



Danish Refugee Council

Iaghluja, Marneuli, Georgia

Working Project

Individual Residential House

(10X13)

Structural, Plumbing and Electrical Parts



2019

CONTENT

| Name of the Page | # | |
|---|----|--|
| Title page | 1 | |
| Conent | 2 | |
| Explanation letter | 3 | |
| Section on the wall | 4 | |
| Plan of the wall | 5 | |
| Reinforcement of partition | 6 | |
| Foundation Plan | 7 | |
| Pad foundation | 8 | |
| Columns and Cores | 9 | |
| Plan of Monolith Reinforced Slab | 10 | |
| Plan of Bond Beam and Cornice Structures on + 3,150 indicator | 11 | |
| Node A; B | 12 | |
| Plan of Ceiling Structure | 13 | |
| Staircases | 14 | |
| Staircases, handrails | 15 | |
| Lintels | 16 | |
| Specifications of reinforcement | 17 | |
| Plan of roof Structure | 18 | |
| Sections and Nodes of Roof 1 -1 , A , B, C, D | 19 | |
| Dormer Window | 20 | |
| Water Supply System | 21 | |
| Sewage System | 22 | |
| Principal Plan of Distribution Switchboard | 23 | |
| Power Supply System | 24 | |

Individual house
(10X13m)

Project address:

Georgia,
Marneuli

Stage:
Architectural project

Content

Format A - 3

Page

2

Pages

24

Structural Design

The working project of the structural design is developed based on the project documentation in accordance with the architectural drawings.

Site name: Residential District in Marneuli town
Site Address: Iaghluja, Marneuli
According to seismic zones - 8 scores
Seismicity of the area - 8 scores.
The design wind load is 30 kgf / m2
The design snow load is 50 kgf / m2

Statistically, the average temperature of the cold month in the winter months is -0.1 degrees Celsius, and the average temperature in summer is 30,3 degrees.

Results of Engineering-Geological Survey:

Dangerous geological processes are not observed in the specified area and they are not expected in the future, it is in satisfactory engineering-geological conditions;
The cover of the second layer is obtained as a base of the foundation, namely the brown clay, semi-dense, with a rarely taped pebble.

Parameters of the Ground:

Conditional calculation impedance $R_0 = 2.2 \text{ kgf/cm}^2$; $p = 1.90 \text{ g / cm}^3$; $E = 320 \text{ kgf / cm}^2$
Internal friction Coefficient $\varphi^\circ = 20$; Specific traction $c = 0.20 \text{ kgf / cm}^2$.
The walls of the ground do not need artificial reinforcement to arrange the trenches of the foundation, it will be arranged by an artificial slope.
After removal of the foundation trench, it is necessary to conduct additional assessment of the geological situation in order to ensure the reaching of the calculation impedance of ground on the foundation basis 2.2 kgf / cm^2 (220 kPa).

Foundations:

The foundations are monolith strip footing, with a base of 50 cm width; while the width of the wall is 30 cm. Deepening of the foundation is 110 cm. As well as it will be the central, padded, with steps, with the same deepening. After concreting of the foundation, one layer of hydro-insulating material should be placed on the surfaces of the soil.

Damp proof material:

The walls are reinforced (so called sandwich structure) three-layer masonry, specifically, the external; layer of perforated ceramic brick, middle layer of thermal insulation XPS tiles and internal layer of small wall block. The bearing structure of the building is the framed structure of reinforced concrete slabs consisting of walls with reinforced inserts (cores, belts) monolith reinforced concrete slab and a reinforced concrete belt binding at the ceiling level, in the work of which the reinforced walls are included.
The reinforced cores are concreted in parallel to the construction of reinforced bearing walls.
The partitions are made from the reinforced small wall pumice blocks. The construction block quality must be no less than M-100 (100 kgf / cm2), according to sand-cement mortar M-100 (100kgf / cm2).
The building block quality should be at least M-200, and at least F-75 of frost resistance grade.

Floor decks:

The bearing structure of the house floor decks is a monolith reinforced concrete girderless floor construction of 150 mm thickness.

Roof:

The roof will be built with painted metal slabs on a wooden structure.



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Explanatory letter

Format A - 3

Page Pages

3 24

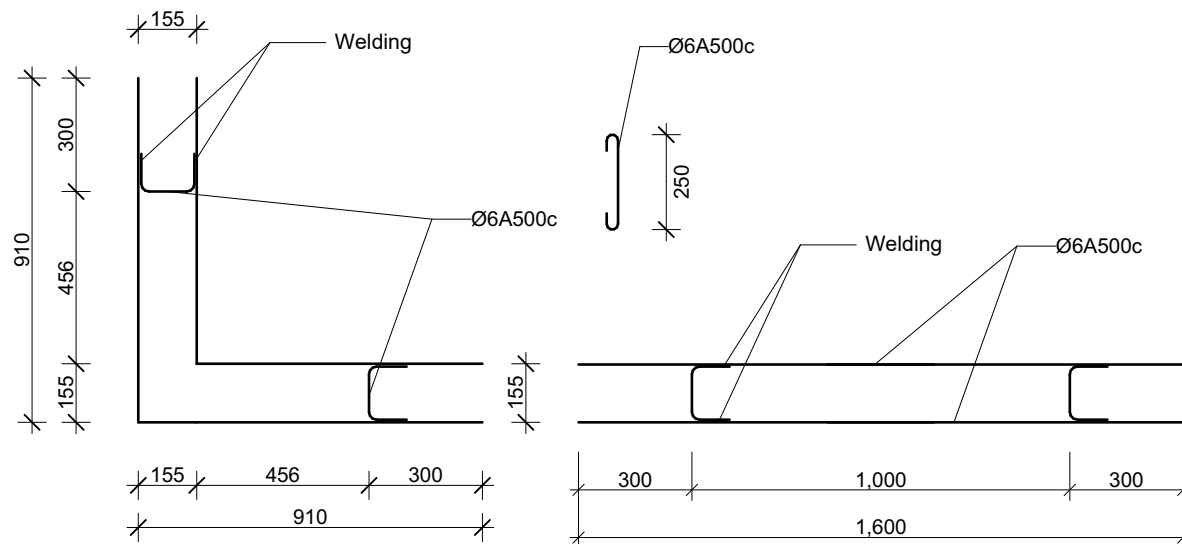
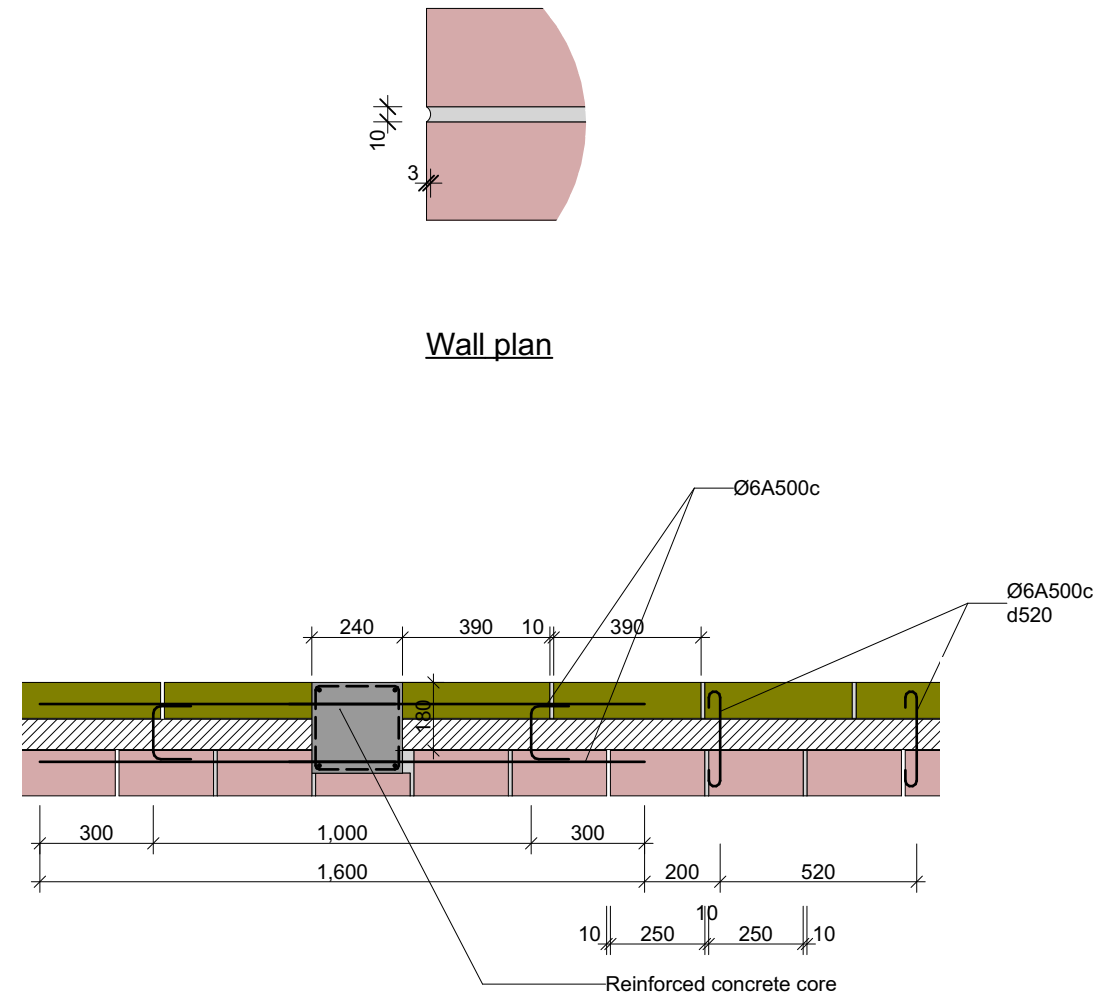
[illegible]

Architectural section drawing of a building facade showing a window opening. The drawing includes dimensions for various components:

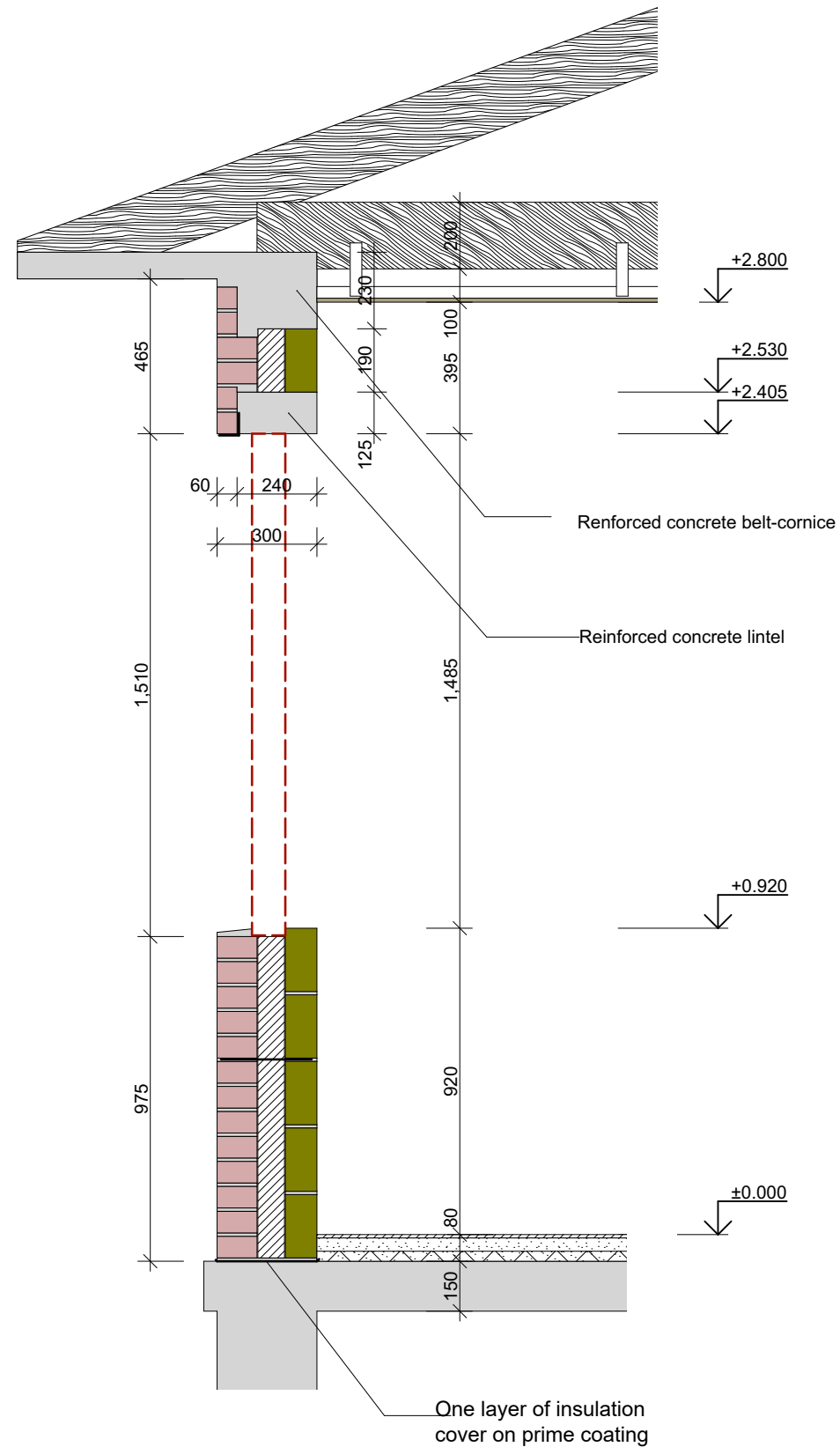
- Reinforced concrete lintel: 240 (width) x 60 (height)
- XPS tiles: 140 (thickness)
- Reinforced concrete belt-cornice: 400 (height)
- Reinforced concrete cornice: 230 (height)

The total height of the facade section is 2,800. The window opening is 2,180 high. The drawing also shows a cross-section of the roof and floor structure. Labels include "Reinforced concrete belt-cornice", "XPS tiles", and "Reinforced concrete lintel". Elevation markers are present at +2.800, +2.180, and ±0.000.

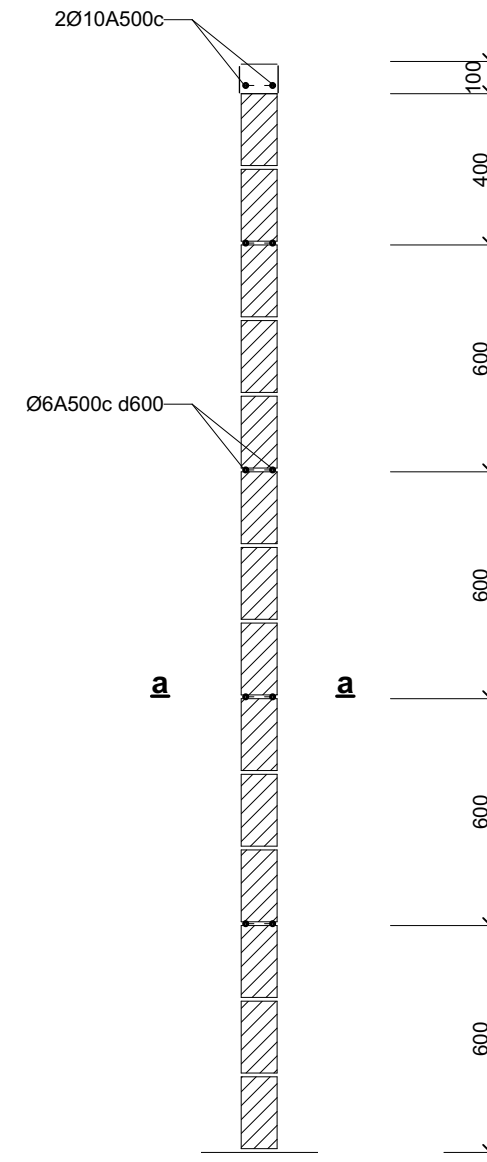
Wall Plan Near the Window and Door Apertures



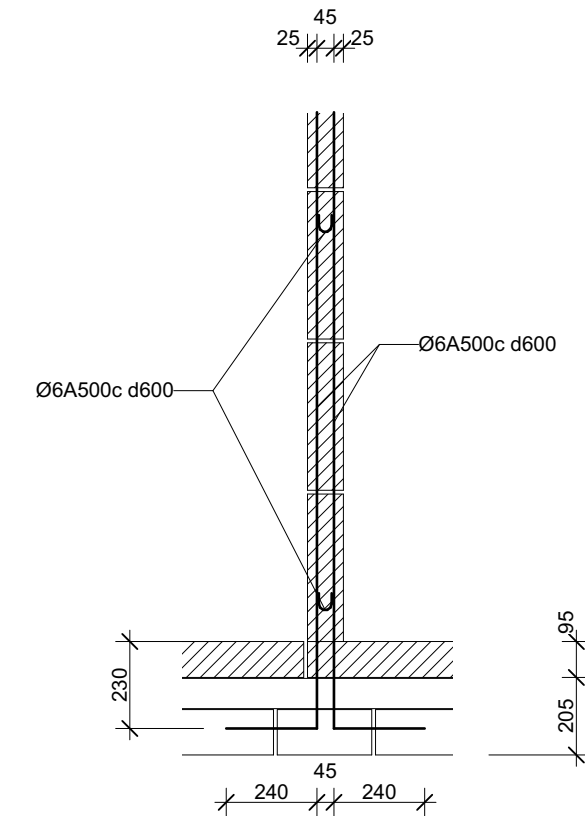
Section on the Wall by the Window Aperture



