

# Impact Analysis Of Electrical Transmission Lines

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The effects of Hydro Transmission Lines and their impact on real property and its occupants can best be described under three separate headings, namely: The visual impact; the physical impact; the psychological impact. Each of the above separate impacts will have specific but cumulative effects on the value of the residual property as well as on the people living on the land, and to assist in determining these effects, we have consulted and will quote from various publications, but more specifically from the following:

Report of the Solandt Commission, TRANSMISSION, April 1975 *A Public Inquiry into the Transmission of Power between Lennox and Oshawa.*

LOCATION HYDRO—Interdisciplinary Research, Centre for Resources Development, University of Guelph.

*The Electrical Effects of High Voltage Transmission Lines,*  
Dr. E. Koczur, P.Eng.  
James F. Maclaren Ltd.

Report of the Solandt Commission, March 1974. *A Public Inquiry into the Transmission of Power between Nanticoke and Pickering.*

The Socio-Economic Impacts of Electric Transmission Corridors—A Comparative Analysis Prepared for: The Royal Commission on Electric Planning, April 1978.

This article endeavours to detail and isolate the various impacts created by the intrusion of high voltage electrical transmission lines in rural and semi-rural areas by an examination of existing reports, studies and articles. It also attempts to correlate such impacts with public reaction through decisions and pronouncements of the courts.

We deal primarily with the new Ontario Hydro 500 KV lines under construction in the Province.

## The Visual Impact

On pages 93 and 94 of the *Solandt Report*, there is a portion devoted to the problem of placing these huge 162-foot towers so that viewing them will not overwhelm the travellers on Highway 401.

The *Solandt Report* concludes that a comfortable viewing distance for a tall object is three times its height or in this case, 486 feet. The assumption is that at this distance the tower tends to blend in with the surroundings and although visible, it is not too objectionable.

While this assumption may be acceptable when applied to motorists travelling at high speeds on an expressway, it becomes unrealistic when the objects viewed are multiple towers and cables in a rural setting.

The conclusion reached in the *Solandt Report* is directly in contrast to the results reported in a *Study*, prepared by the centre for resources, University of Guelph. In the section which deals with the *Visual Impact of Hydro Transmission Lines*, the following statement appears:

**Field studies in Kent County and other landscape types suggest that (at) between one and two miles, the tower begins to approximate foreground forest cover height and neither dominates nor contrasts the landscape. Exceptions to this occur when a tower or towers are skylined thus making the profile dominant for distances exceeding two miles. Studies completed in both summer and winter indicate that seasonable variation does little to affect these distances.**

The one to two-mile limit is generally confirmed by a French Study, as discussed by Van der Ham and Ilding (1971), which suggests that the critical perceiving distance for apartment buildings in flat landscapes is approximately 1,400 metres.

In the course of our research concerning the visual impact of Hydro Transmis-

sion Lines on the environment, the general public and more specifically on those people living under, around, or within sight of Hydro Transmission Lines<sup>1</sup>, we have consulted the *Study*, titled, *Location Hydro—Interdisciplinary Research Centre for Resources Development University of Guelph.*

<sup>1</sup>Hydro Transmission Lines referred to in this article are electric transmission lines belonging to Ontario Hydro.

In the preface to this *Study*, the following appears:

The information provided in the following pages is the result of work undertaken by a team of Agricultural and Resource Economists, Landscape Architects, and Land Resource Scientists from the University of Guelph.

The team set out to make an independent study of the effect of overhead transmission lines on the environment and how to minimize this effect.

The research for this study was completed in 1974 after a two and one-half year period, and the study was published soon after. There are a number of definitive statements in the *Study* concerning the visual impact of Hydro Transmission Lines and installations on the environment, which in my opinion are applicable.

In the introduction to the section titled *Visual Impacts and Their Evaluation* there is a definition of *Visual Impact* as follows:

**Visual Impact may be defined as: a perceivable physical change to the landscape, that results in a negative human response. The definition breaks the study of visual impact into two basic parts; the first dealing with the perceivable visual change and the second considering the resultant human response.**

A change in the visual landscape is initiated by the perceptible addition and/or removal of elements in the landscape. With specific reference to Hydro-Electric power

transmission as a land-use, additions would include towers, the lines they support, and stations for generation transmission and distribution. Elements commonly removed by Hydro installations are forest cover, agricultural crops and occasionally buildings and other man-made structures. These all result in perceivable physical changes. The degree of change is not constant, but varies according to characteristics of both the installations and the landscape in which they occur.

