

A Summary of Key Literature by



Transmission Lines & Property Value Impacts

A Summary of Published Research on Property Value Impacts from High Voltage Transmission Lines

PREPARED FOR THE MSTI REVIEW PROJECT

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ABOUT HEADWATERS ECONOMICS

Headwaters Economics is an independent, nonprofit research group whose mission is to improve community development and land management decisions in the West.

ABOUT THE MSTI REVIEW PROJECT

The MSTI Review Project is a joint effort between three Montana counties and five non-governmental organizations along the Montana-Idaho border to conduct an independent analysis of the Mountain States Transmission Intertie (MSTI).

For more information, please visit the project web site: <http://mstireviewproject.org>

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Introduction and Key Findings

Many stakeholders in the Mountain States Transmission Intertie (MSTI) permitting process including local government officials are concerned about the potential impact of a new high voltage overhead transmission line on private property values in Montana and Idaho. This review discusses research on property value impacts from high voltage overhead transmission lines with a focus on what can be learned that is of relevance to the proposed MSTI project.¹ The target audience for this review is local government officials associated with the MSTI Review Project.

There is a significant body of professional and academic literature on property value impacts from transmission lines. Several important summaries of this body of work are available, including one commissioned for the Draft Environmental Impact Statement (EIS) for the MSTI project.² However, one new study has yet to be assimilated into existing summaries of the professional literature on property value impacts from high voltage overhead transmission lines. The new study is Dr. James Chalmers' research on sales of properties located along the 500 kV Colstrip-BPA line in Montana. Dr. Chalmers' research was carried out under contract to Northwestern Energy in 2010 and 2011. His findings are available in a detailed research report and were published in two peer-reviewed journal articles in 2012.³

Chalmers' research is relevant to the MSTI proposal because it considers property types more comparable to the areas affected by MSTI than any other published studies. If built, MSTI would traverse parts of Montana and Idaho where agriculture land uses, including ranching and intensive crop production, are dominant on private property. Forested cabin sites, exurban and rural residential properties could also be affected. Chalmers' study provides new insights into the market effects of the Colstrip-BPA line on similar property types—although it is not appropriate to generalize from such research to effects on specific properties. The only way to assess impacts on an individual property is through a professional appraisal. Furthermore, Chalmers' research was not designed to provide an impact analysis for MSTI and there it presents opportunities and some notable limitations as a resource in assessing potential impacts from the MSTI line.

¹ The MSTI Review Project is an effort between Montana counties and non-governmental organizations along the Montana-Idaho border to conduct an independent analysis of the Mountain States Transmission Intertie (MSTI) proposal. The Project is working to (1) better understand the need and context of the line, (2) balance energy development with local values by identifying corridors while protecting the community and environment, and (3) assess the economic impacts and benefits of the line. Focused on outreach to local government stakeholders in the MSTI permitting process, the MSTI Review Project core team includes Madison County, MT; Jefferson County, MT; Western Environmental Law Center; Headwaters Economics; Sonoran Institute; Craighead Institute; and Future West. For more information, please see: <http://www.mstireviewproject.org>.

² Kroll, C. A. and Priestly, T. (1992). *The Effects of Overhead Transmission Lines on Property Values*. Report to Edison Electric Institute Siting & Environmental Planning Task Force. Priestley, T. (2009). *Transmission Lines and Property Values: Review of the Research and Summary of Key Findings* (Vol. Appendix c.7.2 to the 2010 Draft EIS, MSTI). Jackson, T. O., & Pitts, J. (2010). *The Effects of Electric Transmission Lines on Property Values: A Literature Review*. *Journal of Real Estate Literature*, 18(2), 239–259.

³ Chalmers, J. A. (2012a). *High Voltage Transmission Lines and Montana Real Estate Values*. Available from Northwestern Energy. Retrieved May 11, 2012, from <http://www.northwesternenergy.com/documents/ElectricTransmission/HighVoltageFinalReport.pdf>. Chalmers, J. A. (2012b). *High-Voltage Transmission Lines and Rural, Western Real Estate Values*. *The Appraisal Journal*, Winter, 2012: 1-16. Available from Northwestern Energy. Retrieved May 11, 2012, from <http://www.northwesternenergy.com/documents/ElectricTransmission/HighVoltageValues.pdf>. Chalmers, J. A. (2012c). *Transmission Line Impacts on Rural Property Values*. *Right of Way*. May/June 2012: 32-36.

The review is organized as follows.

- A brief summary of key points concludes this introduction.
- Section 2 describes the approaches used in research on property value impacts from high voltage transmission lines, what the research says generally, and how Chalmers' research findings compare and contribute to the existing studies.
- Section 3 highlights cautions and challenges in applying existing research, including the Chalmers study, to projections of impacts from the MSTI project.
- A complete bibliography is provided at the end. An annotated digital version with links to many of the referenced studies will be provided with the final draft.

As part of the effort to evaluate and understand property value impacts from transmission lines, the MSTI Review Project hosted a presentation in Butte on April 17, 2012. Dr. Chalmers presented his research findings and a panel of real estate professionals from different locations in the region of Montana potentially affected by MSTI provided comments and critique.⁴

Key Findings

Most property value impact studies use market response to evaluate impact. From a market response perspective, transmission lines affect property values adversely when they sell at prices lower or more slowly than comparable properties without transmission lines. This approach tends to find less evidence of negative impact than what might be expected based on surveys and interviews that ask people about their feelings about transmission lines. The majority of responses to such queries reveal negative associations with transmission lines, although not without variation and some exceptions.

The majority of previous research on property value impacts concerns residential properties in suburban and urban areas. The recent study of sales involving agricultural and residential properties along the Colstrip-BPA 500 kV line in Montana by James Chalmers is the first detailed exploration of market impacts to rural properties in the Interior West. The research uses appraisal-based techniques to evaluate a cohort of 56 case studies and also applied a statistical evaluation to sales in the Aspen Valley Ranches subdivision in Jefferson County.

The case study approach to the BPA-Colstrip 500 kV line found cases in which the adverse impacts to parcels in rural residential subdivisions from the line exceeds what might be expected based on earlier research, while the statistical analysis of the Aspen Valley Ranch showed an average impact of 15 percent devaluation within 1000 feet of the line. The average masks significant variation, with some properties suffering much larger losses in value. Chalmers found little to no sensitivity to price impacts within production agriculture and amenity-influenced agricultural properties. However, his work emphasizes the strong influence of location- and property-specific concerns on the relationship between the presence of a high voltage overhead transmission line and market response.

