

EXECUTIVE SUMMARY OF THE REPORT ON THE ENVIRONMENTAL IMPACT ASSESSMENT OF THE INVESTMENT PROPOSAL FOR MINING AND PROCESSING OF POLYMETAL ORES FROM THE ROZINO DEPOSIT, TINTYAVA PLA, SITUATED IN THE LANDS OF THE ROZINO VILLAGE AND GUGUTKA VILLAGE, IVAYLOVGRAD MUNICIPALITY, HASKOVO DISTRICT.



Investor: Tintyava Exploration AD

December 2025

Executive summary of the Report on The Environmental Impact Assessment of the investment proposal for ‘Mining and Processing of Polymetal Ores from the Rozino Deposit, Tintyava PLA, situated in the lands of the Rozino village and Gugutka village, Ivaylovgrad Municipality, Haskovo district’.

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Introduction

This document is an Executive summary of the Report on The Environmental Impact Assessment of the investment proposal for 'Mining and Processing of Polymetal Ores from the Rozino Deposit, Tintyava PLA, situated in the lands of the Rozino village and Gugutka village, Ivaylovgrad Municipality, Haskovo district.'* *This Executive Summary is intended to present and summarise the main information and conclusions contained in the EIA Report, in a publicly accessible form so that all stakeholders could understand the essence of the investment proposal from the perspective of expected impacts on the environment and human health and the relevant mitigation measures where necessary, and build an informed opinion regarding the positive and negative consequences from the project implementation.*

*The EIA Report was supplemented in accordance with the written instructions of:

1. The Ministry of Environment and Water, Ref. No. OBOC-68-65/20.10.2025
2. The Ministry of Healthcare, Ref. No. 04-09 -119/10.09.2025
3. The East-Aegean Basin Directorate, ref. N. IIY-010-808(2) dated 26.09.2025.

The Report on the assessment of the environmental impact by the investment proposal for Mining and Processing of Polymetal Ores from the Rozino Deposit, Tintyava PLA' Environmental Impact Assessment Report was commissioned Tintyava Exploration AD from the town of Ivaylovgrad.

The EIA Report is consistent with Article 96, paragraph 1 of the Environment Protection Act (EPA, SG, issue 91/2002 ..., most recently amended and supplemented) and Article 12, paragraph 1 of the Regulation on the EIA Terms and Procedures (*The EIA Regulation*, SG, issue 25/2003, most recently amended and supplemented).

The EIA Report and the final draft of the Terms of reference for the scope and content of the EIA reflect and consider the notes and remarks from consultancies, including those made by the competent authorities, concerning the scope and content of the EIA.

General Information

1 . Information about the Investor

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2. General Information about the investment proposal and the EIA procedure

This Report concerns the investment proposal (IP) for 'Mining and Processing of Polymetal Ores from the Rozino Deposit, Tintyava PLA, situated in the lands of the Rozino village and Gugutka village, Ivaylovgrad Municipality, Haskovo district.'.

By way of Permit No. 467/28.02.2017 issued by the Minister of Energy Gorubso – Kardjali AD from the town of Kardjali is allowed to carry out prospecting and exploration for

metalliferous ores and minerals in the Tintyava PLA situated in the lands of the Ivaylovgrad Municipality, Haskovo District, and the Krumovgrad Municipality, Kardjali District.

The rights and obligations set forth in the Agreement dated 02.05.2017 for prospecting and exploration for metalliferous ores and minerals - subsurface resources in the meaning of Article 2, paragraph 1, item 1 of the Underground Resources Act in the Tintyava PLA, concluded between Gorubso – Kardjali AD and the Minister of Energy pursuant to Permit No. 467/28.02.2017 of the ME were transferred to Tintyava Exploration AD by means of an Additional Agreement No. 1 to the Contract, pursuant to Article 25, paragraph 1 of the URA and Article 61, paragraph 1, item 12 of the Contract. This Contract became effective on July 17, 2017 and was followed by a Decision No. 09-OC/2017 of the Minister of Environment and Waters concerning the assessment of the negative environmental impact assessment. On 31.08.2020, an Additional Agreement No. 2 extending the period of the Contract by 2 years was signed between Tintyava Exploration AD and the Minister of Energy.

After a 2-year overall report for the performed activities and a reasoned proposal for the first extension of the Contract were submitted, and pursuant to Article 31, paragraph 3 of the 3PI, in connection with Article 2, paragraph 2 and paragraph 7 of the Contract dated 02.05.2017 r., on 23.01.2023, Tintyava Exploration AD and the Minister of Energy signed Additional Agreement No 3 extending the Contract for 2 more years.

At the time of writing of this report, there is no executed agreement granting a concession for the deposit. As required by Article 37, paragraph 1 of the Underground Resources Act (URA), the concession area includes the area of the deposit or its separate parts, and all areas necessary for the performance of the concession-related non-mining activities. The following should be taken into consideration when defining the concession area:

- the bedding of the mineral resource;
- the technical conditions for its utilization to the full;
- the necessary additional areas for placing of stockpiles, storage facilities and technical infrastructure;
- the requirements of the URA for optimal extraction of the natural resource, the overall and annual mining designs will provide for additional exploration to ensure the most complete possible extraction of natural reserves and resources during the mining of the deposit, by applying suitable and environmentally sound technologies.

The distances between the mining areas and urban boundaries and areas have been taken into consideration with a view to securing buffer zones around the technical infrastructure and to protect the environment and human health.

Therefore, the comments here will extend to the boundaries and size of the design concession area required for the mining of the deposit and processing of the ore as this area will be proposed for alignment with the concerned government authorities during the concession granting procedure.

The Contracting Company intends to carry out mining and processing of polymetal (gold-silver) ores from the Rozino Deposit, Tintyava License, with a future concession area of **275 ha, of which 118 ha will be disturbed**. The main activities considered herein are:

- open pit mining of polymetal ores;
- flotation of the ore to concentrate;
- construction and operation of the necessary attendant infrastructure – roads, water supply, power supply, material stores, mine waste facility, etc.;
- staged rehabilitation of the disturbed areas.

The concession period is set as 35 years.

The purpose of the IP is open pit mining and processing of polymetal gold and silver ore from the Rozino Deposit in the Tintyava PLA. The open pit mining process will involve liberation of the natural resource from overburden, mining by drilling and blasting, and crushing of the mined material. Ore processing will comprise flotation to produce concentrate as the final product from the plant. No ingot metal will be produced. The mining waste will be disposed of in mining waste storage facilities.

The IP does not consider maintenance and construction of an explosives storage facility. Blasting will be based on a written agreement with a specialized company possessing all the necessary permits and agreements and carrying out the storage and delivery of the explosives and blasting of the ore mass.

The investor had informed the Haskovo RIEW, the concerned municipalities, mayor's offices and communities at the earliest stage. The investment proposal (IP) lies within the scope of item 19 - Open mining of raw materials in quarries and pits in the case of surface area exceeding 25 ha, or peat extraction in the case of surface area exceeding 150 ha.' of Annex 1 to the Environmental Protection Act (EPA) and is subject to mandatory Environmental Impact Assessment (EIA).

At this stage, open mining and flotation processing of natural raw materials is outside the scope of Annex 4 of the Environment Protection Act and, therefore, the IP does not require an integrated permit in the meaning of Chapter Seven, Section Two of the Environment Protection Act. Thus, there is no need for an assessment of the applicability of BATs for the proposed technologies.

No storage of hazardous chemical substances and mixes in quantities exceeding those laid down in Annex 3 of the Environment Protection Act is envisaged in the IP and, therefore, it is not subject to Article 103 of the EIA. Explosives will be supplied by a licensed company whose storage facilities are equipped and operated in accordance with the legal requirements for use of hazardous substances.

The future license area does not intrude on protected areas in the meaning of the Protected Areas Act, but affects two protected areas (PA) of the country's Natural 2000 ecological network:

- '*Rhodopi - East*', code BG0001032, for protection of natural habitats and wild flora and fauna;

- '*Byala reka*', code BG0002019, for protection of wild birds.

In line with the instructions given, the Investor has taken steps to prepare the necessary EIA documents and a report on the assessment of IP compliance with the protected area conservation goals and object of protection (CA report).

With reference to the letter of the Ministry of Environment ref. 99-00-587/27.05.2024 and pursuant to Article 98, paragraph 1 of the Environment Protection Act, a notification to a potentially affected party - the Republic of Greece has been sent concerning the EIA procedure and in line with the provisions of the Convention on Environmental Impact Assessment in a Transboundary Context. This notification is consistent with Decision I/4 of the First meeting of the Parties to the Convention.

Letter Ref. OBOC – 68/23.10.2024 of the MOEW contains the response of the Greek state confirming its wish to participate in the EIA procedure as a concerned party. This makes the Minister of Environment and Water the competent authority for conducting of the EIA procedure. The assessment considers in detail the aspects of transboundary impact with particular focus on 'water'.

The project site is within the area of responsibility of the East Aegean Catchment Directorate based in the city of Plovdiv. The EABD Director has expressed a statement in Letter Ref. No. IIV-01-183 (5)/26.05.2023 (Attachment 5) that the IP is admissible provided that the following conditions are met (we attach some of them):

- No pollution of surface and ground water by operations in the IP is allowed;
- No activities that may impair the status of the BG3MA100R270 water body are allowed.
- No direct and indirect disposal of hazardous and harmful substances in ground water is allowed during the IP implementation;
- No felling of natural riparian vegetation is allowed;
- Abstraction from surface or ground water must be carried out following a permit issued in accordance with Article 44, paragraph 1 of the Waters Act;
- Construction of new facilities in a water body must be carried out following a permit issued in accordance with Article 46, paragraph 1 of the Waters Act;
- The quality and quantity status of drinking water sources in the IP area is protected;
- Construction of drainage ditches peripheral to the mine field and to the open pit must be provided for in order to collect precipitation and snow-melt run-off from higher levels to prevent entry of surface water into the pit;
- Adequate measures for reusing of precipitation, waste and drainwater into a closed return cycle in order to reduce the planned water abstraction and efficient use of water.

All those requirements have been taken into account in the basic design and the relevant analyses will be made in this EIA Report.

It should be noted that the Water Act does not provide any bans and restrictions as regards the IP presented above.

This EIA Report was prepared on the grounds of Article 96, paragraph 1 of the Environment Protection Act, in line with the consultations with the concerned parties and the community, additional studies during the EIA procedure, including letters of the MOEW with Ref. No. OBOC-68-17/18.11.2024 and Ref No. OBOC-68-28/14.02.2025 (Attachment 1).

The subject of description and analysis in this EIA Report is the *territory* that will be affected by the entire IP with its additional or auxiliary facilities and activities in relation to the space and time dimensions, the frequency and the duration of significant impacts which the IP is likely to have. The impacts caused by the IP during *its implementation stages – construction, operation, closure and rehabilitation*, have been identified and the extent of development/detail of the draft document and the information provided by the Investor have been taken into account.

Also, the possible cumulative impacts have been evaluated based on available information about any other existing or envisaged activities and projects carried out in the IP area.

The expected impacts have been evaluated and general and specific conclusions are made in respect of the expected potential impacts and their extent. These conclusions underpin the proposed recommendations and measures to reduce the impacts, resolve potential future environmental issues and concerning the safe operations on site, ensuring human-health and the environment protection and sustainable development of the region.

3. Location of the Investment Project Proposal

The Rozino deposit in the Tintyava PLA is situated in the lands of the villages of Rozino, Gugutka, Ivaylovgrad Municipality, Haskovo district, and is 1.2 km. to the south of the Rozino village. The border with Greece is to the east and south, and the municipalities of Lyubimets, Majarovo and Krumovgrad are situated to the north and west. The Rozino Project is located approximately 350km (by road) east-southeast of the city of Sofia.

The Rozino Deposit region is encircled to the south by the steep rocks of the Tashlaka locality and is divided by the Byala River and its tributaries which flow into the regional watershed area of the Arda river. The average altitude in the deposit area is approximately 470 m. (in the north) and 300 m. (in the south).

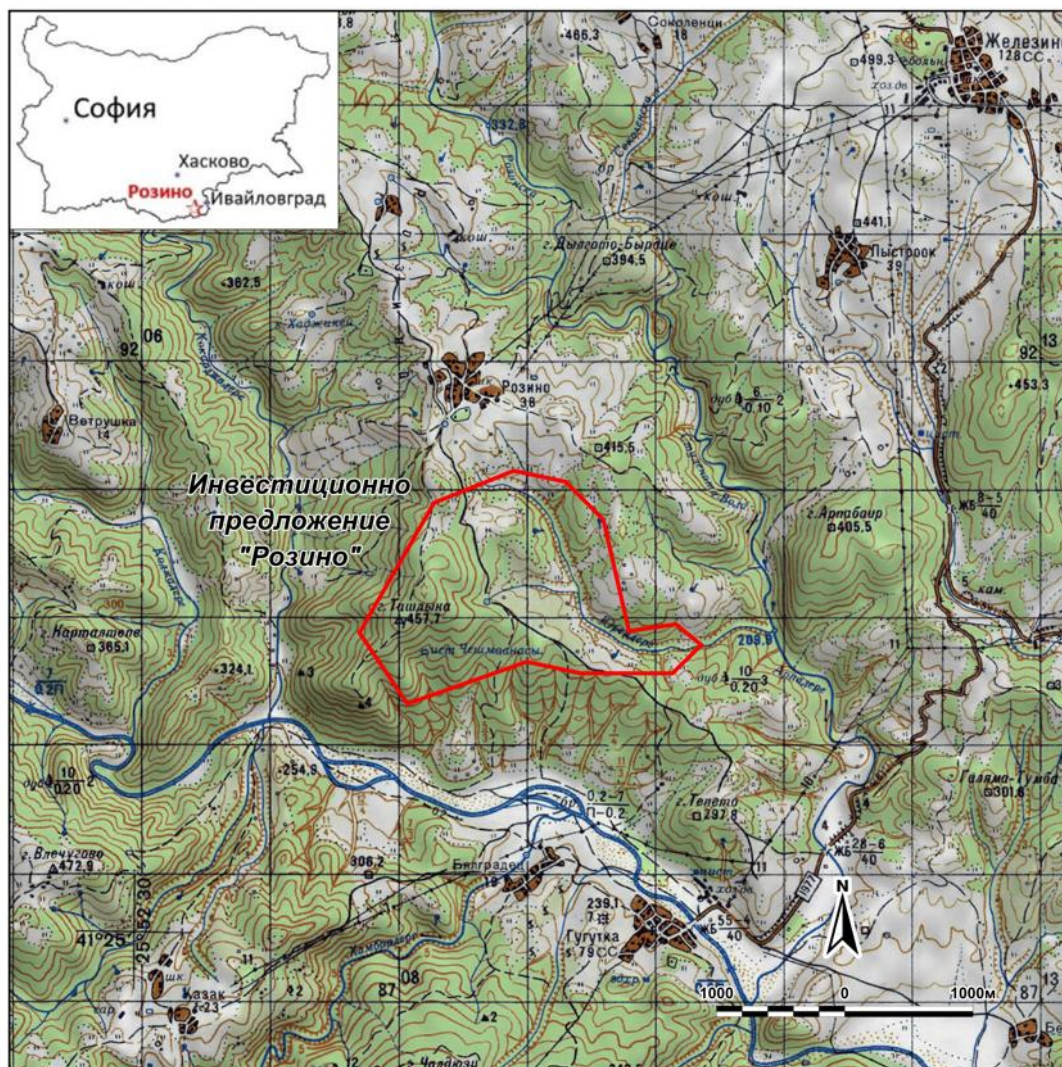


Figure 3-1. Location of the Rozino Deposit, Tintyava Property

The topography in the area is low-mountainous and hilly, with level hills being prevalent. Low ridges and valleys are well pronounced. The Maglenik height is home to Kodjale, the highest peak in the area, of 1,267 m. The elevation above sea level varies between 70 and 700 m., averaging at 320 m. The topography at the level of the Tashlaka peak is highly indented by the Byala reka river and its tributaries - Dermen dere, Kokarja dere, Arpa dere, Hambar dere, Yuruklerska, etc. Tectonically controlled river valleys dominate the river basins, whose rivers, flowing from different directions, enter the main regional river - Arda.

The area belongs entirely to the Gyumyurdjin-Maglenishka geographic sub-area.

North-westerly winds prevail and are active along the valleys and the mountain ridges. Foehn is also present. The annual average precipitation varies widely between 800 and 1,200 mm. Its high is during the autumn and winter, in November and December. Often storms reach 100 mm. over 24 hours. This is one of the reasons for sheet erosion. Snow stays on the ground for 5 to 10 days per year. The surface run-off rate is 5 to 25 l/sec./1m².

Areas required for the IP and road Design depth of mining

The overall intended concession area amounts to **275 ha**, of which **118 ha** will be disturbed. The buffer area covers 157 ha. Some facilities will be developed in areas already processed/disturbed without taking over new areas, with the 'overlap' being 261,9 ha. The individual infrastructure is distributed as follows:

No.	Sites	Areas, ha x 10
1	Processing plant	51.4
2	Open pit	261.9
3	External topsoil stockpile 1	14.5
4	External topsoil stockpile 2	37.0
5	External waste rock stockpile (overburden)	247.0
6	Internal overburden stockpile (backfill).	133.2
7	External process tailings storage facility.	438.4
8	Internal (backfill) process tailings storage facility.	128.7
9	Contact water reservoir. Includes: an external processing waste storage facility, a mine, a processing plant and collection ditches. Comprises a supernatant water body and retaining dam).	9.1
10	Clean water reservoir and collection ditches (lake and retaining wall)	62.4
11	Service roads (external to the above infrastructure)	57.3
12	Overlapped areas - backfilling-internal stockpile and internal process tailings storage facility (this area is deducted from the total area!).	-261.9
Total required area:		1179.0

No mining will be carried out in the buffer zone. The buffer zone will provide protection for the facilities and plants and will restrict accidental access by people and animals. It will ensure compliance with the obligations arising from the Underground Resources Act for further exploration with a view to optimal extraction of reserves and resources from the subsurface.

A visual presentation of the IP elements, which are at the concept phase, is made with the layout plan presented on Figure 3-2. As the project advances with transition toward detailed design, the outlines of individual sub-sites may change insubstantially, within the evaluated terrain, without changes to the impact analysis.

In keeping with the requirements set forth in letter IIV-02-231/1/18.12.2024 of the West Aegean Region Basin Directorate, provisions should be made for construction of drainage ditches peripheral to the mine field and to the open pit must be provided for in order to collect precipitation and snow-melt run-off from higher levels to prevent entry of surface water into the pit. It should be noted that they are visualised in the layout plan hypothetically, given the current topography of the terrain. Their exact locations will be determined following engineering calculations and development of specific technical designs to ensure maximum efficiency in respect of the technical parameters of the future overall design. This is the reason for occasional deviations of the contours of hypothetical ditches outside the proposed concession area. These deviations will be corrected during the technical design phase and will be aligned with and constructed within the submitted concession area.

The coordinates along the outline of the future license are presented in the table below.

Table No. 3-1. Registry of boundary point coordinates of the design license area (БГС 2005 coordinate system)

ID	East	North	Longitude, degrees	Latitude, degrees
1	408811	4589180	25.908290	41.449019
2	409216	4589094	25.913149	41.448299
3	409510	4588798	25.916717	41.445662
4	409710	4587930	25.919241	41.437868
5	410076	4587982	25.923614	41.438381
6	410274	4587821	25.926004	41.436948
7	410050	4587600	25.923359	41.434934
8	409332	4587600	25.914766	41.434853
9	408913	4587690	25.909739	41.435616
10	407994	4587363	25.898795	41.432568
11	407609	4587935	25.894091	41.437674
12	408190	4588930	25.900899	41.446702

The IP layout plan is presented on the next figure.

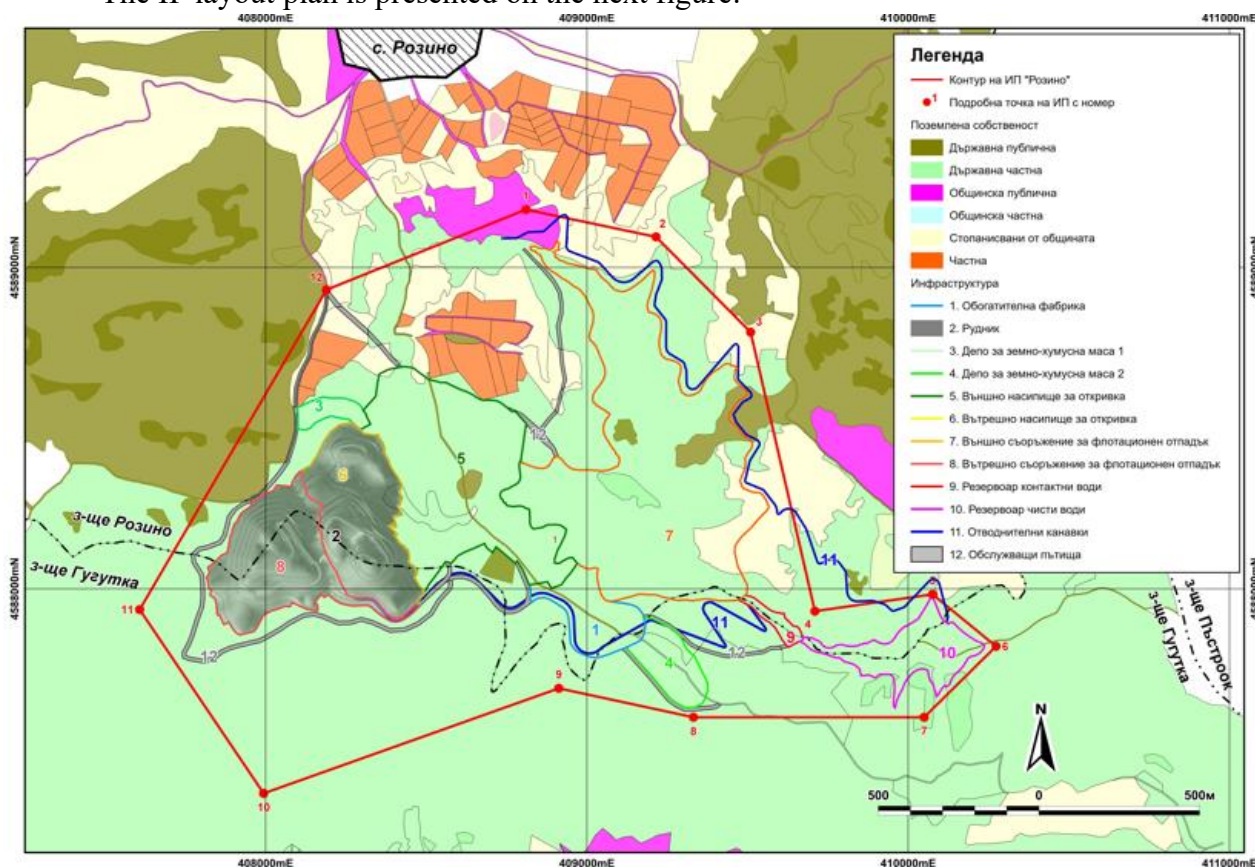


Figure 3-2. IP layout plan

Realizing the investment proposal requires construction of on-site roads and access roads. The Rozino mine will be connected to the road system along the existing unsurfaced road running across the Rozino and the Konnitsi villages and linking them to the towns of Ivaylovgrad and Krumovgrad via the II 59 road.

It is assumed at this time that two options are present for transport access to and from the concession area, including hauling of final produce:

- *option 1:* Via a new 3,725 m. long private road from the concession area to a Category III National Road;
- *option 2:* Via a new 2,810 m. long private road from the concession area to a municipal road. The municipal road is 12,210 m. long.

These options are visualised on **Figure 3-3**.

The expected weekly number of produce hauling trucks totals at 30, with 25 t of net weight hauled per truck, in three business days per week.

An approximate forecast is that hazardous chemicals and materials will be delivered once per quarter but it is unclear where the suppliers will be from as no suppliers have been selected and cannot be selected before a mining concession is obtained and the processing plant is constructed.

The principal intends to use all-electric trucks because no harmful substances are emitted and no internal combustion engine noise is generated. The economic incentives and regulations of the EU, such as the Euro 7 requirement, make way for an increasing number of electric heavy vehicles in the coming years. It is the EU policy to remove gradually heavy diesel-powered vehicles to the benefit of zero-emission vehicles. The IP proponent also aspires to this policy. 5,279 new electric trucks have been registered in the EC in 2023 alone.

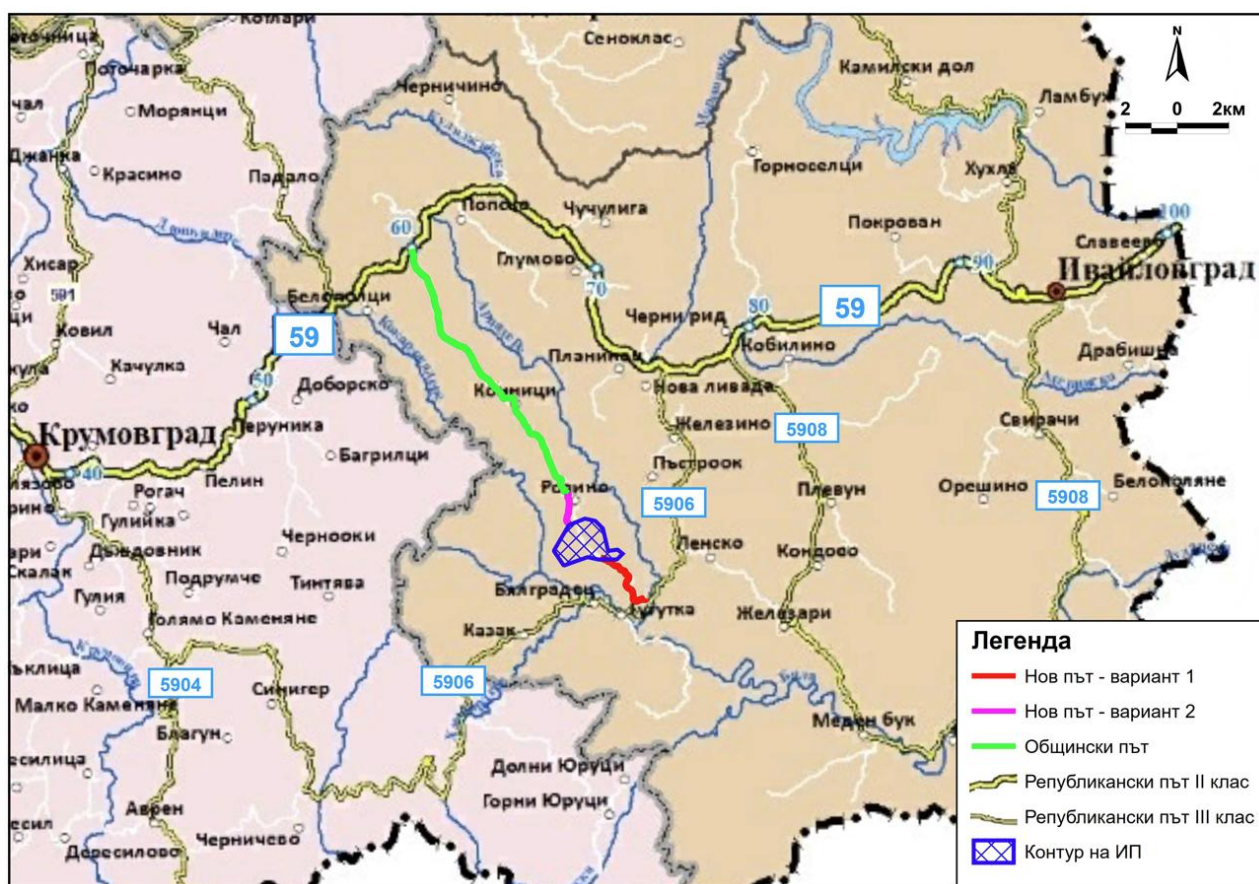


Figure 3-3. Final produce hauling option assumptions

The measured reserves and resources continue to an approximate depth of 195 m., with around 95% of them lying at less than 120 m., with approximately 1% being below 140 m. **The planned maximum depth of the pit is approximately 140 m from the terrain surface.**

RL 315 is the elevation of the fresh water reservoir and RL 325 is the elevation of the mixed water reservoir.

