Impact of Industrial Wind Turbines on Residential Property Assessment In Ontario

2012 Assessment Base Year Study

MUNICIPAL PROPERTY ASSESSMENT CORPORATION

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ABSTRACT

The Municipal Property Assessment Corporation (MPAC) commissioned this study of the effects of industrial wind turbines (IWT) on the current value of property in proximity to the turbines. Over the last few years, the subject of IWTs has been the subject of a number of reports and studies – both in Canada and worldwide. Past and current studies undertaken by both academics as well as real estate and health professionals have focused on the potential impacts of IWTs on property value and health. Given MPAC's legislated mandate, this report focuses on the potential impact of IWTs on property values.

MPAC's study concludes that 2012 Current Value Assessments (CVA) of properties located within proximity to an IWT are assessed at their current value and are equitably assessed in relation to homes at greater distances. No adjustments are required for 2012 CVAs. This finding is consistent with MPAC's 2008 CVA report. The 2012 CVA study also found that there is no statistically significant impact on sale prices of residential properties in these market areas resulting from proximity to an IWT. The study underwent a rigorous independent third-party peer review and includes appendices describing the study parameters and documenting the analyses.

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EXECUTIVE SUMMARY

This report provides the results of the Municipal Property Assessment Corporation's (MPAC) study of the *Impact of Industrial Wind Turbines on Residential Property Assessment in Ontario (2012 Assessment Base Year Study).*

Background

MPAC is responsible for accurately assessing and classifying property in Ontario for the purposes of municipal and education taxation. In Ontario, property assessments are updated on the basis of a four-year assessment cycle. The last province-wide Assessment Update took place in 2012 when MPAC updated the assessments of Ontario's nearly five million properties to reflect the legislated valuation date of January 1, 2012. Assessments updated for the 2012 base year are in effect for the 2013-2016 property tax years. Ontario's assessment phase-in program prescribes that assessment increases are phased in over a four-year period. Any decreases in assessment are applied immediately.

When assessing any property, MPAC relies on the real estate market to indicate what influence a factor, such as Industrial Wind Turbines (IWT), may have on a property's value. MPAC does this through the ongoing study and analysis of the market including the investigation of sales transactions. This market analysis typically reveals whether or not a factor has a negative, positive, or no impact on a property's value.

Over the last few years, the subject of IWTs has been the subject of a number of reports and studies – both in Canada and worldwide. Past and current studies undertaken by both academics as well as real estate and health professionals have focused on the potential impacts of IWTs on property value and health. Given MPAC's legislative mandate, this report focuses on the potential impact of IWTs on property value.

MPAC has completed two reviews of the impact of IWTs: 2008 and 2012 Base Year Studies.

2008 Base Year Study

In 2008, MPAC undertook a study looking at the impact of IWTs on residential assessments using the 2008 base year. The 2008 study concluded that the presence of industrial wind turbines that are either abutting or in proximity to a property did not have a positive or negative impact on the value of assessments.

2012 Base Year Study

In response to the growing presence of IWTs in Ontario as well as requests for information from stakeholders, MPAC undertook a new study using the 2012 assessment base year to provide a thorough examination of the impact of IWTs on residential property assessment.

Specifically, the study examined the following two statements:

1. Determine if residential properties in close proximity to IWTs are assessed equitably in relation to residential properties located at a greater distance. In this report, this is referred to as ***Study 1 – Equity of Residential Assessments in Proximity to Industrial Wind Turbines.***

2. Determine if sale prices of residential properties are affected by the presence of an IWT in close proximity. In this report, this is referred to as ***Study 2 – Effect of Industrial Wind Turbines on Residential Sale Prices.***

Study 2 was added to the original scope of the review to respond to enquiries MPAC received from stakeholders and interested parties.

To conduct these studies, MPAC considered 15 market areas with sufficient sales to allow for analysis and applied industry standard mass appraisal techniques and internationally accepted ratio study standards.

To determine equity of assessments of properties within close proximity to an IWT, MPAC conducted an Assessment-to-Sale Ratio (ASR) study. An individual ASR is calculated by dividing the assessed value of each property by its time adjusted sale price. A ratio study is conducted to first establish the level of appraisal for a group of properties and equity is determined by comparing the level of appraisal with other groups of properties. If a group of properties is assessed at market value, the median ASR will lie between 0.95-1.05. By definition, equity is said to exist if there is 5% or less difference between property categories (or groups of properties) as per International Association of Assessing Officers (IAAO) ratio study standards.

The level of appraisal for properties within 1 km of an IWT is 1.034. The level of appraisal for properties at greater distance (1-2 km, 2-5 km and over 5 km) range from 0.989 to 0.992, a 4.2- 4.5% differential, which is below the 5% noted above.

Conclusions

Following MPAC's review, it was concluded that 2012 CVAs of properties located within proximity of an IWT are assessed at their current value and are equitably assessed in relation to homes at greater distances. No adjustments are required for 2012 CVAs. This finding is consistent with MPAC's 2008 CVA report.

MPAC's findings also concluded that there is no statistically significant impact on sale prices of residential properties in these market areas resulting from proximity to an IWT, when analysing sale prices.

In addition to the results shared in this report, MPAC also commissioned an internationally recognized expert in the field of mass appraisal and ratio studies to review the report and its findings. This expert has confirmed the findings in this report (Appendix A).

As MPAC works towards the next province-wide Assessment Update in 2016, qualified valuation staff will continue to study and analyse the Ontario real estate market including investigation of sales transactions to determine the impact of various factors – including IWTs – have on a property's value.

INTRODUCTION

The topic of wind energy is front and centre in the minds of a large number of Ontarians, particularly those living in rural areas of the province. There has been extensive reporting on the numerous aspects of this new development, be it in the reports of health effects, the approval process for siting IWTs, or the potential for property devaluation due to the perceived stigma attached to these developments.

Several studies, based on both scientific and non-empirical methods, have been completed by academics and real estate professionals to determine whether or not an adverse effect on sales prices exists with the presence of an IWT on a nearby property. In a recent study in the United States[1], released by the Berkeley National Laboratory and prepared for the U.S. Department of Energy, results indicate a minimal impact on property values as a result of being in close proximity to IWTs. One Ontario case study[2], released in 2013, argues that properties in Ontario are devalued by as much as 30-35%.

Current studies on both the valuation impact and health effects are underway by the University of Guelph[3] and Health Canada[4].

Prior to undertaking this study, MPAC conducted a study using 2008 base year Current Value Assessments (CVA), to determine whether residential properties located near IWTs were equitably assessed when compared to properties at a greater distance. The study was based on very limited sales information as there were a limited number of industrial wind turbines in the province at that time. As a result, it was difficult to draw meaningful conclusions with the 2008 study. Based on the available sale information, no adjustment to value was required for the 2008 CVA.

In conducting this current study, MPAC had additional sales data to review than it did in 2008. In addition to more sales, MPAC also received Requests for Reconsideration from the owners of 83 properties where proximity to IWTs was listed as a concern following the 2012 province-wide Assessment Update.

[1] Ben Hoen et al, "A Spatial Hedonic Analysis of the Effects of Wind Energy Facilities on Surrounding Property Values in the United States", Berkeley National Laboratory, August 2013
[2] Ben Lansink, "Case Studies: Diminution / Change in Price Melancthon and Clear Creek Wind Turbine Analyses, Municipal Property Assessment Corporation (MPAC) Current Value Changes," Lansink Appraisals and Consulting, February 2013
[3] R Vyn and R McCullough, "The Effects of Wind Turbines on Property Values in Ontario: Does Perception Match Empirical Evidence?", Canadian Journal of Agricultural Economics, forthcoming
[4] http://www.hc-sc.gc.ca/ewh-semt/consult/_2013/wind_turbine-eoliennes/index-eng.php

PURPOSE OF THIS REPORT

This 2012 base year report has been written to provide a thorough examination of the impact of IWTs on residential property assessment. Specifically, the report examines the following two statements:

1. Determine if residential properties in close proximity to IWTs are assessed equitably in relation to residential properties located at a greater distance. In this report, this is referred to as ***Study 1 – Equity of Residential Assessments in Proximity to Industrial Wind Turbines.***

2. Determine if sale prices of residential properties are impacted by the presence of an IWT in close proximity. In this report, this is referred to as ***Study 2 – Effect of Industrial Wind Turbines on Residential Sale Prices.***

Study 2 was added to the original scope of the review to respond to enquiries MPAC received from stakeholders and interested parties.

LEGISLATION

Sections of the *Assessment Act* relevant to this study include the following:

Section 1 (1): "current value" means, in relation to land, the amount of money the fee simple, if unencumbered, would realize if sold at arm's length by a willing seller to a willing buyer; ("valeur actuelle").

Section 19 (1): The assessment of land shall be based on its current value.

VALUATION OF RESIDENTIAL PROPERTIES

To estimate value of residential properties, MPAC applies the Direct Comparison Approach (DCA) in a mass appraisal environment. DCA estimates the current value of a subject property by adjusting the sale price of comparable properties for differences between the comparable properties and the subject property. Mass appraisal is the valuation of a group of properties as of a given date using standardized processes, employing common data, and allowing for statistical testing.

Multiple Regression Analysis

The DCA approach to value in a mass appraisal setting uses industry standard Computer Assisted Mass Appraisal (CAMA) techniques and, in particular, a statistical tool known as Multiple Regression Analysis (MRA).

Regression analysis is a statistical technique used to analyse data in order to predict the value of one variable, such as market value, based on known data (e.g., living area, lot size, quality, location, etc.). If only one variable is used, such as living area, the procedure is called Simple Regression Analysis. When two or more variables are used in the analysis, the procedure is called Multiple Regression Analysis.

MRA estimates the value of one variable (i.e., the dependent variable) based on the information from the available data (i.e., the independent variables). Assessing authorities, such as MPAC, develop an equation that estimates current value based on the sale prices and property characteristics of sold properties. The equation, or valuation model, provides the best estimate of current value in statistical terms since it reduces the overall error between sale price and predicted value (estimated current value) to the lowest possible amount in dollar terms.

Market Areas

In Ontario, MPAC has defined 130 residential market areas. Market areas are geographic areas subject to the same economic influences. One valuation model is built for each market area. A market area could be a section of a large city, like Toronto, a medium size city like Niagara Falls or a cluster of smaller towns. Also, it could be the rural residential properties with a county or a group of lakes in a recreational waterfront area such as Muskoka or the Kawartha Lakes.

Key Factors Affecting Value

Approximately 85% of the current value of a property can be attributed to the following five property characteristics: location, building area, construction quality, lot size and age of the home adjusted for renovations and additions. Other features that may be adjusted for include; water frontage, building amenities (e.g., basement area, basement finish, bathrooms, fireplaces, heating, air conditioning), secondary structures (e.g., garages, in-ground pools), site features (e.g., abutting green space, abutting a ravine, abutting a commercial property, topography, corner lot, traffic pattern). Not all features will enter every market model; therefore, value influences will differ across the province.

Legislated Valuation Date

All estimates of current value represent market conditions as of January 1, 2012, the legislated valuation date for the 2013-2016 property tax years. As a result, part of MPAC's analysis is to determine the amount of inflation or deflation in each market area and adjust sale prices for time in relation to the legislated valuation date.

Sales Ratio Study

Once each valuation model has been developed, it is tested to ensure equity, accuracy and uniformity using a sales ratio study. A sales ratio study ensures that the overall level of appraisal of the market area is within corporate and industry standards for accuracy and uniformity. The second aspect of the sales ratio study is to ensure that equity has been achieved across all major property characteristics.

Application of Valuation Model

Once the statistical testing has been completed, and the valuation model for each market area has been deemed appropriate, it is applied to all the applicable properties in the market area and individual value review commences by qualified valuation staff. The purpose of this exercise is to reconcile the value estimates to ensure that a fair and equitable assessment has been placed on each property. These efforts tend to focus on areas with few sales and properties with features that cannot be captured within mass appraisal models. This review work continues up until the Assessment Roll is provided to each municipality and will include sales before and after the valuation date.

Sales

For this study, sales in proximity to IWTs were found in 15 market areas.

Table 1 - MPAC Market Area Descriptions

Market Area	MPAC Region	Description
05RR030	05 – Kingston	Napanee, Loyalist Township, Frontenac/Lennox & Addington Counties South Rural/Waterfront
20RR010	20 – Brantford	Brant, Haldimand, Norfolk Counties - Rural/Waterfront
22RR010	22 – Kitchener	Dufferin & Wellington Counties - Rural
22UR020	22 – Kitchener	Dufferin County Villages
22UR030	22 – Kitchener	Wellington County Villages
23RR010	23 – London	Elgin, Middlesex & Oxford Counties - Rural
24RR010	24 – Goderich	Huron & Perth Counties - Rural/Waterfront
25RR010	25 – Owen Sound	Grey & Bruce Counties - Rural/Waterfront
25UR010	25 – Owen Sound	Grey & Bruce Counties - Urban
26RR010	26 – Chatham	Chatham-Kent - Rural/Wallaceburg
26RR030	26 – Chatham	Lambton County - Rural/Waterfront
27RR120	27 – Windsor	Essex County
27UR070	27 – Windsor	Lasalle, Tecumseh, Lakeshore Urban & Essex Urban
31RR010	31 – Sault Ste Marie	District of Algoma
31UR010	31 – Sault Ste Marie	Sault Ste. Marie/Prince Township

Adjustments for being in proximity to IWTs were not included when establishing CVAs for the 2008 or 2012 base year in any of these market areas.

INDUSTRIAL WIND TURBINES

2012 BASE YEAR ANALYSIS

Between 2008 and 2012, Ontario has seen a proliferation of wind turbine projects, with the introduction of the *Green Energy Act* in 2009, and the Feed-in-Tariff (FIT) program. This has resulted in a much larger set of available sales data for properties in proximity to these projects.

For the purposes of the 2012 base year study, MPAC has adopted a definition of an IWT to be one with a capacity of at least 1.5 megawatts. This is consistent with the definition currently being used by Health Canada[5]. In instances where the generating capacity of the IWT was not available in MPAC's property assessment database, it was calculated by dividing the IWT legislated rate of $40,000 per megawatt (MW) into the assessed value of the IWT.

DATA COLLECTION

MPAC assigns a property code of 567 to represent IWTs. As per legislation in the Province of Ontario at the time of this report, IWTs are valued at $40,000/MW, plus the value of the associated land at the industrial tax class. MPAC analyzed sales within 5 km of any IWT with a generating capacity of 1.5 MW or higher.

To ensure MPAC's inventory of IWTs was as complete as possible, geographic co-ordinates were acquired from NAV Canada. Any IWTs identified by NAV Canada that had not yet been field inspected by MPAC were inspected by local staff and all relevant data keyed into MPAC's database. Any IWTs identified on MPAC's computer database that were not included on NAV Canada's database were inspected by local MPAC staff and the GPS co-ordinates were collected. MPAC staff then process controlled all IWT co-ordinates to ensure accuracy (e.g., co-ordinates not placing the IWTs on the correct property). Of the 1,185 IWTs in MPAC's database after this exercise, only 28 had a capacity below 1.5 MW, leaving 1,157 IWTs for review. The distribution across MPAC's market areas is as follows:

Table 2 - Count of IWTs by Market Area

Market Area	MPAC Region	Description	IWT Count	Property Count
05RR030	05 – Kingston	Napanee, Loyalist Township, Frontenac/Lennox & Addington Counties South Rural/Waterfront	86	63
20RR010	20 – Brantford	Brant, Haldimand, Norfolk Counties - Rural/Waterfront	53	42
22RR010	22 – Kitchener	Dufferin & Wellington Counties - Rural	163	107
23RR010	23 – London	Elgin, Middlesex & Oxford Counties - Rural	37	26
24RR010	24 – Goderich	Huron & Perth Counties - Rural/Waterfront	21	18
25RR010	25 – Owen Sound	Grey & Bruce Counties - Rural/Waterfront	167	136
26RR010	26 – Chatham	Chatham-Kent - Rural/Wallaceburg	325	247
26RR030	26 – Chatham	Lambton County - Rural/Waterfront	10	8
27RR120	27 – Windsor	Essex County	170	145
31RR010	31 – Sault Ste. Marie	District of Algoma	69	21
31UR010	31 – Sault Ste. Marie	Sault Ste. Marie/Prince Township	56	21
TOTAL			1,157	834

[5] http://www.hc-sc.gc.ca/ewh-semt/consult/_2013/wind_turbine-eoliennes/comments_part1-commentaires_partie1-eng.php#a16

As some properties had more than one IWT erected on them, the property count does not match the count of IWTs.

Virtually all IWTs are erected on vacant lots or farm properties, with almost 90% located on farms and the remainder on vacant lots.

The year of construction of IWTs in the database ranges from 2002 to 2013, with a market area breakdown as follows:

Table 3 - Typical Physical Characteristics of IWTs Across Ontario

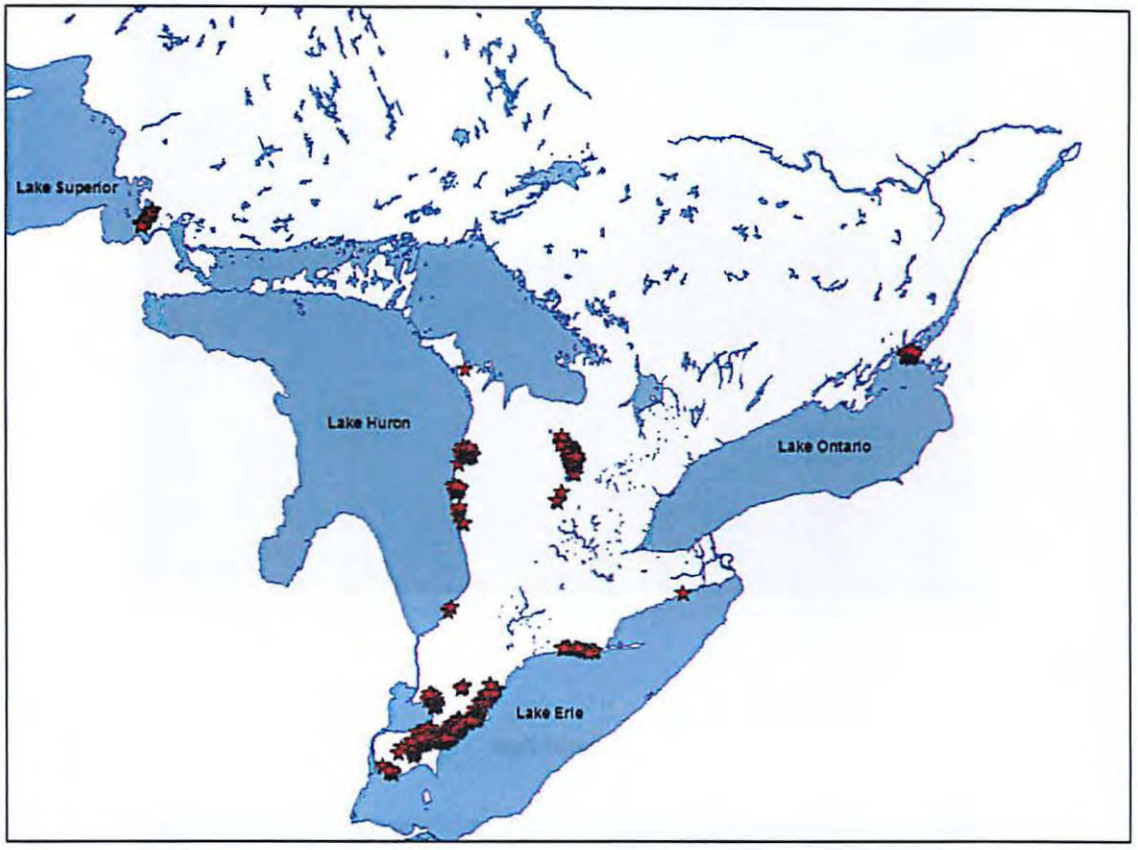
Market Area	MPAC Region	Median Year of Construction	Earliest Year of Construction	Latest Year of Construction	Median Generating Capacity	Minimum Generating Capacity	Maximum Generating Capacity
05RR030	05 - Kingston	2008	2008	2008	2.30	1.65	2.30
20RR010	20 -Brantford	2007	2007	2008	1.50	1.50	1.65
22RR010	22 - Kitchener	2008	2006	2012	1.50	1.50	2.40
23RR010	23 - London	2007	2006	2007	1.50	1.50	1.50
24RR010	24 - Goderich	2006	2006	2006	1.80	1.80	1.80
25RR010	25 – Owen Sound	2008	2002	2012	1.65	1.60	2.30
26RR010	26 – Chatham	2010	2008	2013	2.00	1.50	2.50
26RR030	26 – Chatham	2008	2008	2009	1.65	1.50	1.65
27RR120	27 – Windsor	2010	2010	2010	2.30	1.65	2.30
31RR010	31 – Sault Ste. Marie	2006	2006	2006	1.50	1.50	1.50
31UR010	31 – Sault Ste. Marie	2006	2006	2006	1.50	1.50	1.50
OVERALL		2008	2002	2013	1.80	1.50	2.50

Refer to Table 1 for market area descriptions.

The following map shows the locations of the IWTs used in the analysis. *Appendix B* provides the work instructions for local MPAC staff when determining the GPS co-ordinates for each IWT used in the analyses.

Figure 1

Location of IWTs Across Ontario



SALES INVESTIGATIONS

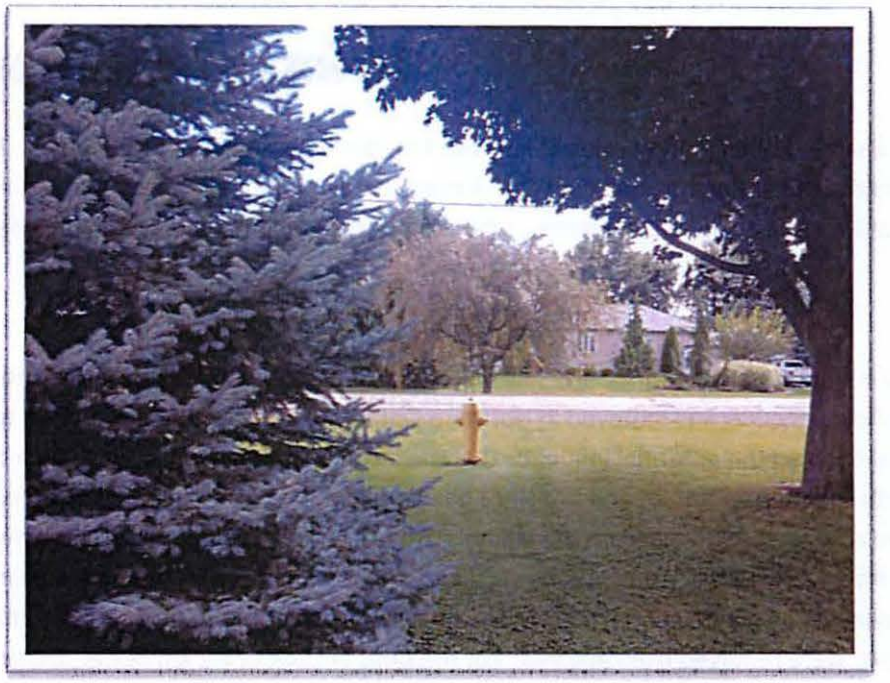
For the purposes of this study, all sales where any portion of a property was within 2 km of one or more IWTs were flagged for inspection by MPAC. The sale was investigated to ensure it was an arm's length transaction and that the property data on file reflected what existed at the time of the sale. Also, GPS co-ordinates were collected from the corner of the residence nearest an IWT. Finally, where possible, pictures were taken from the residence towards the closest surrounding IWT(s). Once this step was completed, distance was once again calculated from the co-ordinates of the IWT to the co-ordinates of the corner of the residences nearest an IWT. This was the actual distance used in the study for sales within 2 km. *Appendix C* includes the work instructions for staff conducting the sales review for this project.

A view variable was created using the pictures and descriptions provided for sales within 2 km of an IWT. Three categories were created:

Full View

Partial View

No View



STUDY 1 – EQUITY OF RESIDENTIAL ASSESSMENTS IN PROXIMITY TO INDUSTRIAL WIND TURBINES

For this study, MPAC analyzed open market sales of improved residential properties from January 2009 through December 2012, in the market areas surrounding IWTs. A market area is defined as a geographic area, usually contiguous, subject to the same economic influences, where properties tend to increase or decrease in value together.

Sales Filters

To account for typical minimum sale amounts, any sale below $10,000 was removed in Southwestern or Eastern Ontario, and any sale below $5,000 was removed in Northern Ontario. Any sale on a property on which an IWT sits, was removed from analysis to avoid the potential influence that the income stream associated to such properties may offer. Cases where a property sold as a vacant lot and has since been built on, or a sale representing a built on property that is now a vacant lot, have also been removed from the analysis. There were five market areas with five or fewer sales and these were excluded from the analysis. To verify the validity of the remaining sales, any sale within 2 km of an IWT was field inspected and reviewed by staff from the local MPAC offices. Sales determined to be other than open market transactions, or suspect, were removed from analysis. For the sales outside of a 2 km buffer, those with extreme ratios of Current Value Assessment to sale price as defined by the International Association of Assessing Officers (IAAO) Standard on Ratio Studies[6], were also removed from analysis.

Assessment-to-Sale Ratio Study

To establish the level of appraisal and test for equity, MPAC looks at Assessment-to-Sale Ratio (ASR). The ASR is calculated by dividing the assessed value of each property by its time adjusted sale price.

One would expect to see a median ASR between 0.95-1.05 for a group of properties if they are assessed at market value. The median ASR of different categories of properties can be compared against one another to ensure that they align and therefore, the level of appraisal is equitable between each group. If the median ASR for a group of properties is higher than another group, this would indicate that it is assessed at a higher level of assessment.

Mean and median ASRs and their 95% confidence intervals were calculated for groups of view and distance variables. The median always divides the data into two equal parts and is less affected by extreme ratios than other measures of central tendency. Because of these properties, the median is the generally preferred measure of central tendency. When the mean or median is calculated on the data in a sample, the result is a point estimate, which is accurate for the sample but is only one indicator of the level of appraisal in the population. Confidence intervals around the measures of level provide indicators of the reliability of the sample statistics as predictors of the overall level of appraisal of the population. Note that noncompliance with appraisal level standards cannot be determined without the use of confidence intervals or hypothesis tests[7]. A confidence interval consists of two numbers (upper and lower limits) that bracket a calculated measure of central tendency for the sample; there is a specified degree of confidence that the calculated upper and lower limits bracket the true measure of central tendency for the population.

[6] International Association of Assessing Officers, *Standard on Ratio Studies*, April 2013, pp. 53-54
[7] Ibid, p. 13

MPAC looked at three different data elements in determining if equity exists:

1. Abutting a property with an IWT;
2. Distance to closest IWT; and,
3. View of an IWT.

1. ABUTTING A PROPERTY WITH AN IWT

There were 32 sales of properties that directly abutted a property with an IWT, 31 of which were within 1 km of an IWT as would be expected and one sale within 2 km (two large abutting lots). When looking at the 31 abutting properties within 1 km of an IWT in comparison to sales less than 1 km from an IWT that do not abut an IWT, the median ASR is actually lower for properties abutting an IWT (0.989 abutting vs. 1.040 not abutting). This indicates that there is no inequity between properties that abut an IWT and other properties within 1 km that do not physically abut an IWT.

When looking at all sales that abut a property with an IWT the median ASR is very near 1.00.

Table 4 - Abutting an IWT ASRs

	Number of Sales	Median	Lower Confidence Limit	Upper Confidence Limit	Actual Coverage (%)
Abutting Wind Turbine	32	1.002	0.929	1.121	98%

Based on all sales of properties abutting a property with an IWT there appears to be no difference between these abutting properties and sales that are a similar distance to a IWT but do not abut an IWT. See *Appendix D1 - Abutting a Property with an IWT* for statistical output.

2. DISTANCE TO CLOSEST IWT

A breakdown of the 41,424 sales used in the analysis, by distance, follows:

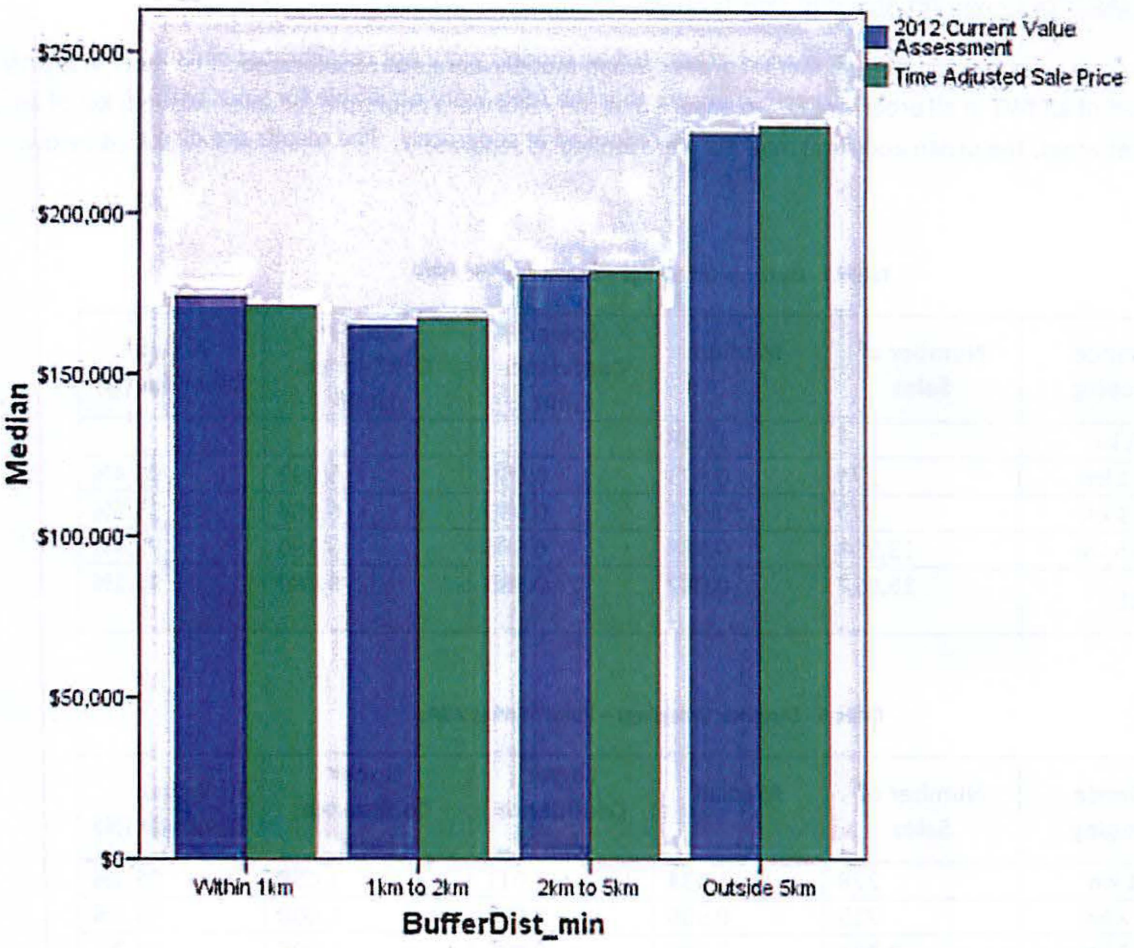
Table 5 - Distance Grouping by Market Area

Market Area	MPAC Region	Pre-Construction			Post Construction Sales			> 5 km
		< 1 km	1-2 km	2-5 km	< 1 km	1-2 km	2-5 km	
05RR030	05 - Kingston	0	0	0	13	7	8	2,606
20RR010	20 -Brantford	0	0	0	25	9	71	4,868
22RR010	22 - Kitchener	1	3	29	25	22	54	1,597
22UR020	22 - Kitchener	0	0	0	0	0	404	2,017
22UR030	22 - Kitchener	0	18	4	0	74	28	2,300
23RR010	23 - London	0	0	1	4	52	71	4,300
24RR010	24 - Goderich	0	0	0	2	3	98	786
25RR010	25 – Owen Sound	0	1	3	12	18	262	2,692
25UR010	25 – Owen Sound	0	0	0	0	16	161	4,180
26RR010	26 - Chatham	31	86	427	52	214	409	663
26RR030	26 - Chatham	0	0	0	1	23	76	1,942
27RR120	27 - Windsor	20	62	132	92	210	636	2,198
27UR070	27 - Windsor	0	29	32	1	125	147	2,660
31RR010	31 – Sault Ste. Marie	0	0	0	0	5	7	1,483
31UR010	31 – Sault Ste. Marie	0	0	0	0	12	3	2,801
TOTAL		52	199	628	227	790	2,435	37,093

Refer to Table 1 for market area descriptions.

Comparing the median assessed value to the median time adjusted sale amount by the distance categories the figures are very similar. The results for all sales are provided in the following graph.

Figure 2 - Comparison of CVA and Time Adjusted Sale Price by Distance Groupings



Appendix D2 - CVA and Tas-Amt Bar Charts contains a similar bar chart for each market area.

When broken into the distance categories, sales within 1 km of an IWT show a higher median ASR than the other groups.

Table 3 - Distance Grouping ASRs

Distance Grouping	Number of Sales	Median	Lower Confidence Limit	Upper Confidence Limit	Actual Coverage (%)
Within 1 km	279	1.034	1.011	1.057	95.8%
1 km to 2 km	989	0.989	0.979	1.000	95.1%
2 km to 5 km	3,063	0.992	0.988	0.997	95.3%
Outside 5 km	37,093	0.992	0.991	0.993	95.0%
OVERALL	**41,424**	**0.992**	**0.991**	**0.994**	**95.0%**

Sales of properties within 1 km of an IWT have a median ASR of 1.034 while the overall median for all sales outside of 5 km of an IWT is 0.992. This is a difference of 4.2%. Also, the median confidence interval does not overlap the confidence interval for the other groups. This indicates the difference is statistically significant. Sales between 1 km and

5 km away from an IWT appear to be assessed at the same level of appraisal as the sales greater than 5 km from an IWT. See *Appendix D3 - Distance by Market Area and Type* for ASR data for each market area.

In Study #2, regressions were run for all rural market areas. Urban models were not recalibrated since there was only one sale within 1 km of an IWT in all urban areas. To ensure that the ASRs were equitable for sales within 5 km of an IWT in urban market areas, the urban and rural markets were looked at separately. The results are displayed below.

Table 4 - Distance Groupings – Urban Market ASRs

Distance Grouping	Number of Sales	Median	Lower Confidence Limit	Upper Confidence Limit	Actual Coverage (%)
Within 1 km	1	1.138			
1 km to 2 km	274	0.975	0.955	0.992	95.4%
2 km to 5 km	779	0.976	0.969	0.984	95.5%
Outside 5 km	13,958	0.988	0.986	0.990	95.1%
OVERALL	**15,012**	**0.987**	**0.985**	**0.989**	**95.1%**

Table 5 - Distance Groupings – Rural Market ASRs

Distance Grouping	Number of Sales	Median	Lower Confidence Limit	Upper Confidence Limit	Actual Coverage (%)
Within 1 km	278	1.034	1.011	1.055	95.2%
1 km to 2 km	715	0.996	0.982	1.008	95.7%
2 km to 5 km	2,284	0.999	0.993	1.005	95.3%
Outside 5 km	23,135	0.995	0.993	0.997	95.1%
OVERALL	**26,412**	**0.996**	**0.994**	**0.997**	**95.0%**

In the urban markets, there is only one sale within 1 km of an IWT. The median ASRs for sales outside of 1 km are all below 1.00. They are slightly lower than the results for the rural market areas; however, the median ASRs outside 1 km in the rural market areas are still below 1.00. Based on these results, it appears that urban market areas are equitably assessed with regard to the distance to the closest IWT. Also, there is no significant difference between urban market areas and rural market areas regarding the influence of distance to the closest IWT. See *Appendix D3 - Distance by Market Area and Type* for ASR data for each market type.

3. View Of An IWT

When all sales within 2 km of the nearest IWT are analyzed together, the median ASR for full view is higher than the median ASR for properties with no view. However, there is correlation between full view and distance. Almost 75% of sales within 1 km of an IWT have a full view while only 25% of sales from 1 to 2 km to an IWT have a full view. As mentioned above, sales within 1 km of an IWT have a median ASR higher than the other distances. Therefore, the sales were split into two groups to perform the ratio study by view towards the closest IWT.

Table 6 - View Groupings – Sales within 1km ASRs

View	Number of Sales	Median	Lower Confidence Limit	Upper Confidence Limit	Actual Coverage (%)
Full View	190	1.032	1.001	1.060	95.0%
Partial View	33	1.005	0.952	1.057	96.5%
No View	56	1.064	0.998	1.092	95.6%
OVERALL	**279**	**1.034**	**1.011**	**1.057**	**95.8%**

Within 1 km, sales with no view have the highest median ASR (1.064 vs. 1.032 for full view) based on 56 sales. Partial view has the lowest median ASR at 1.005. This seems to indicate that view does not affect ASR for sales within 1 km of an IWT.

The ASR results for sales from 1 km to 2 km away from an IWT are:

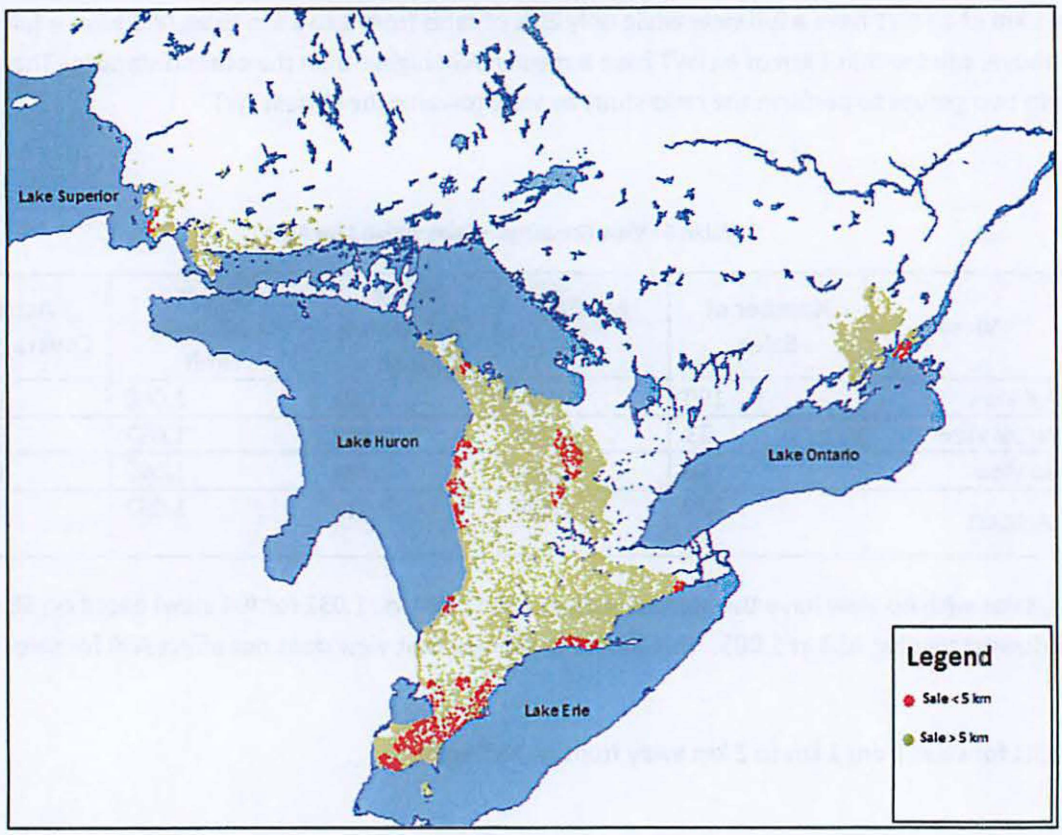
Table 7 - View Groupings – Sales 1km to 2km ASRs

View	Number of Sales	Median	Lower Confidence Limit	Upper Confidence Limit	Actual Coverage (%)
Full View	239	1.001	0.981	1.026	96.2%
Partial View	103	0.980	0.939	1.018	95.2%
No View	647	0.984	0.972	0.997	95.1%
OVERALL	**989**	**0.989**	**0.979**	**1.000**	**95.1%**

Properties with a full view of one or more IWTs have a median ASR of 1.001 while properties with a partial view have a median ASR of 0.980. Sales with no view have a median ASR of 0.984. There is a moderate difference between full view and no view of 1.7%. The confidence intervals of the three groups do overlap and all three groups have median ASRs close to 1.00. See *Appendix D4 - View All Sales and by Market Area* for ASR data for each market area.

Figure 3

Location of Sales Across Ontario



SUMMARY OF FINDINGS

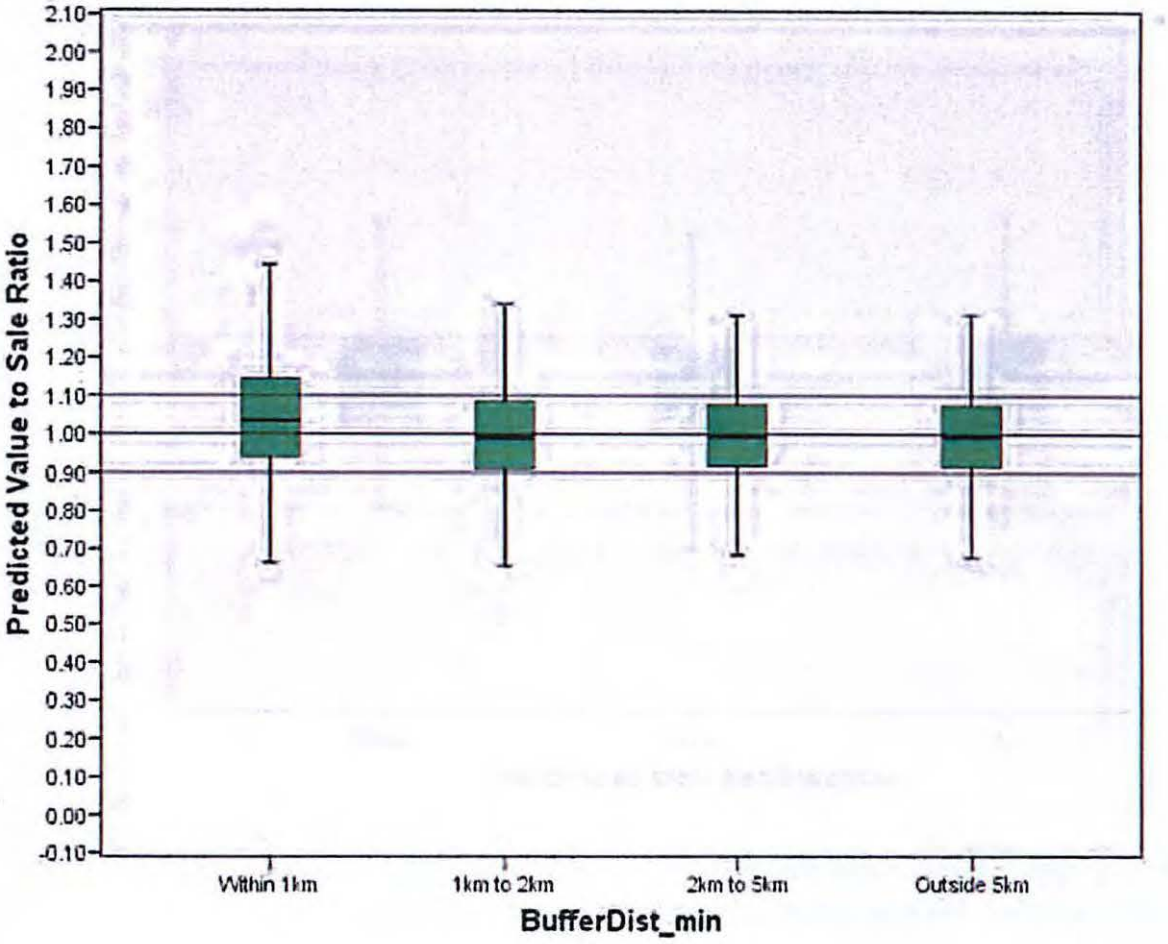
Section 9.2.1 of the IAAO Standard on Ratio Studies states:

"The level of appraisal of each stratum (class, neighborhood, age group, market areas, and the like) should be within 5 percent of the overall level of appraisal of the jurisdiction. For example, if the overall level of appraisal of the jurisdiction is 1.00, but the appraisal level for residential property is 0.93 and the appraisal level for commercial property is 1.06, the jurisdiction is not in compliance with this requirement. This test should be applied only to strata subject to compliance testing. It can be concluded that this standard has been met if 95 percent (two-tailed) confidence intervals about the chosen measures of central tendency for each of the strata fall within 5 percent of the overall level of appraisal calculated for the jurisdiction. Using the above example, if the upper confidence limit for the level of residential property is 0.97 and the lower confidence limit for commercial property is 1.01, the two strata are within the acceptable range."

Sales within 1 km of an IWT showed a level of appraisal that was higher than the median ASR of sales further away (median ASR of 1.034). The lower confidence level of sales within 1 km of an IWT is 1.011. This is well within 5% of the

overall level of appraisal (1.011 – 0.992 = 1.9%). So, although sales within 1 km of an IWT do have a median ASR above the overall level, the difference is not great enough to require value adjustment according to IAAO guidelines. These findings are illustrated in the following box plot.

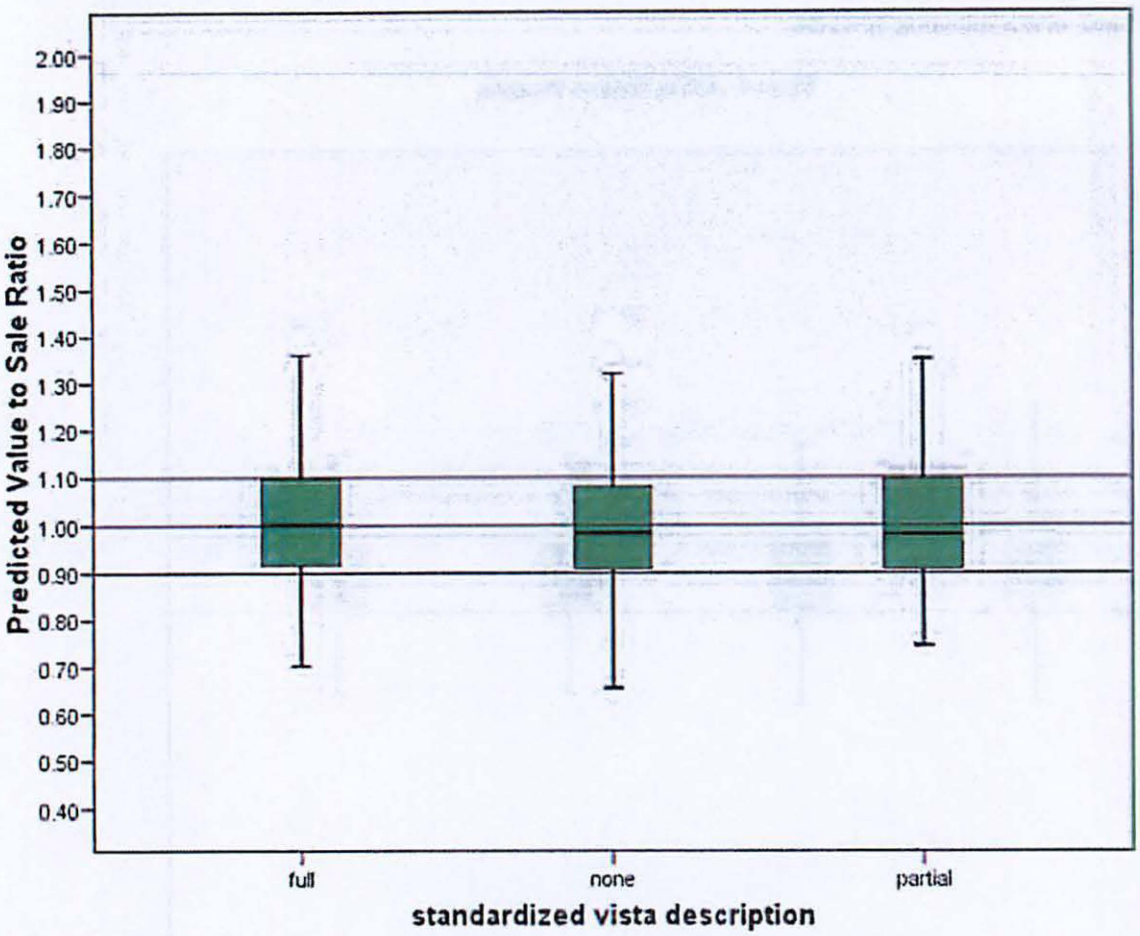
Figure 4 - ASR by Distance Grouping



The dark line within each box represents the median ASR. The lower and upper ends of the box represent the 25th and 75th percentiles, respectively. This box plot illustrates that the median ASR for sales within 1 km of an IWT is slightly higher than the other groups, but the boxes for all the groups overlap. See *Appendix D5 - Distance Boxplots* for additional graphs.

Also, between 1 km and 2 km some testing appeared to indicate a difference in the level of appraisal based on the view towards the closest IWT. The median ASR for properties with a full view is 1.001 while the median ASR for properties with No View is 0.984. This is a difference of 1.7%. This difference is well below 5% without reference to the confidence intervals. Again, based on IAAO standards, the difference between median ASRs does not approach the threshold to require an adjustment. This is also illustrated using the following box plots.

Figure 5 - ASR by View Grouping Sales 1km to 2km to an IWT



The median ASR for full view is slightly higher than the other two view categories but again there is a large amount of overlap among the three boxes. See *Appendix D6 - View Boxplots* for additional graphs.

In the IAAO Standard on Ratio Studies, 2013[8],, an equity decision making matrix is provided to allow a jurisdiction to determine if equity exists between groups of properties. This matrix has been populated for the two scenarios described above. The performance standard range is 0.95 to 1.05. Note that if the point estimate is outside of the performance standard range but the confidence interval does overlap the range, action is not required.

Table 8 - Decision Making Matrix

Scenario	Point Estimate	Confidence Interval (CI) Width	CI Overlaps Performance Standard Range	Point Estimate in Performance Standard Range	Action Required
<1 km to IWT	1.034	1.011 to 1.057	Yes	Yes	No
Full View 1 to 2 km to an IWT	1.001	0.981 to 1.026	Yes	Yes	No

[8] International Association of Assessing Officers, *Standard on Ratio Studies*, April 2013, p. 35

Therefore, based on the results of this analysis, there is no inequity with regards to distance to the closest IWT and view towards an IWT.

This finding is consistent with MPAC's 2008 study. *MPAC's 2008 study is included as Appendix E* of this report.

Our findings are also consistent with a third party review of this study conduct by Robert J. Gloudemans. Mr. Gloudemans is an independent internationally recognized mass appraisal consultant. MPAC provided Mr. Gloudemans with a dataset of all sales less than 5 km from the nearest IWT to conduct his analysis. *Mr. Gloudemans' report is included as Appendix A.*

STUDY 2 – EFFECT OF PROXIMITY TO INDUSTRIAL WIND TURBINES ON RESIDENTIAL SALE PRICES

To determine if sale prices of residential properties are impacted by being in proximity to IWTs, three binary variables (0 – No, 1 – Yes) were created based on the following distance groupings:

IWT_1km - The home is within 1 km of the nearest IWT.

IWT_2km - The home is within 1-2 km of the nearest IWT.

