

Questionnaire 3D-Cadastral: status November 2010

Spain



This questionnaire is an activity of the FIG working group 3D-Cadastral 2010-2014. The purpose of the survey is to make a world-wide inventory of the status of 3D-Cadastral at this moment (fall 2010) and the plans/expectations for the near future (2014). By sharing this information, it should be possible to improve cooperation, learn from each other and support future developments. For more information on the FIG working group on 3D-Cadastral see the website of this working group www.gdmc.nl/3DCadastral. Now a few notes and suggestions, which should be helpful when completing the questionnaire:

- In this questionnaire the concept of 3D-Cadastral with 3D parcels is intended in the broadest possible sense. However, what exactly is (or could be) a 3D parcel is dependent on the legal and organizational context in the specific country (state, province). 3D parcels include land and water spaces, both above and below surface.
- A more formal definition: A 3D parcel is defined as the spatial unit against which (one or more) unique and homogeneous¹ rights (e.g. ownership right or land use right), responsibilities or restrictions are associated to the whole entity, as included in a Land Administration system.
- As the definition above is quite abstract, it is tried in the questions below to be more specific and real world situations are used. Also two example sets of partial/preliminary answers are included from Australia, Queensland and The Netherlands, to support the questions and to be of help when formulating the answers for your jurisdiction.
- A 3D parcel is a 'legal object' describing a part of the space. Often there is a relationship with a real world/physical object, which can also be described in 3D. Please be aware of the difference between these two types of objects and that the focus in the context of 3D-Cadastral is on 3D parcels (spaces of legal objects).
- If a certain question is not relevant or if you have no clue what to respond, do not spend any time on this (and leave the field blank).

¹ Homogenous means that the same combination of rights equally apply within the whole 3D spatial unit. Unique means that this is the largest spatial unit for which this is true. Making the unit any larger would result in the combination of rights not being homogenous. Making the unit smaller would result in at least 2 neighbour 3D parcels with the same combinations of rights.

1. General/applicable 3D real-world situations

This part of the questionnaire refers to the applicable 3D real-world situations to be registered by 3D parcels. It also addressed the types of 3D geometries, which are considered to be valid 3D representations for these parcels.

	Spain 2010	Spain 2014
1.1. Are all 3D parcels constrained to be within one surface (2D) parcel?	Yes. The rights referring to 3d. Cadastral cartography only represents cadastral parcels or urban estates, while the scale plane of every different floor and interior spaces are represented on digital other document (FXCC) link with the 2D map. In Annex I attached the documentation how with the map and these planes of every floor we can produce 3D	
1.2. Are ambulatory ² boundaries permitted?	Yes By law a boundary of a land parcel which follows the movements of a natural feature such as a river	
1.3. Is it allowed to have 3D parcels not related to physical constructs or objects?" (e.g. airspace, subsurface volumes)	Yes. For example parking cells under the ground	
1.4. Are disconnected parts of a single 3D parcel allowed?	yes	
1.5. Limitation – e.g. must the 3D parcel be described by a boundary definition?		

² An ambulatory boundary is a boundary of a land parcel which follows the movements of a natural feature such as a river. Its position determined at points of time (when a survey is carried out), but between such “fixes”, the definition of the property is the position of the real world natural feature.

	Every unit of a building (for example one apartment) has its own cadastral reference Currently individual apartments are usually not visible on the cadastral map, only the outline of the apartment building as related to the ground is visible. However, the rights are attached to the individual apartments and the citizens and other users are interesting in these individual data. With the digital FXCC it is possible to access to this data (see attached example at the end of this document)	
1.6. Are curved surfaces to bound the 3D parcels allowed?	no	
1.7. Must the curved surfaces (if allowed) be cylindrical sections, or any other constraint?		
1.8. Any other constraints – e.g. all surfaces must be horizontal or vertical?		
1.9. Is there generic legislation (law and/or regulations) for 3D descriptions of parcels? If so please, mention law and article(s).	No	
1.10. Is the legal text available in original language?		
1.11. Is the legal text (relevant part) available in English translation?		
1.12. Do you have example descriptions of typical 3D parcels; either ‘prototype’ or ‘operational’?	Yes, look the annex	
1.13. Is there a formal model for the 3D parcels (UML style); e.g. based on ISO TC211 series?	No	
1.14. Are natural resources (groundwater, mining rights) considered as 3D parcels?	No	
1.15. Are polluted areas considered as 3D parcels (as legal restrictions are associated to these spaces: above and below surface)?	NO	
1.16. Are spatial plans considered as 3D parcels (as rights or	Yes. Planning takes care of vertical and horizontal	

restrictions are related to them)? Sometimes also called spatial development plans, zoning plans or physical plans (land use, urban, regional, environmental,...)	propriety division	
1.17. Any other geometric issues?		

2. Infrastructure/utility networks

This refers to the situation where an infrastructure network is considered to be defined within the cadastre. For example in some jurisdictions, an underground network might be privately constructed for the purpose of leasing space in it for other organisations to run cabling. In this case, a network, or part of that network may be considered to be a real estate object.

	Spain 2010	Spain 2014
2.1. Do you register network parcels? (e.g. subterranean conduit networks)	No	
2.2. If so, can the network structure be traced in the database(s)?		
2.3. Does the jurisdiction have private networks? If so please, mention law and article(s).		
2.4. If so, are they registered as 3D property parcels?		
2.5. Is the legal text available in original language? If so, give references to relevant document(s).		
2.6. Is the legal text (relevant part) available in English translation?		
2.7. Do you have example descriptions of typical 3D parcels for networks; either 'prototype' or 'operational'?		
2.8. If the network (legal) objects break at the surface parcel, how do you deal with intersecting networks or vertically parallel networks?		
2.9. Any other geometric issues?		

3. Construction/building units

This refers to 3D properties that are related to constructions and apartment (condominium) buildings. The individual units are often defined by the actual walls and structure of a building, rather than by metes and bounds. E.g. “unit 5 on level 6 of ... building”.

	Spain 2010	Spain 2014
3.1. Do you register 3D construction/building units?	yes	
3.2. If so, what are the most important types? E.g. apartment units, or also other buildings or even more general constructions (infra related; such as bridge, tunnel or even other, such as windmills,...)	Most common are building units and parking cells	
3.3. Does the jurisdiction have construction/building units? If so please, mention law and article(s).	Consolidated text of the law of the Real Estate Cadastre, passed by Royal Legislative Decree 1/2004, of 5 of march. Date BOE 08/03/2004. BOE nº 58 Royal Decree 417/2006 from April 7, by which is developed the consolidated text of the law of the Real Estate Cadastre. BOE Date 26/04/2006. BOE nº 97	
3.4. Is the legal text available in original language?	Yes	
3.5. Is the legal text (relevant part) available in English translation?	No	
3.6. Do you have example descriptions of typical 3D parcels; either ‘prototype’ or ‘operational’?	Yes, see annex II	
3.7. What would be typical 3D boundaries in an apartment complex: middle of the wall and floor/ceiling, or walls, floors/ceiling as neutral/shared 3D space?	Typically the unit is defined to the middle of the walls/ceilings.	
3.8. Is common property inside the building registered? If so, how?	Yes	
3.9. Who owns the common property inside the building?	All the owners of an apartment with a percentage	
3.10. Who owns the land on which the apartment is built?	Generally all the owners of an apartment with a percentage, but can be other types of	

	rights	
3.11. Any other geometric issues?		

4. X/Y Coordinates

	Spain 2010	Spain 2014
4.1. Do the plans of survey guarantee X/Y coordinates? (and are they relative or in an absolute spatial reference system?)	yes	
4.2. Are the cadastral database coordinates authoritative?	No.	
4.3. If not, what is the authoritative source of X/Y coordinates?	National Geographic Institute	
4.4. Do you have parcels defined by the walls of a building (with no recorded geometry)?	Yes, but we are referencing all the units	
4.5. What is the spatial reference system for X/Y Coordinates?	Now we are changing to the European system	
4.6. Any other X/Y coordinate issues?		

5. Z Coordinates/height representation

	Spain 2010	Spain 2014
5.1. Are the Z coordinates of 3D parcels relative to local ground?	No guidelines.	
5.2. Are Z coordinates reduced to a standard datum (absolute)? If so, what is the spatial reference system for the Z coordinate?		
5.3. In principle possible to store both relative and absolute Z coordinate?		
5.4. Is the earth surface (height) explicitly stored (in the DCDB or other accessible register)?		
5.5. What is the source of elevation for the 2D surface parcel?	Surface elevations are not recorded in the DCDB.	
5.6. Any other Z coordinate issues?		

6. Temporal Issues

	Spain 2010	Spain 2014
6.1. Are temporal limits part of the definition of a parcel (2D or 3D)?	No	
6.2. Are moving parcels allowed?	No	
6.3. Are there any limitations on the range of temporal limits? (e.g. only on 3D apartments).		
6.4. Are there any attempt to integrate 3D space and temporal representations, into a single 4D space/time representation?	yes	
6.5. In the case of tidal boundaries, what happens to the 3D ambulatory parcel if the 2D land parcel changes extent due to the movement of High Water Mark?		
6.6. Any other temporal issues?		

7. Rights, Restrictions and Responsibilities

	Spain 2010	Spain 2014
7.1. Range of RRR on 3D parcels.	Same as 2D although may involve responsibility for common property and ownership of subsidiaries such as car parks.	
7.2. Are there any limitations on the range of rights? (e.g. subterranean parcels must be owned by Govt).	No	
7.3. Any other RRR issues?		
7.4. Are there RRRs that are only allowed in 3D (and not valid for 2D)	No	
7.5. Is there specific legislation (laws, regulations) defining 3D RRR types? If so, provide details, e.g. references to documents/ articles.	No	
7.6. Can 3D sub-surface/above-surface parcel be owned by someone other than the person owning the land parcel?	yes	
7.7. What applications do you foresee for 3D cadastre?	Many, air traffic, security, environmental, but mainly property market	

8. DCDB (The Cadastral Database)

	Spain 2010	Spain 2014
8.1. Does the DCDB contain representation of 3D parcels (in any form)?	Yes, but with the limitations described above	
8.2. If so, how are they represented (in the DCDB)?	2D in the map and 3D in other documentation	
8.3. If so, how are they presented on cadastral “maps” (including screen presentations)?		
8.4. Are there possibilities to store geometry of 3D parcels in the DCDB?	No. we built it every time	
8.5. Is it possible to manage a 3D topological structure in the DCDB?	no	
8.6. Are constraints/rules defined for valid 3D objects (closed volume, no overlap, no gap in 3D)? What about rules for a mix of 2D and 3D representations?	See annex	
8.7. How can internal and external user query and visualize the 3D content supporting rotating, slicing, transparency, perspective (3D web/view service, 3D pdf documents,...)?	Not jet	yes
8.8. What Spatial DBMS software do you use? Any 3D capabilities included and used?	Only KLM	
8.9. Do you have any validation rules for 3D representation in the database?	no	
8.10. What (GIS/CAD) software is used for updating, editing, analysis, and visualization of the cadastral data? Any 3D capabilities included and used?		
8.11. What web software is used for remote data access/distribution and visualization? Any 3D capabilities included and used?	KLM	
8.12. Is your DCDB organised as Multi-Layers or Object Oriented or some other data model?	both	
8.13. How do you query 3D objects in your DCDB?		
8.14. Is it possible to query neighbourhood parcels to a 3D	yes	

object, vertically as well as horizontally?		
8.15. Any other DCDB issues?		

9. Plans of Survey (including field sketches)

	Spain 2010	Spain 2014
9.1. Do the survey plans carry 3D parcel representations?		
9.2. If so, how are they represented?		
9.3. Is there specific legislation (regulations) describing the requirements for Plans of Survey in 3D? If so, please give link to the relevant documents.		
9.4. Is sketch level allowed (low geometric quality, but in principle enough to indicate the 3D object)?		
9.5. Is it possible to define a 3D parcel by referring to other 3D real world objects/ topography (and not specifying coordinates)?		
9.6. In what format are the 3D parcels submitted for registration; attached to legal document in a single pdf (which has good 3D capabilities) or in an extension of (city)GML for 3D parcels, or....?		
9.7. Are the 3D parcels somehow checked for spatial validity; e.g. volume is closed, does not overlap with neighbour volume (and also no unwanted 3D gaps)?		
9.8. Do you have examples of (prototype or production) 3D survey plans available?		
9.9. Are any reference objects visible on the survey plan (e.g. real buildings, roads, that is 3D topography)?		
9.10. What form of 3D data acquisition is used (CAD, terrestrial surveying, sketches, stereo/oblique images, laser scanning,...)?		
9.11. What software do you use for creating and processing survey plans? Any 3D capabilities included and used?		
9.12. Can 3D parcels be subdivided, consolidated or nullified?		
9.13. Is there any existing technical circular or directive to assist Surveyors in 3D data collection in		

the field?		
9.14. Any other survey plan issues?		