Throughput. Mode of operation. Personnel.

The reserves in the Rozino Deposit amount to 11.3 Mt of ore grading at 1.33g/t gold and 26.6 Mt of overburden, as described in the Supplement to the Final Report on Reserves'

Given the time required for mine construction, construction of the necessary infrastructure, land-acquisition procedures, investment risks, mining and geology risks, the period of existence of the site will be 35 years for an average annual rate of production of 0.87 Mt of

The planned maximum annual throughput rate is as follows:

- Ore – 1.77 Mt/a or 0.72 Mm³/a;
- Overburden – 3.3 Mt/a or 1.3 Mm³/a;

The planned average annual throughput rate is as follows:

- Ore – 0.87 Mt/a or 0.36 Mm³/a;
- Overburden – 1.65 Mt/a or 0.681 Mm³/a;

Processing of these quantities of ore requires a processing plant with a design annual throughput of 1.7 Mt of Tons This design maximum output of the plant will ensure available processing capacity if the planned maximum annual throughput rate of the mine is achieved.

The following table presents the regimen of operation of the mine and the processing plant.

Table 3-2. Mine and Processing Operation Regimen

No.	Parameters	Unit	Qty
1.	Work days per year		
	- Total number of days in the year	No./Year	365
	- Number of holidays per year	No./Year	0
	- Number of bank holidays per year	No./Year	14
	Total number of work days per year	No./Year	351
2.	Work days per week	No./Week	7
3.	Work shifts per 24 hours	no/day	
3.1.	For the pit	no/day	2
3.2.	For the plant	no/day	3
4.	Shift duration	hour	8

The number of persons operating on site was determined by the types of activities during the operation, with the expected **total personnel being 120 persons**. According the present information, 50 persons will be required for the mining operation and 70 for the Processing Plant.

4. Structure, layout and basic process parameters

4.1. Description of the physical characteristics of the complete IP and, where applies, of any required demolition operations, of the water and subsurface use requirements – during the construction and operation phases. Rehabilitation.

Geological engineering, hydrogeological, geological and other field testing and laboratory testing have been carried out while studying the mining and processing conditions for operation of the deposit. Open pit mining will be employed, given the dip, situation and depth of the natural resource.

The intended IP parameters are as follows:

- ✓ No mining operations have been carried out in the Rozino deposit, Tintyava PLA;
- ✓ No processing plant has been constructed;

- ✓ Access by transport to the deposit will be along existing roads, with partial construction of new roads;
- ✓ There are no electricity and water supplies to the mine.
- ✓ Drilling and blasting will be employed during the mining.
- ✓ The deposit will be operated in accordance with duly approved overall operation and closure design/plan.

Deposit stripping and pit construction are fundamental for the open pit mining. The efficient and safe operation of the Tintyava PLA is contingent on the correct and coherent implementation of these activities.

The open pit mining of polymetal ores from the Tintyava PLA will include drilling and blasting, crushing, hauling and processing of the mined material in the processing plant, hauling of overburden (waste rock) to a stockpile, and transporting of the flotation waste to a MWF.

Mine Construction

The capital mine construction works will be as follows:

- **Year 1:**
 - Rehabilitation of existing road links and building of new roads to the pit, to the processing plant, to stockpiles, to the water reservoirs;
 - Stripping works to prepare 2 stockpiles for topsoil collected selectively where possible and also stored selectively, a mine waste facility, and a temporary low-grade ore stockpile. Approximately 45% of the project area will be stripped;
 - Mine plant maintenance pad is set up;
 - Construction of a power supply line is started;
 - The plant site is cleared and construction of the processing plant is started;
 - Mobile ISOBOX containers for the administration and changeroom facilities are delivered;
 - A diesel generator set is delivered and installed for use during mine construction and, subsequently, as a stand-by power source for cases of main-supply failure;
 - Delivery and installation of a mobile crusher for the MWF retaining walls (dams) and for road construction and maintenance;
 - Grubbing of terrains intended for the clean water pond and starting the dam construction;
 - Grubbing of terrains intended for the contact water pond and starting the dam construction;
 - Grubbing of MWF footprint areas;
 - Grubbing of the contact water reservoir dam area at the base of the MWF;
 - Setting up of the first mine levels, mainly for overburden removal, in order to uncover and prepare ore reserves;
 - Delivery of mobile chemical toilets for the workers.
- **Year 2:**
 - Continued selective topsoil removal, with further 45% of the area, or 90% in total being stripped, and continued selective topsoil disposal for subsequent use in rehabilitation;
 - Continuing works on the MWF and the low-grade ore stockpile;
 - All road links between individual facilities are completed;
 - The MWF contact water reservoir dam is completed as are the pit and the processing plant will be completed;
 - The low-grade ore stockpile contact water reservoir dam will be completed;
 - The clean-water reservoir dam will be completed, as will be the contact-water pond and the non-contact water reservoir.

- The entire system for management of the water flowing to the contact-water and non-contact water reservoirs is completed;
- The adjoining infrastructure is completed and operations can begin;
- Construction of the processing facility will be completed by the end of Year 2.

Table 4.1-1 shows the overburden and ore volumes utilized during the first two years.

Table 4.1-1. Volumes utilized during the mine construction phase

Production year	One		Two	
Section 1	Overburden, t	Ore, t	Overburden, t	Ore, t
Total:	8,621	3,837	708,689	178,947
Stockpiled ore		3,837		178,947

Completion of all of the above activities completes the mine construction phase and initiates the proper mining.

Operation

Proper operations will begin immediately after mining construction is completed and after the plant begins normal operations.

The main processes during the operation will be:

- Overburden removal
- Mining operations
- Ore Processing

Ore mining

Topsoil overburden (mass) work

The topsoil (soil) overburden will be collected separately from the rock overburden. Selective topsoil stockpiling is envisaged and the topsoil will be used for disturbed-area rehabilitation after operations end.

The main soil-mass collection activities will be:

- removal from the envisaged areas of tree and brush vegetation (grubbing);
- heaping of the soil mass by bulldozer, although it should be noted that no topsoil is present in some areas or is shallower than 0.25 cm. and, therefore, cannot be collected. The topsoil from all other areas will be collected in heaps and loaded by front end loader or excavator onto trucks for hauling to the two top-soil stockpiles;

These stockpiles will be developed during the mine construction and will be closed after rehabilitation is completed.

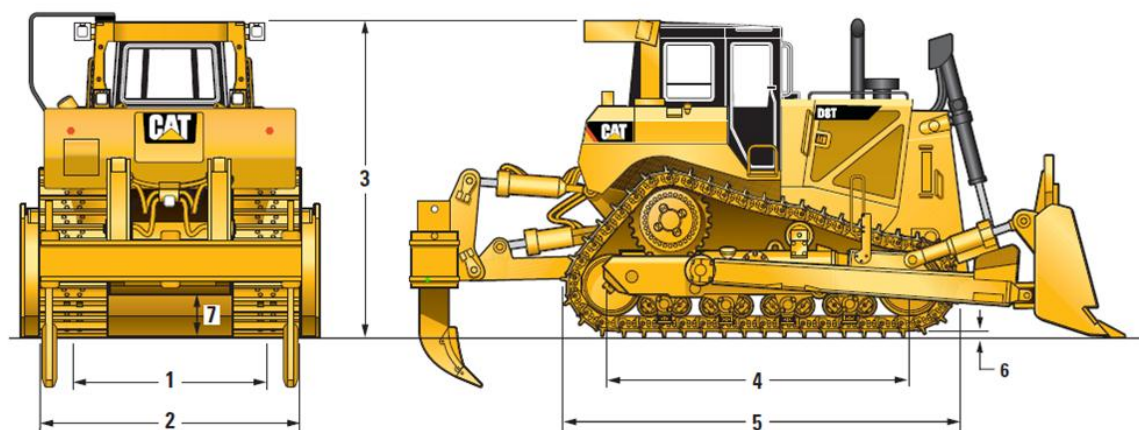


Figure 4.1-1 CAT D8t bulldozer.

Overburden (waste rock) work

The following overburden removal and ore-mining parameters have been set for the Rozino Deposit:

- Working bench height - 5 to 10 m.;
- Non-working bench height - 20 m. (the 5 m. high benches in the final non-mined contour are combined in groups of 4 or two 10 meter high benches joined as 2);
- Working bench angle - 85 to 90°;
- Non-working bench angle - 70°;
- Minimal width between two non-working bench groups - 12 m.;
- Minimal work-area width - 60 m.;
- Overall non-mined face angle $36\div 48^\circ$.

Because of the hardness of the overburden, it is accepted that both the ore and the waste rock will be detached by drilling with subsequent millisecond delay initiation and blasting using the NONEL system.

As it does not contain any payable components but envelops or is hosted in the ore-bearing rocks, the rock overburden in the Rozino Deposit should be selectively removed and stockpiled.

Most generally, the processes for selective removal of waste rock are: drilling and millisecond delay blasting to detach the waste rock from the massif, loading by back-hoe shovel to trucks and hauling to a waste-rock stockpile.

Currently, the NONEL (non-electric) blast field ignition and blasting system has for the past 30 years been most widely used in Bulgaria and in the EU because of its advantages over electric or cap-and-fuse ignition which were used in the past in almost all open pits and quarries in Bulgaria. The NONEL system has the following advantages:

- It is the safest transport, handling and initiation system;
- Its broad range of arming delay devices allows for controlled reduction of the blast impact to a minimum level and blasting of separate series of boreholes in the same blast field;
- Lower sound impact.
- Better fragmentation.

Overall, 26.6 Mt or around 10.8 Mm³ of waste rock will be removed from the deposit by design. Or the expected maximum annual volume is 3.3 Mt (1.3 Mm³/a)

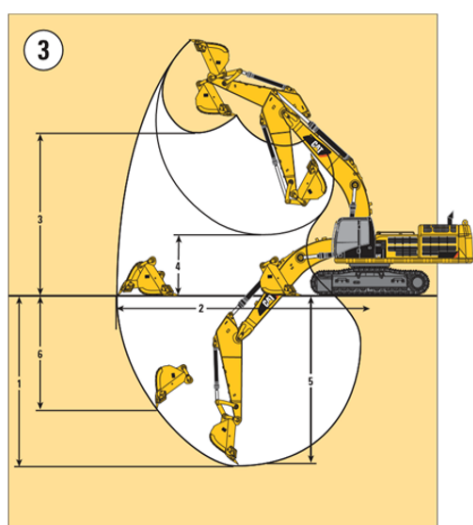
These volumes of waste rock are intended for stockpiling in the WRF to the east of the mine pit.

Backfilling of mined-out spaces will begin after Year 4 (once the reserves in Section 1 are exhausted).

The overburden removal bench heights will be 5 to 10 m.

The waste rock and the ore will be loaded by a 6 m³ backhoe hydraulic excavator, positioned after the blasting and airing of the pit next to the blast field and beginning the loading of the blasted heap.

Figure 4.1-2 presents an overall view of a CAT 930D excavator and its basic technical parameters.



Дължина на стрелата	7.25 m
Рамо	3.4 m
Кофа	6.0 m ³
1 Максимална дълбочина на гребане, мм	7650
2 Максимална дължина на загребване на нивото на земята, мм	12 690
3 Максимална височина на товарене, мм	8200
4 Минимална височина на товарене, мм	3200
5 Максимална дълбочина на гребане със събрана кофа, мм	7520
6 Максимална дълбочина при вертикално гребане, мм	5100

Figure 4.1-2. The CAT 390D excavator and its basic technical parameters

Overburden hauling will be by dumper trucks with a total carrying capacity of approximately 55 t (33 m³) and a 10x4 axle configuration, a 7 m. loading length, a 2.6 m. loading width, and a 1.96 m. unloading height. The trucks will be equipped with modern engines meeting the EURO 6 emission standard.

Twelve machines will be used in overburden removal.

Table 4.1-2. Overburden (topsoil and waste rock) work equipment types

No.	Equipment type	Required units
1.	Drill rig	1
2.	Dozer	1
3.	Excavator	1
4.	Dumper trucks	7
5.	Water Truck	1
	Total overburden:	10

The conceptual design and a maximum annual output of overburden of 3.3 Mt and 1.7 Mt of ore underlie the tentative parameters for drilling and blasting for overburden and ore. The main drilling and blasting parameters are provided in Table 4.1-3.

Table 4.1-3. The main parameters of the ore blasting work

No.	Parameters	Unit	Overburden and ore - average parameters
1	Bench height	m	5 to 10
2	Hole Diameter	mm	76.2 to 110
3	Explosive type	-	ANFO/E3000
4	Relative explosive consumption	kg/m ³	0.36
5	Volume of rock blasted from 1 blast field / blasting for overburden	m ³	Approximately 30,000
6	Volume of rock blasted from 1 blast field / blasting for ore	m ³	Approximately 15,000
7	Frequency of blasting for overburden per	qty	1 time per week

	week		
8	Frequency of blasting for ore per week	qty	1 time per week

The total number of blasts will be 88. The intent of the drilling and blasting works is to secure productive and efficiency of the excavation and hauling equipment and, also, of the primary crushing by suitable optimal crushing of the material and ensuring a minimal quantity of oversize pieces.

No explosives will be stored on site. The IP is not covered by the assumptions of Article 99b of the Environment Protection Act.

A contractor will carry out the drilling and blasting works and will deliver the required explosives immediately prior to their use, which excludes the likelihood of explosives being present on site. The determined mass of the charge will be mandatory for the drafting of each drilling and blasting pattern.

Ammonium nitrate - fuel oil (ANFO) and/or site-mixed emulsion are intended for use as the main explosives. The drilling and blasting parameters have been defined for three different zones on account of the rock mass type and condition, as follows: Oxide, transitive and fresh rocks, for both ore and barren rock, respectively.

Special blasting works means that the blasted material will slide in place without any flyrock. However, as regards the safety of blasting near urban areas, any probability of flyrock will be precluded through the use of protective covers. These protective covers could be heavy rubber blasting mats or geotextile or light covers made of wide and smaller mesh nets used together with discarded post-use conveyor belts. Properly positioned over the blast field, the protective covers restrict flyrock. Blasting mats reduce the generated noise and dust raised during blasting. The individual protective covers will be positioned in a manner that enables blasting fumes to escape. This reduces blasting fume pressure and allows for a debris and dust suppression by the mats. Another substantial advantage is that the covers can be used multiple times.

In this regard and in line with the good open-pit development practices, the first 5 to 6 blasts will be intended to adjust and fine-tune the drilling and blasting parameters. Well-blasted/fragmented material saves further energy for fragmenting of oversize pieces and generally improves the efficiency of the mining and processing machinery.

In line with the Rules on Labour Safety in Open Pits and Quarries, the drilling and blasting contractor will hold a license for operation with explosives and must receive a permit from the Regional Labour Inspectorate for the performance of drilling and blasting for each year and must draft a drilling and blasting pattern for each individual blasting and present it for approval by the Control Over Hazardous Materials Authority of the Ministry of the Interior's regional office. The determined safe mass of the charge will be mandatory for the drafting of each drilling and blasting pattern.

The investor may not carry out any blasting inconsistent with the safe explosive charge determined with respect of the seismic impact in the area of the quarry. The legislator has provided for a strict control mechanism intended to ensure work safety, environmental safety and local community life and health safety.

Experimental blasts have been carried out during the pre-feasibility studies in the Rozino deposit, with control measurements and registration of their environmental impacts, their results are presented in 'Evaluation of the Side Impact of Blasting on the Environment, Rozino Site. Final Report (2020.)'

Ore related work

The following operational parameters have been adopted for both overburden and ore related work:

- Working bench height - 5 to 10 m.;
- Non-working bench height - 20 m. (the 5 m. high benches in the final non-mined contour are combined in groups of 4 or two 10 meter high benches joined as 2);
- Working bench angle - 85 to 90°;
- Non-working bench angle - 70°;
- Minimal width between two non-working bench groups - 12 m.;
- Minimal work-area width - 60 m.;
- Overall non-mined face angle 36÷48°.

Ore will be detached by drilling with subsequent millisecond delay initiation and blasting using the NONEL system.

The NONEL system has the following advantages:

- It is the safest transport, handling and initiation system;
- Its broad range of arming delay devices allows for controlled reduction of the blast impact to a minimum level and blasting of separate series of boreholes in the same blast field;
- Lower sound impact.
- Better fragmentation.

The following mining sequence will be applied:

- prepared reserves from a level will be percussion-bored by a rig equipped with a dust extraction system;
- once bored, the field will be charged with primed explosives and blasted.
- Once the working face is aired, the ore will be loaded by a 6 m³ backhoe excavator onto dumper trucks and will be hauled to the concentrator plant.

The expected maximum annual ore volume is 1.75 Mt, or 0.72 Mm³. In total, 6 machines will be employed in ore mining.

Table 4.1-4. Type of ore equipment, pcs.

No.	Equipment type	Required units
1.	Drill rig	1
2.	Excavator	1
3.	Dump trucks	4
4.	Water Truck	1
	Total Ore:	6

The blasting parameters are provided in **Table 4.1-3**.

Securing the quality of ore feed to the plant requires work in two stages in the Rozino deposit. This will ensure availability of ore with the required quantity and quality over the entire period of operation.

Stage 1 Development of Section 1

All operation will be focused only in Section 1 during this stage.

Once stripping in Section 1 is completed, all the plant will be moved and used in the stripping and preparation of Section 2. Only mining will continue in Section 1 until the scheduled geological reserves are exhausted.

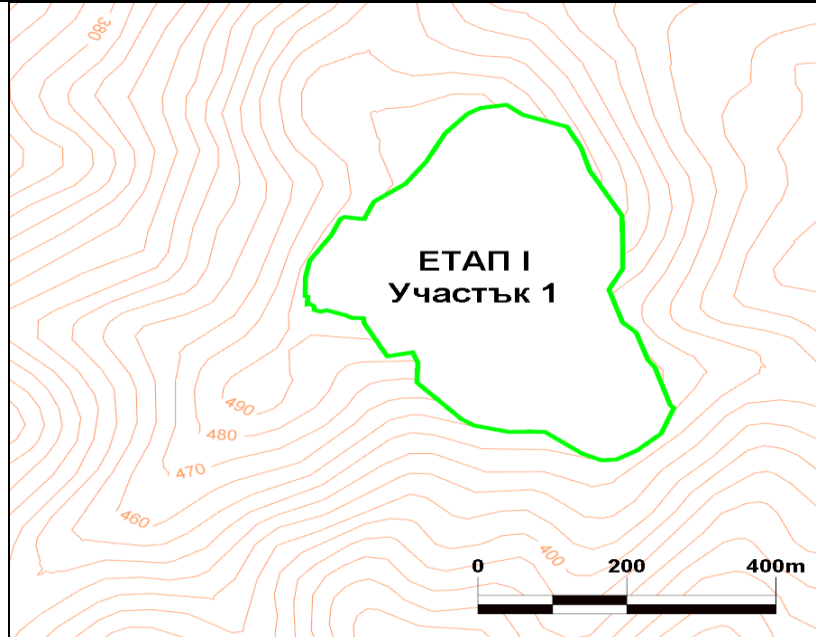


Figure 4.1-3. Stage 1, Section 1 of the deposit

Once the bottom of reserves in Section 1 is reached, waste overburden and mine waste rock can be used as backfill in the pit in this section (the mine waste facility will change from external to internal).

Stage 2: Section 1+2

Stage 2 will begin by pre-stripping in Section 2. Mining in Section 1 will not yet have been completed.

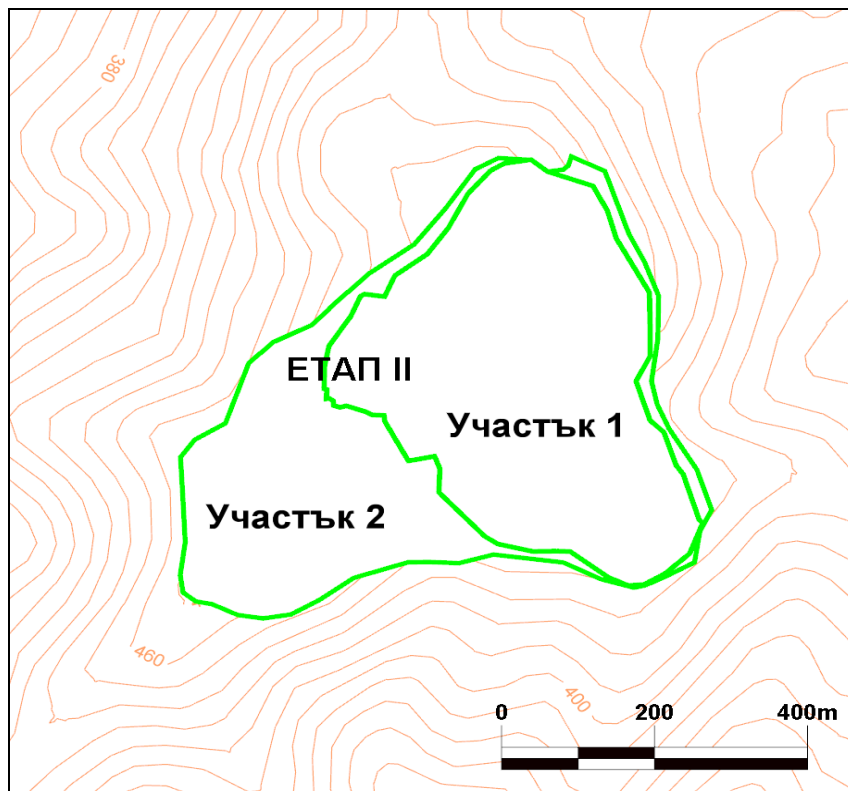


Figure 4.1-4. Stage 2, Section 1 and Section 2 of the deposit

Section 2 will be completed after:

- full exhaustion of reserves in Section 2;
- backfilling of Section 1 using overburden rock and processing waste.

Stockpiling works

Stockpiling will involve selective stacking by bulldozer and trucking.

Selective/separate stockpiling of:

- Earthfill and topsoil;
- Waste rock (overburden);
- Flotation tailings (processing waste)

This selective stockpiling conforms to the best international practices for management and conservation of topsoil which will be used to remediate disturbed areas at the beginning of the rehabilitation phase.

Stockpiling of topsoil

Two earth-fill and topsoil stockpiles will be developed for the deposit, as follows:

- To the north-east with one horizon at RL 495 m;
- To the south-west with two horizons at RL 377 and 382 m.

These stockpiles are expected to evolve during the mine construction and will be closed after rehabilitation is completed. It should be noted that the a staged rehabilitation system can be selected during the drafting of the overall design for operation and closure of disturbed lands.

Stockpiling of waste rock (overburden)

As regards the rock overburden stockpile, it will be bulldozer operated. The waste rock hauled by trucks will be delivered to the stockpile and dumped. Subsequently, a bulldozer will shape the stockpile.

An external stockpile will be developed and in-pit stacking will begin after Year 4.

The boundary between the outer and the in-pit stockpiles is conditional and follows the outline of Section 1 in the pit.

Table 4.1-5. Type of stockpiling equipment, pcs.

No.	Equipment type	Required units
1.	Dozer	2
	Total stockpiling works	2

Disposal of flotation tailings

The processing waste will be disposed of in a thickened state of 70 – 75% solids. This method is preferable to the conventional tailings for the following reasons:

- Higher recovery of return water;
- Lower use of 'fresh' water;
- Smaller disposal area;
- Significant increase in the stability coefficient of disposal facilities containing thickened flotation tailings;
- Significantly reduced risk of compromising of supporting facilities;
- Significantly higher potential for staged rehabilitation.

Disposing of flotation tailings (processing waste) with a 25%/75% water to solids ratio will reduce the footprint and, thus, the volume of the facility by approximately 1÷1.5 ha as compared to conventional disposal where the water to solids ratio is 45%/55%, i.e. there is an approximate 20 to 25% reduction of return water.

The water content of the flotation tailings will be reduced and a thickener will be installed in the processing plant to store the water from the dewatered flotation tailings.

Following exhaustion of the reserves in Section 1 and as the mining works in Section 2 advance, backfilling of the mined out spaces will begin and, again, will be consistent with the best open mining practices. Backfilling is expected to begin during Year 4 or 5 of the operations.

Backfilling has the following positive effects:

- Substantial reduction of the area required to (store overburden) and processing tailings (should the quality of such a process be proven);
- Substantial reduction of the time during which external stacking will be required, allowing for much faster rehabilitation of the possible external stockpile and the external process tailings storage facility.

Ore Processing

Process Flow Diagram and Description of the Ore Processing Plant

According to the pre-feasibility studies, the mined-ore processing sequence includes the following main and auxiliary activities:

- crushing and hauling;
- Storage of crushed ore in a covered intermediate storage facility - a reinforced concrete area covered by a canopy and with a feeder underneath;
- milling (ball mill);
- flotation;
- flotation tailings thickening and disposal in a WRF;
- concentrate thickening and filter-press dewatering;
- auxiliary activities - provision of: water, air and reagents.

The general concentrator-plant process flow diagram is presented on Figure 4.1-5.

Ore Dressing

Crushing

The choice of ore preparation circuit is underpinned by the low fragmentation index (4,7-8,92 kWh/t) and the moderate Bond-mill work index (11,2-12,5 kWh / t) for the different ore types which favours the use of a staged crushing circuit and ball milling. A belt feeder is the primary feeding device and is capable of sustaining impact by large pieces of ore entering the ROM bin. A static grizzly will separate all oversize pieces from the jaw-crusher feeder. Secondary dust from unloading trucks and from the crushing process will be prevented by a sprinkler system installed throughout this plant.

The comminution circuit is designed to produce P80 -12 mm. crushed ore. It will involve three stages of crushing: Primary jaw crusher followed by secondary and tertiary cone crushers. The ore will be fed directly from the pit or by a loader from the ROM pad to the ROM bin. A protective 700 x 700 mm screen will prevent entry of large pieces into the jaw crusher. A static 15kW hydraulic hammer will crush oversize pieces to the required size. A belt feeder (1300 x 6400 mm, 22kW) will feed the primary jaw crusher (160 kW). The crushed ore will be fed to a conveyor through a sieve. Any steel scrap will be removed by a magnet in the metal scrap bin.

Air quality in each crusher building will be maintained by a system of sprinklers. A 5 t maintenance hoist is provided for in the primary crusher building. The primary crushed material will be screened in a two-deck screen. The underside will report to the stockpiled ground ore and

the oversize will report to the secondary and tertiary cone crushers. The secondary and tertiary crushers will operate in a closed circuit with the two-deck screen until all material is fed as through the lower screen deck to the stockpiled crushed ore. Two weightometers are provided for. There is one secondary crusher and two tertiary crushers. Assuming 16 hour work in two shifts with a 75% plant availability on average, the crushing plant throughput will be 5,000 t/day. The total installed capacity of the crushing plant will be approximately 1,600 kW.

Covered crushed-ore intermediate storage

A 15,000 t. of buffer volume is provided for downstream of the crusher. This volume will be sufficient to supply the milling circuit for three days.

The crushed ore will be kept in a temporary stockpile comprising a reinforced concrete pad with a feeding bin and will be covered by a metal canopy to prevent fugitive emissions of dust.