The Chalmers study concerns the effects on raw land values many years after the construction of the line. It was not designed to capture the market response associated with the potential initial stigma of a transmission line proposal. There is some limited evidence in other research that market impacts can be

⁴ The panel included Kevin Pearce, Appraiser and Owner of New Frontier Ranches, Twin Bridges, MT (<http://www.newfrontierranches.com>); Katie Ward, Broker in Sheridan and Missoula (<http://www.propertyinmontana.com>), Vana Taylor, Broker in Bramlette & Co in Dillon, MT (<http://www.bramlettecompany.com>), and Sarah Bauer, Broker in Helena and Boulder, MT (<http://www.mymontanahome.net>). The panel was covered in an April 18, 2011 news report in the Montana Standard which in Appendix 1.

greatest during the siting and construction period—anecdotal information from real estate professionals in southwestern Montana suggest that this trend may be playing out in the current MSTI situation.

The research can inform the siting process for MSTI in several ways. The findings provide solid reasons (among many others) to separate industrial features like a transmission line from residential land uses, especially small lot subdivisions. While the sales data do not provide any evidence of adverse price impacts to production agricultural parcels in eastern and central Montana, interview data substantiate the imperative to locate towers at minimally intrusive locations within existing agricultural operations, especially irrigated, plowed, or otherwise mechanically managed fields. The challenges in using market response to document impacts to agricultural lands where market value is affected by recreational and other amenities is evident in the Chalmers study. These difficulties reveal important information gaps that may suggest a need for further analysis. In the absence of further conclusive research, the siting process will continue to demand discussions with landowners and communities about perceived impacts and how best to mitigate them in the event that the project is permitted.

Approaches to Property Value Impact Analysis

The research summarized in this brief is geared toward conclusions about the size and nature of the impact to property value from high voltage transmission lines. This can be done through several accepted methods that are described below.

It must be noted that the analysis of trends in real estate sales and/or survey data is not the same as assessing costs to an individual landowner. There are costs associated with the permitting, construction, and operation of a new high voltage overhead transmission line in a right of way on private property that are unique to each property. Professional real estate appraisal is the only appropriate way to assess impacts, or potential impacts, to individual properties.

One contribution of published research into groups of properties is to help identify circumstances that make properties vulnerable to a loss in cash value due to the intrusion of a transmission line, but the research findings are not a substitute for property-specific appraisals. Nor do market values necessarily describe the full range of concerns and perceived costs experienced by some affected property owners.⁵

Research Overview

A number of useful summaries of the property value impact literature discuss the following points in much more comprehensive detail.⁶

Transmission line property value research seeks to understand whether the presence of a high voltage overhead transmission line on or near a property affects the market value of the property at all, and if so how much, for how long, et cetera.

⁵ Although dated, a 1988 article provides a good synopsis of the gap between what is compensable and what property owners perceive as costs: Furby, L., et. al. (1988). Electric Power Lines, Property Values, and Compensation. *Journal of Environmental Management*, 27, 69–83. See also: Schutt, A. J. (1996). The Power Line Dilemma: Compensation for Diminished Property Value Caused by Fear of Electromagnetic Fields. *Florida State University Law Review*, 24(125): 125-160.

⁶ Kroll, C. A. and Priestly, T. (1992). The Effects of Overhead Transmission Lines on Property Values. *Report to Edison Electric Institute Siting & Environmental Planning Task Force*. Priestly, T. (2009). *Transmission Lines and Property Values: Review of the Research and Summary of Key Findings* (Vol. Appendix c.7.2 to the 2010 Draft EIS, MSTI). Jackson, T. O., & Pitts, J. (2010). The Effects of Electric Transmission Lines on Property Values: A Literature Review. *Journal of Real Estate Literature*, 18(2), 239–259.

There are two major sources of data that have been explored by researchers. One is data provided through interviews and mail surveys. These types of studies have explored the attitudes of property owners and the public towards transmission lines as well as what real estate professionals and property owners perceive the market impact of high voltage transmission lines to be.

Many more studies focus on market transactions involving properties affected by transmission lines—including those adjacent to transmission line corridors, those encumbered by easements, and those nearby or with a view of transmission lines. Depending on the quantity and quality of sales data and other circumstances, market impacts of transmission lines on property values can be analyzed through appraisal techniques and or by statistical methods.

Appraisal techniques, namely the comparison sales approach, look for differences in market performance of properties affected by high voltage overhead transmission lines to otherwise comparable properties not affected by a transmission line. Criticisms of the comparison sales approach have to do with the influence of an author's expert judgment in locating and refining a set of comparable sales for analytical purposes. The implication is not so much that another appraisal would come to different conclusions, but rather that the choice and manipulation of comparables could influence the finding of price impact. This makes peer-review and publication in professional and academic journals an important threshold for credibility of comparison sales studies.⁷

