

Transparency with the Online-Real-Estate-Price-Calculator in Lower Saxony

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Key words: real estate market, ground value, market report, spatial data infrastructure, GDI- project VBORIS, Immobilien-Price-Calculator in Lower -Saxony

SUMMARY

The committees of experts on real estate value in whole Germany and especially in North-Rhine-Westfalia provide standard ground values and general pricing information for developed real estate throughout the country, which is freely accessible via the Internet portal BORISplus.NRW. The information is derived from purchase contracts, which are registered and evaluated by the committees.

The Internet portal “www.borisplus.nrw.de” is based on the German spatial data infrastructure and uses international OGC standards such as WMS and WFS, which means the standard ground values can also be used for the geoportals of private operators.

The initial version, BORIS.NRW, was launched in 2003 and replaced in October 2008 by the redesigned version BORISplus.NRW. 17000 registered users and more than one million hits per month are a sign of high acceptance, not least thanks to a service that is mostly free of charge.

On the way to an other online-Service for valuation, Lower - Saxony created the “Immobilien-Price-Calculator IPC” for standard-typs of single family-houses, row-houses, semi-detached-houses and condominiums. The address: www.gag.niedersachsen.de, the rate 19,90 € per informance of the rough estimate value.

ZUSAMMENFASSUNG

Die Gutachterausschüsse für Grundstückswerte in ganz Deutschland und speziell im Bundesland Nordrhein-Westfalen stellen in dem Internetportal BORISplus.NRW für jedermann flächendeckend Bodenrichtwerte und eine allgemeine Preisauskunft für bebaute Grundstücke bereit. Basis sind die jährlich abgeschlossenen Kaufverträge, die von den Gutachterausschüssen registriert und ausgewertet werden.

Das Internetportal „www.borisplus.nrw.de“ basiert auf der deutschen Geodateninfrastruktur und nutzt internationale OGC – Standards wie WMS und WFS. Dadurch können die Bodenrichtwerte auch in den Geoportalen von privaten Betreibern genutzt werden.

Die erste Version als BORIS.NRW startete schon 2003, BORISplus.NRW ging mit neuem Design im Oktober 2008 ins Internet. 17 000 registrierte Nutzer und über eine Million Seitenaufrufe pro Monat zeigen die große Akzeptanz, die auch auf einem weitgehend kostenfreien Angebot basiert. Auf dem Weg zu einem weiteren Online-Service für die Bewertung von bebauten Grundstücken hat das Bundesland Niedersachsen den „Immobilien-Preis-Kalkulator IPK“ geschaffen. Bewertet werden Standard-Immobilien wie Einfamilienhäuser, Reihenhäuser, Doppelhaushälften und Eigentumswohnungen. Das Portal: www.gag.niedersachsen.de. Der Preis 19,90 € für jede Auskunft in Form eines überschlägig ermittelten Wertes.

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1. COMMITTEES OF EXPERTS ON REAL ESTATE VALUES IN GERMANY

Since 1960 the committees of experts on real estate values in Germany were first introduced by law. Their aim was and still is to provide transparency in the real estate market in order to prevent excessive and erroneous trends.

The special set-up of the committees of experts has proved very successful throughout its history of almost 50 years.

The responsibility for the committee of experts generally lies with the federal state. Each committee of experts covers a town or district, and its members are volunteers who are highly familiar with the real estate market. These are local real estate experts, such as architects, building surveyors, estate agents, experts from banks and sworn experts.

Each committee of experts is supported by an office, which is usually located at the land surveying and cadastral office or the town planning office. The offices receive copies of all real estate contracts that are completed within the respective town, and the relevant information is fed into a purchase price database. This results in a large amount of data, which can be used to deliver mathematic-statistical evaluations for the analysis of the local real estate market. On this basis, the committees of experts have the following tasks:

- provide information on market value based on the purchase price database
- derive data to assess the current real estate market
- produce an annual publication of data in the form of a standard ground value map and a real estate market report
- prepare valuation reports on fair market value and rent value

The responsibility for organisation and task distribution lies with the 16 federal states, each using their own organisational model. North Rhine-Westphalia currently has 79 committees of experts, based at the offices of the city and district councils.

