An Investigation into the Potential Relationship between Property Values and High Voltage Overhead Transmission Lines in Ireland

An independent report prepared for

EirGrid plc
The Oval, 160 Shelbourne Road
Ballsbridge, Dublin 4
Ireland

February 2016

Part 2 – Appendices

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APPENDIX 1 – Map of Study Areas

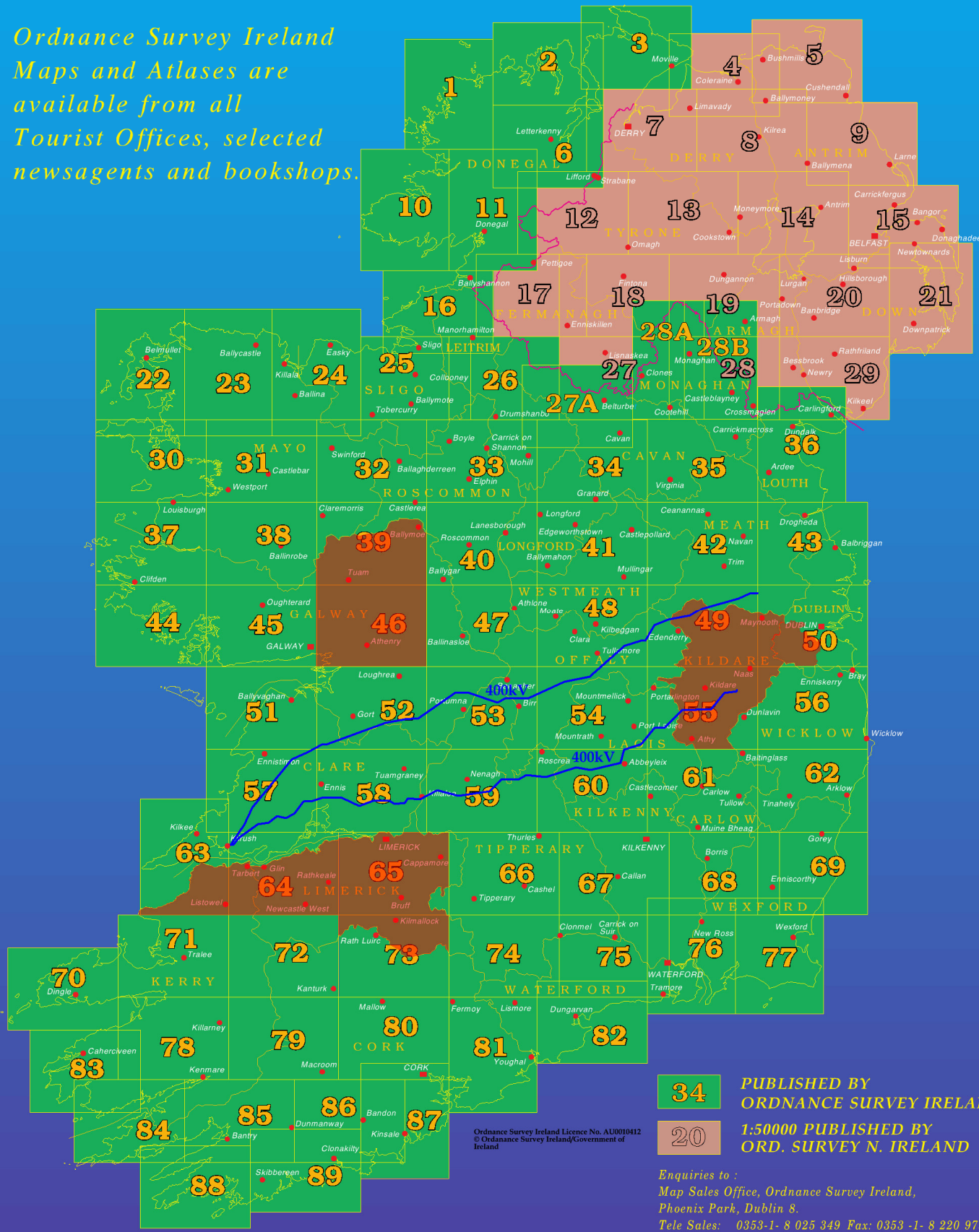
Ordnance Survey Ireland

DISCOVERY SERIES®
SRAITH EOLAIS

Study Areas

Scale 1: 50 000

Ordnance Survey Ireland Maps and Atlases are available from all Tourist Offices, selected newsagents and bookshops.



34 PUBLISHED BY ORDNANCE SURVEY IRELAND

20 1:50000 PUBLISHED BY ORD. SURVEY N. IRELAND

Enquiries to :
Map Sales Office, Ordnance Survey Ireland,
Phoenix Park, Dublin 8.
Tele Sales: 0353-1- 8 025 349 Fax: 0353 -1- 8 220 979
Trade Sales: 0353-1- 8 025 395 Fax: 0353-1- 8 025 380
LOCALL: 1 890 674 627

APPENDIX 2 – Copy of Survey Questionnaire

Gaynor Corr / Insight Statistical Consulting
Interview Questionnaire

Interview date: / / 2011

Name of interviewer(s): Tom Corr

Kevin Miller

Name of firm being interviewed: _____

Address of firm being interviewed: _____

_____

COUNTY _____

I am working as part of a team of consultants looking at the effect of different types of physical infrastructure on property values. The purpose of this interview is to get your professional opinion on how infrastructure effects property values. I will provide you with more details on the specific nature of the study as the interview progresses. To begin with, I want to ask a few questions about yourself.

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1. ABOUT THE INTERVIEWEE(S)

	Interviewee 1	Interviewee 2	Interviewee 3
1.1.1 Name			
1.1.2 Mobile			
1.1.3 Email			
1.2 Qualifications (e.g. MRICS, MIAVI, Assoc IAVI, MIPAV and others)			
1.3 Number of years as a practicing valuer			
1.4 Position in firm			
1.5 Area of property they specialise in firm (e.g. residential, agricultural land, commercial)			

2. INITIAL VALUATIONS

2.1 RESIDENTIAL PROPERTY (SHOW RESPONDENT RESIDENTIAL PROPERTY BROCHURE) This is a brochure for a residential property, which contains a picture and a description of the main features of the property. Please take your time to examine this brochure carefully and provide an estimated valuation for this property if it was located approximately 5km (3 miles) outside TOWN (INSERT NAME OF TOWN WHERE INTERVIEW IS TAKING PLACE)

Residential property estimated valuation: €_____

Additional comments:

2.2 AGRICULTURAL FARMLAND PROPERTY (SHOW RESPONDENT AGRICULTURAL FARMLAND BROCHURE) This is a brochure for an agricultural farmland, which contains an illustration and description of the plot area. Please take your time to examine this brochure carefully and provide an estimated valuation for this property if it was located approximately 5km (3 miles) outside TOWN (INSERT NAME OF TOWN WHERE INTERVIEW IS TAKING PLACE)

Agricultural property estimated valuation: €_____

Additional comments:

3. INFRASTRUCTURE AND PROPERTY

3.1 RESIDENTIAL PROPERTY

I am going to list-off a range of different types of transport and utility infrastructure. In each instance, please provide an estimate of the extent to which you feel **the residential property you just valued** would be affected, *positively*, *negatively* or *at all* in value by being located in close proximity to each transport and utility infrastructure. Please provide your answer in terms of percentage change in value.

	NEGATIVE	None	POSITIVE	*Tick if Not Applicable*
3.1.1 Motorway or dual carriageway *50 metres from back of house but nearest connection 5 km away*	%		%	[ ]
3.1.2 Mainline rail line *50 metres from back of house but nearest connection 15 km away*	%		%	[ ]
3.1.3 Air field e.g. aerodrome or regional airport *50 metres from the perimeter and at rear of the house*	%		%	[ ]
3.1.4 High voltage overhead electricity line *50 metres from the rear of the house and carried on pylons with one visible*	%		%	[ ]
3.1.5 Wind farm *500 metres from the rear of the house to the nearest turbine*	%		%	[ ]
3.1.6 Telecommunications antennae and support structures *50 metres from rear of the house*	%		%	[ ]
3.1.7 Waste-water treatment plant *50 metres from rear of the house*	%		%	[ ]
3.1.8 High Pressure Mains Natural gas transmission pipeline *50 metres from the rear of the house*	%		%	[ ]
3.1.9 Major Landfill (non-hazardous waste) *500 metres from the rear of the house*	%		%	[ ]

Any additional comments:

3.2 AGRICULTURAL FARMLAND PROPERTY

3.2 Once again I am going to list-off a range of different types of transport and utility infrastructure. In each instance, please provide an estimate of the extent to which you feel the **agricultural farmland you just valued** would be affected, positively, negatively or at all in value by being located in close proximity to each transport and utility infrastructure. Please provide your answer in terms of percentage change in value.

	NEGATIVE	None	POSITIVE	*Tick if Not Applicable*
3.2.1 Motorway or dual carriageway *Nearest connection 5 km away*	%		%	[ ]
3.2.2 Mainline rail line *Nearest connection 15 km away*	%		%	[ ]
3.2.3 Air field e.g. aerodrome or regional airport *Adjoins at side of farm*	%		%	[ ]
3.2.4 High voltage overhead electricity line *Lines cross at side of the farm with one pylon on the land*	%		%	[ ]
3.2.5 Wind farm *Adjoins at side of farm*	%		%	[ ]
3.2.6 Telecommunications antennae and support structures *Antennae located at the side of farm*	%		%	[ ]
3.2.7 Waste-water treatment plant *Adjoins at side of farm*	%		%	[ ]
3.2.8 High Pressure Mains Natural gas transmission pipeline *Pipeline crosses the farm at side of farm*	%		%	[ ]
3.2.9 Major Landfill (non-hazardous waste) *Adjoins at side of farm*	%		%	[ ]

Any additional comments:

4. HVOTLs

4.1 I am going to rotate through the different stages of a typical planning process for high voltage overhead electricity lines (HVOTLs). At each stage please provide an estimate of the extent to which you feel the **residential property you just valued** would be affected, *positively*, *negatively* or *at all* in value by being near to a planned high voltage overhead electricity line. Please provide your answer in terms of percentage change in value.

	NEGATIVE	None	**POSITIVE**	*Tick if Not Applicable*
4.1.1 Initial announcement of route for HVOTL (before planning application is submitted)	%		%	[ ]
4.1.2 Full planning permission granted for HVOTL	%		%	[ ]
4.1.3 Construction of HVOTL	%		%	[ ]
4.1.4 One year after completion of HVOTL	%		%	[ ]
4.1.5 Five years after completion of HVOTL	%		%	[ ]
4.1.6 Ten years after completion of HVOTL	%		%	[ ]

IF AN EFFECT IS IDENTIFIED FOR ANY OF THE ABOVE ITEMS PLEASE ASK Q4.2.1 AND Q4.2.2. OTHERWISE PROCEED TO Q4.3

4.2.1 What do you believe to be the single main cause for HVOTLs affecting **residential property** values? DO NOT PROMPT THE RESPONDENT WITH AN ANSWER

4.2.2 What other factors (if any) cause HVOTLs to affect **residential property** values? DO NOT PROMPT THE RESPONDENT WITH AN ANSWER

4.3 Again I am going to rotate through the different stages of a typical planning process for high voltage overhead electricity lines (HVOTLs). At each stage please provide an estimate of the extent to which you feel the **agricultural farmland property** you just valued would be affected, positively, negatively or at all in value by being near to a planned high voltage overhead electricity line. Please provide your answer in terms of percentage change in value.