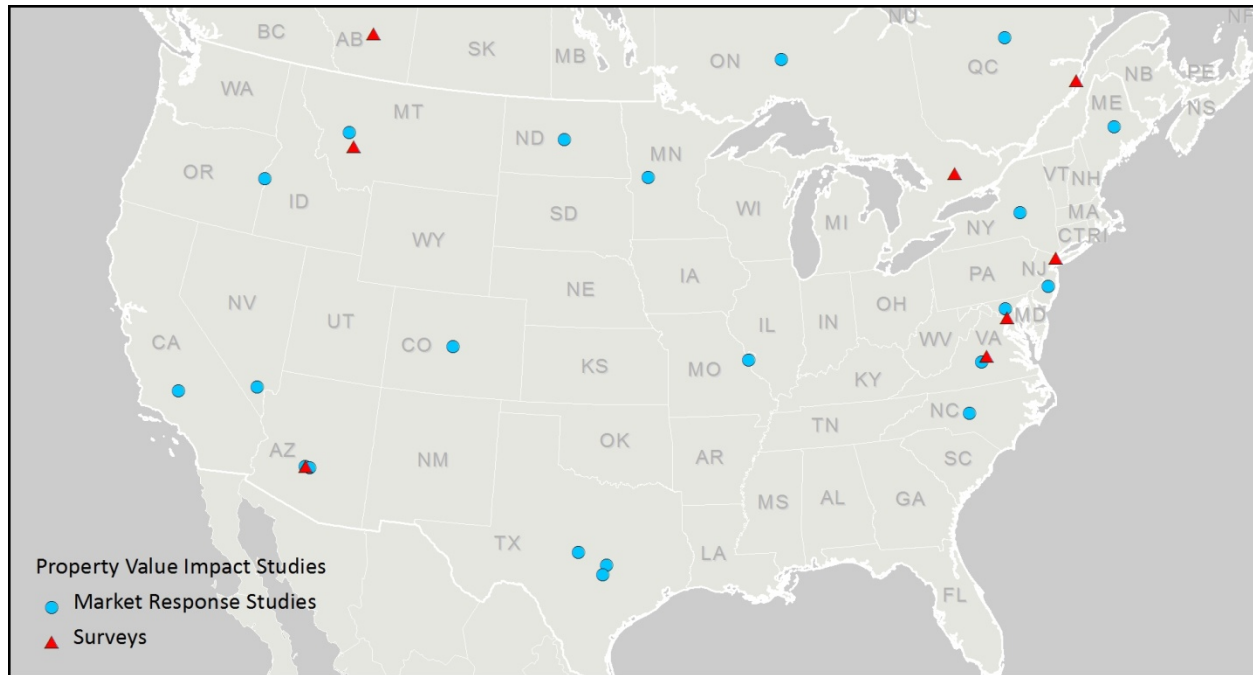
Lastly, there is an increasing focus in the published literature on the use of statistical analysis of large cohorts of sales data. Statistical techniques such as multivariate regression analysis can effectively isolate the influence of high voltage overhead transmission lines on property value from a number of factors that can affect market performance. It can be difficult to find a database of the size and quality necessary for rigorous statistical analysis. And statistical evaluations by design look for significant patterns and exclude outliers that don't fit those patterns. This introduces a risk of underemphasizing or failing to address unusual cases that may still be relevant to assessments of property value impacts from transmission lines.

Map 1 gives an overview of the location and approach of studies of property value impacts conducted in the United States that have been cited by major literature reviews (full citations of all titles are included in the bibliography). As the map suggests, the majority of published research on the impacts of high voltage overhead transmission lines concerns residential property in metropolitan and suburban areas, with only a handful of studies devoted to other property types such as agricultural, vacant, and recreational.⁸ The amount of research interest in the subject over time tracks closely with proposals for new transmission line construction activity.

⁷ An indication of this is the following quotation from an article in *Right of Way* magazine, a professional journal: "Appraisal professionals use a systematic approach, but they realize that the appraisal of real estate is an inexact science. ...[s]ome subjective and judgmental elements may find their way into an appraisal report. Appraisals focusing on transmission line impact are unusually complex, and when insufficient market data is available, the valuation process can become somewhat arbitrary." Rigdon, G. J. (1991). 138 Kv Transmission Lines and the Value of Recreational Land. *Right of Way, December 1991*: 8-18, 15. Retrieved May 11, 2012, from <http://www.irwaonline.org/eweb/upload/1201a.pdf>.

⁸ Not surprisingly, utilities are often the sponsors of transmission line property value impact analysis. For those suspicious of bias in favor of the research sponsors, studies published in professional or academic journals that were peer-reviewed by a community of qualified experts prior to publication can be considered more credible.

Map 1. Study Areas of Research on Property Value Impacts from Transmission Lines



Shows studies dating from the mid-1970s onward. Sources of citations are: Kroll and Priestly, 1992; Priestly, 2009; and Jackson and Pitts, 2010.

Generalized Findings

One observation of available research and previous summaries of that research is that the results have been as mixed as the study approaches and their diverse locations. That said, taking in the whole body of research, most summaries note that negative property value impacts (as measured in market transactions) tend to be smaller in size, extent, and duration than might be expected. For example, a recent summary observes: “The studies reviewed [published empirical research from 1964 to 2009]... generally pointed to small or no effects on sale price due to the presence of electric transmission lines. Some studies found an effect but this generally dissipated with time and distance. The effects that were found ranged from approximately 2% to 9%.”⁹

The explanation offered by researchers for the lack of an effect on price commensurate with the negative perceptions of landowners is basically that in most real estate transactions, numerous factors affect buyer decisions and can often outweigh the stigma of a high voltage overhead transmission line. Writing in a frequently referenced study that first appeared in 1967, William N. Kinnard, wrote: “Proximity to a tower line is not nearly so important to buyers as are other locational or amenity considerations.” This assessment has been echoed in numerous subsequent assessments of the literature.¹⁰

⁹ Jackson, T. O., & Pitts, J. (2010). The Effects of Electric Transmission Lines on Property Values: A Literature Review. *Journal of Real Estate Literature*, 18(2), 239–259: 258.

¹⁰ For example, Kroll and Priestly’s summary of the literature quotes Des Rosiers: “In short, most studies conclude that proximity to a HVTL per se does not necessarily lead to a drop in the value of surrounding properties and that other physical as well as neighborhood variables prevail in the price determination process.” Des Rosiers, F. (2002). Power Lines, Visual Encumbrance, and House Values: A Microspatial Approach to Impact Measurement. *Journal of Real Estate Research*, 23(3): 275-302, 277. (Publicly Available. Retrieved May 11, 2012, from <http://ideas.repec.org/a/jre/issued/v23n32002p275-302.html>). Quoted in Priestley, 2009: 32.

However, there have been very few tests of these conclusions in rural environments, let alone rural Western landscapes. Prior to the publication of Dr. Chalmers' research on the Colstrip-BPA line, there were no peer-reviewed studies of property value impacts from high voltage transmission lines anywhere in the rural West. Several appraiser-directed studies of rural and unimproved land in western states conducted in the 1970s and 1980s are briefly noted in a 1992 review of the literature by Priestly and Kroll, but the reports were typically conducted as reports to utility companies and are not readily available. According to the summaries of these reports provided in Priestly and Kroll's review, the few appraisal studies of transmission line impacts on sales of agricultural and rural properties in western states that utilized sales data (as opposed to interview data) showed little to no effect on price from transmission lines beyond the loss associated with the right of way acreage.