2. BUILDING A SPATIAL DATA INFRASTRUCTURE IN GERMANY

In 2003, the German federal government decided to build a national spatial data infrastructure.

This is controlled by a steering committee, in which the different levels of government are represented.

The spatial data infrastructure in Germany (SDI-DE) is a joint project of the federal, state and local governments. The aim of the SDI-DE is to establish a nationwide and cross-departmental network of spatial data in Germany to ensure that geoinformation will become a more important factor in decision-making processes in the administrative, economic and

political sectors. Apart from the monitoring of national trends, the SDI-DE will also observe developments at a European (INSPIRE) and global (GSDI) level.

The SDI-DE steering committee has the following tasks (www.gdi-de.org):

- develop a concept for an open SDI in Germany that will form part of a future European spatial data infrastructure. [GDI-DE, 2007]
- control and coordinate the measures taken by state, local and federal governments in terms of the development, continuation and implementation of standards in European and international spatial data infrastructures.
- define model projects for the implementation of networked spatial data portals in Germany, based on the principle “some for all”.
- ensure the compulsory provision of the national geodatabase (NGDB) by the public authorities at federal, state and local level.

3. THE “BORIS.NRW” PROJECT

With the arrival of the Internet at the end of the 90s, the committees of experts faced the challenge of using this new medium for the provision of real estate data. For this purpose, a project group was formed in NRW in 1998. A link portal was set up to collate the addresses and services of the 79 committees of experts on real estate value in NRW. Some of these also provided their standard ground value maps as scanned tiles via the Internet.

The major breakthrough came with the creation of the standard ground value information system BORIS.NRW in 2003 (“BOdenRIchtwertinformationsSystem NRW”).

BORIS.NRW includes the following essential elements:

- One common Internet portal to access all standard ground values in NRW. It allows an address search by municipality, street name and house number or a geographical search by a series of scales of different official maps.
- For each selected address the user receives a map section containing details of the relevant standard ground values.
- The explanatory characteristics of the standard ground value can be activated through additional functions (left mouse button, pop-up window).
- The user has the option of selecting one of the following map backgrounds:
 - German Base Map 1:5000
 - Digital Topographic Map 1:10000
 - Topographic Map 1:50000
 - Local map 1:10000/20000.
- The standard ground values plus characteristics can be accessed free of charge.
- It is also possible to purchase an “official” printout of the relevant section of the standard ground value map including explanations on letter-headed paper.

- The real estate market report is available online as a PDF document – either as a free, general version (market transparency for everyone), which can be downloaded free of charge, or as a full version (required valuation data for experts), subject to charge.
- Access to items available on BORIS.NRW that are subject to charge requires a one-off registration with the Centre for Geoinformation of the federal state of NRW and the allocation of a user identification by email. Once these steps have been completed, the user can access the relevant data using his/her password and will be charged according to the cost of the information downloaded.
- A standardised dataset of the standard ground values (BORi.xls) is available nationwide. This is published by the committees of experts on an annual basis.
- The dataset BoRi.xls is an independent product, which and can be purchased and used by third parties, subject to a licence agreement.
- In terms of the marketing of the BoRi.xls dataset, the Internet is only used for advertising, and sales are processed via the usual channels.

Since its launch, BORIS.NRW has become the most successful e-government project of the federal state of NRW. 17000 users have registered to purchase services through the website, and more than one million hits are recorded every month.

BORIS.NRW contains standard ground values, i.e. market information on undeveloped real estate. It does not provide any information on real estate that has already been developed. However, this has now changed with the introduction of the enhanced version BORISplus.NRW in 2008, which informs users about price levels of single-family residences and condominiums in NRW.