	NEGATIVE	None	**POSITIVE**	*Tick if Not Applicable*
4.3.1 Initial announcement of route for HVOTL (before planning application is submitted)	%		%	[ ]
4.3.2 Full planning permission granted for HVOTL	%		%	[ ]
4.3.3 Construction of HVOTL	%		%	[ ]
4.3.4 One year after completion of HVOTL	%		%	[ ]
4.3.5 Five years after completion of HVOTL	%		%	[ ]
4.3.6 Ten years after completion of HVOTL	%		%	[ ]

IF AN EFFECT IS IDENTIFIED FOR ANY OF THE ABOVE ITEMS PLEASE ASK Q4.4.1 AND Q4.4.2.
OTHERWISE PROCEED TO Q5.1

4.4.1 What do you believe to be the single main cause for HVOTLs affecting **agricultural farmland** property values? DO NOT PROMPT THE RESPONDENT WITH AN ANSWER

4.4.2 What other factors (if any) cause HVOTLs to affect **agricultural farmland** values? DO NOT PROMPT THE RESPONDENT WITH AN ANSWER

5. HVOTLs and Valuation Experience

5.1 Have you **ever** valued any residential properties or agricultural farmland in close proximity to high voltage overhead electricity lines? Please tick relevant box for each item.

	Yes	No
5.1.1 Residential property		
5.1.2 Agricultural farmland		

IF YES TO EITHER 5.1.1 OR 5.1.2 ABOVE, ANSWER Q5.2, Q5.3 AND Q5.4. OTHERWISE, PROCEED TO Q6.1.

5.2 Have you valued any residential properties or agricultural farmland in close proximity to high voltage overhead electricity lines within the last five years?

	Yes	No		
5.2.1 Residential property			If yes, approximately how many?	
5.2.2 Agricultural farmland			If yes, approximately how many?	

5.3 Have you valued any residential properties or agricultural farmland in close proximity to high voltage overhead electricity lines within the last twelve months?

	Yes	No		
5.3.1 Residential property			If yes, approximately how many?	
5.3.2 Agricultural farmland			If yes, approximately how many?	

5.4 When valuing properties near high-voltage overhead lines, do you normally take into account the effect of the lines and associated structures on the property?

	Yes	No
5.4.1 Residential property		
5.4.1 Agricultural farmland		

Any additional comments:

6. HVOTLs and Non-Residential Property

6.1 For each of the following **non-residential property types** please state whether or not you believe that high voltage overhead electricity lines would affect the value of the property in the event that it is located in close proximity to the property. Please provide an estimate of the extent to which you feel the non-residential property would be affected, *positively*, *negatively* or *at all* in value and provide your answer in terms of percentage change in value.

	NEGATIVE	None	**POSITIVE**	*Tick if Not Applicable*
6.1.1 Town centre retail units	%		%	[ ]
6.1.2 Outside town centre retail units	%		%	[ ]
6.1.3 Retail warehousing	%		%	[ ]
6.1.4 Town centre office units	%		%	[ ]
6.1.5 Outside town centre office units	%		%	[ ]
6.1.6 Industrial property (manufacturing)	%		%	[ ]
6.1.7 Industrial property (logistics and distribution)	%		%	[ ]

Any additional comments:

7. VALUATIONS (with HVOTL)

7.1.1 (SHOW RESPONDENT RESIDENTIAL PHOTOMONTAGE) This is the same residential property from earlier, yet this time it has a high voltage overhead electricity line located in close proximity to it. Please take your time to examine this carefully and, for each of the three scenarios presented, provide an estimated valuation for this property if it was located approximately 5km (3 miles) outside TOWN (INSERT NAME OF TOWN WHERE INTERVIEW IS TAKING PLACE ... YOU SHOULD REMIND RESPONDENT OF THEIR INITIAL VALUATION IN Q2.1 ... RECORD THE PHOTOMONTAGE REFERENCE NUMBER)

Photomontage reference:	
Reminder of Valuation at Q2.1	€

	110kV	220kV	400kV
Estimated valuation: €			

IF DIFFERENCE IN VALUE WITH RESPONSE TO Q2.1, ASK Q7.1.2, OTHERWISE GO TO Q7.2

7.1.2 Please explain your reasons for the difference in value above with that for the property without the high-voltage overhead transmission lines.

7.2.1 (SHOW RESPONDENT FARMLAND PLOT WITH HVOTL) This is the same agricultural farmland for which you provided an estimated valuation for earlier, yet this time it has a high voltage overhead electricity line running through it. Please take your time to examine this carefully and, for each of the three scenarios presented, provide an estimated valuation for this property if it was located approximately 5km (3 miles) outside TOWN (INSERT NAME OF TOWN WHERE INTERVIEW IS TAKING PLACE ... YOU SHOULD REMIND RESPONDENT OF THEIR INITIAL VALUATION IN O2.2)

Reminder of Valuation at Q2.2	€

	110kV	220kV	400kV
Estimated valuation: €			

IF DIFFERENCE IN VALUE WITH RESPONSE TO Q2.2, ASK Q7.2.2, OTHERWISE GO TO Q8.1

7.2.2 Please explain your reasons for the difference in value above with that for the property without the high-voltage overhead transmission lines.

8. ABOUT YOUR FIRM

8.1 How many years has the firm been in operation? _____ years

8.2 Describe the main geographic area the firm covers:

8.3 How many staff have an IPAV, IAVI or SCSI (or similar) qualification? _____ people

8.4 Please rank the following in order of importance relative to your firm's turnover where 1 = highest turnover, 2 = second highest turnover and 3 = third highest turnover:

(a) Residential sales / valuations	
(b) Commercial sales / valuations	
(c) Agricultural land sales / valuations	

8.5 Approximately how many formal valuations has your firm carried out in the past twelve months:

If respondent is reluctant to provide details, ask for a range e.g. 0-10, 11-20, 21-30, 31-40, and record the mid-point of this range.

(a) Residential	
(b) Commercial	
(c) Agricultural land	

9. ADDITIONAL INFORMATION/COMMENTS

9.1 Are there any additional comments or observations you would like to make in relation to high-voltage overhead lines and property values?

9.2 SUMMARY

END QUESTIONNAIRE - MOVE TO DATA COLLECTION

APPENDIX 3 – Copy of the Questionnaire Residential Property Brochure with no HVOTL's Present

Bungalow Style Dwelling House on 0.5 ac For Sale

Location:

The property is located approximately 5 kms (~3 miles) outside _____ town. The property is accessed from a local public road 1 km from its junction with a regional road.

Description:

The property consists of a modern bungalow style dwelling house of approximately 1,500 ft² (140 mtr²) on a site of 0.5 acres situated in a rural setting. Please find attached a map with the property boundary outlines in red.

Construction:

The bungalow was constructed in the mid 1980s of twin leaf block with insulation between. It has a pitched roof finished with roof tiles. The windows are double glazed with white PVC frames. The heating is oil fired central heating with radiators throughout and open fires in the reception rooms.

Accommodation:

The accommodation is as follows

Entrance Hallway
Living Room
Dining Room
Kitchen
Utility Room
4 Bedrooms
Bathroom.

The floors which are concrete are covered with combinations of timber, carpet and tiles.

Services:

The property has a mains water supply. Sewage service is by means of a standard septic tank and percolation area. ESB and Telecom services come from poles on the public road.

Site & Garden:

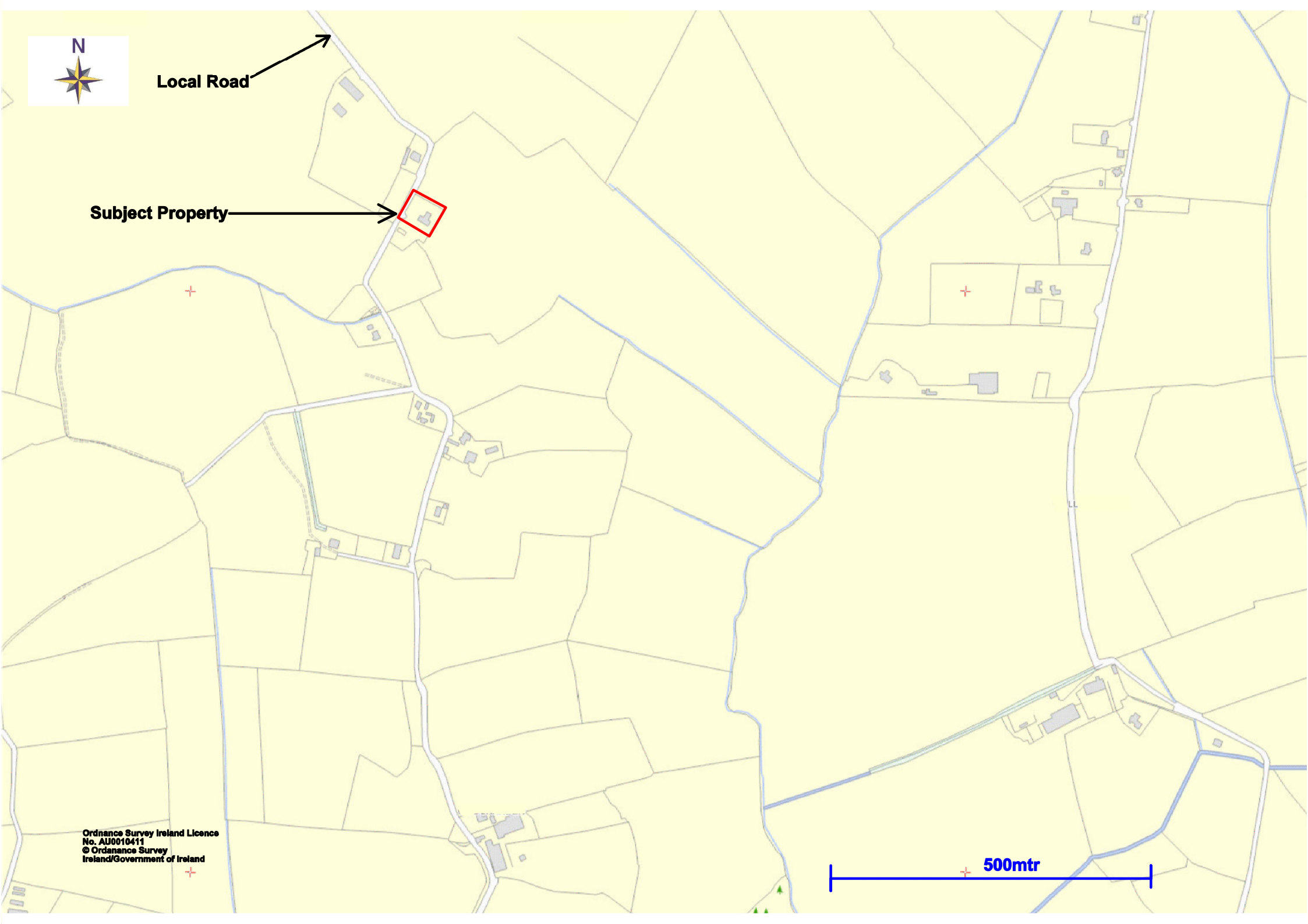
The site is 0.5 acres excluding the public road. Landscaping is mainly grass lawns with some shrubs. The front boundary with the public road is a 1.2 mtr block wall plastered and capped. The boundary with the surrounding field is a well maintained leylandii hedge. The vehicular areas on the site are surfaced with tarmacadam. There is a small patio area to the rear of the house.