Exceptions from other areas are noted in the Priestly and Kroll literature review. A comparison sales study of farmland in Minnesota completed in 1982 found cases of zero price effect as well as negative impacts as high as 20 percent in situations where the transmission lines were highly intrusive on farm operations.¹¹ Another study in rural Alberta that considered agricultural land sales during the period 1976 to 1981 found a decrease in property values from the presence of multiple lines (64 kV and 240 kV), especially in land with irrigation potential.¹² A very recent study of sales of rural land parcels in central Wisconsin during the period 2002-2008 found small, but not statistically significant negative price effects on the sale of properties encumbered by a transmission line easement.¹³

Note: Costs to Agricultural Operations

The property value impact literature is concerned with costs to agricultural operations primarily in terms of their relationship to market price. Technical assessments of operation costs associated with transmission lines for different types of farming properties may be produced as part of the environmental permitting process. A report prepared for the Department of Environmental Quality in conjunction with the proposed Montana-Alberta Transmission Line provided estimated ranges of annual costs associated with transmission structures in "typical" dry land and irrigated farming operations in north-central Montana.¹⁴ More recently, a professional agronomist has completed a technical agricultural impact analysis for south central and southeastern Idaho in conjunction with the EIS process for the Gateway Transmission Line Project that estimates impacts to rotational crop production including: one-time costs

¹¹ Jensen, G. A. and Weber, W.V. (1979). Study of Farms and Sale of Farms Having High Voltage Powerline Crossings Located in Municipalities of Roster, Woodlands, Rockwood, Manitoba Province, Canada. Luverne, Minnesota: Jensen Management Service, Inc. Cited in Kroll and Priestley, 1992: 19.

¹² Thompson, R. R. 1982. The Impact of High Voltage Electric Transmission Lines on Agricultural Land Valuation in Alberta. Master of Science Thesis, Department of Rural Economy, University of Alberta. Cited in Kroll and Priestley, 1992: 44.

¹³ Jackson, T. (2010). Electric Transmission Lines: Is there an Impact on Rural Land Values? *Right of Way*, (November/December), Publicly Available. Retrieved May 11, 2012, from <http://www.real-analytics.com/Transmission%20Lines%20and%20Rural%20Land.pdf>. A rebuttal to challenges to the article is subsequently printed as: Jackson, T. (2011). Electric Transmission Lines and Rural Land Values: A Closer Look. *Right of Way*. Publicly Available. Retrieved May 11, 2012, from http://www.irwaonline.org/eweb/upload/web_may_11_ElectricTrans.pdf. The study methodology does not describe the nature of the land use on the properties considered (88 sales in various locations in central Wisconsin, affected by different transmission lines).

¹⁴ HydroSolutions, Inc. and Fehringer Agricultural Consulting, Inc. (2007). Farming Cost Review (Final) Montana Alberta Tie Limited. Prepared for Montana Dept. of Environmental Quality and featured as

of disturbances from construction per acre as well as annual costs on a per tower basis. Results of that study will not be made public until the final EIS is released.¹⁵

A related question is how easements associated with the Conservation Reserve and other federal Farm Bill-related programs could be affected. Each program has different stipulations for enrollment regarding affected land. In reality each situation will be unique to the property and the program under which it is enrolled. In the case of imposition of a new power line on acreage enrolled for Conservation Reserve Program rental, some portion or all of the acreage affected by the transmission Right of Way could lose eligibility, but not the remainder of the property. The Wildlife Habitat Improvement Program (WHIP) has a large focus on sage grouse habitat protection in Montana and Idaho, suggesting it could be incompatible with overhead transmission lines.

There are a few studies that have looked explicitly at recreational rural property with mixed results. Two separate studies in the Upper Midwest failed to find statistically significant impact of transmission lines on the sales of recreational rural properties in the 1980s.¹⁶ In contrast, a study examining the impact of the 735 kV line in Hydro Quebec on recreational land in Quebec found that proximity to and view of a line exerted a statistically significant negative effect on the value of second home lots—in instances up to 34 percent—during the period 1965-1981. Priestly's summary notes that "Smaller parcels are affected more severely than larger parcels."¹⁷ Curiously, the same study also reportedly observed a positive price effect from encumbrance with a transmission line easement.

In all, there are some general conclusions that have been drawn from the existing literature, but when it comes to rural properties the findings have not been especially conclusive to date. Few studies offer insights that can be safely applied to the types of rural landscapes found in southwestern Montana and southern Idaho. Chalmers' recent research on the Colstrip-BPA 500 kV line in Montana was conducted in response to this shortage of information.

Property Value Impacts from the Colstrip-BPA 500 kV Line in Montana

Nearly 600 miles of 500 kV line stretch across Montana running from Colstrip in the southeast corner of the state west to the state border near Taft. Chalmers' research reports on sales dynamics involving properties within 500 feet of the centerline of the Colstrip-BPA line that sold between 2000 and 2010. Chalmers identified 74 unique transactions meeting these parameters and was able to analyze 49 transactions in detail, along with additional data covering sales in 8 rural subdivisions. Chalmers examined the impacts of the 500 kV line on property sales by using a comparison sales appraisal approach to find market effects and also interviews of buyers and sellers whenever possible. Sales trends are reported for seven property types: Production Agricultural Lands, Agricultural Lands with Recreational Influence, Agricultural Lands with High Amenity Recreation and Natural Features, Rural

¹⁵ Schneider Consulting Services (2012). Agricultural Economic Impact Analysis South Central and Southeastern Idaho Gateway West Transmission Line Project. Manuscript provided to cooperating agencies upon request to Walt George, BLM.

¹⁶ Solum, C. L. (1985). Transmission Line Easement Effect on Rural Land in Northwest Wisconsin. *Right of Way*, April 1985. Retrieved May 11, 2012, from <http://www.irwaonline.org/eweb/upload/0485.pdf>. Rigdon, 1991.

¹⁷ Université du Québec a Montréal. 1982. Impact de l'implantation des lignes de transport d'énergie hydro-électrique sur les valeurs foncières des sites de Villegiature. Project Hydro-Québec HA-596-507. June. Title translation: Impact of the establishment of hydroelectric transmission lines on the property values of second home lots. Cited in Kroll and Priestly, 1992: 44.

Residential Subdivision with lot sizes under 5 acres, Rural Residential Subdivisions with lots sizes over 5 acres, Large Acreage Rural Residential Tracts, and Rural Residential Tracts/Cabin Sites.