IWT_5km - The centre of the lot is within 2-5 km of the nearest IWT.

The requirement for exact location of the house was assumed to be less important as distance to the nearest IWT increases and the centroid of the lot was deemed acceptable for the purposes of this study for properties further than 2 km away from the nearest IWT.

The regression models used to produce the January 1, 2012 Current Value Assessments were recalibrated with these variables included to determine whether they would enter the equation at a statistically significant level. The typical significance level for Multiple Regression Analysis is either 5% or 10%.

If one or more of the distance variables enters a regression analysis significantly, that is an indication that distance to an IWT affects sale prices in that market area and a value adjustment to the assessed value may be required.

SALES UTILIZED

Table 9 provides a breakdown of the distance grouping variables for each market area.

Table 9 - Distance Grouping by Market Area

		Pre-Construction			Post-Construction		
Market Area	MPAC Region	< 1 km	1-2 km	2-5 km	< 1 km	1-2 km	2-5 km
05RR030	05 - Kingston	0	0	0	7	6	10
20RR010	20 -Brantford	0	0	0	19	7	54
22RR010	22 - Kitchener	1	3	32	20	18	37
22UR020	22 - Kitchener	0	0	0	0	0	281
22UR030	22 - Kitchener	0	17	4	0	47	24
23RR010	23 - London	0	0	1	3	41	53
24RR010	24 - Goderich	0	0	0	2	2	74
25RR010	25 – Owen Sound	0	2	2	8	10	201
25UR010	25 – Owen Sound	0	0	0	0	14	109
26RR010	26 - Chatham	33	81	415	15	96	173
26RR030	26 - Chatham	0	0	0	0	23	60
27RR120	27 - Windsor	22	66	185	64	128	397
27UR070	27 - Windsor	0	30	33	1	78	84
31RR010	31 – Sault Ste. Marie	0	0	0	0	12	19
31UR010	31 – Sault Ste. Marie	0	0	0	0	8	4
TOTAL		56	199	672	142	490	1584

This table also indicates the number of sales occurring pre-construction and post construction periods. Pre-construction sales include sales one year prior to completion of the IWT.

Two market areas have sufficient sales to test distance groupings and state of IWT construction, namely *MPAC Region 26-Chatham* representing Lambton County – Rural/Waterfront (market area 26RR010) and *MPAC Region 27-Windsor* representing Essex County (market area 27RR120). Most market areas have sufficient sales within 1 km to test the value impact within that distance.

The sales period to develop valuation models ranges from December 2008 to December 2011 in these market areas. Table 10 provides a summary.

Table 10 - Market Area Sales Summary

Market Area	MPAC Region	Median House Square Footage (sq ft)	Median Age (years)	Median Lot Size (Acres)	Sale Date Range (year/month)	Median Time Adjusted Sale Price
05RR030	05 - Kingston	1,314	38	0.53	08/12 – 11/11	$219,918
20RR010	20 -Brantford	1,324	44	0.25	09/01 – 11/12	$218,254
22RR010	22 - Kitchener	1,729	33	1.32	09/01 – 11/12	$401,056
23RR010	23 - London	1,441	40	0.32	09/01 – 11/12	$230,697
24RR010	24 - Goderich	1,428	46	0.82	08/12 – 11/11	$246,041
25RR010	25 – Owen Sound	1,340	37	0.61	08/12 – 11/11	$219,375
26RR010	26 - Chatham	1,245	52	0.23	09/01 – 11/12	$129,842
26RR030	26 - Chatham	1,346	39	0.26	09/01 – 11/12	$176,225
27RR120	27 - Windsor	1,305	37	0.20	09/01 – 11/12	$170,238
31RR010	31 – Sault Ste. Marie	1,086	43	0.26	08/01 – 11/12	$85,065
OVERALL		**1,332**	**39.5**	**0.29**	09/01 – 11/12	$218,814

Refer to Table 1 for market area descriptions.

When reviewing sale counts for properties within 5 km of an IWT, it was determined that some sales occurred in the urban market areas; however, there were no sales of properties in these market areas within 1 km of an IWT. For the purposes of this study, only rural market areas that had sales within 1 km were studied.

Variables for each distance were added to the model for each market area. If the distance grouping variables entered the equation with 5% significance level (95% confidence level), it would indicate very strong statistical evidence that distance to the nearest IWT is impacting on sale prices.

Tables 11 and 12 provide the dollar adjustment and an indication if the variables entered the model with a 10%, 5% or 1% significance level. Typically, MPAC sets a 5% significance level for any property characteristic to be included in a valuation model in accordance with statistical practice.

Table 11 - Dollar Adjustments in Market Areas with Insufficient Pre-Construction Sales

Market Area	MPAC Region	< 1 km	1-2 km	2-5 km
05RR030	05 - Kingston	+$36,435**	DNE	+$31,832**
20RR010	20 -Brantford	DNE	DNE	DNE
22RR010	22 - Kitchener	DNE	DNE	DNE
23RR010	23 - London	DNE	DNE	-$21,021**
24RR010	24 - Goderich	DNE	DNE	DNE
25RR010	25 – Owen Sound	DNE	DNE	DNE
26RR030	26 - Chatham	DNE	DNE	+$12,261**
31RR010	31 – Sault Ste. Marie	DNE	DNE	DNE

,,*** indicate that the dollar adjustment is statistically significant at the 10%, 5% or 1% significance level, respectively (DNE = Did Not Enter)*

Table 12 - Dollar Adjustments in Market Areas with Sufficient Pre-Construction Sales

Market Area	MPAC Region	Pre-Construction Sales			Post Construction Sales		
		< 1 km	1-2 km	2-5 km	< 1 km	1-2 km	2-5 km
26RR010	26 - Chatham	-$6,451*	-$3,686*	DNE	DNE	DNE	DNE
27RR120	27 - Windsor	DNE	DNE	DNE	DNE	DNE	DNE

,,*** indicate that the dollar adjustment is statistically significant at the 10%, 5% or 1% significance level, respectively*

(DNE = Did Not Enter)

Appendix F includes the regression outputs referred to Tables 11 and 12.

Summary of Findings

Rural valuation models used for the 2012 base year were re-calibrated incorporating the three distance variables. With the exception of *MPAC Region 26-Chatham* representing Chatham-Kent – Rural/Wallaceburg (market area26RR010) and *MPAC Region 27– Windsor* representing Essex County (market area 27RR120), there were insufficient sales to study any potential difference in impact pre-construction and post-construction. In the case of market area 05RR030 (*MPAC Region 5-Kingston* representing Napanee, Loyalist Township, Frontenac/Lennox & Addington Counties South Rural/Waterfront), being within 1 km of an IWT entered the model as a positive value of $36,435. In this market area and the 26RR030 market area, the variable representing properties between 2 and 5 km from an IWT also entered positively.

Upon review of the sales database, it was determined that the IWT variables created for this study were highly correlated with the neighbourhood locational identifier. This strong correlation resulted in coefficients that did not make appraisal sense, and thus have been negated for the purposes of this study.

For market areas 26RR010 and 27RR120, sufficient sales data was evident to study the activity on both pre-construction and post-construction home sales. In neither instance did any of the variables enter the regression for 27RR120. For 26RR010, the variable identifying sales within 1 km of an IWT entered in the pre-construction period, and then only at the 10% significance level. The indicated coefficient was -$6,451. The variable representing sales between 1 and 2 km away from an IWT also entered at a coefficient of -$3,686, also only at the 10% significance level. In the post-construction period, no variable entered the regression for these areas. Thus, it can be assumed that any impact, no matter how marginal, was isolated in these areas to the post-announcement, pre-construction period.

In market area 23RR010 (*MPAC Region 23 – London* representing Elgin, Middlesex & Oxford Counties – Rural), the variable used to identify properties 2-5km away from an IWT entered the regression with a negative coefficient. After review of the sales database, it was determined that this variable was highly correlated with the neighbourhood locational identifier. This is borne out by the fact that neither of the other, closer, distance variables entered the regression.

With the exceptions noted above, no distance variables entered any regression equations for any of the other market areas.

To further confirm its findings, MPAC also conducted an additional analysis using approximately 2,000 sales and re-sales following similar logic to the Lansink study. The main differences between the February 2013 Lansink Study and MPAC's re-sale analysis is the sample size and the determination of the increase in the market between re-sales. Using 2,051 properties and generally accepted time adjustment techniques, MPAC cannot conclude any loss in price due to the proximity of an IWT. *Appendix G includes the re-sales analysis.*

LIST OF REPORT APPENDICES

GLOSSARY OF TERMS

Assessment Roll – An annual listing provided to each taxing authority in the Province of Ontario containing, among other things, the current value and tax classification of each property within the jurisdiction.

Assessment-to-Sale Ratio (ASR) – The ratio obtained by dividing the assessed value of a property by the time adjusted sale price of a property.

Base Year – The year that an estimate of a property's value is based on.

CVA – Current value assessment. The estimated value of a property based on a specific date.

Direct Comparison Approach to Value (aka Sales Comparison Approach to Value) – An approach to valuing a property which estimates the current value of a subject property by adjusting the sale price of comparable properties for differences between the comparable properties and the subject property.

Industrial Wind Turbine (IWT) – A wind turbine used to generate at least 1.5 MW of electricity.

GPS Co-ordinates – A set of two numbers that reference the latitude and longitude of a point on the Earth.

Market Area – A market area is defined as a geographic area, usually contiguous, subject to the same economic influences, where properties tend to increase or decrease in value together.

Market Model – Geographic areas subject to the same economic influences.

Mass Appraisal – The valuation of a group of properties as of a given date using standardized processes, employing common data, and allowing for statistical testing.

Median - The median of a group of numbers is the middle number after they have been sorted from lowest to highest. If you have an odd number of cases, the median is the middle value. If you have an even number of cases, the median is the value midway between the two middle values. The median, in comparison to the mean, is less sensitive to extreme values.

Megawatt (MW) – A unit of measure in energy generation or consumption.

MPAC – The Municipal Property Assessment Corporation. A body responsible for determining the correct market value and tax classification for all properties in the Province of Ontario, based on current value assessment.

Regression Analysis – A statistical technique used to analyse data in order to predict the value of one variable, such as market value, based on known data (e.g., living area, lot size, quality, location, etc.).

For more information about MPAC and how MPAC assesses properties, visit www.mpac.ca.

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Summary of Wind Turbine Analysis
Robert J. Gloudemans
December 4, 2013

At the request of the Municipal Property Assessment Corporation (MPAC), the author conducted an analysis of residential sales within 5 kilometers of wind turbines. The objective of the project was to determine the impact of location near a wind turbine on residential property values.

The analysis used improved residential sales in nine regions and eight market areas that occurred during calendar 2009-2013. Initially 4,332 sales met these criteria. Four sales with assessments and/or sales prices below $30,000 and 10 sales having extreme assessment-to-sales ratio of less than 0.55 or greater than 1.70 were removed from consideration, leaving 4,318 sales.

The dependent variable in the analysis was assessment-to-sales ratios in which 2012 values were divided by time-adjusted sales prices. The models that produced 2012 values did not contain variables related to proximity near wind turbines. Thus, the relevant question is to what extent ratios on these properties are too high because of the absence of such adjustments. Independent variables included the following:

- Distance from the nearest wind turbine, including binary variables for being within one kilometer, being within two kilometers, and being within 5 kilometers
- A binary variable for abutting a property with a wind turbine
- View of the nearest wind turbine: full, partial, or none

Preliminary analyses found no meaningful differences in assessment levels among regions or market areas.

Figure 1 shows a graph of assessment ratios with distance to the nearest wind turbine. A trend line has been drawn to the data, along with a horizontal reference line at 1.00. As can be seen, there is no meaningful relationship with the possible exception of properties within approximately 1 km.

Figure 2 contains a box plot of being within 1, 2, or 5 km of a wind turbine. Again, ratios for properties within 1 km appear slightly high, while there is no difference between properties within 2 or 5 km.

Similarly, figure 3 is a box plot for abutting a wind turbine and figure 4 is a box plot of view of the nearest wind turbine (full, partial, or none). Properties with a full view of the nearest wind turbine may have slightly higher ratios. Of course, these will also tend to be those properties closest to a wind turbine. Regression analysis will determine the relevant variables.

Figure 5 shows the initial regression model. The Adjusted R-Square is .006 (meaning that the model explains only 0.6% of the variation in assessment ratios). The only significant variable, with a coefficient of 0.045, is being within 1 km of a wind turbine. The variable is significant at the 99% confidence level.

Since the graphs and initial model revealed little systematic difference in ratios by any of the candidate variables, the ratios were further trimmed at 0.70 and 1.40 and the model rerun to discern relationships more clearly (3.0% of ratios exceeded the trim points). Figure 6 shows the revised results. Distance within 1 km is still the only significant predictor with a coefficient of .037 and relatively strong t-value of 4.7 (again significant at the 99% confidence level).

Finally, sales within 1 kilometer were divided into those with a full view (183 sales), those with a partial view (32 sales), and those with no view of a wind turbine (54 sales). Figure 7 shows the resulting model with the three variables. Ironically, no view enters while partial view does not.

We conclude that presence of a wind turbine (or turbines) has a statistically significant but minor impact on property values in the study area. The most relevant variable is close proximity. Based on the available data, distance within 1 km of a wind turbine tends to lower values approximately 4%.

Figure 1 – Graph of Ratios with Distance to the Nearest Wind Turbine

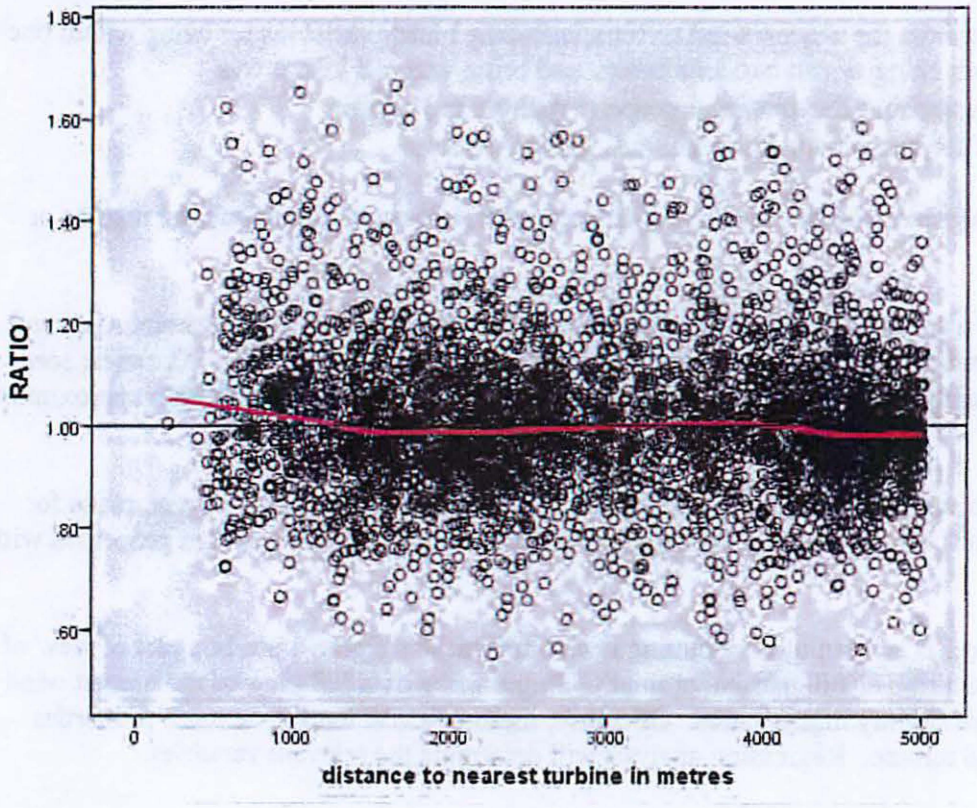


Figure 2 – Graph of Ratios with Kilometers (1, 2, or 5) to the Nearest Wind Turbine

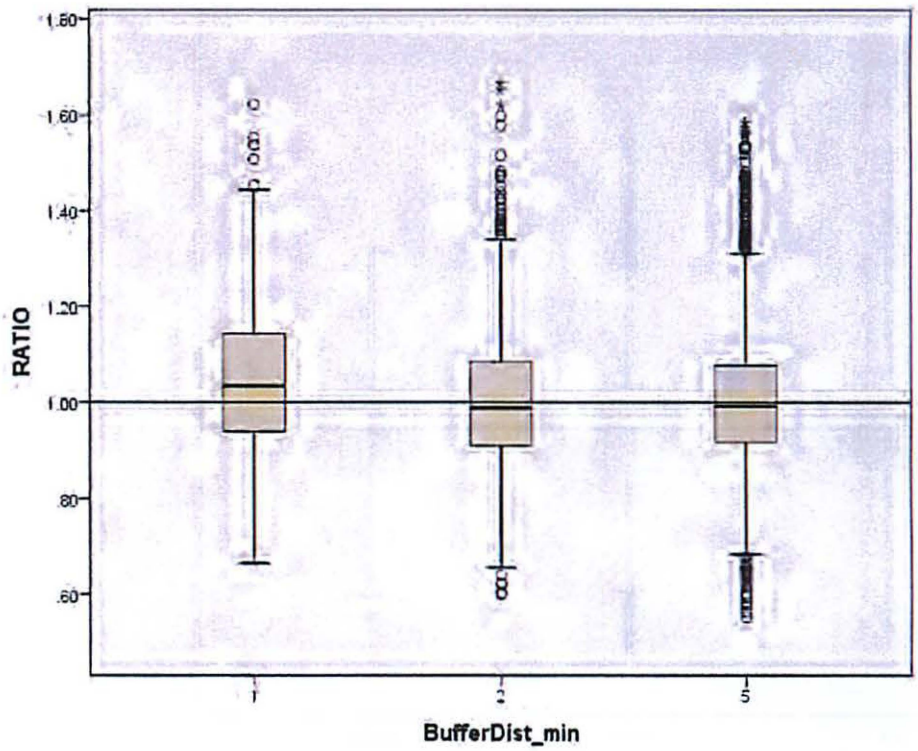


Figure 3 – Graph of Ratios with Abutting a Property with a Wind Turbine (0 = No, 1 = Yes)

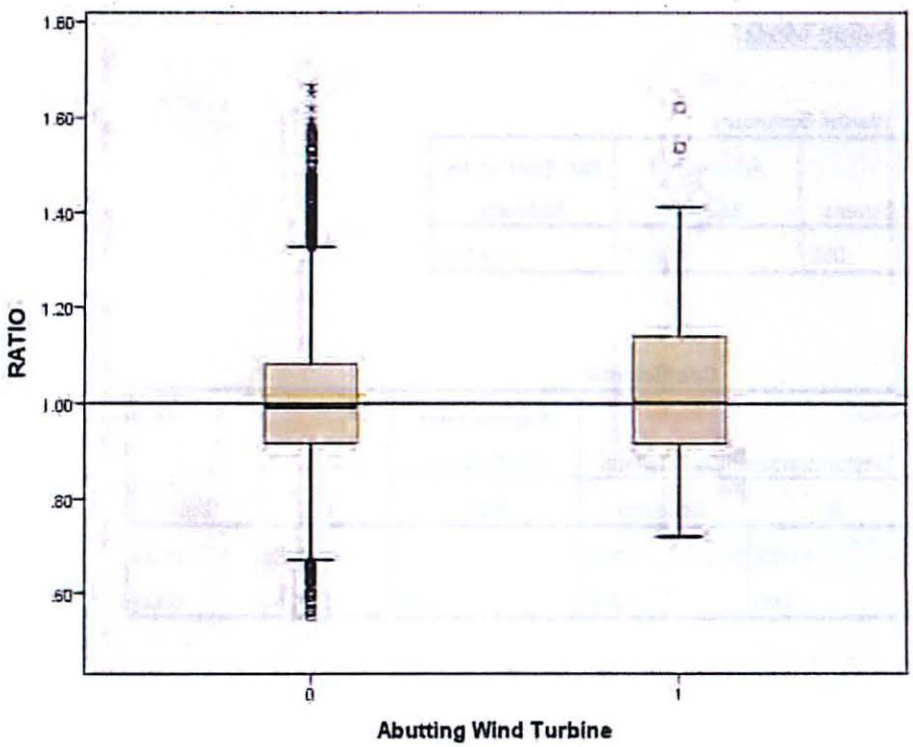


Figure 4 – Graph of Ratios with View of Nearest Wind Turbine

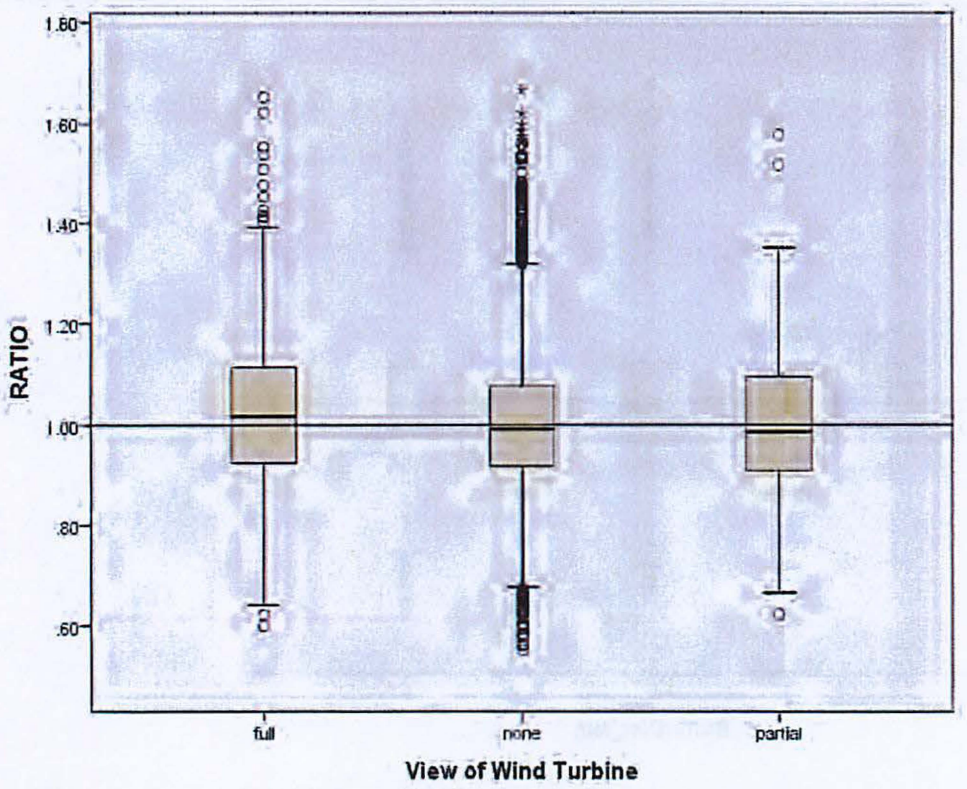


Figure 5 – Initial Regression Model

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.076	.006	.006	.14514

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.003	.002		439.333	.000
	Within 1 km	.045	.009	.076	5.024	.000

Excluded Variables

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics: Tolerance
1	Abutting Wind Turbine	.003	.167	.867	.003	.899
	VIEW_FULL	.021	1.208	.227	.018	.739
	VIEW_PARTIAL	-.017	-1.121	.262	-.017	.983
	Within 2 km	-.006	-.399	.690	-.006	.980
	Distance to nearest turbine	-.010	-.579	.563	-.009	.811

Figure 6 – Revised Model With Outlier Ratios Removed

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.072	.005	.005	.12595

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.000	.002		496.937	.000
	Within 1 km	.037	.008	.072	4.681	.000

Excluded Variables

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics: Tolerance
1	Abutting Wind Turbine	-.024	-1.501	.134	-.023	.906
	VIEW_FULL	.017	.935	.350	.014	.738
	VIEW_PARTIAL	-.016	-1.010	.312	-.016	.983
	Within 2 km	-.008	-.497	.619	-.008	.980
	Distance to nearest turbine	-.006	-.379	.705	-.006	.812

Figure 7 – Model With Sales within 1 Km Categorized by View (Full, Partial, or None)

Model Summary

2

R	R Square	Adjusted R Square	Std. Error of the Estimate
.075	.006	.005	.12594

Coefficients

2

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	1.000	.002		499.070	.000
Full View	.034	.010	.056	3.609	.000
No View	.057	.017	.051	3.331	.001

Excluded Variables

2

	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
					Tolerance
Partial View	.012	.796	.426	.012	1.000

Robert J. Gloudemans

Robert J. Gloudemans is a partner in Almy, Gloudemans, Jacobs & Denne. Bob previously worked for IAAO and the Arizona Department of Revenue. He provides consulting services in mass appraisal modeling, computer-assisted appraisal systems, and ratio studies and has served over 100 clients in the U.S., Canada, and internationally. He has served three appointments on the IAAO Standards Committee and has contributed extensively to the mass appraisal literature. He is the author of *Mass Appraisal of Real Property* (IAAO, 1999) and with his partner, Richard Almy, co-author of the new IAAO textbook, *Fundamentals of Mass Appraisal* (IAAO, 2011).

MUNICIPAL PROPERTY ASSESSMENT CORPORATION

Industrial Wind Turbines – Inspection Project

Work Instructions

2013-05-01

Provided by: Assessment Standards & Mass Appraisal

Work Instructions

Objective

MPAC is undertaking a study to determine whether properties within 2km of an industrial wind turbine (IWT) are valued equitably compared to properties further away. That is not to say that that IWTs do not affect value; but rather that any affect on value is accounted for in the 2012 current value assessments, or that the 2012 current value assessments are within standards.

A preliminary study has already been completed by looking at the centre of properties with IWTs and reviewing the sales on properties whose centre is within 1km, 2km, and 5km.

MPAC is now looking to expand the study by using the exact geographic co-ordinates of the IWTs and the co-ordinates of the surrounding houses.

MPAC has purchased the geographic co-ordinates of most IWTs across the province. However, upon reviewing the data, it has come to light that: (1) there are roll numbers on IPS with IWTs where the data provider did not deliver co-ordinates; and (2) the data provider delivered co-ordinates for IWTs and MPAC has no structure keyed on IPS on those roll numbers.

Before continuing with the study, both of these situations need to be addressed with the assistance of staff in Valuation and Customer Relations.

Once this data is collected and analyzed by Assessment Standards and Mass Appraisal (ASMA), additional data collection will be required for sold properties in proximity to properties with IWTs.

Instructions

Two files are being distributed with these instructions – one file contains roll numbers requiring staff to collect the geographic co-ordinates of the IWT(s) on a property (MPAC already has the IWT assessed); and the other file contains roll numbers requiring staff to assess the IWT(s) on a property (MPAC already has the geographic co-ordinates).

1. Roll Numbers Requiring Staff to Collect the Geographic Co-ordinates of the IWT(s) on a Property

To collect this data will require the use of a GPS device. For this project, we will use the "Garmin GPSMAP 76Cx color map navigator", which will provide the latitude and longitude that is required. These units were used during the Provincial Land Tax (PLT) project in Northern Ontario in 2007. Instructions on using the device are found in Appendix 1.

The inventory file contains a list of roll numbers where MPAC data contains a structure code 567 (Wind Turbine) on IPS. However, the data provider did not supply geographic co-ordinates. Note that there is one line in the inventory per IWT, not per roll number. The inventory contains the IPS structure number of the IWT, it's year of construction, and the generating capacity of the IWT in Megawatts (MW). The final column, "Estimated", indicates whether the generating capacity has been estimated based on the value attributed to the structure. If possible, confirm the capacity while obtaining the co-ordinates – there should be a plate/stamp on the IWT with the generating capacity.

When recording the co-ordinates for the IWTs, take the measurement from as close to the IWT as possible. Hold the device as steady as possible for two minutes or until the co-ordinates stabilize, whichever comes first.

If you are unable to obtain close co-ordinates due to fences or other obstructions, take the measurement from as close as you possibly can; preferably such that there is a straight line between you and IWT, perpendicular to the road, and estimate what you think the distance is between where you take the measurement and where the IWT sits. Make sure that this is all recorded in the Comments. If possible, take a picture as well, and include it when you return the inventory files. Upon returning to the office, use iLOOKABOUT™ in an attempt to obtain more accurate co-ordinates. However, since these properties are generally in rural areas, you may not be able to obtain co-ordinates accurately using digital imagery. In either case, make note in the inventory that you have had to approximate the co-ordinates and the reason.

2. Roll Numbers Requiring Staff to Assess the IWT(s) on a Property

This inventory file contains a list of roll numbers where MPAC does not have an IWT on the Structure tab of IPS, but according to the data source purchased, there is an IWT on the property. **Note that for properties valued outside of IPS, we may in fact have the IWT assessed.** In some situations, it may be that there is an IT portion on the property with the correct value, representing the IWT and corresponding land, but no structure has been keyed

and no industrial land component created and valued. If this is the case, update IPS with the correct data.

For the roll numbers in this inventory, you are required to collect the data on the IWTs, key the structure and appropriate value into IPS, create an industrial land component with an appropriate value in IPS, and issue a supplementary or omitted assessment if required. **Note that for properties valued outside of IPS, these steps may be somewhat different; however, regardless of where a property is valued, IPS should contain a structure line for every IWT.** Of course, if there are any outstanding permits on DTS for the IWTs, ensure that they are marked as complete.

Some roll numbers in the inventory have (potentially) multiple IWTs to be assessed. If you find more IWTs on a property as compared to the inventory, make a note in the Comments field and include the co-ordinates. If you find less IWTs on a property as compared to the inventory, attempt to ascertain whether the IWTs you do find match anything on the inventory. If in doubt, please add as much detail to the Comments field on the inventory to help us understand the situation.

If the IWT is still in the process of being erected, please make a note in the comments field of the inventory file.

If there is no indication of any IWT on the property, or going to be added to the property in the near future, indicate this in the comments field of the inventory file.

What to do if the Owner isn't Home or Entry is Refused (from the Residential Valuation Theory and Data Collection Manual)

If a property owner or any other adult person with authority does not appear to be present at the time of the visit, or it appears no one is at home at the time of the visit, you will make every reasonable effort to confirm no one is at home and verbal contact is not possible. Immediately upon confirmation that no one is at home, you must attach a proper notice to the main or common entrance door or in the alternative the mailbox, if available, explaining the reason for your visit. The notice will provide the owner/adult with authority with a method to contact MPAC subsequent to the visit to discuss the reason for the visit and/or provide information that may be requested concerning the property. After you place the notice, you will then continue to complete an exterior inspection of the property while respecting areas with restricted access. (But only if it is believed no one is at home.)

Reminder: typical inspection procedures are to be followed; and IPS should be updated as required.

Workload Counts by Region (by Roll Number)

Region	Inventory 1	Inventory 2	Total
05	2	3	5
20	29	0	29
21	0	1	1
22	45	20	65
23	37	0	37
24	22	0	22
25	41	14	55
26	93	94	187
27	20	67	87
31	0	4	4

Questions

If you have any questions, please contact one of the following:

Jamie Stata
Region 25 – Owen Sound
519-371-9432 ext 262
Jamie.Stata@mpac.ca

OR

Scott Bradfield
Region 20 – Brantford
519-758-9591 ext 251
Scott.Bradfield@mpac.ca

OR

Jason Moore
Region 18 – St. Catharines
905-688-1968 ext 275
Jason.Moore@mpac.ca

Appendix 1 – Using the "Garmin GPSMAP 76Cx color map navigator"

Using these devices indoors may cause interference for the satellites which it uses to obtain co-ordinates. If you're "getting to know" the device before taking it in the field to use, you may not get the results/steps below unless you're outside.

For example, you may see that it's "Acquiring Satellites" indefinitely, or for a very long time.

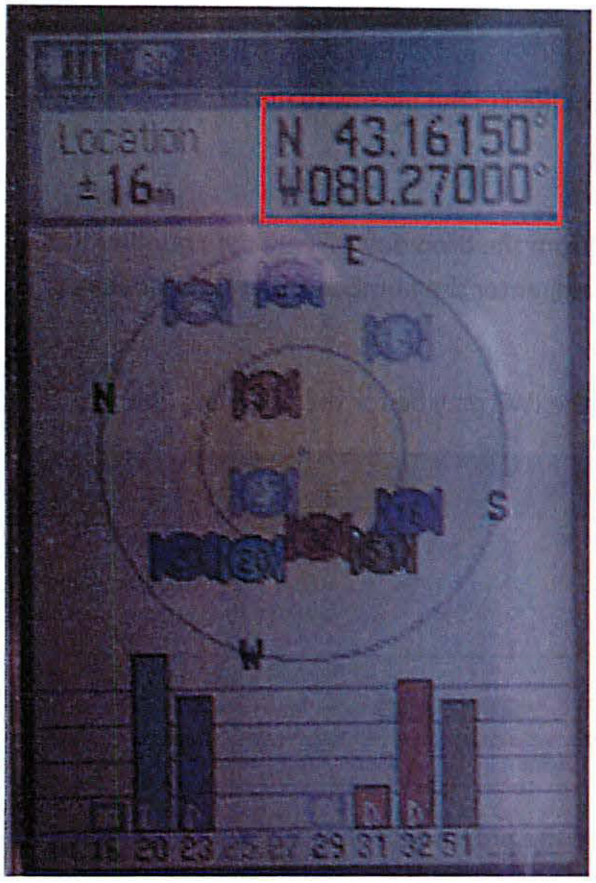
You may get the following message – if you do, chose "New Location".

Insert two AA batteries into the device.

Turn the device on, by pressing and holding the button for a few seconds.

Press the PAGE button until you come to a screen showing satellites orbiting the earth. The screen may say "Acquiring Satellite" at the top until it has locked onto enough satellites.

Once numbers appear in the upper right hand of the screen, you are ready to obtain the geographic co-ordinates.



In the above example, you would record Co-ordinate 1 as 43.16150; and Co-ordinate 2 as 080.27000. Please record all numeric digits, including zeros. Do not include the N (for North) or W (for West) as all of Ontario is North of the Equator; and West of the Prime Meridian

With the exception of putting the batteries in the device, these steps may need to be repeated each time the device is turned off/on. However, there is a car charger that you can plug in which will allow you to keep the device turned on between properties.

Appendix 2 – Using AIM to Find Co-ordinates

AIM has the capability to plot the co-ordinates provided in the inventory file.

Log into AIM.

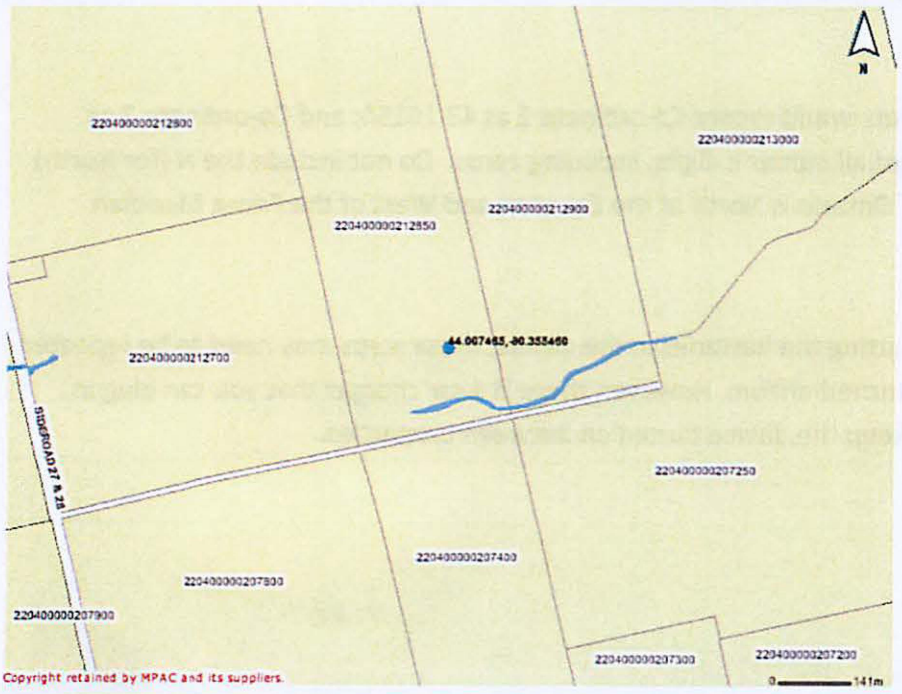
Near the top, beside "Locate", select **ddd.ddddd** from the drop down. Enter the number under Coordinate_1 in the "Lat:" field. In the "Long:" field, enter the number under Coordinate_2, with a negative sign in front of it.

For example, to see exactly where on a property the IWT may be for the following line:

Reg	Roll_Num	Prop code	Hnbhd	Enbhd	Mktarea	CVA2012	Coordinate_1	Coordinate_2	Comments
22	220400000212850	200	A07	0342	RR050	$288,000	N 44.007465	W 80.355460	

Search in AIM as follows:

This will show the location of the expected IWT on the property:



MUNICIPAL PROPERTY ASSESSMENT CORPORATION

Industrial Wind Turbines – Phase 2: Sale Reviews

Work Instructions

2013-07-23

Provided by: Assessment Standards & Mass Appraisal

Work Instructions

Objective

MPAC is undertaking a study to determine whether properties within 2km of an industrial wind turbine (IWT) are valued equitably compared to properties further away. That is not to say that that IWTs do not affect value; but rather that any affect on value is accounted for in the 2012 current value assessments, or that the 2012 current value assessments are within standards.

In the first step of this project, staff from Valuation & Customer Relations visited properties on which IWTs sit, to collect the geographic co-ordinates.

In this phase of the project, properties within 2 km of these IWTs, which have sold, will be inspected and the sale(s) reviewed.

Instructions

One file is being distributed with these instructions – containing a list of sales requiring a field visit and a review of the sale.

Staff are to review each sale to determine its' validity, to verify the data at the time of the sale, and to verify the data as of the date of inspection. Additionally, staff are to collect the co-ordinates of the corner of the house closest to the IWTs, and take a photo(s) from this corner of the house towards the closest IWT (photos labelled as the roll number with "_1", "_2", etc. for multiple photos). If there are multiple IWTs surrounding the property, the closest IWT would be used. Leave "call back" forms if you are unable to talk to the owner. If they do not call back within a reasonable amount of time, do your best to estimate, and note this in the ***Comments*** field of the spreadsheet.

If the sale has already been reviewed (onsite or with a Residential Sales Questionnaire), use the data provided. However, we still require the photo and the co-ordinates.

In the spreadsheet, staff should populate the ***Analysis*** column (Y or N), the ***House Coordinates*** column, the ***Major Value Change*** column (Y or N, if the changes found at time of sale would change the CVA of the property by at least (approximately) ± 5% or ± $10,000), and finally the ***Description of View Towards IWT*** column. There is also a ***Comments*** field to add anything that you feel should be noted. If you are invalidating a sale, use this field to explain why.

As is standard practise while reviewing sales, staff should update the Time of Sale (TOS) snapshot in IPS (manually via the Sales tab until EMS returns the use of the pop-up box), and update the Current Maintenance view with the data on the property at the time of the inspection.

If a property is vacant land, obtain co-ordinates and a photo from as close to the centre of the property (length-wise and width-wise) as possible.

As in the first stage of this project, we will be using the "Garmin GPSMAP 76Cx color map navigator" to collect the co-ordinates. These devices provide co-ordinates as latitude and longitude (also known as decimal degrees). These may look like 42.01425 and -84.00244, or similarly N 42.01425° and W 84.00244°. Other devices, such as the GPS devices in our corporate vehicles, provide co-ordinates in a different format – degrees minutes and seconds. This may look like 42°01'33.024" and -84°13'56.676", or simply 420133.024 and -841356.676. The preference is to use the Garmin devices, but since there are only 6 across the province, the use of the car GPS devices is acceptable – as long as an entire office is done consistently, and we are notified as to which device your office used.

When recording the co-ordinates, take the measurement from as close to the corner of the house as possible. Hold the device as steady as possible for two minutes or until the co-ordinates stabilize, whichever comes first.

If you are unable to obtain close co-ordinates due to fences or other obstructions, take the measurement from as close as you possibly can; preferably such that there is a straight line between you and corner of the house, perpendicular to the road, and estimate what you think the distance is between where you take the measurement and where the corner of the house sits. Make sure that this is all recorded in the Comments. If possible, take a picture as well, and include it when you return the inventory files. Upon returning to the office, use iLOOKABOUT™ or Google Earth™ in an attempt to obtain more accurate co-ordinates. However, since these properties are generally in rural areas, you may not be able to obtain co-ordinates accurately using digital imagery. In either case, make note in the inventory that you have had to approximate the co-ordinates and the reason.

Notes

1. **Typical inspection procedures are to be followed; and IPS should be updated as required.**
2. **Do not use the abuts or proximity to wind turbine variables. If any reduction is warranted due to this study, we will have these fields populated.**

Workload Counts by Region (by Roll Number)

Zone	Region	# of Sales	# of Unique Roll Numbers	Zone Total # of Sales
1	22	174	163	1,070
	23	73	71	
	24	9	9	
	26*	463	448	
	27*	351	334	
2	20	52	51	52
5	25	63	61	63
6	05	32	31	32
7	31	23	21	23

* Regions 26 and 27 had previously requested a preliminary list of sales. These sales are also included in the current sales files, with a column ("OriginalList") to indicate that they were present in the first list. The numbers above represent the new sales since the first lists and NOT the total including those already given.

Questions

If you have any questions, please contact one of the following:

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OR

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Insert two AA batteries into the device.

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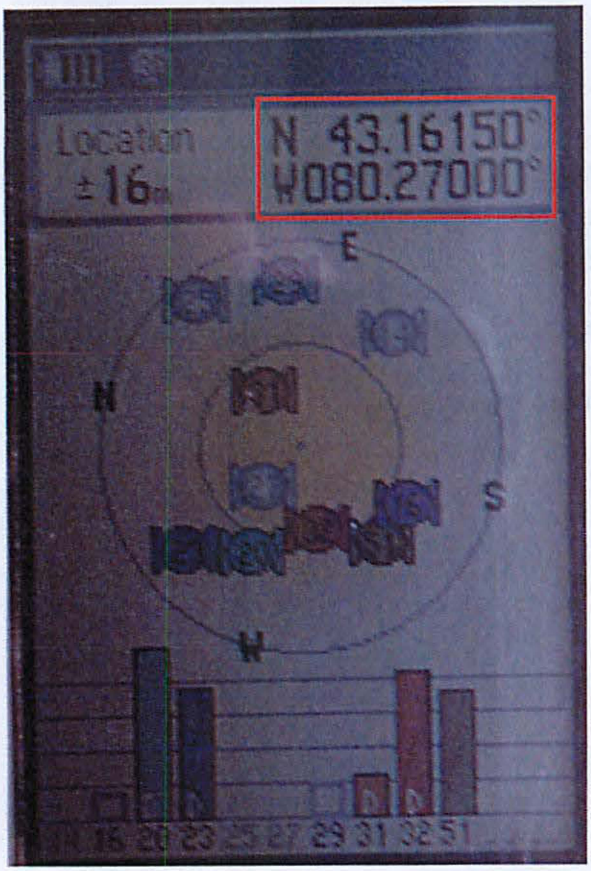

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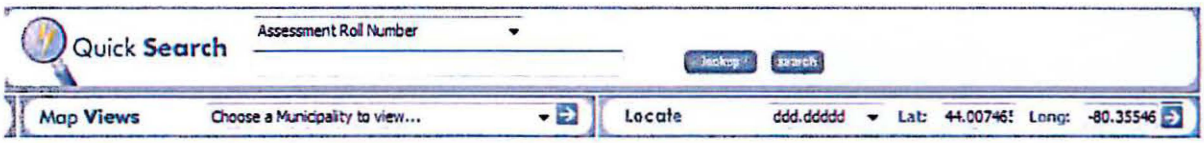
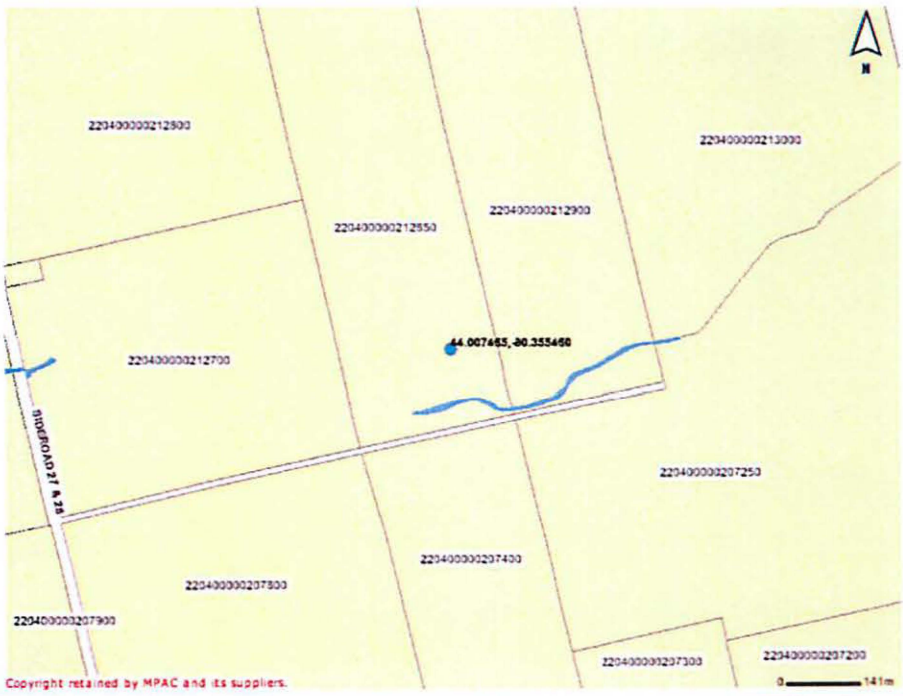
For example, to see exactly where on a property the IWT may be for the following line:

Reg	Roll_Num	Prop code	Hnbhd	Enbhd	Mktarea	CVA2012	Coordinate_1	Coordinate_2	Comments
22	220400000212850	200	A07	0342	RR050	$288,000	N 44.007465	W 80.355460	

Search in AIM as follows:



This will show the location of the expected IWT on the property:



Appendix D1 - Abutting a Property with an IWT

Ratio Statistics - Property Abuts a Property with an IWT

Case Processing Summary

	Count
Overall	32
Excluded	0
Total	32

Ratio Statistics for cva2012 / tas_amt

Mean		1.051
95% Confidence Interval for Mean	Lower Bound	.976
	Upper Bound	1.126
Median		1.002
95% Confidence Interval for Median	Lower Bound	.929
	Upper Bound	1.121
	Actual Coverage	98.0%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

Sales within 1km of an IWT by Abutting Wind Turbine

Case Processing Summary

		Count	Percent
ABUTTING_WINDTURBINE	0 No	248	88.9%
	1 Yes	31	11.1%
Overall		279	100.0%
Excluded		0	
Total		279	

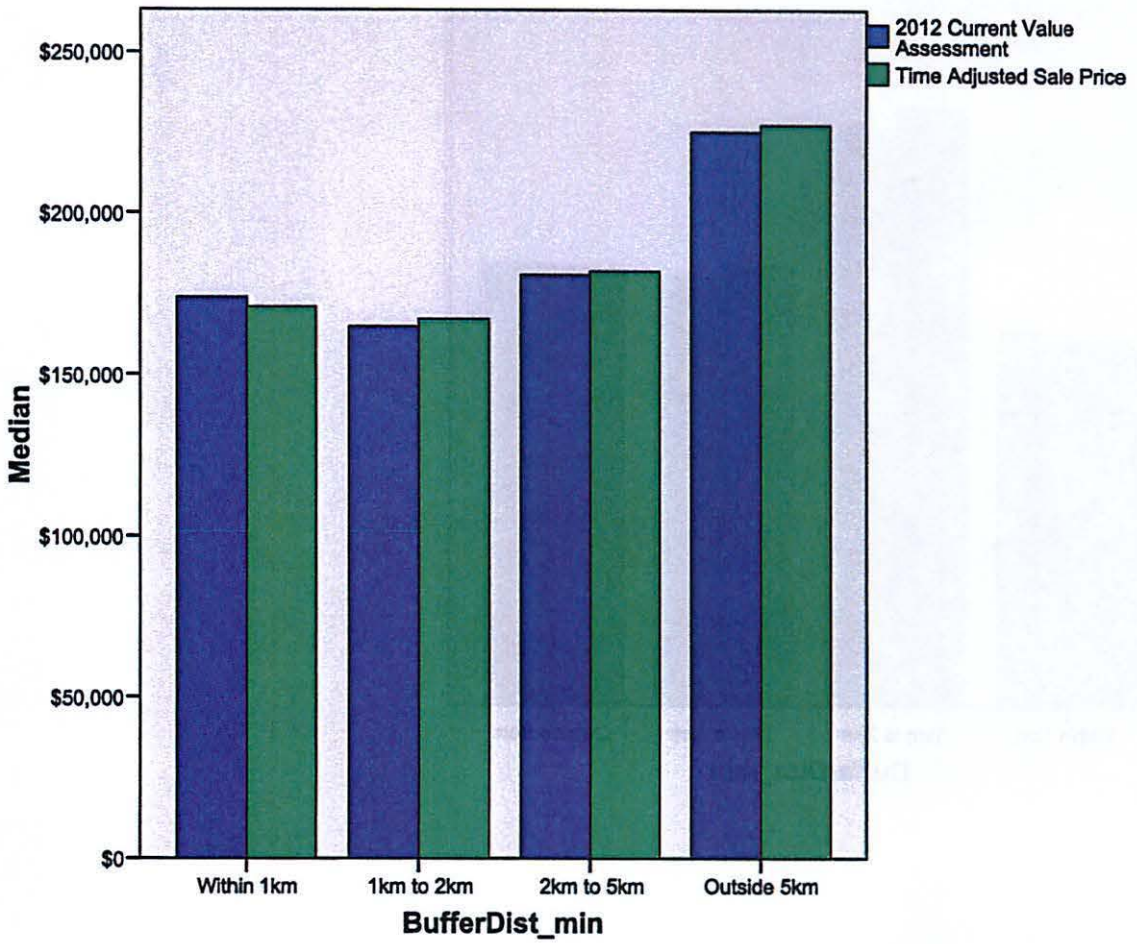
Ratio Statistics for cva2012 / tas_amt

		95% Confidence Interval for Mean			95% Confidence Interval for Median		
Group	Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage
0 No	1.051	1.031	1.071	1.040	1.015	1.058	95.1%
1 Yes	1.052	.974	1.130	.989	.929	1.121	97.1%
Overall	1.051	1.032	1.071	1.034	1.011	1.057	95.8%

