Experiences of the 3D Cadastre Legislation

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Key words: 3D real property units and 3D real property space, experiences during 2.5 years, specific conditions, the cadastral system.

SUMMARY

A new legislation for multi-dimensional real property formation (3D Cadastre) came into force in Sweden on January 1 2004. The act is considered to be the most important basic change that has taken place in Swedish cadastral legislation during the past 30 years.

In Sweden, multi-dimensional real property units are created through a cadastral procedure. An application for implementation of such a procedure must be made to a Cadastral Authority. Before the application for real property formation is approved, a cadastral surveyor evaluates whether the general requirements concerning suitability and the specific conditions regulating multi-dimensional units are satisfied.

The Act has now been active for 2.5 years and what experiences can be drawn from it? There has been a genuine interest for 3D real property formation and the Act has functioned very well. It has been estimated that about 100 multi-dimensional property units were formed during the first year. However, this was shown to be an optimistic prediction. Since the introduction, there have been 90 multi-dimensional property units formed in totally 75 cadastral survey procedures.

So far the legislation for multi-dimensional units has not been adopted in a broader sense in an infrastructural context. Recently, however, new infrastructural projects have been initiated using the legislation.

Although the 3D legislation offers many new possibilities for property formation, it has been shown that it takes time for full awareness of the significance and value of the new legislation to develop. There is however a great interest in this type of real property formation.

In this paper we will briefly present the multi-dimensional legislation and describe how such units are registered in the cadastre. Some interesting cases concerning multi-dimensional properties are discussed.

SUMMARY IN SWEDISH

Den 1 januari 2004 trädde nya lagregler om tredimensionell fastighetsindelning (3D) i kraft i Sverige. Lagändringen betecknas som den största principiella förändringen inom den svenska fastighetsrätten på 30 år.

I Sverige bildas tredimensionella fastigheter genom lantmäteriförrättning. Ansökan om fastighetsbildning för en tredimensionell fastighet lämnas till lantmäterimyndigheten. När lantmäteriförrättningen påbörjas bedömer lantmätaren om en lämplig 3D-fastighet kan bildas samt om de särskilda reglerna för den tredimensionella fastigheten är uppfyllda. Beslut fattas av lantmätaren och förrättningen redovisas i fastighetsregistret när den vunnit laga kraft.

Vilka erfarenheter kan dras efter de första 2.5 åren som de nya lagreglerna om tredimensionella fastigheter varit tillämpliga? Intresset för 3D-fastigheter har varit stort och lagreglerna har kunnat tillämpats i huvudsak på tillfredsställande sätt. Under det första året som lagreglerna tillämpades bedömdes att cirka 100 tredimensionella fastigheter skulle bildas. Detta var dock en alltför optimistisk uppskattning. Sedan den 1 januari 2004 har nu, efter 2.5 år, 90 tredimensionella fastigheter bildats vid totalt 75 förrättningar.

En erfarenhet är att under de första åren med har inte 3D-fastighetsbildningen använts i större projekt rörande infrastruktur, men nyligen har även sådana projekt initierats.

De nya reglerna om 3D-fastigheter erbjuder många nya möjligheter vid fastighetsbildning och fastighetsförvaltning. Det har dock visat sig att det tar tid för marknadsaktörerna att ta till sig de nya lagreglerna och se nya tillämpningar, även om intresset från aktörerna är stort.
I föredraget presenteras kort den tredimensionella lagstiftningen. En genomgång av hur 3D-fastigheter redovisas i fastighetsregistret görs. Exempel på hur lagstiftningen har använts hitintills presenteras också i några praktikfall.

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A NEW MULTI-DIMENSIONAL INFORMATION SYSTEM INTRODUCED IN SWEDEN JANUARY 1st 2004

1. INTRODUCTION

To facilitate an understanding of the background to the new legislation for multi-dimensional information system, an overview description will first be given of the Swedish cadastral system and its connection with division into property units, as well as of the cadastral procedure for creating and changing real property units. An account will also be given of certain rights in land and of the interaction between property subdivision and political control of land use.