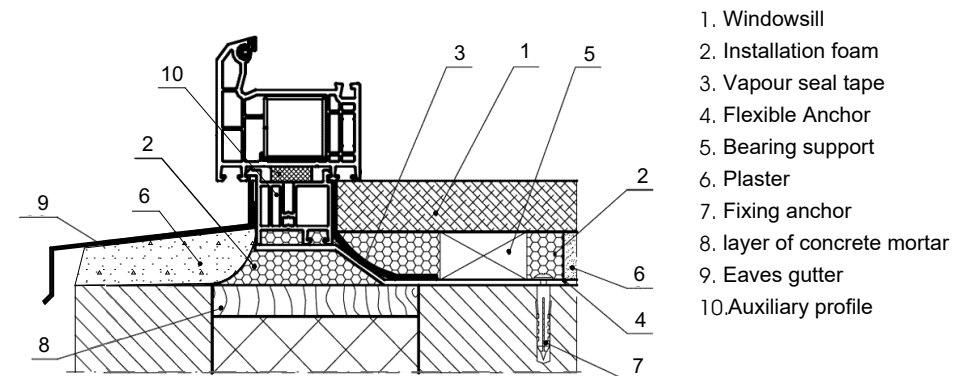
Partition Reinforcement

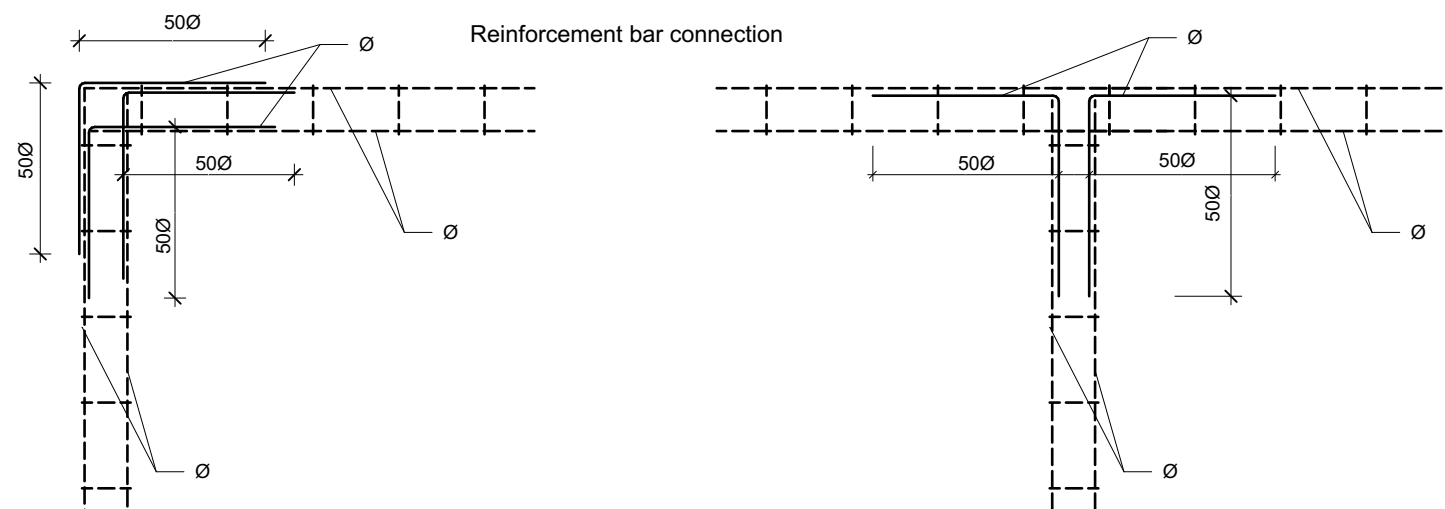
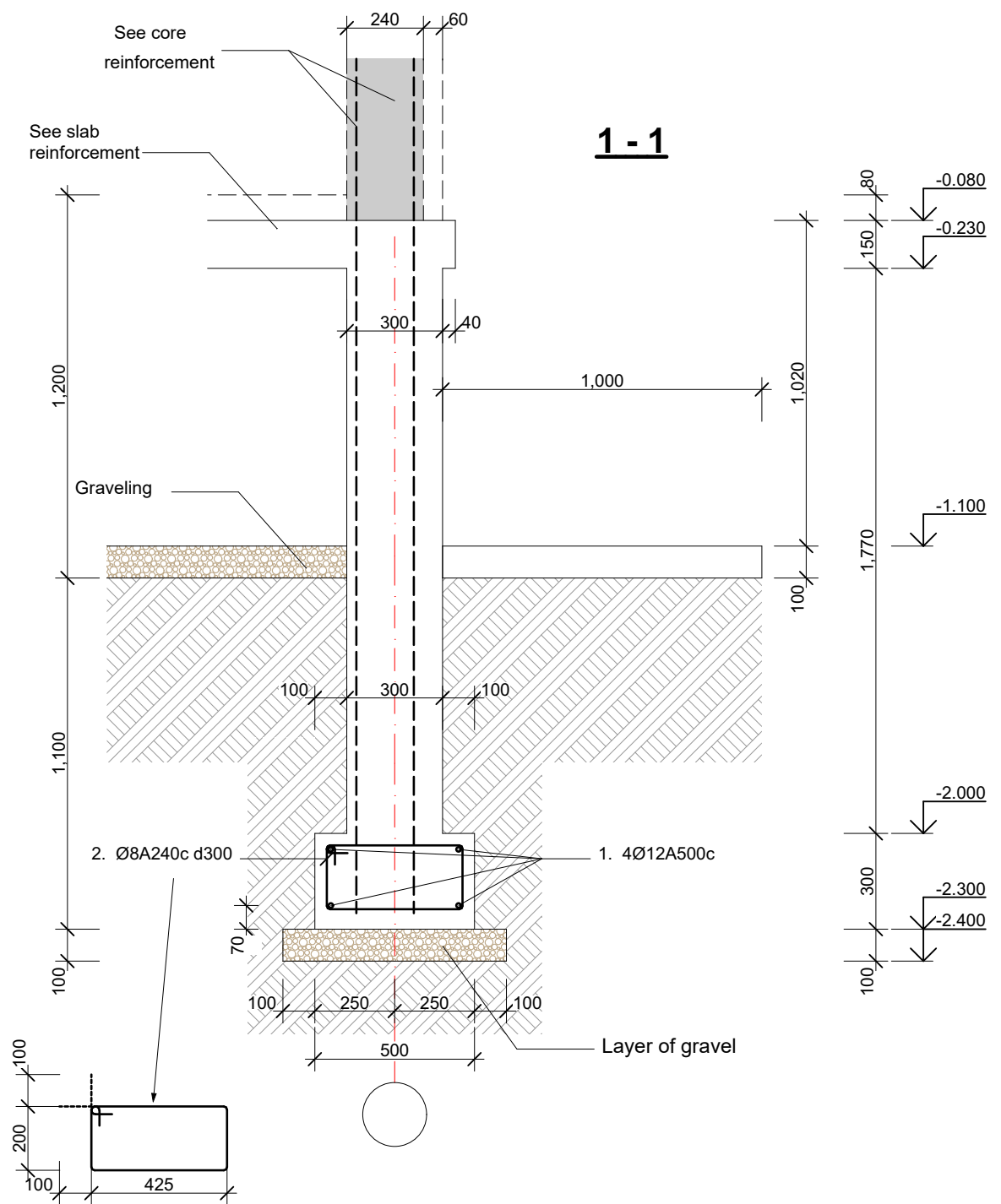
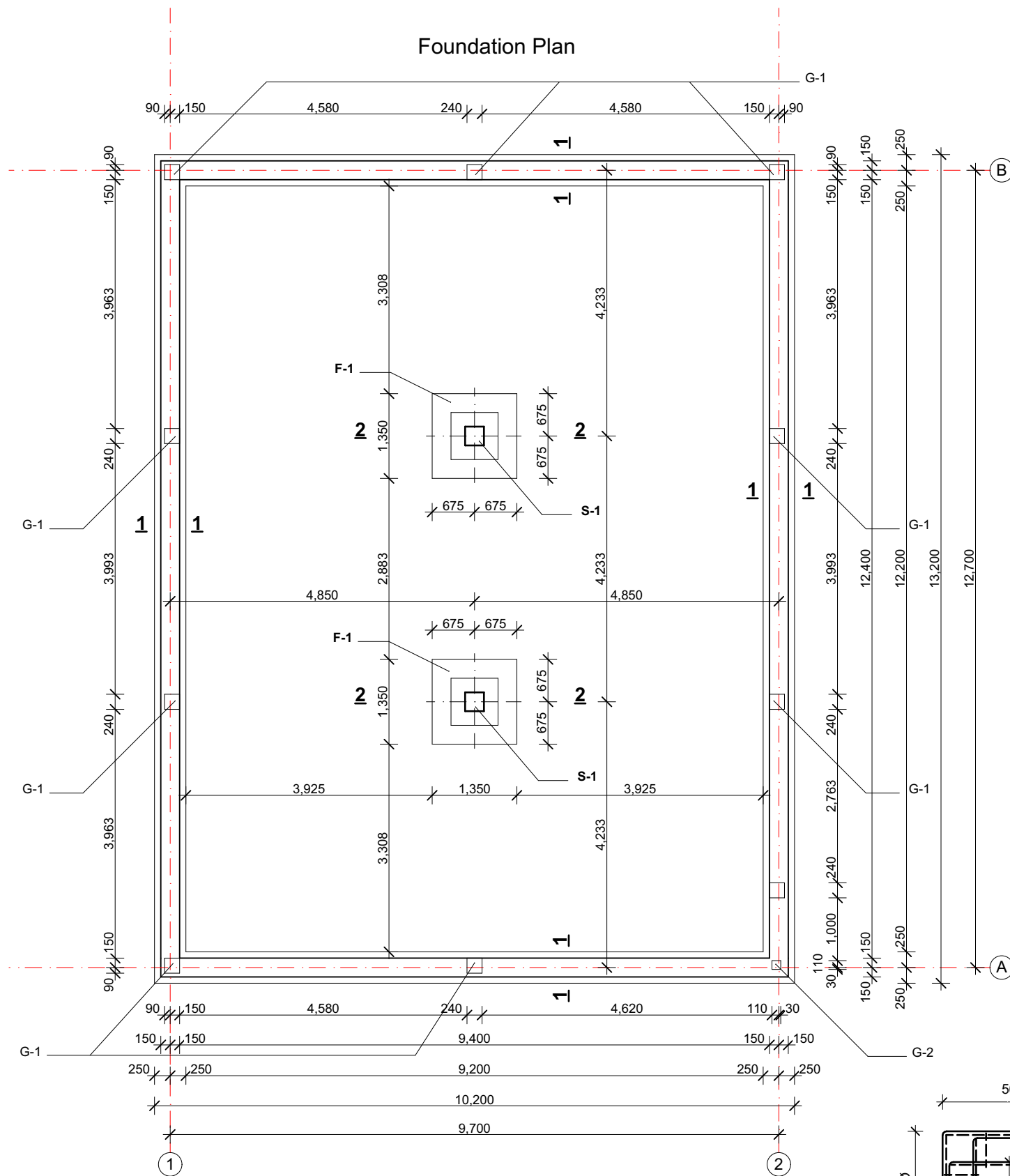


a - a



Window Node by the Windowsill





Georgia,
Marneuli

Stage:
Architectural project

Pad foundation

Format A - 3

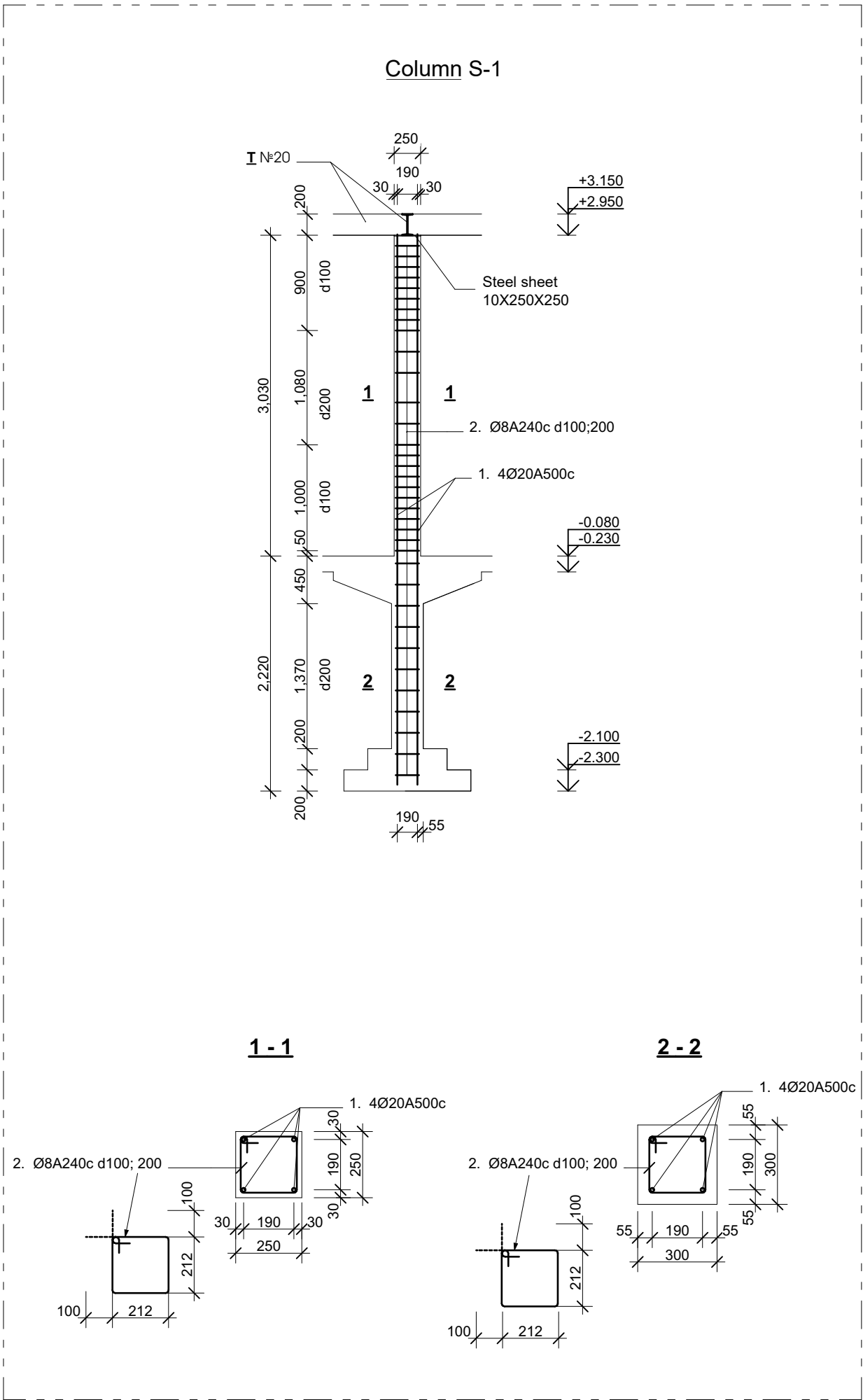
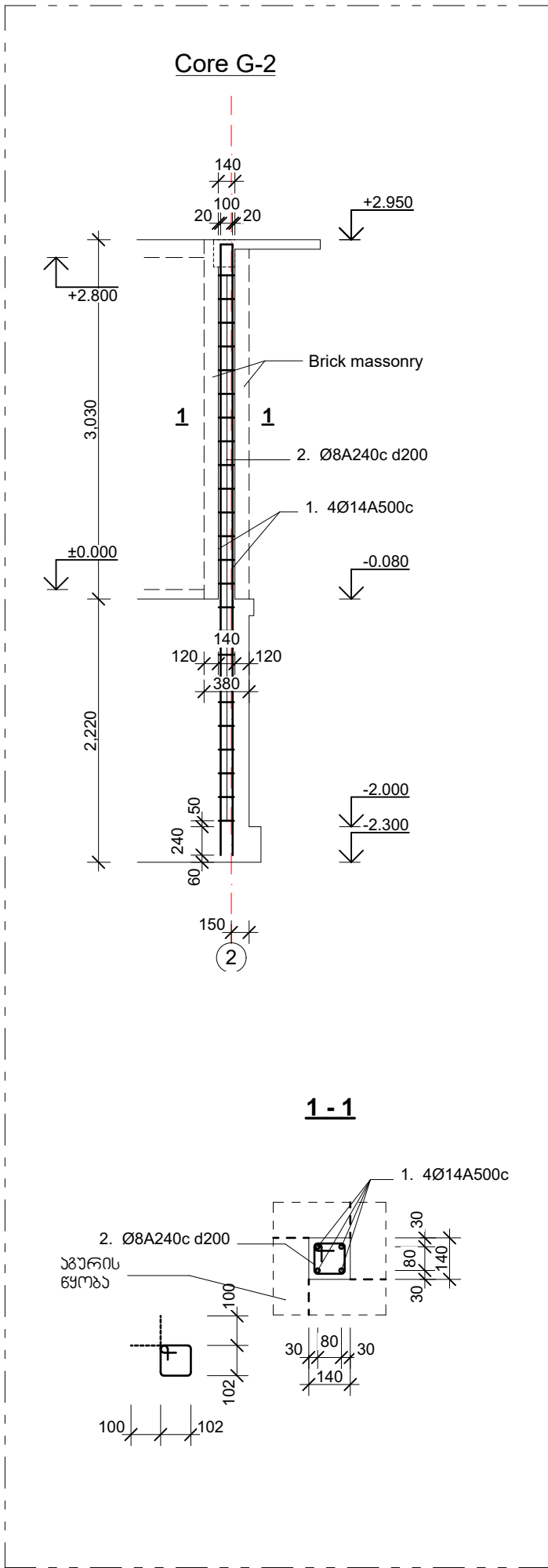
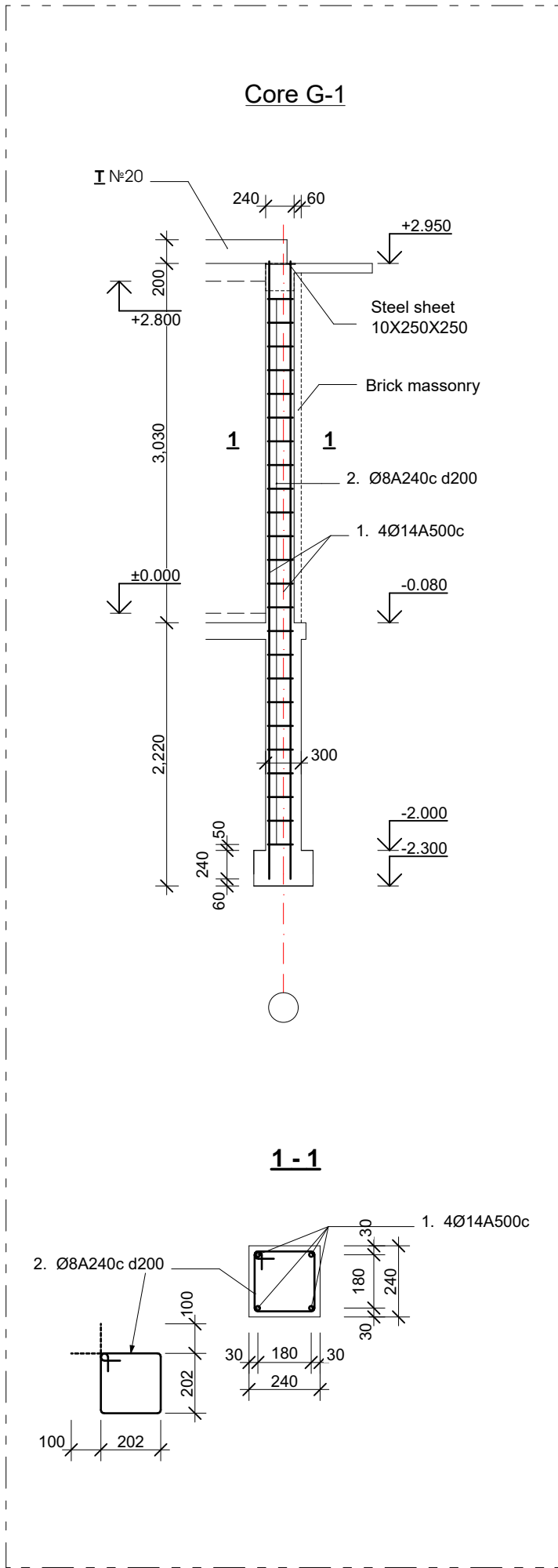
Page

