

## Modelling Legal and Administrative Cadastral Domain: Implementation in the Portuguese Legal Framework

João P Hespanha,\* Mónica Jardim,\*\* Jesper Paasch,\*\*\* and Jaap Zevenbergen\*\*\*\*

Research concerning the classification and modelling of rights, restrictions, and responsibilities related to real property based on a systems approach within the domain of land registration and cadastre commenced with the Core Cadastral Domain Model (CCDM) initiative in 2002. That model has been renamed the Land Administration Domain Model (LADM), having at its core a conceptual model of the relationship of persons (natural, non-natural or group) to registered objects through rights, restrictions, and responsibilities. This basic relationship is assumed to be applicable to land registration and cadastral systems throughout the world. In fact, LADM has gathered support from such international organizations as OGC, ISO/TC211, UN-Habitat and EU-Inspire.<sup>1</sup> It is being discussed within the International Standards Organization (ISO) as Working Draft 19152 with a view to issuing a new international standard.<sup>2</sup>

The research leading to the original CCDM has been published through a series of papers concerning different modelling aspects, cumulating in two articles. One generic<sup>3</sup> and one on the proposed implementation of the Portuguese Cadastre.<sup>4</sup> This first implementation exercise, as well as a current (operational) implementation to the Icelandic Cadastre,<sup>5</sup> both focused specially on the cadastral component (specifically, geometry and spatial topology of surveying and mapping objects, especially parcels).

---

\* Technology and Management Polytechnic School, Águeda, Portugal.

\*\* Law Faculty, University of Coimbra, Portugal.

\*\*\* KTH Royal Institute of Technology, Sweden.

\*\*\*\* OTB Research Institute, Delft University of Technology, the Netherlands.

Note that LADM Class names are in bold italic typeface.

<sup>1</sup> P. Oosterom, C. Lemmen, T. Ingvarsson, P. Molen, H. Ploeger, W. Quak, J. Stoter, and J. Zevenbergen, “The Core Cadastral Domain Model”, *Computers, Environment and Urban Systems*, XXX (2006), p. 627, at 629.

<sup>2</sup> ISO/TC211 (2008) “Working Draft 19152; Geographic Information – Land Administration Domain Model” [www.iso.org](http://www.iso.org) online catalogue.

<sup>3</sup> Ibid.

<sup>4</sup> J. P. Hespanha, P. Oosterom, J. Zevenbergen, and G. P. Dias, (2006) “A Modular Standard for the Cadastral Domain: Application to the Portuguese Cadastre”, *Computers, Environment and Urban Systems*, XXX (2006), p. 562.

<sup>5</sup> T. M. Ingvarsson, “CCDM and Open Source Applications” (2006) (MSc Thesis TUDelft).

Such implementations, together with the early versions of CCDM, did little to elaborate the Legal/Administrative modelling package.<sup>6</sup>

A comprehensive modelling of the Legal and Administrative components is, however, essential to achieve a sufficiently generic data model able to support legal security of tenure, one of the LADM aims. An initial proposal for the classification of real rights under these modelling efforts<sup>7</sup> forms the basic premise of this article.

Implementation in the Portuguese cadastral and land registration systems is particularly relevant pursuant to policies recently formulated in legislation and government directives (D.L. 224/2007, RCM 45/2006).<sup>8</sup>

The primary concern is the existing and proposed classifications of real rights, where the classification proposed by Paasch will be juxtaposed with other classifications, namely, those existing in Portuguese legal doctrine. In Paasch's paper a different view of the core relationship presented in LADM is proposed, namely considering ownership to be a fundamental right in replacement of the LADM "Right, Restriction or Responsibility" main class. Another difference concerns the LADM's *SpatialUnit*, which is simply called "Land", with the meaning of immovable property.

In this article, a wider concept regarding the object of real rights will be used that includes immovable property and also registered movable goods.<sup>9</sup> The proposed classification does not form a closed and completely defined system however, as Paasch states that both personal and land main classes can relate to other types of rights and restrictions besides ownership. This same view is expressed in Zevenbergen.<sup>10</sup>

Real rights will be addressed in this article together with other forms of property in Portuguese legislation, including some forms of restrictions originating in private and public law. The complete set of rights, responsibilities and restrictions/regulations as defined in LADM is also included in Paasch's classification, although different terminology is sometimes used.

As regards terminology, and as referred to elsewhere,<sup>11</sup> clarification is crucial for scientific research, namely when the objectives of such research focus on real estate, where terminology is defined in national laws. This must take into account the fact that LADM is now an international standardisation effort intended to facilitate cross-border transactions,<sup>12</sup> stressing even further the need to clarify terminology.

---

<sup>6</sup> J. Zevenbergen, "Expanding the Legal/Administrative Package of the Cadastral Domain Model – from Grey to Yellow?" in P. Oosterom, C. Schlieder, J. Zevenbergen, C. Hess, C. Lemmen, and E. Fendel (eds) (2005) *Standardization in the Cadastral Domain* (2d ed., 2005), p. 139.

<sup>7</sup> Id; see also J. M. Paasch, "Legal Cadastral Domain Model – An Object-oriented Approach", *Nordic Journal of Surveying and Real Estate Research*, II (2005), p. 117.

<sup>8</sup> D.L. 224/2007: General and Conceptual Principles of SINERGIC. RCM 45/2006: Council of Ministries Resolution launching the SINERGIC project for the implementation of a National Information System for the Cadastre.

<sup>9</sup> In Portugal different services of the Ministry of Justice register real estate, vehicles, aircraft, and ships.

<sup>10</sup> Zevenbergen, note 6 above, p. 139.

<sup>11</sup> A. U. Frank, "Comparing European Cadastres – Methodological Questions" in Oosterom, et al., note 6 above, p. 1.

<sup>12</sup> J. M. Paasch, "Standardization within the Legal Domain: A Terminological Approach", *Euras Yearbook of Standardization*, VI (2008), pp. 105-130.

A complete set of definitions will be given of the rights and regulations discussed, together with possible equivalent terms in English<sup>13</sup> and other languages. The remainder of this article will set out a summary of the classification schemas for legal/administrative components of LADM previously proposed by two of the co-authors (Paasch, Zevenbergen) and present a framework for definitions of real rights as considered in modern Portuguese legal doctrine. Following definitions of the positive side of real rights, the negative side (encompassing regulations and other types of restrictions) will be considered. A number of public regulations and the common form of property known in Portugal as the “Baldios” will complete the set of definitions in Portuguese legislation.

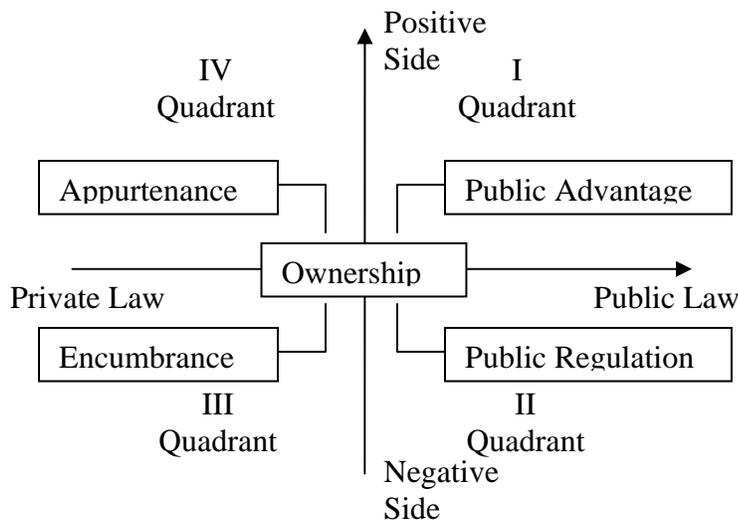
Based on the analysis of the legal and administrative components, a proposed implementation scheme is suggested which will include a number of UML class diagrams and object diagrams depicting specific relationships between the core cadastral classes of persons, rights and real estate objects, together with an overall class diagram of the proposed Portuguese implementation of LADM.

The final section draws conclusions from this research and sets out recommendations for future work.

### Legal and Administrative Component Classification Schemes

Classification here concerns a more logical arrangement of property and estates, abbreviated as real rights, which is common in Portuguese doctrine. This systematization is also useful when considering an object-oriented modelling approach as exemplified in the LADM Legal Model.

The first classification scheme represents a conceptual view centred on ownership-related rights derived from Paasch.



<sup>13</sup> B. A. Garner, *Black's Law Dictionary* (8<sup>th</sup> ed, 2004).

The concept proposed corresponds to a two-axis classification scheme, with the xx axis representing two main branches of law, whereas the yy axis represents a concept traditionally related to the field of rights in real estate. In this concept, the positive side of real rights concerns the powers granted by each right, whereas the negative side of real rights concerns restrictions and responsibilities imposed by each right. The point of origin of this classification scheme is the right of ownership.

The main classes concerning private law are elaborated by Paasch in five different kinds of specialized rights, namely: common right; real property right; personal right; latent right, and lien. Most of these classes of rights can be directly related to a (land) parcel object associated with a corresponding *Recorded Object* of LADM, but they can also be related to other classes of land-related objects.