10. Other Issues

Please include any other issues that may be of interest in an international context. For example, in some foreign jurisdictions 3D parcels can only be separated by horizontal planes.

10.1. Country (State, Province)	Spain
10.2. Your name, function/position and your organization	Amalia Velasco International Coordinator of the Spanish Directorate General for Cadastre
10.3. Contact details: address email, telephone	Travessera de Gracia 58, Entresuelo. Barcelona 08006. Spain Amalia.Velasco@catastro.meh.es + 34 660538686
10.4. Other issues	

Annex I

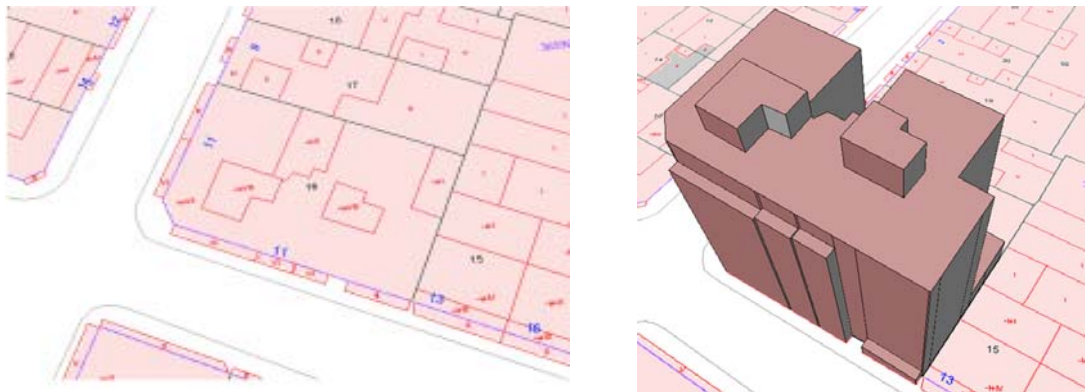
CATASTRO ESPAÑOL 3D

Cadastral cartography has the information of the volumetry of the buildings by number of plants in roman numerals in their maps.

These texts (the numbers) are attributes of the construction layer (CONSTRU) in the data model.

The cadastral parcel as main layer of the cadastre data model has premises (recintos, in Spanish) with polygon topology and its geometry is captured in 2D, this constitutes a continuous model of the territory, without overlaps or holes.

Each cadastral parcel where a building is located is subdivided in “*recintos*”, *premises*, where the different parts of the building are separate: by their very nature (IP pool, JD Garden, TZA terrace,...) or by number of plants (-I+IV basement plus four plants, -II+SOP+X two basements plus veranda plus ten floors,...).



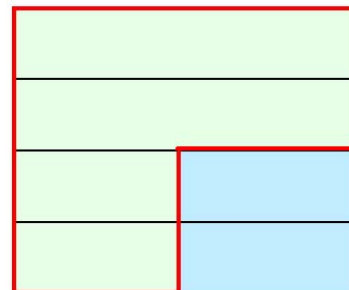
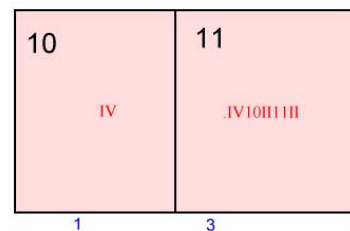
Can 3D modelling all cadastral parcels based on the attribute of construction layer .
The process is to interpret this attribute to obtain the real number of plant of the building, multiply by 3 m that is the average plant height.
This 3D representation of prismatic geometric elements, provides a more or less realistic representation of buildings of an urban area.



There are some exceptions to take into account:

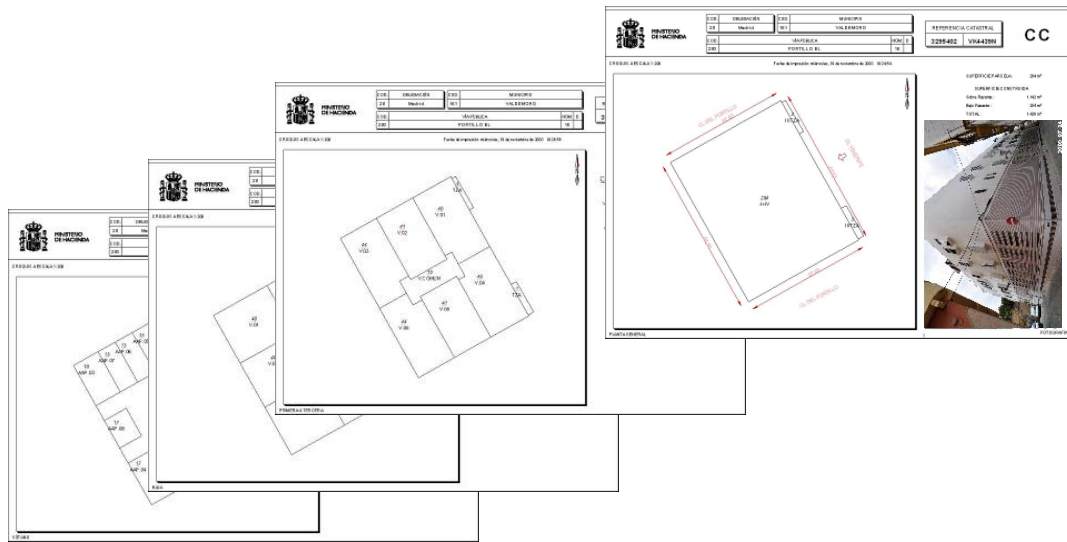
- The terraces or balconies are premises that lie outside the perimeter of the cadastral parcel and fly on the public domain .
- Another exception is when part of a building at a certain height is inserted into another building of the adjoining cadastral parcel, in this case is called "macladas houses".

In these cases you can only define their representation by the syntax of the attribute.



Another way of representing buildings in 3D, is based on vector information of the distribution of rooms of each significant floor of a building that we have in dxf.

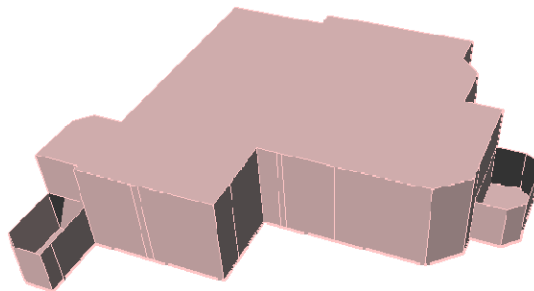
This information is stored in the database, in each parcel, independently but in a format called FXCC that it is georeferenced. (See Spanish “as-is analysis”)



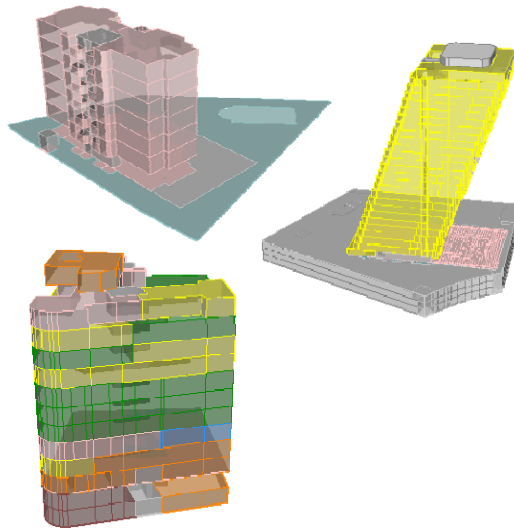
Each element (unit) in the building can be represented geometrically in 3 dimensions in their physical space inside of the building. The Z component sets of 3 meters per plant .

Each local 3D geometric reconstruction is done using planes in space and is constituted by: soil (horizontal plane geometry 2D surface and the dimension of the surface multiplied by 3 meters), walls (as rectangular vertical planes of 3 meters in height of each pair of coordinates), roof (horizontal plane geometry of the local 3 metres above the ground).

There are some exceptions based on the attribute of the element, in the case of the terraces the objects are defined by a floor and walls of 1.5 meters in height.



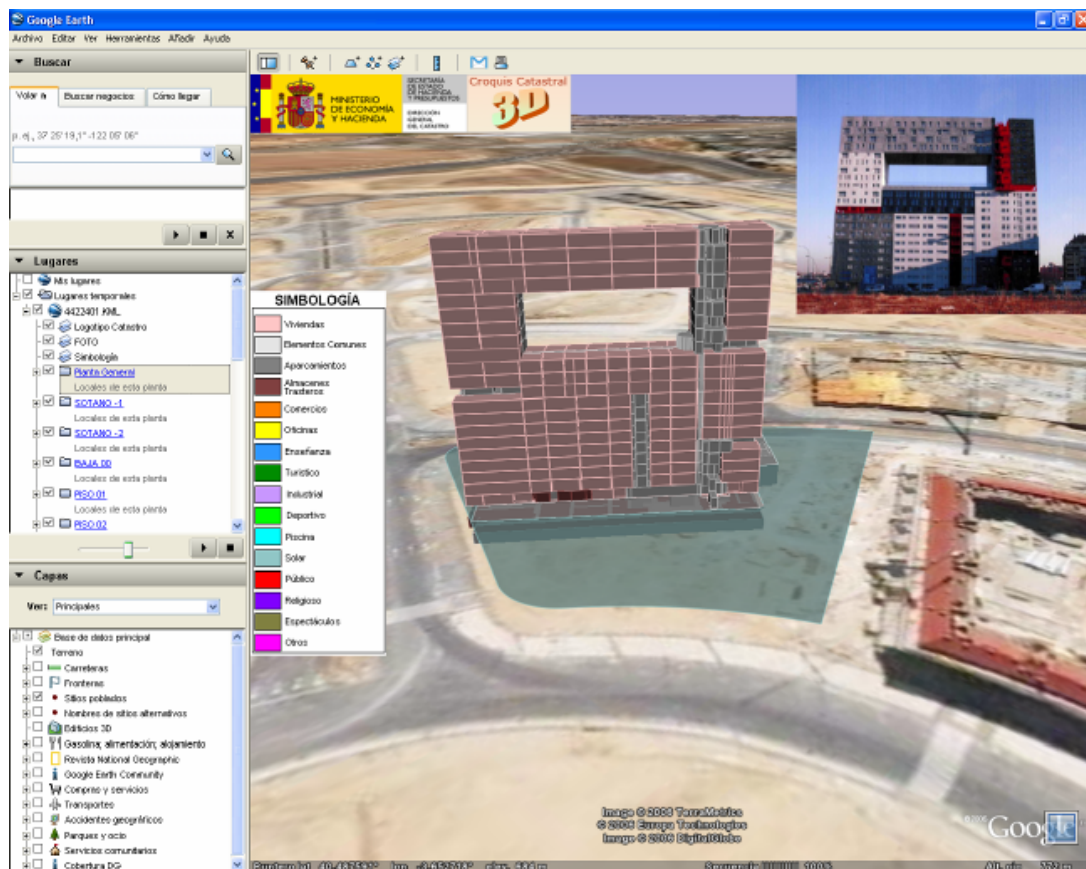
Reconstruction of a building element by element, unit by unit is represented in 3D is as follows, assigning to each unit a colour depending on its use.



The format that we have chosen to view the buildings in cadastre is KML, which allows viewing in a 3D navigation through Google Earth.

At this moment not all the Spanish territory has this information but we are working on it and it will be ready before 2019

This 3D database contains approximately 4.5 million buildings, with complete cities such as Madrid for example.