1.1 The Swedish Cadastral System

The first cadastral system in Sweden was created in the 17th century. The purpose was to establish a base for real property taxation. In 1628 Lantmäteriet (the National Land Survey of Sweden) was established.

All land in Sweden and, in principle, also all water areas, are divided into property units or joint property units. This means that there is a comprehensive division into property units entered in the Swedish Real Property Register. There are no unregistered public areas. The only areas not included in property subdivision are those comprising public water areas, which are in the sea and in four of Sweden's largest lakes.

The Swedish cadastral system consists of the Land Law, the Real Property Formation Act, the Utility Easements Act, the Joint Facilities Act, the Land Survey Code and the Real Property Register, which includes the Land Register. The Swedish cadastral system is considered to be a well-functioning, straightforward, efficient and secure system for all concerned parties.

1.2 The Land Law and The Real Property Formation Act

The formation and re-formation of property units in Sweden can only be carried out through an official decision. Changes to property division are normally made through a cadastral procedure under the Real Property Formation Act. This is the responsibility of the public cadastral authorities. There are both national and municipal authorities of this kind and the national responsibility is vested in Lantmäteriet.

The current Land Law and Real Property Formation Act were introduced in 1972**;** the legal structure is, however, still modern and logical. Together with the Planning and Building Act

(1987) and the Environmental Act (1999), the government has also created a number of other valuable instruments for implementing its land policies.
The Real Property Formation Act covers subdivision, reallotment, amalgamation, re-establishment of property boundaries, registration etc. The law is applied in both urban and rural areas and is a powerful tool that authorises the cadastral surveyor to make decisions concerning changes in the division of land, even those that are not voluntary.

The view taken in Sweden is that the division of land into property units shall reflect the current use of the land. Thus property units cannot be freely formed, and this is reflected in the provisions of the Property Formation Act, which require property units to be deemed suitable for their intended use and sustainable on a long-term basis. When a property unit is formed for housing purposes, for the construction of a dwelling house to be approved there must be access to a road, it must be possible for the building to be supplied with water and sewerage services and so on. Similarly, it is not normally possible for a new housing property to be formed next to an environmentally disruptive facility. Further, it is stipulated that property units may not be formed at variance with existing plans or other land-regulatory provisions. For example, shoreline areas in Sweden are under general protection, so as to make them accessible for the general public. Property units may not be formed in these areas if this would thwart the purpose of the provisions. The regulations for land policy sometimes also preclude partial transfers of property units.

The law includes compulsory purchase and, therefore, the cadastral survey process is frequently used in infrastructure projects instead of time-consuming expropriation processes.

1.3 The Cadastral Process

The activities of the cadastral authorities are regulated - as mentioned earlier - by the legislation in the Real Property Formation Act, the Utility Easements Act and the Facilities Act. A cadastral surveyor carries out cadastral procedures. A cadastral procedure differs from a judicial procedure in that the cadastral surveyor, independently, has the task of investigating and taking decisions concerning the suitability of the measures to be taken. This includes carrying out investigation, contacts with landowners and liaison with relevant public authorities. The latter is required in order to obtain supportive documentation for assessing the compatibility of the intended measures with planning requirements for the area concerned. Within the framework of a cadastral procedure the cadastral surveyor can engage other outside experts, for example to compile background material for complicated compensation decisions or to plan infrastructure such as roads.

Regulations concerning the formation and re-formation of property units are contained in the Real Property Formation Act. There are three distinct procedures for the formation of new property units: subdivision, partition and amalgamation. There is only one re-formation procedure, namely reallotment. Reallotment, however, can embrace several different changes. Land can be transferred from one property unit to another, which can involve major reallocation or the relocation of boundaries between property units. Reallotment can also be used as a means for forming joint property units and amending participation in them. It is also

a means for forming, amending and cancelling easements. In addition, the Property Formation Act contains provisions regarding property definition whereby the extent of a property unit can be determined, for example as regards the correct alignment of a boundary or the existence of an easement.

Cadastral procedure can be used for taking certain coercive decisions, such as procurement of land for streets within areas subject to a detailed development plan or for giving one property unit the right to construct a road across another unit against the wishes of the owner of the servant property.

