Six Houses
Paired 2-2
HALMSTAD, (SWEDEN)

INES MARCO AGUILAR
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Halmstad is a port, university, industrial and recreational city at the mouth of Nissan in the province of Halland on the Swedish west coast. Halmstad is the seat of Halmstad Municipality and the capital of Halland County. The city has a population of about 55,688 out of a municipal total of nearly 90,000.
I.II AREA AND SITUATION

The lot in which I’m going to construct the houses is placed closely together of the downtown.

The land is placed in Klyvaregatan and Södra-gatan. Klyvaregatan is the street perpendicular to the river and Södra-gatan is the street parallel to the river.

The exact position of the area, we can see in the following real photos. As we can see our lot is next to the river Nissan.

The lot has a total area of approximately 3495, 5 m² and its form is irregular.
I. III CURRENT SITUATION.

Currently, in November 2009, on the site there is nothing built.

This place have been always an important place for the industry.

Now, there are a lot of industries, but is planning to change this area in the near future. There are plans for make this zone more attractive to the tourism, constructing in this place residential buildings instead factories.

I took several photos of the site, where you can see that some works have begun.
SIX HOUSES, PAIRED 2-2
I. IV IDEA AND PURPOSE

The place where we are going to build is surrounded by little houses.

I thought it is better build something in keeping with the surroundings.

The main idea is to build 6 houses, paired 2-2 for big families.

Each house has:

- Basement with a small room and garage (2 cars).
- Ground floor: kitchen, living room, bedroom and bathroom adapted.
- First Floor: It has 3 bedrooms, two bathrooms and an office.
- Flat roof with a room and it is possible to access to a small terrace oriented to the south of the town where you can have good views of Nissan river.

The rest of the solar surface will be used to build access to houses and garden area.

The facades will be brick and the exterior carpentry in white lacquered aluminium.

South-facing windows will be great to harness the light and warmth of the sun.
SIX HOUSES, PAIRED 2-2
Halmstad, Sweden

II. TECHNICAL DESCRIPTIONS
Technical descriptions

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2. Foundation
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14. Protection against fire
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17. Urbanization.

All the work will be under current rules.

NTE: Norma tecnológica de la edificación. (Technological standard of the building)

EHFE: Instrucción para el proyecto y la ejecución de forjados unidireccionales de hormigón estructural realizado con elementos prefabricados. (Instruction for the design and execution of unidirectional structural concrete slabs made with prefabricated elements)

EHE: Instrucción del hormigón estructural. (Instruction of structural concrete)

CTE: Código técnico de la edificación. (Technical building code)
CONDITIONING OF THE AREA

The cleaning of the terrain will be made with vegetal land retired and piled up by mechanics means and always observed by the criteria of the Technological Regulation.

Later, the corresponding land transport will be made with trucks loaded until the next garbage dump of the work.

Once the place is clean will be come to the reframing of the zones to excavate, letting witnesses of this reframing to be able to make the pertinent verifications at any time.

The drain will be made by mechanic method, being adopted the opportune measures to avoid as much own damages and as to the public way, being observed at any moment the fulfillment of the regulation.

The leftover grounds of the drain will be transported with trucks loaded next to the garbage dump of the work.

The ditches for footings, and the wells for drains will be excavated by mechanical methods, remaining always clean and rubbish and ground, with clean cuts and horizontal bases. It will follow the criteria of the Regulation.

The leftover ground will be transported with trucks loaded, until next garbage dump of the work.
The wells, ditches and footings will fill up with prepared reinforced concrete HA-30/P/20/IIIb-H with 300 kg/cm² of characteristic resistance. This concrete will be prepared for marine ambiances (corrosion induced by chlorides from seawater) and freezing (IIIb-H). The criterions are explained then.

COMPLETE DESCRIPTION OF THE CONCRETE:  T – R / C / TM/ A

1.  
   - HM (HORMIGON EN MASA) Concrete mass.
   - HA (HORMIGON ARMADO) reinforced concrete.
   - HP (HORMIGON PRETENSADO) Prestressed concrete.

<table>
<thead>
<tr>
<th>Uso estructural</th>
<th>Resistencia característica a compresión a 28 días. En N/mm²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20</td>
</tr>
<tr>
<td>HA</td>
<td>No armado</td>
</tr>
<tr>
<td>HP</td>
<td>No armado</td>
</tr>
</tbody>
</table>

2. R (RESISTENCIA). It’s the characteristic cube strength at the age of 28 days in N/ mm². Normally we use this values 20, 25, 30, 35, 40, 45, 50 N/mm².

3. C (CONSISTENCIA). It identifies the consistence (art. 30.6 EHE)
   - S. Seca (dry)
   - P. Plastica (plastic)
   - B. Blanda (soft)
   - F. Fluida (fluid)

4. TM (TAMAÑO MAXIMO). It’s the maximum size of the soil in mm.

5. A (AMBIENTE). It’s the different kinds of exposure. (art.28.2 EHE).

   We have four kinds of main exposure classes:
I. No risk corrosion or attack.

II. Corrosion induced by carbonation.

III. **Corrosion induced by chlorides from seawater.**

IV. Corrosion induced by chlorides other than from seawater.

Specified exposure classes:

- Q (químico). Chemical attack.
- E. Erosion
- H. Freeze/thaw attack with or without de-icing agents.

This concrete will be elaborated, transported and put in work according to the instruction.

First layer of about 100 mm of thickness will be spilled with cleaning concrete in the base of the laying of founction, on which the corresponding reinforcements do not move and that has the necessary coverings.

The raft will be made with a base of ballasts and compacted artificial skittles of 200 mm of thickness with mechanic methods.

It will be demanded in work that the materials like cement, plasters or stucco that are used have quality mark. The steel for reinforced concrete will have quality seal and will be from only one manufacturer.

After the layer of cleaning concrete we are going to divided de surface in two parts.

We have a part for the garage without insulation and a part for a room that have insulation, so we will use different solutions.
1. The first solution, for the uninsulated area we can see in the next picture.

Here, we have the footing on a sand bed of 150 mm.

On the layer of sand, we will put a layer of concrete of 120 mm thick. It will be sufficient for the use to which it will.

2. The second solution, for the insulation area:
Inês Marco

We have a little room near the garage, with a bathroom, to stay in summer.

We use the solution G:201 in the ISOVER BOOK.

This consists in five layers:

- First one with a drainage material and a thickness of 150 mm.
- Later 3 layers of insulation, two with 100 mm and another with 50 mm.
- The last layer with concrete and 100 mm of thickness.

We can see it in the next picture.

The Warf wall insulation is a layer of Styrofix Isolakiva surrounding the outside.

In addition to the drainage system around the entire building, consisting of several layers of gravel with different diameters and an insulated pipe with geotextil.
The structure will be mixed.
On one side garage, 1st floor and 2nd floor use reinforced concrete columns and beams.
The floor structure will be unidirectional and it will be make in that moment, of 25 ±5 cm, ceramic
filler blocks 60x20x25 cm of according to regulations (NTE; EFHE; EHD; CTE-SE-EA)

The columns will be armed according the regulations.

From the 3rd floor, we will use a structure of wooden columns (120x45 mm) at 600 mm which
ended with the roof, also of wood.

To solve the problem that arises by combining different types of material, in this case concrete and
wood, and knowing that the wood is very absorbent and the concrete has a lot of moisture, we will
use a metal plate that isolates and separates the two materials.
To make the stairs, we will use HA-30/P/20/Ila in stair slabs of 150 mm thick according to NTE standards-EME, EHL and EHE.

We will make a concrete test to check its resistance.
Concrete control test consisting of four test tubes manufacturing cylindrical 15x30 cm., conservation in a moist chamber. Compression fracture.

**ROOF**

The solution we will adopt for the cover consists of wood beams, resting on the wooden columns (120x45mm) that have been anchored to the concrete floor.

The thickness of the beams will be 500 mm, because we include a thick layer of insulation, according to the rules.

Now I’m going to describe the different layers:

- On the beams will be another thin layer of insulation.
- Then a layer of air ventilation to avoid condensation.
- Layer regularization
- Wooden slats
- Ceramic tile

The tiles shall be placed in rows parallel to the wing with flaps and received mortar CEM II / BP 32.5 N
5. EXTERIOR WALLS

For the walls construction according to the book Isover, we have this solution. Y: 209

It will be mounted on a half-timbered.
Inés Marco  

BRICK WORKS

We use brick on the exterior walls and in partitions.
Visible face brick Gray 24x11.5x5 cm. received with cement mortar CEM II / BP 32.5 N and river sand, type , central prepared and delivered on site.

PARTITIONS, COATING AND FALSE CEILING

For the interior partitions we will use hollow bricks (24x11x5,7) cm to put the pipes
The interior finish will later plaster and a coat of paint.

For suspended ceilings:

We have two different ceiling for the bathrooms and for the rest of the house.

In the bathrooms we have an accessible ceiling plasterboard laminated white (60x60 cm) and 10 mm. thick, suspended grid view.

Even fixing accessories, assembly and disassembly scaffolding, finished s/NTE-RTP-17.

In the rest of the house we will use a continuous ceiling "omega Hispalam" formed of support separated 600 mm. among them, anchored directly to forged, on which is screwed plasterboard laminate PLADUR . Treatment included joint sealants. s / NTE-RTC.

FLOOR AND TILE

We will use parquet in all the rooms except in the bathrooms and kitchen where we are going to use tiles.

Parquet multilayer finished with UV curing acrylic lacquer, free of solvents and formaldehyde (or wax-oil finish free of solvents and formaldehyde).
In the bathrooms we have flooring porcelain stoneware tile 31x31 cm. received with white glue, including grouting mortar flashing and cleaning.
CARPENTRY

All windows and exterior doors are aluminium lacquered white.

To cover windows, we will use Venetian blinds that regulate the amount of light entering the room, but this does not eliminate completely the passage of light also can regulate the temperature of the room, as it selects the desired light path and allows passing an air stream without difficulty.

The main door, in beech, varnished de 110x30 mm. On both sides we put security hinges, security locks 4 laps and 5 anchor points, chrome handles and chrome peephole.

The interior passage doors are made of beech wood.

The fronts of the cupboards as well.
**ELECTRICAL INSTALLATION**

The electrical installation consists of:

- A connection of copper wire with insulation. It will be placed over a ditch with mechanical protection and PVC tape marking.
- Ground independent steel pike.
- Individual branch.
- General protective box.
- Power control switch. Lighting circuit. 10 A
- Circuit for general purpose shots. 16 A
- Circuit for washing machine, dishwasher. 20 A
- Circuit for the kitchen. 25
- Points of light.
- Points double switch.
- Basis for plugs.
- External Wall.
- Self-contained emergency luminaries.

**PLUMBING INSTALLATION**

The plumbing will have:

- General connection to the municipal water network.
- Water meter placed in the closet of the connection.
- Plumbing for sink.
- Bidet plumbing.
- Plumbing for toilet.
- Installation of plumbing for a bath.
Plumbing for sink.
Plumbing for washing machine.
Polyethylene pipes for cold water installations and hot water.
Valves, anti return and accessories.
White vitreous china sink. (Model ROCA DAMA).
White vitreous china toilet. (Model ROCA DAMA).
White vitreous china bidet. (Model ROCA DAMA).
Bath enamel steel, white background.
Adapter Shower in White vitreous china
Stainless steel sink.

HEATING INSTALLATION

The heating installation will comprise:

- Installing heating fireplace.
- Thermostat measures the temperature.
- Polypropylene Pipes.
- Valves, small equipment and accessories.
- Floor Heating based polyurethane insulation-film sandwich. With circulation-pump, with its cutting keys, protection system.
- Heating control depending on temperature.
- Antifreeze.
- Accumulation system with mixing valve.
- Biomass boiler.
VENTILATION INSTALLATION

The ventilation system shall comprise:

- Extraction group ensuring the continuous renewal of air in houses, through mouths extraction located in different rooms (kitchen, toilets, rooms bath) and air inlets located in the main rooms (dining room, bedrooms) that allow the introduction of new air.
- PVC conduit.
- Grille.
- Attempt on the roof.