4. THE ENHANCED VERSION “BORISplus.NRW”

Five years after BORIS.NRW was launched, it was time for the Internet presence to be redesigned, for three reasons:

As the demand for real estate market data of condominiums and single-family residences increased, standard ground values alone were no longer sufficient.

The technical concept of BORIS.NRW was conceived between 2001 and 2002 – at a time when spatial data infrastructures were only developed conceptually, and standards such as those of the OGC had not yet been sufficiently defined and established. For this reason, BORIS.NRW was based on a proprietary design; maps, data and services were encapsulated within the programme. From 2004, federal and state governments agreed to develop model projects for implementing the national spatial data infrastructure. One of these model projects (in addition to the project “protected areas”) was the creation of a national information system for standard ground values. The project was successfully launched in NRW and was to be expanded to the remaining federal states. The project, called “networked standard ground value information system” (VBORIS), defined the integration of standard ground value information into a spatial data infrastructure.

These new concepts were implemented through BORISplus.NRW. Based on an open spatial data infrastructure, it uses standardised architectures such as WMS, WFS, WCS etc. The data model of the standard ground values conforms to the national standard. The background maps for the presentation of standard values and purchase prices are available from spatial data servers on the Internet.

The thematic data of the standard ground values can be made available to other users for application in their real estate portals, subject to the relevant licence agreement.

4.1. Information on standard ground values of undeveloped real estate

Standard ground values are determined on an annual basis by the committee of experts. The values are based on a statistical analysis of completed purchase contracts for undeveloped real estate. The contracts are categorised in terms of the characteristics that determine their value (size, usability...) and are then assigned a standard value.

Information available on BORISplus.NRW can be accessed by entering an address (house number) or a cadastre (parcel). The map section contains details on the standard ground values of the surrounding areas. A mouse click on the value opens another window, which shows the relevant characteristics. The standard ground value of the real estate can be determined with a certain amount expertise by analysing the standard ground values of the surrounding areas.

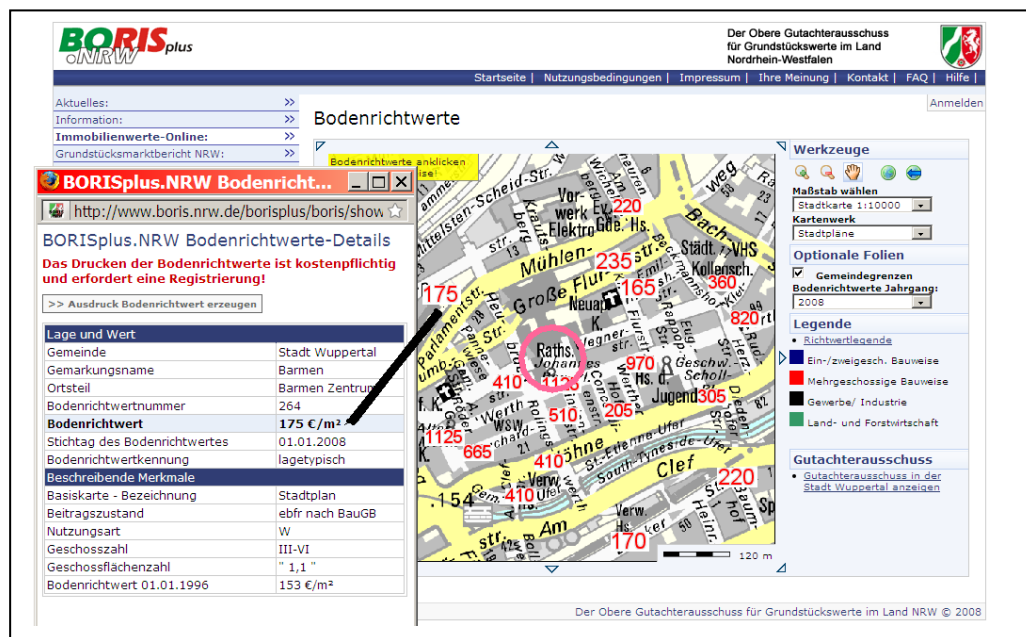


Figure 1: Screenshot of standard ground value information (www.borisplus.nrw.de)

4.2. General pricing information on developed real estate

The general pricing information is based on a specific database search. The committees of experts receive all purchase contracts completed within their areas – for NRW the number of contracts amounts to approx. 150000 per year. A database search allows the selection of specific purchase contracts, which most closely match the selection criteria.