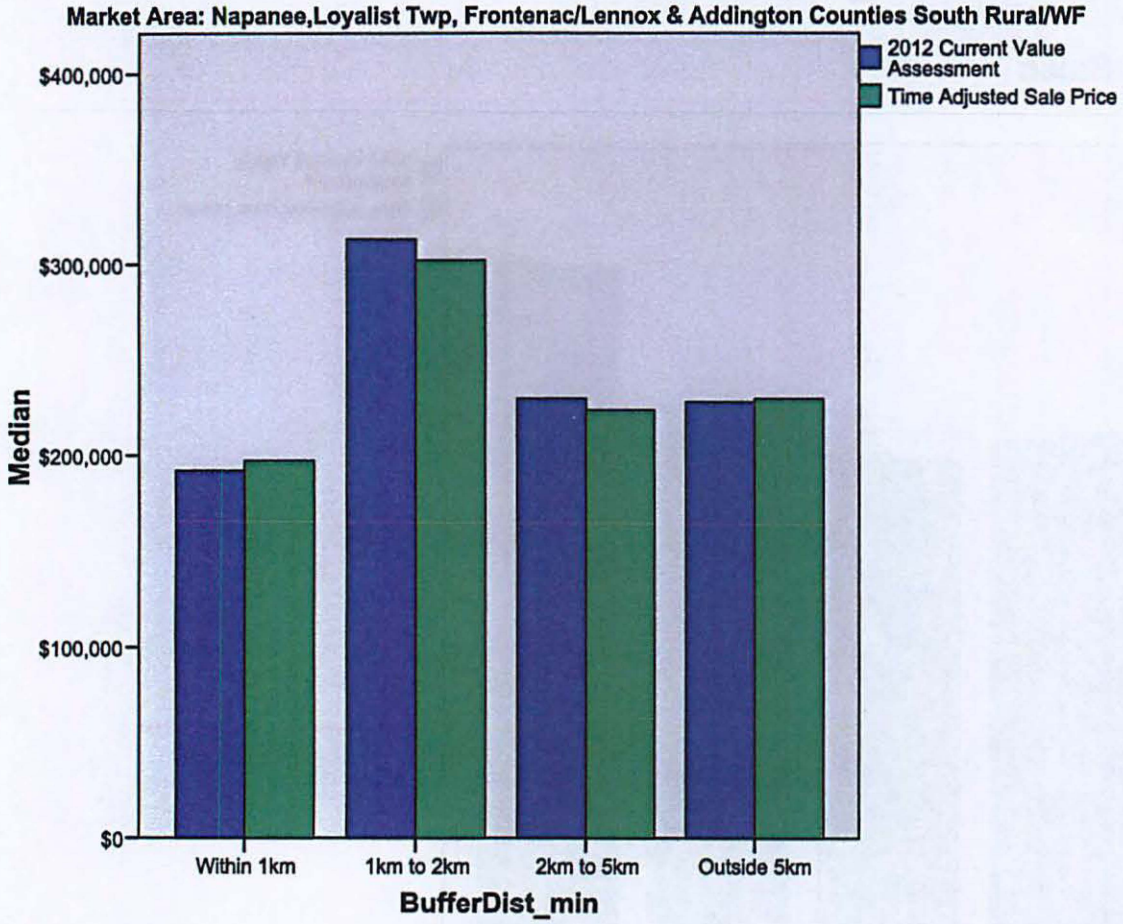
The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

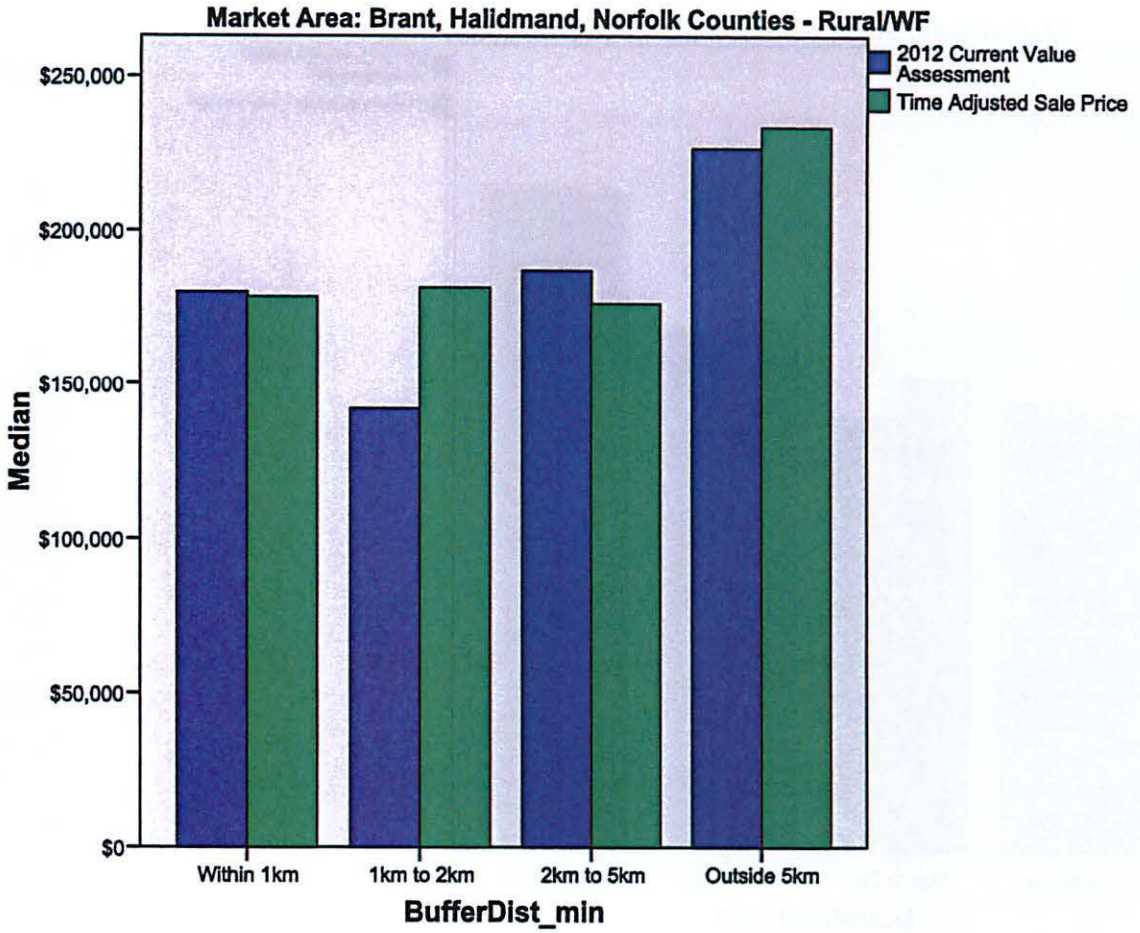
Appendix D2 - CVA and Tas_Amt Bar Charts

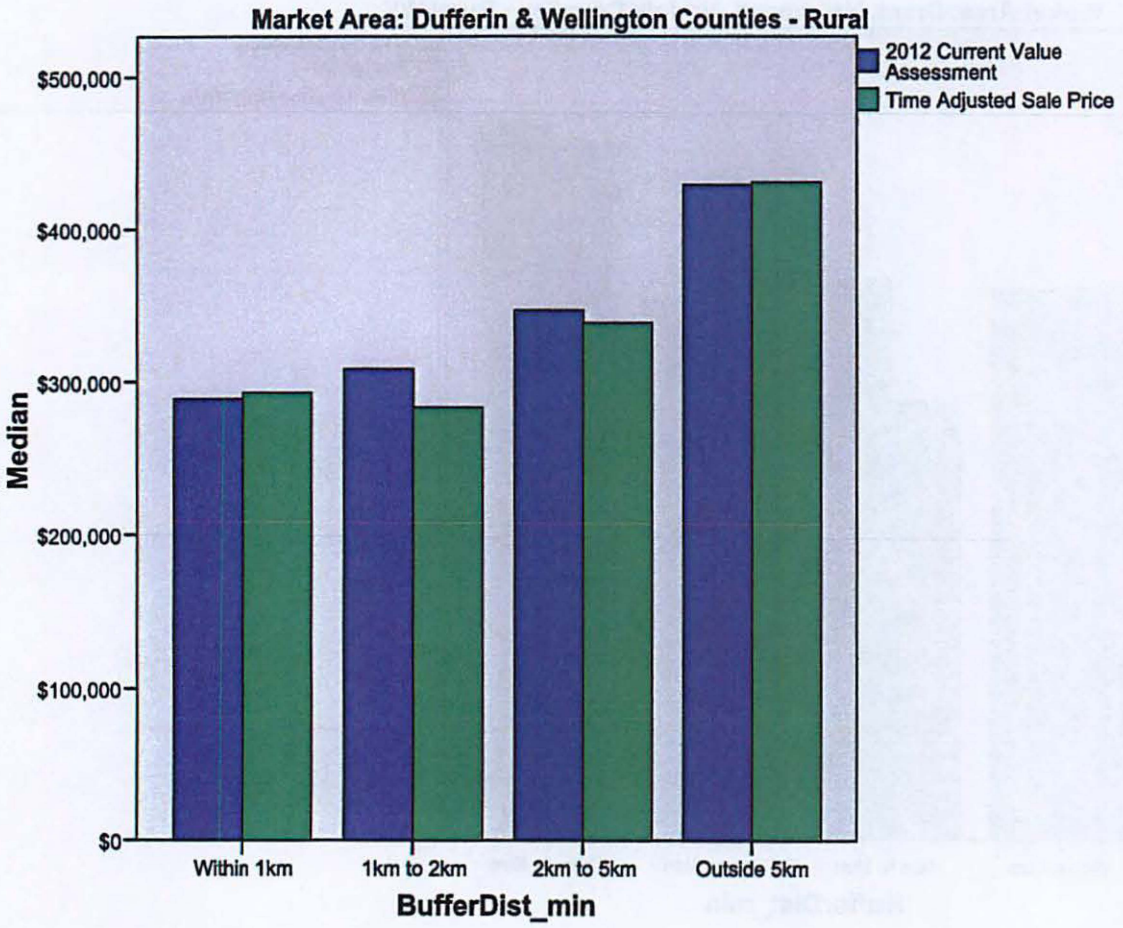
Bar Chart All Sales

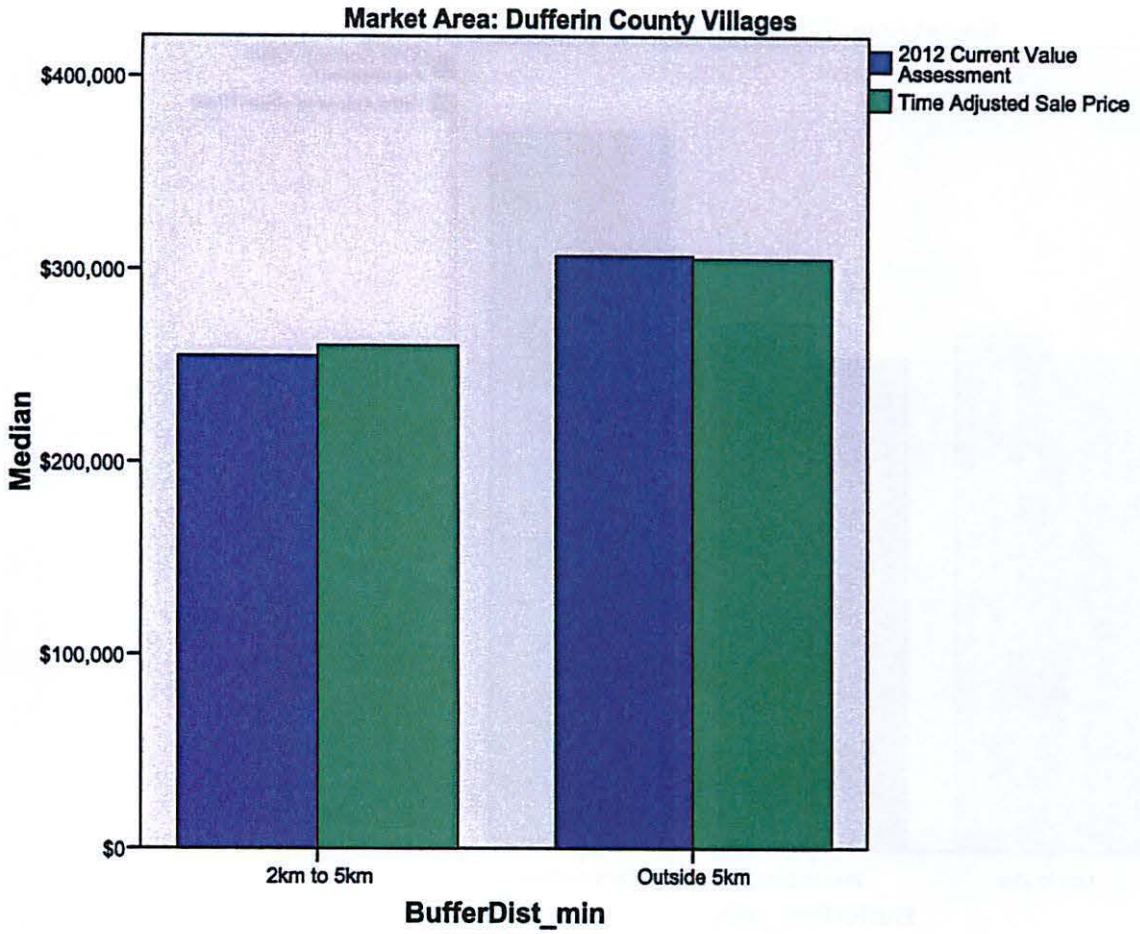


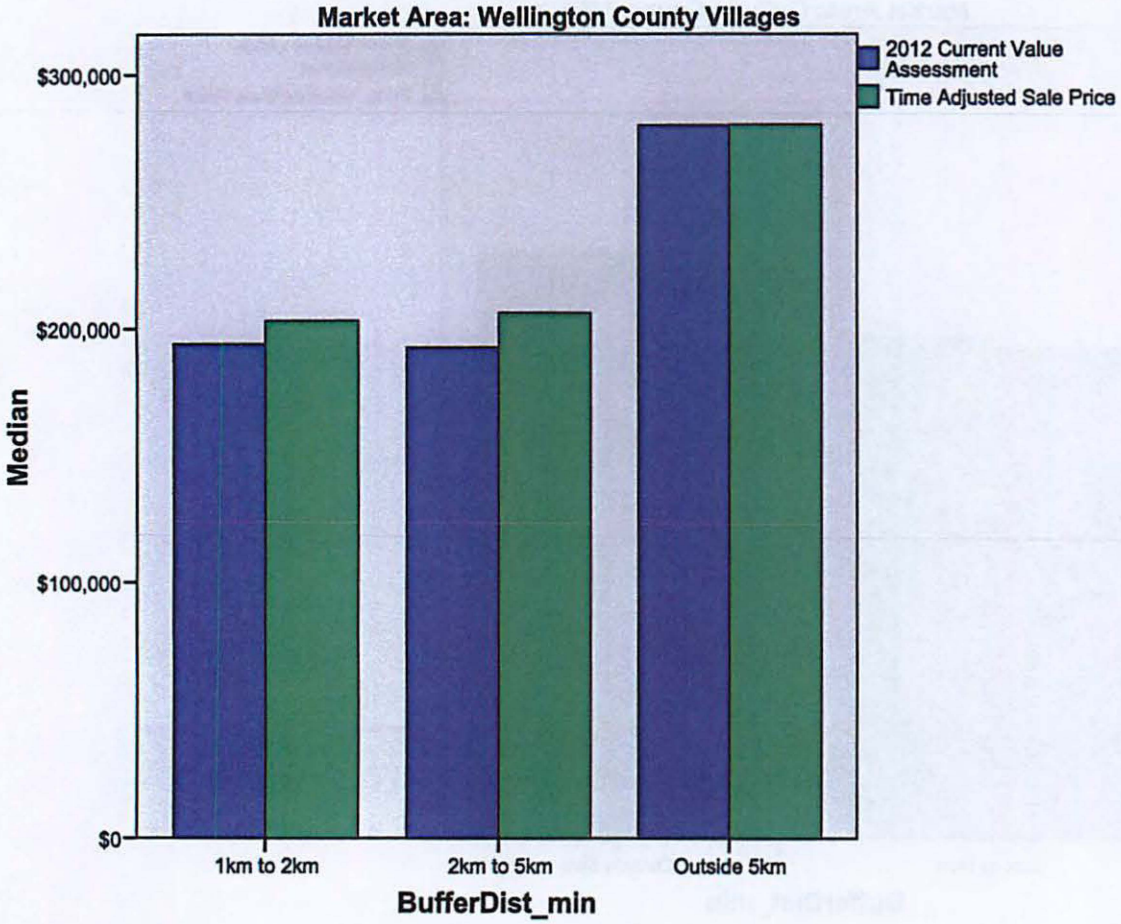
Bar Charts All Sales by Market Area

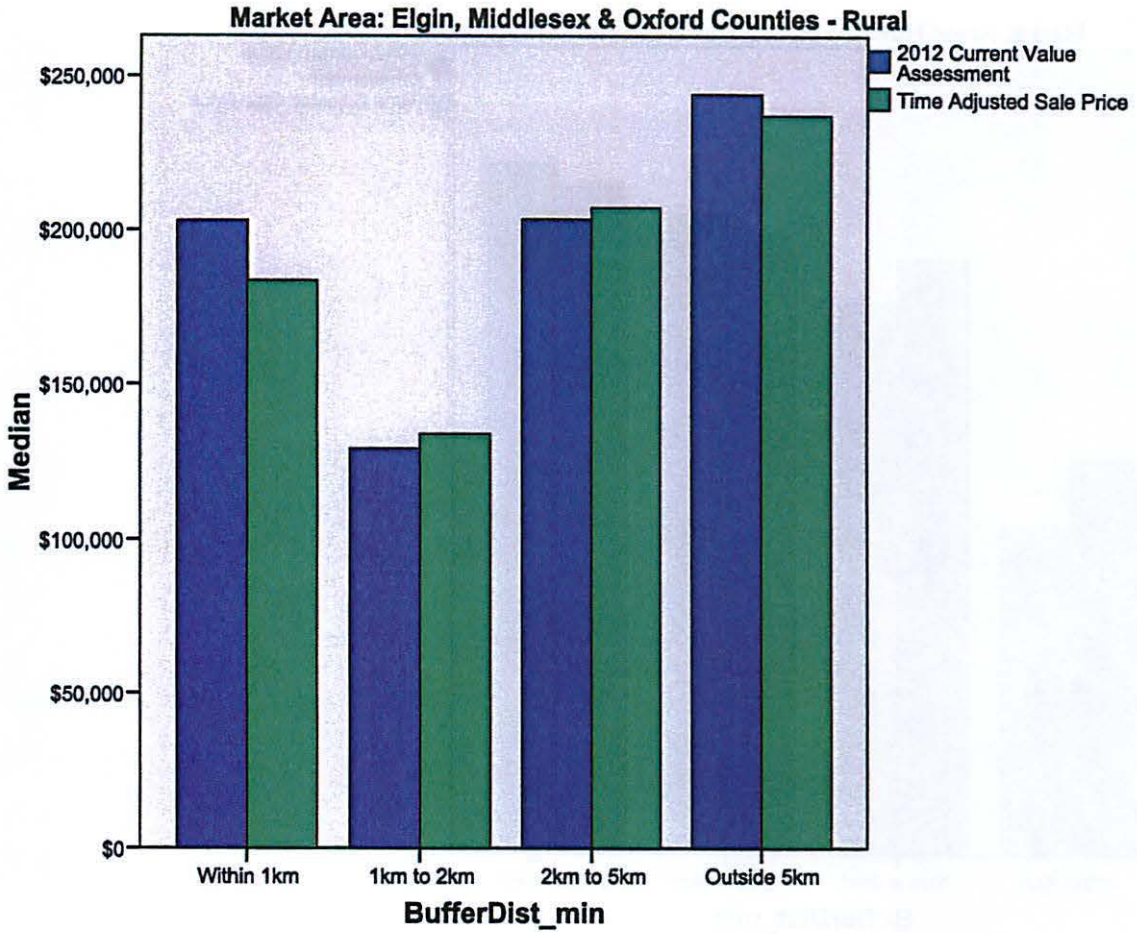

Market Area: Napanee,Loyalist Twp, Frontenac/Lennox & Addington Counties South Rural/WF
2012 Current Value Assessment
Time Adjusted Sale Price
$400,000
$300,000
$200,000
$100,000
$0
Median
Within 1km
1km to 2km
2km to 5km
Outside 5km
BufferDist_min

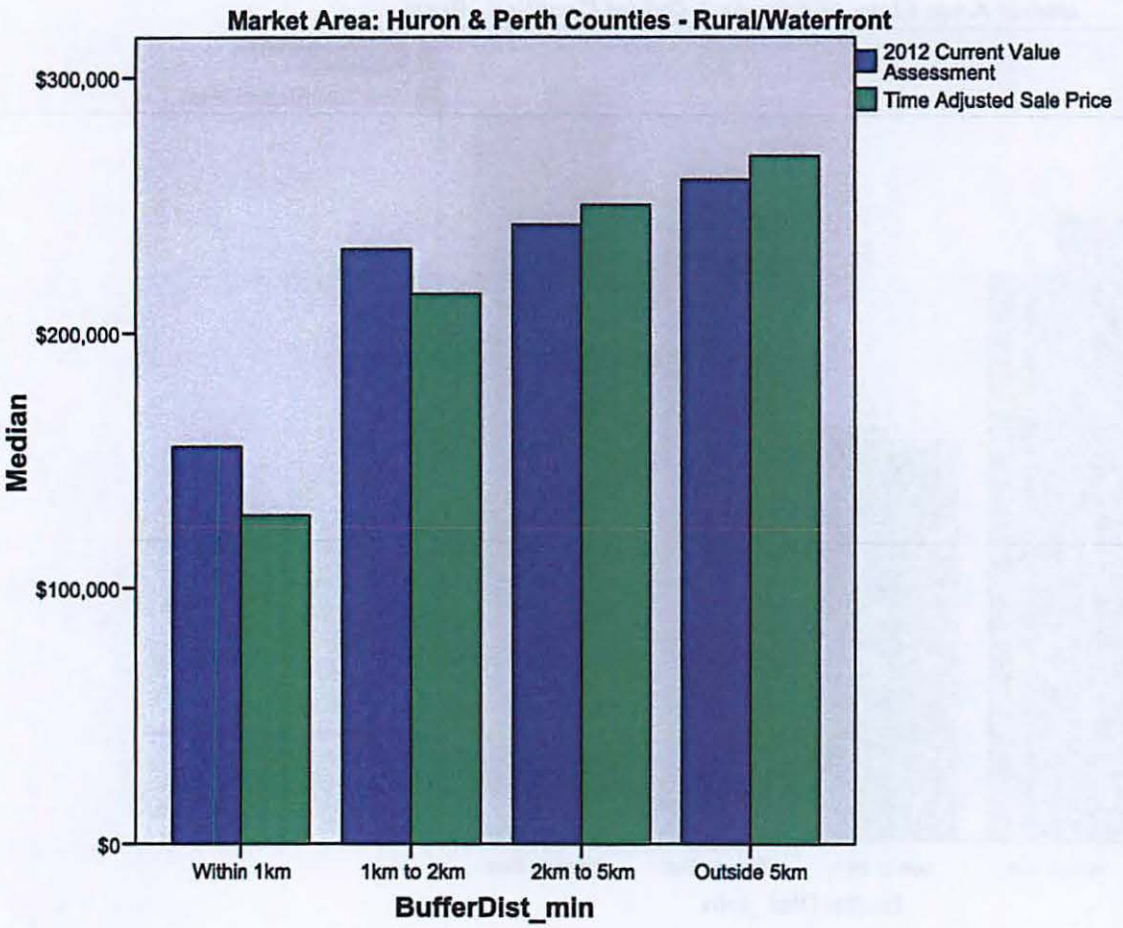

Market Area: Brant, Halidmand, Norfolk Counties - Rural/WF
2012 Current Value Assessment
Time Adjusted Sale Price
$250,000
$200,000
$150,000
$100,000
$50,000
$0
Median
Within 1km
1km to 2km
2km to 5km
Outside 5km
BufferDist_min

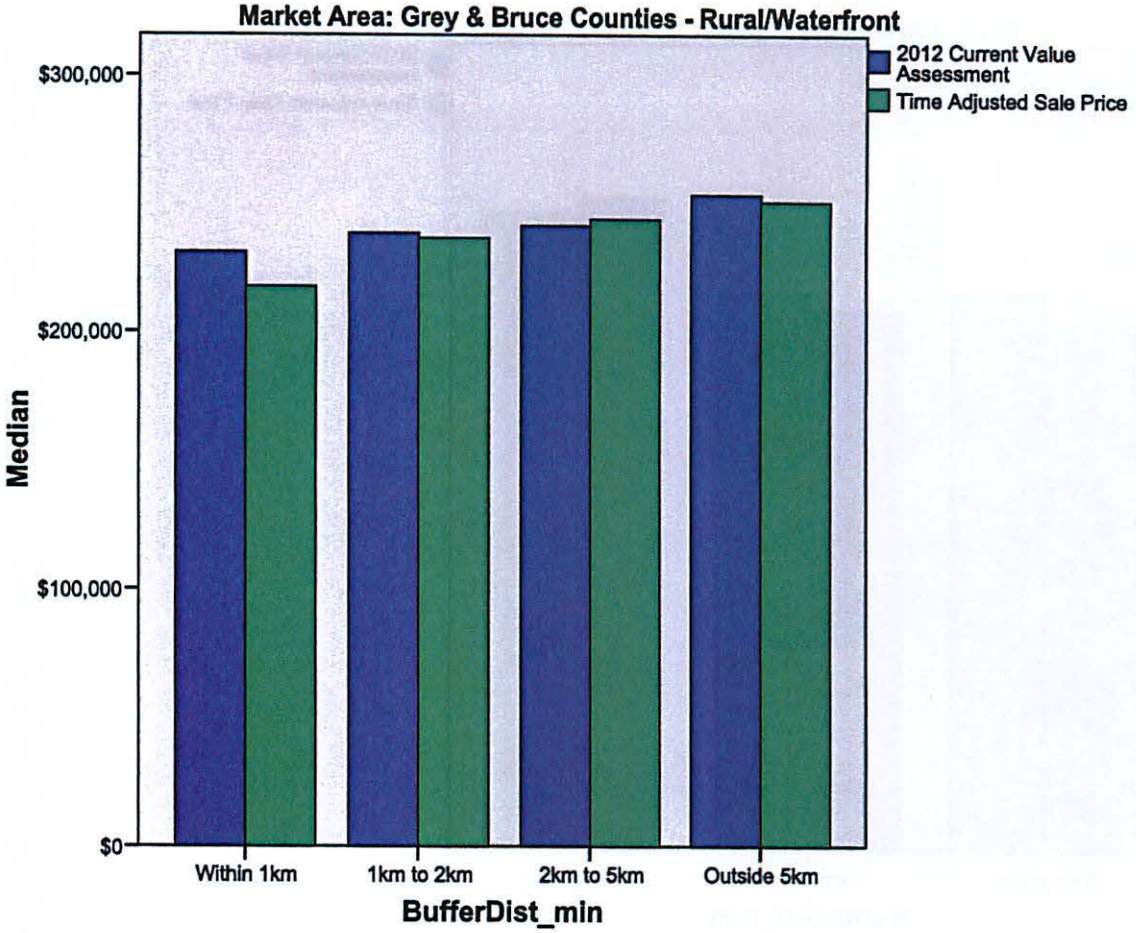

Market Area: Dufferin & Wellington Counties - Rural
2012 Current Value Assessment
Time Adjusted Sale Price
$500,000
$400,000
$300,000
$200,000
$100,000
$0
Median
Within 1km
1km to 2km
2km to 5km
Outside 5km
BufferDist_min

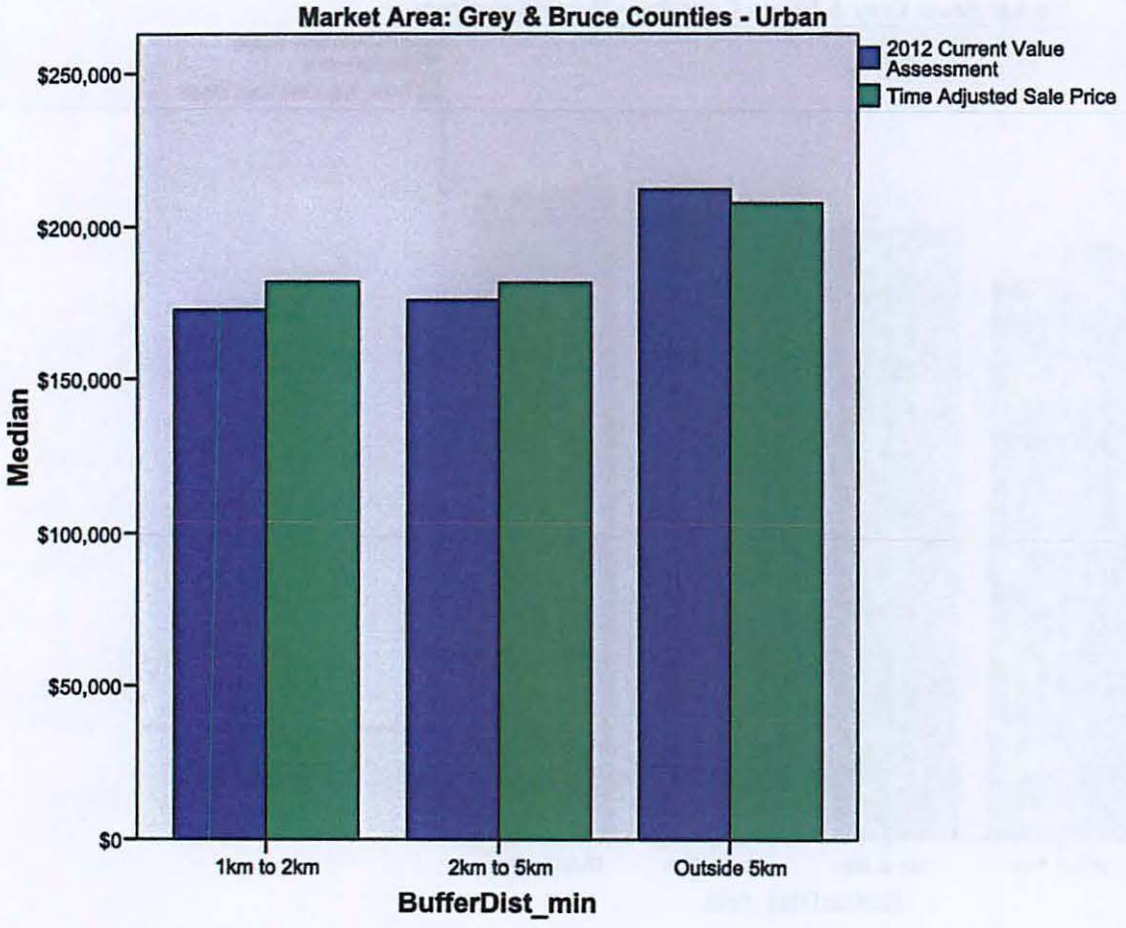

Market Area: Dufferin County Villages
2012 Current Value Assessment
Time Adjusted Sale Price
$400,000
$300,000
$200,000
$100,000
$0
Median
2km to 5km
Outside 5km
BufferDist_min

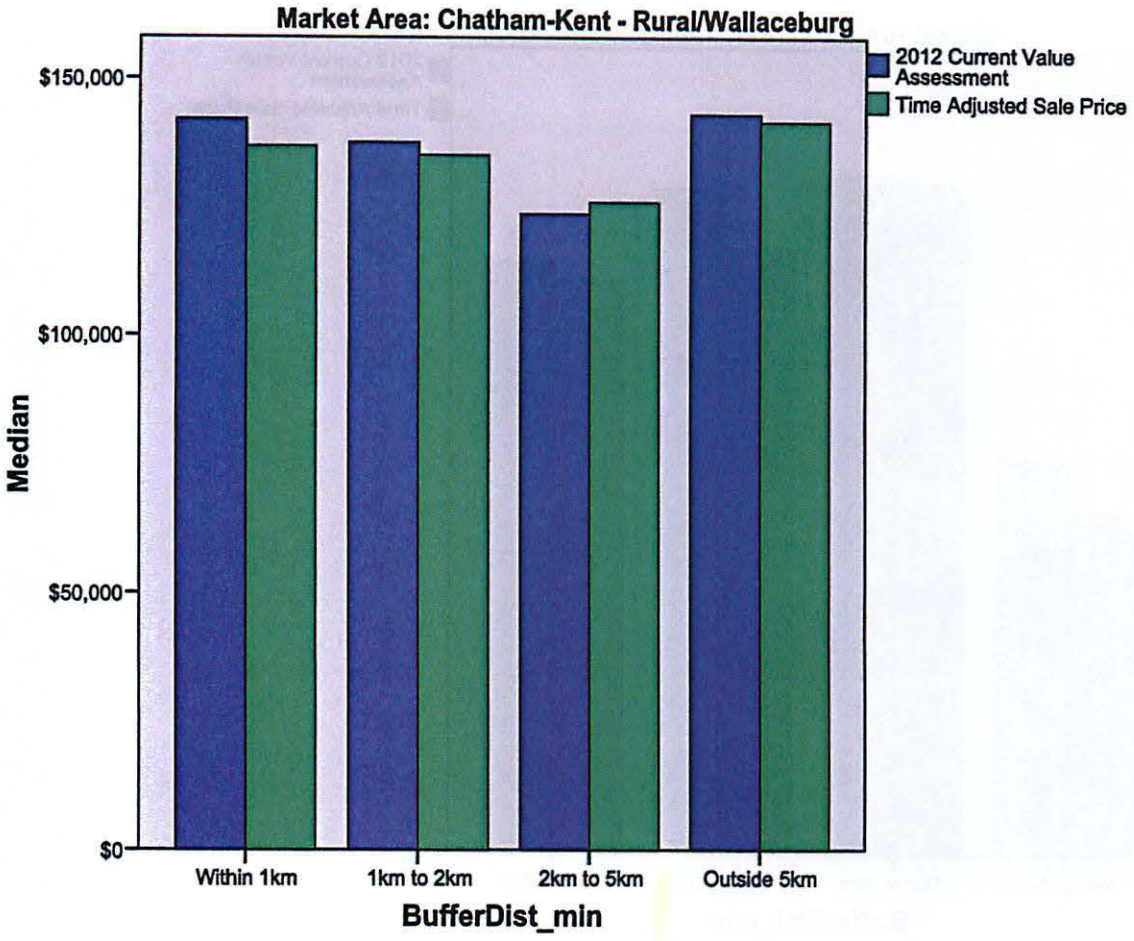

Market Area: Wellington County Villages
2012 Current Value Assessment
Time Adjusted Sale Price
$300,000
$200,000
$100,000
$0
Median
1km to 2km
2km to 5km
Outside 5km
BufferDist_min

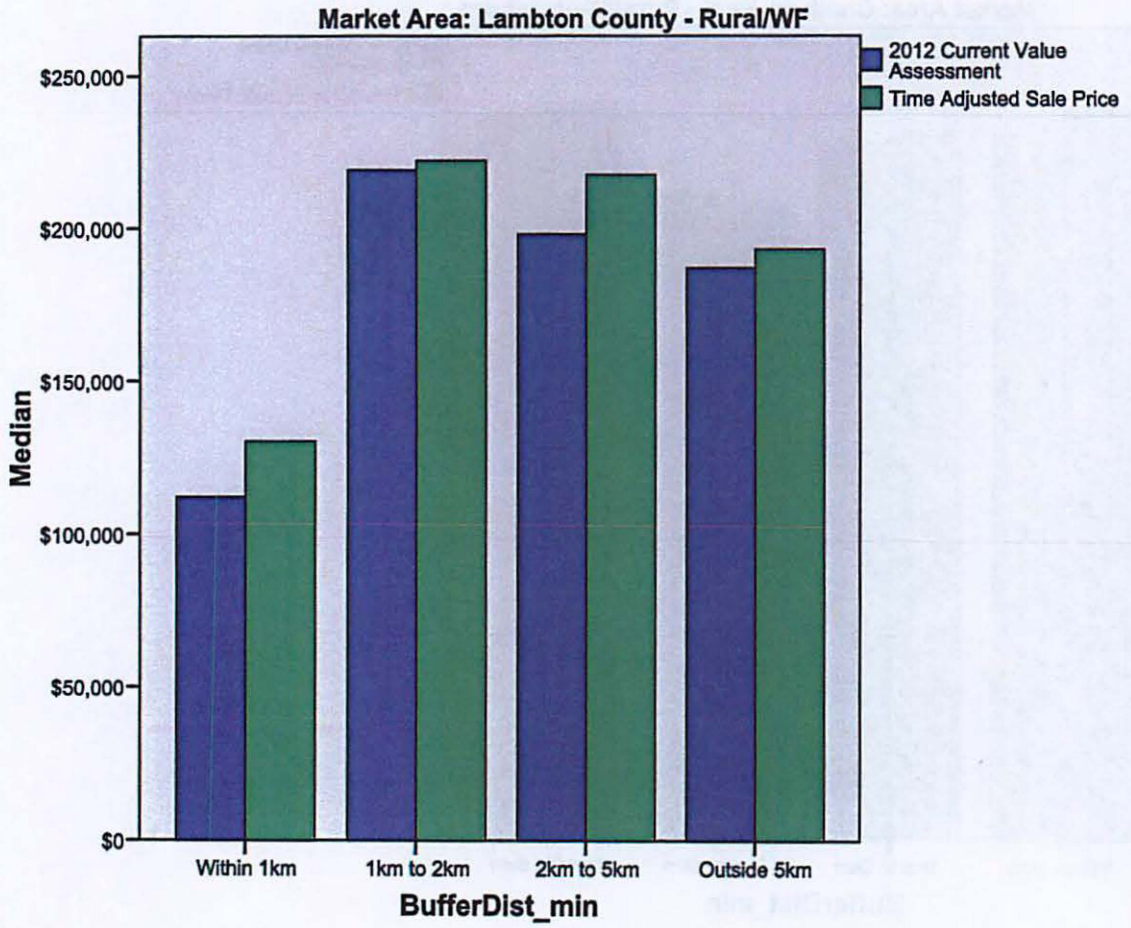

Market Area: Elgin, Middlesex & Oxford Counties - Rural
2012 Current Value Assessment
Time Adjusted Sale Price
$250,000
$200,000
$150,000
$100,000
$50,000
$0
Median
Within 1km
1km to 2km
2km to 5km
Outside 5km
BufferDist_min

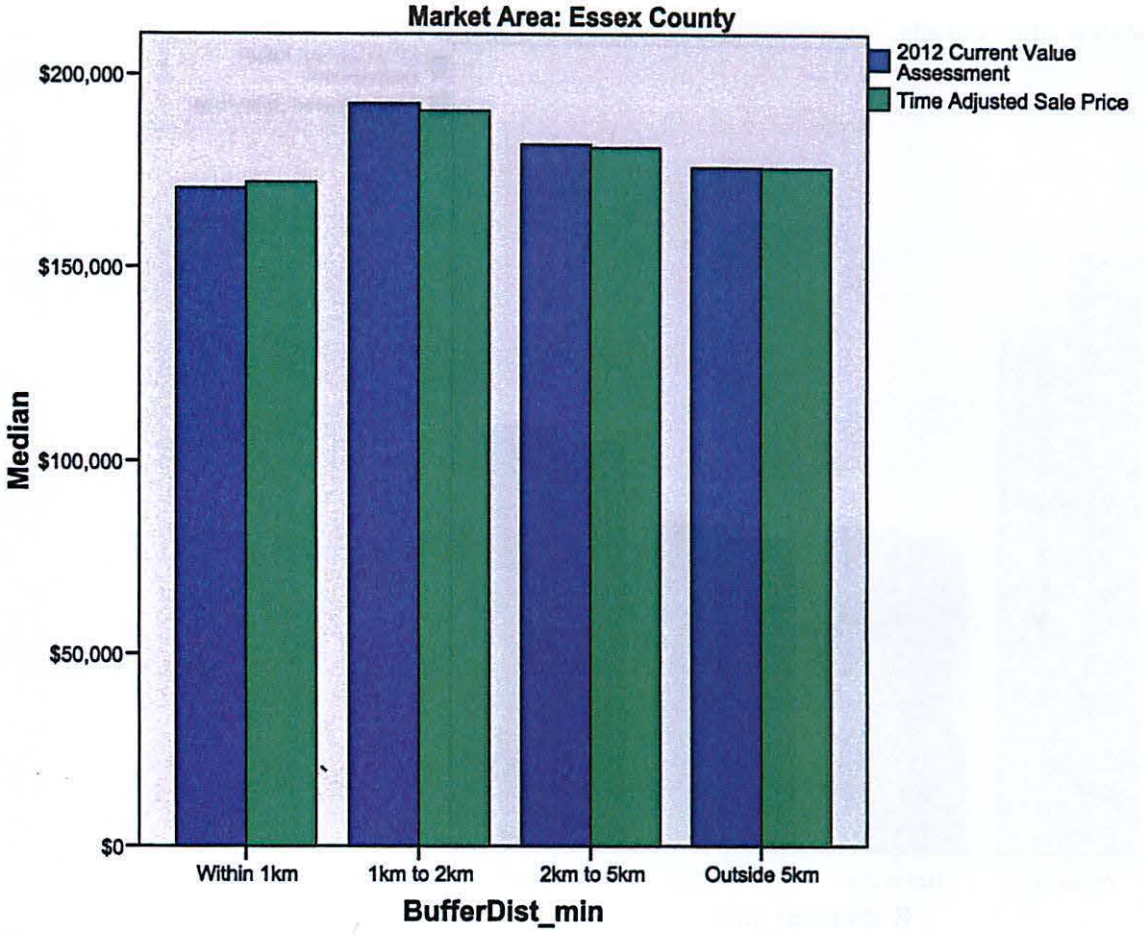

Market Area: Huron & Perth Counties - Rural/Waterfront
2012 Current Value Assessment
Time Adjusted Sale Price
$300,000
$200,000
$100,000
$0
Median
Within 1km
1km to 2km
2km to 5km
Outside 5km
BufferDist_min

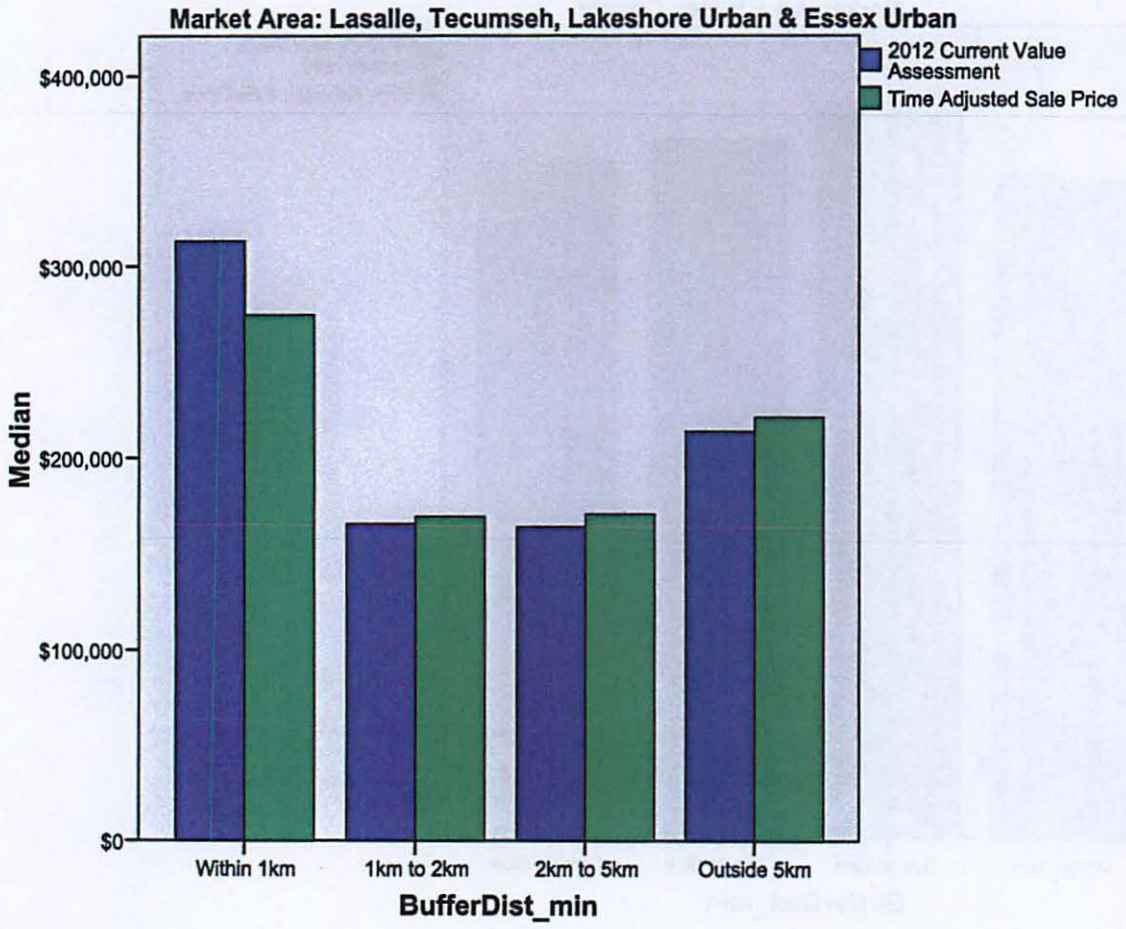

Market Area: Grey & Bruce Counties - Rural/Waterfront
2012 Current Value Assessment
Time Adjusted Sale Price
$300,000
$200,000
$100,000
$0
Median
Within 1km
1km to 2km
2km to 5km
Outside 5km
BufferDist_min

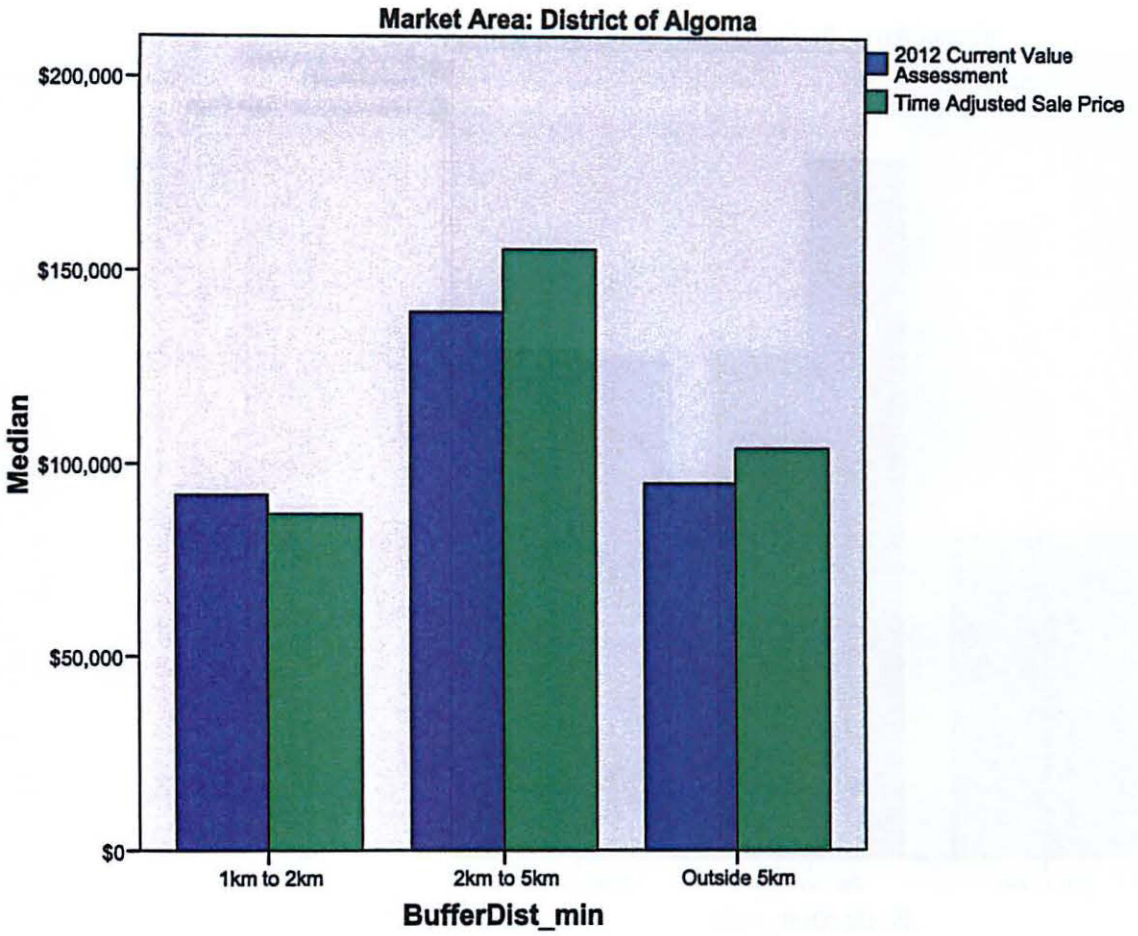

Market Area: Grey & Bruce Counties - Urban
2012 Current Value Assessment
Time Adjusted Sale Price
$250,000
$200,000
$150,000
$100,000
$50,000
$0
Median
1km to 2km
2km to 5km
Outside 5km
BufferDist_min

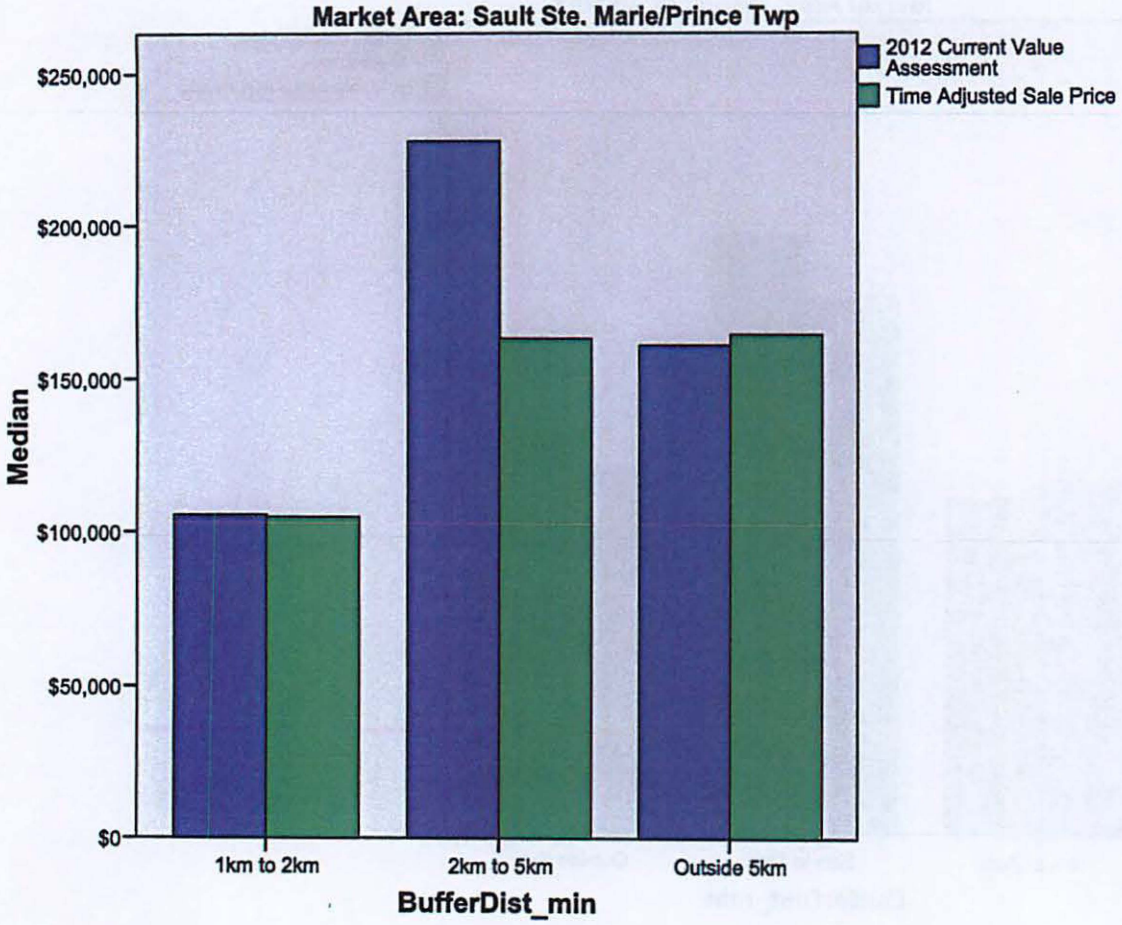

Market Area: Chatham-Kent - Rural/Wallaceburg
2012 Current Value Assessment
Time Adjusted Sale Price
$150,000
$100,000
$50,000
$0
Median
Within 1km
1km to 2km
2km to 5km
Outside 5km
BufferDist_min