The diagram illustrates the entire gold processing workflow. It begins with the arrival of raw ore (ХАЛДА ЗА РУДА) via a truck (АВТОСАМОСВАЛ) and a loader (БАГЕР). The ore is then processed through a series of grinding stages: a primary jaw crusher (ПЛАСТИЧНАТ ПИТАТЕЛ), a cone crusher (КОНУСНА ТРОЩАЧКА), and a ball mill (ЦЕЛЮСТНА ТРОЩАЧКА). The resulting slurry is then classified by a cyclone (ЦИКЛОНЕН КЪЛЪСТЪР) and a classifier (ВИБРАЦИОННО СИТО). The concentrate is then subjected to flotation, which includes a rougher stage (ОСНОВНА ФЛОТАЦИЯ) and a cleaner stage (ПРЕЧИСТНА ФЛОТАЦИЯ). The final concentrate is then dried in a rotary dryer (ТОПЛОВА МЕЛИЩА) and stored in a silo (СИЛОЗ ЗА НАТРУЩЕНА РУДА). The waste stream (ФЛОТАЦИОНЕН ОТПАДЪК) is managed through a series of settling tanks (РЕЗЕРВОАР ЗА ОБРОТНА ВОДА, РЕЗЕРВОАР ЗА ЧИСТИ ВОДИ) and a final disposal area (СЪОРЪЖЕНИЕ ЗА ДЕПОНИРАНЕ НА СЪБЪСТЕН ФЛОТАЦИОНЕН ОТПАДЪК). The diagram also shows the use of various reagents (РЕАГЕНТИ) and the handling of different types of waste (ОТПАДЪК).

Figure 4.1-5. Processing Plant Flow Diagram

Ore grinding.

The ore will be ground in a ball mill. The mill feeding belt will be provided with the necessary ore-feed speed controls and capacity counters. A crosscut conveyor belt sampler will be provided for metallurgical accounting purposes.

The milling circuit comprises a ball mill operating in a closed cycle with a battery of cyclone classifiers. This milling circuit is designed to produce particles P80 -75 µm. The ball mill is 4.88 m in diameter, 7.62 m long with a 3500 kW motor. The ball mill comprises a trunnion and gearbox lubrication system, a cooling system and a control system. The ball mill discharges into a sump feeding the hydrocyclone battery by means of a duty/stand-by feeding pump. The cyclone battery comprises 14 cyclones of which 12 only are operational at any time. The cyclone underflow reports to the flotation circuit while the sand recirculates back to the ball mill.

Any spillage from the grinding circuit will be contained within a sump beneath the ball mill. The sump will be equipped with a vertical slime pump to direct spillage back into the mill feed box.

The installed capacity in the milling circuit is approximately 3,700 kW.

Ore dressing (flotation)

High-volume flotation cells were chosen for the flotation circuit as they are more cost-effective than staged flotation reactors (SFR) from the CAPEX and OPEX perspective. The cells were sized and selected based on resulting laboratory flotation times, with a 2.5 industrial-scale ratio and an aeration ratio of 0.85.

The flotation circuit will comprise a standard collective rougher-scavenger and cleaner sections to produce gold-pyrite containing concentrate.

Prior to reporting to the flotation circuit, the ground ore from the hydrocyclone battery underflow will be passed through a 0,85 mm. mesh size cleaning vibrating screen for removing of all non-typical impurities in the ore, such as wood, plastics, metals and larger ore pebbles.

The cleaning screen underflow will be fed to the two agitation cells, each of 50 m³ in volume. Sequentially connected, they will provide the required slurry and reagent agitation time of 2 x 5 minutes.

A feeding pump downstream of the agitation circuit will feed the slurry to the rougher-scavenger cell circuit comprising 6 high-volume flotation cells in a configuration of 4 gold bearing rougher cells and 2 scavenger cells. Each cell has an effective volume of 60 m³, the total being 360 m³, which ensures the required flotation time of 34 minutes. All flotation cells electrical motors are 90kW each. The flotation cells are supplied with air mass flow control to enable each bank of cells to be controlled.

The scavenger product is the final flotation barren waste and will report to the deep cone thickener for dewatering prior to reporting to the WRF.

The rougher concentrate will be pumped to the cleaner bank. Before reporting to the flotation cells, the slurry will be conditioned in a 10 m³ agitation cell allowing for a 5 minute-long slurry agitation with reagents. The cleaner circuit comprises two cells with installed capacity of 15kW and effective volume of 8 m³ each, or 16 m³ in total, ensuring the required 8.6 minutes of flotation time.

Water sprays are provided in the flotation cell launders to assist froth breakdown and concentrate flow.

A sampler on the discharge side of the scavenger tailings (final tailings) provides a current analysis sample.

The cleaner concentrate is final and reports to a sump feeding a gold bearing concentrate sump. The target gold concentration in the final concentrate is 22 to 30 g/t depending on the grades in the ore feed.

The gold bearing concentrate pump is a fixed-speed cellular pump.

Reagent metering is controlled automatically to operator-set flow rates. Dedicated pumps and metering devices feed frother (Methyl Isobutyl Carbinol - MIBC) and collector (Potassium

Amyl Xanthate - PAX) in various points along the flotation process.

Any spill along the circuit is collected by sump pumps mounted on the flotation circuit floor and is fed to the respective points along the flotation circuit.

The installed capacity in the flotation circuit is approximately 1000 kW.

Concentrate thickening and filtration.

The concentrate thickener has been sized using the available static-settling test results. No dewatering tests have been carried out to size and select the concentrate filter unit. Data about similar concentrate types and particle sizes were used instead. The design moisture content in the concentrate is 10 to 12% density by volume. The concentrate thickening and dewatering circuit comprises a 16 m. diameter concentrate thickener and a dewatering filter press. 11.3 t/h of concentrate will report to the thickener, with 23% solids in the feed. The thickener overflow will be recirculated back to the process water reservoir for reuse in the grinding and flotation circuits. Two 50 mm by 40 mm duty/stand-by thickened tailings pumps will pump the thickened product (50 to 55% solids) to the filter press.

The filter feed reservoir will be agitated to prevent settling of solid particles. Two 75 mm by 50 mm duty/stand-by thickened tailings pumps will pump the concentrate from the filter-press feed reservoir to the concentrate filter-press. The concentrate filter press will be a vertical filter-plate press designed to operate at 75% availability and to produce 11.3 t. of concentrate per day with 10 to 12% moisture content. The filter-press is equipped with a dedicated compressor and air intake.

The concentrate will report to a bin for storage before being loaded for processing by an end-user.

Machinery required for the process plant

- A front-end loader to feed the crusher plant;
- A bulldozer to maintain the crushed ore buffer storage;

Table 4.1-6. Type and numbers of the machines used in the Processing Plant

No.	Equipment type	Required units
1.	Front end loader	1
2.	Dozer	1
Total for processing plant:		2

Flotation Tailings Management

The following specifics were considered for the choice of the tailings thickening and dewatering process:

- Physical and chemical parameters of the flotation tailings will - the current data show no acid generation potential.
- The yield strength limit or yield stress - the property corresponding to the yield strength limit at which plastic deformation of the material occurs;
- Negative water balance;
- Best practices for dewatering of processed mining waste;
- Best practices for management of mining and processing waste.

The above practices and the basic design for the Rozino Deposit have lead to the selection of a technology for disposal of flotation tailings (processing waste) thickened to 70-75%.

Tailings disposal will be preceded by removal of water (thickening). The thickener operates in the following manner: radial flow of slurry to the centre of the thickener, into a feeding tank. As the solids settle, a rake reaching the outer end of the thickener rotates slowly and moves the settled material to the central outlet. At the same time, as solid particles deposit over the thickener base, the supernatant water or solution clarifies and as its level increases with the introduction of more slurry,

it flows over a perimeter launder to return to the process. The particles settling into the centre of the thickener and the matter raked toward it exit through the central exit pipe at the thickener base, containing significantly less water than the slurry in which they had entered the thickener. High-pressure slurry pumps can transfer the thickened processing waste to the storage facility.

The advantage of this method is its efficiency as regards water and the more favourable operating conditions as compared to the conventional method of disposal of processing waste with high content of water. A second advantage over the other options is the minimal potential for liquefaction (slumping or flowing) of the disposed waste or a dam failure. Usually, high-output cone thickeners increase the solids concentration to around 70 -75%.

Cone thickeners ensure the highest yield strength values and guarantee high stability of the stored waste.

The water to solids ratio in the resulting waste is 25/75.

Higher thickening allows for:

- significant increase of the use of return water;
- significant reduction of the use of 'fresh' water.

Being denser, the waste is easier to handle and shape the stockpile it is disposed of in.

Reduced water content shortens significantly the time for evaporation of residual water and improves the stability of the stockpile body, thus allowing for its staged upgrading with guaranteed stability.

Thickening of waste prior to disposal bears a reflection on the overall consumption of water in the processing plant and provides a substantial improvement of the overall water balance.

Also, thickened waste disposal conforms to the natural geographic, geological, geotechnical and geochemical conditions of the site. As the waste is disposed of from the highest toward the lowest stockpile points, it should be noted this disposal enables staged rehabilitation of completed slopes.

Mine closure

If the maximum output is achieved - mining and processing of 1.7 Mt of ore per year, closing and rehabilitation of worked out spaces may begin as early as Year 6 after mining begins.

Post-closure rehabilitation (technical and biological) will ensure a stable and maintenance-free status of the site. The proposed overall site-rehabilitation strategy is:

- Technical rehabilitation;
- Biological rehabilitation.

In practice, technical rehabilitation will start during mine construction, when topsoil will be collected and stockpiled selectively.

The technical rehabilitation activities will involve:

- Forming of ledges and securing of all non-working benches;
- Cleaning of all mine levels of residual rock pieces;
- Loading, delivery and spreading of topsoil along the terrains intended for rehabilitation;
- Preparing of terrains intended for forestation;
- Preparing of terrains intended for recovery for agriculture;
- Ensuring normal surface run-off;
- All areas remediated during the Concentrator Plant closure will be ploughed up (to increase water infiltration and reduce the potential for surface erosion and instability), levelled and covered by a 0.15 m deep top-soil layer (except for the concrete structures).
- The concrete slabs will remain in place and will be covered by approximately 0.40 m. deep layer of topsoil from the stockpiles.

The technical rehabilitation will be followed by biological one. It will comprise:

- Forestation of the areas intended for returning to the forestry fund by creation of a nursery of saplings of local tree species (oak and Austrian pine) which will be required for rehabilitation;
- Sowing of grass in the areas intended for restoration as agricultural land, by purchasing of seed mixes, sowing and growing.

4.2. Required raw and other materials, utilized natural resources, power demands and power used.

The IP is for mining of polymetal gold and silver ore, which means that **the natural resources will be impacted directly.**

The reserves in the Rozino Deposit amount to 11.3 Mt of ore grading at 1.33g/t gold and 26.6 Mt of overburden, as described in the Supplement to the Final Report on Reserves'

Mineral Composition of the Ore

The following were observed in the analysed ore samples:

- Primary materials: pyrite, chalcopryrite, sphalerite, magnetite.
- veined materials: quartz, calcite
- supergenetic materials: haematite/limonite, bornite.

Pyrite is the most frequent primary mineral. The remaining minerals occur as single grains. Pyrite precipitates as idiomorphic and hypidiomorphic grains and aggregates most common separately, rarely with chalcopryrite and sphalerite. Most frequently, the supergenetic minerals affect pyrite which is completely replaced by haematite/limonite in certain places.

No native gold has been found in the ore.

The only vein minerals observed are only quartz and calcite.

Haematite is the most widespread supergenetic mineral, attended by limonite in many places. Several bornite grains have been identified and may be the result of chalcopryrite alteration.

Fuel and hazardous chemical substances and mixes

Fuel, lubricants and other hazardous chemicals and materials (HCM) will be used and stored in the mine site as part of the ore concentration process.

The required equipment will be as follows:

Table 4.2-1. Total required plant and machinery

No .	Equipment type	Overburden work	Ore related work	Stockpiling works	Flotation Plant	Required number, total
1.	Drill rig	1	1	-	-	2
2.	Excavator	1	1	-	-	2
3.	Dump trucks	7	4	-	-	11
4.	Water Truck	1	1	-	-	2
5.	Front end loader	-	-	-	1	1
6.	Dozer	1	-	2	1	4
		Total 11	Total 7	Total 2	Total 2	22

Diesel fuel will be used for loaders and haul trucks and for ancillary self-propelled mining equipment. It will be kept in steel tanks with a total volume of 42.5 t. (with an average density of 0.85) - 50,000 l or 55 m³. The number of the tanks and their sizes will be in accordance with a Design for construction of a filling station consistent with the Zoning Act.

Diesel fuel will be delivered by tank trucks and at most 42.5 t will be present on site.

Fuels and lubricants will be used by the service machinery during the construction and operation of the mine.

The required lubricating, hydraulic and cooling oils and grease will be delivered packaged and the packaging will be returned to the vendors in a full-empty scenario.

Present on site, in a storage facility, will be:

- Prista® M10 De motor oil in 2 drums, each of 110 kg. capacity, totalling at 0.22 t.
- and
- Prista® AN 68 motor oil in 2 drums, each of 110 kg. capacity, totalling at 0.22 t.

Ammonium nitrate - fuel oil (ANFO) and/or site-mixed emulsion are intended for use as ***the main explosives***. The total number of blasts will be 88. A contractor will carry out the drilling and blasting works and will deliver the required explosives immediately prior to their use, which excludes the likelihood of explosives being present on site. ***A specialized explosives manufacturer will supply the blasting materials which will not be stored on-site.***

No ***chemical substances and mixes*** will be used during the mining process. Such materials will be used in the concentration process. The following reagents will be stored and prepared in the reagent supply area:

Frother: Methyl isobutyl carbinol (MBIC). The MIBC preparation system comprises an agitated storage tank with two duty/stand-by distribution pumps feeding MIBC to the flotation circuit. The maximum amount available on site will be 6.6 t., present in: a storage facility and a solution tank with a total capacity of 480 kg – 500 l – 0.6 m³, and a solution feeding tank with a total capacity of 60 kg – 64 l – 0.06 m³ with a solution metering system.

Collector: Potassium Amyl Xanthate (PAX). The maximum amount available on site will be 18.7 t., present in: a storage facility and a solution tank with a total capacity of 1,440 kg – 9,600 l – 10 m³, and a solution feeding tank with a total capacity of 480 kg – 3,200 l – 3.5 m³ with a solution metering system. Two duty/stand-by circulating pumps will feed the solution with PAX to the flotation circuit;

Activator: Copper sulphate (CuSO₄.5H₂O). The maximum amount available on site will be 45 t., present in: a storage facility and a solution tank with a total capacity of 3,000 kg – 20,000 l – 20 m³, and a solution feeding tank with a total capacity of 1500 kg – 10,000 l – 10 m³ with a solution metering system.

Sulphidizing agent: Sodium hydrogen sulphide (NaHS). The maximum amount available on site will be 48 t., present in: a storage facility and a solution tank with a total capacity of 3600 kg – 23,980 l – 25 m³, and a solution feeding tank with a total capacity of 1200 kg – 8,000 l – 8 m³ with a solution metering system.

Collector: Aerofloat 404 (A404). The maximum amount available on site will be 3.6 t, present in: a storage facility and a solution tank with a total capacity of 360 kg – 2,400 l – 2.5 m³, and a solution feeding tank with a total capacity of 60 kg – 400 l – 0.4 m³ with a solution metering system.

Flocculant (mixture): The maximum amount available on site will be 2.2 t., present in an automatic polymer-solution dosage machine. The flocculant distribution system comprises a flocculant dust bin, a feeding auger, an agitated mixing an agitated storage tank and two metering pumps. Polymer solution doses will be prepared in advance in a Tomal PolyRex automatic machine. This will allow for proper solution preparation and aging of flocculants. Both metering pumps will feed the mixed flocculant to the concentrate thickener and to the processing waste thickener. Each line will be equipped with a mixer for further flocculant dilution to 0.02% density upstream of the thickeners.

The delivery, transport, preparation, use, disposal and treatment of solutions and packaging are in line with the regulatory requirements.

Electrical power - Powering the concentrator plant and open pit machines, facilities and installations requires construction of a power line. At this stage, the design scheme involves construction of one branch line from the existing 10 kV power line (designated by a black line in the figure below) and comprises a switch yard in the Rozino Village. The route to the Processing Plant is expected to be 2.4 km long. The switch yard is 583 m. away from the concession boundary.

Water Supply

The IP will require processing water (for the processing plant and for dust control, and potable water for the personnel.

The hydrology report on the hydrology study of existing surface water bodies **shows that** water can be used from Arpa valley between January and May, when its river flow is sufficient, to supply via the Rozino Pumping Station a water flow of at least 50 l/s (for an expected overall volume of 648,000 m³) which is equal to 10% of the average-multiannual water quantity, **and to guarantee the ecological minimum for the river**. An open non-contact water reservoir will be filled during this period by constant pumping.

One possible water-abstraction option is to build a pumping station near the existing Rosino Pumping Station used for supplying of potable water to the village of Rozino. The higher water flow in February, March and April allows for using higher flow rates, at around 100 l/s during these months, to fill the non-contact water during higher precipitation-related inflows.

As the pit develops during the years, the Rozino mine watershed area will accumulate precipitation water. This water will report to an open contact-water reservoir and will be used in the process.

The hydrogeological study in the deposit area showed insignificant groundwater flow-rates and that groundwater abstraction would be utterly insufficient for the process.

Where possible, the water will be returned to ensure optimal water consumption, and an open contact-water basin will be constructed for this purpose.

Bottled water will be provided for drinking purposes.

A contract will be entered into with the Water Supply and Sewerage company for delivery of water from a reservoir which is owned by this company and will be situated 800 m. from the personnel service premises in the processing plant area. There is such an infrastructure and its connection to the future project is technically possible. The exact routes will be determined during the detailed engineering design phase.

No **soils and bio-diversity** will be used as a natural resource but will be impacted by the IP implementation. Their current state and projected impacts are characterised and described in the relevant sections of this Report.

5 . Investment Proposal Alternatives

5.1. Siting Alternatives

As regards the location of the Rozino Deposit in the Tintyava PLA there are no other alternatives since the ores and minerals have been established in this area and the mineable reserve limits have been defined. The boundaries of the future concession area have been proposed accordingly.

5.2. Siting options for the project facilities

Pit location, size and layout are dictated by geology of the ore body and the determined for mining reserves as topographic and geographic constraints combine to reduce opportunity for locating the associated ore processing plant and auxiliary infrastructure and facilities.

Several options with a larger footprint taken by the auxiliary plant and infrastructure have been considered and rejected by the Investor with the view to maximum protection of the natural features.

The following major project design components have been considered in respect of options for design and location:

- the ore mining method and the siting of the respective attendant facilities;
- minimal encroaching upon the soil surface;
- requirements for environmentally sound management of mine wastes.
- minimal impact on areas of the Rhodopes Eastern protected area with code BG0001032 and the Byala reka protected area with code BG0002019.

The practical perspective and all these circumstances show that there is no better alternative for siting the mine, the facilities and the infrastructure.

Difference in impacted areas from the notification sent with letter No. ПД-279/14.02.2023 to the Haskovo RIEW.

The concession area with the above notification amounts to 304.47 ha of which 118.98 ha are disturbed and 185.49 ha are a buffer zone. In order to optimise the location of facilities and reduce the directly impacted areas, the total footprint of the concession area considered in this assessment is 275 ha with 118 ha being disturbed and with 157 ha allocated as a buffer zone.

5.3. Mining Method Alternatives

The open pit mining is applied at deposits with ore bodies which are close to the surface and have substantial low-grade mineral resources. The main disadvantage of this mining method is the formation of a new negative form in the landscape (open pit or borrow), which is a challenge to the rehabilitation of the environment after shut-down of operations. Additionally, another large landscape form may be created – a waste rock stockpile.

Underground mining is used to mine higher grade deposits located at greater depths in the earth's crust. This method requires backfilling of the mined stopes. Underground backfilling is required for the more efficient extraction of the reserves and for prevention of surface caving above the ore bodies. The underground mining option facilitates the management of mine wastes as it involves partial reclaim and reuse of waste products as fill materials in the underground backfilling process. In the case of close-to-surface low-grade deposits, this option is economically infeasible because it involves higher mine construction and operational costs.

Shaft mining is not an option for the conditions in the “Rozino deposit for the following reasons:

- the small bedding depth of the ore body – 15-20 m;
- the small strip ratio – 2.5, making shaft mining systems environmentally unsound;
- the morphological type of the mineralization – veinlet-disseminated, requires exact identification of balance ores and proper and regular extraction, which is difficult in shaft mining. Shaft mining would require setting aside of Appendix areas for temporary stockpiling of different ore types and their subsequent blending prior to feeding to the processing plant.

No such other alternatives could be considered because the mining technology considers the location of the natural resource in the subsurface, and the geological mining conditions. The open mining of polymetal ores is a method widely applied in similar deposits. It is also justified as the only economically viable method, given the expenses for mining, processing and hauling relative to the market price of the produce.

5.4. Raw material processing alternatives

There are three possible alternatives for mined-ore processing:

- *Alternative 1:* Ore mining and crushing within the license and selling to processing facility owners;
- *Alternative 2:* Processing the ore to gold bearing concentrate as the final product within the concession area. This option includes mandatory construction and operation of a concentrator plant which requires increasing of the potential concession area in order to provide sufficient space for

the auxiliary facilities such as: water and chemical solution reservoirs, flotation tailings storage facility, storage facility for the finished product, etc. This option would require additional water management - provision of sufficient amounts of fresh water and sufficient volumes of return water.

- *Alternative 3*: Processing of ore to end metal as the final product within the concession area, which would require: mining, a processing plant, cyaniding and end-metal production facility. Given the proven mineral reserves, this option is economically and financially non-viable and excludes the need for another hazardous chemical substance - cyanide.

The preliminary technical and economic assessment of all three options with a +/-30% accuracy show that *Alternative 2* as unambiguously advantageous.

Alternative 1 is inapplicable for the following reasons:

- remoteness from any existing processing facilities. Apart from being economically unsound, hauling of enormous quantities of ore at such a distance means significant presence of heavy-duty trucks on the road network and, therefore, higher emissions of harmful substances in the ambient air, above-standard noise levels, lasting disturbance of animal species and significant discomfort for the people who use these roads;

- the existing plant is limited to processing of ore from specific deposits with specific throughputs and ore composition. In fact, there is no available production capacity to take additional quantities of ore from the Rozino deposit;

- limited volumes of the respective processing plant waste facilities, designed with specific needs, conditions and capacities in mind.

Alternative 2 which is preferred by the Customer allows for a final product – gold-bearing concentrate of significantly smaller volume as compared to the ore mass, can be transported easily for further processing with lesser impact on the road network and on the environment adjacent to the transport routes.

5.5. Flotation tailings management alternatives

- *Alternative 1*: Conventional spigotting into a TMF whereby water carries the waste slurry to the TMF, which is, by nature, a water-engineering facility.

- *Alternative 2*: Disposal of thickened waste; Additional dewatering of the processing waste produces 70-75% solid waste which is transported to the waste storage facility by means of a pipeline.

Considering the advantages of thickened waste disposal, the Customer intends to use *Alternative 2*.

The advantages of this technology over the disposal of high water content waste are as follows:

- Reduced use of 'fresh' water by 20÷25%, leading to reduced volume and area of the 'fresh' water reservoir by up to 5%;
- Increased recovery of return water by 20÷25%, leading to reduced volume and footprint of the 'contact' water reservoir by up to 5%.
- Reduced footprint of the tailings disposal facility by 10 to 15% through reduced volume of disposed waste;
- Low water content in the disposed waste by up to 5%.
- Accelerated waste drying and solidifying - 1-2 days in dry seasons.
- Increased overall stability coefficient of the stockpile and retaining wall bodies because of lower or zero water content in the waste;
- Reduced risks related to the disposal of high water content waste;
- Possibility for staged rehabilitation of areas once the design disposal levels are reached.

5.6. No-action alternative

The 'no-action alternative' is non-implementation of the investment proposal. In this case the polymetal resources situated and proven in the Rozino Deposit, Tintyava PLA will not be mined and

utilized. This would deprive the state and the Ivaylovgrad Municipality of revenues from fees related to direct and indirect taxes and fees, and the local community from jobs on site and in other service providing companies.

6. Description, analysis and forecast of the impact on environmental media and factors and on the material and cultural heritage that will be impacted by the investment proposal: the community, human health, biodiversity (e.g. fauna and flora), soils (e.g. organic matter, erosion, compaction, sealing), water (e.g. hydromorphological changes, quantity and quality), air, climate (e.g. greenhouse gas emissions, impacts related to adaptation), material assets, cultural heritage, including aspects of architecture and archaeology, and landscape (description of the likely significant consequences for the elements referred to in Article 95, paragraph 4 of the direct consequences and of all indirect, secondary, cumulative, transboundary, short-term, mid-term and long-term, lasting and temporary, positive and negative consequences of the IP, and consideration of the environmental protection goals of significance for the IP)

6.1. Ambient air

Brief Characterisation and Analysis of the Climatic and Meteorological Factors Related to the Particular Impact and the Air Quality.

Being in the Eastern Rhodopes, the IP climate belongs to the transitional-Mediterranean climatic region and is characterised as moderate-continental to Mediterranean. The region is under predominant Mediterranean climatic influence, especially so with regard to the Mediterranean cyclons. Apart from that, owing to its wider openness toward the north, cold continental air masses rushing in from the north is felt strongly. Cyclone activeness during the winter term is the reason both for relatively high temperatures and increased and mainly frontal precipitation. Temperatures in January average between 1 and 2°C. Occasional heavy rains fall with up to 88 mm of precipitation per 24 hours. This intense winter and autumn precipitation makes for relatively high average annual levels between 650 and 750 mm. In most cases the precipitation is rain, with snow falling mainly during the second half of December, and in January and February. The snow cover remains for 5-6 days on rare occasions. Usually, the snow-melt is rather quick and causes the rivers to swell and, in some cases, become violent.

Despite relatively mild winters, springtime thaws are slow in coming. Spring-time chills and white ground frosts occur until mid-April, with spring-time thermal conditions being more favourable further south and the harmful chills and ground frost terminating earlier than those above. According to Bulgaria's Geographic Atlas (2010), the average precipitation total during the spring varied between 150 and 200 mm in the period between 1976 and 2005.

Precipitation is more scarce in the summers, with rather high extreme temperatures, the averages for July being 23 to 25°C, with many sunny days. Hot tropical air masses rush in and cause periods of drought. Precipitation totals in the summer (June, July, August) between 1976 and 2005 varied between 150 and 200 mm same as during the spring.

Significantly higher rains fall in the area under consideration than the country's average. Precipitation highs occur in winter, favouring restriction of fugitive emissions of dust.

In general, the climate in the region allows for year-round mining operations.

Atmospheric air quality in the territory under consideration is controlled by the Haskovo Regional Inspectorate of Environment and Waters. The atmospheric air status in the Ivaylovgrad Municipality, situated within the Rozino deposit boundaries, is good.

A system of monitoring points observes the atmospheric air quality. According to the atmospheric air quality assessment and management zoning (*Article 30, paragraph 1 of Regulation 7 on Air Quality Assessment and Management*), the Ivaylovgrad Municipality belongs to 'regions' in which the levels of one or several pollutants are between their respective upper and lower

assessment threshold levels. The Ivaylovgrad Municipality is not part of the national eco-monitoring system. The nearest point is the Studen Kladenets Automatic Station - Automated urban background measuring point, situated in the built-up part of the town of Kardjali and accounting for the effects of industrial and household emissions. This monitoring point is more than 40 km away on a straight line to the north-west of the IP boundaries and, therefore, its monitoring data are not applicable to the region under consideration.

In line with the *Environment Protection Program of the Ivaylovgrad Municipality, 2023 - 2028*, no excessive quantities of harmful emissions into the atmosphere have been registered. No large industries and environmental polluters are present there.