Possible criteria may include:

Address (town, part of town)

Type of property (condominium, terraced house...)

Location

Year of construction

Fittings and fixtures

Size

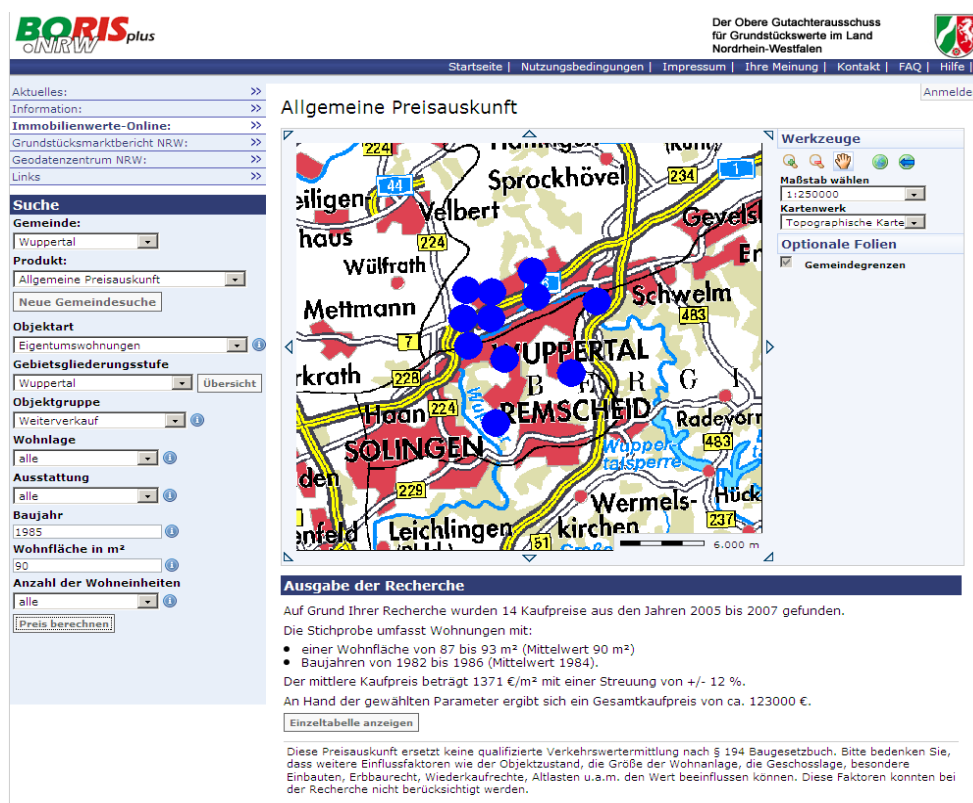


Figure 2: Screenshot of general pricing information (www.borisplus.nrw.de)

The screen shows the result of the database search as a mean value, plus sample size and standard deviation. For reasons of data protection, the locations of sample cases are anonymised for the purpose of this search.

The search, including the on-screen information, is free of charge; a PDF printout may be purchased. For billing purposes, the user is requested to complete a one-off registration process. Monthly bills are issued by the Centre for Geoinformation NRW.

This pricing information cannot replace a qualified valuation according to legal requirements, as it does not take into account all value-specific factors and no site surveys are carried out.