Market Area: Lambton County - Rural/WF
2012 Current Value Assessment
Time Adjusted Sale Price
$250,000
$200,000
$150,000
$100,000
$50,000
$0
Median
Within 1km
1km to 2km
2km to 5km
Outside 5km
BufferDist_min


Market Area: Essex County
2012 Current Value Assessment
Time Adjusted Sale Price
$200,000
$150,000
$100,000
$50,000
$0
Median
Within 1km
1km to 2km
2km to 5km
Outside 5km
BufferDist_min


Market Area: Lasalle, Tecumseh, Lakeshore Urban & Essex Urban
2012 Current Value Assessment
Time Adjusted Sale Price
$400,000
$300,000
$200,000
$100,000
$0
Median
Within 1km
1km to 2km
2km to 5km
Outside 5km
BufferDist_min


Market Area: District of Algoma
2012 Current Value Assessment
Time Adjusted Sale Price
$200,000
$150,000
$100,000
$50,000
$0
Median
1km to 2km
2km to 5km
Outside 5km
BufferDist_min


Market Area: Sault Ste. Marie/Prince Twp
2012 Current Value Assessment
Time Adjusted Sale Price
$250,000
$200,000
$150,000
$100,000
$50,000
$0
Median
1km to 2km
2km to 5km
Outside 5km
BufferDist_min

Appendix D3 - Distance by Market Area and Type

Ratio Statistics by Distance All Sales

Case Processing Summary

		Count	Percent
BufferDist_min	1.00 Within 1km	279	.7%
	2.00 1km to 2km	989	2.4%
	5.00 2km to 5km	3063	7.4%
	6.00 Outside 5km	37093	89.5%
Overall		41424	100.0%
Excluded		0	
Total		41424	

Ratio Statistics for cva2012 / tas_amt

		95% Confidence Interval for Mean		
Group	Mean	Lower Bound	Upper Bound	Median
1.00 Within 1km	1.051	1.032	1.071	1.034
2.00 1km to 2km	1.005	.995	1.015	.989
5.00 2km to 5km	1.003	.998	1.008	.992
6.00 Outside 5km	.999	.997	1.000	.992
Overall	1.000	.998	1.001	.992

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

Ratio Statistics for cva2012 / tas_amt

	95% Confidence Interval for Median		
Group	Lower Bound	Upper Bound	Actual Coverage
1.00 Within 1km	1.011	1.057	95.8%
2.00 1km to 2km	.979	1.000	95.1%
5.00 2km to 5km	.988	.997	95.3%
6.00 Outside 5km	.991	.993	95.0%
Overall	.991	.994	95.0%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

Ratio Statistics by Distance by Market Model Area

MODEL = 05RR030 Napanee,Loyalist Twp, Frontenac/Lennox & Addington Counties South Rural/WF

Case Processing Summary[a]

			Count	Percent
BufferDist_min	1.00	Within 1km	13	.5%
	2.00	1km to 2km	7	.3%
	5.00	2km to 5km	8	.3%
	6.00	Outside 5km	2606	98.9%
Overall			2634	100.0%
Excluded			0	
Total			2634	

a. MODEL = 05RR030 Napanee,Loyalist Twp, Frontenac/Lennox & Addington Counties South Rural/WF

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean		
Group	Mean	Lower Bound	Upper Bound	Median
1.00 Within 1km	1.015	.893	1.136	.981
2.00 1km to 2km	1.061	.764	1.358	1.105
5.00 2km to 5km	.961	.831	1.090	.949
6.00 Outside 5km	.999	.994	1.004	.986
Overall	.999	.994	1.004	.986

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

Ratio Statistics for cva2012 / tas_amt[a]

	95% Confidence Interval for Median		
Group	Lower Bound	Upper Bound	Actual Coverage
1.00 Within 1km	.813	1.248	97.8%
2.00 1km to 2km	.655	1.578	98.4%
5.00 2km to 5km	.727	1.190	99.2%
6.00 Outside 5km	.981	.993	95.2%
Overall	.981	.993	95.1%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 05RR030 Napanee,Loyalist Twp, Frontenac/Lennox & Addington Counties South Rural/WF

MODEL = 20RR010 Brant, Halidmand, Norfolk Counties - Rural/WF

Case Processing Summary[a]

			Count	Percent
BufferDist_min	1.00	Within 1km	25	.5%
	2.00	1km to 2km	9	.2%
	5.00	2km to 5km	71	1.4%
	6.00	Outside 5km	4868	97.9%
Overall			4973	100.0%
Excluded			0	
Total			4973	

a. MODEL = 20RR010 Brant, Halidmand, Norfolk Counties - Rural/WF

Ratio Statistics for cva2012 / tas_amt[a]

Group	Mean	95% Confidence Interval for Mean		Median
		Lower Bound	Upper Bound	
1.00 Within 1km	1.038	.977	1.100	1.020
2.00 1km to 2km	.961	.808	1.113	.933
5.00 2km to 5km	1.046	.998	1.093	1.033
6.00 Outside 5km	.986	.983	.990	.980
Overall	.987	.984	.991	.981

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

Ratio Statistics for cva2012 / tas_amt[a]

Group	95% Confidence Interval for Median		
	Lower Bound	Upper Bound	Actual Coverage
1.00 Within 1km	.941	1.118	95.7%
2.00 1km to 2km	.801	1.112	96.1%
5.00 2km to 5km	.997	1.073	96.8%
6.00 Outside 5km	.976	.984	95.0%
Overall	.976	.984	95.3%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 20RR010 Brant, Haldimand, Norfolk Counties - Rural/WF

MODEL = 22RR010 Dufferin & Wellington Counties - Rural

Case Processing Summary[a]

		Count	Percent
BufferDist_min	1.00 Within 1km	26	1.5%
	2.00 1km to 2km	25	1.4%
	5.00 2km to 5km	83	4.8%
	6.00 Outside 5km	1597	92.3%
Overall		1731	100.0%
Excluded		0	
Total		1731	

a. MODEL = 22RR010 Dufferin & Wellington Counties - Rural

Ratio Statistics for cva2012 / tas_amt[a]

Group	Mean	95% Confidence Interval for Mean		Median
		Lower Bound	Upper Bound	
1.00 Within 1km	1.042	.975	1.110	1.010
2.00 1km to 2km	1.024	.949	1.099	1.071
5.00 2km to 5km	1.029	1.000	1.059	1.024
6.00 Outside 5km	1.008	1.001	1.014	1.003
Overall	1.009	1.003	1.016	1.004

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

Ratio Statistics for cva2012 / tas_amt[a]

Group	95% Confidence Interval for Median		
	Lower Bound	Upper Bound	Actual Coverage
1.00 Within 1km	.943	1.090	97.1%
2.00 1km to 2km	.921	1.137	95.7%
5.00 2km to 5km	.994	1.049	95.2%
6.00 Outside 5km	.993	1.011	95.5%
Overall	.996	1.012	95.1%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 22RR010 Dufferin & Wellington Counties - Rural

MODEL = 22UR020 Dufferin County Villages

Case Processing Summary[a]

		Count	Percent
BufferDist_min	5.00 2km to 5km	404	16.7%
	6.00 Outside 5km	2017	83.3%
Overall		2421	100.0%
Excluded		0	
Total		2421	

a. MODEL = 22UR020 Dufferin County Villages

Ratio Statistics for cva2012 / tas_amt[a]

Group	Mean	95% Confidence Interval for Mean		Median
		Lower Bound	Upper Bound	
5.00 2km to 5km	.982	.973	.992	.976
6.00 Outside 5km	.993	.990	.996	.991
Overall	.991	.988	.994	.988

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

Ratio Statistics for cva2012 / tas_amt[a]

Group	95% Confidence Interval for Median		
	Lower Bound	Upper Bound	Actual Coverage
5.00 2km to 5km	.969	.986	95.9%
6.00 Outside 5km	.987	.995	95.5%
Overall	.985	.992	95.4%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 22UR020 Dufferin County Villages

MODEL = 22UR030 Wellington County Villages

Case Processing Summary[a]

		Count	Percent
BufferDist_min	2.00 1km to 2km	92	3.8%
	5.00 2km to 5km	32	1.3%
	6.00 Outside 5km	2300	94.9%
Overall		2424	100.0%
Excluded		0	
Total		2424	

a. MODEL = 22UR030 Wellington County Villages

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean		
Group	Mean	Lower Bound	Upper Bound	Median
2.00 1km to 2km	.952	.922	.983	.948
5.00 2km to 5km	.981	.924	1.038	.951
6.00 Outside 5km	.989	.985	.993	.988
Overall	.987	.983	.991	.986

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

Ratio Statistics for cva2012 / tas_amt[a]

	95% Confidence Interval for Median		
Group	Lower Bound	Upper Bound	Actual Coverage
2.00 1km to 2km	.905	.967	95.3%
5.00 2km to 5km	.902	1.031	98.0%
6.00 Outside 5km	.984	.993	95.2%
Overall	.981	.991	95.1%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 22UR030 Wellington County Villages

MODEL = 23RR010 Elgin, Middlesex & Oxford Counties - Rural

Case Processing Summary[a]

		Count	Percent
BufferDist_min	1.00 Within 1km	4	.1%
	2.00 1km to 2km	52	1.2%
	5.00 2km to 5km	72	1.6%
	6.00 Outside 5km	4300	97.1%
Overall		4428	100.0%
Excluded		0	
Total		4428	

a. MODEL = 23RR010 Elgin, Middlesex & Oxford Counties - Rural

Ratio Statistics for cva2012 / tas_amt[a]

Group	Mean	95% Confidence Interval for Mean		Median
		Lower Bound	Upper Bound	
1.00 Within 1km	1.073	.987	1.160	1.063
2.00 1km to 2km	.994	.936	1.052	.935
5.00 2km to 5km	1.017	.979	1.056	1.009
6.00 Outside 5km	1.040	1.036	1.043	1.030
Overall	1.039	1.035	1.043	1.029

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

Ratio Statistics for cva2012 / tas_amt[a]

Group	95% Confidence Interval for Median		
	Lower Bound	Upper Bound	Actual Coverage
1.00 Within 1km	1.025	1.142	100.0%
2.00 1km to 2km	.899	1.023	96.4%
5.00 2km to 5km	.974	1.042	95.6%
6.00 Outside 5km	1.026	1.034	95.1%
Overall	1.025	1.033	95.1%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 23RR010 Elgin, Middlesex & Oxford Counties - Rural

MODEL = 24RR010 Huron & Perth Counties - Rural/Waterfront

Case Processing Summary[a]

		Count	Percent
BufferDist_min	1.00 Within 1km	2	.2%
	2.00 1km to 2km	3	.3%
	5.00 2km to 5km	98	11.0%
	6.00 Outside 5km	786	88.4%
Overall		889	100.0%
Excluded		0	
Total		889	

a. MODEL = 24RR010 Huron & Perth Counties - Rural/Waterfront

Ratio Statistics for cva2012 / tas_amt[a]

Group	Mean	95% Confidence Interval for Mean		Median
		Lower Bound	Upper Bound	
1.00 Within 1km	1.219	.478	1.960	1.219
2.00 1km to 2km	1.153	.879	1.427	1.170
5.00 2km to 5km	1.027	.994	1.059	1.021
6.00 Outside 5km	1.012	1.001	1.024	1.001
Overall	1.015	1.004	1.026	1.006

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

Ratio Statistics for cva2012 / tas_amt[a]

Group	95% Confidence Interval for Median		
	Lower Bound	Upper Bound	Actual Coverage
1.00 Within 1km	1.161	1.277	100.0%
2.00 1km to 2km	1.036	1.254	100.0%
5.00 2km to 5km	.998	1.073	96.7%
6.00 Outside 5km	.990	1.012	95.0%
Overall	.994	1.018	95.6%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 24RR010 Huron & Perth Counties - Rural/Waterfront

MODEL = 25RR010 Grey & Bruce Counties - Rural/Waterfront

Case Processing Summary[a]

		Count	Percent
BufferDist_min	1.00 Within 1km	12	.4%
	2.00 1km to 2km	19	.6%
	5.00 2km to 5km	265	8.9%
	6.00 Outside 5km	2692	90.1%
Overall		2988	100.0%
Excluded		0	
Total		2988	

a. MODEL = 25RR010 Grey & Bruce Counties - Rural/Waterfront

Ratio Statistics for cva2012 / tas_amt[a]

Group	Mean	95% Confidence Interval for Mean		Median
		Lower Bound	Upper Bound	
1.00 Within 1km	1.131	.944	1.318	1.045
2.00 1km to 2km	1.038	.969	1.107	1.029
5.00 2km to 5km	1.016	.995	1.037	1.005
6.00 Outside 5km	1.027	1.021	1.034	1.015
Overall	1.027	1.020	1.033	1.013

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

Ratio Statistics for cva2012 / tas_amt[a]

Group	95% Confidence Interval for Median		
	Lower Bound	Upper Bound	Actual Coverage
1.00 Within 1km	.917	1.271	96.1%
2.00 1km to 2km	.941	1.092	98.1%
5.00 2km to 5km	.986	1.022	95.1%
6.00 Outside 5km	1.006	1.022	95.3%
Overall	1.006	1.021	95.4%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 25RR010 Grey & Bruce Counties - Rural/Waterfront

MODEL = 25UR010 Grey & Bruce Counties - Urban

Case Processing Summary[a]

		Count	Percent
BufferDist_min	2.00 1km to 2km	16	.4%
	5.00 2km to 5km	161	3.7%
	6.00 Outside 5km	4180	95.9%
Overall		4357	100.0%
Excluded		0	
Total		4357	

a. MODEL = 25UR010 Grey & Bruce Counties - Urban

Ratio Statistics for cva2012 / tas_amt[a]

Group	Mean	95% Confidence Interval for Mean		Median
		Lower Bound	Upper Bound	
2.00 1km to 2km	1.007	.940	1.075	1.026
5.00 2km to 5km	1.005	.982	1.028	.978
6.00 Outside 5km	1.019	1.015	1.023	1.011
Overall	1.018	1.014	1.022	1.010

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

Ratio Statistics for cva2012 / tas_amt[a]

Group	95% Confidence Interval for Median		
	Lower Bound	Upper Bound	Actual Coverage
2.00 1km to 2km	.899	1.134	97.9%
5.00 2km to 5km	.962	.998	96.0%
6.00 Outside 5km	1.006	1.016	95.1%
Overall	1.005	1.015	95.1%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 25UR010 Grey & Bruce Counties - Urban

MODEL = 26RR010 Chatham-Kent - Rural/Wallaceburg

Case Processing Summary[a]

		Count	Percent
BufferDist_min	1.00 Within 1km	83	4.4%
	2.00 1km to 2km	300	15.9%
	5.00 2km to 5km	836	44.4%
	6.00 Outside 5km	663	35.2%
Overall		1882	100.0%
Excluded		0	
Total		1882	

a. MODEL = 26RR010 Chatham-Kent - Rural/Wallaceburg

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean		
Group	Mean	Lower Bound	Upper Bound	Median
1.00 Within 1km	1.085	1.048	1.122	1.055
2.00 1km to 2km	1.027	1.007	1.047	1.006
5.00 2km to 5km	1.009	.998	1.020	.993
6.00 Outside 5km	1.012	1.001	1.022	1.006
Overall	1.016	1.009	1.023	1.002

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

Ratio Statistics for cva2012 / tas_amt[a]

	95% Confidence Interval for Median		
Group	Lower Bound	Upper Bound	Actual Coverage
1.00 Within 1km	1.036	1.087	95.2%
2.00 1km to 2km	.983	1.027	95.7%
5.00 2km to 5km	.982	1.000	95.1%
6.00 Outside 5km	.997	1.017	95.7%
Overall	.997	1.009	95.5%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 26RR010 Chatham-Kent - Rural/Wallaceburg

MODEL = 26RR030 Lambton County - Rural/WF

Case Processing Summary[a]

		Count	Percent
BufferDist_min	1.00 Within 1km	1	.0%
	2.00 1km to 2km	23	1.1%
	5.00 2km to 5km	76	3.7%
	6.00 Outside 5km	1942	95.1%
Overall		2042	100.0%
Excluded		0	
Total		2042	

a. MODEL = 26RR030 Lambton County - Rural/WF

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean		
Group	Mean	Lower Bound	Upper Bound	Median
1.00 Within 1km	.862	.	.	.862
2.00 1km to 2km	.993	.957	1.030	.993
5.00 2km to 5km	.952	.921	.983	.963
6.00 Outside 5km	.986	.981	.991	.980
Overall	.985	.980	.990	.980

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

Ratio Statistics for cva2012 / tas_amt[a]

	95% Confidence Interval for Median		
Group	Lower Bound	Upper Bound	Actual Coverage
1.00 Within 1km	.	.	.
2.00 1km to 2km	.943	1.030	96.5%
5.00 2km to 5km	.931	.989	97.1%
6.00 Outside 5km	.972	.986	95.2%
Overall	.972	.985	95.1%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 26RR030 Lambton County - Rural/WF

MODEL = 27RR120 Essex County

Case Processing Summary[a]

		Count	Percent
BufferDist_min	1.00 Within 1km	112	3.3%
	2.00 1km to 2km	272	8.1%
	5.00 2km to 5km	768	22.9%
	6.00 Outside 5km	2198	65.6%
Overall		3350	100.0%
Excluded		0	
Total		3350	

a. MODEL = 27RR120 Essex County

Ratio Statistics for cva2012 / tas_amt[a]

Group	Mean	95% Confidence Interval for Mean		Median
		Lower Bound	Upper Bound	
1.00 Within 1km	1.024	.997	1.052	1.005
2.00 1km to 2km	.993	.978	1.008	.984
5.00 2km to 5km	1.003	.994	1.012	1.001
6.00 Outside 5km	.990	.986	.995	.987
Overall	.995	.991	.998	.991

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

Ratio Statistics for cva2012 / tas_amt[a]

Group	95% Confidence Interval for Median		
	Lower Bound	Upper Bound	Actual Coverage
1.00 Within 1km	.981	1.051	95.3%
2.00 1km to 2km	.969	1.000	95.5%
5.00 2km to 5km	.991	1.010	95.3%
6.00 Outside 5km	.983	.992	95.3%
Overall	.986	.995	95.3%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 27RR120 Essex County

MODEL = 27UR070 Lasalle, Tecumseh, Lakeshore Urban & Essex Urban

Case Processing Summary[a]

		Count	Percent
BufferDist_min	1.00 Within 1km	1	.0%
	2.00 1km to 2km	154	5.1%
	5.00 2km to 5km	179	6.0%
	6.00 Outside 5km	2660	88.8%
Overall		2994	100.0%
Excluded		0	
Total		2994	

a. MODEL = 27UR070 Lasalle, Tecumseh, Lakeshore Urban & Essex Urban

Ratio Statistics for cva2012 / tas_amt[a]

Group	Mean	95% Confidence Interval for Mean		Median
		Lower Bound	Upper Bound	
1.00 Within 1km	1.138	.	.	1.138
2.00 1km to 2km	1.012	.992	1.033	.992
5.00 2km to 5km	.988	.971	1.005	.972
6.00 Outside 5km	.979	.976	.983	.977
Overall	.982	.978	.985	.977

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

Ratio Statistics for cva2012 / tas_amt[a]

Group	95% Confidence Interval for Median		
	Lower Bound	Upper Bound	Actual Coverage
1.00 Within 1km	.	.	.
2.00 1km to 2km	.971	1.020	95.6%
5.00 2km to 5km	.957	.997	96.4%
6.00 Outside 5km	.972	.980	95.4%
Overall	.973	.981	95.4%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 27UR070 Lasalle, Tecumseh, Lakeshore Urban & Essex Urban

MODEL = 31RR010 District of Algoma

Case Processing Summary[a]

		Count	Percent
BufferDist_min	2.00 1km to 2km	5	.3%
	5.00 2km to 5km	7	.5%
	6.00 Outside 5km	1483	99.2%
Overall		1495	100.0%
Excluded		0	
Total		1495	

a. MODEL = 31RR010 District of Algoma

Ratio Statistics for cva2012 / tas_amt[a]

Group	Mean	95% Confidence Interval for Mean		Median
		Lower Bound	Upper Bound	
2.00 1km to 2km	1.036	.763	1.310	1.058
5.00 2km to 5km	.862	.686	1.037	.888
6.00 Outside 5km	.932	.921	.943	.909
Overall	.932	.921	.943	.908

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

Ratio Statistics for cva2012 / tas_amt[a]

Group	95% Confidence Interval for Median		
	Lower Bound	Upper Bound	Actual Coverage
2.00 1km to 2km	.800	1.351	100.0%
5.00 2km to 5km	.684	1.189	98.4%
6.00 Outside 5km	.897	.926	95.2%
Overall	.897	.925	95.1%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 31RR010 District of Algoma

MODEL = 31UR010 Sault Ste. Marie/Prince Twp

Case Processing Summary[a]

		Count	Percent
BufferDist_min	2.00 1km to 2km	12	.4%
	5.00 2km to 5km	3	.1%
	6.00 Outside 5km	2801	99.5%
Overall		2816	100.0%
Excluded		0	
Total		2816	

a. MODEL = 31UR010 Sault Ste. Marie/Prince Twp

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean		
Group	Mean	Lower Bound	Upper Bound	Median
2.00 1km to 2km	.960	.818	1.102	.948
5.00 2km to 5km	1.226	.630	1.823	1.217
6.00 Outside 5km	.972	.966	.977	.963
Overall	.972	.966	.977	.963

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

Ratio Statistics for cva2012 / tas_amt[a]

	95% Confidence Interval for Median		
Group	Lower Bound	Upper Bound	Actual Coverage
2.00 1km to 2km	.739	1.062	96.1%
5.00 2km to 5km	.991	1.471	100.0%
6.00 Outside 5km	.957	.968	95.1%
Overall	.957	.968	95.2%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 31UR010 Sault Ste. Marie/Prince Twp

Ratio Statistics by Distance by Market Type

Rural Market Areas

Case Processing Summary[a]

		Count	Percent
BufferDist_min	1.00 Within 1km	278	1.1%
	2.00 1km to 2km	715	2.7%
	5.00 2km to 5km	2284	8.6%
	6.00 Outside 5km	23135	87.6%
Overall		26412	100.0%
Excluded		0	
Total		26412	

a. MRKTTYPE = RR

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean		
Group	Mean	Lower Bound	Upper Bound	Median
1.00 Within 1km	1.051	1.031	1.071	1.034
2.00 1km to 2km	1.011	.999	1.023	.996
5.00 2km to 5km	1.008	1.002	1.014	.999
6.00 Outside 5km	1.002	1.001	1.004	.995
Overall	1.004	1.002	1.005	.996

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

Ratio Statistics for cva2012 / tas_amt[a]

	95% Confidence Interval for Median		
Group	Lower Bound	Upper Bound	Actual Coverage
1.00 Within 1km	1.011	1.055	95.2%
2.00 1km to 2km	.982	1.008	95.7%
5.00 2km to 5km	.993	1.005	95.3%
6.00 Outside 5km	.993	.997	95.1%
Overall	.994	.997	95.0%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MRKTTYPE = RR

Urban Market Areas

Case Processing Summary[a]

		Count	Percent
BufferDist_min	1.00 Within 1km	1	.0%
	2.00 1km to 2km	274	1.8%
	5.00 2km to 5km	779	5.2%
	6.00 Outside 5km	13958	93.0%
Overall		15012	100.0%
Excluded		0	
Total		15012	

a. MRKTTYPE = UR

Ratio Statistics for cva2012 / tas_amt[a]

Group	Mean	95% Confidence Interval for Mean		Median
		Lower Bound	Upper Bound	
1.00 Within 1km	1.138	.	.	1.138
2.00 1km to 2km	.990	.973	1.007	.975
5.00 2km to 5km	.989	.981	.997	.976
6.00 Outside 5km	.993	.991	.995	.988
Overall	.993	.991	.995	.987

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

Ratio Statistics for cva2012 / tas_amt[a]

Group	95% Confidence Interval for Median		
	Lower Bound	Upper Bound	Actual Coverage
1.00 Within 1km	.	.	.
2.00 1km to 2km	.955	.992	95.4%
5.00 2km to 5km	.969	.984	95.5%
6.00 Outside 5km	.986	.990	95.1%
Overall	.985	.989	95.1%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MRKTTYPE = UR

Appendix D4 - View All Sales and by Market Area

Ratio Statistics All Sales Less than 1km to an IWT by View

Case Processing Summary

		Count	Percent
view	full	190	68.1%
	none	56	20.1%
	partial	33	11.8%
Overall		279	100.0%
Excluded		0	
Total		279	

Ratio Statistics for cva2012 / tas_amt

		95% Confidence Interval for Mean			95% Confidence Interval for Median		
Group	Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage
full	1.054	1.029	1.078	1.032	1.001	1.060	95.0%
none	1.070	1.031	1.110	1.064	.998	1.092	95.6%
partial	1.007	.953	1.060	1.005	.952	1.057	96.5%
Overall	1.051	1.032	1.071	1.034	1.011	1.057	95.8%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

Ratio Statistics All Sales 1km to 2km to an IWT by View

Case Processing Summary

		Count	Percent
view	full	239	24.2%
	none	647	65.4%
	partial	103	10.4%
Overall		989	100.0%
Excluded		0	
Total		989	

Ratio Statistics for cva2012 / tas_amt

		95% Confidence Interval for Mean			95% Confidence Interval for Median		
Group	Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage
full	1.021	1.000	1.042	1.001	.981	1.026	96.2%
none	1.000	.988	1.012	.984	.972	.997	95.1%
partial	.999	.968	1.029	.980	.939	1.018	95.2%
Overall	1.005	.995	1.015	.989	.979	1.000	95.1%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

Ratio Statistics Sales less than 1km to an IWT by View by Market Area

MODEL = 05RR030 Napanee,Loyalist Twp, Frontenac/Lennox & Addington Counties South Rural/WF

Case Processing Summary[a]

		Count	Percent
view	full	8	61.5%
	none	2	15.4%
	partial	3	23.1%
Overall		13	100.0%
Excluded		0	
Total		13	

a. MODEL = 05RR030 Napanee,Loyalist Twp, Frontenac/Lennox & Addington Counties South Rural/WF

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean			95% Confidence Interval for Median		
Group	Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage
full	1.066	.900	1.232	1.083	.804	1.295	99.2%
none	1.068	-1.220	3.355	1.068	.888	1.248	100.0%
partial	.842	.538	1.146	.823	.731	.973	100.0%
Overall	1.015	.893	1.136	.981	.813	1.248	97.8%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 05RR030 Napanee,Loyalist Twp, Frontenac/Lennox & Addington Counties South Rural/WF

MODEL = 20RR010 Brant, Halidmand, Norfolk Counties - Rural/WF

Case Processing Summary[a]

		Count	Percent
view	full	12	48.0%
	none	12	48.0%
	partial	1	4.0%
Overall		25	100.0%
Excluded		0	
Total		25	

a. MODEL = 20RR010 Brant, Halidmand, Norfolk Counties - Rural/WF

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean			95% Confidence Interval for Median		
Group	Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage
full	1.059	.951	1.166	1.025	.920	1.172	96.1%
none	1.004	.926	1.082	.998	.875	1.118	96.1%
partial	1.212	.	.	1.212	.	.	.
Overall	1.038	.977	1.100	1.020	.941	1.118	95.7%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 20RR010 Brant, Halidmand, Norfolk Counties - Rural/WF

MODEL = 22RR010 Dufferin & Wellington Counties - Rural

Case Processing Summary[a]

		Count	Percent
view	full	20	76.9%
	none	3	11.5%
	partial	3	11.5%
Overall		26	100.0%
Excluded		0	
Total		26	

a. MODEL = 22RR010 Dufferin & Wellington Counties - Rural

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean			95% Confidence Interval for Median		
Group	Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage
full	1.051	.965	1.136	1.036	.927	1.121	95.9%
none	1.030	.624	1.436	.943	.929	1.219	100.0%
partial	.998	.979	1.017	1.000	.990	1.005	100.0%
Overall	1.042	.975	1.110	1.010	.943	1.090	97.1%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 22RR010 Dufferin & Wellington Counties - Rural

MODEL = 23RR010 Elgin, Middlesex & Oxford Counties - Rural

Case Processing Summary[a]

		Count	Percent
view	full	2	50.0%
	partial	2	50.0%
Overall		4	100.0%
Excluded		0	
Total		4	

a. MODEL = 23RR010 Elgin, Middlesex & Oxford Counties - Rural

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean			95% Confidence Interval for Median		
Group	Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage
full	1.059	.635	1.482	1.059	1.025	1.092	100.0%
partial	1.088	.406	1.770	1.088	1.034	1.142	100.0%
Overall	1.073	.987	1.160	1.063	1.025	1.142	100.0%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 23RR010 Elgin, Middlesex & Oxford Counties - Rural

MODEL = 24RR010 Huron & Perth Counties - Rural/Waterfront

Case Processing Summary[a]

		Count	Percent
view	full	2	100.0%
Overall		2	100.0%
Excluded		0	
Total		2	

a. MODEL = 24RR010 Huron & Perth Counties - Rural/Waterfront

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean			95% Confidence Interval for Median		
Group	Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage
full	1.219	.478	1.960	1.219	1.161	1.277	100.0%
Overall	1.219	.478	1.960	1.219	1.161	1.277	100.0%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 24RR010 Huron & Perth Counties - Rural/Waterfront

MODEL = 25RR010 Grey & Bruce Counties - Rural/Waterfront

Case Processing Summary[a]

		Count	Percent
view	full	10	83.3%
	none	1	8.3%
	partial	1	8.3%
Overall		12	100.0%
Excluded		0	
Total		12	

a. MODEL = 25RR010 Grey & Bruce Counties - Rural/Waterfront

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean			95% Confidence Interval for Median		
Group	Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage
full	1.126	.914	1.338	1.045	.917	1.271	97.9%
none	1.444	.	.	1.444	.	.	.
partial	.875	.	.	.875	.	.	.
Overall	1.131	.944	1.318	1.045	.917	1.271	96.1%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 25RR010 Grey & Bruce Counties - Rural/Waterfront

MODEL = 26RR010 Chatham-Kent - Rural/Wallaceburg

Case Processing Summary[a]

		Count	Percent
view	full	61	73.5%
	none	16	19.3%
	partial	6	7.2%
Overall		83	100.0%
Excluded		0	
Total		83	

a. MODEL = 26RR010 Chatham-Kent - Rural/Wallaceburg

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean			95% Confidence Interval for Median		
Group	Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage
full	1.088	1.043	1.133	1.048	1.024	1.097	96.0%
none	1.094	1.008	1.180	1.075	.998	1.260	97.9%
partial	1.032	.948	1.115	1.049	.926	1.129	96.9%
Overall	1.085	1.048	1.122	1.055	1.036	1.087	95.2%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 26RR010 Chatham-Kent - Rural/Wallaceburg

MODEL = 26RR030 Lambton County - Rural/WF

Case Processing Summary[a]

		Count	Percent
view	partial	1	100.0%
Overall		1	100.0%
Excluded		0	
Total		1	

a. MODEL = 26RR030 Lambton County - Rural/WF

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean			95% Confidence Interval for Median		
Group	Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage
partial	.862	.	.	.862	.	.	.
Overall	.862	.	.	.862	.	.	.

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 26RR030 Lambton County - Rural/WF

MODEL = 27RR120 Essex County

Case Processing Summary[a]

		Count	Percent
view	full	74	66.1%
	none	22	19.6%
	partial	16	14.3%
Overall		112	100.0%
Excluded		0	
Total		112	

a. MODEL = 27RR120 Essex County

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean			95% Confidence Interval for Median		
Group	Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage
full	1.009	.976	1.041	.993	.964	1.048	95.3%
none	1.078	1.024	1.132	1.058	.985	1.162	98.3%
partial	1.024	.928	1.120	1.035	.885	1.214	97.9%
Overall	1.024	.997	1.052	1.005	.981	1.051	95.3%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 27RR120 Essex County

MODEL = 27UR070 Lasalle, Tecumseh, Lakeshore Urban & Essex Urban

Case Processing Summary[a]

		Count	Percent
view	full	1	100.0%
Overall		1	100.0%
Excluded		0	
Total		1	

a. MODEL = 27UR070 Lasalle, Tecumseh, Lakeshore Urban & Essex Urban

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean			95% Confidence Interval for Median		
Group	Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage
full	1.138	.	.	1.138	.	.	.
Overall	1.138	.	.	1.138	.	.	.

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 27UR070 Lasalle, Tecumseh, Lakeshore Urban & Essex Urban

Ratio Statistics Sales 1km to 2km to an IWT by View by Market Area

MODEL = 05RR030 Napanee,Loyalist Twp, Frontenac/Lennox & Addington Counties South Rural/WF

Case Processing Summary[a]

		Count	Percent
view	none	5	71.4%
	partial	2	28.6%
Overall		7	100.0%
Excluded		0	
Total		7	

a. MODEL = 05RR030 Napanee,Loyalist Twp, Frontenac/Lennox & Addington Counties South Rural/WF

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean			95% Confidence Interval for Median		
Group	Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage
none	.944	.616	1.272	1.103	.655	1.197	100.0%
partial	1.354	-1.482	4.191	1.354	1.131	1.578	100.0%
Overall	1.061	.764	1.358	1.105	.655	1.578	98.4%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 05RR030 Napanee,Loyalist Twp, Frontenac/Lennox & Addington Counties South Rural/WF

MODEL = 20RR010 Brant, Halidmand, Norfolk Counties - Rural/WF

Case Processing Summary[a]

		Count	Percent
view	full	2	22.2%
	none	7	77.8%
Overall		9	100.0%
Excluded		0	
Total		9	

a. MODEL = 20RR010 Brant, Halidmand, Norfolk Counties - Rural/WF

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean			95% Confidence Interval for Median		
Group	Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage
full	1.109	-2.798	5.016	1.109	.801	1.417	100.0%
none	.919	.819	1.018	.933	.783	1.112	98.4%
Overall	.961	.808	1.113	.933	.801	1.112	96.1%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 20RR010 Brant, Halidmand, Norfolk Counties - Rural/WF

MODEL = 22RR010 Dufferin & Wellington Counties - Rural

Case Processing Summary[a]

		Count	Percent
view	full	10	40.0%
	none	7	28.0%
	partial	8	32.0%
Overall		25	100.0%
Excluded		0	
Total		25	

a. MODEL = 22RR010 Dufferin & Wellington Counties - Rural

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean			95% Confidence Interval for Median		
Group	Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage
full	1.016	.900	1.132	1.032	.852	1.158	97.9%
none	1.074	.924	1.225	1.086	.853	1.341	98.4%
partial	.990	.799	1.182	1.120	.623	1.189	99.2%
Overall	1.024	.949	1.099	1.071	.921	1.137	95.7%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 22RR010 Dufferin & Wellington Counties - Rural

MODEL = 22UR030 Wellington County Villages

Case Processing Summary[a]

		Count	Percent
view	full	6	6.5%
	none	81	88.0%
	partial	5	5.4%
Overall		92	100.0%
Excluded		0	
Total		92	

a. MODEL = 22UR030 Wellington County Villages

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean			95% Confidence Interval for Median		
Group	Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage
full	.879	.837	.922	.887	.831	.929	96.9%
none	.958	.923	.993	.954	.911	.972	95.5%
partial	.950	.864	1.036	.980	.864	1.015	100.0%
Overall	.952	.922	.983	.948	.905	.967	95.3%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 22UR030 Wellington County Villages

MODEL = 23RR010 Elgin, Middlesex & Oxford Counties - Rural

Case Processing Summary[a]

		Count	Percent
view	full	2	3.8%
	none	48	92.3%
	partial	2	3.8%
Overall		52	100.0%
Excluded		0	
Total		52	

a. MODEL = 23RR010 Elgin, Middlesex & Oxford Counties - Rural

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean			95% Confidence Interval for Median		
Group	Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage
full	.954	-.151	2.058	.954	.867	1.041	100.0%
none	.987	.929	1.046	.935	.899	1.023	97.1%
partial	1.190	-2.956	5.337	1.190	.864	1.517	100.0%
Overall	.994	.936	1.052	.935	.899	1.023	96.4%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 23RR010 Elgin, Middlesex & Oxford Counties - Rural

MODEL = 24RR010 Huron & Perth Counties - Rural/Waterfront

Case Processing Summary[a]

		Count	Percent
view	full	2	66.7%
	partial	1	33.3%
Overall		3	100.0%
Excluded		0	
Total		3	

a. MODEL = 24RR010 Huron & Perth Counties - Rural/Waterfront

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean			95% Confidence Interval for Median		
Group	Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage
full	1.212	.675	1.749	1.212	1.170	1.254	100.0%
partial	1.036	.	.	1.036	.	.	.
Overall	1.153	.879	1.427	1.170	1.036	1.254	100.0%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 24RR010 Huron & Perth Counties - Rural/Waterfront

MODEL = 25RR010 Grey & Bruce Counties - Rural/Waterfront

Case Processing Summary[a]

		Count	Percent
view	full	13	68.4%
	none	4	21.1%
	partial	2	10.5%
Overall		19	100.0%
Excluded		0	
Total		19	

a. MODEL = 25RR010 Grey & Bruce Counties - Rural/Waterfront

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean			95% Confidence Interval for Median		
Group	Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage
full	1.073	.979	1.167	1.048	.977	1.188	97.8%
none	.966	.824	1.107	.981	.852	1.049	100.0%
partial	.956	.374	1.538	.956	.910	1.002	100.0%
Overall	1.038	.969	1.107	1.029	.941	1.092	98.1%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 25RR010 Grey & Bruce Counties - Rural/Waterfront

MODEL = 25UR010 Grey & Bruce Counties - Urban

Case Processing Summary[a]

		Count	Percent
view	none	15	93.8%
	partial	1	6.3%
Overall		16	100.0%
Excluded		0	
Total		16	

a. MODEL = 25UR010 Grey & Bruce Counties - Urban

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean			95% Confidence Interval for Median		
Group	Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage
none	1.025	.965	1.085	1.026	.928	1.134	96.5%
partial	.746	.	.	.746	.	.	.
Overall	1.007	.940	1.075	1.026	.899	1.134	97.9%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 25UR010 Grey & Bruce Counties - Urban

MODEL = 26RR010 Chatham-Kent - Rural/Wallaceburg

Case Processing Summary[a]

		Count	Percent
view	full	78	26.0%
	none	196	65.3%
	partial	26	8.7%
Overall		300	100.0%
Excluded		0	
Total		300	

a. MODEL = 26RR010 Chatham-Kent - Rural/Wallaceburg

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean			95% Confidence Interval for Median		
Group	Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage
full	1.027	.981	1.073	.999	.958	1.030	96.9%
none	1.031	1.007	1.055	1.012	.991	1.040	96.2%
partial	.989	.936	1.041	.972	.924	1.056	97.1%
Overall	1.027	1.007	1.047	1.006	.983	1.027	95.7%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 26RR010 Chatham-Kent - Rural/Wallaceburg

MODEL = 26RR030 Lambton County - Rural/WF

Case Processing Summary[a]

		Count	Percent
view	full	1	4.3%
	none	20	87.0%
	partial	2	8.7%
Overall		23	100.0%
Excluded		0	
Total		23	

a. MODEL = 26RR030 Lambton County - Rural/WF

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean			95% Confidence Interval for Median		
Group	Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage
full	.841	.	.	.841	.	.	.
none	1.004	.965	1.042	1.002	.945	1.049	95.9%
partial	.968	.647	1.289	.968	.943	.993	100.0%
Overall	.993	.957	1.030	.993	.943	1.030	96.5%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 26RR030 Lambton County - Rural/WF

MODEL = 27RR120 Essex County

Case Processing Summary[a]

		Count	Percent
view	full	99	36.4%
	none	132	48.5%
	partial	41	15.1%
Overall		272	100.0%
Excluded		0	
Total		272	

a. MODEL = 27RR120 Essex County

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean			95% Confidence Interval for Median		
Group	Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage
full	1.011	.983	1.039	.999	.977	1.024	95.6%
none	.981	.961	1.001	.983	.961	.997	95.5%
partial	.989	.945	1.033	.948	.920	1.029	97.2%
Overall	.993	.978	1.008	.984	.969	1.000	95.5%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 27RR120 Essex County

MODEL = 27UR070 Lasalle, Tecumseh, Lakeshore Urban & Essex Urban

Case Processing Summary[a]

		Count	Percent
view	full	25	16.2%
	none	116	75.3%
	partial	13	8.4%
Overall		154	100.0%
Excluded		0	
Total		154	

a. MODEL = 27UR070 Lasalle, Tecumseh, Lakeshore Urban & Essex Urban

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean			95% Confidence Interval for Median		
Group	Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage
full	1.052	.997	1.107	1.036	.983	1.125	95.7%
none	1.003	.980	1.027	.980	.948	1.009	96.8%
partial	1.016	.945	1.087	1.014	.934	1.121	97.8%
Overall	1.012	.992	1.033	.992	.971	1.020	95.6%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 27UR070 Lasalle, Tecumseh, Lakeshore Urban & Essex Urban

MODEL = 31RR010 District of Algoma

Case Processing Summary[a]

		Count	Percent
view	none	5	100.0%
Overall		5	100.0%
Excluded		0	
Total		5	

a. MODEL = 31RR010 District of Algoma

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean			95% Confidence Interval for Median		
Group	Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage
none	1.036	.763	1.310	1.058	.800	1.351	100.0%
Overall	1.036	.763	1.310	1.058	.800	1.351	100.0%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 31RR010 District of Algoma

MODEL = 31UR010 Sault Ste. Marie/Prince Twp

Case Processing Summary[a]

		Count	Percent
view	full	1	8.3%
	none	11	91.7%
Overall		12	100.0%
Excluded		0	
Total		12	

a. MODEL = 31UR010 Sault Ste. Marie/Prince Twp

Ratio Statistics for cva2012 / tas_amt[a]

		95% Confidence Interval for Mean			95% Confidence Interval for Median		
Group	Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage
full	.739	.	.	.739	.	.	.
none	.980	.830	1.130	.963	.714	1.267	98.8%
Overall	.960	.818	1.102	.948	.739	1.062	96.1%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

a. MODEL = 31UR010 Sault Ste. Marie/Prince Twp

Appendix D5 - Distance Boxplots

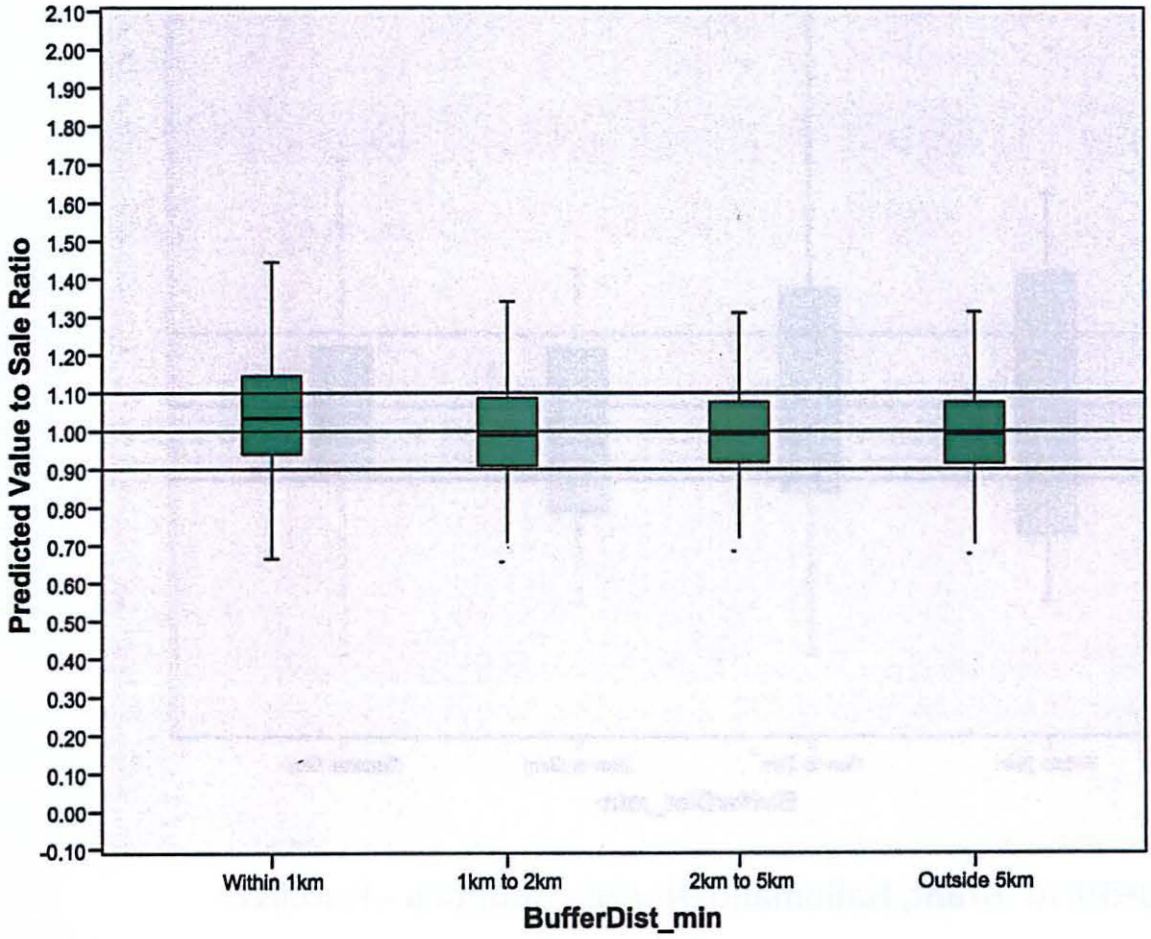
Boxplot ASR by Distance All Sales

BufferDist_min

Case Processing Summary

		Cases					
		Valid		Missing		Total	
	BufferDist_min	N	Percent	N	Percent	N	Percent
ASRX	1.00 Within 1km	279	100.0%	0	.0%	279	100.0%
	2.00 1km to 2km	989	100.0%	0	.0%	989	100.0%
	5.00 2km to 5km	3063	100.0%	0	.0%	3063	100.0%
	6.00 Outside 5km	37093	100.0%	0	.0%	37093	100.0%

ASRX



Boxplots ASR by Distance by Market Area

MODEL = 05RR030 Napanee,Loyalist Twp, Frontenac/Lennox & Addington Counties South Rural/WF

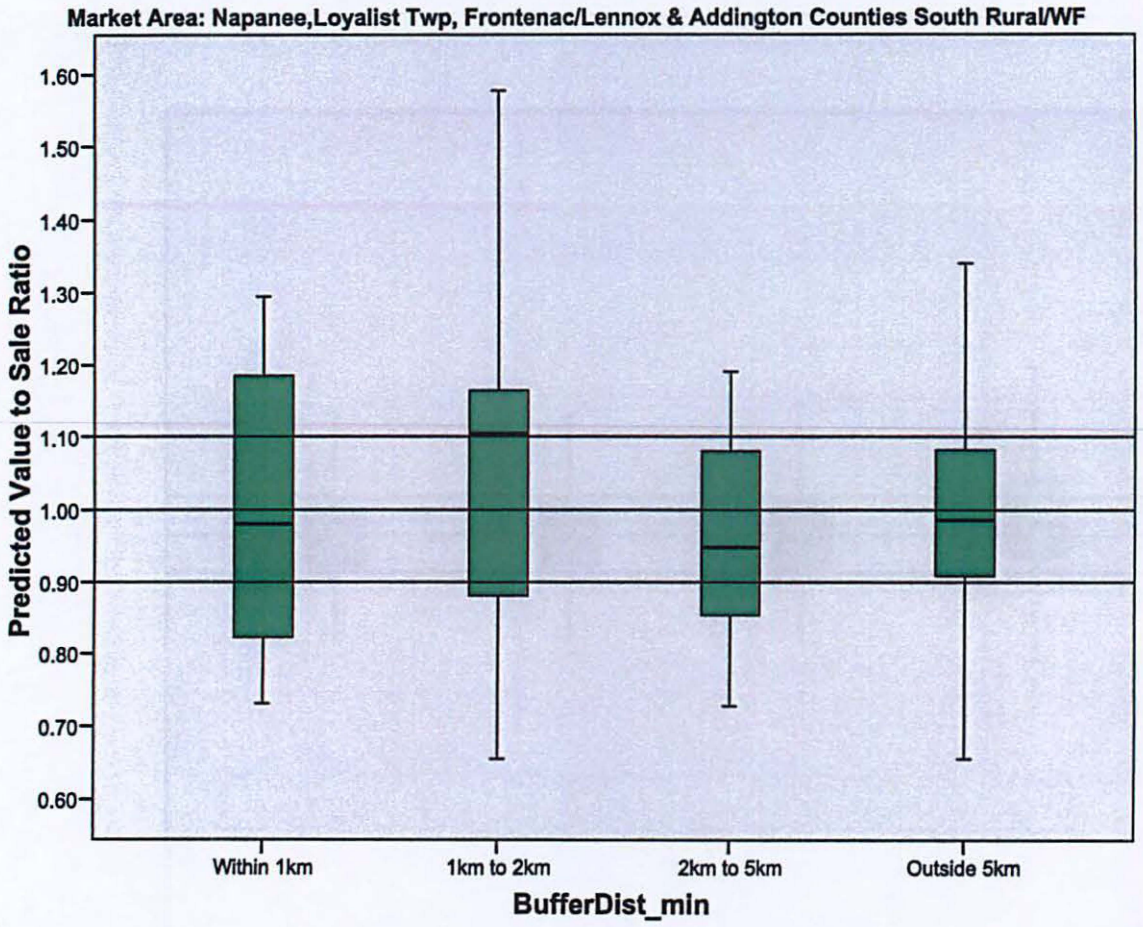
BufferDist_min

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	BufferDist_min	N	Percent	N	Percent	N	Percent
ASRX	1.00 Within 1km	13	100.0%	0	.0%	13	100.0%
	2.00 1km to 2km	7	100.0%	0	.0%	7	100.0%
	5.00 2km to 5km	8	100.0%	0	.0%	8	100.0%
	6.00 Outside 5km	2606	100.0%	0	.0%	2606	100.0%

a. MODEL = 05RR030 Napanee,Loyalist Twp, Frontenac/Lennox & Addington Counties South Rural/WF