Annex II

Data harmonisation component	Questions for as-is analysis of reference documents	As-is analysis
0 Context	Sources for the as-it analysis Country – Producer – Name of product	Spanish Directorate General for Cadastre. Amalia Velasco Context: The Spanish Directorate General for Cadastre, depending upon the Ministry of Economy and Finance, is the Spanish Public Administration responsible for Cadastre, and therefore, is responsible for describing the real-estate properties of the country, being in charge of providing and keeping updated the Real-estate Cadastre as well as of taking care of the correct diffusion of Cadastral data for 95% of the Spanish surface (500.000 km²) with exception to Basque country provinces (7.261 km²) and Navarra (10.421 km²). The Spanish Cadastre is principally a fiscal cadastre, whose databases of cadastral values of rural and urban real estate are the basis for the calculation of real estate tax and other local, regional and national taxes. But this is not its only purpose: it is also a territorial database allowing the location and identification of cadastral parcels and the assignment of the cadastral reference, as well as the supply of graphic and literal information of <i>Urban Cadastre</i> - 12 million urban parcels. - 32 million buildings. - 28 million urban units. <i>Rural Cadastre</i> - 44 million rural parcels - 57 million sub-parcels (part of them also buildings) - 8 million owners
(B) Terminology	Definition of theme Building (if any)?	Theme “Building” includes buildings and other constructions. Definition: For cadastral purposes shall be regarded as constructions: a) The buildings, whatever materials that are built and the use to which it is intended, , provided that are permanently attached to the ground (over the surface o underground even if the can be transported or

But because we are very much used in Spain, many other institutions have taken our classifications.

(D) Application schemas and feature catalogues

Which features and attributes are available?
In case of enumerated attributes, give at least examples of possible values.

Which relationships between features?

In the case of rural real estate, the municipality is divided in polygons(zones) depending on the homogeneity of the cultures, existence of geographical accidents, etc, inside each polygon there are several parcels. The unit of property is the parcel. Each parcel has its cadastral reference. The rural parcel containing one or more sub-parcels depending on use or crops and intensity and quality of these crops

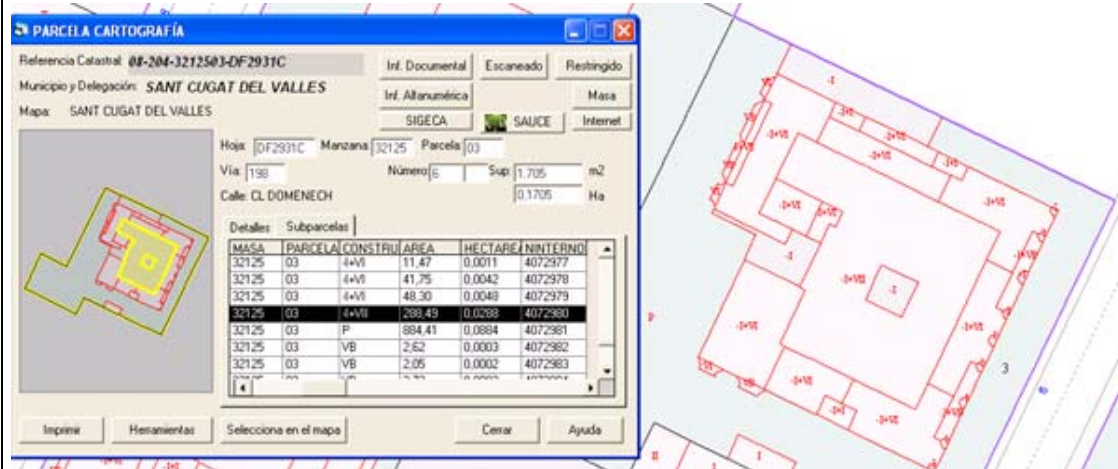
A rural parcel can contain constructions too and these constructions are subparcels.

In the case of urban land, the parcels are grouped in blocks “apples”. The parcels contain buildings and urban units (flats, individualiced parkings, other units inside the real estate.....). Each unit inside the parcel has his own cadastral reference, but all the urban units of a parcel have the same first part of the cadastral reference and all the parcels of a block have in common the first 7 digits of the reference.

In both cases, buildings are build by subparcels:

The feature for buildings is the subparcel (as volume constructed)

In the example bellow and attached at the end of the document:



		Every polygon with a volume is a subparcel and the building is composed by several subparcels of different volume constructed. The graphic object and they are georeferenced The sum of the cultivation or usage subparcels and the construction subparcels must be the full parcel surface Each has the cadastral reference of the parcel (first 14 digits that are common for all the flats, for all the units (locales), see identifier section) which allows linkage with descriptive information There are many associated literal attributes, some are related to the local units, some to the subparcels and some to the parcel. For example the owner (with all his name, identity number, address, type of right, participation coefficient, the value (in euros), the use(internal codification), the usage (internal codification) the address of the building, status of conservation, year of construction, category, temporal attributes that I explain later etc..... Also graphic attributes are several and different for parcel and for subparcel, (and also for each flat of the building, and for any unit in the FXCC that I describe in the next cell) For subparcel of construction the graphic attributes are: sheet, mass, parcel, wich is the cadastral reference of the parcel, built volume in number of floors (for example -I, -II, -I+IV...), area (in meters) , validfrom, validto, coordinates of the centroid, label etc... If necessary we can compose the out side perimeter of the joint of all the sub-parceles which would be the outline of the building
(E) Spatial aspects (Vector geometry)	Does your data base include 3D data? If yes, explain how.	In the Spanish Cadastre, for every building the data base has sketches by floor in digital form. It is named the "digital FXCC" (exchange format for the constructions). See example bellow. The FXCC document is a scaled graphic representation of the properties forming an urban real estate building. In every FXCC the different floors and interior spaces are represented. The FXCC contains a digital photo of the building too. This document is available via Cadastral Virtual Office and it is stored in the system as documental information and link up to parcel data by means of the cadastral reference. Every unit of a building (for example one apartment) has its own cadastral reference Currently individual apartments are usually not visible on the cadastral map, only the outline of the

	Which geometries are used (points, lines, surfaces, solids, ...)? Only straight lines or other types of interpolation (e.g. circular arcs)?	apartment building as related to the ground is visible. However, the rights are attached to the individual apartments and the citizens and other users are interesting in these individual data. With the digital FXCC it is possible to access to this data (see attached example at the end of this document) The construction subparcels :These objects are reflected as recints and stored as closed polygonal boundaries formed by chains of vertices stored in metres in the form of X-Y co-ordinates using the UTM (Universal Transverse Mercator) projection system The FXCC has lines, points, area and text. We use straight lines. When some of our collaborates give us circular arcs we convert this information to straight lines
(E) spatial aspects (Topology)	Are there topological rules?	Yes, you can see in the example below. There are rules to represent a building with different roof heights. not overlaps,
(E) Spatial aspects (Coverages)	Is part of territory covered only by raster data? If yes, which proportion?	No, all the information is vector data already.
(E) Spatial and temporal aspects (Temporal profile)	Are there historic/retired features in your database? Are temporal attributes available? If yes, which? Which are the life-cycle rules	The cadastral information is daily update. We have stored all the map modifications in digital form from 2002, so we can query the evolution of a map. In the literal form we have the information computerized since 1990 and in papers from the origin. We not only keep the last change but all of them. We have several date, when the physic or juridical change occurred in the reality, when the map is change, when de literal data is change, when the citizen declarated it..... Life-cycle rules: there are several rules but the most important is

(e.g. when a feature is considered as modified or as new)

Se asignará una nueva referencia a cada inmueble resultante de la división
We assign a new reference to each resulting unit after to build and split in units (horizontal division) and the old reference disappears

If you see the chapter about the identifier:

When a building is build in a parcel , the fourteen first digits of the cadastral reference will be maintained, the following four are assigned sequentially and the last 2 are calculated for control

Example:

RC del solar: (Cadastral referente of the parcel without construction)

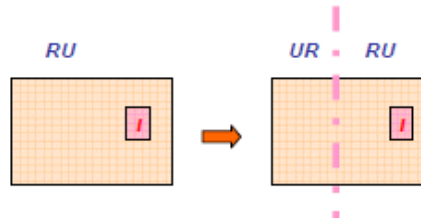
2132101 NG1623S **0001 XY**

RC de la finca una vez edificada y dividida: RC of the real estate once built and split

RC Primer B.I.: 2132101 NG1623S **0002 HU**

RC Segundo B.I.: 2132101 NG1623S **0003 BG**

Another example: when part of the rural parcel become urban



RC origen:

BIR 08016A0 1100042 0000XY

BIU 0014001 00WJ91C 0001FR

	Do you use object versioning?	RC resultantes: BIR 08016A0 1100042 0000XY (S+C, bien único) BIU 08016A0 1100042 0001ZK We don't have object versioning but we can rebuild all the map for every moment only giving a date to the system
(F) Multi-lingual text and cultural adaptability (application schema - specification)	In which language(s) is the application schema (name of feature and attributes)? In which language(s) is the documentation about existing data?	The application schema is only in Castellano. We are now translating our services and procedures of our Cadastral Virtual Office to English and to all the co-official languages: Castellano, Catalán and Gallego..
(F) Multi-lingual text and cultural adaptability (content)	Are geographical names available in several languages? Which languages?	The name of the places, the addresses,can be in the 3 official languages: Castellano, Catalán and Gallego.
(G) Coordinate referencing and units model	Which Coordinate Reference Systems (horizontal, vertical) are used? Is transformation from national CRS to ETRS89 defined? How accurate is it? Which Temporal Reference	We reference our objects by coordinates X,Y Each parcel has a point inside the parcel where the cadastral reference is located and it is also georeferenced. This point is automatically created The FXCC with the digital information of each floor are also georeferenced Our coordinate reference system is ED50 and our system of projection is Universal Transverse Mercator (UTM) Nowadays we are preparing the transformation between ED50 and ETRS89, following the transformation algorithm defined by Spanish Geographical Institute Gregorian calendar (for temporal attributes)

	System (s) is used (if any)? Which units of measurement are used?	meter
(H) Object referencing model	Are buildings used to reference other information? How?	The Spanish law establishes that the Cadastre is a register describing rural and urban real estates. This description includes physical, legal and economic characteristics, featuring location, cadastral reference, surface, usages, class of crop, buildings, graphic representation, cadastral value and title holders As a fiscal cadastre, to calculate the value for every building, and even for every unit of the building we have a lot of information referenced to each building and unit as the owner (with all his name, identity number, address, type of right, participation coefficient, the value (in euros), the use(internal codification), the usage (internal codification), status of conservation, year of construction, category, temporal attributes that I explain later etc..... Also the address of the building and the urbanistic characteristics are referenced to the building "The cadastral value of the real estate is composed of the value of the land and the value of the constructions (buildings). To calculate the value of the buildings we consider, in addition to the urbanistic conditions, its historical-artistic nature, its use or destination(usage), quality and antiquity and any other factors which can affect the value." And of course all this characteristics must be referenced to the building Also the numerous users of cadastral buildings information use our data to reference other information
(J) Portrayal	Is existing data supplied with symbolisation? Which symbolisation? If yes, how ? (e.g. by view services, within GIS formats, ...). For which scales?	Yes. You can see the symbols yourself by the cadastral virtual office www. Sedecatastr.gob.es. or in the example at the end of the document. Anyone can access to our cartography by the cadastral Virtual office is free of charge, 24 h our a day, 7 days a week. Cadastral Virtual Office shows different layers for different scales LINEA SUBPARCE escala> 1:7.500 TXTSUBPARCE escala> 1:7.500 LINEA CONSTRU escala> 1:2.000 TXTCONSTRU escala> 1:1.500 LINEA PARCELA escala> 1:7.500 TXTPARCELAS

R escala> 1:10.000
 U escala> 1:2.500
 D escala> 1:5.000
 LINEA MASA escala> 1:15.000
 TXTMASA escala> 1:5.000
 LINEA ELEMLIN escala> 1:10.000
 EJES NO se visualiza
 LINEA LIMITES escala> 1:50.000
 TEXTOS
 Nº de policía escala> 1:1.500
 Calles escala> 1:3.000
 Resto de rótulos escala> 1:5.000