There are no significant sources of pollution in the IP area. There are no roads with intensive vehicle traffic, no developed industry, no large urban centers and, therefore, household heating does not have a substantial effect on atmospheric air quality.

In total, there are no other pollution sources in the region and it is possible to conclude that the ambient air quality is within the admissible limits.

Conclusion:

The analyses so far allow for the conclusion that background pollution levels in the air, which are related to the IP implementation, are within the admissible human-health protection limit values.

The maximum possible average annual concentrations of PM₁₀ and PM_{2.5} are several times lower than the admissible limit values.

The maximum dust levels in the deposit area are within the admissible limit values for chemical agents in workplace air, specified in Attachment 1 to *Regulation 13 of December 30, 2003 on Employee Protection against Risks of Exposure to Chemical Reagents at Work*.

Air Pollution Sources Associated with the Implementation of the Investment Project – Construction, Operation, Closure and Rehabilitation

The company's investment proposal includes staged development of the two sections of the Rozino Deposit. Once stripping in Section 1 is completed, all the plant will be moved and used in the stripping and preparation of Section 2. Only mining will continue in Section 1 until the scheduled geological reserves are exhausted, i.e. activities will be carried out simultaneously in both sections.

This report considers the period of IP implementation during which maximum ambient-air pollution is expected. These are the first four years of the IP implementation when mining will be carried out concurrently with stripping of the deposit and dumping of overburden on an external stockpile. In-pit stockpiling of overburden will become after the fourth year, which will allow for far less fugitive dust emission in the ambient air as compared to hauling and out-of-pit stockpiling.

Activities causing dust and gas emissions to be released into the ambient air will be carried out during the development, operation and closure of the Rozino Deposit. The emissions from the sources will be **fugitive**.

Based on their source type, the fugitive emissions can be regarded as areal (*from drilling and blasting, overburden and ore removal and stockpiling, handling of mined materials, crushing of the mined materials, engine exhaust from construction machinery, etc.*) and linear (*dust and exhaust from transport vehicle engines moving along roads in and around the pit*).

No operation of a source of controlled emissions into the ambient air is intended for the IP implementation.

Fugitive emission sources:

Construction, stripping and mining works are sequential processes which do not need to be considered separately here for the purpose of analysis. All activities generating fugitive dust into the ambient air can be carried during a year.

Air pollution in the Rozino Deposit area will be caused mainly by dust emissions from:

- rock blasting works;
- overburden handling;
- ore handling;
- processing of mined ore using a crusher;
- the overburden stockpiling area;
- operation of internal combustion engines of mining (processing) machinery used to mine and handle the mined material;
- operation of the internal combustion engines of the heavy-duty mine trucks;
- moving mining machinery along the in-pit roads.

The industrial machines required for mine construction, mining, processing and in-pit hauling is: a blast-hole drilling rig; a mining excavator; a bulldozer; a front end loader; a crushing and sorting plant; a water tank truck; in-pit hauling trucks (*55 t carrying capacity*); etc.

The following methods are used to determine and calculate the emissions of harmful substances:

- AP-42 8.19.2 Crushed stone processing, 1994 - this document presents emission factors for rock drilling and blasting are presented;
- The methodology of the European Environmental Agency (EEA) developed under the European Monitoring and Evaluation Program (EMEP) of the Convention on Long-Range Transboundary Air Pollution, with latest update in 2023.

The calculated emissions of harmful substances are presented below by emission source and by activities causing fugitive emissions into the ambient air.

The emissions of harmful substances are presented by sources with the highest ambient air quality impact in the region, and these sources are:

- mining (processing) equipment for mining and handling of the mined material;
- heavy duty in-pit hauling equipment;
- mined material handling operations;
- processing of mined construction material in a mobile crusher;
- overburden stockpile.

Emissions from industrial plant operations:

Diesel fuel will be used for the operation of industrial plant and transport machinery (*drilling rig, excavator, dozer, front end loader*).

The internal combustion engines of the industrial plant will, during operation, emit into the ambient air the following harmful gases, described most generally: carbon oxides, nitrogen oxides, sulphuric oxides, soot, non-combusted hydrocarbons, etc. The harmful gas quantities can be calculated using the latest methodology of the European Environmental Agency.

Internal combustion engine emissions are typical of such activities and are unavoidable, and will be released mainly within the deposit area. The expected concentrations of pollutants into the ground-level atmosphere are below the threshold limit values for gasses in the occupational environment air. Internal combustion exhaust is released into the atmosphere at high temperature and, therefore, quickly scatter upward. Pollution in the ground air layer settles over short distances (as far as 200 m) and over a large area, thus guaranteeing compliance with the occupational air quality standards.

Mined mass mining/blasting emissions:

The planned annual throughput rate is 5,070,000 *t* of mined material (*ore + waste rock*), with two blasts planned per week.

The blasting and drilling dust emissions released into the atmosphere will be 203 *kg/year* PM₁₀ and PM_{2.5} or 0,0064 *g/s*.

In this particular case, ore mining will involve use of roughly dispersed ammonium nitrate explosive mixtures (*Emulite 100, ANFO or RIOGEL*), selected for their practice-proven qualities.

The quantities of toxic gasses formed during the blasting depends directly onto the oxygen balance of the particular explosive used. In the case of explosives with positive oxygen balance, the quantity of nitrous oxides increases and the carbon oxide decreases. In the case of explosives with negative balance, carbon oxide increases and nitrogen oxides decrease.

According to manufacturer data, up to 933 l/kg of gasses will be released when blasting. It can be assumed conditionally that blasting of 1 t of explosives will release around 933,000 l of gaseous products. According to data from the use of ANFO explosives with 94.5% porous ammonium nitrate and 5.5% diesel fuel (Safety Ratio +0.14%), the gas emissions per 1 kg of explosive are as follows: 142 l/kg CO₂; 22,24 l/kg NO_x; 159 l/kg conditional CO. The tests followed the Bulgarian State Standard CEN 13631 – 16 in a 142 m³ pressure chamber in an existing testing facility.

Except for dust, which is emitted over relatively short distances from its source, gaseous pollutants will mainly flow upwards and will scatter over large distances from the IP site. One or two blasts per week cannot cause violation of the established ambient air quality standards.

Calculation of greenhouse gas emissions from blasting of mined material:

Greenhouse gas emissions can be calculated from the relative CO₂ emission value for 1 t of explosives – 176 kg/t CO₂. Annual use of as much as 727,200 kg will generate up to 128 t/y of CO₂ emissions.

Emissions from loading of mined material and overburden and unloading of overburden:

The calculation results are as follows:

- 411.13 kg/year (0.013037 g/s) PM₁₀ and 62.26 kg/year (0.001974 g/s) PM_{2.5} from handling operations in the mine area (*Area source 1*);
- 287.06 kg/year (0.009103 g/s) PM₁₀ and 43.47 kg/year (0.001378 g/s) PM_{2.5} from unloading and scooping of ore from the ROM pad to the coarse ore bin in the Concentrator Plant (*Area source 2*);
- 267.6 kg/year (0.008486 g/s) PM₁₀ and 40.52 kg/year (0.001285 g/s) PM_{2.5} from unloading of overburden on the stockpile (*Area source 3*).

Emissions from ore processing in the Processing Plant (Area source 2):

A crushing plant will be used to crush the mined ore.

Fugitive dust emissions are released during filling of the crushing and sorting plant feed bin.

According to Table 3.2 in Section 'Industrial Processes and Use of Products' – 'Quarrying and mining of minerals other than coal' (NFR Category 2.A.5.a), the handling emission factor is 0.00055 kg/t (kg PM₁₀ per t of ore) and 0.00014 kg/t for PM_{2.5}.

Up to 1,770,000 t of ore will be fed to the crushing and sorting plant feed bin, during which fugitive emissions are possible such as:

- 973.5 kg/year (0.0309 g/s) PM₁₀;
- and 247.8 kg/year (0.0079 g/s) PM_{2.5}.

It is important to clarify that spraying in the ore crushing process is provided for.

Subsequent ore processing in the ball milling (*opereating in a closed circuit with a group of hydrocyclone classifiers*) and ore dressing will not cause emissions into the atmospheric air.

Wind erosion from the waste rock (overburden) stockpile:

The calculated wind erosion from the waste rock stockpile surface is as follows:

- 767 kg/year (0.0243 g/s) PM₁₀;
- 307 kg/year (0.00973 g/s) PM_{2.5}.

Emissions during transport:

A mine truck will be used to haul ore and overburden.

The overburden will be trucked to the external stockpile during the first 4 years, followed by in-pit stockpiling. The worse option of hauling from the pit to the external stockpile along the following in-pit road will be considered:

- in-pit unpaved road (*the grey line on Figure V.1.1-2*) with the longest hauling distance of 4 km;

The ore will be trucked to the indoor storage of the coarse ore bin in the Processing plant. The following in-pit road will be used:

- in-pit unpaved road (*the orange line on Figure V.1.1-2*) with the longest hauling distance of 1,550 m;

The final concentrate product will be transported for end-user processing along the national road network.

The expected weekly number of produce hauling trucks totals at 30, with 25 t of net weight hauled per truck, in three business days per week. The principal intends to use all-electric trucks because no harmful substances are emitted and no internal combustion engine noise is generated.

The quarry roads are designated with grey and orange lines on the next figure.

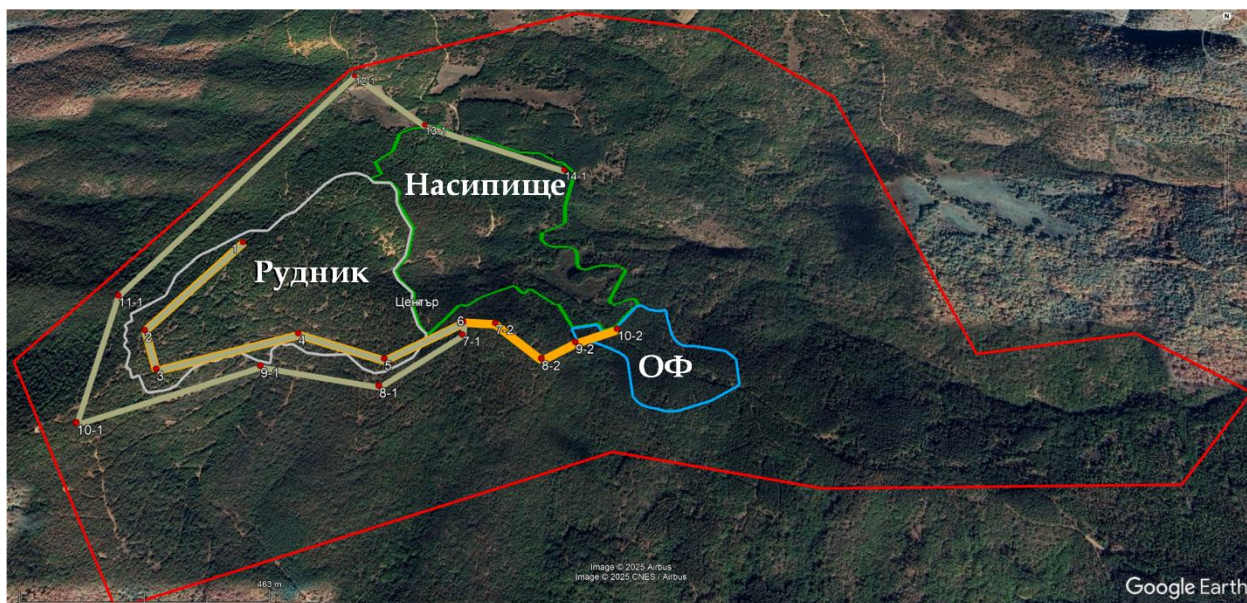


Figure 6.11 In-pit roads

Hauling along unpaved quarry roads:

The unpaved quarry roads are situated within the pit and the external overburden stockpile limits.

The results for transport-related emissions are as follows:

➤ 0.004860889 g/(m.s) PM₁₀ and 0.000483796 g/(m.s) PM_{2.5} during overburden hauling along in-pit roads (*Linear source 1*);

➤ 0.002607211 g/(m.s) PM₁₀ and 0.000259481 g/(m.s) PM_{2.5} during ore hauling along in-pit roads to the Processing plant (*Linear source 2*).

Hauling along paved quarry roads:

The paved quarry roads are those outside the pit and the external overburden stockpile limits.

The results for transport-related emissions are as follows:

- 0.000694358 g/(m.s) PM_{10} and 0.000184805 g/(m.s) $PM_{2.5}$ during overburden hauling along in-pit roads (*Linear source 1*);
- 0.000372446 g/(m.s) PM_{10} and 9.91248E-05 g/(m.s) $PM_{2.5}$ during ore hauling along in-pit roads to the Processing plant (*Linear source 2*).

Total Rozino Deposit Development Emissions

Dust will be the main pollutant emitted during the entire deposit development period. The sources are separated by type (*area and linear*).

Table 6.1-1. Emissions from Area Sources

Activity	PM_{10}	$PM_{2.5}$
	g/s	g/s
Mine operation emissions - area source 1		
Drilling and blasting	0.0064	0.0064
Loading of mined material and overburden on dump trucks	0.013037	0.001974
Total emissions from area source 1	0.019437	0.008374
Stockpile emissions - area source 2		
Unloading of overburden	0.008486	0.001285
Wind erosion from the external stockpile	0.0382	0.01528
Total emissions from area source 2	0.046686	0.016565
Processing plant emissions - area source 3		
Unloading of ore in storage for the coarse-ore bin	0.009103	0.001378
Scooping of ore by excavator to feed the Crusher plant		
Dumping of ore on the Crusher plant	0.0309	0.0079
Crushing in the Crusher plant (<i>primary, secondary and tertiary</i>)	0.064	0.0225
Sieving in the Crusher plant	0.0811	0.0053
Unloading from the Crusher in indoor crushed-ore intermediate storage	0.0013	0.0004
Transferring through a crushed ore silo and to the ball mill belt conveyor	0.0026	0.0007
Total emissions from area source 3	0.189003	0.0368

Table 6.1-2 Linear source emissions

Linear source No.	PM_{10}	$PM_{2.5}$
	g/(m.s)	g/(m.s)
Linear source No. 1 Emissions from in-pit transport, from the pit to the stockpile	0.000694358÷ 0.002433758	0.000184805÷ 0.000242231
Linear source No. 2 Emissions from in-pit transport, from the pit to the processing plant	0.000372446÷ 0.001305397	9.91248E-05÷ 0.000129915

Air and Climate Factor Impact Assessment According to the National Standards and Legal Requirements

a) during the construction and operation of the site

The analyses in the EIA Report allow the conclusion that the activities in the IP site will be a source predominantly of dust in the atmospheric air.

The activities which will be carried out on the IP site will form three area and two linear sources (*in-pit transport with 55 t trucks between the Pit and the Processing Plant*) of pollution.

The studied air space dimensions are: - length (*east to west*) – 4,000 m; - width (*north to south*) – 4,000 m.

The used methodology allows calculation of one-time maximum and average annual concentrations in area and linear source emissions. In this case the main atmospheric air pollutant will be dust with average daily and average annual values determined in the 10 μm particle-size and the average annual values in the 2.5 μm particle-size fraction. The average annual concentrations of pollutants in the atmospheric air calculated with the software will be presented below. This software is not applicable to calculating average daily concentrations.

Certain limitations of the software required a twofold consecutive modelling of linear sources – Linear source 1 was modelled first, followed by Linear source 2. This is followed by a separate area-source model. The linear source results recorded in the text (DAT) files are summed up using the SUPERPOSITION module of the Traffic ORACLE package in order to comply with the principle of superposition. This is followed by aggregating the common linear source file with the area source file. The total average annual value (AAV) results expressed with isolines are superimposed over a satellite image of the region, using the Surfer software.

The average annual PM₁₀ and PM_{2.5} concentration results for linear and area sources are presented in an attachment – the EIA Report software files.

The results of the aggregation of all pollution sources in the Rozino Deposit. Using the SUPERPOSITION module of the Traffic ORACLE software package are recorded in a text (DAT) file (*attached with the EIA Report*).

In general, the stripping and mining works in the Rozino Deposit concession area will not have a significant impact on the ambient air quality in the nearest urban areas. The maximum calculated AAVs for PM₁₀ and PM_{2.5} are significantly lower than the human-health protection limit values.

Potential Atmospheric Air Impact:

The modelling exercises allow for the conclusion that operations in the Rozino Deposit will not cause atmospheric air pollution in excess of the admissible limit values. Dust concentrations in the urban areas will be within the human-health protection limit values.

b) During Closure and Rehabilitation

Rehabilitation activities (*technical and biological*) will have significantly lower impact on the atmospheric air. Once again, fugitive dust and exhaust emissions will be generated by the excavator, bulldozer and dump trucks. No mining equipment and processing equipment will be operated during this phase.

The significantly smaller volume of work as compared to the construction works and deposit operations allow the conclusion that the impact of closure and rehabilitation on the atmospheric air quality within the IP area will be insignificant.

Summary of ambient-air impact conclusions

By type of impact: insignificant, with constant frequency during the mining period;

By territorial impact: local, mainly within the concession area;

Occurrence of impact: permanent, daily, until closure of operations and rehabilitation of disturbed terrain.

Impact duration: continuous, during the deposit operation period, recoverable to some extent by well performed rehabilitation;

Cumulative and combined environmental impacts: The IP will have no substantial impact on air quality in the region.

6.2. Surface and Ground Waters

Surface waters

The Investment proposal for 'Mining and Processing of Polymetal Ores from the Rozino Deposit, Tintyava PLA' is situated within the Byala Reka river basin.

The site of the Investment Proposal is situated in the Ivaylovgrad Municipality, Haskovo District, Southern Bulgaria, and immediately to the south of the Rozino village. The Byala Reka River, the Luda River and their tributaries are the main water sources in the region, and the site is situated between two tributaries to the Byala Reka River (the Kokardja Dere River and the Arpa Dere River). The Byala Reka River drains the Maglenik, Irintepe and Sirta ridges of the Eastern Rhodopes, with a total watershed area of 549 km². Approximately 7.53 m³/s are discharged by the river near the Dolno Lukovo village, and the river is recharged mainly by precipitation. Many surface water bodies are ephemeral, without flows during the dry season (dry valleys).

The surface water bodies closest to the Rozino Deposit boundaries are the Byala Reka River 650 m to the south, the Kokardja Dere River 550 m to the west, and the Arpa Dere River 560 m to the east.

The mine intends to close fully the cycle of mine-contacted water for internal use during normal operating conditions.

An integrated approach for water quality management within the industrial site has been developed. The integrated and sustainable water management report is presented in an attachment with the EIA Report. It is based on the division of surface water into two flows:

- Water in contact with the mining operations - processing cycle return water, TMF return water, ore stockpile return water and pit return water;
- Water not in contact with the production operations - surface, precipitation and slope run-off, and run-off from undisturbed forest areas.

Assessment of Impact

a) During the construction phase

The tailings management facility dam construction will be carried out from the beginning of mine construction works and until the end of year two. There will be no production and the water will be classified as construction water during this phase. The surface water will be managed by way of permanent and temporary channels. The watershed areas are presented in Figure 6. 2-1.

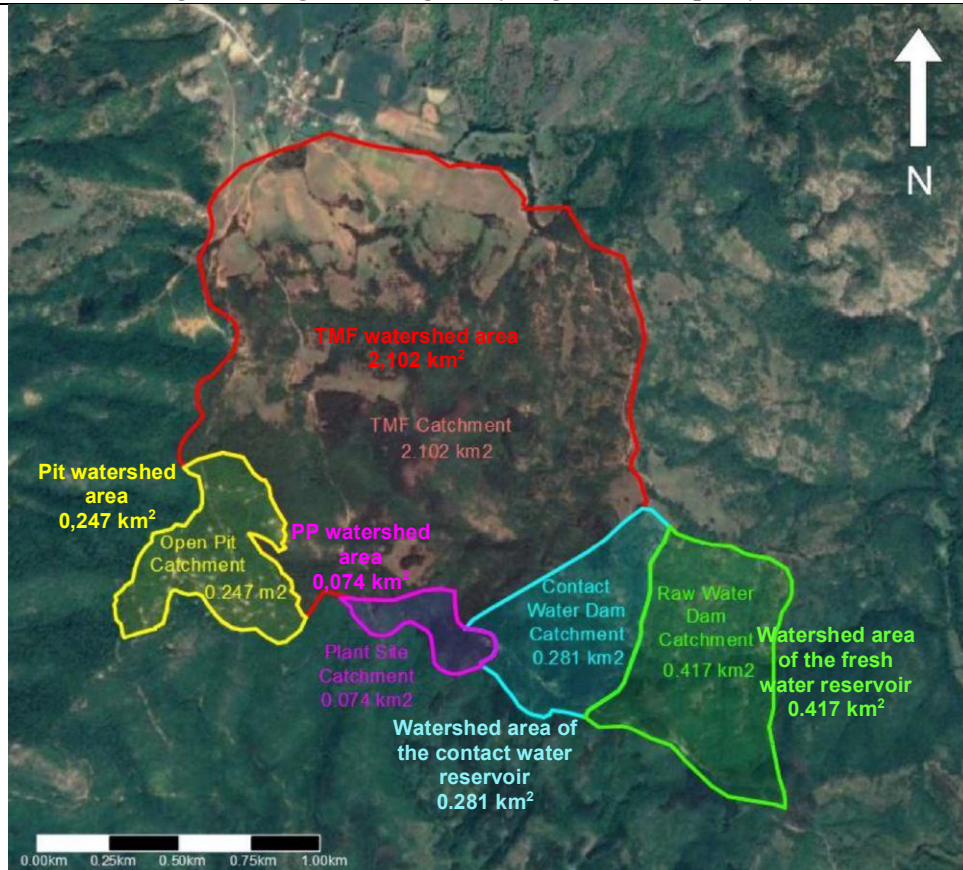


Figure 6.2-1 Catchment areas during the construction
(until Year Two)

Temporary settling ponds will be made during the construction period along the water flow in order to catch any sediment run-off and decant clarified water into the Yuren Dere valley.

No negative impacts on surface water is expected during the construction phase since no objective reasons for such impacts will be present.

b) During the operation phase

Two channels will manage flows from upstream of the facilities during the operation phase - a northern diversion channel along the north-eastern side, and a southern diversion channel to the south of the site. These channels will discharge into the fresh-water reservoir and, respectively, to the contact-water reservoir. The northern diversion channel will operate along the north-eastern end of the TMF from the beginning of year three, and will reach the fresh-water reservoir area north of the site. This configuration will remain unchanged until the end of mining works, prior to closure.

The watershed areas formed during the mine operation period are presented in Figure V.2-2.

The projected pit-bottom elevation is 435 m. No groundwater has been reached during the drilling and no additional pit inflows are expected besides precipitation.

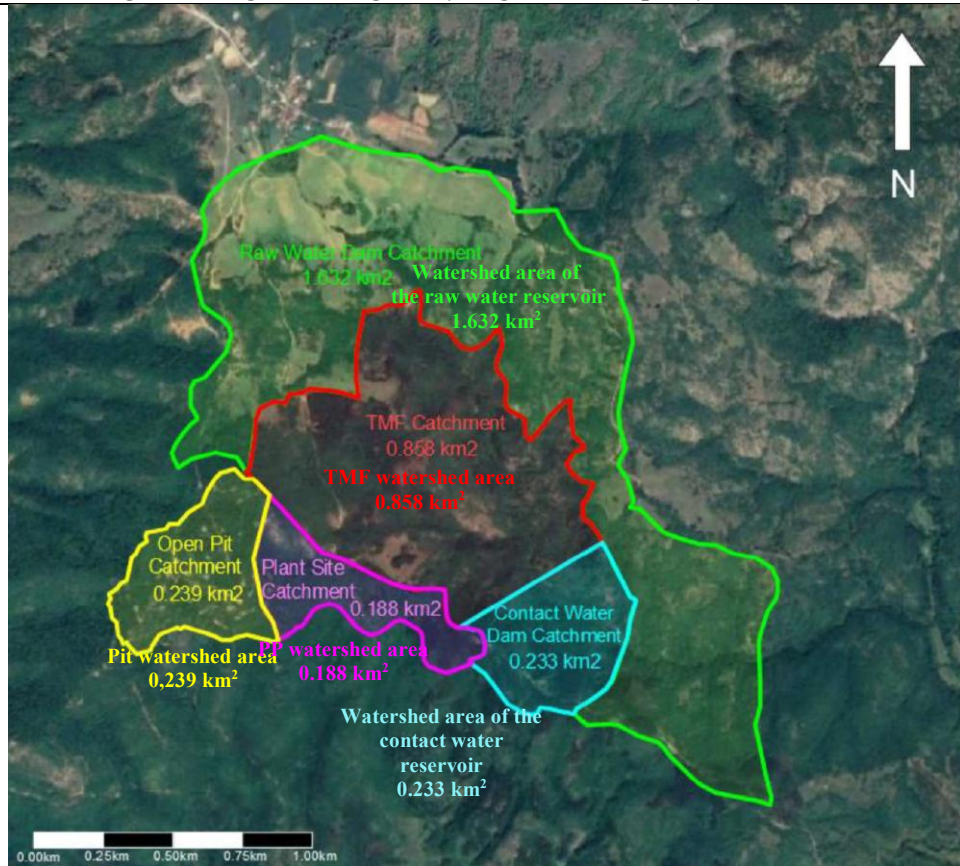


Figure V.2-2 Catchment areas during the operation

Any rain and snow water entering the pit and the stockpiles will be directed to the lowermost parts of these facilities to be pumped from there into the contact water facility.

Bottled drinking water will be provided. Industrial water will be used for domestic purposes.

Building of a central sewage system is not provided since no wastewater treatment plant exists near the site. One option is to use portable cabin services maintained by a specialized company and periodically emptied and transported to a licensed treatment plant. Another option is to design and build a mobile treatment plant adequate to the on-site uses and its removal after on-site operation and closure are completed.

According to the preliminary design, the expected annual deficit of 125,000 to 310,000 m³ of water for the plant will be compensated by a pumping station in the Arpa Dere River situated approximately 1.7 km east of the site.

Water will be pumped directly from the Arpa Dere River during the wet months of the year (January through May). Water from Arpa dere will be abstracted near the point of its confluence with the Yuren dere river adjacent to the Rozino village pumping station. This pumping station has been designed to pump water from a spring flowing into river pool. The flow-rate of this spring varies between 6 and 11 l/s during the entire year and is season dependent. It is calculated that a flow-rate of around 0.34 l/s will be required to supply Rozino village. Any excess water from the spring could, with the relevant justification, be drawn year-round for the industrial needs of the site. The plan is to abstract water from a natural pool without damming or other river blocking construction works.

Surface run-off from the open pit will be used as the first source of processing plant water. This water will be pumped from the open pit sumps into the plant water reservoirs. Water stored in the TMF settling pond will be the second source of processing plant water, and the fresh-water

reservoir will be used as a make-up water (third source), if open pit and TMF water is not sufficient or of the quality required by the plant.

No negative impacts on surface water is expected during the operations phase since no objective reasons for such impacts will be present.

C) During Closure and Rehabilitation

The possibility to introduce accelerated evaporation equipment in order to remove water from the contact-water reservoir and from the system in general during site closure and rehabilitation was studied.

The accelerated evaporation concept involves spraying of approximately 5 l/s of water from the reservoir (by each device) at a height of 18 m into the air with an average drop size of less than 100 µm. This will be achieved by mobile mechanical evaporators allowing 'zero discharge' on site during mine closure. These devices will be installed on the ground or on floating platforms. This allows for operational flexibility and changing of locations depending on wind direction. Any non-evaporated water will remain within the reservoir watershed area with such a system.

The accelerated evaporation forecast, even at the lowest efficiency, is 30% or up to 3028 m³ per month per device. The evaporators will be in active use during mine closure (for a 5 year period of active conservation, as provided for in the investment proposal), when the drainage collected into the contact-water reservoir will be evaporated during the summer months to ensure sufficient volume for winter-time drainage, when evaporation is inefficient.