Buildings Energy Rating:

This building has a D1 energy rating.

Tenure:

The property is held freehold and without any burdens on the title.


N
Local Road
Subject Property
Ordnance Survey Ireland Licence
No. AU0010411
© Ordnance Survey
Ireland/Government of Ireland
500mtr

GD-D-79554

APPENDIX 4 – Copy of the Questionnaire Brochure for Farmland Property with no HVOTL's present

Agricultural Land For Sale

Location:

The property is located approximately 5 kms (~3 miles) out side _____ town. The property is accessed from a local public road 1 km from its junction with a regional road.

Farm Layout:

Attached please find a drawing showing the farm boundary outlined in red.

Description:

The property consists of a non residential farm of approximately 102 map acres. The land is all of good quality and currently in grass with no low lying areas or waste. The only buildings consist of a good quality holding pen, crush and pump house. The farm boundaries and individual fields are surrounded by well maintained stock proof whitethorn hedges which provide good shelter.

Services:

Water supply is by means of a bored well and submersible pump with piping to troughs in the individual fields. There is an electricity supply at the pump house.

Utilities:

There are no low voltage power lines/poles (except connection to pumphouse), communications lines/cables, pipelines or other wayleaves/burdens on the farm.

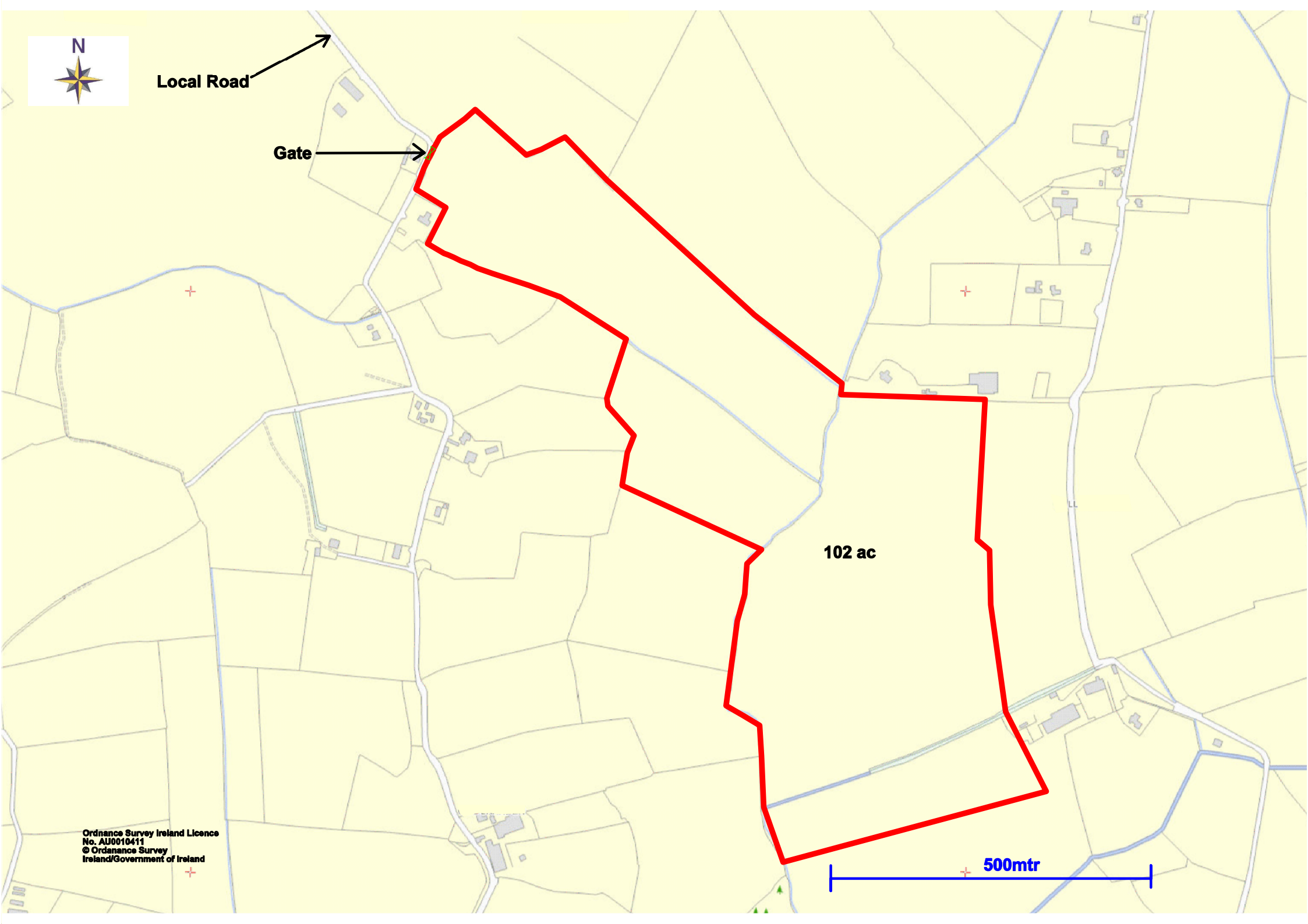
Entitlements:

There are no single farm payment entitlements or quotas with the land.

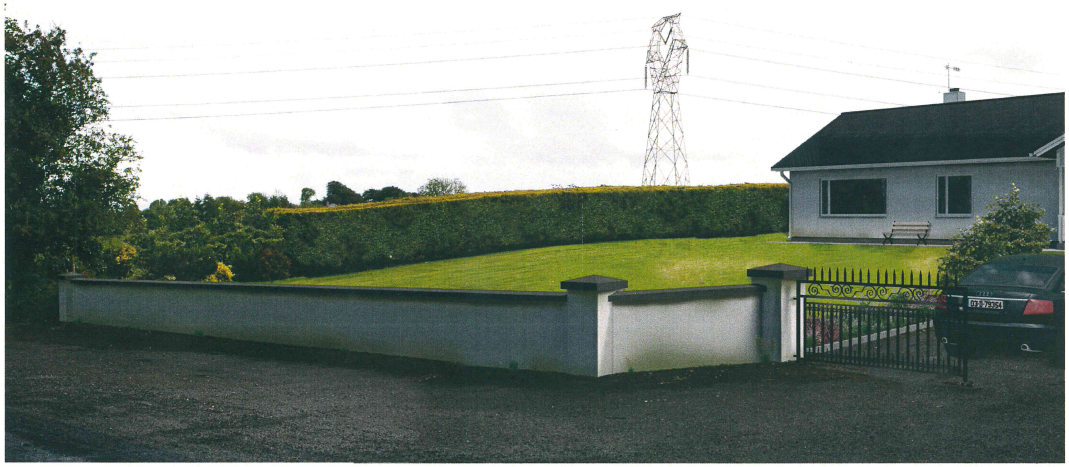
Planning:

There is an existing access point for agricultural purposes at the bend in the local road which consists of 2 x 12′ gates. It would not be possible to get planning for residential purposes on the land for a number of reasons including overdevelopment in the area, sightlines etc.

Tenure:
The land is held freehold and without any burdens on the title.


N
Local Road
Gate
102 ac
500mtr
Ordnance Survey Ireland Licence
No. AU0010411
© Ordnance Survey
Ireland/Government of Ireland

APPENDIX 5 – Copy of Residential Questionnaire Photomontage showing HVOTL's. Note there were 4 versions of this photomontage based on rotating the 4 photographs on the A3 page



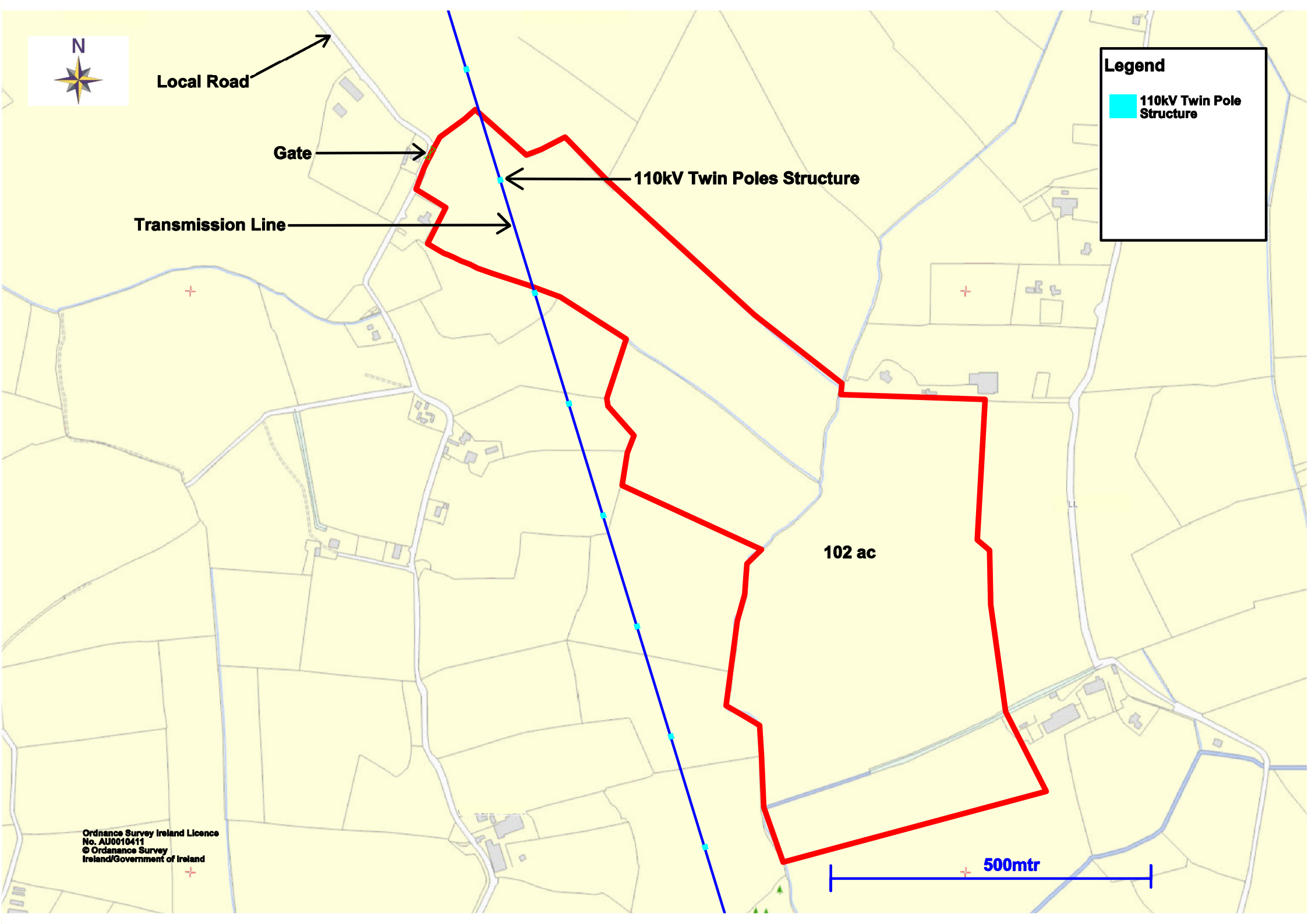
Property with a 400 kV overhead transmission line (structure height 35m)

