

**FINAL PROJECT:**  
**SINGLE FAMILY HOUSE**

**TUTOR:**  
**FRANTISEK KULHANEK**  
**MILAGRO IBORRA**

**AUTHOR:**  
**CARLOS ESTRUCH MARTIN**



Escuela Técnica Superior de  
Ingeniería de Edificación

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# 1. DESCRIPTIVE MEMORY

## 1.1. Characteristics of the site

The current detached house is located in an urbanization called Alfinach, from the town Puzol (Valencia), as in the corresponding graphy site plan.

## 1.2. Composition and program of requirements

The implantation of the house on the parcel is placed perpendicular to the street, separating the main facade 14,43 m from the street, and 4 m from side limits.

The program fits the necessities for be considered as a primary residence or an habitual one. The house is organized primarily on the ground floor as the area not only for the day but for the night as well, leaving the first floor as a study area.

From the entrance, the stariway acts like a connection for the different areas, both vertically and horizontally. So, on one side of the stariway is organized the proper sleeping area with two bedrooms and the master bedroom with their dressing areas and bathrooms.

On the upper floor the stairway leads to the study area and a single bathroom, letting double height to the roof over the stairs.

The garage located on the basement have acces by ramp and can accommodate two vehicles.

## 1.3. Urban atmosphere and functional study

The plot has electricity services, water supply, sewerage, sidewalks and vehicle access by paved road.

The functions to be performed are those for a first residence house.

## 1.4. Application of Urban Orders

Urban Order	According to Urban Orders	According to Project
Parcel Surface (minimum)	600m <sup>2</sup>	1390m <sup>2</sup>
Occupancy	40%	15,51%
Buildability	1 m <sup>3</sup> /m <sup>2</sup>	0,71 m <sup>3</sup> /m <sup>2</sup>
Levels	2	2
Separation from street (minimum)	5m	14,43m
Separation from limits (minimum)	3m	4m
Cornice height limit	7m	¿?¿?¿?

Urban Order	According to Urban Orders	According to Project
Single Family Residential zoning	A-1	A-1

#### 1.5. Useful and built surfaces

Level	Built	Useful
Ground floor	188,37m <sup>2</sup>	160,50m <sup>2</sup>
First floor	44,22m <sup>2</sup>	30,01m <sup>2</sup>
Basement	82,45m <sup>2</sup>	61,19m <sup>2</sup>
<b>TOTAL</b>	342,32m <sup>2</sup>	251,70m <sup>2</sup>

#### 1.6. Money estimation

The amount for the construction is the 140.596,43 € just considering the material execution, with a total of **199.085,43 €** adding general costs, industrial benefit and 18% of I.V.A.

All the amount will be specified later in the document of measurements and budget.

## 2. CONSTRUCTIVE MEMORY

### 2.1. Type of structure

Foundation built with concrete footings at two different levels due to the situation of the basement that takes place only in the half space area than the ground floor.

Reinforced concrete porches, one-way concrete slab and prestressed joists.

Type of walls and division:

External walls consist of face brick of 12 cm. thickness, thermal insulation and inner hollow brick partition wall 7 cm., internal covered with gypsum plaster.

Fire Protection and partitioning (DB SI: Case of fire safety)

The total built area of the building is less than 2500 m<sup>2</sup>, so the house will be set as a single fire sector.

The building is partitioned in a single fire sector, due that the garage is destined for keep less than 5 vehicles the law sets that this area will be considered as a special risk sector of low risk.

### 2.2. Occupation

According to the data table 2.1 of DB SI the occupation it is set by relating the built area with the following density values:

- House; 1 person each 20 m<sup>2</sup>.....  $232,59\text{m}^2/20 = 12$  persons
- Garage; 1 person each 40m<sup>2</sup>.....  $82,45\text{m}^2/40 = 2$  persons

### 2.3. Evacuation (data table 3.1 of DB SI)

The house needs only 1 main exit door due that the occupation is 12 persons, less than 100 as the regulation sets.

The origen of the house it is set in the main door acces at the ground floor, so the way length for evacuate the house is considered as zero; the same way is considered the evacuation height, due that the high to need just 1 exit is 28 meters.

In the garage, as it is considered as a low risk local, the origen will be set at any place of it. The furthest point from the door is 13 meters, less than 35 meters as the law establishes.

The evacuation height or difference between basement floor and ground floor its 2,80 m.

The width of the doors will be always more than 0,80 m. In our case;

- House door; 0,90 m > 0,80 m.
- Garage door; 3,50 m > 0,80 m.

The doors of the house does not open in the evacuation direction due that it is not necessary, for be the occupation less than 100 persons.

#### 2.4. Elements strength against fire (date table 3.1 of DB SI)

- Main structure elements over the evacuation level; R 30
- Main structure elements in basement (garage use), considered as a low risk local; R90

#### 2.5. System against fire

The efficiency of the portable fire extinguisher will be 21A-113B.

It will be set at the garage so that the distance will be no longer than 15 meters from the main evacuation exit at the ground floor.

### **3. JUSTIFICATION; FOUNDATION, STRUCTURE AND WORKS**

Purposes of calculating it is estimated that it will be needed a geotechnical study to determine the soil capacity. Nevertheless it is estimated a capacity of 2 kg/cm<sup>2</sup> for the dimensioning of the foundation.

The foundation is made with isolated footing concrete.

The stairway will be built with a concrete layer of 16 cm depth.

The excavation is performed by mechanical resources and also manual in some parts until achieve the desired depth, joining all the foundation with concrete joists and also the horizontal network of drainage.

The horizontal drainage network will be of PVC with its appropriated ringed joining each section of pipes, over a concrete layer.

At the end of every vertical pipe will be built a registration box made by bricks, internally plastered, over a concrete layer. Also this will be made in every change of direction or inclination.

The inclined roof will be formed with partition walls and bards for slope formation(on slab), waterproofing layer and tile aged, with thermal insulation on slabs.

In the inclined slab also will be set a ribbed rigid insulation under the tiles.

The enclosures will be constituted by visual brick of 12 cm, waterproofed, rigid insulation, doubled with hollow brick partition of 7 cm. Interior plaster screeded, except in those walls with different finish indicated at the corresponding project.

Interior walls will be by hollow brick of 7 cm. made with cement mortar except to the upper union to the roof that will be made by plaster ceiling.

The steps will be formed with hollow brick of 7 cm. taken with cement mortar.

The plumbing will be made with copper tubing embedded in plastic cover with keys and quality accessories, all completely placed and installed according to plans, technical requirements and basic standards for indoor water supply and installation rules for hot water.

A.C.S. gas thermos will be installed.

All drains from sanitary apparatus and electrical appliances will be embedded PVC tubing.

The electrical installation will be performed under plastic tube embedded with cabling and sections to a level of electrification of 5,500 watts, single phase, with the controls and protection of lines required in the low voltage regulations.

The earth connection shall be made of bare copper cable of 35 mm<sup>2</sup> anchored to the foundation iron and copper pike buried with box connection.



It will be installed a TV antenna with multiple takes in the house.

In all the house, bathrooms, kitchen and terrace access, the floor will stoneware with pieces of 30x30 cm. Garage floor finished with concrete.

The stairway landing and steps will be made of beech with 3 cm thickness.

The bathrooms and toilets will be maid with stoneware tiles of 20x20 cm. in soft colors, with borderdecorated.

The laundry will be made with white tiles of 20x20 cm.

The interior walls will be painted to smooth glossy plastic.

Smooth false plaster ceiling with dark perimeter throughout the house.

The exterior carpentry on windows, balconies and shutters will be made of anodized aluminum, lacquered in white. CLIMALIT glazing.

The main door will be reinforced, solid wood, Beech (exterior smooth finish).Equipped with rubber windbreaker hidden under door and five anchor points.

The laundry access door is made with galvanized steel carpentry lacquered in white, with cutting-type horizontal grid (10x50 calibrated with plates, horizontal position) for interior glazing.

The interior carpentry is: Beech plated door drum performance, and wooden frameof the same material lacquered with polimetano colorless, except the sliding doorsto be formed with two 10 mm panel. edged around the perimeter, and plated in Beech (on interior carpentry with three coats polyurethane with two sanding between).

In the walls identified in plans panel paneling is placed, of 10 mm thick on battens.

The garage door will be metal lacquered in white, even with inferior hedge.

The kitchen furniture and laundry room will be white and its interior the same color.

The kitchen worktops are of granite, and also the wall space between thesecountertops and furniture.

All sanitary appliances will be of first quality and white. The laundry tub is whitestoneware, and stainless steel sink.

The inner handrails are galvanized steel, beech handrail and parapet with Beechveneered board, as detailed in drawings.

The exterior handrails will be of galvanized steel, lacquered white, as detailed in drawings, perforated metal parapet and wooden handrail on base frame.

## **Basic hypotheses for calculation**

Faced with the impossibility of knowing the actual mechanical behavior of soil, due to its intrinsic nature, we have considered the following simplifying hypothesis in the calculation.

- The stress distribution is linear.
- The ground deformation at each point is approximately equal to the product of the voltage by the ratio of ballast.
- The ground under each foundation is homogeneous in its physical and mechanical properties.
- At a depth equal to twice the largest dimension of the footing, the tension on the ground is negligible.

The facultative direction check, in view of the terrain and assisted by the appropriate considers after make the essays, the validity on these premises previous taking appropriate action otherwise.

Type of ground and physical and mechanical values .

It has been considered for this project, following an initial visual inspection of the land in its natural conditions, the following determinations:

Cohesive soil compact, ballast coefficient from 1000 to 2000 t/m<sup>2</sup>; density 1.90 T/m<sup>3</sup>; friction angle of 30 °, cohesion 2'00 t/m<sup>2</sup>; maximum permissible tension between 1.5 and 3 Kg/cm<sup>2</sup>.

For calculation purposes, it was considered a tension of 2 kg/cm<sup>2</sup>.

The water level is at a depth that does not affect the foundation ground.

### Checks carried out.

Have been carried out the geotechnical following checks, considering actions the transmitted in service (unfactored) for the structure to the foundation due to the weight of the foundation and the lands that gravitate on him:

#### a) Allowable pressure:

The mean stress of the ground-contacting surface foundation, is less than the permissible maximum stress.

The maximum stress in the surface is less than 1.25 times the permissible maximum stress.

It has also been found that the ratio between the total weight minus the weight of the building excavated terrain, and the surface of the building is less than half the permissible maximum stress.

#### b) Check the dump:

Is taken to a dump safety coefficient equal to 3, verifying the ratio between the stabilizing moment and the overturning moment is more than 3.

c) Slip verification:

For calculation purposes, is considered as friction angle of foundation-ground  $2/3$  of the angle of internal friction of the ground, verifying the ratio between the friction force field-foundation and the horizontal component of the actions over the foundation exceeds to 1.5.

General considerations.

Test pits will be made deep enough to reach all layers that influence the possible seats of construction, with the following minimum depths:

- In foundations discontinuous 3 times the minimum width of the footings, with minimum of 3 meters.
- At foundations continuous one and half times the width of the foundation plate.

In areas of poor quality, will increase these depths.

In case of not safely establish the composition and response of ground, precise tests will be made, to be scheduled, executed and interpreted by qualified personnel.

The minimum depth of foundation will be in any case of 0.75 m.

The depth and type of ground to seat all the foundations will be similar.

In order to avoid differential settling, the average pressures of the ground-foundation contact surface on each of them is similar, with a maximum oscillation of 10% of each other. Within those tolerances, has been diminished the pressure on those of greatest absolute charge.

### **Actions considered in the calculation**

Generalizations.

In calculating the stresses to which the structure is submitted have been considered the following, with their characteristic values, defined as those who have a 95% probability of being exceeded in the period of life of the building.

Eigenvalues.

#### **a) Gravitational Actions**

As established by the standard NBE-AE-88, have been adopted the following values:

<b>CHARGES</b>	<b>WEIGHT</b>
Reinforced concrete	2,500 kg/m <sup>3</sup>
H.4 brick	60 kg/m <sup>2</sup>
H.7 brick	140 kg/m <sup>2</sup>
H.11 brick	140 kg/m <sup>2</sup>
Perforated brick	200 kg/m <sup>2</sup>
Natural Stone	2800 kg/m <sup>3</sup>
Cement mortar plaster	20 kg/m <sup>2</sup>
Plaster coating	12 kg/m <sup>2</sup>
Ceramic tile and/ mortar	80 kg/m <sup>2</sup>
Bards with plaster	60 kg/m <sup>2</sup>
Arabic ceramic tiles	50 kg/m <sup>2</sup>
Slab 26 +4, with concrete cove	300 kg/m <sup>2</sup>

<b>OVERCHARGES OF USE</b>	<b>WEIGHT</b>
Inclined roof not walkable	100 kg/m <sup>2</sup>
Housing	200 kg/m <sup>2</sup>
Overhanging balconies, pointed	200 kg / m
Stairs	300 kg/m <sup>2</sup>
Partitions	100 kg/m <sup>2</sup>

TOTAL CHARGE OF ELEMENTS	WEIGHT
Slabs housing (charge + overcharge)	700 kg/m <sup>2</sup>
Covers	600 kg/m <sup>2</sup>
Wall LP12 + LH7 (2,6 meters high)	700 Kg / ml
Stairs	750 kg/m <sup>2</sup>

### Snow overcharge

As established by the Rule, we assume a uniformly distributed charge on the surface projection of the cover of 40 kg/m<sup>2</sup> for topographical altitudes below 200 meters.

### b) Wind actions

Given the characteristics of the building and its surroundings, have not been considered relevant actions caused by the wind, ignoring its effects on the structure.

### c) Termical and rheological actions.

Not considered in the calculation, for having included in the design of the structure the necessary expansion joints in the set.

#### 4. MINIMUM SLAB EDGE

In the particular case of slabs with joists and lights smaller than 7 m and prestressed slabs with lights smaller than 12 m, and overloads no bigger than 4 kN/m<sup>2</sup> is not necessary to determine whether the arrow agree with the limits of 50.1, if the total depth “h” is greater than the minimum “h<sub>min</sub>” given by:

(In our case the light distance is less than 7 meters but the overlead is bigger than 4 kN/m<sup>2</sup>, so we have to estimate the slab edge with the following formula)

$$h_{\min} = \delta_1 \delta_2 \frac{L}{C}$$

being:

$\delta_1$  Factor depending on the total charge and having the value of  $q / 7$ , where q is the total load in kN/m<sup>2</sup>;

$\delta_2$  Factor which has the value of  $(L / 6)^{1/4}$ ;

L The calculation of the slab light, in m;

C Coefficient whose value is taken from Table 50.2.2.1.b:

#### COEFFICIENTS “C”

Type of Slab	Type of charge	Type of section		
		Isolated	Extreme	Interior
Armed joists	With partitions or walls	17	21	24
	Covers	20	24	27
Prestressed joists	With partitions or walls	19	23	26
	Covers	22	26	29
Prestressed slabs	With partitions or walls	36	-	-
	Covers	45	-	-

$$\delta_1 = \sqrt{q/7} = \sqrt{7/7} = 1$$

$$\delta_2 = (L / 6)^{1/4} = (5,1/6)^{1/4} = 0.96$$

$$h_{\min} = \delta_1 \delta_2 \frac{L}{C}$$

$$\delta_1 = 1$$

$$\delta_2 = 0.96$$

L = 5,1 (bigger distance of a joist located in a horizontal slab on the ground floor which determines the election of the coefficient **C** as the value **23**)

$$h_{\min} = 1 \times 0.96 \times (5.1 / 23) = \mathbf{0,212 \text{ m}}$$

As the formula estimates the minimum edge of the slab will be 0,212 m. Due that the EHE08 sets that the minimum edge is 0,25 m this will be at least the edge of the slabs in our building. Due that the commercial high size of the concrete filler blocks is 22 cm and the minimum thick of the compression layer for our kind of slab is 4 cm, the edge of the slab will be finally **0,26m.**

## 5. SERVICES

### WATER SUPPLY SERVICE

The urbanization has infrastructure for water supply. At the edge of the parcel is in the locker for the general water meter.

The vertical tube, tube that joins the output of the water meter with the indoor particular installation, will be underground in a protected waterway and easily registrable over a layer of sand.

Inside the the house is distributed through the roof, in order to make more difficult the return of water, and therefore always above the height of any of the devices. Over the vertical pipe and at a height easy for the user will be located a cut key, which cut all the internal supply.

#### Minimum flows in home appliances. (DB HS4; Water Supply) Table 2.1

Each of them should receive, independently of the state of others, a minimum instantaneous flow for a proper use:

Tabla 2.1 Caudal instantáneo mínimo para cada tipo de aparato

Tipo de aparato	Caudal instantáneo mínimo	
	de agua fría [dm <sup>3</sup> /s]	de ACS [dm <sup>3</sup> /s]
Lavamanos	0,05	0,03
Lavabo	0,10	0,065
Ducha	0,20	0,10
Bañera de 1,40 m o más	0,30	0,20
Bañera de menos de 1,40 m	0,20	0,15
Bidé	0,10	0,065
Inodoro con cisterna	0,10	-
Inodoro con fluxor	1,25	-
Urinarios con grifo temporizado	0,15	-
Urinarios con cisterna (c/u)	0,04	-
Fregadero doméstico	0,20	0,10
Fregadero no doméstico	0,30	0,20
Lavavajillas doméstico	0,15	0,10
Lavavajillas industrial (20 servicios)	0,25	0,20
Lavadero	0,20	0,10
Lavadora doméstica	0,20	0,15
Lavadora industrial (8 kg)	0,60	0,40
Grifo aislado	0,15	0,10
Grifo garaje	0,20	-
Vertedero	0,20	-

#### Minimum diameters derivations to the appliances. (DB HS4; Water Supply) Table 4.2

Tabla 4.2 Diámetros mínimos de derivaciones a los aparatos

Aparato o punto de consumo	Diámetro nominal del ramal de enlace	
	Tubo de acero	Tubo de cobre o plástico (mm)
Lavamanos	½	12
Lavabo, bidé	½	12
Ducha	½	12
Bañera <1,40 m	¾	20
Bañera >1,40 m	¾	20
Inodoro con cisterna	½	12
Inodoro con fluxor	1- 1 ½	25-40
Urinario con grifo temporizado	½	12
Urinario con cisterna	½	12
Fregadero doméstico	½	12
Fregadero industrial	¾	20
Lavavajillas doméstico	½ (rosca a ¾)	12
Lavavajillas industrial	¾	20
Lavadora doméstica	¾	20
Lavadora industrial	1	25
Vertedero	¾	20



## **Protection against returns**

Backstop systems shall be provided to prevent the reversal of flow in the points listed below and elsewhere as necessary:

- After the water meter;
- At the base of the vertical pipes.
- Before the water treatment equipment.
- Supply tubes not intended for domestic purposes.
- Before refrigeration or air conditioning.

## **Municipal Connection**

The Municipal connection must have at least the following elements:

- a) a key or a collar of for the connection to the outside distribution pipe network supply to open the waterway from the municipal connection.
- b) a tube that links the cut key in the municipal connection with the general cut key.
- c) a cut key outside of the property.

## **General cut key**

The general cut key will interrupt the supply to the building and will be located within the property in an area commonly accessible for handling and properly indicated to allow its identification. If a locker or water meter exists, should generally stay inside the property.

## **Main distributor**

The route of the main distribution must be made in common areas. In case of be embedded should be available for inspection registers and leakage tests, at least in its extreme and changes direction. Cut keys should be disposed in all derivations, such a way that in case of failure at any point can not be interrupted all the supply.

## **Separations regarding other installations**

The route of the cold water pipes should be such that will be not affected by heat sources and therefore must take part always separated from the hot water pipes (or heating ACS) at a distance of 4 cm, at least . When the two pipes are in a same vertical plane, the cold water should always be under the hot water.

The pipes must go below any drains or item containing electrical or electronic devices, and any telecommunications network, in parallel at a distance of at least 30 cm. Regarding the gas pipes, these will be stored at least at a distance of 3 cm.

## **Testing of indoor installations**

1. The installer is required to perform a test of strength and watertightness of all piping, elements and accessories that integrate the installation being all components seen and accessible for control.
2. To start the test, the entire installation will be filled with water, keeping the end taps open until there is assurance that the drain has been completed and there is no air. Then close the taps that have served to the purge and also the power source. Then the bomb is used, which is already connected and maintain its operation up to the test pressure. Once fitted, the procedure according to the type of material as follows:

a) for metal pipes shall be considered valid tests as described in the standard UNE100 151:1988;

b) for multilayer thermoplastic pipes shall be considered valid testing according to Method A of the Standard UNE ENV 12 108:2002.

3. After a previous test, the installation you will connected taps and consumer devices, submitting again to the previous test.

4. The manometer is used in this test should be appreciated intervals least 0.1 bar pressure.

5. Pressures alluded previously relate to the level of the roadway.

### **Particular tests on the hot water installations (ACS)**

a) measurement of flow rate and temperature at points of water;

b) obtain the required flow at the set temperature after opening the estimated number of taps in simultaneity;

c) check the time it takes the water to go out at operating temperature once the hydraulic balance of the various derivations of the return network and open the tap one to one of the farthest from each of the derivations, without open any tap in the last 24 hours;

d) measuring temperatures of the network;

e) with the accumulator at full activity, check with contact thermometer the temperatures at its output and taps. The return temperature must not be lower than 3 ° C at the output of the accumulator.

## **SANITATION SERVICE**

The collectors of the building must drain, preferably by gravity into the well or pit which is usually the point of connection between the drainage installation and the public sewer network, through the corresponding connection.

Water hydraulic clousures should be available in the installation to prevent the transmission of air in the rooms occupied not affecting the waste stream.

The pipe drainage network must have the simplest route possible, distances and slopes to facilitate the evacuation of waste and be self-cleaning. Should be avoided water retention inside.

Will be provided adequate ventilation systems that allow the functioning of the hydraulic closure and evacuation of sewer gas.

The installation should not be used for the evacuation of residues other than wastewater or rainwater.

**Pipes**; the diameter must not decrease in the direction of flow.

It may be provided an increase in diameter when connecting to the downpipe flow rates much larger than those of the situated upstream section.

**Suspended collectors**; the downpipes should be connected by special pieces.

They should have a slope of 1% or more.

Must not connect at the same point more than two collectors.

Registers points in horizontal routes every 15 meters long.

**Buried collectors;** pipes should be placed in ditches located below the distribution of drinking water.

They should have a slope of 2% or more.

The connection of downpipes will be done with interposition of a pit at the end of the downpipes, which must not be syphonic.

**Connecting elements;** in buried networks the joint between the vertical and horizontal networks, between their encounters and derivations, must be arranged with pits on concrete foundation with accessible cover. Can connect only one collector for each side of the pit, such a way that the angle formed by the collector and the output is greater than 90 °.

**Primary ventilation subsystem;** considered sufficient as the only ventilation system in buildings with less than 7 levels and drain derivations are less than 5 m.

Wastewater downpipes should extend at least 1.30 m over the roof of the building if it is not walkable and 2.00 m if it is.

The primary ventilation outlet must not be located closer than 6 m from any outside air intake for air conditioning or ventilation and should surpass it in height.

The output of the ventilation should be adequately protected from strange things and the design should be such that the wind action favors the expulsion of gases.

#### Single derivations (DB HS5; Water Evacuation) Table 4.1

Tabla 4.1 UD's correspondientes a los distintos aparatos sanitarios

Tipo de aparato sanitario	Unidades de desagüe UD		Diámetro mínimo sifón y derivación individual (mm)	
	Uso privado	Uso público	Uso privado	Uso público
Lavabo	1	2	32	40
Bidé	2	3	32	40
Ducha	2	3	40	50
Bañera (con o sin ducha)	3	4	40	50
Inodoro	Con cisterna	4	100	100
	Con fluxómetro	8	100	100
Urinario	Pedestal	-	-	50
	Suspendido	-	-	40
	En batería	-	35	-
Fregadero	De cocina	3	40	50
	De laboratorio, restaurante, etc.	-	2	-
Lavadero	3	-	40	-
Vertedero	-	8	-	100
Fuente para beber	-	5	-	25
Sumidero sifónico	1	3	40	50
Lavavajillas	3	6	40	50
Lavadora	3	6	40	50
Cuarto de baño (lavabo, inodoro, bañera y bidé)	Inodoro con cisterna	7	100	-
	Inodoro con fluxómetro	8	100	-
Cuarto de aseo (lavabo, inodoro y ducha)	Inodoro con cisterna	6	100	-
	Inodoro con fluxómetro	8	100	-

#### Diámetro (mm)

#### Commercials diameters

32  
40  
50  
63  
75  
90  
110  
125  
160  
200

## Wastewater downpipes (DB HS5; Water Evacuation) Table 4.4

**Tabla 4.4 Diámetro de las bajantes según el número de alturas del edificio y el número de UD**

Máximo número de UD, para una altura de bajante de:		Máximo número de UD, en cada ramal para una altura de bajante de:		Diámetro (mm)
Hasta 3 plantas	Más de 3 plantas	Hasta 3 plantas	Más de 3 plantas	
10	25	6	6	50
19	38	11	9	63
27	53	21	13	75
135	280	70	53	90
360	740	181	134	110
540	1100	280	200	125
1208	2240	1120	400	160
2200	3600	1680	600	200
3800	5600	2500	1000	250
6000	9240	4320	1650	315

## Horizontal wastewater collectors (DB HS5; Water Evacuation) Table 4.5

**Tabla 4.5 Diámetro de los colectores horizontales en función del número máximo de UD y la pendiente adoptada**

Máximo número de UD			Diámetro (mm)
Pendiente			
1%	2%	4%	
-	20	25	50
-	24	29	63
-	38	57	75
96	130	160	90
264	321	382	110
390	480	580	125
880	1056	1300	160
1600	1920	2300	200
2900	3500	4200	250
5710	6920	8290	315
8300	10000	12000	350

# ELECTRICAL INSTALLATION (ITC-BT)

## Description and calculation

Selection of the degree of electrification; we are in a house that exceeds 160 m<sup>2</sup>, and therefore requires a high degree of electrification.

Being a high power electrification not be less than 9200 W at 230 V.

**Municipal connection**; we call this the installation between the distribution network of hydroelectric and general protection box.

This network is made by the developer, so it is not our concern.

**Electric meter**; the meter shall be centralized in prefabricated modules, taking care that the derivations in these modules are distributed independently within their respective protective tube.

The situation of the module has not to be wet, will be sufficiently ventilated and illuminated, and if the level of the soil is less than or equal to the corridors and surrounding locals, shall be provided for drainage sinks, in case of failure, neglect or rupture of water pipe.

**Line deliverer to housing**; the section was calculated by the formula:

$$S = \frac{L \times W}{C \times v \times V \times \cos\phi}$$

Being:

S = Section of the line in mm<sup>2</sup>

L = Length of the line in meters

W = Power in watsios

C = Conductivity coefficient

v = Rated voltage

Cosf = Power factor

Will be made of Copper conductor with special isolation.

**Interior installation**; Will be as follows:

Circuits; will be installed at least four independent circuits are:

- Circuit for lighting and lighting power outlets.
- Circuit for the washing machine and water heater.
- Circuit for the kitchen.
- Circuit for other applications.

**General box of distribution**; automatic differential switch of 25 A. capacity, single-phase 230 V and 30 mA sensitivity. All this embedded in a box, plasticized elements will be in fixing guides.

The general protection box will be placed in the main entry or on the facade of the building. Shall keep a terminal for the ground connection of the box, if it is metallic.

**Bathrooms installations;** due that we are installing outside the volume of protection, it is not necessary to use safety outlets.

The only outlet will be placed next to switch, outside the volume of protection and at height of 1.20 meters from the ground.

## **THE MATERIALS USED**

**Electric cable;** for indoor installation has been used copper double insulated and different colors.

**Protective conductors;** of copper and will present the same insulation conductors. Will be installed by the same pipeline than these.

**Identification of the cables;** installation cables are identified by the colors of their isolation;

- Clear blue for neutral conductor.
- Yellow green to the ground conductor and shield.
- Brown, black and gray, for conductors or phases.

**Protection tubes;** will be used to embedding corrugated plastic, immune to attack by building materials. It must be protected at intersections with hot water pipes. In the changes of direction registers will be used.

**Connection boxes;** these will be plasticised with white cover and sized according to the drivers who derived in there.

**Control and operation devices;** commutator and switches, which cut the maximum current of the circuit in which they are placed, without causing permanent arcing, opening and closing circuits, and no possibility of taking an intermediate position, shall be of closed type and insulated material.

**TV Antenna - FM;** will be installed completely independent of the electrical system of the house. Will have two internal connections in the home.

**Ground connection;** all the light points and outlets of the house are connected to the ground as well as TV antenna. This will be a bare conductor of Cu.

**Protection devices;** are the electrical circuit breakers, fuses and circuit breakers. Its ability to cut to short circuit protection, will agree with the short circuit current that may arise at a point of installation.

Will be marked with the nominal current operation voltage as well as the indication sign of disconnection.

Fuses used to protect the secondary circuits shall be calibrated to the intensity of the circuit they protect. Shall be provided with non-combustible insulation. They could be replaced safely and be marked with the nominal correct work voltage.

## **6. REGULATIONS**

**NCSE-02; Earthquake Resistant Construction Standard**

**EHE 08; Structural Concrete Instruction**

**REBT; Low Voltage Electrotechnical Regulation**

**RITE 2007; Regulation of Thermal Installations in Buildings**

**Valencian Community Urbanistic Planning**

**Order 193/1988 of 12 December, of the MINISTRY of PUBLIC WORKS, PLANNING AND TRANSPORT. Standards for accessibility and removal of architectural barriers**

**Technical building code (CTE)**

- DB SE; Structural safety

DB SE1; Stability and resistance

DB SE2; Edification actions

DB SE3; Foundations

DB SE4; Steel

DB SE5; Walls

DB SE6; Wood

- DB SI; Safety in case of fire

DB SI1; Interior propagation

DB SI2; Exterior propagation

DB SI3; Evacuation of occupants

DB SI4; Fire protection installations

DB SI5; Intervention of firefighters

DB SI6; Structural fire resistance

- DB SUA; Utilization Security and Accessibility

DB SUA1; Security against the risk of falls

DB SUA2; Security against the risk of impact or entrapment

DB SUA3; Security against the risk of imprisonment

DB SUA4; Security against risks caused by inadequate lighting

DB SUA5; Security against the risk caused by high occupancy situations

DB SUA6; Security against the risk of drowning

DB SUA7; Security against risks caused by moving vehicles

DB SUA8; Security against risks associated with the action of thunderbolt

DB SUA9; Accessibility

- HS DB: Public Health

HS DB1; Protection against humidity

HS DB2; Waste collection and removal

HS DB3; Indoor Air Quality

HS DB4; Water supply

HS DB5; Drainage

- DB HR; Noise protection

- DB HE: Save Energy

DB HE1; Limiting energy demand

DB HE2; Efficiency of thermal installations

DB HE3; Energy efficiency of lighting installations

DB HE4; Minimum solar contribution to hot water

DB HE5; Minimum photovoltaic contribution electricity



## 7. MEASUREMENTS AND BUDGET

Code	Description	Uds	Length	Width	Height	Partials	Quantity	Price	Amount
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### CHAPTER 01. EARTH WORKS

#### 01.01 m3 Land Transp 8km no/charge

Land Transport of medium density 1.50 t/m<sup>3</sup>, with maximum load dump truck 15 t. at a distance of 8 km., with an average speed of 40 km / h. considering load times, gone, discharge and back without include load.