PROTECTION AGAINST FIRE

Under current rules, the houses will have:

- Fire extinguisher ABC multipurpose dry chemical anti-grilled, with support, and ascertainable gauge hose with diffuser, according to UNE, AENOR certificate.
- Fire extinguisher CO2 snow and ice, 898 efficacy of 5 kg. of extinguishing agent, constructed of steel, with hose bracket and diffuser.

PAINTS

- Smooth matte acrylic paint washable acrylic professional, white or pigmented on horizontal and vertical walls, two hands.
- Enamel paint on metal work, including cleaning and antioxidant layer.

GLASSES

Climalit double glazing, consisting of two colourless glass 4 mm, fixed on carpentry and seal with silicone neuter.
URBANIZATION

We will have:

- Terrazzo tile floor, 40x40x5 cm. On concrete slab and 10 cm. Thick.
- Low-density polyethylene pipe for water supply.
- Sanitation collector buried polyethylene
- Medium voltage electricity network piped under roadway Channeling telephone trench under pavement.
- Furnishings.
- Gardening.
SIX HOUSES, PAIRED 2-2
Halmstad, Sweden

III. HEALTH AND SAFETY
Health and safety

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  IV. VEHICLES, MACHINERY AND MEANS AUXILIARY TO USE

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GENERAL INFORMATION

PROJECT IMPLEMENTATION

Name of the Work
Construction of six houses. "House Par".

Location and locality
The work is located in Halmstad. (Klyvaregatan and Södra-gatan)

Author of Project Execution and Security Survey
Inés Marco Aguilar

Budget Implementation Material
1,793,576,98 €

Deadline for Implementation
The deadline for execution of work is 18 months

DESCRIPTION OF THE WORK

ESTIMATED HUMAN RESOURCES OF THE WORK

The staff planned to carry out the works is estimated at 18 workers or less. All these people will be informed of the work performed and the risks that entail, as well as training for the proper
security measures to cancel and or neutralized by the introduction of collective means of protection first, and use of personal protective equipment, in second place.

ROAD TRAFFIC

Due to the location of the work will occur the movement of vehicles and machines operations lifting, transportation and load positioning within the work. It's necessary pedestrian detours, placing signs, buoys, protections, and the presence of a guard for the traffic.

CLIMATE AND ENVIRONMENT.

For the situation of the play there is no specific climate type variable to consider. To avoid overturning by wind of the formwork and vertical walls, these must be underpinned with the relevant equipment. In the case of wind speeds above 60 km/h, be suspended lifting loads with tower crane and work on scaffolding and roofs.

VEHICLES, MACHINERY AND MEANS AUXILIARY TO USE

In excavations and ditches.
- Vehicles and Machines.
- Retro excavators.
- Wheel Loaders.
- Vibratory compactor.
- Trucks. - Ais.
- Elements and shoring systems.

In structures and slabs.
- Vehicles and machinery.
- Truck mixers.
- Self-propelled cranes.
- Electric circular saws.
- Aids. - Stairs manuals.
- Turrets for concrete pillars.
- Scaffolds and work platforms.
- Elements of formwork and shoring.

On fences and masonry,
- Vehicles and machinery.
- Trucks.
- Sawing ceramic material.
- Aids.
- Nails portapalets crane.
- Platform of unloading of materials.
- Forklifts.
- Pipelines for earthmoving and containers.
- Metal scaffolding tubes.
- Scaffolding hung.
- Working platforms.
- Stairs manuals.

Metal
- Vehicles and machinery.
- Self-propelled cranes.
- Welding equipment.
- Radial.
- Aids.
- Cylinder trolley.
- Sidewalks.

- Walkways.
- Stairs.
- Hanging baskets.
- Tubular scaffolding. Facilities.
- Vehicles and machinery.
- Trucks.
- Cranes electromotive.
- Aids.
- Stairs manuals.
- Metal scaffolding tubes.
- Scaffolding hanging motor.
- Working platforms.
- Groups of cutting and welding.
- Portable electric machines.

In all phases of work,
- Vehicles and machinery.
- Construction cranes.
- Dumper Dumper.
- Aids.

**Actions Prior to the Execution of the Work**

**Access, Perimeter Closures and Ramps**

A) Visits As detailed in the plans have been established safe and comfortable access for people and vehicles and machinery.

B) Perimeter closure to avoid the entrance of outsider people and vehicles. The height of the perimeter protection is 2 meters.

C) Ramps for the movement of trucks will run with slopes equal to or below 12% in the straight sections and 8% in the corners. The minimum width will be 4.5 meters in width on straight sections and curves appropriate.

We placed the following signs:

- At the exit ramp stop sign.
- At the entrance ramp signs of "speed limit 40 km / h" and "input forbidden to pedestrians."

**Signaling**
- At the entrance of personnel to work, install the following signs: Trespassing on any person unconnected to work.

Mandatory use of safety helmets. Danger undetermined. Having passed the entrance gate will be placed an information panel with signals Safety Prohibition Notice Obligation.

- In general electric panels and auxiliaries, install the electrical danger signs.

- In areas where there is danger of falling from a height's mandatory use of seat belts.

- Marked the tape should be used to warn of the danger in areas where there is a risk (ditches, drained, without stripping floors, etc.).

- In areas where fire hazards exist for the storage of combustible material is placed smoke signal.

- In the cement mixers and circular saws to cut ceramic decal will be placed using anti-dust mask and goggles.

- In work with jackhammers and compressors will be placed using signal mandatory hearing protection.

- In the area of location of first aid kit will install the signal corresponding to be located visually.

- In areas where fire extinguishers are placed the appropriate signals will be placed for easy location.

- In the overlapping work and stripping operations will place the sign of falling objects.

- In areas of collection material is placed the sign of fall.

**INSTALLATION INTERIM WORKERS**

The central office also serves as a warehouse, is located near the site of works, so it will function as toilets, wardrobe and make the case that lack of room.

**FIRST AID. EVACUATION ROUTES FOR MAJOR ACCIDENTS**

There will be a medicine chest installed on site and facilitated by the MUTUAL OF OCCUPATIONAL INJURIES.

Also have a kit to perform emergency and cures suitably signposted.

The kit will contain:

- 1 bottle containing hydrogen peroxide.
- 1 bottle containing alcohol of 96 degrees.
- 1 bottle containing tincture of iodine.
- 1 bottle containing Mercurochrome.
- 1 bottle containing ammonia.
- 1 Box containing sterile gauze.
- 1 Box containing sterile cotton wool.
- 1 roll of adhesive tape.
- 1 Tourniquet.
- 1 Bag with water or ice.
- 1 Bag containing sterile gloves.
- 1 clinical thermometer.
- 1 box of self-adhesive dressings.
- Analgesics

### FIRST AID AND HEALTH CARE

<table>
<thead>
<tr>
<th>LEVEL OF ASSISTANCE</th>
<th>NAME AND LOCATION</th>
<th>DISTANCE. (Km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First aid</td>
<td>Medicine chest</td>
<td>In the work</td>
</tr>
<tr>
<td>Primary Care (Emergencies)</td>
<td>Länssjukhuset i Hallstad, 30233 Hallstad Municipality</td>
<td>2.3 km</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 min.</td>
</tr>
<tr>
<td>Assistance Specialized (Hospital)</td>
<td>Länssjukhuset i Hallstad, 30233 Hallstad Municipality</td>
<td>2.3 km</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 min.</td>
</tr>
</tbody>
</table>

### AREAS OF WORK, MOVEMENT AND COLLECTION

Pedestrian and vehicle movement outside the work.

*The area will be perfectly delimited by perimeter fence, which couldn’t be crossed by vehicles or personnel outside the work.*

*Traffic signs shall comply in terms of their distribution and characteristics, as provided for in Section works.*

*All access will have to work safety signs.*

*The obstacles in the vicinity of the site must be properly marked and signposted. He will recruit a Civil Liability insurance of the work.*

### CIRCULATION STAFF WORK.
"The pipes and other items at a height less than 1.80 m., located on the workplace, they must be properly marked to avoid collisions with them.
"Do not be enabled as transit areas, areas whose width between vertical walls is less than 0.60 m.
"The steps under work areas should have protection.
"The passage areas to be overcome ditches and slopes should have walkways with railings solid and complete.
"The passage areas must be permanently free from obstacles.
"The horizontal or vertical holes with high risk of falls of persons or objects, must be protected or at least marked.
"All the transit areas of personnel will be equipped with sufficient lighting.

CIRCULATION OF VEHICLES WORK.

"Before the final establishment of zones of passage for vehicles work, we have previously noted the good condition of pavements, especially on embankments, landfills and land affected by the weather.

- The electric wires and hoses should not be affected by the passage of vehicles.
- Circuits of movement of personnel and work vehicles must be clearly defined and separated.
" The traffic vehicle near the Excavations in the open areas will be protected and spaced 1 m. the perimeter of the hole.

CENTRAL AND PLANTS

For the preparation of the modules of prefabricated concrete slabs and walls, will install a prefabrication plant, being supplied the same materials by a central concrete implanted within the grounds of work.

For use of these facilities must follow the safety instructions in the plant, machinery and stages of work carried out.

PROVISIONAL ELECTRICAL INSTALLATION

On request, we will proceed to mount the temporary electrical installation work.
Risks should be considered as frequently as follows:
- Electrical contacts direct.
- Electrical contacts indirect.
- Malfunction of protection mechanisms and systems.
- Bad behavior of ground connections (incorrect installation).
- Burns.
- Fires.

LIGHTING

The lighting of the area of work is always adequate to perform the work safely.
The portable lighting will be done through tight security lamp with insulating handle, anti moisture hose, standarc connection of 24 volts.
The passageways of the work will be permanently illuminated corners avoiding Dark.

FIRE FIGHTING MEASURES

Work in storages Normally

For reasons of functionality and organization of the works, are usually stored in separate places materials to be used in different trades.
This basic principle is in favour of fire protection must be clearly separated from combustible materials from each other, and all have to avoid any contact with equipment and electric conduits.
Liquid fuels and lubricants need to be in a place isolated, guarded and adequately ventilated, with all closed containers.

In the machinery.

Machinery, both fixed and mobile, powered by electricity, must have the current connections well executed. All waste, wood chips and waste which are caused by work, must regularly be removed, leaving clean daily around the machines.

The transfer of oil.

The fuel transfer operations should be conducted with good ventilation, outside the influence of sparks and ignition sources.
It will avoid also the consequences of potential spills during the operation, so it must be hand-earth or sand to soak.
Be forbidden to smoke or ignite any type of flame.

Protection of welding.
In welding and cutting with projection of glowing objects that are capable of burning, we have to cover near objects them with fire blankets. Should periodically check under the canvas has been introduced a spark or if there is excessive overheating. They won't be cutting and welding in places where explosive, flammable vapors, or where, despite all precautionary measures possible to ensure the safety to a possible fire.

Extinguishing media.
In the situations described above (storage, fixed or mobile equipment, fuel transfer, welding) and others where it is handled a source of ignition, it's obligatory to use fire extinguishers.
In the case of large storage, it's necessary irrigation hoses. Information for vigilante force.
The guards will be informed of the points and areas which may be fire hazards in the work, and measures of protection in the same.
MOST FREQUENT RISKS, PREVENTIVE MEASURES AND PERSONAL PROTECTION

LAND MOVEMENT

Most frequent risks:

- Landslide of soil and rock.
- Landslides and rock.
- Collision, overturning false manoeuvres of earthmoving machinery.
- Falls of personnel and materials to a different level from the edge of the excavation.
- Falls of people at the same level.
- Interference with pipes.

Preventive measures.

- Before the start of the work, place should be inspected in order to detect possible cracks or ground movements.
- The collection of land or materials should not be less than two meters from the edge of the excavation, to prevent overloading static.
- Remove all the stones of the excavation fronts that for its location offer risk of detachment.
- We have to signalize the minimum safety distance of approach to the edge of excavation, at least 2 m.
- It is prohibited to perform any work at the foot of slopes unstable.
- Work is prohibited in the vicinity of power poles, cable, etc. Whose stability is assured.

Personal protection.

- Safety helmet (for personal walk, and lorry drivers who want or have to leave the relevant driving cabs).
- Boots.
- Waterproof clothing for wet environments.
- Dust masks.
- Belt vibration (particularly for drivers of machinery for earthmoving).
- Gloves.

FOUNDATION AND STRUCTURE.

