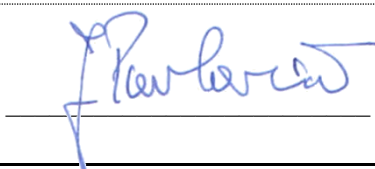


Project part:	Mechanical installations project				
Client:	JP Elektroprivreda Srbije, Carice Milice 2, Belgrade				
Facility:	FGD Construction Project for TPP Nikola Tesla, Location: Obrenovac, K.P. 1934, K.O. Urovci				
Doc. type:	IDR - Conceptual design				
Type of works:	New construction				
Designer:	delta inženjering, Zaplanska br. 86, 11010 Beograd – Voždovac				
Designer's representative:	JugoslavPavlović,dipl.ing.maš., director				
Sign and stamp:	 				
Main designer:	Nemanja Ranković, dipl.ing.maš				
License number:	330 0023 15				
Sign and personal stamp:	 				
Doc. number:	NTFGD-.-IDP-6/1.1				
Contract	Facility	Doc. type	Project part	Book part	Revision
NTFGD	.	IDP	6/1	1	0
Place and date:	Belgrade, 2018				

2018	0	IDR - Conceptual design			
Datum:	Rev.	Vrsta tehničke dokumentacije:		Uradio:	Odobrio:
✉ Zaplanska br. 86, 11010 Beograd – Voždovac ☎ Telefon: +381-11-78.56.903 📠 Faks: +381-11-31.21.788 🌐 www.deltainzenjering.rs			  		
Šifradelatnosti: 7112;		Matični/Registracioni broj: 17085123;		PIB: SR100062229,	PDV br.: 386473

	Client:	JP Elektroprivreda Srbije, Carice Milice 2, Belgrade						
	Facility:	FGD Construction Project for TPP Nikola Tesla, Lokacija: Obrenovac, K.P. 1934, K.O. Urovci						
	Doc. type:	IDR - Conceptual design						
Project part:	NTFGD-.IDP-6/1.1		Mechanical installations project		Page:	1.2.1	Rev.:	0
1.2 BOOK CONTENTS								
No	Document name		Document No	Format	Page	Rev.	Date	
1.1	BOOK COVER PAGE		NTFGD-.IDP-6/1.1 -00	A4	1	0		
1.2	BOOK CONTENTS		NTFGD-.IDP-6/1.1 -00	A4		0		
1.3	DECISION ON APPOINTING THE MAIN DESIGNER		NTFGD-.IDP-6/1.1 -00	A4		0		
1.4	STATEMENT OF THE RESPONSIBLE DESIGNER		NTFGD-.IDP-6/1.1 -00	A4		0		
1.5	TEXTUAL DOCUMENTATION		NTFGD-.IDP-6/1.1 -00	A4	1	0		
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1.6.	NUMERICAL DOCUMENTATION		NTFGD-.IDP-6/1.1 -00	A4	1	0		
1.6.1	BILL OF QUANTITY		NTFGD-.IDP-6/1.1 -00	A4	1	0		
1.7.	GRAPHICAL DOCUMENTATION		NTFGD-.IDP-6/1.1 -00	A4	1	0		
	General layout plot plan		NTFGD-S0.0-IDR-6.0.0- 000-000D-rev00	A1	1	0		
	FGD process flow diagram		NTFGD-S0.0-IDR-7.0.0- 000-001D-rev00	A1	1	0		
	Phase 1 - Gypsum and limestone area		NTFGD-S0.0-IDR-6.0.0-000-002D-rev00	A1	1	0		
	Phase 2 - Absorber area		NTFGD-S0.0-IDR-6.0.0-000-003D-rev00	A1	1	0		
	Arrangement of gypsum storage silo		NTFGD-S0.0-IDR-6.0.0-000-004D-rev00	A1	1	0		
	Floor arrangement of A3,A4 absorber area		NTFGD-S0.0-IDR-6.0.0-000-005D-rev00	A1	1	0		
	Floor arrangement of A5,A6 absorber area		NTFGD-S0.0-IDR-6.0.0-000-006D-rev00	A1	1	0		
	Duct arrangement plan		NTFGD-S0.0-IDR-6.0.0-000-007D-rev00	A1	1	0		
	Arrangement of gypsum slurry disposal system tank area		NTFGD-S0.0-IDR-6.0.0-000-008D-rev00	A1	1	0		
	Limestone Mill Building		NTFGD-S0.0-IDR-6.0.0-000-009D-rev00	A1	1	0		

	Investitor:	JP Elektroprivreda Srbije, Carice Milice 2, Belgrade			
	Objekat:	FGD Construction Project for TPP Nikola Tesla, Lokacija: Obrenovac, K.P. 1934, K.O. Urovci			
	Vrsta teh. dokum.:	IDR - Conceptual design			
Deo projekta:	NTFGD-.IDP-6/1.1	Mechanical installations project.	List:	1.3.1	Rev.: 0

1.3

DECISION ON APPOINTING THE MAIN DESIGNER

According to the Article 128a of Law on Planning and Construction (Official Gazette of RS, no. 72/09, 81/09-correction 64/10-decision US, 24/11 and 121/12, 42/13 decision US, 50/2013 – decision US, 98/2013 – decision US, 132/14 and 145/14) and regulations of the Rulebook on content, manner and process of making and conducting of technical documentation control according to class and purpose of the facility (Official Gazette of RS, no. 23/2015, 77/2015, 58/2016, 96/2016 and 67/2017) as:

MAIN DESIGNER

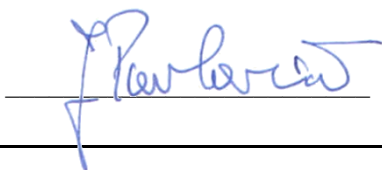
 Zaplanska br. 86, 11010 Beograd – Voždovac	No. <u>396 /18</u> 06.02.18.
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For preparation of technical documentation:

Project part:	Mechanical installations project
Facility:	FGD Construction Project for TPP Nikola Tesla, Location: Obrenovac, K.P. 1934, K.O. Urovci
Doc. type:	IDR - Conceptual design
Type of works:	New construction

is appointing:

Main designer:	Nemanja Ranković, dipl.ing.maš.
License number:	330 0023 15

Designer:	delta inženjering , Zaplanska br. 86, 11010 Beograd – Voždovac
Designer's representative:	Jugoslav Pavlović, dipl.ing.maš., direktor
Sign and personal stamp:	 
Doc. number:	NTFGD-.IDP-6/1.1
Place and date:	Belgrade, 2018

	Client:	JP Elektroprivreda Srbije, Carice Milice 2, Belgrade			
	Facility:	FGD Construction Project for TPP Nikola Tesla, Lokacija: Obrenovac, K.P. 1934, K.O. Urovci			
	Doc. type:	IDR - Conceptual design			
Project part:	NTFGD--IDP-6/1.1 -00	Mechanical installations project	Page	1.4.1	Rev.: 0
1.4 DECLARATION OF RESPONSIBLE DESIGNER					

Responsible designer for the preparation of technical documentation:

Project part	Mechanical installations project,
Facility:	FGD Construction Project for TPP Nikola Tesla, Location: Obrenovac, K.P. 1934, K.O. Urovci
Doc. type:	IDR - Conceptual design
Type of works:	New construction

Responsible designer:	Nemanja Ranković, dipl.ing.
License number:	330 0023 15

I DECLARE

- that the project is entirely in compliance with: other technical documentation for the facility
- that the project was made in accordance with the Law on planning and construction, regulations, standards and norms in the field of construction and rules of the profession;
- that during the project preparation are complied all the prescribed and defined measures and recommendations for meeting the essential requirements for the facility and that the project is prepared in accordance with the measures and recommendations by which is proven the fulfillment of basic requirements.

Responsible designer:	Nemanja Ranković, dipl.ing.
License number:	330 0023 15
Sign and personal stamp:	 
Doc. number:	NTFGD--IDP-6/1.1
Place and date:	Belgrade, 2018

	Client:	JP Elektroprivreda Srbije, Carice Milice 2, Belgrade			
	Facility:	FGD Construction Project for TPP Nikola Tesla, Lokacija: Obrenovac, K.P. 1934, K.O. Urovci			
	Doc. type:	IDR - Conceptual design			
Project part:	NTFGD-.-IDP-6/1.1	Mechanical installations project	Page:	1.5.1	Rev.: 0

1.5	TEXTUAL DOCUMENTATION
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1.5.2	Technical description					

1.5.2.1 Preface

Following the adoption of the environmental protection laws, which were imposed at the end of 2004, as well as the Law on Ratification of the Treaty establishing the Energy Community of South East Europe, Elektroprivreda Srbije (EPS) has initiated a series of activities aimed at fulfilling the obligation to harmonize the operation of thermal power plants with the requirements of EU regulations regarding air protection. Bearing in mind the contribution of thermal power plants to the total emissions of certain pollutants (sulfur dioxide, nitrogen oxides and dust particles), the necessary funds and the necessary time for the realization of the projected technical protection measures, priority was given to the projects of reducing the dust emissions on the existing boilers. It should be emphasized that these reconstructions were also a condition for the introduction of measures for reduction of sulfur dioxide emissions on boilers, since the wet limestone-gypsum process was chosen as the optimal flue gas desulphurization technology for lignite fired boilers with a power exceeding 300 MW.

In order to examine the possibilities and dynamics of the construction of desulphurization plants at EPS, in 2006, the study "Directions for Optimal Reduction of Emissions of Sulfur Oxides from Thermal Power Plants of Elektroprivreda Srbije" was conducted. According to the results of this study, the TPP "Nikola Tesla A" (TENT A) was designated as one of the facilities where the construction of the flue gas desulphurization plant (FGD) would yield good results in terms of reducing SO₂ emissions compared to the estimated costs.

1.5.2.2 Existing state

The Nikola Tesla A thermal power plant is the largest in the Republic of Serbia and the Balkans, with six units with total capacity of 1,650 MW. It is located on the right bank of the Sava River, 40 km upstream from Belgrade and 3 km west of Obrenovac. It is connected to all major centers in the country via roadways and railways, as well as waterways.

The first unit of the Nikola Tesla A thermal power plant has been in operation since March 7, 1970, and the thermal power plant was completed in December 1979, when its sixth unit was put into operation.

Table 1.1 shows the power of TENT A units, with the projected coal quality consumption.

Table 1.1 TENT A boiler capacity and coal consumption

		A1	A2	A3	A4	A5	A6
Unit capacity	MW	210	210	329	308,5	340	347,5
Coal LHV	kJ/kg	6700	6700	6700	6700	6700	6700
Coal consumption	t/h	350	350	440	440	440	490
Specific coal consumption	t/MWh	1,66	1,66	1,34	1,43	1,29	1,41

In the process of electricity generation, TENT A units burn lignite from Kolubara basin, characterized by low LHV and relatively high ash and moisture content.

Concentration of SO₂ in the flue gases significantly exceeds the maximum allowed emissions. Flue gases are discharged into the atmosphere through two chimneys, one 150 m high for blocks A1, A2 and A3 and the second 220 m high for blocks A4, A5 and A6.

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1.5.2.3 Technical description of FGD plant

After many years of activities to tackle the problem of TENT A flue gas desulphurization, a contract was signed with a consortium led by Mitsubishi Hitachi Power Systems (MHPS). MHPS will build the FGD plant in TENT A in Serbia. The project envisions the construction of flue gas desulphurization facilities for blocks A3, A4, A5 and A6. Blocks A1 and A2 are omitted because they will be put out of use due to end-of-life.

FGD on blocks A3, A4, A5 and A6 will be applied with a wet limestone method, using limestone as a sorbent. By-product is gypsum, of construction grade quality. As can be seen from the basic scheme in Figure 1.1, the flue gas desulphurization technology with a wet limestone process generally includes the following technological operations:

- After removal of solid particles in electrostatic filters (two per unit), flue gases are fed into two absorbers, one for the units A3 and A4, and the other for the units A5 and A6;
- For the desulphurization process, water is pumped into the absorbers, fine limestone slurry prepared in a wet ball mill is added, and the necessary amount of air that provides oxygen for the reaction to unfold;
- In the reaction of limestone, water, oxygen and SO_2 from flue gases, gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) and CO_2 are produced, and gypsum from the absorber is sent to thickening and filtration, or to thickening and deposition on TENT A ash landfill;
- The cleaned flue gas is discharged from the absorber, through a wet stack, into the environment.

For the realization of this project, it was agreed that all units A3 to A6 are to have a project capacity of 350 MW power, because this will be the capacity after revamping all units. The task of the project is to achieve significant reductions in emissions of harmful gases such as sulfur dioxide, hydrogen fluoride and hydrogen chloride.

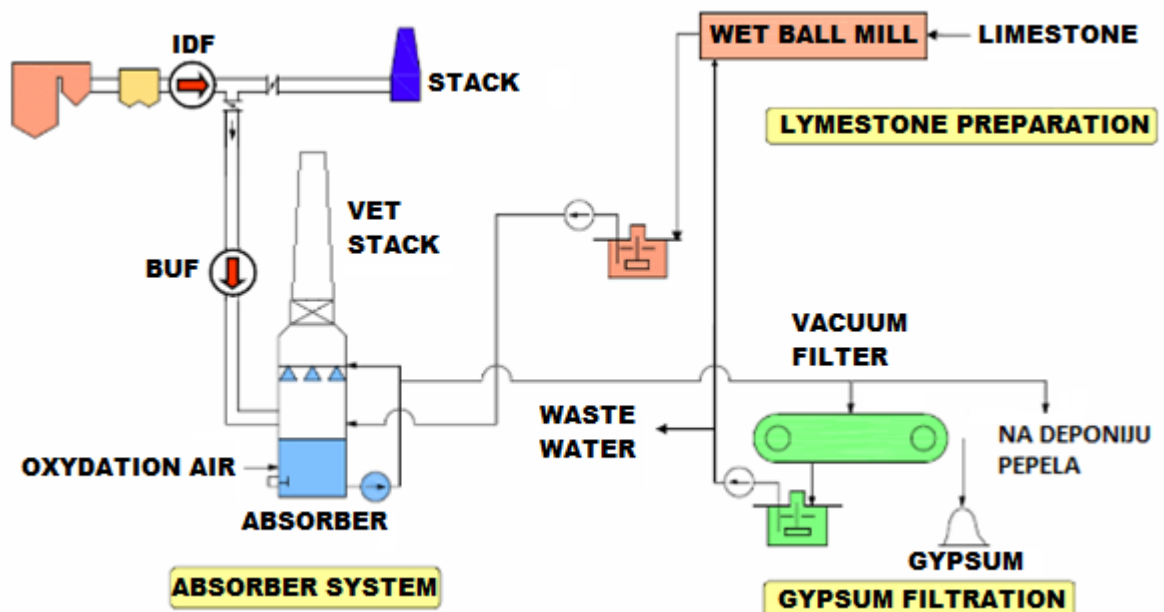


Figure 1.1 Basic scheme of wet limestone FGD

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1.5.2.4 Technical description of connecting existing TENT A facilities with the FGD plant

The general layout of the existing TENT A facilities, with new flue gas desulphurization plant buildings, that are labeled C1 to C42, are shown on the drawing numbered NTFGD-S0.0-IDR-6.0.0-000D-rev00.

As seen on the afore mentioned general layout, the absorber of the A3 and A4 units is located in the immediate vicinity of the stack for the units A1, A2 and A3, and the absorber for the units A5 and A6 is located in the immediate vicinity of unit A6, to the southeast.

The absorbers will be equipped with wet stack, so the clean flue gases are not directed to the existing TENT A stacks, but from the absorber, via wet stacks, emitted to the environment.

Wet stacks are chosen because the existing stacks in TENT A are designed for operation with hot flue gas, whose temperature is significantly above dew point. The flue gas exiting the absorbers with a lower temperature and a high amount of moisture would cause an intense accumulation of moisture on the inner stack walls, additional condensation and formation of droplets that would go into the atmosphere with the gas flow, which, due to the content of dissolved acid oxides, would cause significant damage to the stack walls and put in question the integrity of the stack itself.

Because of all this, it would be necessary to line the stack interior with a special coating, resistant to corrosion. Reconstruction of the existing stack would require activities several months long, needing the units to be stopped during that period.

The above reasons clearly indicate why the wet stack is necessary.

In other words, wet stacks are to be designed, which are intended for working with flue gas at the saturation point at the exit from the absorbers and which ensures optimum conditions of smoke gas dispersion after its exit from the stack.

In the case of the FGD plant in TENT A, the solution of the wet stack on absorbers was adopted as optimal. In this way, the following positive effects are achieved:

- construction of new long, large cross section clean gas ducts to the separate stack is avoided;
- minimal unit downtime;
- less space is needed;
- minimal investment;
- condensate is drained directly into the absorber.

The selected position for the absorbers allows the flue gas from the A3 and A4 blocks to be directed to the absorber 01 (C1), or if the FGD system is not in operation, it goes into the existing stack. For Absorber 02 (C2), there is also the possibility of redirecting the flue gases into the stack if the FGD system is not operational. The flue gas delivery to the absorbers is done with new flue gas ducts using a buster fan (two per absorber, C13 ÷ C16).

The most important component for the FGD process is the limestone, which is delivered by railway, through the railway unloading station (C39); or by trucks, through truck unload building (C18). All facilities for limestone reception, limestone storage and ultimately wet milling of limestone, are located west of block A6, over the railway tracks, so a piping and electrical rack will be built to support necessary pipelines and cables (C38.1).

In the immediate vicinity of the absorbers themselves the compressor stations for oxidation (C4-2HTD and C6-1HTD) are situated. These house the blowers which provide the needed air, precisely oxygen from the air, to carry out the reaction to produce gypsum.

In the immediate vicinity of the limestone milling plant is the gypsum filtering system. The system vacuum filters the gypsum to 10% moisture and sends it to the gypsum silo (C30).