Car ramp	1	15,50	3,70	1,00	57,35
Lower patio	1	17,00	15,00	2,60	663,00
Basement	1	9,00	10,00	2,60	234,00

954,35 3,45 3.292,51

#### 01.02 u Clearing 100m<sup>2</sup> machine

Clearing and grubbing of the land to an area of 100 m<sup>2</sup>, including boot trees and stumps with diameter less than 30 cm. and disposing of waste to landfill or gathering place.

	1	14,00	1,00	14,00
--	---	-------	------	-------

14,00 59,51 833,14

#### 01.03 m3 Excavation manual methods with/charge

Open excavation made under the altitude of implantation in land resources, with manual methods, and direct charge over the transport, as NTE/ADV-1.

Car ramp	1	15,50	3,70	1,00	57,35
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57,35 32,50 1.863,88

### TOTAL CHAPTER 01. EARTH WORKS

5.989,53

Code	Description	Uds	Length	Width	Height	Partials	Quantity	Price	Amount
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**CHAPTER 02. FOUNDATION AND DRAINAGE NETWORK**

**02.01 u Square siphon manhole 55x55cm blind cover**

Prefabricated siphon man- hole of polypropylene, squa- re, registrable, measures 55x55 cm, with lateral con- nections adaptable to pipe diameters from 160 to 315 mm, with blank cover and frame, manufactured by in- jection of polypropylene, fully installed.

1 1,00

1,00 204,45 204,45

**02.02 m2 Cleaning concrete HM 15 10cm**

Cleaning concrete layer HM 15/B/20/IIa prepared, s oft consistency, maximum ag- gregate size 20 mm. and 10 cm. thickness at the base of the foundation, trans- ported and put into work, according EHE.

61,75 61,75

61,75 13,24 817,57

**02.03 m PVC buried collector 200mm elastic Union 30% acc**

Buried collector made ??of a PVC smooth tube sanitation, 200 mm diameter thickness, and elastic connection UNE EN 1401-I, with tube price in- crease of 30% by way of joints, fittings and accesso- ries, placed in ditch 500 +200 mm wide, on a bed of sand / gravel thickness 100 +200 / 10 mm, excluding ex- cavation, filling ditch nor final compaction.

28,5 28,50

28,50 51,12 1.456,92

**02.04 m PVC buried collector 110mm glued Union 30%acc**

Buried collector made ??of a PVC smooth tube sanita- tion,110 mm diameter thick- ness, and elastic connection UNE EN 1401-I, with tube price increase of 30% by way of joints, fittings and acces- sories, placed in ditch 500 +110 mm wide, on a bed of sand / gravel thickness 100 +200 / 10 mm, excluding ex- cavation, filling ditch nor final compaction.

21,4 21,40

21,40 18,27 390,98

Code	Description	Uds	Length	Width	Height	Partials	Quantity	Price	Amount
<b>02.05</b>	<b>quare passage manhole 55x55cm blind cover</b> Prefabricated passage man- hole of polypropylene, squa- re, registrable, measures 55x55 cm, with lateral con- nections adaptable to pipe diameters from 160 to 315 mm, with blank cover and frame, manufactured by in- jection of polypropylene, fully installed.	2				2,00			
							2,00	186,09	372,18
<b>02.06</b>	<b>u Square passage manhole 30x30cm blind cover</b> Prefabricated passage man- hole of polypropylene, square, recordable, meas ures 30x30 cm, with lateral connections adaptable to tube diameters of 75 to 140 mm, with blank cover and frame, manufactured by injection of polypropylene,fullyinstalled.	1				1,00			
							1,00	53,49	53,49
<b>02.07</b>	<b>u Footing 70x70x70 B 500 S 25</b> Square footing 70x70 cm. and 70 cm. thickness, HA-25/B/20/IIa concrete from central to an amount of 25 kg., steel B 500 S, including preparation, steal, concrete spacers, placing and vibration, not including formwork.	6				6,00			
							6,00	82,33	493,98
<b>02.08</b>	<b>u Footing 80x80x70 B 500 S 25</b> Square footing 80x80 cm. and 70 cm. thickness, HA-25/B/20/IIa concrete from central to an amount of 25 kg., steel B 500 S, including preparation, steal, concrete spacers, placing and vibra- tion, not including formwork.	6				6,00			
							6,00	95,30	571,80
<b>02.08</b>	<b>u Footing 100x100x70 B 500 S 25</b> Square footing 100x100 cm. and 70 cm. thickness, HA-25/B/20/IIa concrete from central to an amount of 25 kg., steel B 500 S, including preparation, steal, concrete spacers, placing and vibra- tion, not including formwork.	7				7,00			
							7,00	126,45	885,15

Code	Description	Uds	Length	Width	Height	Partials	Quantity	Price	Amount
<b>02.09</b>	<b>u Footing 80x150x70 B 500 S 25</b> Square footing 80x150 cm. and 70 cm. thickness, HA-25/B/20/IIa concrete from central to an amount of 25 kg., steel B 500 S, including preparation, steal, concrete spacers, placing and vibra- tion, not including formwork.	3				3,00			
							3,00	143,76	431,28
<b>02.10</b>	<b>m3 Concrete HA 25 for brace joist B 500 S 20 no/casing</b> Reinforced concrete, HA 25/B/20/IIa prepared, in bra- cing joists, with average amount of 20 kg. steel B 500 S, including cuts, separators, wire bound, vibrating and cu- ring of concrete, not inclu- ding framing.	26				26,00			
							26,00	164,57	4.278,82

**TOTAL CHAPTER 02. FOUNDATION  
AND DRAINAGE NETWORK      9.956,62**

Code	Description	Uds	Length	Width	Height	Partials	Quantity	Price	Amount
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## CHAPTER 03 STRUCTURE

### 03.01 m2 Concrete blocks wall 40x20x30 with/HM-25

Wall of concrete blocks 40x20x30 cm., Received with cement mortar M-5 made in work and concrete filled bre- ast HM-25, constructed in ac- cordance with SE-F of the CTE and NTE-FFB, including setting out, plumbing and le- vel, dumping and compacted concrete and proportion of wastage, breakages and cle- aning.

66

66,00

66,00 68,46 4.518,36

### 03.02 m3 HA-25/B/20/IIa reinforced concrete foundation slab

Reinforced concrete with a average amount of 100 kg. steel B 500 S, in slabs, con- crete HA-25/B/20/IIa, soft consistency, maximum ag- gregate size 20 mm., expo- sure class IIa, prepared, trans ported and put into work, including formwork.

Basement 11,6

11,60

Ground floor 21,6

21,60

33,20 335,56 11.140,59

### 03.03 m2 Slab 25 22+5 4.5x4.5 concrete cover

One-way reinforced concrete slab 25 N/mm<sup>2</sup> (HA-25/B/20/IIa), soft consis- tency, maximum aggregate size 20 mm, normal exposu- re, mesh 5-5 mm diameter 15x30 ME. steel B 500 T with an average amount of 12 kg. steel B 500 S, with distances of 4.5x4.5 m., thickness 22 +5 cm., 55x27 cm flat joists, strapping and concrete co- ves, including vibration, cu- ring and stripping formwork, according EFHE and EHE.

Ground floor 120

120,00

First floor 180

180,00

Hall entry cover 60

60,00

Study area cover 23,5

23,50

Stairway cover 36,7

36,70

420,20 84,59 35.544,72

### 03.04 m2 Inclined slab HA-25 central 20cm

Inclined slab of stairs made of Central concrete HA-25/B/20/IIa 20 cm thick- ness with an average amount of 13 kg. Steel B 500 S, for coating, with formation of steps, forming, vibrated, curing and demoulding, as EHE.

9

9,00

9,00 145,49 1.309,41

## TOTAL CHAPTER 03. STRUCTURE

52.513,08

Code	Description	Uds	Length	Width	Height	Partials	Quantity	Price	Amount
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## CHAPTER 04. COVERS

### 04.01 m2 Formation roof flap with brick H-6

Formation of roof flap with a slope 25%, made with ceramic brick wall (Castilian H-6) of 24x12x8cm, received with cement mortar M-5, and board flat concrete cove 100x50cm, including setting out, proportional part of wastage, breakages and cleaning, not including closing walls .

Ground floor cover	62							66,00	
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Ground floor cover	14							14,00	
--------------------	----	--	--	--	--	--	--	-------	--

							76,00	29,20	2.219,20
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### 04.02 m2 Mixed tile cover received with concrete mortar

Coverage mixed concrete flat tile red, at 12 pieces/m2, received with cement mortar for its superior fit as NTE/QTT-12, including cleaning, watering the surface, setting out and placement. According to HS DB-1 CTE.

Ground floor cover	2	5,50	10,00					110,00	
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Ground floor cover	1	7,50	4,40					33,00	
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							143,00	20,47	2.927,21
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<b>TOTAL CHAPTER 04. COVERS</b>								<b>5.146,41</b>	
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## CHAPTER 05. FACADES AND PARTITIONS

### 05.01 m2 Wall lightweight concrete blocks 40x20x20 cm

Wall lightweight for coating 20 cm thick, made of concrete blocks 40x20x20 cm of dense aggregates, received with cement mortar M-5, with joints of 1 cm thick, even setting out, level and plumb, proportionally enjarjes, waste and breakage and special pieces (half, corner, etc..), watered parts in contact with mortar, jointing and cleaning, considering a 3% loss and a 30% wastage of mortar according to DB SE-F CTE and NTE / FFB.

Perimetral garden wall	161						161,00		
							161,00	23,76	3.825,36

### 05.02 m2 1/2 foot hollow brick+hollow brick 7cm+ENL+MW-0.040/40

Enclosure composed of main part of factory 1/2 foot thick, made of hollow bricks, covered outside with improved cementitious adhesive layer C2, reinforced with fiberglass mesh alkali resistant coating finish with thin plastic with well ventilated air chamber for the purposes of DB-HE and ventilated for the purposes of DB-HS, heat insulation for the interior hydrophilic mineral wool 40 mm thick with a conductivity of 0.040 W / mK and thermal resistance of 1.00 m2 K / W (MW-EN 13162 - T3-WS-Z3-AF5), folded wall 7 cm thick, made with hollow bricks 24x11.5x7 cm, trim and plaster and finished with thin plastic coating, including training of lintels and jambs, running meetings, and received special elements of carpentry, considering a 3% loss and a 20% wastage of mortar according to SE-F DB CTE-FFL NTE, NTE-RPG and NTE-RPE. FC05a01Njd type, according to the catalog of building elements (Document Recognized by the Government DRA 02/06). E = 305 mm M = 235 kg/m2 U = 1 / (0.46 +1.00) W/m2K as HE DB CTE. Degree of waterproofing (GI) = 5, as the CTE HS DB. Fire resistance = EI120, according to SI DB CTE.

North facade	98						98,00		
holes to deduct	-13						-13,00		
West facade	64,7						64,70		
South facade	87,51						87,51		
holes to deduct	-18						-18,00		
East facade	64,8						64,80		
holes to deduct	-7,6						-7,60		
							276,41	71,20	19.680,39

Code	Description	Uds	Length	Width	Height	Partials	Quantity	Price	Amount
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**05.03 m2 Hollow brick partition 7 cm thickness plastered**

Partition of part of hollow brick of 7 cm thick, made with pieces of 24x11.5x7 cm rigged of edge and received with cement mortar M-5, with joints of 1 cm thick, with screeded and plaster 1.5 cm on both sides, even setting out, level and plumb, proportionally enjarjes, waste and breakage, wet of parts and cleaning, assuming a 3% loss and a 30% wastage of mortar according to DB SE-F CTE, NTE and NTE-PTL-RPG.

Ground floor	1	43,00			2,60		111,80		
Ground floor	1	2,50			3,30		8,25		

							120,05	41,11	4.935,26
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**TOTAL CHAPTER 05. FACADES AND PARTITIONS 28.441,01**



Code	Description	Uds	Length	Width	Height	Partials	Quantity	Price	Amount
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## CHAPTER 06. SERVICES

### 06.01 u Gas installation

Interior gas installation for warm water, heater and kitchen countertop, from the subscriber key to receptors, gas pipes made of copper, elbows, subscriber key, keys equipment, kit exhaust gas boiler and necessary elements for air intake and stale air out, fully installed, tested and working properly according to ITC-ICG 07 of the technical Regulation for distribution and use of gaseous fuels (RD 919/2006).

1

1,00

1,00 439,62 439,62

### 06.02 u Bath 160x75mm

Bath for coating, sheet steel and dimensions 160x75 mm, in color, with chrome handles, slip floor, including drain valve 1 1/2", siphon tube, placed, connections realized with helps of masonry.

2

2,00

2,00 820,59 1.641,18

### 06.03 u Square washbasin1200x500mm white

Washbasin 1200x500 mm, single part, square shape, white glazed porcelain with set of fixing anchors, including drain valve 1 1/2", siphon tube, placed and masonry helps.

4

4,00

4,00 376,89 1.507,56

### 06.04 u Toilet, white

Conventional Toilet for low tank, white glazed porcelain, with lacquered seat and lid fall damped model, standard quality, fixing kit, elbow and plug-in, placed and masonry helps.

3

3,00

3,00 196,35 589,05

### 06.05 u Bidet, white no/cover

Glazed porcelain bidet in white as standard with fixing kit, including drain valve 1 1/2" siphon tube, placed and masonry helps.

3

3,00

3,00 115,77 347,31

## TOTAL CHAPTER 06. SERVICES

4.524,72

Code	Description	Uds	Length	Width	Height	Partials	Quantity	Price	Amount
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## CHAPTER 07. COATINGS

### 07.01 m2 Marble tile pavement 40x20 glossy cream

Tile ivory cream marble pavement, 40x20x2 cm, over layer of sand placed on 2 cm minimum thickness, taken with cement mortar M-5, including jointing with cement grout the same color as the tiles, removal of remains and clean, bright a polished finish, as NTE/RSR-1.

Ground floor	129						129,00		
First floor	23,8						23,80		
								152,80	46,37 7.085,34

### 07.02 m2 Gres 30x30

Ceramic tiles with minimum joint (1.5 - 3 mm) made with white glazed stoneware tiles of 30x30 cm, placed in thick layer of cement mortar and jointing with grout (L), even cutting and cleaning, as NTE/RPA- 3 and Ceramic tile Guide (Document Recognized by the Government DRB 01/06).

Kitchen and laundry	22						22,00		
Bathrooms ground floor	12,8						12,80		
Bathroom first floor	5,7						5,70		
								40,50	30,68 1.242,54

### 07.03 m2 Tiling 30x30

Tiled with minimum joint (1.5 - 3 mm) made with white tile 30x30 cm, placed on thick layer with cement mortar and jointing with grout (L), even cutting and cleaning, as NTE/RPA-3 and Guide Ceramic Tile (Recognized by Government Document DRB 01/06).

Kitchen and laundry	1	25,00		2,60			65,00		
Bathrooms ground floor	1	23,50		2,60			61,10		
Bathroom first floor	1	9,50		3,00			28,50		
								154,60	28,18 4.356,63

### 07.04 m2 Acrylic plastic painting smooth white interior walls

Coating based on acrylic satin latex paint, with good brightness, opacity and whiteness, resistant inside and outside, with a brightness higher than 60% on PVC Leneta, angle 85° (UNE 48026), satin finish, color white on vertical surface of brick, plaster or cement mortar, small adhesions sanded and imperfections, priming coat with diluted acrylic paint, filling of floor faults and two coats of NTE/RPP-24.

Ground floor	1	118,00		2,60			306,80		
First floor	1	38,00		3,00			114,00		
								420,80	4,16 1.750,53

Code	Description	Uds	Length	Width	Height	Partials	Quantity	Price	Amount
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**07.05 m2 Acrylic painting exterior walls**

Coating exterior walls with elastic acrylic waterproof anti fissures, fungicide-algaecide, weather resistant, sun and climate change, with rough texture and matte finish type, color, applied on vertical surfaces of cement mortar or brick, after cleaning the surface, priming coat water based emulsion and topcoat applied by brush or roller.

North facade	98						98,00		
holes to deduct	-13						-13,00		
West facade	64,7						64,70		
South facade	87,51						87,51		
holes to deduct	-18						-18,00		
East facade	64,8						64,80		
holes to deduct	-7,6						-7,60		

276,41 5,22 1.442,86

**07.06 m2 Flat plaster false ceiling 100x60**

False ceiling with smooth plasterboard made of 100x60 cm, sustained with esparto and plaster paste, as NTE/RTC-16.

	182						182,00		
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182,00 10,83 1.971,06

**TOTAL CHAPTER 07. COATINGS 17.848,96**

Code	Description	Uds	Length	Width	Height	Partials	Quantity	Price	Amount
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## CHAPTER 08. CARPENTRY

### 08.01 u Door way plated on cherrywood 72.5 cm wide

Swing door way varnished cherrywood plated on, 1 smooth 203x72.5x3.5cm blind panel with pine precerco 100x45mm, 100x30mm fence, flashing 70x12mm, 80mm brassed hinges and lock knob, and plumb even received the fence, blade set, attachment of the fittings, level, small equipment and final adjustment as NTE/PPM-8.

10

10,00

10,00 351,78 3.517,80

### 08.02 u Smooth wardrobe module plated on cherrywood

Complete module wardrobe cherry wood smooth and dimensions 2500x1800mm, consists of four folding doors height 2330mm, width 480mm and 19mm thick, and interior melamine with shelves and hanging rail, including flashing sided wood veneered in agglomerate, hinges, door per sheet and set of bolts and varnished wood, placement, grading and final adjustment.

6

6,00

6,00 566,25 3.397,50

### 08.03 u Galvanized door 90x205cm

Swing pass door of 1 sheet 90x210cm, made of two galvanized steel plates assembled with each other and polyurethane foam filling, frame galvanized steel sheet of 1.2mm thick hinges and lock with embedded handle, including plumbing, placement and elimination of remains.

1

1,00

1,00 136,88 136,88

### 08.04 u 2-leaf sliding window 120x120

Double sliding window, guides and shutter box incorporated, made of profiles with thermal break aluminum anodized of 15 microns with a quality seal EWAA-Euras with European channel, inner seal, sealing in the fence corners and accessories to ensure proper operation, natural color finish 4-6-6 double glazing, received directly in a hole in the work of 120x120cm by anchor pins arranged every 50cm and less than 25cm from the corners taken with cement mortar, including stakeout placement, plumb and level, assembly and regulation, perimeter sealed with silicone and cleaning, as NTE-FCL.

3

3,00

3,00 362,52 1.087,56

Code	Description	Uds	Length	Width	Height	Partials	Quantity	Price	Amount
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**08.05 u 2-leaf swing window 165x120cm**

Hinged window of two pieces, guides, shutter box and shutter incorporated, made of profiles with thermal break aluminum coating of 60 microns with a quality seal Qualicoat with European channel, inner seal, sealing in the fence corners and accessories to ensure proper operation, finished in white with double glazing 4-6-6, received directly in a hole in the work of 165x120cm by anchor pins arranged every 50cm and less than 25cm from the corners taken with cement mortar, including stakeout placement, plumb and level, assembly and regulation, perimeter sealed with silicone and cleaning, as NTE-FCL.

3

3,00

3,00 349,00 1.047,00

**08.06 u Smooth cherrywood vault door**

Armoured entrance door metal frame made up of galvanized steel, finished in varnished cherry wood, 1 smooth blind panel 210x100x4.5cm with pine precerco 110x45mm, 110x30mm fence, flashing 80x15mm, 5-point lock anchor to handle, even received and plumb the fence, blade set, attachment of the fittings, level, small equipment and final adjustment as NTE/PPM-8.

1

1,00

1,00 1.125,35 1.125,35

**08.07 u 2-leaf sliding door 150x210cm**

Balcony door Double sliding, with splayed monoblock system, blind guides and built aluminum slats, made of anodized aluminum of 15 microns with a quality seal EWAA-Euras with European channel, inner seal, sealant in corners fence and accessories to ensure proper operation, finished in bronze to receive glazing up to 18mm, received directly in a hole in the work of 150x210cm by anchor pins arranged every 50cm and less than 25cm from the corners taken with cement mortar, including staking, placement, plumb and level, assembly and regulation, perimeter sealing with silicone and cleaning, as NTE-FCL.

7

7,00

7,00 348,62 2.440,34

**TOTAL CHAPTER 08. CARPENTRY 12.752,43**

Code	Description	Uds	Length	Width	Height	Partials	Quantity	Price	Amount
------	-------------	-----	--------	-------	--------	----------	----------	-------	--------

## CHAPTER 09. VARIOUS

### 09.01 u Received 2 bowls kitchen sink

Received double sink, including sealing and cleaning.

1

1,00

1,00 44,32 44,32

### 09.02 m Kitchen Furniture

Kitchen Furniture, with the body of white melamine 16 mm. thick base unit composed to embed oven, kitchen sink base with two doors, cabinet base 60 cm. with a door, one of 100 cm. with two doors and one 25 cm. with a door and box, closet hanging rack, hood furniture covers, three wall cabinets 60, 25 and 100 cm. each, with lacquered finish closing hinges, guide bearings and metal boxes handles of doors, base and cornice heel to match the finish and granite bench of 30 mm. thick.

1

1,00

1,00 572,20 572,20

### 09.03 u External mailbox

Box 24x9x32 cm. for outdoor use built in stainless steel epoxy polyester painted in different colors.

1

1,00

1,00 20,00 20,00

### 09.04 u Fridge 2 doors 140x59.5x59.5 cm

2-door Fridge, dimensions 140x59.5x59.5 cm., 260 l. total capacity, freezer 70 l., automatic defrost and reversible doors.

1

1,00

1,00 439,86 439,86

### 09.05 Washing machine superior charge 13prog-400rpm

Top-loading washing machine, glazed steel top and impact resistant glass, dimensions 85x43x60 cm., 13 programs, 400 rpm, 4 buckets for detergent and additives.

1

1,00

1,00 473,69 473,69

**09.06 u Versatile oven**

Versatile to install electric oven,superluxuryseries,radiation, for a capacity of 54 l. Self-cleaning with safety thermostat, reversible catalytic walls, on-off programmer, double Swing grill, illuminated controls and cable.

1

1,00

1,00 434,01 434,01

**09.07 u Fume extractor 90 cm 3 mot**

Extractor for fumes and greases of 90 cm. wide, thee-speed, flow rate m3 / h., anti flames metal grilles, fat filter retainer, light switch and independent connection, inside or outside evacuation, placed and connected to the network.

1

1,00

1,00 190,89 190,89

**09.08 u Shower enclousure 2 doors 1400x1160 mm**

Screen for bath dimensions 1400x1160 mm, consists of 2 hinged doors foldable 180 °, made of white lacquered aluminum and translucent crystals of 6 mm. thick.

2

2,00

2,00 358,50 717,00

**09.09 m Marble countertop 3cm**

Marble countertop dimensions 60X3 cm. for lengths greater than 1.5 m., with polished edge, taken with cement mortar 1:6 (M-40a) including installation, jointing with white cement slurry, remains removal and cleaning.

10,00

10,00

10,00 53,17 531,70

**TOTAL CHAPTER 09. VARIOUS 3.423,67**  
**TOTAL 140.596,43**

## 8. BUDGET SUMMARY

Chapter	Summary	Amount	%
01	EARTH WORKS	5.989,53	4,26
02	FOUNDATION AND DRAINAGE NETWORK	9.956,62	7,08
03	STRUCTURE	52.513,08	7,35
04	COVERS	5.146,41	3,66
05	FACADES AND PARTITIONS	28.441,01	20,23
06	SERVICES	4.524,72	3,22
07	COATINGS	17.848,96	12,70
08	CARPENTRY	12.752,43	9,07
09	VARIOUS	3.423,67	2,44
<b>TOTAL MATERIAL EXECUTION</b>		<b>140.596,43</b>	
	14,00 % General Costs.....	19.684,00	
	6,00 % Industrial Benefit.....	8.436,00	
	AMOUNT OF G.C. y I.B.	28.120,00	
	18,00 % I.V.A.	30.369,00	
	<b>TOTAL CONTRACT BUDGET</b>	<b>199.085,43</b>	
	<b>TOTAL GENERAL BUDGET</b>	<b>199.085,43</b>	

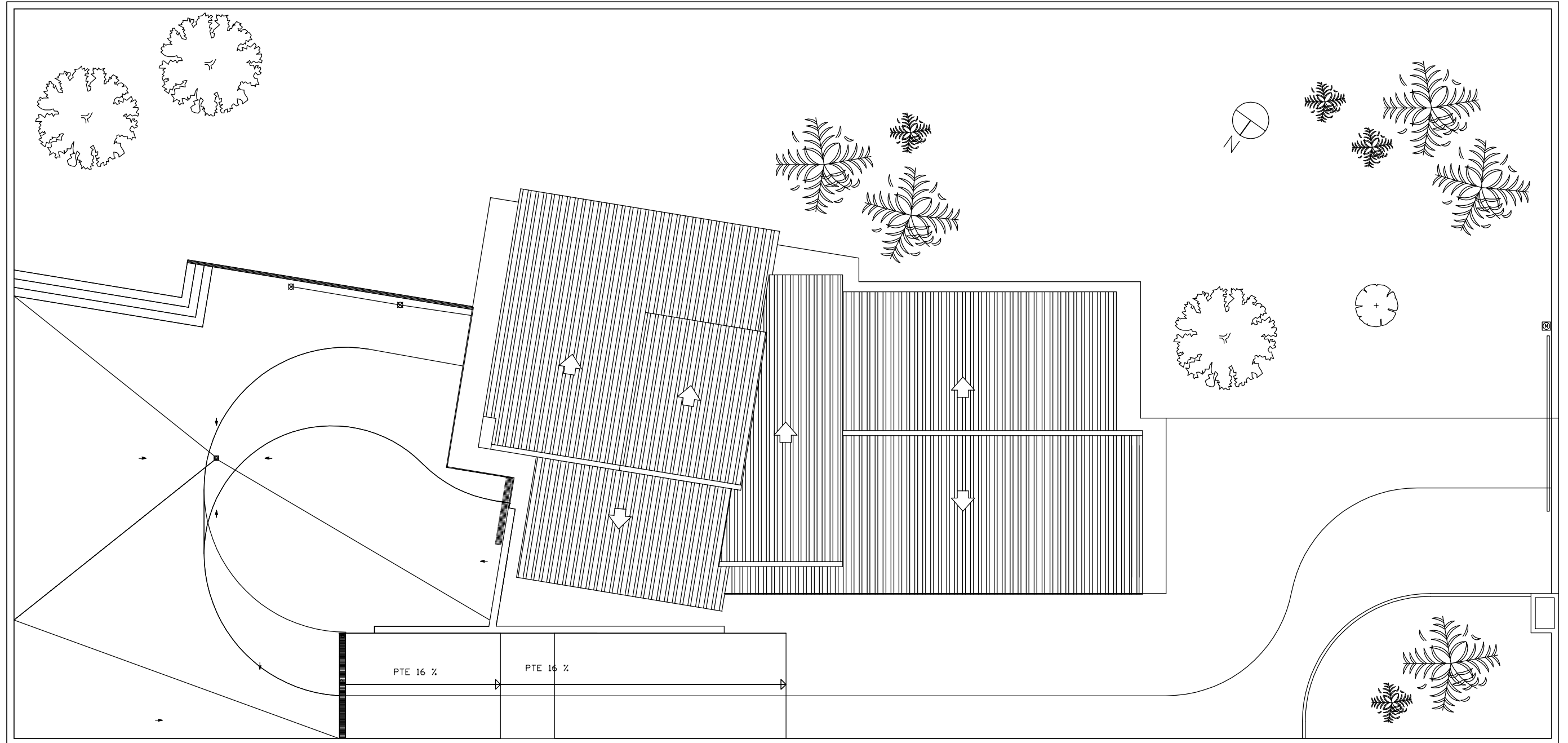
The budget amounts to the said sum of ONE HUNDRED NINETY-NINETHOUSAND EIGHTY-FIVE EUROS.

LA PROPERTY  
 , 28 of May of 2012.