When examining specialized rights classes above, another difference between the Paasch legal model and LADM becomes evident: the *mortgage* is no longer an independent class related to a right (as in LADM), but merely one possible instance of the lien specialized class.

The question arises from the administratively-imposed zoning and regulations, which fit into public advantage and public regulation classes: should these advantages and regulations be related to individual parcel objects, or to other type of real estate object? Or even considered apart from the LADM, in a new but related domain?

In the following sub-paragraphs a brief definition of specialized rights classes based on the Paasch legal classes<sup>14</sup> is presented. The full classification of Portuguese real rights under this scheme is given below:

- common rights: where ownership creates a common right in land not related to the owners. The right belongs to the real property and follows along the property in the event of a transaction. Common parts related to horizontal property<sup>15</sup> are a good Portuguese example;
- real property rights: right executed by the owner of real property (the dominant tenement) in another real property (the servient tenement) arising from his ownership. The right is transferred together with the real property when the property is sold or otherwise alienated. The Portuguese cadastre ASP<sup>16</sup> as a specialized land parcel class is a clear example of this type of right;
- personal rights: a right created by a person to use, harvest the fruits/material of, rent or lease the real property in whole or part, including the claim against a person. The right follows the property when it is sold or otherwise alienated. The *right of use and habitation* is a right derived from ownership (a right of enjoyment, see table 1) and is one example of a Portuguese personal real right;
- personal rights as personal servitudes: according to Portuguese legal doctrine, and also other countries having the Roman law tradition, a personal servitude is considered to be a contract between two individuals and not a real right. However, it fits into the concept defined above;

---

<sup>14</sup> Paasch (2008) at Appendix.

<sup>15</sup> Horizontal Property Right is explained on section 3.2.4.

<sup>16</sup> ASP, *Área Social de Prédio*, is identified within each Parcel, representing e.g. an access easement.

- latent rights: A right which is not yet created in a real property. Regulating the exploration of real property by another real property or person. When the real property is sold or otherwise alienated, the right normally follows. Liens are not considered latent rights. This is the domain of pre-emption rights<sup>17</sup> (*preferência* in Portuguese law), namely the preliminary contract,<sup>18</sup> where some kind of execution is deferred in time;
- lien: is equal to security of payment. An economic and financial right which can be created in real property and thereby regulates ownership. This type of right is better represented by a mortgage (*hipoteca* in Portuguese law) and is typically related to a land parcel object, but can also be related to a part of a parcel.

As mentioned in the personal servitudes example, the Roman law tradition distinguishes two different branches of law within the personal right class. The use and habitation is a real right of enjoyment, where the common set of attributes characterizing real rights applies (see below). But the personal servitude, not being a real right, falls under the law of contracts. This distinction will have further implications in modelling.

As regards public law, the class of public regulations can include planning regulations defined by municipal master plan zoning or by other kinds of zoning regulations defined state-wide, such as agricultural or ecological reserves. There are a number of possible examples in Portuguese land administration policies, which in turn represent (sometimes) an adoption of European Union regulations.

Completing this brief introduction is a table summarizing the Portuguese classification of real rights based on Fernandes.<sup>19</sup>

---

<sup>17</sup> Pre-emption, a term with different legal meanings; in this document refers to the right to buy a property before anyone else.

<sup>18</sup> Effective against third persons.

<sup>19</sup> L. A. C. Fernandes, “Lições de Direitos Reais”, *Quid Juris?* (4th ed.; 2005), p. 17.

1 <sup>st</sup> order classification	Name of Right (Portuguese, with English translation)	Observations and sub-classification (Zevenbergen, 2004)
Gozo (Right of Joy)	<i>Propriedade</i> / Ownership	Maximum real right type A
	<i>Compropriedade</i> / Co-ownership	
	<i>Comunhão</i> / Joint-ownership	
	<i>Propriedade Horizontal</i> / Horizontal Property	
	<i>Usufruto</i> / Usufruct	Derived rights; type B (according Zevenbergen's Classification)
	<i>Uso e Habitação</i> / Use and Habitation	
	<i>Superfície</i> / Superficies	
	<i>Habitação Periódica</i> / Time Sharing	More recent right in PT legislation
<i>Servidões Prediais</i> / Praedial Servitudes	Minor rights; type C <sup>20</sup>	
Garantia (Security)	<i>Hipoteca</i> / Mortgage	Type D or Security Rights
	<i>Retenção</i> / Retention	
	<i>Consignação de Rendimento</i> / Pledge of Receivables	
Aquisição (Acquisition)	<i>Previlégios Creditórios</i> / Privileges	Polemic categorization. <sup>21</sup>
	<i>Contrato-Promessa</i> / Preliminary Contract	
	<i>Preferência</i> / Pre-Emption	

Table 1- Portuguese Classification of Real Rights

Real rights included above will be defined in more detail in the following section.

A word about the classification of real rights in Zevenbergen, which follows more closely current classifications in Portuguese doctrine and, as such, has been used to prepare the Table 1.

The Zevenbergen classification is as follows (with subpoint (e) added):

- a) Maximum real right: the strongest right available in a jurisdiction, called e.g. ownership, freehold or property. In Portugal the best match is perfect property, and the definition is in the next section;
- b) Derived rights: from the previous category where the holder of this derived right is allowed to use the land in its totality<sup>22</sup> (often within the confines of a certain land use type);

<sup>20</sup> There is no clear distinction between type B (derived rights) and type C (minor rights) in Portuguese legal doctrine.

<sup>21</sup> There is no agreed classification of such rights as a special class of real rights in Portuguese legal doctrine.

- c) Minor rights: allow the holder some minor use of someone else's land, e.g. walking over the land to a road. Such rights can be called servitude or easement and also may include the right to prevent certain activities or construction on some nearby land, e.g. freedom of view;<sup>23</sup>
- d) Security rights: rights whereby certain previously mentioned rights can be used as collateral, mainly for bank loans in the form of a mortgage or lien.
- e) Acquisition rights: rights having as their object immovable property, to distinguish them from personal acquisition rights, and legally effective as a means of the acquisition of other real rights, namely ownership. This includes pre-emption rights.

### **List of Portuguese Real Rights**

The first general definition of real rights and its position in Portuguese legal doctrine is as follows. A number of sub-sections ensue based on the classification scheme of Zevenbergen (extended).

#### **General Definitions**

Real rights are studied on a casuistic base (through an analysis of specific real rights and concrete situations) which have as object matter (within the realm of legal doctrine) the right to a thing. The right to a thing is a component of private law that has been codified in the Civil law. The reason for calling these kinds of rights “real” derives from the Latin word for things: “res”, which in English has been translated as “real”.

Real rights in Portugal historically evolved from Roman law (*actio in rem*) to the medieval concept of *ius in re* and then to the modern Civil Code, in which two periods can be identified: French influence (nineteenth century) and Germanic influence (twentieth century up to the present time).

A general definition of real rights is given by Mesquita:<sup>24</sup>

A juridical relationship through which a thing<sup>25</sup> comes within the domain or under the sovereignty of a person<sup>26</sup> according to a certain statute which confers powers but also contains restrictions and obligations.

This definition, as can be perceived in the footnotes, is broader than the usual cadastral domain since it encompasses movable goods not considered to be real estate.

The above definition, not surprisingly, reflects the LADM Core when real rights are defined as a relationship between a corporeal thing (e.g. real estate) and a person (e.g. an individual). It seems to focus on the corporeal thing component as a consequence of the necessity to differentiate real rights from personal rights.

---

<sup>22</sup> Totality here does not mean that the right covers the whole property, as can be seen by the sentence within brackets.

<sup>23</sup> Freedom of view, according Portuguese doctrine, is a restriction imposed on a property right, and as such should not be considered a real right.

<sup>24</sup> M. H. Mesquita, *Obrigações Reais e Ónus Reais* (1990).

<sup>25</sup> A corporeal thing is in this sense any movable or immovable good which can be registered.

<sup>26</sup> A person can be any individual (natural) or collective (non-natural) person.

A real right thus has an object (the corporeal thing) and a subject (the person). The object of the real right can be defined as:<sup>27</sup>

An existing, well determined corporeal thing, which determination should be effective for the creation and acquisition of the real right. Ownership covers the whole object, but certain real rights, e.g. superficies, can apply to part thereof.

Finally, a common set of attributes pertaining to real rights as a whole are as follows:

- real rights are *inherent* in the object of the right (the corporeal thing);
- *sequel*: power granted to the titular of a real right to exercise his right wherever the thing is<sup>28</sup> or against a third person illegally possessing the thing;
- a titular of a security right has a *preference* to receive his credit over any third persons not possessing a prior security right;
- the current juridical status of the corporeal thing should be subject to a *numerus clausus*,<sup>29</sup>
- the current juridical status of the corporeal thing must be *publicized* to interested third persons.