ASRX



MODEL = 20RR010 Brant, Halidmand, Norfolk Counties - Rural/WF

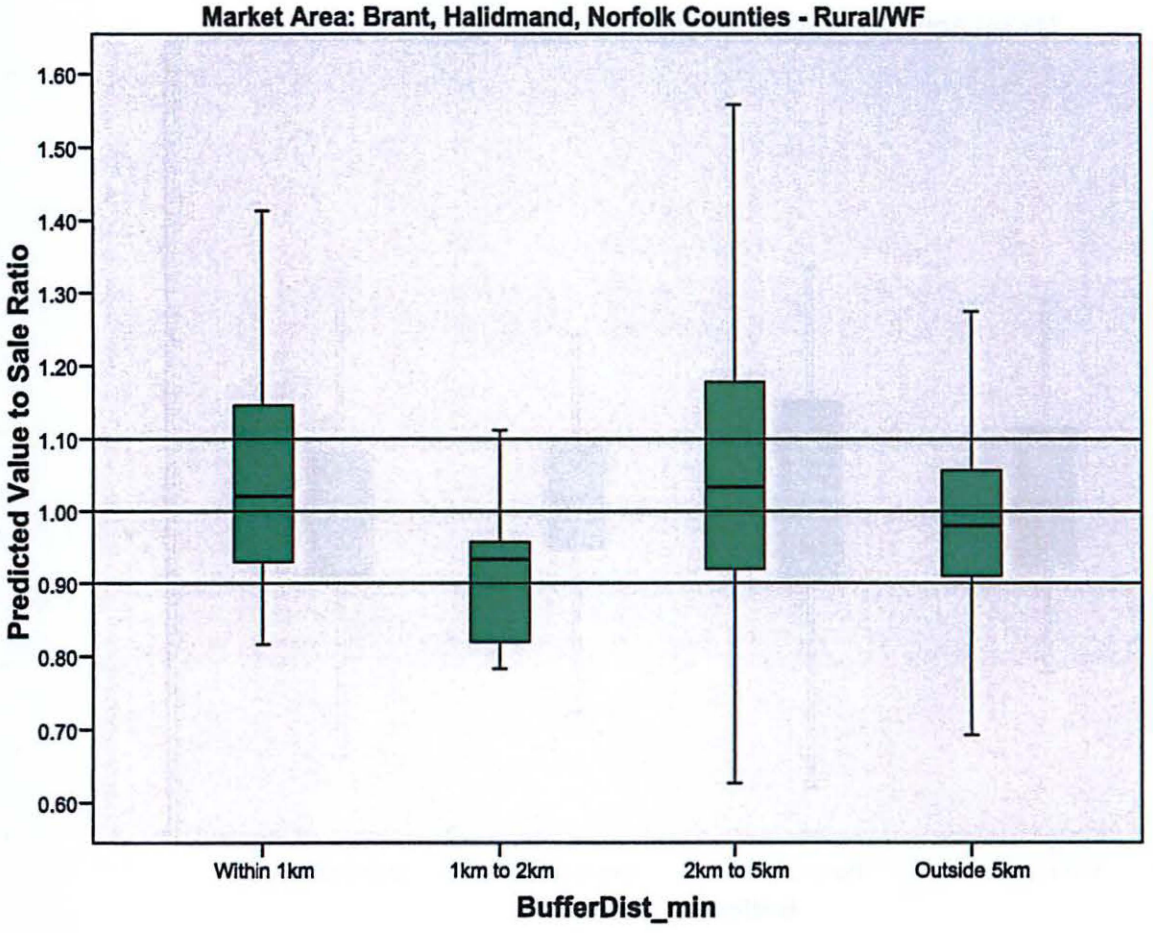
BufferDist_min

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	BufferDist_min	N	Percent	N	Percent	N	Percent
ASRX	1.00 Within 1km	25	100.0%	0	.0%	25	100.0%
	2.00 1km to 2km	9	100.0%	0	.0%	9	100.0%
	5.00 2km to 5km	71	100.0%	0	.0%	71	100.0%
	6.00 Outside 5km	4868	100.0%	0	.0%	4868	100.0%

a. MODEL = 20RR010 Brant, Halidmand, Norfolk Counties - Rural/WF

ASRX



MODEL = 22RR010 Dufferin & Wellington Counties - Rural

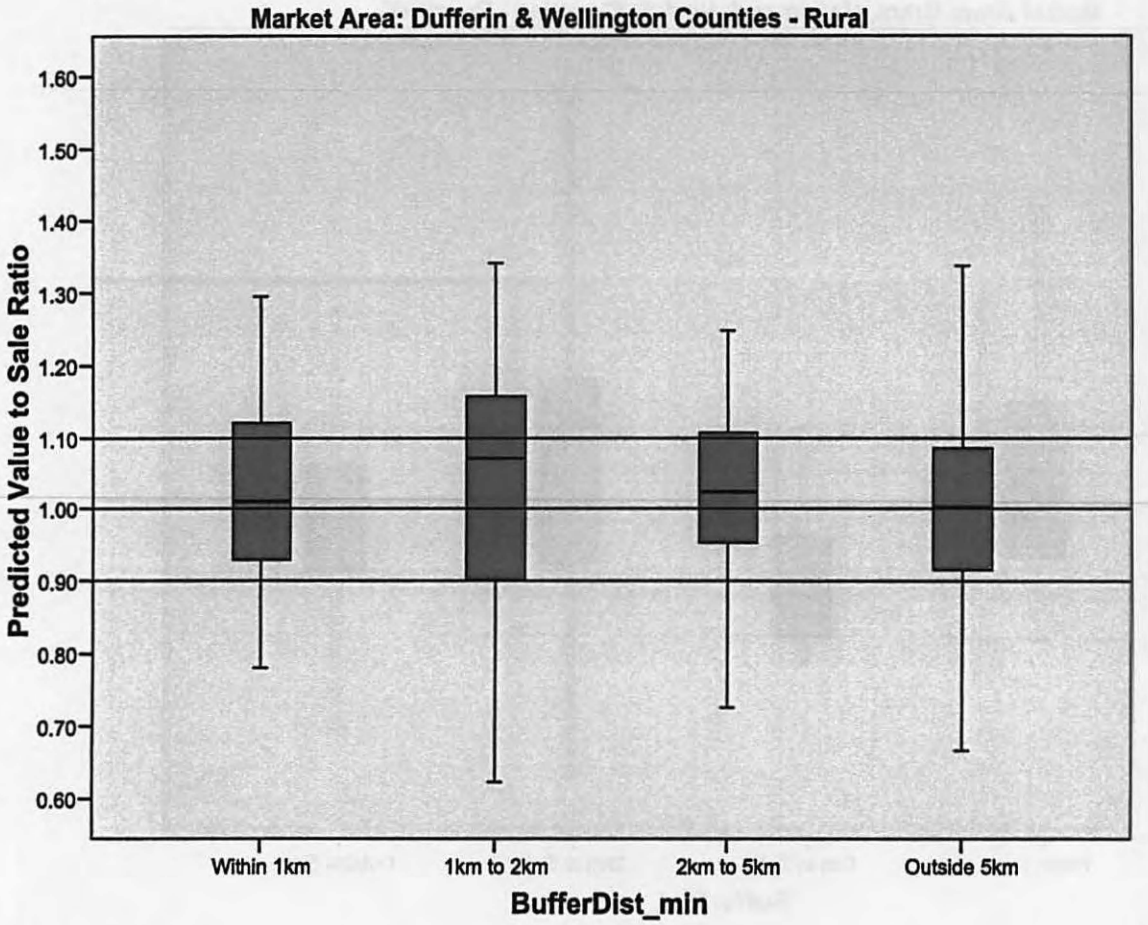
BufferDist_min

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	BufferDist_min	N	Percent	N	Percent	N	Percent
ASRX	1.00 Within 1km	26	100.0%	0	.0%	26	100.0%
	2.00 1km to 2km	25	100.0%	0	.0%	25	100.0%
	5.00 2km to 5km	83	100.0%	0	.0%	83	100.0%
	6.00 Outside 5km	1597	100.0%	0	.0%	1597	100.0%

a. MODEL = 22RR010 Dufferin & Wellington Counties - Rural

ASRX



MODEL = 22UR020 Dufferin County Villages

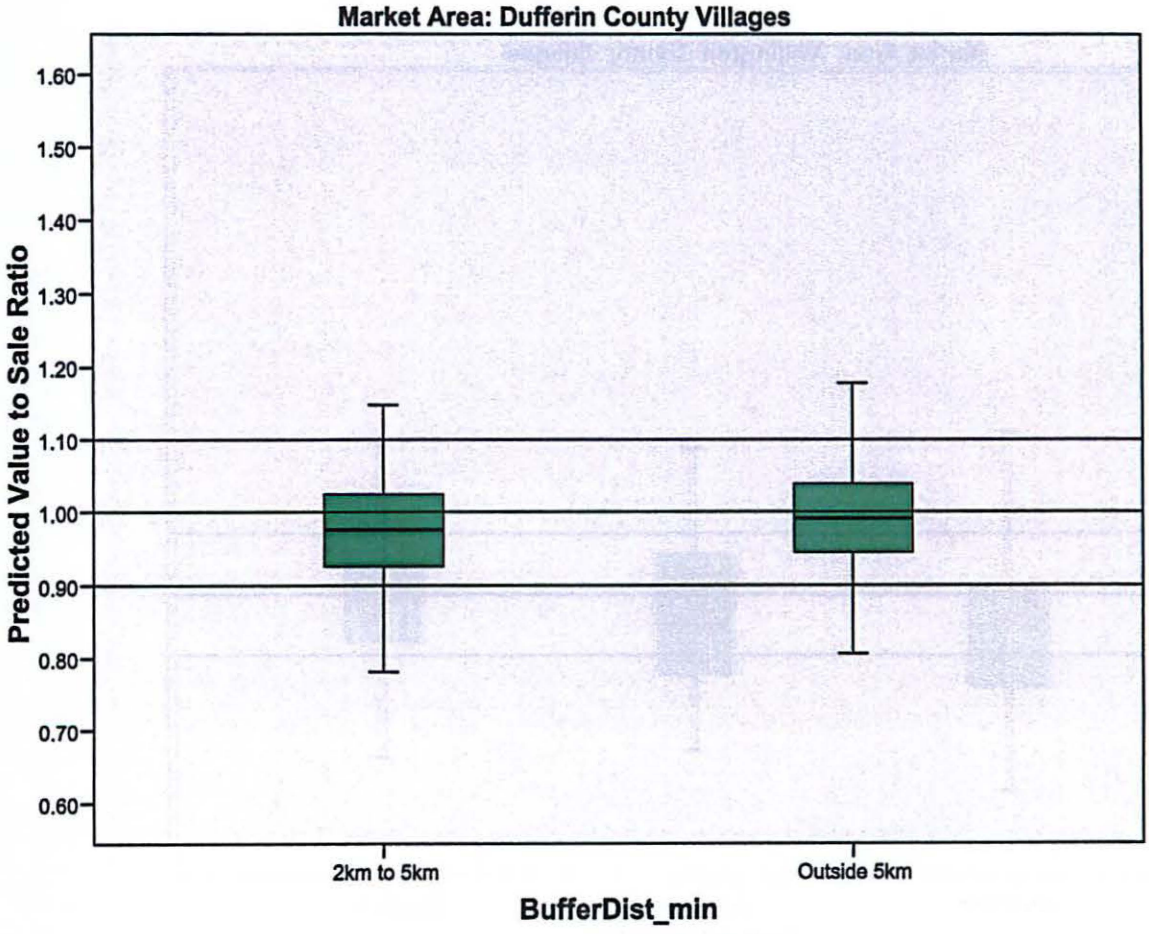
BufferDist_min

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	BufferDist_min	N	Percent	N	Percent	N	Percent
ASRX	5.00 2km to 5km	404	100.0%	0	.0%	404	100.0%
	6.00 Outside 5km	2017	100.0%	0	.0%	2017	100.0%

a. MODEL = 22UR020 Dufferin County Villages

ASRX



MODEL = 22UR030 Wellington County Villages

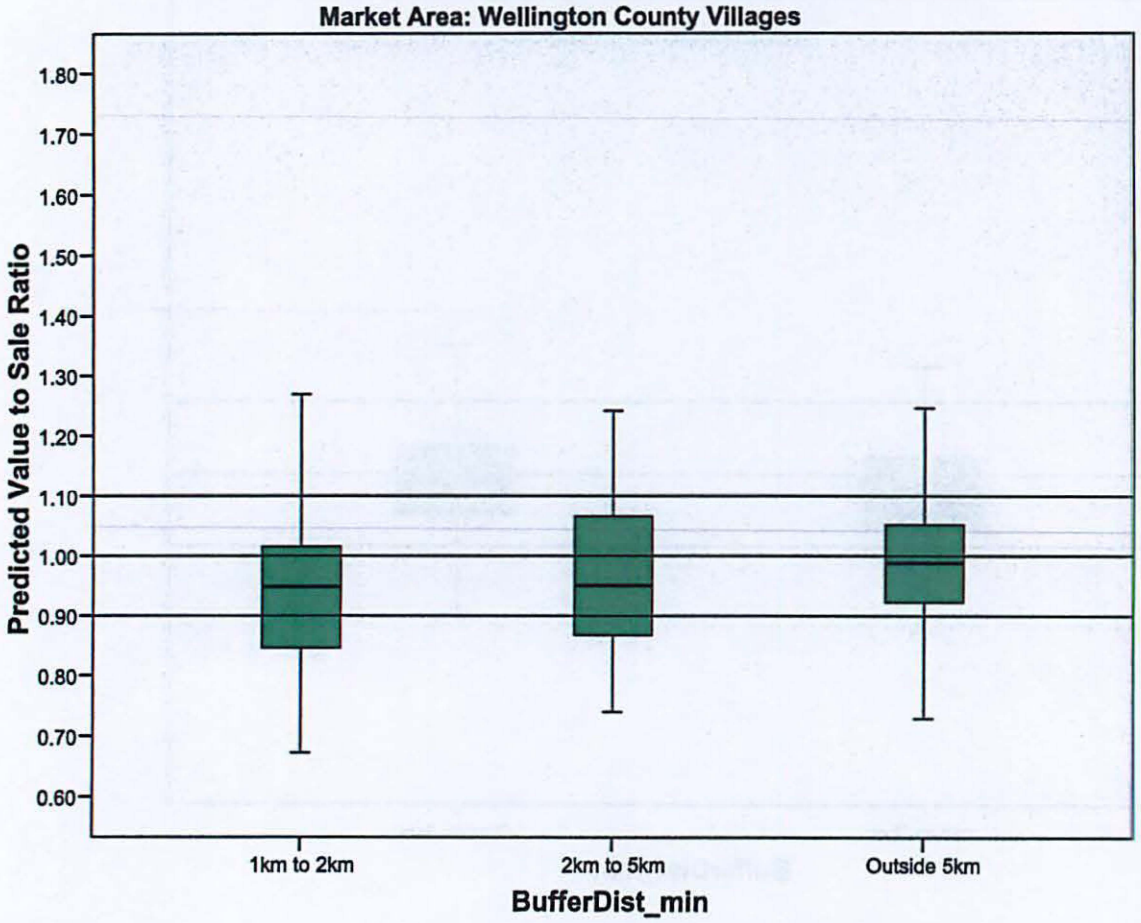
BufferDist_min

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	BufferDist_min	N	Percent	N	Percent	N	Percent
ASRX	2.00 1km to 2km	92	100.0%	0	.0%	92	100.0%
	5.00 2km to 5km	32	100.0%	0	.0%	32	100.0%
	6.00 Outside 5km	2300	100.0%	0	.0%	2300	100.0%

a. MODEL = 22UR030 Wellington County Villages

ASRX



MODEL = 23RR010 Elgin, Middlesex & Oxford Counties - Rural

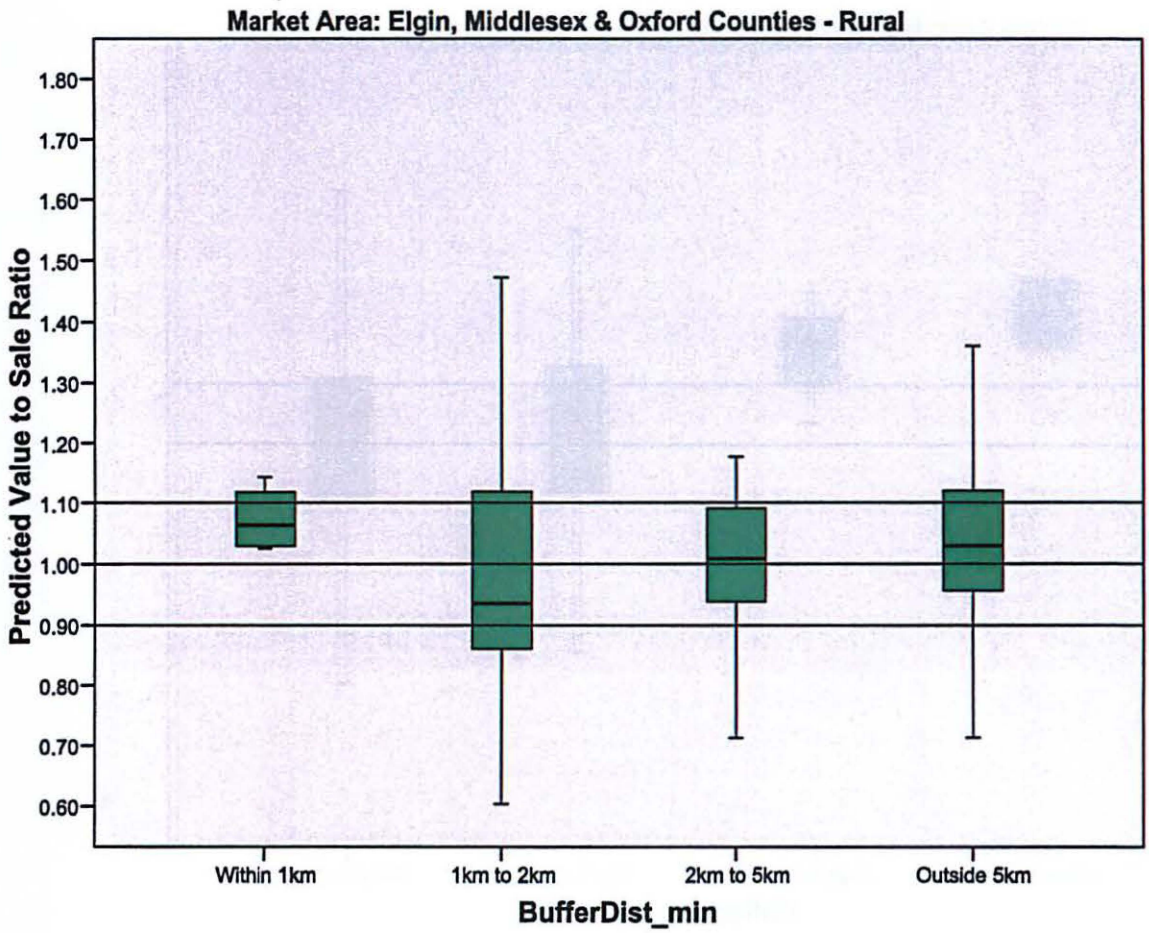
BufferDist_min

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	BufferDist_min	N	Percent	N	Percent	N	Percent
ASRX	1.00 Within 1km	4	100.0%	0	.0%	4	100.0%
	2.00 1km to 2km	52	100.0%	0	.0%	52	100.0%
	5.00 2km to 5km	72	100.0%	0	.0%	72	100.0%
	6.00 Outside 5km	4300	100.0%	0	.0%	4300	100.0%

a. MODEL = 23RR010 Elgin, Middlesex & Oxford Counties - Rural

ASRX



MODEL = 24RR010 Huron & Perth Counties - Rural/Waterfront

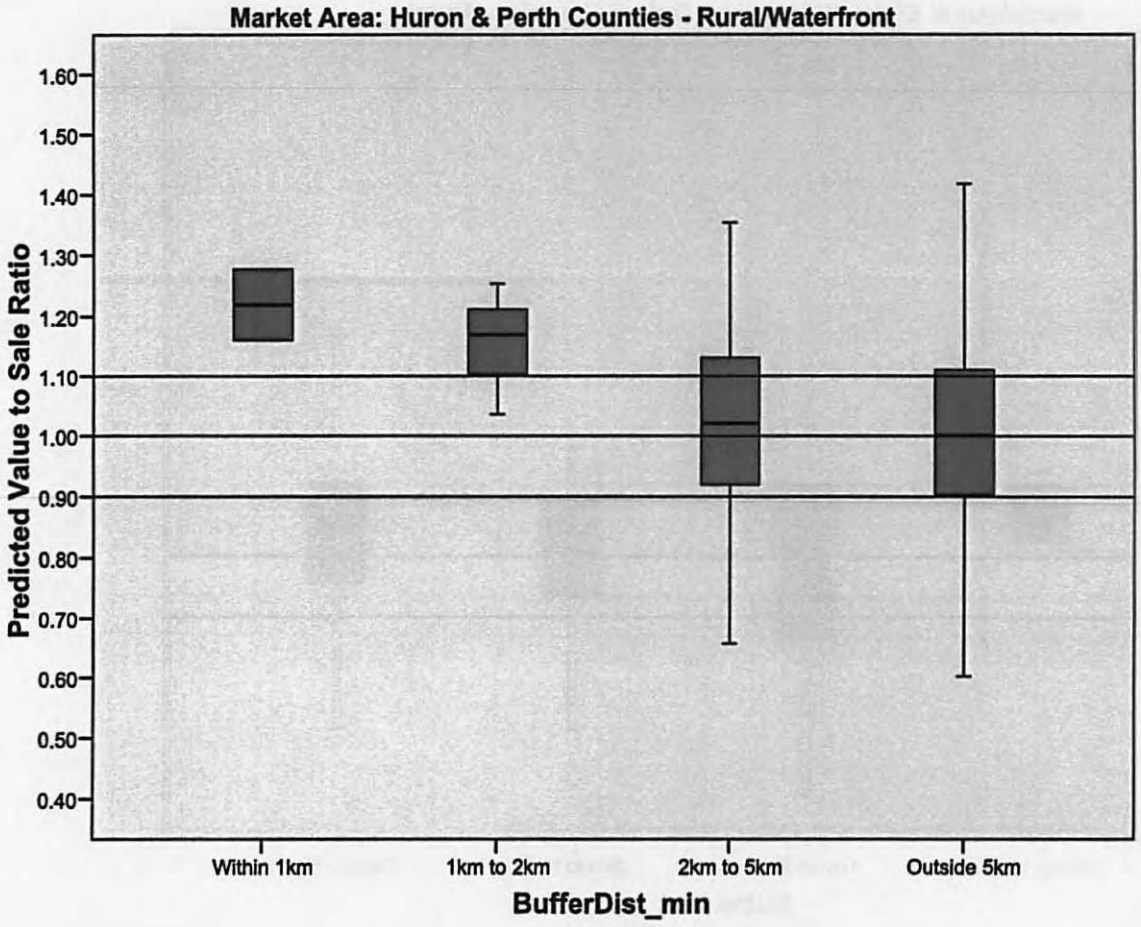
BufferDist_min

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	BufferDist_min	N	Percent	N	Percent	N	Percent
ASRX	1.00 Within 1km	2	100.0%	0	.0%	2	100.0%
	2.00 1km to 2km	3	100.0%	0	.0%	3	100.0%
	5.00 2km to 5km	98	100.0%	0	.0%	98	100.0%
	6.00 Outside 5km	786	100.0%	0	.0%	786	100.0%

a. MODEL = 24RR010 Huron & Perth Counties - Rural/Waterfront

ASRX



MODEL = 25RR010 Grey & Bruce Counties - Rural/Waterfront

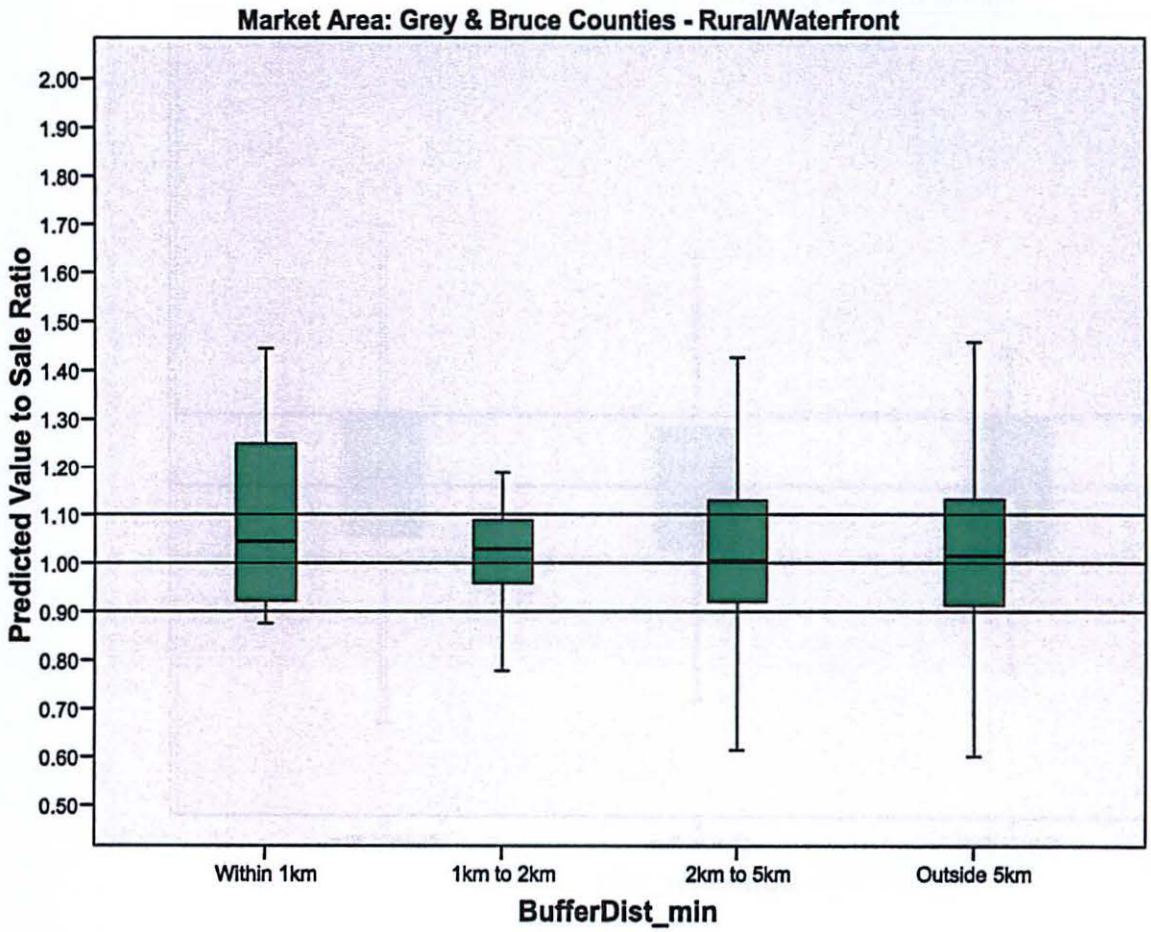
BufferDist_min

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	BufferDist_min	N	Percent	N	Percent	N	Percent
ASRX	1.00 Within 1km	12	100.0%	0	.0%	12	100.0%
	2.00 1km to 2km	19	100.0%	0	.0%	19	100.0%
	5.00 2km to 5km	265	100.0%	0	.0%	265	100.0%
	6.00 Outside 5km	2692	100.0%	0	.0%	2692	100.0%

a. MODEL = 25RR010 Grey & Bruce Counties - Rural/Waterfront

ASRX



MODEL = 25UR010 Grey & Bruce Counties - Urban

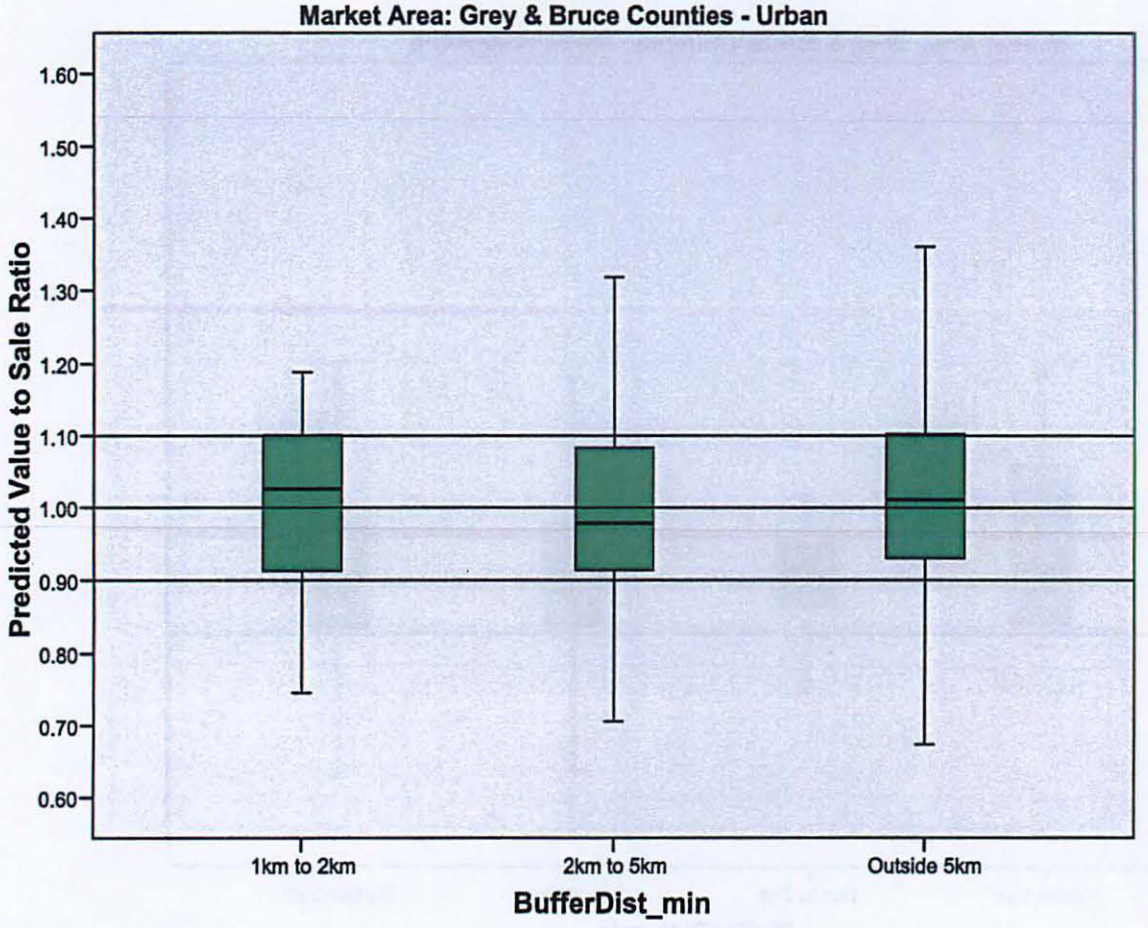
BufferDist_min

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	BufferDist_min	N	Percent	N	Percent	N	Percent
ASRX	2.00 1km to 2km	16	100.0%	0	.0%	16	100.0%
	5.00 2km to 5km	161	100.0%	0	.0%	161	100.0%
	6.00 Outside 5km	4180	100.0%	0	.0%	4180	100.0%

a. MODEL = 25UR010 Grey & Bruce Counties - Urban

ASRX



MODEL = 26RR010 Chatham-Kent - Rural/Wallaceburg

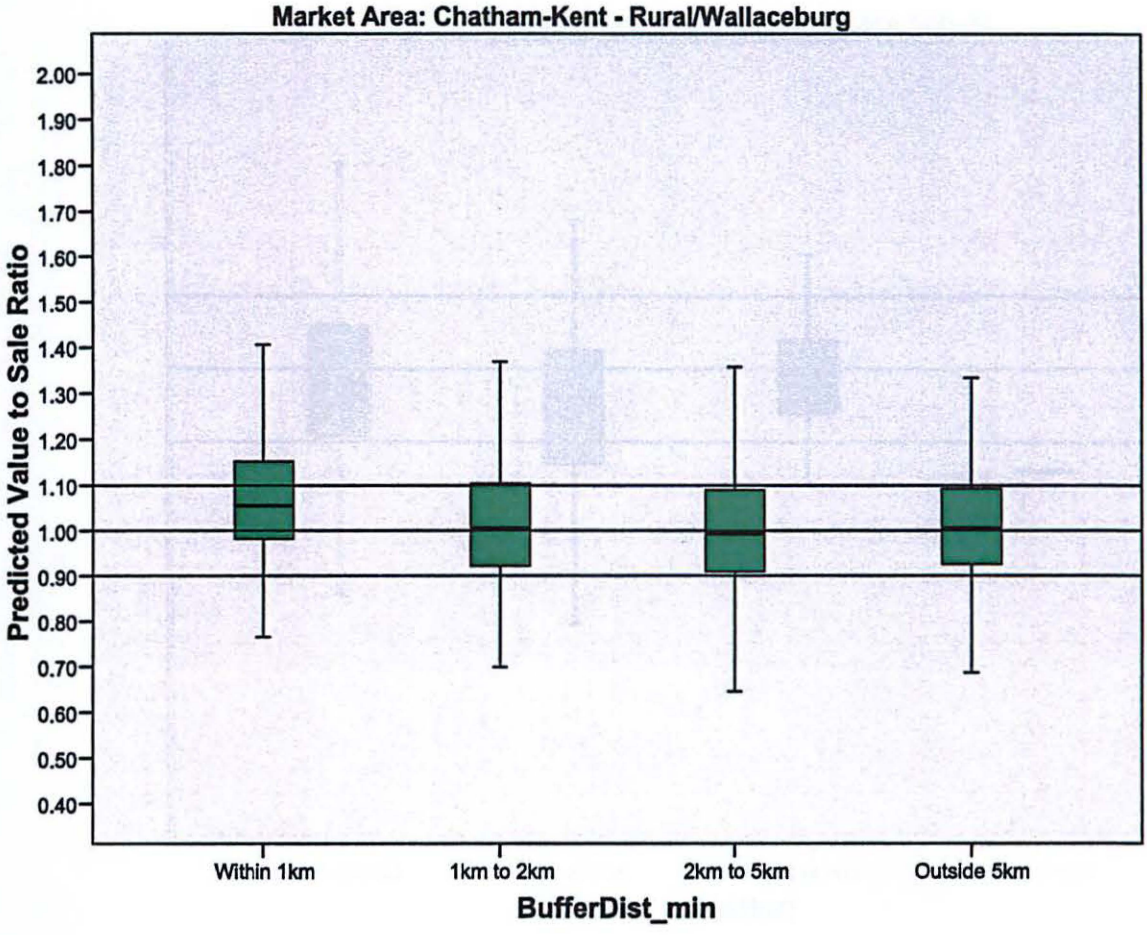
BufferDist_min

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	BufferDist_min	N	Percent	N	Percent	N	Percent
ASRX	1.00 Within 1km	83	100.0%	0	.0%	83	100.0%
	2.00 1km to 2km	300	100.0%	0	.0%	300	100.0%
	5.00 2km to 5km	836	100.0%	0	.0%	836	100.0%
	6.00 Outside 5km	663	100.0%	0	.0%	663	100.0%

a. MODEL = 26RR010 Chatham-Kent - Rural/Wallaceburg

ASRX



MODEL = 26RR030 Lambton County - Rural/WF

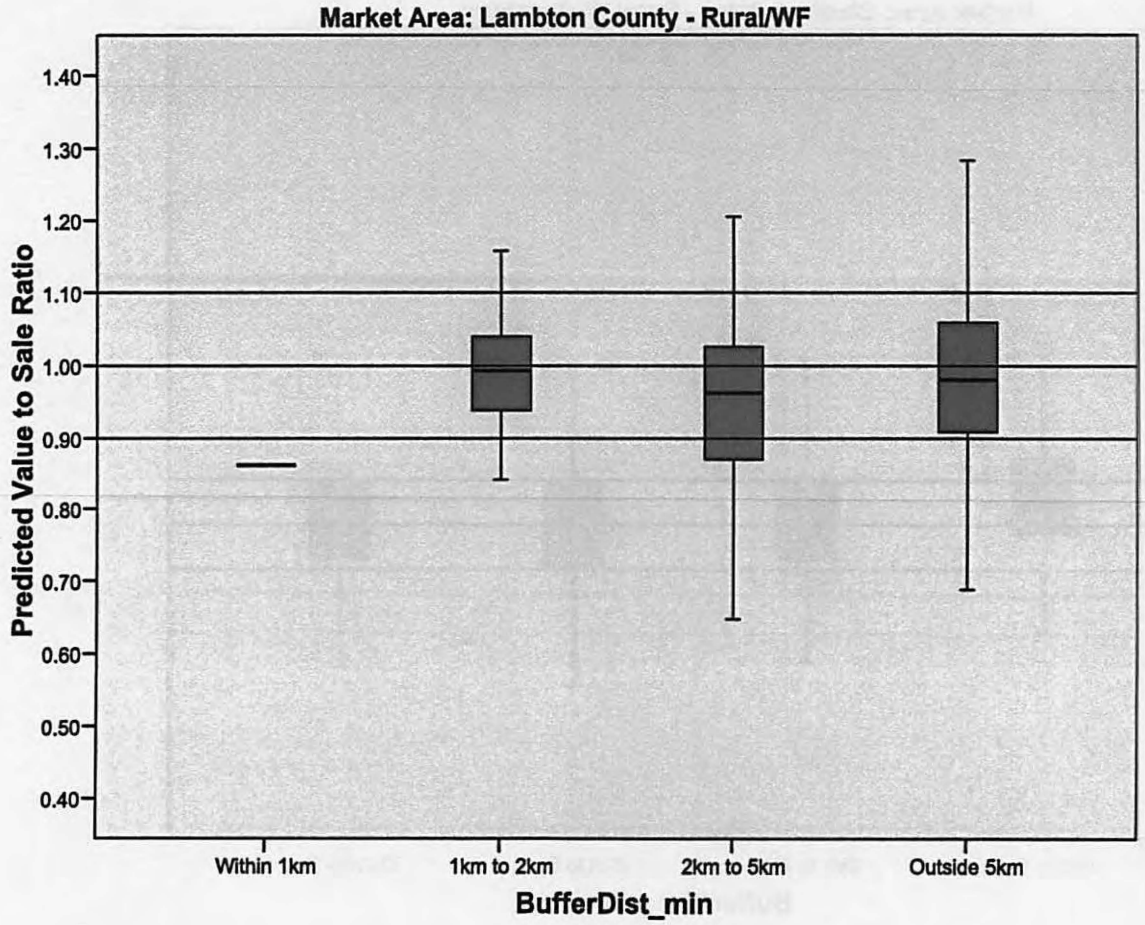
BufferDist_min

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	BufferDist_min	N	Percent	N	Percent	N	Percent
ASRX	1.00 Within 1km	1	100.0%	0	.0%	1	100.0%
	2.00 1km to 2km	23	100.0%	0	.0%	23	100.0%
	5.00 2km to 5km	76	100.0%	0	.0%	76	100.0%
	6.00 Outside 5km	1942	100.0%	0	.0%	1942	100.0%

a. MODEL = 26RR030 Lambton County - Rural/WF

ASRX



MODEL = 27RR120 Essex County

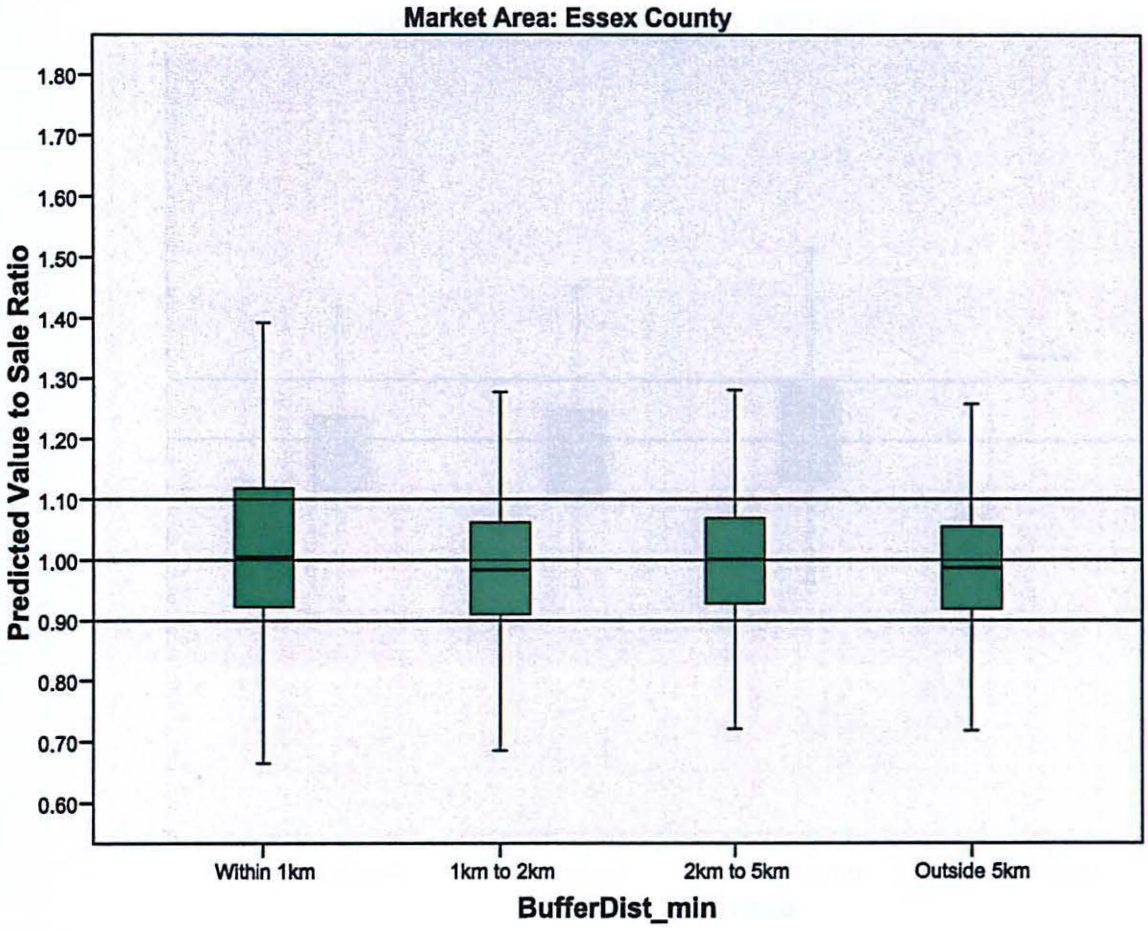
BufferDist_min

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	BufferDist_min	N	Percent	N	Percent	N	Percent
ASRX	1.00 Within 1km	112	100.0%	0	.0%	112	100.0%
	2.00 1km to 2km	272	100.0%	0	.0%	272	100.0%
	5.00 2km to 5km	768	100.0%	0	.0%	768	100.0%
	6.00 Outside 5km	2198	100.0%	0	.0%	2198	100.0%

a. MODEL = 27RR120 Essex County

ASRX



MODEL = 27UR070 Lasalle, Tecumseh, Lakeshore Urban & Essex Urban

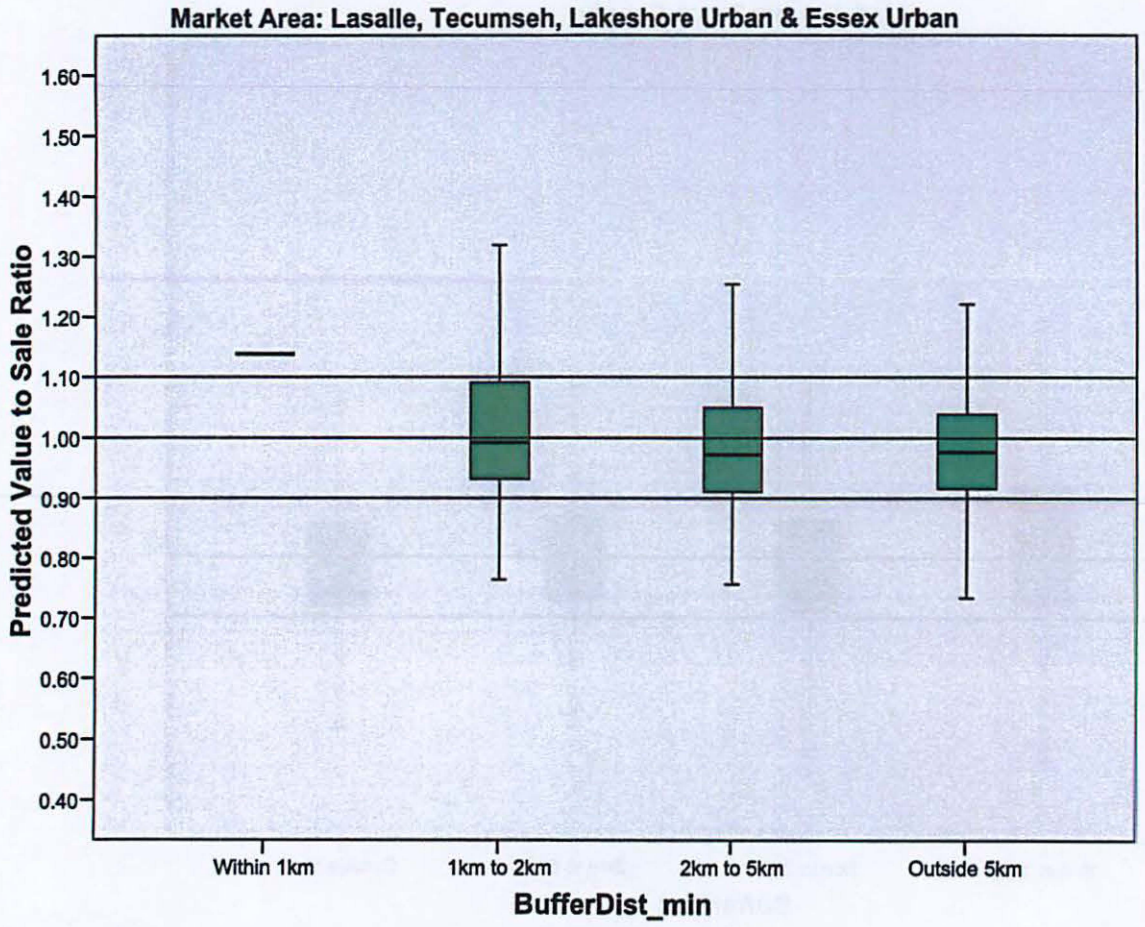
BufferDist_min

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	BufferDist_min	N	Percent	N	Percent	N	Percent
ASRX	1.00 Within 1km	1	100.0%	0	.0%	1	100.0%
	2.00 1km to 2km	154	100.0%	0	.0%	154	100.0%
	5.00 2km to 5km	179	100.0%	0	.0%	179	100.0%
	6.00 Outside 5km	2660	100.0%	0	.0%	2660	100.0%

a. MODEL = 27UR070 Lasalle, Tecumseh, Lakeshore Urban & Essex Urban

ASRX



MODEL = 31RR010 District of Algoma

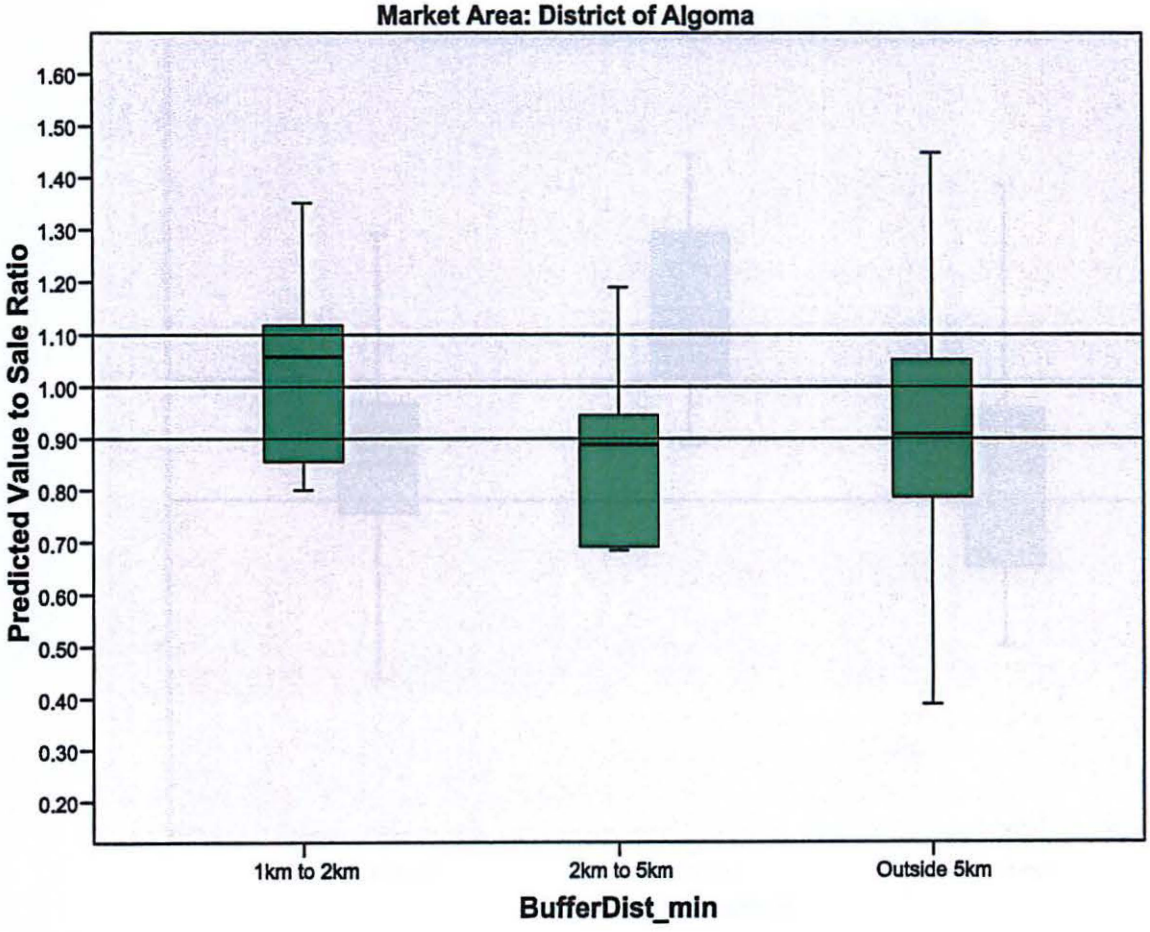
BufferDist_min

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	BufferDist_min	N	Percent	N	Percent	N	Percent
ASRX	2.00 1km to 2km	5	100.0%	0	.0%	5	100.0%
	5.00 2km to 5km	7	100.0%	0	.0%	7	100.0%
	6.00 Outside 5km	1483	100.0%	0	.0%	1483	100.0%