THE ARCHITECTURAL TEAM

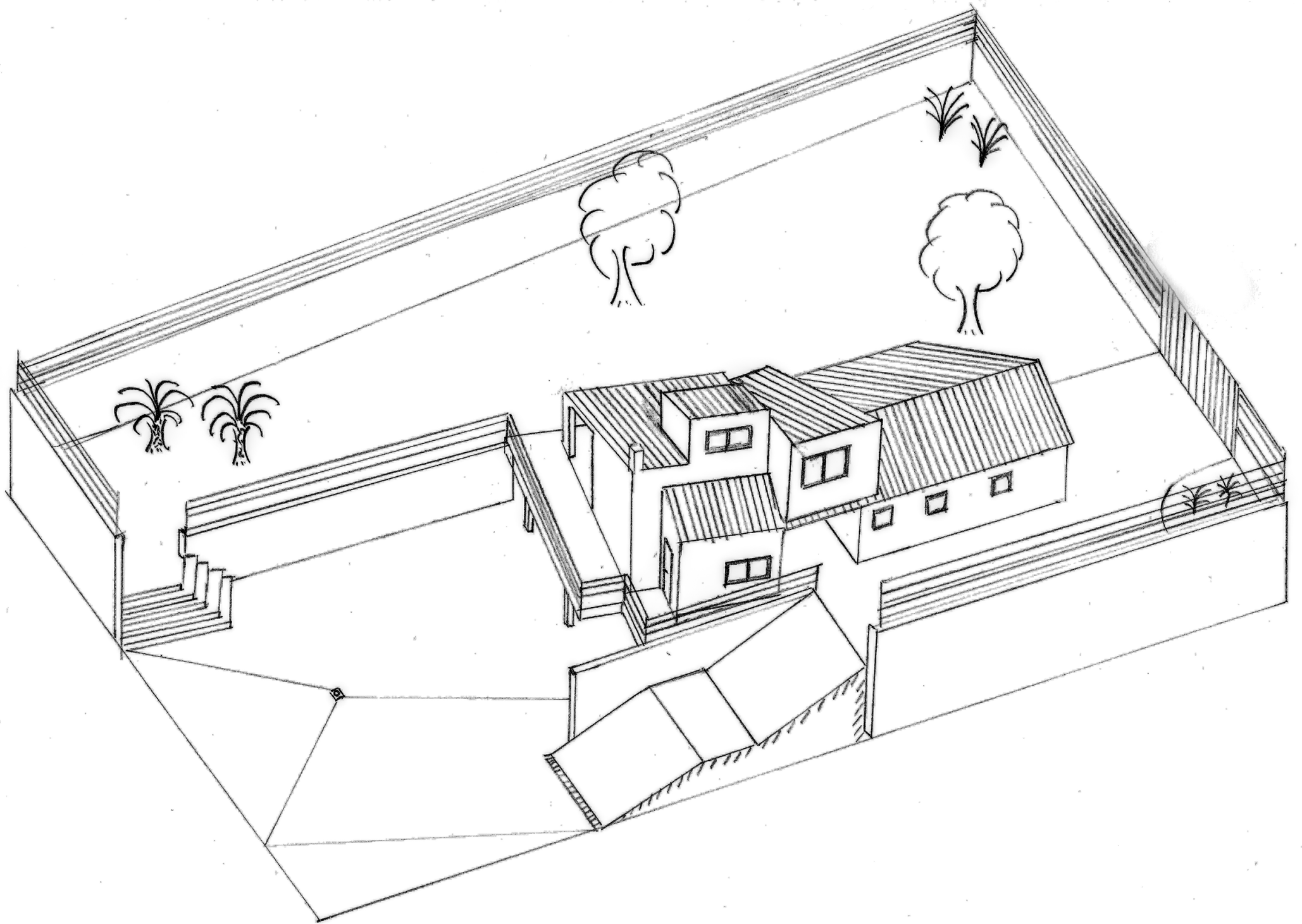


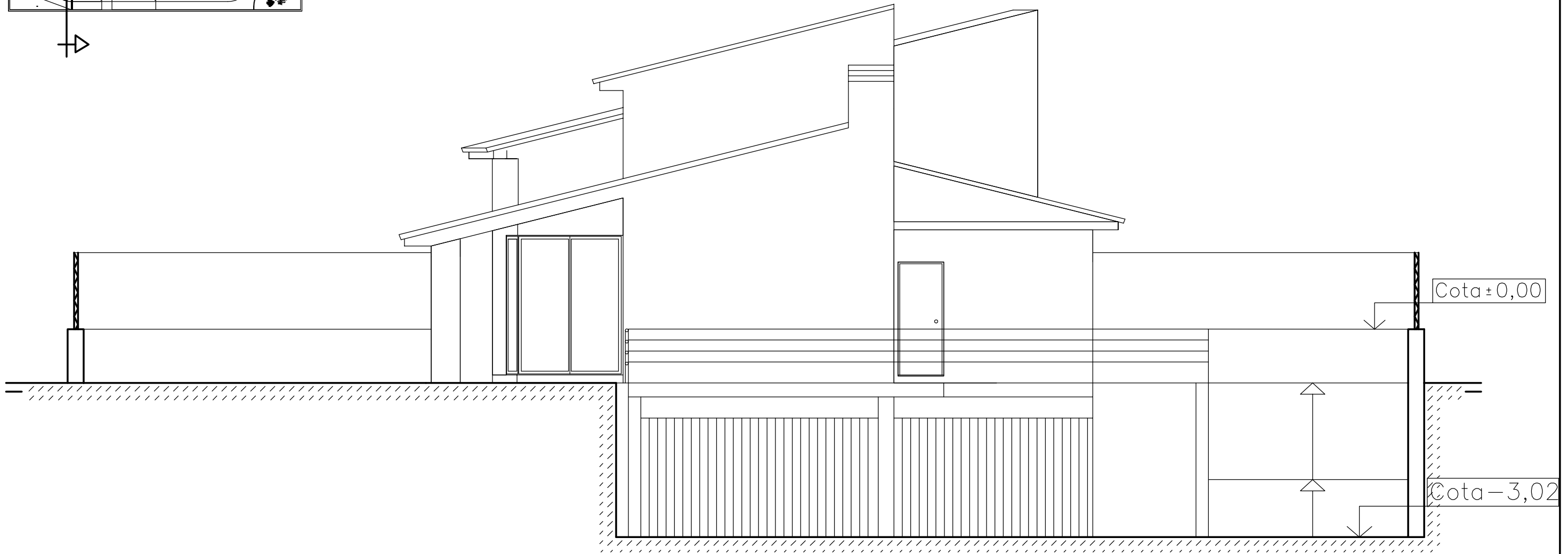
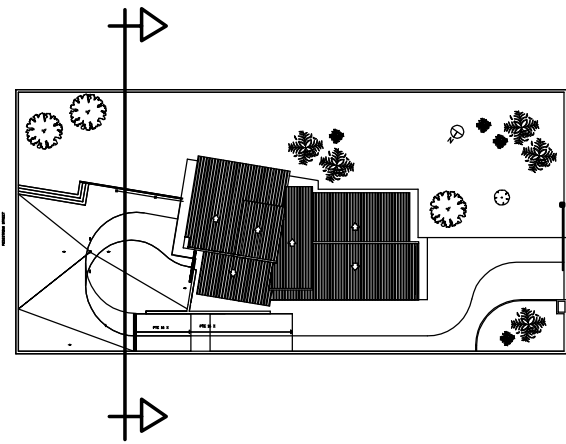
PEDESTRIAN STREET




ACCES STREET

 ESCUELA TÉCNICA SUPERIOR DE INGENIERÍA DE EDIFICACIÓN	PROJECT	SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE	PLACEMENT		
	TUTOR	STUDENT		
	FRANTISEK KULHANEK/ MILAGROS IBORRA	CARLOS ESTRUCH MARTIN		
		Nº PLANE	SCALE	DATE
		1	1/150	13/06/2012

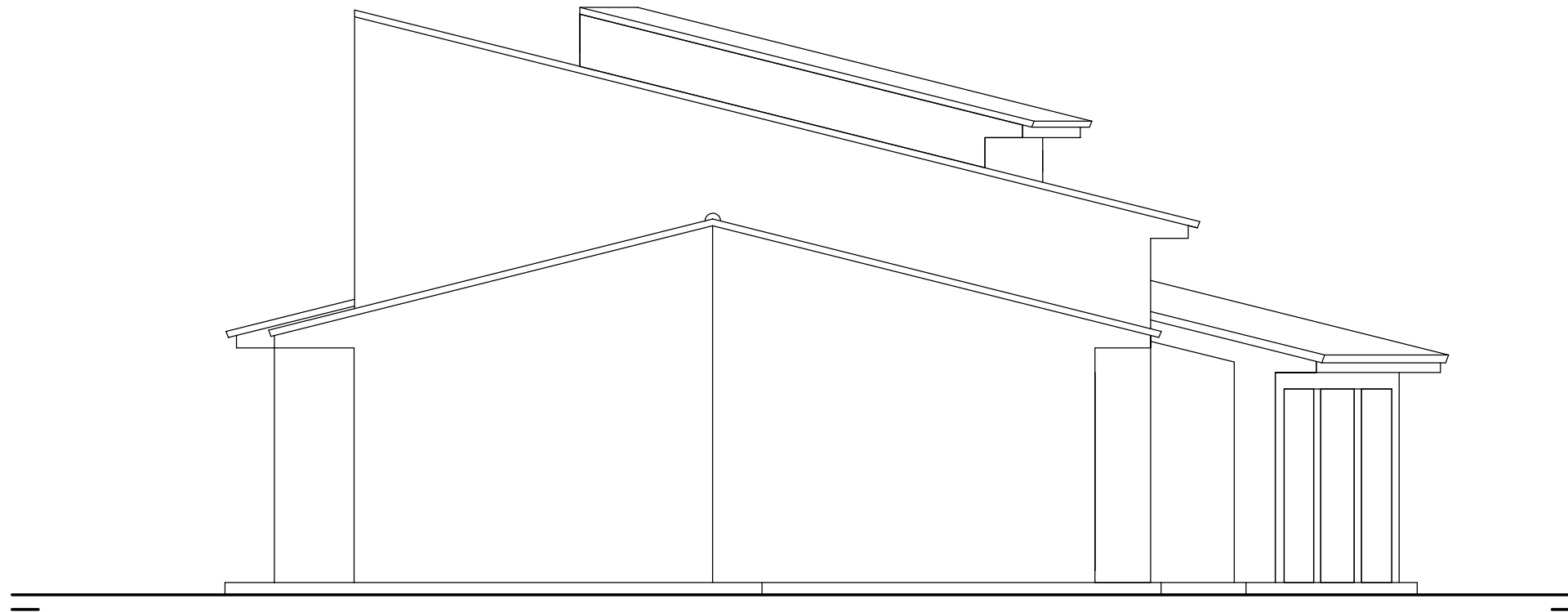






 ESCUELA TÉCNICA SUPERIOR DE INGENIERÍA DE EDIFICACIÓN	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE PARCEL SECTION A		
	TUTOR FRANTISEK KULHANEK/ MILAGRO IBORRA	STUDENT CARLOS ESTRUCH MARTIN	
	Nº PLANE <b>2</b>	SCALE <b>1/75</b>	DATE 13/06/2012





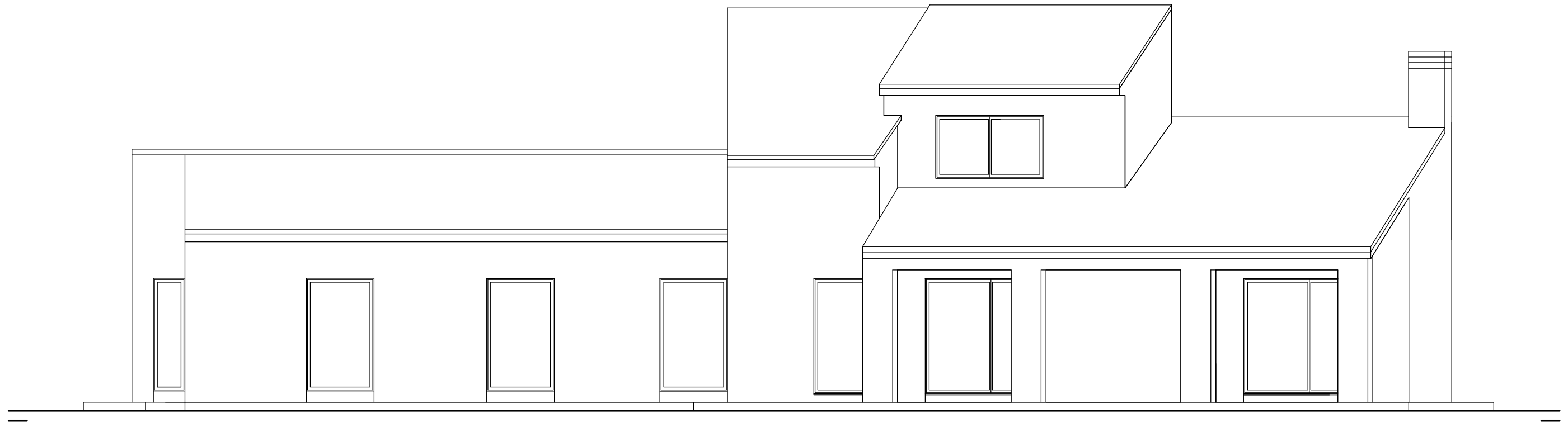
 ESCUELA TÉCNICA SUPERIOR DE INGENIERÍA DE EDIFICACIÓN	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE PARCEL SECTION B		
	TUTOR FRANTISEK KULHANEK/ MILAGRO IBORRA	STUDENT CARLOS ESTRUCH MARTIN	
	Nº PLANE <b>3</b>	SCALE 1/150	DATE 13/06/2012





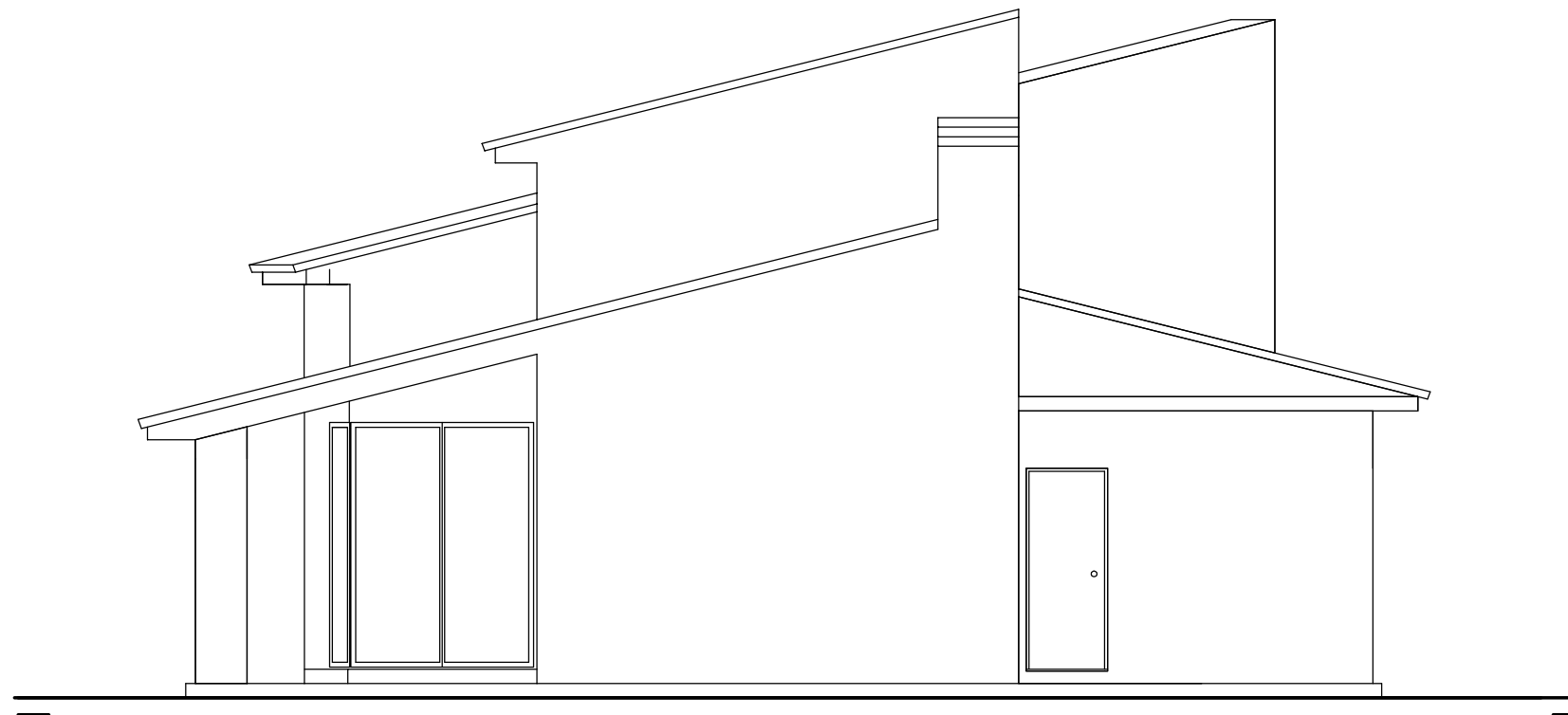
 	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE WEST FACADE		
	TUTOR FRANTISEK KULHANEK/ MILAGRO IBORRA	STUDENT CARLOS ESTRUCH MARTIN	
	Nº PLANE <b>4</b>	SCALE <b>1/75</b>	DATE 13/06/2012



 	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE NORTH FACADE		
	TUTOR	STUDENT	
	FRANTISEK KULHANEK/ MILAGRO IBORRA	CARLOS ESTRUCH MARTIN	
	Nº PLANE	SCALE	DATE
	5	1/75	13/06/2012

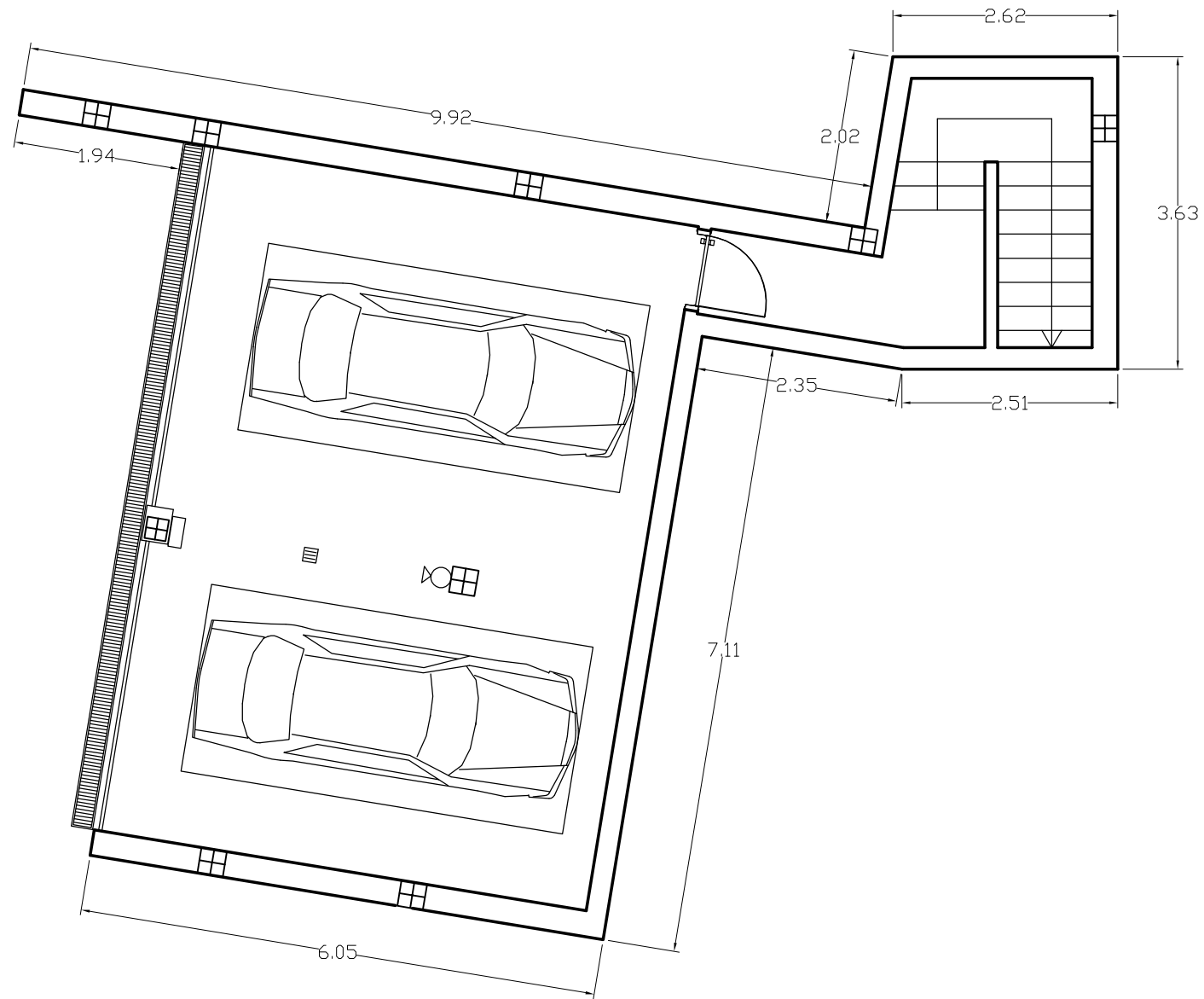


 	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE SOUTH FACADE		
	TUTOR FRANTISEK KULHANEK/ MILAGRO IBORRA	STUDENT CARLOS ESTRUCH MARTIN	
	Nº PLANE <b>6</b>	SCALE <b>1/75</b>	DATE 13/06/2012



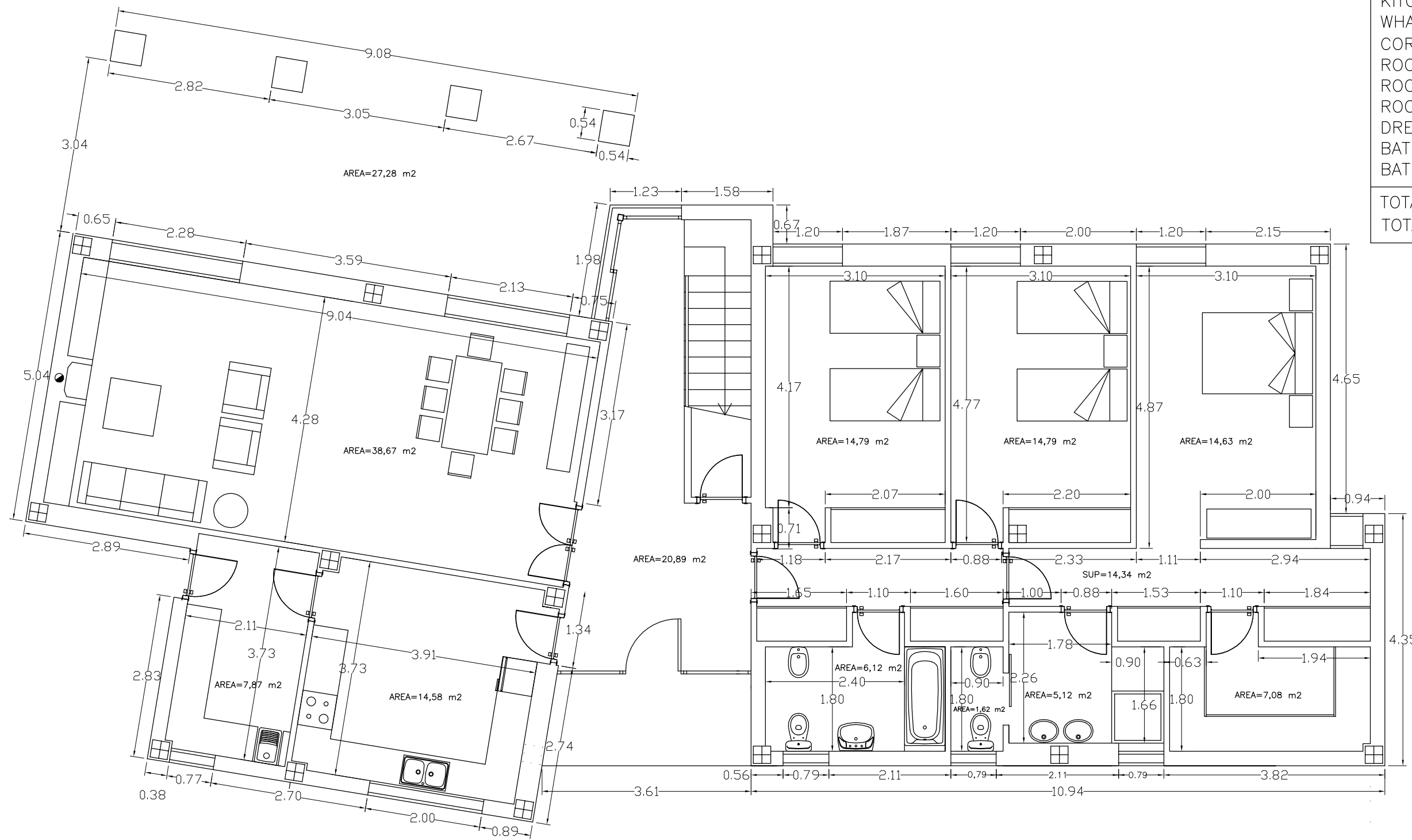
 	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE EAST FACADE		
	TUTOR FRANTISEK KULHANEK/ MILAGRO IBORRA	STUDENT CARLOS ESTRUCH MARTIN	
	Nº PLANE <b>7</b>	SCALE <b>1/75</b>	DATE 13/06/2012






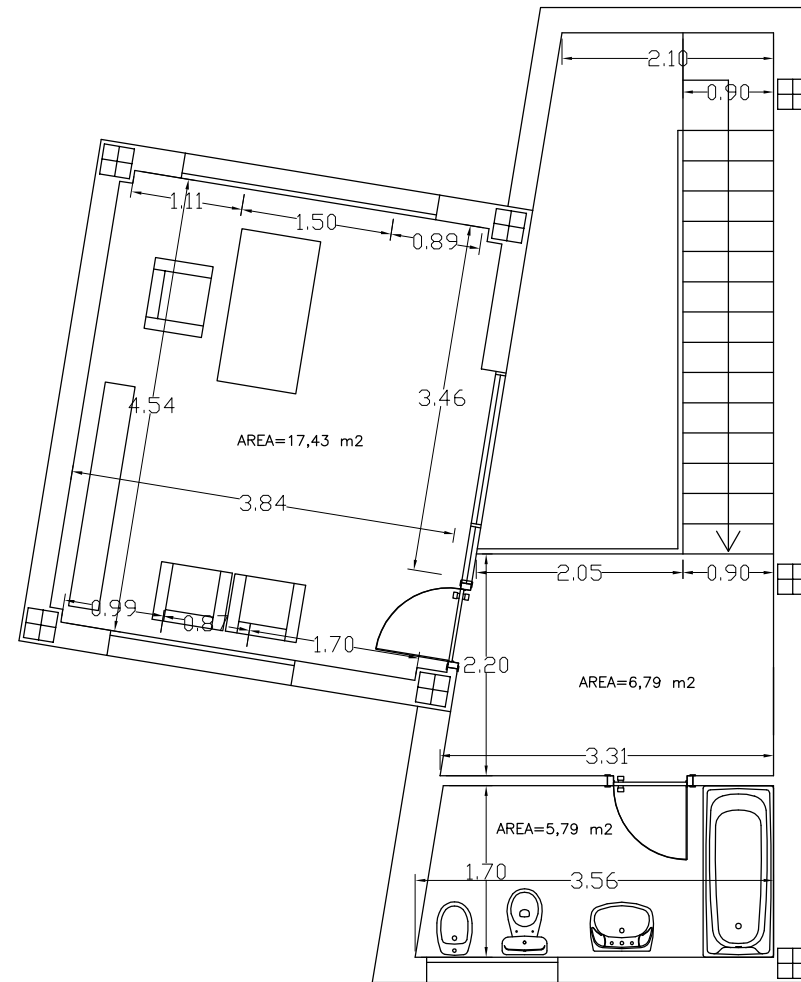
BASEMENT	
USEFUL AREA	53.4 m <sup>2</sup>
BUILT AREA	58.6 m <sup>2</sup>

 ESCUELA TÉCNICA SUPERIOR DE INGENIERÍA DE EDIFICACIÓN	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE DISTRIBUTION AND AREAS; BASEMENT		
	TUTOR FRANTISEK KULHANEK/ MILAGRO IBORRA	STUDENT CARLOS ESTRUCH MARTIN	
	Nº PLANE <b>8</b>	SCALE <b>1/75</b>	DATE 13/06/2012



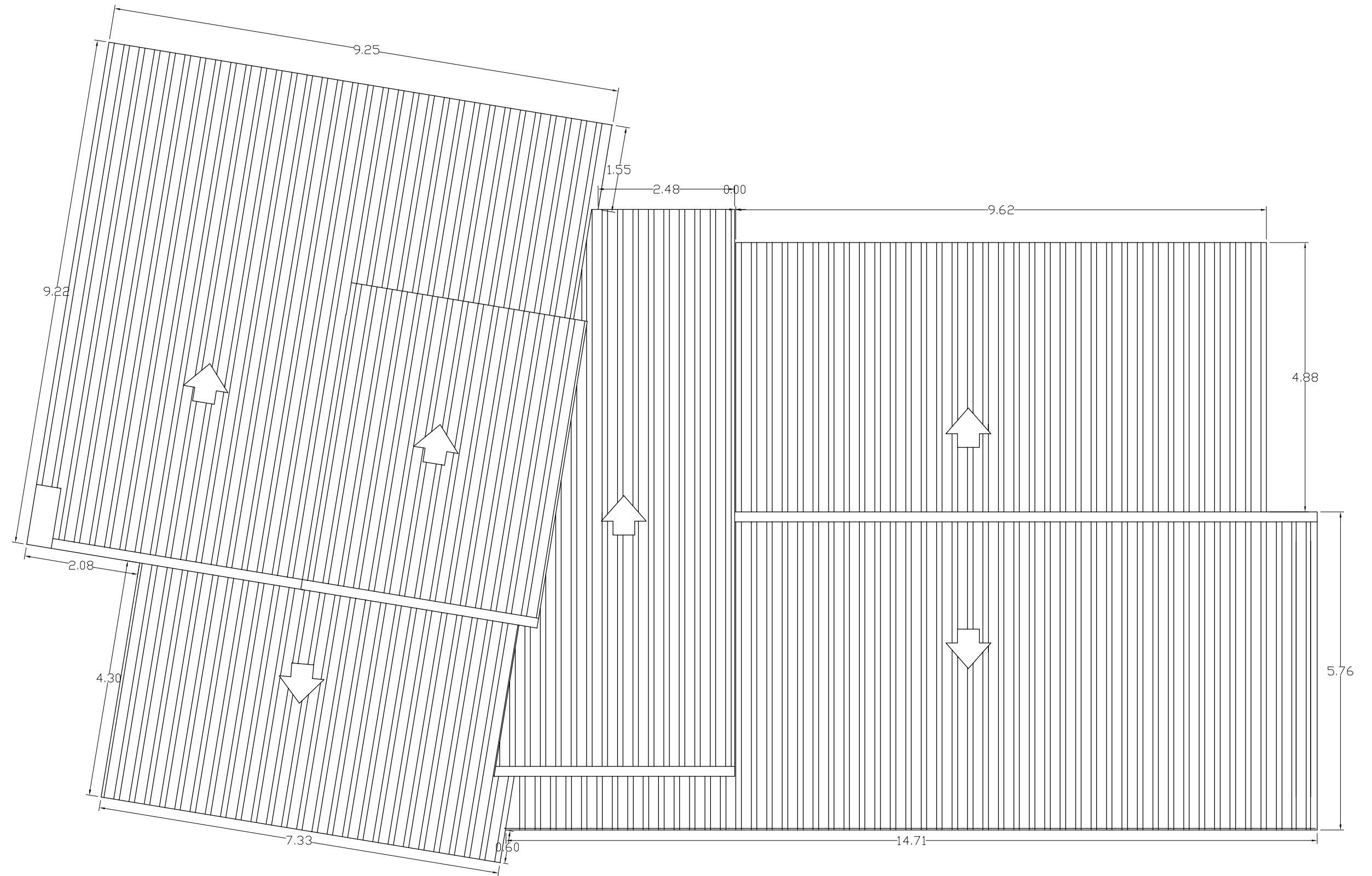
GROUND FLOOR	
HALL AND STAIRWAY	20,89 m2
DINNING ROOM	38,67 m2
KITCHEN	14,58 m2
WHASING ROOM	7,87 m2
CORRIDOR	14,34 m2
ROOM 1	14,79 m2
ROOM 2	14,79 m2
ROOM 3	14,63 m2
DRESSING ROOM	7,08 m2
BATHROOM 1	6,12 m2
BATHROOM 2	6,74 m2
<b>TOTAL USEFUL AREA</b>	<b>160,50 m2</b>
<b>TOTAL BUILT AREA</b>	<b>188,37 m2</b>

	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE DISTRIBUTION AND AREAS; GROUND FLOOR		
	TUTOR	STUDENT	
	FRANTISEK KULHANEK/ MILAGRO IBORRA	CARLOS ESTRUCH MARTIN	
	Nº PLANE	SCALE	DATE
	9	1/75	13/06/2012