#### **Type A: Maximum Real Rights**

In Portuguese legislation, a number of classical and modern real rights fall into this classification. The term “ownership” was avoided because this term can be identified with “the bundle of rights allowing one to use, manage and enjoy property, including the right to convey it to others”.<sup>30</sup>

In this view ownership refers to the complete set of real rights which applies to a given property.

All rights described in this section are defined solely with respect to their *positive* side. Definitions were extracted from Fernandes, unless referenced otherwise. We begin with *possession*, although arguably possession should qualify as a real right. According to *Black’s Law Dictionary* possession is:<sup>31</sup> “the exercise of dominion over property”. Possession is the power a subject exerts as though he had title to real rights of enjoyment (Types A, B or C in Table 1).

If he does not have such title,<sup>32</sup> the law can nonetheless recognize a “de facto” situation, what is called *formal possession*. Following such recognition, and provided that all conditions regarding *usucapio* apply, the possessor becomes a titular of the real right of *usucapio*. From that moment, he could register one or more real rights of types A, B or C as above, this being the reason to not include formal possession as a Type A real right.

#### *Property*

---

<sup>27</sup> Fernandes, note 19 above, p. 56.

<sup>28</sup> Consider a thing defined as in note 25 above.

<sup>29</sup> Limited number of legally pre-defined real rights.

<sup>30</sup> Garner, note 13 above, p. 1138.

<sup>31</sup> *Ibid.*, p. 1201.

<sup>32</sup> Title here means a valid legal transaction, not necessarily a registered right.

This is the fundamental real right,<sup>33</sup> from which a number of other real rights, here classified as minor and derivative, are formed. The titular of such right can fully enjoy the use of the (corporeal) thing, satisfying his legitimate needs, within legal limits and observing legally imposed restrictions. Two variants to this right concerning the composition of the subject are presented next.

### *Co-Property*

The English term is ownership in common:<sup>34</sup> “ownership shared by two or more persons whose interests are divisible”. This is a property right having as its object an immovable thing as a whole but shared by several subjects. The law recognizes three different ways of exerting power under a co-property right: in isolation, by majority decision, and unanimously. Parties may dispose their fractions or ask for division of the thing.<sup>35</sup>

### *Joint Property*

The English term is joint ownership:<sup>36</sup> “undivided ownership shared by two or more persons”. Only one indivisible property right is shared by the joint owners quantitatively related to the right as a whole. Parties may not dispose their fractions or ask for division of the thing.

### *Horizontal Property*

The English term is condominium:<sup>37</sup> “single real estate unit in a multi-unit development in which a person has both separate ownership of a unit and a common interest”. This set of powers has as its object an autonomous fraction of an urban building and some common parts of the building (**Building Unit** objects in LADM). The common parts recognized by law concern the projected right on the soil, structural elements, common equipment and its installation areas and internal common circulation areas. Other areas can be defined in the title as common. This is a relatively recent form of Type A real rights, with some unique features regarding the classical property right, namely the mandatory existence of common parts. Another aspect concerns its representation within the cadastre geometric component, once it requires a three dimensional (3D) shape definition.

With regard to the allowed sharing of real rights in spatial and temporal dimensions, the following table tries to summarize comments so far:

<b>Sharing Type</b>	<b>Real Right</b>	<b>Type (Zevenbergen)</b>	<b>Obligations</b>
No sharing of space No share in time	Property (Ownership)	A	Neighbourhood restrictions apply

<sup>33</sup> Classified as the maximum enjoyment real right in Portuguese doctrine.

<sup>34</sup> Garner, note 13 above, p. 1138.

<sup>35</sup> The Latin term is *communio pro diviso*.

<sup>36</sup> Garner, note 13 above, p. 1138.

<sup>37</sup> Garner, note 13 above, p. 314.

No share in space	Time Sharing	B	D.L. 275/93, <sup>38</sup> Article 21
Share in time	Succession Usufruct	B	Maintain economic use
Share in space No share in time	Co-Property	A	Rights are self-limiting
Share in space Share in time	Time Sharing <sup>39</sup> (as Personal Right)	Not defined	Not subject to registry

Table 2 - Spatial-temporal sharing of real rights

The sharing in time and space above concerns an individual property unit. The last type is rare and not legally recognized, although a valid conceptual hypothesis.

### **Type B: Derivative Rights**

#### *Usufruct*

The English definition according to Garner is:<sup>40</sup> “Right to use and enjoy the fruits of another’s property for a period, without damaging or diminishing it”. This is the right to fully enjoy another’s thing or right, limited in time. Its object can be a corporeal thing (e.g. an immovable) or a right. As *ius in re aliena* this is a derivative right considered to be a personal right by Paasch, which is in consistent with Portuguese doctrine.<sup>41</sup> It is not an exclusive right, and co-exists with a basic property right.

#### *Use and Habitation*

The English definitions according to Garner are:<sup>42</sup> “A long-continued possession and employment of a thing for the purpose for which is adapted (Use); non-transferable and non-hereditary right to dwell in the house of another (Habitation)”. This is the right to use a determined thing on another’s property and have its respective fruits, as needed by the titular and his family. This right is called habitation when the object is a residential building.

#### *Superficies*

<sup>38</sup> D.L. 275/93 defines the time-share real right.

<sup>39</sup> A special type of time-share governed by contract law and representing thus a personal right.

<sup>40</sup> Garner, note 13 above, p. 1580.

<sup>41</sup> Once it was considered to be a real personal right and not a personal right under the law of contract.

<sup>42</sup> Garner, note 13 above, pp. 1577 and 729.

The English definition is:<sup>43</sup> “Personal, hereditary and alienable right to a building, subject to payment of an annual rent”. A relatively recent real right under Portuguese law, this right offers an alternative to the abolished right of emphyteusis. It confers the power to build or maintain a structure or planting on another’s parcel, which is called the *implante*. The subject of such right is the superficiarius and the owner of the soil is the *fundeiro*. The duration of the right, defined in the title; may be temporary or perpetual. The superficiarius can (optionally) pay an annual rent to the *fundeiro*.

### *Time Sharing*

The English definition is:<sup>44</sup> “Joint ownership by several persons who take turns occupying the property”. This is the right to use, for one fixed time period (from 7 to 30 days), a habitation unit integrated into a tourist enterprise, against the payment of an annual fee. This is an example of a new type of real right introduced by Portuguese legislation in 1981. It is arguable whether this should be considered a Type A real right because the owner of the tourist enterprise possesses superior rights over the building (or set of buildings) as a whole.

This type of right can be best described in a cadastre by some form of four dimensional (4D) representation, so as to correctly situate the object of the right both in space (3D) and in time (as a recurring event).

### **Type C: Minor Rights**

Just one Type C real right is defined here, the Praedial Servitude, which has a vast number of modalities identifiable in law. Some are presented below. The English definition considering this to be a positive right or servitude appurtenant:<sup>45</sup> “the right of using one piece of land for the benefit of another”.

### *Praedial Servitude*

Defined as a positive right, this is a real right over another’s property, in which an owner of a parcel (“praedium dominans”) has the right to use certain facilities of another’s parcel (servient property), contributing to the full use and benefit of his parcel. If the subject of such right is not the owner in title, then we do not have a real right, rather a *personal servitude*. A praedial servitude is not divisible; for example, when the servient property is split the praedial servitude is maintained, affecting each of the split parcels. This real right does not conform to the common attribute of juridical types because the content of the right is open to definition in the corresponding title. We consider some of the modalities specified in the law.

### LEGAL SERVITUDE

---

<sup>43</sup> Garner, note 13 above, p. 1478.

<sup>44</sup> Ibid., p. 1521.

<sup>45</sup> Ibid. p. 1400.

Servitudes created according certain predicted legal situations, entering in operation as a result of a court decision or administrative act. Examples of legal servitudes include:

- *Enclosed Estate*: a servitude is created for those parcels without communication with public ways (Civil Code, Art.º 1550º);
- *Water Easement*: allowing owners who do not have access to a public water source or stream to cross someone's land for that purpose (Civil Code, Art.º 1556º);
- *Rural Irrigation*: an owner which does not possess water for irrigation (except with great effort and cost) can use the water from a neighbouring parcel (if left without use), against payment of a fair price (Civil Code, Art.º 1558º);
- *Aqueductus*: right to conduct water through someone's land, be it underground or across the surface, provided the beneficiary indemnifies the owner of servient properties (Civil Code, Art.º 1561º).

All legal servitudes imply payment of a fair indemnification to servient parcel owners. The last three types are classified as rural servitudes in *Black's Law Dictionary*.

#### SERVITUDE OF VIEW

Created by contract or *usucapio*, this servitude gives the owner of such servitude the right to overcome a restriction of view, thus allowing him to open doors, windows or balconies in a newly constructed building up to the parcel boundary.

#### SERVITUDE OF DRIP

Barely used today, this servitude is called *Servidão de Estilicídio* in the Civil Code (Art.º 1365º). The titular has the right to overcome the restriction of drip, which states that rain waters falling on its parcel can not drip or drain onto a neighbour parcel. As above, it can be created by contract or *usucapio*.