Simbology

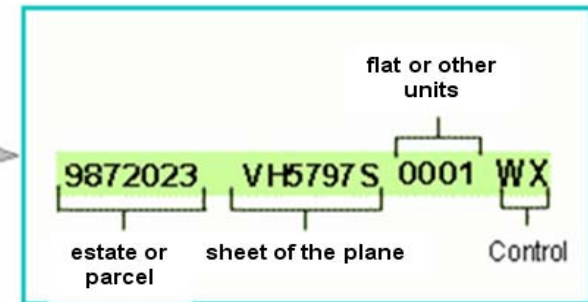
	Color	Outline	OutlineColor	Size =grueso
Polígono rústico	65025	True	16737455	5
Manzana urbana	14540287	True	16737455	4
Parcela rústica	65025	True	0	2
Parcela urbana	14540287	True	0	2
Subparcela rústica	65025	True	255	1
Subparcela urbana	9957545	True	32896	1
Construcción sobre rasante	14540287	true	255	1
Construcción bajo rasante	13158600	True	255	1
Construcción Zona verde	9957545	True	255	1
Construcción Piscinas	16777147	True	255	1
Construcción Suelo	12175776	True	255	1

Text Simbology

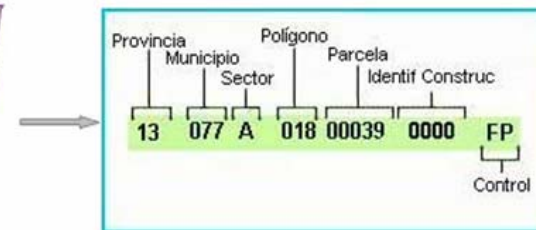
	Color	Font.name	Font.size	Font.italic
Polígono rústico	16737455	Times New Roman	16	True
Manzana Urbana	16737455	Times New Roman	12	False
Parcela CATASTRAL	0	Times New Roman	10	True
Subparcela	255	Times New Roman	8	False
Construcciones	255	Times New Roman	7	False

The Virtual Office of the Cadastre provides the following services free of charge via Internet:

		• Cadastral Information Query: results are provided in alphanumeric and graphic (maps) form and in georeferenced form (dxf), access is restricted only for information subject to Data Protection Law (owner and value), but cartography is all free data • Certificate of Cadastral Data • Data exchange centre for exchange of information with different Administrations and organizations, • Standard WMS allow external geographical systems to overlay Cadastral information onto their own cartographies, WFS services (GML), shapefiles, dxf and other formats are available to registered users and in next future to everybody by digital signature or electronic DNI .. • The system permits the TIME parameter to have historic information. And offers too the Getfeatureinfo service • We provide many other interactive functionalities and soap services for query by Cadastral Reference, by Polygon and parcel; by address and by coordinates (UTM, GPS) • Also we provide a conversor of coordinates to cadastral reference and vice versa • It is possible too to download vectorial cartography for a box set by coordinates x,y. • It is feasible to select which layer (parcels, buildings, subparcels,...) • Last year a 3D+time (=4D) model of buildings and its representation by means of kml files in Google Earth has been incorporated as exchange format Results of the CVO last year: <table> <tr> <td></td><td>Year 2009</td><td>weekly</td></tr> <tr> <td>Cartography</td><td>121.656.913</td><td>2.200.000</td></tr> <tr> <td>Server WMS</td><td>103.144.335</td><td>1.800.00</td></tr> <tr> <td>Server WFS</td><td>1.167.329</td><td>22.000</td></tr> </table>		Year 2009	weekly	Cartography	121.656.913	2.200.000	Server WMS	103.144.335	1.800.00	Server WFS	1.167.329	22.000
	Year 2009	weekly												
Cartography	121.656.913	2.200.000												
Server WMS	103.144.335	1.800.00												
Server WFS	1.167.329	22.000												
(K) Identifier Management	Which elements have a thematic identifier (if any)?	The link between alpha-numerical information and graphic data is achieved using the cadastral reference. The identifier is called cadastral reference and has 20 digits. It is unique, it doesn't change with time, permits down load services and has only INSPIRE permitted symbols. In case of Urban Real estate: the seven first ones identify the estate or parcel, the seven following ones indicate the sheet of the plane where it is located, the four following ones identify the flat or other unit inside the estate and finally, the last two are characters of control.												



For the rural Real estate: the two first digits identify the province, the three following ones the municipality, the following one the sector, the three following ones identify the polygon, the five following ones identify every parcel inside the corresponding polygon, the following ones four are the constructions (if the parcel has some).



There not exist external identifier

	Are there external identifiers?	
(M) Metadata	Which metadata elements are available? At which level (on feature, feature types, data sets, product)?	No metadata elements are available
(N) Maintenance	What are the update procedures of data source? What is the update frequency?	Daily update: To can maintain update the cadastral data base, the SDGC has establish agreements with Pubic Administrations and Institutions, municipalities, public notaries, property registrars, etc... as intermediaries in the relationship between the Cadastre and the citizen. All these collaborators help the cadastral maintenance mainly via internet using the Cadastral Virtual Office that permit on-line maintenance and that is interoperate with other informatic systems There exist protocols defined by law for every modification of the database, owner change, division, aggregation, segregation, union of parcels, change of use, new construction, division of a building etc.. Massive update: Parallel to the daily update, there are massive processes of update that are done generally joined with processes of revaluation. The new information obtained is in general of major quality, more current and complete and the new real estate data are notified individually to every owner
(O) Data quality	Which quality requirements are met by your data base (positional accuracy, completeness, logical consistency, semantic accuracy)?	The cadastral cartography is generated at the municipal level but now we have a continuous map with urban and rural cartography, and with all the municipalities aggregated in a unique data base as I explain in data capture Completeness 100% and semantic accuracy 100% Logical consistency : <u>Gaps and Overlaps</u> There are not permit gaps and overlaps between subparcels. Now we have a continuous mapping for all towns, between neighbouring municipalities, and between rural and urban land; but because all this information was separately took , we have still some problems with gaps and overlaps, but we are working to eliminate them. We studying and proceeding one by one.

There are still some problems of edge-match between neighbouring municipalities, and between rural and urban land. We are studying and proceeding to eliminate one by one.

Positional accuracy

In urban cadastre:

Absolute accuracy

The maximum deviations are lower than a certain absolute linear magnitude: P1.

A percentage of 85 % of the points and elements present deviation lower than another linear parameter: P2.

Categoría	Escala plano	P1(cm.)	P2(cm.)
I	1/500	25	20
II	1/1000	40	30
III	1/2000	75	60

Relative accuracy

Contractual Technical specification define: Linear magnitudes of a cartographic object and the distances between points of different entities in a proximity radio of 100m, will be obtained with a maximum tolerance of:

$$T(m) = 20 + \frac{L^2(m)}{1000} \text{ for scales } 1/500$$

$$T(m) = 30 + \frac{L^2(m)}{1000} \text{ for scales } 1/1000.$$

$$T(m) = 60 + \frac{L^2(m)}{1000} \text{ for scales } 1/2000.$$

-
Being L the considered linear magnitude, express in meters

In rural areas

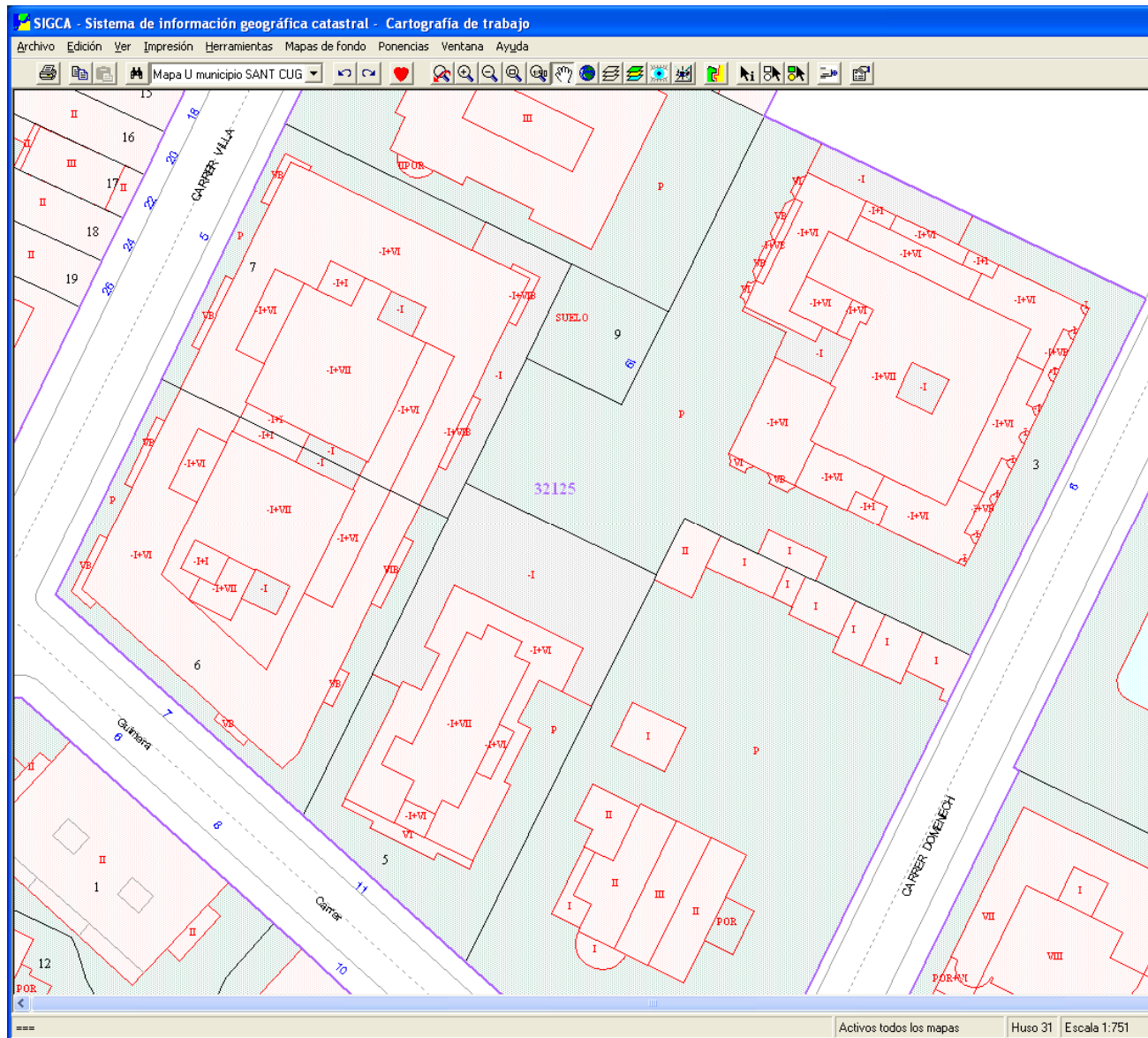
Digital cartography of rural land was generated municipality by municipality in the process of cadastral renovation, from orthophotography (1/5.000- expanded 1/ 2.500),