The second possibility for the gypsum obtained in the absorber in reaction with the limestone suspension, is to be transported to the landfill. The gypsum slurry from the absorber goes to hydrocyclone battery. The overflow of the hydrocyclone battery is accepted into the disposal filtrate tank (C37), located north of the absorber 01, near the coal depot. The hydrocyclone battery underflow is transported to the disposal filtrate tank (out of scope). This tank, as well as further treatment of gypsum slurry and transportation to landfill, is the subject of

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another project: "System for external transport and deposit of gypsum suspension and backflow water system".

Waste water that is a byproduct in the process of gypsum filtration goes to further processing into the existing FGD system wastewater treatment plant. This plant is located in the immediate vicinity of the coal depot, that is, near the future limestone storage building to the north.

Fresh water, supplied by pumps to the FGD process water tank (C9), is provided from the units A3, A4, A5 and A6 cooling water supply system. Process water connection is located on each unit; connection 1 on unit A6, connection 2 on unit A5, connection 3 on unit A4 and connection 4 on unit A3. Maximum water consumption for the FGD system, in the event that the system operates at full capacity, is up to 800 m³/h. Water in the system is obtained by filtration of water from the Sava river.

The main FGD control/electrical building (C5), with the necessary installations for managing the new FGD plant, will be located near the absorber 02 (absorber for units A5 and A6).

Extensive measurements and automatic regulation of all influential parameters in the process are planned. The most important thing in regulating the process is that the consumption of limestone is harmonized with the amount of SO₂ to be removed from flue gases.

1.5.2.5 Implementation of the FGD plant

Due to the complexity of the FGD plant, and according to the technological units, the project is to be implemented in the following phases:

- Phase 1 – Limestone and gypsum area
- Phase 2 – Absorbers area

The phases, as well as their systems, are shown on the process flow diagram NTFGD-S0.0-IDR-7.0.0-001D-rev00 attached.

1.5.2.5.1 Phase 1 – Limestone and gypsum area

The limestone and gypsum area consists of the following systems:

1. Limestone handling system
2. Limestone slurry preparation system
3. Gypsum dewatering system

1.5.2.5.1.1 Limestone handling system

The daily consumption of limestone at the maximum projected concentration of SO₂ in flue gases exceeds 1450 t/day for both absorbers. For this reason, the following limestone handling system for the FGD process in TENT A. is intended. The limestone 100% -20mm is delivered to the TENT A, by trucks or trains. In the case of trucks, they are first directed to one of the truck scales (C29.1 and C29.2), and then unloaded at the truck unloading station (C18). If transported by rail, the limestone is unloaded at the railway unloading station (C39). The limestone is transported from the receiving bunkers of unloading stations to the limestone storage building (C22), with the aid of conveyors and elevators. Reclaiming of limestone from the depot is provided by scrapers, and then limestone is lifted, by conveyor belts and elevators, to the day silos housed in the limestone mill building (C24). Three day limestone silos are planned. Each provides enough limestone for full days work of each of the three wet mill sections.

1.5.2.5.1.2 Limestone slurry preparation system

Preparation of limestone slurry is carried out in the limestone mill building (C24), in which wet milling of limestone takes place in closed cycle wet ball mills.

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There will be three identical grinding sections with wet ball mills, each section covering the needs of one absorber in operation. The first two sections cover the needs of both absorbers and the third mill section is a spare, in case any of the first two sections brake.

The limestone slurry exiting the mill is temporarily stored and diluted in the limestone mill slurry tank. Then the slurry is classified in the hydrocyclone battery. The hydrocyclone battery overflow is taken to the limestone slurry feed tank (C28). From this tank, the fresh limestone slurry is fed to the absorbers, through a loop continuously recirculating the suspension from the absorber. Required amount of fresh limestone slurry is determined by the process parameters (pH of the suspension in the absorber or the ratio of the input and output concentration of SO₂ to the absorber).

The hydrocyclone battery underflow is the coarse fraction and is returned to the mill for additional grinding, together with the fresh limestone.

1.5.2.5.1.3 3. Gypsum dewatering system

The gypsum formed in the reactions in the absorber is continuously pumped from the absorber and can be, depending on the possible placement on the market, sent to gypsum dewatering system or, if there is no placement, to gypsum disposal system.

In case the gypsum is designated to gypsum dewatering system, the suspension from the absorber is pumped into the hydrocyclone battery, where the gypsum is thickened (underflow). Thickened gypsum falls on the vacuum belt filter (building C30), where water is gradually vacuumed from the gypsum until 10% gypsum moisture content is achieved.

The required vacuum is achieved with a vacuum pump. To wash the filter fabric, fresh rinse water is supplied, to prevent the clogging of the filter fabric. The used water from the fabric washing is then collected and partially used to wash the filtered gypsum on the belt.

The first hydrocyclone battery overflow is led to the second hydrocyclone battery. Second hydrocyclone battery overflow is extracted as waste water which, in addition to sludge, contains calcium chloride. It is then transported to the existing FGD system wastewater treatment plant. Chlorine originates from coal. After coal combustion, hydrogen chloride appears in the flue gas. In reaction with limestone, calcium chloride is formed and is diluted in the suspension.

The underflow of the second hydrocyclone battery and the filtrate from the vacuum filter, are returned to the absorber and are continuously recirculated.

Filtered gypsum, with 10% moisture, is deposited in the gypsum silo (C30), from which the trucks are filled for dispatch to consumers.

For each absorber, one gypsum dewatering line will be built, so that it can meet the needs of the process and possible customers.

Piping and electrical racks

Piping and electrical racks will be used for elevated transportation of fluids and support for pipelines crossing obstacles (roads, railways,...). These will be steel structures of different dimensions (length, height, width). Also, in the rack profile, there will be shelves for electrical cables.

The first stage includes racks C38.1, C38.2, C38.3, C38.7, C38.9 and C38.10.

The cross-section dimensions of the racks are defined by a technological solution, depending on the piping and cables to be supported. The spans and lengths depend on obstacles to be circumvented (roads, railways).

Compressor station

Compressor station for instrumental and service compressed air (C36) is planed within Phase 1. The facility is located near the limestone truck unloading station (C18)

The task of the part of the compressor station for instrumental air is to cover the consumption of instrument air, which is about 8 m³/min, pressure of up to 10 bar. It is based on three screw compressors, two working and

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one spare, with all necessary measuring and control equipment, dryers and filters. Instrument compressed air is stored in two vertical tanks with capacity up to 2 m³, with a maximum working pressure of up to 12 bar.

The service air part of compressor station is to cover the planned service air consumption, which is about 9 m³/min, pressure of up to 10 bar. It is based on one screw compressor, with all the necessary measuring and control equipment. Instrument compressed air is stored in one vertical reservoir with capacity up to 3 m³, maximum working pressure of up to 12 bar.

To ensure both systems, pressure gauges on all compressor aggregates are used, as well as safety valves on all compressed air tanks.

1.5.2.5.2 Phase 2 – Absorber area

The absorber zone consists of the following systems:

1. Absorber 01 system
2. Absorber 02 system
3. Flue gas system
4. System for process water, waste water and gypsum slurry suspension
5. Infrastructure facilities of FGD complex

1.5.2.5.2.1 1. Absorber 01 and 02 systems

For units A3 and A4, absorber 01 (C1) is provided, and the second absorber 02 (C2) for units A5 and A6. Each absorber is an independent system. The absorbers are of the same dimensions and consist of the following sections:

- recirculation tank, in which oxidation of calcium sulfite into calcium sulfate (CaSO_3 in $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) is carried out with the help of added oxygen;
- absorption part, in which contact of CaCO_3 suspension and SO_2 is achieved;
- the highest part of the absorber is the mist eliminator, which catches droplets of liquid taken up by the gas stream.

The dedusted flue gas from the A3 and A4 units is directed to the induced draft fans and buster fans (C16 and C15) and discharged into the absorber 01. The same applies to the flue gases of the units A5 and A6 which are directed with the buster fans (C14 and C13) into the absorber 02. The flue gas temperature at the inlet of the absorber is 178 °C, and after cleaning, at the outlet, the gas temperature is 67 °C. Clean flue gases are then discharged into the atmosphere through the wet stack.

Flue gas cleaning is carried out in contact with limestone suspension. This process takes place during the flow of flue gas through the absorbers 01 and 02 of the desulphurization system. Flue gas and suspension in the absorber are in counter current flow. Flue gas is introduced into the lower part of the absorber and flows upwards, coming into contact with the spray of limestone suspension, which drops downwards. The absorbers have several spray levels, thus increasing the efficiency of SO_2 removal.

The number of spray levels depends on the required desulphurization efficiency, as well as the given range of input concentrations of sulfur dioxide. The gas retention time in the absorber is about 3.3 seconds and the gas velocity is 4 m/s. The moisture content of the purified flue gas is 12.7 l/m³.

Suspension circulating the absorbers, using recirculation pumps (C3-1HTD and C4-1HTD for Absorber 01 and C3-2HTD and C4-2HTD for Absorber 02), is lifted and pushed through the spray nozzles spread evenly over the cross-section of the absorber, where it disperses to fine droplets and thus leads to greater contact area with flue gas flow. Droplets of suspension absorb SO_2 from the flue gas in reaction that occurs between SO_2 and the sorbent from the suspension (CaCO_3). Hydrogen chloride (HCl), located in the flue gas, is also absorbed and neutralized in reaction with limestone, forming soluble salt (CaCl_2), which leads to the accumulation of chloride ions in the absorber suspension.

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1.5.2.5.2.2 Flue gas system

The flue gas system transports flue gases to the FGD plant. Flue gas can also be diverted through the roundabout, to the existing stack.

The flue gas system consists of:

- subtraction/diversion from existing flue gas channels
- ducts before the FGD plant
- buster fans
- dampers
- compensators
- sealing system
- wet zone at the top of absorber 01 and 02
- emission monitoring system
- wet stack

The flue gas system transports flue gases from four units of TENT A; A3, A4, A5 and A6. The flue gases of each unit independently pass through the ESP and induced draft fan. After passing through the existing induced draft fan, flue gas system ducts are directing the flue gas through the buster fan, and then the ducts of the adjacent blocks are collected to a single duct. The ducts from unit A3 are connected to the ducts from unit A4, and the ducts from unit A5 with ducts from unit A6. Flue gases then pass through the wet zone of the absorber. There, cleaning of flue gases takes place. Cleaned flue gases, exiting from the absorber, pass through the drop eliminator and a new stack. Following parameters are measured at the exit from the absorber and in the wet zone of the absorber:

- concentration of SO_2 / O_2 / CO / CO_2 / NO_x / solid particles / H_2O is measured in the wet zone
- concentration of SO_2 / O_2 / CO / NO_x / solid particles / H_2O is measured at the exit from the absorber

Routing of flue gases into absorbers or through the roundabouts is done using dampers with built-in fans for sealing and steam heating at low temperatures. The steam for heating the dampers is supplied from the units steam collector. Total steam consumption is up to 4 t/h

1.5.2.5.2.3 System for process water, waste water and gypsum slurry suspension

Process water

FGD process water tanks (C9) are used for storing water needed for the processes. The supply of several different consumers is carried out from the tank. Tanks can be filled with pumps for delivery, and empty by means of pumps for process water dispensing.

Pure water pumped to the FGD process water tank, is provided from the cooling water system of units A3, A4, A5 and A6. The process water connection is located on each unit; connector 1 on block A6, connector 2 on block A5, terminal 3 on block A4 and terminal 4 on block A3. The maximum water consumption of the FGD system, in case the system works at full capacity, is up to 800 m³/h. Water in the system is obtained by filtering water from the Sava River.

Tanks are supplied with continuous level measurement. In front of each tank there is a filtering system.

Waste water and gypsum slurry suspension

In the event that there is no placement for dewatered gypsum, the gypsum suspension does not go to dewatering, but to the hydrocyclone battery in which it is thickened to about 52% solid. Underflow of the hydrocyclone battery is collected in the disposal gypsum tank (out of scope), and the overflow into the disposal filtrate tank (C37) and then returns to the absorber. A part of overflow is still extracted, in order to avoid a

Deo projekta: Project part	NTFGD--IDP-6/1.1	Mechanical installations project.	List: Page	1.5.9	Rev.: Rev.:	0
1.5.2	Technical description					

surplus in the recirculation and dilute the thick underflow to the density of about 50% solid. Diluted underflow slurry can then be directed to the TENT A ash landfill with ash and slag(out of scope).

Pipe and electrical racks

Piping and electrical racks will be used for elevated transportation of fluids and support for pipelines crossing obstacles (roads, railways,...). These will be steel structures of different dimensions (length, height, width). Also, in the rack profile, there will be shelves for electrical cables.

The second stage includes bridges C38.4, C38.5, C38.6, C38.6a, C38.8, C38.11, C38.12 i C38.13, as shown at the disposition.

The cross-section dimensions of the racks are defined by a technological solution, depending on the piping and cables to be supported. The spans and lengths depend on obstacles to be circumvented (roads, railways).

1.5.2.5.2.4 Infrastructure facilities of FGD complex

The infrastructure facilities of FGD system include the FGD control/electrical building (C5) and emergency diesel generator (C7).

FGD control/electrical building is in the immediate vicinity, to the south of unit A6. This building houses the command room for management of the entire FGD plant. The FGD plant capacity is adapted to the real load measured through the input parameters. In the immediate vicinity of the FGD control/electrical building is the emergency diesel generator, which is the power source in case of a power failure.

Main designer:	Nemanja Ranković, dipl.ing.maš.
License number:	330 0023 15




	Client:	JP Elektroprivreda Srbije, Carice Milice 2, Belgrade			
	Facility:	FGD Construction Project for TPP Nikola Tesla, Lokacija: Obrenovac, K.P. 1934, K.O. Urovci			
	Doc. type:	IDR - Conceptual design			
Project part:	NTFGD-.IDP-6/1.1	Mechanical installations project	Page:	1.6.1	Rev.: 0

1.6	NUMERICAL DOCUMENTATION
-----	-------------------------

Deo projekta: Project part	NTFGD-.-IDP-6/1.1	Mechanical installations project.	List: Page	1.6.2	Rev.: Rev.:	0
1.6.1 Bill of quantity						

Table 7: Bill of quantity

No.	Name and description	Qty.	Inst. pow. cap. kW
PHASE 1 – Gypsum and limestone area			
1.0 Limestone handling system			
1.1	Limestone conveyor from limestone railway to limestone truck unloading building (TT1, TT2)	2 sets	44
1.2	Limestone conveyor from limestone truck unloading building to bucket elevator (TT3, TT4)	2 sets	11
1.3	Bucket elevator (KE1, KE2)	2 sets	40
1.4	Limestone conveyor from bucket elevator to limestone storage building (TT5, TT6)	2 sets	11
1.5	Limestone storage building reclaimer (SK1,SK2)	2 sets	80
1.6	Limestone conveyor from reclaimer to Limestone storage building exit (TT7, TT8)	2 sets	11
1.7	Limestone conveyor from limestone storage building exit to bucket elevator (TT9, TT10)	2 sets	11
1.8	Bucket elevator (KE3, KE4)	2 sets	40
1.9	Limestone conveyor from bucket elevator to mill building (TT11, TT12)	2 sets	11
1.10	Limestone conveyor to day silo (TT13, TT14)	2 sets	11
1.11	Day silo (DS1, DS2, DS3)	3 sets	20
1.12	Limestone dedusting system	1 sets	220
2.0 Limestone slurry preparation system			
2.1	Belt feeder (TD1, TD2, TD3)	3 sets	9
2.2	Ball mill (MK1, MK2, MK3)	3 sets	4200
2.3	Limestone mill slurry tank with agitator and pumps (1+1) (RHM1, RHM2, RHM3)	3 sets	390
2.4	Hydrocyclone battery (HC1, HC2, HC3)	3 sets	
2.5	Limestone slurry feed tank with agitator and pumps (1+1) (RHK1, RHK2)	2 sets	220
2.6	Limestone drain pit with agitator and pump (DJ1)	1 set	20
3.0 Gypsum dewatering system			
3.1	Gypsum feed pump (1+1 common spare) (P1, P2)	2 sets	270
3.2	Primary hydrocyclone battery (HC4, HC5)	2 sets	
3.3	Vacuum belt filter (VF1, VF2)	2 sets	44
3.4	Vacuum pump (VP1, VP2)	2 sets	630
3.5	Cloth wash tank with pumps (1+1) (RPT1, RPT2)	2 sets	30
3.6	Cake wash pump (1+1) (P3, P4)	2 sets	30
3.7	Filtrate receiver tank with pump (PPF1, PPF2)	2 sets	
3.8	Gypsum filtrate tank with agitator and pumps (1+1) (RFG1, RFG2)	2 sets	200
3.9	Filtrate pump (P5, P6)	2 sets	90
3.10	Secondary hydrocyclone battery (HC6, HC7)	2 sets	
3.11	Waste water feed tank with agitator and pumps (1+1) (RTV1, RTV2)	2 sets	30
3.12	Gypsum area drain pit with agitator and pumps(DJ2)	1 set	20

Deo projekta: Project part	NTFGD--IDP-6/1.1	Projekat mašinskih instalacija	List: Page	1.6.3	Rev.: Rev.:	0
1.6.1 Bill of quantity						

3.13	Gypsum conveyor (TT15)	1 set	11
3.14	Gypsum conveyor to gypsum silo (TT16)	1 set	11
3.15	Gypsum silo (SG)	1 set	
3.16	Compressor station	1 set	70
PHASE 2 – Absorber zone			
4.0 Absorber 01 and 02 systems			
4.1	Absorber with suspension distributors, mist eliminator, oxidation agitators (6+1) and emergency water tank (01, 02)	2 sets	1260
4.2	Recirculation pumps (8 pcs.) (RP1, RP2)	2 sets	16940
4.3	Oxidation blowers (1+1) (D1, D2)	2 sets	4000
4.4	Gypsum bleed pump (1+1) (P11, P12)	2 sets	300
4.5	Absorber area drain pit with agitator and pumps (1+1) (DJ4, DJ5)	2 sets	300
5.0 Flue gas system			
5.1	Damper (K1÷K12)	12 sets	
5.2	Buster fan (V1÷V4)	4 sets	12400
5.3	Buster fan sealing fan	8 sets	9
5.4	Buster fan sealing fan	16 sets	18
6.0 System for process water, waste water and gypsum slurry suspension			
6.1	Process water tank (RPV1, RVP2)	2 sets	
6.2	Process water feed pump(1+1) (P7, P8)	2 sets	180
6.3	Process water pump (1+1) (P9, P10)	2 sets	360
6.4	Hydrocyclone battery (HC8, HC9)	2 sets	
6.5	Disposal filtrate tank with agitator and pumps (1+1) (RHG1, RHG2)	2 sets	200
6.6	Absorber blow down tank with agitator and pumps (1+1) (RPS)	1 set	285
6.7	Disposal area drain pit with agitator and pump (DJ3)	1 set	20

Main designer:	Nemanja Ranković, dipl.ing.
License number:	330 0023 15

Nemanja Ranković



	Client:	JP Elektroprivreda Srbije, Carice Milice 2, Belgrade			
	Facility:	FGD Construction Project for TPP Nikola Tesla, Lokacija: Obrenovac, K.P. 1934, K.O. Urovci			
	Doc. type:	IDR - Conceptual design			
Project part:	NTFGD-.IDP-6/1.1	Mechanical installations project	Page:	1.7.1	Rev.: 0

1.7

GRAPHICAL DOCUMENTATION

LEGENDA NOVOPROJEKTOVANIH OBJEKATA / LEGEND OF NEWLY DESIGNED BUILDINGS:

FAZA 1/STAGE 1 - SISTEM ZA PRERADU KREČNJAKA I GIPSA/ LIMESTONE AND GYPSUM AREA

FAZA 2/ STAGE 2 - ZONA ABSORBERA / ABSORBERS AREA

SISTEM 1 / SYSTEM 1 - SISTEM APSORBERA 01 / ABSORBER 01

SISTEM 2 / SYSTEM 2 - SISTEM APSORBERA 02 / ABSORBER 02

SISTEM 3 / SYSTEM 3 - SISTEM DIMNIH GASOVA / FLUE GAS SYSTEM

SISTEM 4 / SYSTEM 4 - SISTEM FOR PROCESS WATER, WASTE WATER AND GYPSUM

SLURRY SUSPENSION / SISTEM PROCESNE VODE.

