

# FINAL PROYECT: DETACHED HOUSE

SEGART, VALENCIA (SPAIN)

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JUNE 2012

## **MEMORY**

BASIC PROJECT AND EXECUTION detached house Urbanization el Murtal, plots 48 and 49.  
Segart (Valencia)

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# DESCRIPTIVE MEMORY

## 1.1. LOCATION

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The plots envelope which is requested planning permission is situated in the Urbanization el Murtal, plots 48 and 49 of Segart (Valencia), Urban Land, Residential Management Area Isolated or second residence, with cadastral references 5958301YJ2955N0001MU 5958302YJ2955N0001OU .

## 1.2. PREVIOUS INFORMATION

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### 1.2.1. Background and starting conditions

The object of this document is the description and the complete definition of all aspects that define Basic Project and Execution of a detached house situated on plots 48 and 49 of the Urbanization la Murtal of Segart (Valencia).

### 1.2.2. Location details

The house is situated in Urban Land, Residential Isolated or second residence in accordance with Town Planning Regulations Segart City Council, effective from 22/12/88.

The house consists of a main building, parking area, swimming pool, terraces and garden.

### 1.2.3. Physical environment

The house is situated in the urban land, in a designated area for current planning mainly low density residential. It has road access on both fronts of the plots. It has the potable water services, sewerage system and electricity.

### 1.2.4. Urban services

- Supply of drinking water
- Drainage of sewage to the municipal network of sanitation.
- Supply of electrical energy
- Supply of telephony
- Access road on public highway

## 1.3. PROJECT DESCRIPTION

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### 1.3.1. General description of the project

This basic project and execution of a detached house is aimed at the construction of this housing and the provision of all necessary facilities for proper operation.

The surfaces of the rooms that integrate housing are shown in the following chart:

ROOM	USEFUL SURFACE	ROOM	USEFUL SURFACE
Kitchen	11,50 m <sup>2</sup>	Terrace 1	27,25 m <sup>2</sup>
Living room	25,70 m <sup>2</sup>	Terrace 2	16,20 m <sup>2</sup>
Distributor	13,75 m <sup>2</sup>	Terrace 3	45 m <sup>2</sup>
Bedroom 3	8,25 m <sup>2</sup> + 1,25 m <sup>2</sup>	Parking	30 m <sup>2</sup>
Bedroom 2	8 m <sup>2</sup> + 1,15 m <sup>2</sup>	Pedestrian access	12 m <sup>2</sup>
Bedroom 1	13,35 m <sup>2</sup>	Road access	40,25 m <sup>2</sup>
Bathroom 1	9,15 m <sup>2</sup>	Room facilities under pool	5,20 m <sup>2</sup>
Bathroom 2	5,15 m <sup>2</sup>	TOTAL OUTSIDE AREA	158,20 m <sup>2</sup>
Storage area	3,20 m <sup>2</sup>		
Corridor	5,50 m <sup>2</sup>		
Dressing room	7,35 m <sup>2</sup>		
TOTAL USEFUL	112 m <sup>2</sup>		
TOTAL BUILT	136 m <sup>2</sup>		

### 1.3.2. Description of works to execute

The works object of license is in the construction of a detached house of a plant, organized in two areas, the day, which contains the access, distributor and living room, and at night, with three bedrooms, bathrooms, storage area and dressing room.

## 1.4. FULFILLMENT OF BASIC REQUIREMENTS

### 1.4.1. Urban Regulations

- Law 8/2007 of May 28, Soil. (BOE 29/05/2007)
- Law 16/2005 of 30 December, the Generalitat Valenciana Urban (LUV). (DOGV 05/23/06)
- Decree 67/2006 of 19 May Consell by approving the Regulations on Administration and Management Planning and Urban Development (ROGTU)
- Decree 36/2007 of 13 April Consell by amending Decree 67/2006 of 19 May Consell by approving the Regulations on Administration and Management Planning and Urban
- General Urban Plan of the Municipality

Town Planning Regulations are applicable in the municipality of Segart, in force since its adoption on 22/12/88. The house complies with the urban parameters contained in these Regulations.

URBAN PARAMETRES	ACCORDING URBAN REGULATIONS	ACCORDING PROJECT
MINIMUM PLOT	-	1504 m <sup>2</sup>
BUILDABLE HEIGHT	7 m	6,90 m
MAX. NUMBER OF FLOORS	2 plantas	1 planta
BUILDABLE	0,35 m <sup>2</sup> t/ m <sup>2</sup> s	0,14 m <sup>2</sup> t/ m <sup>2</sup> s
DISTANCE FRONT BOUNDARY	5 m	5 m

DISTANCE SIDES BOUNDARIES	3 m	3 m
OCCUPATION	0,30	0,14
PARKING	1 space/building	1 space

#### 1.4.2. Regulations of application

<b>TECHNICAL BUILDING CODE (CTE)</b>	
Content	Type of regulation
<b>STRUCTURE</b>	
DB SE-AE STRUCTURAL SAFETY. ACTIONS OF THE BUILDING	RD 314/06
DB SE-A STRUCTURAL SAFETY.STEEL	RD 314/06
NCSE-02. CONSTRUCTION STANDARD EARTHQUAKE-RESISTANT	RD 997/02
CONCRETE STRUCTURAL INSTRUCTION (EHE)	RD 1247/08
<b>FIRE</b>	
DB SI SAFETY IN CASE OF FIRE	RD 314/06
<b>USE</b>	
DB SU SAFETY OF USE	RD 314/06
<b>HEALTHINESS</b>	
DB HS HEALTHINESS	RD 314/06
<b>NOISE</b>	
DB HR NOISE PROTECTION	RD 1371/07
<b>ENERGY</b>	
DB HE ENERGY SAVING	RD 314/06

<b>PROFESSIONAL ACTIVITIES</b>	
Content	Type of regulation
<b>FUNCTION</b>	
LAW BUILDING MANAGEMENT	Law 38/99
FORMAN BUILDER. FUNCTIONS	D 16/07/35
FOREMAN BUILDER. FACULTIES AND RESPONSABILITIES	RD 265/71
DUTIES OF CONTRACTORS AND BUILDERS	D 16/07/35
RESPONSIBILITIES OF BUILDERS	Order 22/10/63
PRODUCT LIABILITY	Law 22/94
<b>CONSTRUCTION PROJECT MANAGEMENT</b>	
TECHNICAL BUILDING CODE (CTE)	RD 314/06
APROVAL OF PROTECTION AGAINST NOISE BD-HR AND MODIFICATION OF RD 314/06	RD 1371/07
RULES OF ORDER AND ATTENDANCE BOOK.MODIFICATION	Order 09/06/71
FINAL CERTIFICATE OF LOCATION WORKS	Order 20/01/72
COLLECTION OF AMOUNTS ANTICIPATED IN HOUSING	Law 57/68
SALE AND LEASE HOUSING INFORMATION	RD 515/89

<b>PROTECTION</b>	
BASIC PROCESS FOR ENERGY EFFICIENCY CERTIFICATION	RD 47/07
REGULATION OF FACILITIES OF FIRE PROTECTION	RD 19 42/93
CLASSIFICATION OF CONSTRCTION PRODUCTS AND ELEMENTS OF CONSTRUCTION	RD 110/2008

NOISE LAW	Law 37/03
REGULATION WHICH DEVELOPES NOISE LAW	RD 1367/07
<b>THERMAL SYSTEM</b>	
REGULATION OF THERMAL SYSTEM IN BUILDINGS RITE-2007	RD 1027/07
<b>FUEL</b>	
TECHNICAL REGULATION OF DISTRIBUTION AND USE OF FUEL	RD 919/06
CHANGE OF RULES OF REGULATIONS AND TECHNICAL INSTRUCTION	RD 1523/99
<b>ELECTRICITY</b>	
REGULATION OF LOW ELECTROTECHNICAL CURRENT TECHNIQUES AND ADDITIONAL FACILITIES ITC-BT-01 A 51	RD 842/02
REGULAIONS AND RULES ABOUT ELECTRICAL CONNECTIONS	RD 2949/82
SECURITY REQUIREMENTS IN POWER DEVELOPEMENT	RD 7/88
REGULATIONS FOR HIGH VOLTAGE OVERHEAD LINES	D 3151/68
<b>SPECIFICATIONS</b>	
TECHNICAL ESPECIFICATIONS	Order 04/06/73
INSTRUCTION FOR THE RECEIPT OF CEMENT	RD 1797/03
TECHNICAL SPECIFICATION, WATER PIPES	Order 28/07/74
TECHNICAL SPECIFICATION, DRAINAGE PIPES	Order 15/09/86

#### 1.4.3. Fulfillment of CTE

##### Basic requirements concerning the functionality

###### - Using

The house has been designed that the arrangement and the dimensions of spaces, and the facilities provision, facilitate the life to the proper and its functions on it.

###### - Accessibility

The property has all the requirements according to their characteristic in terms of accessibility.

Access to the telecommunication services, audiovisual and information

The house has been designed that meet all the requirements of current legislation, both in the 'Real Decreto Ley1/1998, of 27th of February', a common infrastructure in the buildings for access to the telecommunication services and regulation governing the common infrastructure of telecommunications for access to telecommunication services in indoor and activity installation of telecommunications equipment and systems (Real Decreto 401/2003 of 4th April, and Ley 32/2003, general de telecomunicaciones).

##### Basic requirements regarding safety

###### - Structural safety

The house is designed to have all the necessary requirements to avoid any damage, or the property itself or any of its parts, which have their origin in the foundation, supports, frameworks, floors, walls or load other structural element, or affect them, ensuring the mechanical strength and stability of the house.

### Basic requirements relating to habitability

#### - Hygiene, health and environmental protection

The property has conditions of safety and proper sealing in your indoor environment, and it doesn't deteriorate the environment in their immediate environment, ensuring a great waste management.

#### - Protection against noise

The house's characteristics ensure that the health of users of the same isn't in danger because of the perceived noise and can perform so successfully in the same activities.

#### 1.4.4. Other specific regulations applicable to the project

EHE: It fulfills with the requirements of the investigation of structural concrete.

NCSE: It fulfills with the parameters required by the seismic building standards and that are justified in memory implementation of the proposed structures.

TELECOMMUNICATIONS: R.D. Law 1/1998 of 27 February on Common Telecommunication infrastructure.

REBT: R.D. 842/2002 of 2 August 2002, Low Voltage Electrotechnical Regulations.

RITE: R.D. 1751/1998, Regulation of thermal installations in buildings and their additional technical instructions.

NBE-AE-88: Actions on building

NBE-EA-95: Calculation of steel structures

NBE-QB-90: Covered with bituminous materials

NBE-FL-90: Walls resistant brick

# CONSTRUCTIVE MEMORY

## 2.1. GEOTECHNICAL STUDY

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There has been no geotechnical study, basing the modeling of the structure the results of studies on abutting, adopting a maximum voltage of the field of 3 kg/cm<sup>2</sup>.

## 2.2. STRUCTURAL SYSTEM

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The structural system of the house is organized by three longitudinal spans parallels to the facade that develop on a structural platform that elevates the field accommodation and comprises two main volumes, one of larger height than integrates the day areas and another smaller that contains the night area.

The structure is of concrete, pillars and slabs, precast concrete joists and vaults. The roof is inclined in the day volume and flat inverted in the night.

### 2.2.1. Foundation

#### - Description

Foundation for footings on natural ground, reinforced concrete HA-25/B20/IIa and steel B500-S UNE 36068, produced, transported and put into work according EHE Instruction, including reinforcements, folds, meetings and start rebars in walls, holes for pipes for subsequent installation of the proposed facilities networks, vibrating of concrete with vibrant rule and formation of concrete joints.

#### - Material taken

Reinforced concrete HA-25/B20/IIa manufactured in central and pump disposal, steel B 500S. The size and reinforced are indicated in structure planes. Are arranged with armatures that meet the minimum amounts indicated in Chart 42.3.5 of the investigation of structural concrete (EHD) in response to structural element considered.

#### - Execution Conditions

Excavation on the surface of each footing must be to spread a layer of concrete HM-20/B/40/IIa prepared, regularization and clean that has a minimum thickness of 10 cm and which is used to base for the foundation (footings).

### 2.2.2. Contentions system

#### - Description

It projects a containment system through concrete wall parallel to the front edge of the plot. This wall contains the field access to it, in which there is a large gap between their foreheads. Their dimensions have been calculated and assembled with the housing structure.

- Material taken

Reinforced concrete HA-25/B/20/IIa, The size and reinforced are indicated in planes. Are arranged with armatures that meet the minimum amounts indicated in Chart 42.3.5 of the investigation of structural concrete (EHD) in response to structural element considered.

- Execution conditions

Excavation on the surface of each footing and / or foundation element must be extended a layer of concrete regularization HM-10/B/40/IIa prepared and clean that has a minimum thickness of 10 cm and which is used to base for the foundation.

### 2.2.3 Horizontal structure

- Description

The horizontal structure has been solved by a one-way slab in a thickness of 25 cm with a compression layer 5 cm and joists interaxis of 72 cm composed of joists concrete, thinners pieces between joists (vibropressed concrete vaults) with reinforcement cast and concrete poured in situ to fill nerves.

- Material taken

Reinforced concrete of 25 N/mm<sup>2</sup> (HA-25/B/20/IIa), soft consistency, maximum aggregate size 20 mm, normal exposure, mesh ME 15x30 mm diameter ø 5-5, steel B 500 T, with semiresistent joists, for thickness of 25+5 cm and interaxis of 72 cm.

- Execution conditions

Vibrating, curing, casing and stripping, according EFHE and EHE.

### 2.2.4. Roof structure

- Non walkable flat roof

Non walkable flat roof with gravel protection, inverted, slope 1-5%, over resistant base, composed of the following elements: slope formation layer of 10 cm thickness of cellular concrete CEM II/A-P 32.5 R, water and air-entraining additive addition, finished with cement mortar layer M-40 (1:6) of 2 cm thickness; asphalt layer in perimeter and singular points, emulsion asphalt type EA; monolayer waterproofing membrane not bonded, in floating position regarding the support except in perimeter and singular points, PN-1 type, formed by a layer of asphalt LBM (SBS)-40/FP unprotected; geotextile separation layer (150 g/m<sup>2</sup>); thermal insulation panel of polystyrene extruded type IV of 40 mm thickness placed on separating layer; separating layer of polypropylene-polyethylene geotextile of 200 g/m<sup>2</sup>; protective layer of 16 to 32 mm diameter, free of fines, extended in a middle layer of 10 cm thickness. Reinforcement strip and galvanized metal profile to protect the waterproofing membrane delivery in meeting of perimeter, sealed at the top, reinforcement strip and drainpipe roof of EPDM siphon with protection grille meeting of perimeter, sealed at the top, reinforcement strip and sealing of expansion joints of the building or resistant support of the roof and roof joints and overflow for drain horizontally to the outside accumulated water by drainpipes.



### -Sloped roof

No-ventilated sloped roof and inverted on inclined slab consisting of metal panels to be defined by the D.F, nailed on phenolic agglomerate board 22x3660x1830mm to set it every 30cm wooden battens nailed to the resistant support with lag screws every 50cm, heat insulation blanket based mineral wool (MW) of 45mm thickness and  $K = 0.044 \text{ W / m } ^\circ \text{ C}$ , placed between the battens and bonded to the support using bituminous adhesive PB-II and waterproofing by bituminous of oxiasphalt laminate, type LO-30-FV of 30 gr/dm<sup>2</sup>, with reinforcement consists of glass fiber felt, welded to the support after priming with emulsion asphalt type PB-II.

## **2.3. ENCLOSURE SYSTEM**

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The street facade has ventilation holes of the toilets, storage areas and warehouse as well as the entrance door under a porch of metal joists. The facade of the house to the plot is organized through glass holes and blind panels, composing an elevation more open in response to the orientation of the plot.

The enclosure shall consist of double hollow ceramic brick partition, Outer leaf brick masonry, dimensions 24x11.5x11 cm, rigged and received with mortar cement M-5 and joints of 1 cm thickness, rendered with cement mortar M-15 on the outside face with insulation between both and air space with brick masonry of dimensions 24x11.5x7 cm on the inside according to the plans.

Reinforced masonry 20 cm thickness, made of concrete blocks 40x20x20 cm of dense aggregates, received with mortar cement M-5, with joints of 1 cm thickness, and precast reinforcement lattice 15 cm wide and longitudinal wires of 4 mm steel B 500 T coated with epoxy resin layer, arranged in 4 rows.

## **2.4. COMPARTMENTED SYSTEM**

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All partitions of the building are formed by double hollow brick of dimension 24x11.5x7 cm, rigged and received with cement mortar M-5, with joints 1 cm thickness and plastering of plaster on both faces of 1.5 cm.

## **2.5. FINISHED SYSTEM**

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### 2.5.1. Exterior finishes

#### -Coatings

In outside partitions, continuous coating outside of 10 mm thickness, consisting of a first layer of rendered with cement mortar M-15 and a second layer of white monolayer mortar.

In the inside of outside partitions, continuous coating inside of 15 mm thickness, consisting of a first layer of plastering of white plaster and a second layer of matte acrylic plastic paint for protection and decoration of inside and outside surfaces, resistant to sunlight breathable and waterproof with matte finish in white.

The roof of the main volume is carry out by metal plates, while the night volume is inverted with a surface finish of washed gravel.

Finally, the swimming pool is carry out by ceramic coating made with white glazed stoneware tiles of 30x30cm, placed in thin layer with normal adhesive cement (C1) and grouting with cement grout (L).

#### -Pavements and tilings

Ceramic floor made with glazed porcelain single color stoneware tile 60x120 cm, placed in thin layer with normal adhesive cement (C1) and grouting with cement grout (L) for the outside floor

#### -Carpentry

The carpentry proposals will be of stainless aluminum with security shutters, except for the access door that they will be of iroco wood.

All hardware will be stainless steel, with handles and knobs straight trace and closed.

The windows will be of climatic, formed by glass of 6 mm, air space of 6 mm and transparent glass of 6 mm, fastened with rubber bands to carpentry, to ensure an adequate climate comfort.

### 2.5.2. Interior finishes

#### -Coatings

In inside partitions, continuous coating of 15 mm thickness, consisting of a first layer of plastering of plaster and a second layer of matte acrylic plastic paint for protection and decoration of inside and outside surfaces, resistant to sunlight breathable and waterproof with matte finish in white.

Inside roof in the bathrooms, dressing room and storage, have false ceiling panels made of 120x60cm, smooth sound of 8.5 kg/m<sup>2</sup> weight, based on pladur, glass fiber and perlite, with visible support based of lacquered metal profiles primary and secondary, topped perimeter with angular metal profile and suspended by threaded wall tie of galvanized rod of diameter 3 mm with a layer of matte acrylic plastic paint for protection and decoration of inside and outside surfaces, resistant to sunlight breathable and waterproof with matte finish in white.

#### -Pavements and tilings

Tiling made with single color tile 30x30 cm, placed in thin layer with normal adhesive cement (C1) and grouting with cement grout (L) for bathrooms and kitchen walls.

Ceramic floor made with glazed porcelain single color stoneware tile 60x120 cm, placed in thin layer with normal adhesive cement (C1) and grouting with cement grout (L) for the floor

#### -Carpentry

The carpentry proposals will be of white lacquered wood, except for the inside bathroom and living room doors that they will be of glass.

## 2.6. INSTALLATIONS

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### 2.6.1. Drainage system

Horizontal drainage system for housing with general network connection to the municipal general network, a Meter of 3/4 "valve box installed in solid brick of 51x38x50cm and 1/2 foot thick, received with cement mortar and river sand 1/6, plastered and polished in their inside, concrete base H-175 kg/m<sup>2</sup>, t.máx.20 mm, with keys ball, check valve 3/4 " and brass tap 1/2", a system of manholes of 60x60x80cm, registrable, built with rough brick of 1/2 "thick foot, received with cement mortar, placed on concrete base H-100, plastered and polished on the inside with cement mortar , concrete slab H-150 slightly reinforced with mesh and a siphon manhole of 60x60x80cm, no registrable, with the same features of the other manhole, connected by handing sewer, made with PVC smooth pipe for sanitation, nominal diameter 160mm and elastic connection, with junctions, accessories and special parts and buried sewer made of a PVC smooth pipe sanitation, diameter 110mm, with junctions, accessories and special parts, placed in trench of wide 500+110mm, on a layer of sand / gravel of thickness 100+110 / 10mm.

For sanitary devices that are installed in the home, discharge units and minimum diameters are the following, according to Table 4.1 of HS 5 CTE for public use.

<b>Devices</b>	<b>Diameter</b>	<b>Discharge units</b>
Washbasin	40mm	2
Shower	50mm	3
Toilet cistern	110mm	5
Drain 50	50mm	3
Drain 70	75mm	6
Drain 100	110mm	9

### 2.6.2. Electricity system

Complete electrical installation in housing with 3 bedrooms and 2 bathrooms, with a large electrification of 9200 W, consisting of general distribution box with controls, handling and general protection by 1 PIA 2x40 A and 2 differential switches 2x40A/30mA for 7 circuits (1 for lighting, 1 socket for general uses and fridge, 1 for sockets in bathrooms and kitchen staff, 1 for washing machine, dishwasher and electric water heater, 1 kitchen and oven, 1 socket for heating and 1 socket for air conditioning) mechanisms and unipolar copper wire placed under different sections of hose corrugated PVC double layer of different diameters, fully installed, connected and in good working order, according NT-IEEV/89 and Low Voltage Electrotechnical Regulations 2002

### 2.6.3. Plumbing system

Plumbing system for a full housing, equipped with kitchen and 2 bathrooms, made with copper pipes for networks of hot and cold water and PVC pipes, 32 mm diameter for the drainage system, prepared for individual trap in each appliance, with PVC downspout and shank to link the toilet/s, water intakes closed with keys or plugs and drain plugs, completely finished.

### 2.6.4. Heating system

Installation of chimney prefabricated for the home built with stone gird as the brackets, lintels top and bottom of firebrick, dark pine shelf 15cm in a natural shade and home to steel, 253x165x85 cm dimensions with chimney stainless steel tube 200mm in diameter with double walls and intermediate insulation.

### 2.6.5. HVAC system

HVAC system (Heating, Ventilating, Air Conditioning) with heat-cold pump, pipeline, including diffusers, return air grilles.

### 2.6.6. Solar energy system

Installation of photovoltaic solar energy for a detached house with 3 bedrooms, kitchen and bathroom, to supply electricity for lighting, and a low power fridge. Composed of photovoltaic modules and its supports, controller, inverter and battery, all of them with CE marked.

### 2.6.7. Extraction and ventilation system

Check the DB for the HS-3: Indoor air quality within the justification of compliance with the requirements of the CTE. This detached house has been chosen the option of natural ventilation

### 2.6.8. Telecommunication system

The installation consists of individual antenna capture equipment with 4 TV and FM sockets, ready to receive all the terrestrial TV channels.

### 2.6.9. Swimming pool

Concrete pool of 9.00x5.60m, average depth of 1.50m, coating of white glass mosaic, made with white cement mortar and grout with white tile adhesive on rendered cement mortar of dosing 1:3 and sand, rounded interior angles, structure of reinforced concrete wall and vibrated HA-25/F/40, average thickness 30cm, double grid of 15x15mm diameter steel B500S, background of the same material of average thickness 20cm, spread through regulated on layer of 10cm, packed and reinforced with mesh 15x15mm of 8; edge of artificial stone 8cm of thickness and 65cm wide.

## 2.7. EQUIPMENT

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### 2.7.1. Baths

- Colored porcelain toilet, tank under, plugs and screws placed through the flooring, sealed with silicone and comprising: cup, lid and tank under seat mechanisms and lacquered lid, hinged steel installed, with bracket wrench 1/2 "chrome and flexible hose 20cm and 1/2".
- Acrylic shower tray dimensions 160x70 cm, of rectangular shape, white, non-slip bottom and drain kit, with drain valve 1 1/2" siphon and pipe.
- Washbasin of 1200x410mm, without pedestal, white porcelain, with kit of fixing anchors, with drain valve 1 1/2" siphon and pipe.
- Mixer Monoblock washbasin, mono tap, special grade, of wall, chrome finish low spout with aerator and flexible supply.
- Tub spout diameter 3/4" with perlator, 130mm length.
- Showerhead with five functions: rain spray, soft, massage, easy clean and economizer (50%), for wall.

### 2.7.2. Kitchen

- Stainless steel sink of dimensions 450x490mm for countertop of 60cm, with a normal bowl without drainer, drain valve, chain, cap, siphon and pipe.

# JUSTIFYING MEMORY

## 3.1. SCHEDULE OF REQUIREMENTS

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### 3.1.1. Structural analysis and dimensioning

The building which this project is intended to use the house unit and all its dependencies allow the accomplishment of the assigned function.

The conditions and requirements that have served as a premise for this project is required by law for the PFC, providing the necessary documentation for actual implementation and fulfilling the statement provided to members of the court assigned.

### 3.1.2. Durability considerations

This house is projected to meet the essential requirements of mechanical strength and stability, fire safety, hygiene, health, environment and safety in use. Compliance with these requirements is expected to meet during the life of 50 years, during which the user has to prove the maintenance manual which is part of the book building.

### 3.1.3. Formal Aspects

This project develops an isolated house. Based on the conditions and requirements listed above, the property has the following formal aspects:

- Choosing the most suitable location for the building.
- Act on the existing environmental conditions surrounding the building.
- Provide the building of appropriate general volumetric characteristics with respect to energy exchanges with the outside.
- Act on the characteristics of the building envelope for optimal performance of interior-exterior energy transfer and to address its permeability.
- Consider the effects that space, and interior finishing elements that indicate the building's energy performance.

## 3.2. STRUCTURAL ANALYSIS AND SIZING

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### 3.2.1. Method of calculation of the structure

To calculate the different types of resistive elements it has been in consideration several hypotheses: total vertical load, alternating overload, and vertical load combined with wind. The structure of the floors is done with one-way slab and beams supporting reinforced concrete pillars. In all cases was used one-way reinforced concrete slabs, the height is (25+5) 30 cm.

It has taken for granted that materials have an elastic behavior, and for the design of the different elements has been followed the method of calculation based on the ultimate limit and service states. In the particular case of the concrete, it has been taken as a model of behavior the normatively admitted: parabola-rectangle, rectangle diagram, etc.

The numerical calculation was done by a computer program, based on the matrix formulation of the method of balance. The software used is CYPE 2009 program. The calculation method is adapted to the current legislation. Likewise it has been used charts and/or abacus of specialized publications.

The method of calculation used for the design of the concrete footing and its reinforcement is reflected in the EHE-08 regulation. In the slabs and reinforced concrete has been checking out the deformations according to the regulation EHE (concrete instruction) too.

### 3.2.2. Foundation

The chosen system is shallow spread footings with a contention system.

The method of calculation used for the design of footings and walls, and their reinforcement is reflected in the regulation EHE-08.

As seen, the value of the allowable stress is prudent, however I will be taken as correct which determines the geotechnical report of the terrain.

### 3.2.3. Structure

- Gravitational actions

According to Basic Document Structural Safety Actions in the Building DB-SE-AE:

<b>GROUND FLOOR</b>	
Slab own weight	3,7 KN/m <sup>2</sup>
Partitions overload	1 KN/m <sup>2</sup>
Own weight flooring	0,77 KN/m <sup>2</sup>
Use overload	2 KN/m <sup>2</sup>
<b>TOTAL</b>	<b>7,47 KN/m<sup>2</sup></b>

<b>GROUND ROOF</b>	
Slab own weight	3,7 KN/m <sup>2</sup>
Wind overload	0,7 KN/m <sup>2</sup>
Snow overload	0,3 KN/m <sup>2</sup>
Use overload	1 KN/m <sup>2</sup>
<b>TOTAL</b>	<b>5,7 KN/m<sup>2</sup></b>

- Wind action

According to Basic Document Structural Safety Actions in the Building DB-SE-AE:

<b>Building situation</b>	A (according to DB-SE-AE= Segart, Valencia)
<b>Height of the buiding</b>	<10m
<b>Wind dynamic pressure</b>	0,42 KN/m <sup>2</sup>
<b>Wind speed</b>	26m/s
<b>Wind coeficient</b>	0,7 -0,3

- Thermal and rheological actions

Not considered because the dimensions of the building are reduced. For this reason, it requires no structural expansion joint

- Seismic action

According to Earthquake Resistant Construction Standard NCSE-02:

<b>Classification of construction</b>	Detached House
<b>Type of structure</b>	One way reinforced concrete frames
<b>Basic Seismic Acceleration (ab)</b>	ab = 0,05g (Annex 1 NCSE-02 Segart, Valencia)
<b>Contribution coefficient (K)</b>	K = 1 (Annex 1 NCSE-02)
<b>Dimensionless coefficient of risk (ρ)</b>	ρ = 1
<b>Amplification factor of the ground (S):</b>	To (ρ x ab ≤ 0,1g) S = C/1,25 = 1,04
<b>Type of terrain coefficient (C)</b>	C = 1,3 (rocky vegetation)
<b>Seismic acceleration calculation (ac)</b>	ac = S x ρ x ab = 0,052g
<b>Method of calculation used</b>	Spectral Modal Analysis
<b>Damping factor</b>	Reinforced concrete structure compartmentalized: 5%
<b>Number of vibration modes considered</b>	3 vibration modes (The total mass displaced > 90% in both axes)
<b>Overload almost constant fraction</b>	The part of overhead to be considered in the seismic mass mobilizable is = 0.5 (housings)
<b>Ductility behavior coefficient</b>	μ = 3 (high ductility)

Constructive measures considered:

- Bracing of foundation with a perimeter ring with tie beams and bracing foundation slab of reinforced concrete.
- Tying the frames exempt from the structure with perpendicular beams to them.
- Concentration of braces in the foot and head of the pillars.
- Pass the rows alternately about partitions over the others.

- Minimum thickness of slab

According to EHE art. 50.2.2.1:

$$H_{\min} = \delta_1 \times \delta_2 \times L/C = 1,20 \times 1,001 \times 6,02/26 = 0,278 = 0,3 = \mathbf{30cm}$$

$$\delta_1 = \sqrt{q/7} = \sqrt{10,09/7} = 1,20$$

$$q = 7,47 \times 1,35 = 10,09$$

$$\delta_2 = (L/6)^{1/4} = (6,02/6)^{1/4} = 1,001$$

L = 6,02 (maximum span of the slab)

C = 26 (Chart 50.2.2.1.b Inner Section)

### 3.3. BUILDING SERVICES IN CONNECTION WITH BASIC CTE REQUIREMENTS

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This project is consistent with m the point 2 of the Second Transitional Provision of Royal Decree 314/2006 of 17 March, approving the Technical Building Code.



### 3.3.1. Basic requirements for Fire Safety FS (SI)

#### Basic Requirement SI 1: Internal propagation

The property subject of this project ensures the limitation of the risk of spread of fire inside.

##### 1.1. Division into fire sectors

-Features of the sector of fire:

INTENDED USE	RESIDENTIAL HOUSING
SITUATION	Floor height above ground evacuation $h \leq 15$ m.
AREA	112 m <sup>2</sup>
FIRE RESISTANCE OF WALLS AND CEILINGS that separate the fire area	EI 60
CONDITIONS ACCORDING DB-IS	Residential Housing

##### 1.2. Local and risk areas

-Locals and special risk areas are:

ROOM FACILITIES (Pool)	
USE	Boiler room with effective rated output $\leq 200$ Kw
LOCAL SIZE	5,2 m <sup>2</sup>
CLASSIFICATION	Low Risk
Special risk zone conditions are fulfilled	Yes

-Conditions integrated of the special risk areas in buildings

FEATURE	Low Risk
Fire resistance of the supporting structure	R 90
Fire resistance of walls and ceilings that separate the area from the rest of the building	EI 90
Independence Hall in each communication in the area with the rest of the building	-
Communication doors with the rest of the building	EI2 45-C5
Maximum evacuation route to a local exit	$\leq 25$ m

##### 1.3. Concealed spaces. Passage facilities through fire compartmentation elements

Considering a single sector of fire, this section does not apply.

##### 1.4. Fire Reaction of building elements decoration and furniture

Conditions are fulfilled of the classes of reaction to fire performance of building elements as shown in Chart 4.1

## **Basic requirement SI 2: Outdoor propagation**

The features and ensure housing situation which limits the risk of spread outside of a fire, in the same house as other buildings.

### 2.1 Divided walls and facades

Not applicable to this verification already facade exist two buildings or different fire risk areas with vertical spread risk.

### 2.2. Roofs

It is not necessary to justify because there is no meeting between a roof and a façade that belong to fire sectors or different buildings.

## **Basic requirement SI 3: Evacuation of the occupants**

The property has adequate means of escape for the occupants to leave the same or reach safety.

### 3.1. Calculation of the occupation

In order to determine the occupation, we will take the value of 20 m<sup>2</sup> / person in Chart 2.1 of occupation densities for residential housing.

Taking a useful area of housing 112 m<sup>2</sup>, the total occupancy is **6 people**.

### 3.2. Number of exits and length of the evacuation routes

It is considered as any origin evacuation point occupiable establishing according to the arrangement of furniture and seating provided.

-FLOOR EXITS:

The house has two safe exits to the outside, as at the script, which allows the dispersion of the occupants.

-LENGTH OF EVACUATION ROUTES:

The length of the evacuation routes to floor some output not exceeding 35 meters in any case, even in the case of single-family housing is not necessary that justification.

### 3.3. Dimensioning of the evacuation means

The doors of the house fulfill the following condition  $A \geq P / 200 \geq 0.8$  meters, have dimensions greater than this last value.

Definitions for the dimensioning calculation:

A = Width of the element (m)

P = Total number of people whose passage is provided through the point whose width is dimensioned.

## 4. Protection of the stairs

The interior of the house has no stairs, so you do not need to justify this section.

## 5. Doors along evacuation routes

It is not necessary that the doors open in the direction of evacuation for not being the occupation of the dwelling greater than 50.

## 6. Marking of means of evacuation

It is not necessary to sign the means of evacuation because it is a Residential Housing use.

## 7. Fire smoke control

The project is not located in any of the cases established in the DB.

### **Basic requirement SI 4: Fire protection facilities**

The house has those equipment and facilities required in terms of their use and condition to enable the detection, control and extinguish a fire.

#### 4.1. Provision of fire protection installations

The proposed building has the equipment and facilities for fire protection indicated in the chart.

The commissioning of the installations require the lodging with the competent organ of the Autonomous Community of the installation company certificate referred to in Article 18 of the Fire Protection Installations.

In special risk areas in accordance with Chapter 2, Section 1 of DB-SI:

TOTAL NUMBER OF PORTABLE EXTINGUISHERS:

Room installations: 1 portable fire extinguisher.

#### 4.2. Signage manual installations of fire protection

The signals are visible even in case of failure in the supply to normal lighting.

Those which are designed photoluminescent, their light emission features of the conditions specified in UNE 23035-4, 1999.

### **Basic requirement SI 5: Fire intervention**

The house and its surroundings have the conditions that are required to facilitate the involvement of rescue and firefighting.

#### 5.1. Approach to buildings

The road from the street approach, maneuvering spaces referred in section 1.2, fulfill the following features:

-Free-Minimum width: 3.50 m.

-Free or low-gauge Height: 4.50 m.

-Bearing capacity of the road: 20.00 Kn/m<sup>2</sup>.

There are no curved stretches of lane rolling.

#### 5.2. Surroundings of buildings

The building has a height of evacuation down less than 9.00 m, therefore does not apply to this section.

The maneuvering space is kept free of street furniture, trees, gardens, markers or other obstacles.

#### 5.3. Accessibility for façade

The façade to which reference is made in section 1.2 has holes that allow access from outside the staff of fire service.

## **Basic requirement SI 6: Fire resistance of the structure**

The supporting structure is designed to maintain the required fire resistance for the time necessary for them to carry out the basic requirements above.

### 6.1. Generalities

Using simplified methods specified in the Basic Document has not been taken into account indirect actions resulting from the fire.

### 6.2. Fire resistance of the structure

Not considered the bearing capacity of the structure after the fire.

### 6.3. Main structural elements

It is considered that the structural fire resistance of the building (including slab, beams and supports) as well as consolidation of the actions proposed is enough if it reaches the class indicated in Chart 3.1 or 3.2 which represents the time in minutes of resistance to action represented by the standard time-temperature curve.

Set to downward evacuation height  $h = 3.00$  m.

The floor, beams and supports have an R-90 or higher to be the evacuation height  $\leq 15$  m.

The slab will have an RF equal or superior to EF seen in the previous section.

USE OF SECTOR: RESIDENTIAL HOUSING (detached house)

FLOOR TYPE: ABOVE GROUND evacuation of building height less than 10 meters.

FIRE RESISTANCE: R-60

LOCAL SPECIAL LOW RISK: ROOM INSTALLATIONS: R-90

### 6.4. Secondary structural elements

To secondary structural elements, such as the loading of the holes in the windows, they require the same fire resistance as the main elements because its collapse could cause personal injury or compromises global stability, disposal or compartmentalization into fire building sectors.

### 6.5. Determination the effects of actions during the fire

Own weight that has been taken into consideration is that of structural elements, and the separating walls, partitions, all kinds of carpentries, coatings (such as flooring, plaster, false roof), fillers and fixed equipment.