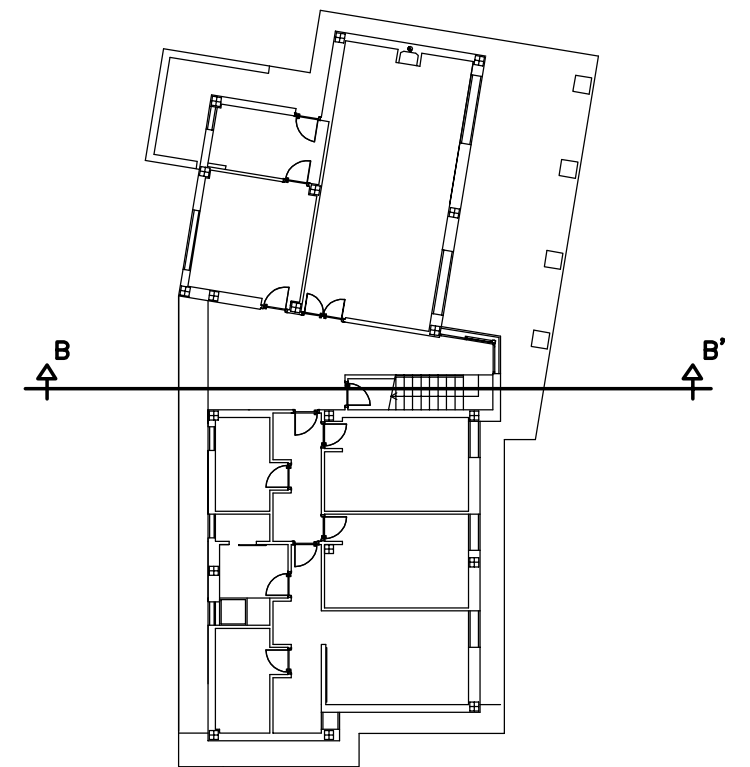
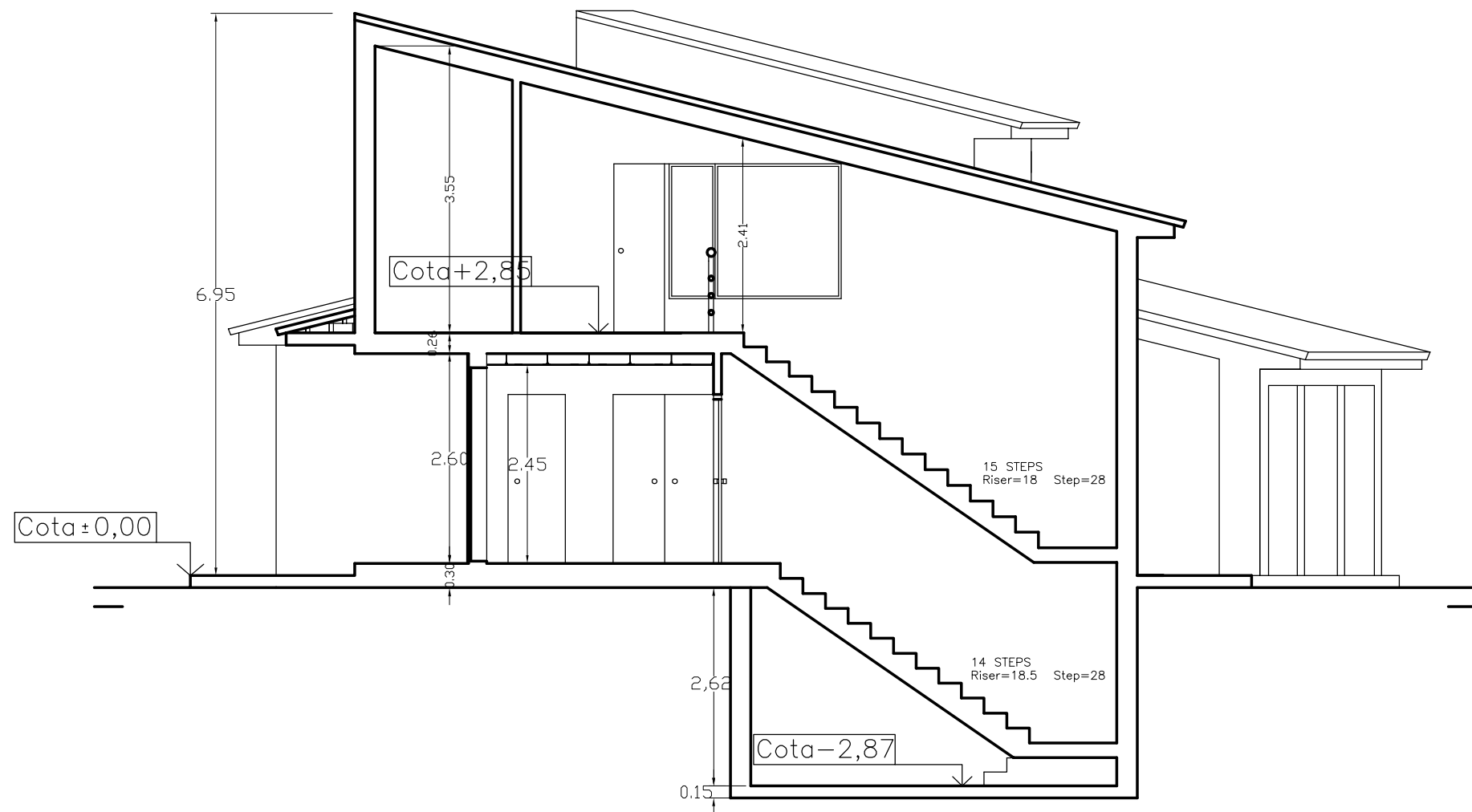


FIRST FLOOR	
HALL	6,79 m2
BATHROOM	5,79 m2
STUDY ROOM	17,43 m2
TOTAL USEFUL AREA	30,01 m2
TOTAL BUILT AREA	44,22 m2

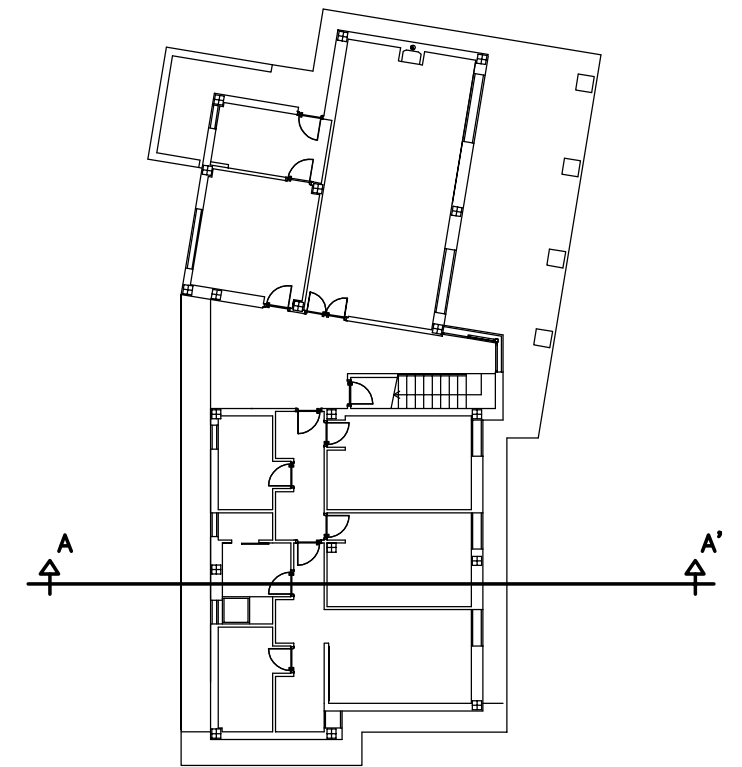
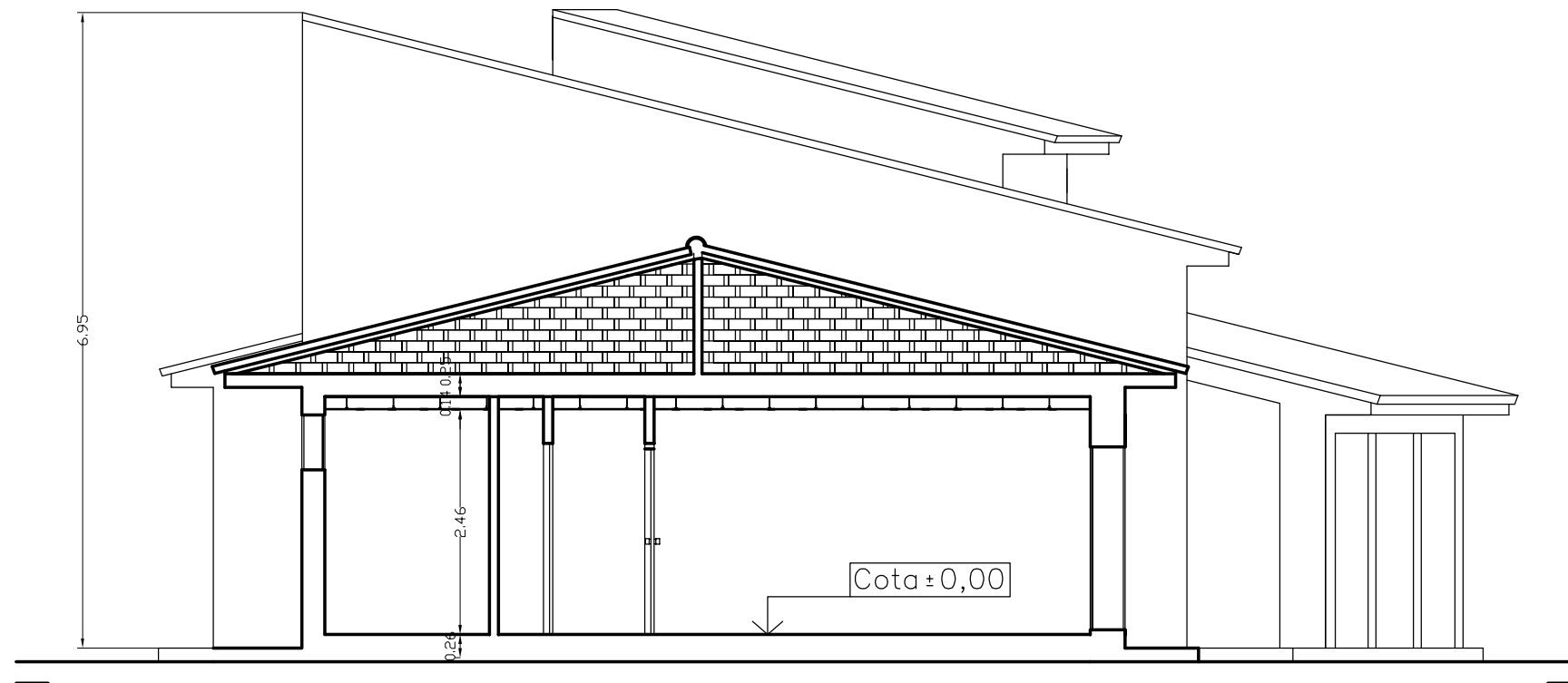
	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE DISTRIBUTION AND AREAS; FIRST FLOOR		
	TUTOR FRANTISEK KULHANEK/ MILAGRO IBORRA	STUDENT CARLOS ESTRUCH MARTIN	
	Nº PLANE <b>10</b>	SCALE <b>1/75</b>	DATE 13/06/2012



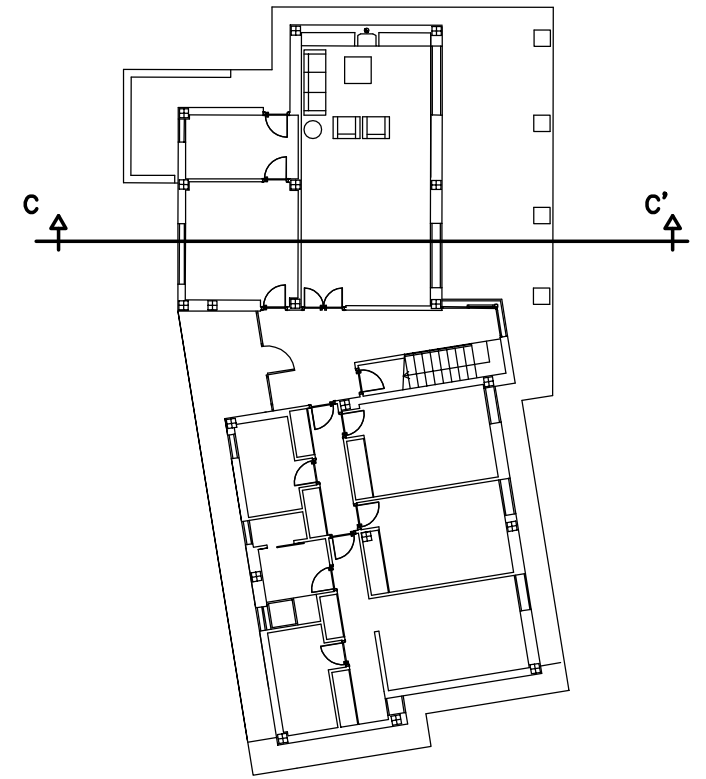
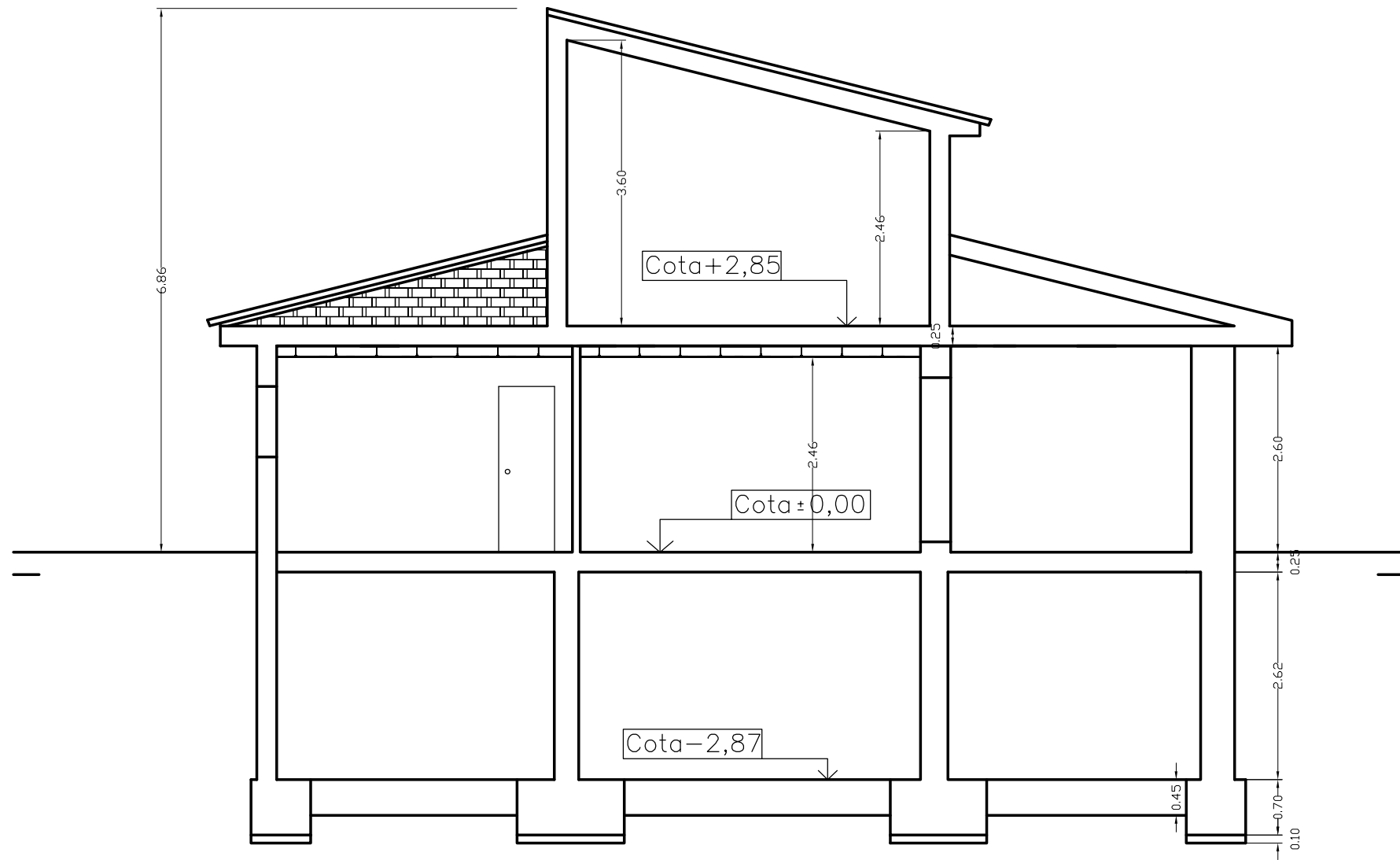
 	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE DISTRIBUTION; COVERS		
	TUTOR FRANTISEK KULHANEK/ MILAGRO IBORRA		STUDENT CARLOS ESTRUCH MARTIN
	Nº PLANE	SCALE	DATE
11	1/75	13/06/2012	



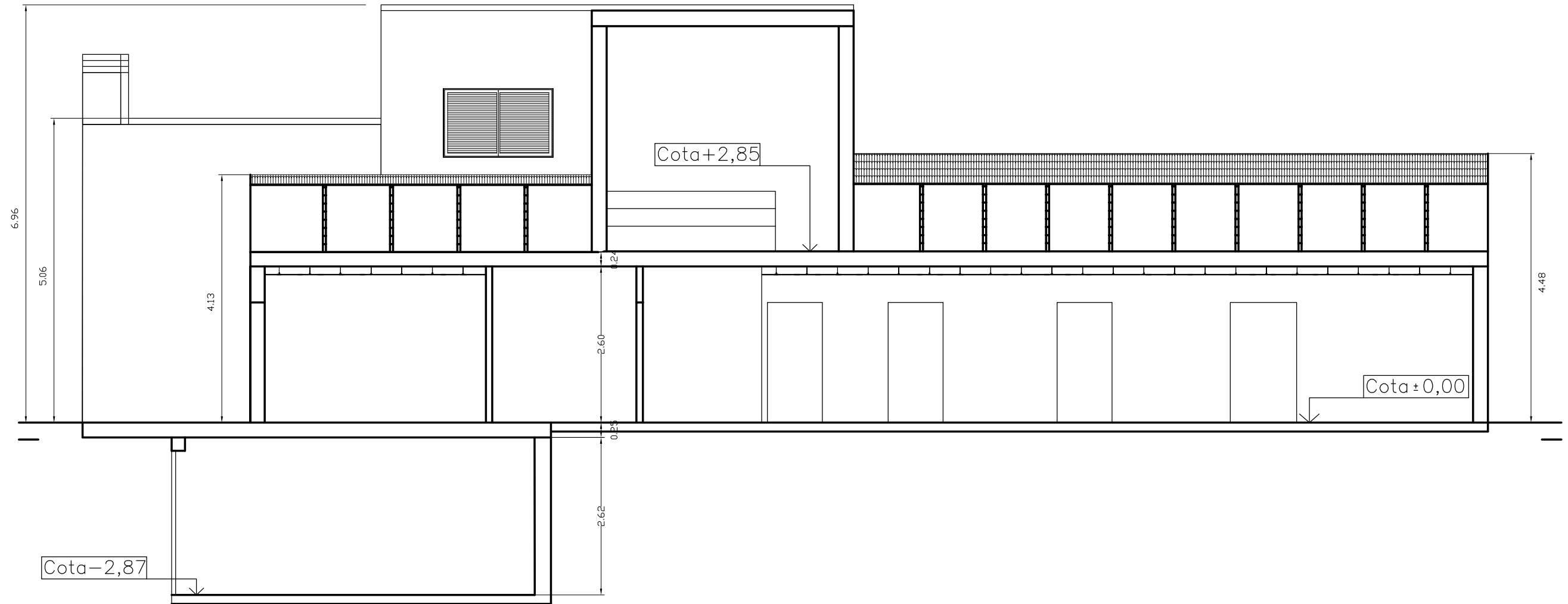
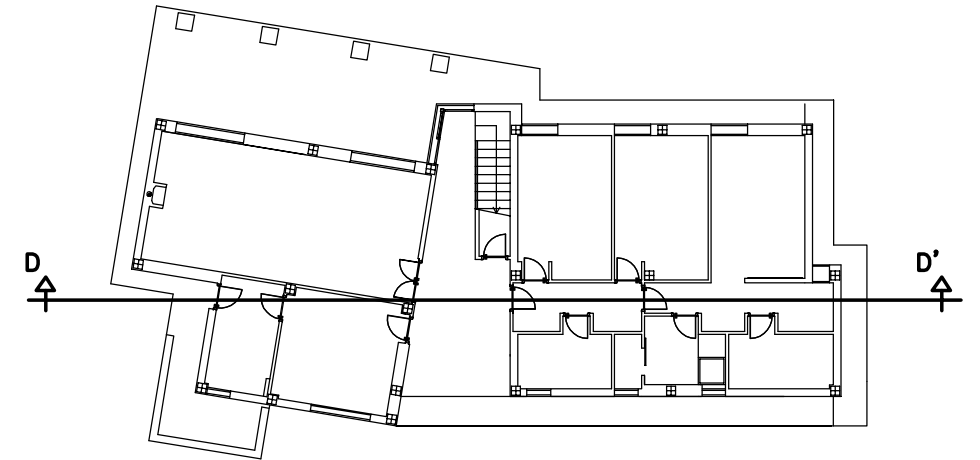
 ESCUELA TÉCNICA SUPERIOR DE INGENIERÍA DE EDIFICACIÓN	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE SECTION B-B'		
	TUTOR FRANTISEK KULHANEK/ MILAGRO IBORRA		STUDENT CARLOS ESTRUCH MARTIN
	Nº PLANE 12	SCALE 1/75	DATE 13/06/2012



 ESCUELA TÉCNICA SUPERIOR DE INGENIERÍA DE EDIFICACIÓN	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE SECTION A-A'		
	TUTOR	STUDENT	
	FRANTISEK KULHANEK/ MILAGRO IBORRA	CARLOS ESTRUCH MARTIN	
	Nº PLANE	SCALE	DATE
	13	1/75	13/06/2012

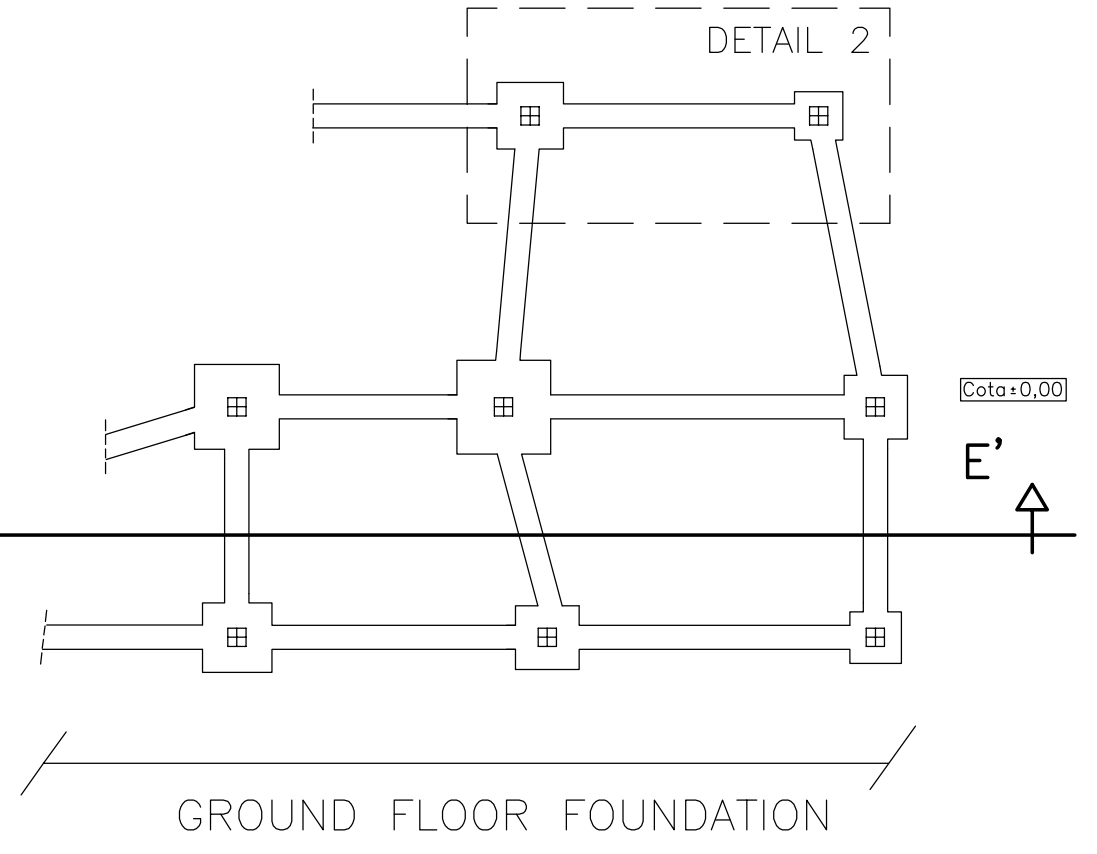
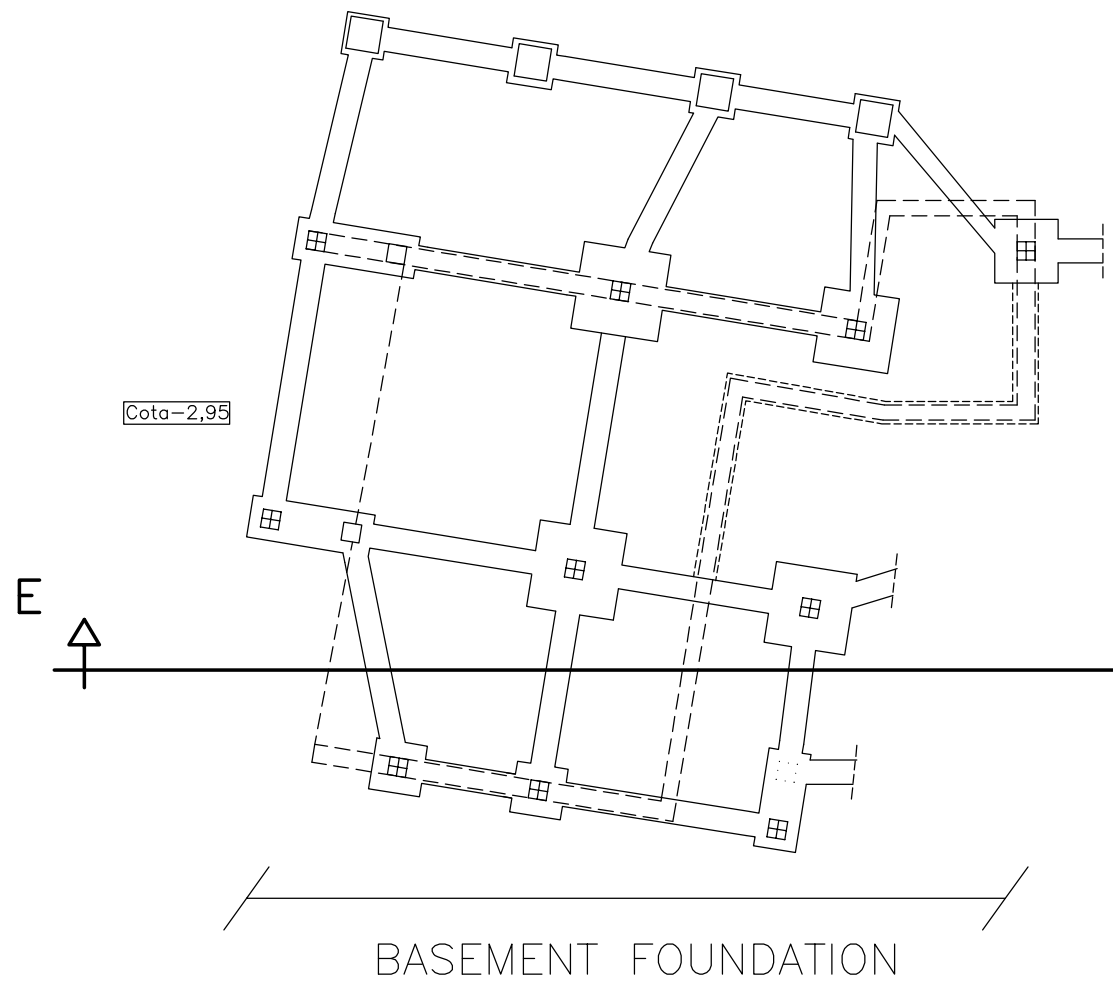
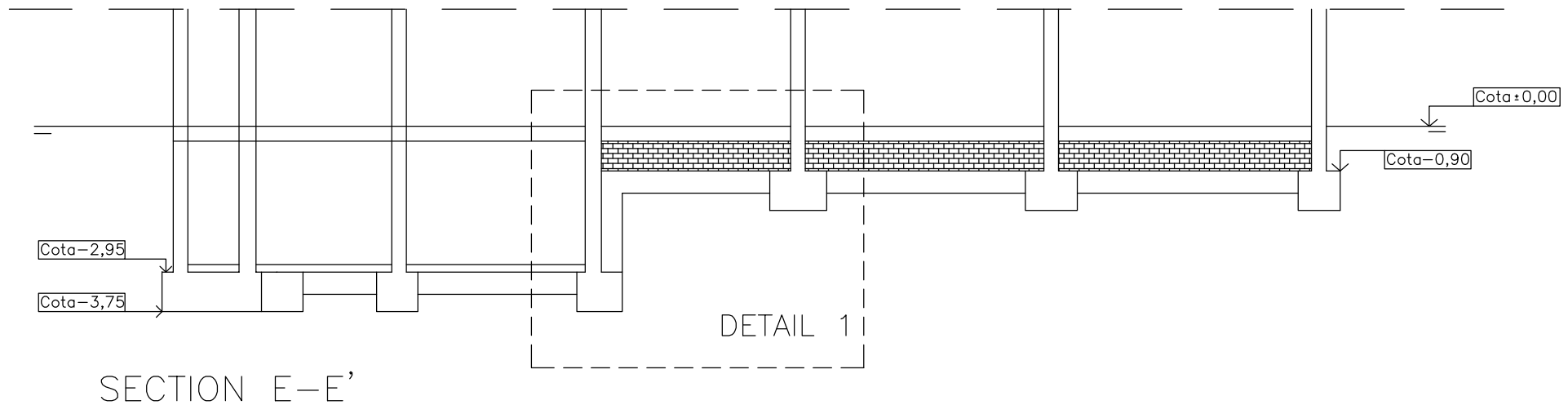



 ESCUELA TÉCNICA SUPERIOR DE INGENIERÍA DE EDIFICACIÓN	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE SECTION C-C'		
	TUTOR FRANTISEK KULHANEK/ MILAGRO IBORRA		STUDENT CARLOS ESTRUCH MARTIN
	Nº PLANE 14	SCALE 1/75	DATE 13/06/2012

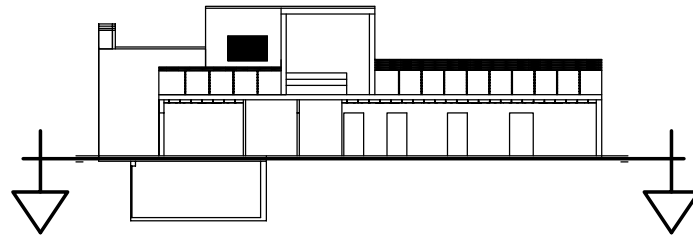


 ESCUELA TÉCNICA SUPERIOR DE INGENIERÍA DE EDIFICACIÓN	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE CARLOS ESTRUCH MARTIN		
	TUTOR FRANTISEK KULHANEK/ MILAGROIBORRA	STUDENT SECTION D-D'	
	Nº PLANE 15	SCALE 1/75	DATE 13/06/2012