SISTEM 5 / SYSTEM 5 - INFRASTRUKTURNI OBJEKTI SISTEMA ODG / INFRASTRUCTURE

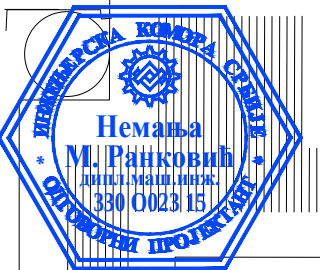
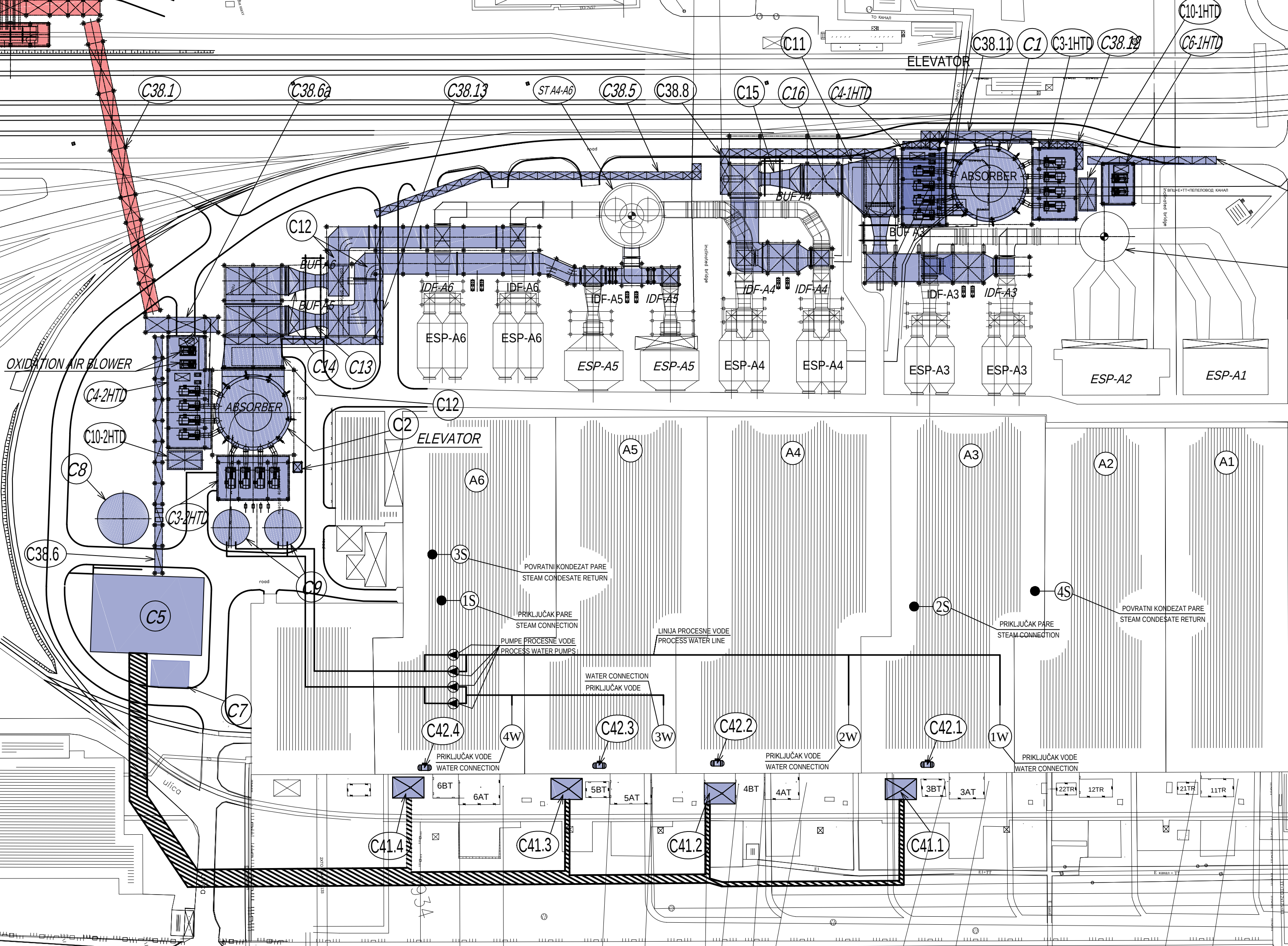
FACILITIES OF FGD COMPLEX

BR. / NO.	NAZIV OBJEKTA / NAME
C1	01 APSORBER / ABSORBER (1HTD)
C2	02 APSORBER / ABSORBER (2HTD)
C3-1HTD	ZGRADA RECIRKULACIONIH PUMPI 1HTD-1/ RECIRCULATION PUMP BUILDING 1
C4-1HTD	ZGRADA RECIRKULACIONIH PUMPI 1HTD-2/ RECIRCULATION PUMP BUILDING 2
C3-2HTD	ZGRADA RECIRKULACIONIH PUMPI 2HTD-1/ RECIRCULATION PUMP BUILDING 1
C4-2HTD	ZGRADA RECIRKULACIONIH PUMPI I DUVALJKI 2HTD-2 / RECIRCULATION PUMP & OXIDATION AIR BLOWER
C5	GLAVNA ELEKTRO-KOMANDNA ZGRADA / FGD CONTROL - ELECTRICAL BUILDING
C6-1HTD	ZGRADA DUVALJKI 1HTD / OXIDATION AIR BLOWER BUILDING
C7	ZGRADA DIZEL AGREGATA / EMERGENCY DIESEL GENERATOR
C8	REZERVOAR ZA PRAŽNJENJE APSORBERA / ABSORBER BLOW DOWN TANK
C9	REZERVOAR PROCESNE VODE / FGD PROCESS WATER TANK
C10-1HTD	DRENAŽNA JAMA 1HTD / ABSORBER DRAIN PIT
C10-2HTD	DRENAŽNA JAMA 2HTD / ABSORBER DRAIN PIT
C11	DIMNI KANALI BLOKOVA A3 I A4 / DUCT FOR UNITS A3 & A4
C12	DIMNI KANALI BLOKOVA A5 I A6 / DUCT FOR UNITS A5 & A6
C13	BUSTER VENTILATOR BLOKA A6 / A6 BUF
C14	BUSTER VENTILATOR BLOKA A65 / A5 BUF
C15	BUSTER VENTILATOR BLOKA A64 / A4 BUF
C16	BUSTER VENTILATOR BLOKA A3 / A3 BUF
C18	ISTOVARNA STANICA ZA KAMIONE / LIMESTONE TRUCK UNLOADING BUILDING
C19	TRANSPORT IZMEĐU ISTOVARNE STANICE VAGONA I KAMIONA / LIMESTONE TRANSFER CONVEYOR
C22	ZGRADA SKLADIŠTENJA KREČNJAKA / LIMESTONE STORAGE BUILDING
C23	ELEKTRO-KOMANDNA ZGRADA KREČNJAKA I GIPSA / LIMESTONE AND GYPSUM ELECTRICAL BUILDING
C24	ZGRADA MLEVENJA / LIMESTONE MILL BUILDING
C28	REZERVOAR HIDROMEŠAVINE KREČNJAKA / LIMESTONE SLURRY FEED TANK
C29.1	KOLSKA VAGA 1 / TRUCK SCALE 1
C29.2	KOLSKA VAGA 2 / TRUCK SCALE 2
C30	SILOS GIPSA / GYPSUM STORAGE SILO

C32.1	REZERVOAR FILTRATA GIPSA 1 / GYPSUM FILTRATE TANK 1
C32.2	REZERVOAR FILTRATA GIPSA 2 / GYPSUM FILTRATE TANK 2
C33.1	REZERVOAR TEHNIČKE VODE 1 / WASTE WATER FEED TANK 1
C33.2	REZERVOAR TEHNIČKE VODE 2 / WASTE WATER FEED TANK 2
C35	PORTIRNICA / GATE HOUSE
C36	KOMPRESORSKA STANICA / COMPRESSOR STATION
C37	ZGRADA ZA ZGRUIJAVANJE HIDROMEŠAVINE GIPSA / GYPSUM SLURRY DISPOSAL SYSTEM TANK
C38.1	CEVNI MOST 1 / PIPING AND ELECTRICAL RACK 1
C38.2	CEVNI MOST 2 / PIPING AND ELECTRICAL RACK 2
C38.3	CEVNI MOST 3 / PIPING AND ELECTRICAL RACK 3
C38.4	CEVNI MOST 4 / PIPING AND ELECTRICAL RACK 4
C38.5	CEVNI MOST 5 / PIPING AND ELECTRICAL RACK 5
C38.6	CEVNI MOST 6 / PIPING AND ELECTRICAL RACK 6
C38.6a	CEVNI MOST 6a / PIPING AND ELECTRICAL RACK 6a
C38.7	CEVNI MOST 7 / PIPING AND ELECTRICAL RACK 7
C38.8	CEVNI MOST 8 / PIPING AND ELECTRICAL RACK 8
C38.9	CEVNI MOST 9 / PIPING AND ELECTRICAL RACK 9
C38.10	CEVNI I ELEKTRO KANAL / PIPING AND ELECTRICAL TRENCH
C38.11	CEVNI MOST 11 / PIPING AND ELECTRICAL RACK 11
C38.12	CEVNI MOST 12 / PIPING AND ELECTRICAL RACK 12
C38.13	CEVNI MOST 13 / PIPING AND ELECTRICAL RACK 13
C39	ISTOVARNA STANICA KREČNJAKA ZA VAGONE / LIMESTONE RAILWAY UNLOADING
C41.1	TRANSFORMATOR 3BT1 / TRANSFORMER - 3BT1
C41.2	TRANSFORMATOR 4BT1 / TRANSFORMER - 4BT1
C41.3	TRANSFORMATOR 5BT1 / TRANSFORMER - 5BT1
C41.4	TRANSFORMATOR 6BT1 / TRANSFORMER - 6BT1
C42.1	REZERVOAR PROTIVPOŽARNE VODE ZA TRANSFORMATOR 3BT1/ TRANSFORMER FP TANK 3BT1
C42.2	REZERVOAR PROTIVPOŽARNE VODE ZA TRANSFORMATOR 4BT1 / TRANSFORMER FP TANK 4BT1
C42.3	REZERVOAR PROTIVPOŽARNE VODE ZA TRANSFORMATOR 5BT1 / TRANSFORMER FP TANK 5BT1
C42.4	REZERVOAR PROTIVPOŽARNE VODE ZA TRANSFORMATOR 6BT1 / TRANSFORMER FP TANK 6BT1

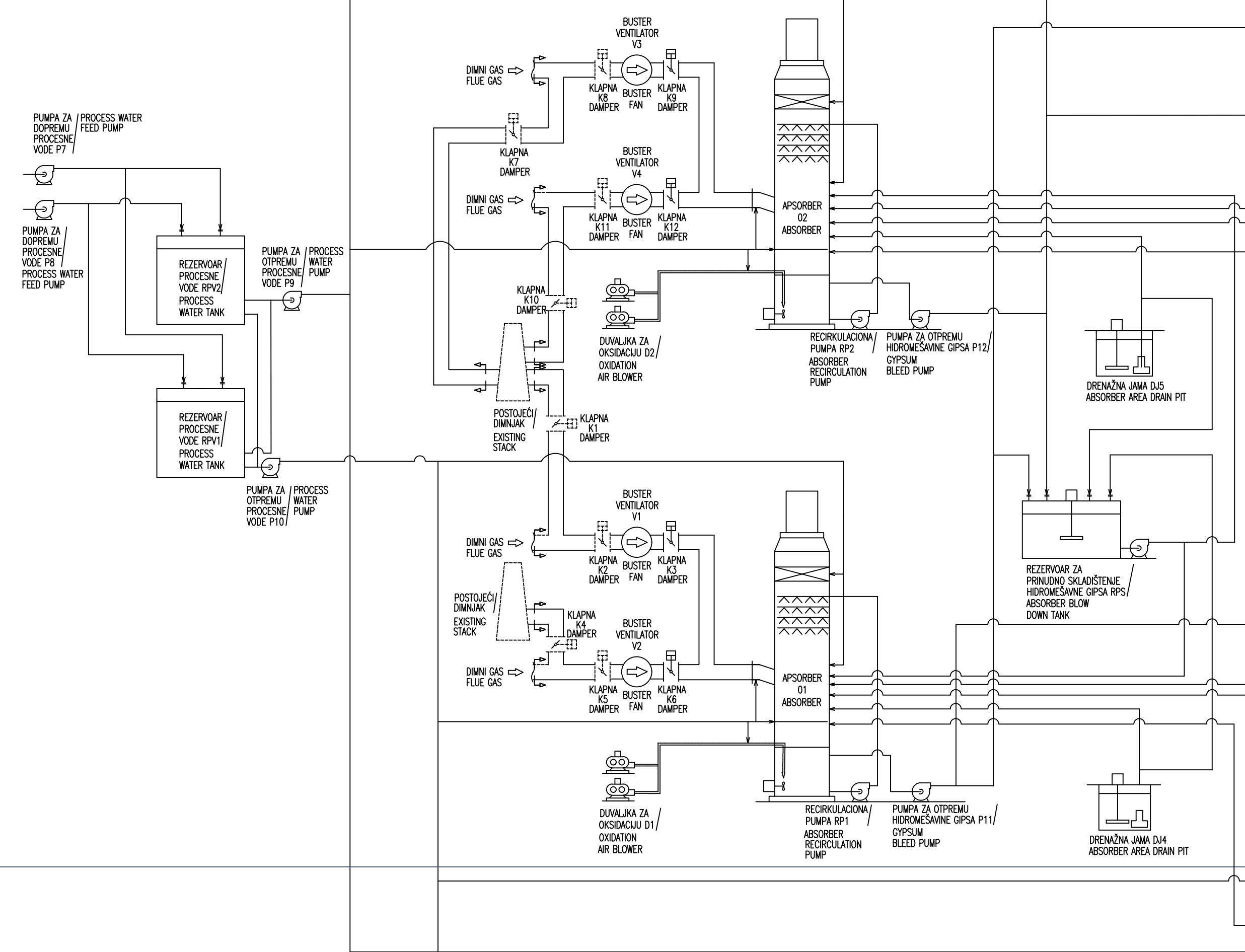
LEGENDA POSTOJEĆIH OBJEKATA VEZANIH ZA SISTEM ODG (nije predmet projekta) :
LEGEND OF EXISTING BUILDINGS RELATED TO FGD PROCESS (out of scope of works) :

R. Br./No.	NAZIV / NAME
A1	BLOK A1 / UNIT A1
A2	BLOK A2 / UNIT A2
A3	BLOK A3 / UNIT A3
A4	BLOK A4 / UNIT A4
A5	BLOK A5 / UNIT A5
A6	BLOK A6 / UNIT A6
ST A1-A3	POSTOJEĆI DIMNJAK BLOKOVA A1-A3 / EXISTING STACK FOR UNITS A1-A3
ST A4-A6	POSTOJEĆI DIMNJAK BLOKOVA A4-A6 / EXISTING STACK FOR UNITS A4-A6
ESP-A1	ELEKTROFILTER A1 / ELECTROSTATIC PRECIPITATOR A1
ESP-A2	ELEKTROFILTER A2 / ELECTROSTATIC PRECIPITATOR A2
ESP-A3	ELEKTROFILTER A3 / ELECTROSTATIC PRECIPITATOR A3
ESP-A4	ELEKTROFILTER A4 / ELECTROSTATIC PRECIPITATOR A4
ESP-A5	ELEKTROFILTER A5 / ELECTROSTATIC PRECIPITATOR A5
ESP-A6	ELEKTROFILTER A6 / ELECTROSTATIC PRECIPITATOR A6
IDF-A3	VENTILATOR A3 / ID FAN A3
IDF-A4	VENTILATOR A4 / ID FAN A4
IDF-A5	VENTILATOR A5 / ID FAN A5
IDF-A6	VENTILATOR A6 / ID FAN A6
WWTP	POSTROJENJE ZA PRERADU OTPADNE VODE / WASTE WATER TREATMENT PLANT