5. LOOKING AHEAD IN WHOLE GERMANY

With the reform of the German Inheritance Tax Law, which took effect on 1 January 2009, the committees of experts face new tasks when it comes to valuating real estate.

With the Internet portal BORISplus.NRW we have created a platform that can provide even more data prepared by the committees via online access. Our goal for the next few years is therefore to use this platform to provide more, specific data required for valuation by real estate experts in a simple and cost-effective way.

5.1 Lower-Saxony goes online with “Immobilien-Price-Calculator IPC”

In 2007, the committees of experts on real estate values in Lower Saxony developed a brand new service to use and provide data of the real estate market. In addition to the standard ground values the submarkets of the developed properties and rented flats should be presented with transparency for everyone. For this purpose, a price information system was evolved for properties with single family houses and houses with two apartments as well as for condominiums - the Online Real Estate Price Calculator. This version will be enlarged in the near future in order to include also properties for twin houses and terraced houses.

The keynote of the Online Real Estate Price Calculator is the specific preparation and consolidation of the real estate market data of the local committees of experts on real estate values. The regression calculation is the basis for these programmes which calculate a price level for nearly every developed standard property in Lower Saxony. The price is calculated by applying only a few user data on the basis of comparing factors from the regression analysis. The calculation does not include detailed information about the property of valuation. With the help of these few essential data each citizen is now in a position to determine a price level in an independent, rapid and direct way at any time possible.

In order to offer a homogeneous system for the price calculation throughout Lower Saxony, the committees of experts on real estate values defined common parameters for the appraisal of developed properties. In this connection, the year of construction and the living space of the building as well as the location and the size of the property turned out to be decisive criteria. These four characteristics are the basis for the online price calculation. Using the price calculator, these characteristics must follow the parameters of the sample which has been taken as a basis. Hence the valuation of exceptional properties is normally not possible. For the calculation, individual characteristics of the condition and the equipment can be considered as little as the need of rehabilitation or modernisation of properties. Besides, legal restrictions of properties are not taken into consideration for the analysis. Prices for properties with ancient assets as well as for properties with very small or huge living spaces or plots

cannot be established by the online price calculator, either. The user must be aware of these facts. The application is limited to highly homogeneous submarkets and provides only the price level for an average property without considering specialities which could have an impact on the value.

All in all, the Online Real Estate Price Calculator offers a user-friendly and low-cost online access to individually conditioned market data of properties in terms of average price levels of developed properties. After the introduction phase the price is 19.90 € for an individual information, but it is also possible to place a subscription.

First evaluations prove that not only house owners but also credit institutions and estate agents especially appreciate the application spectrum of the Online Real Estate Price Calculator. During the testing phase in the first half of 2008, the price calculator was consulted about 150 times per day on average.

It should be specifically noted that the result does not correspond to a market value which is defined according to Article 194 of the German Federal Building Code (BauGB). The determined price level is not binding and rounded up to the nearest ten thousand Euros. The online information cannot and shall not replace the traditional valuation report of the market value. It is not a result from the purchase price collection, either. The Online Real Estate Price Calculator is just an additional information system which offers the customer a well directed, but only rough estimation of the price level of the concerned property.

5.2. Online Calculation of a Price Level

The Online Real Estate Price Calculator can be found on the Internet page of the Lower Saxony committees of experts on real estate values: www.gag.niedersachsen.de / section "Service". The home page offers at first some introducing information about the calculation programme and basic comments on the application as well as on the meaning and use of the results.

The first of four programme steps asks the user to enter the address of the property which should be valued. This information is compared with the existing geographic data. With the help of the supplied address it is determined whether a standard ground value and a statistical regression analysis exist for this item. If this condition is fulfilled, the next step is to query the parameters of the standardised values like year of construction, living space and - for single family houses and houses with two apartments also the size of the property (see figure 1). Of course, the different possibilities of the data input are limited to the range of parameters of the transferred sample whereby the user obtains precise limit values for the calculation.