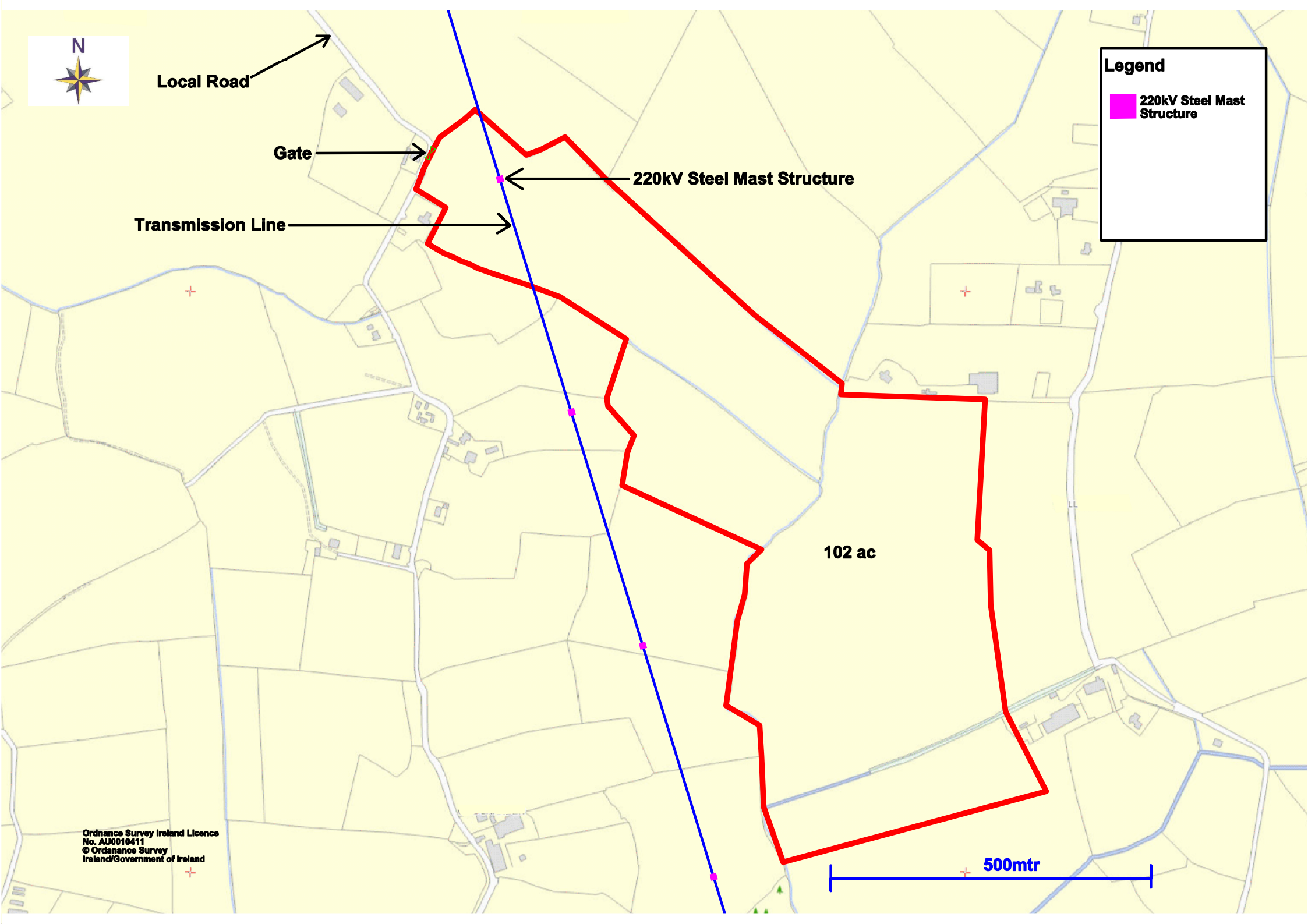
Property with a 220 kV overhead transmission line (structure height 28m)

Property with a 110 kV overhead transmission line (structure height 19m)

Property

APPENDIX 6 – Copy of 3 Maps of Farmland Property with HVOTL's Crossing the Farm, 110kV, 220kV and 400kV


N
Local Road
Gate
110kV Twin Poles Structure
Transmission Line
Legend
110kV Twin Pole Structure
102 ac
500mtr
Ordnance Survey Ireland Licence No. AU0010411
© Ordnance Survey Ireland/Government of Ireland


N
Local Road
Gate
220kV Steel Mast Structure
Transmission Line
Legend
220kV Steel Mast Structure
102 ac
500mtr
Ordnance Survey Ireland Licence
No. AU0010411
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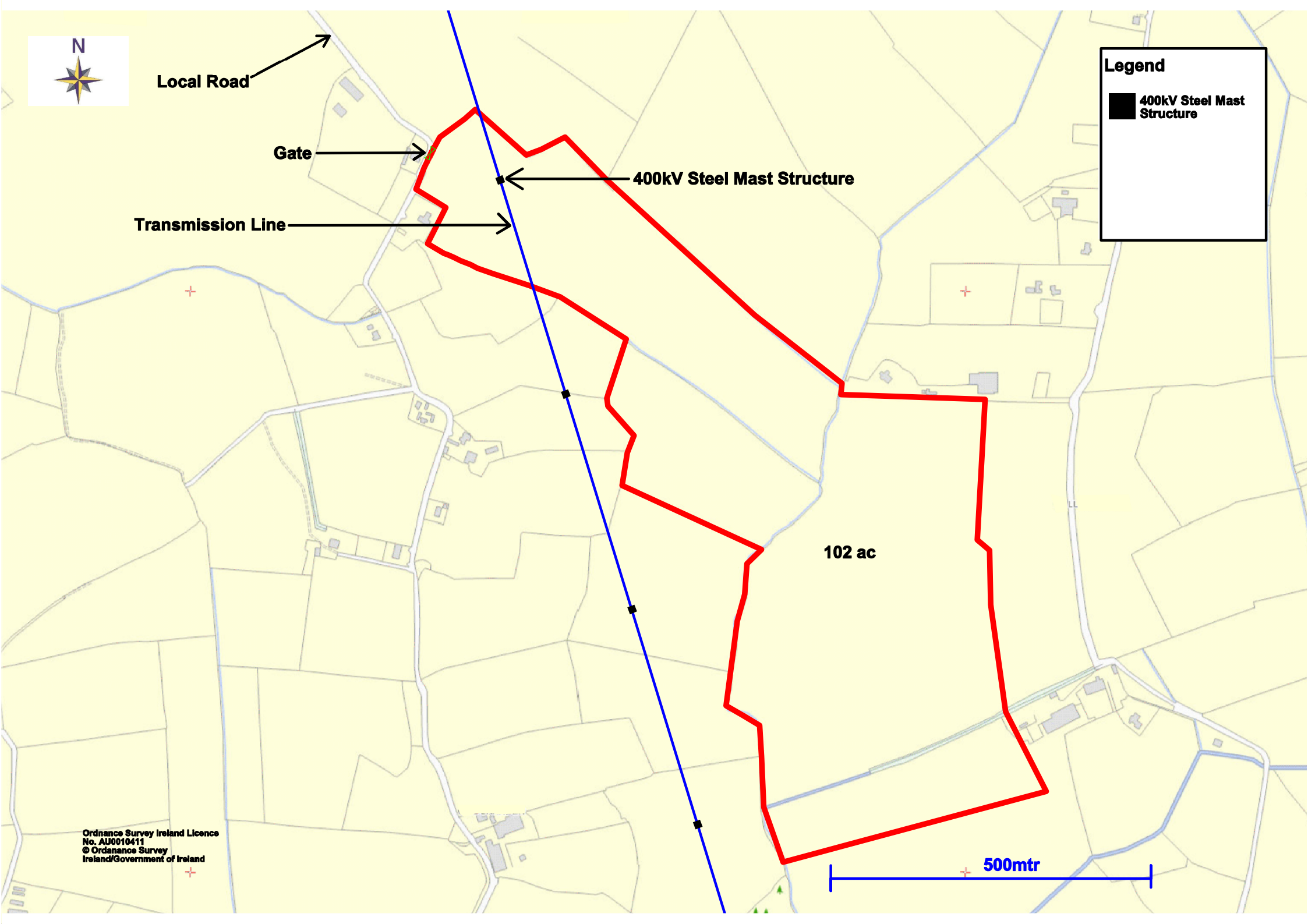
Ireland/Government of Ireland


N
Local Road
Gate
400kV Steel Mast Structure
Transmission Line
Legend
400kV Steel Mast Structure
102 ac
500mtr
Ordnance Survey Ireland Licence
No. AU0010411
© Ordnance Survey
Ireland/Government of Ireland

APPENDIX 7 – Copy of Residential Sales Spreadsheet Templates
Note: The Survey Sheet with vendor and purchaser details related to rural residential properties where the address was insufficient to locate the dwelling.