Most frequent risks.
- Blows to the hands during use of the hammer.
- Fall of the workers.
- Overturining of packages of wood (planks, boards, struts, belts), during lifting maneuvers to plants.
- Fall of wood during vacuum stripping operations.
- Fall of people walking or working on the joists.
- Fall of persons in holes along the edge of the slab.
- Falls of people at the same level.
- Courts to use the circular saw tables.
- Footprints on sharp objects.
- Electrocution by canceling groudng electrical machinery.
- Blows to general objects.
- Dermatitis by contact with concrete

Preventive measures

All the works will be made following the instructions of health and security.

Personal protection.

- Safety helmet.
- Boots.
- Seat belt (Class C).
- Leather gloves.
- Safety glasses anti projections.
- Rubber boots or P.V.C. security.
- Waterproof clothing for humid environments.

DRAINAGE

Most frequent risks.

- Fall of people at different levels.
- Overstrain.
- Derivatives of work carried out in humid, flooded and closed.
- Electrocution.
- Poisoning by gas.
- Explosion of gases or liquids.
- Dermatitis by contact with concrete.
- Infections (work in proximity to the inside or close to sewers in service).

Preventive measures.

- Tubes for pipelines will be collected on a surface as horizontal as possible on wooden ties, preventing them from slipping.
- Wherever there is danger of collapse will proceed to take action necessary to avoid it.
- The drilling of the well will run with the proper method to avoid landslides on people.
- Is forbidden to be alone inside shafts and galleries.
- Workers must remain attached to the outside by a rope anchored to the seat belt.
- The detection of gases is effected by appropriate equipment.
- If gas detection, eviction shall be ordered immediately.
- In case of detection of harmful gases, the entry and stay shall be protected by breathing apparatus.
- The tunnels will have enough light to walk inland. The electric power supply to 24 V.
- Smoking is prohibited inside the shafts and tunnels.
- At the first sign of dizziness within a pit or gallery, be communicated to the peers.
- It is prohibited to access the well to any person outside the work.
- Around the mouth of the well will install a security firm surface of an established base made with plank stuck together.
- It is prohibited to gather material around a well at a distance less than 2 m. (in general).

**Personal protection.**

- Safety helmet.
- Leather gloves.
- Latex gloves (or P.V.C.).
- Boots. —
- Rubber boots (or P.V.C.).
- Lighting autonomously.
- Self-contained breathing equipment (or semi-autonomous).
- Seat belt.
- Safety glasses anti projections.

**BRICK WORK**

**Most frequent risks.**

- Fall of people at different levels.
- Falling objects over people.
- Cortes by handling objects and hand tools.
- Dermatitis by contact with cement.
- Particles in the eyes.
- Cortes by use of machine tools.
- Derivatives carrying out work in dusty environments (cutting ceramic, for example). - Overstrain.
- Electrocution.
- Trapped by lifts and transport.
- The use of derivatives aids.
Preventive measures.

- The large holes will be covered with a horizontal network installed alternately every two floors to prevent falls.
- The ramps of stairs in your environment will be protected by railings.
- Will be installed in areas with danger of falling from height, signs of "danger of falling from height" and "mandatory seat belt use."
- All areas to work, shall be properly lighted.
- Work zones will be cleaned of debris daily.
- A work zone is always accessed safely.
- It is prohibited to balance the loads suspended. Platforms will be installed for loading and unloading of materials.
- The brick is hoisted neatly stacked inside lifting platforms emplintadas, being careful that the pieces can not fall during transport.
- The collection of pallets, will be held next to each pillar to avoid overloading of the structure at points of least resistance.
- The debris and rubble be disposed of by discharge tubes mounted to the end and not directly. Avoid working with the newly erected walls within 48 h. If there were strong winds could fall on staff.

Personal protection.

- Safety helmet.
- Gloves P.V.C. or rubber.
- Leather gloves.
- Boots.
- Seat Belt Class C
- Rubber boots with reinforced toe.

ROOFS

Most frequent risks.

- Fall of people at different levels.
- Falling objects.
- Overstrain.
- Burns (sealed, waterproofing hot).
- Blows or cuts.

Preventive measures.
- The risk of falling into the void will avoid by installing networks around the building.
- All holes in forged horizontal, will be cover with wood during the formation of slopes.
- The circulation necessary on the sloped roof will be resolved through gateways.
- The tiles will be collected on the roof but avoiding overloads.
- It suspended work on the roof with winds above 60 km / h in preventing the risk of falls of persons or objects.
- The wooden battens to put the tiles will be hoist in order.
- The eaves are kept free of objects that may hinder the work or the secure movement.
- The widespread and received on inclined planes, will be implemented, subject to seat belts to the steel cables stretched between "strengths".

Personal protection.
- Safety helmet.
- Boots.
- Rubber boots with reinforced toe.
- Leather gloves.
- Rubber gloves.
- Seat Belt Class C
- Clothing for rainy weather.

COATINGS

Most frequent risks.
- Cuts and bruises.
- Falls in vacuum and at the same level.
- Foreign bodies in the eye.
- Contacts with electricity.

Preventive measures.
- The areas of transit and support for work of plastering is kept clean and tidy.
- Scaffolds for plaster will form on trestle. It's forbidden the use of ladders, jerry cans, piles of material, etc., For these purposes.
- It's forbidden the use of trestle on balconies without protection against falls from height.
- The safety belt will be hook in a firm element of the structure.
- It is prohibited the connection of electrical cables to supply the tables without use of male-female plugs.
Personal protection.

- Safety helmet.
- Gloves P.V.C. or rubber.
- Boots.
- Eye protection against mortars and similar drops.
- Work clothing.
- Seat Belt Class C

FALSE CEILING

Most frequent risks.

- Cutting through the use of hand tools.
- Falls from the manipulation of tracks and guides.
- Falls the same and different levels.
- Contact dermatitis in plaster.
- Foreign bodies in the eye.
- Contacts with electricity.

Preventive measures.

- At all times be kept clean and tidy workplace, to prevent injury from tripping.
- The stairway to use shall be fitted with slip-resistant to prevent accidents caused by instability.
- The trestle working will have a minimum width of 60 cm.
- The installation of suspended ceilings will be made on a tubular scaffold (over 2 meters high) that will have a handrail solid 90 cm. high, consisting of rails, middle bar and skirting.
- The Tubular platforms on wheels not be used without brakes adjusted before go up to them.
- Work surfaces for installing suspended ceilings on ramps and stairs will be horizontal.
- It is prohibited to climb ladders without being subject seat belt at a fixed point of the structure.
- It expressly prohibits the connection of electrical cables to boxes supply without the use of male-female plugs.

"It is forbidden to leave directly on the pavement, sharp objects to avoid accidents.

Personal protection.

- Safety helmet (mandatory for travel by the work).
- Ghent P.V.C. or rubber.
- Leather gloves.
- Boots.
- Eyewear against projections.
- Belt tool holders.
- Seat Belt Class C.
FLOORS

Most frequent risks.
- Falls on the same level.
- Cortes for handling of items with sharp edges or corners.
- Contact dermatitis with cement.
- Falls at different levels.
- Foreign bodies in the eye.
- Overstrain.
- Contacts with electricity.

Preventive measures.
- It is prohibited to connect electrical cables to supply without use of male-female plugs.
- The pieces of loose pavement, will be hoisted stacked in boxes.
  Bags of binder, was hoisted into boxes.
- The boxes or packages of pavement, never be designed so that hinder the passages, to prevent tripping accidents.
- Access will be shut, indicating alternative routes.
- The polishing machine shall be fitted with double insulation (or grounding of all metal parts), to avoid risk of electrical accidents.
- The polishing machine will be equipped with anti-entrapment protection ring (or abrasions), in contact with brushes and sandpaper.
- The maintenance and replacement or change of brush or sandpaper, shall be provided with the machine "unplugged from the mains, to prevent accidents from electrical hazards.

Personal protection.
- Safety helmet (for travel or stay in places with a risk of falling objects).
- Knee padded waterproof.
- Boots.
- Gloves P.V.C. or rubber.
- Leather gloves.
- Impermeable apron.
- Belt-protective girdle the waist.
- Waterproof Gaiters.
- Seat Belt Class C
CARPENTRY

Most frequent risks.

- Falls at different levels.
- Falls vacuum (carpentry for facades).
- Bumps and cuts by objects or tools.
- Fall of metalwork items on people.
- The derivatives of the auxiliary means used.
- Contacts with electricity.

Preventive measures.

- All the carpentry in the process of "presentation”, will be minted to prevent accidental falls.
- Before using any machine-tool, verify that is in optimal conditions and with all the mechanisms and safety guards installed in perfect condition.
- The scaffolding to receive the metal from the inside of the building facades will be limited at the front (which faces the vacuum), a solid handrail, 90 cm. height, measured from the work surface, consisting of handrails, intermediate ribbon to avoid the risk of falls from height.
- The longitudinal metal sections, transported on the shoulders of one man, will laid back, ensuring that the tip that goes before, is at a height higher than that of a person, to avoid hitting the other workers.
- Not be used as a trestle, boxes or stacks of materials, to avoid working on unstable surfaces. - All electrical equipment used in this document shall have grounded.

Personal protection

- Safety helmet.
- Leather gloves.
- Boots.
- Spray-safety goggles.
- The usual for protection for electric welding and cutting.

CARPENTRY AND VARNISH

Most frequent risks.

- Falls of people at different levels.
- Foreign bodies in the eyes.
- Derivatives of the work in hazardous atmospheres (poisoning).
- Contact with corrosive substances.
- Derivatives of ruptured hoses compressors.
- Contacts with electricity.

Preventive measures.
- Paints, (varnishes, solvents, etc..) Are stored at the places mentioned. This places will be ventilated to prevent fire hazards and poisonings.
- It will install a dry chemical fire extinguisher near the door to the warehouse.
- The leaf of the door to the paint store will install a sign of "fire hazard" and a "no smoking".
- It is prohibited to store paintings flammable that can produce vapors to prevent accidents by generation of toxic or explosive atmospheres.
- To avoid the formation of harmful atmospheres always the place with paints will be ventilated.
- Scaffolds for paint will have a working surface of a minimum width of 60 cm. to prevent accidents for work performed on unsafe surfaces.
- It is forbidden the use of ladders on the balconies, without previously having put the means of collective protection (nets, etc..) To avoid the risk of falls.
- Lighting shall be made portable fed by 24 volts.
- It is prohibited the connection of electrical cables for power supply boxes without the use of male-female plugs.
- Ladders used, will be equipped with anti-skid pads to prevent the risk of falls by instability.
- It is forbidden to smoke or eating in the rooms that is painted with paints containing organic solvents or toxic pigments.
- It is forbidden performing welding and cutting in areas near the place where flammable paints are used to avoid the risk of explosion (or fire).

Personal protection.

- Safety helmet (for moving the work).
- Gloves P.V.C.
- Mask with mechanical filter (for dusty environments).
- Chemical filter mask (for toxic atmospheres for organic solvents).
- Safety glasses (anti-particles and droplets).
- Footwear slip.

INSTALLATION

Most frequent risks:

- Injuries and cuts on hands and arms.
- Dermatosis by contact with materials.
- Inhalation of toxic substances.
- Burns.
- Shock and crushing of feet.
- Fire for the storage of combustible materials.
- Electrocution.
- Electrical contacts directly and indirectly.
- Environment pulvigeno.
Preventive measures.

- The portable machines will have double insulated.
- Valves, hoses and torches will be reviewed to prevent gas leakage.
- Gas pipes will be removed near any source of heat.
- Be checked the hand tools to avoid bumps and cuts.
- Adequate ventilation and sufficient.
- Protection of the elevator shaft (permanent).
- Platform lift tentative (permanent).
- The work area is always clean and orderly, and properly lighted.
- Areas are properly marked, where it is working.
- There will be a fire extinguisher next to where welds are made.

In electricity installations

"The connections are always made without tension.
"The evidence that would be carried out with voltage will be made after finishing the wiring.
- Hand tools will be reviewed periodically to avoid cuts and bruises in their use.

Personal protection.

- Safety helmet (to move in the work).
- Helmet for the electricians, approved and with insulation.
- Gloves P.V.C.
- Safety glasses (anti-particles and droplets).
- Footwear slip.
- Belts and harnesses.
- Welders used leather aprons, gloves, goggles and boots with gaiters.