Property formation procedures are documented in cadastral documents, which normally comprise minutes together with a description of the property formation and a cadastral map. When a cadastral procedure has gained force of law, an entry to this effect must be made in the Real Property Register. A cadastral procedure is deemed to be complete when this entry has been made.

A cadastral survey starts with an application for a survey to be carried out. Normally, the survey will involve only a few persons but, in some cases, as many as several hundred persons may be involved. The process consists of following components:

- Application
- Investigation
- Meeting (negotiation)
- Field survey, measuring/demarcating boundaries
- Decisions (juridical, economic and technical)
- Registration.

It is often necessary for the cadastral surveyor to carry out his/her own investigations. During meetings with the parties (the applicants, neighbours and others), the surveyor will encourage those present to become involved in the process with the aim of reaching a decision which can be accepted by all parties. Participation in meetings is not compulsory in "easy" cases. All decisions must be based on the law, land policies and regulations and taken in consultation with the local authority, the County Administration Board and different sector agencies such as the National Road Administration.

If, when all concerned parties have been heard, the investigation shows that it is possible to carry out the survey, the surveyor can take decision concerning both the new subdivision of land and other questions such as easements, economic matters, new boundaries etc. The surveyor is also responsible for securing the interests of creditors where there are mortgages.
The surveyor must be totally impartial and independent and his/her decisions must be fair and take into consideration the needs of both society and the concerned parties. In addition to being responsible for implementation, the surveyor is also responsible for preparing a budget for the procedures. If any of the parties is dissatisfied with the Cadastral Authority's decision, an appeal must be lodged within four weeks.

2. EXPERIENCES OF THE 3D CADASTRE LEGISLATION

2.1 Introduction (Abstract)

A new legislation for multi-dimensional real property formation (3D Cadastre) came into force in Sweden on January 1 2004. The act is considered to be the most important basic change that has taken place in Swedish cadastral legislation during the past 30 years.

In Sweden, multi-dimensional real property units are created through a cadastral procedure. An application for implementation of such a procedure must be made to a Cadastral Authority. Before the application for real property formation is approved, a cadastral surveyor evaluates whether the general requirements concerning suitability and the specific conditions regulating multi-dimensional units are satisfied. Decisions are finally registered in the Real Property Register. A multi-dimensional unit can, as a "traditional" real property unit, be purchased and have registered ownership and be mortgaged. No special problems have been encountered when purchasing multi-dimensional units. In the beginning some investors were somewhat hesitant.

The Act has now been active for 2.5 years and what experiences can be drawn from it? There has been a genuine interest for 3D real property formation and the Act has functioned very well. It has been estimated that about 100 multi-dimensional property units were formed during the first year. However, this was shown to be an optimistic prediction. Since the introduction, there have been 90 multi-dimensional property units formed in totally 75 cadastral survey procedures. The 3D real property units have been created for the following purposes: 35 dwelling projects, 25 commercial activities, 12 industries, 8 underground storage, 5 bridges and 5 major infrastructural projects. About thirty cadastral procedures are at present in progress and fifty projects are in pipeline although no application for cadastral procedures has been made.

So far the legislation for multi-dimensional units has not been adopted in a broader sense in an infrastructural context. Recently, however, new infrastructural projects have been initiated using the legislation. Examples are the railway tunnel under Stockholm and underground stations and garages. Although the 3D legislation offers many new possibilities for property formation, it has been shown that it takes time for full awareness of the significance and value of the new legislation to develop.

2.2 The Multi-Dimensional Legislation

A report proposing the introduction of multi-dimensional division into property units was submitted to the Government in 1996 by a Commission whose full report was presented in the official publication SOU 1996:87. The new legislation came into force on January 1st 2004.

The regulations for the formation of multi-dimensional property units have been incorporated into the existing legislation, in particular the Land Law and the Property Formation Act. This

means that multi-dimensionally defined property units will normally be formed through a cadastral procedure and will be subject to land policy requirements in the same way as other property units. Regulations concerning easements and other property-related rights will apply to them in the usual way. The intention is that only a few special regulations will be needed for this type of property unit. Formation and alterations will follow procedures similar to those that apply for other property units.