Name & address of estate agent:	
Main contact person:	
Unique ID Number	**SALE VALUE** Enter exact amount in euro Please ensure the sales value for each unique ID number matches with the charachteristics provided in the *Residential Sales - Details* spreadsheet
ER43-000	
ER43-001	
ER43-002	
ER43-003	
ER43-004	
ER43-005	
ER43-006	

PLEASE RETURN TO INSIGHT STATISTICAL CONSULTING, 60 Merrion Square, Dublin 2 Phone: 01 6612467 Fax: 01 6612465
Email: dharmon@insightsc.ie

Name & address of estate agent:				**Main contact person:**			
Unique ID Number	**Full Property Address**	**Property Type**	**Plot area**	**Dwelling floor area**	**Bedrooms in dwelling**	**Year built**	**Date sale agreed**
		Select one of the following: (a) Detached (b) Semi-d (c) Terraced (incl end of terrace)	Hectares	Square meters	Number	Select one of the following: (a) Pre 1961 (b) 1961 - 1970 (c) 1971 - 1980 (d) 1981 - 1990 (e) 1991 - 2000 (f) 2001 or later	month-year
ER43-000							
ER43-001							
ER43-002							
ER43-003							

PLEASE RETURN TO GAYNOR CORR, 4 Abbeyleix Road, Portlaoise, Co. Laois Phone: 057 8678080 Fax: 057 8678081
Email: tomcorr@gaynorcorr.ie

Name & address of estate agent:	
Main contact person:	

Unique ID Number	**Vendor OR Purchaser Name**

APPENDIX 8 – Copy of Agricultural Land Sales Templates

Name & address of estate agent:	
Main contact person:	
Unique ID Number	**SALE VALUE** Enter exact amount in euro Please ensure the sales value for each unique ID number matches with the charachteristics provided in the *Farm Sales - Details* spreadsheet
EL43-000	
EL43-001	
EL43-002	
EL43-003	
EL43-004	
EL43-005	
EL43-006	

PLEASE RETURN TO INSIGHT STATISTICAL CONSULTING, 60 Merrion Square, Dublin 2 Phone: 01 6612467 Fax: 01 6612465
Email: dharmon@insightsc.ie

Agricultural Land Sales - Details:
Since 1 January 1990 - Only arms length sales within or partly within 2km corridor

Interviewer:

Study on Infrastructure Property Values

Name & address of estate agent:					Main contact person:						
Unique ID Number	Full Farm Address	Farm Area (hectares)	House Area sq.m.	Road Frontage suitable for sites	Area of Farm Buildings sq.m.	Forestry %	Rating of Sales Location (Poor, Medium, Strong)	Access	Method of Sale	Date Sale Agreed	Percentage of Total Land Area described as:
			Sq. M.		Sq. M.			(a) Unrestricted (b) Restricted (c) By ROW		month-year	(a) Non Productive (b) Suitable for Forestry (c) Poor Quality Grassland (d) Medium Quality Grassland (e) Good Quality Grassland (f) Suitable for any use
EL43-000											
EL43-001											
EL43-002											
EL43-003											
EL43-004											
EL43-005											
EL43-006											

PLEASE RETURN TO GAYNOR CORR, 4 Abbeyleix Road, Portlaoise, Co. Laois Phone: 057 8678080 Fax: 057 8678081
Email: tomcorr@gaynorcorr.ie

Name & address of estate agent:	
Main contact person:	

Unique ID Number	**Vendor OR Purchaser Name**

APPENDIX 9 – Copy of letter from the Office of the Data Protection Commissioner dated 29th July 2011

An Coimisinéir Cosanta Sonrai
Data Protection Commissioner

29 July 2011

Mr. Geoff Tucker
Insight Statistical Consulting
60 Merrion Square
Dublin 2

(letter confirming advice which issued by email on 19/7/11)

Dear Geoff,

I refer to your email of 13 July 2011 to Gary Davis in relation to the proposed research project involving the processing of data related to property prices.

From what you have outlined in your email we understand that the project, as outlined consists of two strands with Gaynor Corr Auctioneer undertaking one strand which does not include the sale price but would include compiling details the property address of those sold by agents as well as the property features and the distance between those properties and relevant infrastructure. We further understand from the project diagram that the property address would be removed before the other details are forwarded in a data file to Insight SC. Separately, we understand that Insight SC would receive a data file directly from agents with an assigned Unique Identification Number (which Gaynor Corr assigned to properties during the interview phase) and the sale price achieved in respect of that UIN.

We would expect that the assigned UIN would not in any way be linked to a geocode and that the property address and any geocoding used during the project is removed prior to its analysis. Furthermore we would expect that Gaynor Corr Auctioneer would also delete the UIN from its data files as soon as it forwards its file to Insight SC in order that any link with the other parallel dataset is broken. On the basis of the project outline diagram and what I have outlined above, the proposed approach would be acceptable from a data protection perspective.

I hope that this is of assistance.

Yours sincerely,

Ciara O'Sullivan
Senior Compliance Officer

Teach na Canáltha, Bóthar an Stáisiúin, Cuil an tSúdaire, Co. Laoise
Canal House, Station Road, Portarlington, Co.Laois
www.cosantasonrai.ie | www.dataprotection.ie
eolas@cosantasonrai.ie | info@dataprotection.ie
t LoCall 1890 252 231 t +353 57 868 4800 f +353 57 868 4757

APPENDIX 10 – Methods of Distance Measurement of Properties to HVOTL's Used in Study

Appendix 10

Methods of measurement of properties to HVOTL'S

- **The main method of measuring used was Google Earth Pro. The property location and the HVOTL'S structure were identified on the aerial photography maps and the distance then measured using the line measurement tool.**

- **Some problems arose with the Google Maps images in a small number of areas. These included low quality images and cloud cover.**

- **In those problem areas a combination of Ordnance Survey Online Mapping and Local Authority Planning Mapping were used to identify properties, HVOTL structures and facilitate measurement.**

- **Measurement in those areas was carried out using the Pythagorean Theorem**
  Distance = Square Root $(X1-X2)^2 + (Y1-Y2)^2$
  X1 Y1 and X2 Y2 are the ITM coordinates of the objects included in the measurement either property or structure. The coordinates were taken from the OSI maps. This method was also used to cross check the Google Earth Pro measurements.

APPENDIX 11 – Distance Measurements taken on Farms within 1 kilometre of the Centre of HVOTL's

Appendix 11

Measurements taken on Farms within 1 kilometre of the centre of HVOTL's

Total Corridor Width: 2 Kilometres

Length of line through Farm
Line Voltage and Type 110 kV, 220 kV or 400 kV, single circuit or double circuit
Number of Twin Poles on farm
Number of Pylons on farm
Dwelling to Structure 1 and type of Structure 1
Dwelling to Structure 2 and type of Structure 2
Dwelling to Line, perpendicular distance
Yard to Structure 1, centre of yard to centre of Structure 1
Yard to Structure 2, centre of yard to centre of Structure 2
Yard to Line, perpendicular distance
Edge of Farm to Structure 1 and type of Structure 1
Edge of Farm to Structure 2 and type of Structure 2
Edge of Farm to Line, perpendicular distance
Impact of Line: "central" or "edge"
Frontage Affected: Yes or No

Note 1: All dwelling measurements are taken from the centre of the dwelling.
Note 2: All measurements to structures are to the centre of the structure.
Note 3: All measurements to lines are to the outer conductor cable.

APPENDIX 12 – Distance Measurements taken on Residential Properties to HVOTL's

Appendix 12

Measurements taken on Residential Properties

1. Line voltage and type ie. whether single circuit or double circuit.

2. Perpendicular distance to the nearest conductor wire.

3. Distance to the centre of the nearest structure and the type of that structure.

4. Distances to the edge of the second nearest structure and the type of that second structure.

5. Measurement of the folio from land registry.

Note 1: Only single family dwellings were included in the study ie. apartments were not included.

Note 2: In all measurements of residential properties, distances were from the centre point of the dwelling.

APPENDIX 13 – Map of EirGrid Soni, HVOTL Transmission System, January 2011

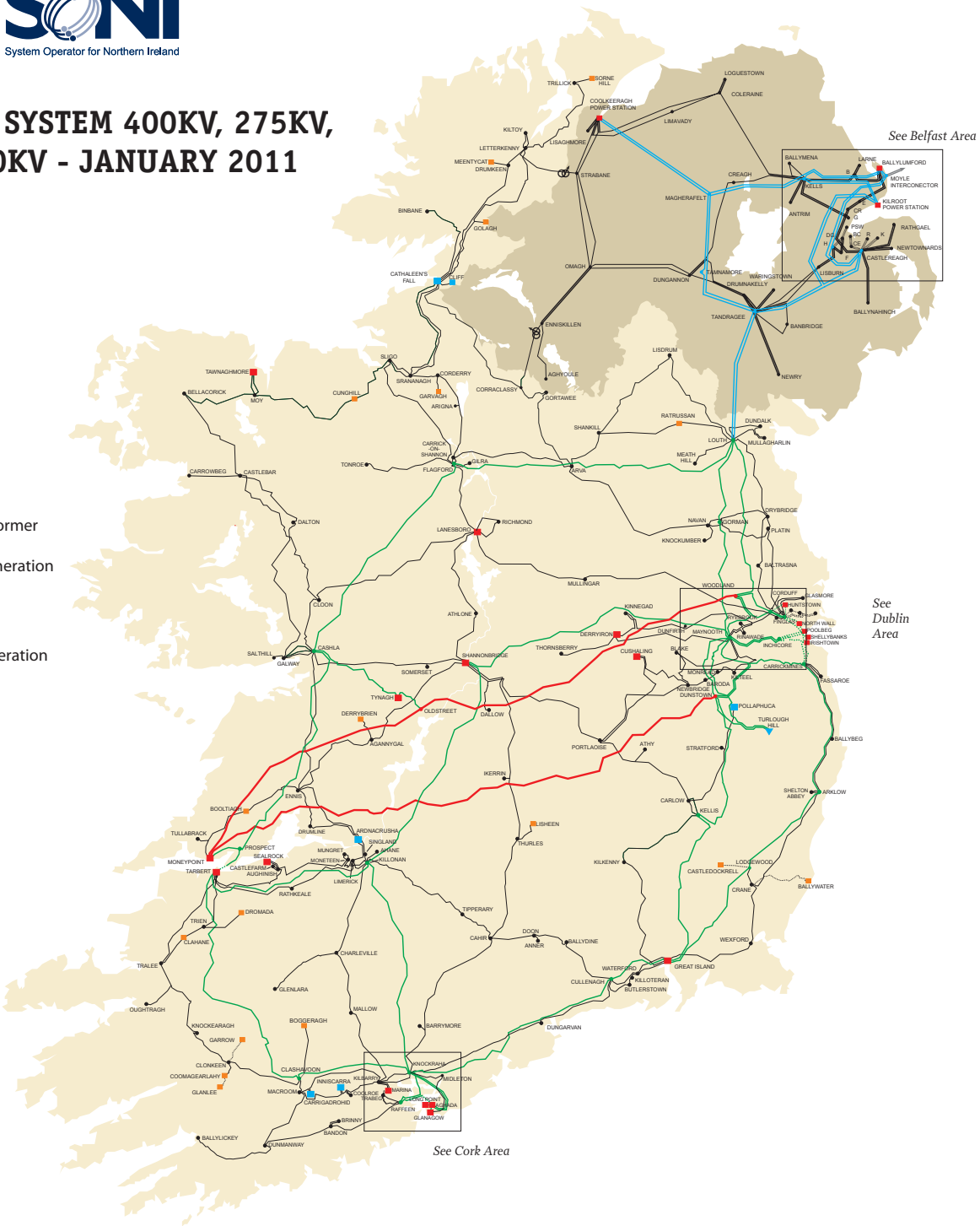
TRANSMISSION SYSTEM 400KV, 275KV, 220KV AND 110KV - JANUARY 2011