#### ACCESS EASEMENT

A servitude which allows one or more persons to travel across another's land to get to a nearby location, such as a road.<sup>46</sup> Black's definition perfectly applies to Portugal; this being perhaps the best-known praedial servitude.

### **Type D: Security Rights**

#### *Mortgage*

---

<sup>46</sup> Garner, note 13 above, p. 548.

The creditor's right to take advantage of his credit and respective interests by using the value of an immovable and certain movable things (Civil Code, Art. ° 688°). He has preference over other creditors which have no special privileges or priority in registration. Registration is mandatory for a mortgage. Until the 1984 revision of the Real Estate Code, this was one of the few mandatory reasons for registration in the Portuguese Land Register.<sup>47</sup>

### *Retention*

The English definition is:<sup>48</sup> "A possessor's right to keep a movable until the possessor's claim against the movable or its owner is satisfied".

This is the debtor's right to maintain a thing in his possession against a creditor, provided that in turn he has a credit against the creditor, e.g. the transporters right to retain transported goods if the transport is not paid (Civil Code, Articles 754° to 760°). This right may be applied to immovable or movable things (thus differing from the English definition). If the thing is an immovable, exercise of this right follows the same procedure as a mortgage.

Retention rights arise automatically from the law, provided that the requisites defined in legislation are satisfied. In such cases registration is not mandatory.

### *Pledge of Receivables*

Also known as *anticrese* (an ancient Greek term), this refers to revenues generated by the economic exploitation of a parcel in order to perform an obligation and respective interests. It can be effective for a maximum period of 15 years (Civil Code, Art° 659°).

### *Privileges*

This type of right is not registered at the land register. The credit is created in favour of public entities, such as State or municipalities (becoming thus creditors). These are not considered to be a real right; however they are considered here because these could seriously affect property transactions and, thus, transmission of real rights.

## **Type E: Acquisition Rights**

This type of right can be considered to be real rights provided the object thereof is an immovable and these rights have legal (real) effectiveness.

### *Pre-Emption Rights*

These may arise from a law, as is the case of co-property. The holder of a real pre-emption right may acquire the ownership of an immovable for a contracted price, over other eventual interested buyers, provided he does this within a certain time limit.

---

<sup>47</sup> I. P. Mendes, *Código do Registo Predial – Anotado e Comentado com Formulário* (13<sup>th</sup> ed.; 2003). After 1984, the legal regime of indirect obligation to register was created. With a few exceptions, all transactions involving the transfer of rights or creation of a credit against immovable property must be registered.

<sup>48</sup> Garner, note 13 above, p. 1342.

### *Preliminary Contract*

Some considerations concerning validity as a real right apply here. Such a contract must be valid and in force. The content of the actual document (title) depends on the nature of the goods being transacted. Registration makes this right legally effective, namely against any third person intending to acquire the same thing.

## **Negative Side of Real Rights: Encumbrances and Public Regulations**

Ownership rights are no longer considered to be absolute types of rights to use and enjoy a corporeal thing, as defined in the first French Civil Code. The Portuguese constitution has a number of articles (Articles 61º, 81º, 88º, 93º and 100º) which imply that the general interest prevails over private property under a number of circumstances. Such limitations contribute to the so-called *social function* of private property.<sup>49</sup>

In private law certain restrictions on real rights arise from neighbourhood relationships between owners in order to prevent conflicts. In such cases the contiguity between parcels imposes certain limitations on completely independent use.<sup>50</sup>

Public and private restrictions on the full use of real rights will be examined next.

### **Public Regulations**

The aims of public regulations are diverse. They may relate to national defence, land policy, ecological sustainability or free circulation of goods and persons, to name just a few. Three principal juridical institutions governing the application of public regulations will be identified: expropriation, requisition, and administrative servitudes. Administrative public regulations defined in the next section fall also into the II Quadrant (Public Law, Negative side).

### *Expropriation*

The English definition is:<sup>51</sup> “A governmental taking or modification of an individual’s property rights, especially by eminent domain”.

Such a taking is regulated by the expropriation code (Law 168/99,<sup>52</sup> amended by Law 13/2002). The State has the right to the compulsory acquisition of the object of the real right provided there is compliance with the demands of the public utility. This should only happen when other means of acquisition (e.g. via private law) are not feasible. The taking should be preceded by a public utility declaration.

---

<sup>49</sup> Fernandes, note 19 above, p. 196; also see A. Dinis, E. Henriques, and M. I. Contreiras, *Direito* (1987).

<sup>50</sup> Fernandes, note 19 above, p. 208.

<sup>51</sup> Garner, note 13 above, p. 621.

<sup>52</sup> Law 168/99 defines expropriation by public utility.

### *Requisition*

The English definition is:<sup>53</sup> “A governmental seizure of property”. This is an administrative act through which a property owner (upon receiving indemnification) has to consent to the temporary use of its property in order to allow fulfilment of the public interest. It is limited in time to a maximum duration of 1 year.

### *Administrative Servitudes*

The English term providing the closest match is public servitude:<sup>54</sup> “Servitude vested in the public at large or in some class of indeterminate individuals. Examples: the right of the public to a highway over privately owned land”. This is the right, conferred by public law, to use certain utilities of a private property to the benefit of a praedium dominans under the previous declaration of public utility. There are a vast number of such servitudes regulated in the law, majority of which are listed in by-law N° 1101/2000. A few examples:

- Geological resource exploration servitudes (D.L. 90/90);
- Raw petrol extraction servitude (D.L. 109/94);
- High voltage power lines servitude (R.D. 1/92).

It must be stressed that the example given for the Anglo-American public servitude hardly classifies as an administrative servitude in Portugal because public roads (national or municipal) are public domain acquired through expropriations.

## **Encumbrances**

The limitations on real rights defined in private law have two origins: Neighbourhood relationships and superimposition of real rights (this last subject is not treated here).

### *Neighborhood Relationships*

Limitations arising from the contiguity or proximity between parcels, such as the exercise of real rights on a particular parcel, can affect the titular of real rights of neighbouring parcels. There are a great number of such limitations identified in law. Restriction of view<sup>55</sup> can be considered to be a neighbourhood imposed limitation.

As a result of the diverse relationships that can arise in the terrain (reflecting “de facto” situations), such limitations should be considered on a case by case basis. The following is a classification of limitations originating in neighbourhood relationships which exist in current law.<sup>56</sup> The list is far from exhaustive.

- *Emissions*: there are different types of emissions (gaseous, noise, vibrations or even heat) which can cause substantial prejudice to neighbouring parcels and are thus prohibited. The neighbourhood here does not mean necessarily contiguity, but rather a nearby area substantially affected by such emissions;

---

<sup>53</sup> Garner, note 13 above, p. 1332.

<sup>54</sup> Ibid., p. 1401.

<sup>55</sup> Requires the owner to maintain an area inside its parcel having a minimum buffer of 1.5 m from the boundary (Civil Code, Art.º 1362º) where he cannot open doors, windows or balconies in a newly constructed building with views towards the neighbouring parcel.

<sup>56</sup> Fernandes, note 19 above, p. 209.

- *Hazardous Installations*: These concern construction, equipment or storage facilities containing corrosive or dangerous substances which can pose a danger to neighbouring parcels. If such installations received a permit and even so a serious accident occurs, the installations must be dismantled.
- *Construction*: these relate to the servitudes of view and drip mentioned above;
- *Plantations*: These concern those near or at a parcel's boundaries. Certain tree species, such as eucalyptus, are prohibited if neighbouring parcels are used for cultivation or are urban. The neighbours (owners) can demand that the roots or branches which extend over their parcels be cut. An exception is when such trees or bushes are used as beacons (Civil Code, Art.º 1369º);
- *Natural Waters Drainage*: Owners of parcels traversed by a natural stream should not build any kind of equipment retaining or otherwise facilitating water flow that would prejudice neighbouring (contiguous) parcels.

Other types not described here cover the use of a neighbouring parcel; water defensive works; excavations; building ruins or demarcation.

### **Administrative Public Regulations**

In order to implement land-related policies aiming at sustainable socio-economic development, where environmental concerns receive each day more attention, the State imposes a series of regulations. These are spatially represented as zoning areas affecting privately owned land, and also parcels under public domain (some acquired through expropriation).

Public regulations implemented as zoning areas are defined and managed at several levels of administration (national, regional or local) and in different sectors of governmental activity (agriculture, environment, public works, energy or telecommunications). Together they form an intricate and complex puzzle of superimposed zoning areas, difficult to manage because of (among other factors) intense process fragmentation<sup>57</sup> and lack of coordination.

Some of these zoning regulations are described below. The actual list is much longer.

### **National Agricultural Reserve**

The Portuguese acronym is RAN. It is regulated by law (D.L. 196/89) and directed towards defending and protecting areas with good promise for agriculture, guaranteeing their proper use so that a genuine contribution will be made to the full development of Portuguese agriculture and to effective land administration.<sup>58</sup>

Such a reserve is defined at the regional level by services of the Ministry of Agriculture and should be adapted locally to each municipality's Master Plan. This confers on owners of parcels under RAN certain real rights, e.g. pre-emption rights to acquire neighbouring parcels also under RAN, and gives such owners special financial incentives. The cultivation unit doubles under RAN, with implications for eventual parcelling out on these areas.