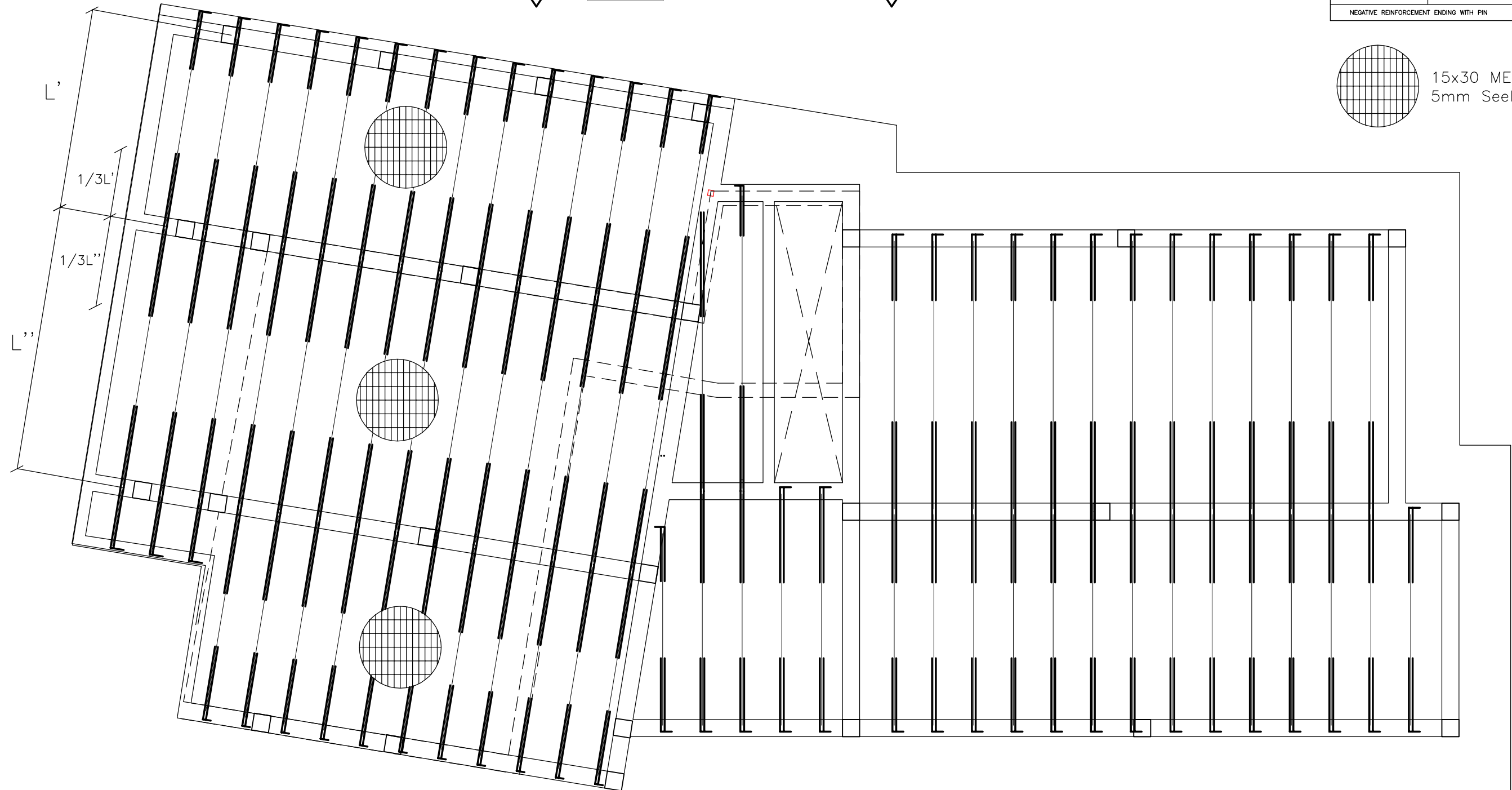
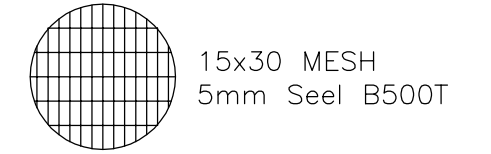


 Escuela Técnica Superior de Ingeniería de Edificación	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE STRUCTURE; BASEMENT		
	TUTOR	STUDENT	
	FRANTISEK KULHANEK/ MILAGRO IBORRA	CARLOS ESTRUCH MARTIN	
	Nº PLANE	SCALE	DATE
	17	1/125	13/06/2012



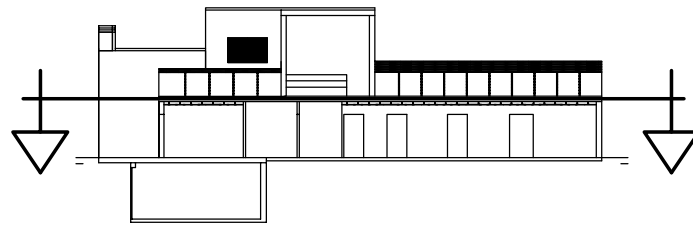
----- Basement Situation

SLAB FEATURES	
TOTAL THICKNESS	22+4 cm.
TOTAL CHARGE	730 kg/m <sup>2</sup>
JOIST TYPE	HALF-RESISTANT
JOIST DISTANCE	70 cm.
NEGATIVE REINFORCEMENT ENDING WITH PIN	

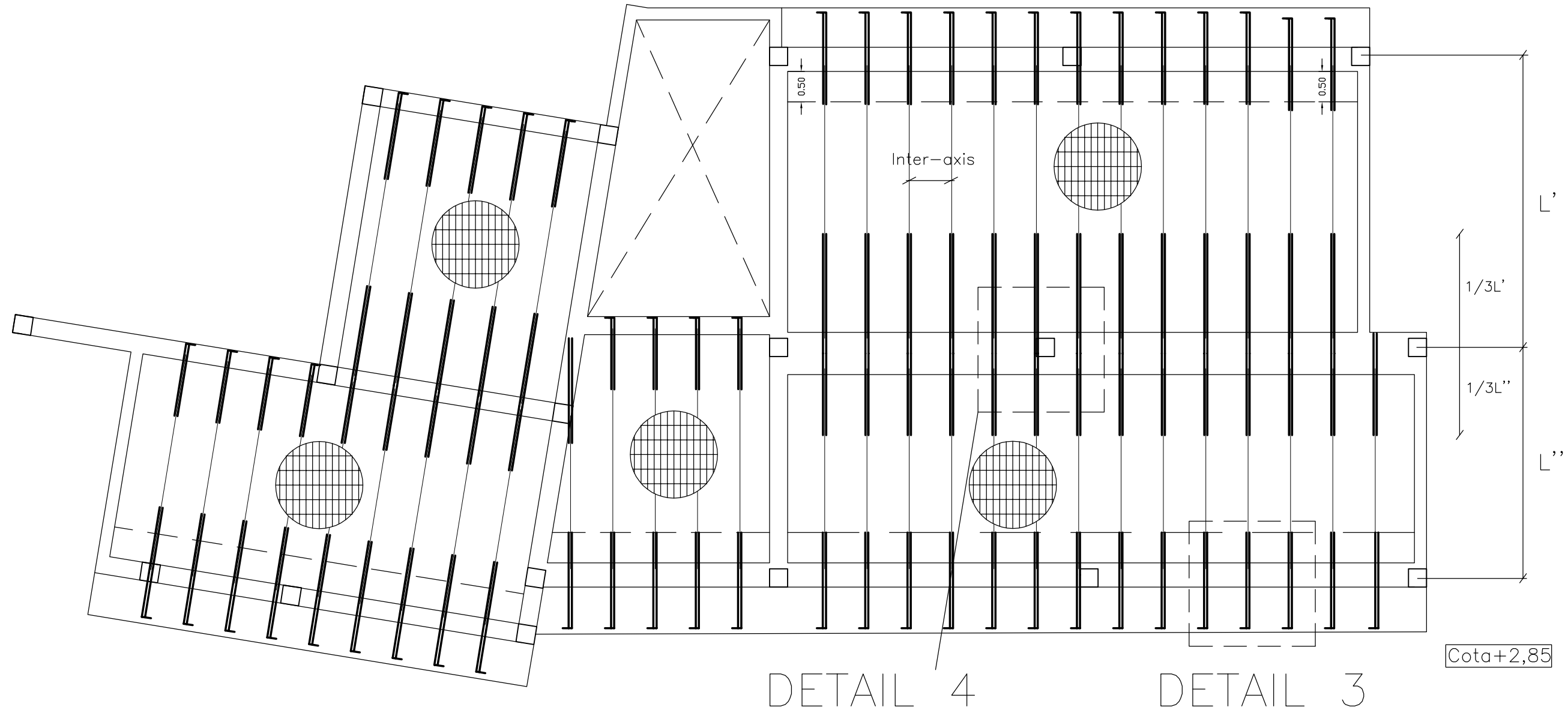


Cota ±0,00

	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE STRUCTURE; GROUND FLOOR		
	TUTOR FRANTISEK KULHANEK/ MILAGRO IBORRA	STUDENT CARLOS ESTRUCH MARTIN	
	Nº PLANE 18	SCALE 1/75	DATE 13/06/2012



SLAB FEATURES	
TOTAL THICKNESS	22+4 cm.
TOTAL CHARGE	730 kg/m <sup>2</sup>
JOIST TYPE	HALF-RESISTANT
JOIST DISTANCE	70 cm.
NEGATIVE REINFORCEMENT ENDING WITH PIN	



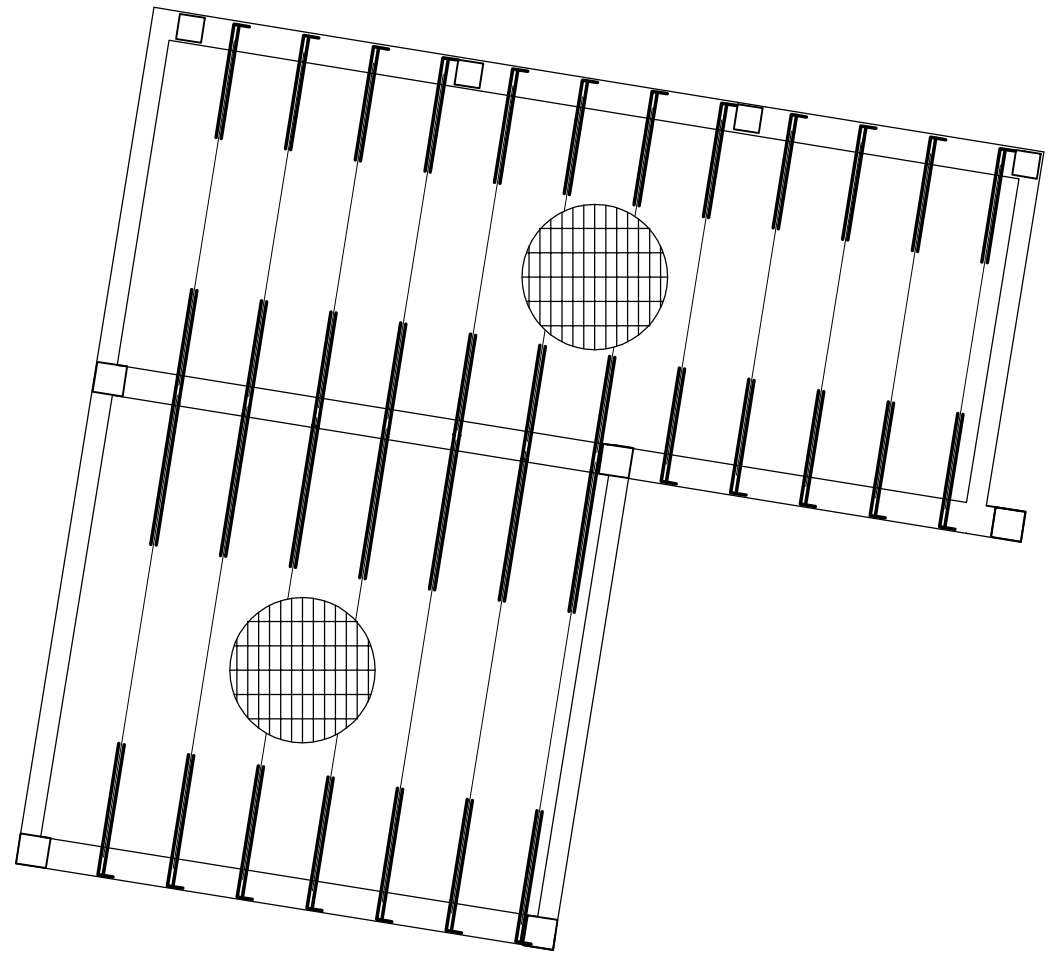
DETAIL 4

DETAIL 3

Cota+2,85

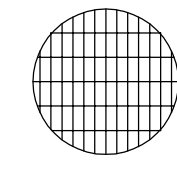
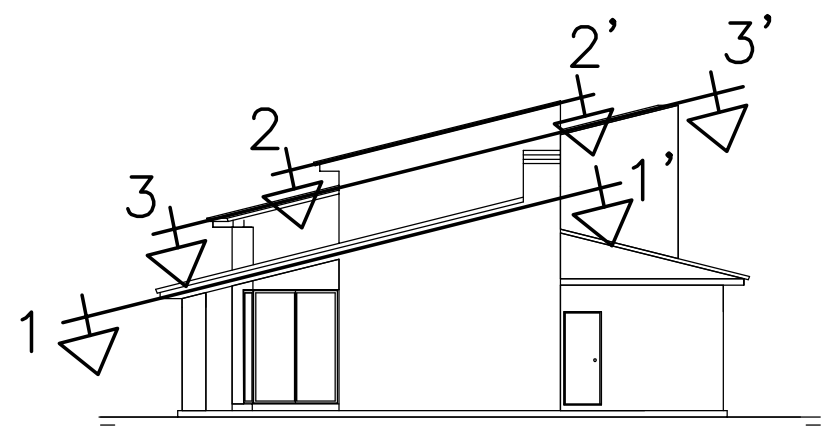
	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE STRUCTURE; FIRST FLOOR		
	TUTOR FRANTISEK KULHANEK/ MILAGRO IBORRA	STUDENT CARLOS ESTRUCH MARTIN	
	Nº PLANE <b>19</b>	SCALE <b>1/75</b>	DATE 13/06/2012

Cota+2,68



Cota+5,10

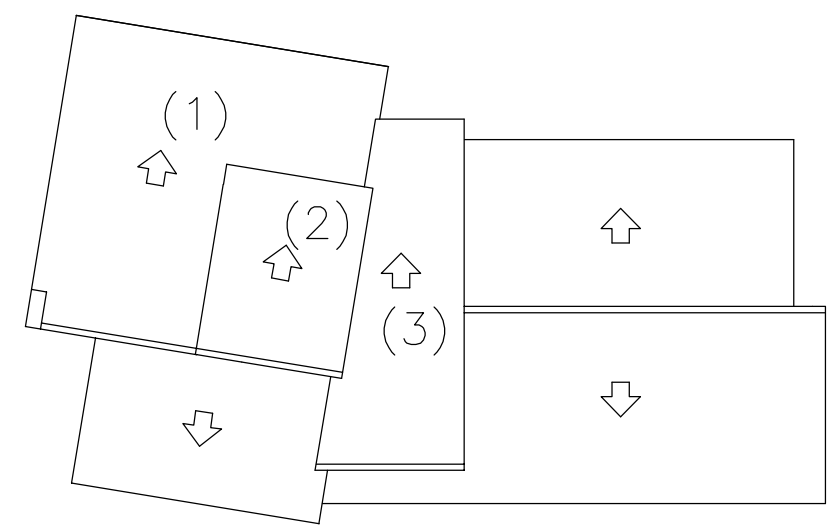
Hall entree cover (1)



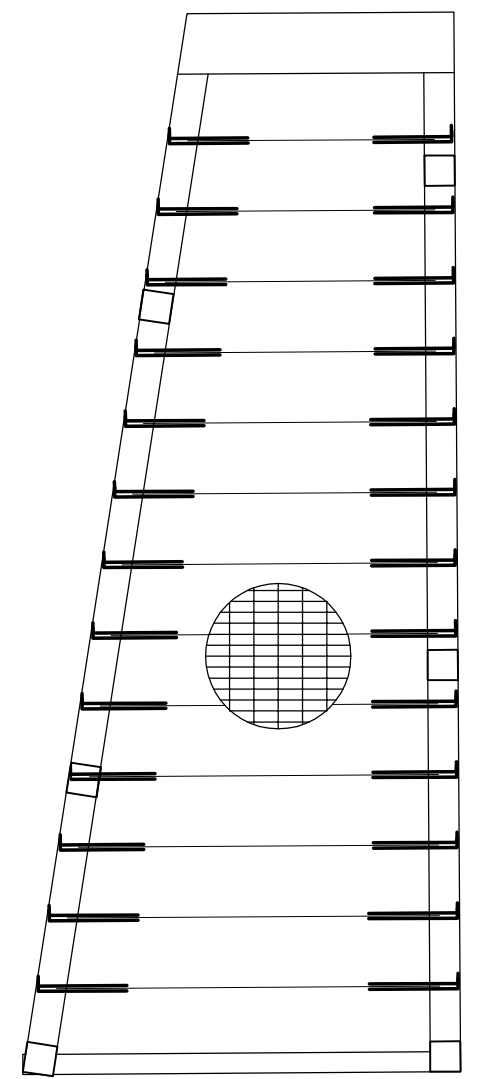
15x30 MESH  
5mm Steel B500T

SLAB FEATURES	
TOTAL THICKNESS	22+4 cm.
TOTAL CHARGE	730 kg/m <sup>2</sup>
JOIST TYPE	HALF-RESISTANT
JOIST DISTANCE	70 cm.
NEGATIVE REINFORCEMENT ENDING WITH PIN	

Cota+4,33



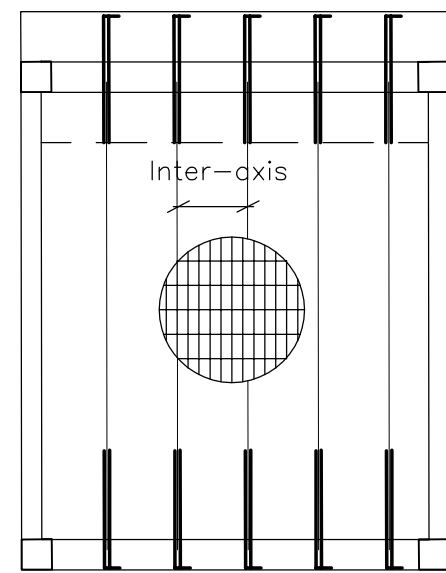
COVERS PLAN



Cota+6,86

Stairway Cover (3)

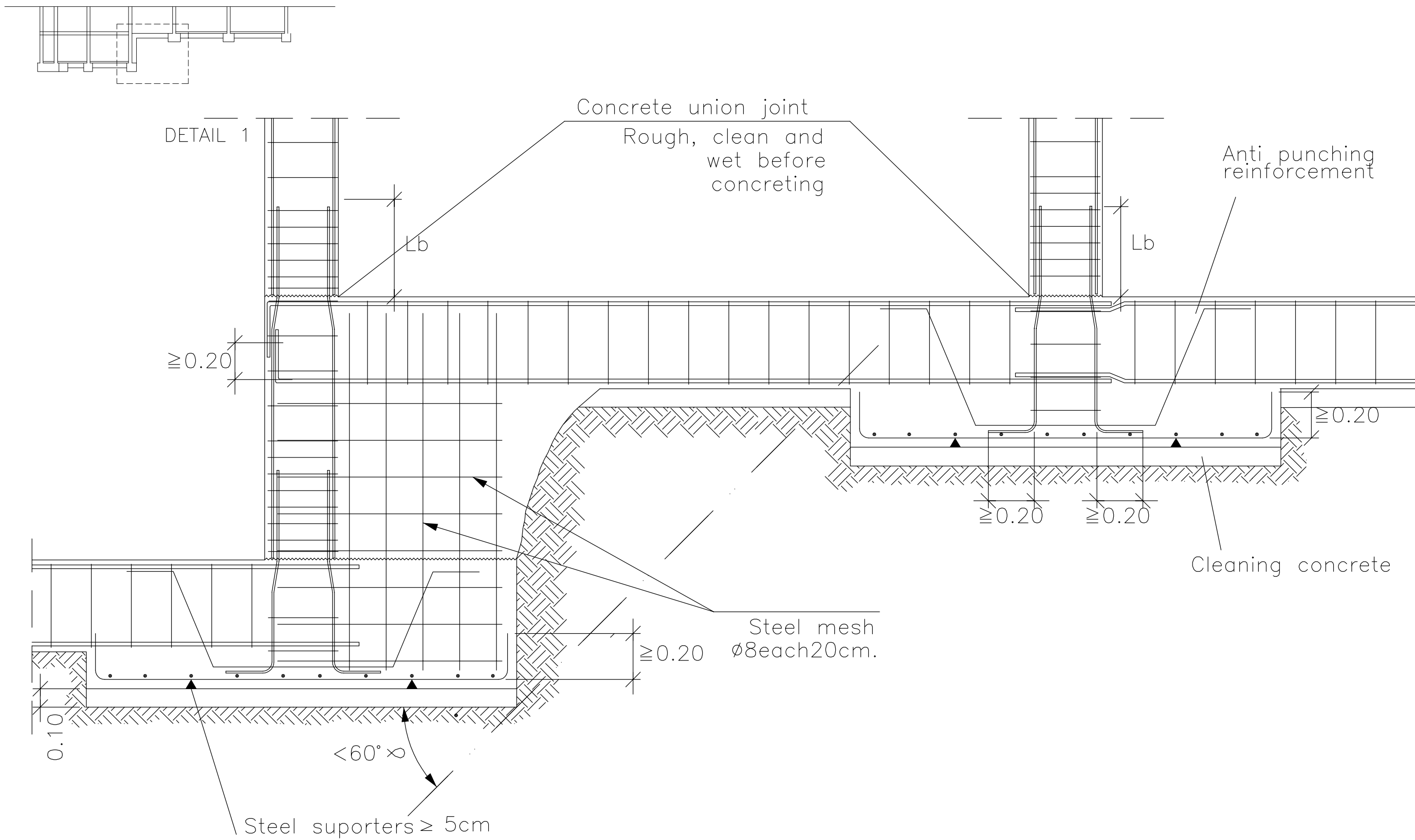
Cota+5,60



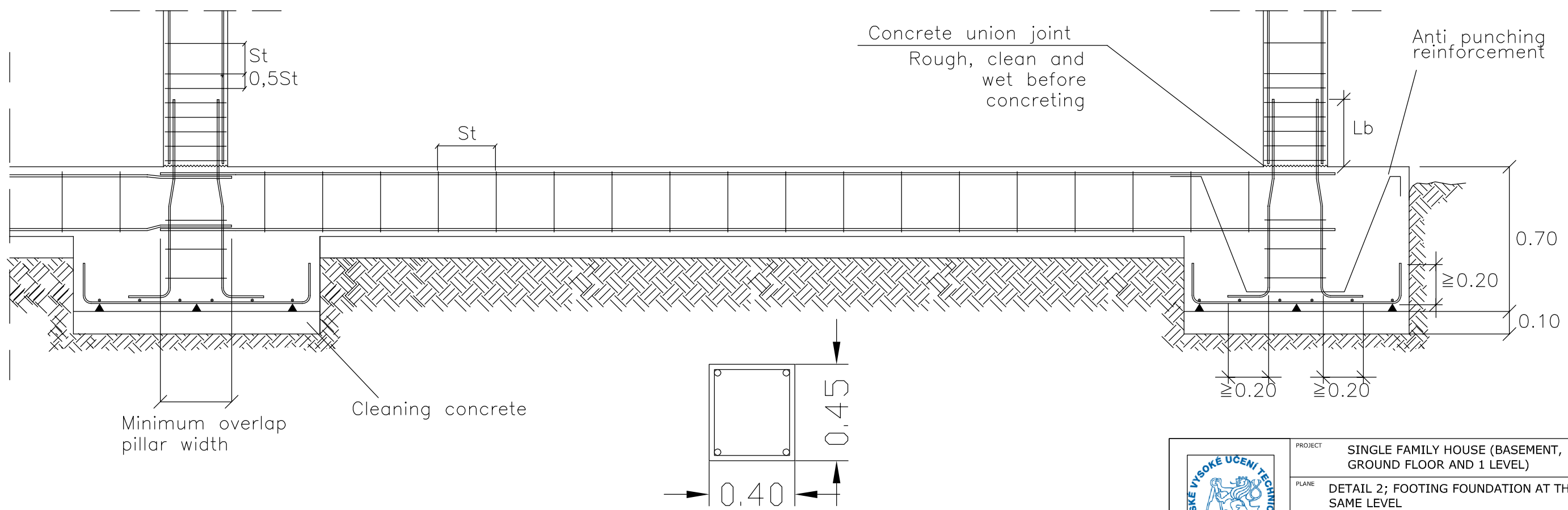
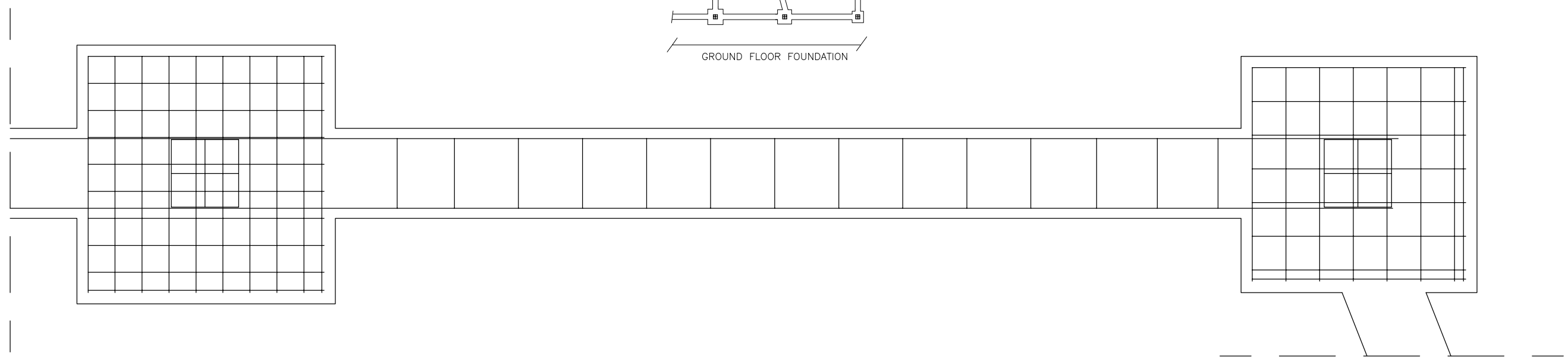
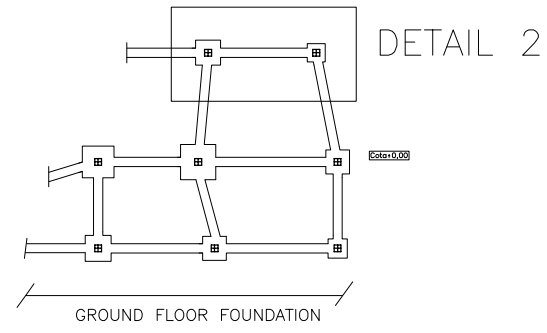
Cota+6,95

Study Area Cover (2)

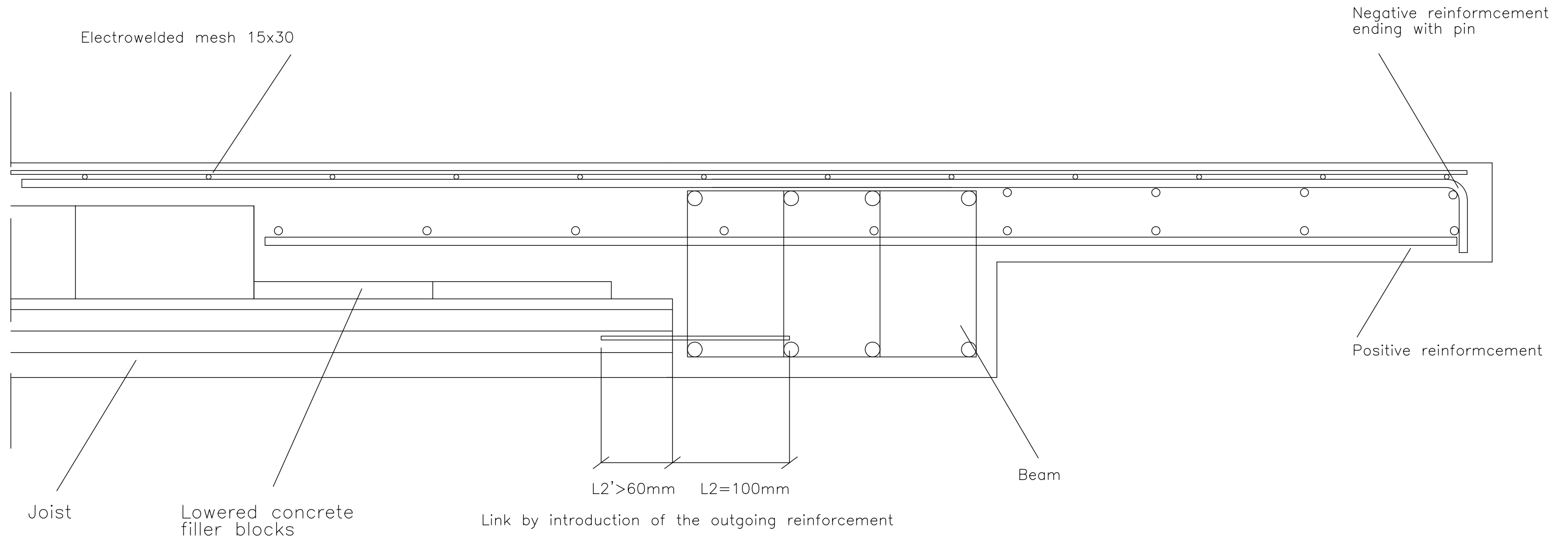
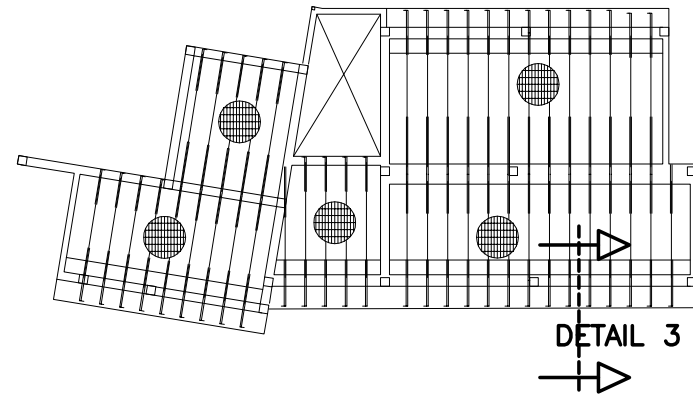
	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE STRUCTURE; COVERS		
	TUTOR	STUDENT	
	FRANTISEK KULHANEK/ MILAGROS IBORRA	CARLOS ESTRUCH MARTIN	
	Nº PLANE	SCALE	DATE
20	1/75	13/06/2012	