System Operator for Northern Ireland

- 400kV Lines
- 275kV Lines
- 220kV Lines
- 110kV Lines
- 220kV Cables
- 110kV Cables
- 400kV Stations
- 275kV Stations
- 220kV Stations
- 110kV Stations
- Phase Shifting Transformer

Transmission Connected Generation

- Hydro Generation
- Thermal Generation
- Pumped Storage Generation
- Wind Generation

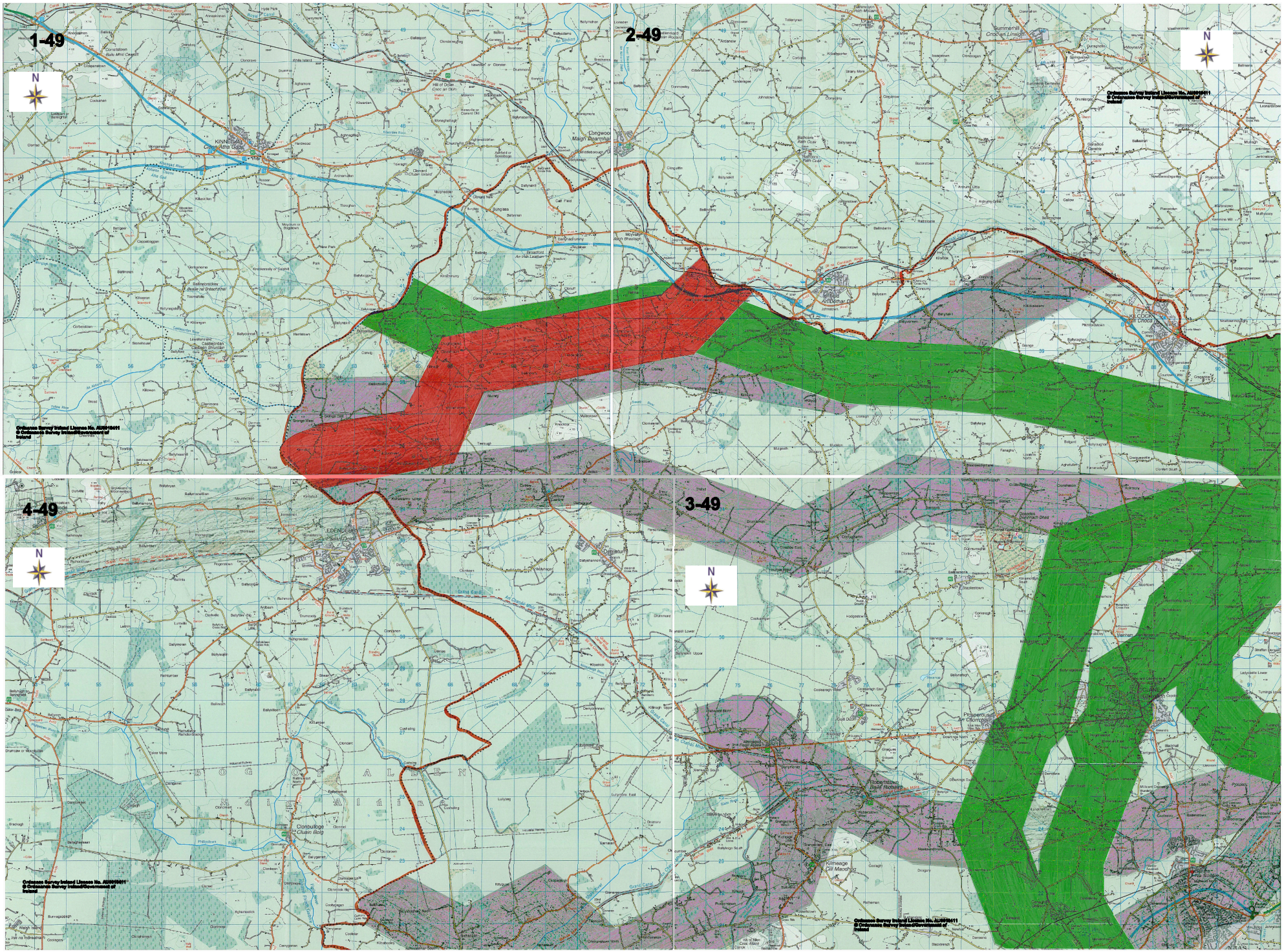


Belfast Area

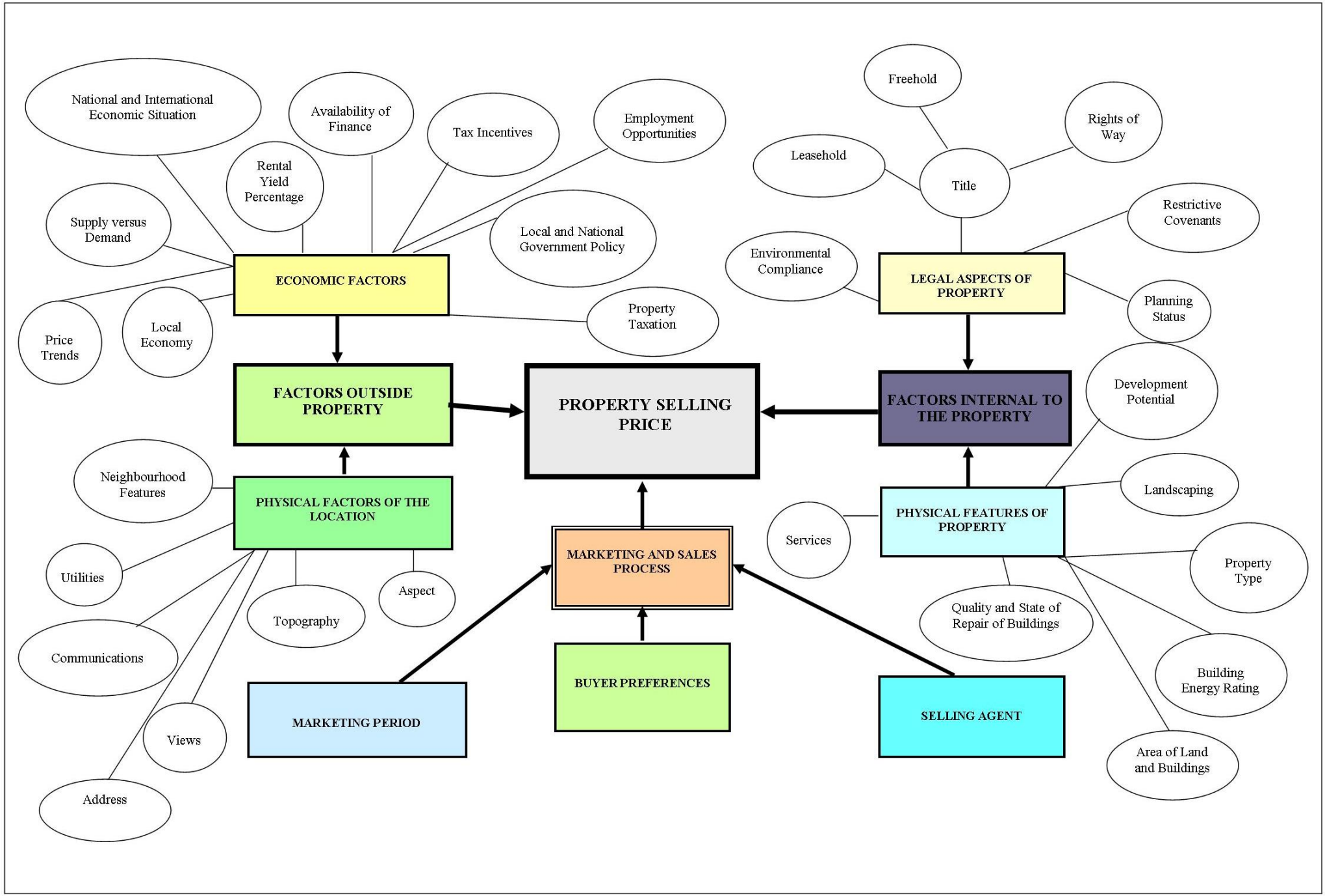
Cork Area

Dublin Area

APPENDIX 14 – Copy of Agent's Ordnance Survey Corridor Maps using North Kildare as an example


1-49
2-49
3-49
4-49
N

APPENDIX 15 – Diagrammatic Representation of some of the factors Affecting Property Selling Price


National and International Economic Situation
Availability of Finance
Tax Incentives
Employment Opportunities
Rental Yield Percentage
Supply versus Demand
Local and National Government Policy
ECONOMIC FACTORS
Price Trends
Local Economy
Property Taxation
FACTORS OUTSIDE PROPERTY
PROPERTY SELLING PRICE
Neighbourhood Features
PHYSICAL FACTORS OF THE LOCATION
Utilities
Communications
Topography
Aspect
Views
Address
MARKETING PERIOD
MARKETING AND SALES PROCESS
BUYER PREFERENCES
Freehold
Leasehold
Title
Rights of Way
Restrictive Covenants
Environmental Compliance
LEGAL ASPECTS OF PROPERTY
Planning Status
Development Potential
FACTORS INTERNAL TO THE PROPERTY
Landscaping
Services
PHYSICAL FEATURES OF PROPERTY
Property Type
Quality and State of Repair of Buildings
Building Energy Rating
SELLING AGENT
Area of Land and Buildings