If all conditions for the calculation are fulfilled and successfully verified, the penultimate step requires the declaration of consent to the terms of use and then the confirmation of the entered data (see figure 4). After the price level has been calculated in the background of the programme, the result is finally presented. As illustrated in figure 5, the calculation programme offers additionally to the price level also information about the value as well as an explanation of the result and an extract of the corresponding standard ground value map.

Adresse http://www.gag.niedersachsen.de/master/C41222619_N26101952_L20_DO_17540589.html?

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Immobilien-Preis-Kalkulator

Schritt 2/4: Eingabe der Objektdaten

Objektart: **Freistehendes Ein-/Zweifamilienhaus**

Ort/Gemeinde: **Wolfenbüttel, Stadt**

Straße: **Neuer Weg**

Hausnummer: **0022**

Geben Sie bitte das Baujahr, die Wohnfläche und die Grundstücksfläche ein und beachten Sie, dass die Eingabe innerhalb der zulässigen Eingabebereiche liegen muss.

Baujahr: zulässiger Eingabebereich (von 1950 bis 2002)

Wohnfläche: m² (von 52 bis 250 m²)

Grundstücksfläche: m² (von 290 bis 1500 m²)

Neue Eingabe Zurück Beenden Weiter

Figure 3: Screenshot of Input of Property Data for Price Calculation

Adresse http://www.gag.niedersachsen.de/master/C41222619_N26101952_L20_DO_17540589.html?

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Immobilien-Preis-Kalkulator

Schritt 3/4: Überprüfung der Eingabedaten

Überprüfen Sie bitte Ihre Eingabedaten:

Objektart: **Freistehendes Ein-/Zweifamilienhaus**

Ort/Gemeinde: **Wolfenbüttel, Stadt**

Straße: **Neuer Weg**

Hausnummer: **0022**

Baujahr: **1970**

Wohnfläche: **120 m²**

Grundstücksfläche: **800 m²**

Die Ermittlung des Preisniveaus ist mit diesen Eingaben möglich.

Die [Nutzungsbedingungen](#) habe ich gelesen und erkläre mich damit einverstanden.

Einzelauskunft Abonnement

Zurück Beenden

Figure 4: Screenshot of Verification of Entered Data and Declaration of Consent to Terms of Use

5.3 Example: Calculation of the Price Level of a Real Estate

Following example, the price level of a property with a singly family house within the Country of Wolfenbüttel, should be determined with the help of the Online Real Estate Price Calculator of the committees of experts on real estate values of Lower Saxony (GAG). The procedure of the online price calculation has been described in details in the preceding chapter. An example of the calculation method of the Online Real Estate Price Calculator will follow below:

Property of Valuation (fictitious; without any personal reference):

Single Family House at Wolfenbüttel
Street Address: Neuer Weg 22

After the address has been entered the Online Real Estate Price Calculator determines the standard ground value zone with the help of the corresponding geographic data and derives the value for the calculation. According to the indicated address a property with a single family house at Wolfenbüttel has a standard ground value of 125 €/m².

Valuation Data:

	User Data	Calculation Data	Calculation Unit
Year of Construction(BAUJ)	1970	7.0	(BAUJ-1900)/10
Living Space (WOFL)	120 sqm	1.2	100 sqm
Size of Property (FLAC)	800 sqm	8.0	100 sqm
Standard Ground Value (LAGE)	125 €/sqm	1.25	100 €/sqm
Date of Purchase (DATU)	2008	18.0	Year of Purchase -1990
Purchase Price / Living Space	Target	Target	100 €/ sqm