Pages

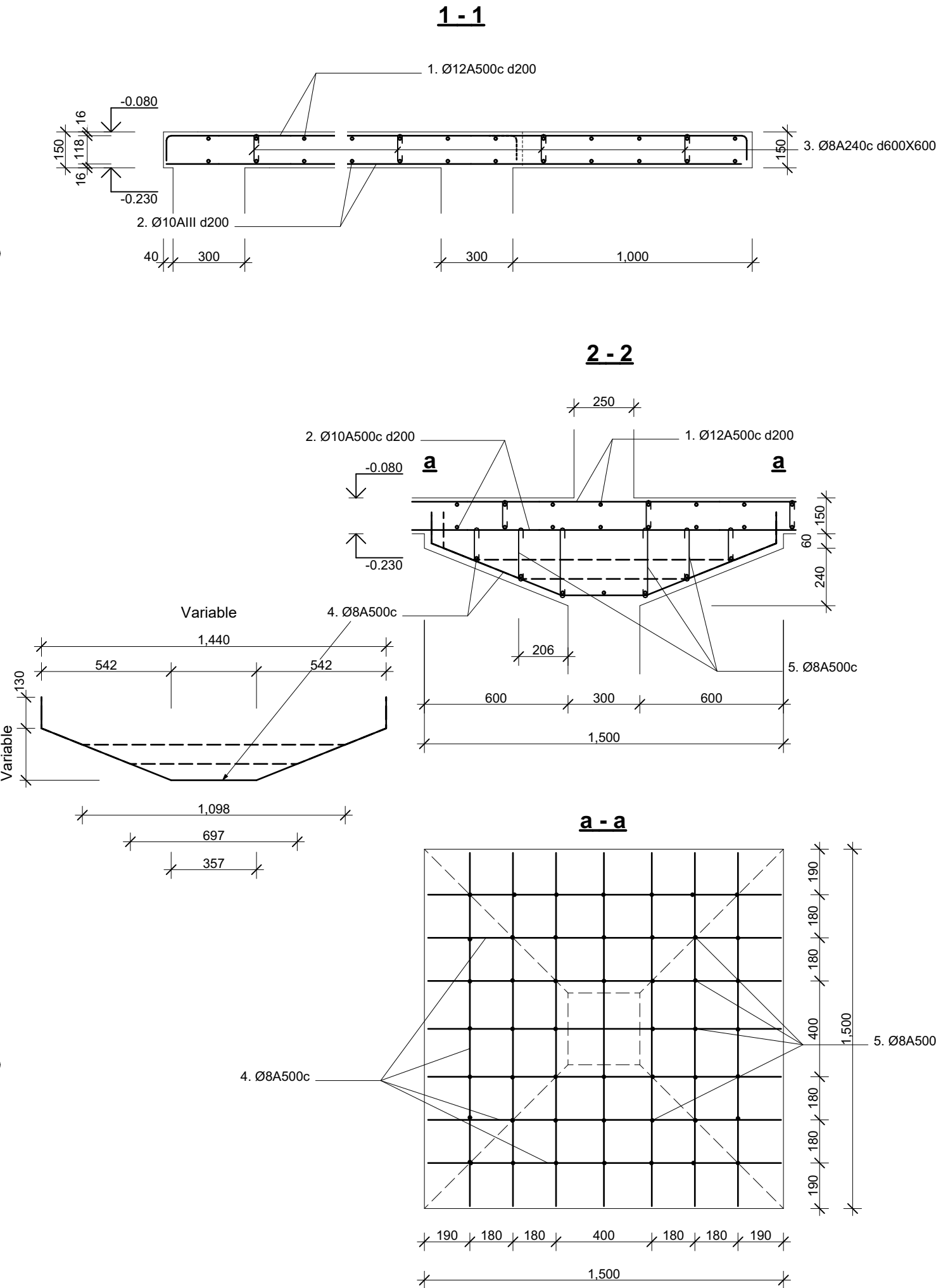
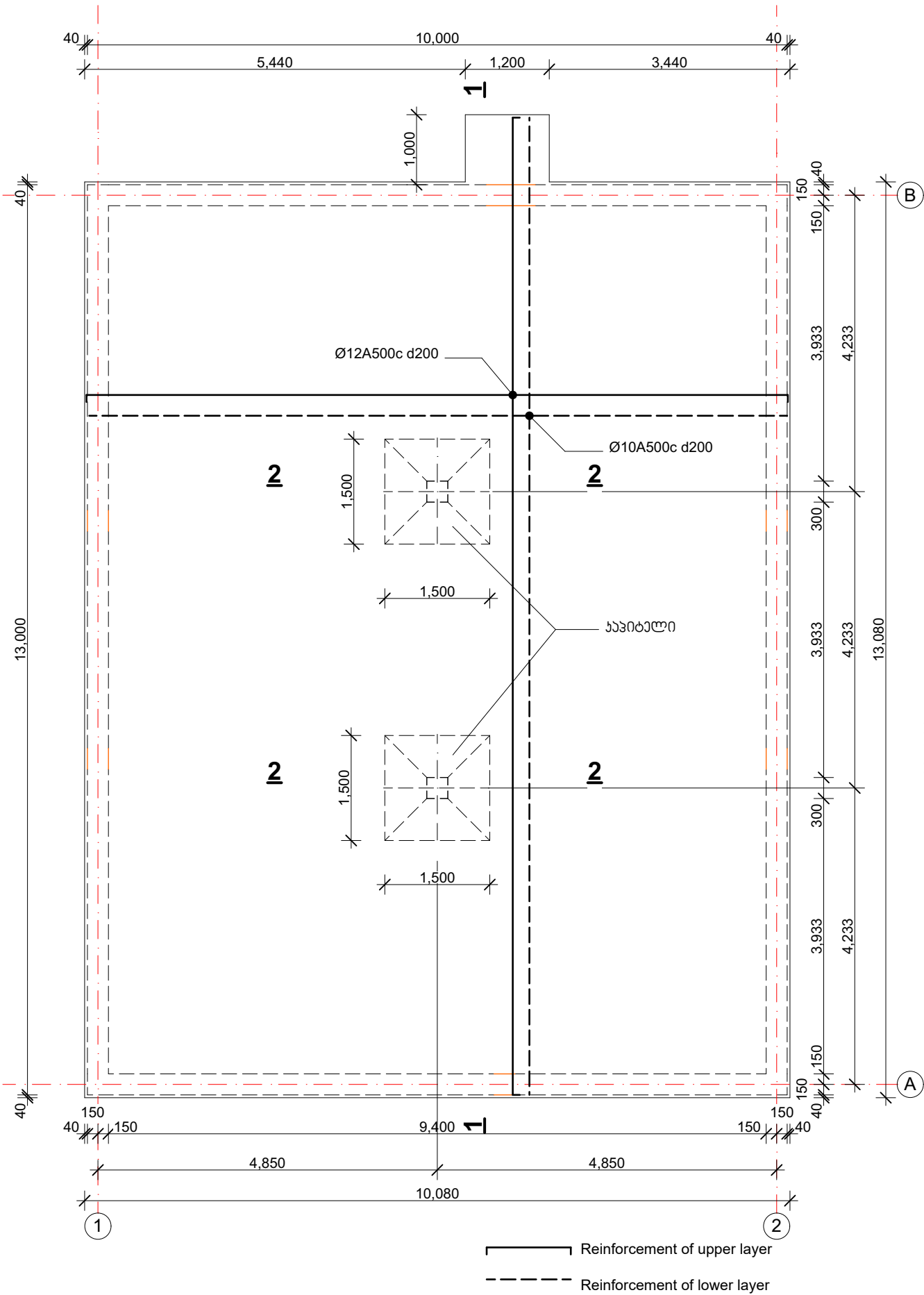
3

24

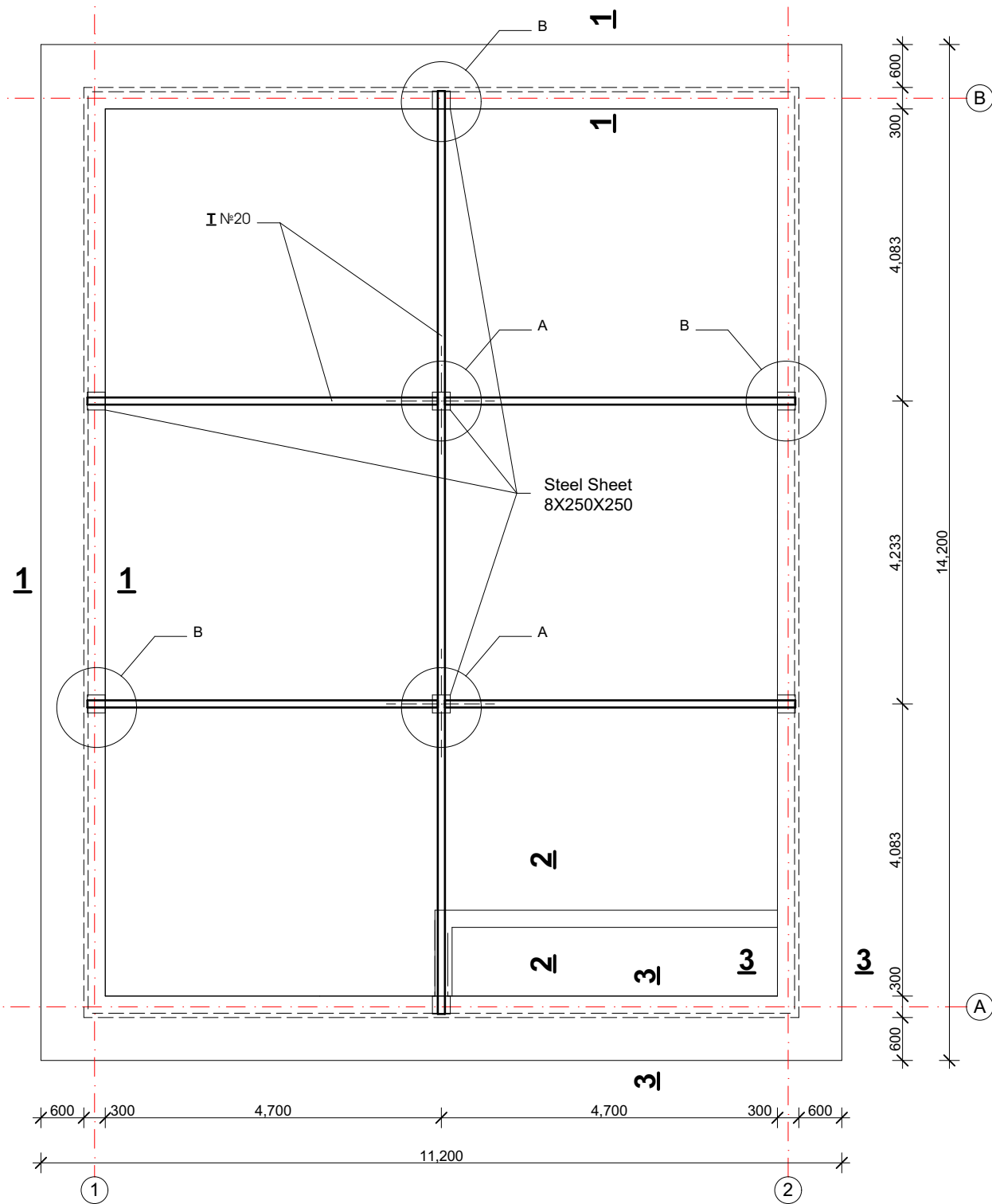
Technical drawing of a reinforced concrete slab cross-section, labeled "a - a". The drawing shows a rectangular slab with a total width of 1,350 and a total height of 1,350. The slab is divided into three vertical sections: a left section of width 300, a central section of width 750, and a right section of width 300. The central section contains a square opening of side length 300, centered within the slab. The opening is reinforced with 4Ø20A500c bars. The slab is reinforced with 12A500c Ø200 bars, with 6 bars in the top layer and 6 bars in the bottom layer. The reinforcement is shown in a grid pattern. The drawing includes dimension lines and labels for the reinforcement bars and the cross-section.