---

<sup>57</sup> A. Mulolwa, "Integrated Land Delivery: Towards Improving Land Administration in Zambia" (PhD Thesis TUDelft, 2002), p. 1.

<sup>58</sup> A. A. Delgado and A. M. C. Ribeiro, *Legislação de Direito do ordenamento do Território e do Urbanismo* (2<sup>nd</sup> ed.; 2004), p. 781.

## National Ecological Reserve

The Portuguese acronym is REN. Such a reserve is regulated by law (D.L. 93/90) and is intended for the protection of ecosystems and the preservation and development of biological processes fundamental to achieving equilibrium with human activities.<sup>59</sup>

The following land cover and geomorphologic types are considered for inclusion in REN zones (the list is not exhaustive):

- Beaches;
- Coastal dune system;
- Sea cliffs;
- Estuaries, lagoons and marshes;
- Maximum rainwater infiltration areas in a catchment basin;
- Areas subject to river floods;
- Escarpments and areas with high risk of erosion.

These have been criticized for the amount of area that they can cover in some municipalities (reaching more than 60% of municipal area).

## Municipal Zoning

The general content was determined in the Land Policy law (Article° 86°, D.L. 380/99),<sup>60</sup> which defines a set of regulations spatially based on a classification and qualification of lands based upon a distinction between urban and rural land.

The following table summarizes the legal qualification of lands.

<b>Basic Classification</b>	<b>Qualification</b>
Rural lands (includes RAN and REN zones)	Agricultural or forestry production spaces; Mining exploration spaces; Spaces affecting extractive and agro-industry; Natural spaces; Spaces for infrastructure or other human activities compatible with agricultural, forestry or natural spaces.
Urban lands	Urban soil; Soil reserved for planned urban development; Urban soils required for ecological sustainability.

Table 3 - Legal Qualification of Rural and Urban Lands

## Public Waters Reservoirs

---

<sup>59</sup> Ibid. p. 811.

<sup>60</sup> D.L. 380/99 defines the Executive Regime for Land Management Instruments.

This type of zoning is regulated by legislation (R.D. 2/88). Water reservoirs used for public purposes such as irrigation, hydro-electrical energy or drinking water supply are protected through restrictions on activities occurring within the public domain and by the establishment of a protection zone around the contour line of full storage (a spatial buffer).

The protection buffer width varies according to the reservoir being classified as protected, conditioned, of limited use or of free use. Each classified reservoir must possess an administrative plan regulating activities in the public domain and protection zone. Presently, there are more than one hundred classified reservoirs (built or under construction).

### **Natural Protected Areas**

This zoning, regulated by legislation (D.L. 19/93),<sup>61</sup> defines a national network of protected areas aimed at natural habitat fauna and flora preservation, among other objectives. Protected areas can be established at national or local levels according to a classification defined by law.

Local level protected areas are called *protected landscape areas* and must be managed by municipalities or their associations. The creation of these areas is completed through a regulation which should define the uses of the land, such as prohibiting the introduction of exotic species of fauna or flora; certain types of construction works; industrial and mining activities, and the like.

### **Coastal Protection Zone**

This is regulated by law (D.L. 302/90) and is spatially represented by a coastal buffer, delimited from the line of spring tide (equinox high tide) up to 2 km inland, where a number of national level regulations apply. Other local (municipal level) regulations must be compatible with national regulations. The following items are regulated within such zones: land use (especially urban soil); access to the coast line; infrastructures; buildings and green areas and shipyards.

### **Cultural Heritage**

This is regulated by a law (Law 107/2001)<sup>62</sup> whose purpose is to protect and value the cultural heritage, which includes both material and intangible things contributing to the national identity and history. Immovable things can be classified as a monument, set, or place and be defined as being of national, public or municipal interest.

A protection zone 50 m wide is automatically established around the exterior outline of an immovable, upon classification. A further special protection zone, including *non aedificandi* areas, must be determined at State level. Such protection zones are in fact considered to be administrative servitudes.

## **Other Forms of Property**

### **Public Domain**

---

<sup>61</sup> D.L. 19/93 defines the Classification of Natural Protected Areas.

<sup>62</sup> Law 107/2001 defines the Protection and Improvement Regime for the Cultural Heritage.

The English definition is:<sup>63</sup> “government owned land”. According to Portuguese law, the State itself, not the government, owns public domain lands. Different types of public domain exist managed by various State or local government organizations. A few examples are given below.<sup>64</sup> These areas are not subject to transactions because they cannot be privatised.<sup>65</sup> However, government organizations can hand over the administration of such areas to private persons in the form of long leases.

#### *Public Water Domain*

These are regulated by law (D.L. 468/71)<sup>66</sup> and include maritime and inland waters superjacent to a riverbed or seabed, the water-covered surface and margins. The margins include a buffer 10 m wide for non-navigable streams and 50 m wide for sea waters or navigable streams. In rivers and streams the margins are defined by the principle of mean flood waters, usually at the top of the natural slope at the river bank.

Private ownership is only permitted within these areas if this was registered prior to 1892 (for historical reasons; Civil Code, Article° 1386°). In those cases administrative servitudes are imposed.

#### *Public Municipal Domain*

This is (partly) regulated in legislation (RJUE, D.L. 555/99).<sup>67</sup> Such domain includes a number of specific land uses administered by the municipality, namely, green areas, collective use areas, and equipment or the road infrastructure. The parameters determining the dimensions of parcels under municipal domain are contained in the Municipal Master Plan, which in turn should be consistent with the national and regional level directives.

In an urban lot operation, the administration of such areas can be granted to groups of neighbouring residents (unit owners) through a long lease.

### **Commons**

The form of property usually referred as the “Commons” under the British tradition has deep roots in history preceding the institution of Roman law. Black’s definition is:<sup>68</sup> “Common appurtenant (historical): landowner’s right to graze animals on another’s land as result of a written grant relating to ownership or occupancy of land”.

---

<sup>63</sup> Garner, note 13 above, p. 1265.

<sup>64</sup> Delgado, note 58 above, p. 585, referring public water reservoirs.

<sup>65</sup> B. Azevedo, *Servidão de Direito Público – Contributo para o seu Estudo* (2005). This prohibition is also referred on the Civil Code, Article° 202°.

<sup>66</sup> D.L. 468/71 defines the legal regime of the public water domain.

<sup>67</sup> D.L. 555/99 defines the legal regime for urbanization and building (Portuguese initials: RJUE).

<sup>68</sup> Garner, note 13 above, p. 291.

The example of a common right cited by Paasch comes from Swedish law:<sup>69</sup> “... a common property unit (samflighet), where several real properties own a share in the common property unit ... if one of the shareholder properties is sold, the share in the common ownership right in the common real property unit automatically follows with the sale”.

These definitions fit into the common right concept from the appurtenance super-class, thus classifying as private property rights.

The Portuguese institution of the Commons, known as *Baldios*, grants ownership of such lands to public entities recognized in the Constitution as local communities.<sup>70</sup> The management of *Baldios* is mandated to locally-constituted commissions, according Law 68/93,<sup>71</sup> amended by Law 89/97.

The subject is the local community, usually the inhabitants of a single settlement. Customary law defines specifically which members of the local community should be shareholders of a *Baldio*. The object is communal land used and managed as such since time immemorial. Provided a qualified majority of shareholders agrees with modifications (together with other provisions established in Law), a *Baldio* or parts of it can be sold as private property, or the reverse (private lands can be integrated into a *Baldio*).

The concrete management and use of the land and resources in a *Baldio* is regulated by customary law or (in recent cases) by a use plan. A *Baldio* can be encumbered by both praedial servitudes from private law and administrative servitudes from public law.

The afore-mentioned specific aspects of this form of property justify its being modelled as a specialized category which is not included in the legal quadrants presented at the beginning of section 2.

### **Legal and Administrative Modelling**

A fairly comprehensive account of Portuguese real rights and of public and private restrictions has been outlined above. According its contents, they will be ascribed to specialized classes under the presented classification schema by Paasch, with some adaptations. Such classification will use as basic elements the ones belonging to UML class diagrams.

The set of real rights and public and private restrictions will be depicted in the following sections through class diagrams ordered by each of the previously defined quadrants, except for the first section dedicated to the ownership right as fundamental real right. It must be stressed, however, that following class diagrams represent only those rights usually recorded at the Land Register. Some of the rights discussed above do not figure here.

After the first set of class diagrams, focusing solely on the legal and administrative components, a number of specific object diagrams will depict relationships with instances of geometrical and person-specialized classes.

### **Specialized Ownership Right Class**

---

<sup>69</sup> Paasch, note 12 above, pp. 128-129.

<sup>70</sup> A. Dinis, E. Henriques, and I. Contreiras, *Direito* (1987), p. 271.

<sup>71</sup> Law 68/93 is the Law of *Baldios*. This form of ownership has old roots and evolved from a customary right to a more elaborate legal regime recognized in the Portuguese Constitution.