After the valuation data have been sent to the calculation programme, the valid regression function starts in the background of the programme. The following regression function of the committees of experts on real estate values Braunschweig is valid for the property of valuation:

$$\begin{aligned}
 \text{Zielgröße}^{E_Z} = & A + K_{1D} \cdot \text{DATU}^{E_{1D}} + K_{2D} \cdot \text{DATU}^{E_{2D}} + K_{3D} \cdot \text{DATU}^{E_{3D}} + \\
 & K_{1B} \cdot \text{BAUJ}^{E_{1B}} + K_{2B} \cdot \text{BAUJ}^{E_{2B}} + K_{3B} \cdot \text{BAUJ}^{E_{3B}} + \\
 & K_{1L} \cdot \text{LAGE}^{E_{1L}} + K_{2L} \cdot \text{LAGE}^{E_{2L}} + \\
 & K_{1F} \cdot \text{FLAC}^{E_{1F}} + K_{2F} \cdot \text{FLAC}^{E_{2F}} + \\
 & K_{1W} \cdot \text{WOFL}^{E_{1W}}
 \end{aligned}$$

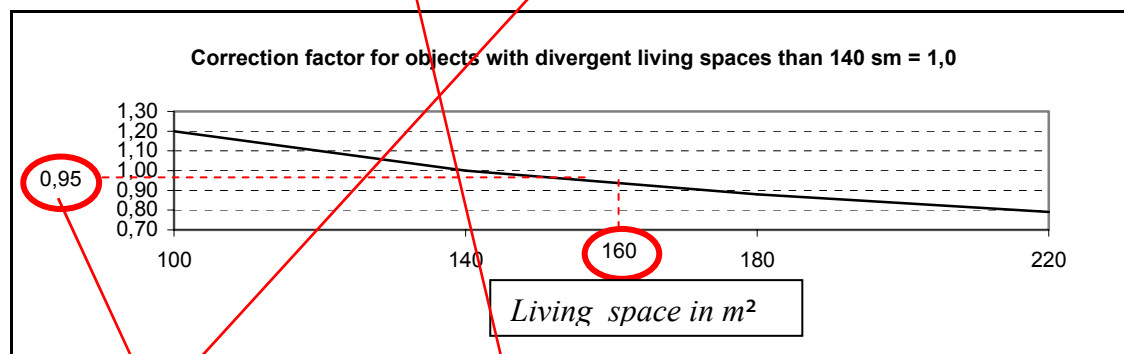
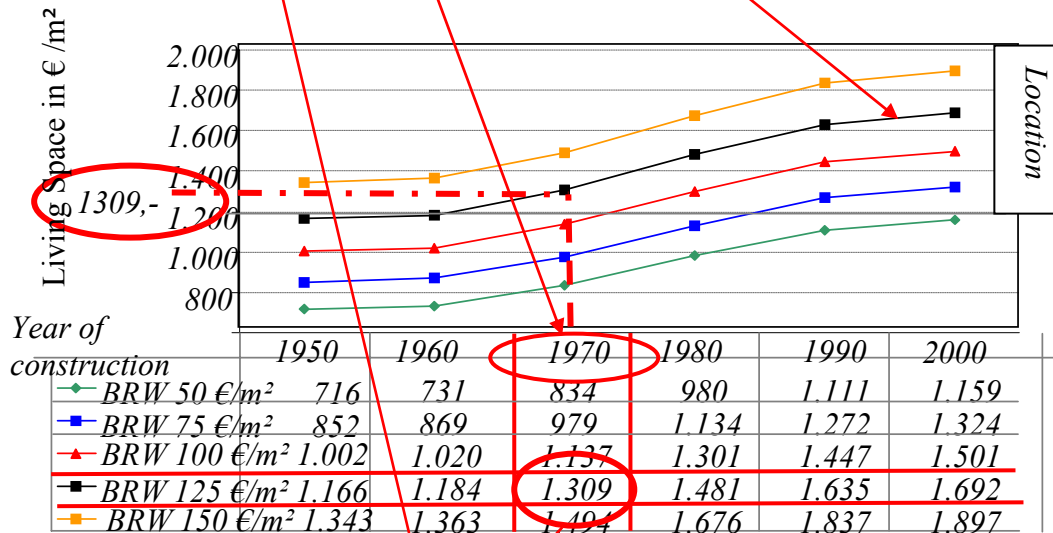
K_{ij} : Regressionskoeffizient i der Einflußgröße j
 E_{ij} : Exponent i der Einflußgröße j
 A : Absolutglied