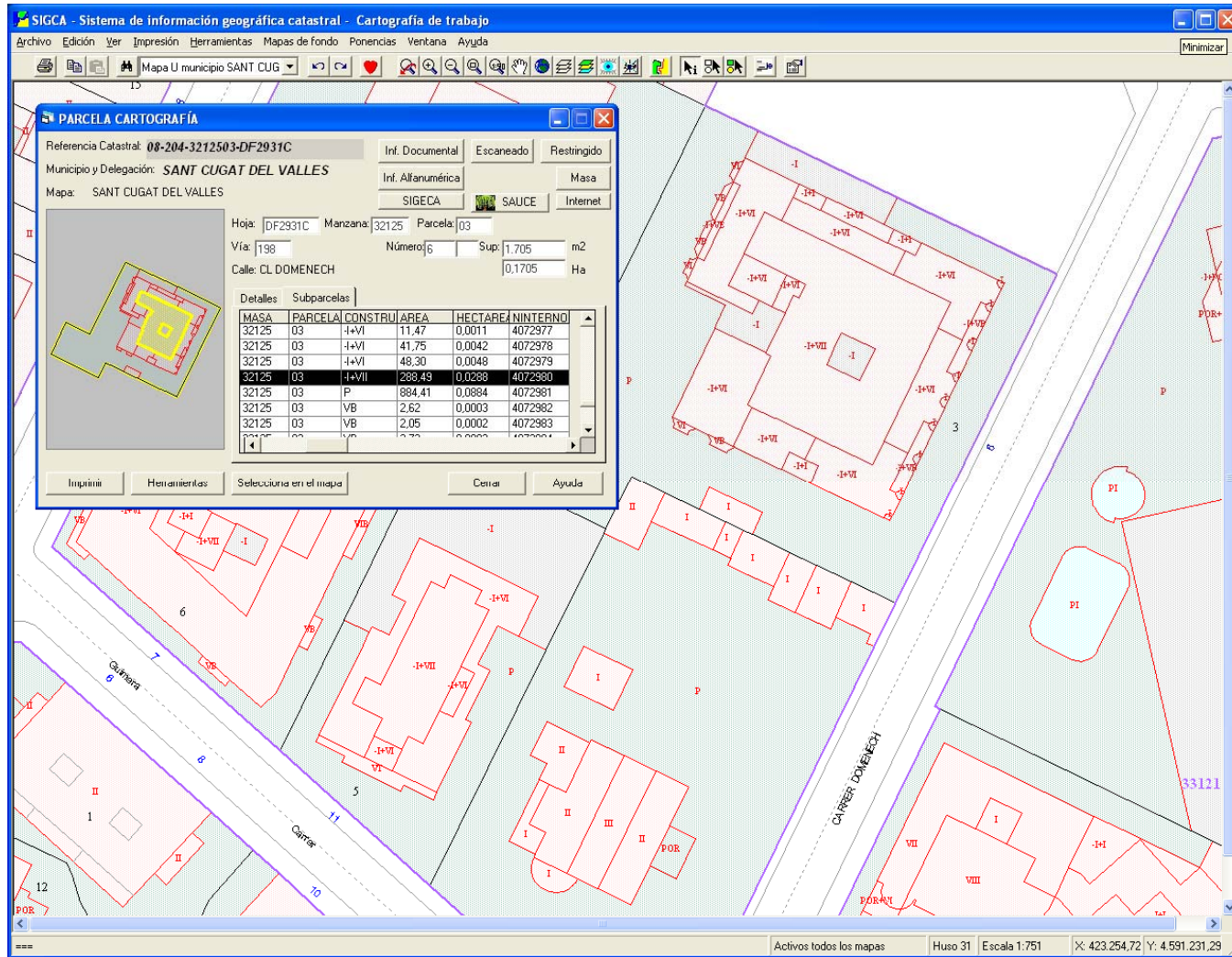
[Followed by fieldwork, to identify the property, and digitalization.](#)

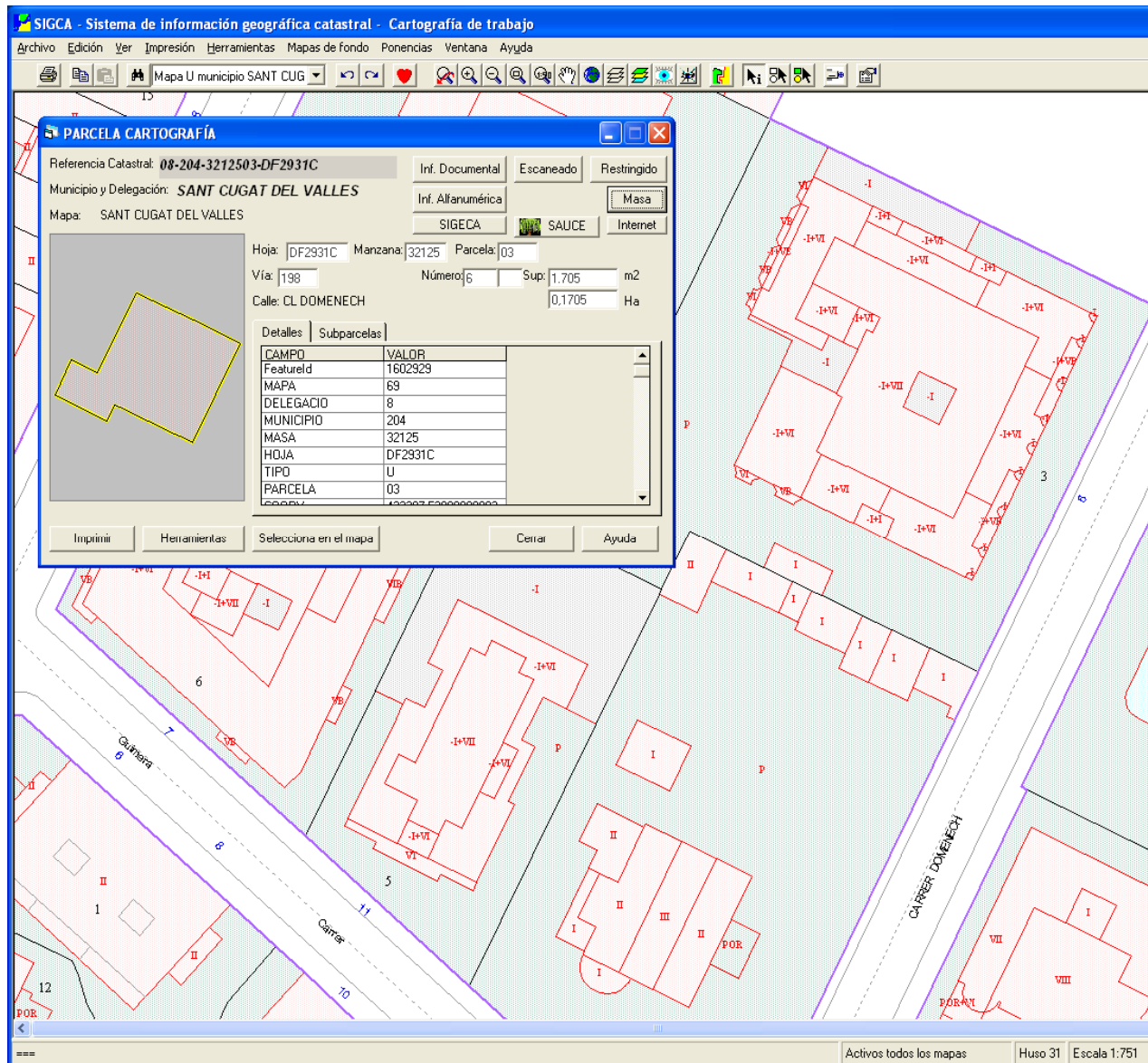
		So, the accuracy is related to the accuracy of the ortophotography Now we work with ortophotos of the “Plan nacional de ortofotografía aérea” PNOA with flights on 1:30000 scale and digital ortophotos in color with size of the pixel of 0,50 meter and planimetric precisions of 1 meter Also we are producing digital flights size of pixel 0,10m or 0,07m for new urban cartography In the last 10 years we are also doing the FXCC for every building. In the FXCC The coordinates of geometric elements come in meters and with at least the accuracy of 1 centimeter.
(P) Data transfer	How is the source data available : - formats, versions - service interfaces - usage constraints	Apart of the services described above for the Cadastral Virtual Office The cartography is provided via web services like WMS, WFS (GML) or SOAP protocol for other services. And in digital format in: DXF (Autodesk), Shapefiles (Esri), SVG (Standard Vectorial Graphics) and the FICC [(Own format: Cadastral Cartography Interchange Format), an ASCII format over which reflects the geometry and features of the entities of cadastral cartography in vectorial format)] The cartography is free not protected data
(Q) Consistency between data (between themes)	How buildings are related: - to Utility and Government Services - to Production and Industrial Facilities - to Agricultural and Aquaculture Facilities - to Cadastral Parcels - to Addresses - to other themes	To Cadastral Parcel: All the buildings of a parcel, that can be more than one, or one with many units, have the first 14 digits of the origin parcel. All the constructed volumes are subparcel of the cadastral parcel. To addresses: every cadastral reference has an address. When a parcel have several buildings o one building with many units, they have what INSPIRE data specification for address has called “sub address” Every unit of a building and the complete build parcel are qualificated with an use, and with a destination(usage). So it is possible ti know the commercial buildings, hospitals, factories, industries, farms, Agricultural construction etc....

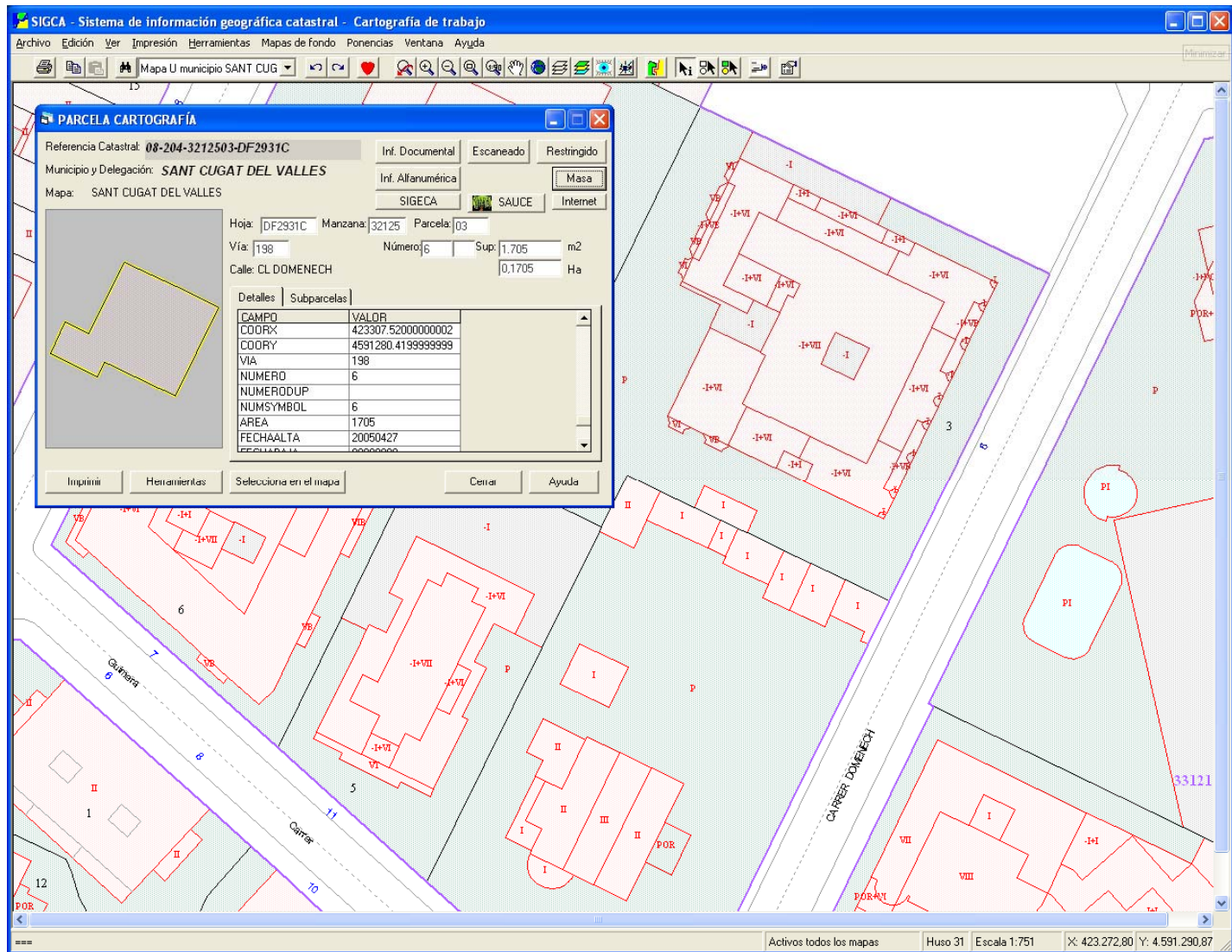
(Q) Consistency between data (between levels of detail)	Are buildings present at different levels of detail (scales)? If yes, which? Are these levels of detail consistent? How is it ensured?	Yes, the common boundaries of blocks parcel and buildings are the same and our applications automatically ensure the consistency between them
(Q)Consistency between data (accross boundaries)	Are there buildings crossing boundaries?	
(S) Data capturing	Which is the original scale(s) to capture buildings?	Now we have a continuous map with urban and rural cartography, and with all the municipalities aggregated in a unique data base but in origin: Digital <u>urban cartography</u> 1:500 or 1:1000 was generated at the municipal level from the digitalisation of existing cadastral cartography following verification of its quality, or using new cartography generated by a process of analytical restitution of apparent parcellary entities obtained in stereographical flights upon which the cadastral parcellary data is placed, identified and updated. In this way we got the data of all the Urban buildings 1. Photogrametrical numerical restitution 2. " Fieldwork and lateredition in office to obtain an apparent parcellary on which to incorporate the property parcellary " 3. " semantic Treatment: codification, alteration and assignment of cadastral References and labels" Digital <u>cartography of rural land</u> was generated municipally by municipally in the process of cadastral renovation, from orthophotography (1/5.000- 1/ 2.500), upon which rural parcel and sub-parcel boundaries was projected. Orthophotographs were at the beginning on paper and since last ninety's also available in digital format. 1." Generation of ortophotos ", 2. " Fieldwork, to identify the property, re-dyed of the ortophoto and later digitalization and edition in office to incorporate the cadastral parcelario ", 3." semantic Treatment: codification, alteration and assignment of cadastral References and labels In this way we got the data of all the Urban buildings In that way we have got the first digital cartography for every municipality in the years 90's but since then, we maintain this information every time with better methodology, more precise technologies and more accuracy.