a. MODEL = 31RR010 District of Algoma

ASRX



MODEL = 31UR010 Sault Ste. Marie/Prince Twp

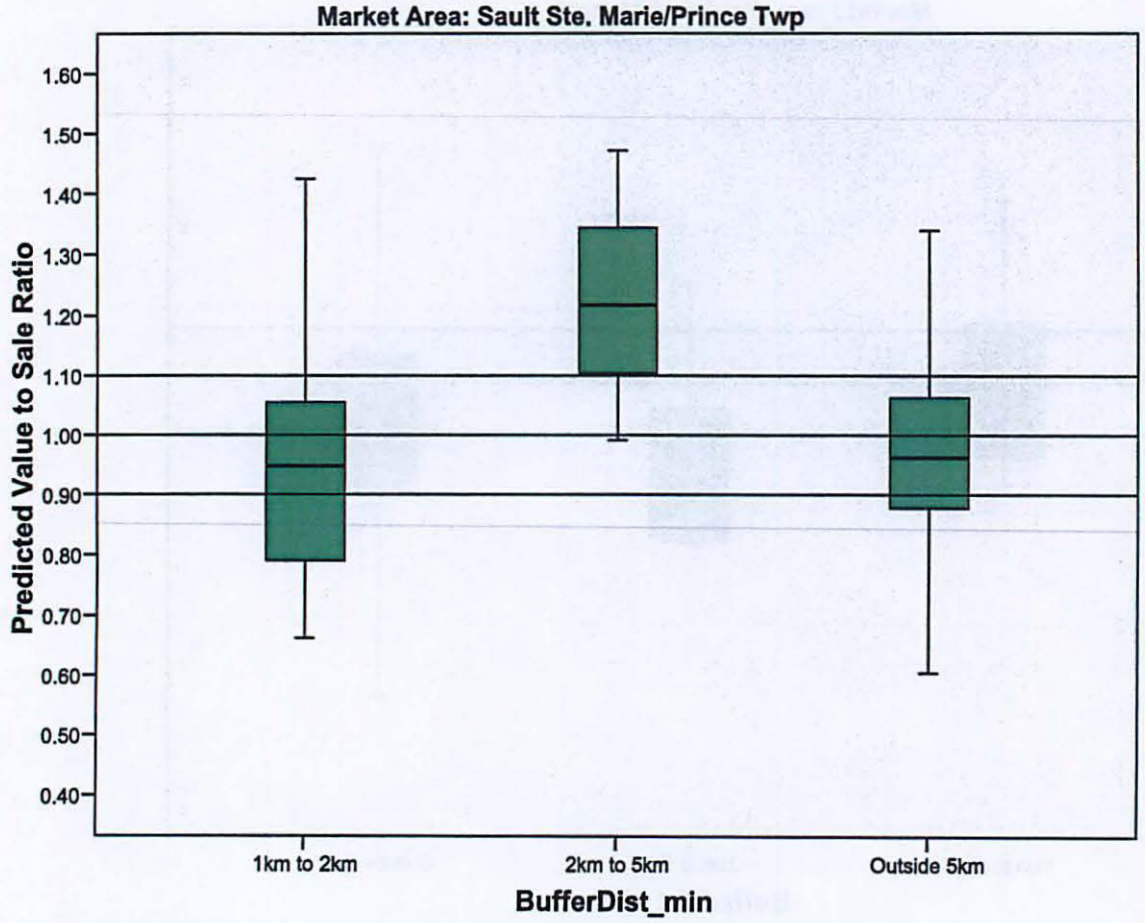
BufferDist_min

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	BufferDist_min	N	Percent	N	Percent	N	Percent
ASRX	2.00 1km to 2km	12	100.0%	0	.0%	12	100.0%
	5.00 2km to 5km	3	100.0%	0	.0%	3	100.0%
	6.00 Outside 5km	2801	100.0%	0	.0%	2801	100.0%

a. MODEL = 31UR010 Sault Ste. Marie/Prince Twp

ASRX



Boxplot ASR by Distance by Market Type

Rural

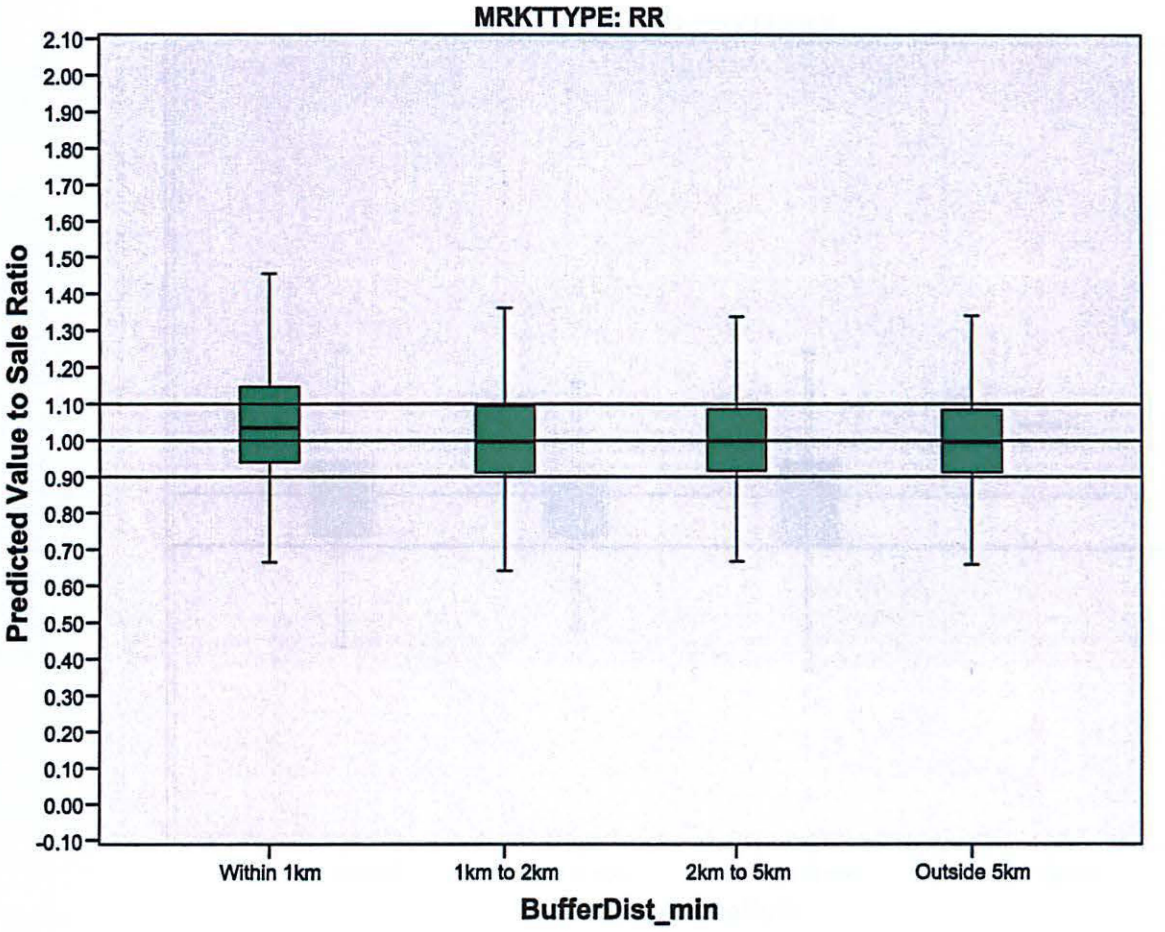
BufferDist_min

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	BufferDist_min	N	Percent	N	Percent	N	Percent
ASRX	1.00 Within 1km	278	100.0%	0	.0%	278	100.0%
	2.00 1km to 2km	715	100.0%	0	.0%	715	100.0%
	5.00 2km to 5km	2284	100.0%	0	.0%	2284	100.0%
	6.00 Outside 5km	23135	100.0%	0	.0%	23135	100.0%

a. MRKTTYPE = RR

ASRX



Urban

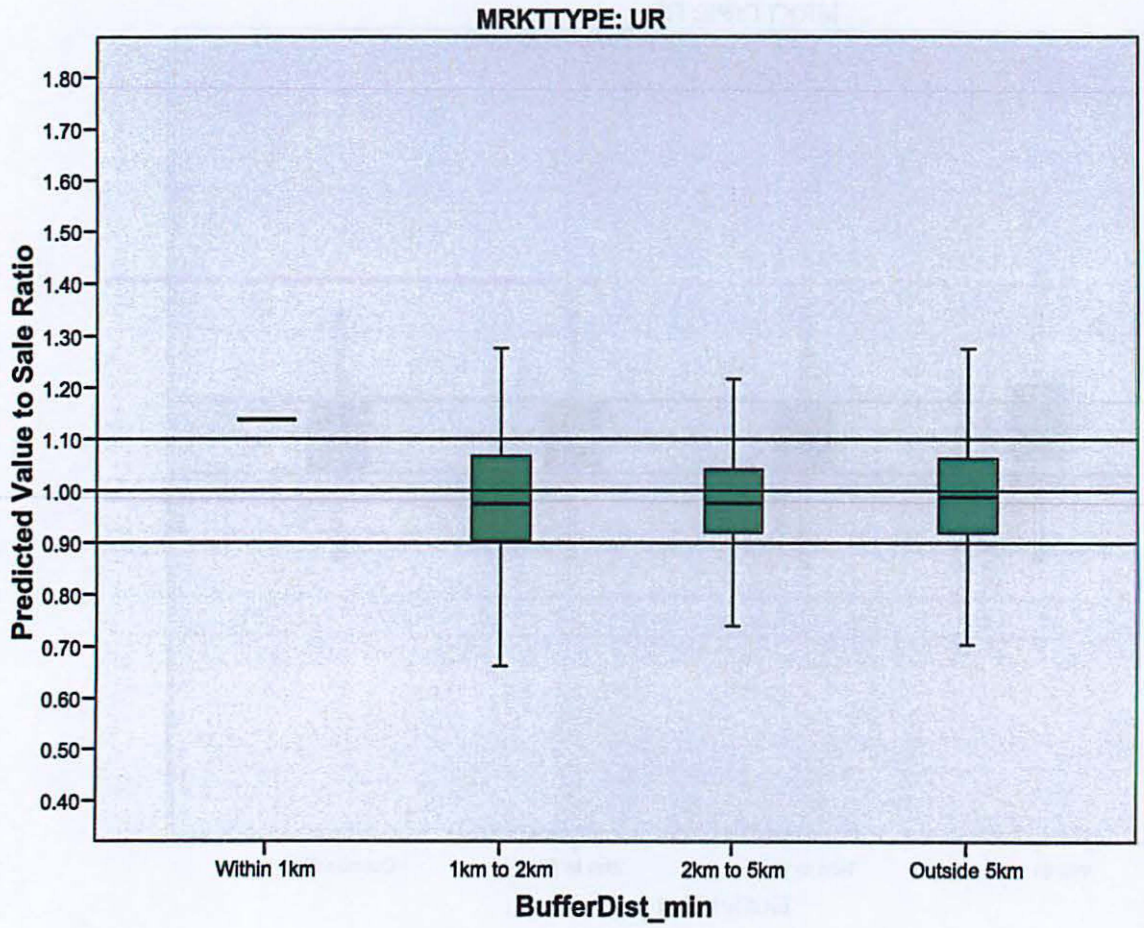
BufferDist_min

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	BufferDist_min	N	Percent	N	Percent	N	Percent
ASRX	1.00 Within 1km	1	100.0%	0	.0%	1	100.0%
	2.00 1km to 2km	274	100.0%	0	.0%	274	100.0%
	5.00 2km to 5km	779	100.0%	0	.0%	779	100.0%
	6.00 Outside 5km	13958	100.0%	0	.0%	13958	100.0%

a. MRKTTYPE = UR

ASRX



Appendix D6 - View Boxplots

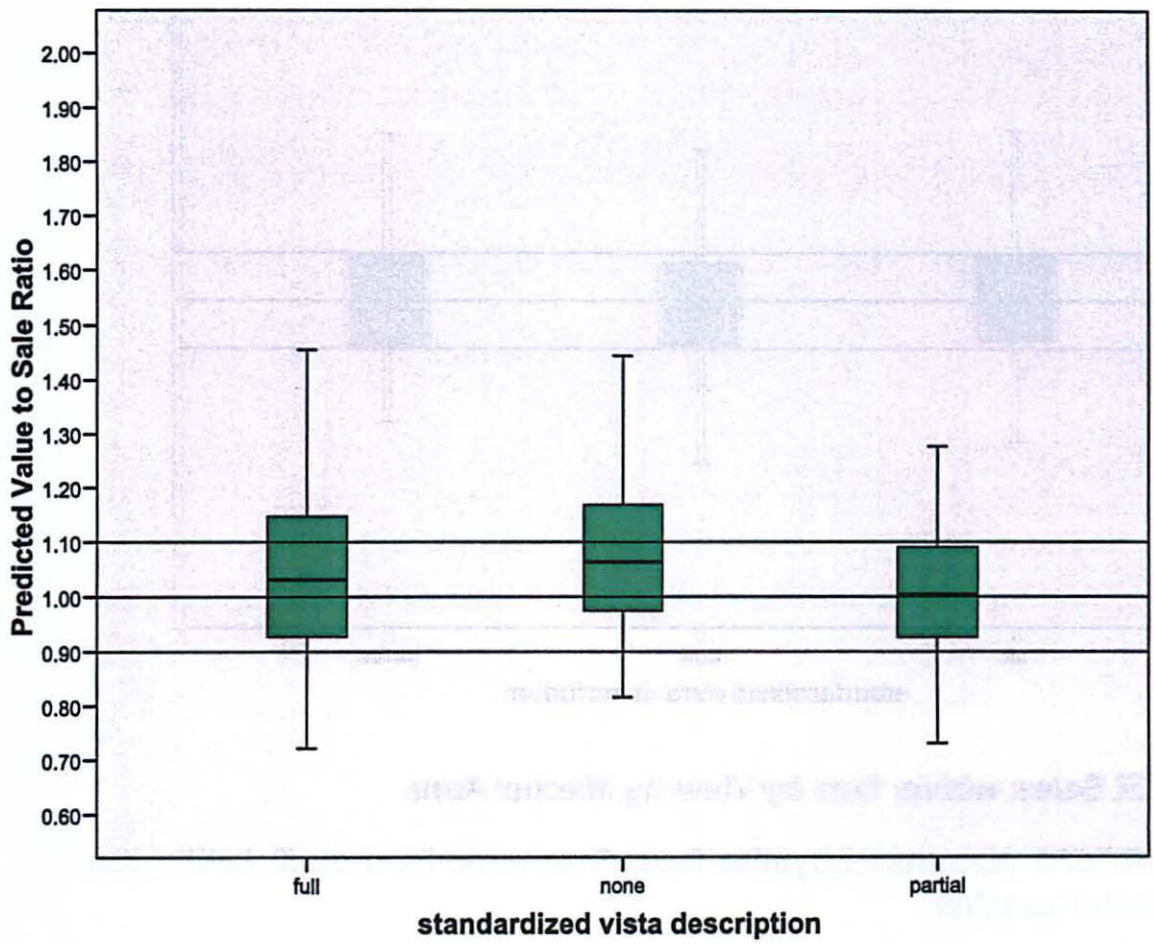
Boxplot ASRs Sales Less Than 1km by View

view

Case Processing Summary

		Cases					
		Valid		Missing		Total	
	view	N	Percent	N	Percent	N	Percent
ASRX	full	190	100.0%	0	.0%	190	100.0%
	none	56	100.0%	0	.0%	56	100.0%
	partial	33	100.0%	0	.0%	33	100.0%

ASRX



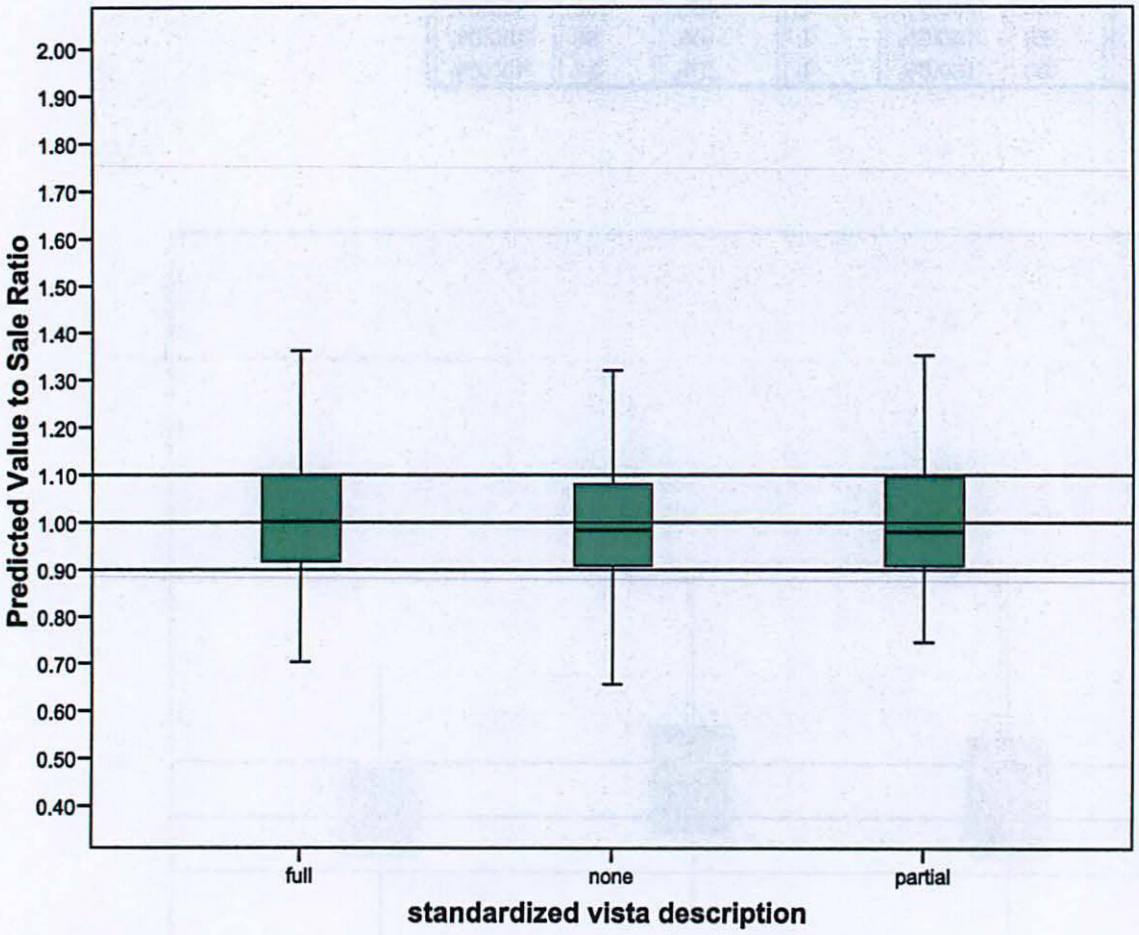
Boxplot ASR Sales 1km to 2km by View

view

Case Processing Summary

		Cases					
		Valid		Missing		Total	
	view	N	Percent	N	Percent	N	Percent
ASRX	full	239	100.0%	0	.0%	239	100.0%
	none	647	100.0%	0	.0%	647	100.0%
	partial	103	100.0%	0	.0%	103	100.0%

ASRX



Boxplots ASR Sales within 1km by View by Market Area

MODEL = 05RR030 Napanee,Loyalist Twp, Frontenac/Lennox & Addington Counties South Rural/WF

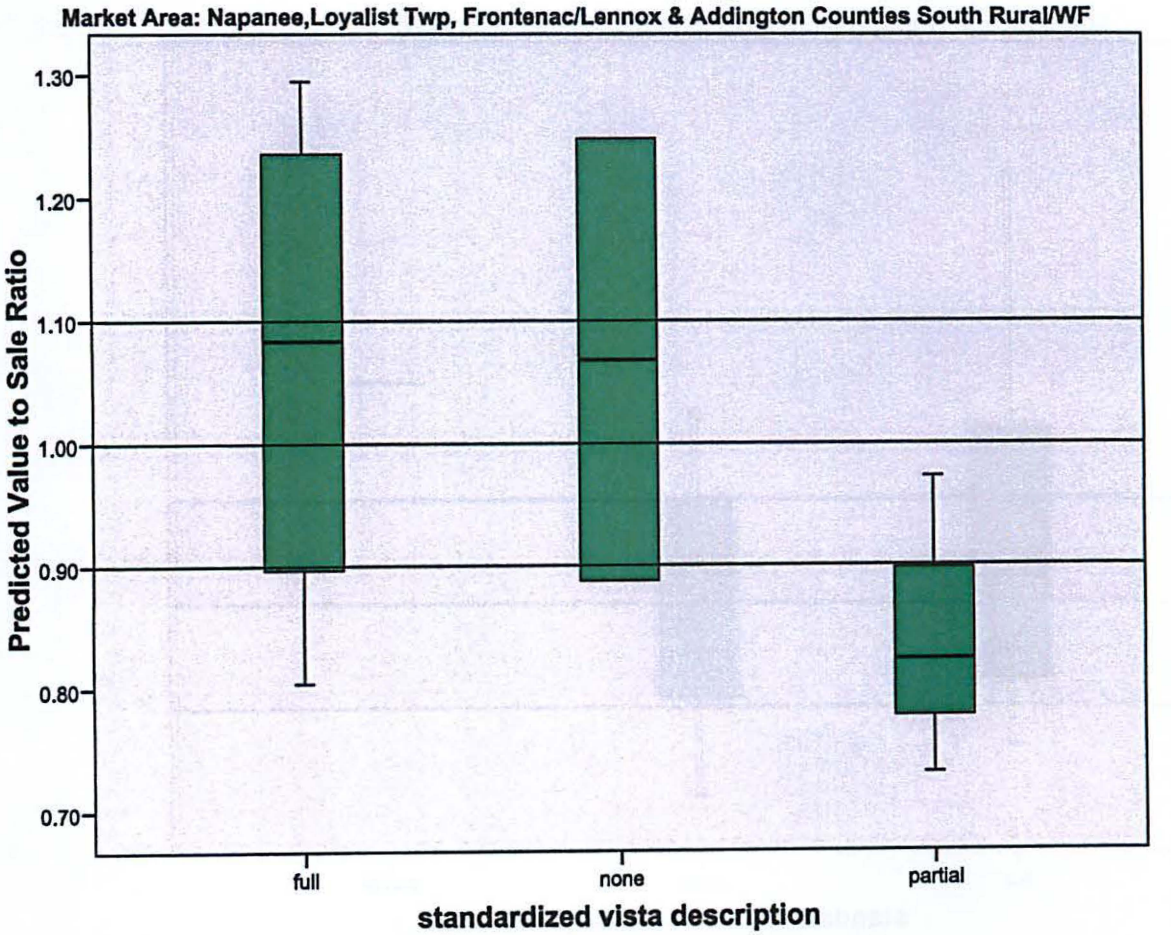
view

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	view	N	Percent	N	Percent	N	Percent
ASRX	full	8	100.0%	0	.0%	8	100.0%
	none	2	100.0%	0	.0%	2	100.0%
	partial	3	100.0%	0	.0%	3	100.0%

a. MODEL = 05RR030 Napanee,Loyalist Twp, Frontenac/Lennox & Addington Counties South Rural/WF

ASRX



MODEL = 20RR010 Brant, Halidmand, Norfolk Counties - Rural/WF

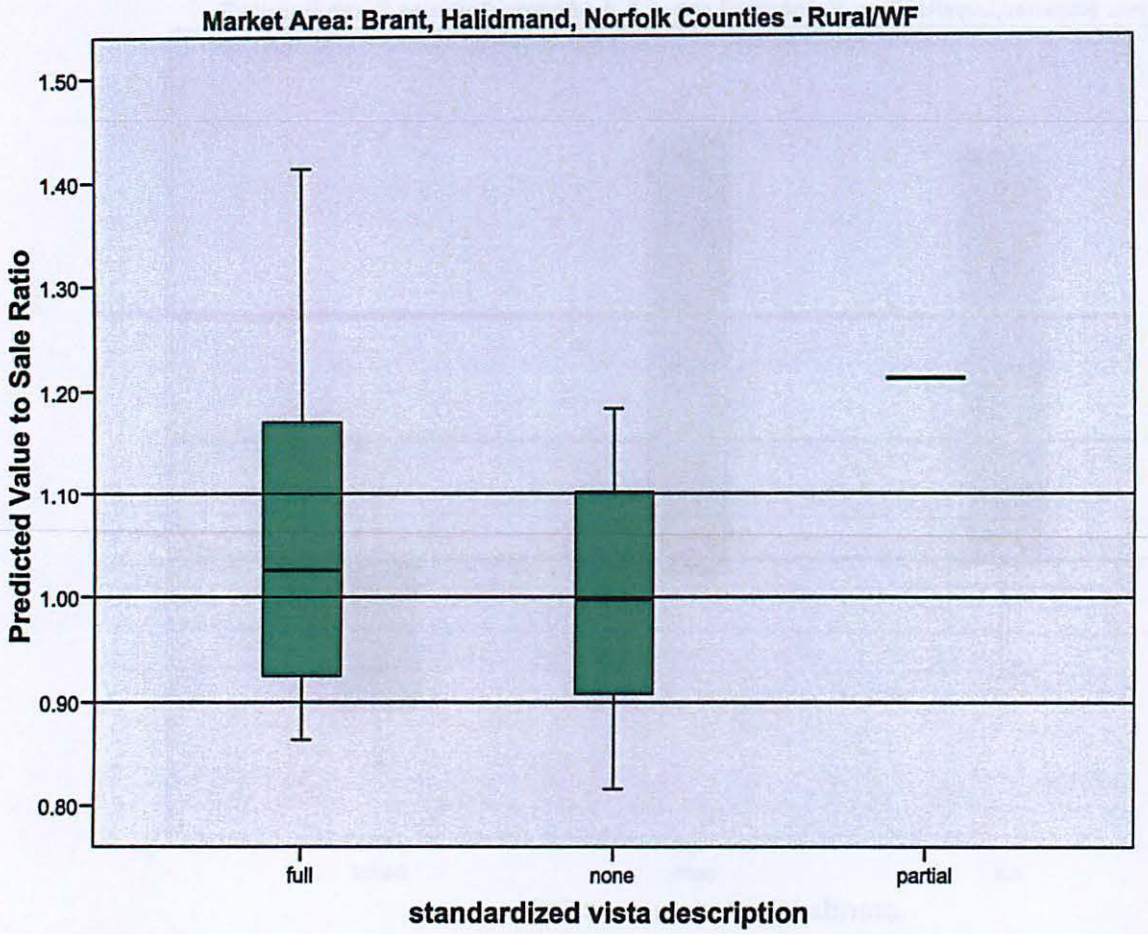
view

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	view	N	Percent	N	Percent	N	Percent
ASRX	full	12	100.0%	0	.0%	12	100.0%
	none	12	100.0%	0	.0%	12	100.0%
	partial	1	100.0%	0	.0%	1	100.0%

a. MODEL = 20RR010 Brant, Halidmand, Norfolk Counties - Rural/WF

ASRX



MODEL = 22RR010 Dufferin & Wellington Counties - Rural

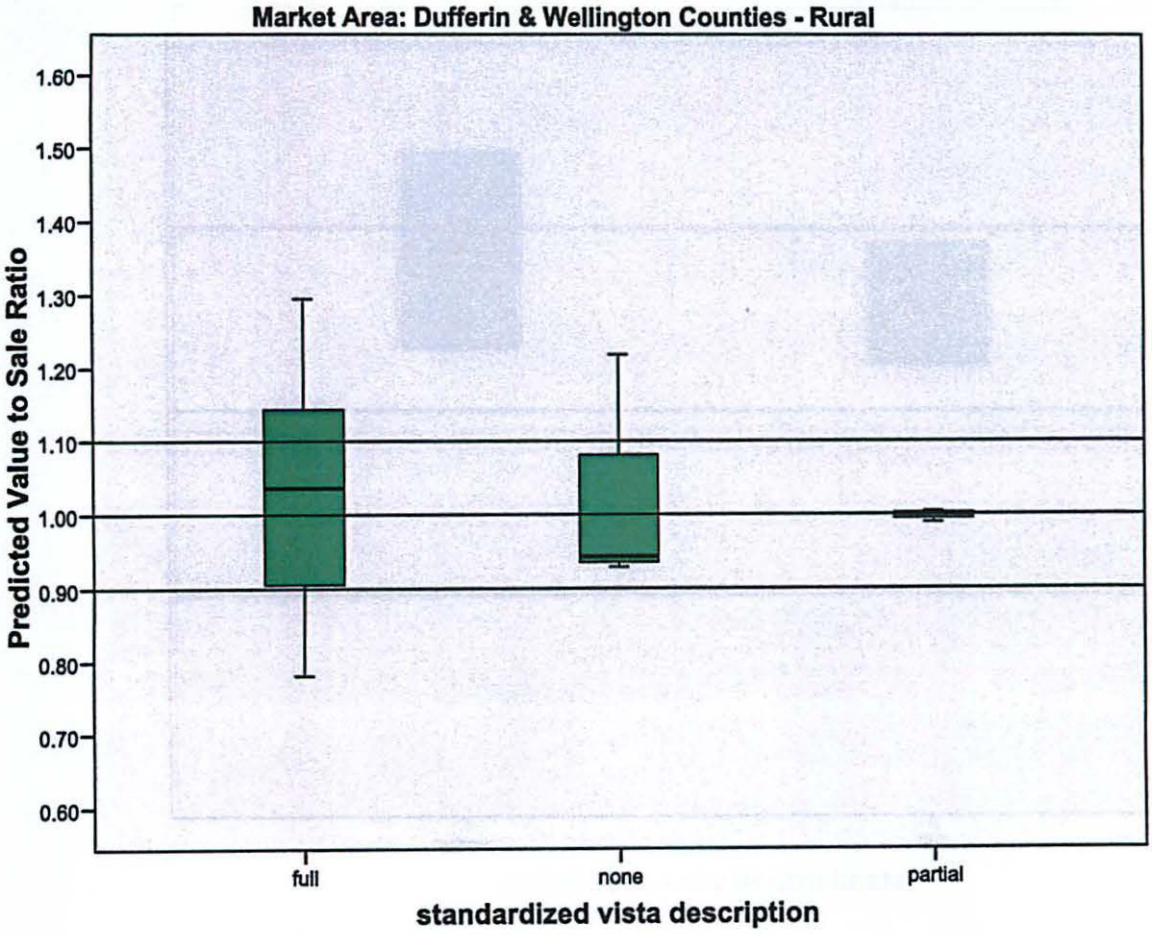
view

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	view	N	Percent	N	Percent	N	Percent
ASRX	full	20	100.0%	0	.0%	20	100.0%
	none	3	100.0%	0	.0%	3	100.0%
	partial	3	100.0%	0	.0%	3	100.0%

a. MODEL = 22RR010 Dufferin & Wellington Counties - Rural

ASRX



MODEL = 23RR010 Elgin, Middlesex & Oxford Counties - Rural

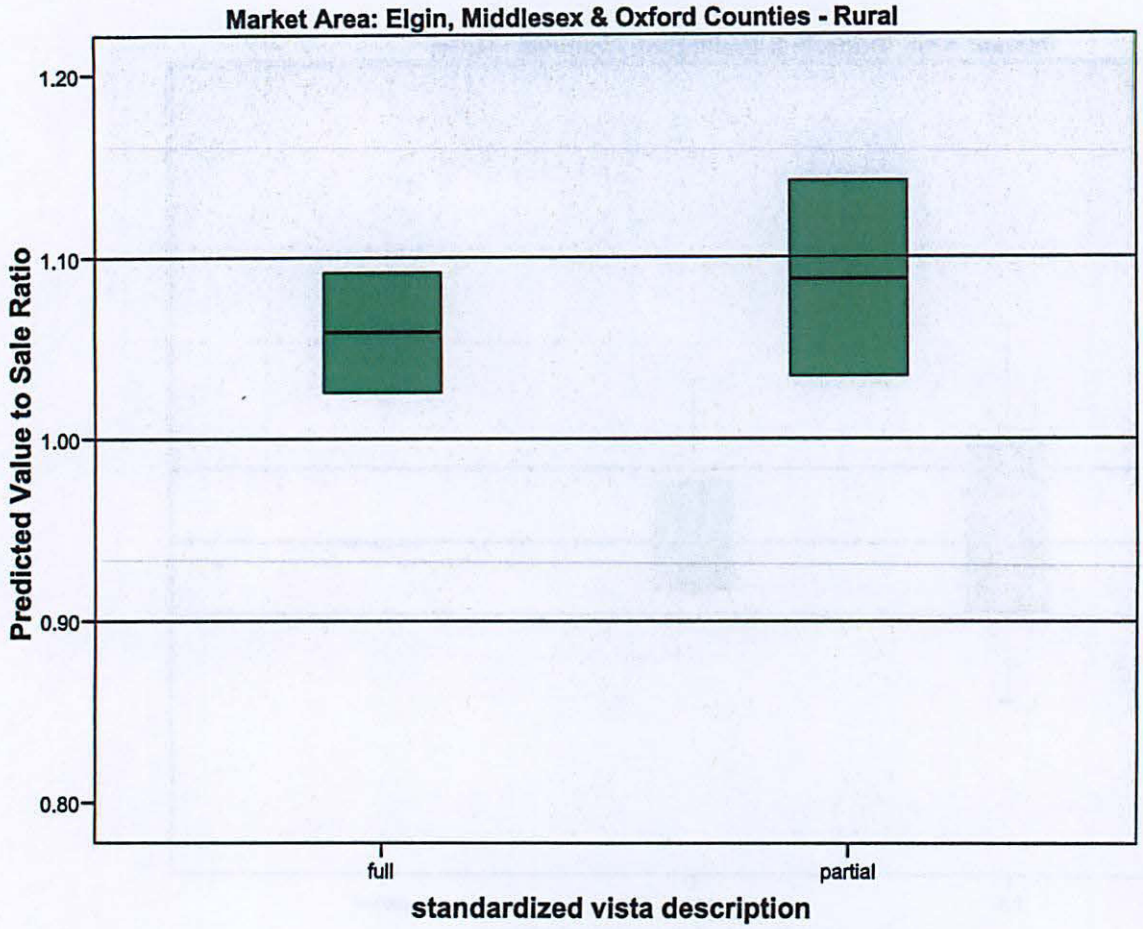
view

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	view	N	Percent	N	Percent	N	Percent
ASRX	full	2	100.0%	0	.0%	2	100.0%
	partial	2	100.0%	0	.0%	2	100.0%

a. MODEL = 23RR010 Elgin, Middlesex & Oxford Counties - Rural

ASRX



MODEL = 24RR010 Huron & Perth Counties - Rural/Waterfront

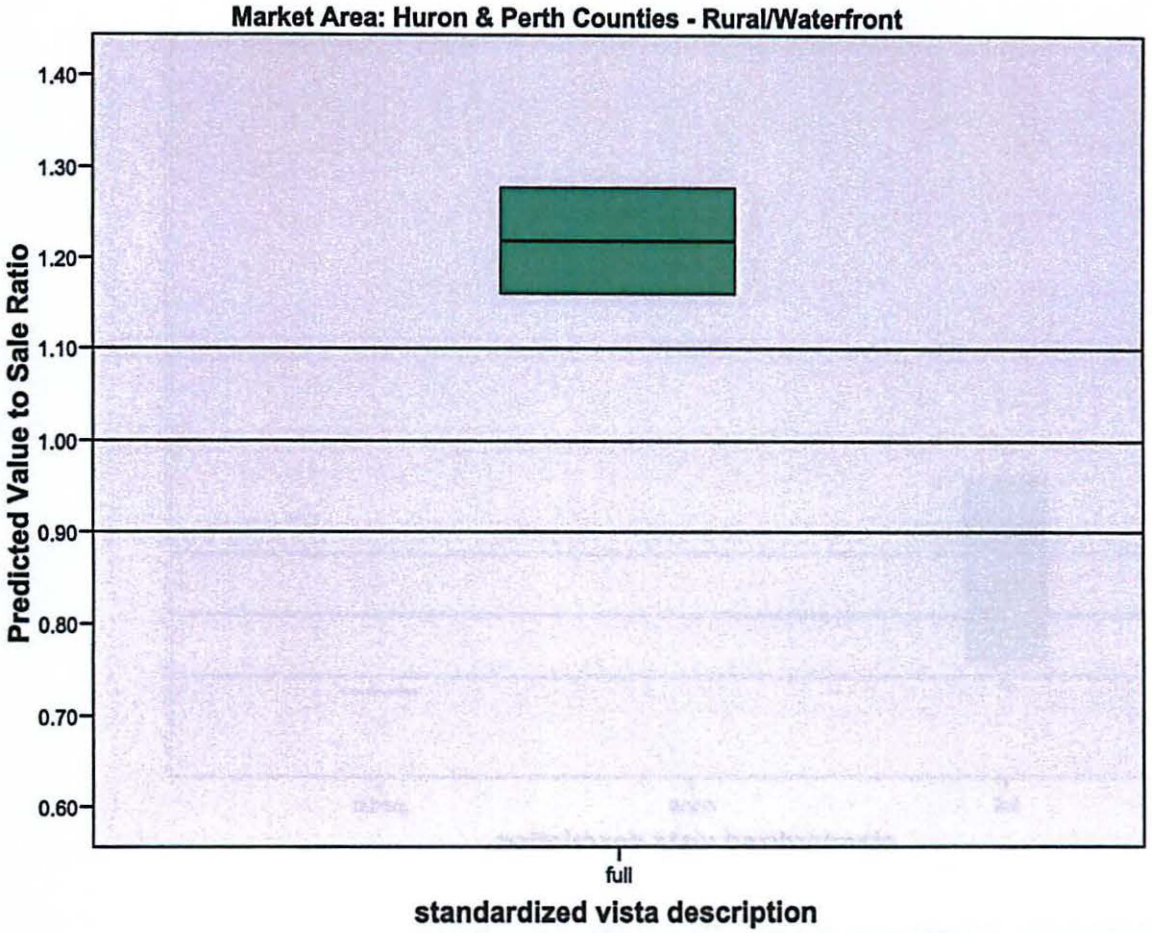
view

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	view	N	Percent	N	Percent	N	Percent
ASRX	full	2	100.0%	0	.0%	2	100.0%

a. MODEL = 24RR010 Huron & Perth Counties - Rural/Waterfront

ASRX



MODEL = 25RR010 Grey & Bruce Counties - Rural/Waterfront

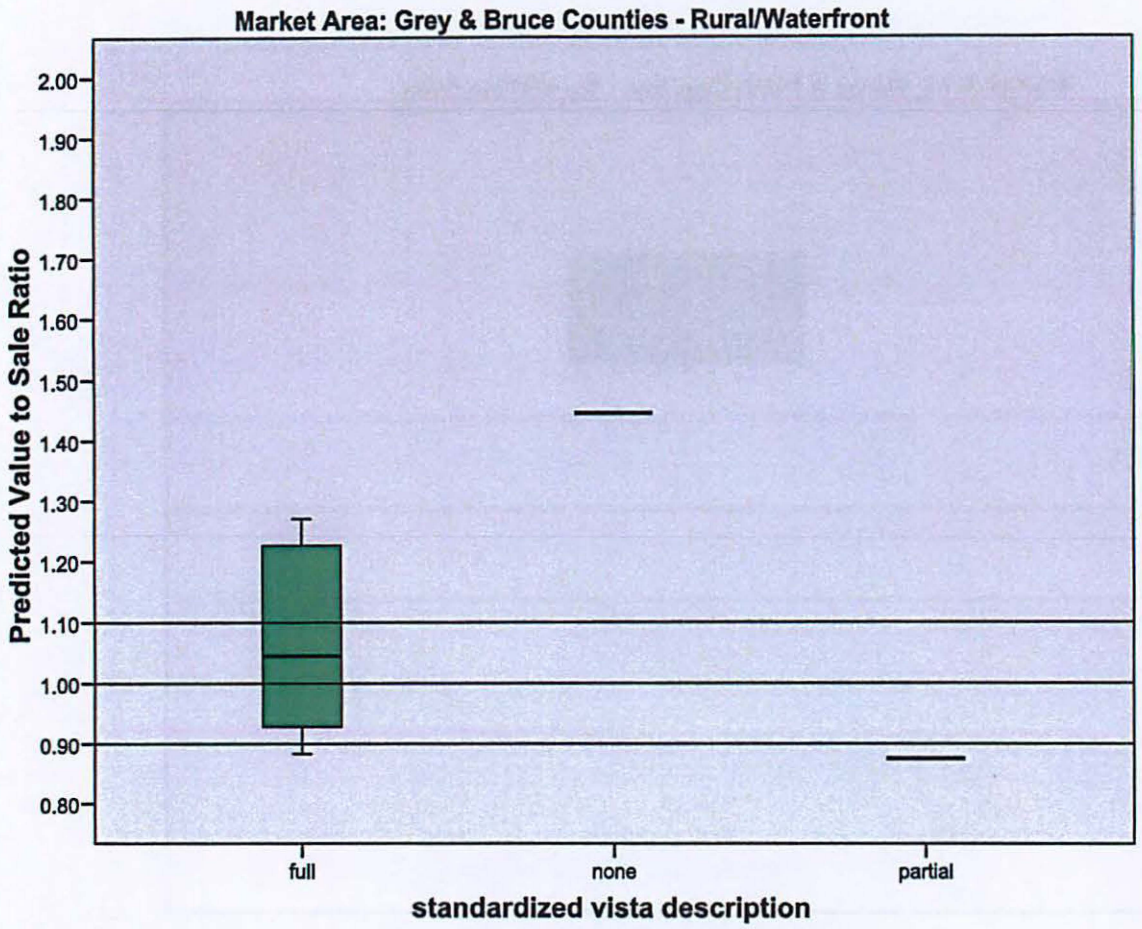
view

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	view	N	Percent	N	Percent	N	Percent
ASRX	full	10	100.0%	0	.0%	10	100.0%
	none	1	100.0%	0	.0%	1	100.0%
	partial	1	100.0%	0	.0%	1	100.0%

a. MODEL = 25RR010 Grey & Bruce Counties - Rural/Waterfront

ASRX



MODEL = 26RR010 Chatham-Kent - Rural/Wallaceburg

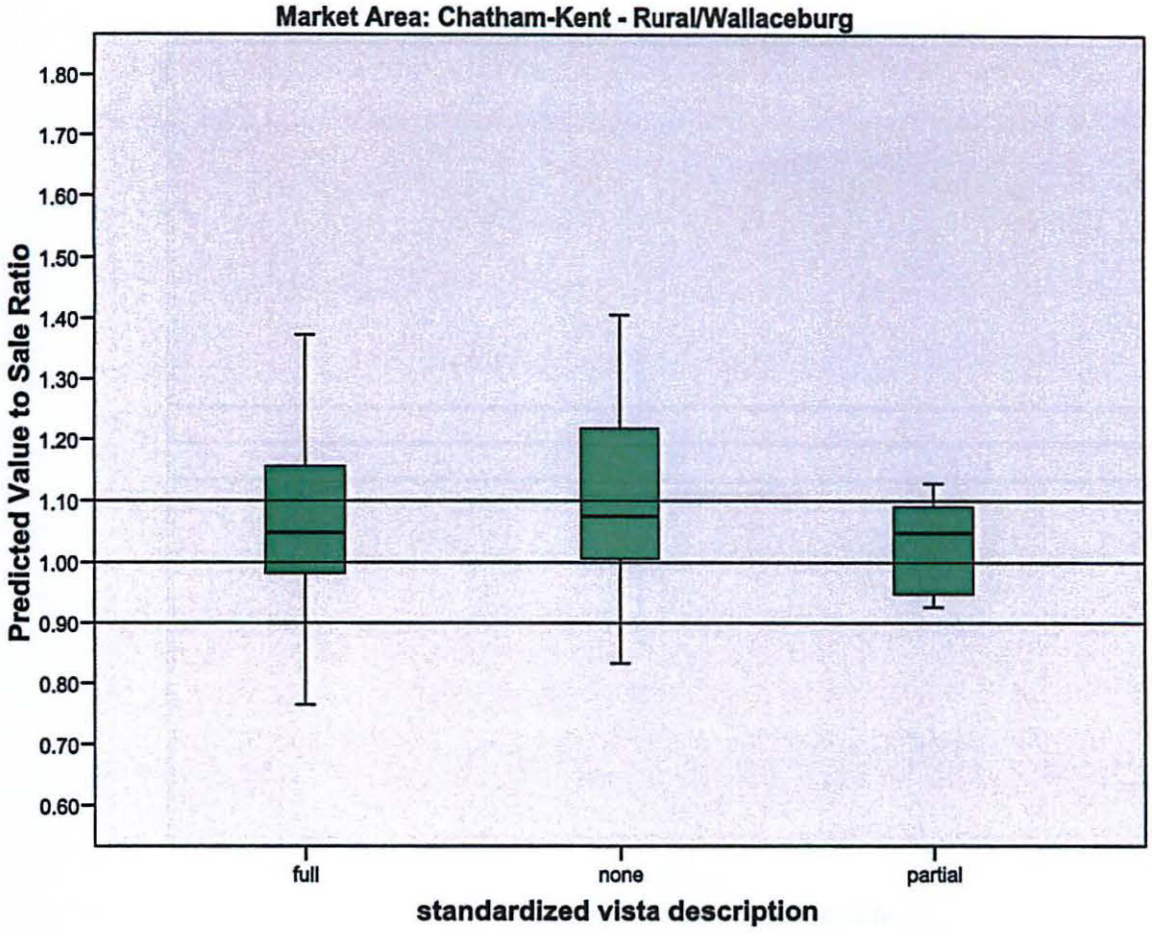
view

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	view	N	Percent	N	Percent	N	Percent
ASRX	full	61	100.0%	0	.0%	61	100.0%
	none	16	100.0%	0	.0%	16	100.0%
	partial	6	100.0%	0	.0%	6	100.0%

a. MODEL = 26RR010 Chatham-Kent - Rural/Wallaceburg

ASRX



MODEL = 26RR030 Lambton County - Rural/WF

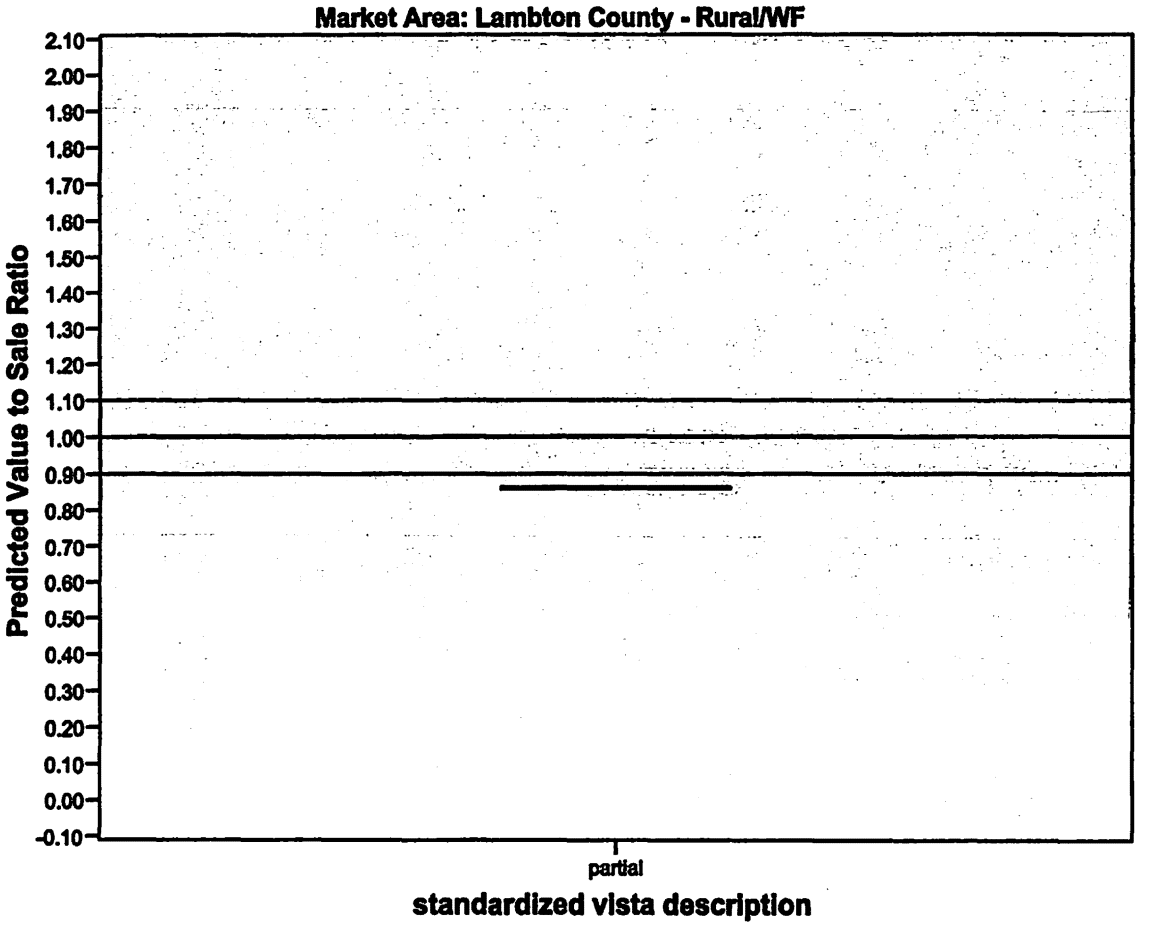
view

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	view	N	Percent	N	Percent	N	Percent
ASRX	partial	1	100.0%	0	.0%	1	100.0%

a. MODEL = 26RR030 Lambton County - Rural/WF

ASRX



MODEL = 27RR120 Essex County

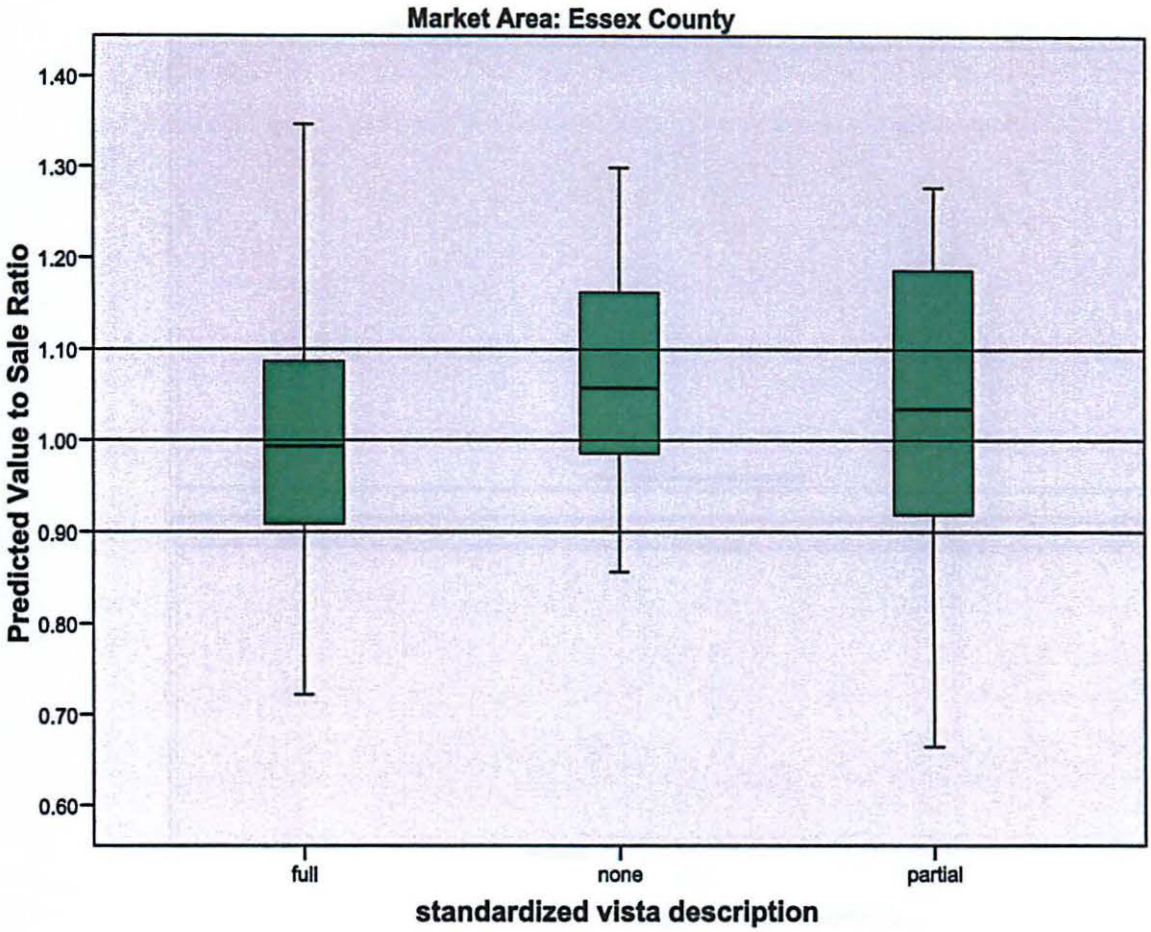
view

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	view	N	Percent	N	Percent	N	Percent
ASRX	full	74	100.0%	0	.0%	74	100.0%
	none	22	100.0%	0	.0%	22	100.0%
	partial	16	100.0%	0	.0%	16	100.0%

a. MODEL = 27RR120 Essex County

ASRX



MODEL = 27UR070 Lasalle, Tecumseh, Lakeshore Urban & Essex Urban

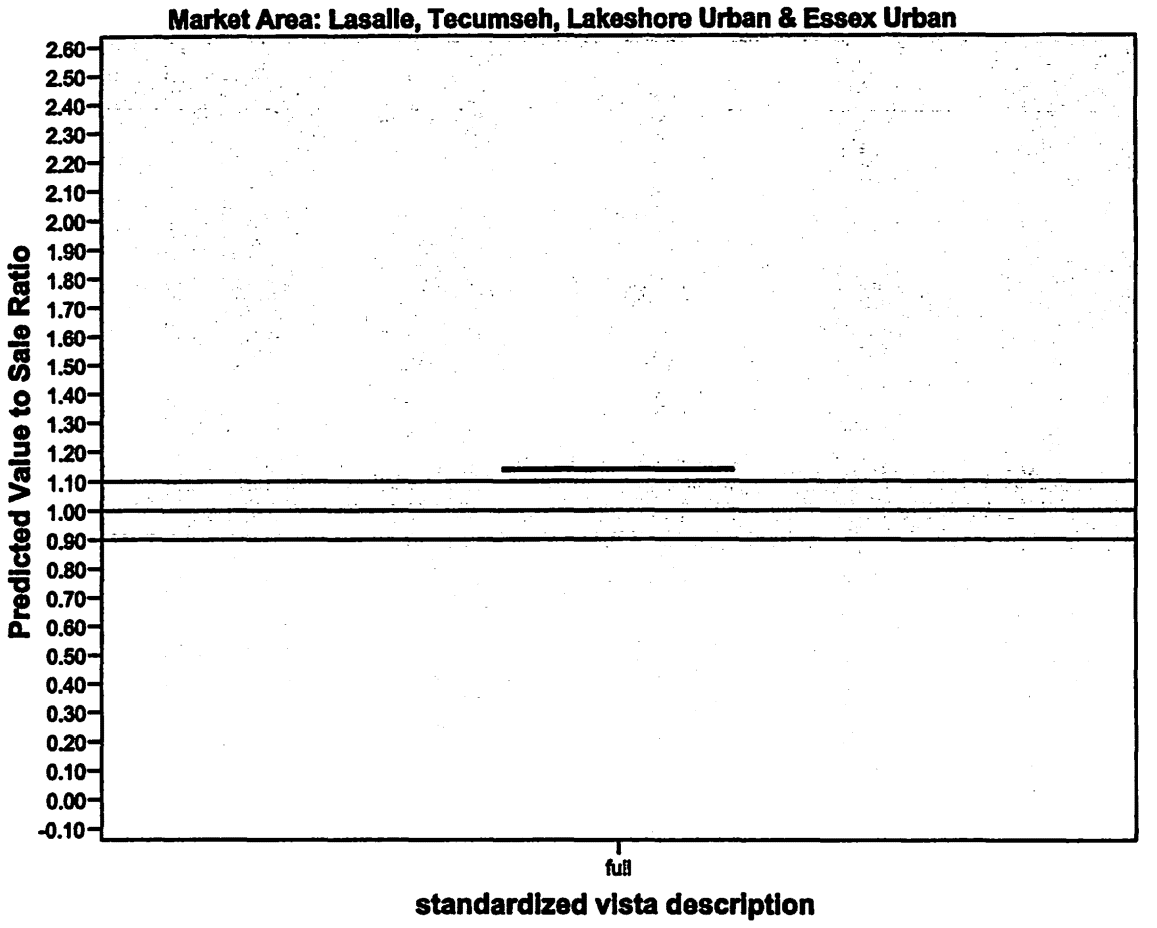
view

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	view	N	Percent	N	Percent	N	Percent
ASRX	full	1	100.0%	0	.0%	1	100.0%

a. MODEL = 27UR070 Lasalle, Tecumseh, Lakeshore Urban & Essex Urban

ASRX



Boxplots ASR Sales 1km to 2km by View by Market Area

MODEL = 05RR030 Napanee,Loyalist Twp, Frontenac/Lennox & Addington Counties South Rural/WF