Obtain the following values:

-Permanent action:

-Variable action in persistent status:  $3'00$  KN/m<sup>2</sup>

-Partial safety factor for type of resistance verification for type of permanent action of own weight and persistent or transient unfavorable situation:  $1'35$

-Partial safety factor for type of resistance verification for type of variable action and persistent or transient unfavorable situation:  $1'50$

-Coefficient of simultaneous effects due to of short duration actions that may be irreversible:  $0'70$

### 6.6. Determination of fire resistance

The fire resistance of an element is set by checking the dimensions of its metal profile as described in the different charts depending on the material given in the appendices C to F, for different fire resistance.

The fire resistance of an element is obtained by carrying out the tests laid down in Royal Decree 312/2005 of 18 March.

In the element analysis has been considered that in the supports and ends of the element during the time of exposure to fire do not vary with respect to those produced at normal temperature.

#### APPENDIX C. Fire resistance of reinforced concrete structures

-Pillars

The coating according EHE to the temperature indicated  $C_{min} = 2.50\text{cm}$

- Beams

The coating according EHE to the temperature indicated  $C_{min} = 2.50\text{cm}$

-Support and walls

According to chart C.2 gives an R-90. Applies to the rest of the building

-One way slab

According to chart C.4

Thickness  $300\text{mm} \geq h \text{ min } 100\text{mm}$ . Distance equivalent to the axis:  $50 \geq$  minimum distance of axis  $25 \text{ mm REI-90}$

#### APPENDIX D. Fire resistance of steel elements

-Beams and braces

According to Table D.1, the standard time of fire resistance obtained with an intumescent paint coating on a fireproof primer is R-60.

-Supports

The steel supports are coated with masonry elements all around exposed to fire, which is considered the side of safety that the fire resistance of the support is at least equal to the fire resistance corresponding to element factory (see Annex F of fire resistance of elements of factory).

The uncoated supports with masonry elements are coated with intumescent paint over a primer fireproof.

#### APPENDIX F. Fire resistance of masonry elements

-Partition wall 1:

Composition: triple hollow brick of 11cm.

Type of coating: rendered cement mortar.

Thickness of the masonry: 110mm.

Fire resistance according to Table F.1: **EI-180** minutes.

-Partition wall 2:

Composition: hollow brick of 7cm

Type of coating: plastering

According exposure: on both sides.

Thickness of the masonry: 70mm.

Fire resistance according to Table F.1: **EI-90** minutes.

-Wall 3:

Composition: concrete hollow block 20cm.

Type of coating: rendered of cement mortar.

Thickness of the masonry: 110mm.

Fire resistance, according to table F.2: **EI-120** minutes

### **3.3.2. Security basic demands of use (SU)**

#### **Basic requirement SU 1: Security against the risk of falls**

The morphology of the building and its parts has been designed to offer the following benefits:

- It limited the risk of falling users.
- The floor favor people not to slipping, tripping or will be difficult mobility.
- It's limited the risk of falling through holes in changes of level, on stairs and ramps.
- Cleaning the exterior glazing can be done safety.

##### 1.1. Slipperiness of the floor

This project has a use residential housing so it does not apply to it the requirement to limit the risk of soil slippage. The restricted areas are excluded from the application.

##### 1.2. Discontinuities in the pavement

Except in restricted areas and to limit the risk of falls as a result of stumbling or tripping, floor meet the following conditions:

- Won't be any imperfections or irregularities involving different level of more than 6 mm.
- The difference in height not exceeding 50 mm will be resolved with a slope not exceeding 25%
- In interior areas for movement of people, the floor does not present holes or gaps that can enter a sphere of 15 mm in diameter.

##### 1.3. Difference in height

- Protection of difference of height

To limit the risk of falling, protective barriers in the existing slopes, terrace, holes and openings such as balconies and windows, etc. with an elevation difference greater than 550 mm.

- Features of protective barriers

Height

Protective barriers have at least a height of 900 mm when the height difference that protect not exceed 6 m and 1100 mm in all other cases, except in the case of stairwells of width less than 400 mm , in which the rails have a height of 900 mm, minimum.

Resistance

The protective barriers shall be rugged and rigid enough to withstand the horizontal force set out in section 3.2 of the Basic Document SE-AE, depending on the area where they are.

Construction features

Barrier protection of the ladder meets the conditions of section 3.2.3, as they are designed to not be easily scaled by children, there are no points of support in the height between 200 and 700 mm above the soil and not be apertures that can be pierced by an area of 100 mm diameter.

Barriers located in front of a row of fixed seats

Not having barriers placed in front of a row of fixed seats, this item is not applicable

##### 1.4. Stairs and ramps

- Restricted Use Stairs

There are no stairs.

The ramp of the plot has a slope less than 16%.

- Stairs general use

There are no stairs in general use.

### 1.5. Cleaning the outside glazing

The glazings of the house are accessible by both sides, so you do not need any special cleaning system.

### **Basic requirement SU 2: Safety against the risk of impact or entrapment**

Proper design of fixed and building practices ensures that the risk that users may suffer impact or entrapment with them, should be limited safety.

#### 2.1. Impact

-Impact with fixed elements

The vertical clearance in circulation areas shall be at least 2,100 mm in restricted areas and 2,200 mm in other areas. On the threshold of the door headroom is 2,000 mm, minimum.

- Impact with workable elements

Except in restricted areas, internal doors on the side of the corridors whose width is less than 2.50 m are arranged such that the sweep of the blade does not invade the corridor.

Swing doors situated between circulation areas do not invade the passage area.

- Impact fragile element

There are areas at risk of impact.

- Impact with Insufficiently perceptible elements

The large glazed areas that may be confused with doors or openings shall be provided, along its length, signaling at a height between 850 mm lower and 1,100 mm and a height of between 1,500 mm higher and 1,700 mm.

This signage is not necessary when there uprights separated by a distance of 600 mm, maximum, or if the glass surface has at least one cross member located at the lower height above.

#### 2.2. Trapping

There is no element of automatically opening and closing of this type.

### **Basic requirement SU 3: Security against risk of imprisonment**

The building has been designed to limit the possibility for users to accidentally get trapped somewhere.

#### 3.1. Imprisonment

There are doors of a room that have device for locking from inside and where people can become accidentally trapped inside.

In those doors exist an unlocked system from outside the room and the rooms have controlled lighting from within. It fulfills this paragraph 1 of section 3 of the SUA DB.

### **Basic requirement SU 4: Security against the risk caused by inadequate lightning**

The lighting proposal ensures that the risk of users suffer damage due to it both in circulation areas in the interior and exterior, is limited, even in an emergency or failure of normal lighting.

#### 4.1. Normal lighting of circulation areas

-Minimum levels of lighting

Area			Minimum lighting lux
Outside	Exclusive for people	Stairs	10
		rest of the areas	5
	For vehicles or mixed		10
Inside	Exclusive for people	Stairs	75
		rest of the areas	50
	For vehicles or mixed		50

The average uniformity factor of the lighting will be 40% or more.

#### 4.2. Emergency lighting

-Equipment

In accordance with paragraph 2.1 of Section 4 of SU DB, housing does not require emergency lighting, having a lower occupancy of 100 people.

#### **Basic requirement SU 5: Security against the risk caused by high occupancy situations.**

The use and the ability of the property failure guarantee the impossibility of risk caused by high occupancy situations.

Just as stated in paragraph 1 of section 5 of the DB SU in relation to the need to justify the fulfillment of security against the risk caused by high occupancy situations the conditions set out in section do not apply in the type of project.

#### **Basic requirement SU 6: Security against the risk of drowning.**

There are no items in the home which could cause risk due to drowning.

##### 6.1. Pool

There are pools for collective use.

##### 6.2. Wells and tanks

There are no wells, tanks or pipes that are open and accessible to people at risk of drowning.

#### **Basic requirement SU 7: Security against the risk caused by moving vehicles**

This project is a detached house, the risk caused by moving vehicles is considered limited.

##### 7.1. Scope of application

This Section applies to use parking areas and traffic lanes of vehicles in the buildings, except for the parking of the houses, so it does not apply to this project.

#### **Basic requirement SU 8: Security against the risk related to the action of lightning**

The purpose of this project has been designed so that the risk of electrocution and fire caused by lightning is limited.

##### 8.1. Verification procedure

It will be necessary to install a protection system against lightning when the expected frequency of impacts  $N_e$  exceeds the acceptable risk  $N_a$ .



The expected frequency of impacts is determined by the expression:

$$N_e = N_g \times A_e \times C_1 \times 10^{-6} \text{ (n}^\circ \text{ impacts / year)} = 0'0020326$$

- $N_g$ : density of impact on the ground, obtained according to Figure 1.1, Section 8 of SU DB.  $N_g$  equals **2** (n<sup>o</sup> impact / year, km<sup>2</sup>)

- $A_e$ : Surface capture equivalent of isolated building in m<sup>2</sup>, which is delimited by a line drawn at a distance 3H each of the points on the perimeter of the building, where H is the height of the building perimeter at the point considered. H equals **2.030'26** m<sup>2</sup>.

- $C_1$ : Coefficient related to the environment, the building is located close to other buildings or trees of the same height or higher (Chart 1.1 of Section 8 of the DB SUA).  $C_1$  equals **0'5**.

## 8.2. Acceptable risk

The acceptable risk,  $N_a$ , determined by the expression:

$$N_a = (5,5 / (C_2 \times C_3 \times C_4 \times C_5)) \times 10^{-3} = 0'0055$$

- $C_2$ : coefficient depending on the type of construction, the building has a concrete structure and concrete and metal deck (according to Chart 1.2 of section 8 of the DB SU).  $C_2$  equals **1**.

- $C_3$ : coefficient depending on the content of the building, the content of the building is classified in this category: Other contents (according to Chart 1.3 of section 8 of the DB SU).  $C_3$  equals **1**.

- $C_4$ : coefficient depending on the use of the building, the use of the building is classified in this category: Rest of buildings (according to Chart 1.4 of section 8 of the DB SU).  $C_4$  equals **1**.

- $C_5$ : coefficient depending on the need for continuity in the activities taking place in the building, the use of the building is classified in this category: Rest of buildings (according to Chart 1.5 of section 8 of the DB SU).  $C_5$  equals **1**.

### **Basic requirement SU 9: Accessibility**

It facilitates access to and use non-discriminatory, independent and secure buildings for people with disabilities.

Accessibility conditions are only requested in homes that must be accessible. For this reason, no justification is required in this section.

### **3.3.3. Basic requirements for energy saving (HE)**

#### **Basic requirement HE1: Limited energy demand**

The envelope of the house has all the necessary requirements to guarantee the limitation of energy demand to ensure adequate thermal comfort depending on your local climate and its use. In that way, it has appropriate characteristics of isolation and inertia, air permeability and exposure to solar radiation, preventing the development of humidity and interstitial condensation.

#### **1.1. Verification procedure**

It is chosen the alternative procedure of checking the following: "simplified option."

This option is based on indirect control of the energy demand of buildings by limiting the parameters characteristic of the enclosure and interior partitions that make up the thermal envelope. Checking is made through the comparison of the values obtained in the

calculation with the maximum permitted. This option may be applied to building works of new construction to meet the requirements specified in paragraph 3.2.1.2 of section HE-1 to DB-HE and rehabilitation works of existing buildings.

In this option limits the presence of condensation on the surface and inside the enclosure and are limited energy losses due to air infiltration to normal conditions of use of the buildings.

## 1.2. Description and quantification of the requirements

### -Energy demand

The energy demand of buildings is limited according to the climate of the locality in which they are located, according to climatic zone set out in paragraph 3.1.1, and internal loading spaces in accordance with paragraph 3.1.2.

To avoid unbalance between the thermal quality of different areas, each one of the enclosure and interior partitions of the envelope thermal transmittance shall not exceed the values given in Chart 2.1 of Section 1 of the DB-HE depending on the climate zone in which the building is located.

In the case of the project which is the object of this memory the maximum transmittance values are:

<b>Enclosures and interior partitions</b>	<b>ZONES B</b>
Façade walls, interior partitions in contact with inhabitable spaces, the perimeter first meter floor resting on the ground and first meter of wall in contact with the ground	1,07
Floors	0,68
Roofs	0,59
Glasses and Frames	5,70
Dividing wall	1,07

### Determining the climatic zone

The province of Valencia project, the reference height is 8 and the town is Segart, with a level difference between the town of the project and the capital of 300 m.

The project outside relative humidity for condensation testing in January is 63%. The resulting climate zone is C2.

Considering classification of points 1 and 2, paragraph 3.2.1 of Section 1 of DB-HE: There are interior spaces classified as "living spaces low internal load"

Considering classification of section 3, paragraph 3.2.1 of Section 1 of DB-HE:

There are interior spaces classified as "spaces of class 3 or lower humidity"

### -Condensations

The surface condensation on enclosures and interior partitions that make up the thermal envelope of the building shall be limited so as to prevent mold growth on its interior surface. To this end, those inner surfaces of the enclosure that can absorb water or susceptible to degradation and thermal bridges especially in the same, the monthly average relative humidity on said surface will be less than 80%.

The interstitial condensation occurring in the enclosures and interior partitions that make up the thermal envelope of the building shall be such as not to produce a significant reduction in their thermal or risk of degradation or loss of life. Also, the maximum accumulated condensate in each annual period shall not exceed the amount of evaporation possible in the same period.

- Air permeability

Just as stated in section 1 of the DB-HE (paragraph 2.3.3): air permeability of the woodwork, measured with a pressure of 100 Pa, will be worth less than 50 m<sup>3</sup>/hm<sup>2</sup>.

### 1.3. Supporting documentation

To justify the fulfillment of the conditions set forth in section 1 of the DB-HE forms are enclosed to support the calculation of the characteristic parameters means and the forms in accordance to those contained in Appendix H of the DB-HE to the habitable zone of low internal load and high internal load of the building.

FORM 1: Calculation of the characteristic parameters means

<b>CLIMATIC ZONE</b>	B3	<b>Low internal load area</b>	X	<b>High internal load area</b>
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<b>WALLS (UMm) and (Utm)</b>					
Types		A (m <sup>2</sup> )	U (W/m <sup>2</sup> K)	A.U (W/K)	Results
N	Wall in contact with air	48'96	0'4	19'58	UMm = A.U/A=0'40
E	Wall in contact with air	24'47	0'4	9'79	0'40
W	Wall in contact with air	33'53	0'4	13'41	0'40
S	Wall in contact with air	62'30	0'4	24'92	0'40

<b>FLOORS (Usm)</b>					
Types		A (m <sup>2</sup> )	U (W/m <sup>2</sup> K)	A.U (W/K)	Results
Supported on the ground		76'84	0	0	

<b>HOLES (UMm) y (Utm)</b>							
Types		A (m <sup>2</sup> )	U (W/m <sup>2</sup> K)	F	A.U (W/K)	A.F (m <sup>2</sup> )	Results
N	Holes	26'77	2,70	0'62	72'28	16'59	Uhm = A.U/A=2'70 FHm = A.F/A=0'62
E	Holes	1'44	2,70	0'62	3'89	0'89	2,70 0,62
W	Holes	6'32	0,40	0'62	2'53	3'92	0,40 0,62
S	Holes	4'32	0,40	0'62	1'73	2'68	0,40 0,62

FORM 2 CONFORMITY – Energy demand

<b>CLIMATIC ZONE</b>	C2	<b>Low internal load area</b>	X	<b>High internal load area</b>
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<b>Enclosures and interior partitions of the thermal envelope</b>	<b>Umax(project)</b>		<b>Umax</b>
Façade walls	0'40	≤	0,95
First meter of the perimeter of floors supported and walls in contact with the ground	0		
Interior partitions in contact with inhabitable spaces	0		
Floors	0	≤	0,53
Roofs	0	≤	0,49

Holes of glass skylights	2'80	≤	4,40
Frames of holes and skylights	0'90		
Dividing walls	0	≤	1,00

Interior partitions (residential buildings)	0	≤	1,2
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<b>FAÇADE WALLS</b>			
	UMm	≤	Umlim
N	0'40		0'82
E	0'40		
W	0'40		
S	0'40		

<b>HOLES</b>				
	Uhm	≤	Uhlim	
N	2'70		3	
E				5'7
W				
S	2'70			5'7

<b>FLOORS</b>			
	Usm	≤	Uslim
	0		0'52

<b>ROOFS</b>			
	Ucm	≤	Uclim
	0		0'45

### FORM 3 CONFORMITY – Condensations

Enclosures used

The enclosures used for the preparation of the justification of HE are listed below:

Name: ENF+LH11+AIS+LH7+YE

U: 0'39765 W/m<sup>2</sup>h<sup>o</sup>K

Materials:

-Cement mortar or lime for masonry for rendered/plastering 1600 <d <1800.

Thickness (cm): 1'5

Cond. (W/m<sup>2</sup>K): 1

-Hollow brick LH

Thickness (cm): 11'5

Cond. (W/m<sup>2</sup>K): 0'32

- Cement mortar or lime for masonry for rendered/plastering 1600 <d <1800.

Thickness (cm): 1'5

Cond. (W/m<sup>2</sup>K): 1

- EPS Expanded Polystyrene (0'029 W/Mk)

Thickness (cm): 5

Cond. (W/m<sup>2</sup>K): 0'029

- Hollow brick  
Thickness (cm): 7  
Cond. (W/m<sup>2</sup>K): 0'32
- Plaster mortar  
Thickness (cm): 1  
Cond. (W/m<sup>2</sup>K): 0'80

### **Basic requirement HE2: Performance of thermal system**

Thermal systems of the house ensure thermal comfort of its occupants and all requirements set forth in the existing Regulation of Thermal Systems in Buildings (RITE).

Buildings shall have adequate heating systems designed to provide thermal comfort of occupants, regulating the performance of themselves and their equipments.

This requirement is currently developing the existing Regulation of Thermal Installations in Buildings, RITE, and its implementation will be defined in the building project.

### **Basic requirement HE3: Energy efficiency of lighting system**

Lighting systems are designed according to the needs from the proper use of energy efficient housing and through a control system that adjusts the ignition to the actual occupancy of each area. The house has also a system of regulation of natural light that takes full advantage of it in the required areas.

#### 3.1. Solutions adopted to save energy on lighting installation

First, it has tried to design single-family housing so as to allow *the use of natural light*, getting the integration of all possible surfaces that allow such use in the building's architecture.

In this way, natural light provides users to the installation an environment that meets your expectations, facilitating the development of their daily activities. The contribution of natural light to housing has been made by doors, windows and facades. Depending on the use surface varies from 1 to 25%.

Depending on the orientation of the surfaces that allow the housing to have natural light and season of the year, to take advantage of that light has been a need for control systems such as blinds and curtains in the recesses, this shielding can refine the light reducing possible dazles.

Second, it has established a *system of artificial lighting control*, it is important to select the right one for not raising the oversized system installation.

The objectives are energy saving, cost saving and visual comfort. Fulfillment of the three depending on the selected control system can reach energy savings up to 60%.

The systems available are:

1. Manual switches
2. Control for System all-nothing
3. Autonomous luminary control
4. Control according the natural level
5. Control by centralized system.

Although all of them in case of housing we have used only the first two.

*-Manual switches*

As indicated in the Technical Building Code, all installations must have switches that allow the user to maneuver on and off of the different lights, and so has designed the electrical system of the house.

It is well known that this system allows the user switch on when perceives natural light is insufficient for their daily activities.

With this system it is important to have the lights connected to different circuits, differing primarily those that are near areas with provision of natural light.

In the rooms with more than one point of light have been designed independent mechanisms of switch on and off, to use first of these that is farthest from the source of natural light, it will be necessary before those who are next to the windows for example.

The ideal situation would be to have a switch for luminaries, although this could oversize represent investment for energy savings can be obtained. It is recommended that the number of switches is not less than the square root of the number of luminaries.

The inconvenience of the system is off, as it is checked that the installation of some rooms remains switch on until the occupant leaves the house, he often lights are kept on in empty rooms. Will be essential make aware users of the need to make good use of switches to saving energy.

*-Control for System all-nothing*

In the simplest systems, the presence detection lighting act on a certain area in response to movement of body heat can be infrared, acoustic (ultrasonic, microwave) or hybrids. Have not been placed in housing.

**Basic requirement HE4: Minimum solar contribution to sanity hot water.**

The house has a system for collecting, storing and using solar energy al low temperature, suitable for the global solar radiation of the location and hot water demand of the house itself, ensuring that portion of the total thermal energy needs are covered by this system.

4.1. Characterization and quantification of the requirements

*-Minimum solar contribution*

The minimum annual solar contribution is the fraction between the annual values of solar energy required and provided annual energy demand, derived from monthly values. In Charts 2.1 and 2.2 of section HE-4 indicates, for each climate zone and different levels of demand for hot water (DHW) to a reference temperature of 60 ° C, the minimum solar contribution annual considering the following cases:

-General: assuming that the energy source of support is diesel, propane, Natural gas or others.

- Joule effect: assuming that the energy source is electricity support by Joule effect.

Demand criterion	Unit of measurement	N ° of units of measurement	SHW liters / day at 60 ° C	Demand of temperature reference for water defendant
Detached houses	Per person	5	30	150
			<b>TOTAL</b>	150

Solar contribution				
Energy source of support	Total demand for SHW of the building (l/d)	Climatic zone	Minimum solar contribution according to section HE-4 in %	Solar contribution of project in %
Electricity by Joule effect	150	IV	70	70

#### 4.2. Calculation and sizing

##### -Climatic zones

The climatic zone of the project is IV.

According to the climatic zone the annual average global solar radiation on a horizontal surface (H) will be between the following intervals:

MJ/m<sup>2</sup>: 16'6 ≤ H ≤ 18'0

KWh/m<sup>2</sup>: 4'6 ≤ H ≤ 5'0

##### -General conditions

The installations will be made with a primary circuit and secondary circuit independent, with a chemical antifreeze and avoid any mixing of different fluids can operate at the installation.

The installation allows the water reaches a temperature of 60 ° C, is not supported appearance of components of galvanized steel.

Regarding protection against electric shock, the installations fulfill with the regulations set in place and the specific rules that control it.

Electrolytic sleeves are installed between elements of different materials to prevent galvanic couple.

##### -Collection system

The collector selected possess the certification issued by the competent authority on the subject as regulated in the RD 891/1980 of 14 April, on homologation of solar collectors and the Order of July 28, 1980 by approving the standards and technical instructions for the certification of solar collectors, or certification or regulatory conditions consider replacing it. Pay special attention on tightness and durability of the collector connections.

The collectors are arranged in lines formed by the same number of elements. The lines of collectors are connected together in parallel.

Closing valves are installed at the entrance and exit of the different batteries of collectors and between the pumps, so that they can be used for isolation of these components in maintenance, replacement, etc. Will install a safety valve row to protect the installation.

Within each line the collectors are connected in serie. The application is exclusively for SHW and the conditions of maximum area for exclusive SHW installations according to zone (section 3.3.2.3-HE-4).

The connection between collectors and between rows is done a way that the hydraulic circuit to be balanced using the return reversed.

##### -Solar accumulation system

The surface of collectors is 1,5m<sup>2</sup>

Accumulation volume is 100 liters

Will be installed on a single tank that houses the volume of accumulation. The Solar accumulation system configuration will be vertical. The Solar accumulation system will be located in interior zones.

Installation is manufactured. For the purposes of prevention of Legionnaires be reached thermal levels required according to the regulations by not using the installation.

In the accumulation system will be placed a thermometer whose reading is easily visible by the user.

The accumulators will have shut off valves or other appropriate systems to cut off flows outside the tank in case of unintentional damage to the system.

#### -Exchange system

The exchanger is incorporated into the accumulator, the relation between the surface area of exchange and the total catchment area is not less than 0.15.

In each of the inlet pipes and exit of water of the heat exchanger is installed a shut off valve next to the corresponding hose.

It is used the load circuit with a second exchanger (tertiary circuit).

#### -Hydraulic circuit

The hydraulic circuit is balanced in itself. The flow of the circuit is balanced controlling it with balancing valves. The flow of the fluid bearer is 3.

It will be composed of piping, pumps, expansion vessels, air purge and drain

#### -Conventional auxiliary power system

(As is indicated in paragraph 3.3.6.2 HE-4, is not used any conventional auxiliary power system in the primary circuit of collectors.

The conventional auxiliary system will be designed to cover the service as if there were not solar system and become operational only when strictly necessary and in order to realize the maximum possible energy extracted from the collection area.

The system of conventional energy supply auxiliary line has a thermostat control over the preparation temperature that in normal operating conditions will allow fulfill with current legislation at any time concerning the prevention and control of legionellosis.

The equipment will be modulating, that is, it is able to regulate its power in order to obtain a permanent temperature which is independent of the inlet water temperature to the above mentioned equipment.)

#### -Control system

The control system ensures correct operation of the installations, trying to get a good use of solar energy captured and ensuring proper use of auxiliary power. The regulation and control system shall include the operation of control circuits and protection systems and security against overheating, frost, etc.

Circulation is forced the control of operation will be operated with control systems according to solar radiation.

The control system will ensure that in any case will be reaching temperatures above the maximum supported by the materials, components and treatments of circuits.

The control system will ensure than in any point the temperature of the working fluid drops below a temperature three degrees higher than the freezing of the fluid.

#### - Measuring system

The installation is less than 20 m<sup>2</sup>. Are arranged the measuring equipment of pressure and temperature that allow the correct operation.

#### - Components solar system for hot water

Solar collectors, Accumulators, Heat exchanger, Circulation pumps, Pipes, Valves, Expansion vessels, Traps, Filling system, Electrical and control system

#### -Orientation and inclination losses

The inclination angle in sexagesimal degrees is 40.

To the azimuth angle (in sexagesimal degrees) is 30.

The collectors are included within the general case.

The loss for orientation and inclination is 60.

The losses of solar radiation by shadows is 0.50



According to described in DB HE (HE-4) is done by these additional steps of action:

- a) Vigilance plan
- b) Preventive maintenance plan

a) Vigilance plan

The vigilance plan is basically about the operations that allow us to assume the operational values of the installation are correct. It is a simple observation plan main functional parameters to verify the correct operation of the facility. Will the scope described in Chart 4.1:

Installation element	Operation	Frequency (months)	Description
COLLECTORS	Cleaning of glasses	To set	With water and suitable products
	Glasses	3	IV condensation in the middle of the day
	joints	3	IV Cracking and warping
	absorber	3	IV Corrosion, deformation, leaks, etc.
	connections	3	IV leaks
	Structure	3	IV Degradation, signs of corrosion
PRIMARY CIRCUIT	Pipe, insulation and filling system	6	IV Absence of humidity and leaks
	Manual purger	3	Empty the bottle
SECONDARY CIRCUIT	thermometer	Daily	IV Temperature
	Pipe and insulation	6	IV Absence of humidity and leaks
	solar accumulator	3	Purged from the accumulation of sludge from the bottom of the tank

b) Preventive maintenance plan

The maintenance will involve at least an annual review of the installation for systems with collection surface less than 20 m<sup>2</sup> and a review every six months for installations with area greater than this amount.

The Maintenance Plan must be made by competent personnel who know solar thermal technology and mechanical equipment in general. The installation will have a maintenance book which reflect all operations carried out and corrective maintenance.

**Basic requirement HE5: Contribution minimum photovoltaic power**

This project doesn't incorporate feedback system and solar energy conversion by photovoltaic processes.

### **3.3.4. Basic requirements Protection against noise (HR)**

#### **Previous details**

##### **1.1. Definition of enclosures relating to the project:**

Building Use: Residential private.

Unit of Service: The whole house

Enclosure habitable: Rooms and rooms, including kitchen, bathrooms and distributors

Protected enclosure: Bedrooms and dining

Uninhabitable enclosure: No exist

Common area: No exist

Enclosure of activity: No exist

Enclosure of installations: Room Facilities

Noisy enclosure: No exist

##### **1.2. Index value of the noise day Ld1**

As we have no official data on noise index value Ld1 we'll take it as 60 Dba for the type of acoustic area on sectors of land dominated by residential land.

##### **1.3. Limit values of Isolation**

###### **AIRBORNE SOUND INSULATION**

In protected enclosures: BEDROOM AND DINING

-Protection against noise in enclosures belonging to the same unit for use in private residential buildings (PARTITION):

The global rate of noise reduction of partitions will not be less than 33 Dba.

-Protection against noise from enclosures not belonging to the same unit of use. (SEPARATION WITH OTHER HOUSES):

In our case, being an exempt building and isolated, this value is not considered.

-Protection against noise generated in enclosures of installations and enclosures of activity:

Not considered to be a detached house which is defined as a single unit of use.

-Protection against noise coming from outside:

We consider a noise index day Ld1 of 60 Dba in residential use are obtained some values from Airborne Sound Insulation, D2m, Nt, Atr, between a protected enclosure and the outside of:

Bedrooms 30Dba

Rooms 30Dba

In the enclosures habitable: BEDROOMS, ROOMS, KITCHEN, BATHROOM, CORRIDORS AND DISTRIBUTOR

-Protection against noise in enclosures belonging to the same unit for use in private residential buildings (PARTITION)

The global rate of noise reduction of partitions will not be less than 33 Dba.

-Protection against noise from enclosures not belonging to the same unit of use. (SEPARATION WITH OTHER HOUSES):

Not applicable in our case

-Protection against noise generated in enclosures of installations and enclosures of activity:

Not considered to be a detached house which is defined as a single unit of use.

-In habitable enclosures and protected enclosures adjacent to other buildings:

Not applicable.

## ACOUSTIC INSULATION TO NOISE IMPACTS

Not considered in this project to be a single unit of use.

## TIME LIMIT VALUES REVERBERATION

Not considered in this project as it is a detached house with no other housing common areas.

## NOISE AND VIBRATION OF INSTALLATIONS

They are satisfied if they fulfill that specified in paragraph 3.3, in their specific regulations and conditions specified in paragraphs 3.1.4.1.2, 3.1.4.2.2. and 5.1.4.

### 2.1. Design and sizing

- Applicability of the method

Is chosen the simplified option to be a residential building, with a resistant horizontal structure consists of slabs with lightweight elements.

- Definition of construction elements

PARTITION			
KIND: Partition of brick direct support on the slab			
CONSTRUCTIVE ELEMENTS	ACOUSTICS PARAMETERS		
	m Kg/m <sup>2</sup>	RA Dba	ΔRA
ENL 15+LHD7mm+ENL 15	84	36	-

FACADES			
KIND: Of two sheets with an inside sheet of masonry direct support. Being elements of two sheets, the air space must be filled with sound absorbing material and vibration damper. Hinged windows with lacquered aluminum thermal bridge break and double glazing with air space 4/8/6			
CONSTRUCTIVE ELEMENTS	ACOUSTICS PARAMETERS		
	m Kg/m <sup>2</sup>	RA dBA	ΔRA
RE+LCH (110mm)+RM(15mm)+AT+LDH(7mm)+ENL(15mm)	269	47	-
WINDOWS	-	32	-

SLABS					
KIND: one way slab thickness of 300 mm and pieces of concrete vault.					
CONSTRUCTIVE ELEMENTS	ACOUSTICS PARAMETERS				
	m Kg/m <sup>2</sup>	RA dBA	Ln,w	ΔLn,w	ΔRA
FU_BC300 mm 400 55 80	400	55	80	-	-
ROOF: YL15 + C	-	-	-	5	5

ROOFS					
KIND: Resistant support formed by one way slab with among joint elements of concrete vaults and formation slope with lightweight aggregate.					
CONSTRUCTIVE ELEMENTS	ACOUSTICS PARAMETERS				
	m Kg/m <sup>2</sup>	RA dBA	Ln,w	ΔLn,w	ΔRA
SR: FU_bc350mm 400 55 80	400	55	80	-	-
FP: lightweight concrete	-	-	-	-	-

ROOF: YL15 + C	-	-	-	5	5
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2.2. Reverberation time and sound absorption  
Not applicable as there are no common elements.

2.3. Noise and Vibration of the installations

PARTITION		
Type: MASONRY PARTITION DIRECT SUPPORT	FEATURES	
	Project	Required
ENL15mm+LHD7mm+ENL15mm	m(Kg/m <sup>2</sup> )= 76 RA(dBA)= 36	70 35

FACADES, ROOFS AND FLOORS IN CONTACT WITH THE OUTSIDE AIR (section 3.1.2.5)					
Solution: <b>FACADE EXTERIOR: ROOM AND BEDROOMS</b>					
Constructive elements	Type	Area m <sup>2</sup>	Holes	FEATURES	
				Project	Required
Blind part	RE+LH11+RM+AT+LH7+ENL	48,96		RA,tr(dBA)=35	30
Holes	Aluminium RPT 6+12+6	26,77	54,67%	RA,tr(bDA)=30	25

Solution: <b>FACADE EXTERIOR: TOILETS AND STORAGE</b>					
Constructive elements	Type	Area m <sup>2</sup>	Holes	FEATURES	
				Project	Required
Blind part	RE+LH11+RM+AT+LH7+ENL	62,30		RA,tr(dBA)=35	30
Holes	Aluminium RPT 6+12+6	4,32	6,93%	RA,tr(bDA)=30	28

Solution: <b>ROOF</b>					
Constructive elements	Type	Area m <sup>2</sup>	Holes	FEATURES	
				Project	Required
Blind part	FUBC 350mm	135,98	0%	RA,tr(dBA)=55	30
Holes	-			RA,tr(bDA)= -	-

### 3.4. BOOK OF SPECIFICATIONS

The purpose of these specifications is to define the criteria for establishing the relationship between agents involved in the works defined in this project and provide a basis for carrying out the contract work between the developer and the contractor.

#### 3.4.1. General conditions

##### - The contract

Of the diverse types of contract, it is chosen for the contract for units of work, which measures, values, judges and pays the works dividing the total cost in the corresponding units of work.

##### FORMALIZATION OF THE CONTRACT

The contracts will formalize by means of private document, in general, that will be able to rise up to public writing by request of any of the parts and in agreement with the in force dispositions.

The contractor, before formalizing the writing, will have signed also the foot of the "Schedule of conditions" that will govern the work in the planes, picture of prices and in the general budget.

They will be have account of the successful bidder all the expenses that there causes the extension of the document in which the contract is obtained.

#### REASONS OF THE RESCISSION OF THE CONTRACT

They will be considered to be sufficient reasons for the rescission of a contract those that later distinguish themselves:

- Death or disability of the contractor.
- Bankruptcy of the contractor. In the previous cases if the inheritors of the contractor or syndics were offering to go to dig the works, under the same conditions stipulated in the contract, the owner can admit or reject the offer, without in this last case they have those rights to some indemnification.

Also they will be reasons justified for the rescission of the contract:

- The alterations of the same one for the reasons:
  - a) The modifications of the project in such form that represents fundamental alterations of the same one, in the opinion of the director of work and, in any case, providing that the variation of the budget of execution, as consequence of the mentioned modifications, represents approximately 25 %, as minimum of the amount of that one.
  - b) The modification of units of work, providing that these represent variations, more or less, of 40 % as minimum of some of the units of the project that have been modified.
- The suspension of the begun work and in any case, providing that for reasons foreign to the contract one does not give beginning to the work awarded in the term of three months and to depart from the adjudication. In such a case the return of the bail will be automatic.
- The suspension of the begun work providing that the term of suspension has exceeded of one year.
- The breach of the conditions of the contract, when it indicates carelessness and bad faith, with prejudice of the interests of the work.
- The completion of the term of the work without well-taken reason.
- The bad faith in the execution of the works.

#### - Obligatory arbitration

It divides both they promise to submit in his differences to the arbitration of amicable compounders, designated one of them for the owner, different for the contract and an Engineer for the official corresponding college. In addition one of these compounders will be obligatorily the director of work.

#### - Competent jurisdiction

In case of not coming to agreement for the previous procedure, both parts remain obliged to submit the discussion of all the questions that could arise as derivatives of his contract to the authorities and ordinary courts, in accordance with the in force legislation, resigning the common right and the jurisdiction of his domicile, being competent the jurisdiction where the work was nailed.

#### - Responsibility of the contractor

The contractor is responsible for the execution of the works in the conditions established in the contract and in the documents that compose the present project. The memory will not have the consider ration of project document. Since consequence of it will come forced to the demolition and reconstruction from everything executed evil, without there could use as

excuse, which the director of work has examined and recognized the construction during the work, not the fact that the partial liquidations should have been paid.

- Accidents of work

In case of accidents happened to the workmen with motive and in the exercise of the works for the execution of the work, the contractor will be abided by the ready thing in this regard in the in force legislation, being in any case, only one responsible for his fulfillment and without for no concept the property could remain affected for responsibilities of any type.

The contractor this one bound to adopt the safety measures that the in force dispositions to avoid in possible you injure to the workers or to the pedestrian, not only in the scaffoldings, but in all the places of the work.

Of the accidents and prejudices of any kind that, for not fulfilling the legislated exceeds the matter, they could happen or strike, he will be the contractor the responsible only one, or his representatives in the work, since it thinks that in the contracted prices all the necessary expenses are included to complement the due above mentioned legal dispositions.

- Damages to third

The contractor will be responsible for all the accidents that for inexperience and / or carelessness were striking so much in the building in which the works are affected as in the contiguous ones. It will be, therefore, of his account the credit of the corresponding indemnifications, when there was place to it, of all the hurts and prejudices that had been caused during the execution of the works. The contractor will fulfill the requirements that prescribe the in force dispositions on the matter, must demand, when it was needed, the voucher of such a fulfillment.

- Payments to arbitrary

The payment of taxes and arbitraments, police officers or of another species, so much recounted to fences, system of illumination, etc., whose credit will be done during the time of the execution of the work, as those owed to concepts inherent in the works that are realized, they are chargeable to the contract, providing that in the particular conditions of the project the opposite is not stipulated. Nevertheless to the contractor there will be restored the amount of all those concepts that the director of work considers to be just to do it.