	Which part of building is captured (e.g. roof or on ground)? Are there selection criteria in existing data (e.g. threshold excluding smallest buildings)? Which?	In the last 10 years we are also doing the FXCC for every building. In the FXCC The coordinates of geometric elements come in meters and with at least the accuracy of 1 centimeter. We do not take the height, we take the number of plants, we do calculation to determine the height In urban area not shall be regarded as constructions works of urbanization or improvement to be determined according to the rules, but in this case its value must be incorporate in the value of land, neither small shed Also in rural areas: <i>En ningún caso tendrán la consideración de construcciones a efectos de este impuesto, los cobertizos de pequeña entidad utilizados en explotaciones agrícolas, ganaderas o forestales que, por el carácter ligero y poco duradero de los materiales empleados en su construcción, sólo sirvan para usos tales como el mayor aprovechamiento de la tierra, la protección de los cultivos, albergue temporal de ganados en despoblado o guarda de aperos e instrumentos propios de la actividad a la que sirven y están afectos;</i> <i>tampoco tendrán la consideración de construcciones a efectos de este impuesto las obras y mejoras incorporadas a los terrenos de naturaleza rústica, que formarán parte indisociable del valor de estos."</i>
(T)Conformance	Does the data source explicitly conform to any specifications? (e.g any ISO standards, City GML, etc.)	OGC, ISO to exchange formats but also our own specification
Other	Any other relevant information about existing data related to buildings	









Microsoft PowerPoint - [Presentación25]

Archivo Edición Ver Insertar Formato Herramientas Presentación Ventana ?

Escribe una pregunta

Arial 18

Egitlo Nueva diapositiva...

1

2

SIGSA - Sistema de información geográfica catastral - Cartografía de trabajo

Referencia Catastral: 00-204-321250-0F2931C

Municipio y Delegación: SANT Cugat del Valles

Mapa: SANT CUGAT DEL VALLES

Inf. Documental Inf. Catastral Restringido

Inf. Alfanumérica SIGECA MUSE Internet

Hoja: 0F2931C Manzana: 32125 Parcela: 03

Via: 198 Número: 5 Superficie: 1.705 m2

Calle: CL DOMENECH

Detalles Subparcelas

MASA	PARCELA	CONSTRUCCIÓN	ÁREA	HECTÁREAS	INTERNO
32125	03	14V	11.47	0.0011	4072977
32125	03	14V	41.75	0.0042	4072978
32125	03	14V	48.30	0.0048	4072979
32125	03	14V	288.49	0.0288	4072980
32125	03	P	884.41	0.0884	4072981
32125	03	VB	2.52	0.0003	4072982
32125	03	VB	2.05	0.0002	4072983

Impresión Herramientas Selección en el mapa Cerrar Ayuda

Haga clic para agregar notas

Diapositiva 1 de 2

Diseño predeterminado

spañol (Español - alf. internacional)

Diseño de la diapositiva

Aplicar diseño de diapositiva:

Diseños de texto

Diseños de objetos

Diseño de texto y objetos

Mostrar al insertar diapositivas

Microsoft PowerPoint - [Presentación25]

Archivo Edición Ver Insertar Formato Herramientas Presentación Ventana ?

Escribe una pregunta

89%

Eglio Nueva diapositiva...

1

2

SIGCA - Sistema de Información Geográfica Catastral - Cartografía de trabajo

Referencia Catastral: 00-204-3212503-0F2931G

Municipio y Delegación: SANT CUGAT DEL VALLES

Mapa: SANT CUGAT DEL VALLES

Hoja: 0F2931G Manzana: 32125 Parcela: 03

Via: 138 Número: 5 Sup: 1.705 m2

Calle: CL DOMENECH

Int. Documental Int. Alfanumérica Int. Masas

SIGCA MUCCE Internet

Detalles Subparcelas

MAZA	PARCELA	CONSTRUCCIÓN	ÁREA	HECTÁREAS
32125	03	4+VI	11.47	0.0011
32125	03	4+VI	41.75	0.0042
32125	03	4+VI	48.30	0.0048

Información documental asociada

Impresión Herramientas Selección en el mapa Cerrar

Haga clic para agregar notas

Dibujo Autoformas

Diapositiva 2 de 2 Diseño predeterminado spañol (España - alf. internacional)

Diseño de la diapositiva

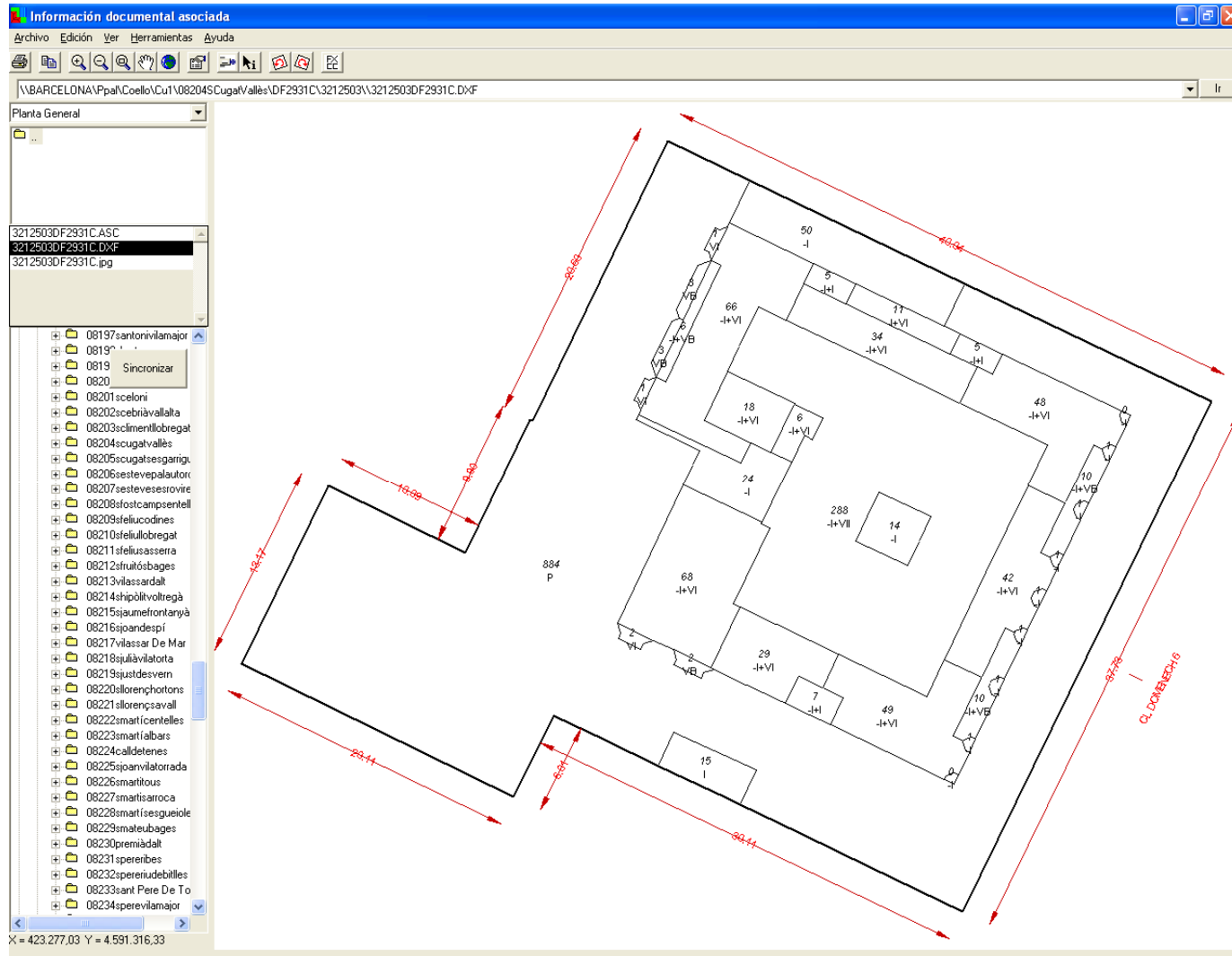
Aplicar diseño de diapositiva:

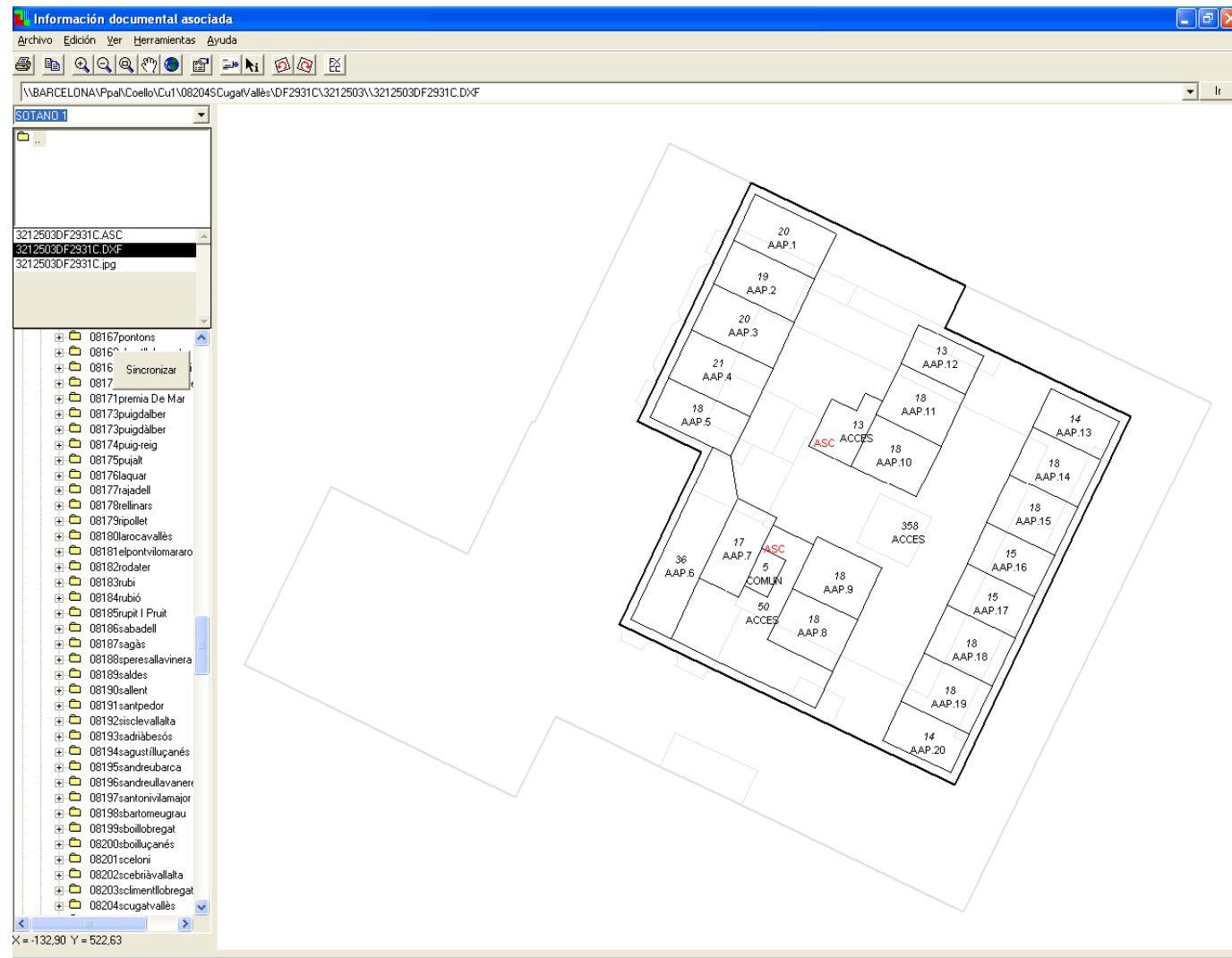
Diseños de texto

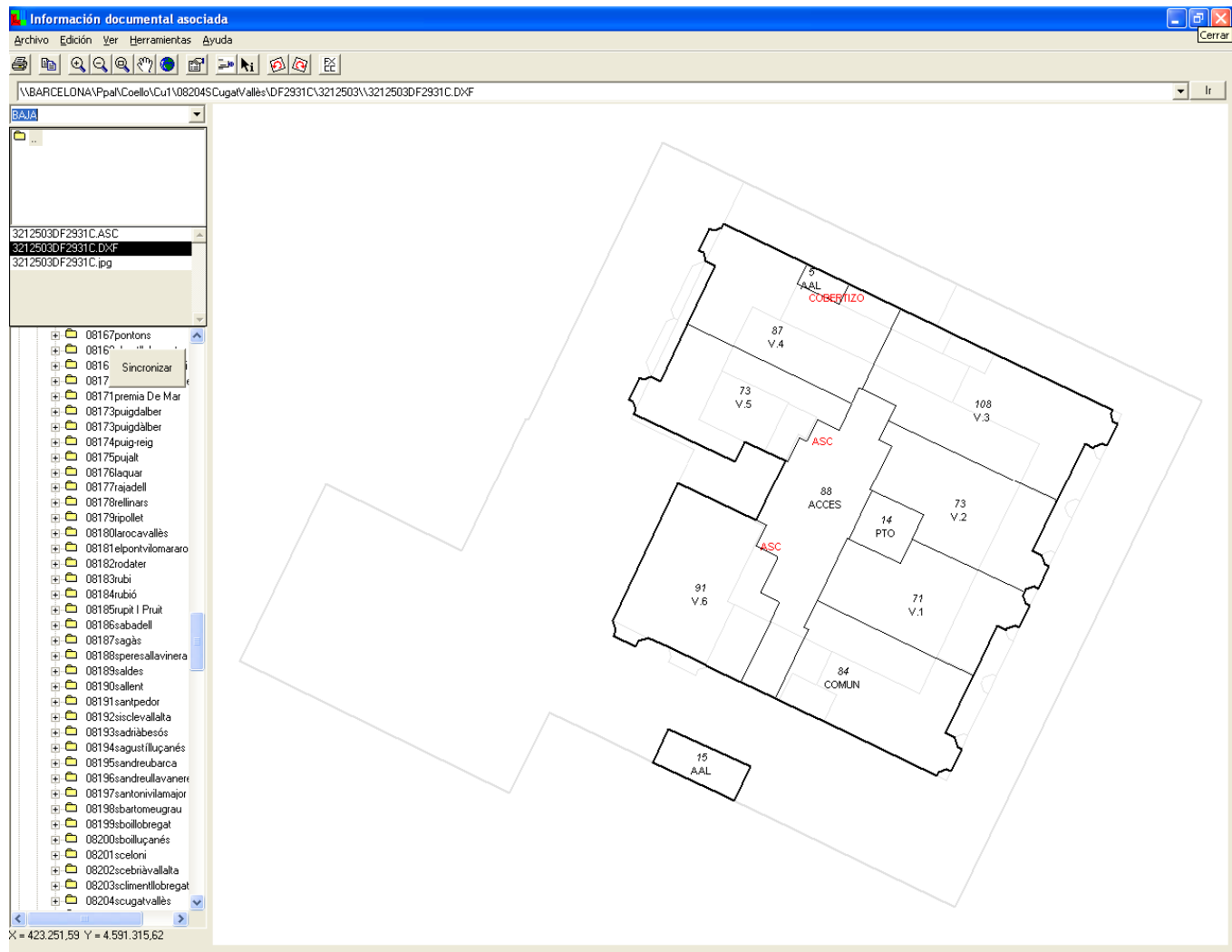
Diseños de objetos

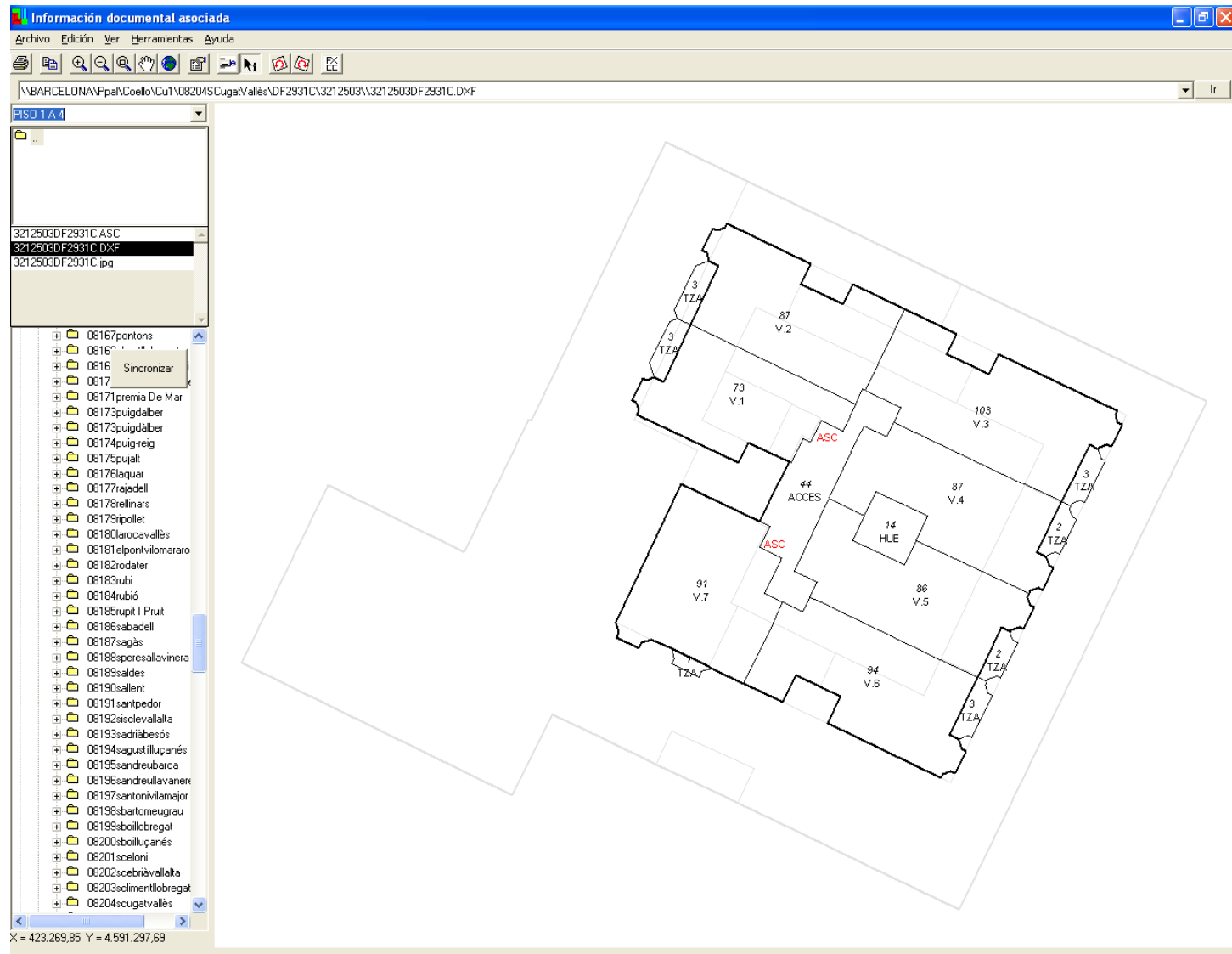
Diseño de texto y objetos

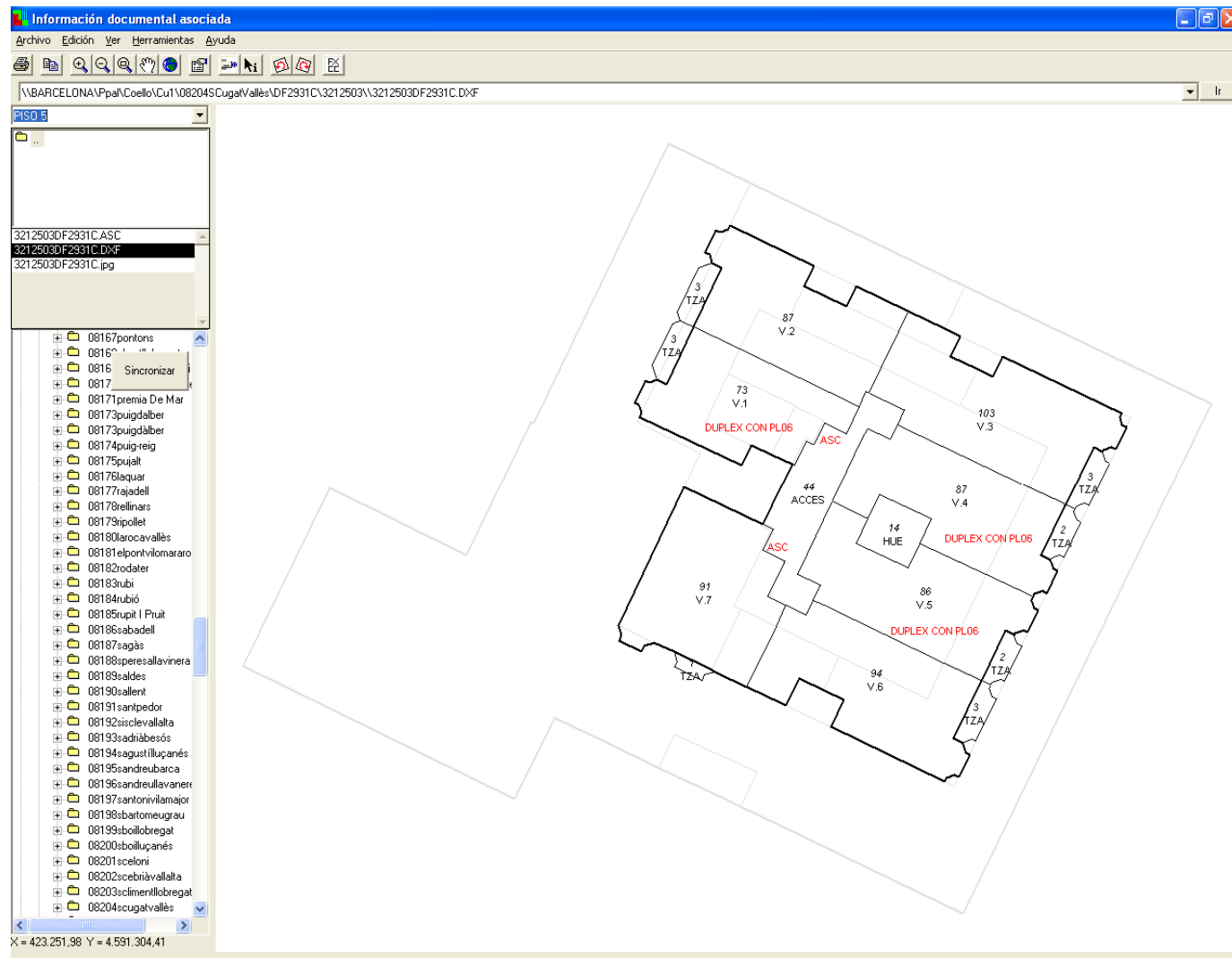
Mostrar al insertar diapositivas

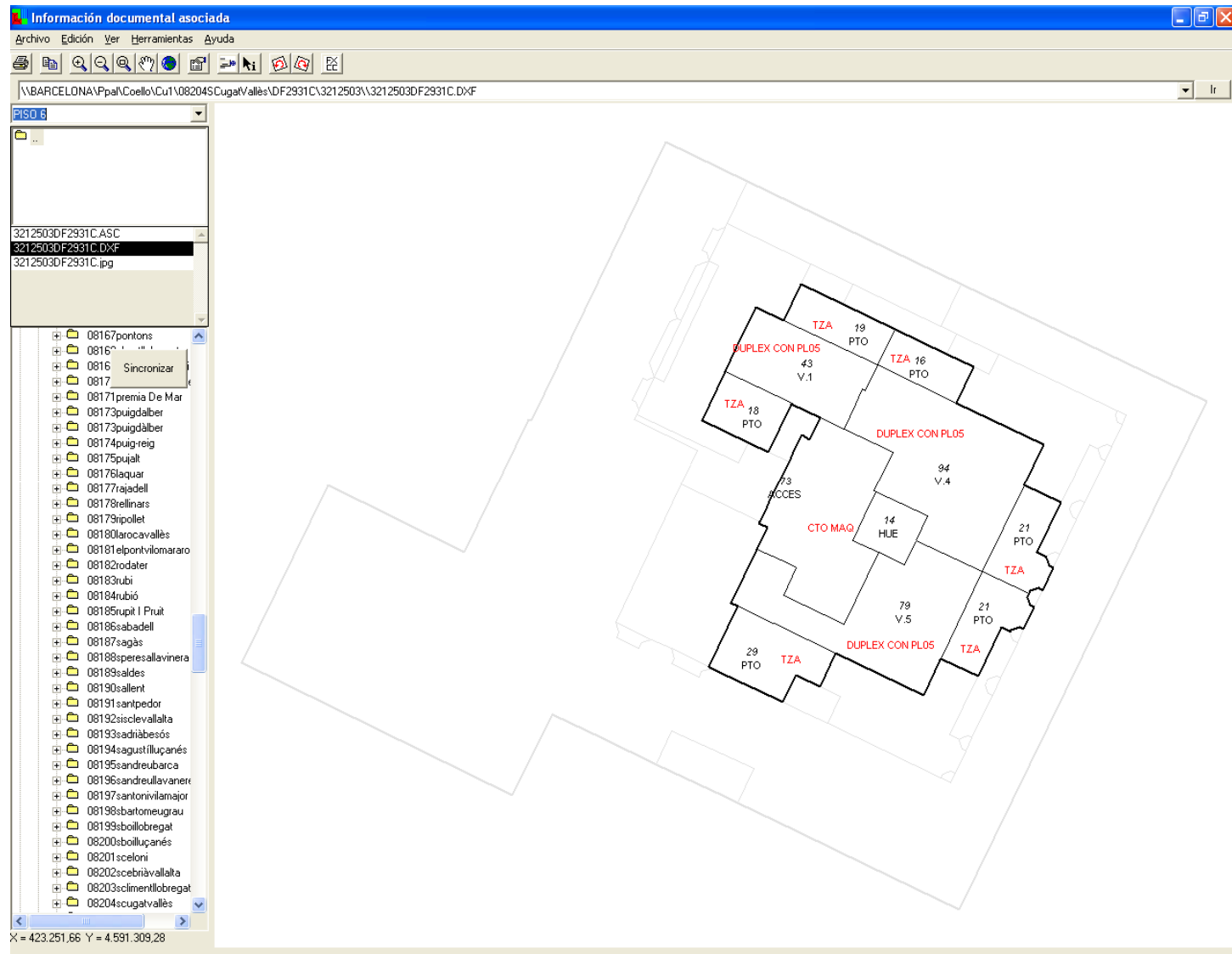












Información documental asociada

Archivo Edición Ver Herramientas Ayuda

3212503DF2931C.ASC

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3212503DF2931C.jpg

08167pontons

08167Sincronizar

0817

08171premia De Mar

08173puigdalber

08173puigdalber

08174puig-reig

08175pujalt

08176laquar

08177rajadell

08178rellinars

08179ipollet

08180larocavallès

08181elpontvilomararo

08182rodater

08183rubi

08184rubió

08185rupit i Pruit

08186abadell

08187sagàs

08188speresallavina

08189saldes

08190sallent

08191santpedor

08192sisclavallalta

08193sadiabesós

08194sagutillucanés

08195andreubarca

08196sandreullavaner

08197santonvilamajor

08198sbartomeugrau

08199sboillobregat

08200sboilucanés

08201sceloni

08202scebriavallalta

08203scimentillobregat

08204scugatvalles

Nombre de la Gerencia: BARCELONA-AREA METROPOLITANA (080)

Nombre del Municipio: SANT CUGAT DEL VALLES (204)

Datos de la parcela

====

Situación: CL DOMENECH 0006

Referencia catastral: 3212503DF2931C

Linderos

====

Lindero derecho:

Lindero izquierdo:

Lindero del fondo:

Datos de la captura

====

Escala: 1/0200

Fecha: 15/04/05

Superficies

====

De la parcela: 1.705 m²

Sobre rasante: 4.394 m²

Bajo rasante: 792 m²

Total construida: 5.186 m²

Resumen de superficies por uso

====

Código	Sup. en m²	Descripción
AAP	366	APARCAMIENTO
ACCES	802	ACCES
COMUN	89	COMUN
AAL	20	ALMACEN
V	3.824	RESIDENCIAL USO PROPIO
TZA	85	TERRAZA
	5.186	

Desglose de zonas comunes

====

Código	Sup. en m²	Descripción
ACCES	802	ACCES
COMUN	89	COMUN
	891	

Número de plantas significativas: 5

Superficies según usos en las plantas significativas

Nombre de la planta significativa número 1: SOTANO 1

Número de plantas reales a las que corresponde: 1

Número de usos registrados: 24

Código	Sup. en m²	Descripción
AAP.1	20	APARCAMIENTO
AAP.10	18	APARCAMIENTO
AAP.11	18	APARCAMIENTO
AAP.12	13	APARCAMIENTO
AAP.13	14	APARCAMIENTO
AAP.14	18	APARCAMIENTO
AAP.15	18	APARCAMIENTO
AAP.16	15	APARCAMIENTO
AAP.17	15	APARCAMIENTO

Información documental asociada

Archivo Edición Ver Herramientas Ayuda

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08167pontons

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0816 Sincronizar

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08173puigdalber

08174puigdalber

08174puigdalber

08175puigdalber

08175puigdalber

08176laquar

08177rajadell

08178rellinars

08179ipollet

08180arocavallès

08181elpontvilomararo

08182rodater

08183rubi

08184rubí

08185rupit I Fruit

08186sabadell

08187sagàs

08188speresallavina

08189saldes

08190sallent

08191santpedor

08192sisclevallalta

08193sadiabesós

08194sagustillucanés

08195andreubarca

08196andreubarca

08197santonvilamajor

08198santomeugrau

08199santomeugrau

08200santomeugrau

08201santomeugrau

08202santomeugrau

08203santomeugrau

08204santomeugrau

792

Nombre de la planta significativa número 2: BAJA