AIDS

Scaffolding, ladders, props, mortar silos. It must comply with preventive measures according to the most common risks.

MACHINERY

Most frequent risks.

- Run over.
- Overtum.
- Derivatives of maintenance operations (burns, entrapment, etc.).
- Projections.
- Vibrations.
- Noise.
- Dust environment.
- Falls to raise or lower the machine.
- Footprints in the wrong position (on chains or wheels).
- Fall at different levels.
- Vacuum-Falls

Preventive measures.

- It is prohibited to work or be within the range of machinery for avoid the risks of run over.
- It is prohibited to work with machinery in the vicinity of the power line.
- Before leaving the cabin, drivers will have put the brake and stopped the engine by removing the ignition key, to avoid the risks of hydraulic system failures.
- Footbridges and access steps will be clean of gravel, mud and oil, to prevent the risk of falling. - It is forbidden the transport of people on the machine, to avoid the risk of falls or collisions.
- It is forbidden the maintenance work or repairs of machinery with the engine running, in preventing unnecessary risks.
- They shall be signed internal circulation roads using a rope of standard banners and traffic signals
- The tower crane is located in the place indicated on the plans.
- The lanes to ride the support of the crane will be “flat”.
- The ways of cranes to be installed, shall meet the following safety conditions:

  - Concrete slab on compacted ground.
  - Perfectly horizontal (longitudinal and transverse).
  - Well founded on solid ground.
  - It will be perfectly aligned and with a constant width along the route.
  - The rails are of the same section all of them.
  - The filling material between two rails not exceed the level of support plates.
- Ways of tower cranes to install will be connected to ground.

DETAILS OF EMPLOYMENT AND CONSERVATION OF USEFUL AND TOOLS

Both employment and on the conservation of tools and devices, the Works Manager will ensure proper use and maintenance, workers have to meet the specifications given by the manufacturer. The Works Manager will make sure that tools and devices will be used with the safety requirements specific to them. These tools will be used following general rules, should apply practical and general knowledge, according to accepted criteria.
DETAILS OF EMPLOYMENT AND CONSERVATION OF PREVENTIVE EQUIPMENT

Within the preventive equipment are considered the two main groups: personal protective equipment and collective means of protection.

Personal Protective Equipment

All clothing will set a period of life, discarding its end. If for any reason, work or misuse, individual protective clothing or equipment is damaged, it will replace regardless of the expected length. These computers will have the CE marking.

Collective Protection Equipment

- **HANDRAILS**

The balustrades incorporate two hooks for placement of the handrails above a height of 100 cms. and Intermediate tube 30 mm in diameter. Likewise, the balustrade has place where you can join the corresponding skirting.

- **PROTECTION FENCES**

They will have at least 100 cms. tall, metal studs and support so that they remain stable. These fences may be used anchored conveniently, for the protection of trenches and pits.

- **SAFETY CORRIDORS**

These elements may be metal. It will be able to withstand the impact of objects which are likely to fall.

- **PERIMETER MESH**

Protecting the risk of falling into the void by the peripheral edge. The lower end of the network is anchored to brackets embedded in the wrought. They are to protect the plants working. Mesh measures 10 x 10 cm.

- **CABLES AND ELEMENTS OF SAFETY BELT AND ANCHORS**

It will have sufficient strength to withstand the stresses to which they may be subjected, according to its protective function.

- **TRAFFIC SIGNALS AND SAFETY**

It will agree with current regulations.

- **EXTINGUISHERS**
Of dust polyvalent, revised load content within the year. Ladders be in good condition for use, will be of sufficient length to exceed 1 m. and be fitted with skid pads at the base.

- VERTICAL MESH

In vertical protections stairwells and balconies etc. It will be used vertical mesh hooked to each framework.

- HORIZONTAL MESH

It will be placed to protect the possible fall of people and objects in yards.

Let's review what the company should do before an accident at work:

1. ATTENTION TO ACCIDENT.

   First aid

   The company must have the proper first aid material in respect of quantity and characteristics, the number of workers and the risks they are exposed and a easy access to medical center nearest.
   Workplaces with more than 50 employees must have a room for first aid and other possible health care, providing one first aid kit, a table and a drinking water source. It will be close to the jobs and easily accessible to stretchers

   Medicine chest of first aid must:

   - Be fit for the number of workers
   - Have appropriate content depending on the activity
   - Be duly marked (signs of square or rectangular background green and white pictogram)
   - Be located in an easily accessible and known to all workers
   - At least one must be portable
   - Be reviewed periodically to ensure they have all the material necessary and that it is not expired.

   Care for worker in case of minor accidents

   In accidents of a minor nature, the worker must have the first aid equipment needed to do a little priest. In minor accidents, the employee will go to Mutual Medical Center that the company has agreed, in advance to inform your manager.
   It is important the workers to know where is located the medical center so they know where to go if necessary.
   In case of sick leave be necessary, the Medical Mutua will issue the corresponding report, that the employee must deliver to the company.
Care for worker in case of serious and very serious accidents.

When in the work happen in a workplace accident of a serious or very serious nature, the staff received the required training in first aid will pay first attention to the injured until the ambulance arrives and / or emergency services. The injured should be transported in a vehicle adapted and the company must inform the hospital or clinic to which you're headed. It is important that workers have been informed and educated about the steps to take in the event of an accident, emergency telephones, announcements, etc..

Training in first aid must:

- Be provided by qualified
- Be theoretical
- practical
- To be assessed Addressing how to cope with different types of accident:
  - Bleeding
  - Cuts, wounds
  - Burns
  - Sprains, strains
  - CPR
Excavations
LADDERS
PRECAUTIONS
Going up
Going down
PRECAUTION IN THE USE OF LADDERS

NEVER SPLICE TWO LADDERS

LADDERS WITH NON-SLICE BASES

CHAIN TO AVOID OPENING

ASSEMBLED STEPS
ACCEPTED FORMS FOR THE SLINGS

NEVER CROSS TWO SLINGS. IT CAN PRODUCE THE BREAKAGE OF THE TRAPPED SLING

HORIZONTAL LOADS
Precautions to keep them securely fastened.
SIGNALS HANDLING CRANES

ATENTION  RISE  SLOW RISE

DETENTION  DESCENT  SLOW DESCENT

URGENT DETENTION  SUPPORT  END OF COMMAND

SLOW MOVING HORIZONTAL

HORIZONTAL MOVING
Be kept a safe distance between the crane and the electric line of 50m.
Between buildings and cranes will be a minimum space of 0.5 m.
If two cranes work at a time, keep a safe distance.
In case of strong winds (120 km/h), the crane is fixed to the ground.

Tower Cranes
Precautions near power lines

The cranes will be mounted properly, ensuring a secure and solid fixing to the ground.
The cranes will be loaded with weights not exceeding a maximum payload.

Tower cranes
Precautions for stability and loads.
MESH (fall of persons or objects)

Mesh, development 5m.  
Mesh, height 5m.

Gallows mesh

Cantilever mesh
Seat belt anchorages
Personal protection. Safety Boots

Toe

Security Toe

Personal protection. Safety glasses

Eye

Top
Temporary
Bottom
Personal protection. Security helmet.

- Wing
- Cap
- Visor
- Buffer strips
- Harness

Harness height

Cup
Top
Free light
Cap
Band contour
### WARNING SIGNS

<table>
<thead>
<tr>
<th>MEANING</th>
<th>SYMBOL</th>
<th>COLOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIRE FLAMMABLE MATERIAL</td>
<td>![Flammable Symbol]</td>
<td>BLACK/YELLOW/BLACK</td>
</tr>
<tr>
<td>FIRE EXPLOSIVE MATERIAL</td>
<td>![Explosive Symbol]</td>
<td>BLACK/YELLOW/BLACK</td>
</tr>
<tr>
<td>RISK RADIOACTIVE MATERIAL</td>
<td>![Radioactive Symbol]</td>
<td>BLACK/YELLOW/BLACK</td>
</tr>
<tr>
<td>RISK SUSPENDED LOADS</td>
<td>![Suspended Load Symbol]</td>
<td>BLACK/YELLOW/BLACK</td>
</tr>
<tr>
<td>RISK OF POISONING TOXIC SUBSTANCES</td>
<td>![Poison Symbol]</td>
<td>BLACK/YELLOW/BLACK</td>
</tr>
<tr>
<td>RISK OF CORROSION BY CORROSIVE SUBSTANCES</td>
<td>![Corrosion Symbol]</td>
<td>BLACK/YELLOW/BLACK</td>
</tr>
</tbody>
</table>
### WARNING SIGNS

<table>
<thead>
<tr>
<th>MEANING</th>
<th>SYMBOL</th>
<th>COLOURS</th>
<th>WARNING SIGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall at the same level</td>
<td><img src="image" alt="Symbol" /></td>
<td>Black</td>
<td>Yellow</td>
</tr>
<tr>
<td>High pressure</td>
<td><img src="image" alt="Symbol" /></td>
<td>Black</td>
<td>Yellow</td>
</tr>
<tr>
<td>High temperature</td>
<td><img src="image" alt="Symbol" /></td>
<td>Black</td>
<td>Yellow</td>
</tr>
<tr>
<td>Low temperature</td>
<td><img src="image" alt="Symbol" /></td>
<td>Black</td>
<td>Yellow</td>
</tr>
<tr>
<td>Laser radiations</td>
<td><img src="image" alt="Symbol" /></td>
<td>Black</td>
<td>Yellow</td>
</tr>
<tr>
<td>Trucks</td>
<td><img src="image" alt="Symbol" /></td>
<td>Black</td>
<td>Yellow</td>
</tr>
</tbody>
</table>
## RESCUE SIGNS

<table>
<thead>
<tr>
<th>MEANING</th>
<th>SYMBOL</th>
<th>COLOR SAFETY</th>
<th>COLOR CONTRAST</th>
<th>RESCUE SIGNS</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIRST AID EQUIPMENT</td>
<td>![Symbol]</td>
<td>WHITE</td>
<td>GREEN</td>
<td>WHITE</td>
</tr>
<tr>
<td>LOCATION OF EQUIPMENT</td>
<td>![Symbol]</td>
<td>WHITE</td>
<td>GREEN</td>
<td>WHITE</td>
</tr>
<tr>
<td>DIRECTION TO FIRST AIDS</td>
<td>![Symbol]</td>
<td>WHITE</td>
<td>GREEN</td>
<td>WHITE</td>
</tr>
<tr>
<td>LOCATION OF EMERGENCY EXIT</td>
<td>![Symbol]</td>
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<td>GREEN</td>
<td>WHITE</td>
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<tr>
<td>DIRECTION TO THE EMERGENCY EXIT</td>
<td>![Symbol]</td>
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<tr>
<td>LOCATION OF EMERGENCY SHOWER</td>
<td>![Symbol]</td>
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</table>
### Items reflective beacon

<table>
<thead>
<tr>
<th>Meaning</th>
<th>Symbol</th>
<th>Color</th>
<th>Security Contrast</th>
<th>Signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Directional panel high</td>
<td><img src="image" alt="Symbol" /></td>
<td>RED</td>
<td>WHITE</td>
<td><img src="image" alt="Sign" /></td>
</tr>
<tr>
<td>Directional panel strait</td>
<td><img src="image" alt="Symbol" /></td>
<td>RED</td>
<td>WHITE</td>
<td><img src="image" alt="Sign" /></td>
</tr>
<tr>
<td>Double directional panel high</td>
<td><img src="image" alt="Symbol" /></td>
<td>RED</td>
<td>WHITE</td>
<td><img src="image" alt="Sign" /></td>
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<tr>
<td>Double directional panel strait</td>
<td><img src="image" alt="Symbol" /></td>
<td>RED</td>
<td>WHITE</td>
<td><img src="image" alt="Sign" /></td>
</tr>
<tr>
<td>Panel zone traffic exclude</td>
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<td><img src="image" alt="Sign" /></td>
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<tr>
<td>Cone</td>
<td><img src="image" alt="Symbol" /></td>
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<td><img src="image" alt="Sign" /></td>
</tr>
<tr>
<td>MEANING</td>
<td>SYMBOL (FACE)</td>
<td>SYMBOL (HEAD)</td>
<td>COLORS</td>
<td>SECURITY SIGN</td>
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<tr>
<td>-----------------------</td>
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<tr>
<td>MANDATORY PROTECTION RESPIRATORY TRACT</td>
<td><img src="image1" alt="Face" /></td>
<td><img src="image2" alt="Head" /></td>
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</tr>
<tr>
<td>MANDATORY PROTECTION HEAD</td>
<td><img src="image3" alt="Face" /></td>
<td><img src="image4" alt="Head" /></td>
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<tr>
<td>MANDATORY PROTECTION EAR</td>
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<tr>
<td>MANDATORY PROTECTION EYE</td>
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<tr>
<td>MANDATORY PROTECTION HANDS</td>
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<td><img src="image10" alt="Head" /></td>
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<tr>
<td>MANDATORY PROTECTION FOOT</td>
<td><img src="image11" alt="Face" /></td>
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<tr>
<td>MANDATORY USE OF SCREEN</td>
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<tr>
<td>MANDATORY USE OF PROTECTOR ADJUSTABLE</td>
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## SECURITY SIGNS