The climate in the region will favour accelerated evaporation. High average temperatures and relatively low humidity between April and September mean that this could be the optimal accelerated-evaporation period.

Furthermore, on site closing the suction end of the pumping station drawing water from the Arpa Dere River during site operation will be dismantled with minimal impact on the river bed.

No negative impacts on surface water is expected during the closure and rehabilitation phase since no objective reasons for such impacts will be present.

Groundwater

The IP area surface is situated within ground water body (GWB) with code BG3G000PtPg049 Fissure water - Eastern Rhodopean Complex, in a region which is part of the Eastern Rhodopean block comprising Pre-Cambrian, Palaeogene and Quaternary rock formations. This GWB is next to the state border which predominantly follows along watershed crests.

According to Bulgaria's hydrogeological zoning, the area under consideration belongs to the Eastern Rhodopean region of the Rila-Rhodopes district and is part of the Arda River valley. The waters of highest practical significance in the territory under consideration, which is part of the Arda River catchment area, are waters circulating in the alluvial sediments of the Byala Reka River and its tributaries and the Arpa Dere River, the Hambar Dere River, the Yuruklerska River etc. The paleogenic sediments form laminar aquifer complex with mainly low flow rate.

Summary of water impact conclusions

• Surface water

The impact on surface water during all the implementation stages of the investment proposal for 'Mining and Processing of Polymetal Ores from the Rozino Deposit' is determined as insignificant. The quality of the surface water used from the Arpa Dere River is as high as 10% of the average multi-annual water quantities and **are not expected to have a negative effect (including transboundary negative effect)** and, also, no discharging of waste water into surface water bodies is planned for. A 'zero discharge' approach is adopted.

• Groundwater

The implementation of the investment proposal for 'Mining and Processing of Polymetal Ores from the Rozino Deposit, Tintyava PLA' **is not expected to have a negative impact on**

ground water and will not deteriorate the chemical and quantitative status of the affected groundwater body BG3G000PtPg049 Fissure water - Eastern Rhodopean Complex.

One technological option during the IP implementation is abstraction of water from the Arpa Dere River floodplain by constructing a pumping station in the area of the existing Rozino Pumping Station.

The mining will take place 1,300 m away from the 1,000 radius buffer zone and 2,300 m from the head reservoir and, therefore, no impact on the potable water protection zone is expected. The Clean Water Reservoir will be constructed downstream of the head reservoir, in the point in the concession area closest to it.

The impact on the chemical status of ground water will be neutralized by lining the contact water reservoir bottom and walls and by constructing a system to intercept eventual break-through involving a curtain drain and a grout curtain.

6.4. Lands and Soils

Size of affected areas

The overall intended concession area amounts to **275 ha**, of which **118 ha** will be disturbed. The buffer area covers 157 ha. Some facilities will be developed in areas already processed/disturbed without taking over new areas, with the 'overlap' being 261,9 ha.

Pollution sources

Soil pollution during the IP implementation can be direct - through oil and lubricant spills, and indirectly through deposition of emissions.

The oil products and lubricants which may be emitted during failure of ore mining and processing machines are a potential source of soil pollution. These are local and insignificant and will be localised and removed immediately. Such pollution cannot impact the soil of adjacent terrains. The risk of such pollution is minimal if the equipment is operated and maintained properly.

Dust deposition can be caused as follows:

- During mining (dust emissions of short duration and limited impact radius);
- During stockpiling (the geologic materials normally have sufficient moisture content and such an impact could be expected only in the dry months – limited impact radius);
- Soil pollution from open line sources (in-pit and external haulage roads) - limited impact radius, mostly on both sides of the roads;
- During drilling and blasting, instant and singular during blasting.

A primary jaw crusher followed by secondary and tertiary cone crushers will be used for ore crushing. Additionally, air quality in each crusher building will be maintained by a system of sprinklers.

Dust emissions from mining and stockpiling operations do not differ in chemical composition from the soil parent materials in the region and therefore they do not create any risk of altering the properties and fertility of the soil.

Deposition of other emissions: Resulting from deposition on the surface of aerosols and gases containing toxic organic compounds. Blasting, construction machines, and transport vehicles are potential sources of soil pollution. Exhaust in the ambient air contains CO, NO_x, SO₂, CH₄ and dust. These emissions will be limited in time and quantity.

Compaction by construction and mining machines This degrading impact is expected to occur mainly during the mine-field preparatory stages, overburden pre-stripping and construction of auxiliary facilities, including the water reservoirs. This type of damage is of temporary nature.

Stripped rocks which will be stockpiled in designated mined sections will not be the source of toxic substances and will not pollute the soils adjacent to such sections.

Assessment of Impact

Any removed topsoil and soil cover will be temporarily stockpiled. The stockpiled soils will be used during the rehabilitation of areas disturbed by the operation.

The mining workings will be designed to prevent intensive erosion.

The open pit operation will cause technogenic and anthropogenic disturbance to a substantial portion of the lands, and degrading of the remaining lands.

a) Construction

The impact on soils will begin with the start of mining preparations, Processing Plant construction, construction of the mine waste facility, placing of the mining equipment, of portable toilets etc. According to Article 43 of the Environment Protection Act, the fertile soil layer is under special protection and, therefore, it will be scooped and placed separately on top-soil stockpiles before construction begins. These activities will be carried out without contamination of or damage to the soil in the neighbouring land properties. Subsequently, the fertile top-soil layer and the soil will be used to rehabilitate the terrain.

The impact during pre-stripping can be defined as mechanical disturbance of the soil genetic profile as a result of soil-cover removal with attendant losses in quality and quantity.

The main technogenic factors will be the pits followed by the stockpiles, the Processing Plant, the mine waste facility, the water reservoirs, the top-soil layer and the on-site roads.

The most significant impacts will be caused during this stage.

Excavation will cause direct disturbance to the soils, but the the impacts will be reduced by back-filling of the mined spaces during the subsequent stages and by staged technical and biological rehabilitation. The technical rehabilitation will comprise predominantly back-filling of the mined spaces and shaping of horizontal areas, where possible, while the biological rehabilitation will involve planting of vegetation suitable for the region.

b) Operation

Thickening to 70-75% solids is the technology chosen for flotation tailings disposal by means of a thickener separating water (thickening) from the tailings prior to their disposal. This technology will provide several positive effects:

- efficient use of water;
- minimal potential for liquefaction (free sliding or flowing) or breaking of the facility dam which would be a risk for the adjacent lands;
- ease of handling - piling and shaping of the facility for minimal impact on the surrounding terrain;
- improved stability of the MWF body due to reduced water content, enabling its gradual upgrading;
- consideration of natural geographic, geological, geotechnical and geochemical conditions of the site. As the waste is disposed of from the highest toward the lowest stockpile points, it should be noted this disposal enables staged rehabilitation of completed slopes.

The operations in the concession area will not have a tangible physical impact on the surrounding lands and soils, except for dust from the movement of vehicles and construction machinery. This This will be overcome by regular spraying of roads and areas of intensive dust emissions in periods of dry weather.

No physical degradation processes (acidification, significant alkalization, over-saturation, bogging, salination, etc.) and pollution with toxic organic and inorganic chemical

substances (harmful aerosols, burst pollution, etc.) are expected if the technological and environmental regulations are complied by the personnel involved in the operations.

Complete rehabilitation will be carried out of the disturbed areas upon completion of the mining and processing operations, using the soil materials stockpiled during the construction phase.

c) Closure and rehabilitation

Designing of the future technical and biological rehabilitation aimed at environmental restoration is required. A good practice is to carry out preliminary assessment of the proposed rehabilitation work, the advantages of the proposed rehabilitation measures, and minimization of the impact on the environment.

It should be noted that self-sown plants establish in the 10-20 cm depth of grey-brown soils with initial stages of formation of grainy-crumbly structured soils in older open-pit mining stockpiles.

Leaving of the concession area requires a certain volume of technical and biological rehabilitation work in disturbed areas, and removal of unnecessary facilities.

Detailed designs will be prepared during the operation for all concession-area leaving activities. The technical rehabilitation will involve terrain levelling.

Easement strips around the extreme boundaries of the pits and stockpiles, and the disturbed areas, will be restored by biological rehabilitation.

The soil volumes required for rehabilitation will be the soils removed from the areas during the operation.

Application of suitable fertilizers will be provided for in order to create better soil conditions and nutrition in the rehabilitated areas. Care for grass sown areas, for example, over the legally required 5 year period, comprises irrigation, fertilization in early spring, and mowing.

In conclusion, the following impact may be expected by the implementation of the investment proposal on this environmental component:

Summary of soil impact conclusions:

By type of impact: substantial, negative within the mining areas, and beneath all adjacent facilities (soil stockpiles, MWF, Processing Plant, water reservoirs, on-site roads) and insignificant in the neighbouring areas. Non-compliance with production discipline may cause compaction of adjacent lands and emissions of dust beyond the concession boundaries.

By territorial extent of the impact: local, within the disturbed lands in the concession area;

Occurrence of impact: permanent, daily, until closure of operations and rehabilitation of the terrain.

Duration of impact: continuous, during the concession period, recoverable to some extent by well performed rehabilitation;

Cumulative and combined impacts: none expected given the significant distance from other operational deposits near-by.

6.4. Subsurface Environment and Mineral Diversity

The Tintyava PLA is located in the Eastern Rhodope fall, east of the Belorechki cupola. It is positioned in a Palaeogene graben, typical of the Eastern Rhodopes and filled mainly by coarse clastic material and by less rudaceous sediments.

The following impacts will be caused during the individual IP implementation stages:

a) Construction (pre-stripping and mineral-reserve mining preparation)

The impacts during this stage are related to the beginning of development and mining works in the mine sections - mine construction with uncovering of the mineral resources and construction of auxiliary facilities - the stockpiles, the TMF, the Processing plant, the water reservoirs, the on-

site roads, and power lines. The impacts on the subsurface during this stage are direct, caused by the shaping of the future pit, and indirect, in respect of the remaining auxiliary facilities.

b) Operation (extraction of reserves)

The operation of the deposit involves two main impacts on the geological environment: formation of man-made empty spaces in the geological environment (mine pits) and man-made seismic impacts caused by blasting during the mining operations.

The seismic impact on the geological environment will be caused by blasting required for mining of the mineral resource. Each blasting plan will be developed in detail in the relevant detailed designs, in consideration of the distances from existing buildings, facilities and infrastructure in the immediate vicinity.

Experimental blasting on-site and under similar conditions was carried out for the purposes of this EIA in order to evaluate the side effects of blasting on the environment of blasting and to provide recommendations for management of process-related blasting during the open-pit mining of the Rozino Deposit. Special measurement equipment was used to obtain the results. The blasting vibration impact and airblast effect were assessed using the method generally accepted in blasting work worldwide (and also embedded in the specialized seismograph software, underlain by the blasting effect (seismic/airblast) relative to the quantity of explosive relationship, and the distance to secured facilities expressed by the so-called separation distance, as follows:

The report on side effect of blasting on the environment for the Rozino Deposit is presented in an attachment with the EIA Report.

The following conclusions can be made from the assessment of the blast impacts on humans and on the environment:

- The drilling and blasting design for the Rozino deposit conforms to the standards for safe impact on humans and structures beyond the limits of the danger zone during burden blasting for all three design blasthole diameters (76, 89 and 102 mm) and with separate (stand-alone) delay periods of ignition of each charge and maximum charge weight of up to 30 kg, in accordance with the forecast calculations using the experimentally determined side-impact dependencies on the distance and weight of the exploded charges;

- As the deposit is situated in a Natural 2000 area, the drilling and blasting process should employ the minimal possible side impact on the environment by the blasting. The drilling and blasting parameter with the lowest side impact (Table 9) is the blasting process with charges up to 14 kg. in weight. Barring any other aggravating conditions, it is recommended that the blasthole diameter be 76 mm.

- As mining evolves at depth, conditions of the operation will change. Therefore, periodic check measurements using specialized equipment are recommended in order to update mathematical dependencies (3) and (5) with deposit-specific data, determine the levels of impact and adjust the drilling and blasting parameters as necessary.

It is particularly important when designing and carrying out drilling and blasting to find the most acceptable option in which the explosion side impact be minimized, kept within the admissible limit values and providing the maximum rock-mass crushing effect of the explosion, consistent with the expected parameters, such as: achieving the target grain size of the blown rock mass, minimal displacement of the muckpile, minimal ore loss and dilution, etc.

It should be noted that as the pit develops below the upper edge, the airblast and noise impacts will be further limited by the barrier function of the non-mined benches.

In the case of mining for ores and minerals near urban areas, the blasting times, most often during day-light working hours, are coordinated with the local community in order to avoid the surprise effect and with a view to reducing the unpleasant effect on the comfort of residents in the region.

Additional recommendations

Measurements and expert analysis of the blasting vibration impact are recommended in order to take measures during the design and performance of commercial blasting in order to preserve the stability of non-mined and work benches as the pit is deepened.

In respect of all mining facilities within the blasting impact danger zone, blasting and drilling must be designed and carried out in accordance with Chapter Six of the Safety Rules Applicable to Blasting Operations: 'Special Blasting Works'.

c) Closure and rehabilitation

Closure and rehabilitation is the final stage of mine-section existence. Closure, decommissioning, subsequent rehabilitation of mined areas, processing sites, pads, facilities and unnecessary infrastructure are performed during this stage. Mandatory monitoring is part of this stage.

No impacts on the geological environment are expected during the technical liquidation (dismantling of plant and facilities, removal of used equipment from the site).

Summary of subsoil impact conclusions:

By type of impact: negative and irrecoverable for the natural resource

By territorial extent of the impact: locally, within the mined sections

Occurrence of impact: constant during the concession period

Duration of impact: continuous during the concession period

Cumulative and combined impacts: expected in respect of exhausting of gold-bearing ore reserves in the area.

6.5. Landscape

a) Construction and Operation

The landscape in the sections will, as a result of IP implementation, sustain anthropogenic and, in particular, technogenic changes. No changes of landscape dominant features in the whole region are expected but a zone of industrial landscape will be formed. Operations in the deposit will cause local changes to the main landscape type, and no substantial change of the internal structure and landscape functions will be allowed by well-organized operations, avoiding further ecological disbalance.

Unfavourable anthropogenic changes will have a stronger impact on the topography, on the soil cover, and on the fauna and flora. This impact will be local, its territorial extent remaining within the worked sections of the concession. The impact will be of continuous nature over the concession period, of a complex and cumulative nature as regards the mined sections and the industrial site, but will not extend to areas outside. Implementation of the project will cause complete technogenic changes (high level of anthropogenic influence) of some of the landscape, but the landscape in the neighbouring undeveloped areas will remain stable and functional.

The sections will be open-pit mined, which will inevitably involve rock blasting and excavation, and operation of heavy-duty plant and equipment. The project development will substantially modify the physical appearance of the project site by creating a devegetated landform with clearly expressed elevation. Landscape structure and functions will change - the structure will change from horizontal to vertical and will affect the bedrock, topography, soil and vegetation components. The lands of the 'technogenic landscape' will be repurposed.

The negative impacts from the project development will include:

- physical occupation of land;
- devegetation;
- short-term derogation of the quality of environmental media.

b) Closure and rehabilitation

In order to minimise to some extent the negative effects of the mining operations and to restore the landscape in the region, staged rehabilitation works in mined-out spaces will be carried out by technical and biological means. This rehabilitation is intended to achieve a better arranged space, consistent with the terrain features and more suitable for its future use. The rehabilitation will restore to some extent the altered functional status of the mined spaces in the deposit and in its surrounding region, and will restore the disturbed landscape.

Summary of landscape impact conclusions:

By type of impact: direct, with a high degree of anthropogenic impact in the mining sections and in the auxiliary facilities, and indirect in respect of the terrain in their immediate proximity, through expected visual change.

Duration of Impact: long-lasting - during the concession period

By territorial impact: local, within the developed and mined sections in the concession area;

Cumulative and combined environmental impacts: no cumulative impact on the landscape would be observed at this stage because of the remoteness of other mined deposits of mineral resources.

6.6. Flora and Fauna

Flora

The possible impacts on the flora caused by similar projects are:

1. Direct destruction of vegetation within the IP elements. The entire area of individual IP elements plus small areas closed between them, or between individual elements and their access roads is regarded as affected and, therefore, the directly affected surface area is 146.58 ha.

2. Damage of vegetation by pollution during mining and drilling and blasting (incl. *seismic impacts, blast waves, debris, dust and NOx*). According to the analysis of pollution, no excessive dust and NOx levels are expected outside the concession area. Taken alone, the seismic impact, blast wave or debris cannot cause lasting damage to vegetation or, respectively, to the species' habitats. This is supported by terrain studies around other active mines and quarries in Bulgaria during which natural habitats have been found in immediate proximity to their edges.

3. Fragmentation when an area (polygon) occupied by a vegetation type is affected in a way such that its remaining part(s) are of area insufficient to preserve the characteristics of the affected vegetation type or if these characteristics are impacted negatively. Deterioration or even loss of such characteristics is caused by the so-called "edge effect" whereby abiotic (sun shine, air humidity, soil moisture etc.) and/or biotic (species composition of tree, brush or grass stands) environmental factors are changed in the strip immediately next to the boundaries of polygons with certain vegetation types (Andren 1994, Bennett & Saunders 2010, Didham 2010, Fahrig 2003, Franklin et al. 2002).

4. Destruction of individual plant species *within the IP elements*. This impact is evaluated only for species of importance for conservation, if any are present in the directly impacted area. The evaluation of the remaining species is included in the evaluation for direct destruction of vegetation.

5. Influx of non-native and/or invasive plant species used during *the biological rehabilitation*. No impacts are expected with the use of species typical of the region and, therefore, will not be evaluated separately.

According to the mapping of vegetation in the IP area, the area of direct impact will include polygons or parts of polygons of 9 habitat types (out of 11 found; Table V.6.1-1, Attachment V.1.1-1 of the EIA Report)/ Four of these habitats are included in Attachment 1 of the Biodiversity Act and is the subject of protection in the Rhodopes - Eastern Protected Zone. The impact they will sustain is assessed in the Protected Area Impact Report.

Only C2.31 Upper currents of permanent, slow-flowing rivers and streams is more limited among the remaining 5 habitats. We have included in this habitat the middle stretch of Yuren dere, which dries up during the hot summer months. This fact and the stony bottom explain the complete absence of macrophytic vegetation. Therefore, the conservation value of this habitat is low. The remaining 4 types of vegetation are of secondary origin, widespread both in this region and in Bulgaria, and occupy large areas in some cases. Some of them are undesirable from the nature-conservation perspective because they occupy areas in habitats of significance for conservation such as coniferous crops. Most often such plant types are disseminated by direct or indirect human intervention because of their adaptability.

Since vegetation of this type is planted in the place of fragmented sections of the habitats of significance for conservation (except for coniferous crops), fragmentation of such vegetation cannot change its characteristics and the impact on the vegetation type. Fragmentation of coniferous crops would increase the participation of indigenous species and gradual 'taking over' of individual fragments of adjacent vegetation types.

Therefore, it can be concluded that the impact on the remaining 5 types of vegetation will be **insignificant**.

Our field studies and the information about the biology and the ecology of the respective plant species show that the IP will or may impact individuals of 5 species of high conservation value – pontic fritillary, violet limodore, pink butterfly orchid, autumn lady's-tresses, poppy anemone. All five species are widespread in the Eastern Rhodopes and/or in Bulgaria, but usually their populations are small. The poppy anemone is an exception, with a numerous population in the Madjarovo area. Finding it in the studied area means that even if it is present there, its populations will be small. An enormous population of pink butterfly orchid was found outside the studied area, west of Rozino village, over an area of 15 ha. This allows the conclusion that any destruction caused by the IP will be of singular individuals of these five species. The comparatively broad distribution and/or widespread suitable habitats in the region, and/or the comparatively good adaptivity of these species mean that the impacts caused to them can be defined as **insignificant**.

Fauna

The possible impacts on the fauna caused by similar projects are:

1. Direct destruction of habitats of species within the IP elements. The entire area of individual IP elements plus small areas closed between them, or between individual elements and their access roads is regarded as affected. Therefore, the directly affected surface area is 146.58 ha.

2. Damage of habitats of species by pollution during mining and drilling and blasting (incl. seismic impacts, blast waves, debris, dust and NOx). According to the analysis of pollution, no excessive dust and NOx levels are expected outside the concession area. Taken alone, the seismic impact, blast wave or debris cannot cause lasting damage to vegetation or, respectively, to the species' habitats. This is supported by terrain studies around other active quarries in Bulgaria during which natural habitats have been found in immediate proximity to their edges. Habitats of species associated with aquatic environment may be affected by increased turbidity in the water during the mine construction phase.

3. Fragmentation of habitats of species - if an area (polygon) occupied by a species habitat is affected in a way such that its remaining part(s) are of area insufficient to preserve the characteristics of the affected habitat of this particular species. To be used by a species, many species require polygons of certain species-specific size in which potential habitats are present.

4. Barrier effect resulting from mine development, separation of polygons with habitats of species or bio-corridors, so that individuals of such species are deprived of free access to individual parts of the mine. The barrier effect may be caused by inability of individuals of a species to overcome the quarry area or 'reluctance' to do so because of disturbance. This results in impossible or difficult migration (in a broader sense this could be diurnal migration for feeding, or seasonal

migration related to various abiotic factors or breeding, or resettlement), and/or fragmentation of the populations of affected species. No barrier effect for birds and bats is implied by the IP, given its low elevation and the high mobility of these groups of species.

5. Disturbance of individuals of animal species by *moving and operating construction, mining and transport equipment and people*, and by *drilling and blasting*. Not many studies of noise impact on biodiversity have been carried out. There are even fewer accessible studies of this type. For example, Hirvonen (2001) measures equivalent noise level of 56 dBA above which significant impacts on waterfowl nesting around newly-built motorway are established. Based on available literature, Archer (2014) predicts significant impacts by pulsed noise on biodiversity leading to abandonment of territories at maximum noise levels above 80 dBA. Shannon et al. (2015) review the existing literature covering this subject (68 publications concerning terrestrial fauna). The author use this as the basis to calculate a median equivalent noise level value of 60 dBA as the limit value above which noise-caused impacts on the terrestrial fauna are observed, as is supported by a solid number of published literature.

This impact may cause abandonment of habitats in the area of disturbance, reduced nesting success and/or abandonment of nests with eggs and/or chicks in the case of some more sensitive species (some mammals, birds). The effects of disturbance are species specific. The maximum extent of such impact by noise from the IP elements during normal operation is 110 m. The expected equivalent values at this distance are around 55 dBA. Disturbance during blasting operations may be caused by the seismic effects, the blast wave and debris, and, also, by pulsed noise. An equivalent noise level of 54 dBA was measured in the GUSV quarry (Studena deposit), at a distance of around 650 m. from the blasting field (61 blast holes) (EIA Report for the IP for Mining of Construction Materials – Dolomites, from the Studena Deposit, Zavodski Stroezi 2 Section, in the lands of the Studena village and the Krapets village, Pernik Municipality). Experimental blasting for the present IP showed maximum average levels of 64 dBA measured at a distance of 800 m. This leads to the conclusion that the drilling and blasting operations will not cause significant disturbance at more than 700 m. from the mine boundaries.

6. Mortality of individuals of animal species during *movement and operation of transport and construction equipment*. This impact will be observed mainly during the mine construction phase because this is when individual animal species are likely to be present within the IP elements. Individuals of small, slow-moving species or slow-moving young of all species residing in the area of the construction works may be affected. Such an impact is not expected or will be insubstantial during the operation phase when the IP will be unsuitable for inhabitation by these species.

Bird mortality may occur because of the power line. Poles of unsuitable construction in the case of 20kV power lines may cause mortality by electrocution. Higher voltage power lines pose no risk of electrocution but collisions of birds with the strike termination cable are likely.

Rehabilitation will have no additional negative effect on the animal species.

Invertebrates

Direct destruction of the entire range of biotic components in within IPs of this type is inevitable during their development.

During construction:

Some habitats will be destroyed directly. This stage will include felling of trees and shrubs, removal of grass, removal of the topsoil substrate and initial pit development. The changes in vegetation will cause change of the invertebrate fauna. The geobiont, stratobiont and epigeobiont invertebrate fauna will be affected. The habitats within these footprints will be destroyed. The fauna in the soil and waste rock stockpile footprint will also change.

The habitats of species demanding wider life-supporting territories will be fragmented. Given the specifics and lifestyle of invertebrates, this effect can be regarded as insignificant.

Barrier effects for invertebrates are also not very likely.

Undoubtedly, there will be disturbance (some species are highly sensitive to human presence) and mortality of individuals (direct destruction during development or collision with transport vehicles, etc.).

During the operation:

At this stage the impacts will be the same, given the staged development of the mine. It is possible to mitigate these impacts to some extent, because much of the animals will already have left the region or will have died out.

Lasting changes in local fauna in the soil and waste rock stockpile footprints will occur. The areas where soil material will be removed and stockpiled will be most affected. The initial pit development will require removal of not only soil but also rock material, which will also be stockpiled.

During Closure and Rehabilitation:

The rehabilitation of these sections will be a difficult and slow process. Improvement of the environment and, to some extent, recovery of habitats and populations are expected during this phase. Disturbance, mortality and pollution by dust or gas will remain as active, but mitigated, factors.

Usually, such 'interventions' in the natural environment change the edificatory plant species and lead to non-typical succession rather than recovery of habitats ('imitation' of primary succession). Pioneer species and communities that are typical of the initial stages of succession will appear. The areas where soil material will be removed will be most affected.

Improper rehabilitation poses risks of influx of aggressive species (introduction of non-native, invasive and synanthropic animals) that will change the structure of the species, being enemies and competitors of the local species.

The consequences which are undesired for the invertebrate fauna may be mitigated through the application of the entire package of proposed measures for mitigation of the negative IP impact on biodiversity in general.

Vertebrate animals

During our field studies and from work on other projects in the part of the Eastern Rhodopes that includes the IP, we have found or inferred from the available habitats that 139 vertebrate animal species can be observed in the area (Table IV.6.1-1 in the EIA Report). Some amphibians and reptiles, the stork, the raptors, the nightjar, the European roller, some woodpeckers (grey, black, middle spotted woodpecker), songbirds and the wolf are given higher conservation status. All they are subject to protection in the two protected zones in which the IP is situated – the Rhodopes - Eastern Protected Zone (under the Habitats Directive) and the Byala Reka River Protected Zone (under the Birds Directive). The exceptions are the European legless lizard, the goshawk, the red-breasted flycatcher and the wild cat.

European legless lizards were not registered in the studied area. The studied area offers small habitats for this species - grasslands and shrublands, and rarefied forests along the northern periphery, a small portion of which will be directly affected. Therefore, the impact on the habitat of this species will be **insignificant**. Being peripheral relative to the IP, these habitats allow for an **insignificant** barrier effect. This species is vulnerable to overrunning, but since it was not found during the field studies, its population in the region is small and, therefore, singular individuals will be at risk. Application of the measures provided for in the Protected Area Impact Report may **eliminate** the impact.

A goshawk was found in Yuren Dere. This species nests in high-stem mountain and lowland forests, in river-edge forests and in coniferous plantations. It hunts practically everywhere (Golemanski 2011, personal observations). The impacts for this species will be the same as those described in the Protected Area Impact Report for the European sparrow hawk (*Accipiter nisus*). If the activities start during the species' nesting period, the species may leave any nests in or near-by the IP, and such nests are at risk of being destroyed or abandoned with subsequent loss of eggs

and/or young chicks. Should this happen, the impact on the species' population in the area may be **significant**. Mortality may occur because of the power line. Poles of unsuitable construction in the case of 20kV power lines may cause mortality by electrocution. Higher voltage power lines pose no risk of electrocution but collisions of birds with the strike termination cable are likely. The impacts can be **eliminated** by application of the measures envisaged in the Protected Area Impact Report in respect of wild birds which are the subject of protection in the Byala Reka River Protected Zone.