In addition, the research delved into some detail to understand the impacts of transmission lines on rural residential subdivision property sales by looking at the full history of sales of rural residential lots in several subdivisions (e.g., every transaction from the date of plat). A full statistical analysis was conducted on sales of parcels in Aspen Valley Ranches, a rural subdivision in Jefferson County that was platted in 1985. In addition, the study applied a comparison sales and interview approach to seven subdivisions in Sanders County located within a 500 kV transmission corridor running east-west from Hot Springs to Taft that parallels the Clark Fork River Valley.

In all cases examined by Chalmers, the 500 kV line and associated easement was in place at the time of purchase and in the case of subdivisions, at the time of original plat. For the majority of the properties studied, the line had been present for over twenty-five years.

The research findings are reported in three ways.¹⁸ A complete research report with detailed data on individual transactions is available, and two peer-reviewed articles have been published. *The Appraisal Journal*¹⁹ published the findings from the comparison sales and interview methodology in its winter 2012 issue under the title “High-Voltage Transmission Lines and Rural, Western Real Estate Values.” An article in the magazine *Right of Way*²⁰ documents the results of multiple regression analysis of sales trends in Aspen Valley Ranches.

The findings are summarized briefly below.

Production Agriculture Lands

Chalmers reports on 19 transactions affecting properties with production agriculture—the dominant land use located within 500 feet of the Colstrip-BPA line. The properties were characteristic of farm and ranch land in eastern and central Montana, typically featuring a mix of native range and dry cropland, with a few instances of irrigated land and improved pasture. Chalmers provides interview material indicating that while the transmission lines presented nuisance factors—especially for farming operations, neither the interviews nor the sales data indicate that the nuisance translated to an impact on sale price.

Agricultural Lands with Recreational Influence and Agricultural Lands with High Amenity Recreation and Natural Features

Chalmers analyzes three transactions involving agricultural properties with some recreational influence and three transactions involving agricultural properties with significant amenity or recreational influences. This cohort has particular relevance for the Montana counties affected by the MSTI proposal, where agricultural land often has significant recreational and amenity influences. Sales data were available for five of the transactions. Chalmers did not find evidence of a price effect from the presence of a

¹⁸ Chalmers, J. A. (2012a). *High Voltage Transmission Lines and Montana Real Estate Values*. Available from NorthWestern Energy. Retrieved May 11, 2012, from <http://www.northwesternenergy.com/documents/ElectricTransmission/HighVoltageFinalReport.pdf>. Chalmers, J. A. (2012b). High-Voltage Transmission Lines and Rural, Western Real Estate Values. *The Appraisal Journal*, Winter, 2012: 1-16. Available from NorthWestern Energy. Retrieved May 11, 2012, from <http://www.northwesternenergy.com/documents/ElectricTransmission/HighVoltageValues.pdf>. Chalmers, J. A. (2012c). Transmission Line Impacts on Rural Property Values. *Right of Way*. May/June 2012: 32-36.

¹⁹ *The Appraisal Journal* is published by the Appraisal Institute, a professional appraisal organization. *The Appraisal Journal* publishes research of interest to professional appraisers, written by appraisers and academics. Manuscripts are reviewed by a panel of professional or academic peers depending on their focus.

²⁰ *Right of Way* is a magazine published by the International Right of Way Association, a professional organization.

transmission line in the study properties, although in two cases the sellers who were interviewed felt strongly that the transmission line had had an adverse effect on the sale of the property.

This conflicting evidence in one example from the Agricultural Land with High Amenity Recreation and Natural Features merits attention because it helps to demonstrate how appraisal-based market analyses work. The property in question is a 350-acre parcel in central Broadwater County with Missouri River frontage sold without improvements in 2006. The Colstrip-BPA 500 kV line travels through the middle of property and is visible from most areas of the property. The amenities unique to the property include the river frontage, wildlife habitat, and presumably an open, scenic character (although this has to be inferred from the notes in Chalmers' report and basic knowledge of the area). Chalmers interviewed the seller, the buyer, and a former operator of the property with real estate expertise and also consulted market data.

Chalmers' interviewees provided a host of subjective information about impacts from the transmission line and other features of the property affecting its sale. The seller reported showing the property an estimated 25 to 30 times, stated that the transmission lines were always an issue with prospective buyers, and estimated the loss from the transmission line in terms of potential sale price in the absence of transmission line at 25 percent. The buyer, despite reporting many current frustrations with the transmission line, is noted as saying, "I looked at it [the 500 kV line] and felt it wasn't that bad."²¹ The former operator who spoke to Chalmers suggested the marketing period for the property was not exceptional and disputed the seller's comment that a price concession was made in the final negotiation. The notes provided on the former operator's comments suggest that the property was possibly a second-tier amenity property with less competitive fishing and hunting amenities and low potential for rural subdivision.

Chalmers compares the sale of this property on an adjusted price per acre to two comparable sales in the area of properties with similar features but no transmission line. The per-acre price falls between the per-acre price of the two comparable sales. Based on this data, there is no evidence of a significant price impact from the line.

This case study highlights the potential for a wide gap between subjective reports of property value loss and what market data capture. There are at least two ways to think about this. A critical view would point out the significant challenges associated with identifying comparable sales and accurately adjusting per-acre prices for seven large, highly unique recreationally-influenced agricultural properties. These challenges—and the lack of transparency in the actual calculations and choices within the comparison sales methodology—could raise questions about the reproducibility of these findings and by extension their conclusiveness.

Another interpretation is that offered by Chalmers: the larger the property and the more diverse its attributes, the less likely the transmission line is to significantly affect price. It is likely that both assessments of these kinds of conflicts between subjective information about price and market effects, and appraisal-based sales comparisons, have some merit; they are not necessarily exclusive.

Rural Residential Subdivisions

In describing market effects on rural residential subdivisions in the categories of lots smaller than 5 acres and lot size greater than 5 acres, Chalmers reports on twelve different data points—five are individual lot sales and the remaining seven are groups of all available lot sales of individual subdivisions since the date of plat. All but one example were supported by sales data. These data show the strongest evidence of price and "absorption" effects. Three of six cases of small lot (<5 acres) subdivisions showed evidence of

²¹ Chalmers 2012c: 5-4.

a price impact, in one case as large as 50 percent, and two had significant absorption effects.²² In three of six cases of rural residential subdivisions with lot sizes larger than 5 acres there was evidence of price impact of up to 25 percent, and evidence of an extending marketing period for affected lots.