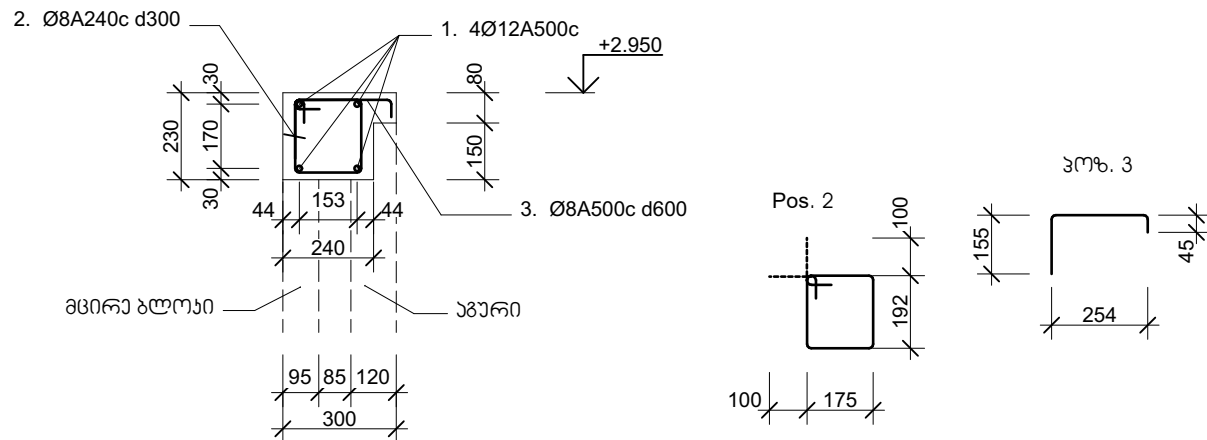
Plan of the Monolith Reinforced Concrete Slab



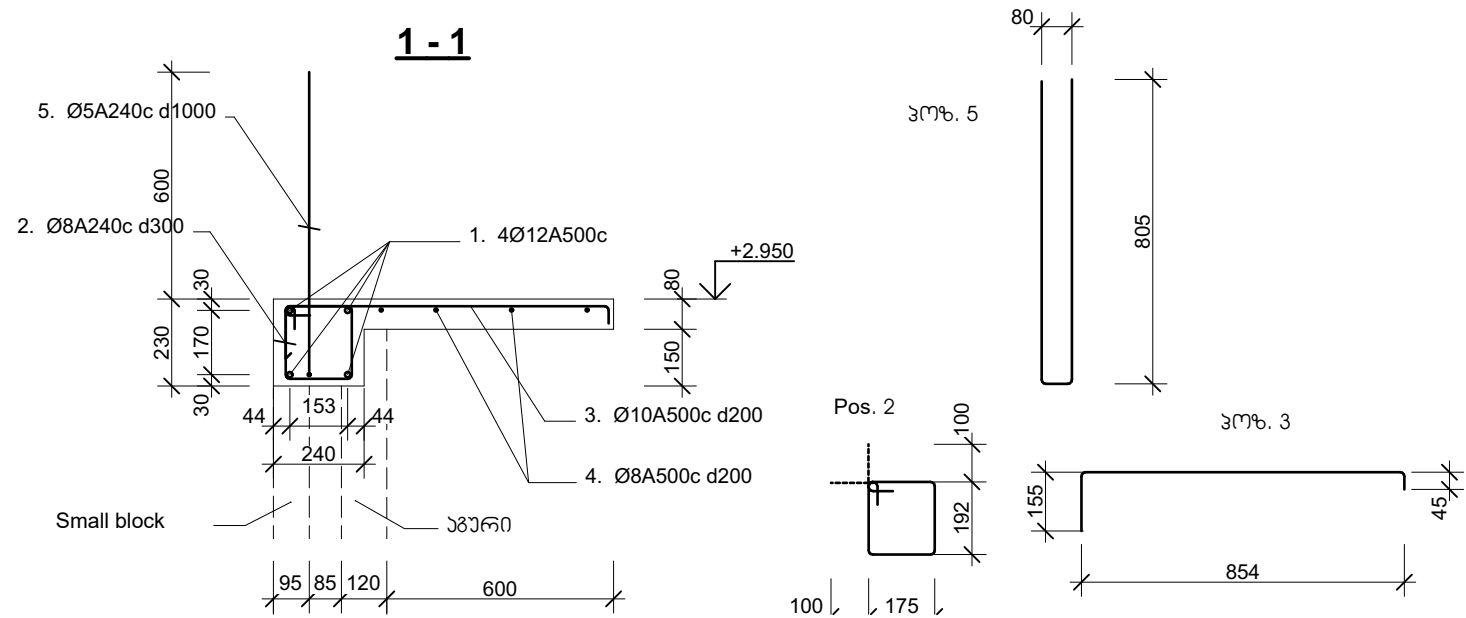
Plan of Bond Beam and Cornice Structures
on the indicator + 3,150



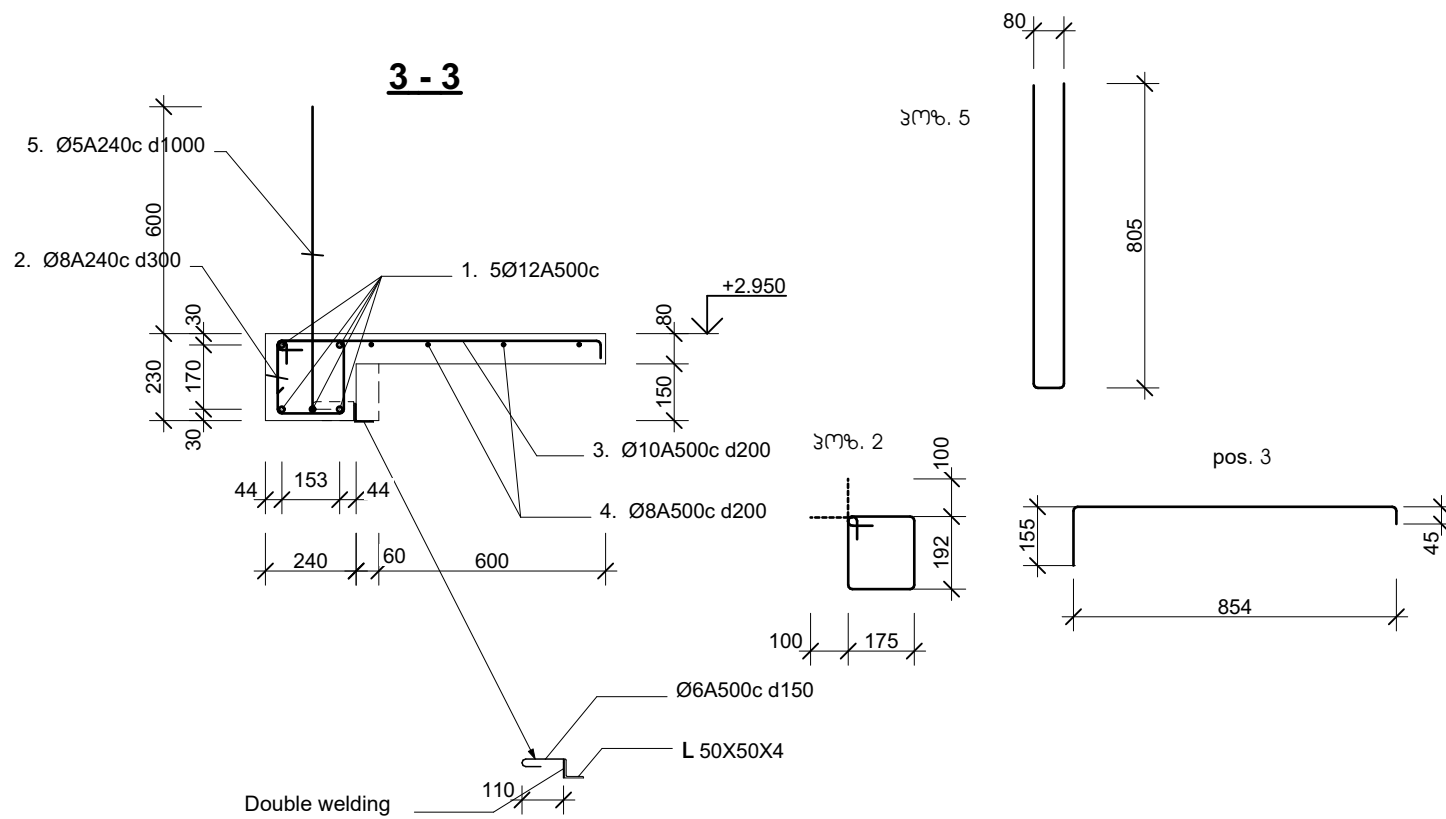
2 - 2



1 - 1



3 - 3



Individual house
(10X13m)

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Georgia,
Marneuli

პედაგოგი:

მედიკოსი
პროექტი

Stage:

Architectural project

Node A;B

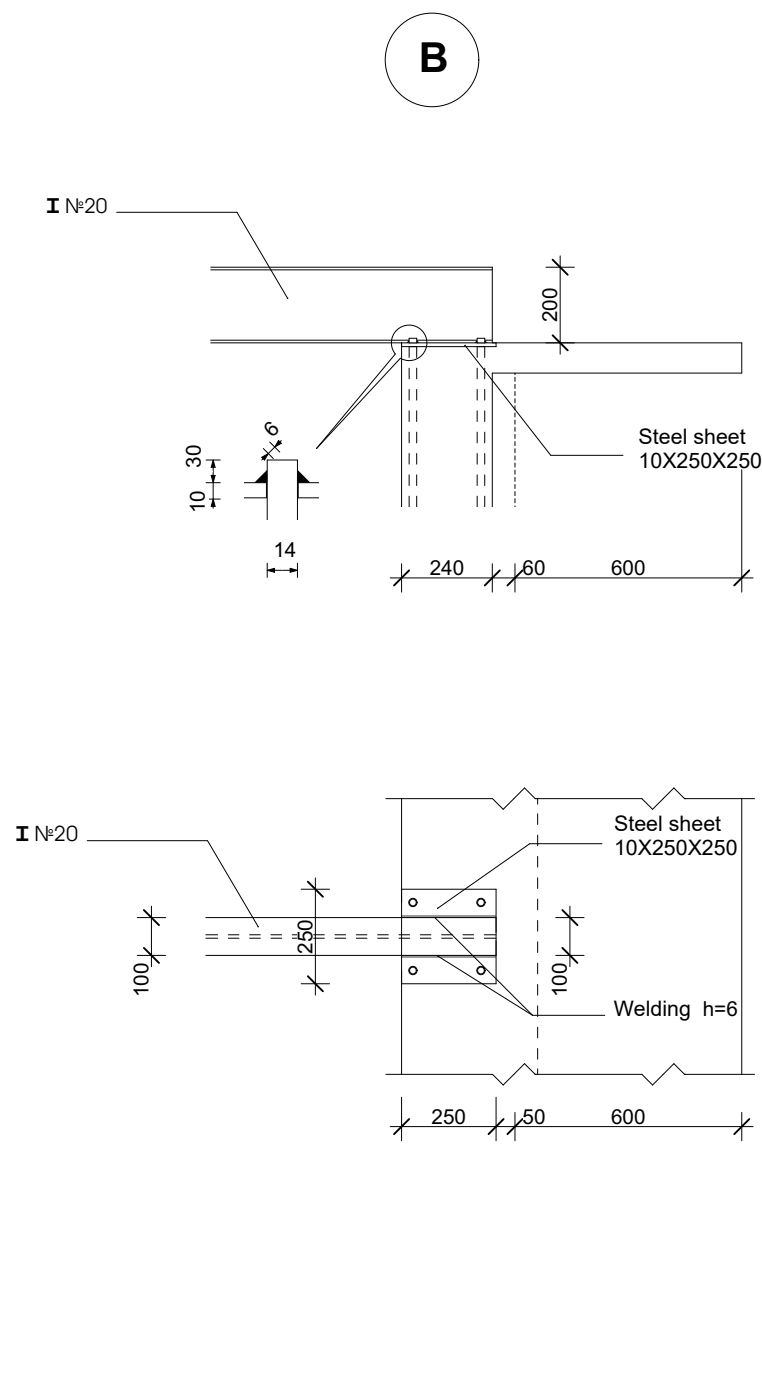
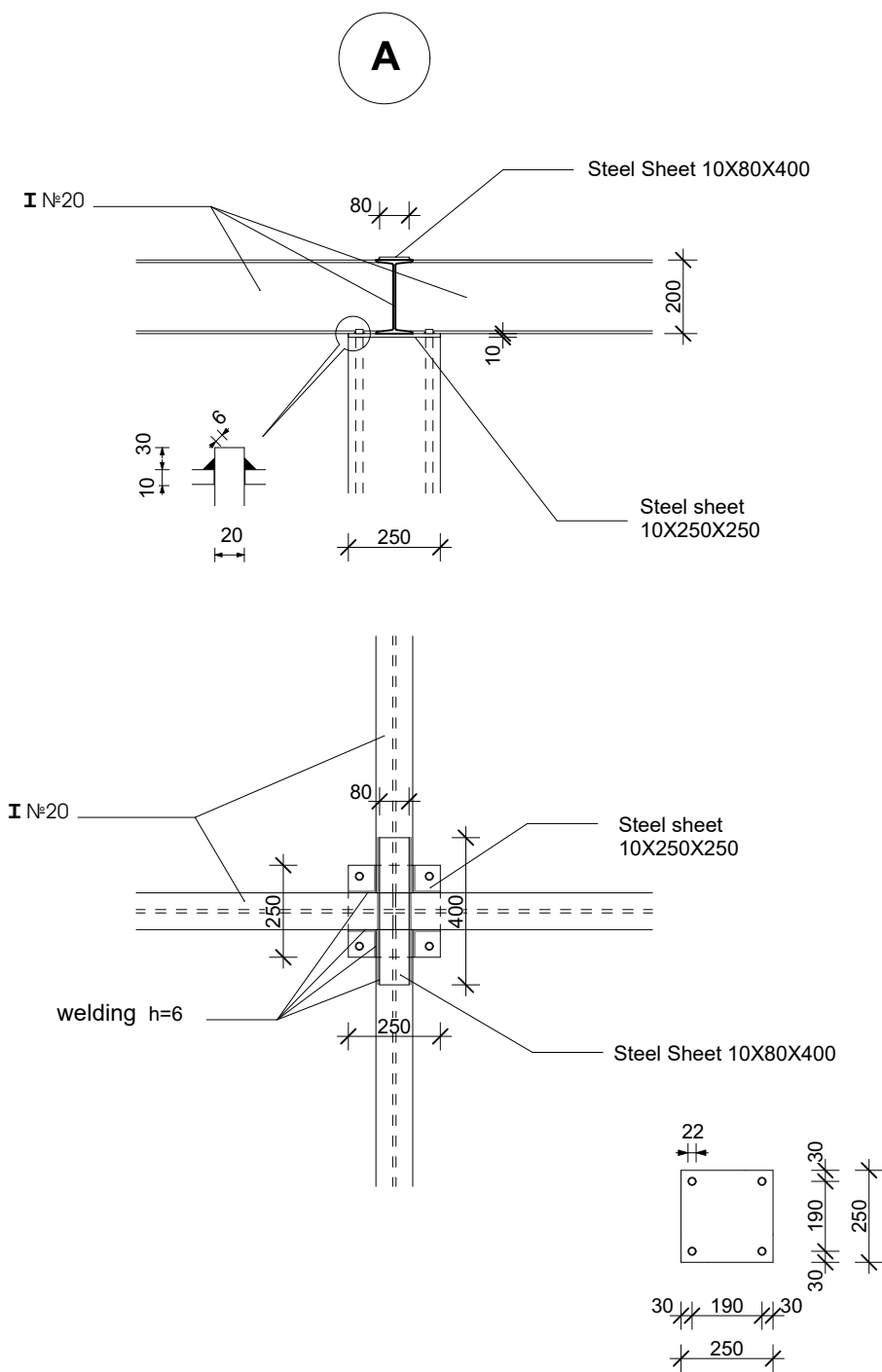
Format A - 3

Page

12

Pages

24



Technical drawing of a metal shelving unit. The drawing shows a side view of the unit with dimensions and labels.

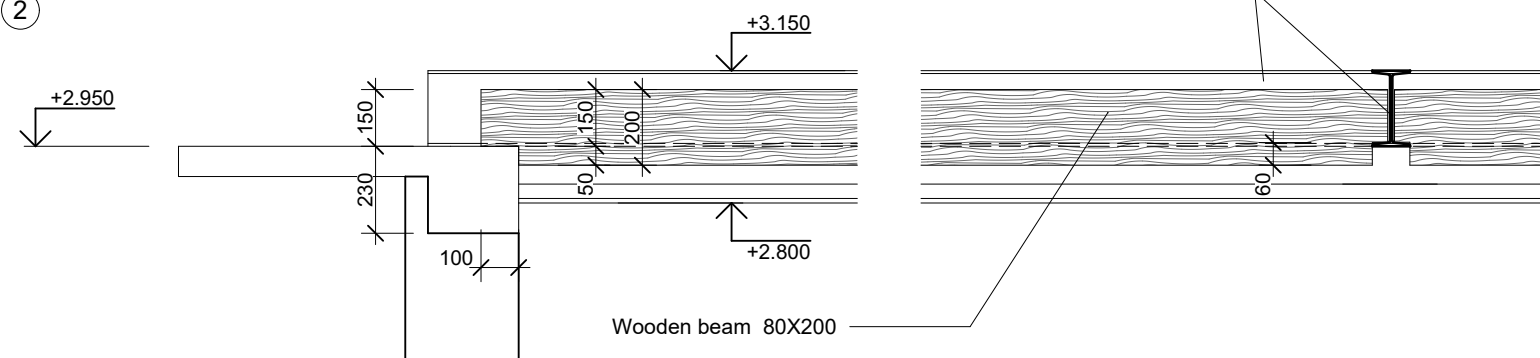
Dimensions:

- Overall width: 800 mm (divided into 100 mm, 4,650 mm, 100 mm, and 800 mm).
- Overall height: 1,900 mm (divided into 150 mm, 1,750 mm, and 100 mm).
- Shelf spacing: 800 mm (for the main section) and 450 mm (for the bottom section).
- Shelf thickness: 20 mm (labeled as I №20).
- Beam size: 80X200 mm (labeled as Wooden beam).