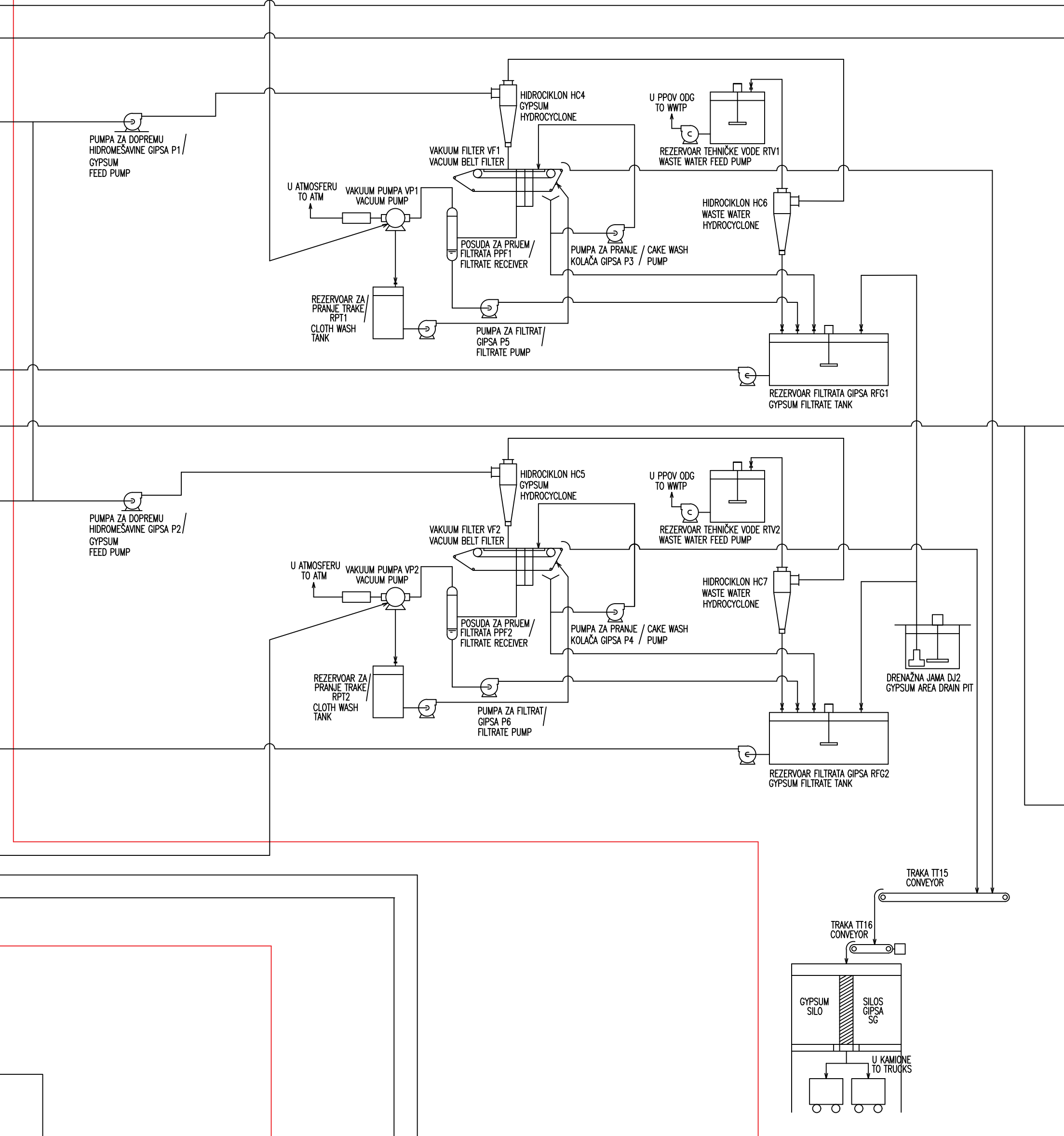


Opis revizije / Revision description		Datum/Date	Crtao/Drawn	Overio/Appr.
Broj ugovora / Contract No :12.01.12625/52-17				
Konzorijum: Consortium:	  			
Odg. projektant: Respon. designer:	Ime i prezime / Name	Paraf/Sign.	Investitor: Client:	
Licenca odg. proj. Lic. des. license:	330 0023 15		Digital: Complex:	JP ELEKTROPRIVREDA SRBIJE PE ELEKTROPRIVREDA SERBIJA
Vista teh. dok. Project type:	IDR - Idejno rešenje IDR - Conceptual design		Postrojenje: Facility:	Postrojenje za ODG za TE Nikola Tesla A FGD Construction Project for TPP Nikola Tesla
Datum: Date:	25.01.2018.	Projekcija: Projection:	Dvo postrojenje: Unit:	
Deo projekta: Project part:	Mašinski Projekat Mechanical Design	Crtao inž. Drawing number:	1/1000	1/1
Situation plan General layout plot plan		NTFGD-S0.0-IDR-6.0.0-000-0000-rev00		

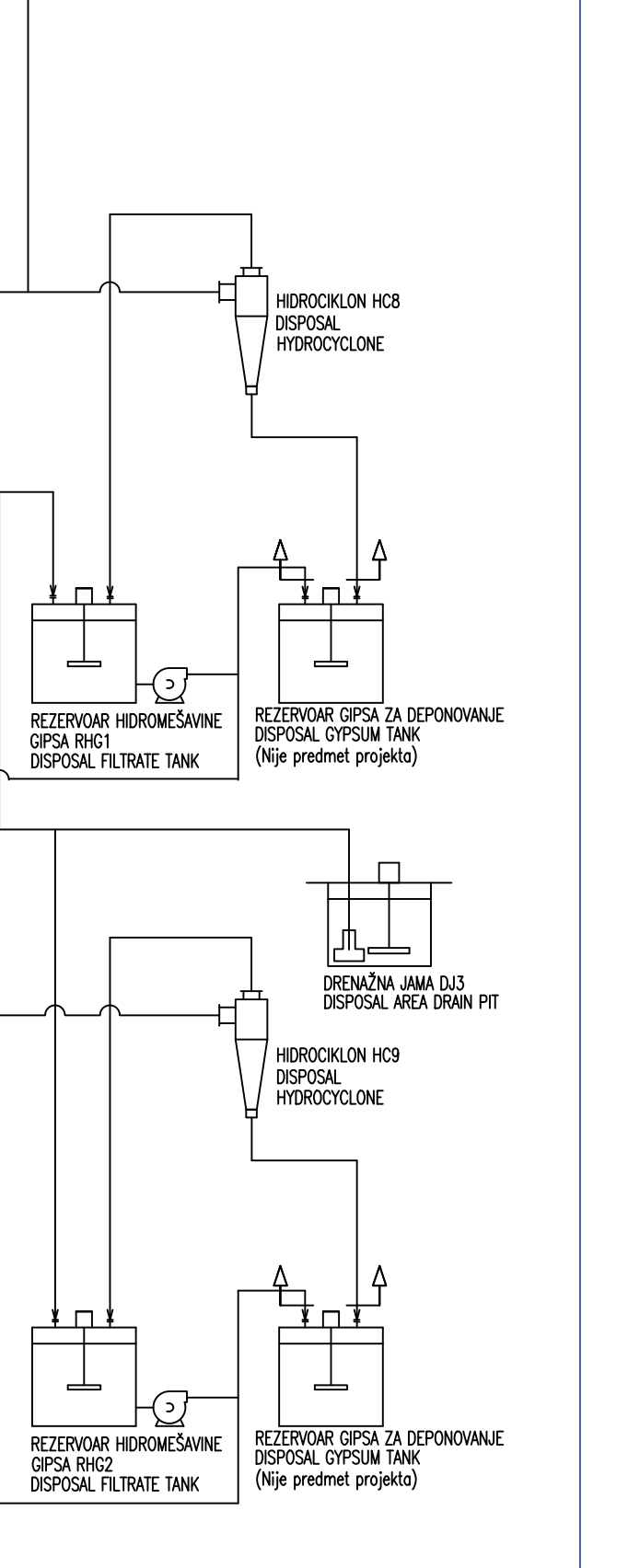
FAZA 2 / PHASE 2
SISTEM APSORBERA /
ABSORPTION SYSTEM



FAZA 1 / PHASE 1
SISTEM ZA FILTRIRANJE GIPSA / GYPSUM DEWATERING SYSTEM

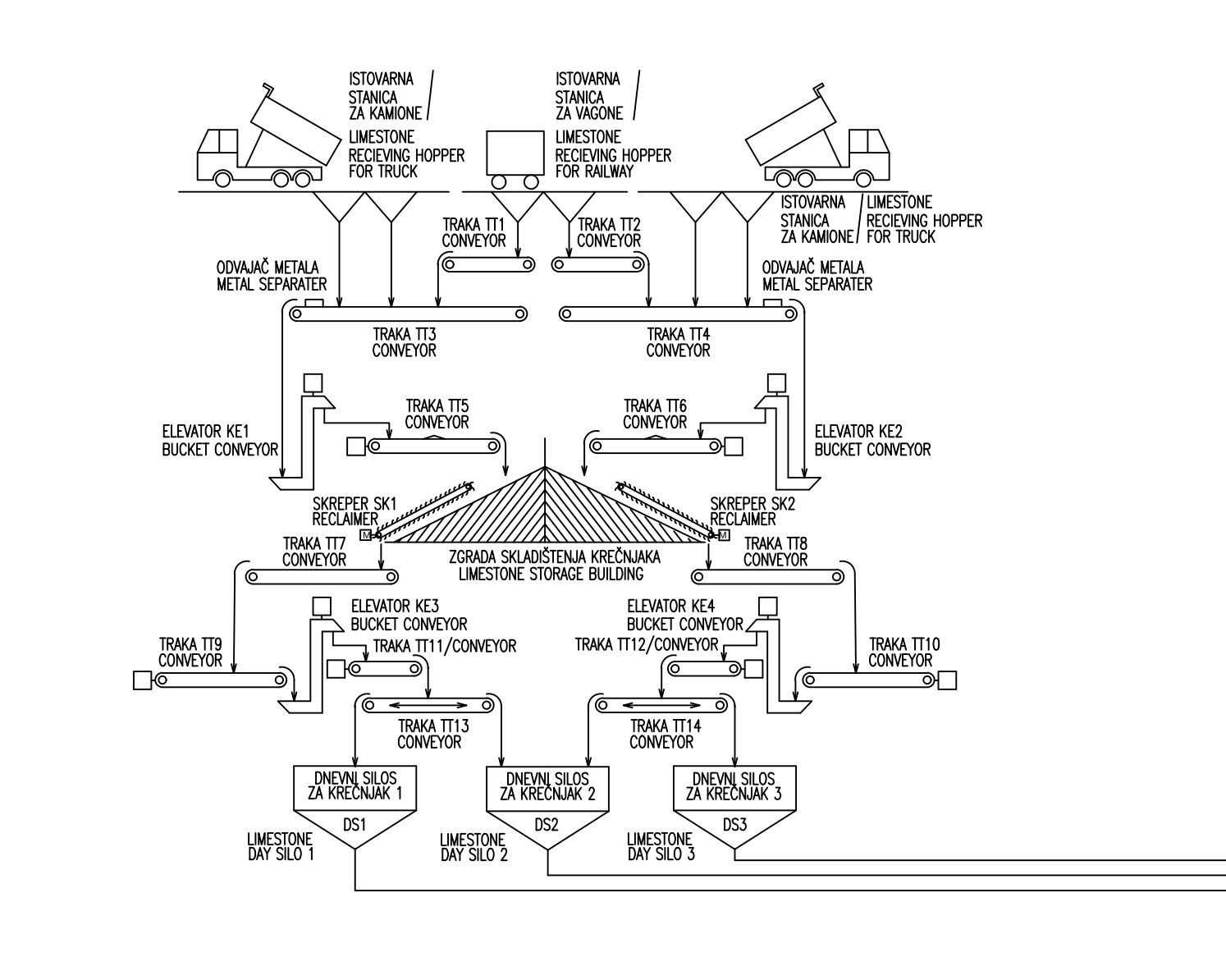


FAZA 2 / PHASE 2
SISTEM HIDROMEŠAVINE GIPSA /
GYPSUM DISPOSAL SYSTEM



FAZA 1 / PHASE 1

SISTEM ZA PRIJEM I SKLADIŠTENJE KREČNJAKA / LIMESTONE HANDLING SYSTEM



FAZA 1 / PHASE 1

SISTEM ZA PRIPREMU / LYMESTONE SLURRY

HIDROMEŠAVINE KREČNJAKA / PREP. SYSTEM



REV.	Ops revizije / Revision description	Date/Date	Crtao/Drawn	Overio/Appr.	
Broj ugovora / Contract No :12.01.12625/52-17					
Konzorcijum: Consortium:	MTS MTS TELEKOMUNIKACIJE MOBILE SYSTEMS	TOCHU	MTS MTS TELEKOMUNIKACIJE MOBILE SYSTEMS	Jedinstvo	
delta inženjering www.deltainzenjering.rs	Ime i prezime / Name	Paraf/Sig.	Investitor/ Client:	JP ELEKTROPRIVREDA SRBIJE PE ELEKTROPRIVREDA SERBIA	
	Odg. projekat/ Respon. designat Licenca od projek. Res. des. izostaje Project type:	371 5696 03	Odbj. Complex:	Poslovanje za ODG za TE Nikola Tesla A FGD Construction Project for TPP Nikola Tesla	
	Datum: Date:	25.01.2018.	Projekcija: Projection:	Poslovanje: Facility:	
	Dno projekta: Project part:	Projekat tehnologije Technology design			
	Razmera: Scale:	Naziv crteža: Drawing name:	Crted broj: Drawing number:	Listid: Page of:	1/1
x/x	Poslovanje za ODG - Tehnološka šema FGD Process flow digram		NTFGD-S0-0-IDR-7-0-0-000-001D-rev00		
			Rev.		