- Announcements and cartels

Without previous authorization of the owner it will be able to put neither in the works, nor in his fences on any more inscriptions or announcements that the suitable ones to the regime of the works and the city police.

There exempts of this measure the cartel optional announcer of the work who will be placed by request of the director of work and will run to account of the contractor.

- Copies of documents

The contractor has right to extract copies to his coast, of the planes, budgets, schedule of conditions, and also of other documents of the project. The Technical Engineer, if the contractor requests it, authorizes these copies with his signature, once it has confronted them.

### 3.4.2. Conditions of technicians

#### - Agents obligations

The responsibilities of the different agents involved in the building are regulated by Law 38/99 Building Management (L.O.E.)

#### DEVELOPER

- a) Decide, drives, software and financed with own resources or outside, the building work for themselves or their subsequent disposal, delivery or transfer to third parties under any title.
- b) Takes the lead the entire process of building, developing the management necessary to perform the work originally contemplated, and bear all the cost involved.

#### BUILDING CONTRACTOR

- a) To organize constructed works, writing the plans of work that are needed and projecting or authorizing the provisional facilities and auxiliary means of work.
- b) To elaborate, when it is needed, the safety plan and hygiene of the work in application of the corresponding study and to have in any case the execution of the preventive measures, guarding over his fulfillment and over the observance of the in force regulation as for safety and hygiene in the work.
- c) To sign with the Engineer, the record of I restate of the work.
- d) To show the headquarters of the whole personnel that intervenes in the work and to coordinate the interventions of the subcontractors.
- e) The competence assures each and every of the materials and constructive elements that should be in use, verifying the preparations in work and rejecting, on own initiative or for prescription of the Technical Engineer, the supplies or prefabricated that do not possess the guarantees or documents of suitability needed by the procedure of application.
- f) To guard the book of orders and follow-up of the work and to give informed to the annotations that are practiced in the same one.
- g) To facilitate the precise materials to the Technical Engineer, in advance sufficiently, for the fulfillment of his assignment.
- h) To prepare the partial certifications of work and the offer of final liquidation.
- i) To sign with the promoter the minutes of provisional and definitive receipt.
- j) To coordinate the assurances of accidents of work and damages to third during the work.

#### THE CONTRACT MANAGER

- a) To verify the adequacy of the foundation projected to the royal characteristics of the soil.
- b) To write the complementary ones or rectified of the project that is needed.
- c) To be present at the works, its nature and complexity needs all the times, in order to solve the contingencies that take place and to give the complementary instructions that are precise to obtain the correct solution.
- d) To coordinate the intervention in work of other technical personnel who, in his case, meet to the direction with own function in partial aspects of his specialty.
- e) To approve the partial certifications of work, the final liquidation and to advise the promoter forthwith of the receipt.
- f) To prepare the final documentation of the work and to send and to sign in union of the Technical Engineer, the final certificate of the same one.

#### BUILDING EXECUTION MANAGER

- a) To write the document of studies and analysis of the project.
- b) To plan, in view of the architectural project, the contract and the technical regulation of application, the quality control and economically of the works.
- c) To write when it is needed, the study of the systems adapted to the risks of the work in the accomplishment of the work and to approve the safety plan and hygiene for the application of the same one.
- d) To affect the rest of the work and to prepare the corresponding record, signing it in union of the Engineer and of the Builder.
- e) To verify the provisional facilities, auxiliary means and safety systems and hygiene in the work, controlling his correct execution.
- f) To order and to direct the execution of the material in accordance with the project, the technical procedure and the procedure of good construction.
- g) To realize or to arrange the tests and material testing, facilities and other units of work according to the sampling rates programmed in the plan of control, as well as to affect other checking that turn out to be necessary to assure the constructive quality of agreement with the project and the technical applicable regulation. Of the results the builder will report punctually, him giving, in his case, the opportune orders; of the contingency not be solving he will adopt the measures that correspond realizing to the Engineer.
- h) To realize the measurements of work executed and to give conformity, according to the established relations, to the valued certifications and to the liquidation of the work.
- i) To sign, in union of the engineer, the final certificate of the work.



## **BUDGET**

BASIC PROJECT AND EXECUTION detached house Urbanization el Murtal, plots 48 and 49.  
Segart (Valencia)

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## BUDGET

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## BUDGET AND MEASUREMENTS

Detached house in Segart

CODE	DESCRIPTION	UDS	LENGTH	WIDTH	HEIGHT	PARTIAL	QUANTITY	PRICE	AMOUNT
<b>CHAPTER 1 EARTHWORKS</b>									
<b>01.01</b>	<b>m2 Manual land cleaning</b>								
	Clearance and cleaning the land by manual means according, NTE/ADE-1.								
		1,1	320,00			352,00			
							352,00	0,02	7,04
<b>01.02</b>	<b>m3 Excavation trench Backhoe</b>								
	Excavation for trench formation, on hard land, with backhoe, even manual helps in areas of difficult access, cleaning and extraction of remains to the edges and transport load on, according NTE/ADZ-4.								
	Tie beam	1	1,83		0,40	0,73			
		1	0,22		0,40	0,09			
		1	0,72		0,40	0,29			
		1	1,43		0,40	0,57			
		1	1,50		0,40	0,60			
		1	0,90		0,40	0,36			
		1	0,70		0,40	0,28			
		1	0,93		0,40	0,37			
		1	0,08		0,40	0,03			
		1	0,18		0,40	0,07			
		1	1,76		0,40	0,70			
		1	1,94		0,40	0,78			
		1	0,72		0,40	0,29			
		1	0,89		0,40	0,36			
		1	0,19		0,40	0,08			
	Fence	1	66,00	0,40	0,40	10,56			
							16,16	7,53	121,68
<b>01.03</b>	<b>m3 Excavation well Backhoe</b>								
	Excavation for formation of wells, on hard lands, with mechanical means, backhoe, including manual help in areas of difficult access, cleaning and extraction of remains to the edges, not including transport load on, according NTE/ADZ-4.								
	Footings	1	1,69		0,60	1,01			
		1	1,21		0,60	0,73			
		1	2,56		0,60	1,54			
		1	2,25		0,60	1,35			
		1	1,95		0,60	1,17			
		1	1,95		0,60	1,17			
		1	0,80		0,60	0,48			
		1	1,00		0,60	0,60			
		1	1,96		0,60	1,18			
	Retaining wall	1	44,21		0,60	26,53			
	Pool	1	19,65		0,60	11,79			
							47,55	8,02	381,35
<b>01.04</b>	<b>m3 Excavation well pneumatic hammer</b>								
	Excavation for manholes and wells formation, on hard land, with mechanical means, pneumatic hammer, even manual help in areas of difficult access, cleaning and extraction of remains to the edges, not including transport load on, as NTE/ADZ-4.								
	Manholes	5	0,60	0,60	0,80	1,44			
							1,44	17,95	25,85

## BUDGET AND MEASUREMENTS

Detached house in Segart

CODE	DESCRIPTION	UDS	LENGTH	WIDTH	HEIGHT	PARTIAL	QUANTITY	PRICE	AMOUNT
<b>01.05</b>	<b>u Remove medium sized tree</b> Remove from medium-sized tree. Aerial part and stump, even cutting of branches and cutting with mechanical means, loading and transportation of remains by truck								
							30,00	5,49	164,70
<b>01.06</b>	<b>m3 Fill Extended own</b> Fill and extended their own land by mechanical means, grader, including compaction roller self-propelled, and irrigation, in layers of 25cm. maximum thickness, with 95% degree of compaction, according N TE/ADZ-12.								
	Filled	1	100,35			100,35			
							100,35	3,56	357,25
<b>01.07</b>	<b>m3 Fill loan extended</b> Fill and land loan extended by mechanical means, grader, including compacting, self-propelled roller in layers of 25cm. maximum thickness, with 95% degree of compaction, according NTE/ADZ-12.								
	Housing	1	72,30			72,30			
							72,30	7,13	515,50
<b>TOTAL CHAPTER 01 EARTHWORKS.....</b>									<b>1.573,37</b>

## BUDGET AND MEASUREMENTS

Detached house in Segart

CODE	DESCRIPTION	UDS	LENGTH	WIDTH	HEIGHT	PARTIAL	QUANTITY	PRICE	AMOUNT
<b>CHAPTER 2 HORIZONTAL DRAINAGE SYSTEM</b>									
<b>02.01</b>	<b>u General network connection and meter</b>								
	Connection home sanitation to the municipal general network, to a maximum distance of 8m, consisting of: compressor break pavement, digging ditches manual sanitation in areas of hard consistency, placement of mass concrete pipe plug bell, rubber joint of 30cm of inside diameter, covered rear connection and replacement of pavement with concrete HM-20/P/40/l, excluding formation of the well at the point of connection and with auxiliary means.						1,00	375,00	375,00
<b>02.02</b>	<b>u Meter</b>								
	Meter of 3/4 "valve box installed in solid brick of 51x38x50cm and 1/2 foot thick, received with cement mortar and river sand 1/6, plastered and polished in their inside, concrete base H-175 kg/m2, t.máx.20 mm, even keys ball, check valve 3/4 " and brass tap 1/2".						1,00	156,62	156,62
<b>02.03</b>	<b>u Siphon manhole 60x60cm with blank cover</b>								
	Manhole buried of 60x60x80cm, not registrable, built with rough brick of 1/2 "thick foot, received with cement mortar, placed on concrete base H-100, plastered and polished on the inside with cement mortar , concrete slab H-150 slightly reinforced with mesh , totally completed, not including the excavation, neither filling perimeter subsequent .						1,00	34,49	34,49
<b>02.04</b>	<b>u Manhole 60x60cm with blank cover</b>								
	Manhole of 60x60x80cm, registrable, built with rough brick of 1/2 "thick foot, received with cement mortar, placed on concrete base H-100, plastered and polished on the inside with cement mortar , concrete slab H-150 slightly reinforced with mesh , totally completed, not including the excavation, neither filling perimeter subsequent .						8,00	55,38	443,04
<b>02.05</b>	<b>m Hanging PVC sewer of 160mm</b>								
	Handing sewer, made with PVC smooth pipe for sanitation, nominal diameter 160mm and elastic connection, according to standard UNE EN 1401-l, with pipe price increase of 30% on concept of junctions, accessories and special parts.	1	39,00			39,00			
<b>02.05</b>	<b>m Buried PVC sewer of 110mm</b>								
	Buried sewer made of a PVC smooth pipe sanitation, diameter 110mm, glued junction and thickness according to standard UNE EN 1401-l, with pipe price increase of 30% on concept of junctions, accessories and special parts, placed in trench of wide 500 +110mm, on a layer of sand / gravel of thickness 100+110 / 10mm, excluding excavation, filling the trench neither final compaction.	1	55,00			55,00			
							55,00	7,56	415,80
<b>TOTAL CHAPTER 02 HORIZONTAL DRAINAGE SYSTEM.....</b>									<b>2.277,88</b>

## BUDGET AND MEASUREMENTS

Detached house in Segart

CODE	DESCRIPTION	UDS	LENGTH	WIDTH	HEIGHT	PARTIAL	QUANTITY	PRICE	AMOUNT
<b>CHAPTER 3 FOUNDATIONS</b>									
<b>03.01</b>	<b>m3 HA 25 footings B 400 S with casing</b>								
	Reinforced concrete HA 25/B/40/IIa prepared, in footings, with an average amount of 20 kg steel B 400 S, including cuts, separators, wire bound, vibrating and curing of concrete, including casing.								
	Footings	1	1,69		0,50		0,85		
		1	1,21		0,50		0,61		
		1	2,56		0,50		1,28		
		1	2,25		0,50		1,13		
		1	1,95		0,50		0,98		
		1	1,95		0,50		0,98		
		1	0,80		0,50		0,40		
		1	1,00		0,50		0,50		
		1	1,96		0,50		0,98		
	Retaining wall	1	44,21		0,50		22,11		
	Pool	1	19,65		0,50		9,83		
	Rest	1	1,00		1,00		1,00		
	Measuring excess	1	2,96				2,96		
							43,61	46,00	2.006,06
<b>03.02</b>	<b>m3 HA 25 tie beam B 400 S with casing</b>								
	Reinforced concrete, HA 25/B/20/IIa prepared, in tie beams, with an average amount of 20 kg steel B 400 S, including cuts, separators, wire bound, vibrating and curing of concrete, including casing.								
	Tie beam	1	1,83		0,30		0,55		
		1	0,22		0,30		0,07		
		1	0,72		0,30		0,22		
		1	1,43		0,30		0,43		
		1	1,50		0,30		0,45		
		1	0,90		0,30		0,27		
		1	0,70		0,30		0,21		
		1	0,93		0,30		0,28		
		1	0,08		0,30		0,02		
		1	0,18		0,30		0,05		
		1	1,76		0,30		0,53		
		1	1,94		0,30		0,58		
		1	0,72		0,30		0,22		
		1	0,89		0,30		0,27		
		1	0,19		0,30		0,06		
	Fence	1	66,00	0,40	0,30		7,92		
							12,13	66,73	809,43



## BUDGET AND MEASUREMENTS

Detached house in Segart

CODE	DESCRIPTION	UDS	LENGTH	WIDTH	HEIGHT	PARTIAL	QUANTITY	PRICE	AMOUNT
<b>CHAPTER 4 STRUCTURES</b>									
<b>04.01</b>	<b>m3 Slab HA-25 with semiresistent joist</b>								
	One way slab made with semiresistent joists, thickness of 25cm, interaxis of 72cm, with concrete deck and compression layer HA-25/B/20/IIa of 5cm., mesh ME 15x30 diameter $\varnothing$ 5-5mm steel B 500 T, even vibrating, curing, according EFHE and EHE.								
	Slab 1	1	215,00			215,00			
	Slab 2	1	90,00			90,00			
	Slab 3	1	54,00			54,00			
							359,00	34,34	12.328,06
<b>04.02</b>	<b>m Lintel formation with angular</b>								
	Formation of lintel in brick masonry, with a 60x6mm angular steel A-42b welded to rebars of waiting, including grading, placing, cutting and painting antioxidant protection, according NTE-FFL-12.								
	Lintel	1	3,20			3,20			
		1	2,65			2,65			
		1	3,50			3,50			
		1	2,80			2,80			
		1	2,80			2,80			
		1	1,50			1,50			
		1	1,80			1,80			
							18,25	6,19	112,97
<b>04.03</b>	<b>m Load bearing with prestressed beams</b>								
	Load bearing made with two prestressed beams, including layout, leveling and cleaning, according NTE / FFL.								
		3	1,00			3,00			
		5	0,60			3,00			
							6,00	12,46	74,76
<b>04.04</b>	<b>m2 Cores and screens HA-25 with 1 sided casing</b>								
	Cores and screens, reinforced concrete 25 N/mm2 (HA 25/B/20/IIa) with an average amount of 13 kg of steel B 400 S, 25cm. thick, 1 sided metal casing, including curing, casing and stripping, according EHE.								
	Retaining wall plots	1	26,00		0,60	15,60			
							15,60	16,42	256,15
<b>04.05</b>	<b>m2 Cores and screens HA-25 with 2 sided casing</b>								
	Cores and screens, reinforced concrete 25 N/mm2 (HA 25/B/20/IIa) with an average amount of 13 kg of steel B 400 S, 25cm. thick, 2 sided metal casing, including curing, casing and stripping, according EHE.								
	Pool wall	2	9,00		2,00	36,00			
		2	5,40		2,50	27,00			
							63,00	18,61	1.172,43
<b>04.06</b>	<b>m2 Concrete base HA 15 e=15</b>								
	Concrete base made with HA 15/B/20/IIa with a thickness of 15cm. reinforced with wire mesh to diameter 4-4 ME 15x15 B 500 S placed on bare ground and compacted by hand extended by ruled and finished								
	Pool	1	48,60			48,60			
	Pedestrian and parking	1	125,00			125,00			
							173,60	8,67	1.505,11



## BUDGET AND MEASUREMENTS

Detached house in Segart

CODE	DESCRIPTION	UDS	LENGTH	WIDTH	HEIGHT	PARTIAL	QUANTITY	PRICE	AMOUNT
<b>04.07</b>	<b>u Steel sheet of anchor S275 350x350x25mm</b>								
	Steel sheet of Anchor metallic support, focusing on the foundation, steel S275, dimensions 350x350mm, And 25 mm of thickness, with stiffeners 2UPN-80 350mm length, composed of reinforcement anchoring steel rods AE-215 L, even holes, threaded nuts, cleaning and painting, according NTE/EAS-7.								
							2,00	33,93	67,86
<b>TOTAL CHAPTER 04 STRUCTURES.....</b>									<b>15.517,34</b>

## BUDGET AND MEASUREMENTS

Detached house in Segart

CODE	DESCRIPTION	UDS	LENGTH	WIDTH	HEIGHT	PARTIAL	QUANTITY	PRICE	AMOUNT
<b>CHAPTER 5 MASONRY</b>									
<b>05.01</b>	<b>m2 Brick masonry LH 24x11.5x7 e=7cm</b>								
	Masonry for coating of 7cm thick, made of hollow bricks 24x11.5x7 cm, rigged of edge and received with mortar of cement M-5, with joints 1 cm thick, including stakeout, level and plumb, part proportional of junctions, waste and breakage, damp cleaning of parts and considering a 3% loss and a 30% shrinkage of mortar according to DB SE-F of CTE and NTE-FFL								
	Inside	3	3,60		3,00		32,40		
		2	2,00		3,00		12,00		
		2	0,80		3,00		4,80		
		1	11,50		3,00		34,50		
		1	3,80		3,00		11,40		
		3	1,60		3,00		14,40		
		1	6,70		4,00		26,80		
	Outside	1	2,60		3,00		7,80		
		1	12,00		3,00		36,00		
		1	8,20		3,00		24,60		
		1	2,00		3,00		6,00		
		2	1,50		3,00		9,00		
		1	5,60		3,70		20,72		
		1	6,70		4,00		26,80		
		1	4,00		4,00		16,00		
		1	2,45		4,50		11,03		
		1	6,00		2,50		15,00		
							309,25	4,40	1.360,70
<b>05.02</b>	<b>m2 Brick masonry LH 24x11.5x11 e=11cm</b>								
	Masonry for coating of 11cm thick, made of hollow bricks 24x11.5x7 cm, rigged of edge and received with mortar of cement M-5, with joints 1 cm thick, including stakeout, level and plumb, part proportional junctions, waste and breakage, damp cleaning of parts and considering a 3% loss and a 30% shrinkage of mortar according to DB SE-F of CTE and NTE-FFL								
	Outside	1	2,60		3,00		14,50		
		1	12,00		3,00		2,40		
		1	8,20		3,00		8,50		
		1	2,00		3,00		2,10		
		2	1,50		3,00		1,50		
							41,00	11,52	472,32
<b>05.03</b>	<b>m Artificial stone Flashing</b>								
	Artificial stone Flashing 20cm wide, polished, with drip edge, with slope, made with mortar of cement M-5, including grouting with white cement slurry, removal of debris and cleaning.								
	Flashing	1	14,50				14,50		
		1	2,40				2,40		
		1	8,50				8,50		
		1	2,10				2,10		
		1	1,50				1,50		
		1	12,00				12,00		
							41,00	11,52	472,32
<b>05.04</b>	<b>m Formation brick step H/D</b>								
	Formation of stair steps with double hollow brick 25x12x8cm. received with mortar of cement CEM II / B-P 32.5 N and river sand 1/6, staking and cleaning, measured in length.								
	Stairs	1	3,36				3,36		
		1	1,15				1,15		
		1	8,50				8,50		
							13,01	12,81	166,66



## BUDGET AND MEASUREMENTS

Detached house in Segart

CODE	DESCRIPTION	UDS	LENGTH	WIDTH	HEIGHT	PARTIAL	QUANTITY	PRICE	AMOUNT
<b>CHAPTER 6 ROOFS</b>									
<b>06.01</b>	<b>m2 Flat roof</b>								
	No walkable flat roof with gravel protection, inverted, slope 1-5%, based on strong, composed of the following: slope formation layer 10cm thick concrete base medium cell foamed cement CEM II/A-P 32.5 R, water and air-entraining additive addition, finished with cement mortar layer M-40 (1:6) 2cm of thickness and cement whose dosage is greater than 250 kg/m <sup>3</sup> ; asphalt layer in perimeter and singular points, asphalt emulsion type EA; monolayer waterproofing membrane not bonded, floating position regarding support except in perimeter and singular points, PN-1 type, as NBE-QB-90 and UNE 104-402/96, consist of a layer of asphalt LBM (SBS)-40/FP unprotected; geotextile separation layer (150 g/m <sup>2</sup> ); insulation extruded polystyrene panel type IV according to UNE 92.115/97 of 40 mm thick layer placed on separator; separating layer of poly propylene-polyethylene geotextile of 200 g/m <sup>2</sup> layer protective layer of pebbles of 16 to 32mm diameter, free of fines, extended in a middle layer of 10 cm thick. Even reinforcement strip and galvanized profile to protect the waterproofing membrane delivery in meeting of perimeter, sealed at the top, backing band and cup drain siphon EPDM with protection grille meeting of perimeter, sealed at the top, band booster and sealing of expansion joints of the building or resistant surface of the deck and roof boards and weirs formed horizontally gargoyles to drain accumulated water outside by sealing drainpipes.								
	Slab 2	1	90,00			90,00			
							90,00	28,53	2.567,70
<b>06.02</b>	<b>m2 Roof with conformed steel sheet</b>								
	Roof with conformed steel sheets according to NTE/QTG-7 even share of laps and fasteners, safety and sealing. Measured in real scale.								
	Slab 3	1	51,00			51,00			
							51,00	8,59	438,09
<b>06.03</b>	<b>m2 Sloped roof</b>								
	No-ventilated sloped roof and inverted on inclined slab consisting of metal panels to be defined by the D.F, nailed on phenolic agglomerate board 22x3660x1830mm to set it every 30cm wooden battens nailed to the bracket with lag screws every 50cm resistant, heat insulation blanket based mineral wool (MW) of 45mm thickness and K = 0.044 W / m ° C, placed between the joists and attached to the bracket using bituminous adhesive and waterproofing PB-II by bituminous of oxiasphalt layer, type SO-30-30-FV gr/dm <sup>2</sup> , with reinforcement consists of glass fiber felt, welded to the support after priming with asphalt emulsion type PB-II, including cleaning, layout, forming eaves, ridge, files and special meetings.								
	Slab 3	1	51,00			51,00			
							51,00	13,84	705,84
<b>TOTAL CHAPTER 06 ROOFS.....</b>									<b>3.711,63</b>



## BUDGET AND MEASUREMENTS

Detached house in Segart

CODE	DESCRIPTION	UDS	LENGTH	WIDTH	HEIGHT	PARTIAL	QUANTITY	PRICE	AMOUNT
	Inside	6	3,60		3,00	64,80			
		4	2,00		3,00	24,00			
		4	0,80		3,00	9,60			
		2	11,50		3,00	69,00			
		2	3,80		3,00	22,80			
		6	1,60		3,00	28,80			
		2	6,70		4,00	53,60			
	Outside	1	2,60		3,00	7,80			
		1	8,20		3,00	24,60			
		1	2,00		3,00	6,00			
		2	1,50		3,00	9,00			
		1	5,60		3,70	20,72			
		1	6,70		4,00	26,80			
		1	4,00		4,00	16,00			
		1	2,45		4,50	11,03			
		1	6,00		2,50	15,00			
							409,55	2,83	1.159,03
<b>07.05</b>	<b>m2 Acrylic matte plastic on horizontal surface</b>								
	Coating based on acrylic matte plastic painting for protection and decoration of inside and outside surfaces, resistant to sunlight, breathable and waterproof matte finish in white, on a horizontal surface of brick, plaster and cement mortar, after sanding of small adhesions and imperfections, undercoat with diluted plastic painting very thin filling of faults and two coats of finish, according NTE/RPP-24.								
	Height 2,40 m	1	44,00			44,00			
	Height 2,85 m	1	36,00			36,00			
	Height 3,20 m	1	12,00			12,00			
	Average Height 4,00 m	1	26,00			26,00			
							118,40	3,21	378,78
<b>07.06</b>	<b>m2 White monolayer 1 layer e = 8mm</b>								
	White monolayer, scraping, white cement mortar applied to the trowel in a layer of thickness not less than 8mm, even and clean cuts, according NTE / RPA-3 and subsequent cleaning, according NTE/RPR-6.								
	Outside	1	12,50		3,50	43,75			
		1	6,80		3,50	23,80			
		1	14,20		1,40	19,88			
		2	1,90		2,10	7,98			
		1	7,00		4,00	28,00			
		1	6,00		4,00	24,00			
		1	7,00		2,00	14,00			
		1	4,00		3,40	13,60			
		2	7,50		2,70	40,50			
							215,51	5,00	1077,35
<b>07.07</b>	<b>m2 Stoneware 30x30 for swimming pool</b>								
	Ceramic coating with minimum joint (1.5 - 3mm) made with white glazed stoneware tiles of 30x30cm, placed in thin layer with normal adhesive cement (C1) and grouting with cement grout (L), even and clean cuts, according NTE / RPA-3 and Ceramic tile Guide(Document Recognized by the Government DRB 01/06), suitable for swimming pools.								
	Pool	2	7,00		1,00	14,00			
		1	4,00		1,00	4,00			
		1	4,00		1,50	6,00			
		1	4,00		7,00	28,00			
							52,00	14,69	763,88
<b>TOTAL CHAPTER 07 COATINGS VERTICAL AND HORIZONTAL.....</b>									<b>6.578,41</b>

## BUDGET AND MEASUREMENTS

Detached house in Segart

CODE	DESCRIPTION	UDS	LENGTH	WIDTH	HEIGHT	PARTIAL	QUANTITY	PRICE	AMOUNT
<b>CHAPTER 8 PAVEMENTS AND TILINGS</b>									
<b>08.01</b>	<b>m Silestone countertop e = 2cm</b> Silestone countertop or similar 2 cm. thick, with skirt and base, anchors, placed, measure executed surface (minimum = 1 m2).								
							3,50	50,00	175,00
<b>08.02</b>	<b>m2 Tiling 30x30</b> Tiling with minimum joint (1.5 - 3 mm) made with single color tile 30x30 cm, placed in thin layer with normal adhesive cement (C1) and grouting with cement grout (L), even cutting and cleaning, according NTE/RPA-3 and Ceramic tile Guide (Document Recognized by the Government DRB 01/06).								
		1	9,50		2,80	26,60			
							26,60	13,05	347,13
<b>08.03</b>	<b>m2 Porcelain tile 60x120</b> Ceramic floor tile with minimum joint (1.5 - 3 mm) made with glazed porcelain single color stoneware tile 60x120 cm, placed in thin layer with normal adhesive cement (C1) and grouting with cement grout (L), even cutting and cleaning, according NTE/RPA-3 and Ceramic tile Guide (Document Recognized by the Government DRB 01/06).								
	Inside	1	125,00			125,00			
	Ouside	1	126,50			126,50			
	Bath	1	10,00			10,00			
							261,50	16,91	4.421,97
<b>08.04</b>	<b>m Porcelain tile 60x120</b> Baseboard of glazed single color porcelain stoneware tile with minimum joint (1.5 - 3 mm) of 9x20 cm, placed in thin layer with normal adhesive cement (C1) and grouting with cement grout (L), even and clean cuts, according Tile Guide ceramics (Recognized by Government Document DRB 01/06).								
	Inside	1	120,50			120,50			
							120,50	2,67	321,74
<b>08.05</b>	<b>u Helps</b>								
							0,05	5.276,01	263,80
<b>TOTAL CHAPTER 08 PAVEMENTS AND TILING.....</b>									<b>5.529,64</b>

## BUDGET AND MEASUREMENTS

Detached house in Segart

CODE	DESCRIPTION	UDS	LENGTH	WIDTH	HEIGHT	PARTIAL	QUANTITY	PRICE	AMOUNT
<b>CHAPTER 9 CARPENTRY</b>									
09.01	<b>u Entrance door veneer in iroco</b> Entrance door veneer in varnished iroco, 1 blind smooth leaf of 203x82.5x4cm with pine precerco 150x45mm, 150x30mm fence, flashing 80x15mm, 95mm brassed bolts and lock with knob, and even received the fence plumb, adjusted of the leaf, fixing iron hardwares, leveled, and final adjustment small item , according NTE/PPM-8.						3,00	687,50	2.062,50
09.02	<b>u Sliding lacquered door 1 leaf 200x90</b> Sliding door lacquered of MDF, 1 blind smooth leaf of 200x90cm, placed on partition walls of laminated plaster, flashing of 70x123mm and chrome lock,even placement of the frame, fitted of the leaf, fixing the iron hardwares, level and final adjustment.						5,00	351,66	1.758,30
09.03	<b>u Sliding lacquered door 1 leaf 250x100</b> Sliding door lacquered of MDF, 1 blind smooth leaf of 250x100cm, placed on partition walls of laminated plaster, flashing of 70x123mm and chrome lock, even placement of the frame, fitted of the leaf, fixing the iron hardwares, level and final adjustment.						3,00	549,60	1.648,80
09.04	<b>u Sliding lacquered door 3 leaves</b> Sliding door of MDF lacquered, 3 blind smooth leaves of 2503x90x3.5cm, with pine doorframe 100x45mm, 100x30mm fence, 70x12mm flashing, lock, even received and plumbing of the fence, fitted the leaf, fixing the iron hardwares, level, small elements and final adjustment, according NTE/PPM-9.						1,00	351,44	351,44
09.05	<b>u Tilt and turn window 240x60</b> Window of a tilt and turn leaf of sizes 240x60cm, GP.45 series, made of anodized aluminum profiles of 15 microns, inside joint seal, sealing in of the fence corners and accessories to ensure proper operation, finished in natural color to receive glazing up to 33mm, received directly into a hole 180x50cm work prepared by anchoring pins every 50cm and less than 25cm from the corners taken with cement mortar, even layout, plumbed and level, assembly and regulation, perimeter sealed with silicone and cleaning, according NTE-FCL. Includes locking monoblock shutter (safety) with tubular motor.						5,00	332,33	1.661,65
09.06	<b>u Tilt and turn window 210x115</b> Window of a tilt and turn leaf of sizes 210x115cm, GP.45 series, made of anodized aluminum profiles of 15 microns, inside joint seal, sealing in of the fence corners and accessories to ensure proper operation, finished in natural color to receive glazing up to 33mm, received directly into a hole 170x50cm work prepared by anchoring pins every 50cm and less than 25cm from the corners taken with cement mortar, even layout, plumbed and level, assembly and regulation, perimeter sealed with silicone and cleaning, according NTE-FCL. Includes locking monoblock shutter (safety) with tubular motor.						3,00	464,59	1.393,77
09.07	<b>u Sliding window 2 leaves 105x210</b> Window dimensions 210x210cm of two sliding leaves, GP.90 series, made of anodized aluminum profiles of 15 microns, inside joint seal, sealing in of the fence corners and accessories to ensure proper operation, finished in natural color to receive glazing up to 18mm, received directly into a hole 180x70cm work prepared by anchoring pins every 50cm and less than 25cm from the corners taken with cement mortar, even layout, plumbed and level, assembly and regulation, perimeter sealed with silicone and cleaning, according NTE-FCL.						2,00	924,29	1.848,58



## BUDGET AND MEASUREMENTS

Detached house in Segart

CODE	DESCRIPTION	UDS	LENGTH	WIDTH	HEIGHT	PARTIAL	QUANTITY	PRICE	AMOUNT
09.08	<p><b>u Sliding window 1 leaf 115x210 and fixed leaf 210x210</b></p> <p>Set of dimensions 325x210cm consist of sliding door leaf of 115x210cm, with lock, handle internal and retaining spring opener with stainless steel long handle on one side, GP.45 series, with a fixed side of 210x210cm, made of anodized aluminum profiles of 15 microns, inside joint seal, sealing in of the fence corners and accessories to ensure proper operation, finished in natural color to receive glazing up to 33mm, received directly into a hole 165x240cm work prepared by anchoring pins every 50cm and less than 25cm from the corners taken with cement mortar, even layout, plumbed and level, assembly and regulation,perimeter sealed with silicone and cleaning, according NTE-FCL. Includes locking monoblock shutter (safety) with tubular motor.</p>						1,00	1.083,01	1.083,01
09.09	<p><b>u Sliding window 1 leaf 115x240 and fixed leaf 200x240</b></p> <p>Set of dimensions 315x245cm consist of a fixed side of 200x240cm, with sliding door leaf of 115x240cm, with handle two-sided, GP.45 series, made of anodized aluminum profiles of 15 microns, inside joint seal, sealing in of the fence corners and accessories to ensure proper operation, finished in natural color to receive glazing up to 33mm, received directly into a hole 300x225cm work prepared by anchoring pins every 50cm and less than 25cm from the corners taken with cement mortar, even layout, plumbed and level, assembly and regulation,perimeter sealed with silicone and cleaning, according NTE-FCL.</p>						1,00	1.085,79	1.085,79
09.10	<p><b>u Sliding window 2 leafs 240x60</b></p> <p>Window dimensions 240x60cm of two sliding leafs, made of anodized aluminum profiles of 15 microns, inside joint seal, sealing in of the fence corners and accessories to ensure proper operation , finished in natural color to receive glazing up to 18mm, received directly into a hole 250x60cm work prepared by anchoring pins every 50cm and less than 25cm from the corners taken with cement mortar, even layout, plumbed and level, assembly and regulation, perimeter sealed with silicone and cleaning, according NTE-FCL.</p>						1,00	389,82	389,82
09.11	<p><b>u Sliding window 2 leafs 265x240</b></p> <p>Set of dimensions 265x240cm consist of two leafs, one fixed of 150x240cm and one sliding of 115x240cm, P.90 series, made of anodized aluminum profiles of 15 microns, inside joint seal, sealing in of the fence corners and accessories to ensure proper operation, finished in natural color to receive glazing up to 18mm, received directly into a hole 460x70cm work prepared by anchoring pins every 50cm and less than 25cm from the corners taken with cement mortar, even layout, plumbed and level, assembly and regulation,perimeter sealed with silicone and cleaning, according NTE-FCL. Includes locking monoblock shutter (safety) with tubular motor.</p>						1,00	1.458,17	1.458,17
09.12	<p><b>u Bath screen</b></p> <p>Bath screen consists of two glass 3 mm thick, connected by a layer of polyvinyl butyral colorless, solar factor g = 0.80 to 0.85 and thermal transmittance U = 5.6 W/m2K, fixed on carpentry with coined by supporting chocks perimeter and side including cold seal with silicone and placement of reeds.</p>						2,00	314,25	628,50
09.13	<p><b>u Vehicle access door</b></p> <p>Sliding entrance door 1 leaf of dimensions 2.00m wide and 4.000m high made of anodized aluminum profiles 15 microns, natural color, to be defined by Project Manager, even cutting, preparation and profile connections, fixing battens, pin and hanger hardware and security, placing joint sealing and cleaning according NTE/FCL-16.</p>						0,05	5.276,01	263,80
<b>TOTAL CHAPTER 09 CARPENTRY.....</b>								<b>16.445,72</b>	



# BUDGET AND MEASUREMENTS

Detached house in Segart

CODE	DESCRIPTION	UDS	LENGTH	WIDTH	HEIGHT	PARTIAL	QUANTITY	PRICE	AMOUNT
<b>CHAPTER 11 GLASSES</b>									
11.01	<b>m2 Double glazing</b> Double thermal insulated glazing consists of two glass monolithic single colorless of 6mm and 6mm and , with an intermediate air chamber of 12 mm aluminum spacer profile perimeter sealed with solar factor $g = 0.70-0.75$ and thermal transmittance $U = 2.8 \text{ W / m}^2\text{K}$ fixed to carpentry with coined by chocks of support perimeter and side even cold seal with silicone and placement of reeds.								
							34,10	22,00	750,20
<b>TOTAL CHAPTER 11 GLASSES.....</b>									<b>750,20</b>

## BUDGET AND MEASUREMENTS

Detached house in Segart

CODE	DESCRIPTION	UDS	LENGTH	WIDTH	HEIGHT	PARTIAL	QUANTITY	PRICE	AMOUNT
<b>CHAPTER 12 ELECTRICITY</b>									
<b>12.01</b>	<b>m Earth connection network of structure</b>								
	Earth connection network of structure, made of bare copper wire of 35 mm <sup>2</sup> , joining aluminothermic by welding to the reinforced of each footing, including share of rod and checking registration.								
							40,00	5,12	204,80
<b>12.02</b>	<b>m Outdoor wall luminaire</b>								
	Outdoor wall luminaire with aluminum housing, reflector sheet of polished aluminum and anodized special sealing joint, protection degree IP44 class I, with 2 compact fluorescent lamps of 18 W., with electrical equipment. Installed, including fittings and connections.								
							10,00	34,00	340,00
<b>12.03</b>	<b>u Electrical installation</b>								
	Complete electrical installation in housing with 3 bedrooms and 2 bathrooms, with a large electrification of 9200 W, consisting of general distribution box with controls, handling and general protection by 1 PIA 2x40 A and 2 differential switches 2x40A/30mA for 7 circuits (1 for lighting, 1 socket for general uses and fridge, 1 for sockets in bathrooms and kitchen staff, 1 for washing machine, dishwasher and electric water heater, 1 kitchen and oven, 1 socket for heating and 1 socket for air conditioning) on medium quality mechanisms and unipolar copper wire placed under different sections of hose corrugated PVC double layer of different diameters, fully installed, connected and in good working order, according NT-IEEV/89 and Low Voltage Electrotechnical Regulations 2002.								
							1,00	3.898,16	3.898,16
<b>TOTAL CHAPTER 12 ELECTRICITY.....</b>									<b>4.442,96</b>