<table>
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<tr>
<th>MEANING</th>
<th>SYMBOL</th>
<th>COLORS</th>
<th>SAFETY</th>
<th>CONTRAST</th>
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<td>NO SMOKING</td>
<td>![No Smoking Symbol]</td>
<td>BLACK</td>
<td>RED</td>
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<tr>
<td>NO OFF WITH WATER</td>
<td>![No Fire Symbol]</td>
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<tr>
<td>NO SMOKING NO NAKED FLAME</td>
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<td>NO PEDESTRIANS</td>
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<td>WHITE</td>
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</tbody>
</table>
SIX HOUSES, PAIRED 2-2
Halmstad, Sweden

IV. MEASUREMENT
AND BUDGET
Budget

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EARTH WORK
INSTALLATION OF SANITARY DRAINAGE:
FOUNDATION
STRUCTURE
ROOF
BRICK WORK AND INTERIOR PARTITIONS
COATING AND FALSE CEILING
FLOOR AND TILE
METALWORK (OUTDOOR)
WOODWORK (INDOOR)
LOCKSMITH WORK
ELECTRICAL INSTALLATION
PLUMBING INSTALLATION
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VENTILATION INSTALLATION
PROTECTION AGAINST FIRE
PAINTS
GLASSES
CLEANING OF THE AREA

CONDITIONING OF THE AREA

SAFETY
### BUDGET FOR PROVISION OF THE CONTRACTED SERVICES

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Description</th>
<th>Cost (€)</th>
<th>Cost (SEK)</th>
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<tbody>
<tr>
<td>1</td>
<td>EARTH WORK</td>
<td>64.465,72</td>
<td>653.385,01</td>
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<td>2</td>
<td>INSTALLATION OF SANITARY DRAINAGE</td>
<td>12.850,86</td>
<td>130.241,18</td>
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<td>FOUNDATION</td>
<td>55.856,93</td>
<td>566.128,49</td>
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<td>4</td>
<td>STRUCTURE</td>
<td>71.946,82</td>
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<td>5</td>
<td>RCOF</td>
<td>21.375,60</td>
<td>216.646,31</td>
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<td>6</td>
<td>BRICK WORK AND INTERIOR PARTITIONS</td>
<td>68.151,35</td>
<td>690.744,46</td>
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<td>7</td>
<td>COATING AND FALSE CEILING</td>
<td>34.707,59</td>
<td>351.772,80</td>
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<td>8</td>
<td>FLOOR AND TILE</td>
<td>53.498,24</td>
<td>542.228,98</td>
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<td>30.791,64</td>
<td>312.082,18</td>
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<td>36.678,49</td>
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<td>ELECTRICAL INSTALLATION</td>
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<td>HEATING INSTALLATION</td>
<td>136.258,32</td>
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<td>VENTILATION INSTALLATION</td>
<td>5.188,05</td>
<td>52.582,97</td>
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<td>PROTECTION AGAINST FIRE</td>
<td>372,66</td>
<td>3.770,406</td>
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<td>17</td>
<td>INSULATION AND WATERPROOFING</td>
<td>20.010</td>
<td>202.811,36</td>
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<td>18</td>
<td>PAINTS</td>
<td>15.921,90</td>
<td>161.367,30</td>
</tr>
<tr>
<td>19</td>
<td>GLASSES</td>
<td>3.528,67</td>
<td>35.758,04</td>
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<td>20</td>
<td>CONDITIONING OF THE AREA</td>
<td>27.452,12</td>
<td>278.239,75</td>
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<tr>
<td>Chapter</td>
<td>Budget 1</td>
<td>Budget 2</td>
<td></td>
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<tr>
<td>----------------------------------------------</td>
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<tr>
<td>Safety</td>
<td>25,718,81 €</td>
<td>260,664,79 SEK</td>
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<tr>
<td>Machinery, Materials and Labor</td>
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<td>5,799,492,56 SEK</td>
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<td>Material Requirement Budget</td>
<td>1,299,316,85 €</td>
<td>13,166,010 SEK</td>
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<td>+13% General Cost</td>
<td>168,911,19 €</td>
<td>1,711,997,44 SEK</td>
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</tr>
<tr>
<td>+6% Industrial Profit</td>
<td>77,959,011 €</td>
<td>790,153,44 SEK</td>
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<tr>
<td>Total</td>
<td>1,546,187,05 €</td>
<td>15,669,408 SEK</td>
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<tr>
<td>+16% IVA (Tax)</td>
<td>247,389,93 €</td>
<td>2,507,411,210 SEK</td>
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<td>Budget for Provision of the Contracted Services</td>
<td>1,793,576,98 €</td>
<td>18,172,950 SEK</td>
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</table>
Inés Marco

SIX HOUSES, PAIRED 2-2

<table>
<thead>
<tr>
<th>Nº</th>
<th>Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
</table>

CHAPTER 01 EARTH WORKS:

01.01 M2 Removal of topsoil by mechanical means

Removal and stacking of topsoil surface layer by mechanical means no load or transport to the dump and proportionally aids.

Plot

3495.5 0.53 1852.615 €

01.02 M3 Land excavation machine

Open excavation on land compact, mechanically, extraction of land outside of the excavation, without charge or transport to landfill and proportionally aids.

Plot

4148.85 1.68 6970.97 €

01.03 M3 Loading and transport to landfill

Land transport to the landfill, at a shorter distance of 20 km., Considering round trip, and with proportionally aids, considering also the load.

7644.35 7.03 53.739,58 €

01.04 M3 Filling and compaction by mechanical means and supply of land.

Extended Filling and ramming with land by mechanical means, in tiers of 30 cm. thick, with contributions of land, including watered and refining the same slope, and proportionally aids.

117.63 16.18 1903.25 €

TOTAL CHAPTER 01 EARTH WORK .................................................. 64.465,72 €
02.01 UD. Connection to network general sanitation.

Connection of general sanitation network, with a shorter distance of 8 meters consists of: breaking the pavement with a compressor, manual digging sanitation ditches, laying pipe of PVC with a diameter of 200 mm. Joining with elastic joint, blocked the attack and subsequent replacement of concrete pavement HM-20/P/40/Illa mass, not including pit formation in the curb and proportionally aids.

<table>
<thead>
<tr>
<th>Nº</th>
<th>Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2</td>
<td>6</td>
<td>347,69</td>
<td>2,086,74 €</td>
</tr>
</tbody>
</table>

02.02 UD. Brick Coffer standing of downpipe 38x38x50cm.

Chest at the foot of downspout of 38x38x50 cm. internal measures, built with solid brick 1 / 2 foot thick, receive with cement mortar M-5, placed on mass concrete hearth HM-20/P/40/I 10 cm. thick, plastered and polished on the inside with cement mortar M-15 rounded corners with PVC elbow 45 degrees, to avoid the blow-down in the hearth, with cover and concrete frame prefabricated reinforced, and finished with proportionally aids, excluding the excavation, filling or back perimeter, s / CTE-HS-5.

<table>
<thead>
<tr>
<th>Nº</th>
<th>Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>8</td>
<td>24</td>
<td>21,92</td>
<td>526,32 €</td>
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</tbody>
</table>

02.03 UD. Pass Coffer 51x51x65 cm

Not registrable buried casket of 51x51x65 cm. internal measures, built with solid brick 1 / 2 foot thick, received with cement mortar M-5, placed on mass concrete hearth HM-20/P/40/Illa 10 cm. thick, plastered and polished on the inside with cement mortar M-15 rounded angles, and closed superiorly concrete slab HM-20/P/20/Illa lightly armed with wire mesh, finished and sealed with cement mortar.

Proportionally aids, not including excavations ,s / CTE-HS-5.

<table>
<thead>
<tr>
<th>Nº</th>
<th>Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
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<tbody>
<tr>
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<td>18</td>
<td>5,86</td>
<td>105,48 €</td>
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74
<table>
<thead>
<tr>
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<th>Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>02.04</td>
<td>UD. Registration Coffe 63x63x80 cm.</td>
<td>Chest from 63x63x80 cm. internal measures, built with perforated brick 1/2 foot thick, received with cement mortar M-5, placed on mass concrete hearth HM-20/P40/IIla 10 cm. thick, plastered and polished on the inside with cement mortar M-15 rounded angles, slightly reinforced with wire mesh, plaster and polished on the inside with cement mortar M-15, and with cover and prefabricated reinforced concrete frame, finished with proportionally aided, not including the excavations, s/CTE-HS-5.</td>
<td>3</td>
<td>19.10</td>
</tr>
<tr>
<td>02.05</td>
<td>M. Multilayer PVC collector .110 mm.</td>
<td>Sanitation Collector smooth multilayer buried PVC with a diameter 110 mm. gluing. Placed in a trench, on river sand 10 cm. compacted and levelled, filled laterally and superiorly up to 10 cm. with the same sand. With proportionally aided including the digging of trenches, s/CTE-HS-5.</td>
<td>3</td>
<td>29.04</td>
</tr>
<tr>
<td>02.06</td>
<td>M. Multilayer PVC collector .125 mm</td>
<td>Sanitation Collector smooth multilayer buried PVC with a diameter 110 mm. gluing. Placed in a trench, on river sand 10 cm. compacted and levelled, filled laterally and superiorly up to 10 cm. with the same sand. With proportionally aided including the digging of trenches, s/CTE-HS-5</td>
<td>3</td>
<td>32.75</td>
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<tr>
<td>02.07</td>
<td>M. Multilayer PVC collector .160mm</td>
<td>Sanitation collector buried PVC rigid wall and 2 kN/m2 compact, with a diameter of 160 mm. and elastic joint bonding. Placed in a trench, on river sand 10 cm. compacted and levelled, filled</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nº</td>
<td>Unit</td>
<td>Measurement</td>
<td>Cost</td>
<td>Amount</td>
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<td>----</td>
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<td>------</td>
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<tr>
<td>3</td>
<td>9.25</td>
<td>27.75</td>
<td>8.79</td>
<td>243.92 €</td>
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</tbody>
</table>

**02.08 M. Collector hanging PVC. 90 mm**
Sanitation Collector hanging PVC, diameter 90 mm. And with bonding glue, hanging by metal clamps, including proportion of aids, fully installed s / CTE-HS-5.

| 3  | 26.65 | 76.95 | 10.78 | 829.52 € |

**02.09 M. Collector hanging PVC. 110 mm**
Sanitation Collector hanging PVC, diameter 110 mm. And with bonding glue, hanging by metal clamps, including proportion of aids, fully installed s / CTE-HS-5.

| 3  | 21.30 | 63.9 | 11.75 | 750.83 € |

**02.10 M. Evacuation system. Polypropylene. 110 mm**
Waste pipe polypropylene soundproof D110 mm. With union system by inserting cuffed, placed with support brackets and insulation in the step of forging, including special pieces share soundproof, fully installed, s / CTE-HS-5.