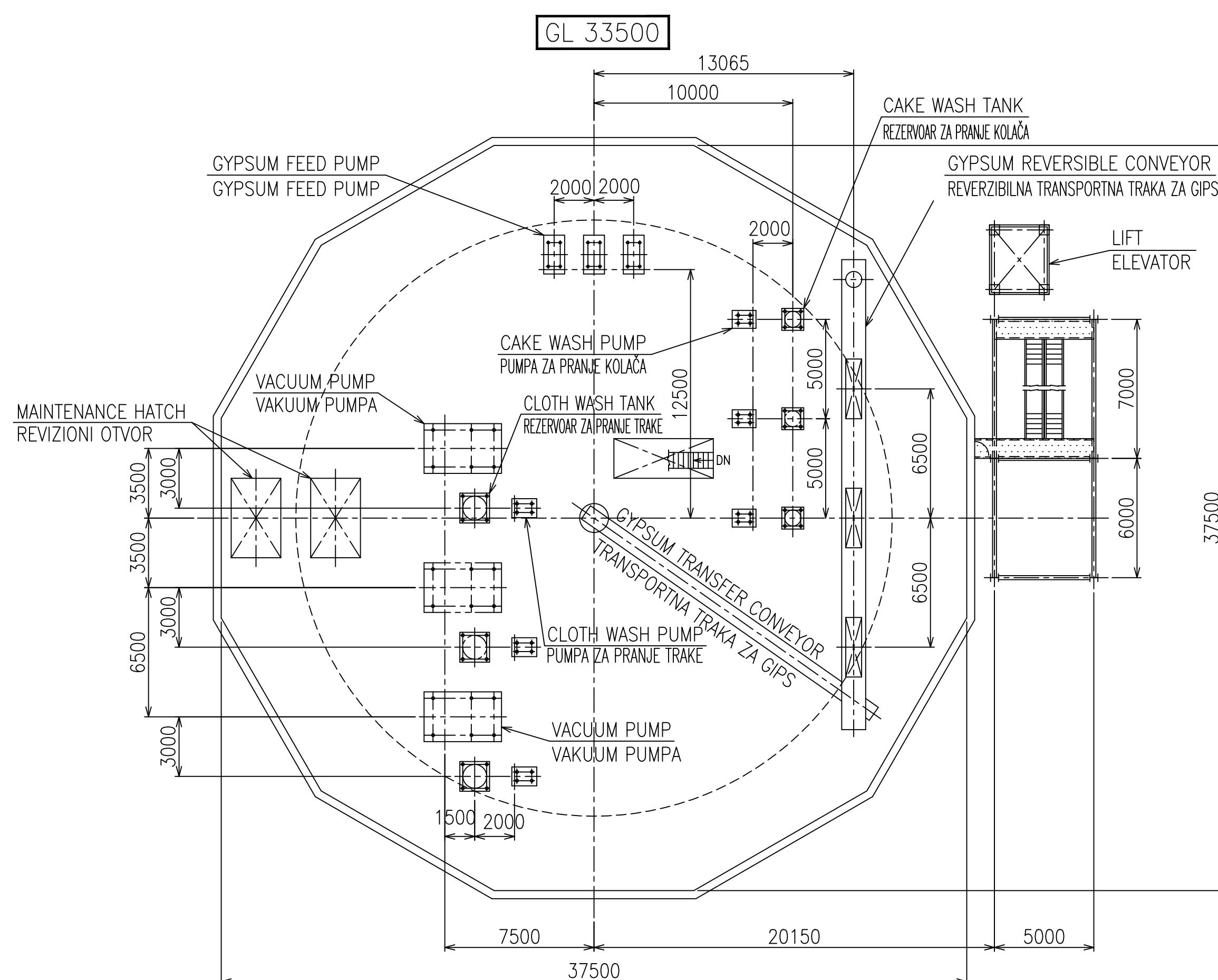
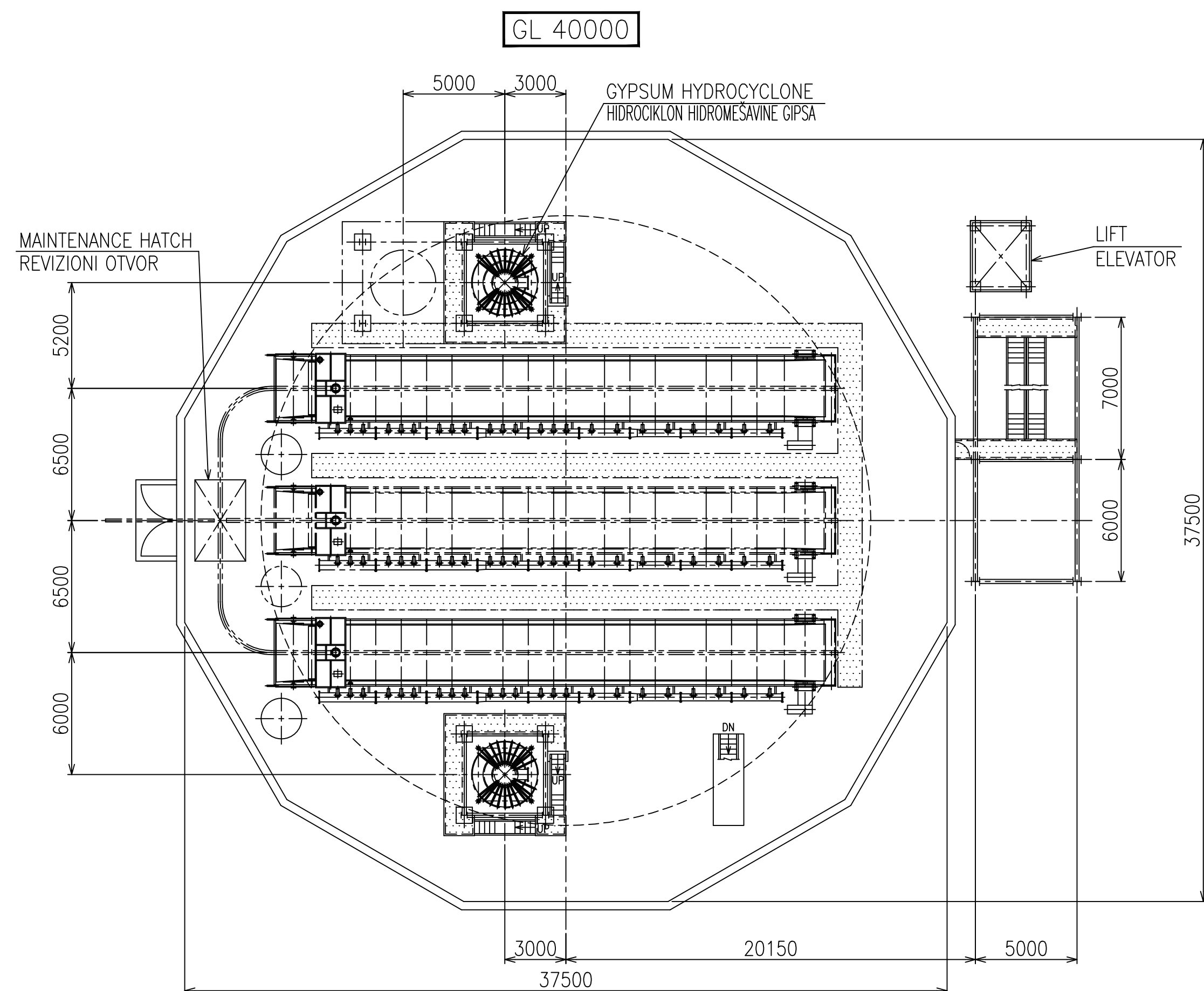
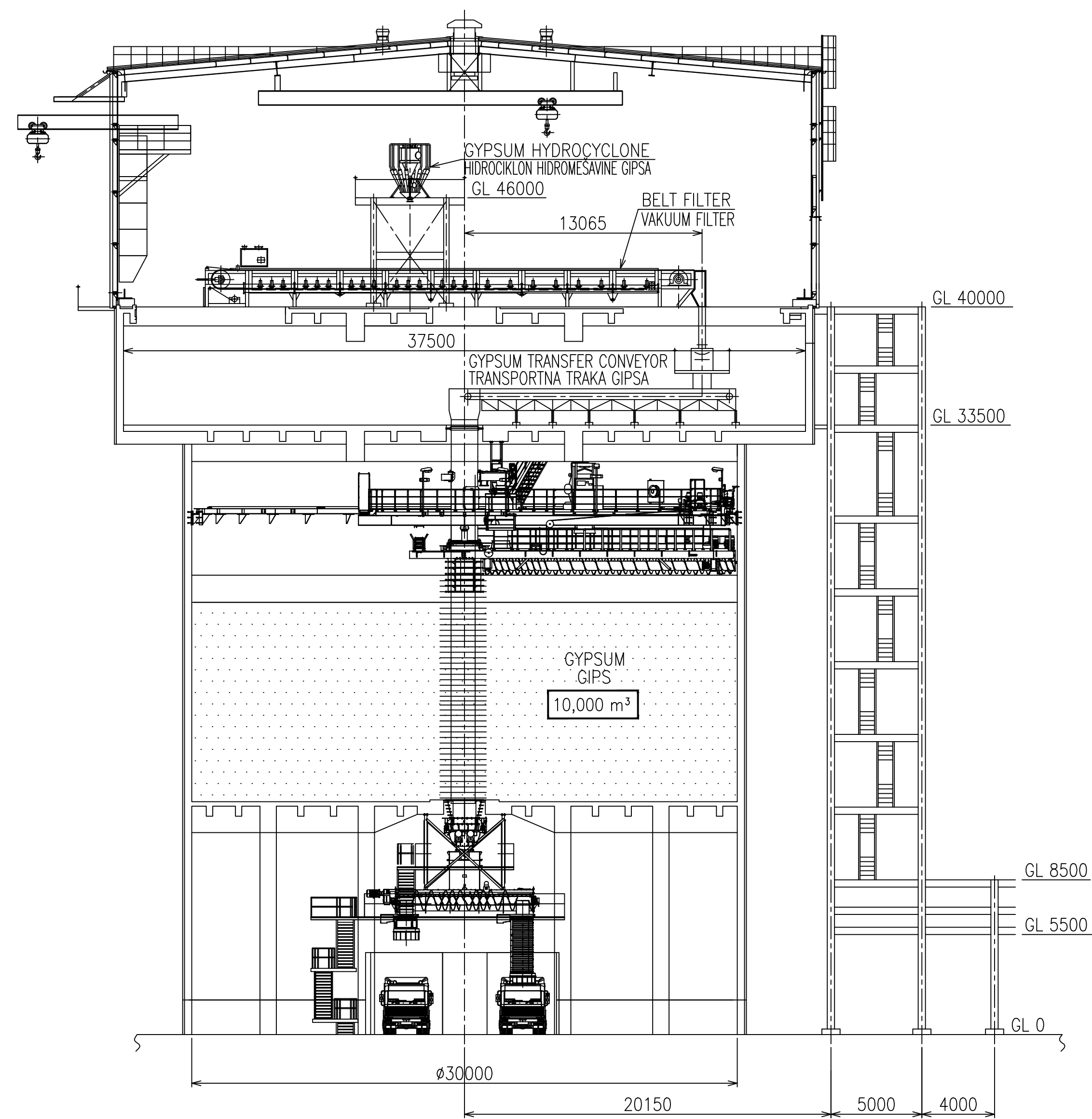
LEGENDA POSTOJEĆIH OBJEKATA VEZANIH ZA SISTEM ODG (nije predmet projekta) :
LEGEND OF EXISTING BUILDINGS RELATED TO FGD PROCESS (out of scope of works) :

R. Br./No.	N A Z I V / N A M E
A1	BLOK A1 / UNIT A1
A2	BLOK A2 / UNIT A2
A3	BLOK A3 / UNIT A3
A4	BLOK A4 / UNIT A4
A5	BLOK A5 / UNIT A5
A6	BLOK A6 / UNIT A6
ST A1-A3	POSTOJEĆI DIMNJAK BLOKOVA A1-A3 / EXISTING STACK FOR UNITS A1-A3
ST A4-A6	POSTOJEĆI DIMNJAK BLOKOVA A1-A3 / EXISTING STACK FOR UNITS A4-A6
ESP-A1	ELEKTROFILTER A1 / ELECTROSTATIC PRECIPITATOR A1
ESP-A2	ELEKTROFILTER A2 / ELECTROSTATIC PRECIPITATOR A2
ESP-A3	ELEKTROFILTER A3 / ELECTROSTATIC PRECIPITATOR A3
ESP-A4	ELEKTROFILTER A4 / ELECTROSTATIC PRECIPITATOR A4
ESP-A5	ELEKTROFILTER A5 / ELECTROSTATIC PRECIPITATOR A5
ESP-A6	ELEKTROFILTER A6 / ELECTROSTATIC PRECIPITATOR A6
IDF-A3	VENTILATOR A3 / ID FAN A3
IDF-A4	VENTILATOR A4 / ID FAN A4
IDF-A5	VENTILATOR A5 / ID FAN A5
IDF-A6	VENTILATOR A6 / ID FAN A6

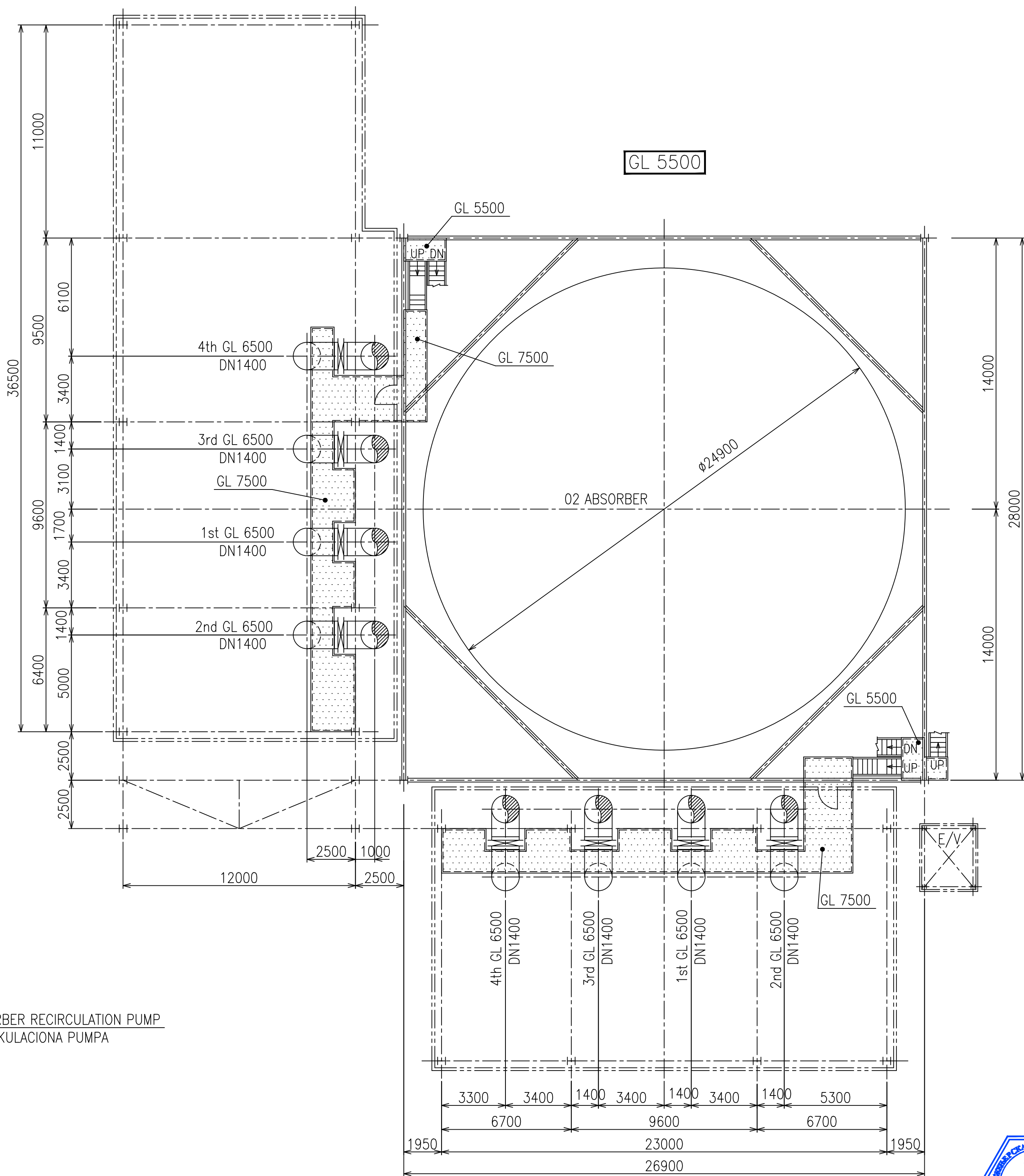
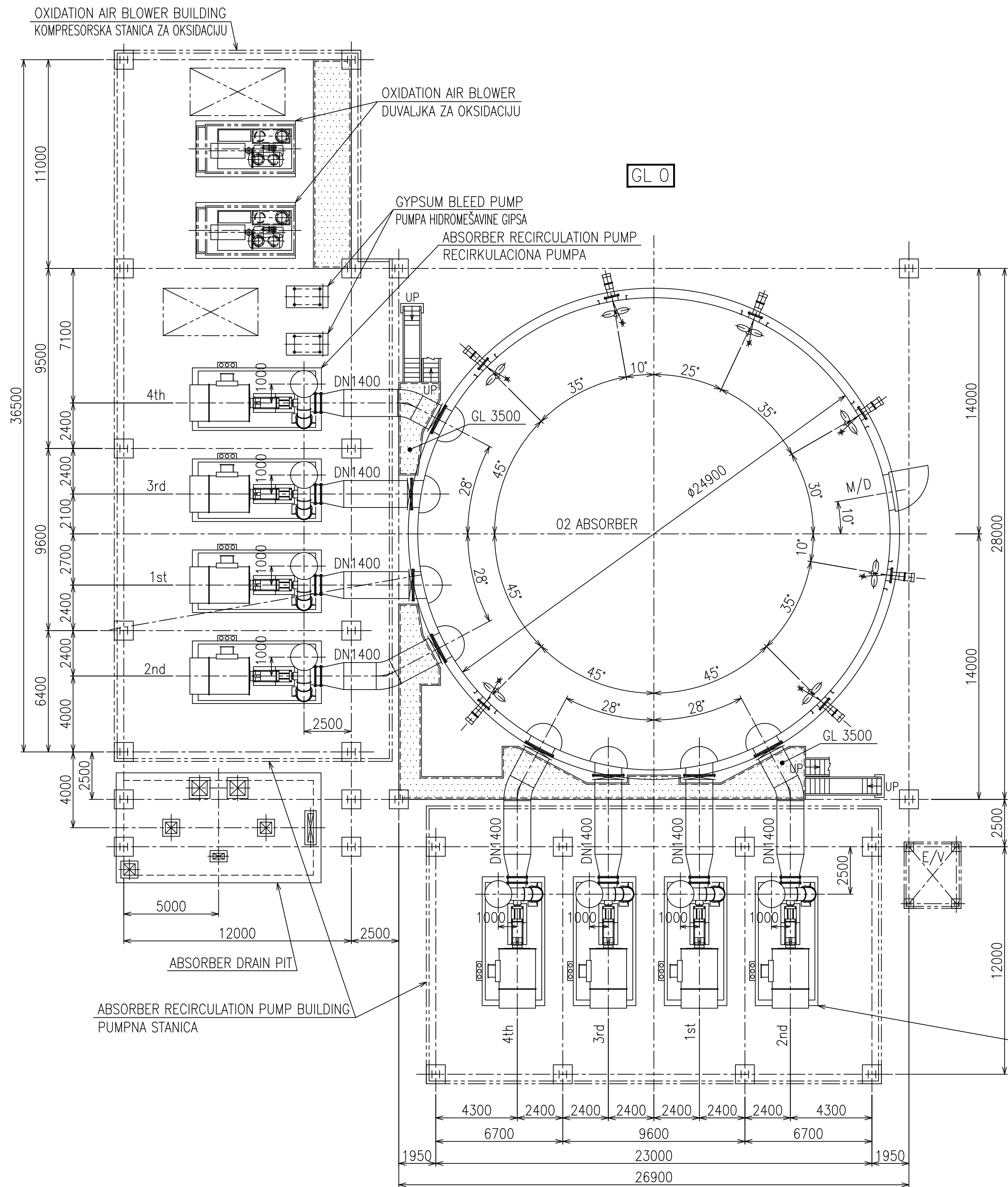
NO.	N A Z I V / N A M E
(C1)	APSORBER 01 / 01 ABSORBER (1HTD)
(C2)	APSORBER 02 / 02 ABSORBER (2HTD)
C3-1HTD	PUMPNA STANICA 1 APSORBERA C1 / ABSORBER C1 RECIRCULATION PUMP BUILDING 1
C4-1HTD	PUMPNA STANICA 2 APSORBERA C1 / ABSORBER C1 RECIRCULATION PUMP BUILDING 2
C3-2HTD	PUMPNA STANICA 1 APSORBERA C2 / ABSORBER C2 RECIRCULATION PUMP BUILDING 1
C4-2HTD	PUMPNA STANICA 1 KOMPRESORSKA STANICA ZA OKSIDACIJU APSORBERA C2 ABSORBER C2 RECIRCULATION PUMP & OXIDATION A.B. BUILDING 2
(C5)	GLAVNA ELEKTROKOMANDNA ZGRADA / FGD CONTROL / ELECTRICAL BUILDING
C6-1HTD	KOMPRESORSKA STANICA ZA OKSIDACIJU A1 / OXIDATION AIR BLOWER BUILDING
(C7)	DIZEL GENERATOR / EMERGENCY DIESEL GENERATOR
(C8)	REZERVOAR ZA PRILIVNO SKLADIŠTENJE HIDROMEŠAVINE GPSA / ABSORBER BLOW DOWN TANK
(C9)	REZERVOAR PROCESNE VODE / FGD PROCESS WATER TANK
C10-1HTD	DRENAŽNA JAMA 1THD / ABSORBER DRAIN PIT
C10-2HTD	DRENAŽNA JAMA 2THD / ABSORBER DRAIN PIT
(C11)	DIMNI KANALI BLOKOVA A3 & A4 / DUCT FOR UNITS A3 & A4
(C12)	DIMNI KANALI BLOKOVA A5 & A6 / DUCT FOR UNITS A5 & A6
(C13)	BUSTER VENTILATOR BLOKA A6 / A6 BUF
(C14)	BUSTER VENTILATOR BLOKA A5 / A5 BUF
(C15)	BUSTER VENTILATOR BLOKA A4 / A4 BUF
(C16)	BUSTER VENTILATOR BLOKA A3 / A3 BUF
(C37)	REZERVOAR HIDROMEŠAVINE GPSA / GYPSUM SLURRY DISPOSAL SYSTEM TANK
C38.4	CEVNI MOST 4 / PIPING AND ELECTRICAL RACK 4
C38.5	CEVNI MOST 5 / PIPING AND ELECTRICAL RACK 5
C38.6	CEVNI MOST 6 / PIPING AND ELECTRICAL RACK 6
C38.6a	CEVNI MOST 6a / PIPING AND ELECTRICAL RACK 6a
C38.8	CEVNI MOST 8 / PIPING AND ELECTRICAL RACK 8
C38.10	CEVNI TUNEL / PIPING AND ELECTRICAL TRENCH
C38.11	CEVNI MOST 11 / PIPING AND ELECTRICAL RACK 11
C38.12	CEVNI MOST 12 / PIPING AND ELECTRICAL RACK 12
C38.13	CEVNI MOST 13 / PIPING AND ELECTRICAL RACK 13
C41.1	TRANSFORMATOR 1 / TRANSFORMER - 3BT1
C41.2	TRANSFORMATOR 2 / TRANSFORMER - 4BT1
C41.3	TRANSFORMATOR 3 / TRANSFORMER - 5BT1
C41.4	TRANSFORMATOR 4 / TRANSFORMER - 6BT1
C42.1	PP REZERVOAR TRANSFORMATORA 1 / TRANSFORMER FP TANK 3BT1
C42.2	PP REZERVOAR TRANSFORMATORA 2 / TRANSFORMER FP TANK 4BT1
C42.3	PP REZERVOAR TRANSFORMATORA 3 / TRANSFORMER FP TANK 5BT1
C42.4	PP REZERVOAR TRANSFORMATORA 4 / TRANSFORMER FP TANK 6BT1