## BUDGET AND MEASUREMENTS

Detached house in Segart

CODE	DESCRIPTION	UDS	LENGTH	WIDTH	HEIGHT	PARTIAL	QUANTITY	PRICE	AMOUNT
<b>CHAPTER 13 PLUMBING</b>									
13.01	<b>u Aluminum Drain siphon 200x200</b> Aluminum Drain siphon with aluminum grating 200x200mm. vertical output for collection of rainwater or wet rooms, installed and connected to the general network of drainage, including auxiliary means, excluding manhole of support.						5,00	13,17	65,85
13.02	<b>u Porcelain toilet</b> Colored porcelain toilet, tank under normal series, plugs and screws placed through the flooring, even sealed with silicone and comprising: cup, lid and tank under seat mechanisms and lacquered lid, hinged steel installed, including with bracket wrench 1/2 "chrome and flexible hose 20cm and 1/2" of function.						2,00	165,00	330,00
13.03	<b>m PVC downspout Rainwater 90mm</b> PVC downspout Rainwater, 90mm in diameter, with joint system Rubber ring joint (EN12200), placed with metal clamps, installed, including special pieces of PVC						20,00	6,28	125,60
13.04	<b>u Connection</b> Connection to the municipal general network of drinking water to a maximum length of 8m, made of polyethylene pipe of 20mm nominal diameter, high density and high pressure 0.6 MPa with polypropylene collar 40-3/4" reinforced with fiberglass, even special parts of polyethylene and screw cap, finished and running, and without include breakage of the pavement.						1,00	40,17	40,17
13.05	<b>u Water meter</b> Water meter of 20 mm 3/4 ", placed in manhole of connection, and connected to the secondary service drop and the internal distribution network, including installation of two valves 20mm, drain tap, check valve and other auxiliary items, riding and running, even verification, and not including the connection, or inside network.						1,00	123,10	123,10
13.06	<b>u Hydrant with cap</b> Hydrant with cap, fast link, built in brass, 3/4 "diameter, assembled over metal coil, connection and concrete, installed.						1,00	25,08	25,08
13.07	<b>u Plumbing system</b> Plumbing system for a full housing, equipped with kitchen and 2 bathrooms, made with copper pipes for networks of hot and cold water and PVC pipes, 32 mm diameter for the drainage system, prepared for individual trap in each appliance, even with PVC downspout and shank to link the toilet/s, water intakes closed with keys or plugs and drain plugs, completely finished.						1,00	1.234,40	1.234,40
13.08	<b>u Shower tray</b> Acrylic shower tray dimensions 160x70 cm, of rectangular shape, white, non-slip bottom and drain kit, including drain valve 1 1/2 " siphon and pipe, placed and masonry support.						2,00	265,49	530,98
13.09	<b>u Washbasin of 1200x410mm</b> Washbasin of 1200x410mm, without pedestal, white porcelain, with kit of fixing anchors, including drain valve 1 1/2 "siphon and pipe, placed and masonry support.						2,00	256,77	513,54
13.10	<b>u Sink 450x490mm</b> Stainless steel sink of dimensions 450x490mm for countertop of 60cm, with a normal bowl without drainer, drain valve, chain, cap, siphon and pipe, placed and masonry support.						1,00	67,12	67,12

## BUDGET AND MEASUREMENTS

Detached house in Segart

CODE	DESCRIPTION	UDS	LENGTH	WIDTH	HEIGHT	PARTIAL	QUANTITY	PRICE	AMOUNT
<b>13.11</b>	<b>u Mixer Monoblock</b> Mixer Monoblock washbasin, mono tap, special grade, of wall, chrome finish low spout with aerator and flexible supply fully installed and tested.						2,00	232,00	464,00
<b>13.12</b>	<b>u Tub spout</b> Tub spout diameter 3/4" with perlator, 130mm length, fully installed and tested.						1,00	46,42	46,42
<b>13.13</b>	<b>u Tub spout</b> Showerhead with five functions: rain spray, soft, massage, easy clean and economizer (50%), for wall, fully installed and tested.						2,00	74,46	148,92
<b>TOTAL CHAPTER 13 PLUMBING.....</b>									<b>3.715,18</b>

## BUDGET AND MEASUREMENTS

Detached house in Segart

CODE	DESCRIPTION	UDS	LENGTH	WIDTH	HEIGHT	PARTIAL	QUANTITY	PRICE	AMOUNT
<b>CHAPTER 14 HEATING</b>									
14.01	<b>u Smelting furnace</b> Smelting furnace of 18,000 kcal / h for heating oil, installed, control equipment consisting of a thermometer, thermostat control and safety with manual reset, a network of insulated copper pipes to the boiler room.								
14.02	<b>u C fuel tank</b> C fuel tank of 1,000 liters. steel plate, complete, to move air protected against corrosion by sandblasting treatment SA-2 1/2, primer of 300 micron polyurethane resin and epoxy layers, excluding civil works, canalization until burner with copper tubing electrolyte protected with PVC sheath tube of 18 mm., loading spout 3 ", vent pipe, valves and fittings, without pressure equipment.						1,00	953,60	953,60
14.03	<b>m Heating chimney</b> Heating chimney installation insulated double smooth wall 150mm, inner diameter, constructed inside and outside of stainless steel, approved.						1,00	852,60	852,60
14.04	<b>u Heating chimney</b> Steel sheet element 75/3 power 117 kcal / h, monoturn key of 3/8 " plugs, holders, trap, installed on supports.						7,00	147,07	1.029,49
14.05	<b>m Copper pipe of 10-12mm</b> Copper pipe of 10-12mm diameter, for heating distribution network, with accessories, welding, small equipment and thermal insulation, tested at 10 kg/cm2.						117,00	8,91	1.042,47
14.06	<b>m Copper pipe of 13-15mm</b> Copper pipe of 13-15mm diameter, for heating distribution network, with accessories, welding, small equipment and thermal insulation, tested at 10 kg/cm2.						6,51	5,20	33,85
14.07	<b>m Copper pipe of 16-18mm</b> Copper pipe of 16-18mm diameter, for heating distribution network, with accessories, welding, small equipment and thermal insulation, tested at 10 kg/cm2.						9,76	5,72	55,83
14.08	<b>m Copper pipe of 20-22mm</b> Copper pipe of 20-22mm diameter, for heating distribution network, with accessories, welding, small equipment and thermal insulation, tested at 10 kg/cm2.						8,13	6,50	52,85
14.09	<b>m Copper pipe of 26-28mm</b> Copper pipe of 26-28mm diameter, for heating distribution network, with accessories, welding, small equipment and thermal insulation, tested at 10 kg/cm2.						4,88	7,85	38,31
14.10	<b>u Ball valve PN-10 from 3/8"</b> Ball valve PN-10 from 3/8 ", installed, small items and accessories.						3,25	9,27	30,13
14.11	<b>u Ball valve PN-10 from 1/2"</b> Ball valve PN-10 from 1/2 ", installed, small items and accessories.						2,00	10,47	20,94
							2,00	11,17	22,34

## BUDGET AND MEASUREMENTS

Detached house in Segart

CODE	DESCRIPTION	UDS	LENGTH	WIDTH	HEIGHT	PARTIAL	QUANTITY	PRICE	AMOUNT
<b>14.12</b>	<b>u Room thermostat</b> Electronic room thermostat for heating and cooling, centralized external switch set to winter/summer adjustment range 5-30 °C, held in corrugated PVC pipe and M 20/gp5 unipolar insulated copper wire for a nominal voltage of 750 V. and section 1.5mm <sup>2</sup> ., including electronic room thermostat mechanism Jung-CD 500, cash register, fully installed.								
							1,00	73,52	73,52
<b>14.13</b>	<b>u Installation of chimney</b> Installation of chimney prefabricated for the home built with stone gard as the brackets, lintels top and bottom of firebrick, dark pine shelf 15cm in a natural shade and home to steel, 253x165x85 cm dimensions with chimney stainless steel tube 200mm in diameter with double walls and intermediate insulation, completely installed, tested and working properly								
							1,00	1.138,83	1.138,83
<b>TOTAL CHAPTER 14 HEATING.....</b>									<b>5.344,76</b>





## BUDGET AND MEASUREMENTS

Detached house in Segart

CODE	DESCRIPTION	UDS	LENGTH	WIDTH	HEIGHT	PARTIAL	QUANTITY	PRICE	AMOUNT
<b>CHAPTER 16 URBANIZATION</b>									
16.01	<p><b>u Concrete pool of 9.00x5.60m</b></p> <p>Concrete pool of 9.00x5.60m, average depth of 1.50m, coating of white glass mosaic, made with white cement mortar and grout with white tile adhesive on rendered cement mortar of dosing 1:3 and sand, rounded interior angles, structure of reinforced concrete wall and vibrated HA-25/F/40, average thickness 30cm, double grid of 15x15mm diameter steel B500S, background of the same material of average thickness 20cm, spread through regulated on layer of 10cm, packed and reinforced with mesh 15x15mm of 8; edge of artificial stone 8cm of thickness and 65cm wide, completely finished, even stainless steel pool ladder and cleaning system, clean water, fully installed and working.</p>								
							1,00	2.750,00	2.750,00
16.02	<b>u Installing pool cleaning</b>								
							1,00	950,00	950,00
16.03	<p><b>u Installing irrigation</b></p> <p>Installing sprinkler irrigation for garden, includes 2 sprinklers.</p>								
							1,00	175,00	175,00
<b>TOTAL CHAPTER 16 URBANIZATION.....</b>									<b>3.875,00</b>

## BUDGET AND MEASUREMENTS

Detached house in Segart

CODE	DESCRIPTION	UDS	LENGTH	WIDTH	HEIGHT	PARTIAL	QUANTITY	PRICE	AMOUNT
<b>CHAPTER 17 VARIOUS</b>									
17.01	<b>u Installing pool cleaning</b> Mailbox of dimensions 28x11, 5x39 cm and weight 1.7 kg, with card entry slot on the front, white polycarbonate body and door of the same material and color lock, card, installation auxiliary means for placement.								
							1,00	29,01	29,01
17.02	<b>u Kitchen furniture</b>								
							1,00	950,00	950,00
17.03	<b>u Installation of photovoltaic solar energy</b> Installation of photovoltaic solar energy for a detached house with 3 bedrooms, kitchen and bathroom, to supply electricity for lighting, and a low power fridge. Composed of photovoltaic modules according to UNE-EN 61215:1997 and its supports, controller, inverter and battery, all of them with CE marked, fully installed, tested and working properly according to DB SE and DB HE-5 of the CTE.								
							1,00	1.741,94	1.741,94
<b>TOTAL CHAPTER 17 VARIOUS.....</b>									<b>2.720,95</b>

## BUDGET AND MEASUREMENTS

Detached house in Segart

CODE	DESCRIPTION	UDS	LENGTH	WIDTH	HEIGHT	PARTIAL	QUANTITY	PRICE	AMOUNT
<b>CHAPTER 18 MANAGEMENT OF WASTE</b>									
18.01	u Management of waste								
							1,00	570,00	570,00
<b>TOTAL CHAPTER 18 MANAGEMENT OF WASTE.....</b>									<b>570,00</b>





## BUDGET AND MEASUREMENTS

Detached house in Segart

CHAPTER	SUMMARY	EUROS	%
01	EARTHWORKS.....	1.573,37	1,78
02	HORIZONTAL DRAINAGE SYSTEM.....	2.277,88	2,57
03	FOUNDATIONS.....	2.867,17	3,24
04	STRUCTURES.....	15.517,34	17,53
05	MASONRY.....	5.028,35	5,68
06	ROOFS.....	3.711,63	4,19
07	COATINGS VERTICALS AND HORIZONTALS.....	6.578,41	7,43
08	PAVEMENTS AND TILINGS.....	5.529,64	6,25
09	CARPENTRY.....	16.445,72	18,58
10	IRONWORKS.....	786,24	0,89
11	GLASSES.....	750,20	0,85
12	ELECTRICITY.....	4.442,96	5,02
13	PLUMBING.....	3.715,18	4,20
14	HEATING.....	5.344,76	6,04
15	HVAC SYSTEM.....	4.215,50	4,76
16	URBANIZATION.....	3.875,00	4,38
17	VARIOUS.....	2.720,95	3,07
18	MANAGEMENT OF WASTE.....	570,00	0,64
19	QUALITY CONTROL.....	1.280,70	1,45
20	SAFETY AND HEALTH.....	1.280,70	1,45
	<b>TOTAL EXECUCION MATERIAL</b>	<b>88.511,70</b>	
	13,00% Overhead.....	11.506,52	
	6,00% Industrial profit.....	5.310,70	
	AMOUNT OF O. y I.P	16.817,22	
		<b>105.328,92</b>	
	18,00% I.V.A. ....	18.959,21	
	<b>TOTAL CONTRACT BUDGET</b>	<b>124.288,13</b>	
	<b>TOTAL GENERAL BUDGET</b>	<b>124.288,13</b>	

## PLANS

BASIC PROJECT AND EXECUTION detached house Urbanization el Murtal, plots 48 and 49. Segart (Valencia)

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7. ELEVATION PLAN WEST
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PROJECT	DETACHED HOUSE, URB. EL MURTAL
LOCATION	SEGART, VALENCIA (SPAIN)
AUTHOR	JOSHUA GARCIA GONZALEZ
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA
SCALE	1:4000
DATE	JUNE 2012

 THE CITY OF VALENCIA TECHNICAL UNIVERSITY	Escuela Técnica Superior de Gestión en la Edificación
PLAN N°	<b>01</b>



PROJECT  
 DETACHED HOUSE, URB. EL MURTAL  
 LOCATION  
 SEGART, VALENCIA (SPAIN)

AUTHOR  
 JOSHUA GARCIA GONZALEZ

TUTOR  
 FRANTISEK KULHANEK / MILAGROS IBORRA

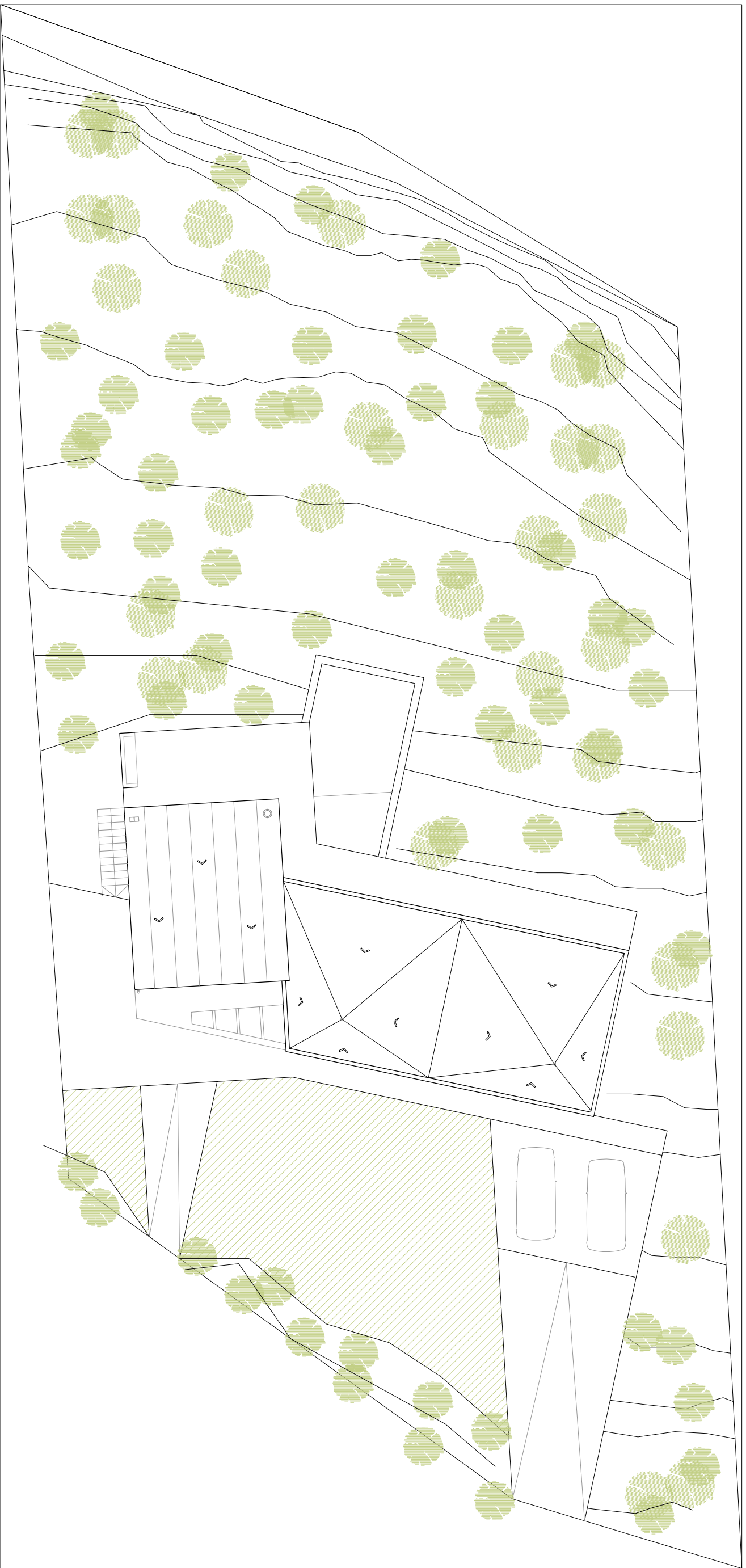
SCALE 1:1000  
 PLAN NAME  
 LOCATION

DATE  
 JUNE 2012



Escuela Técnica Superior  
 de Gestión en la Edificación

PLAN Nº  
**02**



PROJECT	DETACHED HOUSE, URB. EL MURTAL
LOCATION	SEGART, VALENCIA (SPAIN)
AUTHOR	JOSHUA GARCIA GONZALEZ
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA
SCALE	1:175
DATE	JUNE 2012
PLAN NAME	PLOT DETACHED HOUSE
PLAN N°	3



Escuela Técnica Superior  
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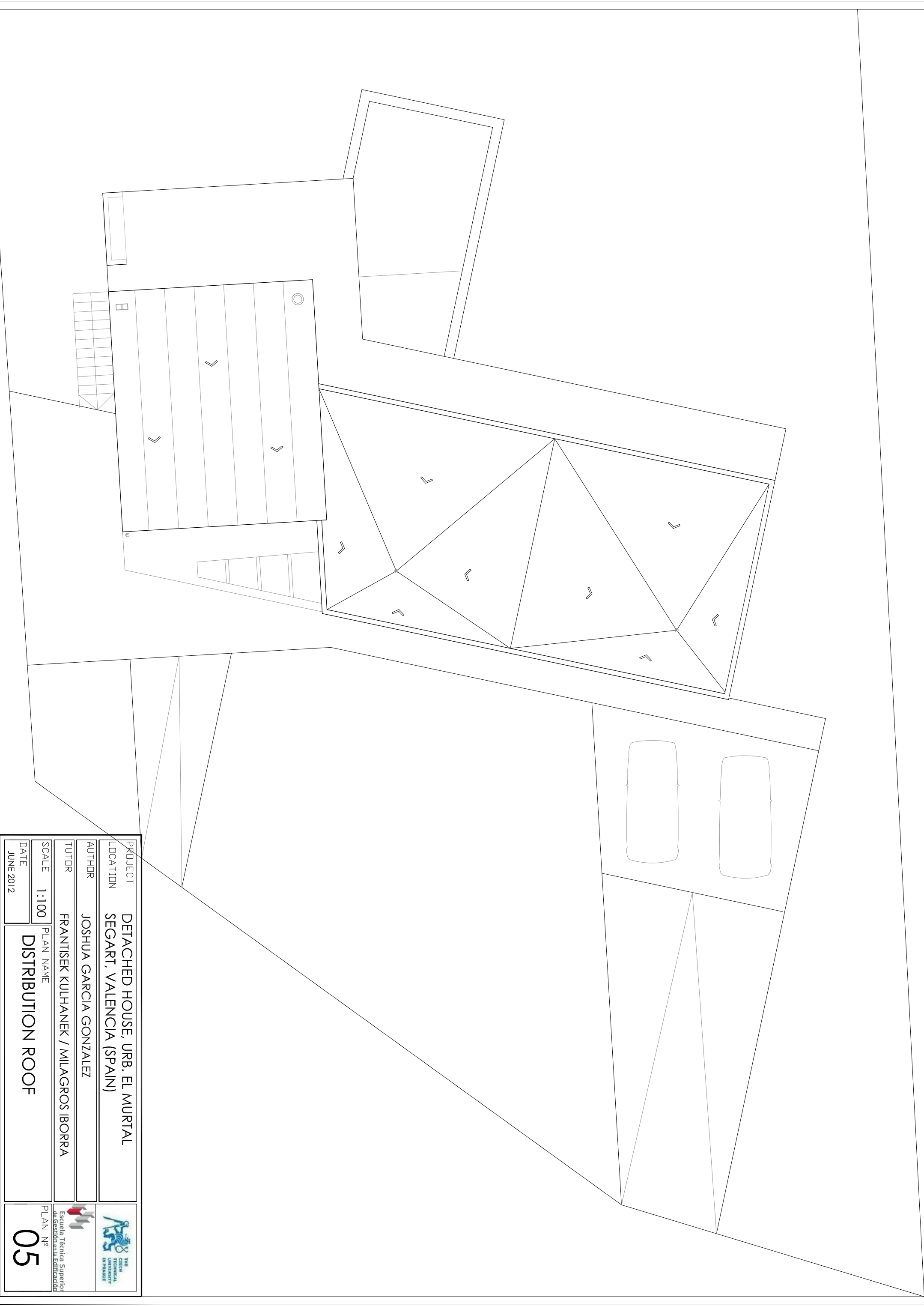
**TABLE OF USEFUL SURFACES**

KITCHEN	11'50 m <sup>2</sup>	
LIVING ROOM	25'70 m <sup>2</sup>	
DISTRIBUTOR	13,75 m <sup>2</sup>	
BEDROOM 3	8'25 m <sup>2</sup> + 1'25 m <sup>2</sup> storage.	
BEDROOM 2	8'00 m <sup>2</sup> + 1'15 m <sup>2</sup> storage.	
BEDROOM 1	13'35 m <sup>2</sup>	
BATHROOM 1	9'15 m <sup>2</sup>	TERRACE 1
BATHROOM 2	5'15 m <sup>2</sup>	TERRACE 2
STORAGE AREA 1	3'20 m <sup>2</sup>	TERRACE 3
CORRIDOR	5'50 m <sup>2</sup>	PARKING
DRESSING ROOM	7'35 m <sup>2</sup>	PEDESTRIAN ACC.
<b>TOTAL USEFUL SURF.</b>	<b>112 m<sup>2</sup></b>	<b>ROAD ACC.</b>
		27'25 m <sup>2</sup>
		16'20 m <sup>2</sup>
		4'500 m <sup>2</sup>
		3'000 m <sup>2</sup>
		12'00 m <sup>2</sup>
		40'25 m <sup>2</sup>

PROJECT	DETACHED HOUSE, URB. EL MURTAL
LOCATION	SEGART, VALENCIA (SPAIN)
AUTHOR	JOSHUA GARCIA GONZALEZ
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA
SCALE	1:100
DATE	JUNE 2012
PLAN NAME	DISTRIBUTION GROUND FLOOR
PLAN Nº	04



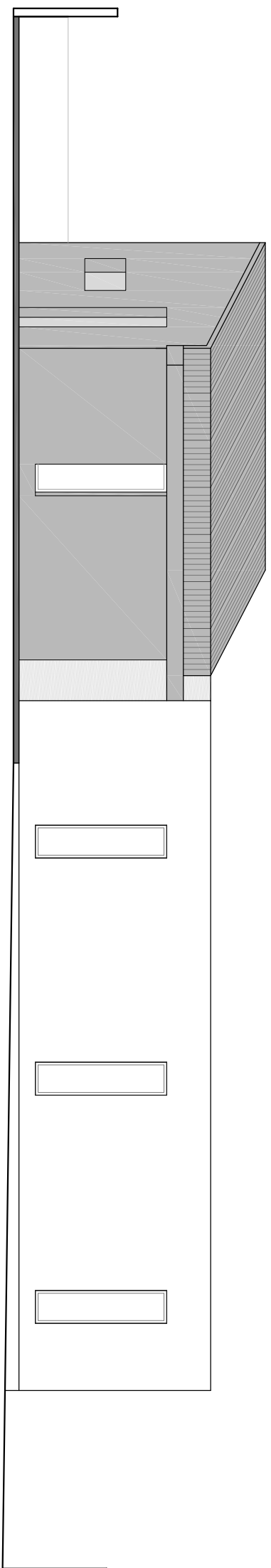
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PROJECT	DETACHED HOUSE, URB. EL MURTAL
LOCATION	SEGART, VALENCIA (SPAIN)
AUTHOR	JOSHUA GARCIA GONZALEZ
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA
SCALE	1:100
DATE	JUNE 2012
PLAN NAME	DISTRIBUTION ROOF
PLAN Nº	05



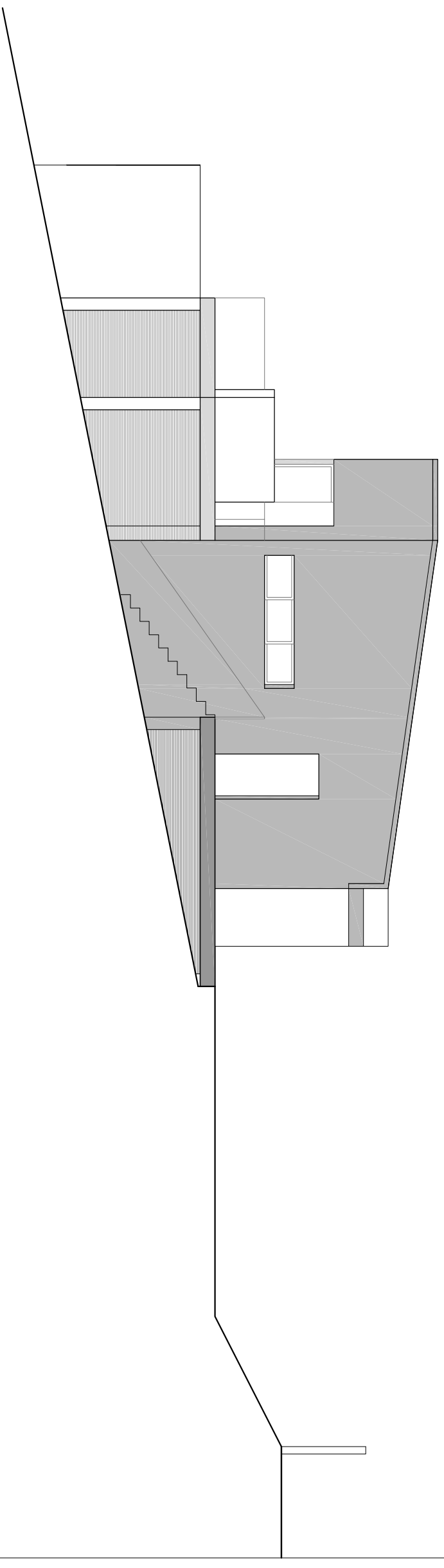
Escuela Técnica Superior  
de Gestión en la Edificación



PROJECT	DETACHED HOUSE, URB. EL MURTAL
LOCATION	SEGART, VALENCIA (SPAIN)
AUTHOR	JOSHUA GARCIA GONZALEZ
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA
SCALE	1:100
DATE	JUNE 2012

 Escuela Técnica Superior de Gestión en la Edificación	PLAN N.º
	<b>06</b>

PLAN NAME  
**ELEVATION PLAN: SOUTH**

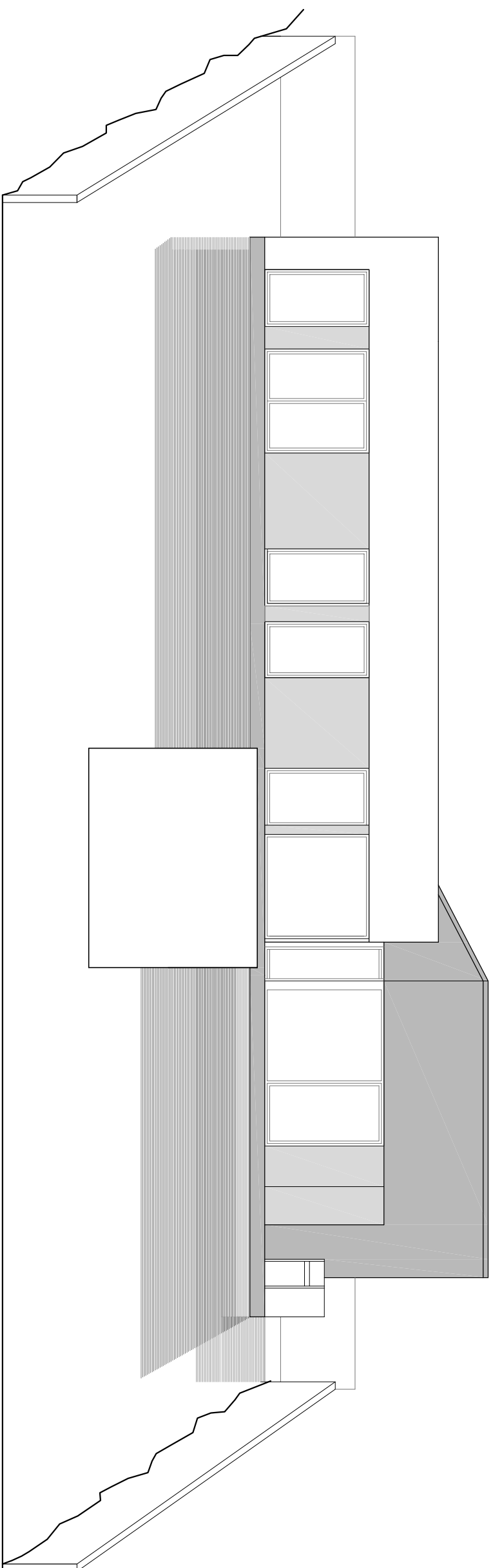


PROJECT	DETACHED HOUSE, URB. EL MURTAL
LOCATION	SEGART, VALENCIA (SPAIN)
AUTHOR	JOSHUA GARCIA GONZALEZ
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA
SCALE	1:100
DATE	JUNE 2012
PLAN NAME	ELEVATION PLAN: WEST
PLAN N°	07



Escuela Técnica Superior  
de Gestión en la Edificación

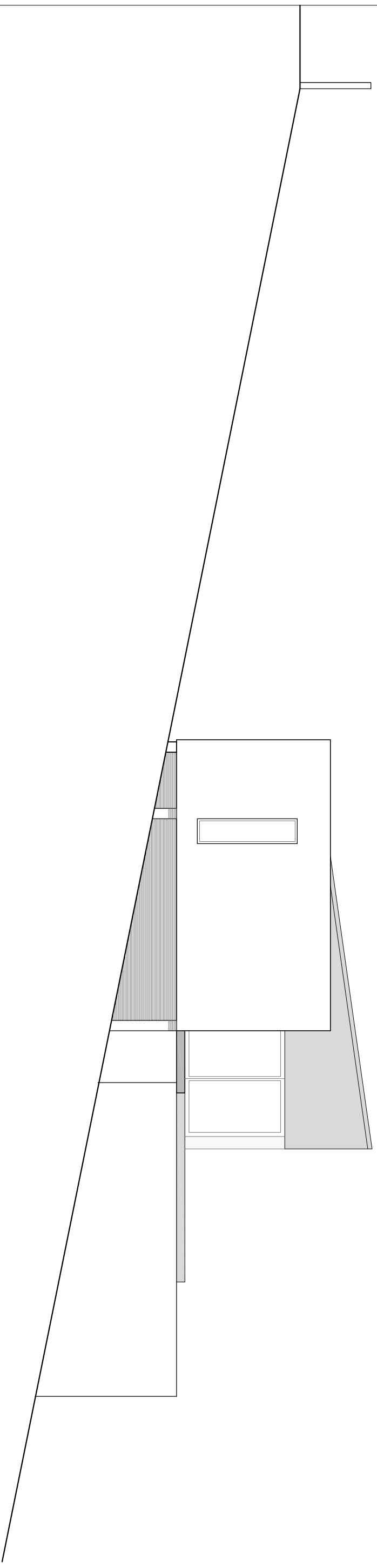




PROJECT	DETACHED HOUSE, URB. EL MURTAL
LOCATION	SEGART, VALENCIA (SPAIN)
AUTHOR	JOSHUA GARCIA GONZALEZ
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA
SCALE	1:100
DATE	JUNE 2012
PLAN NAME	ELEVATION PLAN: NORTH
PLAN N°	08



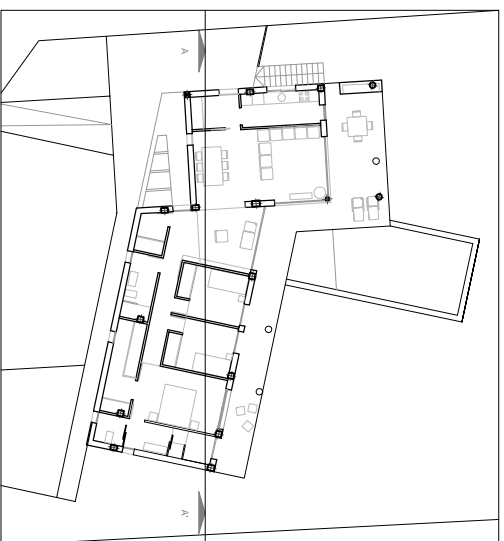
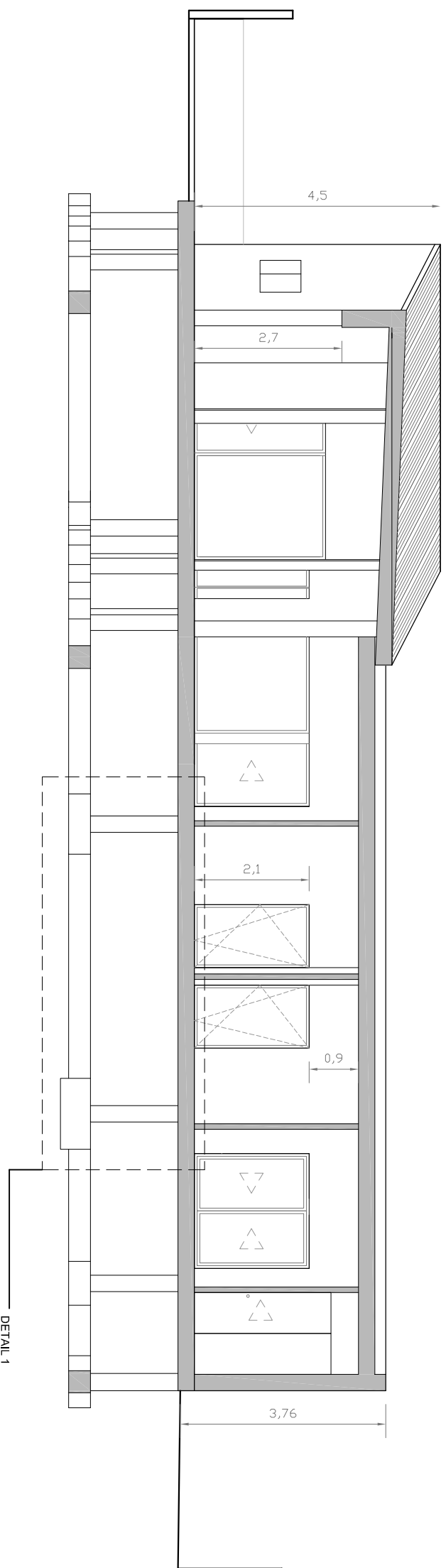
Escuela Técnica Superior  
de Gestión en la Edificación