2.2.1. Certain Specific Conditions

A number of specific conditions must be satisfied before permission to form multi-dimensional units is granted. One stipulation is that the property units must contain, or be destined to contain, a building or some other facility and not consist merely of air or a volume of rock, se figures below.

A multi-dimensional property unit need not consist of a whole building or facility: it can also

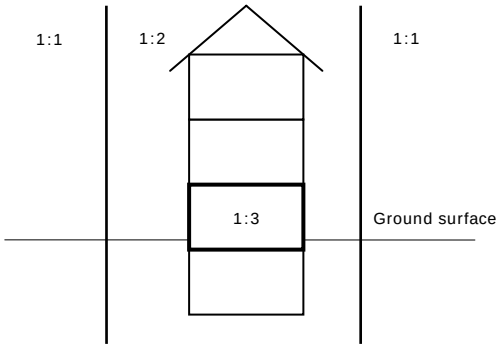

Figure 1. The multi-dimensional real property unit concept (1:3).

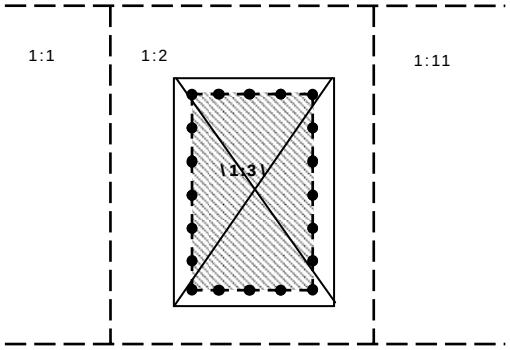

Figure 2: A multi-dimensional real property unit as shown on the Cadastral Index Map.

comprise part of a building or some other facility. This means that a building can be divided up into different, stackable property units always provided that these units, like other property units, are judged to be suitable for their stated purpose. A mandatory provision is, however, that a 3D property unit must be assured of access to the ground surface. This access can be secured through the creation of easements when the property unit is formed or, when several property units are to have common access, through the formation of a joint facility. Examples of units which would not be accepted as suitable for the formation of 3D property units are a property unit consisting of a rock cavern with no access to the ground surface or the upper part of a building without access to a lift or a staircase.

An important limitation in the legislation concerns the possibility to form multi-dimensional property units for housing purposes. A property unit cannot be a space consisting of only one dwelling unit and therefore the legislation does not permit the creation of strata titles. The political view in Sweden is that ownership of apartment units should not be permitted. A multi-dimensional real property unit for dwelling purpose can only be created if it comprises at least five dwelling units. However, dwellings can be included in a multi-dimensional

division into property units. Part of a building containing at least five dwelling units can constitute a 3D property unit. A building can, for example, be divided in such a way that an underlying part with commercial premises constitutes one property unit, the part above it, consisting of office, constitutes a second property unit and a third part above the office property consists of a property unit containing dwelling units.

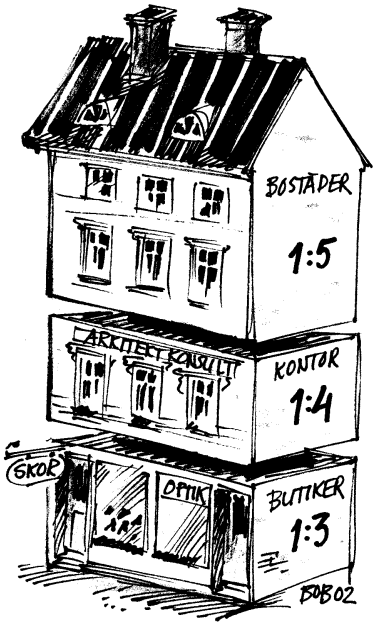

Figure 3: Multi-dimensional real property unit for dwellings (1:5), office (1:4) and commercial purposes (1:3).