Labels:

- 1**: Section line indicator.
- 2**: Section line indicator.
- A**: Section line indicator.
- B**: Section line indicator.
- I №20**: Label for the shelf thickness.
- Wooden beam 80X200**: Label for the beam size.

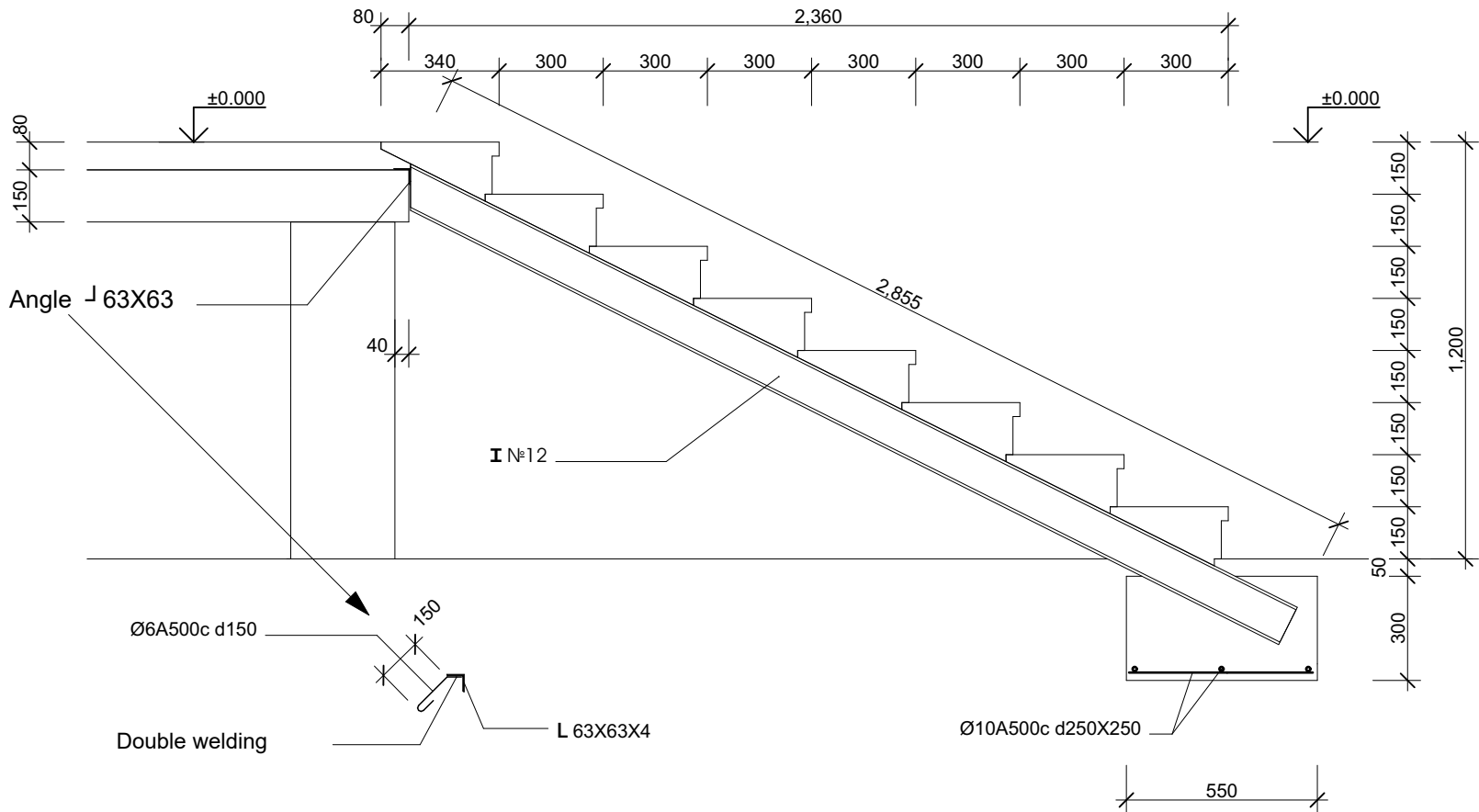
| სპეციფიკაცია Specification | | | | |
|---------------------------------------|----------------------|-------------------|--------------------------------|--------------------------|
| ქოჭის ქვეთი Beam section | სიგრძე მ Length m | რაოდენობა Q-ty | სულ სიგრძე მ Total length m | მოცულობა მ3 Volume m3 |
| ხის ქოჭო 80x200 Wooden beam 80x200 | 4.9 | 34 | 166.60 | 2.67 |
| | | | Σ | 2.67 |



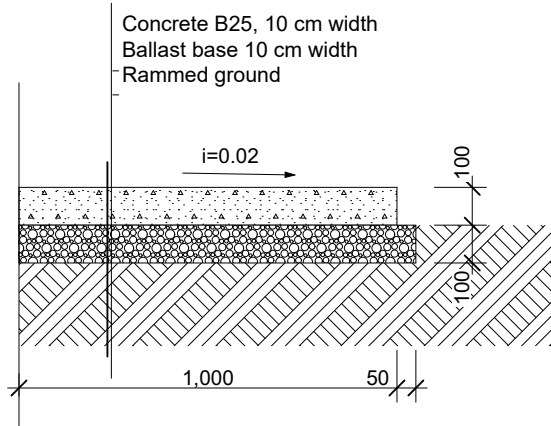
Technical drawing of a rectangular building footprint. The drawing includes the following dimensions and features:

- Overall Dimensions:**
 - Width: 1,500 (indicated by a dimension line at the bottom).
 - Depth: 2,400 (indicated by a dimension line on the right side).
- Internal Grid and Spacing:**
 - Horizontal spacing: 150 (from the left edge to the first vertical line) and 1,200 (between the two main vertical lines).
 - Vertical spacing: 300 (between each of the eight horizontal lines).
- Structural Markers:**
 - Four dashed lines (two on each long side) represent structural elements.
 - A circle with a dot is located at the bottom center of the footprint.
 - A triangle with lines pointing to the top corners is located at the top center of the footprint.

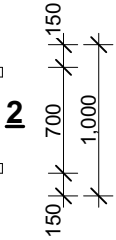
1-1



Structure of Walkway



2



Angle \perp 6 3X63



Ø6A500c d150

Double welding

L 63X63X4

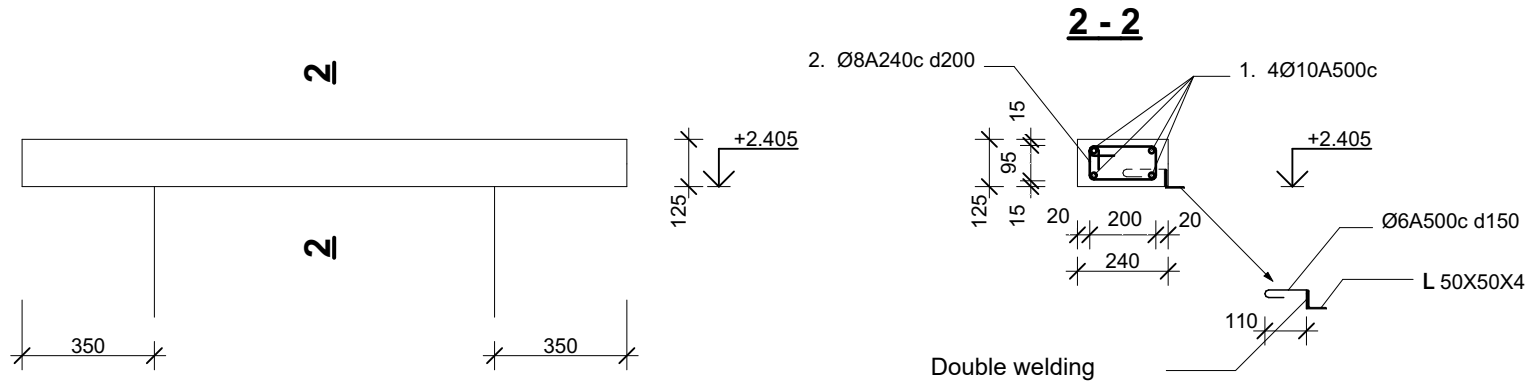
Ø10A500c d250X250 _

550

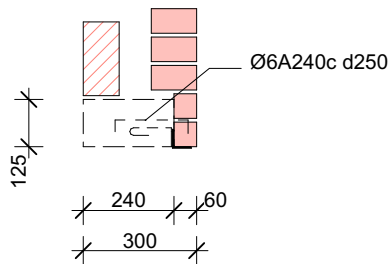
01:

□20X20X2

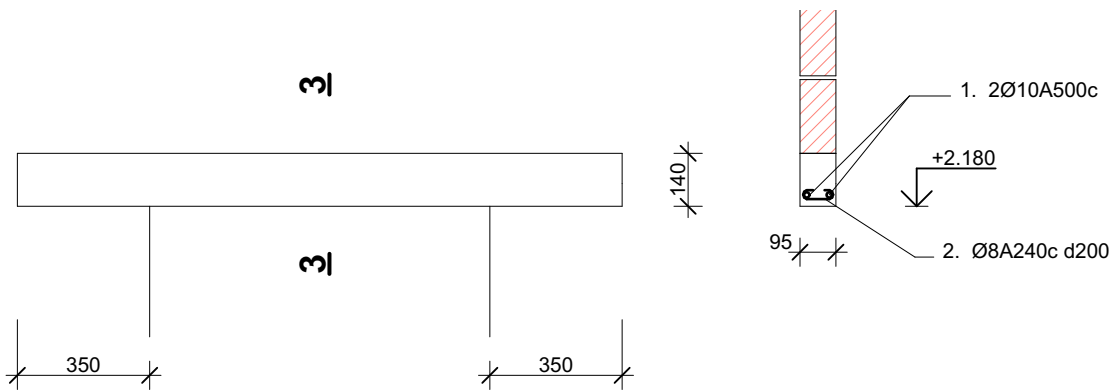
Reinforced concrete lintel of windowl



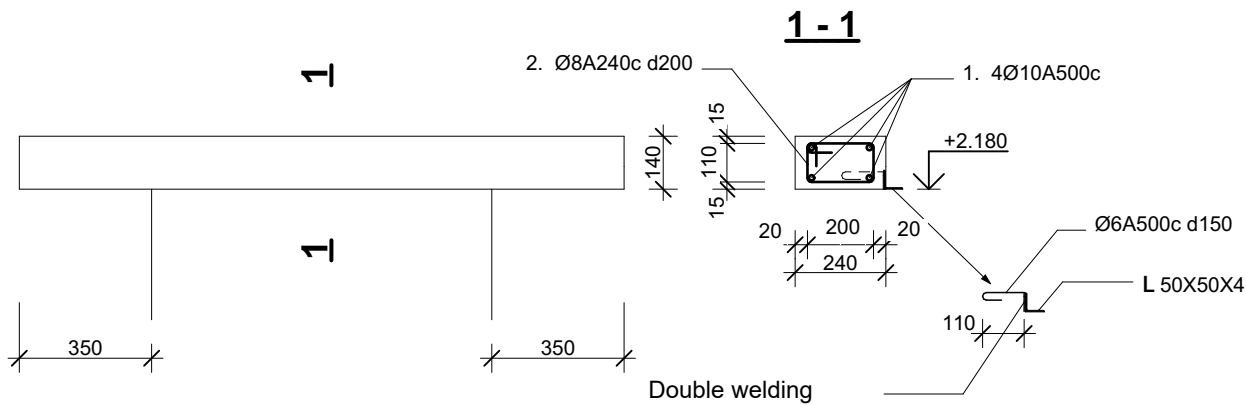
Lintel to be concreted on
angles after brick masonry



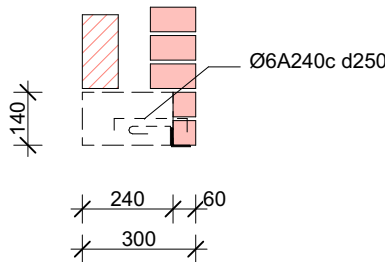
Reinforced concrete linte of the door on partitionl **3 - 3**



Reinforced concrete linte of door



The lintel will be concreted on the angle
square after the masonry



| ელემენტი Component | № | პროფილი Profile | სიგრძე მმ Length mm | რაოდენობა Q-ty | საერთო სიგრძე მ Total length m |
|--|---|--------------------|------------------------|-------------------|--------------------------------------|
| საძირკველი Foundaiton | | | | | |
| საძირკველი ღუნტურიი Strip foundation | 1 | 12 A500c | 59400 | 4 | 237.6 |
| | 2 | 8 A240c | 1450 | 150 | 217.5 |
| საძირკველი წერტილოვანი Pad foundation F-1 | 1 | 12 A500c | 1330 | 32 | 42.56 |
| | | | | | |
| ბეტონი B25 m3 Concrete B25 m3 | | | | | 32.5 |
| | | | | | |
| რკინაბეტონის სვეტები და გულანები Reinforced concrete columns and cores | | | | | |
| გულანა G-1 (10ცალი) Core G-1 (10 pcs) | 1 | 14 A500c | 5200 | 40 | 208 |
| | 2 | 8 A240c | 1010 | 260 | 262.6 |
| გულანა G-2 (1ცალი) Core G-2 (1 pcs) | 1 | 14 A500c | 5200 | 4 | 20.8 |
| | 2 | 8 A240c | 610 | 26 | 15.86 |
| სვეტი S-1 (2ცალი) Column S-1 (2pcs) | 1 | 20 A500c | 5200 | 8 | 41.6 |
| | 2 | 8 A240c | 1050 | 70 | 73.5 |
| ბეტონი B25 | | | | | 2.5 |
| | | | | | |
| რკინაბეტონის გადახურვის ფილა Reinforced Concrete Floor Slab | | | | | |
| ფილა Slab | 1 | 12 A500c | | | 1460.00 |
| | 2 | 10 A500c | | | 1430.00 |
| | 3 | 8 A240c | | | 140.00 |
| კაპიტული Capital | 4 | 8 A500c | 1750 | 28 | 49.00 |
| | 5 | 8 A240c | 350 | 96 | 33.60 |
| ბეტონი B25 m3 Concrete B25 m3 | | | | | 21.5 |

| არმატურის ამოკრეფა Specification of reinforcement | | | | | |
|---|-----------------------------------|------------------------------|-----------------------------------|---|--------|
| კვეთი Cross section | საერთო სიგრძე მ Total length m | გრამის წონა Weight of r/m | საერთო წონა კგ Total weight kg | საერთო წონა კლასის მიხედვით) კგ Total weight (according to the class) kg | |
| A240c | 5 A240c | 95.0 | 0.190 | 18.1 | 444.0 |
| | 8 A240c | 1080.0 | 0.394 | 425.9 | |
| A500c | 6 A500c | 1350.0 | 0.222 | 299.7 | 3706.6 |
| | 8 A500c | 263.0 | 0.394 | 103.7 | |
| | 10 A500c | 1811.0 | 0.616 | 1116.0 | |
| | 12 A500c | 2037.0 | 0.887 | 1807.6 | |
| | 14 A500c | 229.0 | 1.208 | 276.6 | |
| | 16 A500c | | 1.578 | 0.0 | |
| | 18 A500c | | 1.997 | 0.0 | |
| | 20 A500c | 41.8 | 2.465 | 103.0 | |
| | 22 A500c | | 2.983 | 0.0 | |
| | 25 A500c | | 3.851 | 0.0 | |
| სულ Total | | | 4150.6 | | |

| ელემენტი Component | № | პროფილი Profile | სიგრძე მმ Length mm | რაოდენობა Q-ty | საერთო სიგრძე მ Total length m |
|---|---|--------------------|------------------------|-------------------|--------------------------------------|
| ლაგვარდანი და კოჭები Carnice and beams | | | | | |
| ჭრილი 1-1,3-3 Section 1-1,3-3 | 1 | 12 A500c | 67400 | 4 | 269.60 |
| | 2 | 8 A240c | 950 | 223 | 212.17 |
| | 3 | 10 A500c | 1050 | 206 | 216.30 |
| | 4 | 8 A500c | 52400 | 4 | 209.60 |
| | 5 | 5 A240c | 1690 | 56 | 94.64 |
| 50X50X4 | | | | | 6.20 |
| ჭრილი 2-2 Section 2-2 | 1 | 12 A500c | 6800 | 4 | 27.20 |
| | 2 | 8 A240c | 950 | 24 | 22.80 |
| | 3 | 8 A500c | 455 | 9 | 4.10 |
| ორტეხებრი კოჭები I-beams | | I #20 | 4350 | 3 | 13.05 |
| | | I #20 | 4950 | 4 | 19.80 |
| | | | | | |
| ბეტონი B25 m3 Concrete B25 m3 | | | | | 5.5 |
| | | | | | |
| ზღუდარები Lintels | | | | | |
| ზღუდარი გარე კედელზე Lintel on external wall | 1 | 10 A500c | | | 117 |
| | 2 | 8 A240c | | | 84.5 |
| | | 50X50X4 | | | 12.6 |
| ზღუდარი ტიხრებზე Lintel on partitions | 1 | 10 A500c | | | 28 |
| | 2 | 8 A240c | 245 | 40 | 17 |
| ბეტონი B25 m3 Concrete B25 m3 | | | | | 1.14 |
| | | | | | |
| კიბეები Staircases | | | | | |
| | 1 | 10 A500c | | | 20 |
| | | I #12 | 2900 | 4 | 11.6 |
| | | 63X63X4 | | | 2.5 |
| ბეტონი B25 m3 Concrete B25 m3 | | | | | 0.52 |
| | | | | | |
| კედლების და ტიხრების არმირება Reinforcement of walls and partitions | | | | | |
| | 1 | 6 A500c | | | 1350 |