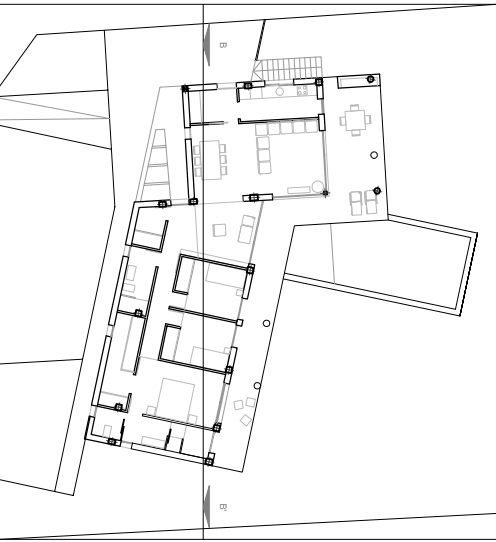
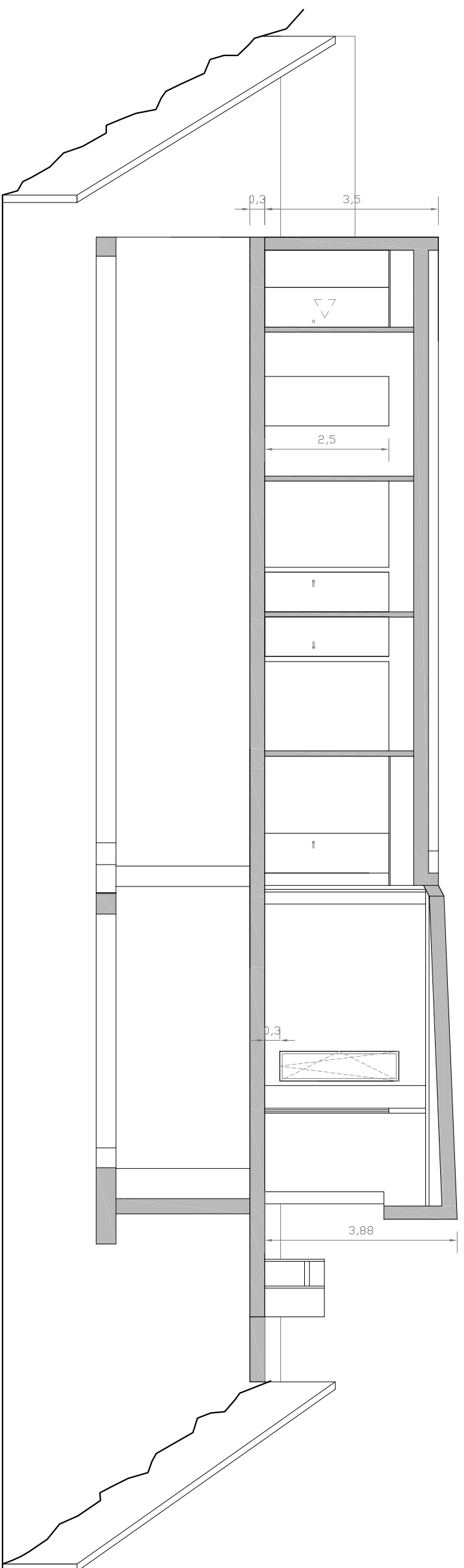
PROJECT	DETACHED HOUSE, URB. EL MURTAL
LOCATION	SEGART, VALENCIA (SPAIN)
AUTHOR	JOSHUA GARCIA GONZALEZ
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA
SCALE	1:100
DATE	JUNE 2012
PLAN NAME	ELEVATION PLAN: EAST
PLAN N°	09



Escuela Técnica Superior de Gestión en la Edificación



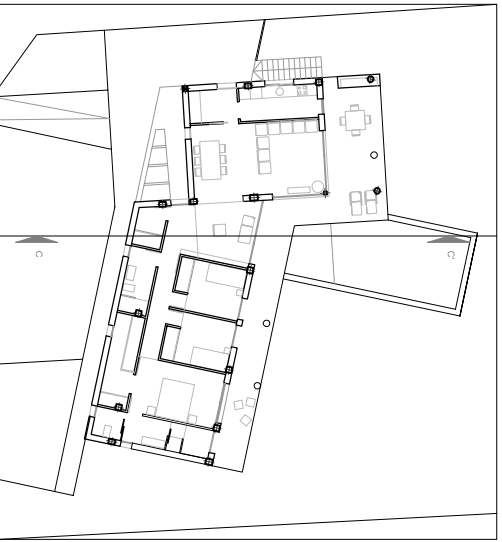
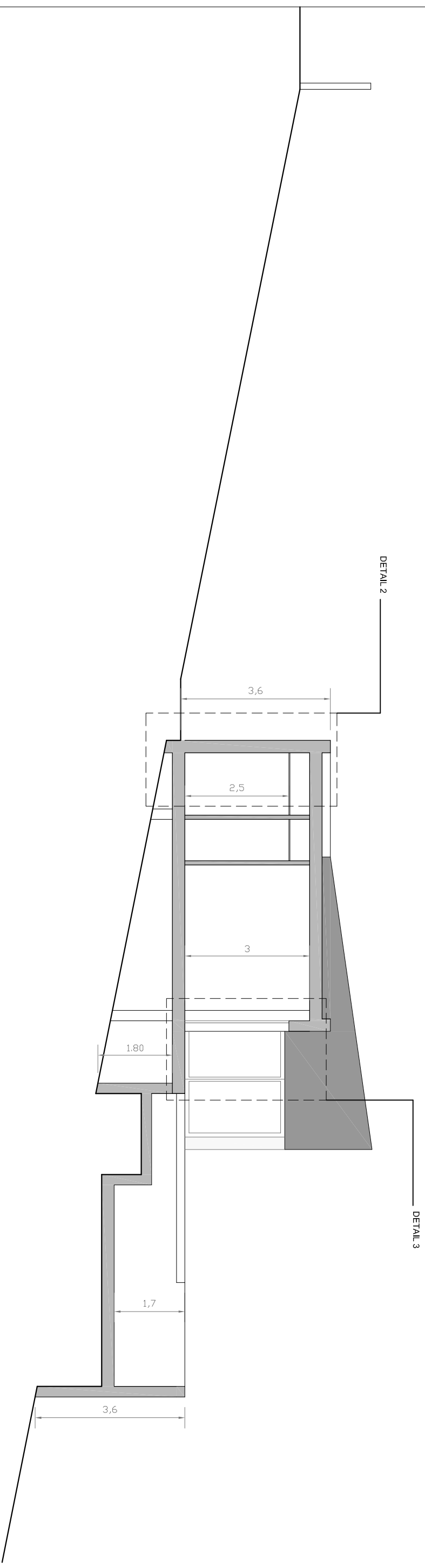
PROJECT	DETACHED HOUSE, URB. EL MURTAL	 Escuela Técnica Superior de Gestión e Ingeniería Edificación
LOCATION	SEGART, VALENCIA (SPAIN)	
AUTHOR	JOSHUA GARCIA GONZALEZ	 PLAN Nº <b>10</b>
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA	
SCALE	1:100	PLAN NAME
DATE	JUNE 2012	SECTION A-A'





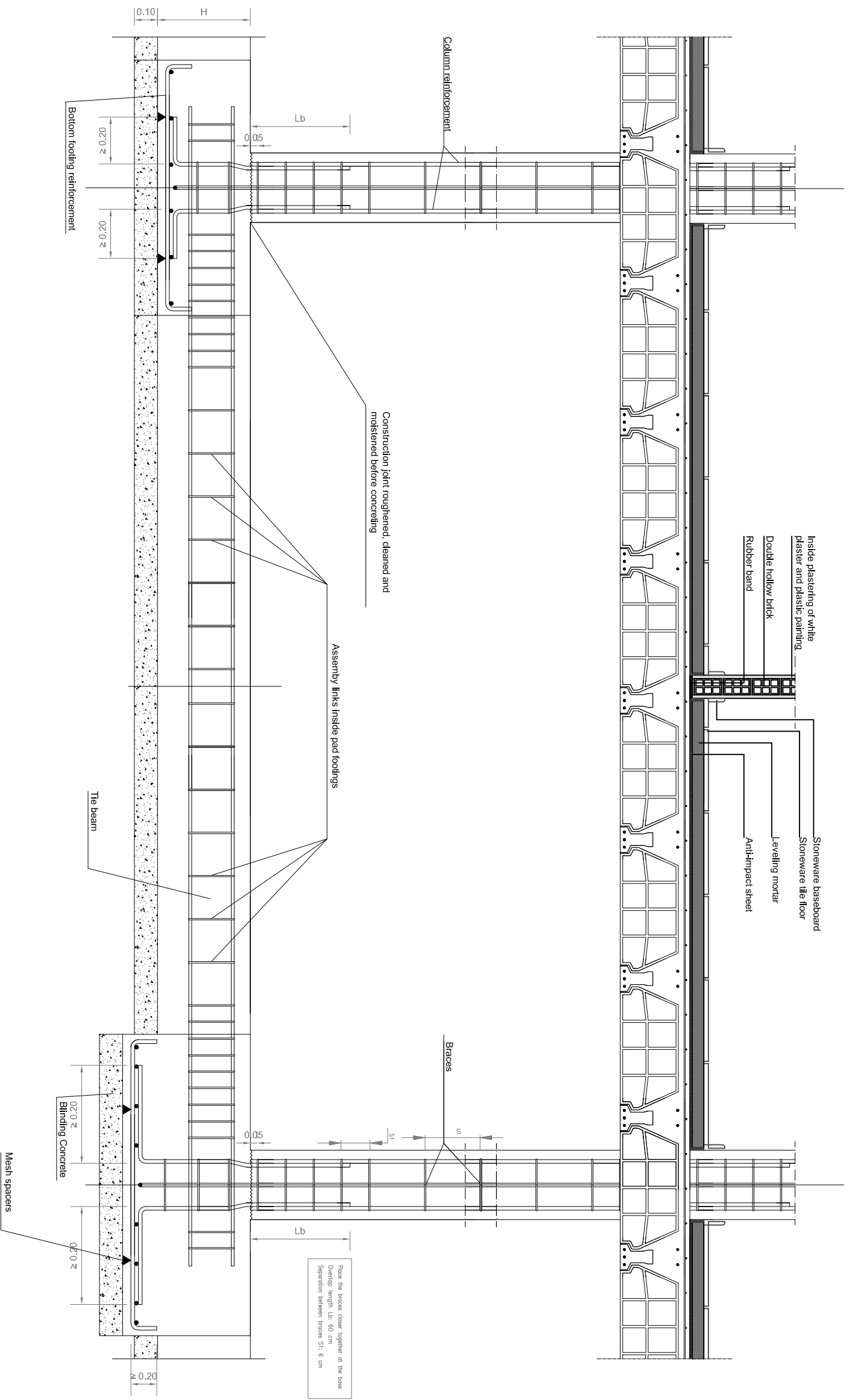
PROJECT	DETACHED HOUSE, URB. EL MURTAL
LOCATION	SEGART, VALENCIA (SPAIN)
AUTHOR	JOSHUA GARCIA GONZALEZ
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA
SCALE	1:100
DATE	JUNE 2012
PLAN NAME	SECTION B-B'
PLAN N°	11





Escuela Técnica Superior de Gestión en la Edificación

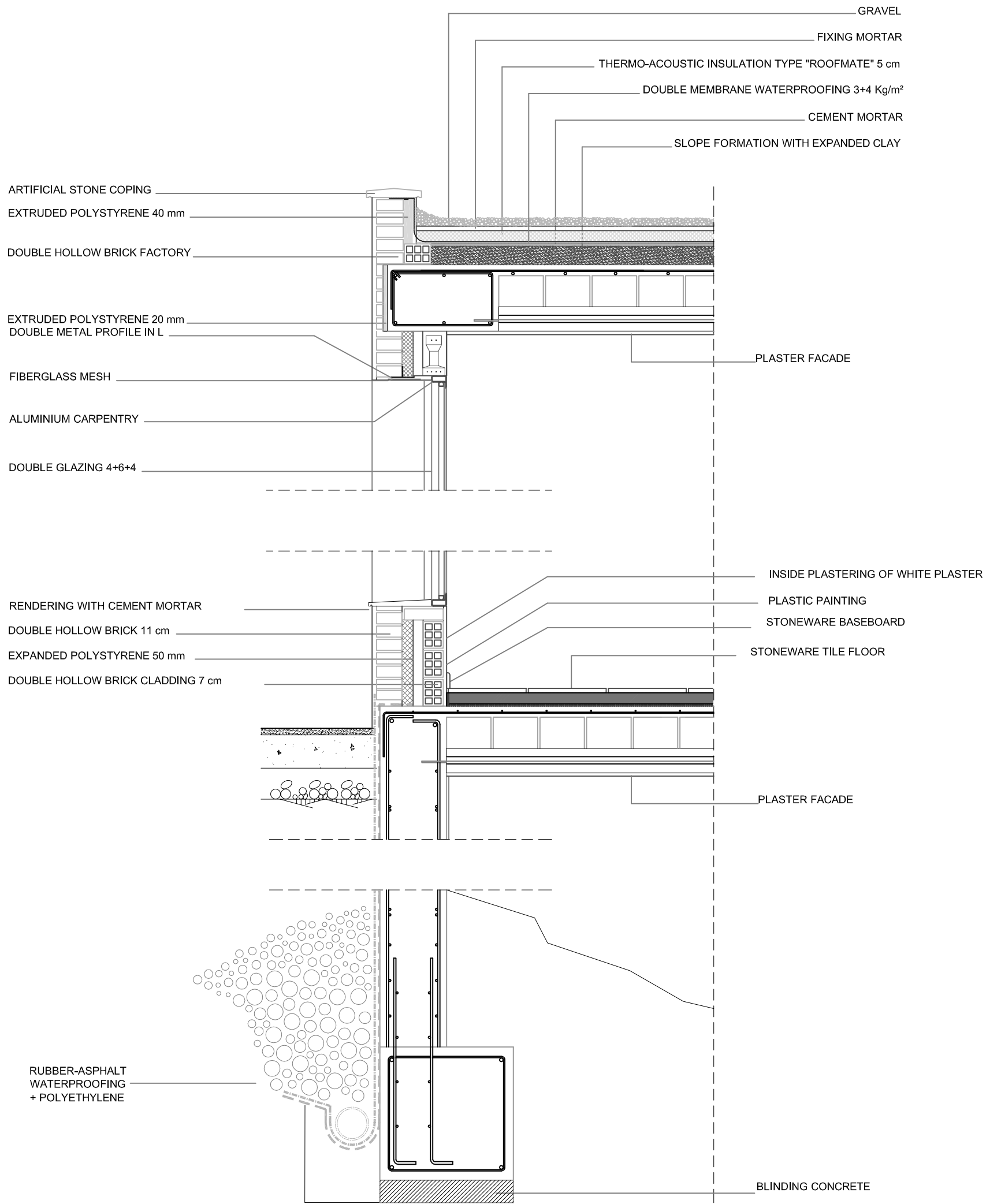


PROJECT	DETACHED HOUSE, URB. EL MURTAL	 THE CZECH TECHNICAL UNIVERSITY IN PRAGUE
LOCATION	SEGART, VALENCIA (SPAIN)	
AUTHOR	JOSHUA GARCIA GONZALEZ	 Escuela Técnica Superior de Gestión en la Edificación
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA	
SCALE	1:100	PLAN N.º <b>12</b>
DATE	JUNE 2012	
PLAN NAME <b>SECTION C-C'</b>		



PROJECT	DETACHED HOUSE, URB. EL MURTAL	 THE TECHNICAL UNIVERSITY OF VALENCIA
LOCATION	SEGART, VALENCIA (SPAIN)	
AUTHOR	JOSHUA GARCIA GONZALEZ	 Escuela Técnica Superior de Gestión en la Edificación
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA	
SCALE	1:20	PLAN Nº
DATE	JUNE 2012	13

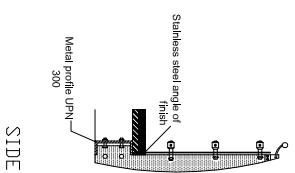
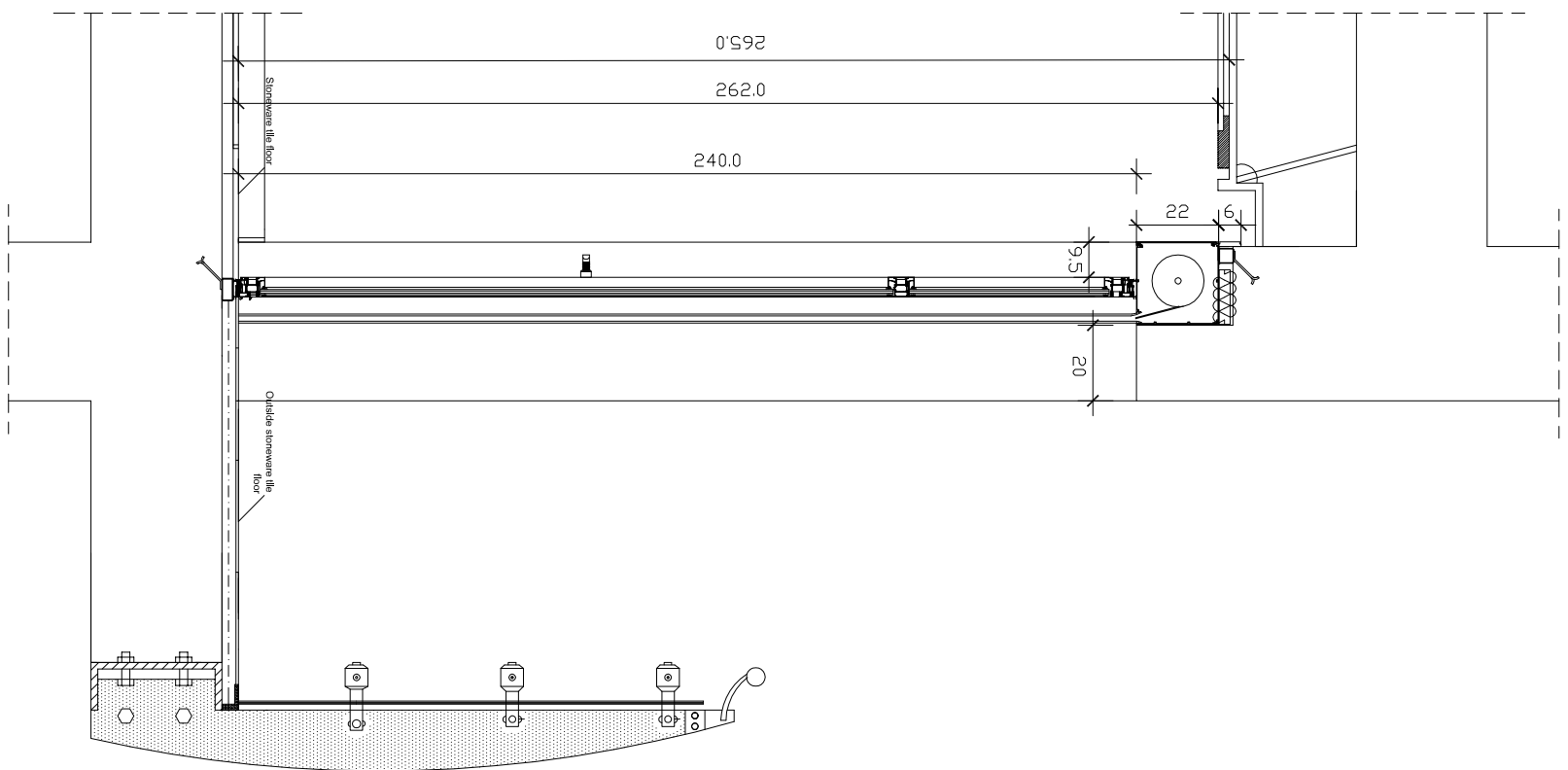
PLAN NAME  
**DETAIL 1 FOUNDATION**



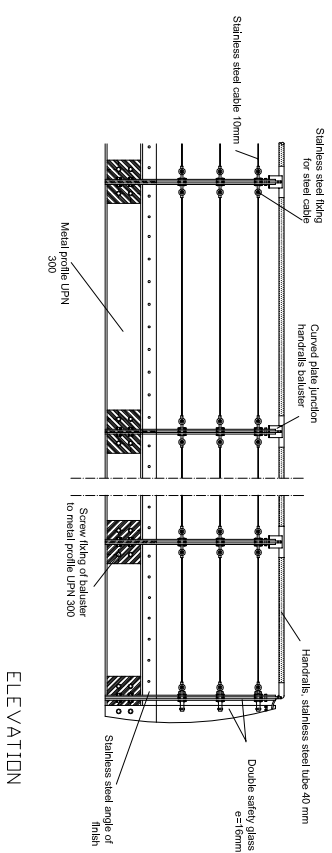
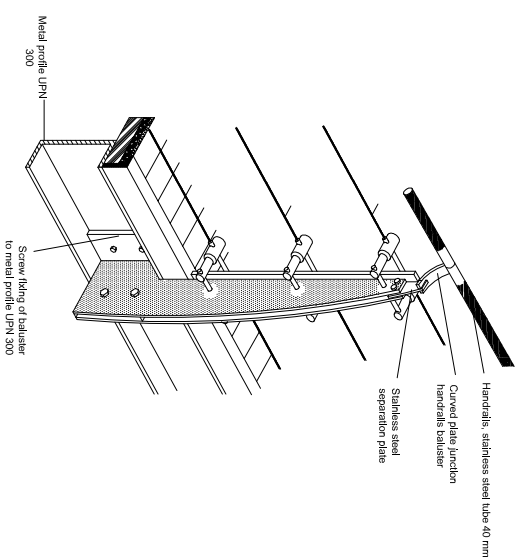
PROJECT	DETACHED HOUSE, URB. EL MURTAL
LOCATION	SEGART, VALENCIA (SPAIN)
AUTHOR	JOSHUA GARCIA GONZALEZ
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA
SCALE	1:50
DATE	JUNE 2012
PLAN NAME	DETAIL 2 SECTION C-C'
PLAN N <sup>o</sup>	14



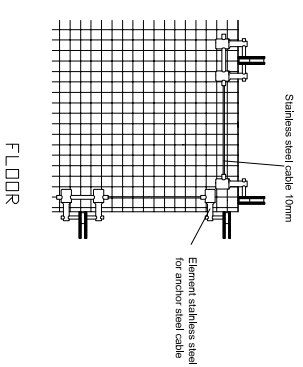
Escuela Técnica Superior  
de Gestión en la Edificación



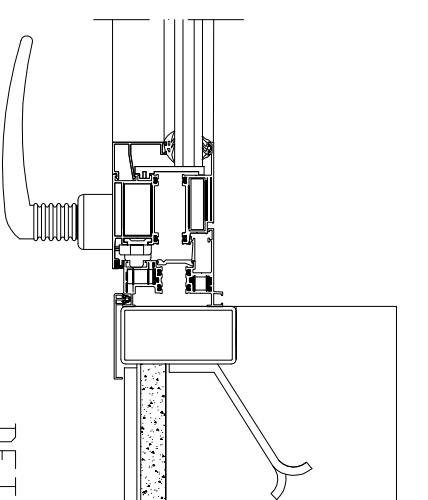
SIDE



ELEVATION



FLOOR

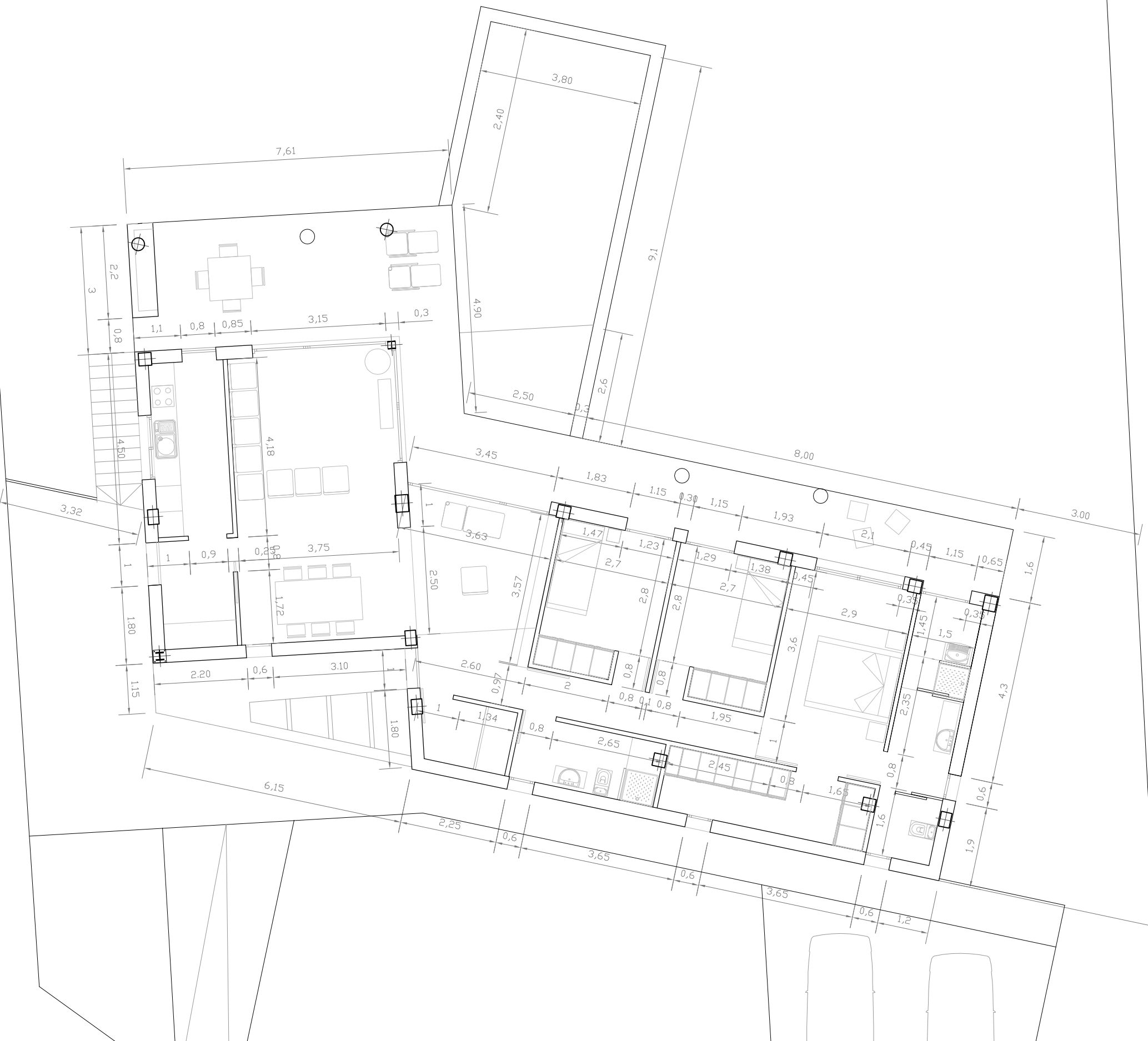


DETAIL OF HARDWARE

DETAIL OF HANDRAIL

PROJECT	DETACHED HOUSE, URB. EL MURTAL	
LOCATION	SEGART, VALENCIA (SPAIN)	
AUTHOR	JOSHUA GARCIA GONZALEZ	
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA	
SCALE	1:50	PLAN NAME
DATE	JUNE 2012	DETAIL 3 TERRACE
PLAN Nº	15	Escuela Técnica Superior de Gestión en la Edificación

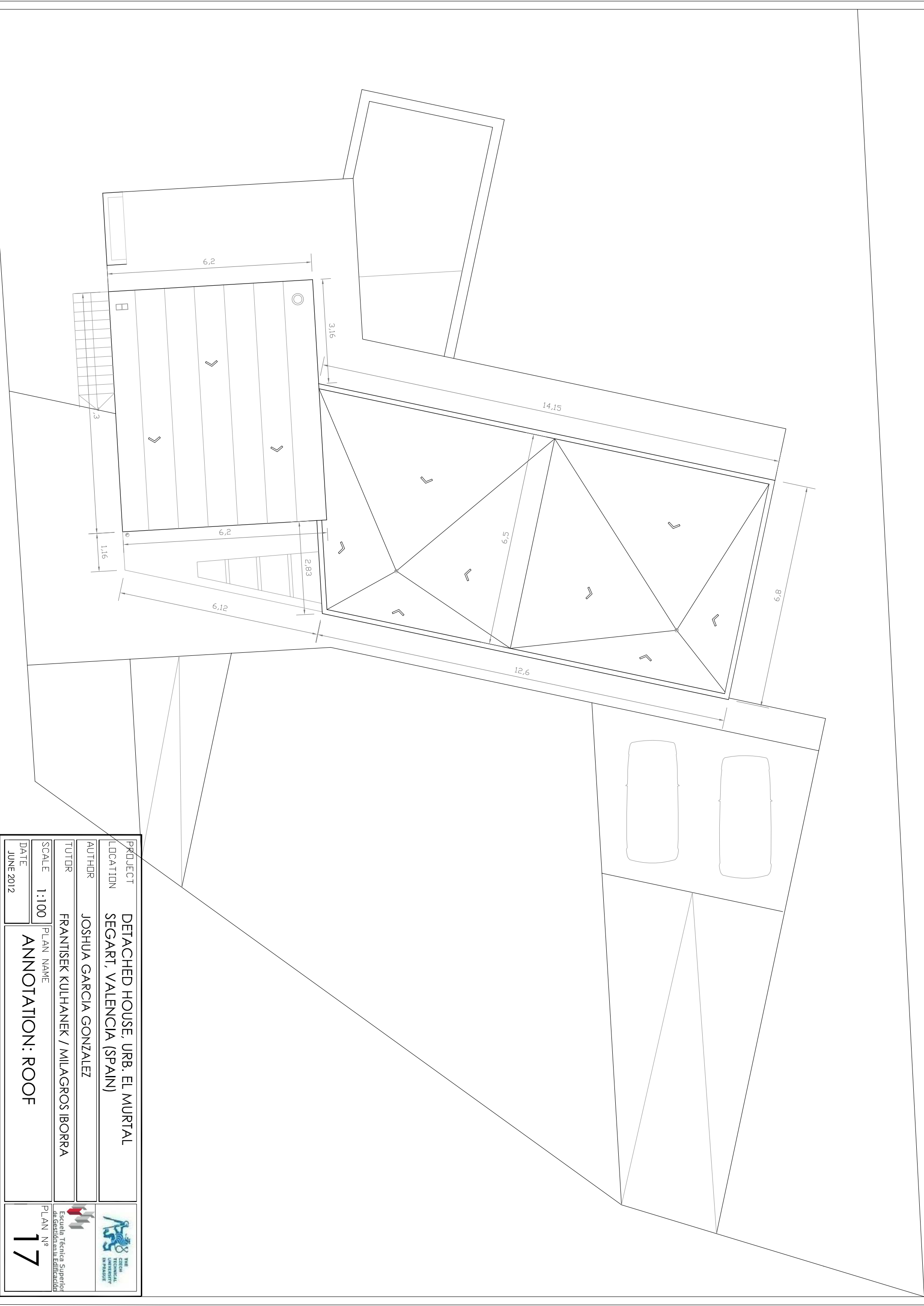




PROJECT	DETACHED HOUSE, URB. EL MURTAL
LOCATION	SEGART, VALENCIA (SPAIN)
AUTHOR	JOSHUA GARCIA GONZALEZ
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA
SCALE	1:100
DATE	JUNE 2012
PLAN NAME	ANNOTATION: GROUND FLOOR
PLAN Nº	16



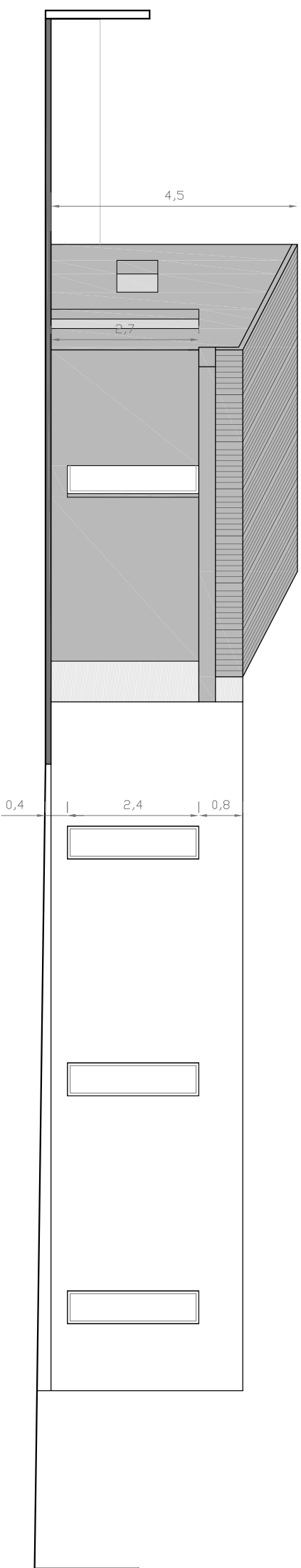
Escuela Técnica Superior  
de Gestión en la Edificación




PROJECT	DETACHED HOUSE, URB. EL MURTAL
LOCATION	SEGART, VALENCIA (SPAIN)
AUTHOR	JOSHUA GARCIA GONZALEZ
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA
SCALE	1:100
DATE	JUNE 2012
PLAN NAME	ANNOTATION: ROOF
PLAN Nº	17

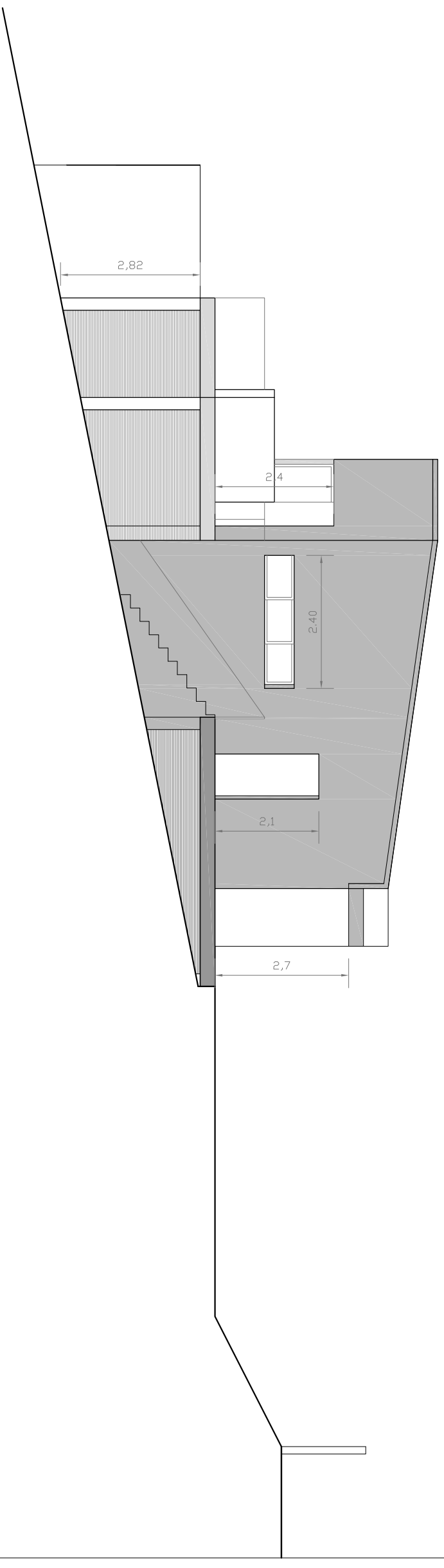


Escuela Técnica Superior  
de Gestión en la Edificación



PROJECT	DETACHED HOUSE, URB. EL MURTAL
LOCATION	SEGART, VALENCIA (SPAIN)
AUTHOR	JOSHUA GARCIA GONZALEZ
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA
SCALE	1:100
DATE	JUNE 2012
PLAN NAME	ANNOTATION: SOUTH ELEVATION

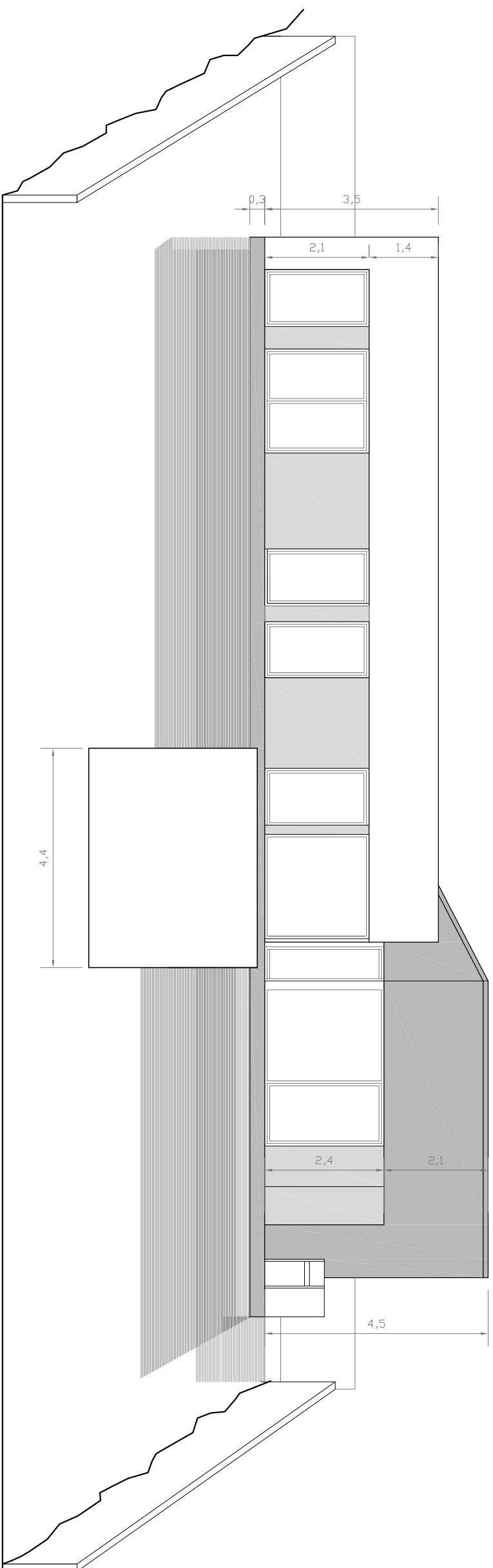
 <p>THE CZECH TECHNICAL UNIVERSITY IN PRAGUE</p>	<p>Escuela Técnica Superior de Gestión en la Edificación</p> <p>PLAN Nº</p> <p><b>18</b></p>
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PROJECT	DETACHED HOUSE, URB. EL MURTAL
LOCATION	SEGART, VALENCIA (SPAIN)
AUTHOR	JOSHUA GARCIA GONZALEZ
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA
SCALE	1:100
DATE	JUNE 2012
PLAN NAME	ANNOTATION: WEST ELEVATION
PLAN Nº	19