Assessing these data, Chalmers makes the point that the design of a subdivision, the nature of the topography, and the layout of the transmission line all work together to affect how easily the intrusion of the line is mitigated. The smaller the opportunity to mitigate the intrusion of the line on individual residences, the greater the measured impact on price and market value is.

Aspen Valley Ranches

A separate statistical analysis was performed on lot sales in Aspen Valley Ranches, a rural subdivision with 156 separate 20-acre (+/-) lots and bisected by the Colstrip-BPA 500 kV line. In all, 183 sales of unimproved lots between 1986 and 2010 were included in the analysis, which involved rigorous testing of factors such as lot size for their influence on sales price. The statistical analysis indicates an average discount of 15 percent in the sale price of the lots within 1,000 feet of the center line of the 500kV line. Chalmers did not identify a delay in marketing time of the lots near the 500 kV line. He attributes this to a pricing schedule that “must have been a fair reflection of the market’s evaluation of the relative strengths and weaknesses of the individual lots.”²³

Large Rural Residential Tracts and Rural Recreational Tracts/Cabin Sites

Chalmers also presents findings for two eclectic property types. Sales data were available for three of four transactions involving large rural residential tracts (ranging from 60 to 591 acres in size with seasonal or year-round use). Although Chalmers acknowledges that transmission lines likely result in a thinning of the buying pool for these properties especially when they are conspicuous, he does not find any evidence of price effects in comparable sales analysis.

Sales data were available for 10 of 14 transactions involving cabin sites and other recreationally-focused small properties, mostly in western Montana. Chalmers finds inconclusive evidence of adverse price impacts on 3 of the 14 transactions but on the whole observes that buyers of recreational land approach their purchase with very different criteria than residential buyers. In his words, accessibility and “the unique recreational character of the site will frequently dominate considerations relative to the transmission lines.”²⁴

Implications for Evaluating the Proposed MSTI Line

With regard to those circumstances that may affect vulnerability to transmission line impacts in rural settings, Chalmers suggests three general principles based on his study of the BPA line:

1. When a property’s sole use is residential, its vulnerability to price impacts from a transmission line increases.
2. As property size increases, vulnerability to negative market impacts from a transmission line decreases.
3. If substitutes are available, vulnerability to price impacts and marketing delays can increase.

Although extents vary, price impacts and market delays associated with the 500 kV line on small rural residential parcels are clearly noted in the Chalmers study. This has implications for existing rural

²² See summary table, Chalmers 2012b: 10.

²³ Chalmers 2012b: 36.

²⁴ Chalmers 2012: 14.

subdivisions—to the extent that lost property value is a criteria in a siting decision on the part of permitting agencies, these are the first properties to avoid.

The strength of this signal has implications for future development as well. Non-contiguous development patterns often eliminate options to separate land uses effectively. Designated energy corridors on public lands ideally would recognize vulnerable property types on adjacent private land and avoid them. That said, Chalmers’ study and other research suggest that subdivision development can be planned in ways that minimize the intrusion of a 500 kV line and by extension the scale of property devaluation. The rural residential parcels that suffered the greatest devaluation in Chalmers’ study tended to be those with few opportunities to mitigate the impact of the line on individual parcels due to the design of the original plat.

Production agriculture properties including cropland, pasture, and dryland farming dominate the private property landscape in the majority of the Idaho counties potentially affected by MSTI. While the sales data do not provide any evidence of decreased market competitiveness of production agricultural parcels in eastern and central Montana counties within 1,000 feet of the centerline of the Colstrip-BPA 500 kV line, interview data confirm a large nuisance factor for agricultural operators. These findings and other studies confirm the obvious imperative to locate towers at minimally intrusive locations within existing agricultural operations, especially irrigated, plowed, or otherwise mechanically managed fields.

Agricultural properties with highly varied levels of amenity, development, and recreational influences dominate the private property landscape in southwestern Montana. Property value impact research including the Chalmers study does not support the suspicion that this type of property is especially vulnerable to adverse price effects from the presence of a transmission line. On the other hand, evidence of a lack of price impact is presently limited to the lack of an observed per-acre price impact in the seven case studies developed in the Chalmers report. This suggests that much more information is needed before it will be possible to forecast the range of property value impacts from MSTI with any certainty.

There are indications from previous research that the negative price impacts and the stigma of a transmission line development are greatest at the time when the project is being developed and proposed. One implication of this relative to the Chalmers research is that by focusing on a line that has been part of the landscape for several decades, the study might underestimate market impacts relative to the ten-year period of permitting and (possible) construction when the route is initially uncertain and the line is the subject of controversy, and later when construction impacts are greatest.

The Chalmers study may be frustrating for stakeholders in the MSTI siting process seeking timely data that affirms their professional and personal experiences from the impact of the MSTI proposal. Realtors associated with the panel held by the MSTI Review Project as well as others active in southwestern Montana have attested to a marked impact of the proposed project on real estate sales activity over the past four years.²⁵ One concern is that “top tier” buyers won’t consider recreational properties affected (or potentially affected) by a transmission line. In addition, two realtors at the panel indicated that the MSTI proposal has kept sellers from putting properties on the market and has frozen certain real estate development proposals.

One real estate appraiser has proposed that Chalmers could have studied the effects of the Colstrip-BPA line at the time of permitting. See the letters in Appendix 1 for this proposal and Chalmers’ response that data availability would be a problem.

²⁵ See Appendix 1.

As the discussion above seeks to point out, capturing present trends associated with MSTI in reliable market data could be very challenging. For example, the loss of “top tier” buyers could only be quantified in a price impact if, when a property was sold, it sold for a per-acre price significantly lower than comparable properties. There are a few obvious challenges in attributing the share of the slowdown or loss of value that can be legitimately attributed to the MSTI project proposal. The first is that the timing of the MSTI proposal coincides with the recession. The recession brought a major slump in the demand for rural land for development purposes. Isolating the MSTI impact within this larger trend could be extremely challenging. Doing this credibly would mean locating areas with similar real estate offerings and no transmission proposals in order to make meaningful comparisons. There are a couple of challenges in locating areas and properties for comparison. The first is that the proposal involves so many different potential routes that there are relatively few unaffected areas in southwestern Montana. The second is that when it comes to high amenity large ranch properties, the volume of properties on the market has been low.²⁶

Altogether, established quantifiable evidence of a clear market response to the MSTI proposal would be a formidable exercise in scope that may not yield conclusive results. Here, a survey-based methodology could be useful to help gather and assess the reported concerns from those active in the real estate market in areas affected by the MSTI proposal in Montana and Idaho. If surveys of real estate professionals and buyers could help to clarify the specific concerns about the proposal, this may provide information of value to the siting process.