Red-breasted flycatchers were registered only during migration. This species nests mainly in beech forests with natural structure, at elevations between 600 and 1,550 m. a.s.l. (Golemanski 2011). It occurs in various habitats during migration, including urban parks (personal observations). Therefore, the impact on the habitat of this species during migration will be **insignificant**. Since this species does not nest in the region, the disturbance for migrating individuals will also be **insignificant**. **There will be no mortality.**

Wild cats in Bulgaria prefer old, high stem forests but would settle in various other habitats such as woodlands and scrub in which they make their lairs and raise its young. They prefer hunting in open habitats (Peshev et al. 2004, Macdonald & Barrett 1993, personal observations). The IP includes potential habitats of this species but these habitats are spread throughout virtually all Eastern Rhodopes and, therefore, will sustain **insignificant** impact. This species was not found in the studied area but its presence there is not impossible. Even if this is the case, when disturbed, mammals move their lairs and their young outside the area of disturbance. The impact on individuals who may inhabit the area will be **insignificant**. **No impact** on the population of the species will occur in the region.

The impacts on the species included in Attachment 2 of the Biodiversity Act are considered and analysed in detail in the Protected Area Impact Report.

The remaining species, although included in Attachment 3 of the Biodiversity Act or in Bulgaria's Red Data Book (as 'Almost threatened'), are widespread and with comparatively numerous populations both in the Eastern Rhodopes and in Bulgaria in general. The impact on the habitats of this species will, therefore, be **insignificant** during migration. The species uses a wide range of habitats, including man-made. Therefore, the impact on its population and its habitats in the region will be **insignificant**.

General conclusions about the impact on the flora and fauna, from the perspective of the EIA Report:

By type of impact: direct and indirect, of insignificant extent;

By territorial impact: local for the IP terrain and indirect, partially as far as 700 m;

Occurrence of impact: on a daily basis, during the working day and twice per week by drilling and blasting;

Duration of Impact: during the concession period;

National ecological network

Protected zones

The IP area is situated in two protected areas (PA) of the National Environmental Network Natura Figure 2000 (Figure 6.6-1):

- 'Rhodopi - Eastern', code BG0001032, for protection of natural habitats and wild flora and fauna;

- 'Byala reka', code BG0002019, for protection of wild birds.

Protected Areas

The IP area does not impact any protected areas in the meaning of the Protected Areas Act. The nearest such area is the Hambar Dere Protected Locality (PL) (Figure IV.6.6-1) situated

approximately 1.6 km. from the concession area (distance between the nearest concession and PL boundary points).

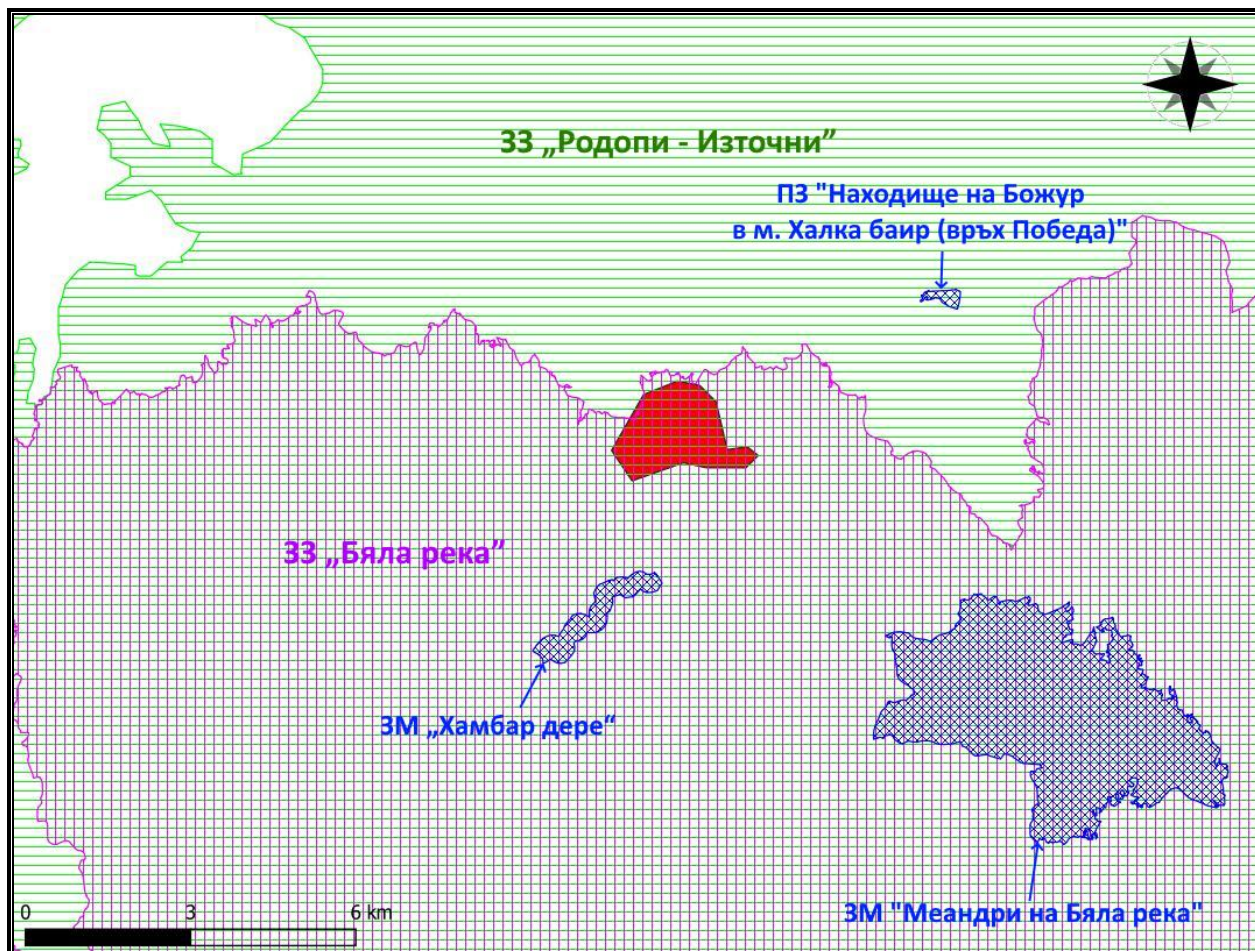


Figure 6.6-1: IP location relative to the protected zone and to the protected area. Red polygon – concession area; green horizontal line – Protected Area under the Habitats Directive; pink vertical line – Protected Area under the Birds Directive; blue diagonal line – protected areas under the Protected Areas Act.

6.7. Cultural and Historical Heritage

This part of the EIA Report was made in order to establish the extent to which known sites of cultural heritage could be impacted by the implementation of the investment proposal for 'Mining and Processing of Polymetal Ores from the Rozino Deposit, Tintyava PLA, situated in the lands of the Rozino village and Gugutka village, Ivaylovgrad Municipality, Haskovo district.'. This analysis was carried out by gathering and processing of data about known cultural values. The existence, location and current status of cultural heritage object were determined using various information sources – the Bulgaria's Archaeological Map computer system, the registers of the National Institute of Immovable Cultural Heritage, reports from site exploration along the railway line and along other infrastructure in the region, specialised publications concerning former archaeological studies, and analysis of topographic maps and ortho-photo maps.

The nature of the investment initiative assumes that its implementation may endanger or compromise mainly archaeological cultural values. According to Article 146 of the Cultural Heritage Act, archaeological sites are all movable and immovable material traces of human activity from past epochs, situated or found in the earth layers, on the earth's surface, on dry land and under

water, whose main information sources are terrain studies. Immovable and movable archaeological objects are cultural values by status, categorised as being of national significance or comprising natural wealth. The diversity of human activities and the enormous chronological section during which they have been created and existed explain the substantial diversity of this type of objects.

Known cultural values near the investment proposal were established during the analysis and measures for their protection defined in the specialised regulatory framework are specified. All objects whose protection could be affected positively or negatively by all activities of the project for 'Mining and Processing of Polymetal Ores from the Rozino Deposit, Tintyava PLA' are presented.

The region in which the investment proposal is situated is poorly studied and the number of known archaeological objects is comparatively small. A total of ten archaeological sites have been registered in the lands of the Rozino and Gugutka villages so far. Of those four are near, but outside, the Tintyava PLA. It is possible that there may be unregistered archaeological objects in the region and that they may be endangered by future exploration or mining.

Registered archaeological objects near the concession area boundaries:

1 . Bulgaria's archaeology map No. 1590350. A medieval castle in the Kaleto locality, situated 2.5 km. south-southwest of the Rozino Village and 0.25 km from the southwestern boundary of the concession area. GPS coordinates: 41.43391667 25.89338333.

2 . Bulgaria's archaeology map No. 1590322. An early iron age settlement situated 0.5 km. south-west of the Rozino Village and 0.3 km from the northern boundary of the concession area. GPS coordinates: 41.45247 25.9094.

3 . Bulgaria's archaeology map No. 10003863. Burial mound situated 2 km. northwest of the Gugutka village and 0.4 km from the southern boundary of the concession area. GPS coordinates: 41.42944 25.90336.

4 . A site without a Bulgaria's archaeology map number Antique building situated 2.6 km. south of the Rozino Village and 0.2 km from the southwestern boundary of the concession area. GPS coordinates: 41.431842 25.896716.

If the investment proposal is not realised, the condition of the known archaeological sites will not change.

Predicted impact

Construction works pose a significant danger of disturbing the integrity of the construction works. First, the most serious threat for the archaeological objects are the so-called earthworks - topsoil removal and temporary stockpiling, exploratory digs, mining, and rehabilitation of disturbed terrain. All excavation work types can affect cultural strata, wreck archaeological structures or destroy artefacts. Furthermore, IP implementation may endanger unknown archaeological objects.

The degree of exposure of archaeological objects to damage depends also on their specifics, such as type, chronology, depth of the cultural strata, presence of elements of architecture, the parameters of the protection zones, etc. The objects closest to the areas in which active earthworks will be carried out will be most seriously endangered.

It is clear from the preliminary analysis of expected negative impacts from IP implementation that any of the implementation activities may be a potential hazard of varying intensity for the integrity of cultural values.

a) Construction

The negative impacts on the objects of cultural heritage may be caused by excavation works within the concession limits. Most endangered will be the archaeological cultural values whose specifics make them most difficult to identify. It is very likely that unknown archaeological object may be affected by the construction works. Therefore, and also by virtue of Article 161, paragraph 2 of the Cultural Heritage Act, surveillance by archaeologists will be required during the construction works. If new archaeological sites are identified, the provisions of art. 148 and 160 of the same act will apply.

b) Operation

The operation of the IP for 'Mining and Processing of Polymetal Ores from the Rozino Deposit, Tintyava PLA' may pose a threat to any cultural values within its limits. One indirect impact worthy of note is the change of the cultural and traditional landscape of the region.

c) Closure and rehabilitation

At this stage negative impacts can be expected for objects of cultural heritage in the case of top-soil removal outside the concession area.

Summary of conclusions regarding the cultural and historical heritage:

By type of impact: direct, insignificant when the regulatory requirements are complied with;

By territorial extent of the impact: local, within the worked sections;

Occurrence of impact: temporary, until stripping of the top-soil layer; rehabilitation of terrain;

Duration of impact: for the duration of construction and operation phases;

Cumulative and combined impacts: none expected when the regulatory measures are enforced.

6.8. Waste

The waste generated from the operation should be split in two groups: subject to the Waste Management Act, and mine waste subject to the Underground Resources Act.

The waste which will be generated and managed in accordance with the Underground Resources Act are:

- Code 01 01 01 - wastes from mineral metalliferous excavation, which will be disposed of on a waste rock stockpile;
- Code 01 03 06 - tailings other than those mentioned in 01 03 04 and 01 03 05, that will be disposed of as paste.

The waste covered by the URA which will be generated

During construction

To a large extent, the construction stage comprises deposit development preparations and *mineral reserve uncovering works in preparation for mining*.

Some typical construction works will be carried out during the construction of the processing plant and of the other necessary facilities. Construction permitting for any particular site will be followed by construction waste management planning in accordance with the *Regulation on Construction Waste Management and Incorporation of Recovered Construction Materials*.

The expected construction waste types are:

17 01 01 Concrete;

17 02 03 Plastics;

17 04 05 Iron and steel;

17 05 04 Soil and stones other than those mentioned in 17 05 03

✓ **Hazardous waste**

Hazardous waste will be generated during the construction and preparatory phases predominantly by the construction machinery used for the site facilities (mine dry, Processing plant), blasting and preparations for mining.

13 01 10 - Mineral-based non-chlorinated hydraulic oils.*

13 02 05 mineral-based non-chlorinated engine, gear and lubricating oils*

16 01 07 – Oil filters*

16 01 13 – Brake fluids*

16 06 01 – Lead batteries*

15 02 02 - Absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances.*

✓ **Other Non Hazardous waste**

15 01 01 - Paper and cardboard packaging

15 01 02 - Plastic packaging

15 01 03 - wooden packaging

✓ **Mixed household waste**

20 03 01 – Mixed municipal waste.

◆ **Mine Wastes Generated during Project Operation**

The following waste-related activities will be carried out during the mining, operation and ore processing in the deposit area:

Hazardous waste

Some waste may be generated by quarrying equipment for mining, loading and hauling only during emergency/unforeseen replacement within the mined sections.

13 01 10* - Mineral-based non-chlorinated hydraulic oils.

13 01 11* - Synthetic hydraulic oils.

13 02 06 * – Synthetic engine, gear and lubricating oils

15 02 02* - Absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances.

15 01 10* – Packaging containing residual hazardous wastes or contaminated with hazardous waste;

16 06 01* – Lead batteries

No hazardous waste will be stored in the IP area but will be hauled in a timely manner

Mixed household waste

20 03 01 – Mixed household waste

◆ **Expected generation of waste during closure and rehabilitation**

Waste generated during the rehabilitation of the deposit will be the same as the waste generated during the period of construction and mining preparations, and will comprise concrete, polluted wiping cloths, and household type waste, but no mining waste.

All waste will be handed over on the basis of written contracts with persons holding the relevant permits or registration documents issued pursuant to the Waste Management Act.

The local municipal waste transporting company serving the Ivaylovgrad Municipality will be contracted to haul periodically the household waste which will be collected in containers.

The generated wastes are described in item V.8 of the EIA Report both by the manner of their generation and by name, quantity, place of generation, and manner of treatment.

Summary of waste-impact conclusions:

By type of impact: insignificant

By territorial extent of the impact: limited, within the worked sections

Occurrence of impact: in respect of waste covered by the Waste Management Act - temporary; in respect of mining waste - continuous, daily, until closure of operations and rehabilitation of the terrain;

Duration of impact: continuous, during the deposit operation period, recoverable;

Cumulative and combined impacts on the environment: none expected because of the limited territorial impact and because of technical and biological rehabilitation.

6.9. Hazardous substances

Diesel fuel will be used during the construction and operation periods for loaders and haul trucks and for ancillary self-propelled mining equipment. It will be kept in steel tanks with a total volume of 42.5 t. (with an average density of 0.85) - 50,000 l or 55 m³. The number of the tanks and their sizes will be in accordance with a Design for construction of a filling station consistent with the Zoning Act.

Diesel fuel will be delivered by tank trucks and at most 42.5 t will be present on site.

Fuels and lubricants will be used by the service machinery during the construction and operation of the mine.

The required lubricating, hydraulic and cooling oils and grease will be delivered packaged and the packaging will be returned to the vendors in a full-empty scenario.

Present on site, in a storage facility, will be:

- Prista® M10 De motor oil in 2 drums, each of 110 kg. capacity, totalling at 0.22 t. and
- Prista® AN 68 motor oil in 2 drums, each of 110 kg. capacity, totalling at 0.22 t.

Ammonium nitrate - fuel oil (ANFO) and/or site-mixed emulsion are intended for use as **the main explosives**.

No **chemical substances and mixes** will be used during the mining process. Such materials will be used in the concentration process. The following reagents will be stored and prepared in the reagent supply area:

Frother: Methyl isobutyl carbinol (MBIC). The maximum amount available on site will be 6.6 t., present in: a storage facility and a solution tank with a total capacity of 480 kg – 500 l – 0.6 m³, and a solution feeding tank with a total capacity of 60 kg – 64 l – 0.06 m³ with a solution metering system.

Collector: Potassium Amyl Xanthate (PAX). The maximum amount available on site will be 18.7 t., present in: a storage facility and a solution tank with a total capacity of 1,440 kg – 9,600 l – 10 m³, and a solution feeding tank with a total capacity of 480 kg – 3,200 l – 3.5 m³ with a solution metering system. Two duty/stand-by circulating pumps will feed the solution with PAX to the flotation circuit;

Activator: Copper sulphate (CuSO₄.5H₂O). The maximum amount available on site will be 45 t., present in: a storage facility and a solution tank with a total capacity of 3,000 kg – 20,000 l – 20 m³, and a solution feeding tank with a total capacity of 1500 kg – 10,000 l – 10 m³ with a solution metering system.

Sulphidizing agent: Sodium hydrogen sulphide (NaHS). The maximum amount available on site will be 48 t., present in: a storage facility and a solution tank with a total capacity of 3600 kg – 23,980 l – 25 m³, and a solution feeding tank with a total capacity of 1200 kg – 8,000 l – 8 m³ with a solution metering system.

Collector: Aerofloat 404 (A404). The maximum amount available on site will be 3.6 t., present in: a storage facility and a solution tank with a total capacity of 360 kg – 2,400 l – 2.5 m³, and a solution feeding tank with a total capacity of 60 kg – 400 l – 0.4 m³ with a solution metering system.

Flocculant (mixture): The maximum amount available on site will be 2.2 t., present in an automatic polymer-solution dosage machine. The flocculant distribution system comprises a flocculant dust bin, a feeding auger, an agitated mixing an agitated storage tank and two metering pumps. Polymer solution doses will be prepared in advance in a Tomal PolyRex automatic machine. This will allow for proper solution preparation and aging of flocculants. Both metering pumps will feed the mixed flocculant to the concentrate thickener and to the processing waste thickener. Each line will be equipped with a mixer for further flocculant dilution to 0.02% density upstream of the thickeners.

The delivery, transport, preparation, use, disposal and treatment of solutions and packaging are in line with the regulatory requirements.

Rehabilitation will be staged and will complete at the end of the concession period. A technical and biological rehabilitation design not involving use and storage of hazardous chemicals and materials will be prepared.

Summary of conclusions about hazardous substance impacts

By type of impact: insignificant

By territorial extent of the impact: locally, within the work sections

Occurrence of impact: temporary

Duration of impact: during the deposit operation period, recoverable;

Cumulative and combined impacts: none expected because of the limited territorial impact.

6.10. Physical factors Risk Energy Sources and Radiation

Forecast of the expected noise in the environment during construction, operation, closure and rehabilitation of the IP.

The implementation of the investment proposal will emit noise from operating machines, mining and processing equipment, and from drilling and blasting.

a) Construction and Operation

The IP construction phase will involve in-pit road construction, preparation of stockpile areas (*for topsoil and overburden*), Processing plant construction, and preparation of quarry entry faces.

The construction phase will evolve in parallel with the mining activities which will be carried out during the first year of IP implementation, but can be divided conditionally into a Processing plant construction phase and construction phase for the the remaining activities for staged stripping, mining and processing of mined ore.

Noise from industrial plant:

Typical construction and strip mining development equipment will be used during the construction and deposit development phases: excavators, bulldozers, dump trucks, front-end loaders, drill rigs, jaw crushers and a percussion-rotary drill with equivalent noise levels of 68 to 110 dB(A).

Noise from blasting operations:

As regards this source of intermittent noise, a trial blasting was carried out and a *Report on the Evaluation of the Side Impact of Blasting on the Environment for the project Rozino Deposit, Kardjali Municipality (attached with the EIA Report)*.

b) Closure and rehabilitation

The heavy-duty and processing machinery will not be substantially different from the equipment used during the construction phase. The machines for mining and processing of mined mineral resources will not be used during this phase and, therefore, it may be assumed that the impact will be significantly lower than during the pre-stripping and mining phases.

Assessment of expected noise impact

Noise from the construction of the Processing Plant:

The predominant noise during the Processing Plant construction period will be generated by operation of the construction equipment.

Depending on the technical state of repair of the equipment, the expected noise levels in immediate proximity to the source will vary at $80 \div_{\max} 105 \text{ dB(A)}$. The distance to which operation of the machines will cause some negative effect (*noise above the admissible limit values for residential territories and zones of 55 dB(A)*) was calculated using the Method for calculation of noise from local and industrial sources – Regulation 6 of 2006 on the Environmental Noise Parameters.

According to the calculations using the methodology for a radius of 100 m from the source of noise, the maximum noise load will be up to 55 dB(A), and the maximum noise levels at a distance of 150÷200 m from the source will reach 45 dB(A) and the impact on the environment insignificant.

The maximum noise level in places of protection (*the nearest residential building - at a distance of 1,580 m from the Processing Plant site*) is expected to be as high as only 25 dB(A), which is 30 dB(A) below the limit values for noise levels in residential zones and areas.

Noise from industrial plant during stripping, mining and processing:

The in-pit activities will be performed for up to 14 hours per day - during the day-time and evening hours. The Processing Plant operations will be round the clock. Several industrial sources of noise will be situated on the Rozino Deposit site, with their respective contours and geometric centres. The worst possible scenario of deposit operations was considered - operation of all sources of noise in the nearest proximity to the residential buildings. These are the sources of industrial noise:

- the contour surrounding the equipment serving the external overburden stockpile – the geometric centre is situated at approximately 1,800 m from the nearest residential building in the Byal Gradets village;
- the contour around the mining equipment (*excavator, bulldozer, front end loader, dump trucks*) – the geometric centre is situated at approximately 1,800 m from the nearest residential building in the Byal Gradets village;
- the contour around the Processing Plant – the geometric centre is situated at approximately 1700 m from the nearest residential building in the Byal Gradets village. The latter location is stationary.

The maximum noise levels in the area of sensitive objects in need of increased noise protection will be insignificant, at $18.5 \div 21.9 \text{ dB(A)}$, with the admissible levels being 45-55 dB(A). It is important to note that at these noise levels (*up to 21.9 dB(A)*) the mining operations on the IP site will not be heard by people in the near-by settlements.

Noise from transport vehicles:

The calculated equivalent noise level at a distance of 5 m from the in-pit roads does not exceed 40 dB(A). No change of background noise levels related to operating heavy-duty equipment is expected.

Noise from blasting operations:

Igniting explosive charges in order to fragment rocks during open pit mining for ores and minerals some of the blast energy transits into the air environment and generates an airblast wave propagating at more than 600 m/s. This propagation velocity diminishes as the distance from the explosion increases and the airblast impact becomes acoustic below 343 m/s.

Given the commercial blasting specifics, it is assumed that there is no uniform comfort limit value for comfort limit values for blastwork noise impacts in urban areas near open pits in the meaning of Regulation 6 of 2006 (*maximum admissible day-time limit value for residential buildings - 55 dBA*).

The trial-blast forecast values determined using the dependency derived from blasting of charges consistent with the operating blast works during the Rozino Deposit development are, in respect of the lateral airblast wave/noise impact – in the worst case, with a borehole diameter of 102 mm and charge weight of up to 30 kg, blasted within one delay interval, show that the forecast level of impact at a distance of 1,200 m (*as far as the first buildings in the Rozino village*) is 108-109 dB(C), which is classified as Moderately Strong Noise and is within the limit values between 'general conversation in a group' and 'telephone conversation'.

At the same time, it should be noted that the time of exposure to noise generated by technological blasting during mining of mineral resources in Bulgaria is 1-2 s, and that the safe exposure for this impact value (up to 109 dBC) is longer than 8 hours.

The most frequent approach to non-disturbance of the comfort of the people residing near open pits and quarries will involve the use of the approach used most frequently when developing deposits of mineral resources - alignment with the local community of the time most suitable / acceptable for technological blasting.

As mining develops and the pit deepens below the upper edge, the airblast and noise impacts will be further limited by the shielding function of the non-mined benches.

Conclusions in line with the Report on the Assessment of environmental side impact by blasting in the Rozino Deposit, Kardjali Municipality:

The specialized equipment employed during trial blasting in the Rozino Deposit showed blast induced vibration levels lower than the maximum admissible limit values, and lower than the standard for comfort in the secured zones required by Regulation 9/12.02.2010 on the Maximum Allowable Vibration Levels in Living Quarters.

The airblast/noise impacts recorded 800 m from the trial blasting site in the Rozino deposit are significantly lower than the maximum admissible limit values stipulated by the current Bulgarian legislation and lower than the limit values accepted throughout the world.

Blastwork noise is lower than the recorded background noise measured during the day preceding the trial.

According to those present during the blasting, the feeling at a distance of 600 m. and 800 m. away was like a 'distant thunder'.

The recorded side impact measurements during the blasting in the Rozino deposit fit within the cloud of results obtained through studies carried out in similar mine-engineering, natural and anthropogenic conditions in Bulgaria. This allows use of the mathematical formulae derived from these studies should be used to calculate the blasting vibration and airblast impacts in the Rozino conditions depending on the distance from the secured facility and the weight of the explosive charge ignited in one delay period.

The following conclusion can be made from the assessment of the blast impacts on humans and on the environment:

➤ the drilling and blasting design for the Rozino deposit conforms to the standards for safe impact on humans and structures during burden blasting for all three design blasthole diameters (76, 89 and 102 mm) and with separate (*stand-alone*) delay periods of ignition of each charge.

Vibrations and Radiation

Vibrations

Above-standard general vibrations. Published literature indicates that heavy equipment generates excessive levels of common vibrations. Older equipment generates stronger vibrations. Operators of trucks, excavators and bulldozers will be exposed to common vibrations. Common vibrations damage primarily the musculo-skeletal and vascular systems. The resonance effect can also cause damage to many internal organs.

Local vibrations – of utility vehicles will be exposed to local vibrations. Their adverse impact on human health results in impairment of the sensory and micro-vascular system of the upper limbs. Those effects are exacerbated when working in an overcooling microclimate.

The drivers of earth moving and heavy duty machines will be exposed to general and local vibrations. These may not exceed the admissible limit values in the case of new and modern equipment.

Radiation

It can be seen from the assays that the samples from the controlled areas conform to the requirements for specific activeness of natural radionuclides, laid down in Attachment 3, table 3 of the Regulation on Radiation Safety, in order to deregulate large quantities of materials. No hazard is present to the environment, the on-site workers and the population and, therefore, no particular measures and activities are needed to ensure radiation safety.

The gamma-spectrometry analysis results compared to the standards in the current legislation show that the materials removed from the site do not pose a threat to the environment and would not cause changes to the natural radiation background of the site. The radioactivity measured in the studied layers is sufficiently low to prevent pollution and distribution of radioactive isotopes into the remaining environment media.

The mining operations will not be a source of increased radionuclide content and will not cause sudden or gradual increase in radioactivity of the waste rock, the mine waste and the waste water.

Welding operations will be carried out during the construction of the Processing Plant. A combined effect of chemical exposure and radiant (ultraviolet and infra-red) energy will be observed during the welding operations, with visible spectrum radiation. The intensity of the infra-red radiation will differ and vary between 100 and 2,450 W/m^2 depending on the technical parameters and weight of the heated material. Regarding ultraviolet radiation - a summary spectral density at a distance of 1 m is specified, being 0.4 - 162 W/m^2 from the heated zone. Infra-red and ultraviolet radiation affect the visual analyser and personal protective equipment such as goggles and helmets will be required.