On the first class diagram the principal legal types of (private) ownership, grouped previously as Type A Real Rights, are associated with the abstract main class of ownership right.

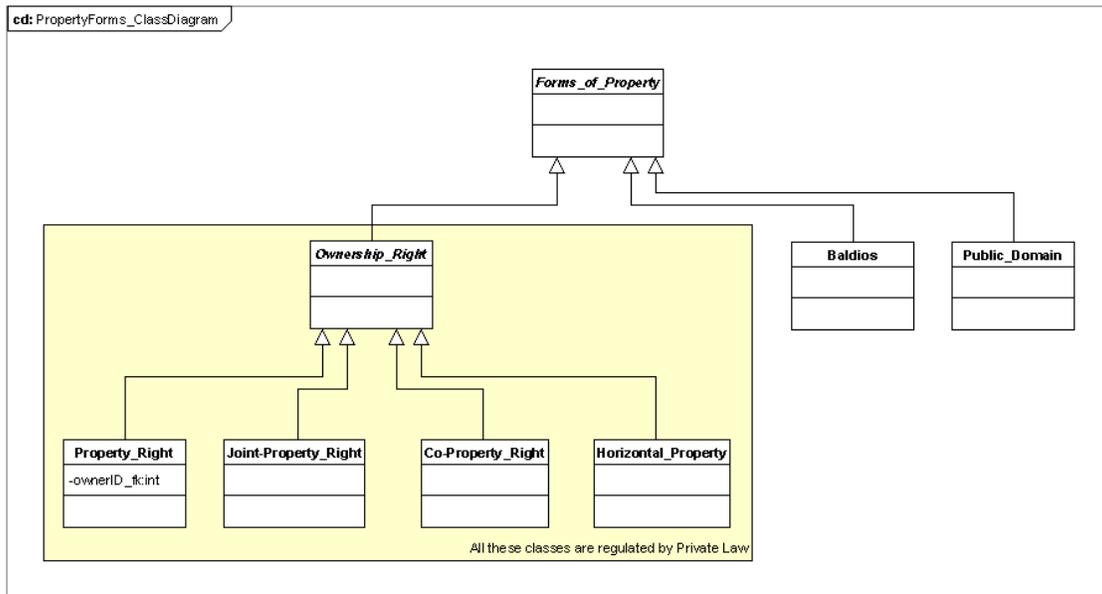


Figure 1- Ownership specializations

As depicted in the diagram, a high level abstract class *Forms\_of\_Property* represents the basic forms of property recognized in the Portuguese Constitution and law. The ownership right, as regulated by private law, is one of the three possible forms of property, whereas public domain is regulated by public law and *Baldios* is regulated by a specific law. Specialized classes under ownership include property, joint-property, co-property and horizontal property, as previously defined.

#### IV Quadrant (Private, Positive Real Rights) Specializations

The abstract class from which all the other derive is appurtenance, representing all positive real rights under private law. The following hierarchy represents classes according to the Paasch classification.

The final, more specialized level represents real rights as defined in Portuguese law classified according to the Paasch specialized classes.

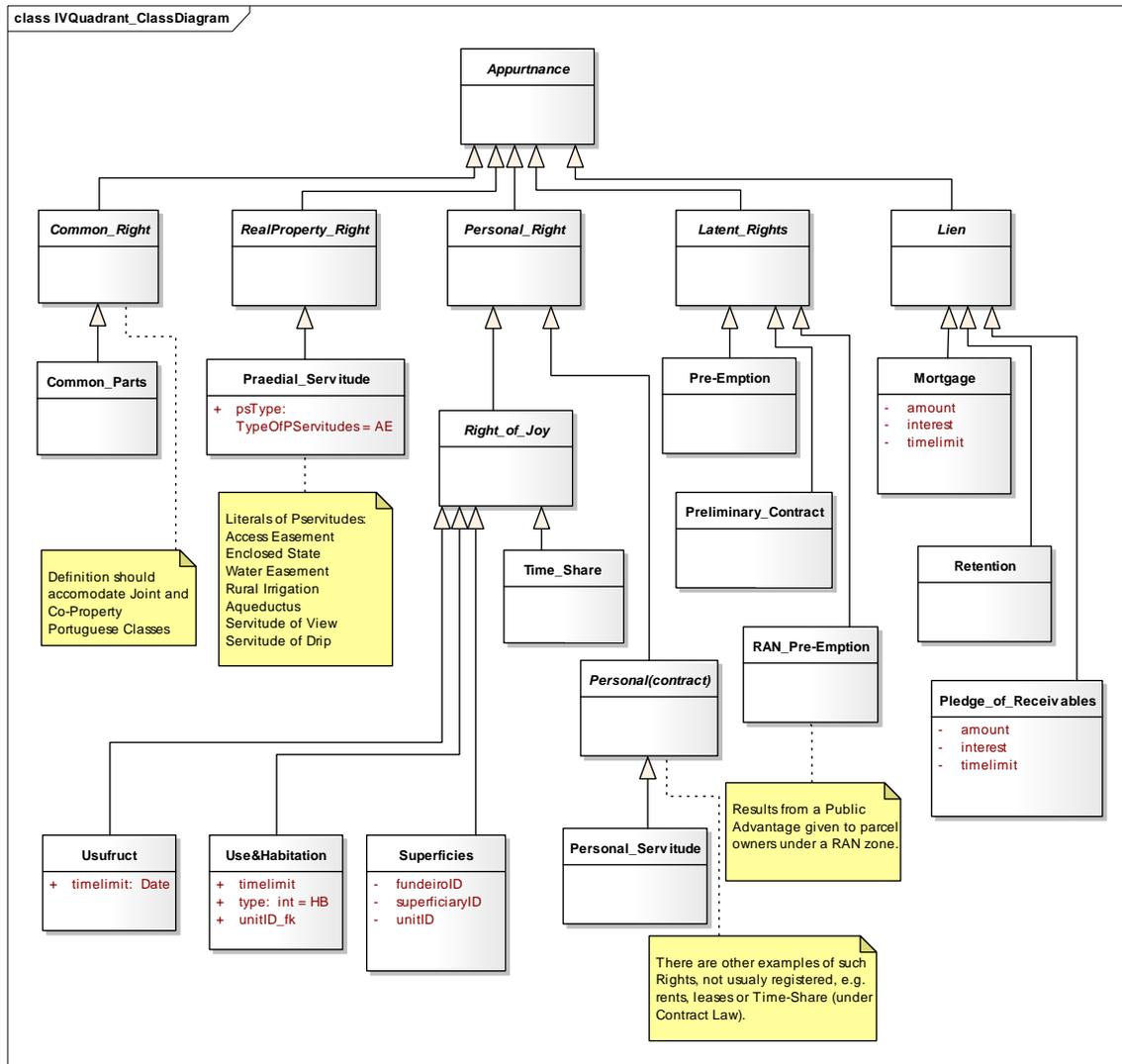


Figure 2 - Appurtenance specialization classes

Beginning with common right, the class common parts was created as specialized class, and represents the common interests hold by the owners of horizontal property on a same building. Only one specialization of real property right is presented, namely Praedial Servitude, but there are several different types included as comments in the UML diagram. As this is a IV Quadrant diagram, just the positive side should be recorded here, that is, the one related with the *Praedium dominans*.

The personal right has four specialized classes, namely usufruct, use and habitation, superficies and time share, as defined previously. The reason to depict them as distinct classes (and not identify them through a Type attribute) is their different nature concerning coverage (exerted on the whole parcel or in part), time limits, inheritance, or relations with the holder of ownership rights.

Three specialized classes were identified under latent rights, the first regarding pre-emption rights, the second a preliminary contract, and the third respecting a result from a public advantage under RAN regime (see above), also manifested as a different type of pre-emption right, called “RAN Pre-Emption”.

Under lien, a total of three specialisation classes were identified, previously defined as Type D real rights: mortgage, retention and pledge of receivables. These rights exhibit different characteristics which justify maintaining them as separate classes, namely, regarding the way they are recorded.

Two Object Diagrams below will show relationships of superficies and horizontal property real rights with other components of the LADM class diagram.

### I Quadrant (Public, Positive Rights) Specializations

Land administration regulations are frequently seen as a burden imposed by the State on (private) ownership, but they should be considered as public regulations as defined by Paasch.<sup>72</sup> However, imposing certain types of zoning or even creating certain types of public domain in the vicinity of a privately owned parcel can be beneficial financially (through increased value) and legally (granting special rights to the owner).

The following diagram departs from the abstract class public advantage as defined by Paasch<sup>73</sup> and considers a series of specialized classes representing benefits to ownership rights granted by (land administration) zoning and public domain.