The fact that a 3D property unit must comprise a building or other facility or a part thereof does not mean that the property unit has to be developed when it is formed. During a transition period property units that consist of air space or unused space below ground can be permitted. To as far as possible ensure that a planned building will be constructed, a building permit must be obtained. Furthermore, the division into property units must conform to the building permit documents. Obtaining building permission is, however, no guarantee that the building development will take place or that the property units formed will have a tangible content. The legislation therefore includes special provisions that makes it possible to delete multi-dimensional property units which do not satisfy the requirements stated in the legislation. Without these special regulations for dealing with underdeveloped three-dimensional property units it would be possible to create “air space.” In addition to being applicable when a building or facility has not been erected, the regulations can also be used to handle situations where a building or facility has been destroyed, for example by fire. The regulations can be applied to cancel or re-form unutilized property units. It is the cadastral surveyor who sets the timeframe within which the current unit will be finalised or, if not finalised, cancelled.

It is also possible for new property units to be created using three-dimensional spaces from several different property units. "Trans-boundary" property units of this kind can be formed below ground, for example by constructing underground storage or parking facilities beneath

several different property units or where one storey of a building is to be added to a building on the neighbouring property unit (see figure 4 and 5).

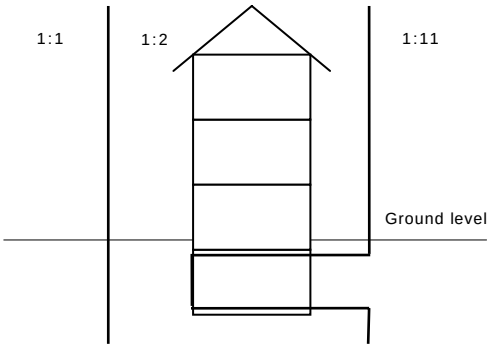

Figure 4: The concept of a multi-dimensional real property space (1:11) within a neighbouring real property unit (1:2).

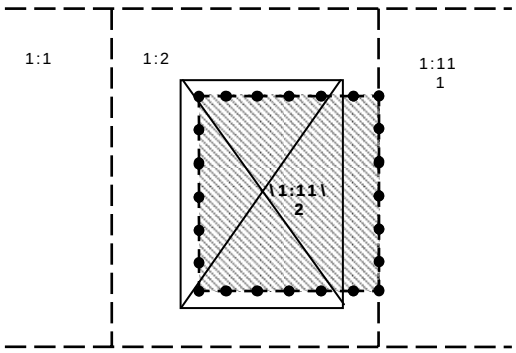

Figure 5: A multi-dimensional real property space (1:11) as shown on the Cadastral Index Map.

2.2.2 Co-operation between Multi-Dimensional Property Units

Even prior to the introduction of the new legislation an effective structure existed regulating co-operation between different property units in the form of co-operation between joint facilities under the Joint Facility Act and organised through joint property management associations. This has been applied to the new multi-dimensional units. When a building consists of several property units, stairwells, lifts and other jointly used spaces can be established as joint facilities. Load-bearing structures, roofs and similar, can also be included in a joint facility of this kind. The various property units within the building are jointly responsible for covering the costs both for the creation of the facility and for running it. For the apportionment of the costs, property units are allotted one participatory share for construction and one for operation.

2.2.3 Boundaries

Sweden has a system of fixed boundaries; boundaries are normally demarcated on the ground. The introduction of the new legislation for multi-dimensional real property has required changes to the existing legislation. It is now possible to choose whether the boundaries of a multi-dimensional unit should be fixed by X, Y and Z co-ordinates or, which will be more usual, be described with reference to walls, ceiling and roof and floor. A written description in the decision will often be needed to ensure clear documentation.

2.3. The Real Property Register

A property formation procedure is complete when the cadastral procedure has been entered in the Real Property Register. The same applies for the formation or re-formation of multi-

dimensional property units. Multi-dimensional property units are documented in the register with information concerning the multi-dimensional space and the type of building it comprises, together with its location defined by a centroid co-ordinate. In addition, the Real Property Register contains information about the original real property unit which is affected by the multi-dimensional procedure.