Individual house
(10X13m)

Project address:

Georgia,
Marneuli

Stage:
Architectural project

Roof structure plan

Format A - 3

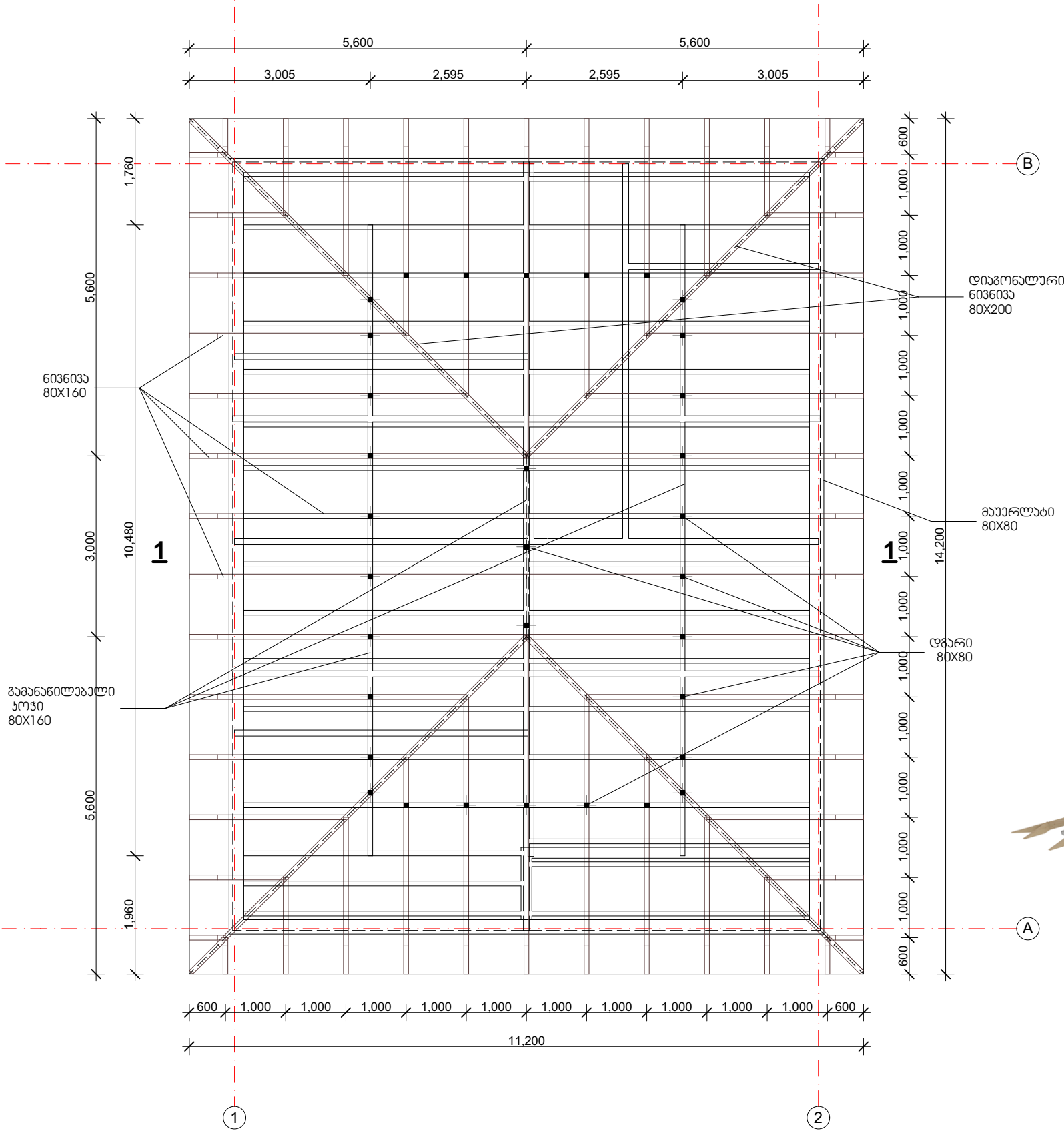
Page

18

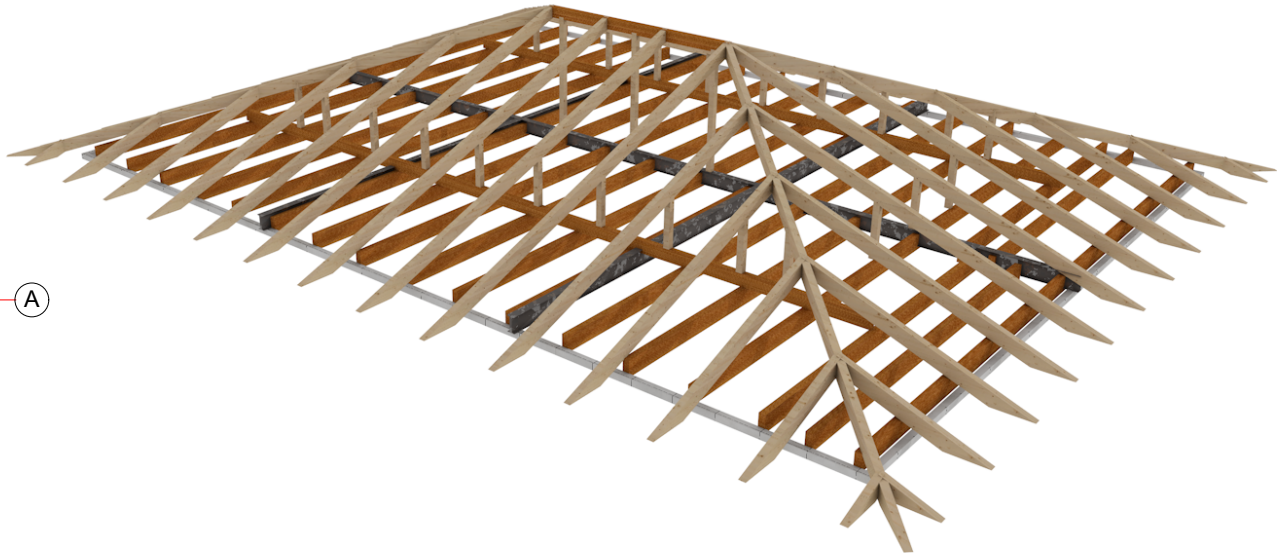
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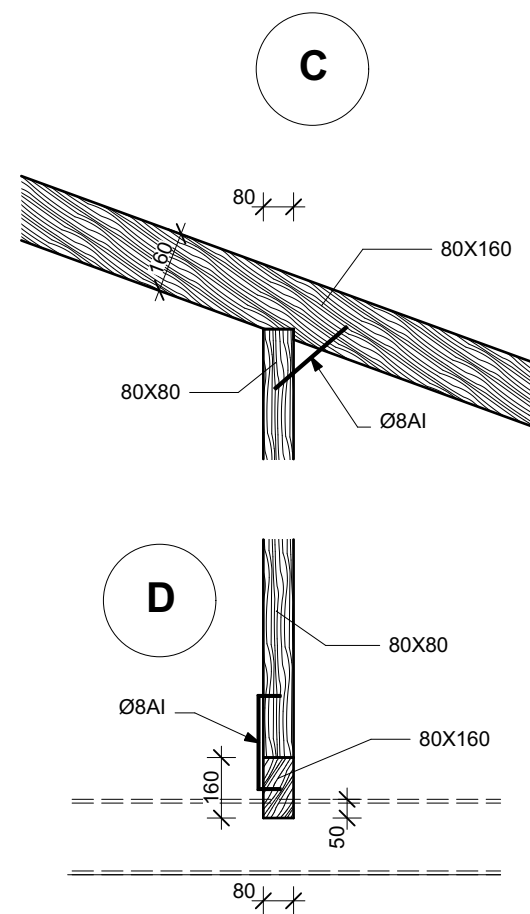
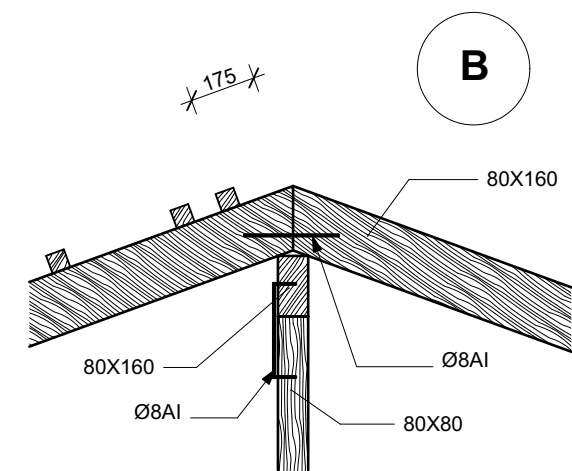
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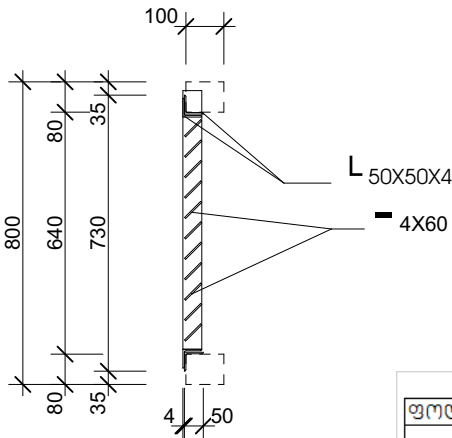
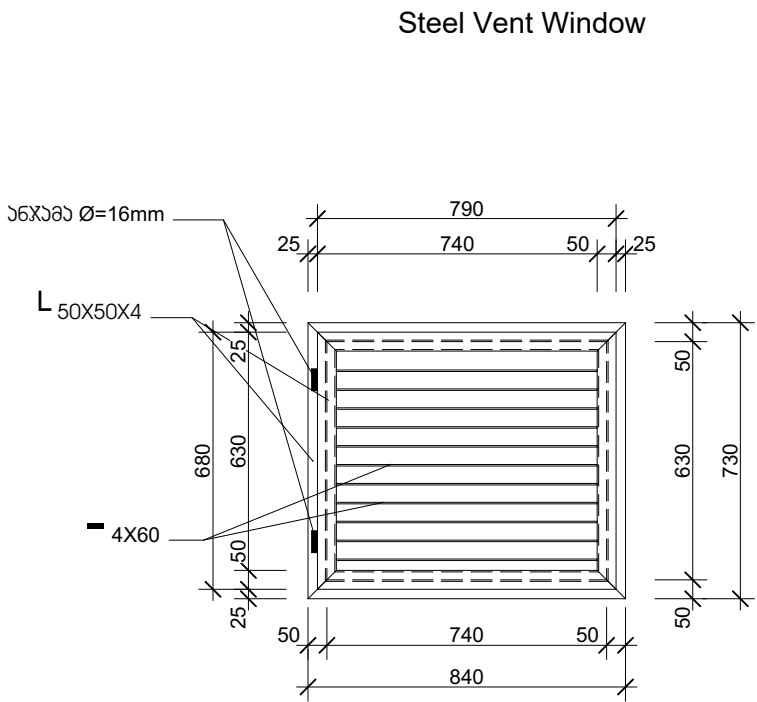
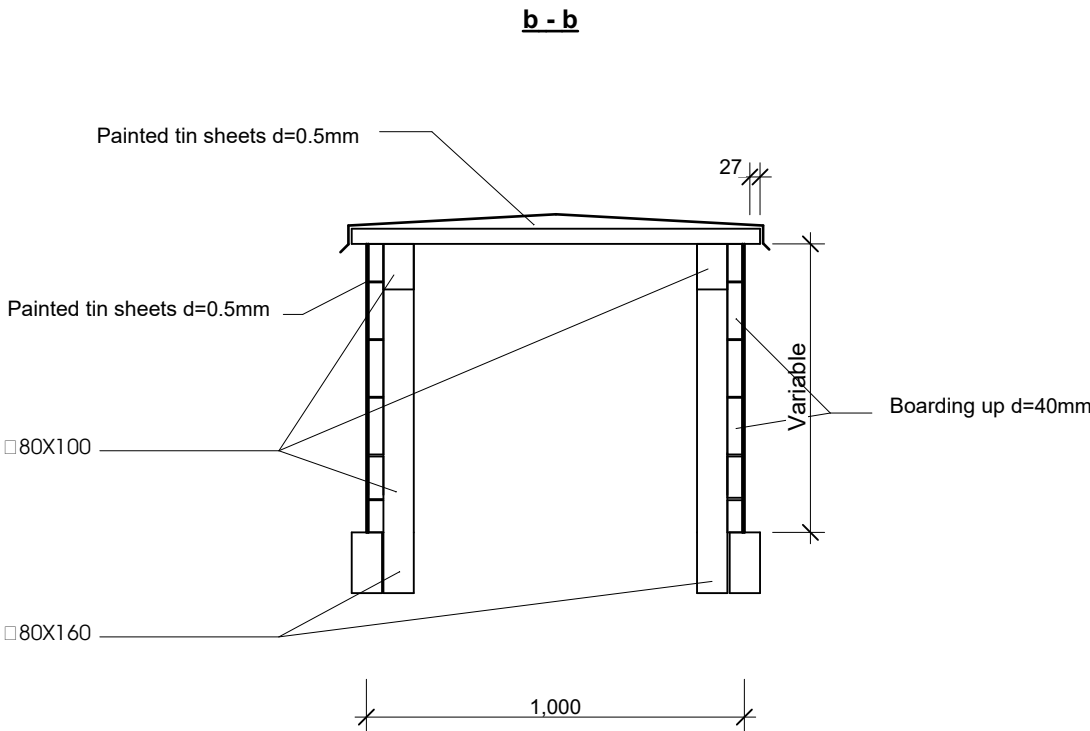
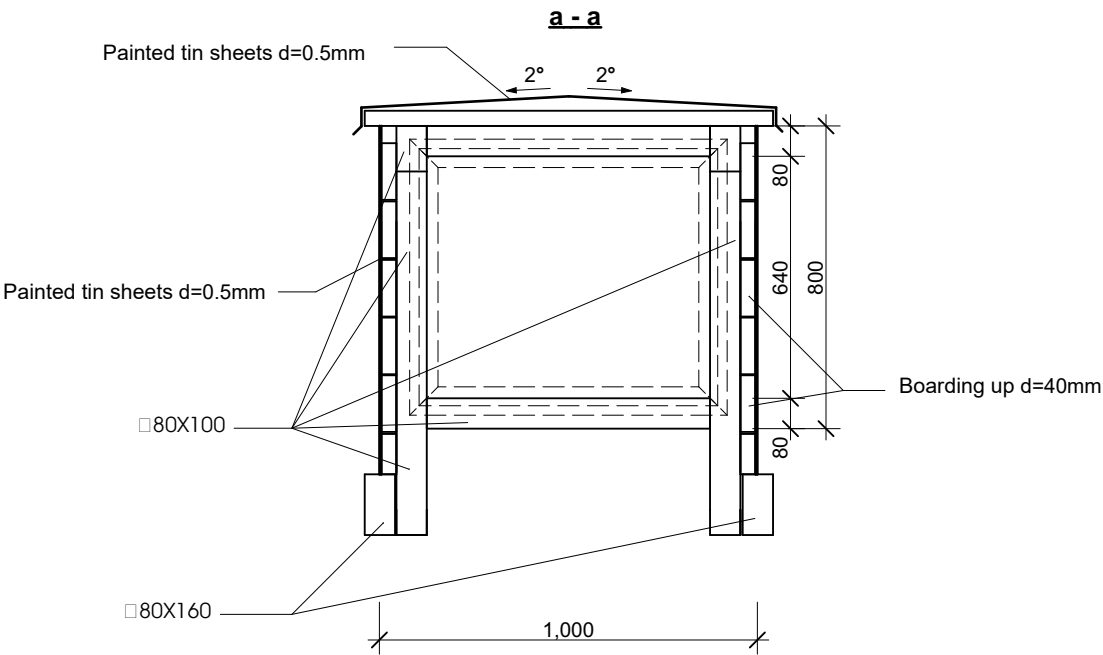
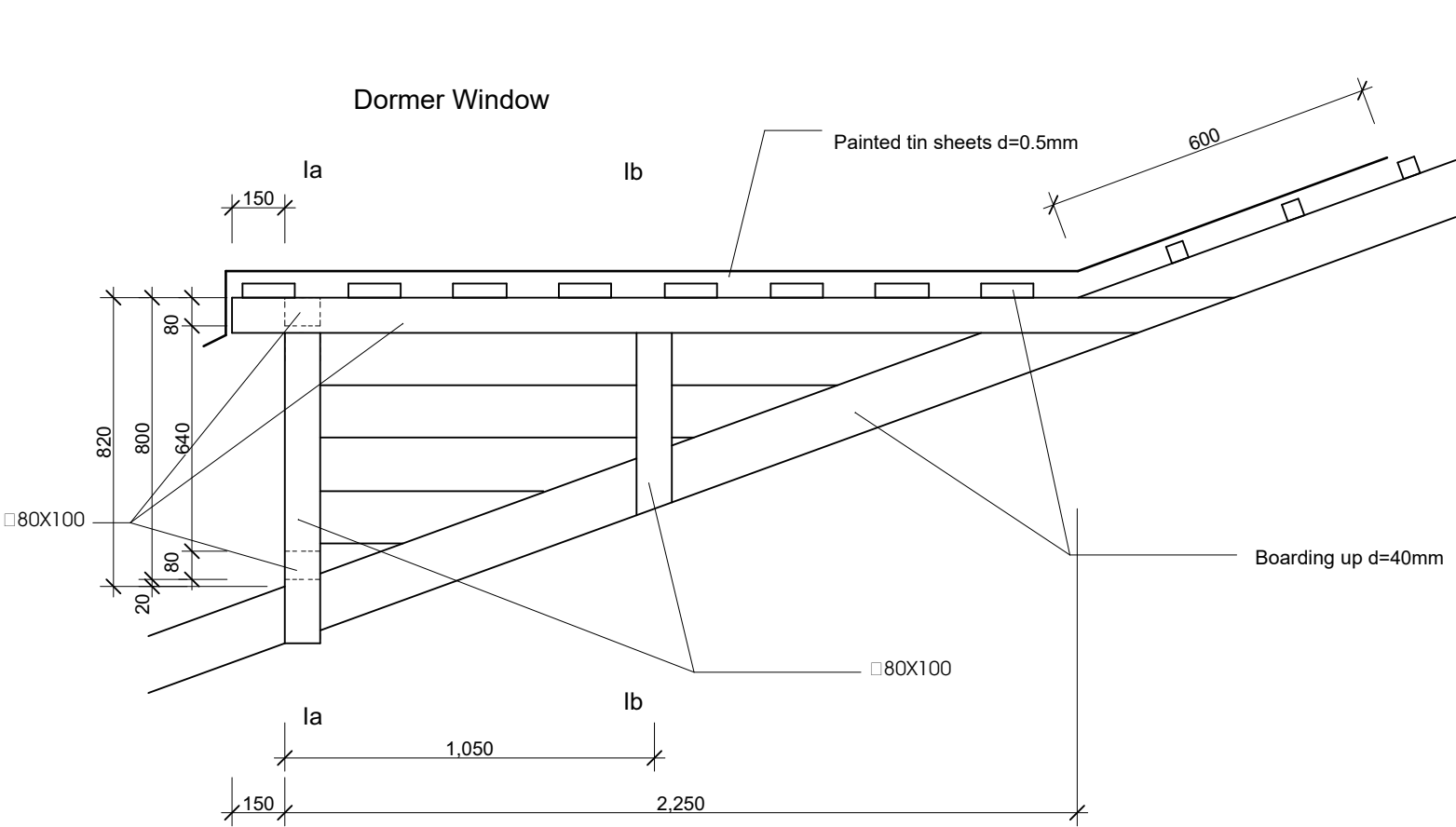
Roof Structure Plan