Sewage downpipe

| 3  | 44.80 | 134.4 | 15.67 | 2106.04 € |

**02.11 M. Rainwater downpipe. PVC.110mm.**
PVC downpipe rainwater, UNE-EN-1453, 110 mm. diameter, with system Joining with elastic joint, with metal clamps placed, installed, even share of special pieces of PVC, working. According CTE-HS-5.
Inés Marco

SIX HOUSES, PAIRED 1-2

<table>
<thead>
<tr>
<th>Nº</th>
<th>Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>61.60</td>
<td>184.8</td>
<td>5.98</td>
<td>1105.10 €</td>
</tr>
</tbody>
</table>

**02.12 M. Prepainted gutter. 280mm.**

Gutter seen lacquered steel sheet of 0.6 mm. thick, circular section with a development of 280 mm., fixed to the eaves by lacquered supports placed every 50 cm., fully equipped, even with share auctions and lacquered veneer, welds, connectors to drainpipes, fully installed.

| Roof | 3 | 7.35 | 22.05 | 17.25 | 380.36 € |

**02.13 M. Stainless steel gutter. 330mm.**

Stainless steel gutter seen DIN 18,481, which is circular with a development of 333 mm, fixed to the eaves with brackets placed every 50 cm. fully equipped, including special pieces proportionally and auctions, solder, connectors to drainpipes, fully installed.

| Roof | 3 | 7 | 21 | 48.62 | 1021.02 € |

**02.14 M. Polymer concrete gutter. L = 1m. 200x200mm**

Surface drainage gutter, formed by precast polymer concrete 200x200 mm. external measures, with ductile iron grating of 500x240mm., placed on a bed of sand compacted even share of special parts and minor equipment, mounted, level and proportion of aids, s / CTE-HS-5.

| Garage | 3 | 6 | 18 | 73.50 | 1.323,36 € |
Inés Marco

02.15 UD. Drain. PVC. grid. PVC. 200x200mm

PVC drain siphon PVC grid 200x200 mm. and with vertical output of 75-90 mm.; for rainwater tanks or wet rooms, installed and connection to the mains drainage, even with proportionally small gripping material and aids, and excluding chest support s / CTE-HS-5.

<table>
<thead>
<tr>
<th>Nº</th>
<th>Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
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<tbody>
<tr>
<td>3</td>
<td>10</td>
<td>30</td>
<td>15,15</td>
<td>454,5€</td>
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</tbody>
</table>

02.16 UD. Steel sink siphoning inoxidable. 20x20 cm.
Sink siphon stainless steel 3 mm. thick, vertical or horizontal exit for rainwater harvesting or local moist, 20x20 cm., installed and connection to the general network drainage of 63 mm., even with small proportion of gripping material and media auxiliary, s / CTE-HS-5.

<table>
<thead>
<tr>
<th>Nº</th>
<th>Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>3</td>
<td>9</td>
<td>102,77</td>
<td>924,93 €</td>
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</table>

TOTAL CHAPTER 02. NET OF HORIZONTAL DRAINAGE........................12.850,86 €

CHAPTER 03  FOUNDATION

03.01 M3 Cleaning Concrete HM-20/P/20/IIla
HM-mass concrete 20 N/mm2, plastic consistency, maximum size 20 mm., For maritime environment, developed for cleaning and level of funds foundations, including spill with crane, vibration and placement. According to regulations.

<table>
<thead>
<tr>
<th>Nº</th>
<th>Unit</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>28,77</td>
<td>76,68</td>
<td>2.205,08 €</td>
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</table>
Inés Marco

<table>
<thead>
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<th>Nº Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

03.02 M3 Reinforced concrete HA-30/P/20/Ila
Reinforcement concrete HA-30 N/mm², plastic consistency, and maximum size. 20 mm. aggressive environment, developed in central, in footings. Even reinforcement (50 kg/m³). Placement by truck bomb, vibration and placed. According to standards.

115.08 124.67 14.351.63 €

03.03 M2 Concrete slab HA-25, 15cm. Reinforced.#15x15x6
Concrete slab 15 cm. thick, made with concrete HA-25 N/mm² Maximum size .20 mm. Prepared in work, placement and assembly with 15x15x6 mesh, boards, sawing them and troweling. According to regulations.

157.08 11.29 1.773.43 €

03.04 M3 Reinforce concrete in Dwarf wall. HA-30/P/20/Ila
HA-30N/mm² reinforced concrete, plastic consistency, maximum size. 20 mm. for aggressive environments, developed in central, wall 30 cm. of thickness, even reinforced (60 kg/m³), and stripping formwork panels 3.00 Metal x1, 00 m. Two-sided placement, formwork and stripping crane, vibrated and placed. According to standards

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>61.58</td>
<td>184.74</td>
<td>165.92</td>
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<tr>
<td>6</td>
<td>30.638.94 €</td>
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03.05 Ud. Test specimens of concrete.
Concrete control test consisting of four test tubes manufacturing cylindrical 15x30 cm., conservation in a moist chamber, fracture faces and compression.

Dwarf walls | 3 | 2 | 6 |
Footing   | 3 | 2 | 6 |

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>38.91</td>
<td>466.92 €</td>
<td></td>
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</tbody>
</table>

03.06 Ud. Test corrugated steel.
Full essay on deformed bars with a diameter determinated: mass per meter, equivalent section, deviations, geometric characteristics, check marks from the manufacturer, bent 180 degrees,
Inés Marco

<table>
<thead>
<tr>
<th>Nº</th>
<th>Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>56.12</td>
<td>56.12 €</td>
</tr>
</tbody>
</table>

**TOTAL CHAPTER 03 FOUNDATION ............................................................................................... 55.856,93 €**

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**CHAPTER 04 STRUCTURE**

**04.01 M2 Framework with joist 25+5.thick.**
Framework 25+5 cm. formed based on prestressed concrete beams, separate 70 cm. between axes, fantail ceramics 70x25x30 cm. and layer compression of 5 cm. HA-25/P/20/IIla concrete, developed central, reinforced (2.00 kg/m2). According to standards.

| 755,67 | 37.31 | 28.194,05 € |

**04.02 M2. Framework done at the time. Unidirectional 25+5.**
Framework in-situ way of singing 25+5 cm. consisting of nerves in situ width of 10 cm. concrete, 70 cm apart. between axes, fantail ceramics 60x20x25 cm. and compression layer of 5 cm. of HA-30/P/20/IIla prepared in central, reinforced (3.00 kg/m2). According to standards.

| 1038,18 | 33.50 | 34.779,03 € |

**04.03 M2. Inclined slab for stair. Concrete HA-30/P/20. 15 cm thick.**
Reinforced concrete HA-30 N/mm2, maximum size 20 mm., Plastic consistency, developed central, sloping stair slab, 0.15 m. thick, reinforced (85 kg/m3) and formwork, placement with pen. Crane, vibrated and placed. According to standards.

| 99,84 | 45.80 | 4.571,76 € |

**04.04 Ml. Wooden battens (120x45 mm) in columns.**

| 3     | 210  | 630  | 2.95  | 1858.5 € |

**04.05 Ml. Wooden battens (70x45 mm) in columns.**
**04.06** Md. Wooden battens (120x120 mm) en columns.

<table>
<thead>
<tr>
<th>Nº</th>
<th>Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>210</td>
<td>630</td>
<td>2.15</td>
<td>1354.5 €</td>
</tr>
</tbody>
</table>

**04.07** Ud. Testing of corrugated steel.

Full essay on deformed bars with a diameter determinated: mass per meter, equivalent section, deviations, geometric characteristics, check marks from the manufacturer, bent 180 degrees, bending 90°, strength, relationship between resistance and limit elastic elongation, load-deformation diagram and comparison of results with those given in regulation.

<table>
<thead>
<tr>
<th>Nº</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>56,12</td>
<td></td>
<td>56,12 €</td>
</tr>
</tbody>
</table>

**04.08** Ud. Test specimens of concrete.

Concrete control test consisting of four test tubes manufacturing cylindrical 15x30 cm., conservation in a moist chamber, capping fracture faces and in compression.

Columns 8
Frameworks 8

<table>
<thead>
<tr>
<th>Nº</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>38,91</td>
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<td>622,56 €</td>
</tr>
</tbody>
</table>

**TOTAL CHAPTER 04 STRUCTURE**..........................71,946,82 €

**CHAPTER 05 ROOF**

**05.01.** Md. Wooden battens (500x45 mm) in beams in roof.

<table>
<thead>
<tr>
<th>Nº</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>88</td>
<td>264</td>
<td>4.25</td>
</tr>
</tbody>
</table>

**05.02 M2.** Isolation of 500 mm thick.

<table>
<thead>
<tr>
<th>Nº</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>120</td>
<td>360</td>
<td>6,024</td>
</tr>
</tbody>
</table>

81
<table>
<thead>
<tr>
<th>Nº</th>
<th>Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>05.02</td>
<td>ML. Wood Slats (450x450 mm) for placement of tiles. Separated 20 cm.</td>
<td>3</td>
<td>634.5</td>
<td>1903.5</td>
</tr>
</tbody>
</table>

**05.03 M2 Curve 40x20 ceramic tile**

Roof with ceramic tile. 40x20 cm., Arranged in rows parallel to the wing, with overlaps and received with cement mortar CEM II / B P 32.5 N and river sand-type M-2, 5, including share of special parts, ridges, limes, ventilation tiles, overheads, support facilities and security features, s / NTE-QTT-11.

<table>
<thead>
<tr>
<th>Nº</th>
<th>Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>65.29</td>
<td>195.87</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>61.22</td>
<td>183.66</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>379.53</td>
<td>16.13</td>
<td>6121.81 €</td>
<td></td>
</tr>
</tbody>
</table>

**05.04 M2. Isolated trafficable roof**

Trafficable roof consisting of: extruded insulation 60mm, pending formation of cement mortar M-5, 10 cm. average thickness, asphalt primers; monolayer sheet asphalt, completely attached to the stand with torch; geotextile sheet of 200 g/m2. layer of cement mortar M-5 thick 3 cm. Ready to pave with sandstone exterior.

<table>
<thead>
<tr>
<th>Nº</th>
<th>Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>House 1</td>
<td>70.48</td>
<td>211.44</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>House 2</td>
<td>62.88</td>
<td>188.64</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>400.08</td>
<td>20.04</td>
</tr>
</tbody>
</table>

**TOTAL CHAPTER 05 ROOF...** 21.375,60 €
<table>
<thead>
<tr>
<th>No. Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1824,37</td>
<td>29,84</td>
</tr>
</tbody>
</table>

**06.01 M2. White face brick. Placed half a foot. Mortar M-7, 5.**
Face brick white view of 24x11, 5x5 cm. 1 / 2 ft. thick received with cement mortar CEM II / BP 32,5 N and river sand, type M-7, 5. Prepared in central and put on work, even hooks, loss and breakage, wetted parts, grouting, cleaning and aid.

| 3 | 608,14 | 1824,42 | 8,03 | 14.650,1 € |

**06.02 M2. Insulation panels in walls.**
Thermal insulation for walls with ventilated chamber, consisting of blankets of glass wool water repellent, bonded with thermosetting resins, incorporated under a veil of glass reinforced on one side.

| 3 | 83,61  | 250,83  | 8,6  | 2.156,97 € |

**06.03 M2. Blocks of Termoarcilla. 30x19x14 cm**
Termoarcilla blocks of 30x19x14 cm. low density to make the walls or closures. He mixture clay materials and the granular layer, hosted by the mortar cement CEM II / BP 32,5 N and rivar sand, as C.T.E

| 3 | 328,54 | 985,62  | 6,02 | 5.993,02 € |

**06.04 M2. Brick hollow in wall. 24x11x5,7**
Hollow brick partition, Distributions and cameras, received with cement mortar.

| 3 | 51,34  | 154,02  | 5,48 | 843,37 € |

**06.05 M2. Ceramic brick walls for downpipes.**
Hollow brick partition simple 24x11, 5x4 cm. In cameras, received with cement mortar CEM II / BP 32,5 N and river sand type M-5, prepared in central and put on work.
### 06.06 UD. STATIC VACUUM WHITE HP. 51x83cm
Vacuum cleaner ventilation static 31x31 cm. internal dimensions formed by four intermediate pieces and a precast concrete base received with queue. Fully installed according to regulations.