The contents of the written part of the Real Property Register for a multi-dimensional real property unit are shown in the figure below:

Property

Designation	**Date of latest change in general part**
Staffanstorp Stanstorp 1:792	2004-01-08
Reference: 120323097	

3D information
The property has one or several 3D spaces.
Parish
S:T Staffan

Addresses

Address	
Blekingevägen	2
245 38 Staffanstorp	

Map location

Area	**X**	(Nat. Referens system)	**Y**	(Nat.referen ssystem)	**Cadastral indx map**	
1		6171330.0		1336290.0	5224722	
2		6171381.1		1336211.8	5224722	
3		6171315.4		1336229.0	5224722	
4		6171302.3		1336294.9	5224722	
5	3D space	6171311.7		1336306.3	5224722	
	Use:					Building
	Size: Horizontal extent approximately 20 sq m.					
	Exist from: Staffanstorp Stanstorp 1:6					

2.4 Need and Demand

There had long been a demand for the introduction of a legislation, which would make it possible to create property units vertically above and below ground level. The demand came initially from the building and construction sectors and two main areas of application were identified:

- for rehabilitation of inner city areas by building an additional storey on existing buildings or a more rational use of publicly owned land for, for example, underground parking,
- for implementation of major road and railway infrastructure projects.

Since the legislation came into force 2.5 year ago, the interest for multi-dimensional real property formation has been very large. 75 cadastral procedures have been completed and a additional thirty are in progress. Around one fifty projects are in the pipeline although, as yet, no application for cadastral procedures has been made. The most important of the projects for which cadastral procedures are being prepared, are a number of major infrastructural development schemes for railway tunnels for example under the city of Stockholm and for underground garages.

The cadastral procedures are spread throughout Sweden. Of course there are a concentration of the 3D real property units to the cities of Stockholm, Gothenburg and Malmö because of the lack of building sites and the high land prices in these areas.

2.5 Some Examples

The 3D real property units can be divided into different purposes, as are shown below. The most common purpose is the 3D real property for dwelling projects. Some interesting cases concerning multi-dimensional 3D properties are discussed in this section.
The 3D property units have been created for following purposes:

- dwelling projects: 35
- commercial activities: 25
- industries: 12
- underground storage: 12
- bridges 5
- major infrastructural projects: 5.

Totally: 90 multi-dimensional property units, of which 25 during 2004, 40 during 2005 and up to June 2006 25.

2.5.1 Dwelling Projects

Turning Torso
Turning Torso, in the city of Malmö, is a somewhat spectacular building, drawn by the Spanish architect Santiago Calatrava. It is a building with 54 stories where stories one to twelve were divided to one 3D real property unit for commercial purposes. The boundaries were settled one meter outside the walls. The apartments on the upper stories were intended to be owned by tenant-owner association. But the market was not ready for the unusual building and the apartments were hard to sell. Today the apartments are for rent and all apartments have been rented. Now only one company owns the building and the 3D real property unit is incorporated in the residual property unit. However, this is a typical case where the new legislation can be used. There is no need of splitting the property when there is just one owner.
Kv. Grinden and Kv. Örnen
A common example of dividing a building into two parts is to create one part for dwelling purposes and one 3D real property unit for commercial activities and joint facilities for garages, lifts and utilities. This is done in the Kv. Grinden in Stockholm. Another 3D real

property unit is created in Kv. Örnen in Lidköping. This is a similar example but the building has also a cultural historic value, so the cadastral surveyor decided that the facade would be a joint facility. The part for dwelling purpose contains five apartments. As mentioned before a multi-dimensional real property unit for dwelling purpose can only be created if it comprises at least five dwelling units. The two property units within the building are jointly responsible for it and for other joint facilities such as stairwells and the garden.

Kv Bageriet
It is also possible for the new property unit to be created using 3D spaces from several different property units, a so called "trans-boundary" property unit. In this way there can be properties that are homogeny and the property management will be more efficient.

2.5.2 Commercial Activities

Kv Apoteket
It is also possible, during a transition period, to create a subdivision of a 3D real property unit that only consists of an air space. In this case, "an air space 3D real property unit" is created above an existing garage facility. The aim is to facilitate the financing of the new building. Of course, the "air-space-building" agrees with the regulations of the detail development plan.