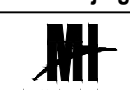
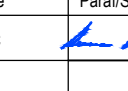


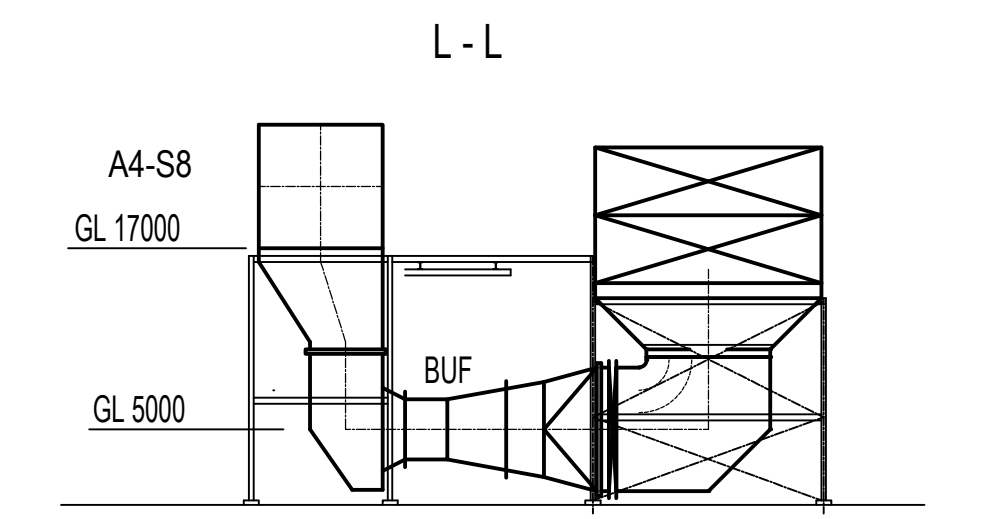
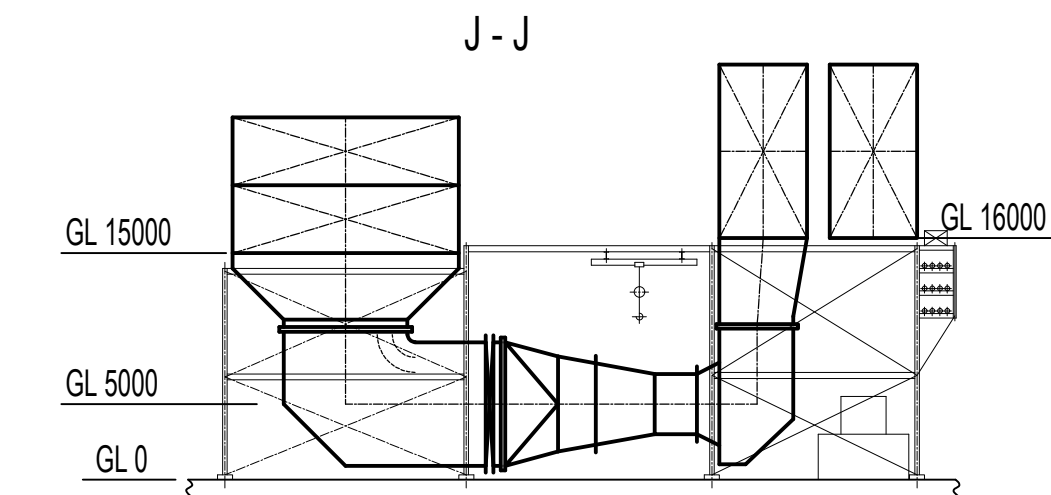
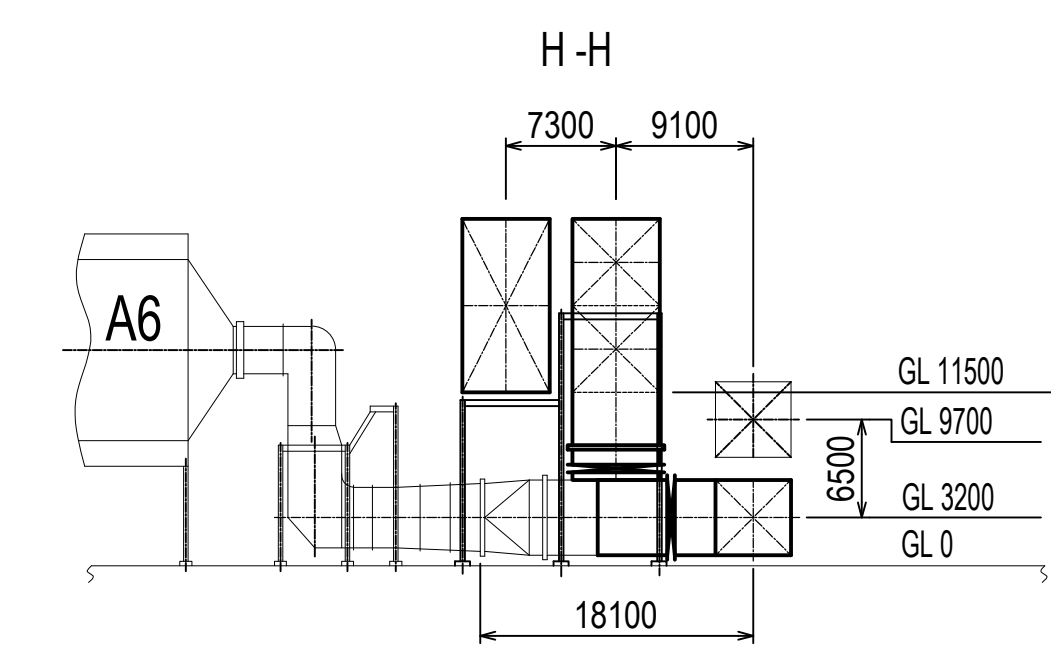
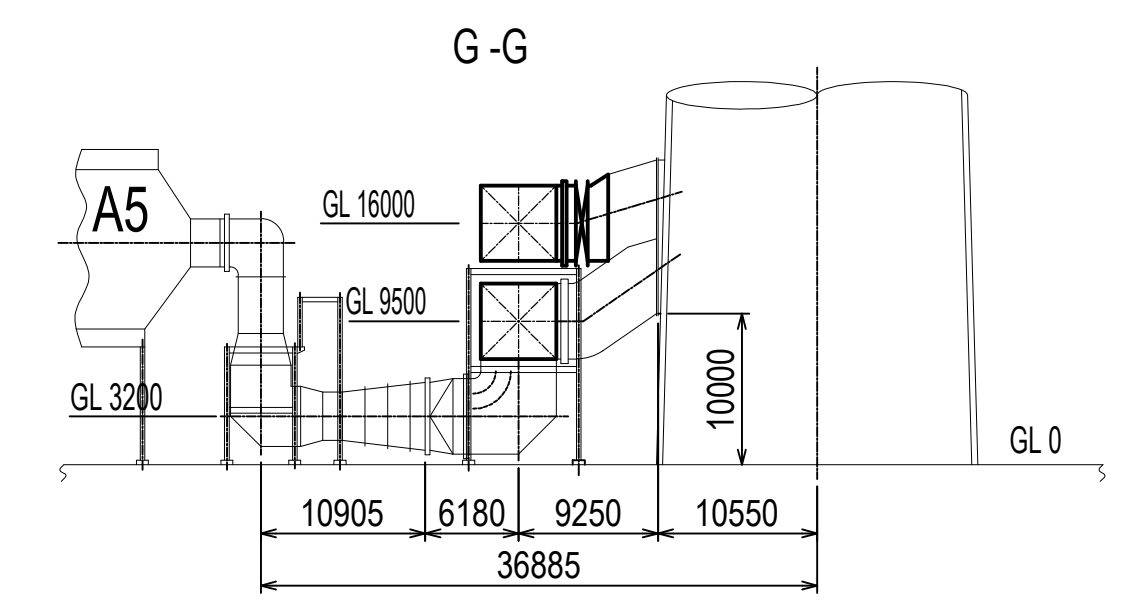
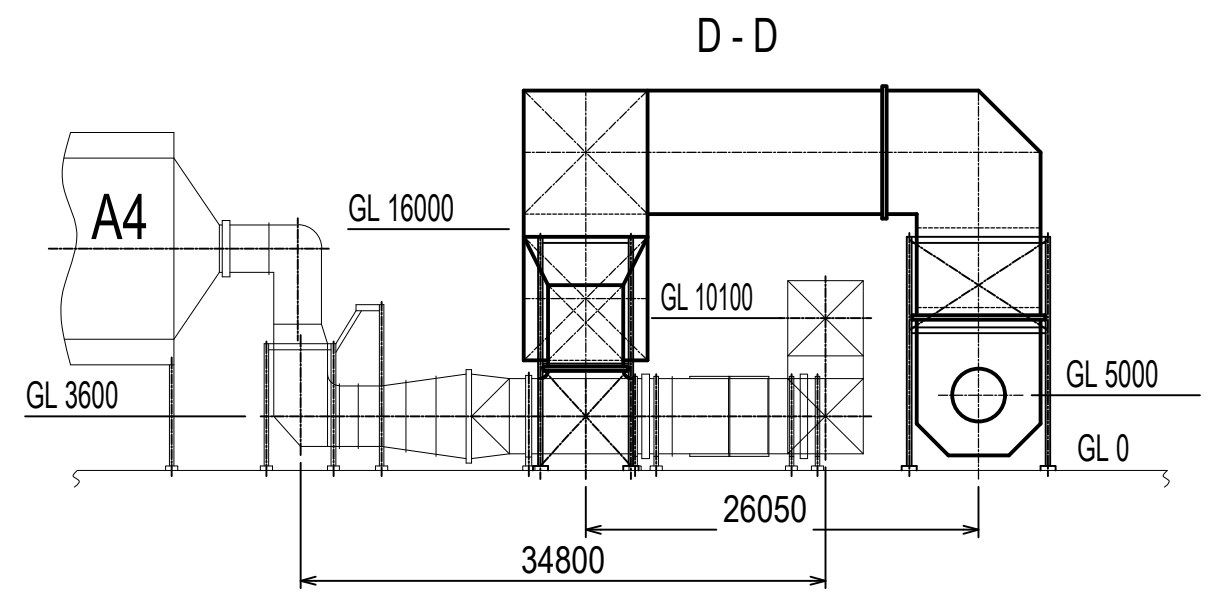
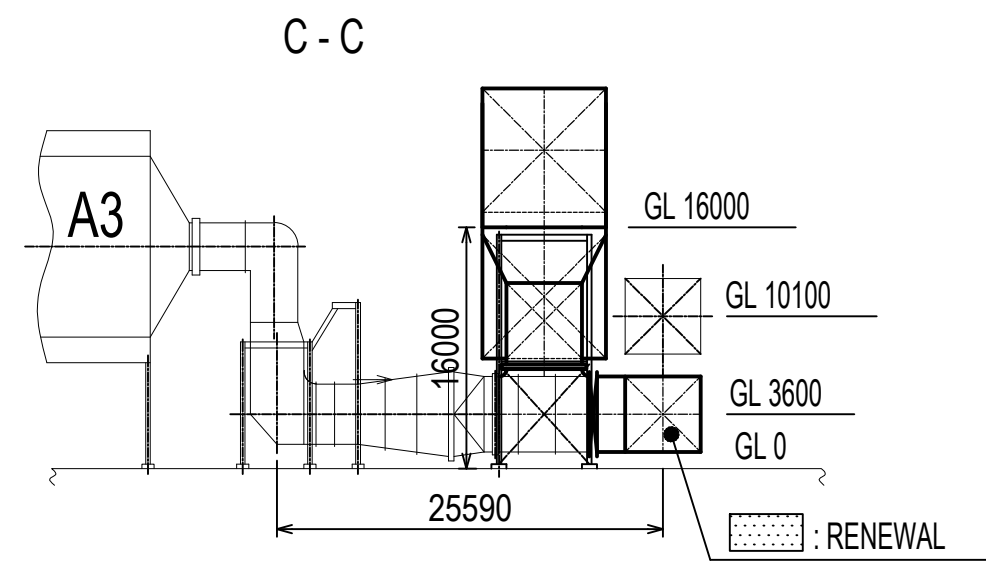
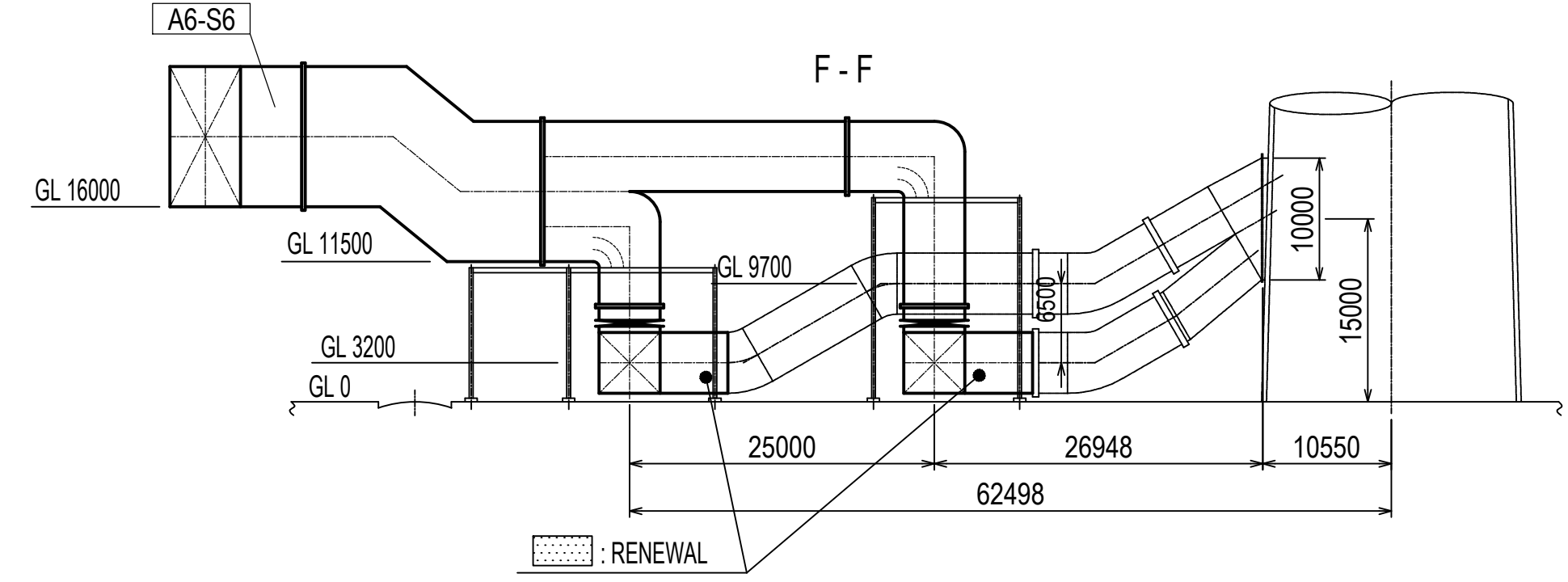
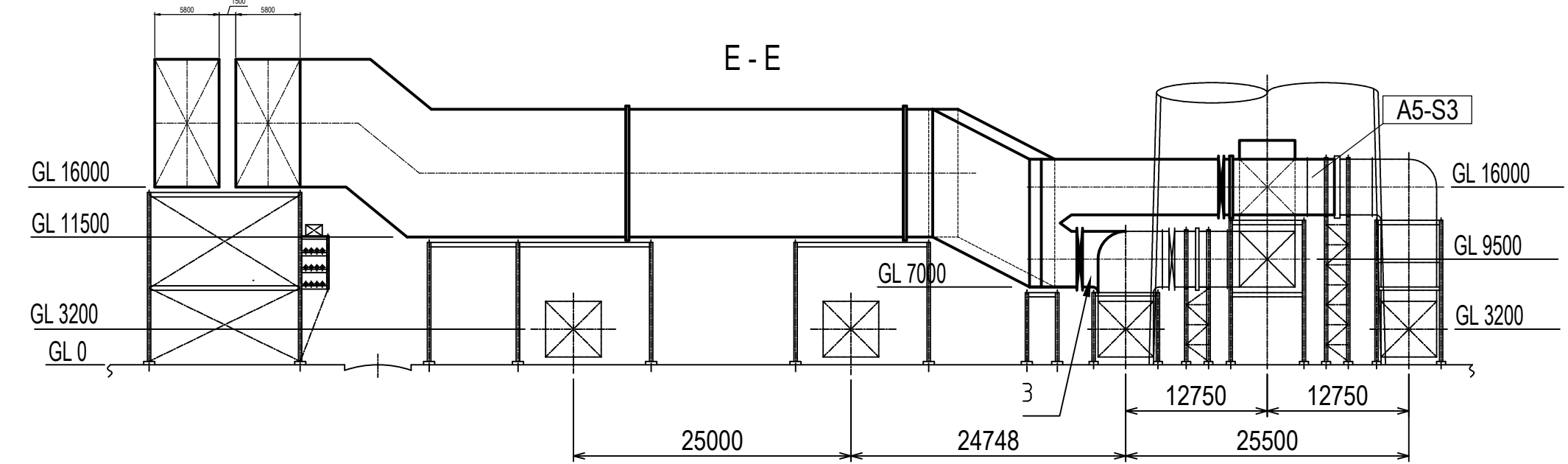
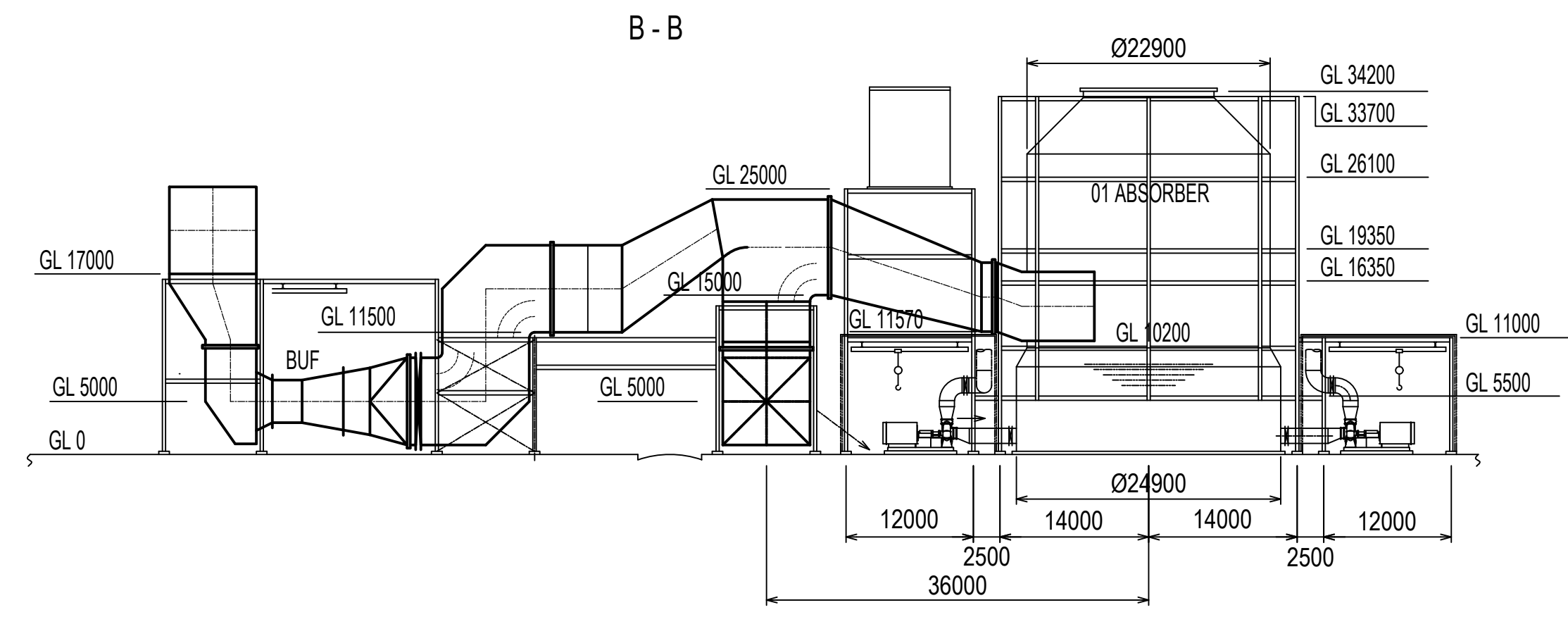
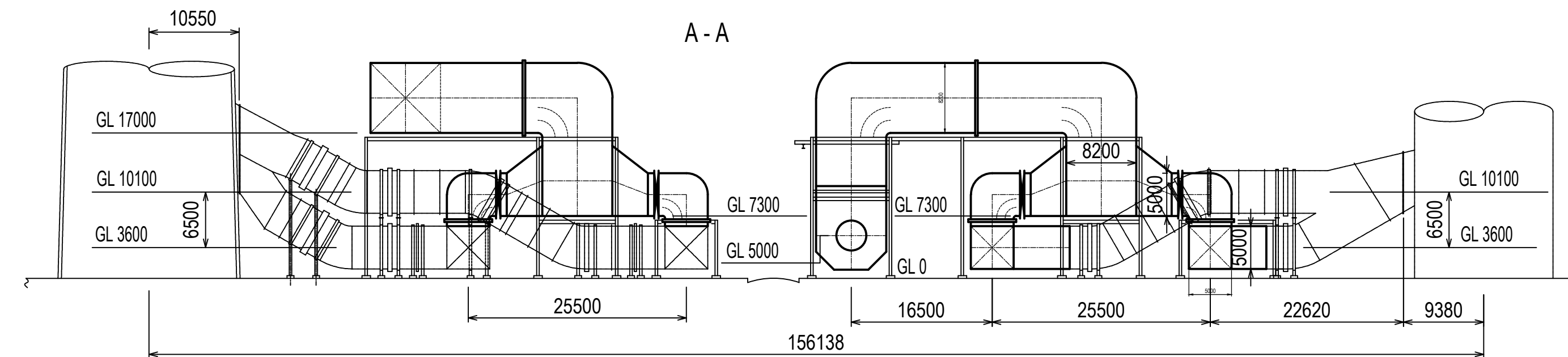
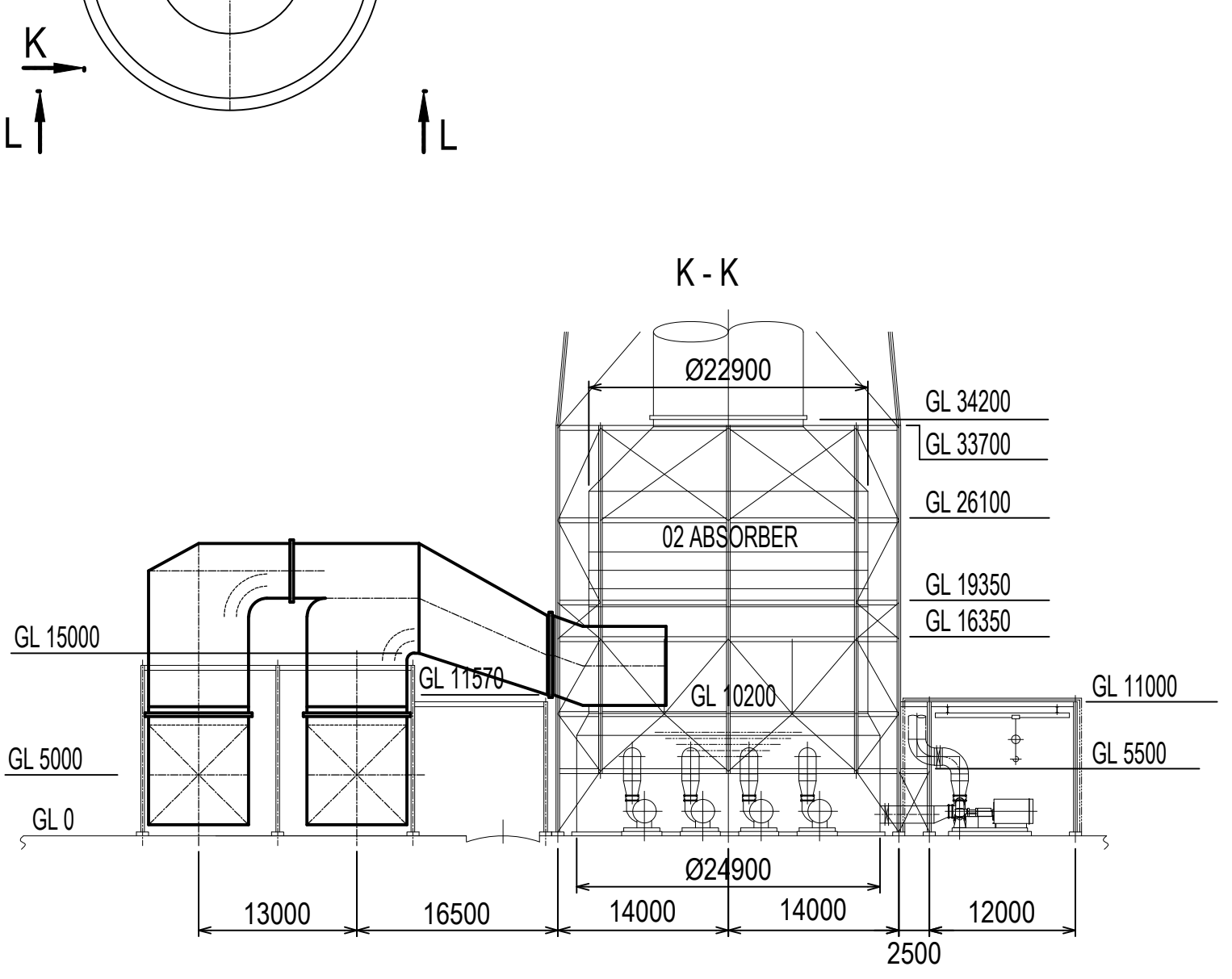