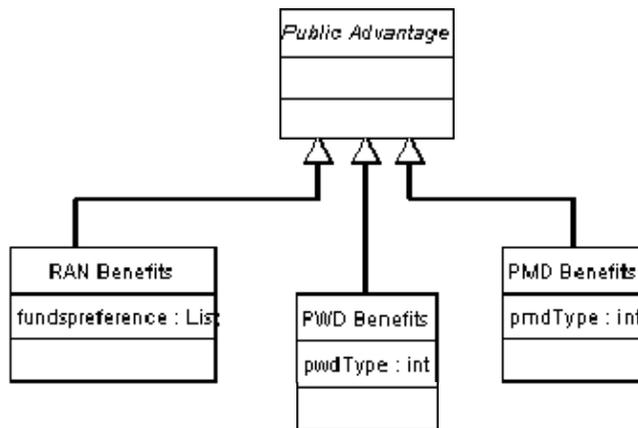


Figure 3 - Public Advantage specializations

RAN Benefits are those introduced by National Agriculture Reserve zoning, namely giving preference to some public funds to owners of parcels under RAN or granting pre-emption rights to acquire neighbouring parcels also under RAN. PWD Benefits are those introduced by proximity to a public water domain where several activities are allowed (water sports, tourism or recreation). Similarly, PMD Benefits are those introduced by proximity to a public municipal domain such as a municipal road with urban infrastructures as water distribution and sewage.

### II Quadrant (Public, Negative Rights) Specializations

<sup>72</sup> Paasch, note 12 above, p. 130.

<sup>73</sup> Ibid.

The relevant class diagram depicts three main elements previously defined under public regulations. They are modelled as specializations of the abstract class public regulation. There are several differences contributing to definition as independent classes, notably regarding the fact that expropriation and requisition refer to administrative processes. The expropriation class refers to a temporary process which turns private lands into public domain, whereas requisition is by definition temporary (with duration fixed by law). An administrative servitude does not generally specify a time limit.

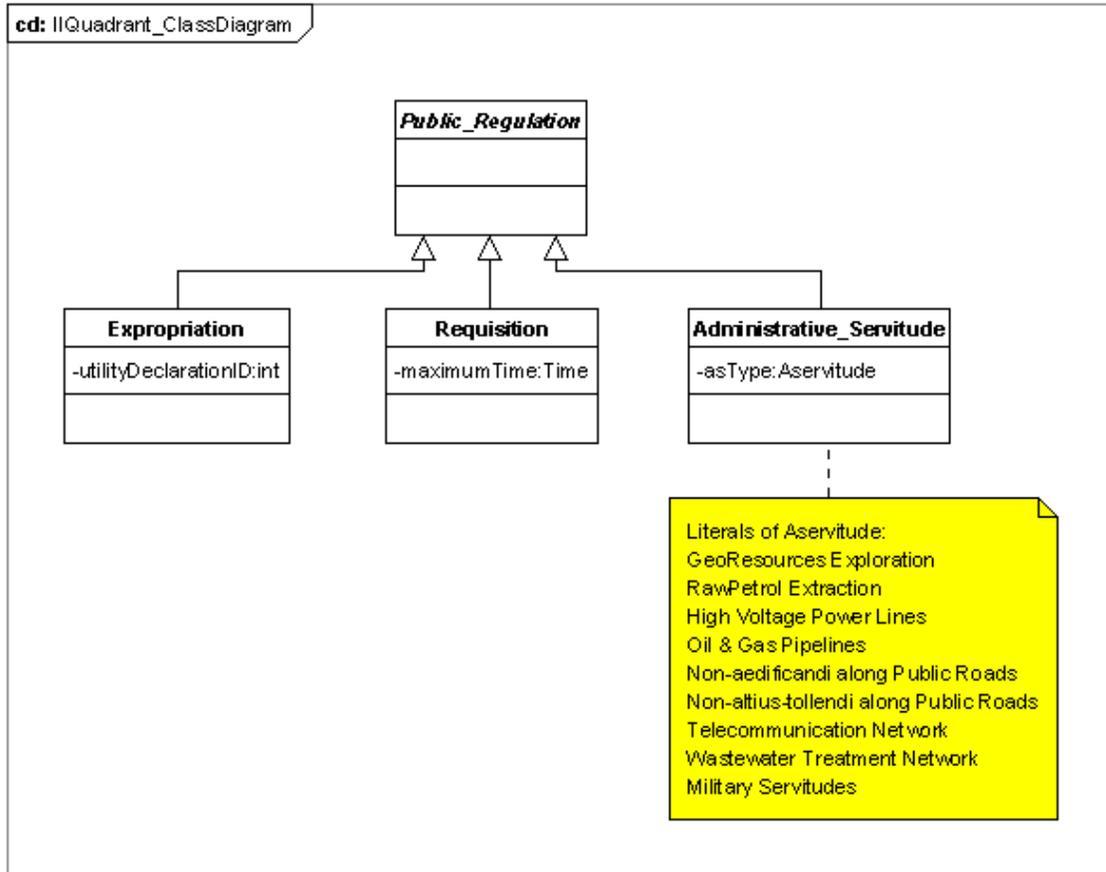


Figure 4 - Public Regulation specialization classes

The diagram shows a limited number of types of administrative servitude, as literals from the asType attribute.

The Object Diagram shows relationships of the expropriation class with other LADM objects.

Administrative public regulations are not shown in the diagram, although they should be considered as specialisations from the public regulation abstract class.

### III Quadrant (Private, Negative Rights) Specializations

In general, specializations concern the abstract class of encumbrance and should correspond to the negative side of real (and also certain personal) rights already depicted in Figure 2 above. As discussed elsewhere,<sup>74</sup> when registering such rights there is always the possibility to limit registration to the positive side of real rights (which type of powers are given to whom) or to the negative side (which type of restrictions encumbers each right). A third possibility is to register a mix of positive or negative side of rights, depending on the type of right concerned, as implemented, for example, in the Dutch register.

The Portuguese land register records the positive side of rights in the most cases. As a result, we have not produced a diagram for this Quadrant, but the issue deserves further attention. Another consequence is that in order to verify which encumbrances affect a given property right, one has to retrieve the set of rights recorded for the concerned parcel and examine the record. From the standpoint of the security of a real estate transaction, however, it is fundamental for a buyer to know what negative rights, if any, affect a given parcel. Although an aware the seller will normally inform the buyer about the positive rights, even this cannot be assumed and should be verified against the register.

#### Object Diagrams

This type of diagram is included in order to show relationships between instances of previously identified real rights and respective subjects (persons)<sup>75</sup> and objects (real estate).

##### *Superficies Right Object Diagram*

This diagram shows an example of relationships between a superficies right and respective parties as natural persons (subject names: Francis as superficiary and Bob as *fundeiro*) and real estate (object: Building Reserve). The *fundeiro* (Bob) has the property right in parcel (LA\_RecordedObject class in LADM) where the Building is located.

---

<sup>74</sup> Zevenbergen, note 6 above.

<sup>75</sup> Represented in LADM by the generic party super-class.

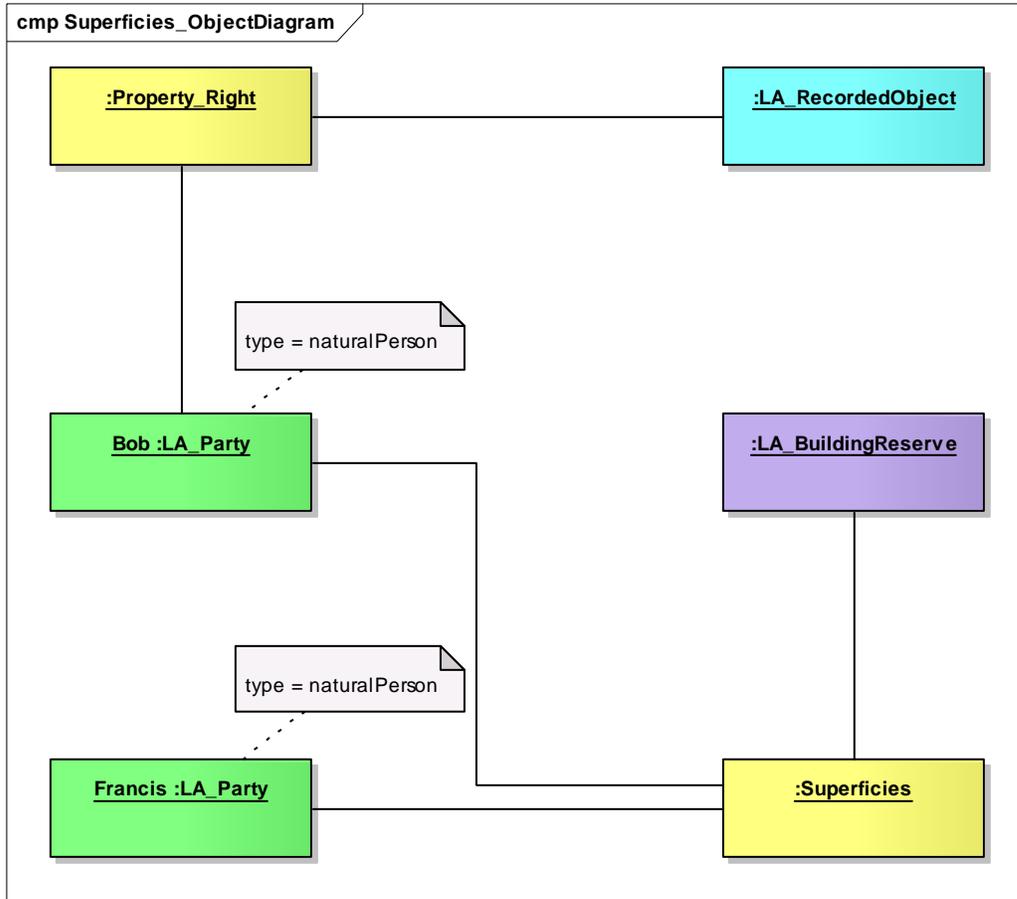


Figure 5 - Superficies Objects

Colours/shades of grey follow general LADM components conventions, as in the following legend:



### *Horizontal Property Object Diagram*

In this diagram objects involved in the horizontal property relationship were included. Real estate objects represent units in a larger (apartment) building, with the individual unit related to a specific natural person, Tom, through the horizontal property right.