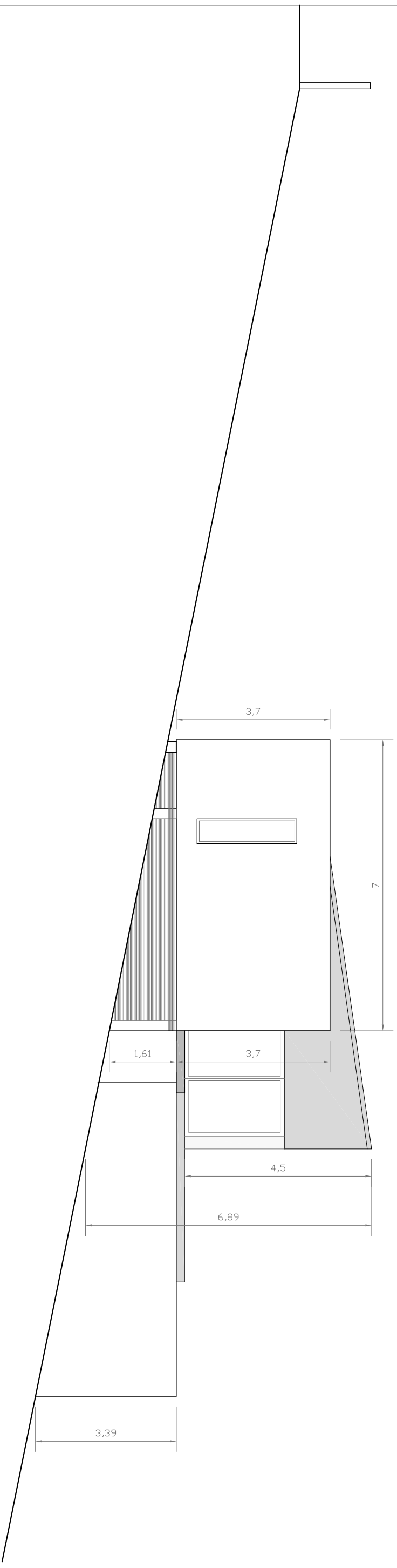
Escuela Técnica Superior  
de Gestión en la Edificación



PROJECT	DETACHED HOUSE, URB. EL MURTAL
LOCATION	SEGART, VALENCIA (SPAIN)
AUTHOR	JOSHUA GARCIA GONZALEZ
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA
SCALE	1:100
DATE	JUNE 2012
PLAN NAME	ANNOTATION: NORTH ELEVATION
PLAN Nº	20



Escuela Técnica Superior  
de Gestión en la Edificación



PROJECT	DETACHED HOUSE, URB. EL MURTAL
LOCATION	SEGART, VALENCIA (SPAIN)
AUTHOR	JOSHUA GARCIA GONZALEZ
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA
SCALE	1:100
DATE	JUNE 2012
PLAN NAME	ANNOTATION: EAST ELEVATION
PLAN N°	21



Escuela Técnica Superior  
de Gestión en la Edificación



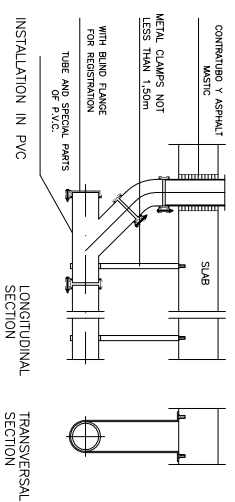
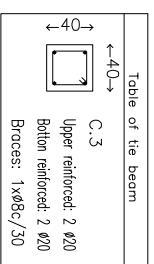
STRUCTURAL MASS CONCRETE, REINFORCED OR PRESTRESSED ELEMENTS: CHART OF CORRECT FEATURES SUITABLE TO THE INSTRUCTION (EHE-08)

STRUCTURAL ELEMENTS	Concrete type	Level of control	Nominal coating (mm)			Safety factors (γ <sub>c</sub> )
			Lateral	Superior	Inferior	
Foundation	HA-25/B/20/1/a	STADISTIC	7	30	70	Persistent situation 1,50
Walls	HA-25/B/20/1/a	STADISTIC	3	-	-	Persistent situation 1,50
Pillars	HA-25/B/20/1/a	STADISTIC	3	-	-	Persistent situation 1,50
Beam and slabs	HA-25/B/20/1/a	STADISTIC	3	30	30	Accidental situation 1,30
Pool	HA-25/B/20/1/a	STADISTIC	-	-	-	Accidental situation 1,30

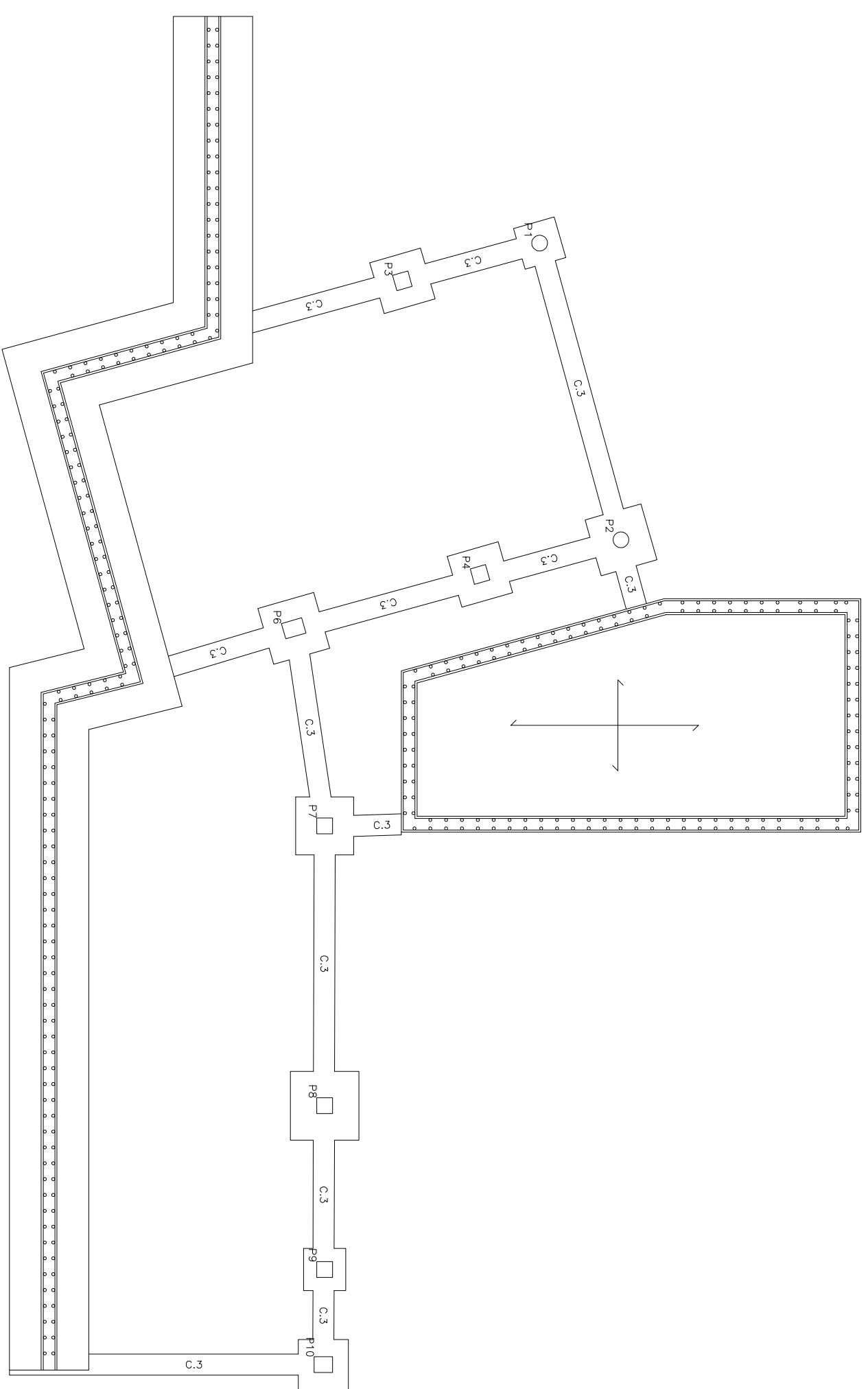
STRUCTURAL ELEMENTS	Concrete type	Safety factors	
		Persistent (γ <sub>c</sub> )	Accidental situation (γ <sub>c</sub> )
Foundation	B 400 S	1,50	1,00
Walls	B 400 S	1,50	1,00
Pillars	B 400 S	1,50	1,00
Beam and slabs	B 400 S	1,50	1,00
Pool	B 400 S	1,50	1,00

EXECUTION LEVEL CONTROL	ACTION TYPE	Safety factors of actions to check			
		Permanent situation	Permanent or temporary situation	Accidental situation	Accidental situation
Normal	Variable	YQ=0,00	YQ=1,50	YQ=0,00	YQ=1,15
		YQ=1,3	YQ=1,3	YQ=1,0	YQ=1,0
Permanent	Permanent	YQ=1,3	YQ=1,3	YQ=1,0	YQ=1,0

TABLE OF FOUNDATION ELEMENTS		
References	Dimensions (cm)	Thickness (cm)
P1 y P9	80x80	40
P2	110x110	40
P3	100x100	40
P4	100x100	40
P6	110x110	40
P7	110x110	40
P8	130x130	55
P10	95x95	40



Foundation	Concrete: HA-25, γ <sub>c</sub> =1,5
Steel in foundation:	B 400 S, γ <sub>s</sub> =1,15
Scale:	1:100
Pool Foundation	Concrete: HA-25, γ <sub>c</sub> =1,5
Steel in foundation:	B 400 S, γ <sub>s</sub> =1,15
Thickness:	40cm



PROJECT	DETACHED HOUSE, URB. EL MURTAL	
LOCATION	SEGART, VALENCIA (SPAIN)	
AUTHOR	JOSHUA GARCIA GONZALEZ	
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA	
SCALE	1:100	PLAN NAME <b>FOUNDATION</b>
DATE	JUNE 2012	
PLAN Nº	23	Escuela Técnica Superior de Gestión y Edificación 



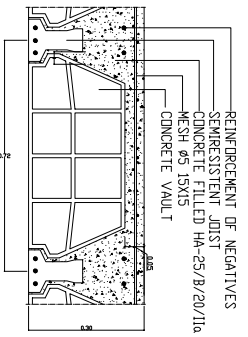
STRUCTURAL MASS CONCRETE, REINFORCED OR PRESTRESSED ELEMENTS: CHART OF CORRECT FEATURES SUITABLE TO THE INSTRUCTION (EHE-08)

STRUCTURAL ELEMENTS	Concrete type	Nominal coating (mm)			Safety factors (γ <sub>c</sub> )	
		Level of control	Lateral	Superior		Inferior
Foundation	HA-25/B/20/1/a	STAUSTIC	7	50	70	Persistent situation 1,50
Walls	HA-25/B/20/1/a	STAUSTIC	3	-	-	-
Pillars	HA-25/B/20/1/a	STAUSTIC	3	-	-	-
Beam and slabs	HA-25/B/20/1/a	STAUSTIC	3	30	30	Accidental situation 1,30
Pool	HA-25/B/20/1/a	STAUSTIC	-	-	-	Accidental situation 1,30

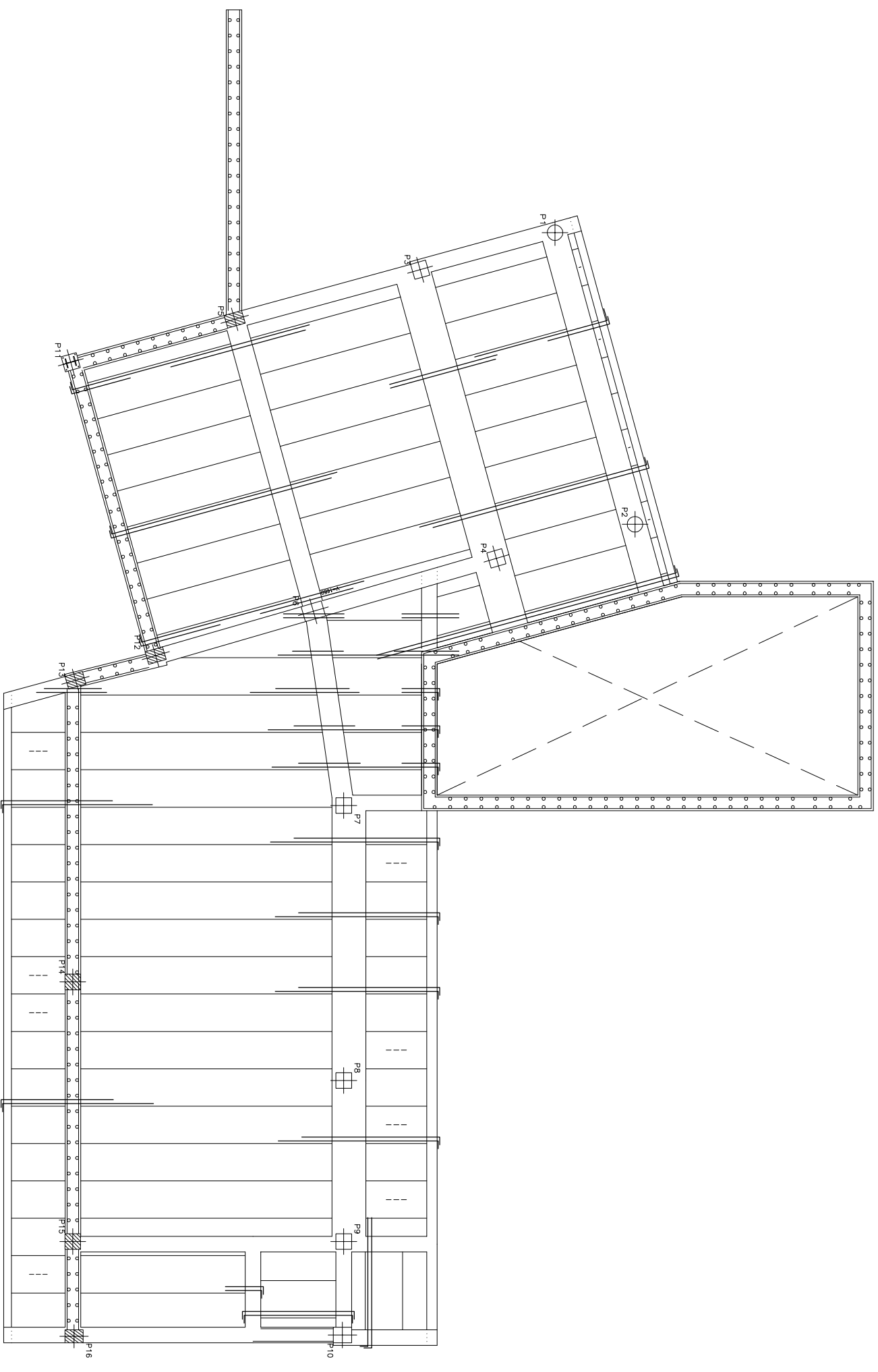
EXECUTION LEVEL CONTROL	ACTION TYPE	Safety factors of actions to check		
		Permanent situation	Unfavorable situation	Favorable situation
Normal	Variable	YQ=0,00	YQ=1,50	YQ=0,00
		YQ=1,3	YQ=1,0	YQ=1,15
Permanent	Permanent	YQ=0,00	YQ=1,50	YQ=0,00
		YQ=1,3	YQ=1,0	YQ=1,15

Chart of features of slabs with joists (Group 1)  
 SLAB OF CONCRETE JOIST  
 Thickness of vault: 25 cm  
 Thickness compression layer: 5 cm  
 Interaxis: 72 cm  
 Vault: Concrete  
 Width of the joist: 12 cm  
 Volume of concrete: 0,088 m<sup>3</sup>/m<sup>2</sup>  
 Own weight: 0,371 kN/m<sup>2</sup>

Slab 1  
 Concrete: HA-25, γ<sub>c</sub>=1,5  
 Steel in slab: B 400 S, γ<sub>s</sub>=1,15  
 Scale: 1:100



TRANSVERSAL SLAB SECTION



PROJECT	DETACHED HOUSE, URB. EL MURTAL	
LOCATION	SEGART, VALENCIA (SPAIN)	
AUTHOR	JOSHUA GARCIA GONZALEZ	
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA	
SCALE	1:100	
DATE	JUNE 2012	
PLAN NAME	STRUCTURE: SANITARY SLAB	
PLAN Nº	24	

STRUCTURAL MASS CONCRETE, REINFORCED OR PRESTRESSED ELEMENTS: CHART OF CORRECT FEATURES SUITABLE TO THE INSTRUCTION (EHE-08)

STRUCTURAL ELEMENTS	Concrete type	Level of control	Nominal coating (mm)			Safety factors (γ <sub>c</sub> )
			Lateral	Superior	Interior	
Foundation	HA-25/B/20/1/a	STADISTIC	7	50	70	Persistent situation 1,50
Walls	HA-25/B/20/1/a	STADISTIC	3	-	-	Accidental situation 1,30
Pilars	HA-25/B/20/1/a	STADISTIC	3	-	-	Accidental situation 1,30
Beam and slabs	HA-25/B/20/1/a	STADISTIC	3	30	30	Accidental situation 1,30
Pool	HA-25/B/20/1/a	STADISTIC	-	-	-	Accidental situation 1,30

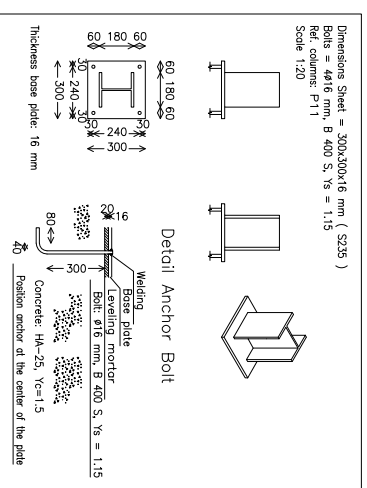
STEEL

STRUCTURAL ELEMENTS	Concrete type	Safety factors (γ <sub>c</sub> )
Foundation	B 400 S	Persistent situation 1,50
Walls	B 400 S	Accidental situation 1,00
Pilars	B 400 S	
Beam and slabs	B 400 S	
Pool	B 400 S	

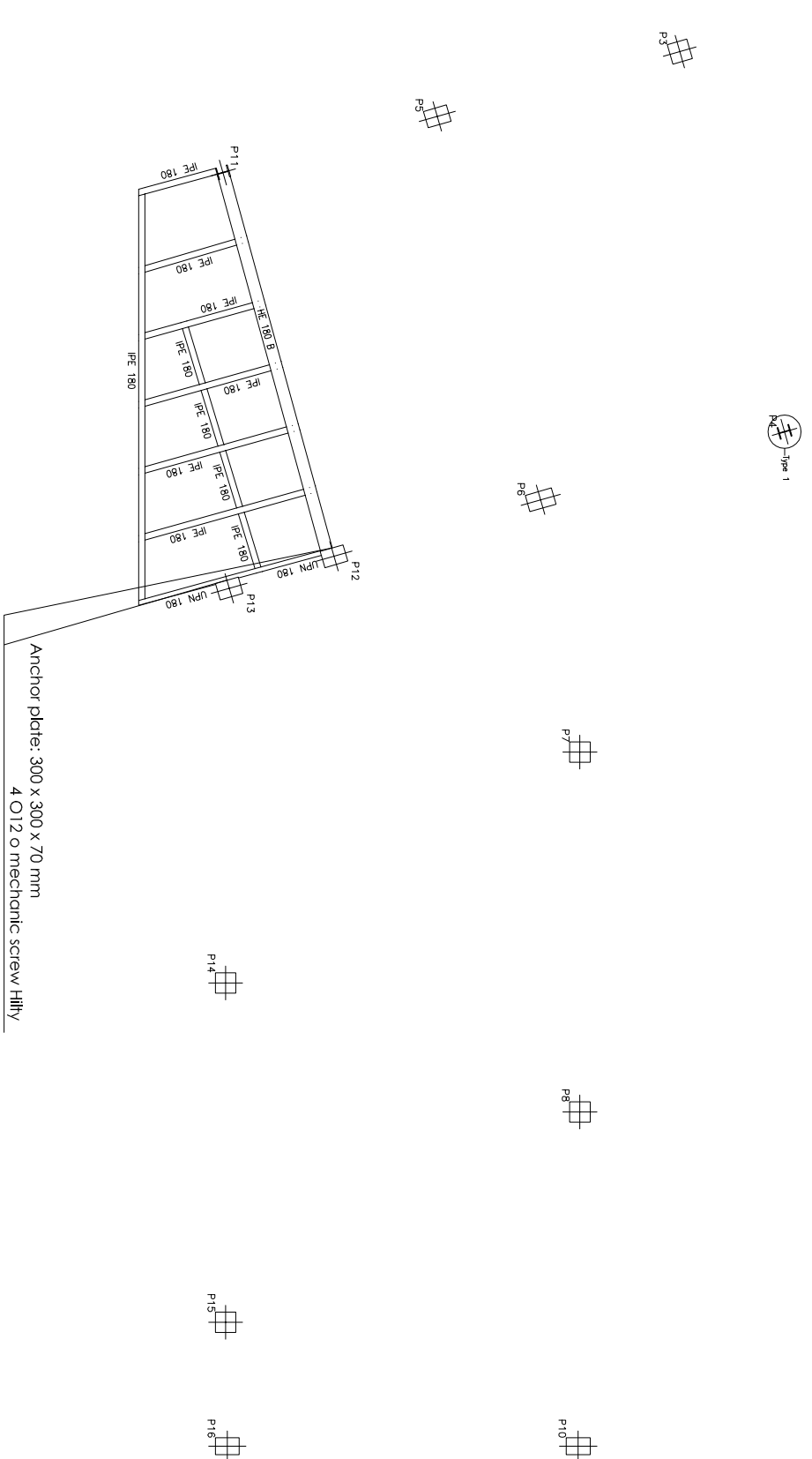
EXECUTION


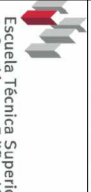
EXECUTION LEVEL CONTROL	ACTION TYPE	Safety factors of actions to check			
		Permanent or temporary situation	Unfavorable	Favorable	Accidental situation
Normal	Variable	γ <sub>Q</sub> =0,00	γ <sub>Q</sub> =1,50	γ <sub>Q</sub> =0,00	γ <sub>Q</sub> =1,15
		Permanent	γ <sub>Q</sub> =1,3		γ <sub>Q</sub> =1,0

All the steel used in the frame it will have a officially recognized distinctive (AENOR).



Slab 2  
Rolled and welded steel: S235  
Steel: B 400 S, γs=1.15  
Scale: 1:100



PROJECT	DETACHED HOUSE, URB. EL MURTAL	 Escuela Técnica Superior de Gestión en la Edificación
LOCATION	SEGART, VALENCIA (SPAIN)	
AUTHOR	JOSHUA GARCIA GONZALEZ	 Escuela Técnica Superior de Gestión en la Edificación
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA	
SCALE	1:100	PLAN Nº <b>25</b>
DATE	JUNE 2012	
STRUCTURE: METAL PORCH		

STRUCTURAL MASS CONCRETE, REINFORCED OR PRESTRESSED ELEMENTS: CHART OF CORRECT FEATURES SUITABLE TO THE INSTRUCTION (EHE-08)

CONCRETE				Society factors (γc)	
STRUCTURAL ELEMENTS	Concrete type	Level of control	Nominal coating (mm)		Society factors (γc)
Foundation	HA-25/B/20/1/a	STAUSTIC	Lateral	Superior	Inferior
Walls	HA-25/B/20/1/a	STAUSTIC	7	50	70
Pillars	HA-25/B/20/1/a	STAUSTIC	3	-	-
Beam and slabs	HA-25/B/20/1/a	STAUSTIC	3	-	-
Pool	HA-25/B/20/1/a	STAUSTIC	3	30	30
					Accidental situation 1,30

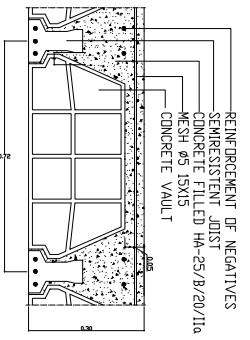
  

STEEL				Society factors (γs)	
STRUCTURAL ELEMENTS	Concrete type	Safety factors of actions to check			
Foundation	B 400 S	Permanent or temporary situation			
Walls	B 400 S	Favorable situation			
Pillars	B 400 S	Unfavorable situation			
Beam and slabs	B 400 S	Favorable situation			
Pool	B 400 S	Unfavorable situation			

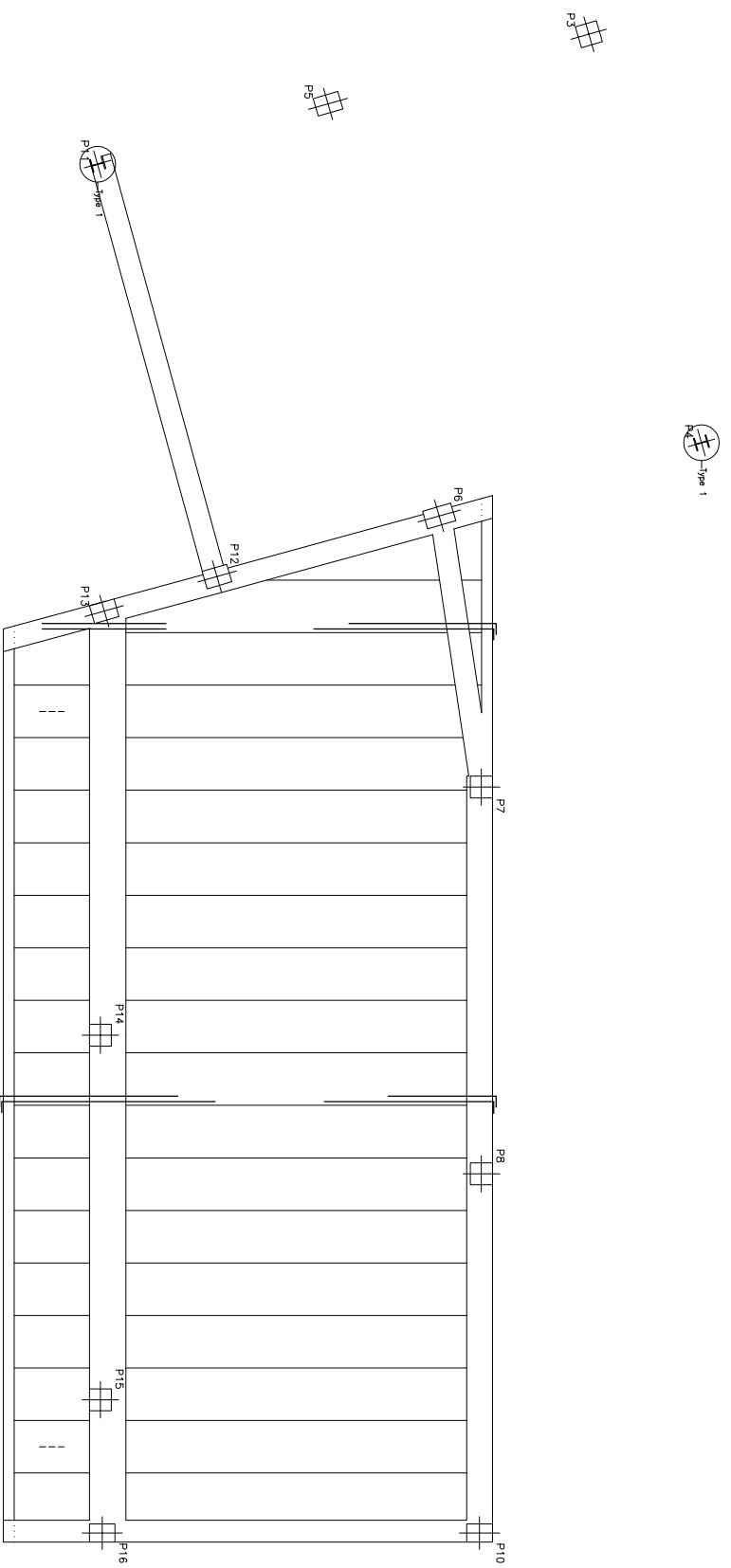
EXECUTION LEVEL CONTROL	ACTION TYPE	Safety factors of actions to check			
		Permanent or temporary situation	Unfavorable situation	Favorable situation	Accidental situation
Normal	Variable	YQ=0,00	YQ=1,50	YQ=0,00	YQ=1,15
	Permanent	YQ=1,3		YQ=1,00	YQ=1,10

Chart of features of slabs with joists (Group 3)  
 SLAB OF CONCRETE JOIST  
 Thickness of vault: 25 cm  
 Thickness compression layer: 5 cm  
 Height: 72 cm  
 Vault: Concrete  
 Width of the joist: 12 cm  
 Volume of concrete: 0,088 m<sup>3</sup>/m<sup>2</sup>  
 Own weight: 0,371 k/m<sup>2</sup>

Slab 3  
 Concrete: HA-25, γc=1,5  
 Steel in slab: B 400 S, γs=1,15  
 Scale: 1:100



TRANSVERSAL SLAB SECTION



PROJECT	DETACHED HOUSE, URB. EL MURTAL	
LOCATION	SEGART, VALENCIA (SPAIN)	
AUTHOR	JOSHUA GARCIA GONZALEZ	
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA	
SCALE	1:100	
DATE	JUNE 2012	
PLAN NAME <b>STRUCTURE: GROUND FLOOR SLAB</b>		PLAN Nº <b>26</b>
Escuela Técnica Superior de Gestión e Ingeniería Edificación		

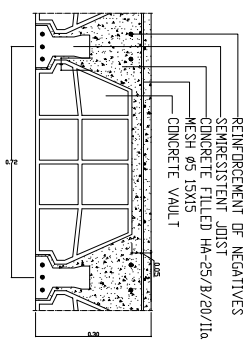
STRUCTURAL MASS CONCRETE, REINFORCED OR PRESTRESSED ELEMENTS: CHART OF CORRECT FEATURES SUITABLE TO THE INSTRUCTION (EHE-08)

STRUCTURAL ELEMENTS	Concrete type	Level of control			Safety factors (γc)
		Lateral	Superior	Inferior	
Foundation	HA-25/B/20/I/a	7	50	70	Persistent situation 1,50
Walls	HA-25/B/20/I/a	3	-	-	
Pillars	HA-25/B/20/I/a	3	-	-	Accidental situation 1,30
Beam and slabs	HA-25/B/20/I/a	3	30	30	
Pool	HA-25/B/20/I/a	-	-	-	Accidental situation 1,30

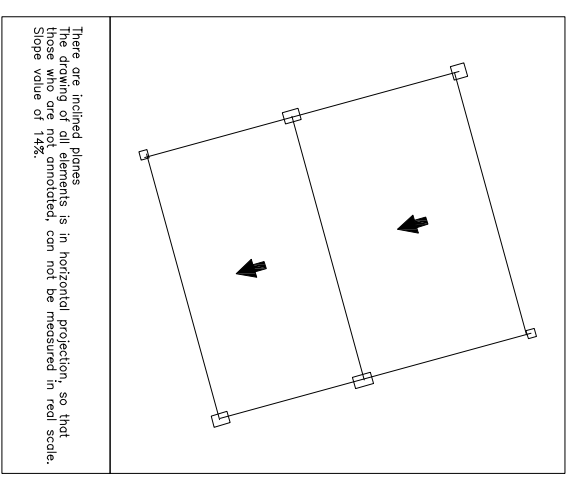
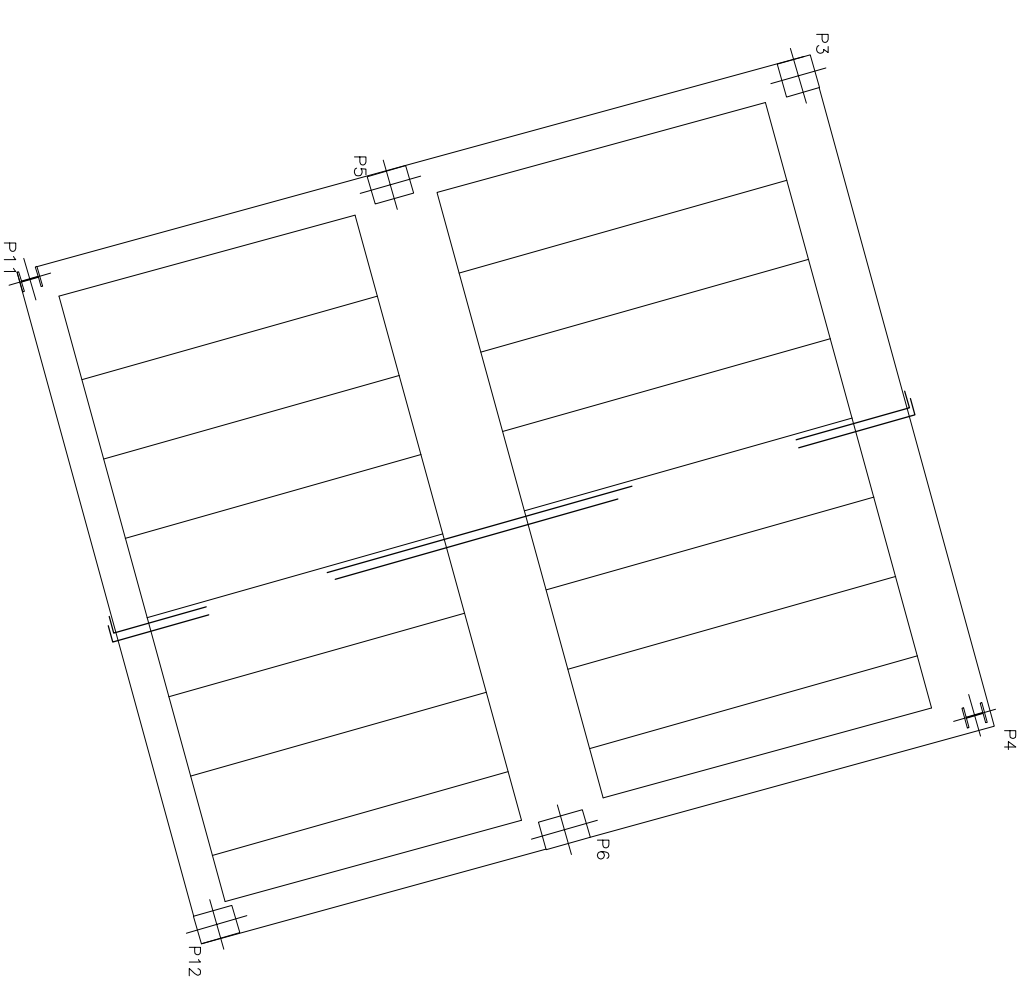
EXECUTION LEVEL CONTROL	ACTION TYPE	Safety factors of actions to check		
		Permanent or temporary situation	Unfavorable	Favorable
Normal	Variable	YQ=0,00	YQ=1,50	YQ=0,00
	Permanent	YQ=1,3	YQ=1,00	YQ=1,15

Chart of features of slabs with joists (Group 4)  
 SLAB OF CONCRETE JOIST  
 Thickness of vault: 25 cm  
 Thickness compression layer: 5 cm  
 Inertias: 72 cm  
 Vault: Concrete  
 Width of the joist: 12 cm  
 Volume of concrete: 0,088 m<sup>3</sup>/m<sup>2</sup>  
 Own weight: 0,371 kN/m<sup>2</sup>

Slab 4  
 Concrete: HA-25, γc=1,5  
 Steel in slab: B 400 S, γs=1,15  
 Scale: 1:100