Example for determination of comparison-value with the informations in the "Report of Real Estate", specially for "One-family-houses in Wolfenbüttel" with the following attributes:



- Year of construction 1970
- Standard ground value 125,- €/m²
- Living size 160m²

Comparison-factors for one-family-houses in Wolfenbüttel, dependend on „year of construction“ and „Location“ in form of „Standard Ground



Calculation of Comparison-Value:

$$1309, \text{ €/m}^2 \times 0,95 = 1243,55 \text{ €/m}^2 \times 160 \text{ m}^2 \text{ Living space} = 198.968,- \text{ €} = \text{rd. } 200.000,- \text{ €}$$

Using the corresponding coefficients of regression, exponents and calculation data of the valuated property the following multiple regression formula is valid:

$$\left(\frac{\text{KP}}{\text{WOFL}}\right)^{0,6} = 57,248 - 9,936 \cdot 18 + 0,650 \cdot 18^2 - 0,014 \cdot 18^3 + \\ 3,782 \cdot 7 + 0,545 \cdot 7^2 - 0,024 \cdot 7^3 + \\ 1,349 \cdot 1,25 + 0,073 \cdot 1,25^2 + \\ 0,220 \cdot 8 + -0,010 \cdot 8^2 + \\ 3,811 \cdot 1,2^{-0,4}$$

The regression result shows the relation of the purchase price to the living space:

$$\left(\frac{\text{KP}}{\text{WOFL}}\right) = 1.356,97 \frac{\text{€}}{\text{m}^2}$$

Multiplying this result with the living space shows the requested price level:

$$\text{Preisniveau} = 1.356,97 \frac{\text{€}}{\text{m}^2} \cdot 120 \text{ m}^2 \\ = 162.836 \text{ €} \\ \approx \underline{\underline{160.000 \text{ €}}}$$

The calculated value must be rounded up to the nearest ten thousand Euros, as the result refers to a fictitious property with a developed single family house with an average equipment; further conditions which could have an impact of the property value have not been taken into consideration.

6. RESULTS OF REGIONAL REAL ESTATE MARKETS

With the help of the Online-Real-Estate-Price-Calculator one is able to get comfortable Information about price levels of single family homes, house with two apartments as well as condominiums. This can be done with the help of specific, rehashed comparing factors that are published by real estate market reports. The application is fairly easy even for amateurs. All that needs to be entered is the address and characteristics that most likely influence the real estate price of the affecting property. Those characteristics include the year of construction as well as the area or living space. The influence of the location of the affected property and the land value is determined by the Online-Real-Estate-Price-Calculator through georeferenced standard ground value map of the committee. In order to do so the standard ground values are divided with the help of a digital land register map, so the correct land value can be allocated with each address.

Result of the online calculation is the price level for a certain real estate with property data of compatible real estate with average features and condition. This information cannot substitute an expert opinion of valuation but it gives every citizen the opportunity to find out information about the price level of a developed site in Lower Saxony, for just 19,90 €.

Within a short time it will be possible to enlarge the calculation of real estate also for row houses and semi-detached-houses.

Thereby Online-Real-Estate-Price-Calculator will create even more transparency of the real estate market of Lower Saxony. This project has already been honoured and placed third at the “GIS Best Practice Award 2008“, from German Association of Surveying (“Deutscher Verein für Vermessungswesen”; DVW).

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BIOGRAPHICAL NOTES

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Chairman of DVW-Arbeitskreis 6 “Immobilienwertermittlung”
Member of FIG - Commission 9 „Valuation and Management of Real Estate”
Chairman of FIG Working Group 9.5 “GIS and Valuation”

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