Appendix 16 - Impact of High Voltage Overhead Transmission Lines on Property Values - Summary of Urban Residential Property Research in Main Report					
No.	**Author & Date**	**Type of Research**	**Subject Matter**	**Study Location**	**Findings**
1	Kinnard (1967)	Survey of residential home owners and people who influence sales including agents, valuers, financial institutions and builders	Power Lines and Residential Property Values	U.S., Metropolitan Hartford, Connecticut	43.6% response to survey. Most surveyed home owners did not mind living near a power line. 85% indicated they would purchase again in same location. Any negative reactions were reduced by screening from view of towers and lines. Those who influenced sales tended to have a more negative attitude to HVOTL's than homeowners. Owners of higher value homes tended to be slightly more negative in their opinion of HVOTL's. *(Reviewed by Jackson & Pitts 2010)*
2	Colwell & Foley (1979)	Statistical Sales Price Analysis	Electric Transmission Lines and the selling price of residential property (137kV lines with steel towers). Study from 1968 to 1978 (50ft. Easement) - 200 house sales	Decateur, Illinois, U.S.	Lot size included as a dependant variable. Selling price increases, but at a decreasing rate with increasing distance from the lines. Lines seemed to have little effect at 200ft. (61 metres approx.). Largest impacts, approximately 6%, were between 50 and 200 ft. (15 to 61 metres approx.) (*Reviewed by Kroll & Priestly 1992)*
3	Fridriksson, MacFadyen and Branch (1982)	Review of empirical studies	Electrical Transmission Line Effects on Land Values: A critical Review of the Literature		27 key studies identified most frequently in literature. Nearly all of these key studies were suspect in methodology for a range of reasons. Researchers in these studies believed that the value effects would be very obvious and tight methodological controls would not be needed. *(Reviewed by Furby et al 1998 and Kroll & Priestly 1992)*
4	Furby, Gregroy, Slovic & Fischhoff (1988)	Review of empirical studies of the effect of transmission lines on property values. Discussion of relevant theoretical issues regarding property rights and the nature of property value.	"Electric Power Transmission Lines, Property Values and Compensation."	Discussion of property rights and compensation based on the law and practice in the U.S.	Where negotiations with affected property owners in relation to compensation for HVOTL easements fail then the power of "eminent domain" enables compulsory acquisition. The owner is entitled to "just compensation" under the Fifth Amendment of the Constitution of the United States. Properties not directly affected are not entitled to compensation. The researchers state "professional appraisers almost uniformly maintain that transmission lines rarely reduce the value of properties they cross or lie near (Carll, 1956; Holt, 1983; Meyer, 1982; Miller, 1982). The Mountain West Research (Fridriksson et al, 1982) which was a review of the "key studies" at that time, found that ten had no significant effect on land values, ten were inconclusive and five concluded that the overall effect on land values was negative. Fridriksson et al (1982) reported that nearly all these studies were poor quality and attributed this to researchers belief that land value impacts would be obvious, thereby removing the need for rigid methodological controls. Colwell and Foley (1979) was quoted as a study with a more rigorous methodology.
5	Colwell (1990)	Statistical Sales Price Analysis	Power lines and land value. Same lines and data as used in Colwell & Foley (1979) Impacts on property values and effect of the passage of time on impacts	Decateur, Illinois, U.S.	Properties with easements experience loss of value - largest impacts in the region of 6% were between 50ft and 200ft (15 to 61 metres approximately). Presence of a tower on a lot did not cause an additional significant effect on price in general. The negative effect of line proximity on value decreased over time. However the value reduction of lots adjacent to or with direct views of a tower may not decrease with time. See Colwell & Foley (1979) – same data.

Appendix 16 - Impact of High Voltage Overhead Transmission Lines on Property Values - Summary of Urban Residential Property Research in Main Report					
No.	**Author & Date**	**Type of Research**	**Subject Matter**	**Study Location**	**Findings**
6	Ignelzi & Priestly (1991)	Statistical sales price analysis	A Statistical Analysis of Transmission Line Impacts on Residential Property Values in Six Neighborhoods	Six neighborhoods in northern California. 18 metre towers carrying 115kV upgraded to 50 metre towers carrying 230kV.	Before the lines were upgraded a minor negative impact of less than 1% for houses in close proximity to power lines (91 metres). Prices decreased in the region of 12% when new 50 metre towers carrying 230kV were introduced to the area. However the negative impact diminished within 5 years which would suggest that the negative visual impact was at it's highest at the planning and construction time.
7	Kroll & Priestley (1992)	Comprehensive review and analysis of literature	The Effects of Overhead Transmission Lines on Property Values	U.S. and Canada	Research is broken down into three main categories, appraiser studies, attitudinal studies and statistical analysis. They indicated that research work was incomplete but the following findings are listed: HVOTL's have the potential to reduce prices of residential and agricultural properties generally in range zero to 10% for houses but greater than 15% in some specialised rural cases. Other factors much more relevant than HVOTL's in relation to prices. Most likely effects are close to or under lines. Positive impacts may occur due to amenity value of ROW's. Smaller properties may be more affected. Impacts may be greatest immediately after construction work, diminishing over time.
8	Hamilton & Schwann (1995)	Statistical sales price analysis	Do High Voltage Electric Transmission Lines Affect Property Value? Transmission lines from 60kV to 500kV	Metropolitan Vancouver	Single family residential houses. Study years 1985 - 1991. Reduction in value of 6.3% for properties adjacent to a HVOTL easement corridor due to proximity and visual impact. With more distant properties the effect is minimal with property on average only losing 1% of their value. They concluded that HVOTLs do have an effect on property values with reductions in the region of 6%. These negative impacts on value are restricted to narrow bands of less than 200 metres and are primarily due to the visual externalities of the transmission towers.
9	Kinnard & Dickey (1995)	Discussion on compensation and approaches to measuring possible impacts from HVOTLs on property values.	A Primer on Proximity Impact Research: Residential Property Values Near High – Voltage Transmission Lines	Discussion and review based on U.S. and Canadian research and practice.	General discussion on compensation, U.S. Court cases and research methodologies. Market Impact Studies (MRA) using multiple regression analysis in the hedonic pricing model format, is stated to be preferred in the current professional and academic literature and they state: *"The models (MRA) reflect what buyers and sellers actually do, as opposed to what potential buyers say they might do, under specified hypothetical circumstances".* They also state: *"Moreover, the literature of survey research suggests strongly that respondents frequently do not do what they advocate when confronted with an actual decision"*

Appendix 16 - Impact of High Voltage Overhead Transmission Lines on Property Values - Summary of Urban Residential Property Research in Main Report

No.	Author & Date	Type of Research	Subject Matter	Study Location	Findings
10	Gallimore & Jane (1997)	Survey of public and of valuers	Public and Professional Perception of HVOTL Risks: Avoiding Circularity	West Midlands in the U.K. 132kV HVOTL	130 residential occupiers and 70 property valuers were surveyed by mail shot. A subjective rating of "every day" risks (1 lowest and 19 highest) was obtained in relation to a basket of eleven different risks including smoking cigarettes, drinking alcohol, having an x-ray and living near HVOTL's. Valuers perceived HVOTL risk to be greater than the public and the difference was statistically significant. People living near power lines placed HVOTL risk lower than those living remote from power lines. Peoples own perceptions of HVOTL risk do not significantly differ from what they believe are the perceptions of others on this matter. Valuers could possibly amplify fears in their advice where their perception of risk from HVOTL's is greater than the public's and this could lead to circularity between valuations and the formation of market prices. Valuers held the view that their own opinions are representative of those of the public but the survey did not confirm this view.
11	Bond & Hopkins (2002)	Statistical sales price analysis and attitudinal survey combined with a literature review	The Impact of Transmission Lines on Residential Property Values: Results of a Case Study	Suburb of Newlands, Wellington, New Zealand	The only previously published study (1968) in New Zealand indicated that transmission lines may not have a quantifiable effect on value. Bond and Hopkins found a statistically significant negative impact for proximity to towers. Sales analysis indicated that having a tower close to a property caused a devaluation of 20% at 10 to 15 metres, 5% at 50 metres and negligible effect at 100 metres. The presence of the transmission lines had a minimal effect and was not statistically significant. The authors indicated that the local hilly terrain in the study area rendered the results inconclusive due to the total or partial blockage of the line of sight to HVOTLs. In the attitudinal study nearly two thirds of the respondents had negative feelings about the HVOTL's with those living closest having the greatest degree of negativity. However from a comparison of the results, it appears that the negative feelings expressed are often not reflected in the price paid for such property. Undulating terrain and scenic harbour views for some houses may have affected the results.
12	Des Rosiers (2002)	Statistical Sales Analysis	Visual Emcumbrance and House Values: A Microspatial Approach to Impact Measurement	City of Brossard, Greater Montreal Area, Canada 315kV transmission line, 507 single family homes	Period of study 1991 to 1996. Maximum reduction in price was for properties adjacent to an easement and facing a pylon - average decrease of roughly 10%. On the other hand there was an average increase in value of 7.4% to 9.2% for properties 1 to 2 lots away from a pylon due to increased visual clearance and privacy from the corridor. Mid span properties were reduced by an average of 4.7% because of low minimal clearance of lines causing a visual obstruction. Properties with a limited rear or side view of a HVOTL structure but not adjacent to the easement usually experienced an increase of 3% to 4% due to improved visual clearance. The maximum net visual encumbrance (difference between positive and negative effects) lies between 50 and 100 metres from the easement boundary with reductions of 5% to 12% in price. Outside 100 metres effect decreases rapidly and disappears at 150 metres. Luxury homes were found to be more sensitive to the visual impacts from HVOTL's. No significant price change detected for adjacent properties due to media coverage of 1992 Swedish epidemiological studies on EMF and health hazards.

Appendix 17 - Impact of High Voltage Overhead Transmission Lines on Rural Property Values					
No.	**Author & Date**	**Type of Research**	**Subject Matter**	**Study Location**	**Findings**
1	Brown (1976)	Regression Analysis of Sales Data	The Effect of Power Line Structures and Easements on Farm Land Values (1965 to 1970)	Saskatchewan, Canada	No statistical significance found with regard to power lines and land value. Paired analysis of very similar parcels with and without a power line showed an increased selling price for the parcels with power lines. However this positive effect could not reasonably be assumed to be due to the lines *(Kroll & Priestly 1992)*.
2	Mitchel et al (1976)	Attitudinal Survey & Simple Statistics	The Longterm Socio-Economic Impact of an Electrical Prower Transmission Corridor on the Rural Environment: Perception and Reality	Eastern Canada, Waterloo, Ontario	No evidence of any difference in price. 33% of respondents to survey believed that line had a negative effect on property. Study of doubtful reliability, small sample and weakness of approach *(Kroll & Priestly 1992)*.
3	Boyer et al (1978)	Attitudinal Survey & Simple Statistics	The Socio-economic impact of high voltage transmission lines on property values - rural area	Eastern Canada, Southern Ontario - 230kV and 500kV lines	Fewer sales of properties with 500kV lines. Estimated effect of 16 to 29 percent reduction, depending on property size with properties under 10 acres experiencing twice the percentage loss in value of properties over 50 acres. Problems with weakness of basic approach make this analysis of limited value *(Kroll & Priestley 1992)*.
4	Woods & Gordon (1981)	Statistical Analysis of Sales Prices	Study on the Economic Impact of Electric Transmission Corridors on Rural Property Values: Final Report	Ontario, Canada - at six different locations	Land ranged from purely agricultural to land with residential development potential. Large variation by study area. Areas where there was a large level of residential development were found to have statistically significant negative price reductions with the average going as high as a 16.9% reduction in one case. However the purely agricutural land had no statistically significant effect showing up and in two cases there was a positive impact on prices *(Kroll & Priestley 1992)*.
5	Rigdon (1991)	Statistical Sales Price Analysis	Transmission lines and the value of recreational land - 128kV power line	Marquette County, Michigan, U.S.	No evidence was found of a relationship between power lines and sales prices of recreational land.
6	Jackson (2010)	Statistical Sales Analysis	Electrical Transmission Lines: Is there an impact on rural land values? 115kV to 345kV	Wisconsin, U.S.	Small discounts that could be attributable to the presence of the lines (1.11% to 2.44%). However these small differences were not statistically significant.
7	Chalmers (2012)	Case study using a combination of appraiser techniques	High-Voltage Transmission Lines and Rural, Western Real Estate Values. 500kV line	Montana, U.S.	"Production Agricultural Lands" – these showed no price impacts from HVOTLs. Interestingly the extent of the encumbrance easement, for which the landowners is compensated, showed no impact on the sale price. "Agricultural Lands with Recreational Influence" – again these showed no influence on price from the 500Kv HVOTL. These were large tracts of land ranging in area from 3,000 acres to 7,943 acres with 76% to 99% of the land being open range. "Agricultural Lands with High Amenity Recreation and Natural Features" – these were unique type properties and no effect was found on sales price from HVOTLs. "Rural Residential Subdivisions – Lot Size Less than 5 acres" – Residential use dominated in these small plots where locating a house away from the 500kV line would be difficult due to the small parcel size. These parcels were in effect house sites with either an easement on the parcel or they were located adjacent to the 500kV line. In addition at the time of these site sales significant numbers of relatively homogeneous sites were offered to the market at the same time. The results were mixed with 3 of the locations showing evidence of a negative price impact from the HVOTL. The impact appeared to average around a 15% reduction. The results were extremely variable with half of the parcels showing no impact and some properties showing large impacts. In another case where a one acre parcel was offered to the market the implied listing price discount equated with the area of the site restricted by the easement. Again the results varied widely with half of the parcels showing no impact. "Rural Residential Subdivisions – Lot Size 5 acres or Greater" – There were six properties in this category ranging from 5 to 30 acres. Evidence suggested 3 suffered a negative impact and 3 did not. The discounts were up to 30%. Some of these parcels had easements traversing them. "Large Acrage Rural Residential Tracts" – These properties ranged from 60 to 591 acres and negative price impacts were not found in any of the cases. "Rural Recreational Tracts/Cabin Sites" – In two of the fourteen cases there was a possible adverse sale price effect but the evidence for this was far from conclusive.