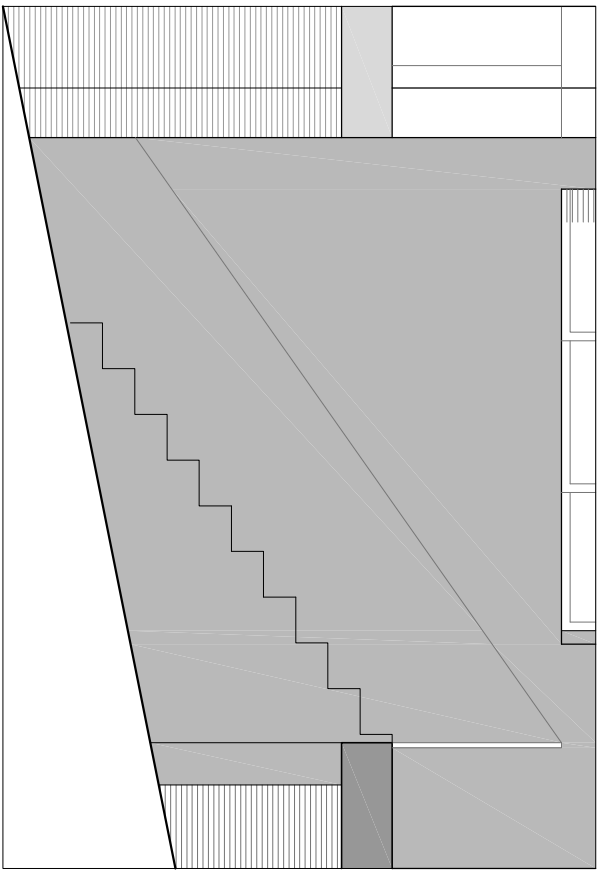
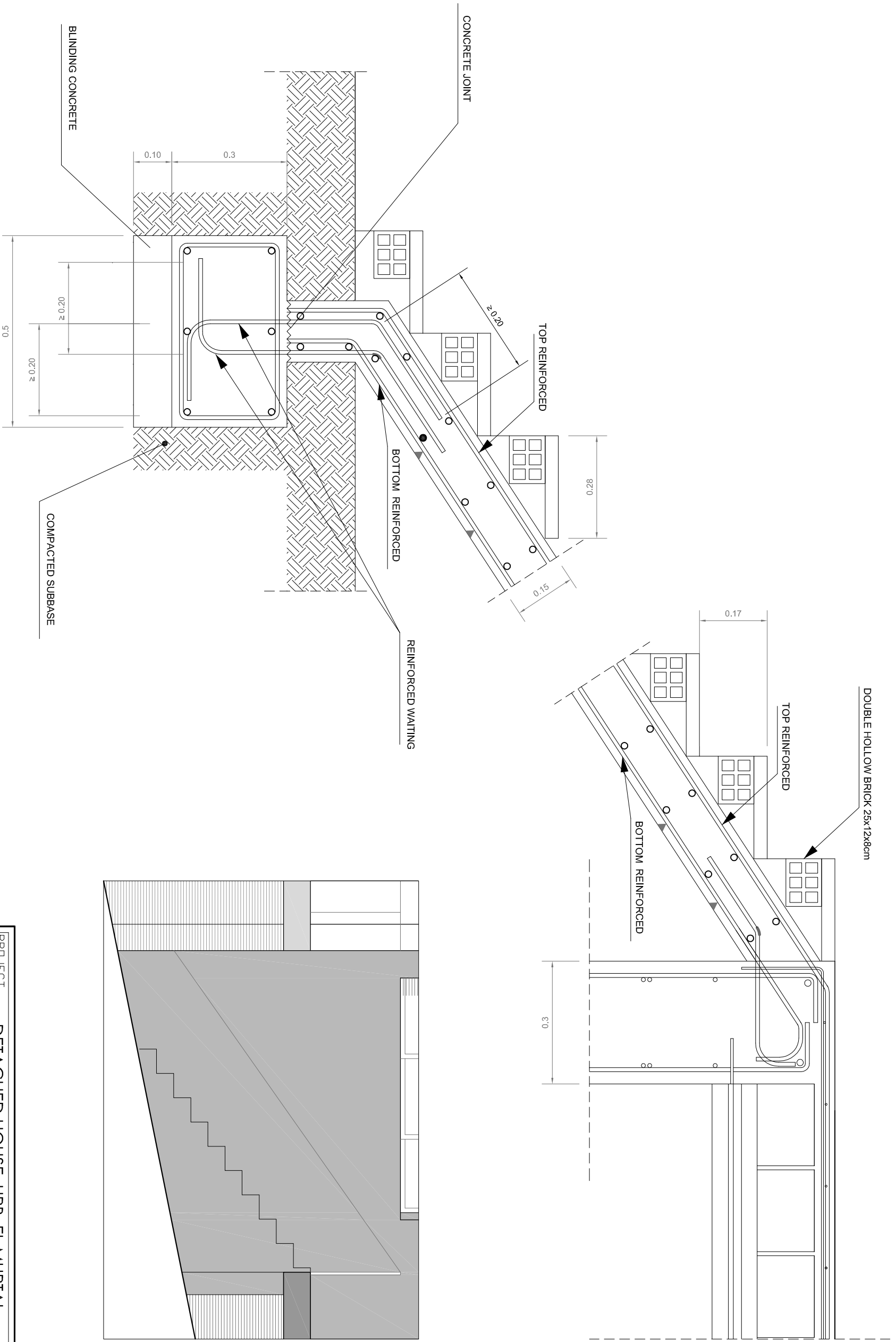




TRANSVERSAL SLAB SECTION



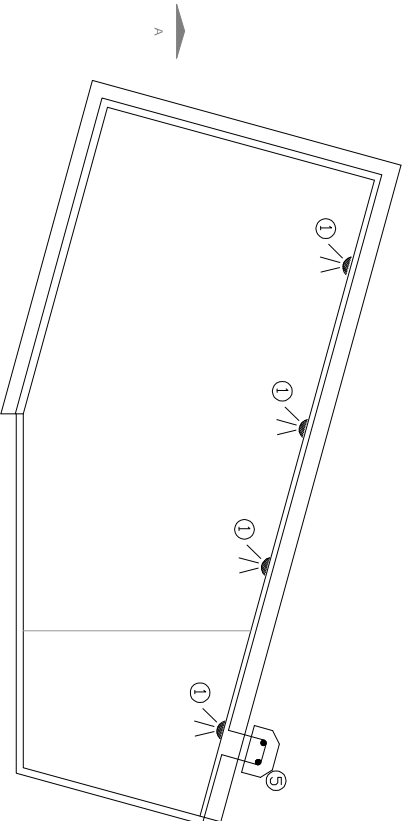
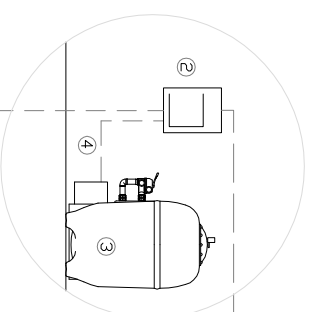
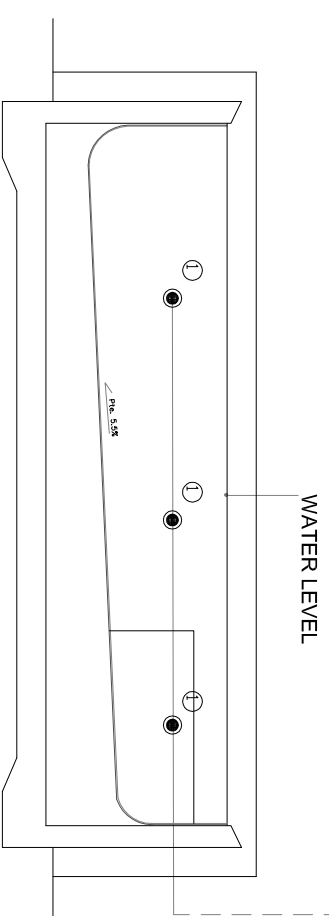
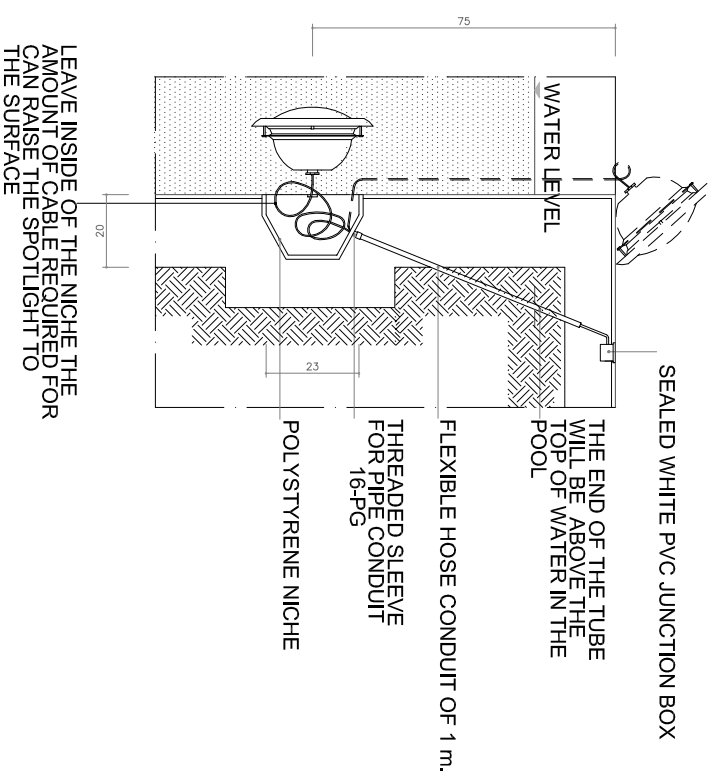
There are inclined planes.  
 The drawing of all elements is in horizontal projection, so that those who are not annotated, can not be measured in real scale.  
 Slope value of 14%.

PROJECT	DETACHED HOUSE, URB. EL MURTAL	
LOCATION	SEGART, VALENCIA (SPAIN)	
AUTHOR	JOSHUA GARCIA GONZALEZ	
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA	
SCALE	1:100	PLAN NAME <b>STRUCTURE: ROOF SLAB</b>
DATE	JUNE 2012	
PLAN Nº <b>27</b>		Escuela Técnica Superior de Gestión y Edificación



PROJECT	DETACHED HOUSE, URB. EL MURTAL	 Escuela Técnica Superior de Gestión en la Edificación
LOCATION	SEGART, VALENCIA (SPAIN)	
AUTHOR	JOSHUA GARCIA GONZALEZ	 Escuela Técnica Superior de Gestión en la Edificación
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA	
SCALE	1:10	PLAN Nº <b>28</b>
DATE	JUNE 2012	
PLAN NAME <b>DETAIL OUTSIDE STAIRS</b>		

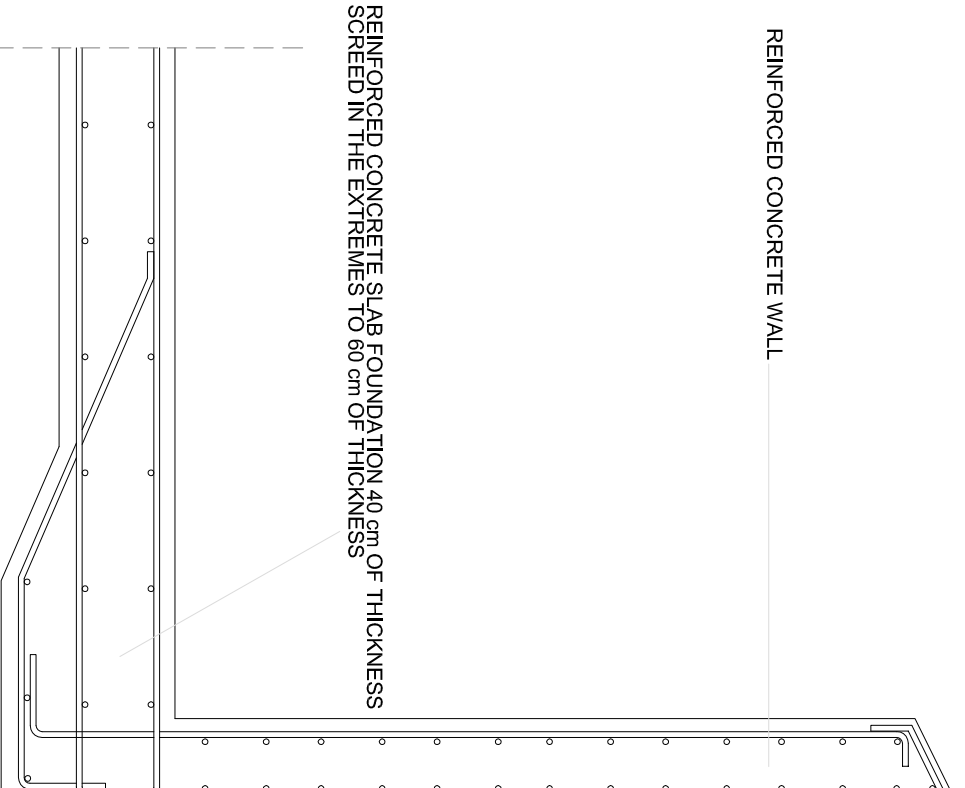
UNDERWATER PROJECTOR DETAIL  
ANNOTATION IN cm.



ELECTRICAL SYSTEM

- GROUNDING CABLE Ø35 mm. OF COPPER
- ① UNDERWATER PROJECTOR (See detail)
- ② CONTROLLER CLOSET FOR FILTER AND REFLECTOR WITH A TRANSFORMER.
- ③ SAND FILTER IN REINFORCED POLYESTER
- ④ AUTO SUCTION PUMP
- ⑤ PIT GROUNDING

REINFORCED CONCRETE WALL



DETAIL CONCRETE SLAB POOL  
E 1:25

PROJECT DETACHED HOUSE, URB. EL MURTAL  
LOCATION SEGART, VALENCIA (SPAIN)

AUTHOR JOSHUA GARCIA GONZALEZ

TUTOR FRANTISEK KULHANEK / MILAGROS IBORRA

SCALE - PLAN NAME

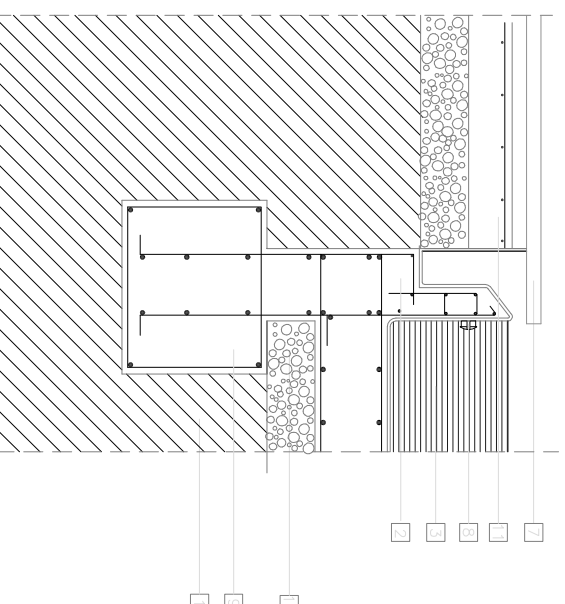
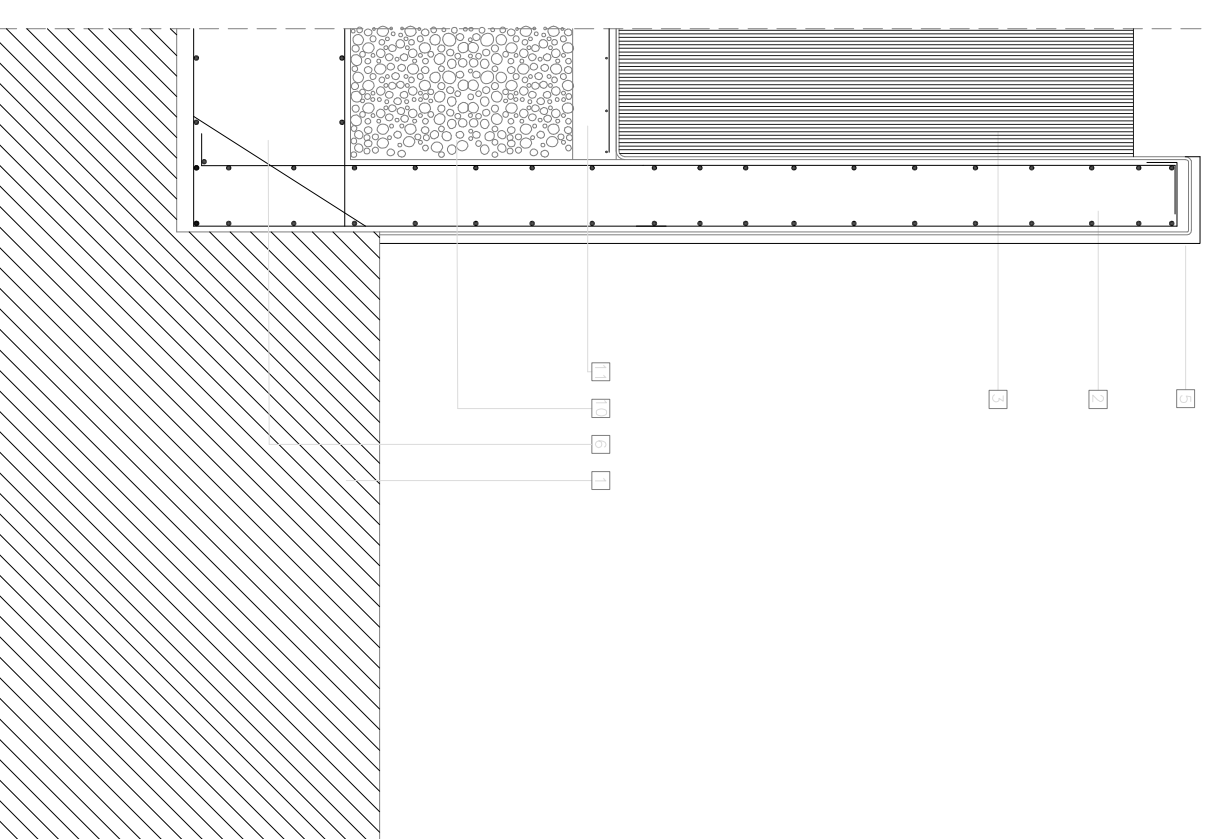
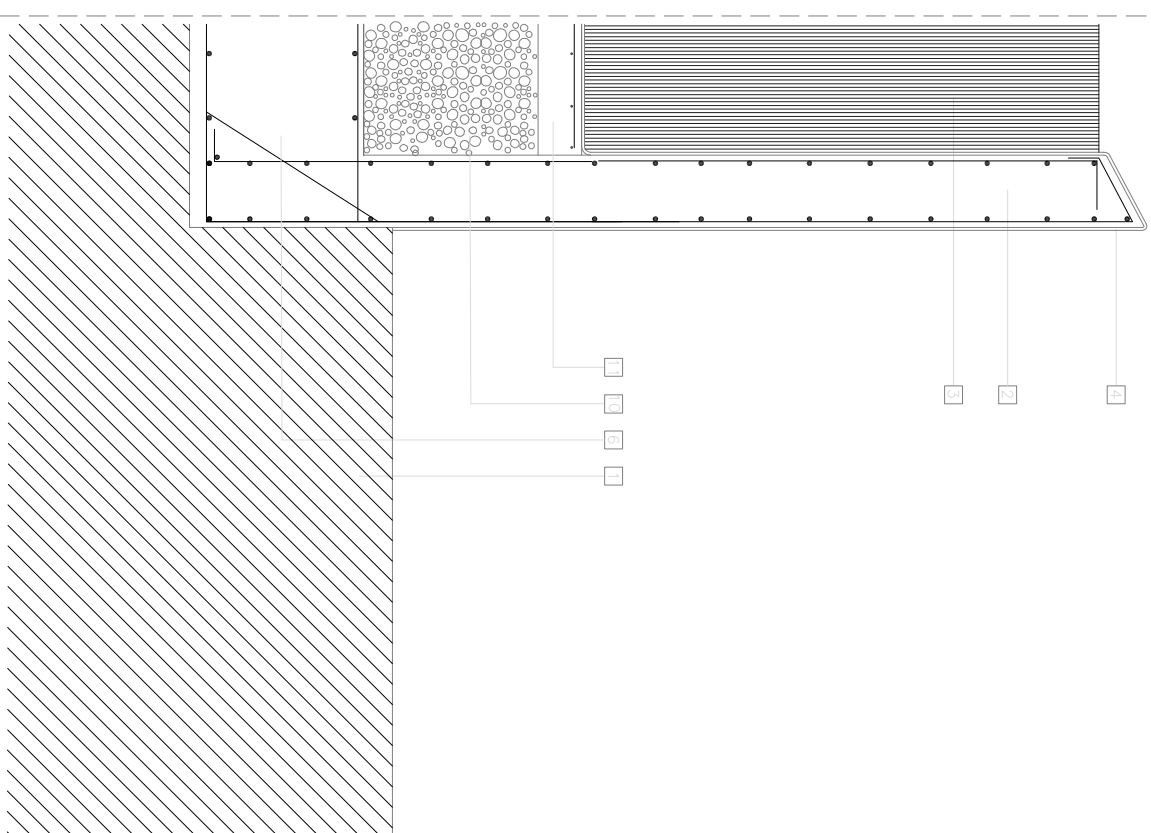
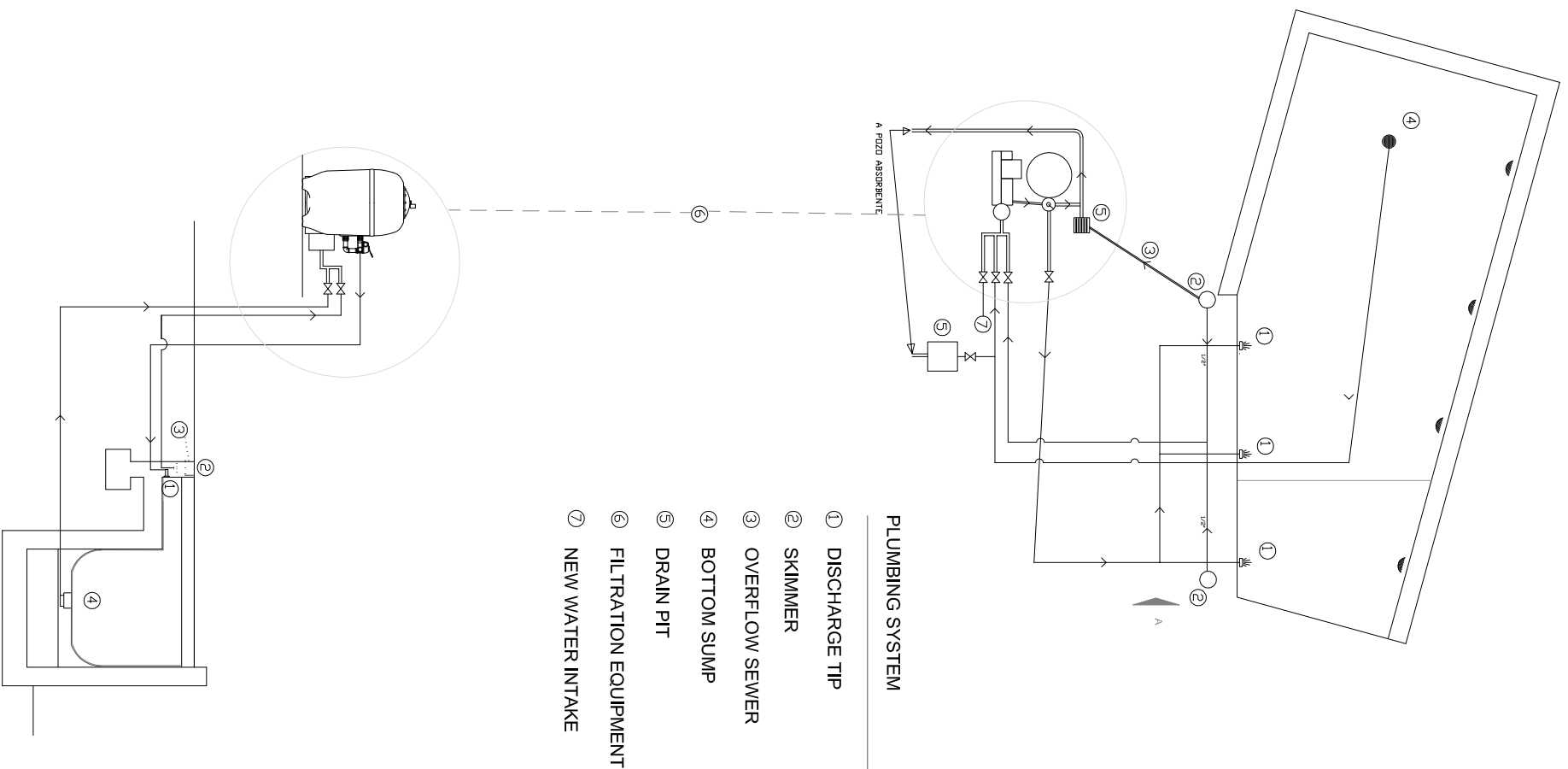
DATE JUNE 2012

POOL CONSTRUCTION DETAILS



Escuela Técnica Superior  
de Gestión en la Edificación

PLAN Nº  
**29**



- LEYENDA**
- 1 LAND
  - 2 REINFORCED CONCRETE WALL
  - 3 WATER
  - 4 MONOLAYER COATING
  - 5 NATURAL STONE VENEER
  - 6 REINFORCED CONCRETE SLAB FOUNDATION 40 cm OF THICKNESS SCREED IN THE EXTREMES TO 60 cm OF THICKNESS
  - 7 OUTSIDE CERAMIC FLOOR TILE
  - 8 SKIMMER
  - 9 STRIP FOOTING OF REINFORCED CONCRETE 60x50cm
  - 10 COMPACTED AGGREGATE
  - 11 REINFORCED CONCRETE BASE

PROJECT	DETACHED HOUSE, URB. EL MURTAL
LOCATION	SEGART, VALENCIA (SPAIN)
AUTHOR	JOSHUA GARCIA GONZALEZ
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA
SCALE	-
DATE	JUNE 2012
PLAN NAME	<b>POOL CONSTRUCTION DETAILS</b>
PLAN Nº	<b>30</b>



Escuela Técnica Superior  
de Gestión y Edificación

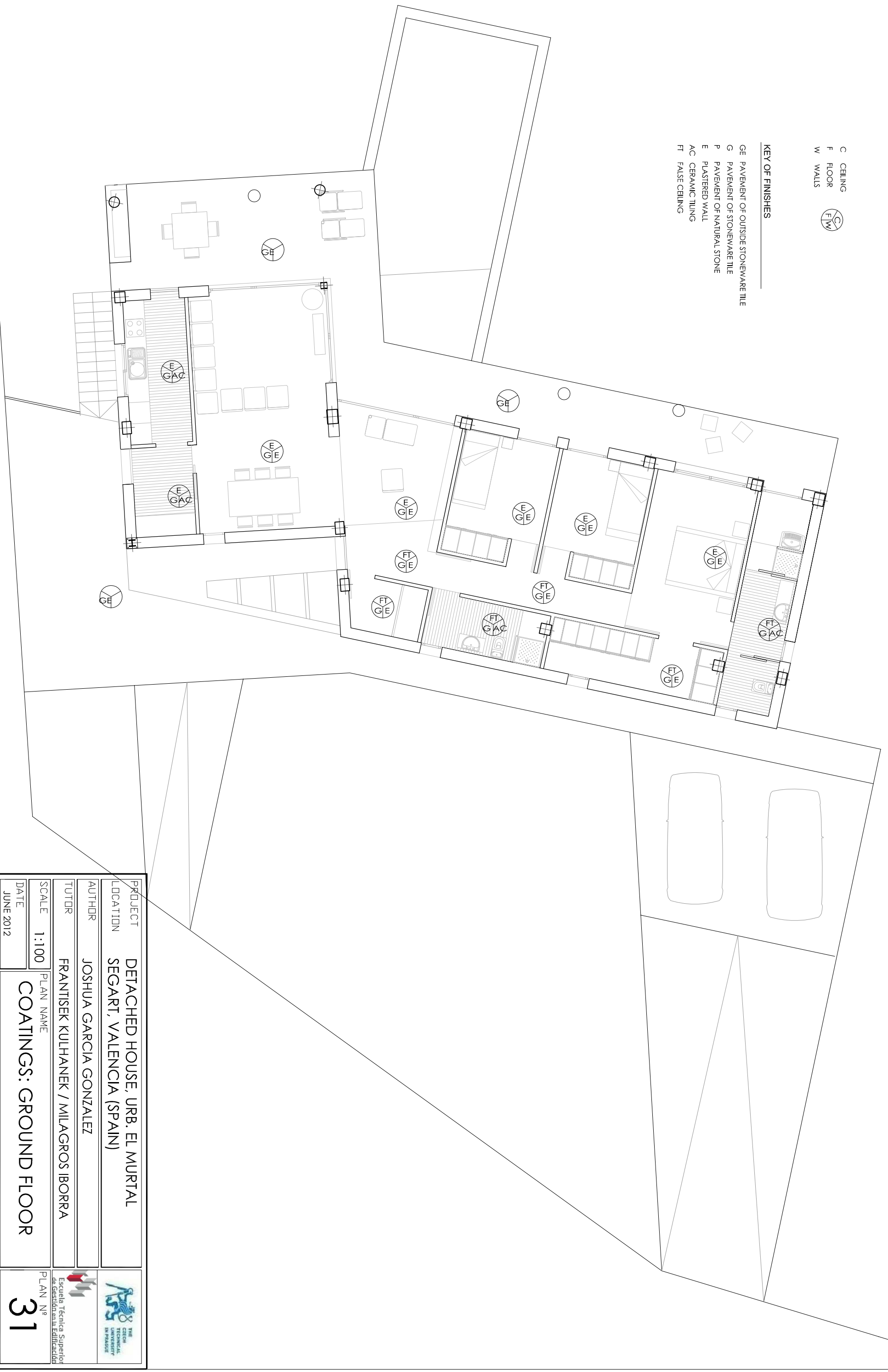


C CEILING  
 F FLOOR  
 W WALLS



KEY OF FINISHES

GE PAVEMENT OF OUTSIDE STONEWARE TILE  
 G PAVEMENT OF STONEWARE TILE  
 P PAVEMENT OF NATURAL STONE  
 E PLASTERED WALL  
 AC CERAMIC TILING  
 FT FALSE CEILING



PROJECT DETACHED HOUSE, URB. EL MURTAL  
 LOCATION SEGART, VALENCIA (SPAIN)

AUTHOR JOSHUA GARCIA GONZALEZ

TUTOR FRANTISEK KULHANEK / MILAGROS IBORRA

SCALE 1:100  
 DATE JUNE 2012

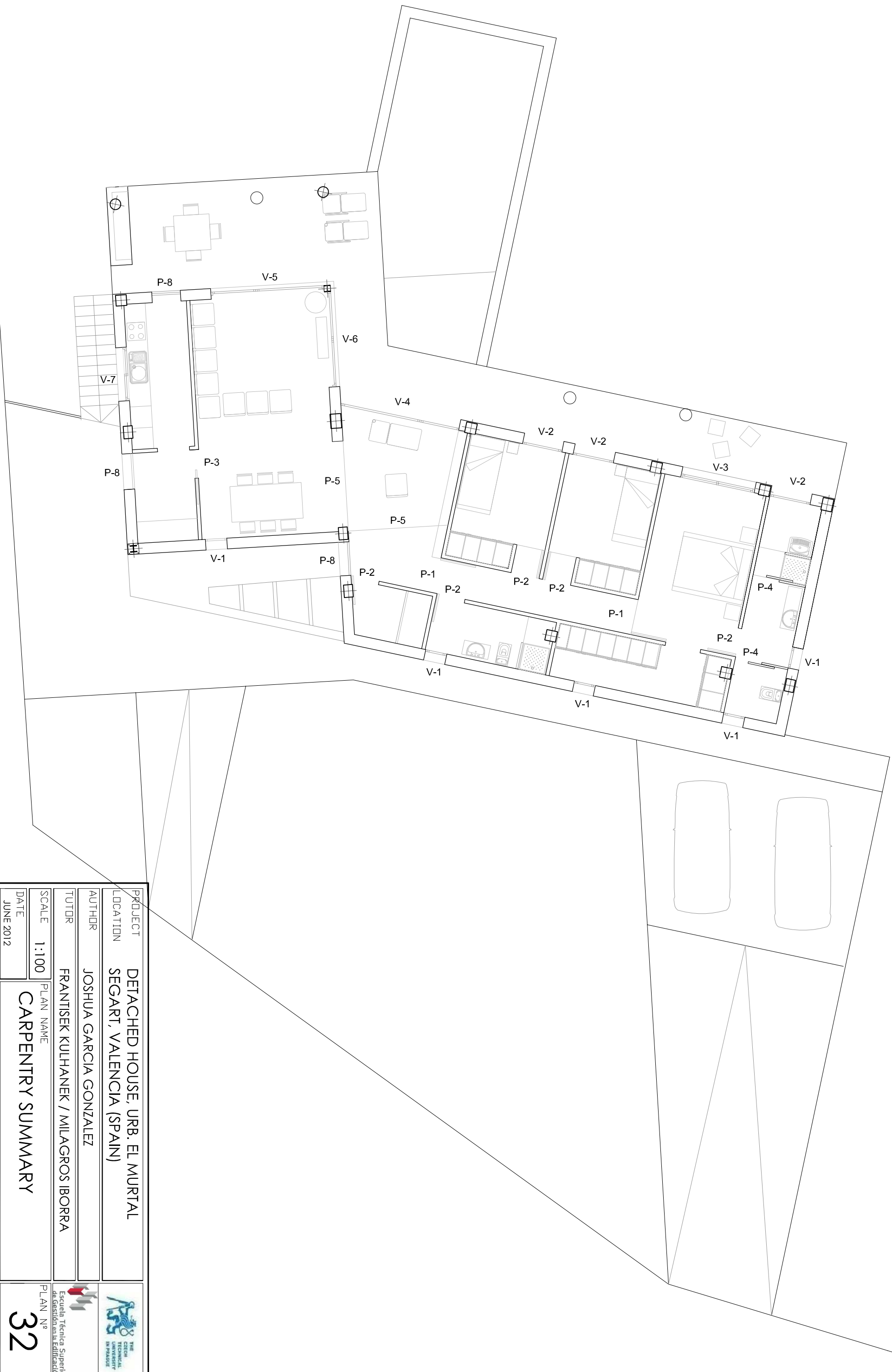
PLAN NAME  
**COATINGS: GROUND FLOOR**



Escuela Técnica Superior  
 de Gestión en la Edificación

PLAN Nº  
**31**





PROJECT	DETACHED HOUSE, URB. EL MURTAL
LOCATION	SEGART, VALENCIA (SPAIN)
AUTHOR	JOSHUA GARCIA GONZALEZ
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA
SCALE	1:100
DATE	JUNE 2012
PLAN NAME	CARPENTRY SUMMARY
PLAN Nº	32

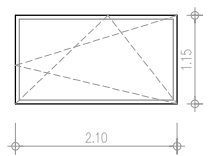


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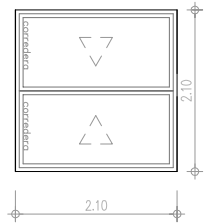
OUTSIDE CARPENTRY

SECTIONS	
LENGTH	600 mm
HEIGHT	2400 mm
HARDWARE	HANDLES, HINGES, CREMONA
LEAF / FINISHES	STAINLESS ALUMINIUM ANODIZING REPOUSING, CLIMATE GLASS
UNITS	5

1



2



3

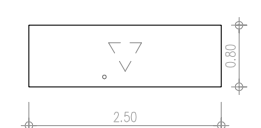
INSIDE CARPENTRY

SECTIONS	
LENGTH	1000 mm
HEIGHT	2500 mm
HARDWARE	WHITE LACQUERED WOOD
LEAF / FINISHES	WHITE LACQUERED WOOD
UNITS	2

1



2

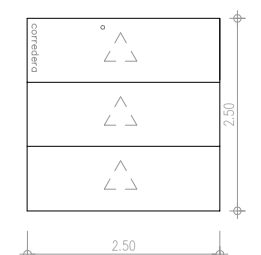


3

INSIDE CARPENTRY

SECTIONS	
LENGTH	800 mm
HEIGHT	2500 mm
HARDWARE	GLASS
LEAF / FINISHES	GLASS
UNITS	2

4



5

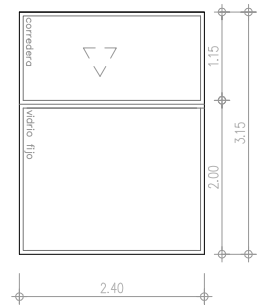
SECTIONS	
LENGTH	2000 mm
HEIGHT	2500 mm
HARDWARE	GLASS
LEAF / FINISHES	GLASS
UNITS	2

2

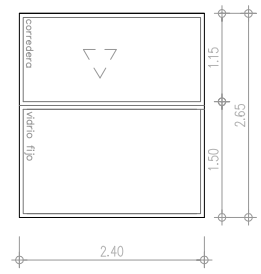
OUTSIDE CARPENTRY

SECTIONS	
LENGTH	3450 mm
HEIGHT	2100 mm
HARDWARE	HANDLES, HINGES, CREMONA
LEAF / FINISHES	STAINLESS ALUMINIUM ANODIZING REPOUSING, CLIMATE GLASS
UNITS	1

4



5



6

SECTIONS	
LENGTH	3150 mm
HEIGHT	2400 mm
HARDWARE	HANDLES, HINGES, CREMONA
LEAF / FINISHES	STAINLESS ALUMINIUM ANODIZING REPOUSING, CLIMATE GLASS
UNITS	1

5

SECTIONS	
LENGTH	2850 mm
HEIGHT	2400 mm
HARDWARE	HANDLES, HINGES, CREMONA
LEAF / FINISHES	STAINLESS ALUMINIUM ANODIZING REPOUSING, CLIMATE GLASS
UNITS	1

6

OUTSIDE CARPENTRY

SECTIONS	
LENGTH	2000 mm
HEIGHT	600 mm
HARDWARE	HANDLES, HINGES, CREMONA
LEAF / FINISHES	STAINLESS ALUMINIUM ANODIZING REPOUSING, CLIMATE GLASS
UNITS	1