2.5.3 Industries

Kivik
Kivik´s Musteri is situated in an area with shortage of building sites. The owner wanted to increase the business and was also interested in a split ownership. The only option for the company to increase was to build on top of the present building. Therefore, the 3D legislation was a good choice. Because of the new building on top of the present, the installations are separated from each other in a way that makes it possible to create a minimum of joint facilities and easements.

2.5.4 Underground Storage

Helsingborg
In the town Helsingborg there is a new underground garage built under a square. There is a ramp down to the garage. The garage is owned by a parking company and the square is owned by the municipality. Because of the separated ownership the administration is more efficient. If the parking company could not own the garage, it may never have been built. The municipality is not always interested in financing a project like this.

Lime Cuarry
A tunnel from a lime cuarry out to the sea is situated under dwelling properties in Limhamn outside Malmö. The tunnel was constructed during the 50´s and was used to transport lime to the harbour in Limhamn. Since the 70´s the tunnel has not been in use. The tunnel has more or less been forgotten over the last 30 years. The company, which was active in the lime cuarry, now are closing down. The company is selling the property and the right to the tunnel

must therefore be cleared out. The tunnel is situated 15-30 meters below the buildings and most of the residential owners did not know that there was a tunnel under the buildings. The tunnel is now going to be a 3D real property unit belonging to the lime cuarry property. Some of the house-owners have appealed against the cadastral surveyor´s decision and claimed a payment in advance to the amount of 400 000 euro. However, this amount is not realistic. Now, it is the Land Court that will decide whether it will be a 3D real property unit or not. The Land Court will also decide the amount of payment to the house-owners. This appeal is the first cadastral procedure in Sweden concerning 3D real property units.

2.5.5 Bridges

Magnoliagården
The very first 3D cadastre procedure with the new legislation was a passage between two buildings above a street, belonging to a block of service flats. The aim with this 3D real property unit was to create a passage that could connect the two buildings with each other in a way that makes it possible to move from one building to another without going outside. It is natural that the passage is a 3D property owned by the block of service flats because it is only the people working and living in the service flats that are using the passage.

2.5.6 Infrastructural Projects

The most important of the projects for which cadastral procedures are being prepared are several major infrastructural development schemes for railway tunnel under the cities of Malmö and Stockholm and for underground garages.

2.6 Experiences from the First 2.5 Years

Approximately 20 000 cadastral procedures are carried out annually in Sweden and, during 2005, about 40 of them were multi-dimensional procedures, which were either completed or were in progress. We estimate that the number of 3D real property units will be doubled every year during the following five years. Many tenant-owner associations are interested in streamlining the business and will subdivide the commercial part from the dwelling part of the building. The Swedish legislation of taxation is the reason of the interest from the tenant-owner associations. Although the 3D legislation offers many new possibilities for property formation, our experience after the first years is that it will take time for full awareness of the significance and value of the new legislation to develop. Multi-dimensional real property formation requires a new way of thinking and a new way of looking at problem solving. In Malmö the underground railway system is under construction and even if the 3D legislation was applicable when the construction began it was not possible to use the legislation. The detail development plan did not allow a 3D real property unit. The planning procedures in this case have not had the opportunity to change the detail development plan in order to fit the 3D legislation. In the future there will be a change and the underground railway system in Malmö is to be a 3D real property unit. The planning process for infrastructural projects has a long duration and cannot easily be changed after decision has been made. That’s why not so many 3D real property units for major infrastructural projects are created yet.

So far, cadastral procedures have mainly involved the subdivision of existing buildings into dwelling and commercial units. For these procedures the new regulations have functioned well. In most cases, joint facilities were formed for stairwells, lifts and utilities through decisions taken by the cadastral surveyor. In some cases, easements have been created; in some instances the issue of common parts has been resolved by the involved parties themselves through private agreements, which have not always been distinct and legally secure. Rights based on private agreements are not shown in the Real Property Register.

Every year the National Land Survey is going to evaluate the experiences from the 3D legislation from the first years. The result will be presented to the Ministry of Justice.

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BIOGRAPHICAL NOTES

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