Conclusions

Stakeholders in the permitting process for the MSTI proposal may be frustrated by the research on property value impacts from high voltage overhead transmission lines.

On the one hand, there is a large body of peer-reviewed evidence that suggests that property value impacts—measured in actual sales of properties affected by a transmission line easement to those that are not—often do not register, and when they do, they are relatively small. Few of these studies address the types of property in the area affected by MSTI in Montana and Idaho which includes rural residential subdivisions, production agriculture, and recreationally-influence agricultural land.

On the other hand, there are case studies and appraisal reports that occasionally find very large impacts on sales price and or time on the market. This includes recent market research about dynamics of land prices on properties located adjacent to the Colstrip-BPA line in Montana in the period 2000-2010. That study identified some dramatic impacts on rural subdivisions with small lots and poor plat design in terms of minimizing the impact of the transmission line to particular parcels. The same report did not find evidence of transmission line impact on sales involving production agricultural properties and based on a small number of case studies found no impact on the sales of recreationally-influenced agricultural lands from the presence of the Colstrip-BPA line.

The absence of a market impact on recreationally-influenced agricultural properties conflicts with the experience of some area real estate professionals who have spoken about their experiences selling property in the MSTI study area in southwestern Montana. It is possible that more detailed market research on recreational property sales involving transmission line proposals or installed transmission lines could help to clarify these conflicting conclusions. However, given the limits on available data and

²⁶ A good overview of the recent dynamics of Montana rural real estate markets is provided by Bozeman-based appraiser Clark Wheeler in his online report, “General Market Conditions and Sales,” June 2011. <http://www.normancwheelerandassociates.com/market.html>

study design it is likely that it may not be possible to develop quantifiable, conclusive information about the market response to high voltage transmission lines within this cohort of properties.

Despite these information challenges, there are some common-sense conclusions that can be drawn. From a broad permitting perspective, a general observation is that when property value impacts occur, they tend to be negative. Impacts to any type of property are highest when the impact of the line on the property's use cannot be mitigated. From the perspective of a siting process seeking to minimize risk of lost property value (as one of a many factors considered), there is credible data suggesting that small-lot rural residential subdivisions face high risk as a class of properties. For larger properties, it is difficult to predict impact without specifically considering how the siting of the line would affect the use of the property. Formal appraisals are the only appropriate mechanism to assess impacts to individual properties.

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Appendix 1. Realtor Perspectives

April 18, 2012 report on Panel on Chalmers Research held at Montana Tech.

Apr 18, 2012 (The Montana Standard - McClatchy-Tribune Information Services via COMTEX) -- Major power lines overall have a limited impact on property values, but also can lower the value of some smaller parcels as well as driving up the time it takes for them to sell.

That was among the conclusions that Jim Chalmers, Ph.D, an economist, presented Tuesday at Montana Tech during a talk put on by the MSTI Review Project. The collaborative group made up of county commissioners and nonprofit groups is studying NorthWestern Energy's proposed 500 kV power line.

Chalmers said overall the effects were less, yet he cautioned that his study used an existing high-power line in Montana that has been around for 30 years. And buyers consider that when looking at a property.

"You knew exactly where the line was, you knew how high the towers were going to be," he said. "In the studies we did, the buyer chose that property; in this case the property owner had the line imposed on them."

The Mountain States Transmission Intertie, or MSTI, is proposed to be built from near Townsend and run through southwest Montana to southern Idaho. The line has caused a heated debate and some landowners have spoken out with concerns that it will lower their property values.

Chalmers led the study that looked at a similar 500 kV line running across Montana. The study came to three main conclusions: the more a property was for residential use, the more likely it was to lose value; smaller parcels were more prone to see a lower value; and properties with a similar parcel available for sale were more vulnerable to see a value reduction.

But he said with larger ranches, the study found no effects on the price of the property.

That drew criticism from a panel of real estate agents.

Kevin Pearce, a broker-owner with New Frontier Ranches in Twin Bridges, said the study only addressed an existing line and didn't consider the effects during construction of a power line. He said the presence of a power line can completely shut out some buyers.

"A top-tier buyer is not going to be interested, period," he said. "Then you're going to be left with a second-tier buyer and a reduced price."

Pearce said what's needed is a study specific to MSTI.

And Katie Ward, a broker with her own company in Sheridan and Missoula, said buyers often ask for properties without power lines even on the larger tracts.

"In this economy, people have choices, even with the bigger properties," she said.

The brokers agreed that the uncertainty of where MSTI will be built has spooked some buyers. In one case in Beaverhead County, a proposed subdivision was dropped over those concerns, said Vana Taylor, a broker with Bramlette and Co. Realtors in Dillon.

"We really can't put a price on it because we don't know where it's going to be located," she said.

Jefferson County Commissioners Leonard Wortman and Tom Lythgoe said their preference is that MSTI get built on public land so it doesn't affect private property values.

"We shouldn't be messing up the current owners, property values and viewsheds," Lythgoe said.

But Ted Williams, an engineer with wind energy company Gaelectric, said if that's done, the project would be delayed up to a decade because groups would fight it.

"All of these efforts to put it on public land are just an effort to kill the line," he said. "It simply won't get done because it will take too long."

-- Reporter Nick Gevock may be reached at nick.gevock@mtstandard.com

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ANOTHER VIEW OF HIGH VOLTAGE TRANSMISSION LINES

Kevin T. Pearce, ARA

Letter to the editor submitted to local papers and to the The American Society of Farm Managers and Rural Appraisers (ASFMRA). Received by MSTI Review Project via e-mail, May 20, 2012.

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The recently completed report “High Voltage Transmission Lines and Montana Real Estate Values” by James A. Chalmers, Ph.D. was carried out under contract to Northwestern Energy (NWE) during 2010 and 2011. Northwestern Energy is proposing to construct a 500 kV High Voltage Transmission Line (HVTL) from Townsend, Montana southerly some 450-500 miles across southwestern Montana to near Twin Falls, Idaho to deliver Montana-generated power to possible users in the western US. This proposed line is identified as the Mountain States Transmission Intertie line (MSTI). The Chalmers report was commissioned by NWE to be used to study the effects of HVTL on real estate values as an aid in the process of planning, permitting, and siting the proposed MSTI power line.