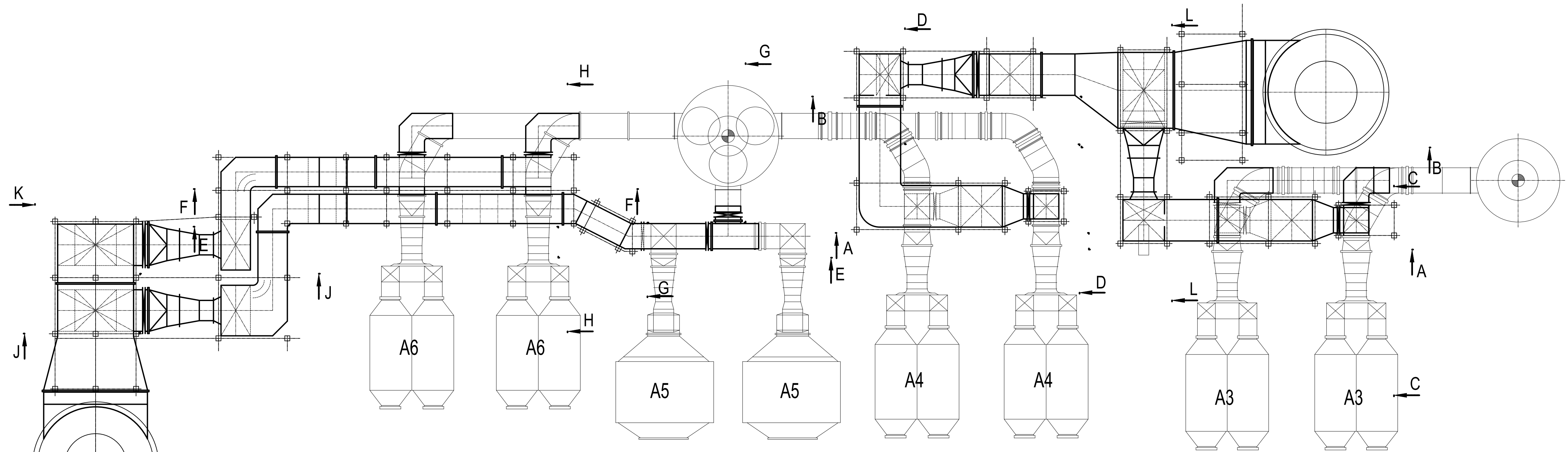
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BROJ USLOVORA/CONTRACT NO: 12.01.2025/52-17					
Kontenzum: Consortium:					
Odg. projektant: Nemanja Ranković					
Licenca odg. proj. 330 0023 15					
Vista teh. dok.: IDR - Idejno rešenje					
Datum: 25.01.2018.					
Projekat: Mašinski Projekat					
Dio projekta: Mechanical Design					
Naziv objekta: Faza 2 - Zona apsorbena					
Scale: 1/1000					
Dokument: NTFGD-S0.0-IDR-6.0.0-000-003D-rev00					
Listof: 1/1					