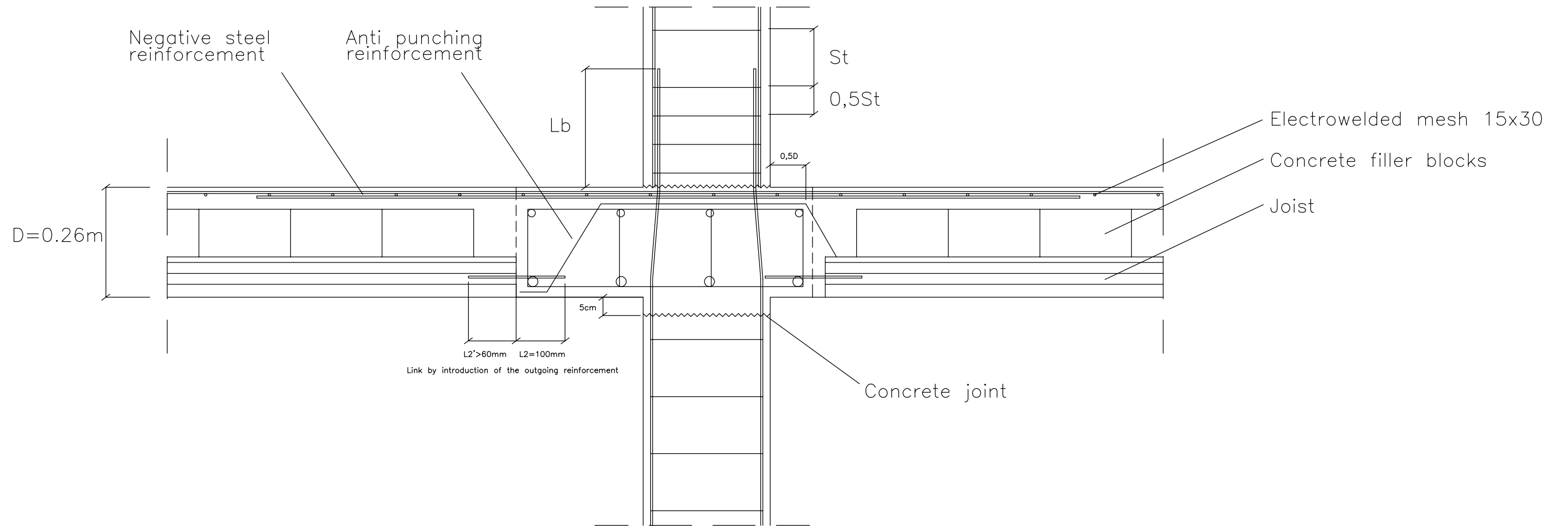
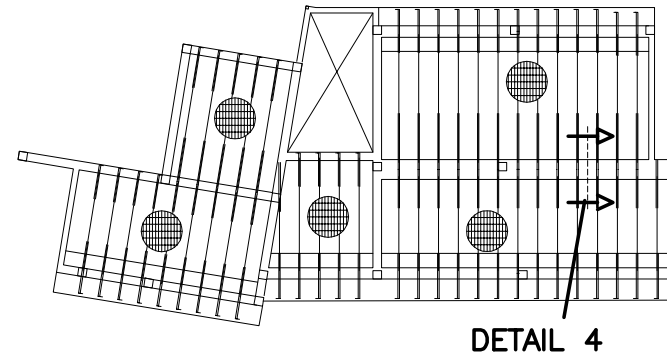
 <small>Escuela Técnica Superior de Ingeniería de Edificación</small>	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE DETAIL 1; DIFFERENT FOUNDATIONS LEVEL		
	TUTOR FRANTISEK KULHANEK/ MILAGRO IBORRA	STUDENT CARLOS ESTRUCH MARTIN	
	Nº PLANE <b>21</b>	SCALE 1/15	DATE 13/06/2012



 <p>Escuela Técnica Superior de Ingeniería de Edificación</p>	PROJECT	SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE	DETAIL 2; FOOTING FOUNDATION AT THE SAME LEVEL		
<p>FRANTISEK KULHANEK/ MILAGRO IBORRA</p>	TUTOR	STUDENT		
		CARLOS ESTRUCH MARTIN		
	Nº PLANE	SCALE	DATE	
	22	1/20	13/06/2012	



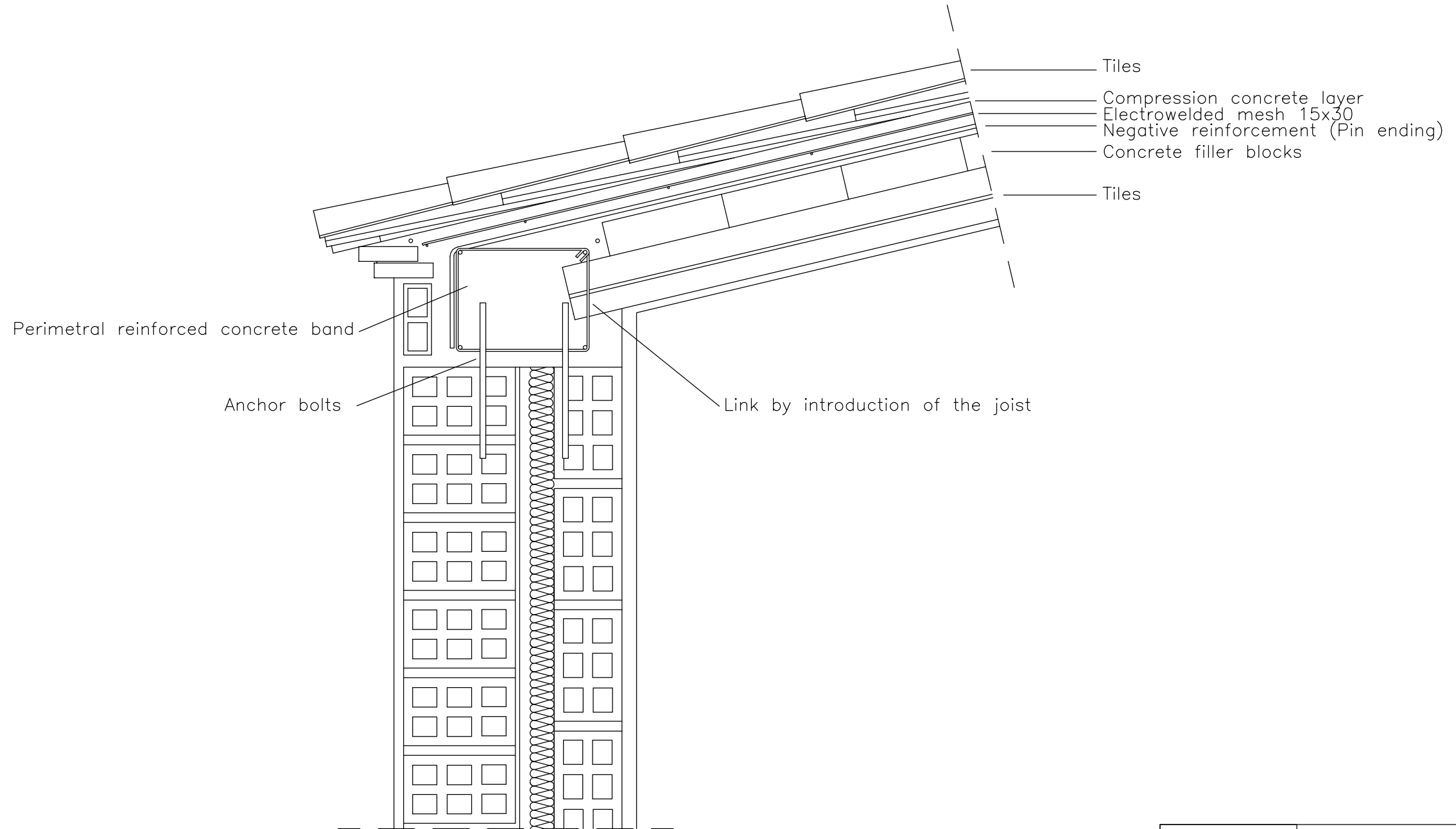
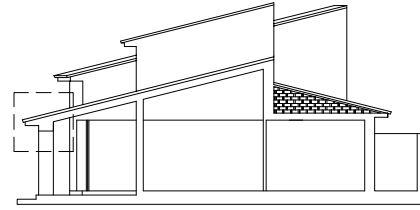
 ESCUELA TÉCNICA SUPERIOR DE INGENIERÍA DE EDIFICACIÓN	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE DETAIL 3; BALCONY		
	TUTOR FRANTISEK KULHANEK/ MILAGRO IBORRA	STUDENT CARLOS ESTRUCH MARTIN	
	Nº PLANE <b>23</b>	SCALE <b>1/5</b>	DATE 13/06/2012



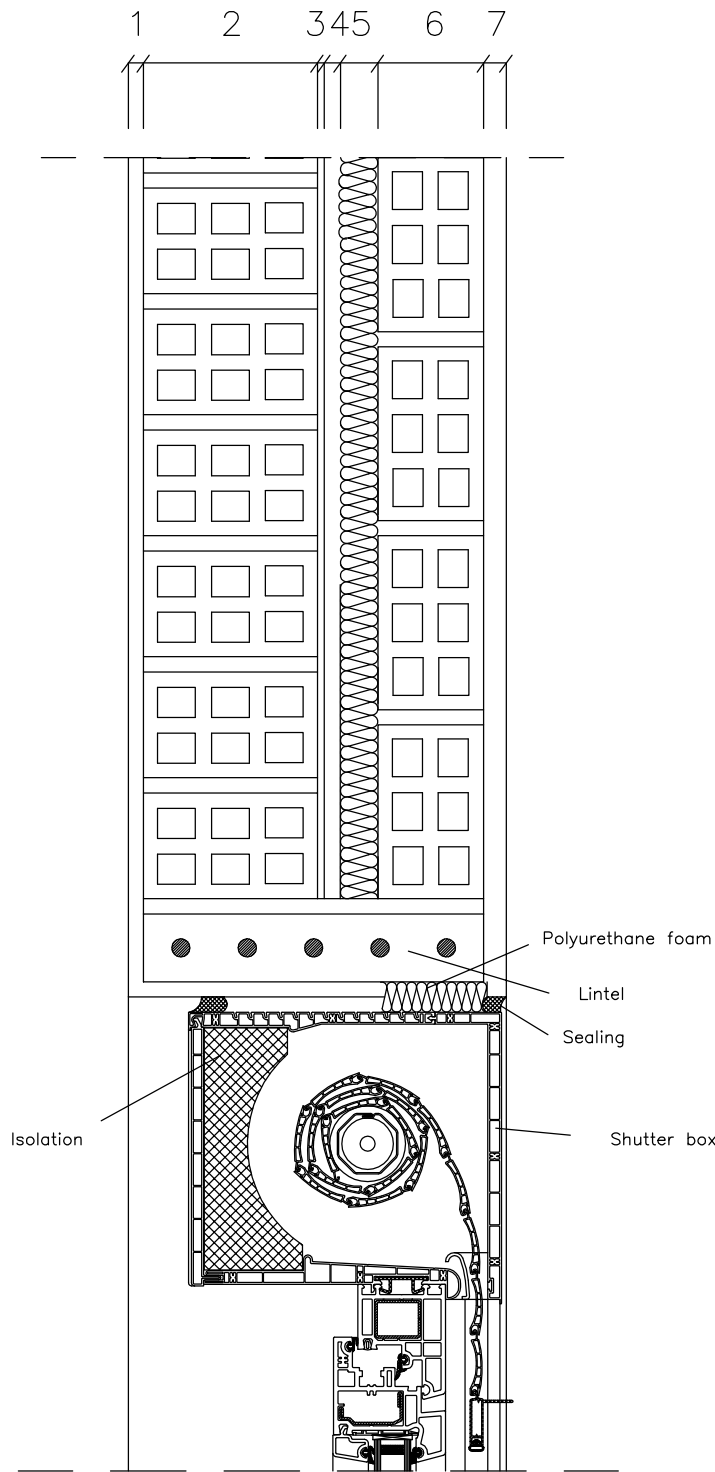
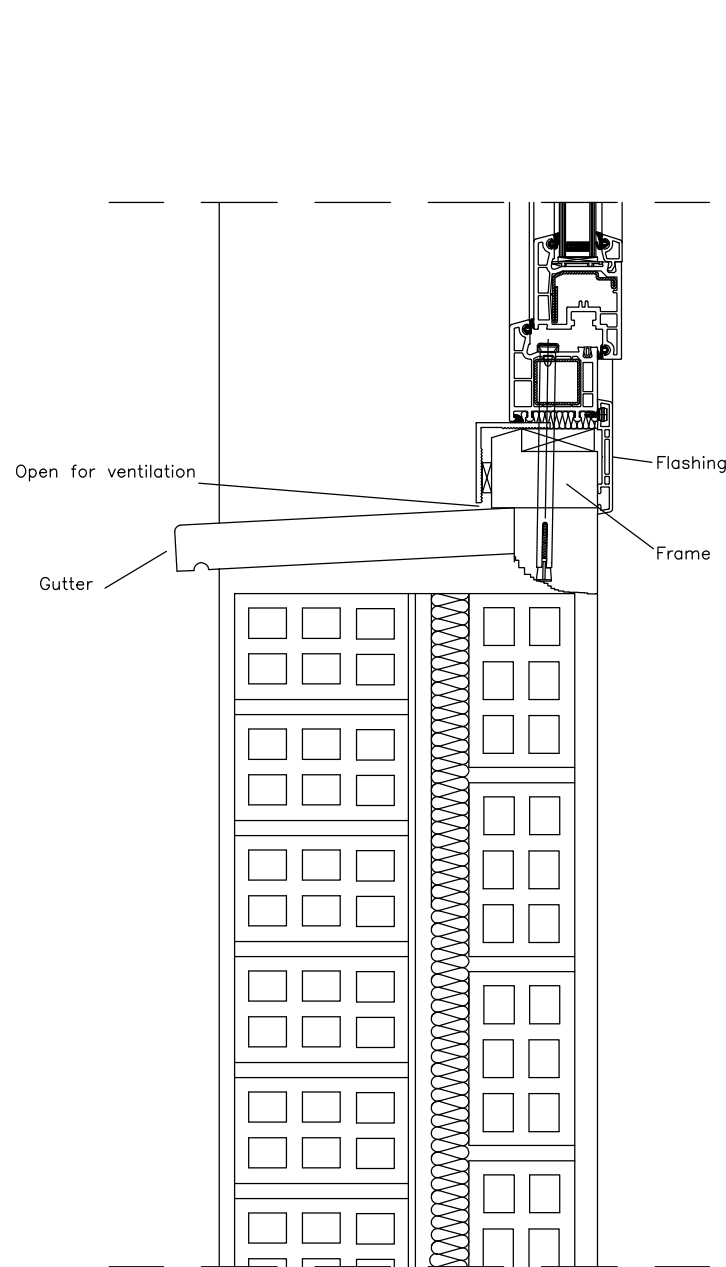
 ESCUELA TÉCNICA SUPERIOR DE INGENIERÍA DE EDIFICACIÓN	PROJECT	SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE	DETAIL 4; LONGITUDINAL SLAB AND PILLAR SECTION		
	TUTOR	FRANTISEK KULHANEK/ MILAGRO IBORRA		
	STUDENT	CARLOS ESTRUCH MARTIN		
	Nº PLANE	SCALE	DATE	
	24	1/10	13/06/2012	



DETAIL 5



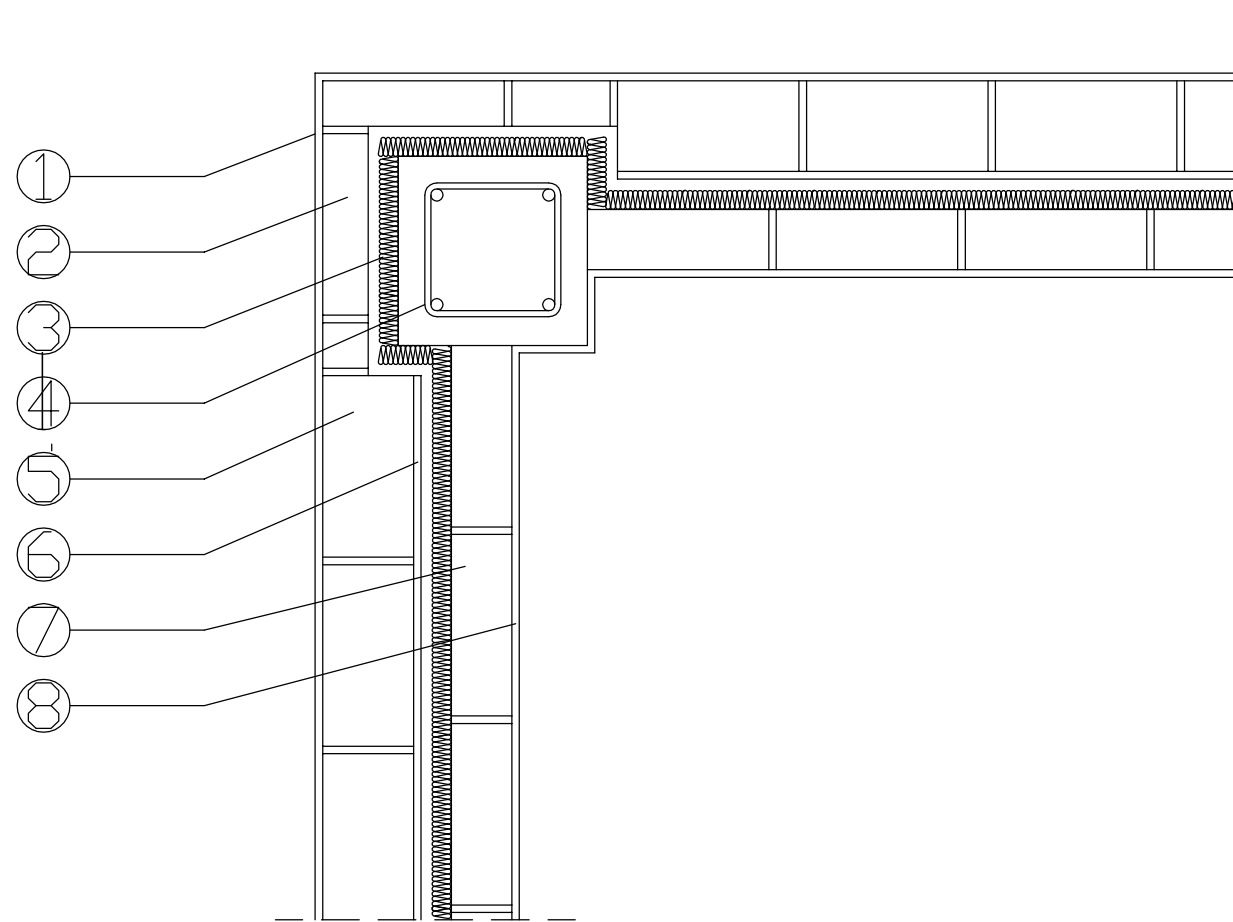
 Escuela Técnica Superior de Ingeniería de Edificación	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE DETAIL 5; INCLINED SLAB WITH WALL MEETING		
	TUTOR FRANTISEK KULHANEK/ MILAGRO IBORRA	STUDENT CARLOS ESTRUCH MARTIN	
	Nº PLANE <b>25</b>	SCALE <b>1/5</b>	DATE 13/06/2012



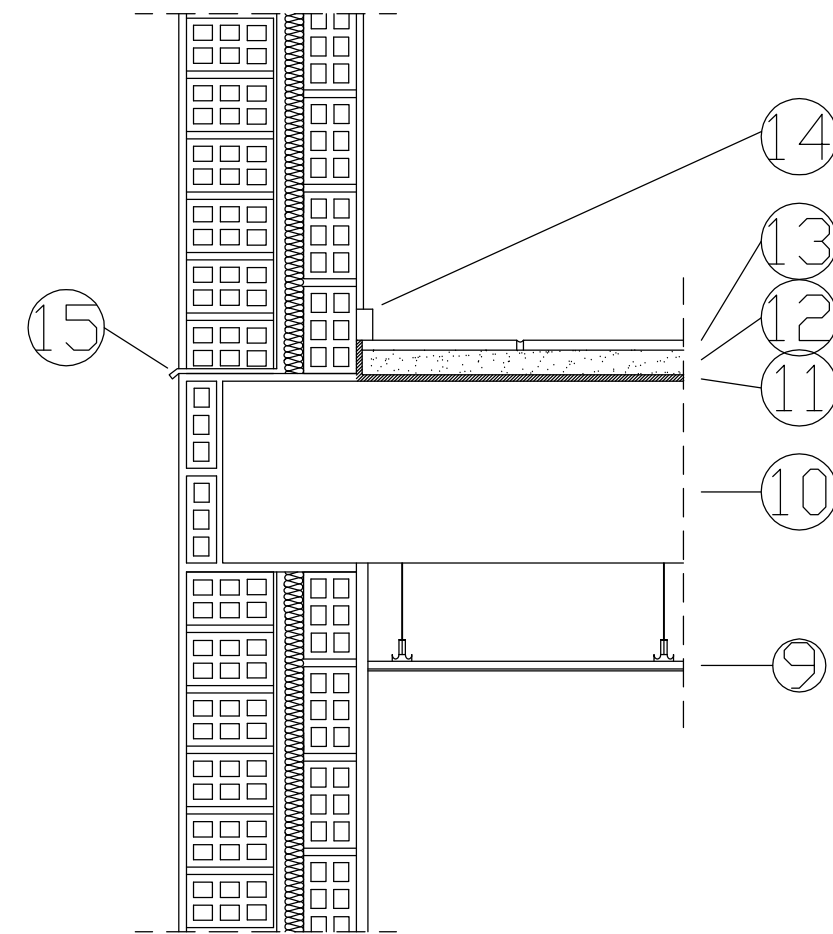
- 1 External plaster
- 2 Main enclosure; 1/2 foot brick
- 3 Waterproofing mortar
- 4 Air chamber
- 5 Thermal insulation
- 6 Secondary enclosure; 7cm brick
- 7 Internal plaster and paint

 ESCUELA TÉCNICA SUPERIOR DE INGENIERÍA DE EDIFICACIÓN	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE DETAIL 6; WINDOW AND WALL SECTION		
	TUTOR FRANTISEK KULHANEK/ MILAGRO IBORRA	STUDENT CARLOS ESTRUCH MARTIN	
	Nº PLANE <b>26</b>	SCALE 1/5	DATE 13/06/2012

- 1 External plaster
- 2 6 cm single hollow brick
- 3 Thermal insulation
- 4 Pillar 30x30
- 5 Main enclosure; 1/2 foot brick
- 6 Air chamber
- 7 Secondary enclosure; 7cm brick
- 8 Internal plaster and paint

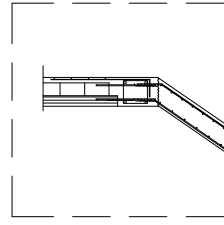


- 9 False plaster ceiling
- 10 Concrete slab
- 11 Anti impact sheet
- 12 Leveling mortar
- 13 Pavement
- 14 Pavement border
- 15 Evacuation system

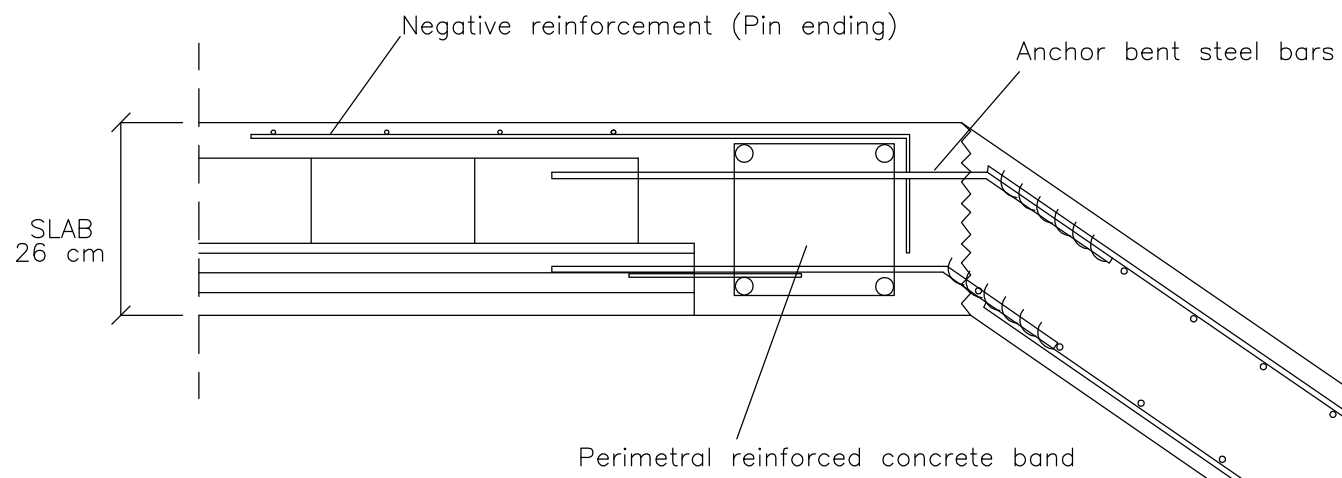
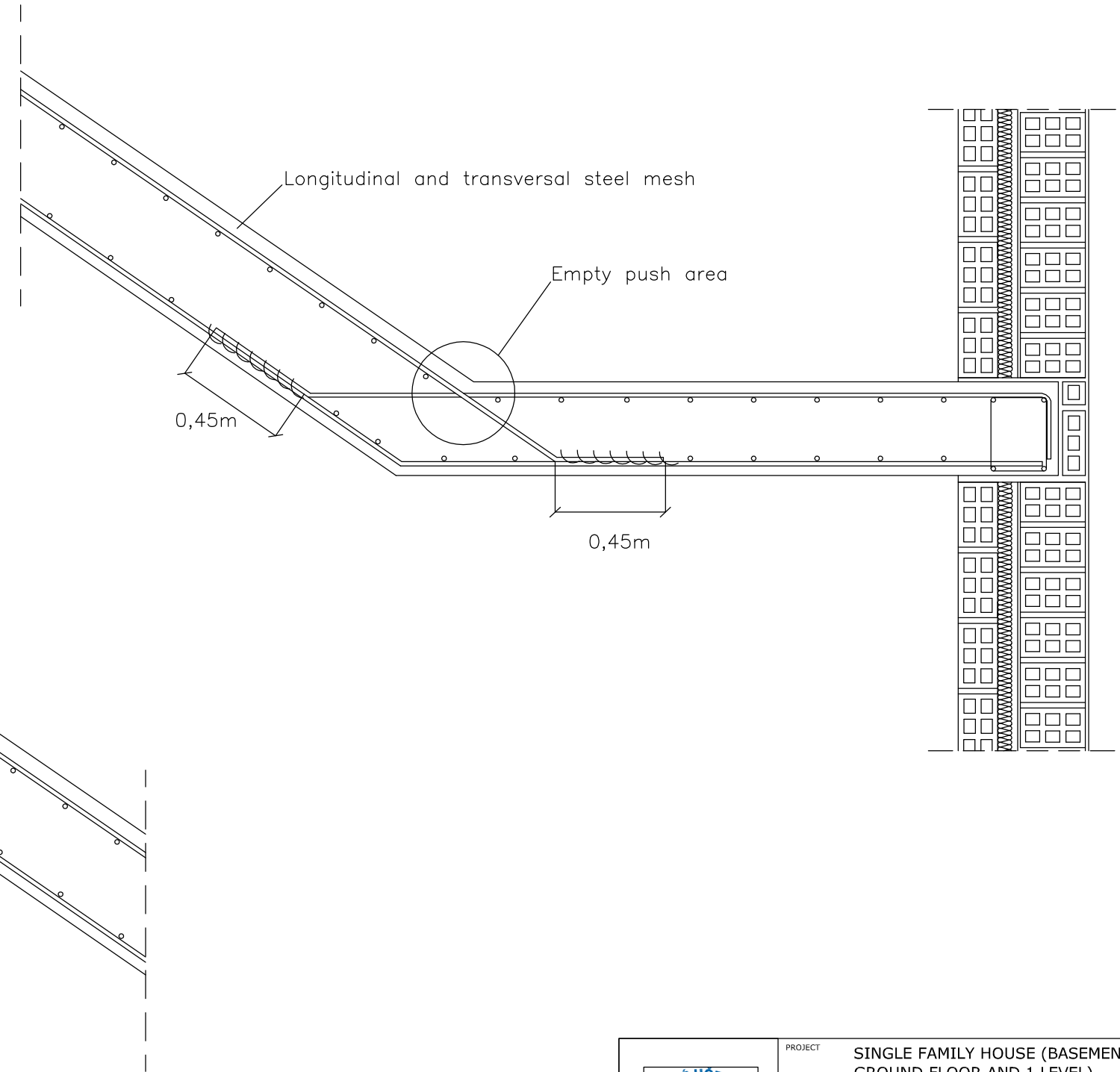
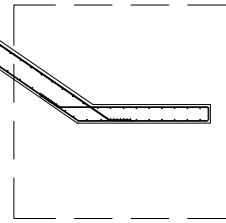


	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE DETAILS 7-8; WALL ENCOUNTERS		
	TUTOR FRANTISEK KULHANEK/ MILAGRO IBORRA	STUDENT CARLOS ESTRUCH MARTIN	
	Nº PLANE <b>27</b>	SCALE <b>1/10</b>	DATE 13/06/2012