Assessment of drilling and blasting impacts

The results show that where the required trial blasting parameters are observed, the predicted seismic impact levels at different distances outside the pit are as follows:

- consistent with the provisions of Article 1 of Annex 7, Instructions for the Defining of Safe Distances during Blasting under Article 141 of the Safety Rules Applicable to Blasting Operations;
- below the maximum allowable vibration levels in living quarters, as provided for *Regulation 9 of February 12, 2010 on the Maximum Allowable Vibration Levels in Living Quarters*;
- the calculated blasting vibration impact values are substantially lower than the admissible limit values: humans, buildings and facilities, including comfort.

Protective blasting mats are recommended for blasting boreholes at distances below 300 m. from urban areas in order to prevent fly rock and risks for the population and the environment.

Conclusions

1. Noise impacts from IP implementation will be localised on site. The admissible levels of background noise in residential areas will not be exceeded.

2. Moving heavy-duty equipment will not cause substantial increase of background noise levels.

3. No objects in need of increased protection or residential areas in the secured zone will be affected during blasting operations.

4. The impact on the workers will be insignificant if preventive measures and personal protection equipment are used.

No breach of the background radiation and no radioactive pollution of air, water and soil on the IP territory are expected. The machines and facilities used for stripping, mining, closure and rehabilitation are not sources of magnetic, electromagnetic, thermal or other types of radiation.

The sources of **noise and vibration** will be dispersed, with a limited territorial range. The impact will be of short duration and of varying recurrence.

By type of impact: insignificant

Area of impact: Local;

Occurrence of impact: temporary, during the operation phase (*during weekdays*)

Duration of impact: the periods of construction, operation, closure and rehabilitation.

Cumulative and combined impacts: insignificant

Radiation

The machines and facilities used for stripping, mining, closure and rehabilitation are not sources of magnetic, electromagnetic, thermal or other types of radiation.

Under normal operation the IP will not cause radioactive contamination of the environmental media.

Summarised conclusions regarding the impact by radiation and on the natural radiation background

By type of impact: none expected under normal operating conditions; insignificantly negative during potential emergencies, and non-cumulative;

By territorial extent of the impact: local, within the concession area; without impact on the local population and on the protected areas;

Occurrence of impact: very low

Duration of impact: during the period of operation, but only in emergencies;

Cumulative and combined impacts on the environment: **The IP will have no measurable cumulative effect on the radiation background in the region**

6.11. Assessment of the environmental and occupational health aspects and risks to human health

Risk assessment and health impact during construction

The IP construction phase will involve in-pit road construction, preparation of stockpile areas (*for topsoil and overburden*), Processing plant construction, and preparation of quarry entry faces.

A. Risk factors and impacts on the workers

Bottled drinking water will be provided to the workers. Water from the non-contact reservoir will be used for household purposes (for the toilet facilities). Mobile ISOBOX containers for the administration and change-room facilities are provided for.

Specific work-place conditions exist in respect of construction works and are a complex of production related factors - microclimate, noise and vibrations, dust, toxic gases. The analysis of their impacts is the following:

Unfavourable microclimate

Exposure to unfavourable micro-climate (high or low temperatures, humidity, rain, snow, ultraviolet radiation) is related to body overheating or cooling (overstressed heat regulation), risk of

colds, with more temperature and rainfall anomalies with more frequent unfavourable climate being expected, given the trends in climate changes.

The risks are minimized by using adequate work and protective attire consistent with the specific weather, provision of rooms for warming up and rest, provision of suitable liquids (warm drinks in winter and fruit drinks in summer).

High noise levels – Construction machinery, transport vehicles and drilling and blasting will be the sources of noise. The equivalent noise levels for the main machinery used during the operations in the deposit will vary between 68 and 110 dB(A). The effects on the workers are categorised as specific (aural noise effects) and non-specific (extra-aural noise effects).

The technical measures include soundproofing of the cabins of construction machinery and transport vehicles, and choosing of adequate transport-vehicle speeds. Earmuffs are mandatory for those working in the open.

General and local vibrations

Operators of trucks, excavators and bulldozers will be exposed to general vibrations. Common vibrations damage primarily the musculo-skeletal and vascular systems. The resonance effect can also cause damage to many internal organs.

The operators of concrete vibrators and tamping machines will be subjected to local vibrations.

Radiation - Welding operations will be carried out during the construction of the Processing Plant. A combined effect of chemical exposure and radiant (ultraviolet and infra-red) energy will be observed during the welding operations, with visible spectrum radiation. Infra-red and ultraviolet radiation affect the visual analyser and personal protective equipment such as goggles and helmets will be required.

Air pollution – Impacts predominantly by damaging the function of the respiratory, cardiovascular and immune systems. The main pollutants are: *Particulate matter (PM₁₀ and PM_{2.5}); Carbon dioxide; Nitrous and sulphuric oxides; Diesel engine exhaust.*

According to the assessment on ambient air quality impact made in the EIA Report, the expected concentrations of pollutants into the ground-level atmosphere are below the threshold limit values for gasses in the occupational environment air. Internal combustion exhaust is released into the atmosphere at high temperature and, therefore, quickly scatter upward. Pollution in the ground air layer settles over short distances (as far as 200 m) and over a large area, thus guaranteeing compliance with the occupational air quality standards.

Physical strain - Work during limestone mining and processing is highly mechanised. Manual labour requiring significant physical efforts will also be used as required. In terms of physical strain, the work load can be classified as "moderately heavy" to "heavy". The effects are managed with suitable work schedules and activity-implementation instructions, including changing of work positions and rest during the work shift.

Labour traumatism – Labour traumatism is related to slipping, tripping, and falling risks and, also, striking by falling objects, working in inconvenient posture, and injuries by machinery and equipment. These risks are prevented by applying specific occupational safety instructions.

In summary, worker impacts are short-term, completely controllable and reversible, and, therefore, of minor degree and significance.

B. Risk factors and impacts on the near-by population

Based on the determined impacts by construction/pre-stripping works in the mined areas and facilities on the other environmental media and factors, evaluated in the EIA Report, the risks and impacts on the environmental health and hygiene aspects in near-by settlements and in the nearest sites in need of health protection, are as follows:

- In respect of ambient air quality in the near-by settlements:

According to the analyses made in the EIA Report, the expected concentrations of pollutants into the ground-level atmosphere are below the threshold limit values for gasses in the occupational

environment air. Pollution in the ground air layer settles over short distances (as far as 200 m) and over a large area and, therefore, no ambient air pollutant concentrations are expected to reach the nearest settlements.

- In respect of water, including potable water sources and facilities:

According to the evaluations made in the EIA Report, no negative impacts on surface water are expected during the construction works. The analysis of the impact on ground water during this stage shows that the intended design solutions (bottom and wall lining of the contact water reservoir, drainage curtain, grout wall) will not allow polluting of the ground water. Also, the quantitative status of the affected groundwater body will not deteriorate.

- In respect of soil quality in the region:

The soil cover will be encroached upon directly only in the mining section as a result of extraction and uncovering of the reserves. The soils in adjacent terrains will be affected only by transport vehicle emissions deposited in the immediate proximity to the road surface - to a low extent, of low significance, localised and reversible.

- In respect of harmful physical factors (noise, vibrations, non-ionising and ionising radiation):

According to the noise-impact analysis and evaluation (made in item EIA Report), there will be up to 55 dB(A) noise load within a 100 m radius from the noise source (construction machinery) and up to 45 dB(A) at a distance of 150÷200 m from the source and that the environmental impact will be insignificant. The maximum noise level in places of protection (the nearest residential building, in the Byal Gradets village, is 1,548 m away from the Processing Plant site) is expected to be as high as only 25 dB(A), which is 30 dB(A) below the limit values for noise levels in residential zones and areas.

- In respect of waste and hazardous chemical substances:

Managing the generated **waste** in accordance with the regulatory framework ensures lack of health impacts and risks for the near-by population.

When properly used in accordance with the regulatory requirements and material safety data sheets, **hazardous substances** (diesel fuel in construction machinery and transport vehicle fuel tanks and lubricants during the construction phase) are not expected to affect human health. No explosives will be stored on site.

- In respect of climate change:

The consequences of climate change concern only on-site workers because they will be exposed to more extreme weather events (provided that the current climate change trends, temperature and precipitation, in particular, continue). This impact is controllable and adjustable using suitable work clothes and personal protection equipment, selecting suitable work and rest times, and ensuring of suitable amenities. No impacts on the near-by population are expected.

- Visual impact:

The topography and existing tree vegetation in the territories between the disturbed areas and the nearest settlements, including the envisaged buffer area within the concession, will prevent any visual impact by the mining operations, and the disturbed areas will not be visible by the population.

Evaluation of risks and impacts during operation (extraction of reserves and processing in the Processing Plant)

A. Risk factors and impacts on the workers

The risk factors for outdoor workers (50 persons) involved in mining, stockpiling and tailings management facility operations overlap with the risk factors present during the construction phase, with risks related to **drilling and blasting** being added. The drilling and blasting works involve burst emissions of toxic gases, dust, intense noise, vibrations, and blast waves):

The drilling and blasting impact will be within the admissible limit values when the relevant regulatory framework is complied with, involving correct determining of safe blasting distances (incl. flyrock danger zones, the blast seismic impact distance, the airblast wave distance, and the toxic-gas impact safe distance), adherence to the drilling and blasting rules and standards, and use by the workers of suitable personal protection equipment. Additional measures to safeguard and limit the extent and degree of drilling and blasting impacts are provided for in this particular IP, such as use of blasting mats preventing flyrock.

The risk factors for **workers in the processing plant** (70 persons) are defined by the essence of the activities carried out – crushing and hauling, storing the crushed ore in indoor buffer storage, milling, flotation with reagents (frother: Methyl isobutyl carbinol (MBIC), Collector: Potassium Amyl Xanthate (PAX), Activator: Copper sulphate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$), Sulphidizer: Sodium hydrogen sulphide (NaHS), Collector: Aerofloat 404 (A404), Flocculant (mix)), flotation tails thickening, concentrate thickening and filter-press dewatering.

In ore-dressing, the workers are exposed to aerosols of complex composition (dust in the crusher units and vapours in the flotation units), noise, vibrations, discomforting climate.

The workers servicing the crusher units and the conveyor belts have no fixed workplace since they walk around various machines and are exposed mainly to dust and unfavourable microclimate. The necessary personal protection equipment will be provided to them.

Reagents are stored in isolated separate storage facility from which they are fed to the flotation units by an automated system. The workers are in no direct contact with the reagents.

The flotation unit workers are operators and the processes are automated, minimizing exposure to toxic chemical reagents. The flotation vessels are open and the content of harmful substances in the vapours is minimal, within the admissible occupational-environment levels, according to the design data. Adequate ventilation is provided.

The processes are automatic, controlled by monitors and sensors picking up any possible deviation from the normal production process, in which case operation of the plant is stopped automatically.

Measures are provided for in the design to limit the emission of pollutants, such as a sprinkler to prevent secondary dust emissions, including during the unloading and crushing processes. Good air quality will be maintained in this way in each crusher building. The crushed material facilities are covered, which will prevent spreading of dust.

Any spill along the circuit is collected by sump pumps mounted on the flotation circuit floor and is fed to the respective points along the flotation circuit.

As regards noise in the work environment, the Investor will fulfil its obligations according to *Regulation 2 on Employee Protection against Risks of Exposure to Noise at Work*, by ensuring maximum occupational environment noise levels of not more than 85 dB(A), and, where necessary, by making the arrangements necessary to reduce the harmful impact of this factor (suitable work/rest regimen for workers, individual protective equipment, etc.).

Safety instructions are prepared and applied for each work position and adherence to these instructions ensures the prevention of health risks, incidents and accidents.

The risks are defined as long-term, completely controllable and reversible, and, therefore, insignificant.

B. Risk factors and impacts on the near-by population

- In respect of ambient air quality in the near-by settlements:

The ambient air impact evaluation in the EIA Report shows that activities in the worst case (the IP implementation period during which maximum atmospheric air pollution is expected, or the first four years of the IP implementation when mining will be carried out concurrently with stripping of the deposit and dumping of overburden on an external stockpile. when mining will be carried out) do not cause any significant impact on ambient air quality, the maximum estimated

annual average values for PM₁₀ and PM_{2.5} being substantially below the human-health protection admissible levels.

- In respect of water, including potable water sources and facilities:

According to the evaluations made in the EIA Report, no negative impacts on surface water are expected. The analysis of the impact on ground water shows that the intended design solutions (bottom and wall lining of the contact water reservoir, drainage curtain, grout wall) will not allow polluting of the ground water. Also, the quantitative status of the affected groundwater body will not deteriorate.

- In respect of soil quality in the region:

The soil cover will be encroached upon directly only in the mining section as a result of extraction and uncovering of the reserves. The soils in adjacent terrains will be affected only by transport vehicle emissions deposited in the immediate proximity to the road surface - to a low extent, of low significance, localised and reversible.

- In respect of harmful physical factors (noise, vibrations, non-ionising and ionising radiation):

The expected noise impact assessed in the EIA Report shows that:

- The expected noise levels generated by machinery during stripping, mining and processing and reaching the nearest sites in need of health protection – housing in the Byal Gradets, Gugutka and Rozino villages, are significantly lower than the limit value of 45-55 dB(A), and this includes the noise levels from each source - Table V.10.2-4, and the total noise levels – Table V.10.2-5 above. The maximum noise levels in the area of sensitive objects in need of increased noise protection will be insignificant, at 18.5-21.9 dB(A), with the admissible levels being 45-55 dB(A). It is important to note that at these noise levels (up to 21.9 dB(A)) the mining operations on the IP site will not be heard by people in the near-by settlements.

- The transport-vehicle noise calculated as the equivalent level at a distance of 5 m from the in-pit roads does not exceed 40 dB(A). No change of background noise levels related to operating heavy-duty equipment is expected in the nearest settlements;

- The blasting noise has been determined by way of experimental blasting with the estimated impact level at a distance of 1,200 m (as far as the first buildings in the Rozino village) being 108-109 dB(C), which is classified as 'Moderately loud noise' (see Table V.10.2-7) and is within the limits of impact between 'conversation in a group' and 'telephone conversation' (see Table V.10.2-6). At the same time, the duration of exposure to noise generated by technological blasting during mining of mineral resources in Bulgaria is 1-2 s, and that the safe exposure for this impact value (up to 109 dBC) is longer than 8 hours.

No breach of the background radiation and no radioactive pollution of air, water and soil on the IP territory are expected. The machines and facilities used for stripping, mining, closure and rehabilitation are not sources of **magnetic, electromagnetic, thermal or other types of radiation**.

- In respect of waste and hazardous chemical substances:

Managing the generated **waste** in accordance with the regulatory framework ensures lack of health impacts and risks for the near-by population.

No impact on human health is expected in the case of proper use of **the hazardous substances** in accordance with the regulatory requirements and with the material safety data sheets. No explosives will be stored on site.

- In respect of climate change:

IP implementation will not have any effect on the local climate, and the consequences of climate change which are observed and predicted for Bulgaria and for the region under consideration, will not be affected by the IP implementation. Therefore, no impact related to climate changes and arising from the IP is expected for the near-by population.

- Visual impact:

Similar to the construction phase, no unfavourable visual impact is expected.

Evaluation of risks and impacts during closing and rehabilitation

Rehabilitation of areas disturbed by mining and processing of mined materials will involve technical and biological rehabilitation. Staged rehabilitation during the operation and final rehabilitation are intended.

Closure in the mining sections will involve evacuation of the mining equipment and of the production and logistical facilities.

The risk factors during rehabilitation are: toxic exhaust from the internal-combustion engines of the equipment in use, dust, noise and vibrations – this will impact mainly the workers, similar to the impact during construction.

No negative health effects on the population in adjacent urban areas is expected during the closing and rehabilitation.

Conclusions about the effects on human health:

By type of impact: direct and indirect - for those working on-site, without a tangible negative effect (no exceeding of environmental protection and human-health protection limit values and standards is expected) for the near-by population;

Area of impact: local, predominantly in activity areas and in the immediate proximity, without substantial impact on the nearest objects in need of health protection;

Occurrence of impact: daily, within the worked daytime hours;

Duration of impact: temporary - during the phase of construction, long-term – during the operation phase

Cumulative and combined impacts: insignificant – in respect of ambient air and noise.

6.12. Transboundary impact

With reference to the letter of the Ministry of Environment ref. 99-00-587/27.05.2024 and pursuant to Article 98, paragraph 1 of the Environment Protection Act, a notification to a potentially affected party - the Republic of Greece has been sent concerning the EIA procedure and in line with the provisions of the Convention on Environmental Impact Assessment in a Transboundary Context. This notification is consistent with Decision I/4 of the First meeting of the Parties to the Convention.

Letter Ref. OBOC – 68/23.10.2024 of the MOEW contains the response of the Greek state confirming its wish to participate in the EIA procedure as a concerned party. Therefore, the assessment considers in detail the aspects of transboundary impact with particular focus on 'water'.

It should be stated explicitly that the EIA procedure involved an exhaustive analysis and confirmation of the potential impacts, including through the use of adequate mathematical models and forecasts **for the worst operating conditions in the deposit and at maximum output.**

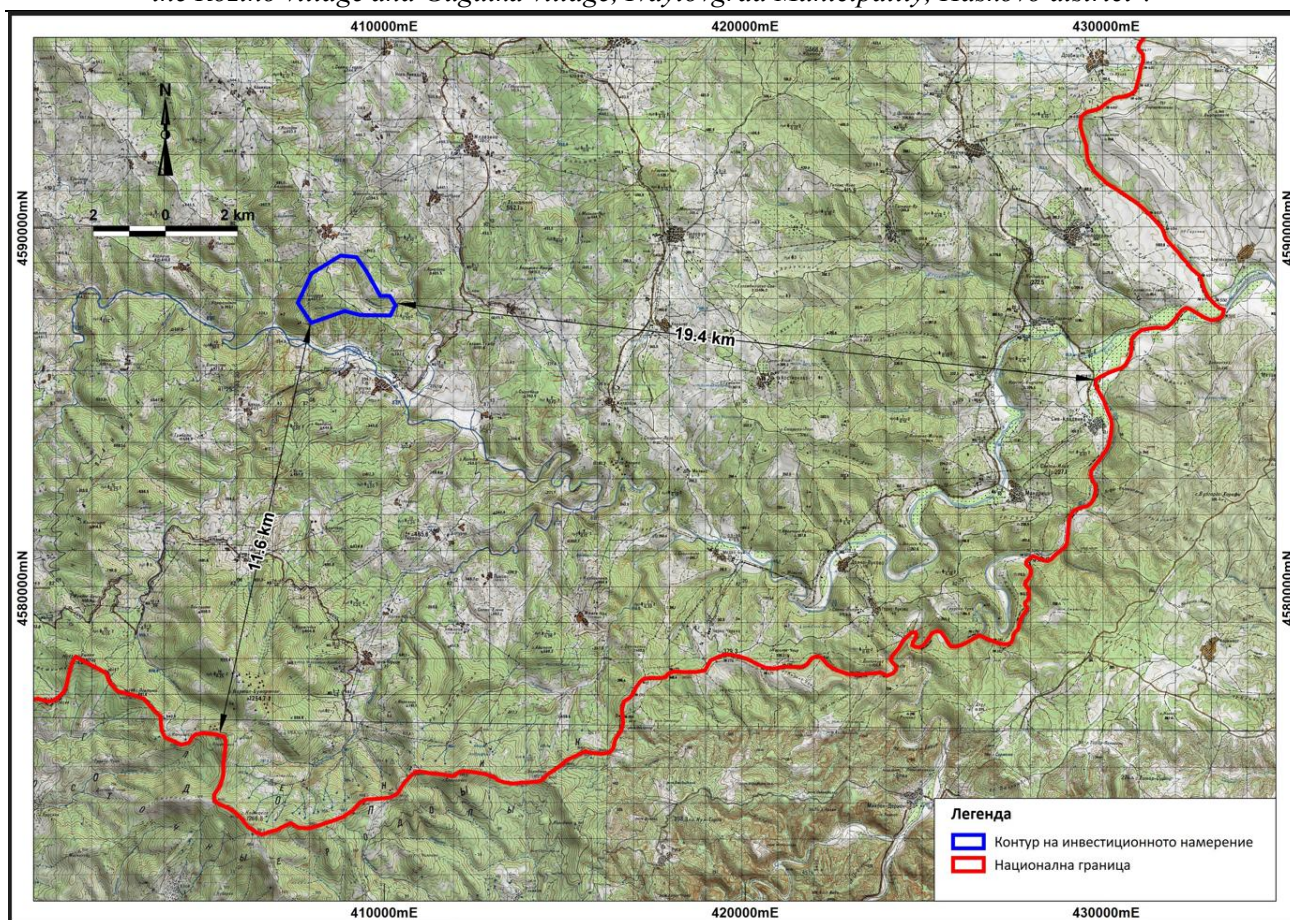


Figure 6.12-1. Distance of the Rozino Deposit from the border with the Republic of Greece

The following impacts may be forecasted for the various environmental media and factors:

Ambient air

Any dust and gas emissions during the various IP implementation phases will be restricted to the area of the deposit, meaning it will be local, and pollutants will settle within short distances around the work areas. **It is not possible to emit pollutants which would overcome the regional terrain features (mountainous elevations and river valleys) and reach the territory of the Republic of Greece, even less so in air-polluting concentrations.**

Surface and Ground Waters

No transboundary impact on the ecological and chemical status of the surface water, water flows and water quantities of the Luda and Byala Reka Rivers entering the Republic of Greece is expected during all stages of construction, operation and rehabilitation of the Rozino Deposit.

No impacts on surface water quality or quantity are expected. The IP will construct two consecutively situated reservoirs (the second one for non-contact, or conditionally clean, water) thus eliminating any likelihood of entry into water bodies of water separated by the IP. No discharging of process and ablation effluent into surface water bodies or into the sewerage systems of urban centres is envisaged. All collected water will be recirculated to the process circuits.

Also, no impact on the chemical and qualitative status of the groundwater bodies is expected. Also, a hydrogeology study in the deposit area has established that the flow of groundwater is insubstantial. Given the design depth of the pit, there is no reason to expect direct impacts on a groundwater body and to drinking water sources with sanitary protection belt areas and use permits as required by the Water Act.

Therefore, no impacts can be expected to arise and cause negative effects on water

quality in the Republic of Greece.

Subsurface

The harmful impact is concentrated mostly on the geological media, since non-renewable natural resources will be extracted. The information from the exploration and the mining technology which will be employed for the deposit allow the assumption that part of the IP area will be affected by the mining operations, **but that the entire region will not be affected in a manner changing the sustainability of the geological media and of its qualitative features, and, even less so, causing transboundary impacts.**

Lands and Soils

Given the nature of the operation – open mining of natural resources, the direct impacts on soils will be local and only in the territory of the Republic of Bulgaria. This will in no way impact the soils in the neighbouring state. **These soils will be restored to the maximum possible extent through timely and staged technical and biological rehabilitation.**

Noise

The analyses and calculations made in Section V prove that the IP implementation will not increase the background noise in the near-by settlements. The maximum noise levels that will reach the objects in need of increased noise protection are lower than the background noise levels in the urban and surrounding natural environments.

The distance to the Republic of Greece means that no elevated equivalent noise levels can reach its territory. Stripping, mining and handling operations and ore processing noise will be extinguished completely near the IP site. No impact on background noise levels in the Republic of Greece will be possible.

As regards blasting, the trial blasting showed that no negative transboundary impact can be expected. The blasting operations are at levels lower than the registered background noise even in near-by protected objects, measured prior to and during the trial blasting day.

Biodiversity

As two protected areas from the Natura 2000 network will be affected, an assessment will be made of the IP compliance with the scope and goals for protection of these areas. The Byala reka River is a protected area designated for protection of wild birds and the habitats of protected bird species must be preserved and restored if their nature-conservation status requires improvement. **It is inadmissible to cause significant negative impacts on the areas of the national Natura 2000 ecological network which, for its part, is a reason to avoid damage to biodiversity also on the territory of the Republic of Greece. It will be possible to carry out the activities only following approval of the IP as required by the Biodiversity Act.**

Waste

The proposed method for treatment and management of waste generated by the operations does not suggest environmental risks. Flotation tailings with minimal levels of humidity will be disposed of with two consecutive water reservoirs - the second one being intended for non-contact (conditionally clean) water, built downstream of the WRF. **This will eliminate any chance of pollutants entering the water, even during calamities, and reaching the territory of the Republic of Greece.**

Landscape

The significant distances from the border with the Republic of Greece and given the rolling and mountainous topography - a natural barrier to pollutants in the ambient air and a barrier to visual impacts, **no visual or landscape impacts may be expected.**

Health risk

The evaluations and analyses of the IP impact during its different implementation phases

(construction, operation, closure and rehabilitation.) show that the impacts are local in scope, predominantly in the directly affected terrains and within the concession area. Insignificant concentrations of particulate matter and noise substantially below the respective limit values reach the nearest settlements. Given the significantly larger distance of 11.6 km from the concession boundary, the analyses show that **no ground are present to suggest any transboundary risks for the health of the population in the border areas of the Republic of Greece, as can be seen from the evaluations for the other components and environmental media, including ambient air quality, noise, water, soils, and hazardous chemical substances.**

7. Description of the likely significant consequences of the environmental impacts caused by the IP

Construction and operation the investment proposal, including demolition and decommissioning, where applicable

The various IP implementation stages are described in detail in item II of the EIA Report. They include mine construction, operation of the deposit, closure and rehabilitation..

The likely environmental consequences of the IP during its various phases are reviewed in detail in Section V of this Report, with a summary of impact for each environmental media and factor. No significant negative impacts rendering impossible the IP implementation have been identified based on this evaluation. The proposed measures should be applied in order to mitigate the established impacts.

The use of natural resources and, in particular, the subsurface, soils, water and biodiversity, in consideration, as far as possible, of the sustainable presence of such resources

The subsurface

Given the nature of the IP, ***the subsurface*** will be impacted directly by mine-site development and extraction of the natural resource. The reserves in the Rozino Deposit amount to 11.3 Mt of ore grading at 1.33g/t gold and 26.6 Mt of overburden, as described in the Supplement to the Final Report on Reserves'

The consequences of the impacts on the subsurface are in direct connection to the optimal extraction of the mineral resource within the pit areas. Staged technical and biological rehabilitation is intended for maximum restoration of the mined spaces.

The ***soils*** will be impacted directly by the mining and processing operations. Topsoil layer stripping is intended for removal and subsequent use during the rehabilitation. The surface area of the future concession is **275 ha, of which 118 ha will be disturbed**. This area includes the open pit sites, the waste rock stockpiles, the processing sites, the mine roads, and the water reservoirs. The expected impacts on the earth and soils during the construction and operation phases comprise mechanical disturbance and destruction of the integrity of the soil profile on these particular terrains. These impacts will be minimised to some extent by the technical and biological rehabilitation.

Water

Surface water will be used during the planned abstraction from the Arpa Dere River during January through May of a flow ensuring a quantity of water at approximately 50 l/s (the expected total volume being 648,000 m³), or 10% of the average multi-annual water quantity, thus ensuring the ecological minimum of the river. The plan is to abstract water from a natural pool without damming or other river blocking construction works. A strategy for minimal use of fresh water and maximum recycling in the Processing Plant has been developed.

One technological option, used only as necessary, during the IP implementation is abstraction of water from the Arpa Dere River floodplain (groundwater body BG3G000PtPg049) by constructing a pumping station in the area of the existing Rozino Pumping Station.

Biodiversity

No use of natural resources based on the flora and fauna is envisaged in the IP. All possible impacts on biodiversity, incl. indirect impacts, are evaluated in item V of the EIA Report.