Número de plantas reales a las que corresponde: 1

Número de usos registrados: 10

Código	Sup. en m²	Descripción
AAL 20	14	APARCAMIENTO
AAP 3	20	APARCAMIENTO
AAP 4	21	APARCAMIENTO
AAP 5	18	APARCAMIENTO
AAP 6	36	APARCAMIENTO
AAP 7	17	APARCAMIENTO
AAP 8	18	APARCAMIENTO
AAP 9	18	APARCAMIENTO
ACCES	358	ACCES
ACCES	50	ACCES
ACCES	13	ACCES
COMUN	5	COMUN
792		

Nombre de la planta significativa número 3: PISO 1 A 4

Número de plantas reales a las que corresponde: 4

Número de usos registrados: 15

Código	Sup. en m²	Descripción
AAL	5	ALMACEN
AAL	15	ALMACEN
ACCES	88	ACCES
COMUN	84	COMUN
V. 1	71	RESIDENCIAL USO PROPIO
V. 2	73	RESIDENCIAL USO PROPIO
V. 3	108	RESIDENCIAL USO PROPIO
V. 4	87	RESIDENCIAL USO PROPIO
V. 5	73	RESIDENCIAL USO PROPIO
V. 6	91	RESIDENCIAL USO PROPIO
695		

Nombre de la planta significativa número 4: PISO 5

Número de plantas reales a las que corresponde: 1

Número de usos registrados: 15

Código	Sup. en m²	Descripción
ACCES	44	ACCES
TZA	3	TERRAZA
TZA	2	TERRAZA
TZA	3	TERRAZA
TZA	2	TERRAZA
TZA	3	TERRAZA
TZA	1	TERRAZA
TZA	3	TERRAZA
V. 1	73	RESIDENCIAL USO PROPIO
V. 2	87	RESIDENCIAL USO PROPIO
V. 3	103	RESIDENCIAL USO PROPIO
V. 4	87	RESIDENCIAL USO PROPIO
V. 5	86	RESIDENCIAL USO PROPIO
V. 6	94	RESIDENCIAL USO PROPIO
V. 7	91	RESIDENCIAL USO PROPIO
682		

Información documental asociada

Archivo Edición Ver Herramientas Ayuda

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08171premia De Mar
08173puigdalber
08173puigdalber
08174puig-reig
08175puigalt
08176laquar
08177rajadell
08178rellinars
08179ipollet
08180larocavallès
08181elpontvilomararo
08182rodaler
08183rubi
08184rubió
08185rupit i Pruit
08186sabadell
08187sagàs
08188speresallavinerà
08189saldes
08190sallent
08191sanpedor
08192sisclevallalta
08193sadiàbesós
08194sagustílluçanés
08195sandreubarca
08196sandreullavaner
08197santonvilamajor
08198sbatomeugrau
08199sabolobregat
08200sboilluçanés
08201scloní
08202scebriàvallalta
08203sclimentillobregat
08204scugatvalles

Número de plantas reales a las que corresponde: 4
Número de usos registrados: 15

Código	Sup. en m²	Descripción
ACCES	44	ACCES
TZA	3	TERRAZA
TZA	2	TERRAZA
TZA	3	TERRAZA
TZA	2	TERRAZA
TZA	3	TERRAZA
TZA	1	TERRAZA
TZA	3	TERRAZA
V. 1	73	RESIDENCIAL USO PROPIO
V. 2	87	RESIDENCIAL USO PROPIO
V. 3	103	RESIDENCIAL USO PROPIO
V. 4	87	RESIDENCIAL USO PROPIO
V. 5	86	RESIDENCIAL USO PROPIO
V. 6	94	RESIDENCIAL USO PROPIO
V. 7	91	RESIDENCIAL USO PROPIO
	682	

Nombre de la planta significativa número 4: PISO 5
Número de plantas reales a las que corresponde: 1
Número de usos registrados: 15

Código	Sup. en m²	Descripción
ACCES	44	ACCES
TZA	3	TERRAZA
TZA	2	TERRAZA
TZA	3	TERRAZA
TZA	2	TERRAZA
TZA	3	TERRAZA
TZA	1	TERRAZA
TZA	3	TERRAZA
V. 1	73	RESIDENCIAL USO PROPIO
V. 2	87	RESIDENCIAL USO PROPIO
V. 3	103	RESIDENCIAL USO PROPIO
V. 4	87	RESIDENCIAL USO PROPIO
V. 5	86	RESIDENCIAL USO PROPIO
V. 6	94	RESIDENCIAL USO PROPIO
V. 7	91	RESIDENCIAL USO PROPIO
	682	

Nombre de la planta significativa número 5: PISO 6
Número de plantas reales a las que corresponde: 1
Número de usos registrados: 4

Código	Sup. en m²	Descripción
ACCES	73	ACCES
V. 1	43	RESIDENCIAL USO PROPIO
V. 4	94	RESIDENCIAL USO PROPIO
V. 5	79	RESIDENCIAL USO PROPIO
	289	

EXPEDIENTE
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