The Chalmers report considered the effect of a HVTL on real estate values by studying the 650+/- mile route of a 500 kV line extending from Colstrip, MT westerly across Montana to the Idaho/Montana border. This power line was constructed in the early 1980’s. The report, however, utilized sales data from “arms length” transactions that occurred in the year 2000 through 2010 on properties within 500 feet centerline of the 500kV line.

Seven different property types were identified in the Chalmers report across Montana that was analyzed through paired-sales and before and after analysis. This report leads the reader(s) to a conclusion that there is very little, to no effect on real estate values due to HVTLs. This might be expected since this report studied the effects of the power lines 30+/- years **after** construction of the power line. After 30 years, the lands affected by the power lines have healed and become a part of the accepted landscape. Also, for the majority of the study period (2000-2010), the Montana real estate market was appreciating rapidly and in many areas, a buying frenzy was occurring which left few substitute and alternative properties that forced buyers to accept properties containing HVTLs (when in most other markets they would not consider) and purchase them at or near par as compared to those without HVTLs.

While I do not necessarily disagree with the results of this report within the context of the scope of work and parameters of the project, I do not believe that this report accurately depicts the effects of HVTLs on real estate values at the time of planning, permitting, construction, or immediately after construction of a HVTL. This report is not relevant or applicable to the proposed MSTI project and its effect on current real estate values.

Studies of market data considering the effects of fire, flood, and other occurrences indicate that there is a considerable negative affect on land values at the time of and immediately after their occurrence. To accurately depict the true effects of HVTLs on real estate values at the time of a new HVTL’s permitting, siting, and construction, a study of sales data consistent and contemporaneously with the planning, construction, and immediately following construction should be utilized rather than transactions occurring 30 years after construction.

Response to “Another View of High Voltage Transmission Lines”

James A. Chalmers, Ph.D.

Letter provided to the MSTI Review Project, 5/30/2012 and submitted to local newspapers.

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High Voltage Transmission Lines and Montana Real Estate Values: Final Report (the “Chalmers Study”) was presented at a public forum at Montana Tech in Butte on April 17 of this year. This report is available at _____. Presentation of the study was followed by comments from a panel of real estate professionals including Mr. Kevin Pearce, ARA of Twin Bridges. Mr. Pearce made comments at that time which he followed up with a letter that was published in the *Dillon Tribune* on May 23, 2012 and the *Madisonian* on May 24, 2012.

At the most general level, his point is that the effects on the real estate market and property values during the siting and construction period of a transmission line may be different from the effects once the line is constructed. I agree with this proposition. However he goes on to argue that our study of an established transmission line has no relevance to the proposed MSTI project and its effect on current real estate values. In so doing, his representation of both the purpose of our work and its findings merit clarification. Finally, he offers an opinion with respect to the longer term effects of transmission lines that deserves brief discussion.

Mr. Pearce says that our study was commissioned by NorthWestern Energy “...as an aid in the process of planning, permitting and siting of the proposed MSTI power line.” That’s not correct. The study was conceptualized from the outset as an analysis of the effects of Montana’s only existing 500kV line on the value of the various property types that it crossed or was close to. The basic question was once a line was built and buyers and sellers were fully informed with respect to its location, its visibility, etc. what were the implications for the value of affected properties. Given the interest in development of renewable energy sources in Montana, and proposals for new transmission facilities emerging as a result, NWE had a broader interest in understanding how rural land uses may be affected by HVTL’s in general. The study was motivated by, and paralleled, similar work that I had carried out in New England, recognizing that no similar work had been carried out in Montana or surrounding states.

Mr. Pearce characterizes our study as concluding that “...there is very little, to no effect on real estate values due to HVTLs.” That also is incorrect. The case studies for two of the seven property types we studied showed significant price effects as well as effects on marketing time. Further, we were careful to emphasize that you couldn’t generalize from our results to the effects on a particular property. For those property types where our case studies found no effect, it was easy to imagine particular circumstances where there would be an effect. Conversely, where our case studies found an effect, it was easy to imagine particular circumstances where there would be no effect. What our study did identify were the factors and conditions where the likelihood of effect was greater or lesser, but conclusions with respect to any particular property would have to be grounded in a site specific analysis of the attributes of the property that give it value and the way in which the transmission line affects those attributes.

Finally, Mr. Pearce argues that our study of sales along a transmission line that had been in place since the early 1980’s was irrelevant to understanding property value effects from a new transmission line because “... the lands affected by the power lines have healed and the lines (added) have become a part of the accepted landscape.” He goes on to suggest an analogy to the effects of fire or flood. I understand the fire or flood argument where the negative effects dissipate over time, but when a buyer sees a transmission line on a property, especially a buyer new to that market, his reaction is unlikely to be different whether the line has been there for 5, 15 or 25 years. As to whether our case studies reflect the

experience of properties during a highly active market or a down market, our findings that the availability of unaffected substitute properties is a critical factor in determining the likelihood of value impacts speak directly to this very point.

These clarifications notwithstanding, I certainly acknowledge that the current situation of not knowing where the final MSTI alignment is going to be and what the lines might look like from any particular property introduces an important element of uncertainty that can significantly impact the current value and marketability of a property. This question was not intended to be addressed by our study. Mr. Pearce asks for a study that would examine sales relevant to this period of siting and potential construction. However, sales during this period for the 500kV lines we studied would be very old and of a substantially different market era. They are also likely to be very few in number, partly because the time period of siting is relatively short and because the effect of uncertainty on potentially affected properties is to cause people to be reluctant to try to sell during this period or, if they do, to be unsuccessful. Finally, finding parties to these transactions 30+ years later would be extraordinarily difficult if not impossible, as would obtaining accurate interview recollections as to their buying and selling motivations.

Further, it's not clear what the relevance of knowing these interim effects would be to the large number of potentially affected properties while multiple corridors are under consideration. Once the final alignment is known many of these properties will turn out to be completely unaffected. The two relevant areas of contribution of the real estate research we carried out are the siting process, i.e. recognizing areas where the likelihood of property value effects are greater or lesser, and determining appropriate compensation for those properties actually affected once the final alignment is known. Our research has important things to say in both of these areas.

James A. Chalmers, Ph.D.