Emissions of pollutants, noise, vibrations, non-ionizing radiation and radiation; occurrence of harmful impacts and waste disposal and recovery

Regarding atmospheric air pollutants

A quantitative and qualitative assessment of pollutants emitted into the atmospheric air during IP implementation is presented in item V.1 of the EIA Report. The maximum expected average hourly and average annual levels of pollution in urban areas are within the human-health protection limit values.

Regarding harmful physical factors

The activities carried out in the Deposit during all three IP implementation stages are not expected to give rise of above-standard noise for the residential zones in the region.

Regarding radiation

It can be seen from the assays that the samples from the controlled areas conform to the requirements for specific activeness of natural radionuclides, laid down in Attachment 3, table 3 of the Regulation on Radiation Safety, in order to deregulate large quantities of materials. No hazard is present to the environment, the on-site workers and the population and, therefore, no particular measures and activities are needed to ensure radiation safety.

The gamma-spectrometry analysis results compared to the standards in the current legislation show that the materials removed from the site do not pose a threat to the environment and would not cause changes to the natural radiation background of the site. The radioactivity measured in the studied layers is sufficiently low to prevent pollution and distribution of radioactive isotopes into the remaining environment media.

The mining operations will not be a source of increased radionuclide content and will not cause sudden or gradual increase in radioactivity of the waste rock, the mine waste and the waste water.

Regarding waste

Stripped overburden and flotation tailings will be hauled to the Tailings Management Facility where it will be classified as category B according to the requirements for mining waste facilities referred to in Article 22b, paragraph 4 of the Underground Resources Act.

The limited amount of hazardous and non-hazardous production waste which will be generated by operating machines and equipment will be handed over for subsequent treatment based on written contracts with persons holding the waste-specific documents required by Article 35 of the Waste Management Act.

Municipal waste will be generated by the life activities of the personnel and will be collected in mixed municipal waste bins placed on the processing site. This waste will be hauled periodically by a contractor hauling municipal waste in the Ivaylovgrad Municipality.

The investment proposal does not provide for disposal and re-use of waste in the concession area.

The generated wastes are described in detail in item 5 of Report both by the manner of their generation and by name, quantity, place of generation, and manner of treatment during the various phases.

Human health or environmental risks, including risks arising from accidents or catastrophes

A detailed analysis of *human health* risks and their evaluation are made in item V.11 of the

EIA Report in respect of the population and in respect of the persons working in the impacted areas. The results of this analysis and evaluation show that the population and the persons working on-site will not be exposed to significant risks during all IP implementation stages because:

- no exceeding of the environmental and human-health limit values is expected outside the work areas, and the workers will be provided with adequate personal protective equipment in order to minimise impacts and discomfort typical of the activities under consideration;
 - the operations will not involve storage of hazardous chemical substances in quantities with potential for large-scale accidents;
- an Emergency Plan with specific actions will be used during the IP phases.

Risks during emergency and incidents

Ore mining and processing involve the use of mechanical equipment which could cause serious accidents. Emergencies and incidents involving the mechanical equipment, transport vehicles, Processing Plant and MWF equipment may cause leaks and spills of petroleum products (oils, fuels). These leaks and spills could be small in quantity and over insignificant areas, when the equipment is new or in good repair. Such leaks and spills can be dealt with easily and quickly, provided that oil and fuel adsorbent materials are secured constantly in a location specified in the emergency plan. Also, cases of specific pollution are expected to be extremely rare because they are deviations from the normal processing schedule.

Accidents and trauma of personnel is possible in the event of non-compliance with the occupational health and safety regulations.

Risks concerning the ***cultural heritage***, including risks caused by accidents and catastrophes, are possible if the provisions of the Cultural Heritage Act are not complied with.

Archaeological objects which cannot be localised by non-destructive methods may be present in the concession area. If traces of archaeological substance are identified, the provisions of art. 72 and 160 of the Cultural Heritage Act will apply.

Risks for the ***environment*** and human health may arise if the following natural disasters occur:

Earthquakes

According to Bulgaria's current seismic zoning, the deposit is situated in an area with an earthquake potential of I-VII according to the Medvedev-Sponheuer-Karnik intensity scale. The seismic coefficient for the region is $K_s = 0.10$.

The following destruction can be expected depending on the degree of earthquake impact:

- up to level VI – slight
- levels VI-IX – severe

There are no infrastructural facilities other than existing forest roads in the sections of the deposit.

Landslides

No landslides have been registered in the deposit, according to the register and map of landslides prepared by Geozashtita EOOD - Pernik branch Two landslides have been registered in the town of Ivaylovgrad - on the Yane Sandanski street and on the Paisi street.

Floods

The deposit area is not in a significant flood-risk area.

Combining of the impact with the impacts from other existing and/or approved investment proposals, in consideration of all existing environmental problems concerning

areas of particular ecological importance that are likely to be impacted, or impacts related to the use of natural resources

Summary of cumulative impacts:

❖ ***Atmospheric air:***

The effect on atmospheric air quality is local in extent and cannot be expected to have a cumulative effect.

❖ ***Lands and Soils:***

The lands impacted by mining will be more than 1 km. away from other exploration properties, and the current uses of the intervening terrain will be preserved and no large re-purposed massifs will be formed. According to the regulations and if the exploration properties be granted mining concessions, all mining of natural resources must have plans for rehabilitation of disturbed areas, and these plans must include use of the topsoil layer during the rehabilitation.

❖ ***Subsurface Environment, Mineral Diversity:***

The subsurface will be impacted directly by the mining operations. The significant distance to the various operating polymetal and gneiss deposits means that no impacts on the on the subsurface and no negative geological phenomena such as increased seismic activity, subsidence, slides, rockfalls, rupturing of the earth's crust etc. will be caused. Extraction of established reserves is controlled by the state via the Ministry of Energy, in accordance with the *National Mining Industry Development Strategy* (2015) and with the terms of the mining-concession granting contracts. According to the Mining Strategy of 2015, Bulgaria is third in copper mining and fourth in gold mining in Europe, which shows our country's leading position in European mining. The vision in the 2030 strategy is for the Republic of Bulgaria to become a regional leader in sustainable use of mineral resources and reserves and in the development of mining communities. Bulgaria's mining industry is a key industry and a main driver of economic development. Mining industry is developed by efficient, integrated and long-term use of mineral resources in accordance with the sustainable-development requirements extending to the three main aspects: economic, ecological - green mining industry, and social - corporate social responsibility.

❖ ***Landscape:***

The landscape type changes during surface mine development. This change is limited to the extent of the concession area. The remoteness between the sites and the topography do not allow for formation of large areas with technogenically altered landscape. One additional impact limitation measure is implementation of rehabilitation plans with restoration as close to the initial landscape type as possible.

❖ ***Mining, processing and ore hauling noise:***

The impact on background noise levels in the near-by objects in need of increased noise protection will be insignificant and is not expected to be cumulative.

❖ ***Population and human health***

No cumulative impacts on the health and hygiene aspects of the environment and, respectively, on the population and on human health are expected.

IP impact on climate (e.g. the nature and degree of greenhouse gas emissions) and the vulnerability of the IP to climate changes

Greenhouse gases will be generated by the internal combustion engines of a total of 8 mining machines and transport vehicles during the stripping and subsequent mining. Greenhouse gases will be generated by the on-site internal combustion engines during mine construction and subsequent mining.

The following greenhouse gas emission measures can be applied:

- using of equipment meeting the European ICE exhaust standards;
- non-admission of idle operation of ICE machines;
- maintenance of ICE equipment in good working order and in good repair;
- organising overburden and mining operations for minimal engine idling;

In view of the above, mining in the Rozino Deposit will have a minimal effect on climate change, the impact being emissions from the internal combustion engines of the machines used during the operation.

Given the technological developments in the automotive and transport industry, it can be expected that the greenhouse gas emissions will decrease gradually over time.

Used technologies and substances

The Rozino Deposit will be open-mined by means of drilling and blasting. Specialized mining equipment will be used for the purpose, comprising excavators, bulldozers, dump trucks etc.

A specialized company will carry out the blast works and will deliver the explosives immediately before blasting.

The topsoil and overburden will be removed and disposed of at the respective soil and overburden stockpiles and will be used for mined-area rehabilitation.

Hazardous chemical substances, preparations and products will be used in the Processing Plant, and diesel fuel for the machines. These materials will be used in compliance with the safety standards.

A flotation tailings thickening and dewatering process has been chosen in order to reduce impacts.

Almost the same equipment will be used during the rehabilitation, as at the beginning of mine development.

8. Plan for Implementation of the Measures Planned to Prevent, Mitigate or, Where Possible, Eliminate Significant Negative Impacts on the Environment, and a Plan for Implementation of the Measures under Art. 96 Par. 1 Item 7 of the EPA

No. #	Measures	Period	Objective
AMBIENT AIR			
1.	Development of an efficient blasting technology with reduced emission of toxic gases and dust	Engineering	Limiting the emission of toxic gasses and unfavourable health impacts for on-site workers
2.	Spraying of internal and external transport roads in dry and windy weather	Construction and Operation	Reduction of dust pollution in the region and protection of soils
3.	Periodic spraying in the handling areas	Construction and Operation	Restriction of dust emissions into the ground atmospheric layer.
4.	Development and approval of a	Construction and	Restriction of dust

No. #	Measures	Period	Objective
	handling operations instruction	Operation	emissions into the ground atmospheric layer.
5.	Prevention of transport vehicle overloading	Construction, operation, and closure and rehabilitation	Restriction of dust emissions into the ground atmospheric layer.
6.	Using machines in good repair, maintaining the stripping, mining, processing and transport equipment in good repair	Construction, operation, and closure and rehabilitation	Reduction of harmful emissions into the ambient air. Protection of waters and soils
7.	Disallow idling operation of the mining and transport equipment	Construction, operation, and closure and rehabilitation	Reducing automotive exhaust emissions
8.	Perform blasting during suitable wind direction - from the nearest settlement toward the mine	Operation	Ensure gas and dust emission spreading away from the settlement
9.	Use of blasting mats when blasting in the final contour of the pit in the direction of the near-by settlements	Operation	Restriction of dust emissions during blast work.
10.	Maintenance of minimal height of mined material stockpiles	Operation	Restriction of dust emissions into the ground atmospheric layer.
WATER			
11.	Prevent work below the ground-water static level.	Operation	Prevent direct ground-water pollution.
12.	Limiting activities increasing the risk of direct or indirect introduction of hazardous substances or other pollution in the ground water	Construction, operation, and closure and rehabilitation	Prevent direct ground-water pollution.
13.	Prevention of discharges of waste water, including ablution effluent, into surface and/or ground water	Operation	Prevent direct surface and ground-water pollution.
14.	Use of construction and transport equipment in good repair within the concession-area boundaries	Construction, operation, and closure and rehabilitation	Prevent surface and ground-water pollution.
15.	Preventing of pollution in the Byala Reka, Yulan Dere and Kokardja Dere rivers by construction materials and fuel and lubricants from the transport equipment.	Construction and Operation	Achievement of the goals for water body BG3MA100R270 - Byala Reka River and its Tributaries, set forth in the third RBMP, which are preservation of the good ecological status and prevention of its

No. #	Measures	Period	Objective
			deterioration.
16.	Disallowing of storage of waste in areas stripped of topsoil.	Construction	Prevent ground-water pollution.
17.	Starting a water-abstraction permitting procedure with the East-Aegean Basin Directorate.	Construction	Compliance with the water use and protection legislation.
18.	Maintaining the clean and contact water networks in good repair, and their attendant water-recycling facilities, with periodic monitoring and preventive maintenance.	Operation	Prevention of waste water (and contact water) spills and pollution of the surface and ground waters.
19.	Prohibition for repair works within the IP boundaries, except during emergencies.	Construction, operation, and closure and rehabilitation	Prevent surface and ground-water pollution.
20.	Ensuring limited access to the water intake facilities.	Operation	Prevention of spills and overuse of natural resources
SUBSURFACE			
21.	Include in the Overall Design for mining from the deposit staged technical and biological rehabilitation consistent with the technical specifics of the various sub-projects and with the specific vegetation.	Engineering	Maximum restoration of disturbed terrain.
22.	Performance of all mining and processing activities within the limits of the concession area.	Construction and Operation	Compliance with the Underground Resources Act
23.	Strict adherence to the approved Overall and Annual Detailed Designs for mining and rehabilitation of the deposit.	Construction, operation and rehabilitation	Regulatory compliance
24.	Strict adherence to the approved Mine Waste Management Plan	Construction and Operation	Compliance with the Underground Resources Act
25.	Application of lateral blast impact minimization techniques, such as: - increased stemming length; - reduced charge mass (smaller diameter boreholes, broken charges); - application of adequate blasting patterns (orienting the fracture front and the direction of muck displacement, minimizing the charge mass per delay period, etc.); - use of protection covers.	Operation	Ensuring occupational safety
26.	In the case of mining for ores and	Operation	Ensuring occupational

No. #	Measures	Period	Objective
	minerals near urban areas, the blasting times, most often during day-light working hours, are coordinated with the local community in order to avoid the surprise effect and with a view to reducing the unpleasant effect on the comfort of residents in the region.		safety
LANDS AND SOILS			
27.	Stripping and stockpiling of soils and of the fertile soil layer in accordance with the provisions of Regulation 26/02.12.1996 (with latest amendments and supplements in the SG, issue 22/2002). Define and designate the temporary top-soil stockpiling locations within the sites dedicated for this purpose.	Construction and Operation	Use of soils and of the fertile soil layer for rehabilitation
28.	Development of a soil monitoring plan in accordance with Article 29, paragraph , item 2 of the Soils Act.	Construction, operation, and closure and rehabilitation	Timely identification of negative processes occurring in the soils and prediction of their development with a view to soil conservation.
29.	Staged rehabilitation of the disturbed areas and use of stockpiled soil and overburden..	Operation Closure and rehabilitation	Prevention of dangerous physical and geological phenomena
30.	Prevention of pollution of soils external to the work sections	Operation	Protection of soils in the region
WASTES			
31.	Separate collection of waste and its handing over in a timely manner for transporting and subsequent treatment	Construction, operation, and closure and rehabilitation	Prevention of scattering of waste and and pollution of soil and water
32.	Handing over of waste for subsequent treatment based on written contracts with persons holding the documents required by Article 35 of the Waste Management Act.	Construction, operation, and closure and rehabilitation	Manage wastes in compliance with the WMA.
33.	Only vehicles and mobile equipment in good operating condition must be used in and outside the concession area. Transporting of hazardous wastes only in closed metal containers/drums.	Construction, operation, and closure and rehabilitation	Prevention of scattering of waste and and pollution of soil and water
34.	Waste oil from emergency oil	Construction,	Eliminate spills and

No. #	Measures	Period	Objective
	change must be collected in a manner that enables their recycling – in closed, chemically resistant and spill-proof containers which are marked and kept indoors.	operation, and closure and rehabilitation	pollution of soil and water. Manage waste in compliance with the WMA.
35.	In case of accidental (uncontrolled) spillage of oil or other pollutants, immediate removal of any contaminated soil and rock and its transporting to a suitable waste disposal site permitted to accept such wastes.	Construction, operation, and closure and rehabilitation	Eliminate spills and pollution of soil and water. Manage waste in compliance with the WMA.
36.	Placement of household type waste bins	Construction, operation, and closure and rehabilitation	Manage waste in compliance with the WMA.
HAZARDOUS SUBSTANCES			
37.	Hazardous substances (diesel fuel, oils, grease) should be used in accordance with the accident, release or spill prevention measures and with the exposure control measures, set forth in the relevant regulation/administrative order, in the Material Safety Data Sheets and in the instructions about safe use.	Construction, operation, and closure and rehabilitation	Protection of the environment and human health against the impact of hazardous chemical substances.
LANDSCAPE			
38.	Designing for technical, biological, and landscape and land-use rehabilitation consistent with the adjacent landscapes.	Engineering	Ensuring of natural inclusion of the rehabilitated terrains into the adjacent landscape
39.	Carrying out of staged and timely rehabilitation (technical and biological) of the disturbed areas in accordance with the approved rehabilitation designs.	Operation and closure and rehabilitation	Acceptable landscaping of the terrain, integration of the rehabilitated terrain into the local landscape
BIODIVERSITY			
40.	Sodium lamps will be used for exterior lighting (emitting mainly in the red and yellow parts of the spectrum, attracting substantially fewer nocturnal insects as compared to mercury-luminescent lamps which emit significant amounts of blue and ultraviolet rays). Limit the number of lamps down to 2 per ha.	Designing Construction and Operation	Limiting the strong attraction and disorienting effect of the lamps which disorient and easily kill nocturnal insects. Reducing the mortality of insects, including insects which are subject of protection in the protected zone.
41.	Using only tree and brush species which are indigenous in the country.	Engineering and rehabilitation	Preserving of the nature of vegetation in the region

No. #	Measures	Period	Objective
	Approving of the list of species by a botany expert.		including the natural habitats which are the subject of protection in the zone. Prevention of the spreading of invasive species.
42.	Traffic is not allowed off the approved roads and courses to the various IP elements. Vehicles must drive only on approved roads that have clear and permanent signs.	Construction and Operation	Prevention of further destruction of vegetation in the machine-traffic zones, including natural habitats which are subject of protection in the protected zone. Restricting the disturbance and mortality rates of animals, including species which are subject of protection in the protected zone.
HARMFUL PHYSICAL FACTORS			
43.	Modern mechanical equipment should be used during the IP implementation in order to reduce noise pollution of the environment, as is required by the Regulation on the Essential Requirements and Environmental Noise Compliance Assessment of Equipment and Plant for Use Outdoors (SG, issue 11 of 2004)	Engineering, construction, operation, and closure and rehabilitation	Less noise emissions into the environment from the operating machinery and transport vehicles.
44.	Rational selection of the charge construction and of its parameters (overdrilling depth, charge length, stemming length, charge decking, blasthole diameter, selection of suitable stemming material, adequate selection of upper or lower charge priming, application of adequate blasting patterns (orienting the fracture front and the direction of muck displacement, minimizing the charge mass per delay period, etc.); and detonation charging system	Operation	Controlling of blasting side effects (including impacts on the subsurface and on protected buildings and facilities)
45.	Conduct systematic control of the compliance with the admissible limit values for noise in the natural and residential environments.	Operation	Minimisation of noise impact on workers
46.	Carrying out of periodic self-measurement of noise parameters in	Operation	Monitoring of the 70 dBA hygiene limit value for

No. #	Measures	Period	Objective
	accordance with Regulation 27 dated 5.04.2006 on the Work of the National Environmental Noise Monitoring System and the Requirements for Carrying out Internal Monitoring and Reporting of the Industrial Sources of Noise in the Environment		industrial areas
47.	Disallow idling operation of the mining and transport equipment	Operation	Reduction of noise pollution
48.	Use of blasting mats when blasting in the final contour of the pit in the direction of the near-by settlements	Operation	Restriction of dust emissions during blast work.
CULTURAL AND HISTORIC HERITAGE			
49.	Preliminary archaeological studies – searching for archaeological objects within the future concession area in accordance with Article 161, paragraph 1 of the Cultural Heritage Act in order to establish the presence of unknown objects and to take measures for their conservation.	Prior to construction and mining works.	In order to prevent destruction of unknown archaeological objects,
50.	Rescue excavations (provided that archaeological objects are found in the sites that will be disturbed directly in the concession area)	Prior to construction and mining works.	If archaeological objects are registered If structures and artefacts are found and show features of cultural values, operations are stopped immediately and Article 72 of the Cultural Heritage Act is applied immediately.
HEALTH AND HYGIENE ASPECTS			
51.	An occupational health and safety plan, prepared for the phases of construction, operation, and closure and rehabilitation, should provide for periodic control measurements of occupational factors, including chemical agents, and the parameters of the operations (including drilling and blasting) and the worker health protection measures should be adjusted according to the results.	Prior to construction	Provision of occupational safety and health for on-site workers during the various IP implementation phases.
52.	The workers should be provided with adequate personal protection equipment consistent with the work performed. Monitor whether the PPEs are fit for purpose and used	Construction, operation, and closure and rehabilitation	Reduction of negative impacts on workers' health

No. #	Measures	Period	Objective
	correctly.		
53.	Development and introduction of a work and rest regimen during work.	Construction, operation, and closure and rehabilitation	Reduction of labour traumatism
54.	Provision to the workers of refreshing and warm drinks during hot or, respectively, cold periods during the year.	Construction, operation, and closure and rehabilitation	Ensuring of occupational health and safety
55.	Indicate mine workings and approaches to them that may pose danger of falling to people or animals, as well as subsidence, caving and landslides in the pit area with warning boards and secure with concrete-pole and mesh or barbed wire fences.	Construction, operation, and closure and rehabilitation	Prevention of occupational accidents.
56.	Regular induction of on-site workers, training, initial and periodic medical check-ups.	Construction, operation, and closure and rehabilitation	Ensuring of occupational health and safety
57.	Provide personnel on site trained in first aid in the event of accidents, and a first-aid kit with the necessary medicines and dressing should be provided.	Construction, operation, and closure and rehabilitation	Ensuring of occupational health and safety

9. Description of the expected significant environmental and human-health impacts of the IP resulting from the vulnerability of the IP risks of serious incidents and/or disasters of significance to the IP. The relevant information should be obtained by risk assessment. The description should include the applicable measures to prevent or mitigate the the significant unfavourable environmental and human-health consequences of these events, and details about the preparedness and proposed responses to such emergencies.

1. Description of expected significant unfavourable impacts by the investment proposal on the environment and on human health determined during the risk assessment

No conditions exist on the IP site for large-scale accidents, according to the criteria for reporting of large-scale accidents as required by Annex 5 of the Environment Protection Act.

2. Description of applicable measures intended to prevent or mitigate significant unfavourable consequences of large-scale accidents

No measures are envisaged because no large-scale accident can occur on the IP site.

10. Conclusion in accordance with Article 83 par. 5 of the Environment Protection Act

The main conclusions about the assumed extent of the impact expected from implementation of the Investment Proposal for 'Mining and Processing of Polymetal Ores from the Rozino Deposit, Tintyava PLA, situated in the lands of the Rozino village and Gugutka village, Ivaylovgrad Municipality, Haskovo district.' can be summarised as follows:

The harmful impact is concentrated mostly on the geological media, since non-renewable natural resources will be extracted. The atmospheric air, soils, landscape, flora and fauna will also be unavoidably impacted, given the nature of the investment proposal - open-pit mining of metalliferous mineral resources. This impact will be of limited duration, during the future concession of up to 35 years.

It should be pointed out explicitly that the impact analyses and the modelling of emissions into the atmospheric air, the drilling and blasting impacts, the noise impacts, the annoyance of the population and the forecasts in this Report were made with the worst operating conditions for the deposit, with a maximum output.

Ambient air

Application of the measures specified in item VII of this EIA Report will limit the impact on ambient air quality by the IP within the area surrounding the deposit. No change of background levels of air pollution is expected in the near-by settlements. No negative human-health effect is expected. The cumulative pollution in the urban environment will be negligible. It can be concluded from the calculations and emission distribution models for the IP that no transboundary impact will be expected.

Surface and Ground Water

The impact on surface water during all the implementation stages of the investment proposal for 'Mining and Processing of Polymetal Ores from the Rozino Deposit' is determined as insignificant. Up to 15 of the multi-annual water quantities will be abstracted from the surface water of the Arpa Dere River (Water Body BG3MA100R270 - Byala Reka River and its Tributaries) and is not expected to cause an impact (including transboundary) on the watershed area of the Byala Reka River. The water on site will be returned to the process with minimal recharging from water abstraction, precipitation and treated process water, and no discharging of waste water into surface water bodies is planned for. A 'zero discharge' approach is adopted.

The implementation of the investment proposal for 'Mining and Processing of Polymetal Ores from the Rozino Deposit, Tintyava PLA' is not expected to have a negative impact on ground water and will not deteriorate the chemical and quantitative status of the affected groundwater body BG3G000PtPg049 Fissure water - Eastern Rhodopean Complex. The mining operations will be carried out in the seepage zone without reaching the water level. Passive ground water inflow will be priority pumped to the plant in order to meet the processing plant requirements.

The impact on the chemical status of ground water will be neutralized by lining the contact water reservoir bottom and walls and by constructing a system to intercept eventual break-through involving a curtain drain and a grout curtain.

One technological option during the IP implementation is Limited abstraction of water from the Arpa Dere River floodplain by constructing a pumping station in the area of the existing Rozino Pumping Station.

No cumulative impact on waters exists - no discharging of wastewater is planned for.

No transboundary impact is expected, based on the analyses made in this Report.

Subsurface

The analysis of the existing status of the subsurface and the mining technology which will be employed for the deposit allow the assumption that part of the IP area will be affected by the mining operations, but that the entire region will not be affected in a manner causing substantial changes of the sustainability of the geological media and of its qualitative parameters. The mineral resource will be extracted fully and without loss (wastage), as is required by law, provided that the approved detailed designs for development and rehabilitation and the mine waste management plan are compiled with.

Noise

The activities during the different IP implementation phases will lead to changing noise levels in the near-by residential areas. The effect on noise levels in the area will be local in extent and is not expected to have a cumulative effect. It can be stated with a sufficient degree of credibility, based on the distribution calculation for noise generated during IP implementation, that no transboundary impact would be possible.

Radiation

The gamma-spectrometry analysis results compared to the standards in the current legislation show that the activity will not endanger the environment and would not cause changes to the natural radiation background of the assessed terrain and its surroundings. The radioactivity measured in the studied layers is sufficiently low to prevent pollution and distribution of radioactive isotopes into the remaining environment media. No hazard is present to the environment, the on-site workers and the population and, therefore, no particular measures and activities are needed to ensure radiation safety.

Biodiversity

The IP implementation will cause insignificant impact on the fauna and flora, provided that the proposed measures are complied with.

Health risk

The main impact by the IP implementation phases will be on the on-site workers, and is typical of this activity type (mining). Using adequate personal protection equipment and complying with the relevant occupational health and safety requirements will reduce such impacts to insignificance, without threat to workers' health.

No significant impact on the near-by population and objects in need of health protection is expected because the IP will not cause violation of the environment and human-health protection limit values. The measures proposed in the EIA Report, including measures concerning air quality, harmful physical factors, and water, will prevent/limit the harmful impacts to the possible minimum.

As regards the remaining environmental media and factors, including waste, the impact will be insignificant because the territory that will be included in the future concession area will be affected and the terrain will be rehabilitated to the maximum extent possible upon completion of operations in the mined sections and closure of the mine.

According to the nature and extent of the assumed negative impacts, the team of experts who are the authors of this EIA Report has made recommendations and propose measures to prevent, reduce and, where possible, discontinue the harmful environmental and human-health impacts.

Depending on the conclusions from the environmental and human-health impact assessments, the team of independent experts who developed this EIA Report is of the opinion that no significant negative impact on the environment and on human health can be expected as a result of IP implementation, provided that the recommendations and proposed measures to prevent, reduce and, where possible, discontinue the harmful impacts on the environment and on human health.

Based on the detailed analysis of impacts by construction, operation and closure and rehabilitation of the IP for 'Mining and Processing of Polymetal Ores from the Rozino Deposit, Tintyava PLA, situated in the lands of the Rozino village and Gugutka village, Ivaylovgrad Municipality, Haskovo district' on humans, on the environmental media and on the factors affecting it, the authors of this EIA Report recommends to the Supreme Expert

Executive summary of the Report on The Environmental Impact Assessment of the investment proposal for 'Mining and Processing of Polymetal Ores from the Rozino Deposit, Tintyava PLA, situated in the lands of the Rozino village and Gugutka village, Ivaylovgrad Municipality, Haskovo district'.

Environmental Council of the MOEW to APPROVE the implementation of the investment proposal made by TINTYAVA EXPLORATION AD with mandatory implementation of the proposed measures to reduce potential impacts identified in this assessment.

Attachments:

Attachment 1 Letters from MOEW Ref. NO. OBOC-68-17/18.11.2024 and Ref. No. OBOC-68-28/14.02.2025.