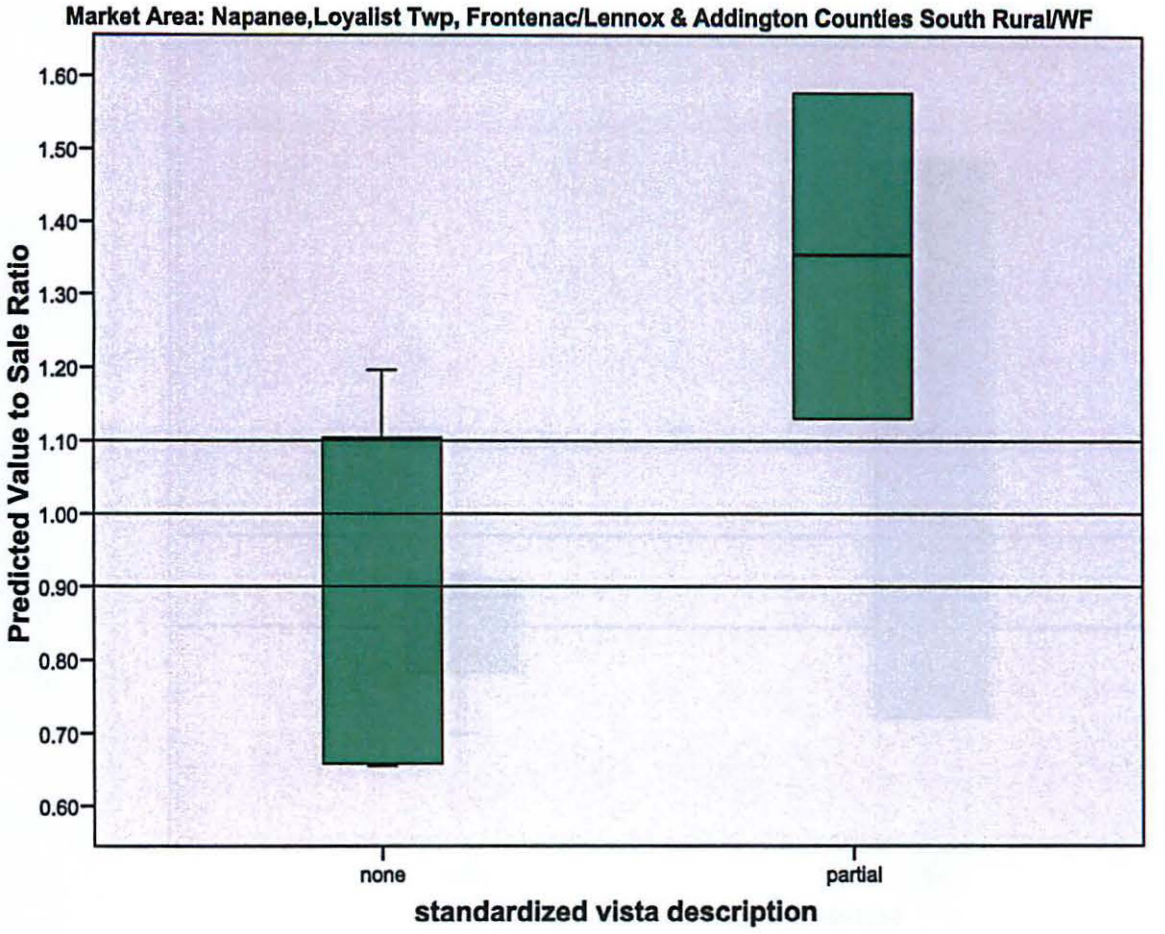
view

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	view	N	Percent	N	Percent	N	Percent
ASRX	none	5	100.0%	0	.0%	5	100.0%
	partial	2	100.0%	0	.0%	2	100.0%

a. MODEL = 05RR030 Napanee,Loyalist Twp, Frontenac/Lennox & Addington Counties South Rural/WF

ASRX



MODEL = 20RR010 Brant, Halidmand, Norfolk Counties - Rural/WF

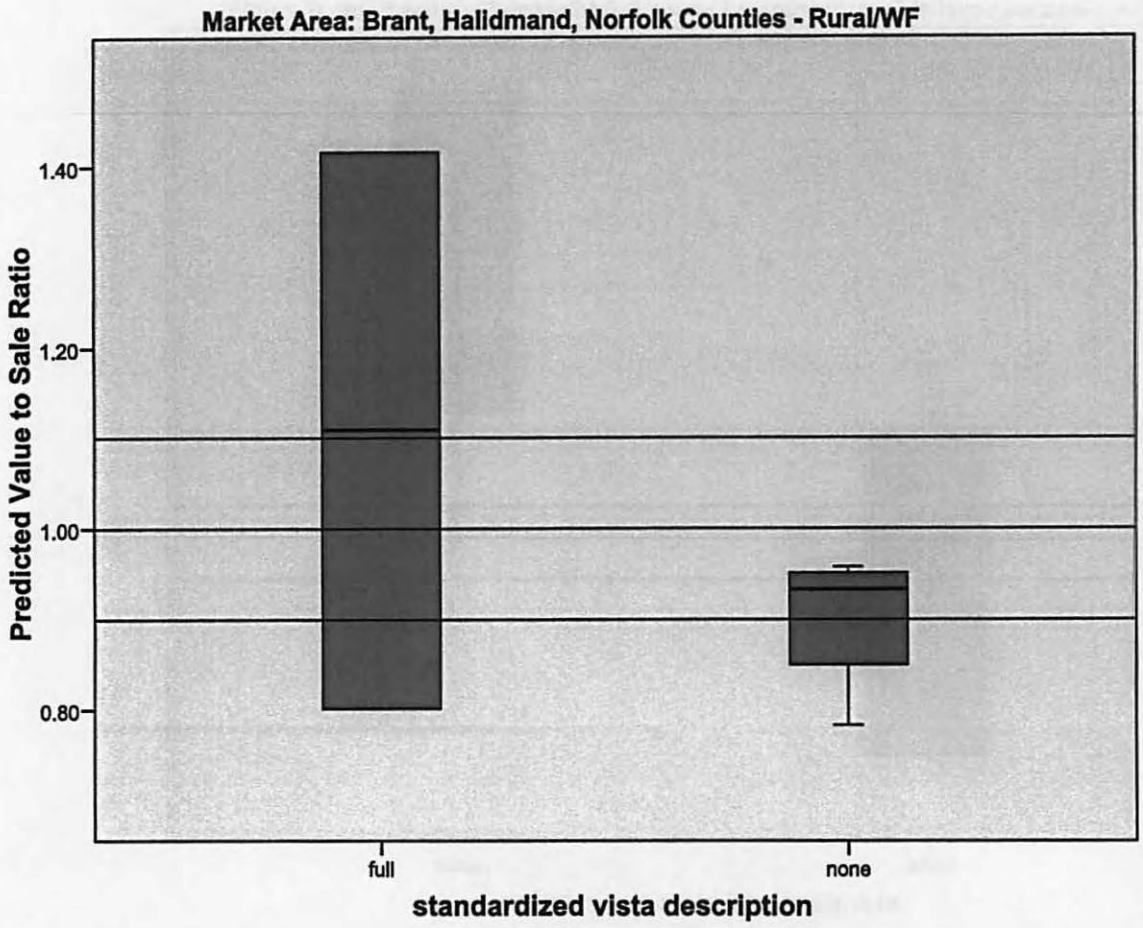
view

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	view	N	Percent	N	Percent	N	Percent
ASRX	full	2	100.0%	0	.0%	2	100.0%
	none	7	100.0%	0	.0%	7	100.0%

a. MODEL = 20RR010 Brant, Halidmand, Norfolk Counties - Rural/WF

ASRX



MODEL = 22RR010 Dufferin & Wellington Counties - Rural

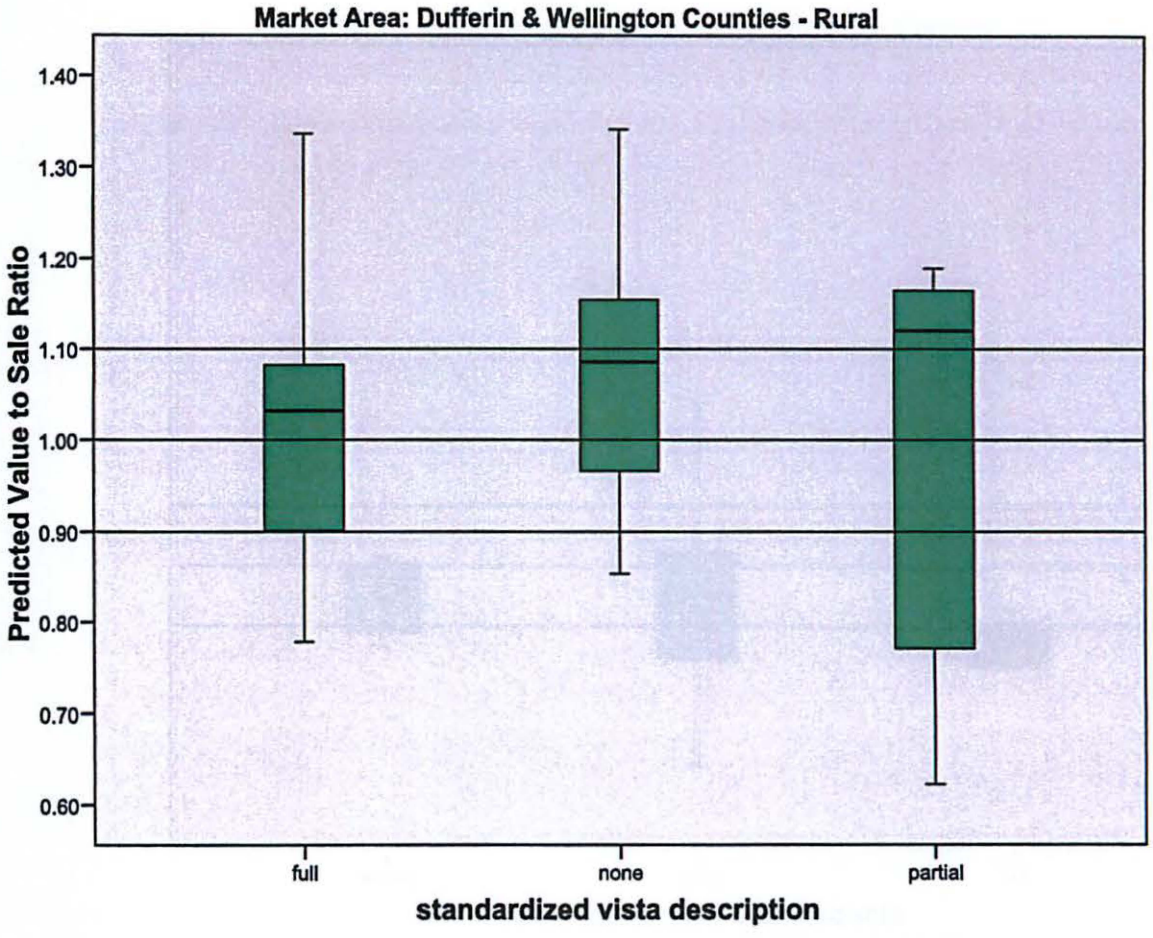
view

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	view	N	Percent	N	Percent	N	Percent
ASRX	full	10	100.0%	0	.0%	10	100.0%
	none	7	100.0%	0	.0%	7	100.0%
	partial	8	100.0%	0	.0%	8	100.0%

a. MODEL = 22RR010 Dufferin & Wellington Counties - Rural

ASRX



MODEL = 22UR030 Wellington County Villages

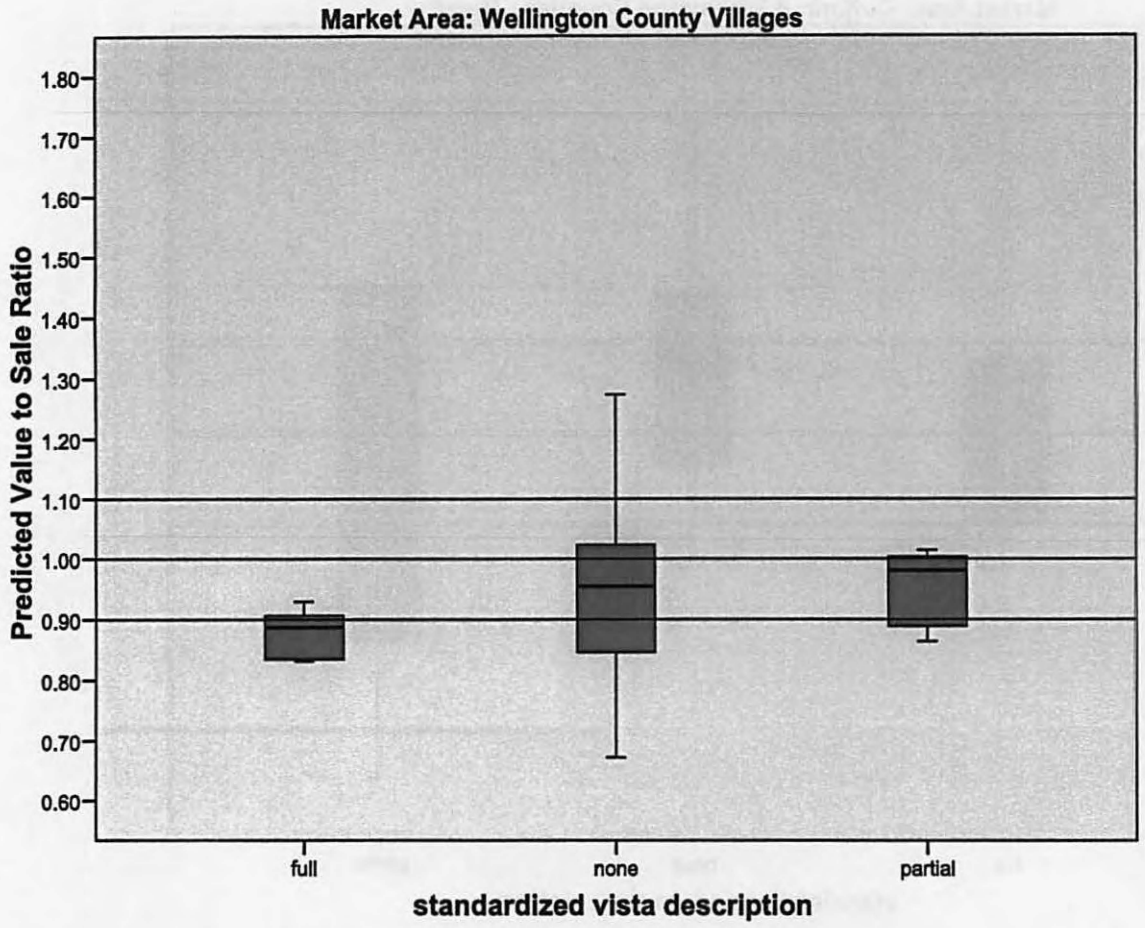
view

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	view	N	Percent	N	Percent	N	Percent
ASRX	full	6	100.0%	0	.0%	6	100.0%
	none	81	100.0%	0	.0%	81	100.0%
	partial	5	100.0%	0	.0%	5	100.0%

a. MODEL = 22UR030 Wellington County Villages

ASRX



MODEL = 23RR010 Elgin, Middlesex & Oxford Counties - Rural

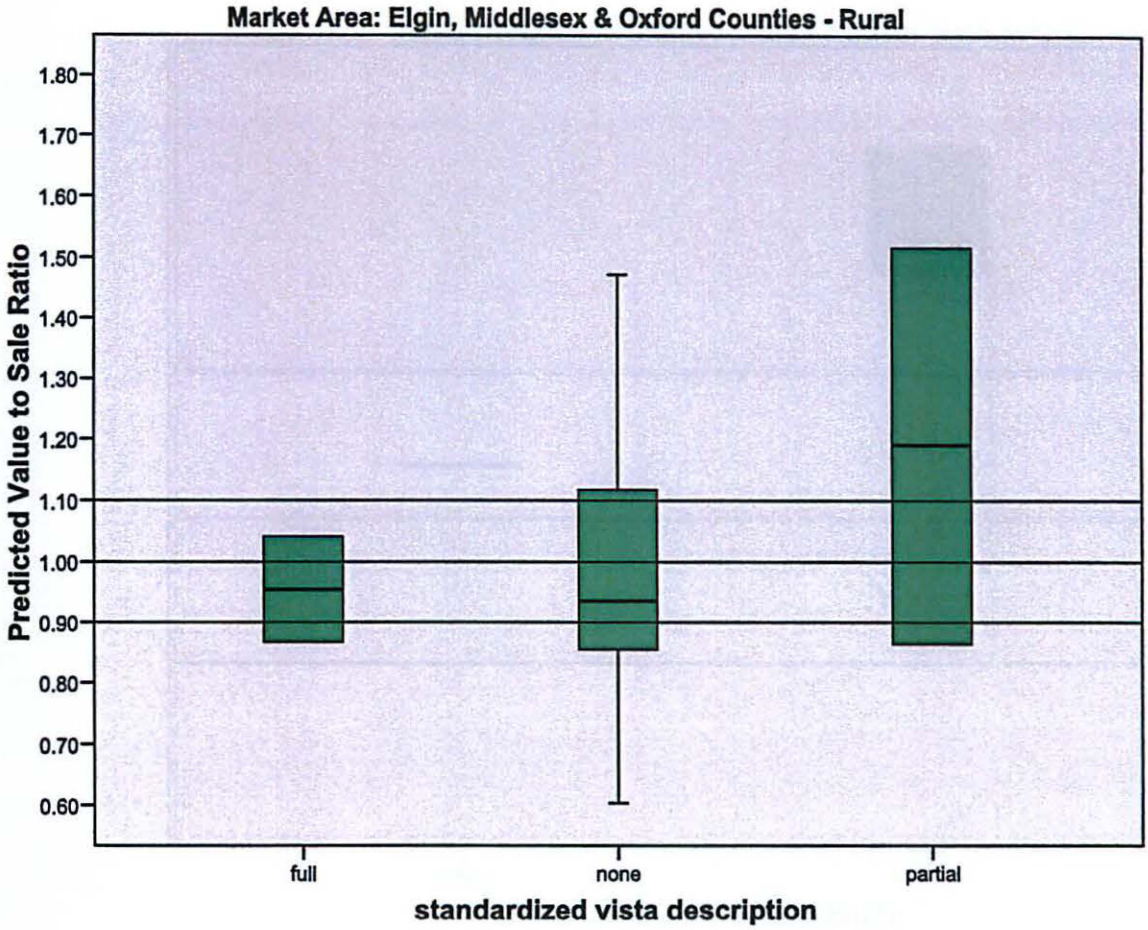
view

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	view	N	Percent	N	Percent	N	Percent
ASRX	full	2	100.0%	0	.0%	2	100.0%
	none	48	100.0%	0	.0%	48	100.0%
	partial	2	100.0%	0	.0%	2	100.0%

a. MODEL = 23RR010 Elgin, Middlesex & Oxford Counties - Rural

ASRX



MODEL = 24RR010 Huron & Perth Counties - Rural/Waterfront

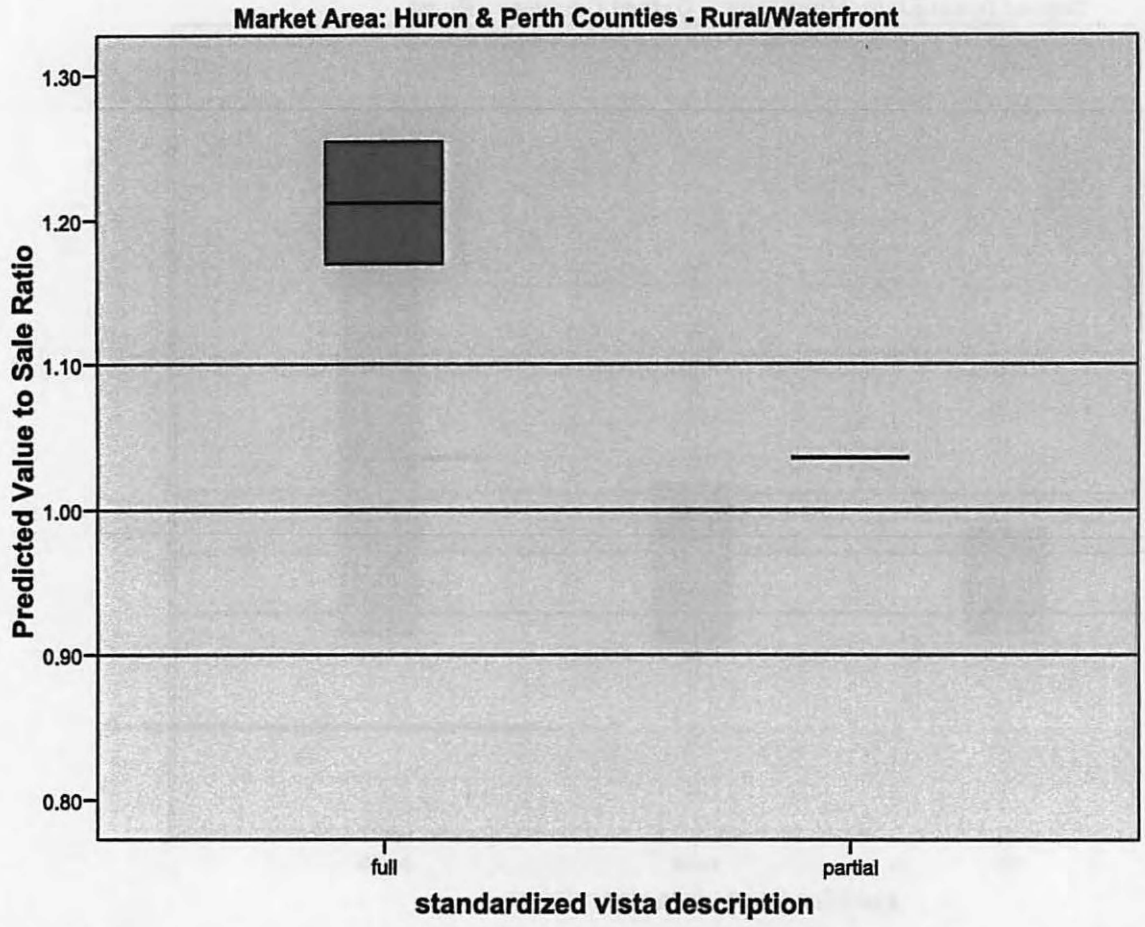
view

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	view	N	Percent	N	Percent	N	Percent
ASRX	full	2	100.0%	0	.0%	2	100.0%
	partial	1	100.0%	0	.0%	1	100.0%

a. MODEL = 24RR010 Huron & Perth Counties - Rural/Waterfront

ASRX



MODEL = 25RR010 Grey & Bruce Counties - Rural/Waterfront

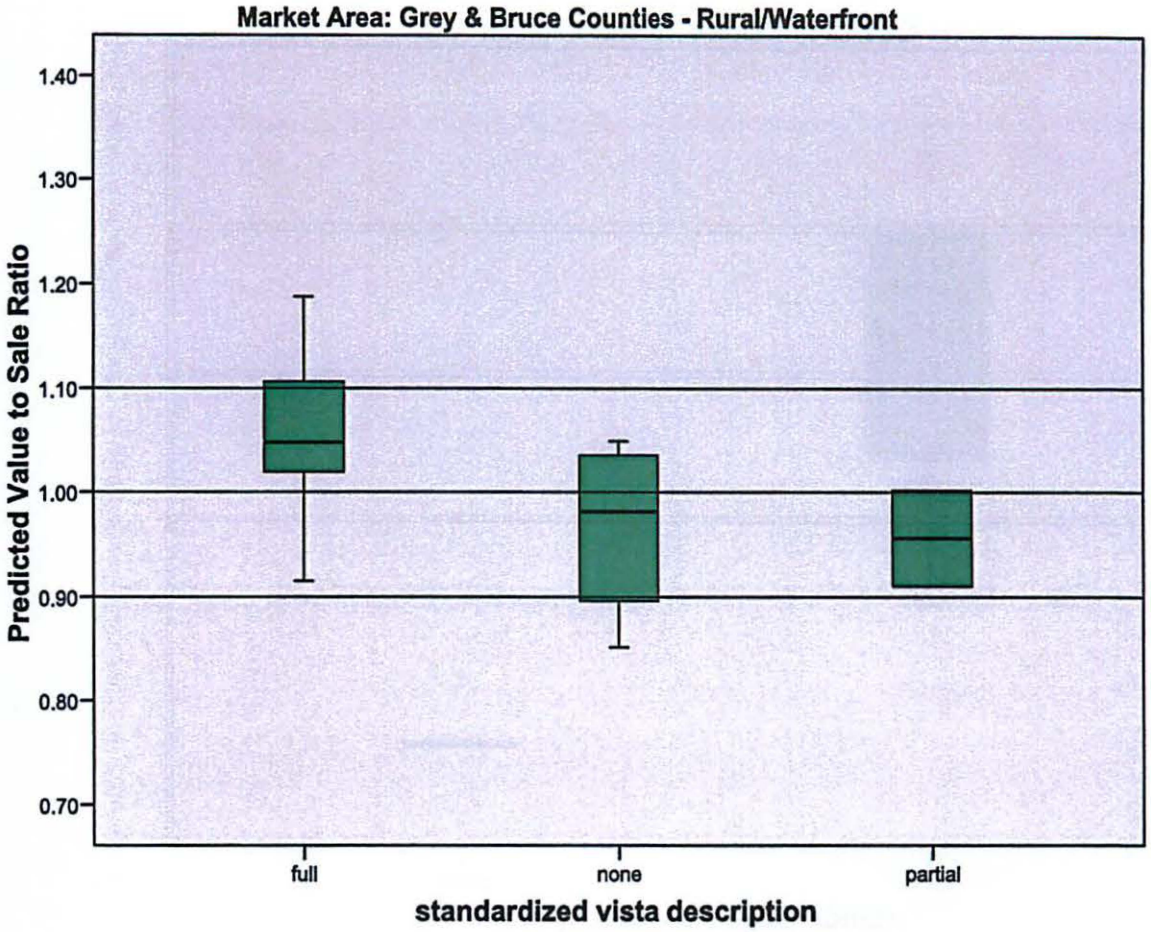
view

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	view	N	Percent	N	Percent	N	Percent
ASRX	full	13	100.0%	0	.0%	13	100.0%
	none	4	100.0%	0	.0%	4	100.0%
	partial	2	100.0%	0	.0%	2	100.0%

a. MODEL = 25RR010 Grey & Bruce Counties - Rural/Waterfront

ASRX



MODEL = 25UR010 Grey & Bruce Counties - Urban

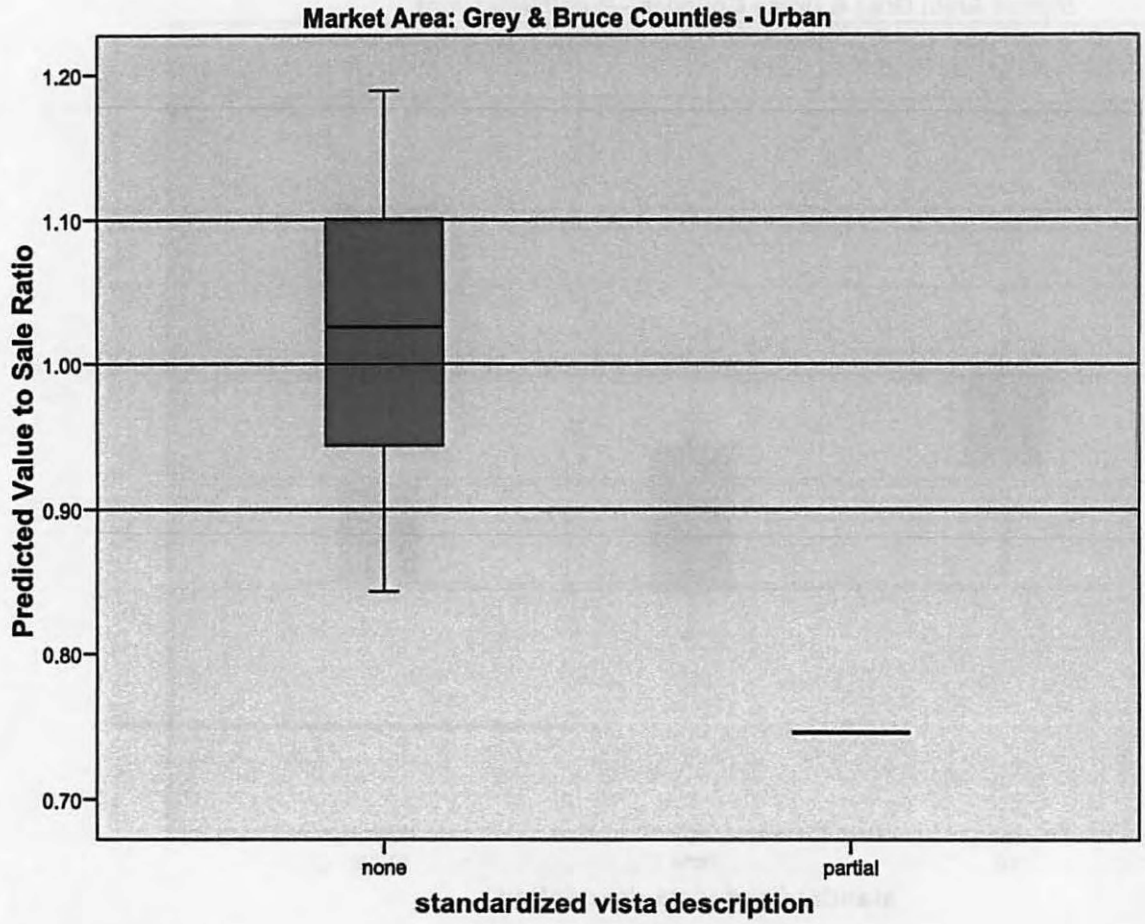
view

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	view	N	Percent	N	Percent	N	Percent
ASRX	none	15	100.0%	0	.0%	15	100.0%
	partial	1	100.0%	0	.0%	1	100.0%

a. MODEL = 25UR010 Grey & Bruce Counties - Urban

ASRX



MODEL = 26RR010 Chatham-Kent - Rural/Wallaceburg

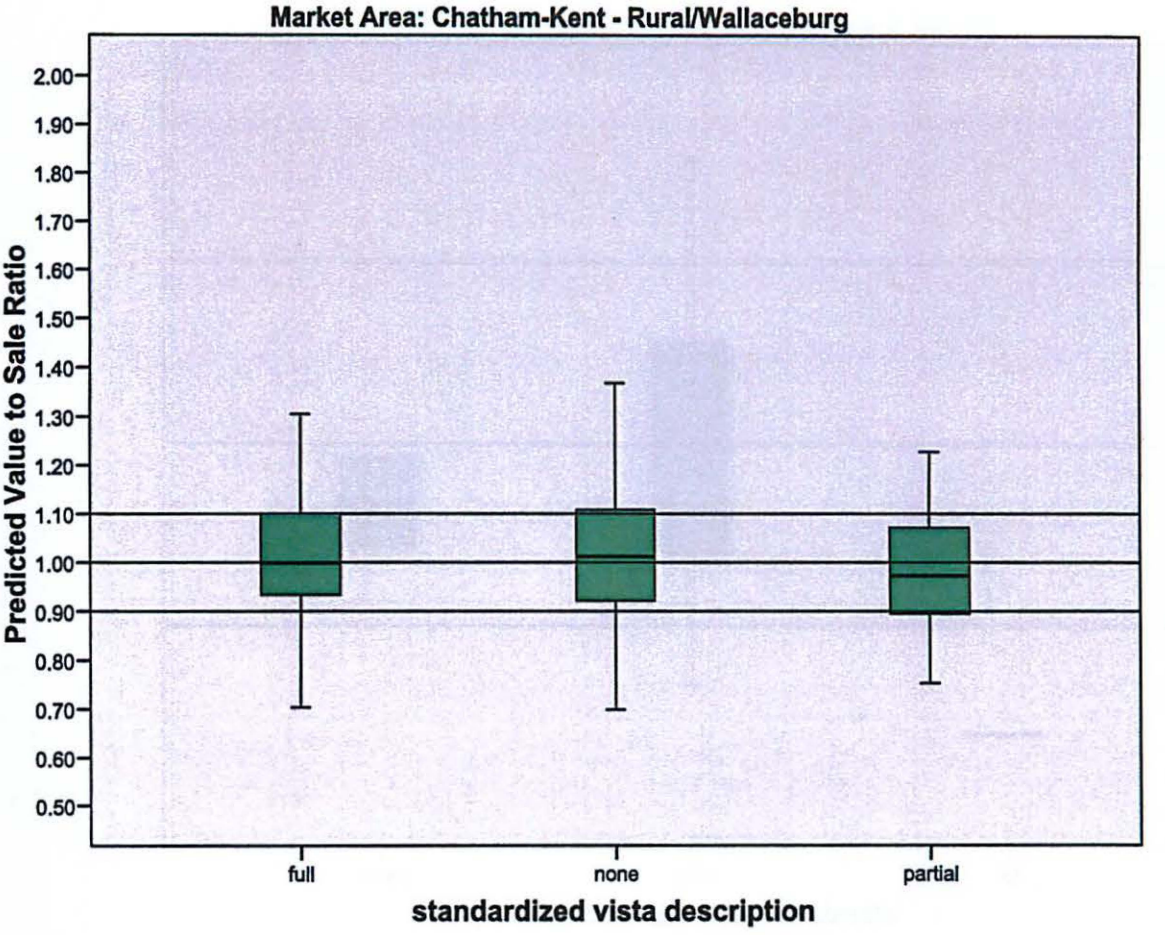
view

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	view	N	Percent	N	Percent	N	Percent
ASRX	full	78	100.0%	0	.0%	78	100.0%
	none	196	100.0%	0	.0%	196	100.0%
	partial	26	100.0%	0	.0%	26	100.0%

a. MODEL = 26RR010 Chatham-Kent - Rural/Wallaceburg

ASRX



MODEL = 26RR030 Lambton County - Rural/WF

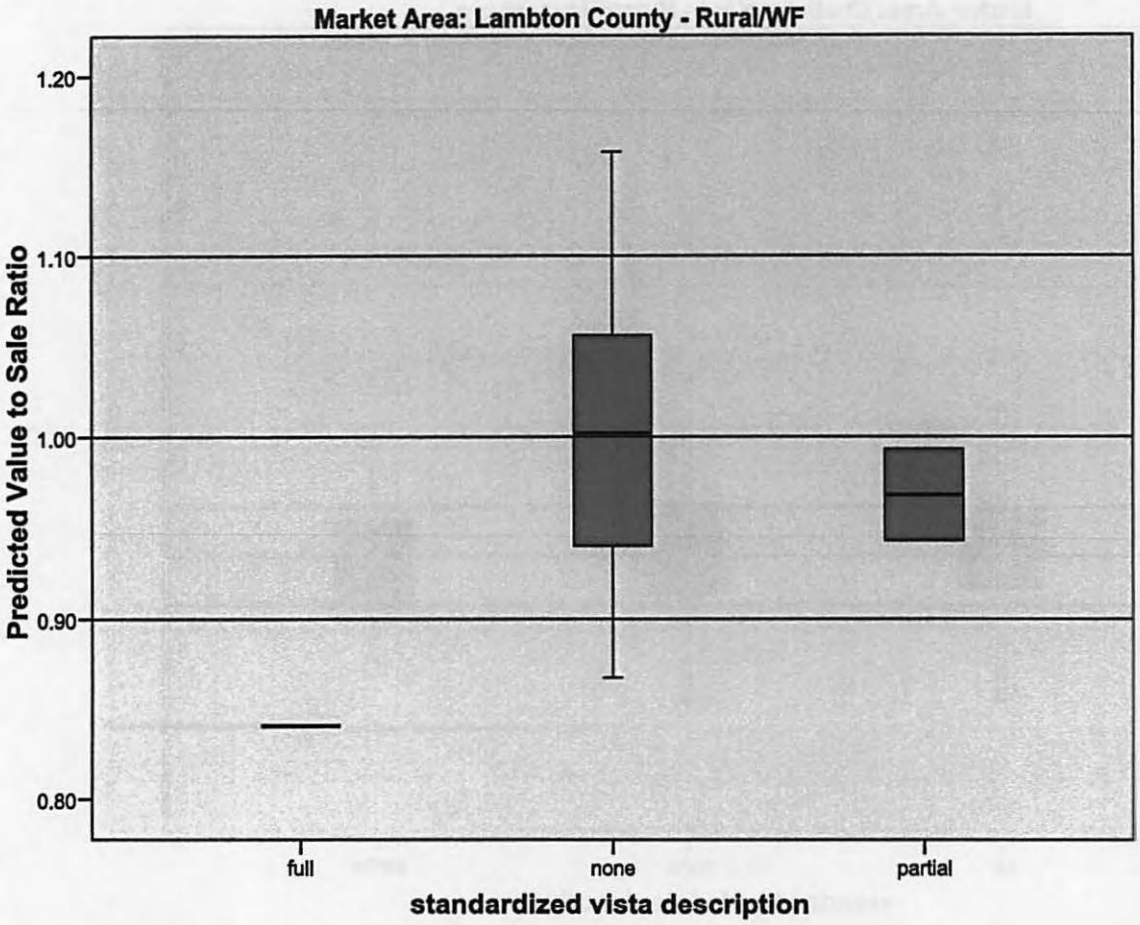
view

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	view	N	Percent	N	Percent	N	Percent
ASRX	full	1	100.0%	0	.0%	1	100.0%
	none	20	100.0%	0	.0%	20	100.0%
	partial	2	100.0%	0	.0%	2	100.0%

a. MODEL = 26RR030 Lambton County - Rural/WF

ASRX



MODEL = 27RR120 Essex County

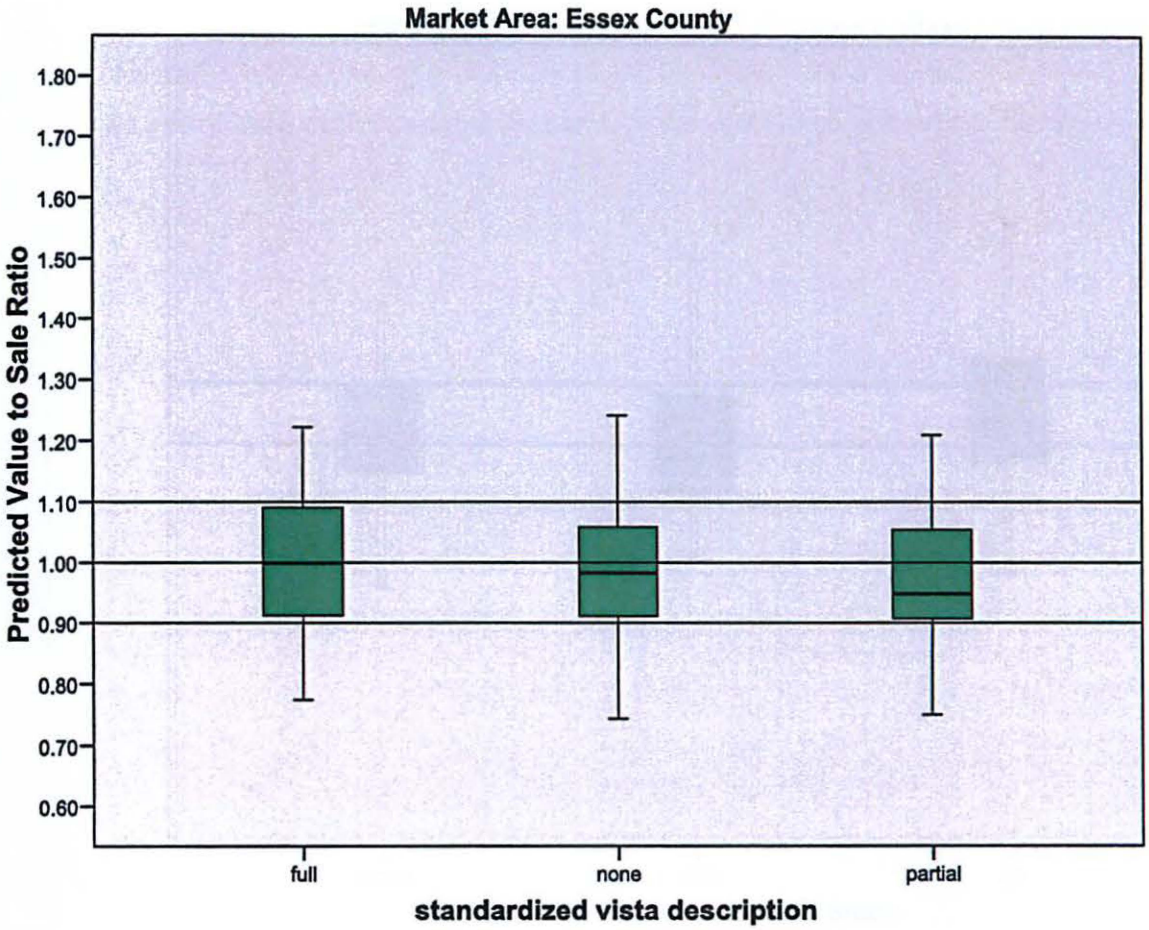
view

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	view	N	Percent	N	Percent	N	Percent
ASRX	full	99	100.0%	0	.0%	99	100.0%
	none	132	100.0%	0	.0%	132	100.0%
	partial	41	100.0%	0	.0%	41	100.0%

a. MODEL = 27RR120 Essex County

ASRX



MODEL = 27UR070 Lasalle, Tecumseh, Lakeshore Urban & Essex Urban

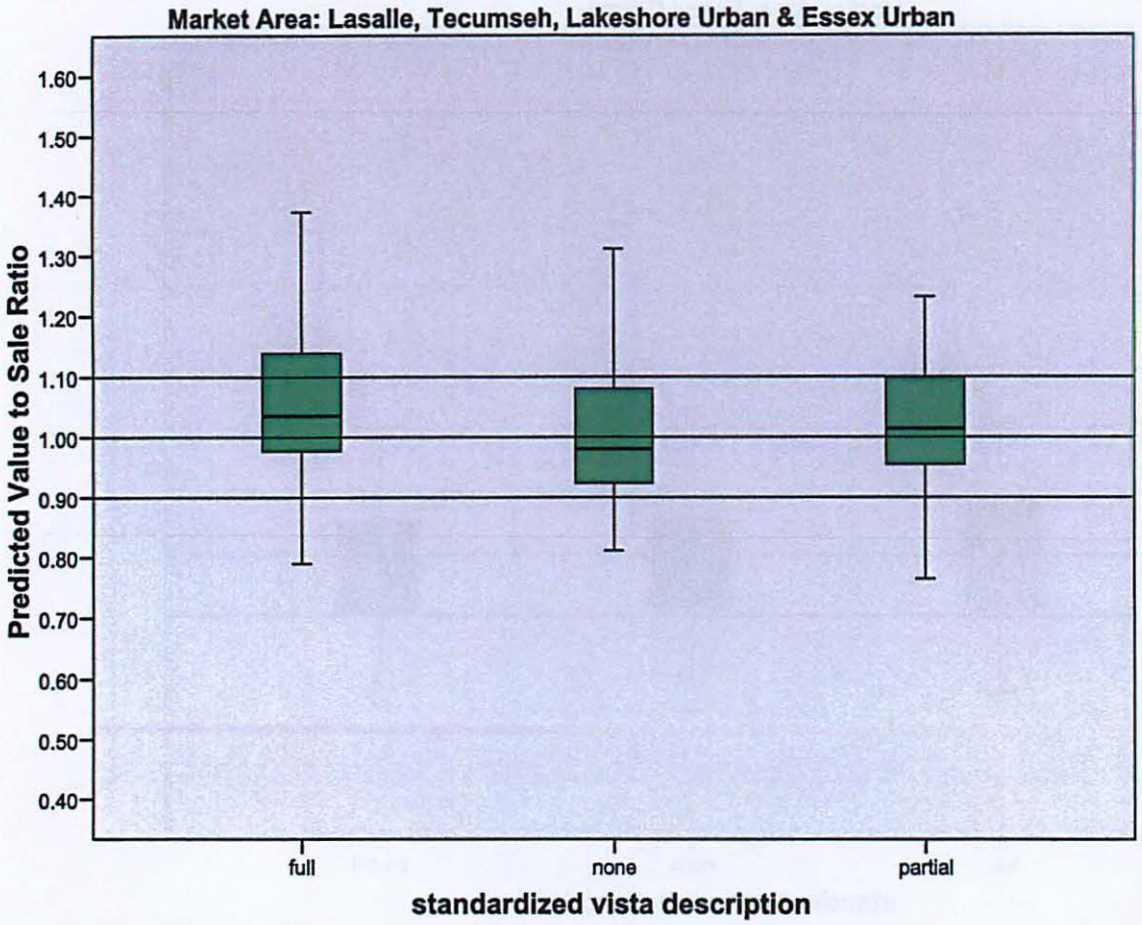
view

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	view	N	Percent	N	Percent	N	Percent
ASRX	full	25	100.0%	0	.0%	25	100.0%
	none	116	100.0%	0	.0%	116	100.0%
	partial	13	100.0%	0	.0%	13	100.0%

a. MODEL = 27UR070 Lasalle, Tecumseh, Lakeshore Urban & Essex Urban

ASRX



MODEL = 31RR010 District of Algoma

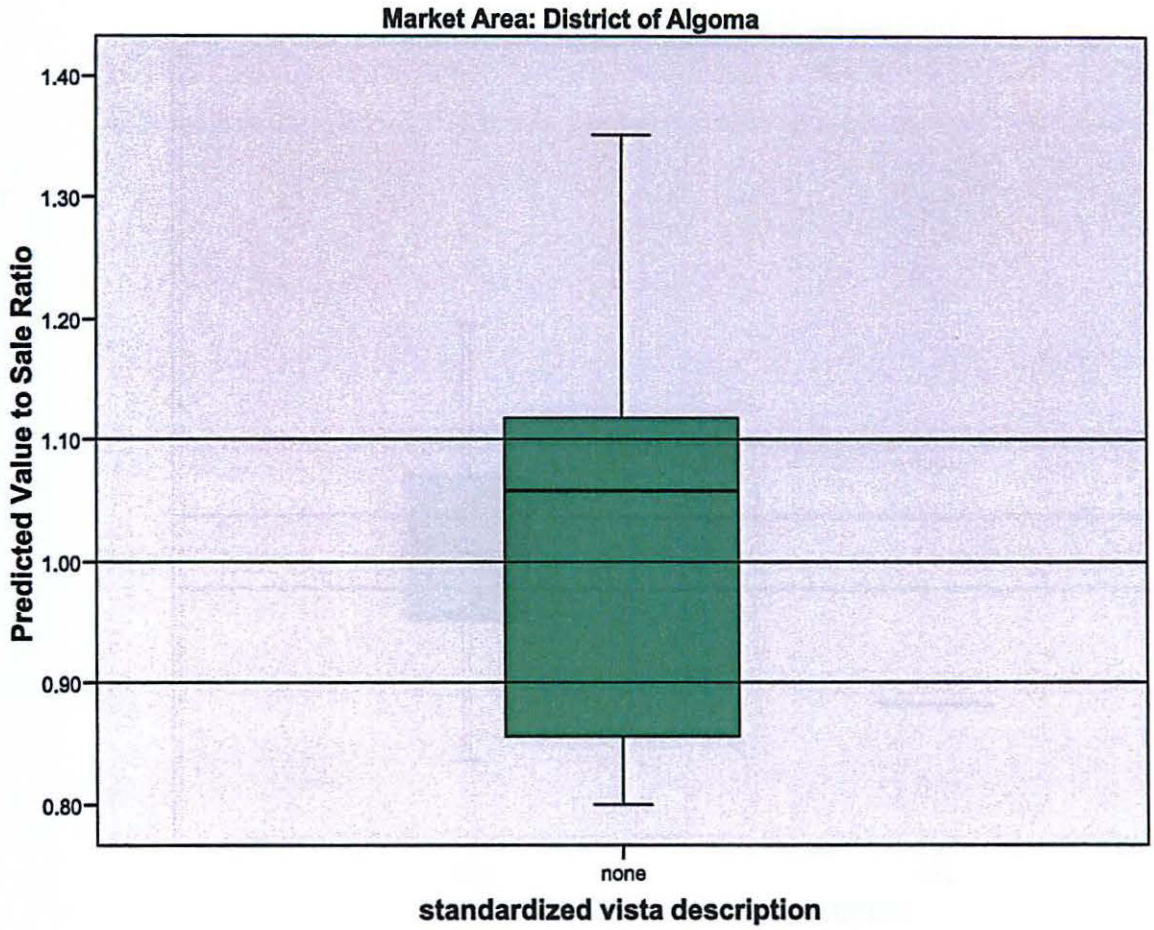
view

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	view	N	Percent	N	Percent	N	Percent
ASRX	none	5	100.0%	0	.0%	5	100.0%

a. MODEL = 31RR010 District of Algoma

ASRX



MODEL = 31UR010 Sault Ste. Marie/Prince Twp

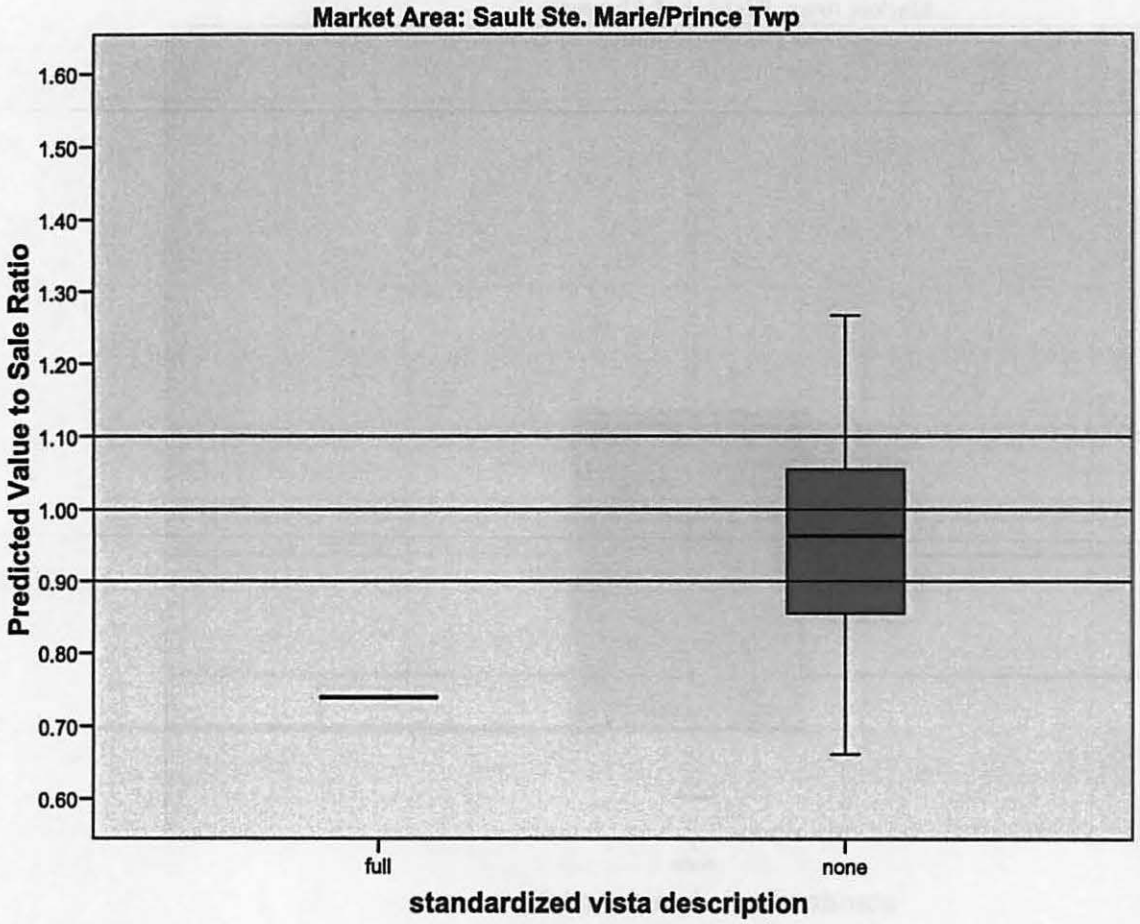
view

Case Processing Summary[a]

		Cases					
		Valid		Missing		Total	
	view	N	Percent	N	Percent	N	Percent
ASRX	full	1	100.0%	0	.0%	1	100.0%
	none	11	100.0%	0	.0%	11	100.0%

a. MODEL = 31UR010 Sault Ste. Marie/Prince Twp

ASRX


Market Area: Sault Ste. Marie/Prince Twp
Predicted Value to Sale Ratio
1.60
1.50
1.40
1.30
1.20
1.10
1.00
0.90
0.80
0.70
0.60
full
none
standardized vista description

Impact of Wind Turbine Proximity on Sale Price

Background

Concern has been expressed that being in proximity to wind turbines negatively affects the sale prices of homes. To determine if this is the case, MPAC sought to determine if any difference in the market value of these residential homes was evident from its analysis for the 2008 base year reassessment.