DETAIL 8



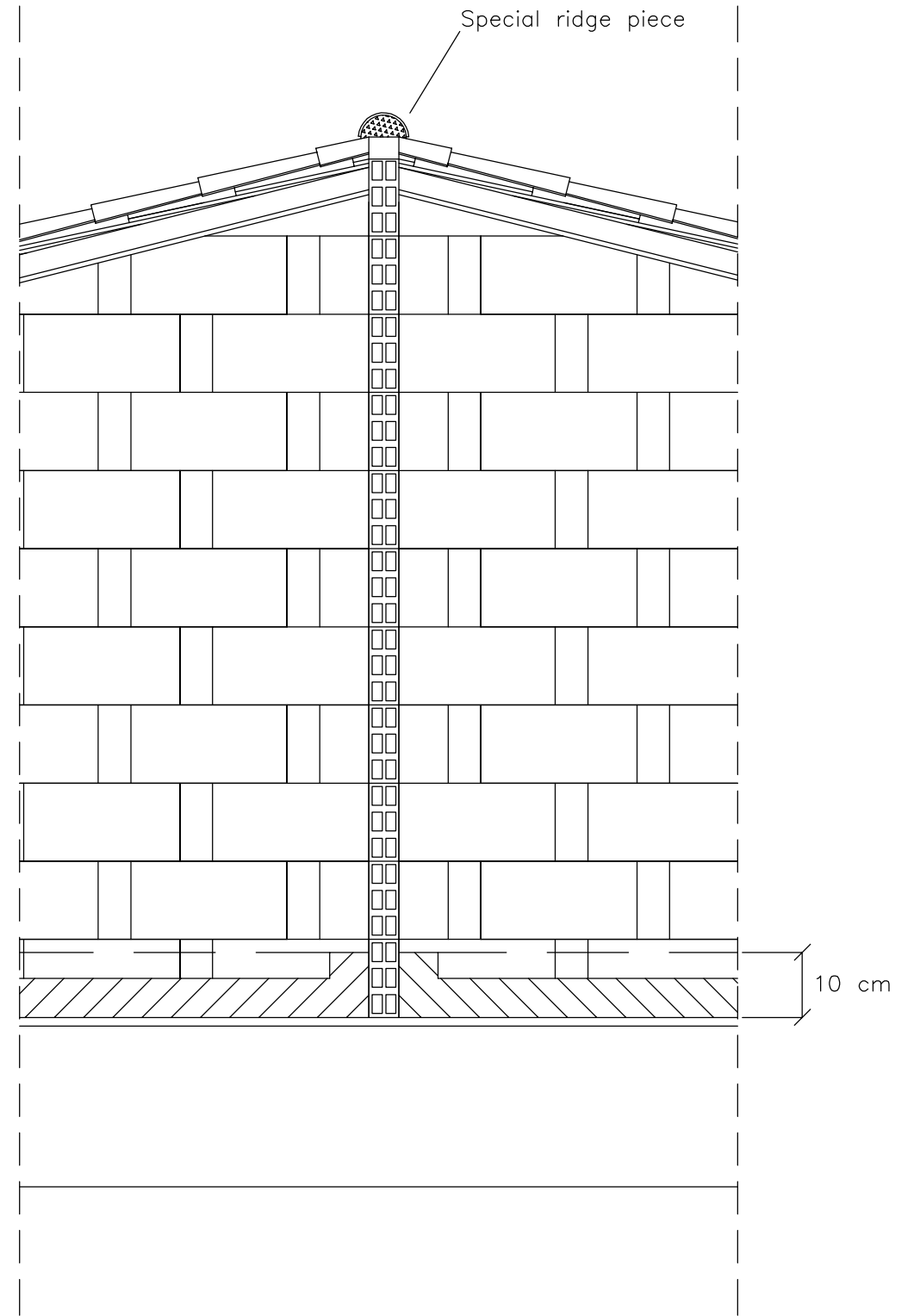
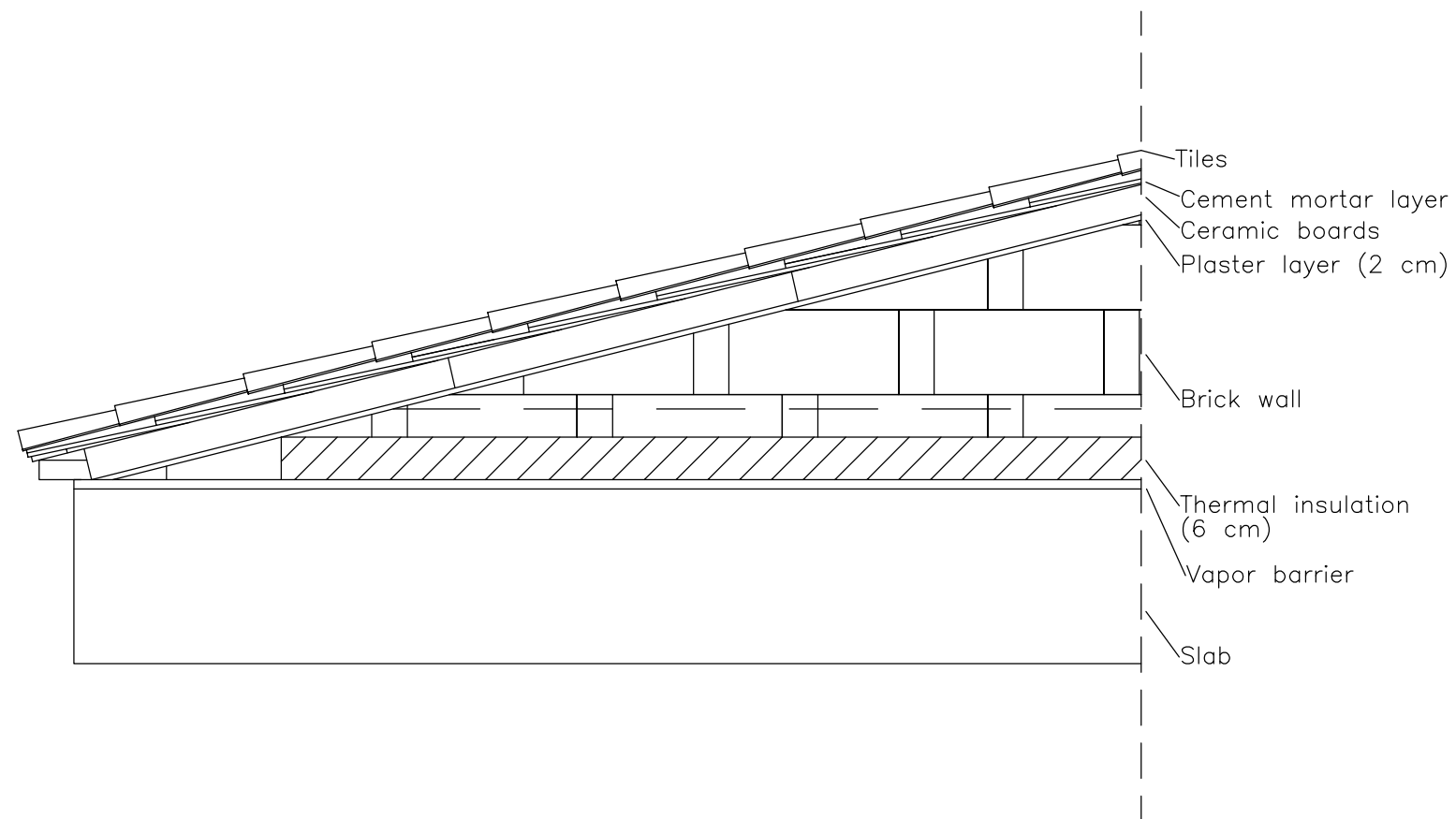
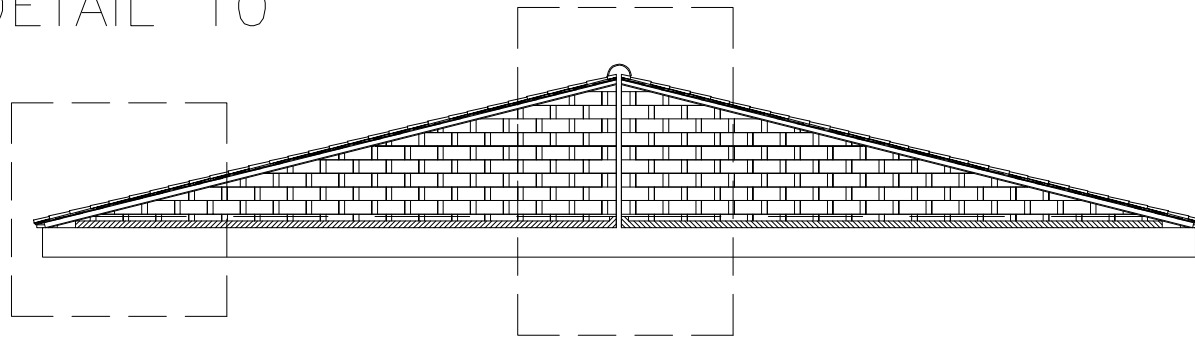
DETAIL 9



	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE DETAILS 9-10; STAIRS SECTION		
	TUTOR FRANTISEK KULHANEK/ MILAGRO IBORRA	STUDENT CARLOS ESTRUCH MARTIN	
	Nº PLANE 28	SCALE 1/10	DATE 13/06/2012

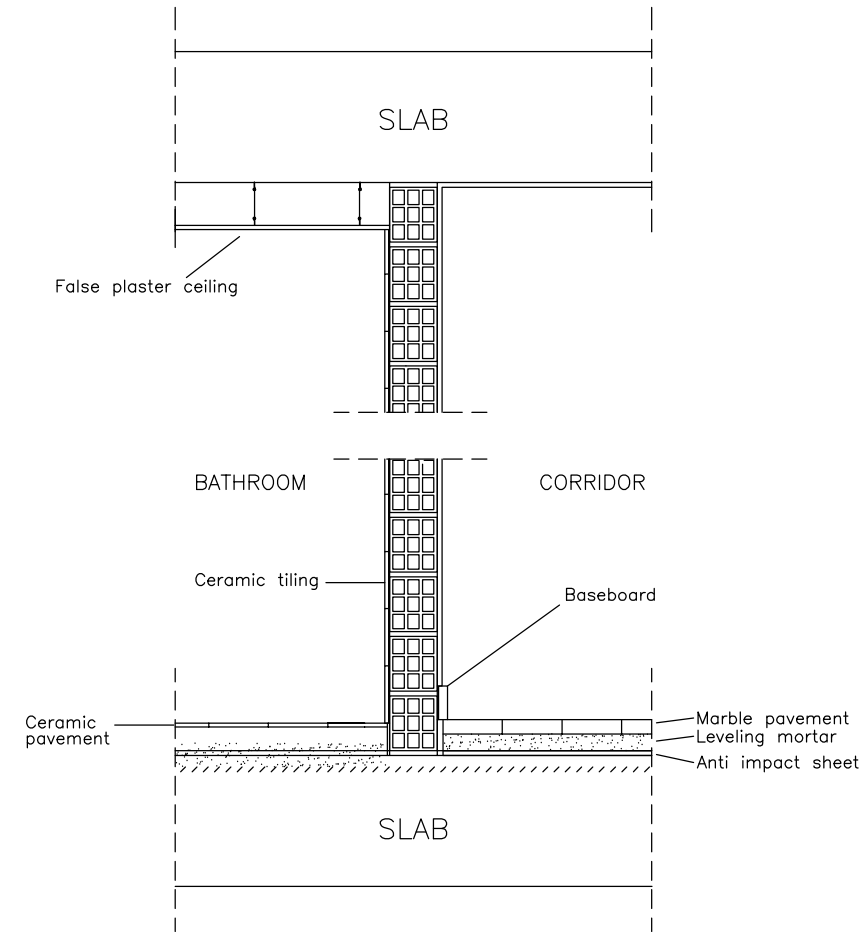
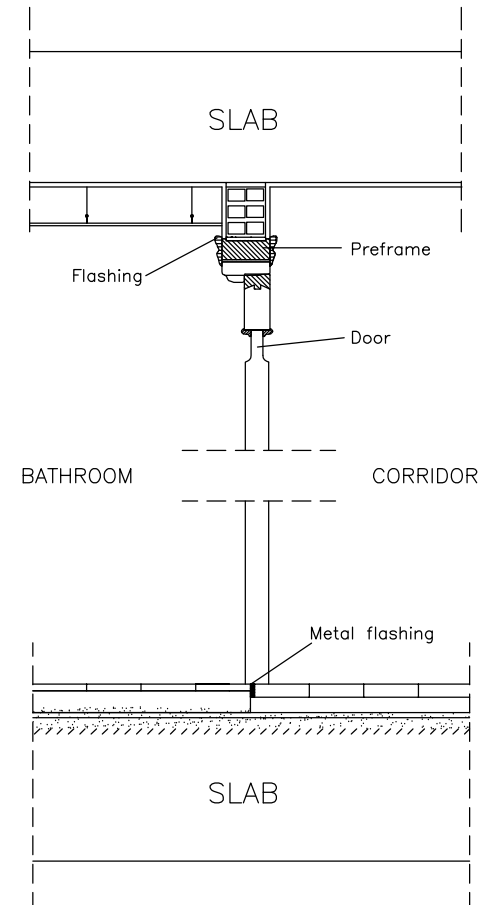
DETAIL 11

DETAIL 10

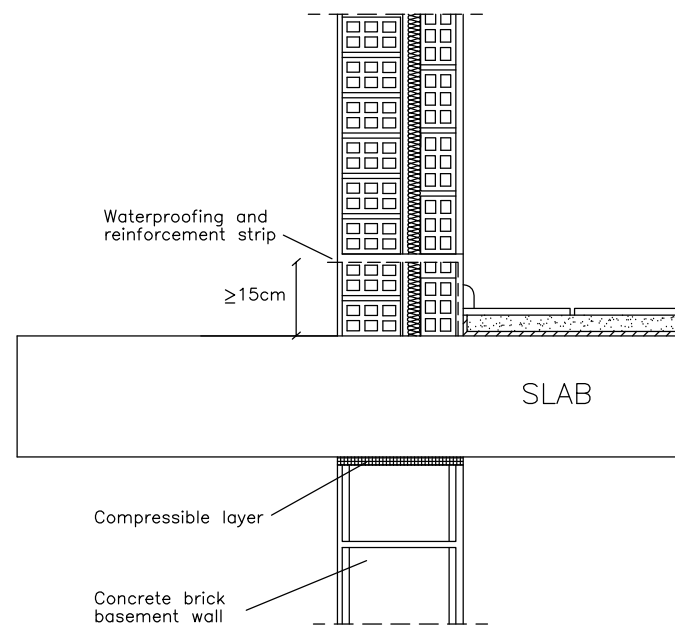


 	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE DETAILS 11-12; COVER SECTION		
	TUTOR FRANTISEK KULHANEK/ MILAGRO IBORRA		STUDENT CARLOS ESTRUCH MARTIN
	Nº PLANE 29	SCALE 1/10	DATE 13/06/2012

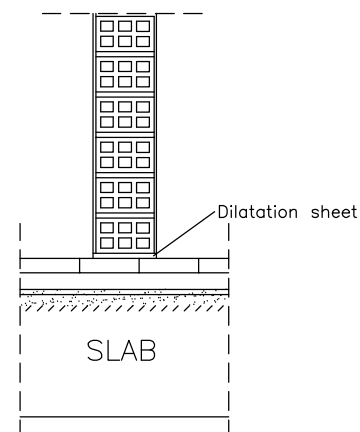
BATHROOM WALL  
Pavement change



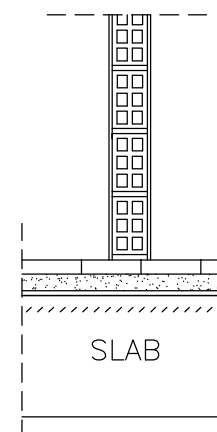
EXTERIOR WALL



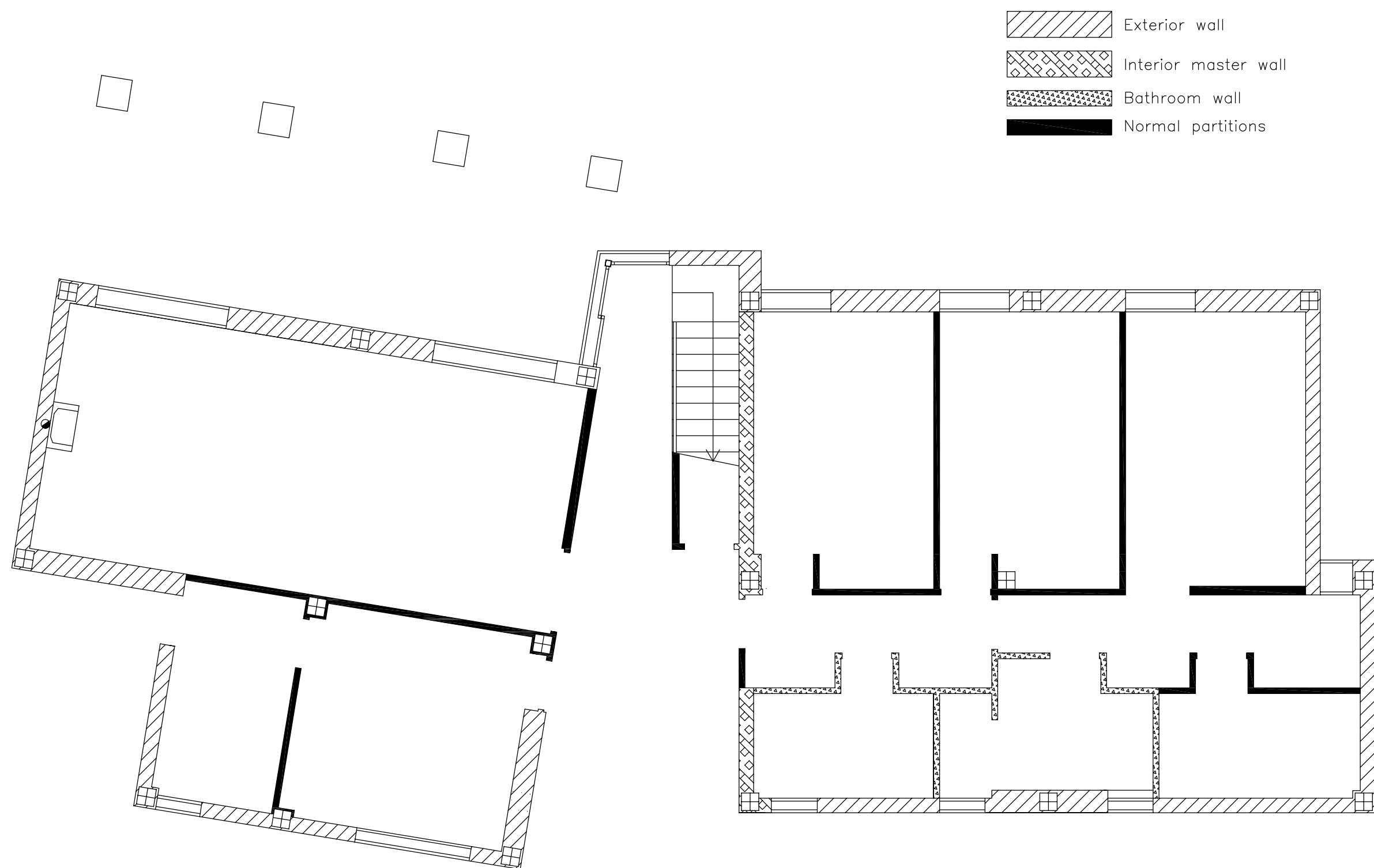
INTERIOR MASTER WALL



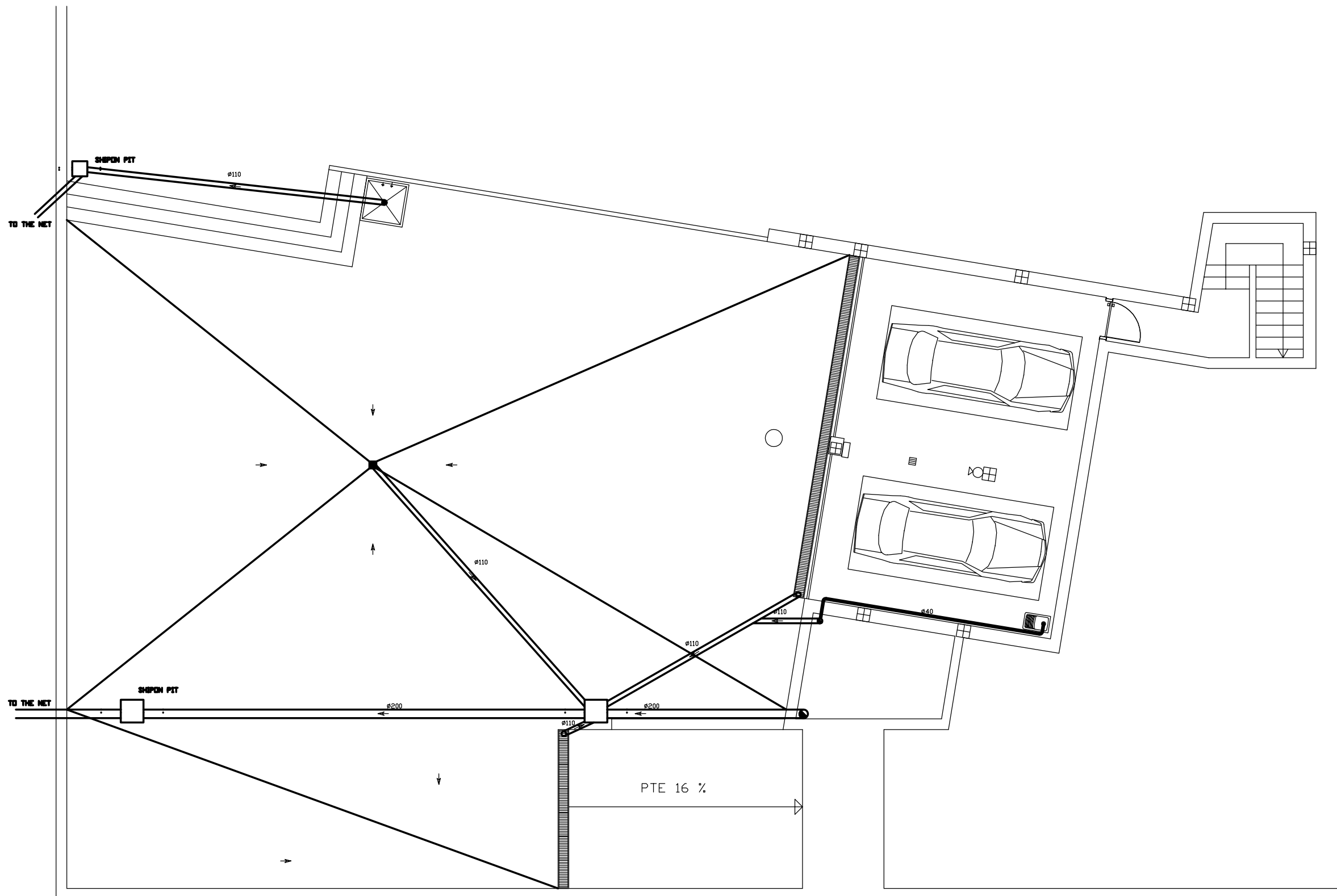
NORMAL PARTITIONS



	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE DETAILS 12-17; WALLS SECTIONS		
	TUTOR FRANTISEK KULHANEK/ MILAGRO IBORRA	STUDENT CARLOS ESTRUCH MARTIN	
	Nº PLANE <b>30</b>	SCALE <b>1/15</b>	DATE 13/06/2012



 Escuela Técnica Superior de Ingeniería de Edificación	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE TYPES OF WALLS		
	TUTOR FRANTISEK KULHANEK/ MILAGRO IBORRA		STUDENT CARLOS ESTRUCH MARTIN
	Nº PLANE 41	SCALE 1/75	DATE 13/06/2012

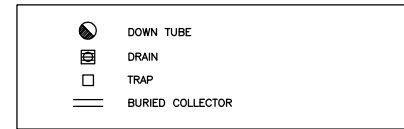


	DOWN TUBE
	DRAIN
	PIT
	BURIED COLLECTOR

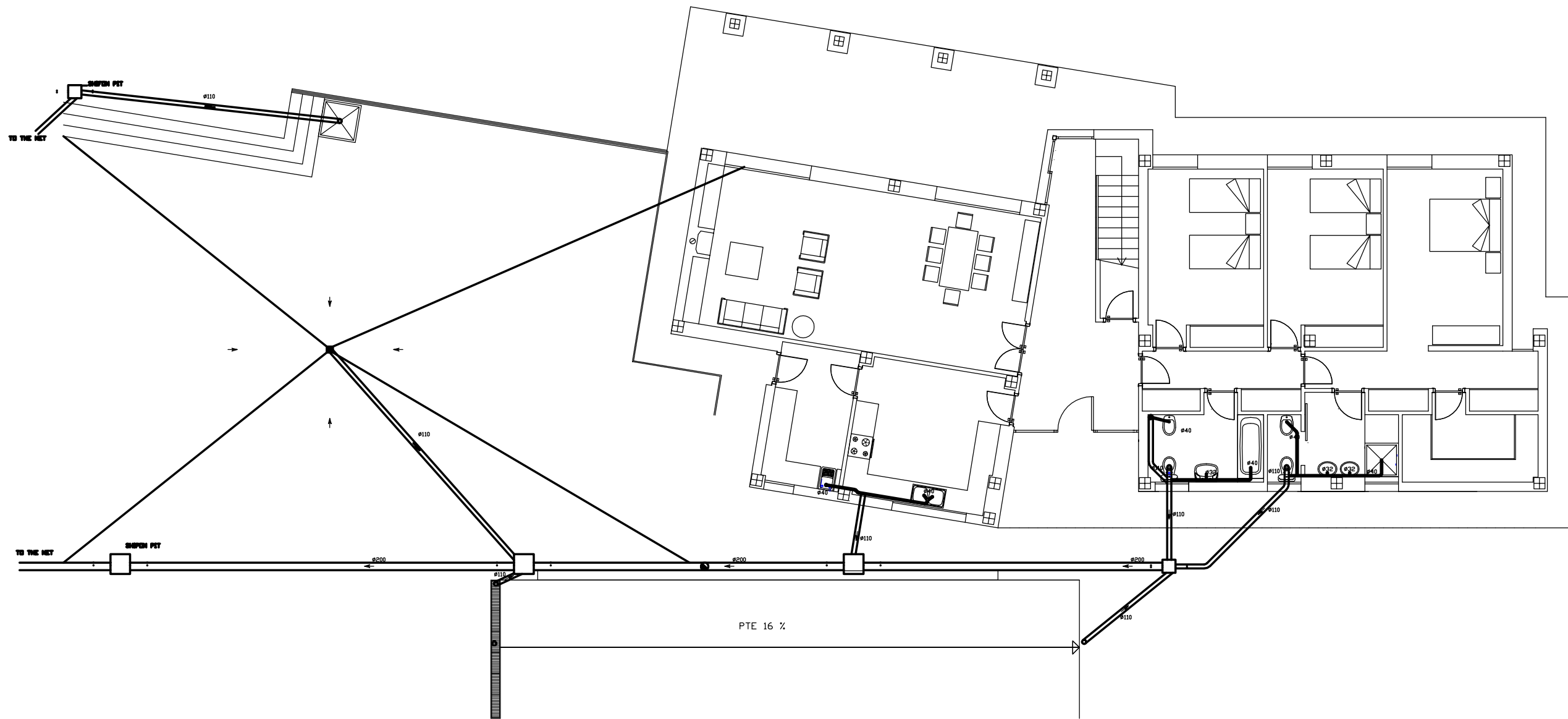
DEVICE	$\phi$ (mm)
TOILET	110
BIDET	32
WASHBASIN	32
BATH	40
SINK	40
DISHWASER	40
WASHING MACHINE	40
LAUNDRY	40

	PROJECT	SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE	PLUMBING SYSTEM; BASEMENT		
	TUTOR	FRANTISEK KULHANEK/ MILAGRO IBORRA	STUDENT CARLOS ESTRUCH MARTIN	
		Nº PLANE	SCALE	DATE
		<b>31</b>	1/100	13/06/2012









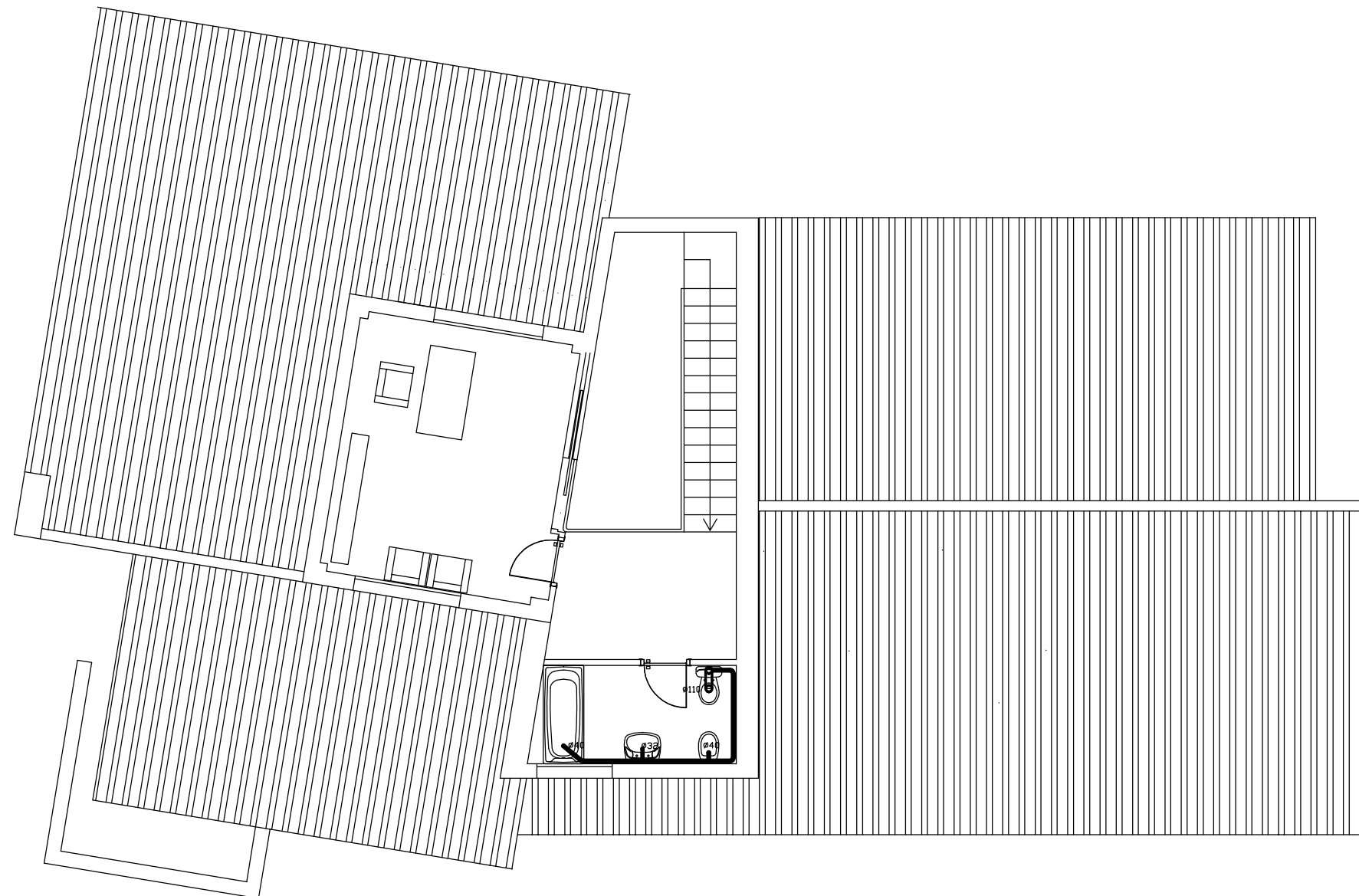
DEVICE	Ø (mm)
TOILET	110
BIDET	32
WASHBASIN	32
BATH	40
SINK	40
DISHWASER	40
WASHING MACHINE	40
LAUNDRY	40