<table>
<thead>
<tr>
<th>Nº</th>
<th>Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chimney house 1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chimney house 2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>6</td>
<td>45,88</td>
<td>275,34 €</td>
</tr>
</tbody>
</table>

### 06.07 UD. GARAGE DOOR RECEIVED
Received garage door, as the unit completely finished.

| House 1 | 1 |       |       |          |
| House 2 | 1 |       |       |          |
| 3       | 2 | 6      | 106,68| 640,08 € |

### 06.08 UD. Received for external works.
Received for exterior aluminum fence, as the unit completely completed.

|       |     |     |       |          |
| 96,00 | 10,92 | 1048,32 € |

### 06.09 UD. Received for internal works.
Received interior aluminium fence, as the unit completely finished.

|       | 34,00 | 102,00 | 8,79  | 896,58 € |

### 06.10 UD. Received bath.

|       | 18   | 19,49  | 351,00 € |

### 06.11 UD. Brick work aids.
Help electricity installations masonry, plumbing, heating, gas and telecommunications, for single family dwelling (given an impact average per dwelling with 3 bedrooms, 2 bathrooms, kitchen and living room), including labor in loading and unloading materials, opening and capping of farms and
received, including proportion of auxiliary material, and cleaning. (10% of the combined budgets of the facilities). Measured per unit housing.

<table>
<thead>
<tr>
<th>House</th>
<th>1</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>2</td>
<td>6</td>
</tr>
</tbody>
</table>

500.75  3005.4 €

TOTAL CHAPTER 06 BRICK WORK........................................68.151.35 €
### CHAPTER 07 COATINGS AND FALSE CEILINGS

#### 07.01 M2. Plastered wall.
Plastered walls, thickness 0.5 cm, even wet the facing, cleaning and protection of PVC in corners. According to regulations.

<table>
<thead>
<tr>
<th>Nº Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>1097,42</td>
<td>3292,26</td>
<td>5,45</td>
</tr>
</tbody>
</table>

#### 07.02 M2. Plastered ceilings.
Plaster on ceilings, including the cleaning and wet facing, built according normative.

<table>
<thead>
<tr>
<th>Nº Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>190,87</td>
<td>572,61</td>
<td>5,64</td>
</tr>
</tbody>
</table>

#### 07.03 M2. False plasterboard ceiling.

<table>
<thead>
<tr>
<th>Nº Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>314,03</td>
<td>942,09</td>
<td>11,65</td>
</tr>
</tbody>
</table>

#### 07.04 M2. Laminated gypsum ceiling in bathrooms.

<table>
<thead>
<tr>
<th>Nº Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>21,66</td>
<td>64,98</td>
<td>13,72</td>
</tr>
</tbody>
</table>

#### 07.05 M2. Wooden ceiling in access to housing.

<table>
<thead>
<tr>
<th>Nº Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>13,78</td>
<td>41,34</td>
<td>40,29</td>
</tr>
</tbody>
</table>

**TOTAL CHAPTER 07 COATINGS AND FALSE CEILINGS**

34.707,59 €

### CHAPTER 08 FLOOR AND TILES

#### 08.01 M2. Glazed stoneware tile.
Platelet tile with color glazed stoneware 25x25 cm., Line placement, received with adhesive cementitious.

<table>
<thead>
<tr>
<th>Nº Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>246,24</td>
<td>738,72</td>
<td>27,05</td>
</tr>
</tbody>
</table>

#### 08.02 M2. Porcelain tile flooring.
Flooring porcelain stoneware tile 31x31 cm., received with adhesive.
Inés Marco

SIX HOUSES, PAIRED 1-2

<table>
<thead>
<tr>
<th>Nº</th>
<th>Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>08.03 M2. Parquet floor.</td>
<td></td>
<td>123,93</td>
<td>27,69</td>
<td>3.431,62 €</td>
</tr>
<tr>
<td></td>
<td></td>
<td>631,20</td>
<td>24,40</td>
<td>15.407,49 €</td>
</tr>
<tr>
<td>08.04 M2. Porcelain tile floors slip resistant for balcony and terraces.</td>
<td>3</td>
<td>133,36</td>
<td>400,08</td>
<td>27,75</td>
</tr>
</tbody>
</table>

TOTAL CHAPTER 08 FLOOR AND TILE........................................... 53.498,24 €

CHAPTER 09 METALWORK (OUTDOOR)

<p>| 09.01 UD. Lacquered aluminum window. With a leaf. 200x50cm in basement. | 3 | 1 | 3 | 199,64 | 598,92 € |
| 09.02 UD. Lacquered aluminum window. With a leaf. 50x50cm in bathrooms. | 3 | 2 | 6 | 116,88 | 701,28 € |
| 09.03 UD. Lacquered aluminum window. With 2 leafs. 340x90 cm. | 3 | 2 | 6 | 467,6 | 2805,6 € |
| 09.04 UD. Lacquered aluminum window. With a leaf 50x110 cm. | 3 | 6 | 18 | 173,32 | 3119,76 € |
| 09.05 UD. Practicable Gate 1-sheet for glazing, lacquered aluminum, of 60 microns, of 100x210 cm. | 3 | 1 | 3 | 265,11 | 795,33 € |</p>
<table>
<thead>
<tr>
<th>Nº</th>
<th>Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>09.06 UD</td>
<td>Practicable Gate 1-sheet for glazing, lacquered aluminum, of 60 microns, of 200x210 cm.</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>09.07 UD</td>
<td>Lacquered aluminum window. With a leaf. 110x120.cm</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>09.08 UD</td>
<td>Lacquered aluminum window. With 2 leaves 280x120.cm</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>09.09 UD</td>
<td>Lacquered aluminum window. With 2 leaves. 150x120.cm</td>
<td>3</td>
<td>5</td>
<td>18</td>
</tr>
<tr>
<td>09.10 UD</td>
<td>Lacquered aluminum window. With 2 leaves 150x100.cm</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>09.11 UD</td>
<td>Lacquered aluminum window. With a leaf 50x100.cm</td>
<td>3</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>09.12 UD</td>
<td>Glass block window. Not practicable. 75x125 cm.</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>09.13 UD</td>
<td>Lacquered aluminum window. With a leaf 90x110 cm.</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>09.14 UD</td>
<td>Gate 2 Balconera practicable glazing sheets of lacquered aluminum white. 400x210 cm.</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>09.15 UD</td>
<td>Lacquered aluminum window. With 2 leaves 180x110 cm.</td>
<td>3</td>
<td>4</td>
<td>12</td>
</tr>
</tbody>
</table>
Inés Marco

SIX HOUSES, PAIRED 2-2

<table>
<thead>
<tr>
<th>Nº</th>
<th>Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>09.16 UD.</td>
<td>Practicable Balconera Gate 1-sheet for glazing, painted aluminum white 100x210 cm</td>
<td>3</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>09.17 UD.</td>
<td>Lacquered aluminum window. With a leaf 200x110cm.</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>09.18 UD.</td>
<td>Lacquered aluminum window. With 2 leafs 150x110 cm.</td>
<td>3</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>09.19 UD.</td>
<td>Lacquered aluminum window. With 2 leafs 100x130 cm.</td>
<td>3</td>
<td>2</td>
<td>6</td>
</tr>
</tbody>
</table>

TOTAL CHAPTER 09 METALWORK ........................................ 30.791,64 €

CHAPTER 10 WOODWORK (INDOOR)

10.01 UD. Main door, Beech steamed.
Security door standard input, middle series, with smooth panel (EBL) steamed beech, varnished pine precerco even 110x35 mm.

<table>
<thead>
<tr>
<th>House</th>
<th>1</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>472.23</td>
</tr>
</tbody>
</table>

10.02 UD. Door solid, steamed beech.

<table>
<thead>
<tr>
<th>House</th>
<th>14</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>29</td>
<td>87</td>
</tr>
<tr>
<td></td>
<td></td>
<td>150.08</td>
</tr>
</tbody>
</table>

10.03 UD. Sliding door. Steamed beech.

<table>
<thead>
<tr>
<th>3</th>
<th>1</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>212.76</td>
</tr>
</tbody>
</table>

10.04 M2. Front sliding wardrobe, with smooth leaves and shelf of beech vaporized
<table>
<thead>
<tr>
<th>Nº</th>
<th>Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td></td>
<td>51,89</td>
<td>155,67</td>
<td>129,42</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20.145,52 €</td>
</tr>
</tbody>
</table>

TOTAL CHAPTER 10 WOODWORK.......................... 36.678,49 €

**CHAPTER 11 ELECTRICAL INSTALLATION**

11.01 Installation of electricity, including:

- Household connection.
- Earth connection.
- Individual referrals.
- Safety protection overall.
- Power control switch.
- Lighting circuits.
- Circuit for washing machine, dishwasher, thermos.
- Circuit kitcher.
- Points of light.
- Power sockets.
- Output cables.
- Outdoor luminaire.
- Luminaria autonomously.

<table>
<thead>
<tr>
<th>Nº</th>
<th>Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td></td>
<td>9625,92</td>
<td></td>
<td>28.877,76 €</td>
</tr>
</tbody>
</table>

TOTAL CHAPTER 11 ELECTRICAL INSTALLATION..........28.877,76 €

**CHAPTER 12 TELECOMUNICATION INSTALLATION**

12.01 Telecomunication installation including:

- Video intercom
- Making phone
- Making T.V

<table>
<thead>
<tr>
<th>Nº</th>
<th>Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td></td>
<td>2094,4</td>
<td></td>
<td>6283,20 €</td>
</tr>
</tbody>
</table>

TOTAL CHAPER 12 TELECOMUNICATION INSTALLATION...............6.283,20 €
### CHAPTER 13 PLUMBING INSTALLATION

13.01 Plumbing installation, including:
- Connection to the general net of water.
- Water meter.
- Installation of water to sink.
- Installation of water for bidet.
- Installation of water for toilet.
- Installation of water for a bath.
- Installation of water to sink.
- Installation of water for washing machine and dishwasher.
- Pipes. Porcelain sink.
- Porcelain toilet.
- Porcelain Bidet.
- Bath enamel steel sheet.
- Stainless steel sink.

<table>
<thead>
<tr>
<th>Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td></td>
<td>7,285.97</td>
<td>21,802.22 €</td>
</tr>
</tbody>
</table>

**TOTAL CHAPTER 13 PLUMBING INSTALLATION**.................21,802.22 €

### CHAPTER 14 HEATING INSTALLATION

14.01 Heating installation including:
- Installation of insulated heating fireplace.
- Thermostat.
- Dilator elastic.
- Valves.
- Circulator.
- Pipes.
- Underfloor heating.
### Chapter 14 Heating Installation

<table>
<thead>
<tr>
<th>Nº</th>
<th>Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Accumulation system.</td>
<td></td>
<td>45,203,20</td>
<td>136,258,32 €</td>
</tr>
<tr>
<td></td>
<td>Biomass boiler.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total Chapter 14 Heating Installation**

**136,258,32 €**

### Chapter 15 Ventilation Installation

14.01 Installation ventilation which includes:
- Group extraction.
- PVC conduits.
- Grille
- Attempt to roof.

<table>
<thead>
<tr>
<th>Nº</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td></td>
<td>1,729,35</td>
<td>5,188,05 €</td>
</tr>
</tbody>
</table>

**Total Chapter 15 Ventilation Installation**

**5,188,05 €**

### Chapter 16 Protection Against Fire

16.01 Protection against fire including:
- Dry chemical extinguisher.
- CO2 Extinguisher

**Total Chapter 16 Protection Against Fire**

**372,66 €**

### Chapter 17 Insulation and Waterproofing

17.01 Insulation and waterproofing, including:
- Insulation and waterproofing of the foundation.
- Glass wool panel in walls and partitions.
- Insulation of 0.5 m in roof.
CHAPTER 17 INSULATION AND WATERPROOFING

<table>
<thead>
<tr>
<th>Nº</th>
<th>Unit</th>
<th>Measurement</th>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td></td>
<td>6.670</td>
<td>20.010 €</td>
<td></td>
</tr>
</tbody>
</table>

TOTAL CHAPTER 17 INSULATION AND WATERPROOFING......20.010 €

CHAPTER 18 PAINT

18.01 Painting including:
Smooth matte acrylic paint washable acrylic professional, white or pigmented on horizontal and vertical walls, two coats, including primer and PLASTEC.
Enamel paint on ironwork.
| 3  |      | 5.307.38 | 15.921.90 € |

TOTAL CHAPTER 18 PAINTS..........................15.921.90 €

CHAPTER 19 GLASSES

19.01 Glasses including:
Double glazing 4mm colorless.
Vertical enclosure with glass profiles.
| 3  |      | 1.176.23 | 3.528.67 € |

TOTAL CHAPTER 19 GLASSES......................3.528.67 €

CHAPTER 20 INTERIOR URBANIZATION OF THE PLOT

20.01 Urbanization works, including:
Exterior illumination.
Gardening.
Exterior Paving.
Installation’s distribution.
Urban furniture.