Such changes, or even anticipation of them, can elicit human response. The negativity of the response is implied by the very use of the term impact. It is defined as a forceful collision of contact but, since the onset of widespread environmental awareness, it has come to mean *the adverse* effect of the forceful collision between the environment and the technology of man.

Written and verbal submissions to recent line location inquiries clearly demonstrate that people are reacting negatively to the imposition of Hydro lines in the landscape.

For the purpose of this study a modified but more specific definition is required. Since Hydro is not a space defining element the critical perceiving distance is the distance at which a transmission line no longer influences the visual experience either by dominating or by contrasting with the perceivable landscape. This is not to say that a hydro line cannot be seen beyond the critical perceiving distance, rather when it is seen it plays only a minor role in its visual experience.

The visual effect of transmission lines on the environment is noted below:

The intrusion of transmission lines into such landscape is particularly disruptive because the visual harmony and pleasant variety that follows from wise use, is greatly diminished in consequence. There is harsh function, materials, and form incompatibility.

Elsewhere in the *Study* concerning a method of valuing the visual landscape, the following statement appears:

To understand how people value the visual landscape, one must look upon it as a *natural resource*. However unlike other natural resources such as minerals, timber or soil, the visual resource is *exploited* but not diminished through the act of viewing it. Furthermore, the value of the resource cannot be successfully determined by market value since it is not bought and sold. Although the sale of some properties may include a value for the visual resource, economics has yet to be proven a reliable indicator. Other methods must be devised to determine and monitor value.

From the above, we conclude that there is indeed a negative influence on the environment and on the visual aspect of the landscape which translates into a loss in value.

The visual impact on the residual land after a transmission line taking and on the people living on the land is a result of the use of the land for electric transmission lines.

I have long been of the opinion that the intrusion of a high voltage transmission corridor has the effect of reducing the market value of lands adjacent to such a facility.

In the past, unfortunately, individual expropriated landowners have either been unwilling or financially unable to subsidize the cost of research of sufficient scope to support this opinion. However, a study to examine and determine the long-term social and economic impacts of transmission lines was recently undertaken by the Department of Man-Environment Studies, Faculty of Environmental Studies, University of Waterloo, to follow a similar paper presented in 1976 to the Royal Commission on Electric Power Planning.

This study entitled *The Socio-Economic Impacts of Electric Transmission Corridors—A Comparative Analysis*, was published in April of 1978 and submitted to the Royal Commission on Electric Power Planning.

Although this study covers a wide range of impacts, for the purpose of this report, we have included excerpts which deal directly with reduction in the market value of lands adjacent to transmission corridors.

The following excerpt from the summary of the study describes its purpose, the methods used to obtain and analyze data, and some of the general conclusions.

#### SUMMARY

1. The purpose of the study was to examine the long-term social and economic impacts of a 500 KV and a 230 KV transmission line. The lines studied were the 500 KV line between Essa and Kleinburg and the 230 KV line between Essa and Orangeville. The lines are of different age, voltage and physical size. An attempt was made to identify the influences of these factors on social and economic impacts. Control lines were identified one mile to the east of the existing line (Chapter 1).
2. A review of the literature dealing with the social and economic impacts of transmission lines was undertaken. The review includes a number of studies done for utility companies throughout North America (Chapter 2).
3. The physical characteristics of the lines and controls were analyzed. Comparisons were made between each line and its respective control and between the study area. No significant differences were found between the lines and their respective controls but some differences between the study areas were noted (Chapter 3).
4. A total of 1,007 sales of properties on both lines and controls during the years 1967-77 were analyzed. Data from Regional Registry Offices was used to examine patterns of frequency of sales and average price per acre for different sizes and types of property. During the 1967-77 period, fewer properties of less than 10 acres and more properties of 10-50 acres were sold on the lines than on the controls. Properties over 150 acres sold with similar frequency. The