7

SECTIONS	
LENGTH	1000 mm
HEIGHT	2100 mm
HARDWARE	WOOD
LEAF / FINISHES	WOOD
UNITS	3

8

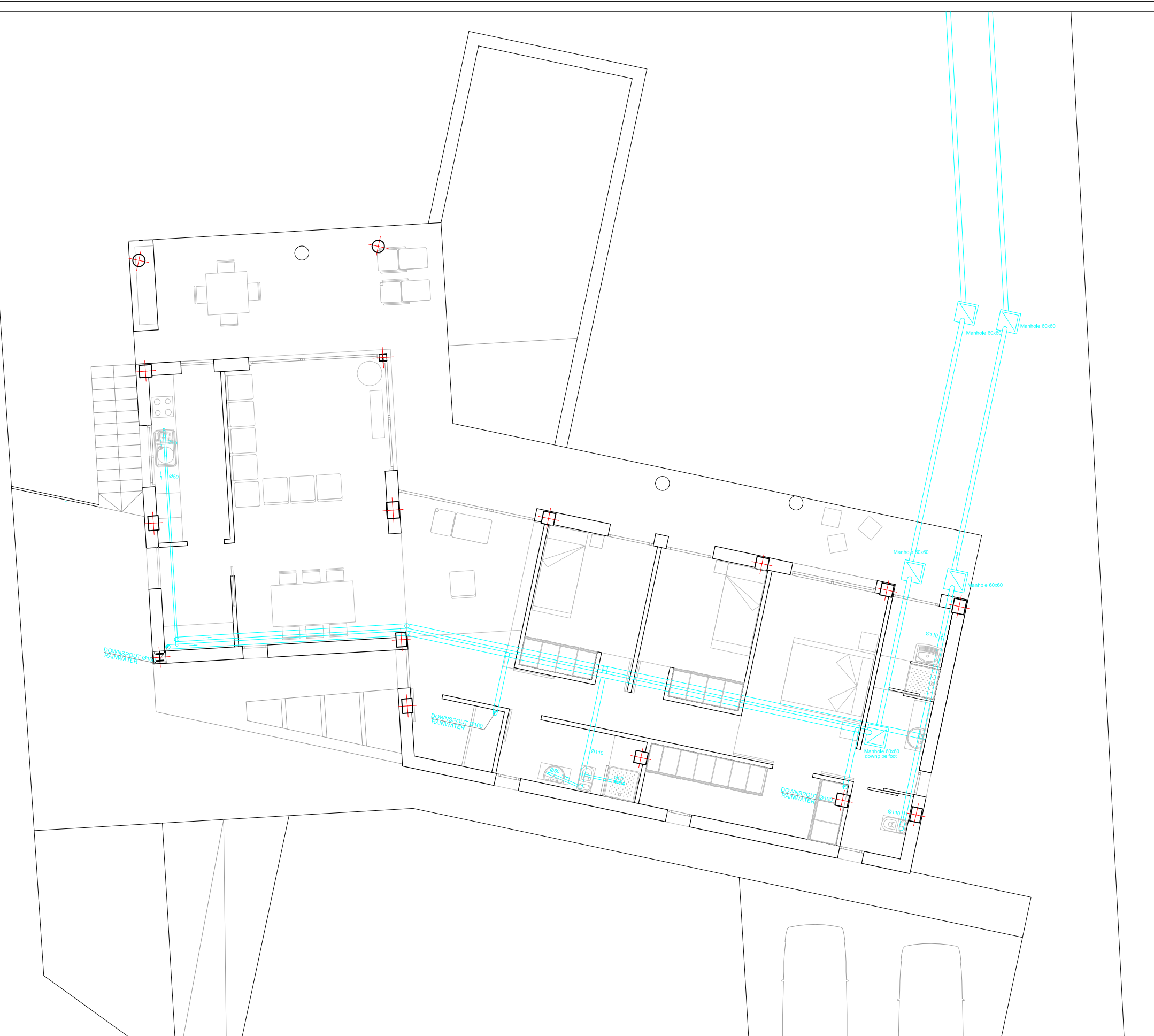
PROJECT: DETACHED HOUSE, URB. EL MURTAL  
 LOCATION: SEGART, VALENCIA (SPAIN)  
 AUTHOR: JOSHUA GARCIA GONZALEZ

TUTOR: FRANTISEK KULHANEK / MILAGROS IBORRA

SCALE: 1:100  
 PLAN NAME: CARPENTRY DETAILS  
 DATE: JUNE 2012



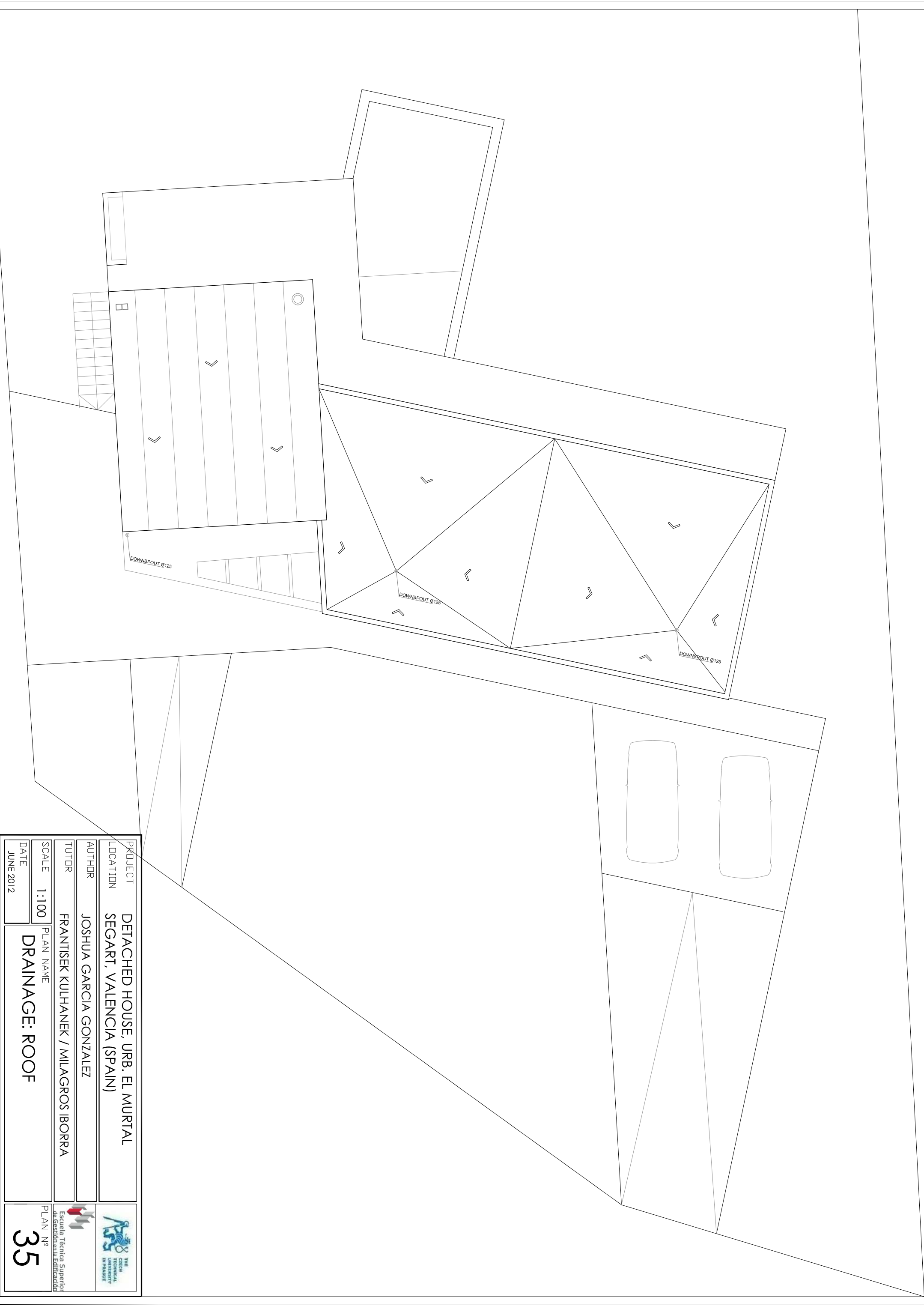
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PROJECT	DETACHED HOUSE, URB. EL MURTAL
LOCATION	SEGART, VALENCIA (SPAIN)
AUTHOR	JOSHUA GARCIA GONZALEZ
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA
SCALE	1:100
DATE	JUNE 2012
PLAN NAME	DRAINAGE: GROUND FLOOR
PLAN Nº	34



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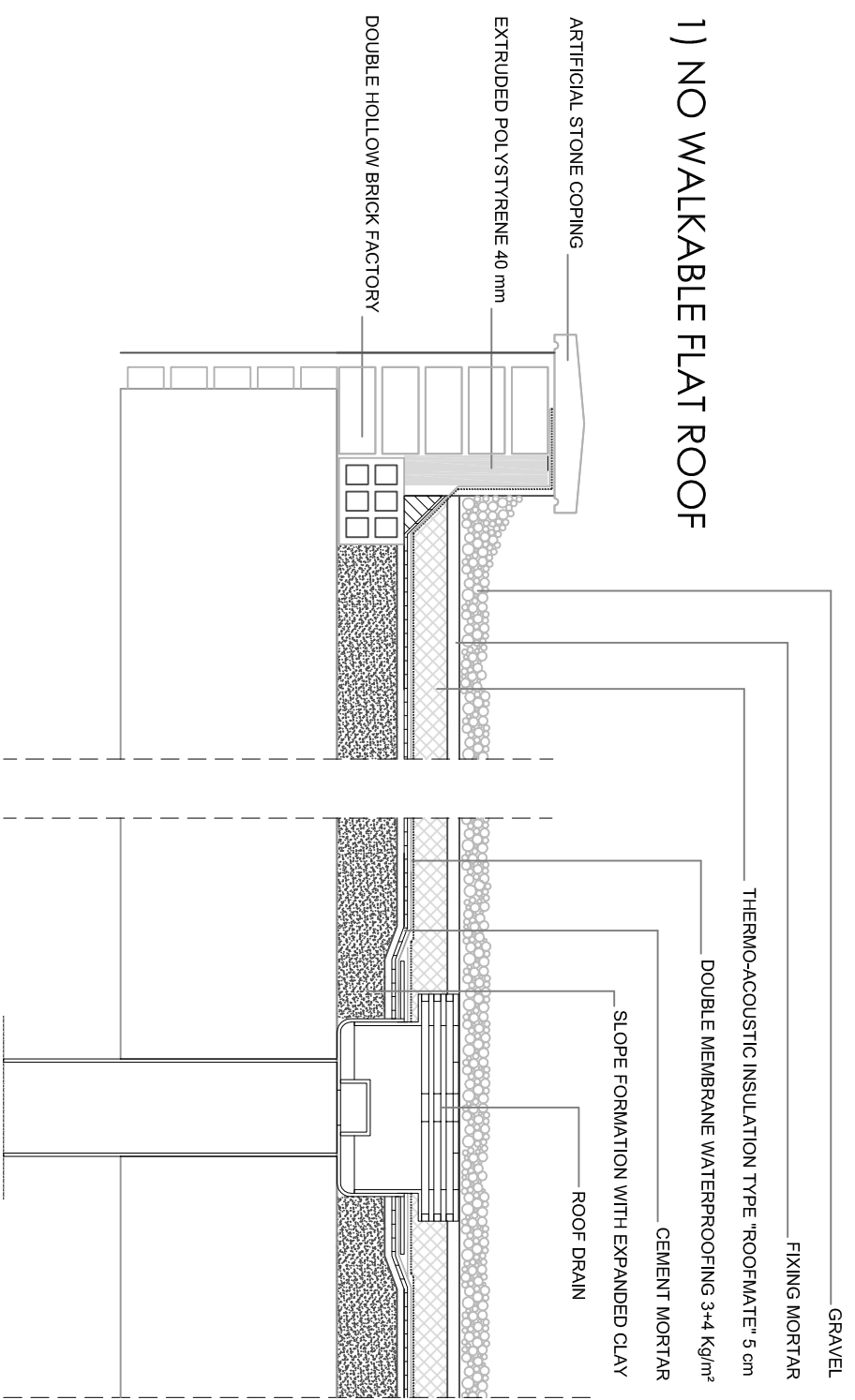


PROJECT	DETACHED HOUSE, URB. EL MURTAL
LOCATION	SEGART, VALENCIA (SPAIN)
AUTHOR	JOSHUA GARCIA GONZALEZ
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA
SCALE	1:100
DATE	JUNE 2012
PLAN NAME	DRAINAGE: ROOF
PLAN Nº	35

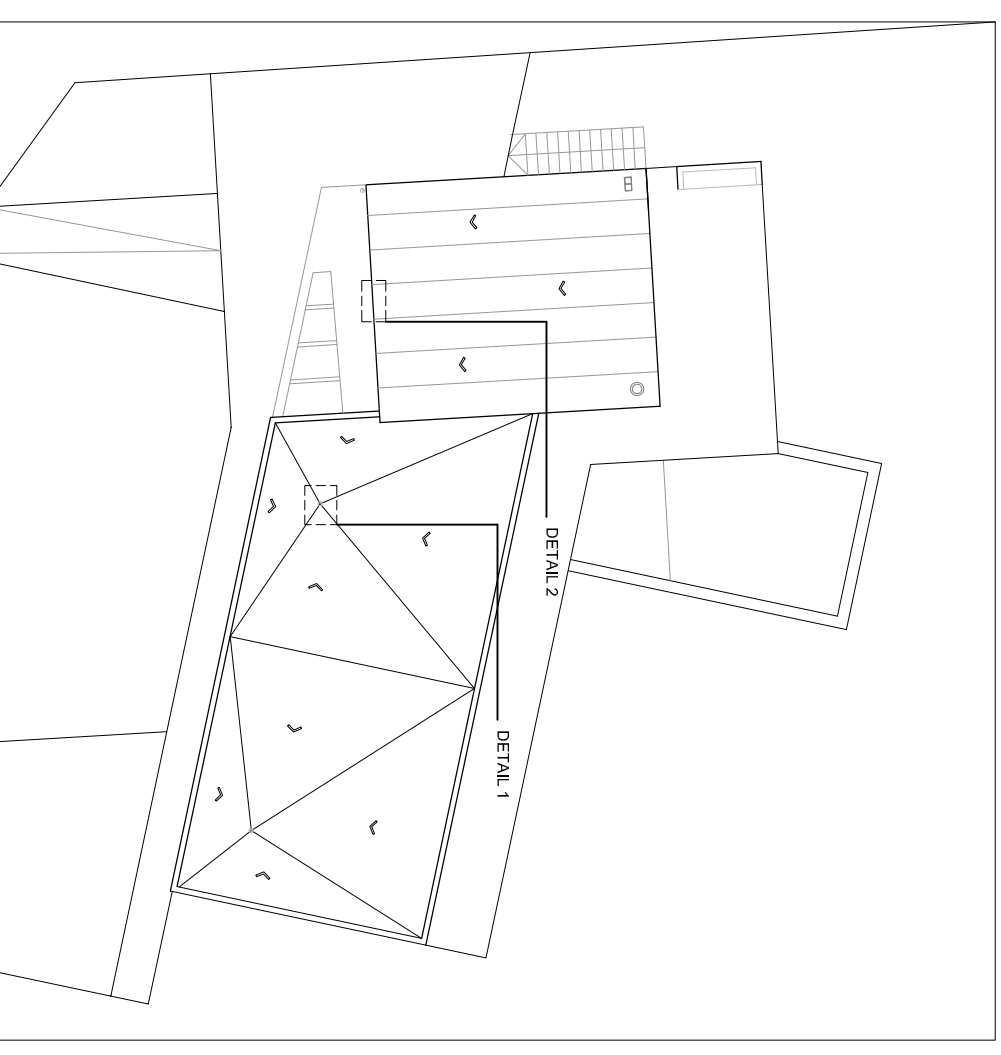
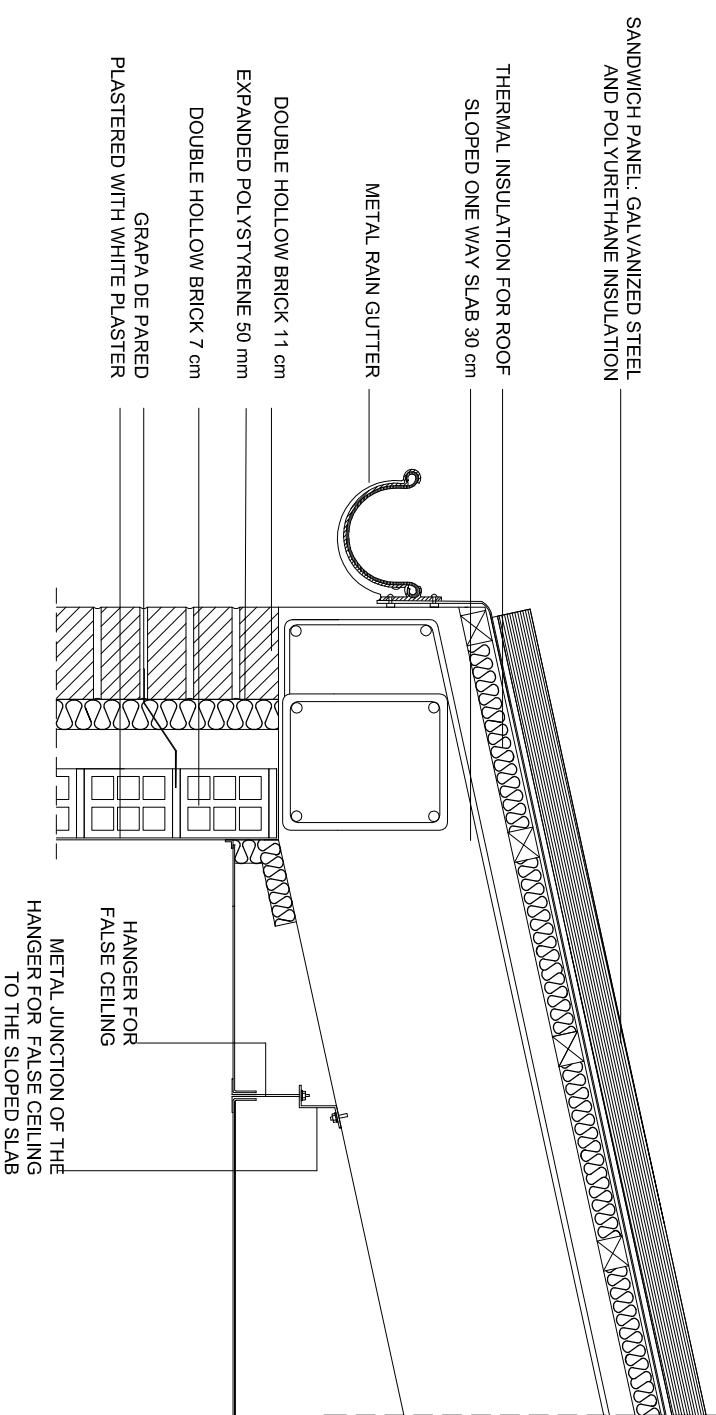


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# 1) NO WALKABLE FLAT ROOF













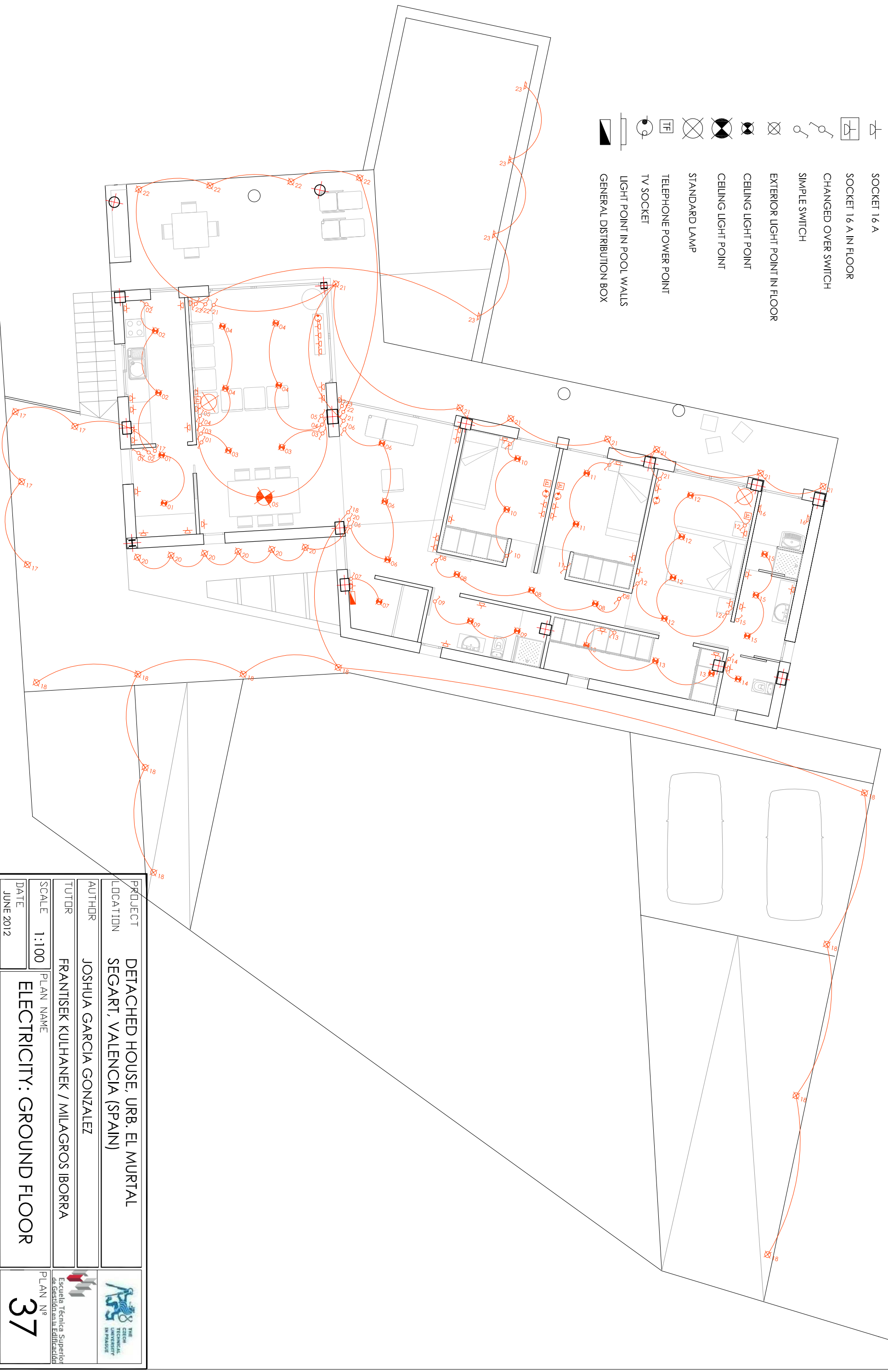
# 2) SLOPED ROOF



PROJECT	DETACHED HOUSE, URB. EL MURTAL	
LOCATION	SEGART, VALENCIA (SPAIN)	
AUTHOR	JOSHUA GARCIA GONZALEZ	
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA	
SCALE	1:10	Escuela Técnica Superior de Gestión en la Edificación <b>PLAN Nº</b> <b>36</b>
DATE	JUNE 2012	
<b>PLAN NAME</b> <b>DETAIL DRAINAGE ROOF</b>		

**KEY OF ELECTRICITY**

-  SOCKET 16 A
-  SOCKET 16 A IN FLOOR
-  CHANGED OVER SWITCH
-  SIMPLE SWITCH
-  EXTERIOR LIGHT POINT IN FLOOR
-  CEILING LIGHT POINT
-  CEILING LIGHT POINT
-  STANDARD LAMP
-  TELEPHONE POWER POINT
-  TV SOCKET
-  LIGHT POINT IN POOL WALLS
-  GENERAL DISTRIBUTION BOX



<b>PROJECT</b>	DETACHED HOUSE, URB. EL MURTAL
<b>LOCATION</b>	SEGART, VALENCIA (SPAIN)
<b>AUTHOR</b>	JOSHUA GARCIA GONZALEZ
<b>TUTOR</b>	FRANTISEK KULHANEK / MILAGROS IBORRA
<b>SCALE</b>	1:100
<b>DATE</b>	JUNE 2012
<b>PLAN NAME</b>	
<b>ELECTRICITY: GROUND FLOOR</b>	
<b>PLAN Nº</b>	
<b>37</b>	















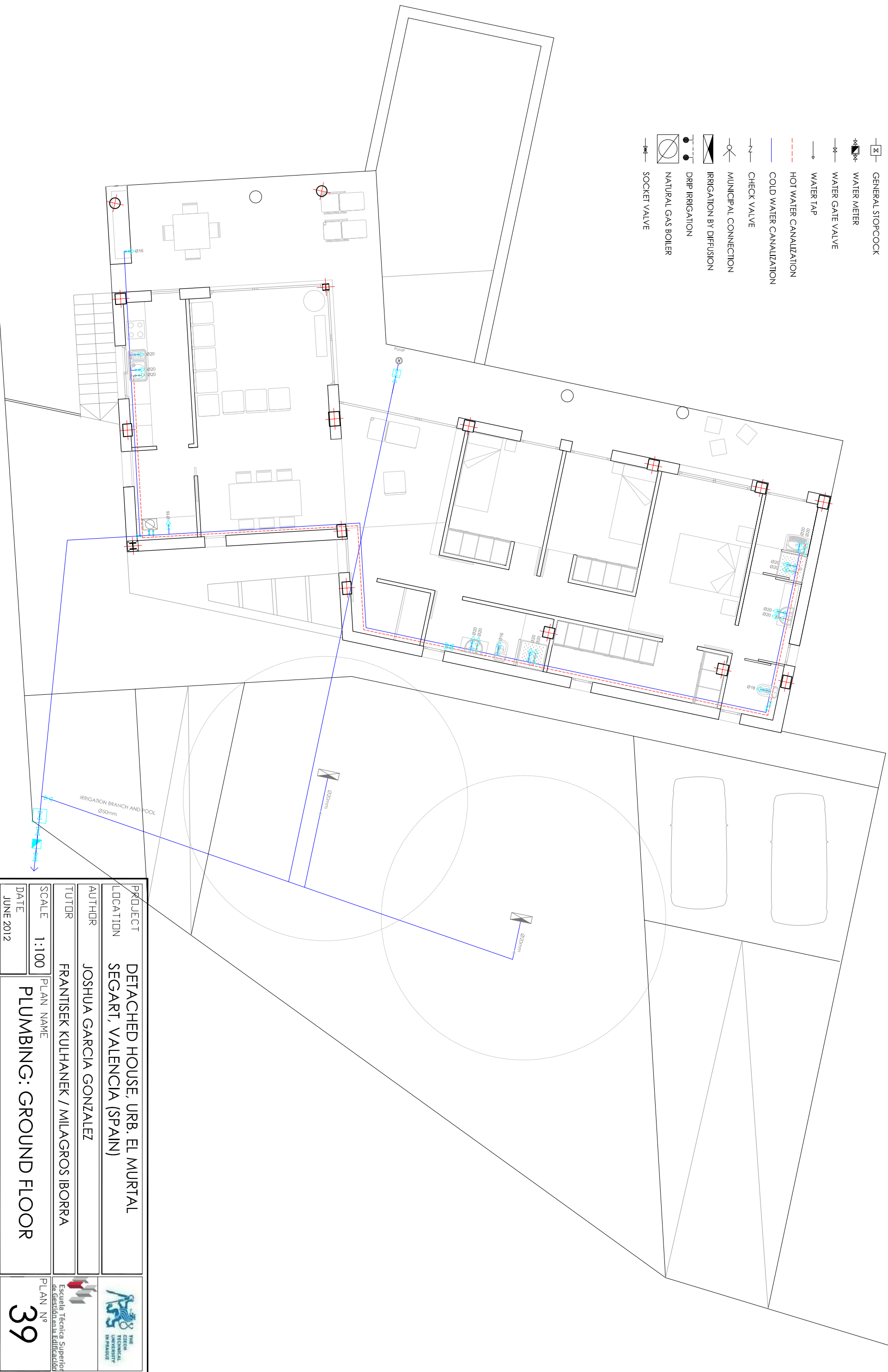
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de Gestión en la Edificación





KEY OF PLUMBING

-  GENERAL STOPCOCK
-  WATER METER
-  WATER GATE VALVE
-  WATER TAP
-  HOT WATER CANALIZATION
-  COLD WATER CANALIZATION
-  CHECK VALVE
-  MUNICIPAL CONNECTION
-  IRRIGATION BY DIFFUSION
-  DRIP IRRIGATION
-  NATURAL GAS BOILER
-  SOCKET VALVE

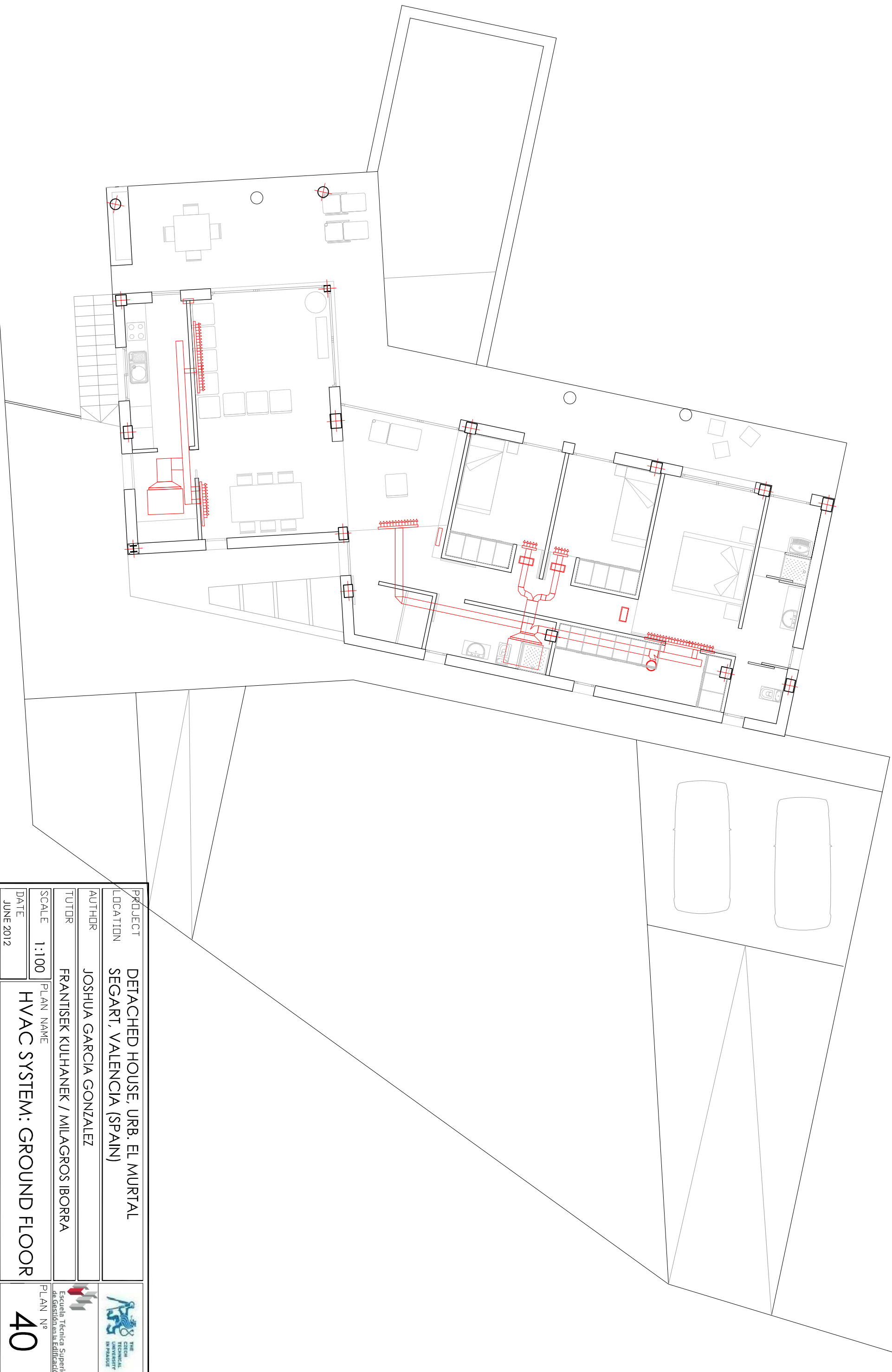


PROJECT	DETACHED HOUSE, URB. EL MURTAL
LOCATION	SEGART, VALENCIA (SPAIN)
AUTHOR	JOSHUA GARCIA GONZALEZ
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA
SCALE	1:100
DATE	JUNE 2012
PLAN NAME	PLUMBING: GROUND FLOOR
PLAN Nº	39



Escuela Técnica Superior de Gestión en la Edificación





PROJECT DETACHED HOUSE, URB. EL MURTAL  
 LOCATION SEGART, VALENCIA (SPAIN)

AUTHOR JOSHUA GARCIA GONZALEZ

TUTOR FRANTISEK KULHANEK / MILAGROS IBORRA

SCALE 1:100  
 PLAN NAME HVAC SYSTEM: GROUND FLOOR

DATE JUNE 2012



Escuela Técnica Superior  
 de Gestión en la Edificación

PLAN Nº  
**40**

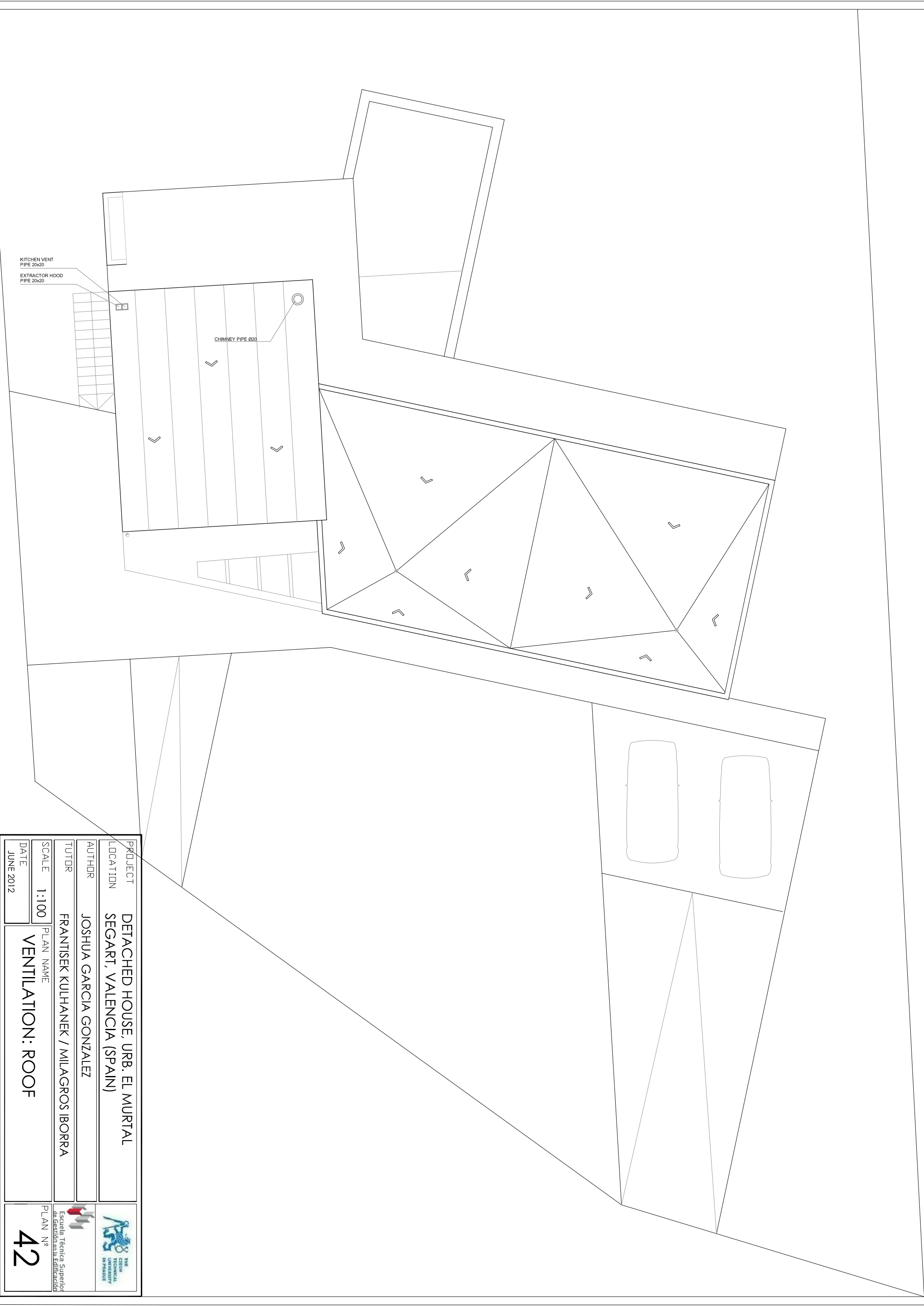
- VENTILATION SYSTEM**
- ADMISSION OPENING
  - EXTRACTION PIPE
  - WATER TAP
  - CROSS OPENING




PROJECT	DETACHED HOUSE, URB. EL MURTAL
LOCATION	SEGART, VALENCIA (SPAIN)
AUTHOR	JOSHUA GARCIA GONZALEZ
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA
SCALE	1:100
DATE	JUNE 2012
PLAN NAME	VENTILATION: GROUND FLOOR
PLAN Nº	41



Escuela Técnica Superior  
de Gestión en la Edificación



PROJECT	DETACHED HOUSE, URB. EL MURTAL	 THE TECHNICAL UNIVERSITY OF VALENCIA
LOCATION	SEGART, VALENCIA (SPAIN)	
AUTHOR	JOSHUA GARCIA GONZALEZ	Escuela Técnica Superior de Gestión en la Edificación
TUTOR	FRANTISEK KULHANEK / MILAGROS IBORRA	
SCALE	1:100	PLAN Nº <b>42</b>
DATE	JUNE 2012	
PLAN NAME <b>VENTILATION: ROOF</b>		