Methodology

MPAC does not have a data element that identifies if a property abuts or is in proximity to a wind turbine. Therefore it was necessary to create an inventory of these properties. To do this, MPAC's database was reviewed and every property in the Province with a wind turbine or turbines was flagged. Wind turbines have a unique structure code. Therefore, an extract of every roll number with one or more occurrence of this structure code was completed. Also, the department responsible for valuing wind farms was contacted and a list of all wind farms valued by this group was provided. Using these two sources the inventory was created. It should be noted that if a wind turbine has been recently built and not yet inspected and added to MPAC's database, it would not be included in this inventory.

Next, using MPAC's internal definitions of abuts and proximity (included at the end of this report), we identified any residential property (excluding farms) that met each definition and sold between 2005/01 and 2008/04. The number of wind turbines on the site that abutted or was in proximity was also recorded along with their total wattage. Farm sales were not included in this study because the Assessment Act dictates that they be valued based on their productive value using only farmer-to-farmer sales (Section 19.5). This is different from residential properties that are assessed based on their most probable selling price on the open market (Section 19.1). As a result, assessed values of farms can differ from their sale prices and would skew the results of this study.

Sale prices were time adjusted to reflect the January 1, 2008 valuation date used for MPAC's latest reassessment. These time adjustments were developed by market model area using all valid residential sales that occurred over the time period mentioned above. There are 131 market model areas in the Province. Once identified MPAC can compare its assessed values to the time adjusted sale prices to see if the results indicate any pattern of overassessment or underassessment.

Results

Because MPAC did not make an adjustment for proximity to wind turbines when developing its assessed values, if wind turbines did not affect value, one would expect to see assessment to sales ratios (the assessed value divided by the time adjusted sale price) near 1. If wind turbines had a negative affect, one would expect to see an average assessment to sale ratio (ASR) above 1.

Impact of Wind Turbine Proximity on Sale Price

Province-wide there were 17 sales that met the specified criteria. Six sales abutted wind turbines. Eleven sales were in proximity to wind turbines (Using MPAC's internal definitions). The median assessment to sales ratio was 88% for the abutting properties and 92% for properties in proximity to wind turbines (see attached spreadsheet for full results). Also, there was no apparent relationship with the amount of power generated at the nearby site and the ASR. Given the limited number of sales, it is not possible to draw definitive conclusions. However, at this time it appears that there is not adequate evidence to warrant a negative adjustment to residential properties that abut or are in proximity to wind turbines.

Assessment Act Sections

19.1 The assessment of land shall be based on its Current Value. "Current Value" as defined in the Act means, in relation to land, the amount of money the fee simple, if unencumbered, would realize if sold at arm's length by a willing seller to a willing buyer

19.5 For the purposes of determining the current value of farm lands used only for farm purposes by the owner or used only for farm purposes by a tenant of the owner and buildings thereon used solely for farm purposes, including the residence of the owner or tenant and of the owner's or tenant's employees and their families on the farm lands,

(a) consideration shall be given to the current value of the lands and buildings for farm purposes only;

(b) consideration shall not be given to sales of lands and buildings to persons whose principal occupation is other than farming; and

(c) the Minister may, by regulation, define "farm lands" and "farm purposes".

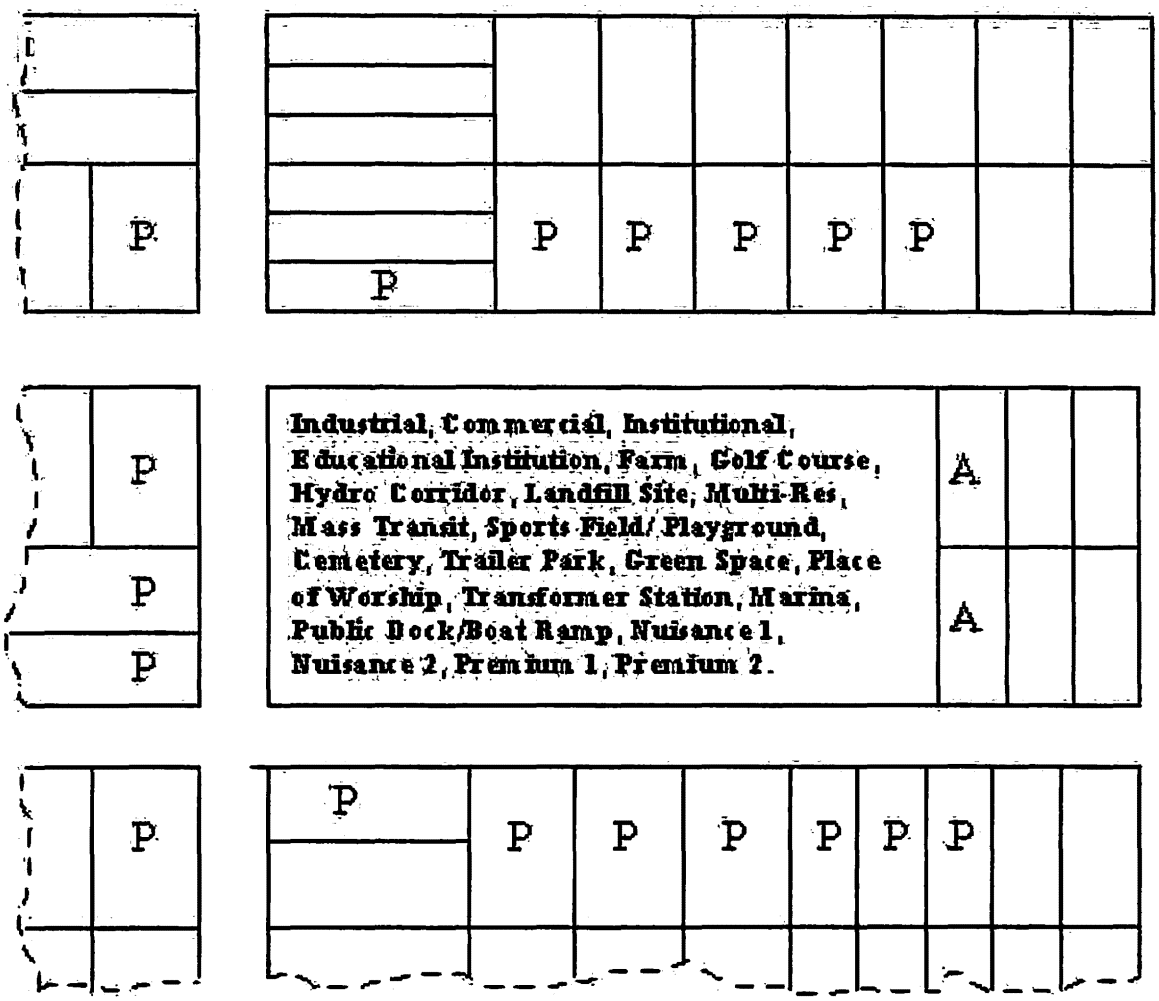
MPAC's Internal Definitions of Abuts and Proximity

ABUTS:	Property is directly and immediately contiguous, physically touching, or sharing a common boundary line with another property or a site characteristic.
PROXIMITY:	Property is directly across or diagonally across from the feature or attribute being described. It also includes properties within an economic neighbourhood that are positively or negatively affected by an economic influence, which affects the value within that neighbourhood. This may affect a few houses on a street, the entire street or a larger area. The positive or negative effect of economic influences may be different in some extreme situations and therefore may change the boundaries of what is normally considered 'proximity". Exceptions to the standard definition of proximity require appraisal judgement, common sense and consistency. *See Illustration for standard examples of abuts and proximity properties.*

Impact of Wind Turbine Proximity on Sale Price

ILLUSTRATIONS FOR ABUTS and PROXIMITY

1.



Appendix F – Study # 2 Regression Recalibrations
Excluded Variables by Market Model

05RR030 Excluded Variables

Model: 19

	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics		
SC304SF	-.004(s)	-.565	.572	-.012	.970	1.031	.184
TRAFFIC	-.006(s)	-.873	.383	-.018	.921	1.086	.184
rd_gravl	-.002(s)	-.255	.799	-.005	.825	1.212	.184
IWT_2KM	-.010(s)	-1.091	.275	-.023	.603	1.657	.183

20RR010 Excluded Variables

Model: 58

	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
LAND_A92	-.003(fff)	-.606	.545	-.008	.706
LAND_A94	.002(fff)	.345	.730	.005	.678
LAND_A95	.000(fff)	-.057	.955	-.001	.938
LAND_A96	-.004(fff)	-.927	.354	-.013	.911
LAND_A97	-.001(fff)	-.268	.789	-.004	.902
LAND_A98	.001(fff)	.312	.755	.004	.951
LAND_AA8	.004(fff)	.647	.518	.009	.545
LAND_A18	.003(fff)	.475	.635	.007	.626
LAND_A46	-.001(fff)	-.249	.803	-.003	.973
LAND_A77	.004(fff)	.822	.411	.012	.778
LAND_AA6	.004(fff)	.911	.362	.013	.756
LAND_B62	.005(fff)	1.194	.233	.017	.943
LAND_B64	-.003(fff)	-.752	.452	-.011	.928
LAND_B65	.003(fff)	.524	.600	.007	.652
LAND_B67	-.003(fff)	-.512	.609	-.007	.638
LAND_B71	-.002(fff)	-.444	.657	-.006	.925
LAND_A14	-.002(fff)	-.386	.699	-.005	.981
LAND_A20AA2AB2	-.001(fff)	-.236	.814	-.003	.987
LAND_A21	-.005(fff)	-1.207	.227	-.017	.917
LAND_A22	.000(fff)	-.074	.941	-.001	.909
LAND_A23	-.001(fff)	-.265	.791	-.004	.990
LAND_A24	.002(fff)	.391	.696	.005	.983
LAND_A25	.000(fff)	-.009	.993	.000	.989
LAND_A26	-.004(fff)	-1.016	.310	-.014	.984
LAND_A27	.003(fff)	.659	.510	.009	.980
LAND_A31	.002(fff)	.537	.591	.008	.993
LAND_A34	-.007(fff)	-1.524	.128	-.021	.965
LAND_A35	-.002(fff)	-.480	.631	-.007	.988
LAND_A37	-.003(fff)	-.484	.628	-.007	.486

LAND_A38	-.006(fff)	-1.506	.132	-.021	.989
LAND_A53B60	.003(fff)	.622	.534	.009	.987
LAND_A54	.006(fff)	1.365	.172	.019	.983
LAND_A57	-.001(fff)	-.281	.779	-.004	.979
LAND_A62A65	-.001(fff)	-.243	.808	-.003	.990
LAND_A63	-.007(fff)	-1.572	.116	-.022	.967
LAND_A64	-.001(fff)	-.351	.725	-.005	.986
LAND_A80	-.006(fff)	-1.454	.146	-.020	.982
LAND_A76	.004(fff)	.956	.339	.013	.842
LAND_A88	-.006(fff)	-1.337	.181	-.019	.895
LAND_AA3	.002(fff)	.583	.560	.008	.990
LAND_AA4	.005(fff)	1.115	.265	.016	.990
LAND_A05	.006(fff)	1.095	.273	.015	.643
LAND_A07	.007(fff)	1.297	.195	.018	.573
LAND_A09	.001(fff)	.108	.914	.002	.544
LAND_A59	-.005(fff)	-1.264	.206	-.018	.969
SIMCOE_BUILTON	-.015(fff)	-.875	.382	-.012	.062
PORTDOVER_BUILTON	.016(fff)	1.038	.299	.015	.072
HNVILLAGES_BUILTON	.012(fff)	.740	.459	.010	.071
CALEDONIA_VACANT	-.006(fff)	-1.226	.220	-.017	.680
IWT_1KM	-.006(fff)	-1.385	.166	-.019	.913
IWT_2KM	-.002(fff)	-.459	.646	-.006	.978
IWT_5KM	-.002(fff)	-.392	.695	-.005	.716

22RR010 Excluded Variables

Model: 32

	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
NB304	-.005(ff)	-.503	.615	-.012	.940
NB306	.008(ff)	.767	.443	.018	.864
NB307	-.005(ff)	-.495	.621	-.012	.915
NB312	.011(ff)	1.027	.305	.024	.771
NB313	.006(ff)	.622	.534	.015	.863
NB331	.006(ff)	.590	.555	.014	.759
NB332	-.009(ff)	-.837	.403	-.020	.697
NB335	.005(ff)	.544	.587	.013	.914
NB341	.003(ff)	.290	.772	.007	.704
NB342	-.004(ff)	-.430	.667	-.010	.905
NB345	.000(ff)	-.042	.967	-.001	.747
SPL_BF	-.001(ff)	-.117	.907	-.003	.963
SPL_SIDE	-.003(ff)	-.358	.720	-.009	.978
corner	-.007(ff)	-.764	.445	-.018	.977
rd_gravl	-.009(ff)	-.877	.381	-.021	.850
IWT_1KM	-.001(ff)	-.089	.929	-.002	.888
IWT_2KM	-.003(ff)	-.268	.789	-.006	.945
IWT_5KM	-.009(ff)	-.961	.337	-.023	.920

23RR010 excluded variables

Model: 73

	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
NB0327	-.012(uuu)	-1.229	.219	-.020	.320
NB0367	-.001(uuu)	-.202	.840	-.003	.868
NB0369	.004(uuu)	.600	.549	.010	.664
NB0337	-.010(uuu)	-1.028	.304	-.016	.353
NB0338	.005(uuu)	.837	.403	.013	.851
NB0339	.003(uuu)	.367	.714	.006	.530
PCVLCONDO_BUILT	.000(uuu)	-.042	.967	-.001	.994
dw_shar	-.008(uuu)	-1.407	.159	-.022	.972
ab_playg	-.006(uuu)	-1.006	.314	-.016	.968
ab_walkw	-.002(uuu)	-.393	.695	-.006	.953
ab_cemet	.005(uuu)	.852	.394	.014	.982
ab_chrch	.006(uuu)	1.048	.295	.017	.965
pr_playg	-.006(uuu)	-1.037	.300	-.017	.914
pr_green	-.005(uuu)	-.854	.393	-.014	.971
pr_chrch	-.004(uuu)	-.730	.465	-.012	.940
culdesac	.003(uuu)	.494	.622	.008	.879
tp_steep	.001(uuu)	.220	.826	.004	.821
tp_low	-.005(uuu)	-.858	.391	-.014	.927
H3227X35	.007(uuu)	.940	.347	.015	.596
H3227X61	-.007(uuu)	-1.176	.240	-.019	.791
H3238X61	.(uuu)	.	.	.	.000
H3245B25	.004(uuu)	.606	.545	.010	.696
H3245X30	-.012(uuu)	-.804	.421	-.013	.136
H3202X15	-.002(uuu)	-.317	.751	-.005	.516
H3202X46	.007(uuu)	1.235	.217	.020	.917
H3211X15	-.008(uuu)	-1.428	.154	-.023	.893
H3418E26	-.006(uuu)	-1.028	.304	-.016	.886
H3418E21	.002(uuu)	.406	.685	.006	.931
H3424E04	-.008(uuu)	-1.274	.203	-.020	.829
H3424E05	.006(uuu)	1.047	.295	.017	.913
H3424E10	-.003(uuu)	-.554	.580	-.009	.939
H3424E11	-.001(uuu)	-.179	.858	-.003	.921
H3939A06	-.002(uuu)	-.329	.742	-.005	.890
H3939A07	.008(uuu)	1.359	.174	.022	.942
H3926A12	.005(uuu)	.921	.357	.015	.921
H3906M03	-.009(uuu)	-1.465	.143	-.023	.839
H3906M05	.002(uuu)	.211	.833	.003	.236
H3916A04	.009(uuu)	1.596	.111	.025	.912
H3926A22	.002(uuu)	.312	.755	.005	.940
IWT_1KM	-.008(uuu)	-1.438	.150	-.023	.987
IWT_2KM	-.003(uuu)	-.308	.758	-.005	.286

24RR010 Excluded Variables

Model: 33

	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
NB1306	.015(gg)	1.370	.171	.049	.972
NB1307	-.009(gg)	-.823	.411	-.030	.993
NB1308	.000(gg)	.014	.989	.001	.963
NB1309	-.003(gg)	-.240	.810	-.009	.984
NB1310	.002(gg)	.145	.885	.005	.895
NB1311	.003(gg)	.263	.792	.010	.954
NB1312	-.014(gg)	-1.217	.224	-.044	.958
NB1314	-.016(gg)	-1.363	.173	-.049	.941
NB1316	.006(gg)	.557	.578	.020	.973
NB1317	-.006(gg)	-.509	.611	-.018	.956
NB1319	-.004(gg)	-.319	.750	-.012	.911
NB1320	-.013(gg)	-1.122	.262	-.041	.926
NB1322	-.005(gg)	-.407	.684	-.015	.928
NB1324	-.009(gg)	-.834	.404	-.030	.971
NB1330	-.008(gg)	-.744	.457	-.027	.944
NB1331	.000(gg)	.027	.978	.001	.934
NB1402	.007(gg)	.562	.574	.020	.833
NB1403	.005(gg)	.405	.685	.015	.825
NB1404	.007(gg)	.633	.527	.023	.916
NB1405	.012(gg)	.983	.326	.036	.858
NB1407	-.009(gg)	-.732	.464	-.026	.895
NB1408	.008(gg)	.617	.538	.022	.800
NB1410	.012(gg)	1.044	.297	.038	.922
NB1411	.013(gg)	1.157	.248	.042	.972
vl_1321	.015(gg)	1.113	.266	.040	.719
vl_1323	-.013(gg)	-.957	.339	-.035	.719
vl_1332	.008(gg)	.671	.503	.024	.885
RAV_LIN	.004(gg)	.379	.705	.014	.883
sc310sf	.001(gg)	.098	.922	.004	.910
IWT_1KM	-.009(gg)	-.829	.407	-.030	.955
IWT_2KM	-.010(gg)	-.836	.403	-.030	.953
IWT_5KM	.000(gg)	-.006	.995	.000	.572

25RR010 Excluded Variables

Model: 47

	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
NB1200	.005(uu)	.716	.474	.013	.817
NB1202	.011(uu)	1.351	.177	.024	.580
NB1206	.008(uu)	1.097	.273	.020	.747
NB1209	-.002(uu)	-.300	.764	-.005	.864
NB1210	-.009(uu)	-1.132	.258	-.020	.638
NB1213	.006(uu)	.746	.456	.013	.558
NB1216	-.006(uu)	-.898	.369	-.016	.920
NB1217	-.002(uu)	-.318	.750	-.006	.958
NB1218	.002(uu)	.255	.799	.005	.836
NB1219	.010(uu)	1.588	.112	.029	.872
NB1221	.001(uu)	.186	.852	.003	.667
NB1222	-.005(uu)	-.848	.396	-.015	.894
NB1225	.006(uu)	.484	.629	.009	.219
NB1226	.004(uu)	.634	.526	.011	.950
NB1227	-.006(uu)	-.950	.342	-.017	.931
NB1228	.001(uu)	.135	.893	.002	.984
NB1229	-.002(uu)	-.267	.790	-.005	.958
NB1230	.002(uu)	.278	.781	.005	.965
NB1231	-.004(uu)	-.697	.486	-.013	.983
NB1232	.001(uu)	.225	.822	.004	.984
NB1233	.003(uu)	.424	.671	.008	.996
NB1235	-.001(uu)	-.129	.897	-.002	.970
NB1236	.010(uu)	1.602	.109	.029	.863
NB1237	.006(uu)	.813	.416	.015	.718
NB1238	-.004(uu)	-.564	.573	-.010	.794
NB1239	.006(uu)	.903	.366	.016	.983
NB1240	-.010(uu)	-1.402	.161	-.025	.750
NB1242	.005(uu)	.741	.459	.013	.831
NB1243	.001(uu)	.171	.864	.003	.811
NB1244	.001(uu)	.090	.928	.002	.459
NB1246	-.008(uu)	-1.308	.191	-.024	.968
NB1247	-.009(uu)	-1.491	.136	-.027	.953
NB1249	-.004(uu)	-.577	.564	-.010	.626
NB1250	.004(uu)	.639	.523	.011	.832
NB1251	.004(uu)	.630	.529	.011	.892
NB1300	.013(uu)	1.323	.186	.024	.374
NB1302	.007(uu)	.879	.380	.016	.664
NB1303	-.007(uu)	-1.156	.248	-.021	.902
NB1305	.004(uu)	.580	.562	.010	.819
NB1307	.010(uu)	1.400	.162	.025	.760
NB1309	.000(uu)	.071	.944	.001	.922
NB1310	-.004(uu)	-.496	.620	-.009	.576
NB1311	.009(uu)	1.437	.151	.026	.941
NB1312	.000(uu)	-.006	.995	.000	.913

NB1313	.002(uu)	.289	.773	.005	.967
NB1314	-.004(uu)	-.641	.521	-.012	.978
NB1315	.006(uu)	.983	.326	.018	.847
NB1316	-.006(uu)	-.971	.332	-.017	.839
NB1317	-.003(uu)	-.521	.603	-.009	.937
NB1318	.003(uu)	.369	.712	.007	.758
NB1319	-.008(uu)	-1.262	.207	-.023	.958
NB1320	-.003(uu)	-.469	.639	-.008	.805
NB1321	.001(uu)	.092	.927	.002	.801
NB1322	.000(uu)	-.050	.960	-.001	.826
NB1323	.008(uu)	1.261	.207	.023	.959
NB1325	-.007(uu)	-1.156	.248	-.021	.990
NB1326	.005(uu)	.724	.469	.013	.930
NB1328	.002(uu)	.352	.725	.006	.994
NB1329	-.005(uu)	-.683	.495	-.012	.598
NB1330	.001(uu)	.179	.858	.003	.925
NB1332	.001(uu)	.207	.836	.004	.842
NB1333	-.010(uu)	-1.433	.152	-.026	.742
NB1334	-.009(uu)	-1.328	.184	-.024	.830
NB1335	.002(uu)	.316	.752	.006	.878
NB1336	.007(uu)	1.015	.310	.018	.813
NB1338	-.002(uu)	-.390	.696	-.007	.932
NB1339	-.009(uu)	-1.454	.146	-.026	.910
NB1340	-.007(uu)	-1.115	.265	-.020	.942
NB1341	-.009(uu)	-1.278	.201	-.023	.725
NB1343	-.012(uu)	-1.454	.146	-.026	.532
NB1344	-.003(uu)	-.484	.628	-.009	.831
NB1345	-.007(uu)	-1.000	.317	-.018	.712
NB1346	-.003(uu)	-.513	.608	-.009	.924
NB1347	-.006(uu)	-.920	.358	-.017	.916
NB1348	.006(uu)	.755	.450	.014	.535
corner	-.003(uu)	-.477	.633	-.009	.946
culdesac	.003(uu)	.490	.624	.009	.831
RAV_LIN	-.007(uu)	-1.047	.295	-.019	.865
IWT_1KM	-.002(uu)	-.273	.785	-.005	.891
IWT_2KM	.001(uu)	.137	.891	.002	.926
IWT_5KM	.001(uu)	.158	.875	.003	.651

26RR010 Excluded Variables

Model: 21

	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
NB0184	.005(u)	.652	.514	.017	.688
NB0185	-.003(u)	-.343	.732	-.009	.700
NB0187	.001(u)	.080	.936	.002	.793
NB0200	.004(u)	.498	.618	.013	.874
NB0203	.005(u)	.635	.526	.016	.926
NB0204	.006(u)	.790	.430	.020	.960
NB0212	.003(u)	.400	.689	.010	.961
NB0214	-.004(u)	-.530	.596	-.014	.933
NB0216	-.004(u)	-.581	.561	-.015	.860
NB0220	-.007(u)	-.939	.348	-.024	.886
NB0224	.005(u)	.095	.924	.002	.016
NB0226	-.003(u)	-.464	.643	-.012	.975
NB0232	-.008(u)	-1.051	.293	-.027	.933
NB0241	.003(u)	.457	.648	.012	.917
NB0248	.001(u)	.199	.842	.005	.954
NB0250	-.011(u)	-1.376	.169	-.036	.767
NB0251	.000(u)	-.007	.995	.000	.792
NB0254	-.008(u)	-1.098	.272	-.028	.937
NB0259	.007(u)	.614	.539	.016	.328
NB0270	-.004(u)	-.354	.723	-.009	.464
NB0272	-.018(u)	-.769	.442	-.020	.090
NB0273	.003(u)	.337	.736	.009	.766
NB0276	-.001(u)	-.119	.905	-.003	.425
NB192_B16	.001(u)	.126	.900	.003	.806
NB230_E19	.001(u)	.124	.901	.003	.366
NB251_HIQUAL	.004(u)	.586	.558	.015	.951
PC333SF	.007(u)	.906	.365	.023	.833
PC332	-.036(u)	-1.114	.265	-.029	.047
PC391	.006(u)	.688	.492	.018	.668
PC392	-.003(u)	-.408	.683	-.011	.767
PC392395	.009(u)	1.148	.251	.030	.784
NB183_LOWQUAL	.004(u)	.370	.712	.010	.424
acc_no	-.004(u)	-.531	.595	-.014	.818
FL1_D	-.004(u)	-.494	.621	-.013	.713
floodp_r	.003(u)	.327	.744	.008	.779
no_str_l	.008(u)	.858	.391	.022	.535
zone_com	.003(u)	.452	.651	.012	.895
IWT_1KM	-.004(u)	-.584	.559	-.015	.946
IWT_2KM	.002(u)	.183	.855	.005	.720
IWT_5KM	-.009(u)	-1.153	.249	-.030	.764

26RR030 Excluded Variables

Model: 6

	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
FL1_D	-.002(f)	-.308	.758	-.007	.681
PC333TO336_SF	.002(f)	.395	.693	.009	.812
MARKET2	-.003(f)	-.082	.935	-.002	.024
NB407B14_PC100	.001(f)	.211	.833	.005	.784
NB0304	-.004(f)	-.537	.592	-.012	.559
NB0305	.002(f)	.256	.798	.006	.724
NB0306	.004(f)	.646	.518	.015	.827
NB0311	.001(f)	.149	.881	.003	.767
NB0351	-.004(f)	-.714	.475	-.016	.716
NB352_D65	.003(f)	.577	.564	.013	.989
NB0353	.000(f)	-.022	.983	.000	.861
NB0354	-.003(f)	-.532	.595	-.012	.904
NB0355	.000(f)	-.010	.992	.000	.926
NB0357	.000(f)	-.001	.999	.000	.948
NB0362	-.001(f)	-.233	.816	-.005	.713
NB0364	-.003(f)	-.625	.532	-.014	.966
NB0365	.000(f)	.077	.939	.002	.985
NB0368	.008(f)	1.356	.175	.031	.827
NB0370	-.001(f)	-.216	.829	-.005	.917
NB0371	-.002(f)	-.280	.779	-.006	.568
NB0376	.001(f)	.136	.892	.003	.977
NB0378	-.003(f)	-.349	.727	-.008	.487
NB410_B61	-.007(f)	-1.300	.194	-.030	.831
NB415_B56	.000(f)	-.020	.984	.000	.372
NB417_B48	.012(f)	1.338	.181	.031	.330
ab_educ	-.003(f)	-.605	.545	-.014	.962
ab_hydro	-.007(f)	-1.327	.185	-.031	.893
SPLITLIN	.004(f)	.720	.471	.017	.773
SPL_UNCV	-.004(f)	-.767	.443	-.018	.989
zone_com	-.001(f)	-.211	.833	-.005	.931
zone_ind	-.007(f)	-1.185	.236	-.027	.820
ZONE_LIN	-.005(f)	-.831	.406	-.019	.895
IWT_2KM	-.016(f)	-1.417	.157	-.033	.218

27RR120 Excluded Variables

Model: 42

	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
NB0165	-.002(pp)	-.256	.798	-.005	.521
NB0166	-.001(pp)	-.200	.842	-.004	.618
NB0169	.004(pp)	.560	.575	.011	.537
NB0170	.007(pp)	1.332	.183	.025	.853
NB0172	.000(pp)	.002	.998	.000	.701
NB0176	-.004(pp)	-.770	.442	-.015	.934
NB0177	.000(pp)	.075	.941	.001	.625
NB0179	-.003(pp)	-.533	.594	-.010	.718
NB0180	-.007(pp)	-.793	.428	-.015	.287
NB0183	-.003(pp)	-.561	.575	-.011	.720
NB0184	.007(pp)	1.374	.170	.026	.719
NB0187	-.003(pp)	-.480	.631	-.009	.433
NB0192	-.004(pp)	-.587	.557	-.011	.455
NB0198	.000(pp)	.032	.975	.001	.297
NB0199	-.003(pp)	-.722	.470	-.014	.980
NB0272	.001(pp)	.131	.895	.002	.498
NB0279	.000(pp)	-.048	.962	-.001	.390
NB0281	-.004(pp)	-.839	.402	-.016	.902
NB0284	.011(pp)	1.496	.135	.028	.394
NB0286	.002(pp)	.344	.731	.007	.607
NB0288	-.007(pp)	-1.220	.222	-.023	.648
NB0293	.001(pp)	.234	.815	.004	.923
VILL_VL	.011(pp)	.939	.348	.018	.154
ab_playg	-.004(pp)	-.844	.399	-.016	.939
ab_u_box	-.003(pp)	-.598	.550	-.011	.919
FL1_D	.000(pp)	.003	.998	.000	.851
DES_LOG_SF	.001(pp)	.303	.762	.006	.974
STOR_114	-.006(pp)	-1.205	.228	-.023	.924
SPLIT_ADJ	.002(pp)	.426	.670	.008	.791
NORTH381	.002(pp)	.344	.731	.007	.582
NB359_A49	.001(pp)	.107	.915	.002	.451
NB383_D47	.006(pp)	1.085	.278	.021	.607
FLOOD_IM	.006(pp)	1.299	.194	.025	.854
NB169_PC100	.002(pp)	.314	.754	.006	.930
NB170_PC311	.001(pp)	.180	.857	.003	.936
NB370_PC100	-.008(pp)	-1.055	.292	-.020	.373
NB372_B74	-.002(pp)	-.404	.686	-.008	.827
NB182_NOT_C80	.005(pp)	.882	.378	.017	.770
IWT_1KM	-.004(pp)	-.703	.482	-.013	.727
IWT_2KM	.006(pp)	1.142	.254	.022	.767
IWT_5KM	-.007(pp)	-1.323	.186	-.025	.712

31RR010 Excluded Variables

Model: 9

	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
iwtlt2km	.003(i)	.307	.759	.006	.843
IWT_5KM	.016(i)	1.487	.137	.028	.705

Re-sales Analyses - Lansink and MPAC

Introduction

Lansink Appraisal and Consulting released case studies on the impact of proximity to industrial wind turbines (IWTs) on sale prices for properties located near the Melancthon and Clear Creek wind turbine facilities in southwestern Ontario.

The conclusions presented in the Lansink study are based on the analysis of 12 properties that sold and resold between June 2005 and November 2012. In two instances in the Clear Creek study, initial sales date back to March 2004 and September 1995. On other properties in the Clear Creek area, the Lansink study uses MPAC's January 1, 2008 Current Value Assessment (CVA) as a proxy sale price in which to conduct the analysis. All five properties used in the Melancthon study area involved Canadian Hydro Developers (CHD) as the purchaser on the initial sale and the vendor on the re-sale.

The conclusions of the case studies indicate a 30-35% loss in price due to the proximity of the properties to an IWT, based on the sale and re-sale of the 12 properties.

In MPAC's review of the Lansink study, the appropriateness of the price change index is considered and another re-sale analysis is conducted using an alternative price index methodology in over 2,000 re-sales across Ontario.

Basic Methodology in Lansink Study

Each sale and re-sale (or in the absence of an initial sale the 2008 CVA) is presented as a case study. The initial sale price and date are shown along with the Multiple Listing Service (MLS) average sale price for the month of sale. The re-sale price and date are shown along with the MLS average sale price for the month of the re-sale for the property. The MLS average sale prices are based on Canadian Real Estate Association (CREA) data as presented by the local real estate board.

The case study uses the percentage difference between MLS average sale prices to estimate price change over time in the marketplace. The initial sale is trended to the sale date of the re-sale. The difference between the trended sale price and the actual re-sale price is calculated as a dollar amount and a percentage. Any difference in price between the trended sale price and the actual sale price is attributed to the presence of the IWT and presented as a diminution of price.

Table 1 below provides a sample calculation that determines the loss in price in the Lansink case studies.

Table 1: Lansink Case Study Methodology Sample Calculation

	Sale Price	Sale Date	Average MLS Price @ Time of Sale	Percentage Change – MLS Average	Trended Sale Price	Diminution of Price
Initial Sale	$100,000	October 2010	$100,000	25.00%	$125,000	($10,000)
Re-Sale	$115,000	October 2011	$125,000			-8.0%

In this example, using only 2 data points, the property initially sold for $100,000 in October 2010. It sold again in October 2011 for $115,000. The average MLS sale prices were $100,000 and $125,000 respectively at time of sale. This results in a 25% increase over a 12 month period. The initial sale price is trended by 25% (multiplier of 1.25) to produce a trended sale price of $125,000. The Lansink study argues that without the nearby IWT, the property should have sold for its trended sale price and then calculates the loss in price as the difference between the trended sale price and its actual sale price. In the above example, the loss in price is ($10,000) or -8.0%.

Methodology Issues

The first issue with the basic methodology is the use of the average MLS sale price as a proxy for market change. CREA statistics are board-wide and may not accurately represent the average sale price in the local area (i.e., neighbourhood). Some areas of the board will be above average, some will be below average and others will be average. The use of average sale prices that are more local may produce different results. Also, there is no comparison of the housing stock that sold during each time period. If the type of houses that sold each month differs, that could affect the average sale price and produce a misleading time adjustment.

The second issue is the use of only two data points to develop a trend. Two points always produce a straight line and don't give any information on what happened in between. Alternative time adjustment methods are available and used by appraisers using all available sales data and would produce a more reliable market trend[1].

Two sales used in the Clear Creek study area uses re-sales 8 and 17 years apart. One assumption with re-sale analysis is that there are no physical changes between sales. Given the length of time between, it is difficult to imagine this assumption holds true. The remaining sales in the Clear Creek study area only have one sale and use the 2008 CVA as a proxy sale price as of January 2008. MPAC is not aware of any professional literature which states that assessments or appraised values maybe used in a re-sale analysis.

To demonstrate that Canadian Hydro Developers paid market value when they initially purchased the five properties near the Melancthon wind farm, the Lansink study calculated the median sale price per square foot for two groups of properties. Group A was 20 properties northwest of Shelburne and to the northeast and southeast of the IWT's. Group B was four of the five sales purchased by CHD. Because the two groups had similar sale prices per square foot, the Lansink study concluded that the CHD purchase prices represent fair open market prices. One of MPAC's major concerns with this approach is that Group B is made up of only 4 sales. This is a very small sample.

[1] Mike Wolff, Adjusting Market Value over Time, The Appraisal Journal, Fall 2010

Another issue with one of the sales in Group B is that it has an indicated living area in MPAC's database of 900 square feet as opposed to the 1,800 square feet recorded by the Lansink study The property in question appears to be a raised bungalow with a basement walkout. According to the Appraisal Institute of Canada, finished basements are generally not included in total gross living area. Total gross living area being defined as finished above grade residential space[2].

Other articles state that above grade and below grade finished areas should be distinguished between one another. Below grade is generally defined as space on a level with earth adjacent to any exterior wall[3]. MPAC has recorded 563 square feet of finished area on this basement walkout level.

Inclusion of unfinished basement area as total living area by the Lansink study is incorrect. The question is should finished area below grade be included as total living area used to determine the sale price per square foot. This difference is important and significant because of the small size and its impact on the median sale price per square foot for these four properties. If 900 square feet is used, the median and average sale prices per square foot increase to $248.11 and $257.94 respectively. If the finished area below grade is included and 1,463 square feet of living area is used, the median and average are $219.87 and $225.34.

Also, the sample used in Group A is a subset of the available sales in the area. These sales come from four of MPAC's homogeneous neighbourhoods. Homogenous Neighbourhoods are defined to capture the influence of a particular location within a given market area.

When all 113 sales in these four neighbourhoods are looked at, the following values per square foot are indicated:

	Number of Sales	Median Sale Price/ SF ($)	Mean Sale Price / SF ($)
Unused Sales	91	176.64	187.90
Group A Sales	18	212.37	206.16
Group B Sales	4	248.11	257.94
Overall	**113**	**194.88**	**194.28**

Two of the sales included in the Lansink study were coded as builder sales by MPAC and were not included in MPAC's sales database. For this reason, there are 18 sales from Group A included in the above table.

Upon further review, MPAC noted that three of the four CHD purchases (Group B) occurred in one homogeneous neighbourhood (A67). Ten of the 20 Group A sales occurred in this neighbourhood. For this reason MPAC looked at all the sales in this homogeneous neighbourhood separately using 900 square feet for the sale in question.

[2] The Appraisal of Real Estate, 3rd Canadian Edition, (Appraisal Institute of Canada), 2010, p.11.7

[3] Dianna LeBreton, How to measure and calculate residential square footage, Canadian Property Valuation Volume 53, Book 1, (Appraisal Institute of Canada), 2009

	Number of Sales	Median Sale Price/ SF ($)	Mean Sale Price / SF ($)
Unused Sales	11	200.00	200.38
Group A Sales	10	210.25	213.24
Group B Sales	3	231.25	255.60
Overall	24	210.25	212.64

These figures indicate there may be a difference between the sale prices paid by CHD and the typical sale prices in this area, albeit on a very small sample. If 1,463 square feet are used for the sale in question, the median and average sale price per square foot drops to $208.48 and $212.13, respectively. This highlights the volatility of using small sales samples.

One final issue with the sales used in the Lansink study was that the second sale price was consistently lower than the first sale price despite the fact the time frame being analyzed was one of inflation. The absence of variability in the study make them suspect.

MPAC's Re-Sale Analysis

MPAC identified over 2,000 re-sales of properties within the database used to conduct its Assessment to Sale Ratio (ASR) analysis, as part of its own study on the impact of IWT's for the 2012 CVAs.

A re-sale analysis using similar logic to the Lansink study was conducted using the Time Adjustment Factors (TAFs) developed as part of MPAC's analysis for each residential market area to prepare and quality check the 2012 CVAs prior to being placed on the assessment roll. Residential time trends can be determined using one of five accepted methods. Paired sales methods and re-sale analysis methods are generally limited to fee appraisal and often too tedious for mass appraisal work. Mass appraisal time trend methods include tracking the sale price per unit over time, sales to assessment ratios over time or including time variables as a variable in the valuation model (i.e., Multiple Regression Analysis (MRA) model). Including time variables in the valuation model is MPAC's preferred approach to developing time trends and TAFs.

The advantages of including time variables in the MRA model is that the effect of time is isolated because the model controls the other value influences as part of the equation and all available sales within each market area can be used. Time trends may be straight-line (constant rate of change and direction over time) or non-linear (different rates of change and direction over time). Non-linear trends require additional terms to be added to the analysis to adequately capture market change.

For valuation purposes, MPAC bases the midpoint of the TAF's on the legislated valuation date of January 1, 2012.

The following is a sample calculation of a time trend:

Coefficient for (Months x Total Living Area) = $0.833

Average Living Area = 1,500 square feet

Average Sale Price = $200,000

Average Increase per month = 0.833*1500 = 1249.5

Time Trend (r) = 1249.5/200,000 = 0.62475% per month

Once the monthly rate is established, a table of Time Adjustment Factors can be calculated for each month using the formula (r*Months) +1.

Table 2 below, provides a sample table for the sales period, from July 2010 to December 2011, a period of 18 months.

To centre the time adjustment factor on a desired month, simply divide the time trend for the desired month by each monthly time trend. To centre the time adjustment on December 2011, divide 1.1186 by each monthly trend.

The ratio of the monthly TAFs will provide the percentage change in the market between the sale dates.

Table 2: Sample Time Adjustment Factor Table

Sale Date	Month Number	Time Trend	Time Adjustment Factor
July 2010	1	1.0062	1.1117
August 2010	2	1.0125	1.1048
September 2010	3	1.0189	1.0979
October 2010	4	1.0252	1.0911
November 2010	5	1.0316	1.0843
December 2010	6	1.0381	1.0776
January 2011	7	1.0446	1.0709
February 2011	8	1.0511	1.0643
March 2011	9	1.0577	1.0577
April 2011	10	1.0643	1.0511
May 2011	11	1.0709	1.0446
June 2011	12	1.0776	1.0381
July 2011	13	1.0843	1.0316
August 2011	14	1.0911	1.0252
September 2011	15	1.0979	1.0189
October 2011	16	1.1048	1.0125
November 2011	17	1.1117	1.0062
December 2011	18	1.1186	1.0000

To conduct its re-sale analysis for this study, MPAC time adjusted the initial sale of each property to that of the second sale using the ratio of monthly TAFs. This produces a trended sale price as of the re-sale date. Table 3 provides an example using the same data as Table 1 above.

Table 3: MPAC's Re-Sale Analysis Sample Calculation

	Sale Price	Sale Date	TAF to Jan 1, 2012	TAF Ratio	Trended Sale Price	Percentage Difference
Initial Sale	$100,000	October 2010	1.0911	1.078	$107,800	
Re-Sale	$115,000	October 2011	1.0125			6.68%

In the example, the property initially sold for $100,000 in October 2010. It sold again in October 2011 for $115,000. The TAF from October 2010 to January 1, 2012 is 1.0911, indicating an overall increase of 9.11% over the time frame. The TAF from October 2011 to January 1, 2012 is 1.0125, indicating an overall increase of 1.25% over the time frame. The ratio of the TAFs is 1.078 (1.0911/1.0125), which indicates a 7.8% increase the 12 months between sales. The initial sale price is trended by 7.8% (multiplier of 1.078) to produce a trended sale price of $107,800.

An examination of the differences between the trended sale price and the actual sale amounts reveals the actual market change indicated by the re-sales as compared to the market change indicated by the entire market area. In other words;

- A difference of 0% would indicate that the market change as shown by the re-sales is exactly the same as that indicated for their respective market areas.
- A difference above 0% means that the re-sales are indicating greater inflation in value than their respective market area.
- A difference below 0% means that the re-sales are indicating greater deflation in value than that of their respective market areas.

In the sample calculation above, the re-sale of the subject property at $115,000 is 6.68% greater than the trended sale price in the market area of $107,800.

Table 4 provides the median percentage change for the 2,051 re-sales in MPAC's sales database using the previously defined distance groupings.

Table 4: Summary of MPAC's Re-sale Analysis

Distance Grouping	Number of Sales	Median Percentage Difference	Minimum Percentage Difference	Maximum Percentage Difference	Number of Sales Less than 0%	Number of Sales Greater than 0%
Within 1km	12	2.84	-15.36	30.61	4	8
1km to 2km	52	6.35	-14.29	63.00	16	36
2km to 5km	150	-0.57	-18.90	88.10	77	73
Outside 5km	1,837	2.05	-28.16	127.02	680	1,157
OVERALL	**2,051**	**1.96**	**-28.16**	**127.02**	**777**	**1,274**

The results in Table 4 indicate that re-sales of properties closest to wind turbines are experiencing greater market increases than their respective market area. In terms of individual re-sale market increases, re-sale's with market shifts greater than 0% out number re-sales with market shifts less than 0% by approximately 2 to 1 for properties within 2 km of an industrial wind turbine. This result would indicate no loss in price due to proximity to the IWT.

Summary of Findings

MPAC's own re-sale analysis using a generally accepted methodology for time adjustment factors indicates no loss in price based on proximity to the nearest IWT. This analysis using similar logic to that used in the Lansink study confirms the previous results from MPAC's report on the impact of wind turbines on 2012 CVAs and is contrary to the conclusions of the Lansink study.

Of the 2,051 sales used in MPAC's re-sale analysis, 2,002 had higher second sales, nine sold for the same price twice and 40 sold for less the second time. Of the 40 that sold for less the second time, 39 are outside 5km of an IWT, 1 is within 2 to 5km of an IWT and none are within 2km. That means 97.5% of these properties sold for more the second time. It is possible that some selection bias may exist in the Lansink studies. MPAC has attempted to prevent this by using all available re-sales in its analysis.

MPAC previously applied the same re-analysis logic to another study conducted by Lansink Appraisal and Consulting on the potential impact of existing or proposed gravel pits on neighbouring residential properties[4]. The gravel pit study followed the same methodology as the Lansink Wind Turbine Study.

Similar to this study, 13 of the 19 properties used had resale prices that were lower than the initial sale used in the study. Of the remaining six sales, one sold for the same price twice, one sold for $1,000 more than five years after the initial sale and one had 20 years between sales. The Lansink Gravel Pit study concluded a potential diminution in price (if any) of approximately 22%. MPAC's internal analysis indicated no loss in price in the study area using the same re-sale analysis process.

[4] Ben Lansink, "Case Studies: Diminution / Change in Price (if any) on Residential Real Estate Located in the Vicinity of an Existing or Proposed Ontario Pit or Quarry," Lansink Appraisals and Consulting, July 2013