27.452.12 €

TOTAL CHAPTER 20 URBANIZATION..................27.452.12 €
CHAPTER 21 HEALTH AND SAFETY

1ª COLLECTIVE PROTECTION.

21.01 M2. SCAFFOLDING IN FRONT BITOBULAR.
3  900  2.700  8,35  22.545 €

21.02 UD. PEDESTRIAN DOOR sheet 1,00 x2, 00 m.
Pedestrian gate galvanized trapezoidal 1,00 x2, 00 m. to enclosure fence placement.
1  7,15  7,15 €

21.03 UD. SHEET METAL DOOR FOR ENTRY OF VANS . 4.00 X2, 00 M.
1  16,79  16,79 €

21.04 UD. SECONDARY WORK BOX. 40 kw.
1  54,54  54,54 €

21.05 UD. SAFETY TRANSFORMER.
1  5,6  5,6 €

21.06 UD. Chemical fire extinguishers.
9  5,46  16,38 €

21.07 UD. CO2 ESTINGUISHER.
6  21,44  42,88 €

21.08 M. HANDRAIL IN SLABS.
Railing slab perimeter protection, consisting of struts Telescopic metal placed every 2.5 m, insured with tripod, handrails and intermediate beam tube consisting of 50 mm., painted in yellow and black, and baseboard of 15x5 cm.
3  280  840  0,76  638,4 €
94
<table>
<thead>
<tr>
<th>Nº</th>
<th>Unit</th>
<th>Measurement</th>
<th>Cost</th>
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<tr>
<td>21.09 M. REFLECTING HOARDING.</td>
<td>246,00</td>
<td>3,58</td>
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<td>21.10 UD. SAFETY HELMET.</td>
<td>20</td>
<td>0,66</td>
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<tr>
<td>21.11 UD. OVERALLS.</td>
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<td>4,25</td>
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<td>21.12 UD. GLASSES AGAINST IMPACTS.</td>
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<td>21.13 UD. HEARING PROTECTORS.</td>
<td>20</td>
<td>0,62</td>
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<td>21.14 UD. CANVAS GLOVES REINFORCED.</td>
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<td>0,57</td>
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<td>21.15 UD. PAIR OF BOOTS SAFETY.</td>
<td>20</td>
<td>1,67</td>
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<tr>
<td>21.16 UD. LUMBAR PROTECTION WITH BRACES.</td>
<td>10</td>
<td>1,16</td>
<td>11,6 €</td>
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<tr>
<td>21.17 UD. TOOL BELTS.</td>
<td>2</td>
<td>0,98</td>
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<td>21.18 UD. SCREEN WELDING.</td>
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<tr>
<td>21.19</td>
<td>UD. WELDING LEATHER APRON.</td>
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<td>21.20</td>
<td>UD. PAIR OF GLOVES FOR WELDERS.</td>
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<td>21.21</td>
<td>UD. HARNESS WITH MOORING DORSAL.</td>
<td>3</td>
<td>3.39</td>
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<td>21.22</td>
<td>UD. FIXED ANCHOR POINT.</td>
<td>5</td>
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<td>TOTAL INDIVIDUAL PROTECTION.</td>
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<td>193.26 €</td>
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3º SIGNALING

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<td>UD. FULL PANEL PVC 700x1000 mm.</td>
<td>6</td>
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To include up to 15 characters signal, even texts.Trespassing any person outside the work

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<thead>
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<td>21.24</td>
<td>UD. EXTINGUISHER SIGNAGE.</td>
<td>15</td>
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<td>21.25</td>
<td>UD. RISK SIGNBOARD.</td>
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<td>21.26</td>
<td>UD. REFLECTIVE VEST.</td>
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<td>TOTAL SIGNALING</td>
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<td></td>
<td>49.01 €</td>
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<tr>
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<td>21.27</td>
<td>M. ELECTRIC CONNECTON TO HUT. 4X6 mm²</td>
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<td>0.73</td>
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<td>21.28</td>
<td>M. PROVISIONAL CONNECTION PLUMBING. 25 mm.</td>
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<td>21.29</td>
<td>UD. DEPOSIT BIN.</td>
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<td>UD. EMERGENCY KIT.</td>
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<td>21.31</td>
<td>MS. BOOTH RENTAL CLEANING. 7,91 M²</td>
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<tr>
<td>21.32</td>
<td>MS. BOOTH RENTAL STORE. 7,91 M²</td>
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<td>21.33</td>
<td>MS. BOOTH RENTAL OFFICE. 8,92 M.Z.</td>
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TOTAL TEMPORARY FACILITIES................................................................714.72 €

5º MORE THINGS.

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<th>BASIC MEDICAL EXAMINATION.</th>
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<tr>
<td>21.34</td>
<td>UD.</td>
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SIX HOUSES, PAIRED 2-2
<table>
<thead>
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<tr>
<td>21.35 UD. FORTNIGHTLY REVIEW OF SCAFFOLDING.</td>
<td>20</td>
<td>9.64</td>
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<td>21.36 UD. MONTHLY COST OF TRAINING IN SAFETY AND HEALTH.</td>
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<td><strong>TOTAL</strong></td>
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<td><strong>TOTAL CHAPTER 20 HEALTH AND SAFETY</strong></td>
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<td>Nº</td>
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<td>22.01</td>
<td>UD. CRANE FOR CONSTRUCTION.</td>
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<td>UD. CONCRETE MIXERS 300L.</td>
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<td>22.03</td>
<td>UD. EXCAVATOR. LOADER. BACKHOE.</td>
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<td>19.069,07</td>
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<td>22.04</td>
<td>UD. DUMPER. DUMP TRUCK.</td>
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<td>45.989,55</td>
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<td>22.05</td>
<td>UD. Tanker. LEVELS. VIBRATING ROLLER.</td>
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<td>1</td>
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<td>1.801,69</td>
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<td>TOTAL MACHINERY</td>
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<td>96.683,16 €</td>
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<td>TOTAL MATERIALS</td>
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<td>315.319,92 €</td>
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<td>TOTAL LABOR</td>
<td></td>
<td>160.487,93 €</td>
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<td>TOTAL CHAPTER 21 MACHINERY, MATERIALS AND LABOR</td>
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<td>572.196,10 €</td>
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</table>
TOTAL BUDGET........................................1,299,316,85 €
+ 13% GENERAL COSTS.............................168,911,19 €
+ 6% INDUSTRIAL PROFIT.......................77,959,011 €
TOTAL.................................................1,546,187,05 €
+ 16% IVA.............................................247,389,93 €
BUDGET FOR PROVISION OF THE CONTRACTED SERVICES
......................................................1,793,576,98 €
SIX HOUSES, PAIRED 2-2
Halmstad, Sweden

V. GANTT CHARTS
GANTT CHART

SUMMARY OF TIME AND WORKS


DATE TO START: 1/03/2010

DATE TO FINISH: 16/07/2011

DURATION TOTAL OF THE WORKS: 18 months.

TASKS:

EARTH WORK: 30 DAYS

INSTALLATION OF SANITARY DRAINAGE: 45 DAYS (IN THREE TIMES)

FOUNDATION: 50 DAYS

STRUCTURE: 80 DAYS

ROOF: 20 DAYS

BRICK WORK: 165 DAYS

COATING AND FALSE CEILING: 85 DAYS

FLOOR AND TILE: 90 DAYS

METALWORK (OUTDOOR): 30 DAYS (IN THREE TIMES)

WOODWORK (INDOOR): 30 DAYS (IN THREE TIMES)

LOCKSMITH WORK: 25 DAYS (IN THREE TIMES)

ELECTRICAL INSTALLATION: 45 DAYS (IN THREE TIMES)

PLUMBING INSTALLATION: 45 DAYS (IN THREE TIMES)

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HEATING INSTALLATION: 45 DAYS (IN THREE TIMES)
VENTILATION INSTALLATION: 45 DAYS
PROTECTION AGAINST FIRE: 45 DAYS
PAINTS: 50 DAYS
GLASSES: 15 DAYS
CLEANING OF THE AREA: 7 DAYS
CONDITIONING OF THE AREA: 20 DAYS
SAFETY: ALL THE DAYS
Revision of times and work

The work will start the 1st of March of 2010, and it's planned to last 18 months. Depending on the time, it has been estimated determined resources. I have decided to perform the different phases of the work in order in each house, so that we will manage to save in optional resources.

The first thing to do is the cleaning of the solar, removing all the vegetal cape. Later it will start the excavating work. It is provided to long approximately 30 days.

Once the excavation of the first plot will be done, we will pass to the second one, and afterward to the third one and at the same time in the first plot we will start to work in the foundation and the placement of the drainage.

The chosen foundation elements are isolated footings of 1,5x 1,5 x 0,5 m without brace. In all the perimeter we will construct dwarf walls above continuous footing. The concrete that we will use will be resistant to marine chlorides because we are in a coast zone. Once the founding will be finished (it will take approximately 50 days), we will start with the structure.

It will be reinforced concrete structure until the second floor; the third floor will consist in a framework of wooden strips which will stand the cover, made of Wood also. The framework is unidirectional of 25+ 5 cm, made of concrete beams and ceramic filler blocks of 60 cm.

The estimated time to execute the structure of the 6 houses is 80 days.

The cover consists in wooden beams of 500mm of thickness on wooden pillars; the separation between the axes will be of 1,20m, it will has an isolation cape of 500mm of thickness between the beams, and on the top of both we will place a regularization cape, ventilation, battens and tiles. The cover must be correctly executed and finished before starting with the brick work to avoid humidity in the materials. The time spent in the cover will be 20 days.

Then the Brick work will start.

Being in Sweden, the best solution for the exterior enclosures is one based on glass wool panels subjected by a framework of wooden strips screwed to pillars, ceilings and floors; which act as insulators both thermal and acoustic.
On the exterior part of the enclosure we will place gray brick factory and in the internal part, the enclosures will be plastered and painted.

For the interior partitions we will use a double hollow brick and a simple hollow brick.

The masonry work will take 165 days.

While the enclosures are being made, the first frames of carpentry can be placed.

This carpentry work is divided in two times, so we will have timeout in the same activity.

At the same time we will be executing the grooves to place the pipes of the different facilities, hot and cold water, drainage, heating, electricity, telecommunications and ventilation.

The facilities work will be carry out in different times, while we will advance in the construction.

Once the masonry will be finished, we will place the frames, doors and windows in all the houses as well as the last plumbing, drainage and electricity, for example: toilets, faucets, databases, sockets, switches, light points ... etc.

As happened in previous activities, while we are executing the enclosures of the different houses, we can make the coating in the interior walls and place the false ceilings. This will take 85 days and when we will finish with it, we will place the tiled flooring for kitchens and bathrooms.

We will set the parquet floor in the rest of the houses after finishing the rest of the works that could damage them.

The execution of floors and tiled is estimated in 90 days.

After finishing it, we will paint the houses and we will place the glasses in doors and windows and we will set up the extinguishers in the basements and ground floors.

Finally, we will be made the different shots to the general network, the furnishings will be installed and conditioned urban green areas.
VI. CONSTRUCTION

DRAWINGS
CONSTRUCTION DRAWINGS

INDEX

I. LOT DIMENSION
II. AREA
III. NORTH FAÇADE
IV. SOUTH FAÇADE
V. WEST FAÇADE
VI. A-A' SECTION
VII. FOUNDATION
VIII. FOUNDATION'S DETAILS
IX. STRUCTURE (5 PLANS)
X. STRUCTURE'S DETAILS
XI. MEASURES (4 PLANS)
XII. CONSTRUCTIVE SECTION
XIII. DISTRIBUTION (2 PLANS)
XIV. PLUMBING INSTALLATION (4 PLANS)
XV. HEATING INSTALLATION (4 PLANS)
XVI. VENTILATION INSTALLATION (4 PLANS)
XVII. PROTECTION AGAINST FIRE (2 PLANS)
SOUTH FACADE
WEST FACADE
Footing A-A’

Dwarf wall B-B'
<table>
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<tbody>
<tr>
<td>PLAN</td>
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**Situation:**
- Location: Sweden
- Spain

**Name:**
- Nick

Diagram showing sections in Sweden and Spain.
FIRST FLOOR