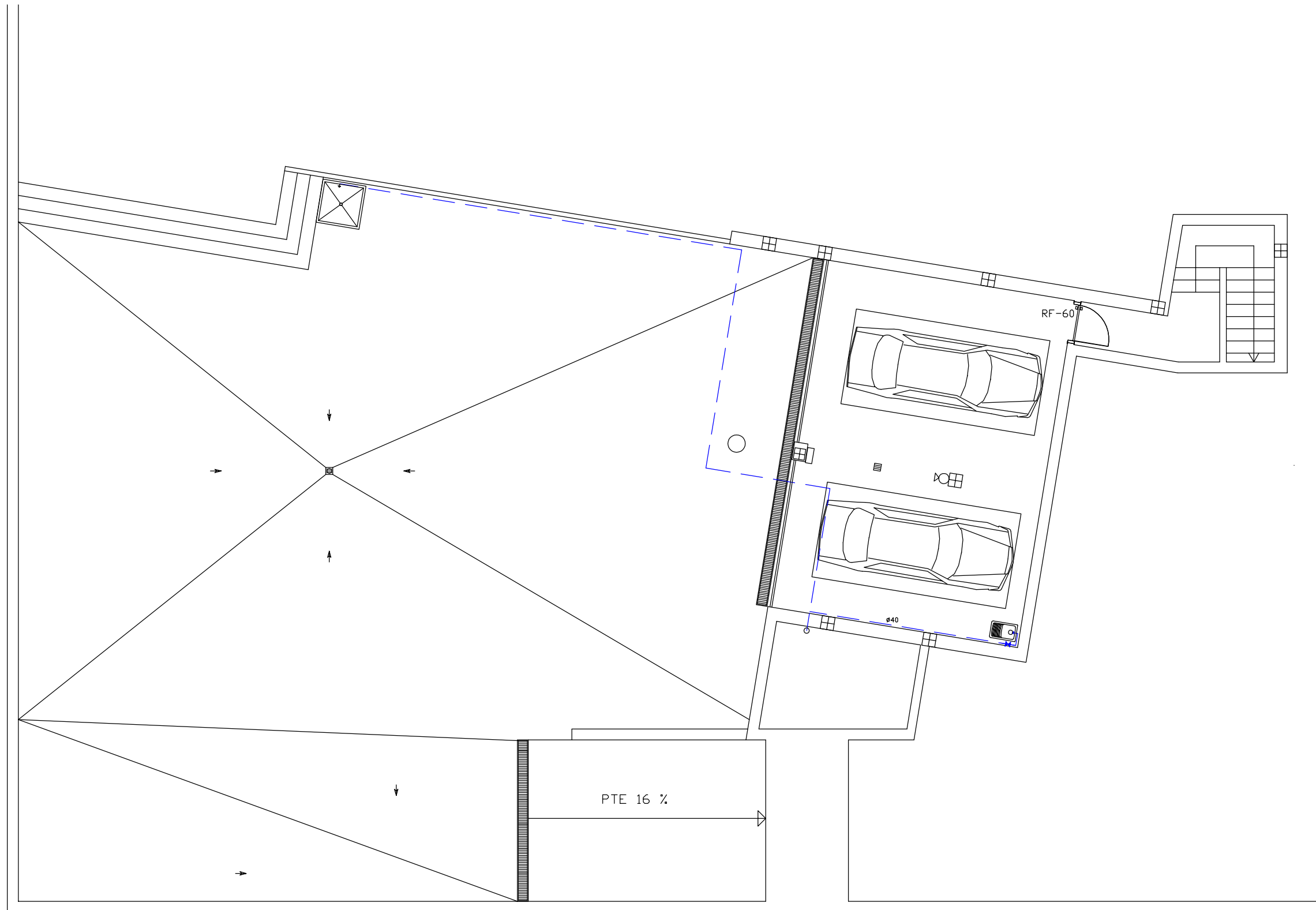
	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE PLUMBING SYSTEM; GROUND FLOOR		
	TUTOR	STUDENT	
	FRANTISEK KULHANEK/ MILAGRO IBORRA	CARLOS ESTRUCH MARTIN	
	Nº PLANE	SCALE	DATE
	32	1/125	13/06/2012

	DOWN TUBE
	DRAIN
	TRAP
	BURIED COLLECTOR

DEVICE	Ø (mm)
TOILET	110
BIDET	32
WASHBASIN	32
BATH	40
SINK	40
DISHWASER	40
WASHING MACHINE	40
LAUNDRY	40




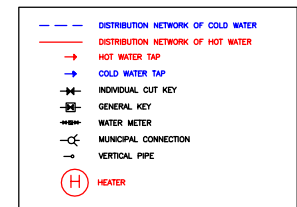
 <small>Escuela Técnica Superior de Ingeniería de Edificación</small>	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE PLUMBING SYSTEM; FIRST FLOOR		
	TUTOR FRANTISEK KULHANEK/ MILAGRO IBORRA	STUDENT CARLOS ESTRUCH MARTIN	
	Nº PLANE <b>33</b>	SCALE 1/100	DATE 13/06/2012



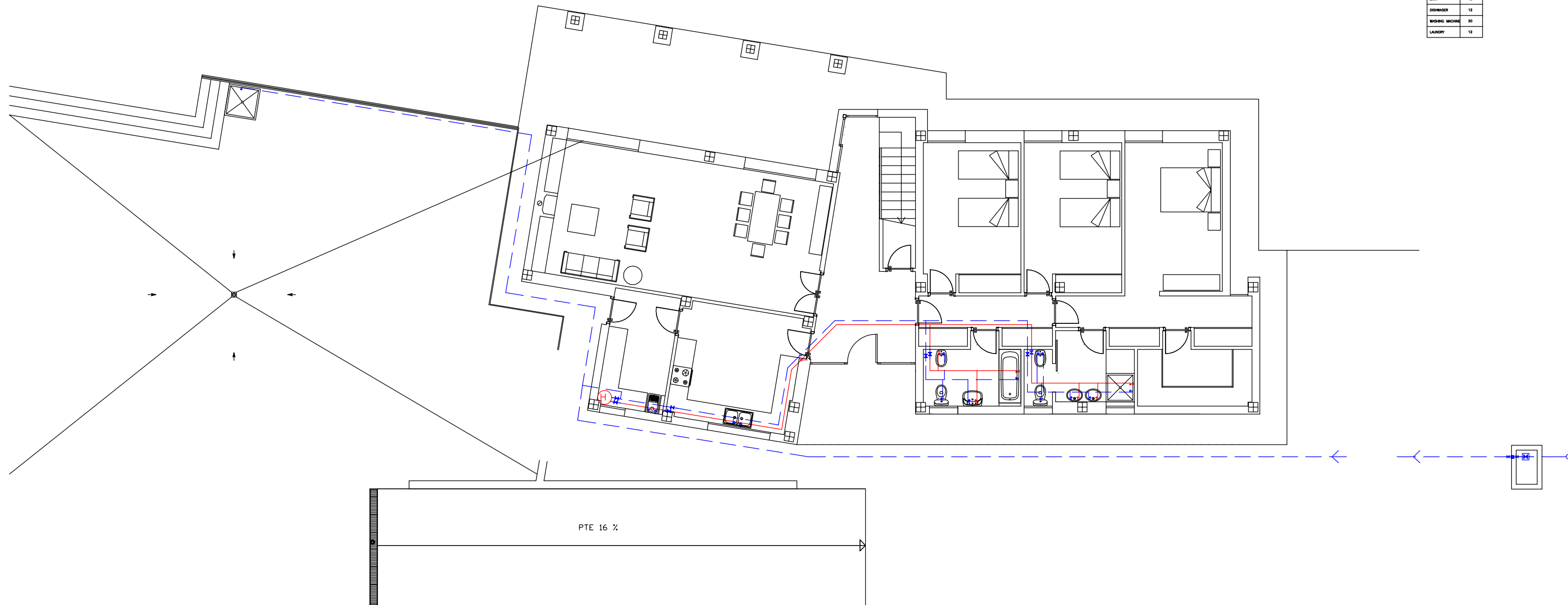
---	DISTRIBUTION NETWORK OF COLD WATER
---	DISTRIBUTION NETWORK OF HOT WATER
→	HOT WATER TAP
→	COLD WATER TAP
⊞	INDIVIDUAL CUT KEY
⊞	VERTICAL PIPE


DEVICE	PLANE
TOILET	12
BIDET	12
WASHBASIN	12
BATH	20
SINK	12
DISHWASER	12
WASHING MACHINE	20
LAUNDRY	12

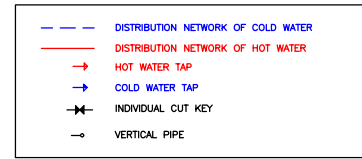
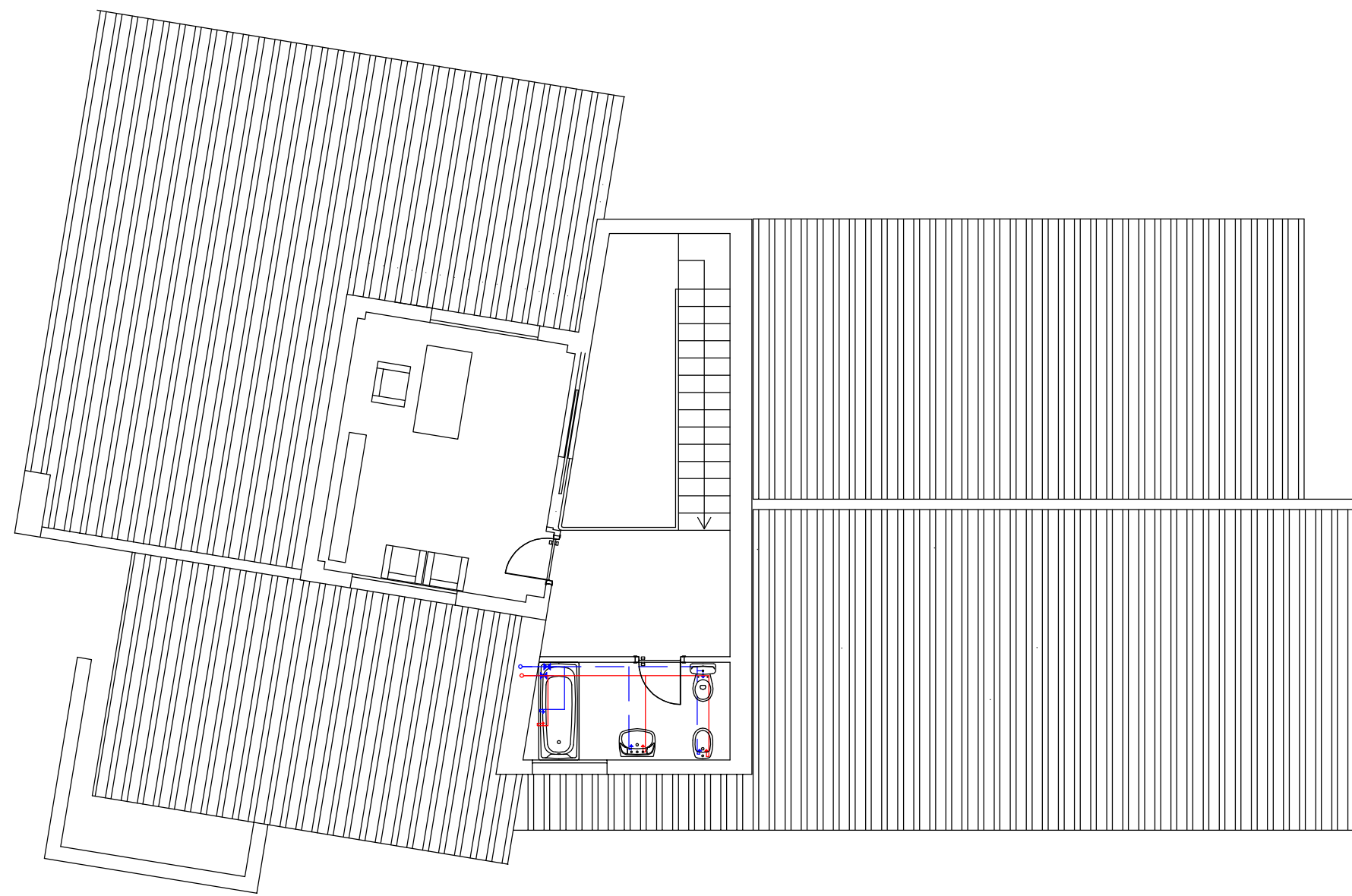
 Escuela Técnica Superior de Ingeniería de Edificación	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)	
	PLANE WATER SUPPLY; BASEMENT	
	TUTOR FRANTISEK KULHANEK/ MILAGRO IBORRA	STUDENT CARLOS ESTRUCH MARTIN
	Nº PLANE 34	SCALE 1/100




DEVICE	Q <sub>max</sub> [L/s]
TOILET	12
BIDET	12
WASHBASIN	12
BATH	20
SINK	12
DISHWASHER	12
WASHING MACHINE	20
LAUNDRY	12



 Escuela Técnica Superior de Ingeniería de Edificación	PROJECT		SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE		WATER SUPPLY; GROUND FLOOR		
	TUTOR		STUDENT		
	FRANTISEK KULHANEK/ MILAGRO IBORRA		CARLOS ESTRUCH MARTIN		
		Nº PLANE	SCALE	DATE	
		35	1/125	13/06/2012	

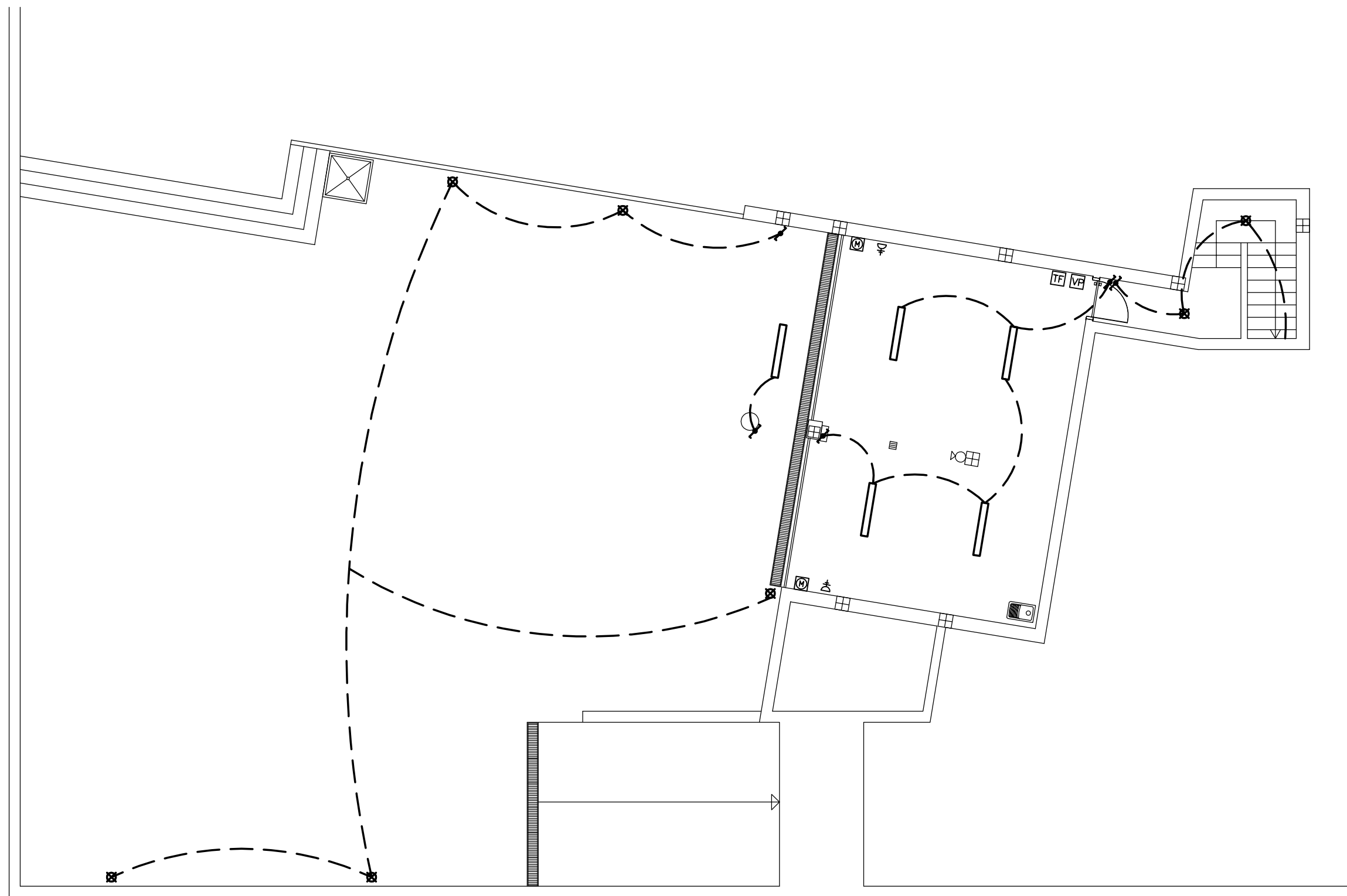



DEVICE	liters per second
TOILET	12
BIDET	12
WASHBASIN	12
BATH	20
SINK	12
DISHWASER	12
WASHING MACHINE	20
LAUNDRY	12

 <small>Escuela Técnica Superior de Ingeniería de Edificación</small>	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE WATER SUPPLY; FIRST FLOOR		
	TUTOR FRANTISEK KULHANEK/ MILAGRO IBORRA	STUDENT CARLOS ESTRUCH MARTIN	
	Nº PLANE <b>36</b>	SCALE 1/100	DATE 13/06/2012

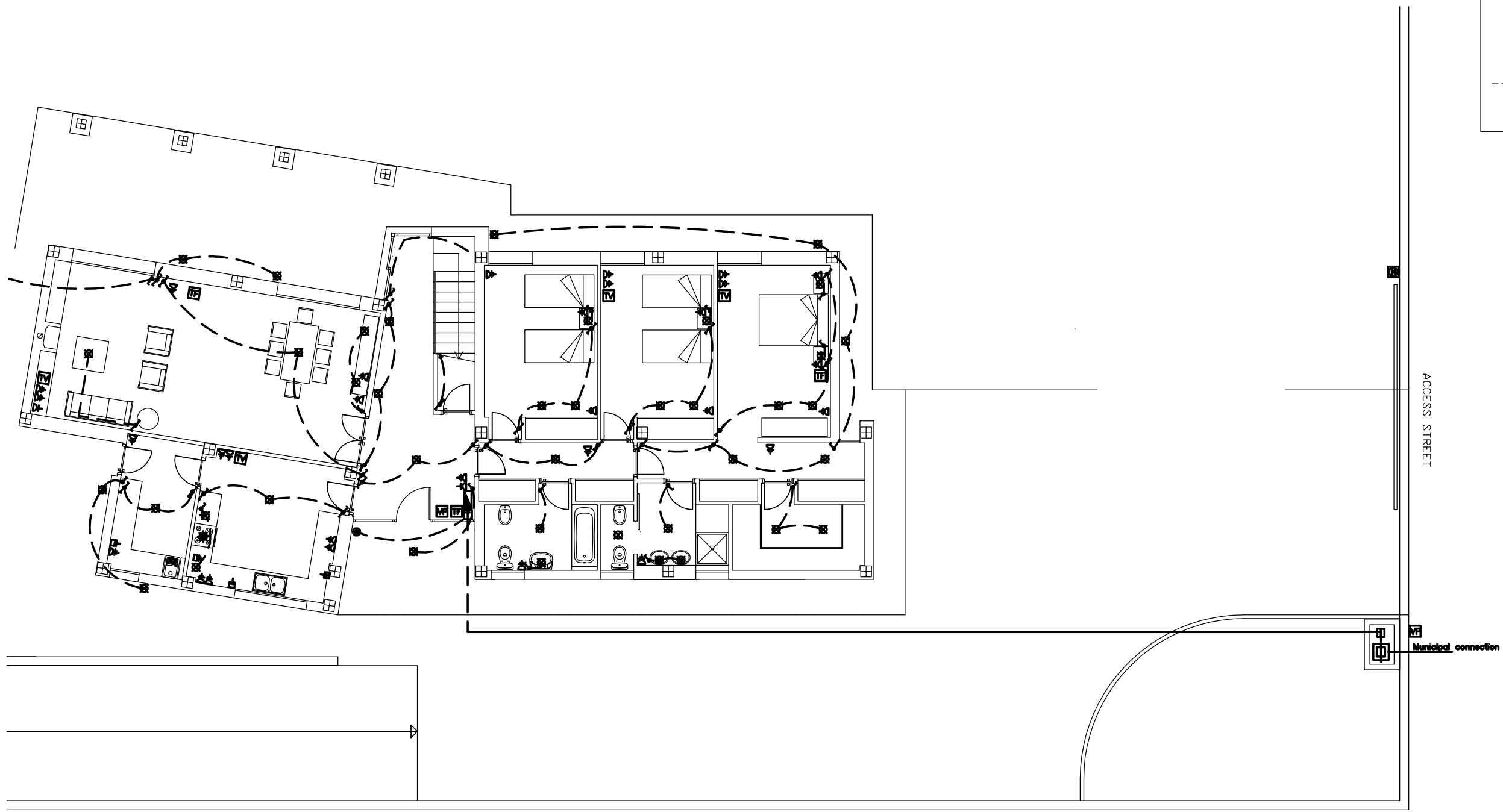
ELECTRICAL SYMBOLS


- ⊗ Light Point
- ▭ Fluorescent Light Point
- ⊕ Switch
- ⊖ Commutator
- ⊕ Electrical outlet
- TF Telephone connection
- Lighting circuit
- VP Door Camera
- M Door engine

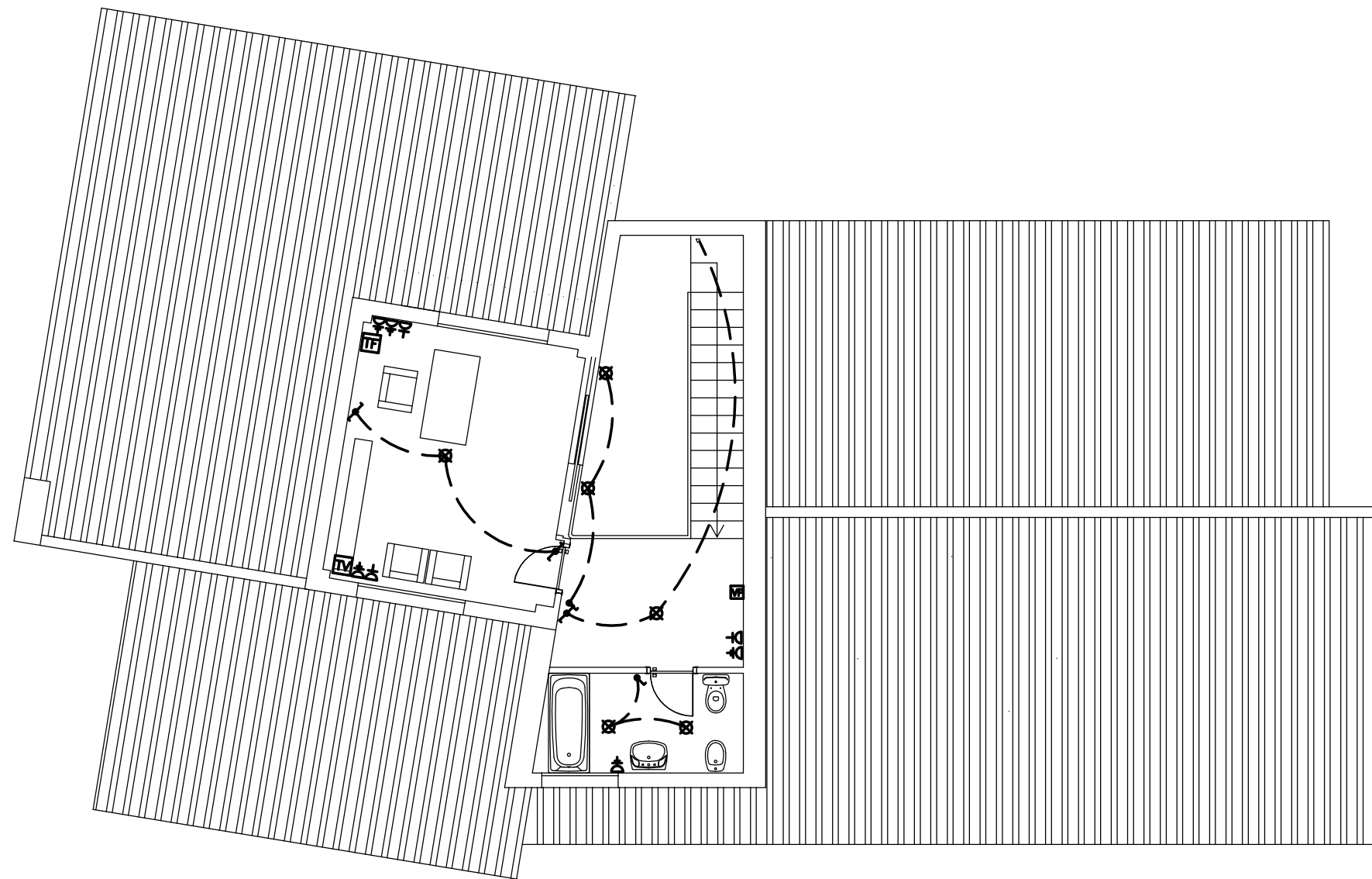


 Escuela Técnica Superior de Ingeniería de Edificación	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE ELECTRICITY; BASEMENT		
	TUTOR FRANTISEK KULHANEK/ MILAGRO IBORRA	STUDENT CARLOS ESTRUCH MARTIN	
	Nº PLANE <b>37</b>	SCALE 1/100	DATE 13/06/2012

ELECTRICAL SYMBOLS	
	C.G.P. (Circuit Protection Device)
	Electricity Meter
	General distribution circuit device
	Light Point
	Fluorescent Light Point
	Switch
	Commutator
	Ring Bell
	Electrical outlet
	Electrical appliance outlet
	Kitchen outlet
	Smoke Evacuator
	TV Jack
	Telephone Jack
	Lighting circuit
	Door camera
	Door engine



 Escuela Técnica Superior de Ingeniería de Edificación	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE ELECTRICITY; GROUND FLOOR		
	TUTOR FRANTISEK KULHANEK/ MILAGRO IBORRA	STUDENT CARLOS ESTRUCH MARTIN	
	Nº PLANE <b>38</b>	SCALE 1/125	DATE 13/06/2012



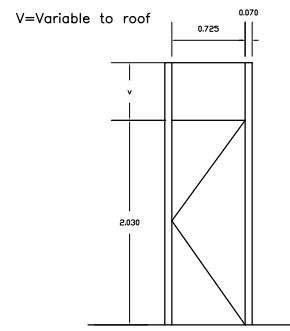
**ELECTRICAL SYMBOLS**

- ⊗ Light Point
- ⊕ Switch
- ⊖ Commutator
- ⊕ Electrical outlet
- ⊕ Lighting outlet
- TF Telephone connection
- TV TV jack
- - - Lighting circuit
- VP Door Camera

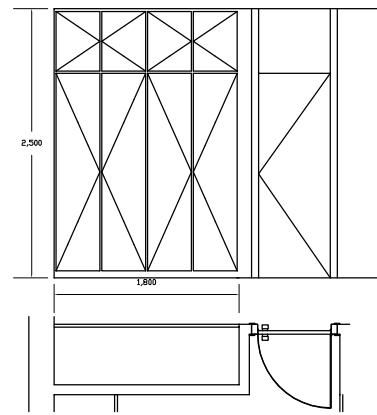
 <small>Escuela Técnica Superior de Ingeniería de Edificación</small>	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE ELECTRICITY; FIRST FLOOR		
	TUTOR FRANTISEK KULHANEK/ MILAGRO IBORRA	STUDENT CARLOS ESTRUCH MARTIN	
	Nº PLANE <b>39</b>	SCALE 1/100	DATE 13/06/2012



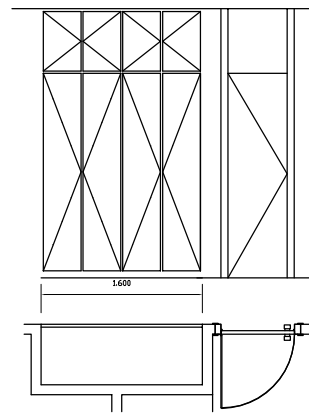
WOOD CARPENTRY



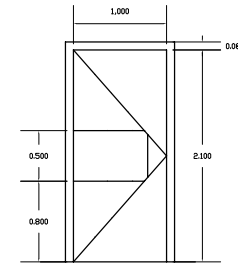
D1 10 UNITS



WD1 3 UNITS

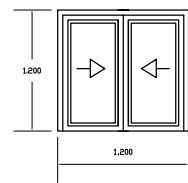


WD2 3 UNITS

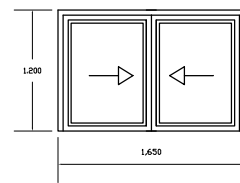


D2 1 UNIT

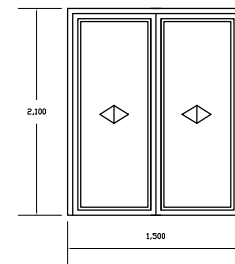
LACQUERED ALUMINUM CARPENTRY



W1 3 UNITS

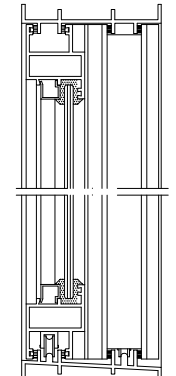


W2 3 UNITS

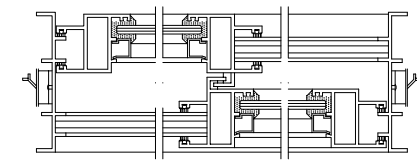


W3 7 UNITS

METALIC CARPENTRY SECTIONS



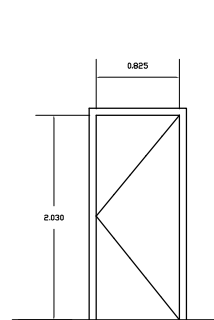
VERTICAL SECTION



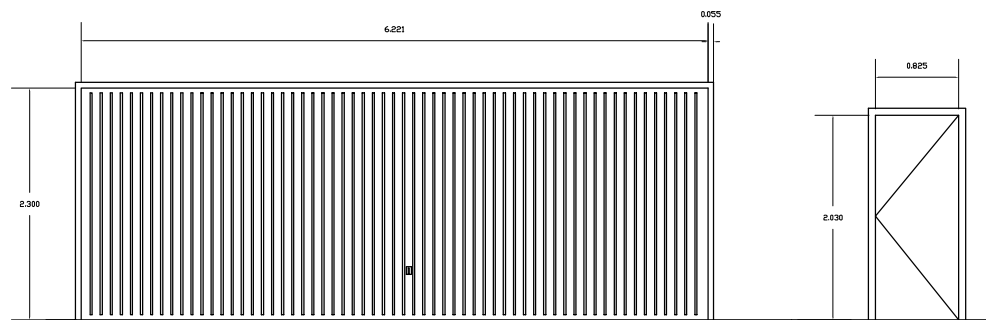
HORIZONTAL SECTION

E=1/5

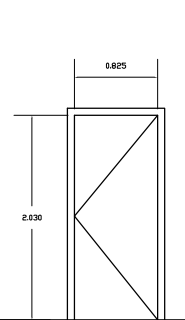
GALVANIZED STEEL CARPENTRY



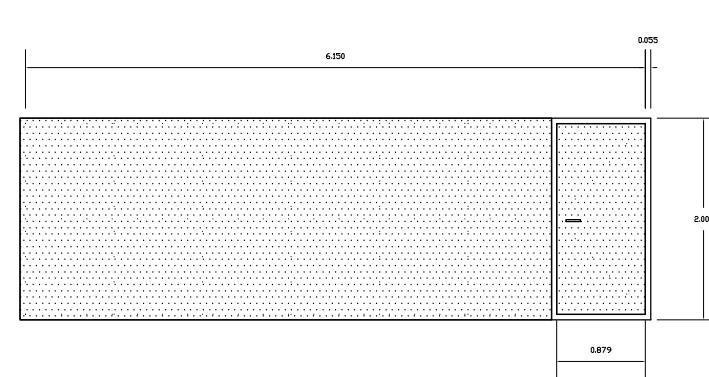
GD1 1 UNIT




GD2 1 UNIT



GD3 1 UNIT



GD4 1 UNIT

 <p>Escuela Técnica Superior de Ingeniería de Edificación</p>	PROJECT SINGLE FAMILY HOUSE (BASEMENT, GROUND FLOOR AND 1 LEVEL)		
	PLANE CARPENTRY		
	TUTOR	STUDENT	
	FRANTISEK KULHANEK/ MILAGRO IBORRA	CARLOS ESTRUCH MARTIN	
	Nº PLANE	SCALE	DATE
	40	1/75	13/06/2012