To fully characterize horizontal property, however, the parts of the building held in common, represented by the SharedUnit object name, should be related to the group of persons holding horizontal property rights in the building, that is, the “Condo Owners Assembly” Group Person (LADM: LA\_GroupParty), through a common parts right.

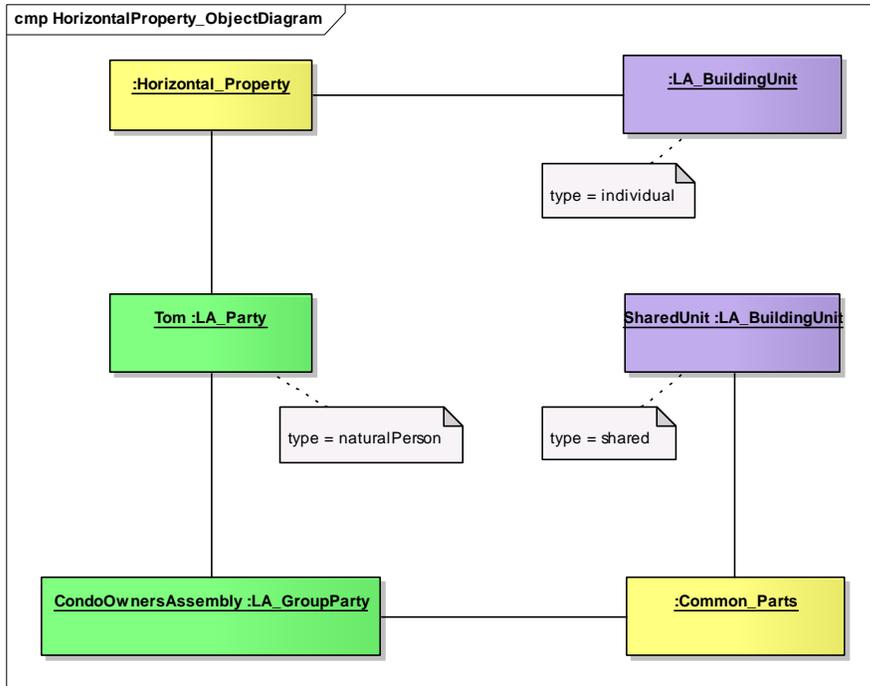


Figure 6 - Horizontal Property Objects

*Expropriation Object Diagram*

This diagram shows the relationships of the expropriation object with a special type of non-natural person representing the State as the subject (see comment); and with an AdminParcelSet object name<sup>76</sup> representing the set of parcels that will be expropriated.

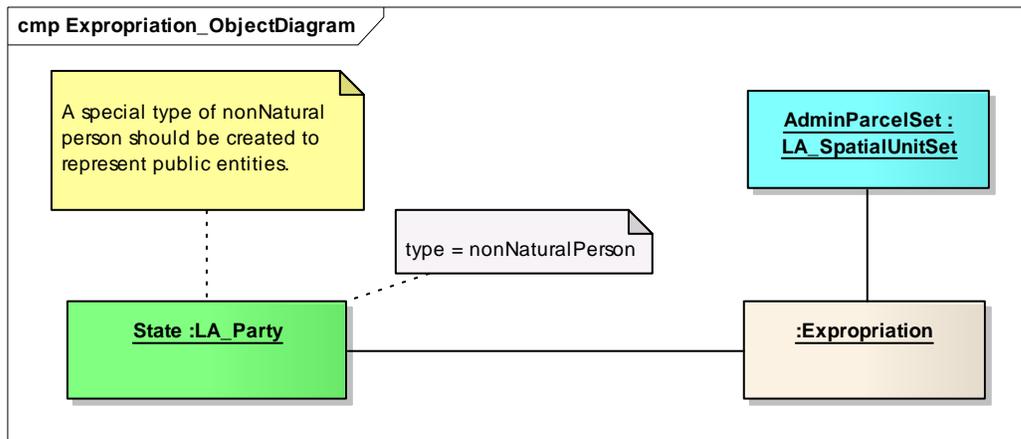


Figure 7 - Expropriation Objects

<sup>76</sup> The corresponding class on LADM is the LA\_SpatialUnitSet, which is a generic class representing a set of non-contiguous spatial features.

Expropriation is an administrative procedure, and above diagram merely shows the first phase where affected parcels are identified. In a second phase a number of new land parcel objects should be created in order to define which portions will constitute the public domain (not depicted). The expropriation object is not coloured because this type of objects was not yet determined in the LADM.

### **Conclusions and Recommendations**

Differences in legal modelling can be traced back to diverse legal traditions that are a product of national history and society.<sup>77</sup> A few differences were immediately detected in definitions contained in *Black's Law Dictionary*; for example, the public servitude compared with the administrative servitude. Such differences lead to a few modifications of the basic model proposed by Paasch, especially concerning the distinction between personal rights classified as real rights of enjoyment and those rights regulated by the general law of contract.

The definitions of Portuguese real rights herein are based on current legal doctrine and, as such, the proposed implementation of the Legal Model followed a doctrinal approach in most cases. Although this approach might lead to adoption by Portuguese institutions more readily, further modifications of the basic model were implied, and this may engage different results were a functional approach to be adopted.

An alternative is to suggest a Legal Model having the widest possible application by defining a number of Legal Profiles based on certain legal traditions; for example, for countries which have derived their real rights from Roman law. Such Profiles should enable a more detailed level of analysis based on a simpler and more abstract legal core model.

The results of this study do lack investigation of the behaviour of real rights related to their means of creation, modification or extinction. It is recognized that the modelling of such dynamic aspects may eventually lead to further modifications of the legal model and supply more insight into relationships with other components of the LADM.

As regards the modelling of real rights forming the core of the legal classes presented in the IV<sup>th</sup> Quadrant (private law, positive side of rights), a number of issues arose from the consideration of previously proposed classifications.<sup>78</sup> A comparison of each classification with modern Portuguese legal doctrine led to the general conclusion that the most similar classification was that presented in Zevenbergen.

In Portugal there is no clear distinction between derived rights and minor rights; Table 1 attempts such distinctions based on classification definitions.

---

<sup>77</sup> J. Zevenbergen, "Systems of Land Registration – Aspects and Effects" (PhD Thesis TUDelft, Publications on Geodesy 51, Netherlands Geodetic Commission, 2002); also see E. Stubjkaer, "The Institutionalization of Real Property Rights – The Case of Denmark" (2004) (University of Aalborg, unpublished).

<sup>78</sup> Zevenbergen, note 6 above; Paasch, note 12 above.

It was far more difficult to ascribe Portuguese legal right classes to specializations of the appurtenance main class in Paasch. The final result equally reflects (indirectly) a transformation between the two classification schemes. Major discussions revolved around the distinction between personal rights as real rights and personal rights under general contract law. Symptomatic of these difficulties is the fact that there were problems with the personal rights examples. There were also problems with the classification of common rights arising out of the original definition, which precluded some obvious Portuguese candidates as *Baldios*. Thus, the class diagram in Figure 2 was obtained after lengthy discussions between the co-authors and should be regarded as a best fit and not a unanimously agreed result.

It should be said that the class diagrams in the other legal quadrants are a contribution of this article, and consideration of its classification definitions also played a part in the different arrangement presented here (as opposed to original contributions).

Of relevance too, new and clearer insights into the interplay of legal and administrative components and LADM resulted from the modelling effort. Although mainly Portuguese legislation and land administration regulations were considered, the fact that they were reflected in an international modelling effort similar to that in Paasch and LADM could form an important contribution to further developments in this research area.

The main difference between the Paasch and Zevenbergen classifications of real rights relate to the legal doctrinal base. Zevenbergen's classification is built on the tradition of civil codes throughout Western and Southern Europe rooted in Roman law. Paasch's classification is more functional and should be able to fit the set of rights, restrictions and responsibilities regarding land in any legal system of the world, but in a way that challenges the average expert of the legal system through the use of unfamiliar "neutral" terminology. In the Portuguese implementation presented here, Zevenbergen's classification fitted better, but for a generic LADM the classification by Paasch should be more appropriate.