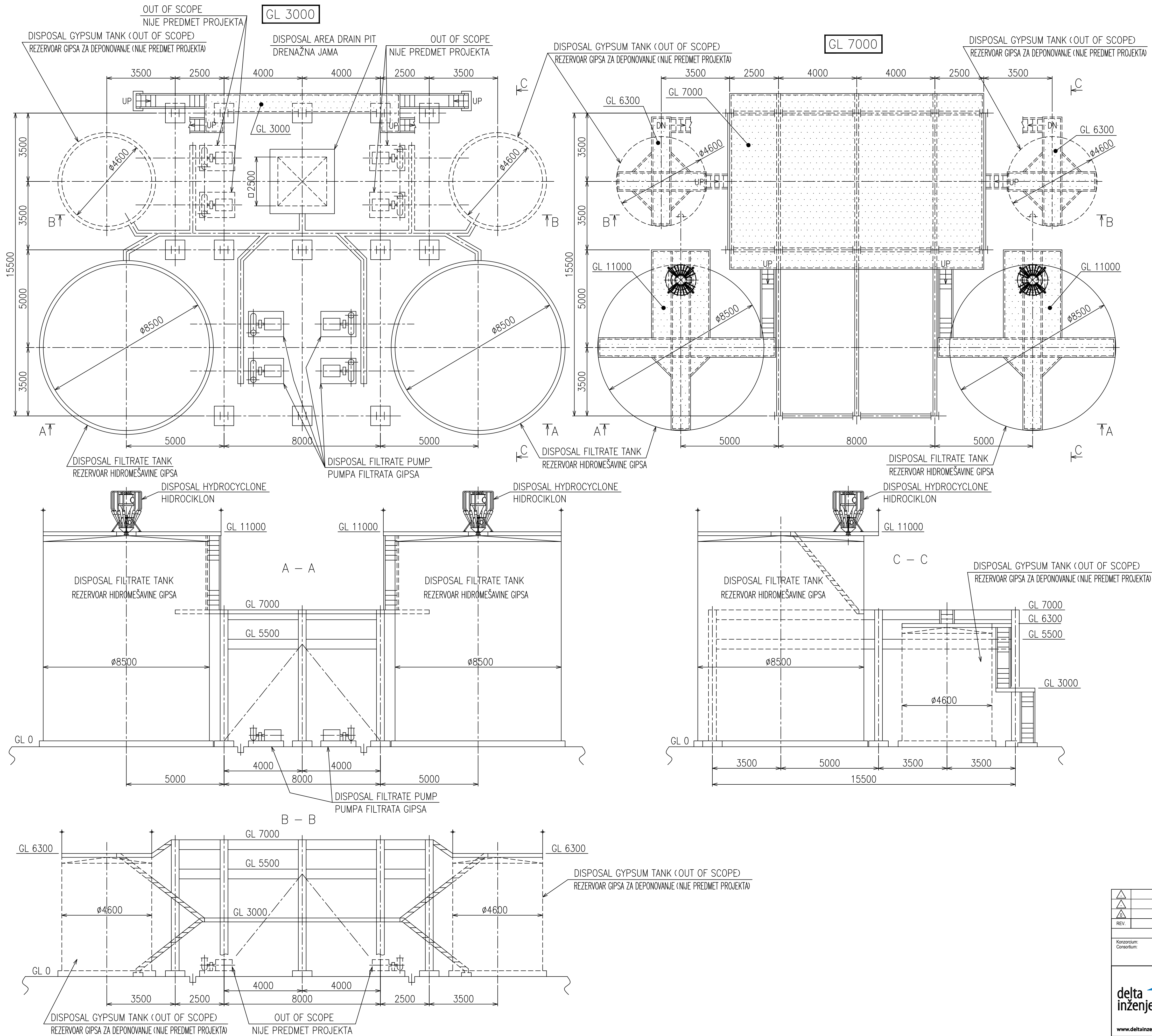
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Broj ugovora / Contract No :12.01.12625-52-17										
Konzorcijum: Consortium:	INSTITUT ZA PROJEKTOVANJE I INŽENJERING	ITOPKU	INSTITUT ZA PROJEKTOVANJE I INŽENJERING	Jedinstvo						
delta inženjering www.deltainzenjering.rs	Odgov. projektant: Projekat. dizajner: Licenca odg. proi. res. licencat. Vred. teh. dok.: Projekt. tip: Datum: Date:	Ime i prezime / Name Nemanja Ranković 330 0023 15 IDR - Jedro radnjeg IDR - Conceptual design 25.01.2018.	Paraf/Sgn. 	Investitor: Client: JP ELEKTROPRIVREDA SRBIJE PE ELEKTROPRIVREDA SRBIJA	Oprema: Complex: Postrojenje za ODG za TE Nikola Tesla A FGD Condensation Project for TPP Nikola Tesla Postrojenje: Facility: Faza 1 - Zona kretnjaka i gipsone Phase 1 - Gypsum and limestone area					
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	Razmera: Scale:	Naziv crteži: Drawing name:	Silos gipsa - Dispozicija opreme Arrangement of gypsum silo			Listof: Pageof: Rev.				
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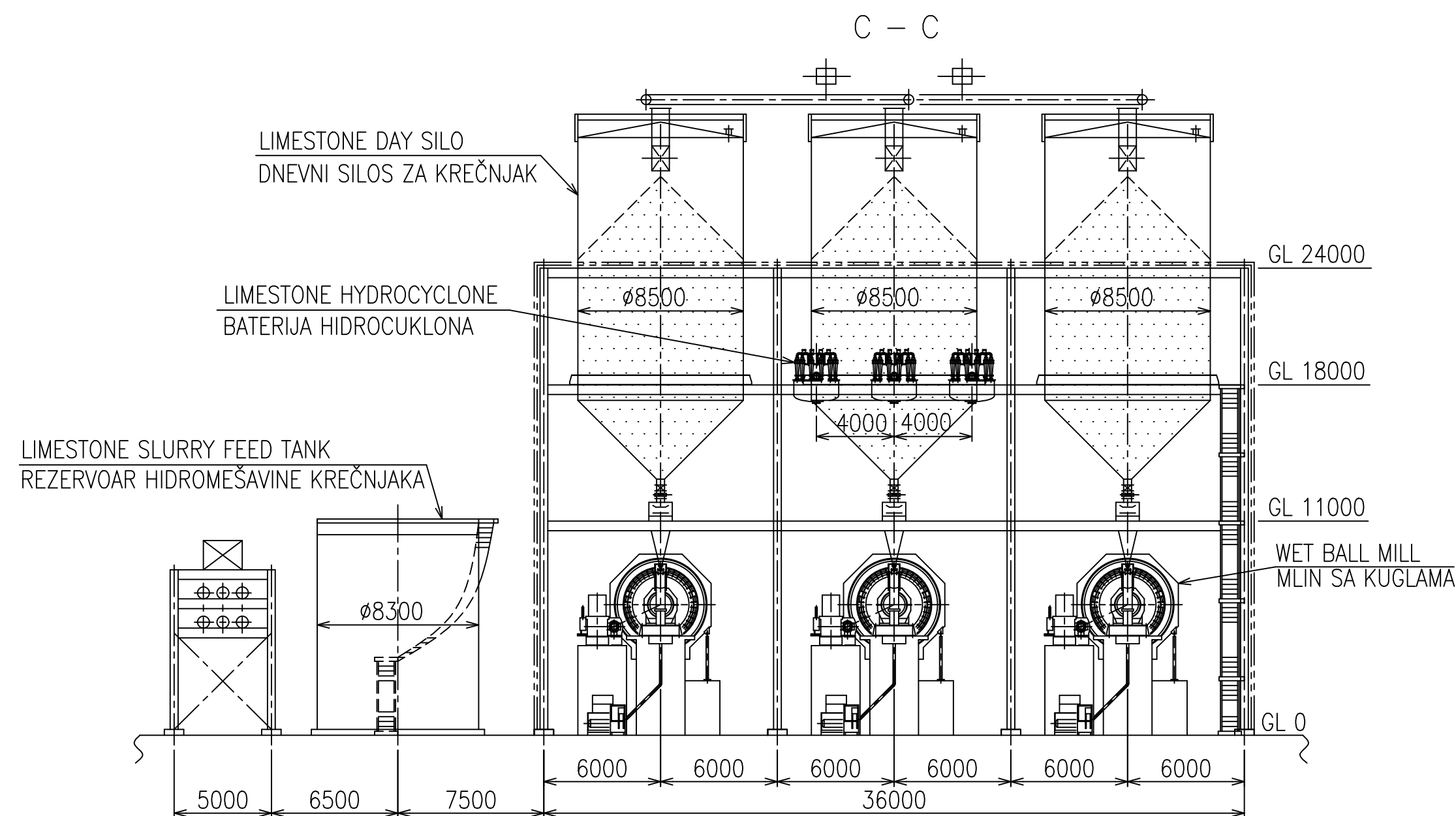
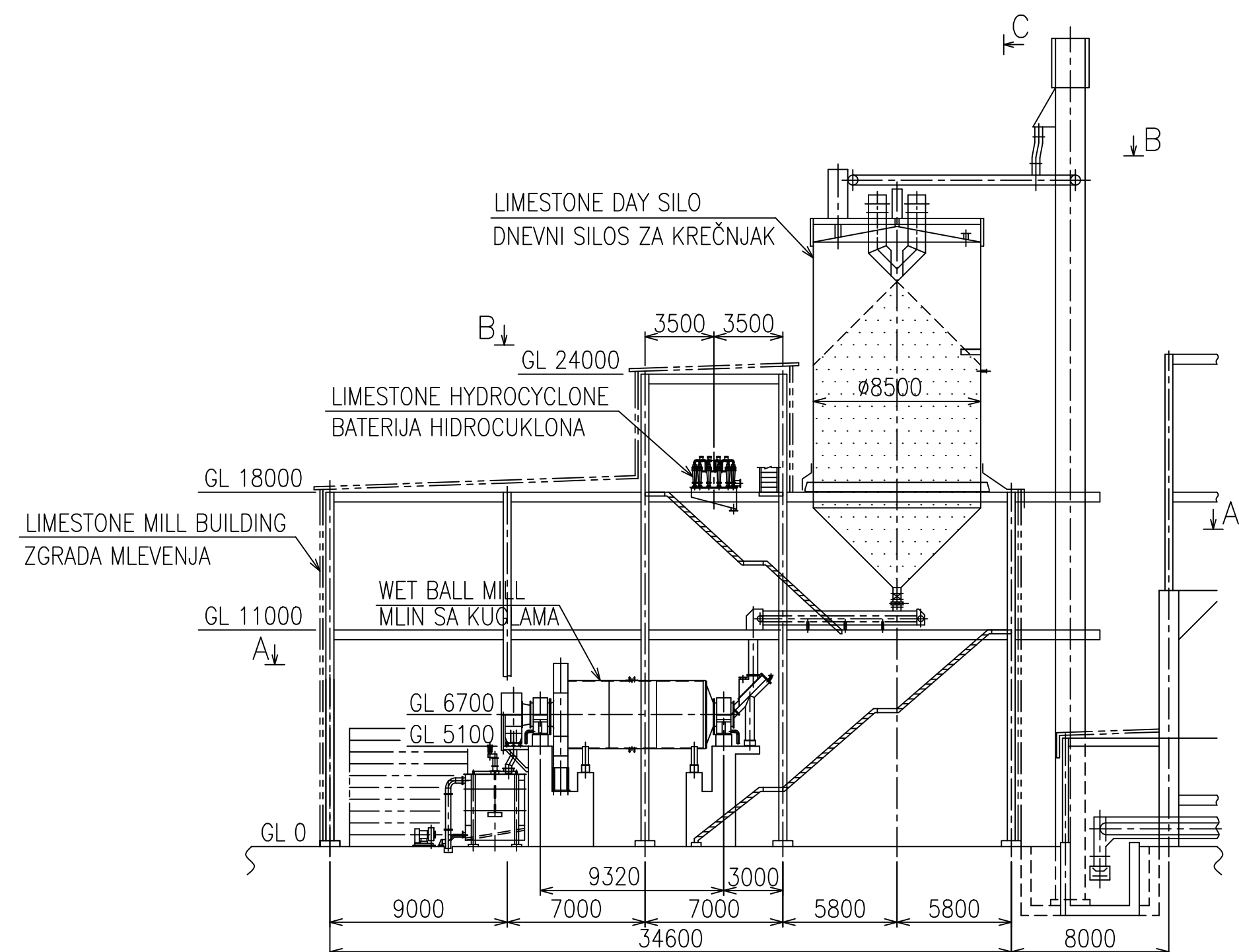
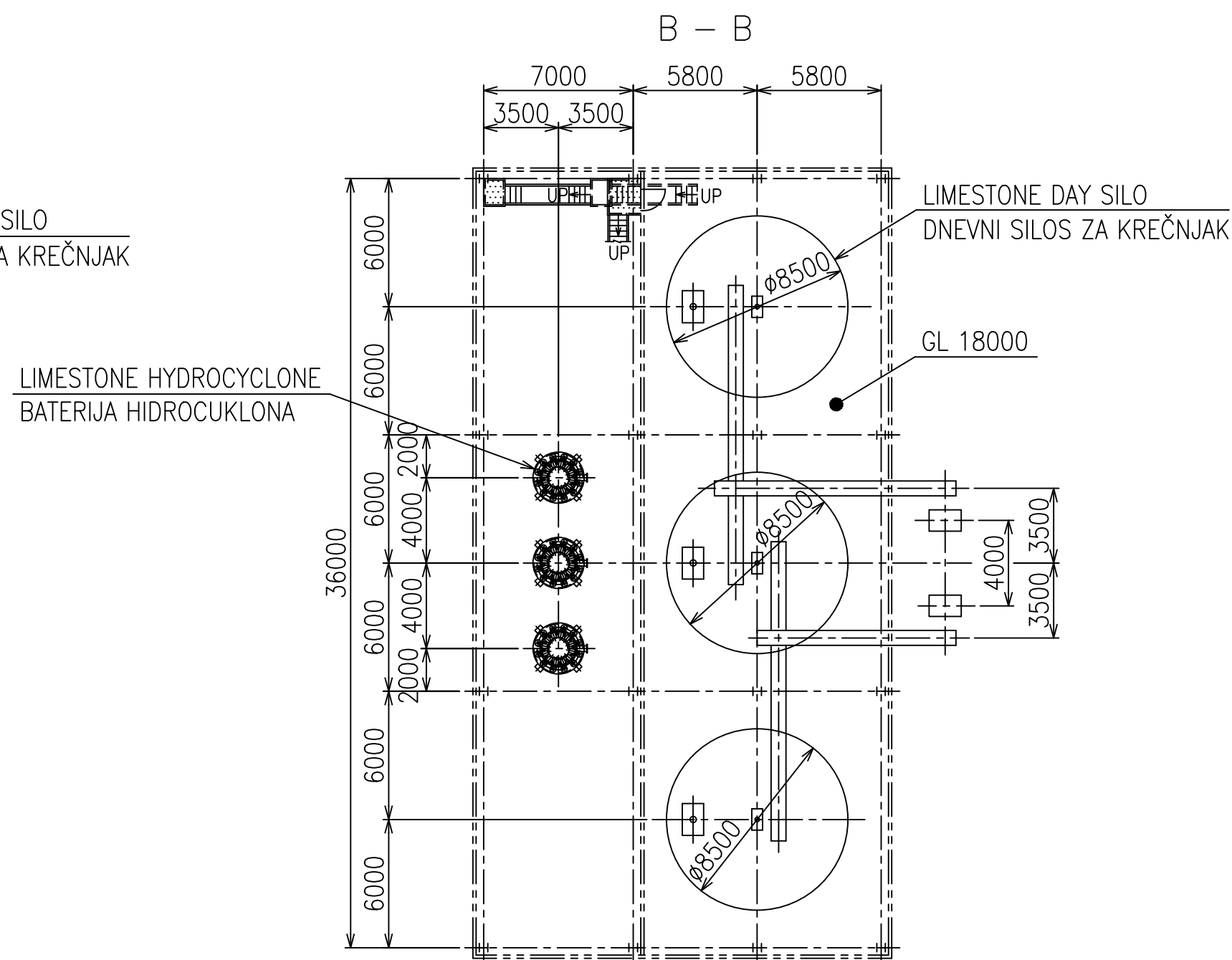
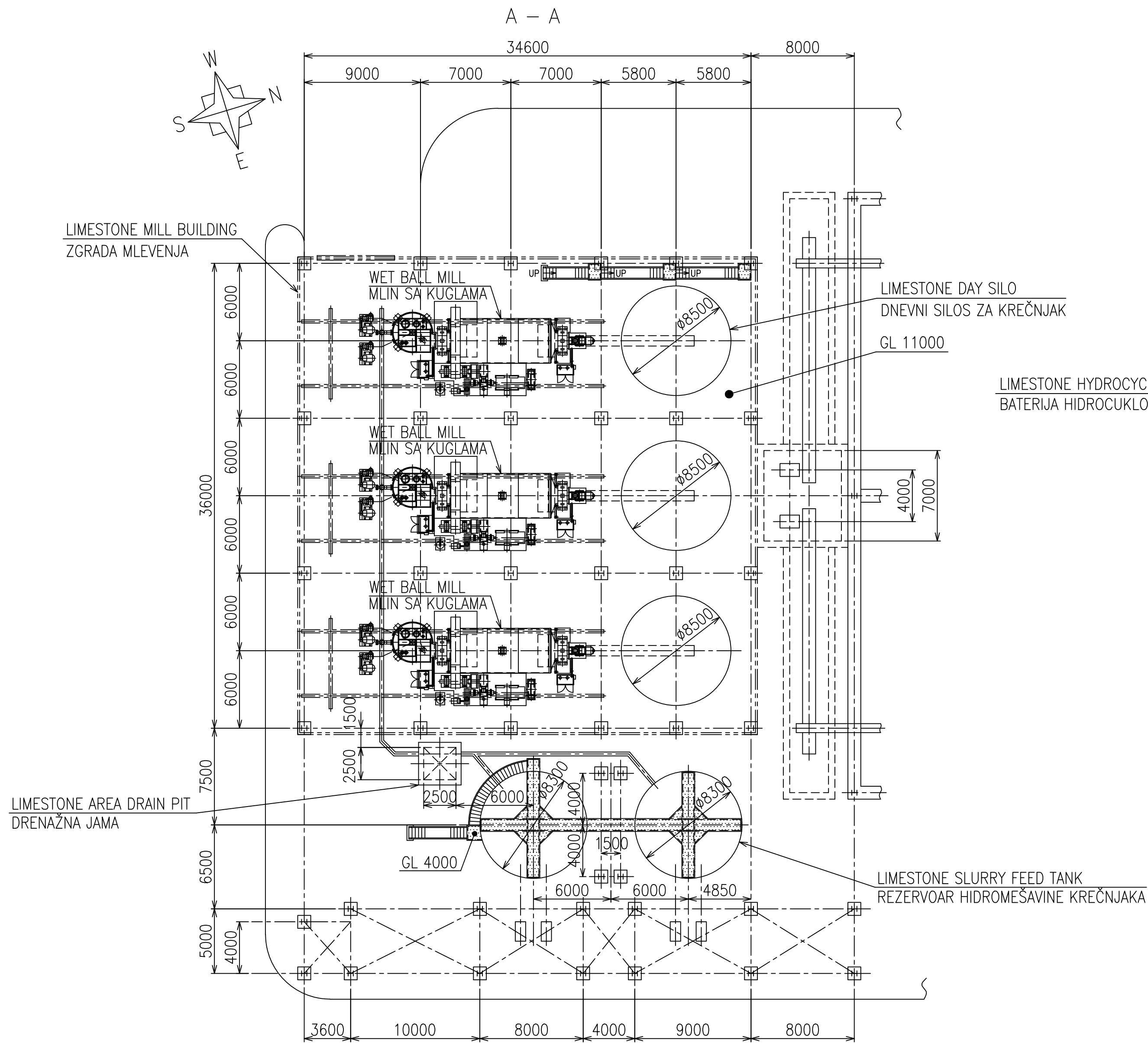
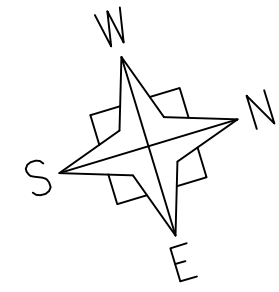
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Korporacijom:   				
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		Nemanja Ranković				Dizalac/ Designer:		Postrojenje za ODG za TE Nikola Tesla A FGD Construction Project for TPP Nikola Tesla			
		330 0023 15									
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www.deltainženjering.rs		Deo projekta/ Project part:		Mašinski Projekat Mechanical Design		Dio postrojenja: Unit:		Faza 2 - Zona apsorbera Phase 2 - Absorber area			
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Odgo. projektant: Respon. designer:	Ime i prezime / Name	Paraf/Sign.	Projekat: Complex:	Postrojenje za ODG za TE Nikola Tesla A FGD Construction Project for TPP Nikola Tesla
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