| სპეციფიკაცია Specification | | | | |
|--|--------------------------|-------------------------|-----------------------------------|--------------------------|
| ქოჭის ჯვარი Beam section | სისქე მმ Thickness mm | სიმაღლე მმ Height mm | საერთო სიგრძე მ Total length m | მოცულობა მ3 Volume m3 |
| დიაგონალური 6036033 Diagonal rafter | 80 | 160 | 32.8 | 0.42 |
| 6036033 Rafter | 80 | 160 | 169.4 | 2.17 |
| გაბანაწილებელი ქოჭი Wall-plate | 80 | 80 | 48 | 0.31 |
| გაბანაწილებელი ქოჭი Ledger | 80 | 160 | 22 | 0.28 |
| სვეტი Pillar | 80 | 80 | 38.4 | 0.25 |
| ლავის ქოჭი Joist | 50 | 50 | 602.00 | 1.51 |
| | | | Σ | 4.93 |

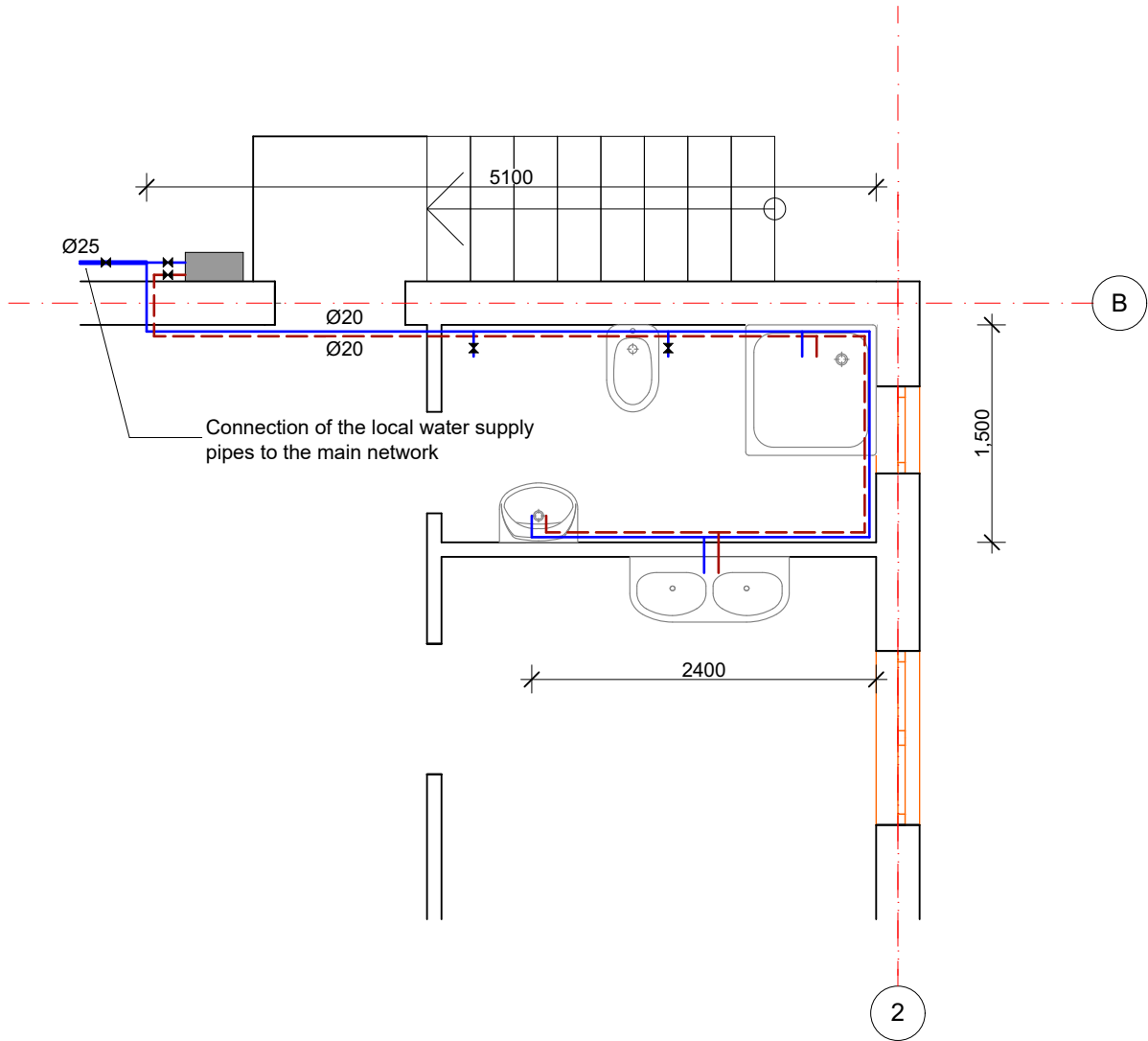




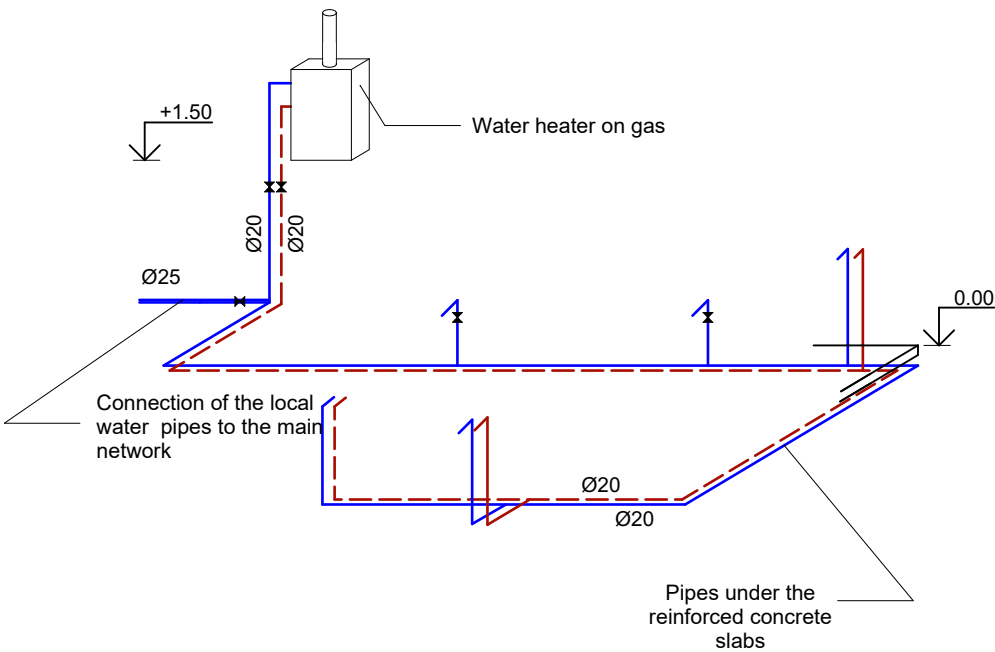


| შპს "საპროექტო" Specification of Steel | | | | |
|--|----------------------|-------------------|-----------------------------------|----------------------|
| პროექტის ნაწილი Beam section | სიგრძე მ Length m | რაოდენობა Q-ty | საერთო სიგრძე მ Total length m | წონა კგ Weight kg |
| L50X50X4 | 0.73 | 2 | 1.46 | 4.23 |
| L50X50X4 | 0.84 | 2 | 1.68 | 4.87 |
| L50X50X4 | 0.68 | 2 | 1.36 | 3.94 |
| L50X50X4 | 0.79 | 2 | 1.58 | 4.58 |
| 60X4 | 0.69 | 11 | 7.59 | 14.27 |
| | | | Σ | 31.90 |

Water Supply System Plan



Water Supply System Axonometry



Water Supply

Water supply of the residential house is provided through the water pipeline from the street. Supply of running watery is carried out under with the incoming water pipe placed under the roof slabs of the first floor. The water will pass through the mechanical filter. Quantity of water-service meter equipment is five. The water pipeline network will be constructed from polypropylene pipes and fittings. Cold and hot water pipes should be insulated with heat insulation. First of all, the two-meter pipe should be latched with insulation, then the mineral cotton insulation of 5 cm thickness should be fixed. The hot water supply of the building is carried out through the gas water heater.

Sewerage System

The sewerage network of the residential house is represented by a single pillar and a pipeline, through which the sanitary sewage flows into the sewerage manhole of the yard. The sewage pipes are provided under the roof slabs and will be fixed on the same slabs with bracing, a horizontal part of the pipe to be insulated with heat insulation (10 cm thickness). The sewerage network is built with 100 and 50 mm polypropylene pipes. For the purpose of ventilation of the network, the pillar of 0.2 m separates from the ceiling and stops transversely in the attic. The horizontal sections of the drainage network will be built by the following minimum slope: for 100-pipes -0,02; 50 pipes - 0,03.

| სპეციფიკაცია Specification | | | |
|-------------------------------|---|--------------------------------------|-------------------|
| N | დასახელება List | განზომილება ბის ერთეული UoM | რაოდენობა Q-ty |
| 1 | ხელსაბანის კომპლექტი, ნიჟარით, შემრევით, სიფონით და ნიჟარის ფუხით Sink, mixer tap, plumbing trap, sink stand. | ცალი pcs | 1 |
| 2 | სამზარეულოს უკანგავი ფოლადის ნიჟარა, შემრევით და სიფონით Kitchen stainless steel sink, mixer tap, plumbing trap | ცალი pcs | 1 |
| 3 | შაბის ქვეში შემრევით და სიფონით Shower unit wit mixer tap and plumbing trap | ცალი pcs | 1 |
| 4 | უნიტაზის კომპლექტი ჩამრეცხი ავზით და გოფირებული საკანალიზაციო მილით WC bowl with flush tank and corrugated sewage pipe | ცალი pcs | 1 |
| 5 | ტრაპი დ-50მმ Floor trap 50 mm | ცალი pcs | 1 |
| 6 | პლასტმასის ცივი წყლის წვალხადენის მილი დ-25მმ Plastic water pipe for cold water D-25 mm | მეტრი m | 35 |
| 7 | პლასტმასის ცივი წყლის წვალხადენის მილი დ-20მმ Plastic water pipe for cold water D-20 mm | მეტრი m | 17 |
| 8 | პლასტმასის ცხელი წყლის წვალხადენის მილი დ-20მმ Plastic water pipe for hot water D-20 mm | მეტრი m | 17 |
| 9 | პლასტმასის ვენტილი დ-25 Plastic valve D-25 | მეტრი m | 1 |
| 10 | პლასტმასის ვენტილი დ-20 Plastic valve D-20 | მეტრი m | 4 |
| 11 | პლასტმასის კანალიზაციის მილი დ-100მმ Plastic sewage pipe D-100mm | მეტრი m | 37.8 |
| 12 | პლასტმასის კანალიზაციის მილი დ-50მმ Plastic sewage pipe D-50mm | მეტრი m | 12.0 |
| 13 | საკანალიზაციო ჭის ღუქი Hatch of the sewage manhole | ცალი | 1 |

Individual house
(10X13m)

Project address:

Georgia,
Marneuli

Stage:
Architectural project

Sewage system

Format A - 3

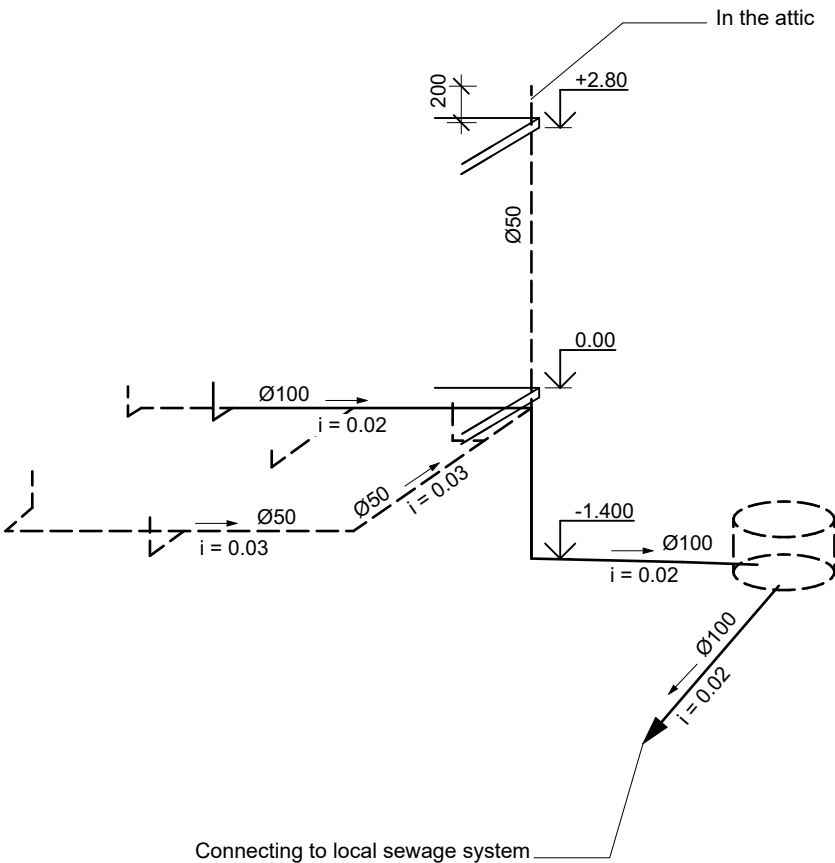
Page

22

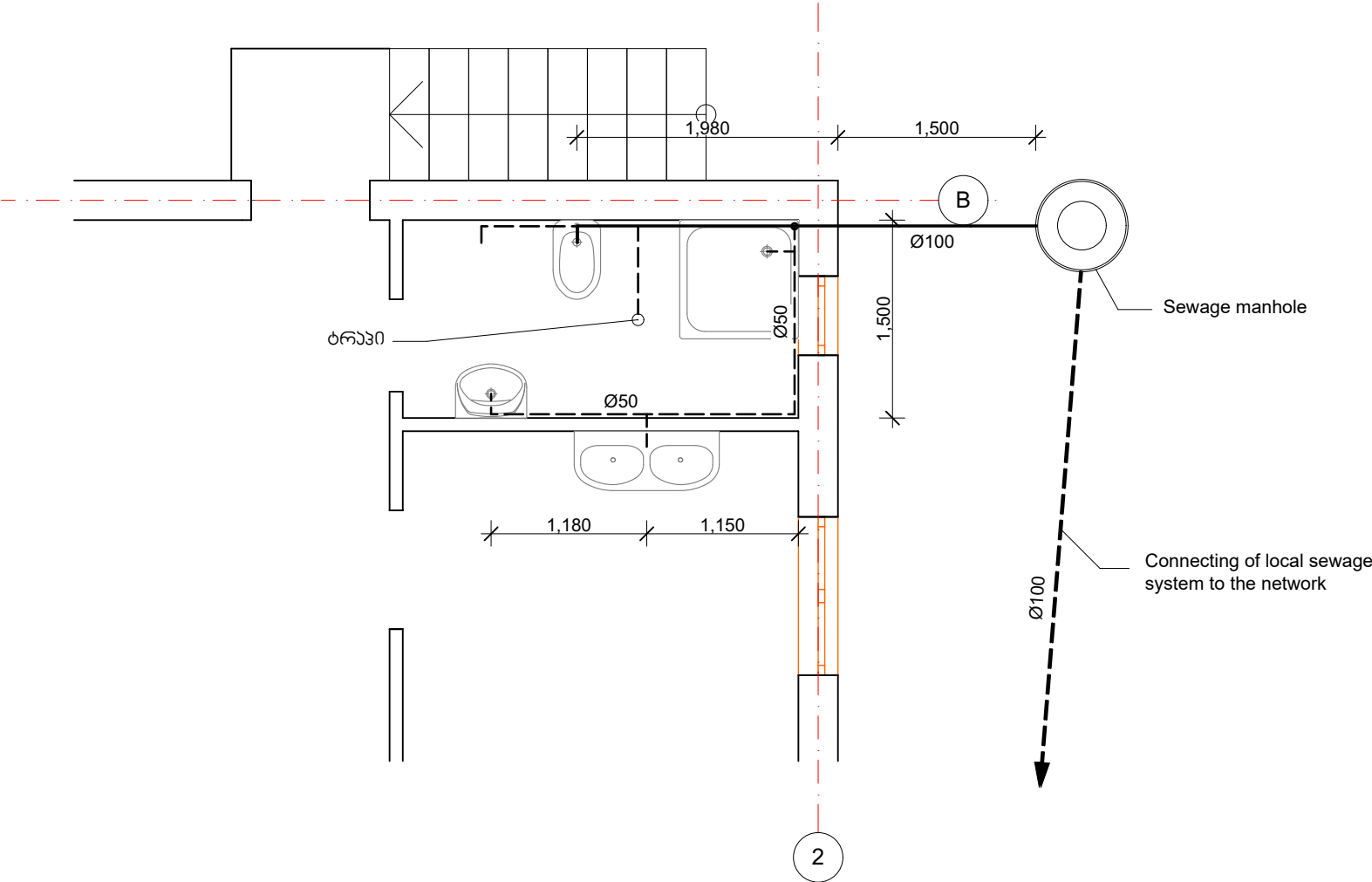
Pages

24

Sewage System Axonometry



Sewage System Plan

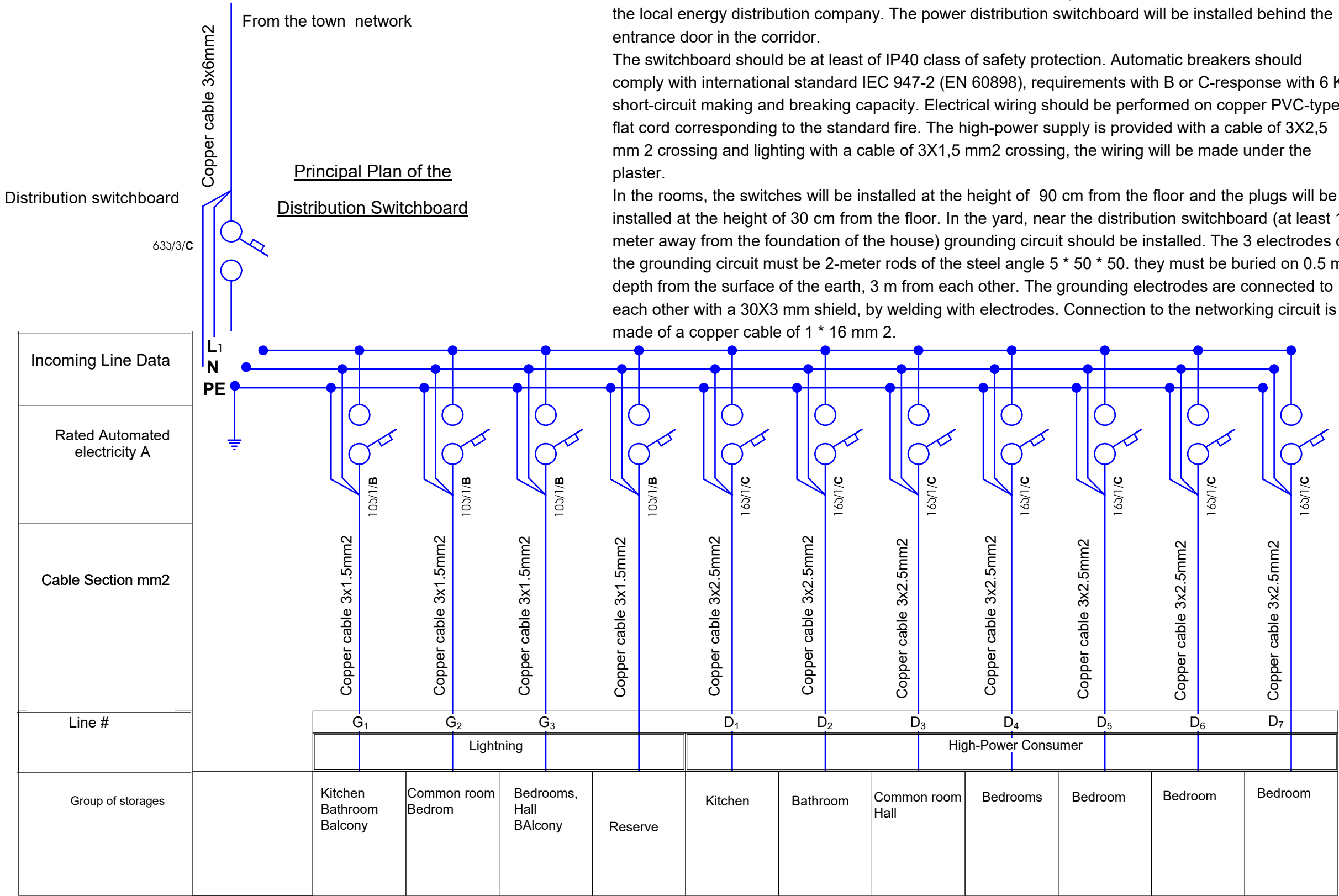


Power Supply

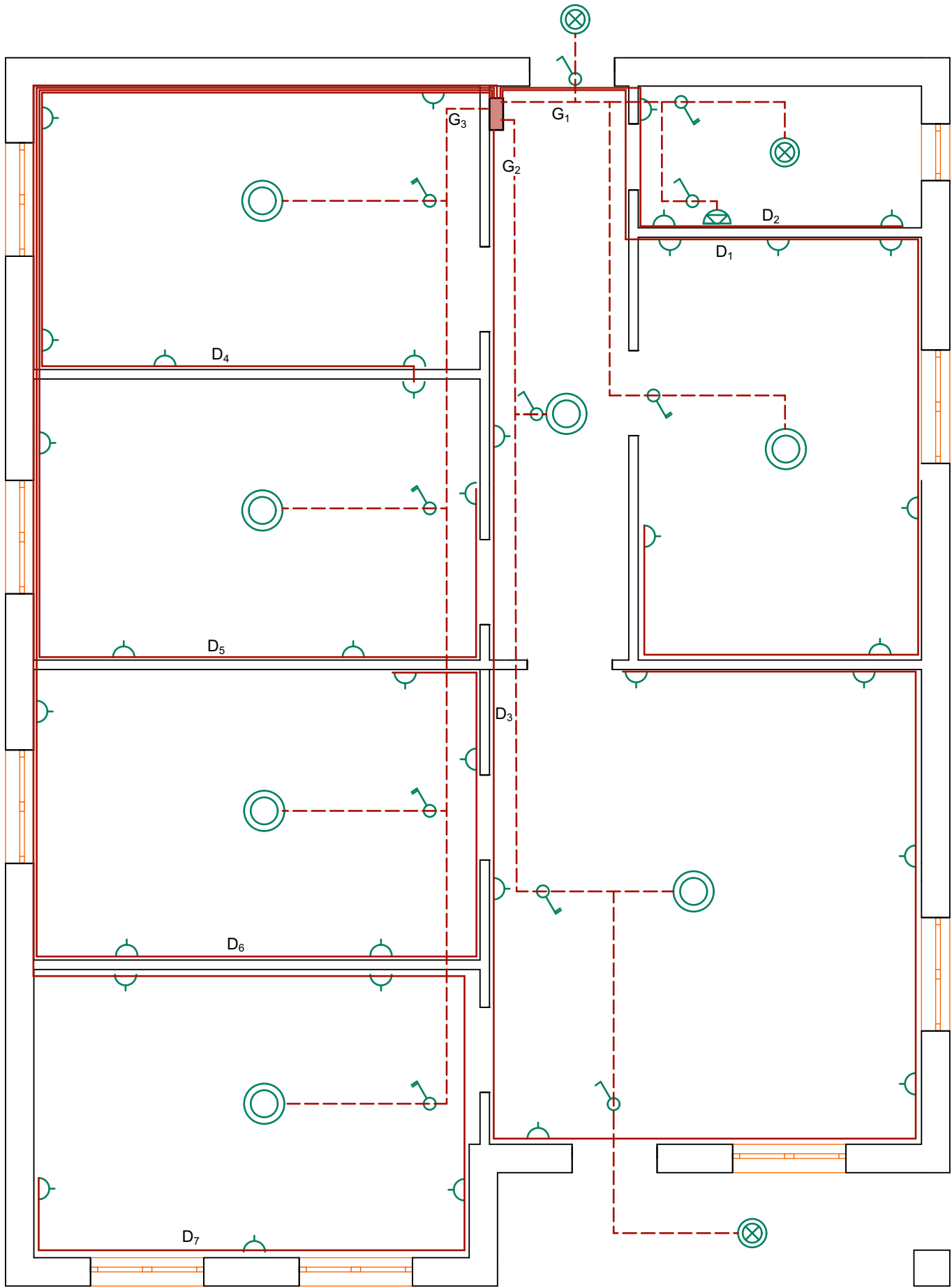
The electric part of the residential project is implemented on the basis of BCH-59-88 and RD34.20.185-94 of international and residential buildings and public construction electric designs, in compliance with the architectural-construction, technological, sanitary and other technical requirements. The voltage of the electric network is 220V, with the transformed matrix neutral. The residential house will be supplied with power from the power meter. The electricity to the power meter will be provided by the local energy distribution company. The power distribution switchboard will be installed behind the entrance door in the corridor.

The switchboard should be at least of IP40 class of safety protection. Automatic breakers should comply with international standard IEC 947-2 (EN 60898), requirements with B or C-response with 6 KA short-circuit making and breaking capacity. Electrical wiring should be performed on copper PVC-type flat cord corresponding to the standard fire. The high-power supply is provided with a cable of 3X2,5 mm 2 crossing and lighting with a cable of 3X1,5 mm2 crossing, the wiring will be made under the plaster.

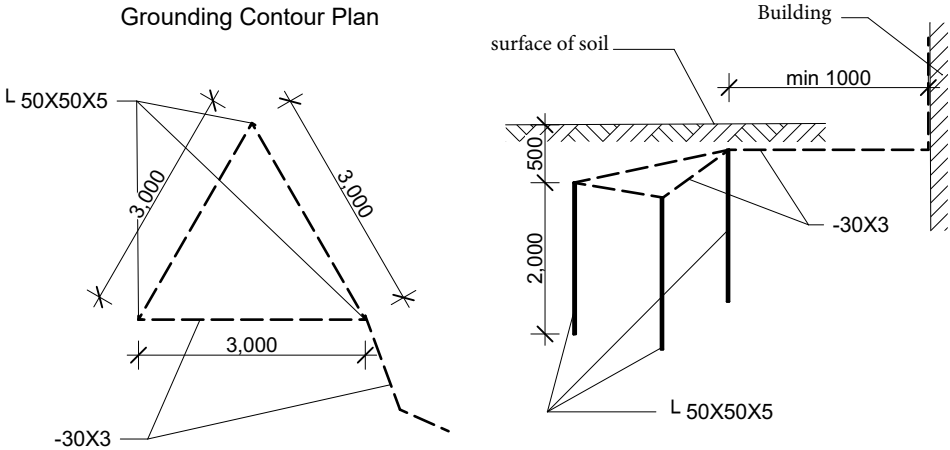
In the rooms, the switches will be installed at the height of 90 cm from the floor and the plugs will be installed at the height of 30 cm from the floor. In the yard, near the distribution switchboard (at least 1 meter away from the foundation of the house) grounding circuit should be installed. The 3 electrodes of the grounding circuit must be 2-meter rods of the steel angle 5 * 50 * 50. they must be buried on 0.5 m depth from the surface of the earth, 3 m from each other. The grounding electrodes are connected to each other with a 30X3 mm shield, by welding with electrodes. Connection to the networking circuit is made of a copper cable of 1 * 16 mm 2.



Electrical System Plan



| სპეციფიკაცია Specification | | | |
|-------------------------------|---|-------------------------------|-----------|
| № | დასახელება List | განზომილება ბის ერთეული | რაოდენობა |
| 1 | გამანაწილებელი ფარი, ჩაფლული, შეშვეანზე ორპოლუსა ავტომატური ამომრთველით 50ამპ. ხახაზო ავტომატური ამომრთველებით 220ვ10ა-12ც; Distribution switchboard,two-pole circuit-breaker 50A Line circuit breaker220V1-A-4pcs/220V16A-8pcs | ცალი | 1 |
| 2 | ხაშტეფხელი ორპოლუსა შეხამე დამამიწებელი კონტაქტით 10ამპ Two-pole outlet socket with grounding contact 10A | ცალი | 37 |
| 3 | ამომრთველი ერთკლავიშისანი One key switch | ცალი | 4 |
| 4 | ამომრთველი ორკლავიშისანი Two key Switch | ცალი | 7 |
| 5 | ოთახის ხანათი ხანათი მოწყობილობა Lighting fixture of the room | ცალი | 7 |
| 6 | ტენგამძლე კედლის ბრა Moisture resisant wall mount lightning fixture | ცალი | 1 |
| 7 | ტენგამძლე ხანათი მოწყობილობა Moisture resisant lightning fixture | ცალი | 3 |
| 8 | კაბელი ხბილენძის ორმაგი იზოლაციითკვეთი3X1,5კვ.მმ Copper cable 3x1.5 mm2 double-insulated | მეტრი | 96 |
| 9 | კაბელი ხბილენძის ორმაგი იზოლაციითკვეთი3X2,5კვ.მმ Copper cable 3x2.5mm2 double insulated | მეტრი | 245 |
| 10 | შემომეგანი კაბელიხბილენძის ორმაგი იზოლაციით კვეთი 3X6კვ.მმ Incoming copper cable 3x6mm2 double insulated | მეტრი | 30 |
| 11 | გამანაწილებელიკოლოფი Distribution box | ცალი | 32 |



- Distribution switchboard
- Lighting fixture of the room
- Moisture resisant lightning fixture
- Moisture resisant wall mount lightning fixture
- One key switch
- One key switch
- Outlet Socket
- Copper cable 3x1.5 mm2
- Copper cable 3x2.5 mm2



Danish Refugee Council

Individual house
(10X13m)

Project address:

Georgia,
Marneuli

Stage:
Architectural project

Power
Supply System

Format A - 3

Page Pages

24 24