Appendix 16 - Impact of High Voltage Overhead Transmission Lines on Property Values - Summary of Urban Residential Property Research in Main Report

No.	Author & Date	Type of Research	Subject Matter	Study Location	Findings
13	Wolverton & Bottemiller (2003)	Statistical sales price analysis	Further analysis of transmission line impact on residential property values	Sales in King County Washington; Clark County Washington; Washington County Oregon; Clackasnas County Oregon. Lines were varied from 115kV to 500kV.	The results were not statistically significant either in relation to a price effect or price appreciation over time for properties abutting and not abutting an HVOTL right of way. Although not statistically significant the results showed small reductions of -1.4% for King County and -3.2% for Clackasnas County. On the other hand Washington County and Clarke County showed an almost zero impact.
14	Sims & Dent (2005)	National survey of property valuers and statistical analysis of transaction data. A literature review was also included.	High Voltage Overhead Power Lines and Property Values: A Residential Study in the U.K.	Survey of valuers and agents was in the U.K. and transaction study was in Scotland, "Blackwood", Cumbernauld, near Glasgow	Physical proximity and the visual presence of a pylon have a significant and negative impact on value, whereas a ROW created due to the presence of a line to the rear of the house can significantly increase value despite a view of the line itself. The value of property within 100 metres of HVOTL was found to be reduced by 6 - 17% (average 11.5%). Pylon impact was more severe than HVOTL impacts "up to 20.7%" reduction in value versus similar property 250 metres away. House front view of pylon was more negative, -14.4%, versus rear view, -7.1%. Properties with lake or countryside views were more affected. All negative impacts diminished with distance and were negligible at 250 metres. Detached houses were more affected than semi detached houses. In the survey, valuers and agents perceive the reduction to be 5 - 10%.
15	Pitts & Jackson (2007)	Literature review and market interviews	Power Lines and Property Values revisited	Central California, Discovery Bay near Brentwood, Summer Lake near Oakley and Sierra View in Roseville	50% approximately of realtors and appraisers interviewed said they had not observed negative impacts on either residential sale prices or days on market due to the presence of the power lines. They indicated that the major factors affecting sale price of houses included the general economy, interest rates, inventory and neighbourhood amenities. The other 50% of those interviewed indicated that prices were reduced for adjacent homes between 2% and 7% and for properties not adjacent but with a view of the power lines by 0% to 5%. An increase of 0 to 60 days marketing time was also indicated. None of the realtors or appraisers interviewed had observed any negative impact where there was a direct view. Many indicated that any negative impacts would be more evident in a weak market and would diminish when the market picked up.

Appendix 16 - Impact of High Voltage Overhead Transmission Lines on Property Values - Summary of Urban Residential Property Research in Main Report

No.	Author & Date	Type of Research	Subject Matter	Study Location	Findings
16	Chalmers & Voorvaart (2009)	Statistical Sales Price Analysis	High Voltage Transmission Lines: Proximity, Visibility and Encumbrance Effects	Connecticut and Massachusetts. Single family residential houses. 345kV line. 1200 home sales 1998 to 2007 were taken into account.	In the four study areas examined, there was no evidence of systematic effects of either proximity or visibility of 345kV transmission lines on residential real estate values. Encumbrance of the transmission line easement did appear to have a consistent, small negative effect on value, with the negative impact being significant at the 90% or 95% level. There was no evidence to show that effects are greater in a down market but the number of observations in the relevant period were small. There was no evidence to show that higher valued properties were more vulnerable to HVOTL impacts.
17	Jackson & Pitts (2010)	Literature Review	The Effect of Electric Transmission Lines on Property Values: A Literature Review	U.S. and Canada	Reviewed studies were from 1964 to 2009. All studies were published and dealt with empirical data, either survey based data or actual real estate sales data. The conclusion stated as follows: *"The studies reviewed, while having some inconsistencies in their detailed results, generally pointed to small or no effects on sales price due to the presence of electric transmission lines. Some studies found an effect but this effect generally dissipated with time and distance. The effects that were found ranged from approximately 2% - 9%. Most studies found no effect and in some cases a premium was observed. This was attributed to the additional open area usually behind the residence created by the transmission line easement."*
18	Bottemiller & Wolverton (2013)	Statistical sales analysis and a discussion of price appreciation rates over time.	The Price Effect of HVTLs on Abutting Homes	Portland, Oregon and Seattle, Washington. The HVOTLs ranged from 115kV to 500kV	This study consisted of a further study in Portland and Seattle by the same authors as listed above (Wolverton & Bottemiller, 2003). The sales period studied was 2005, 2006 and 2007 which was a sellers market. Price reductions of 1.65% in Portland and 2.43% in Seattle were recorded and both of thse figures were statistically significant. However on further analysis the upper price quartile of the Seattle home sales showed a reduction in value of 11.225%. This segment of the market consisted of houses with a mean sale price of $1,035,105. The negative effect on the lower three price quartiles in Seattle was minimal and it was not statistically significant.

APPENDIX 17 – Impact of High Voltage Overhead Transmission Lines on Rural Property Values – Summary of Research Work Reviewed

Appendix 17 - Impact of High Voltage Overhead Transmission Lines on Rural Property Values

No.	Author & Date	Type of Research	Subject Matter	Study Location	Findings
1	Brown (1976)	Regression Analysis of Sales Data	The Effect of Power Line Structures and Easements on Farm Land Values (1965 to 1970)	Saskatchewan, Canada	No statistical significance found with regard to power lines and land value. Paired analysis of very similar parcels with and without a power line showed an increased selling price for the parcels with power lines. However this positive effect could not reasonably be assumed to be due to the lines *(Kroll & Priestly 1992)*.
2	Mitchel et al (1976)	Attitudinal Survey & Simple Statistics	The Longterm Socio-Economic Impact of an Electrical Prower Transmission Corridor on the Rural Environment: Perception and Reality	Eastern Canada, Waterloo, Ontario	No evidence of any difference in price. 33% of respondents to survey believed that line had a negative effect on property. Study of doubtful reliability, small sample and weakness of approach *(Kroll & Priestly 1992)*.
3	Boyer et al (1978)	Attitudinal Survey & Simple Statistics	The Socio-economic impact of high voltage transmission lines on property values - rural area	Eastern Canada, Southern Ontario - 230kV and 500kV lines	Fewer sales of properties with 500kV lines. Estimated effect of 16 to 29 percent reduction, depending on property size with properties under 10 acres experiencing twice the percentage loss in value of properties over 50 acres. Problems with weakness of basic approach make this analysis of limited value *(Kroll & Priestley 1992)*.
4	Woods & Gordon (1981)	Statistical Analysis of Sales Prices	Study on the Economic Impact of Electric Transmission Corridors on Rural Property Values: Final Report	Ontario, Canada - at six different locations	Land ranged from purely agricultural to land with residential development potential. Large variation by study area. Areas where there was a large level of residential development were found to have statistically significant negative price reductions with the average going as high as a 16.9% reduction in one case. However the purely agricutural land had no statistically significant effect showing up and in two cases there was a positive impact on prices *(Kroll & Priestley 1992)*.
5	Rigdon (1991)	Statistical Sales Price Analysis	Transmission lines and the value of recreational land - 128kV power line	Marquette County, Michigan, U.S.	No evidence was found of a relationship between power lines and sales prices of recreational land.
6	Jackson (2010)	Statistical Sales Analysis	Electrical Transmission Lines: Is there an impact on rural land values? 115kV to 345kV	Wisconsin, U.S.	Small discounts that could be attributable to the presence of the lines (1.11% to 2.44%). However these small differences were not statistically significant.
7	Chalmers (2012)	Case study using a combination of appraiser techniques	High-Voltage Transmission Lines and Rural, Western Real Estate Values. 500kV line	Montana, U.S.	"Production Agricultural Lands" – these showed no price impacts from HVOTLs. Interestingly the extent of the encumbrance easement, for which the landowners is compensated, showed no impact on the sale price. "Agricultural Lands with Recreational Influence" – again these showed no influence on price from the 500Kv HVOTL. These were large tracts of land ranging in area from 3,000 acres to 7,943 acres with 76% to 99% of the land being open range. "Agricultural Lands with High Amenity Recreation and Natural Features" – these were unique type properties and no effect was found on sales price from HVOTLs. "Rural Residential Subdivisions – Lot Size Less than 5 acres" – Residential use dominated in these small plots where locating a house away from the 500kV line would be difficult due to the small parcel size. These parcels were in effect house sites with either an easement on the parcel or they were located adjacent to the 500kV line. In addition at the time of these site sales significant numbers of relatively homogeneous sites were offered to the market at the same time. The results were mixed with 3 of the locations showing evidence of a negative price impact from the HVOTL. The impact appeared to average around a 15% reduction. The results were extremely variable with half of the parcels showing no impact and some properties showing large impacts. In another case where a one acre parcel was offered to the market the implied listing price discount equated with the area of the site restricted by the easement. Again the results varied widely with half of the parcels showing no impact. "Rural Residential Subdivisions – Lot Size 5 acres or Greater" – There were six properties in this category ranging from 5 to 30 acres. Evidence suggested 3 suffered a negative impact and 3 did not. The discounts were up to 30%. Some of these parcels had easements traversing them. "Large Acrage Rural Residential Tracts" – These properties ranged from 60 to 591 acres and negative price impacts were not found in any of the cases. "Rural Recreational Tracts/Cabin Sites" – In two of the fourteen cases there was a possible adverse sale price effect but the evidence for this was far from conclusive.