

**NON-TECHNICAL SUMMARY
OF THE REPORT
ON THE ENVIRONMENTAL IMPACT ASSESSMENT
OF AN INVESTMENT PROPOSAL FOR
"EXTRACTION AND PROCESSING OF POLYMETALLIC
ORES FROM THE "ROZINO" DEPOSIT, AREA
TINTYAVA, LOCATED IN THE LAND OF THE VILLAGES OF
ROZINO AND GUGUTKA, MUNICIPALITY OF IVAYLOVGRAD,
REGION OF HASKOVO"**



Client: Tintyava Exploration AD

March 2026

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Introduction

This document is a non-technical summary of the environmental impact assessment (EIA) report on the investment proposal for "Extraction and processing of polymetallic ores from the Rosino deposit, Tintyava area, located in the territories of the villages of Rozino and Gugutka, Ivaylovgrad municipality, Haskovo region.* *The purpose of the Non-Technical Summary is to present and summarize in a form accessible to the public the main information and conclusions contained in the EIA Report, so that all interested parties can understand the essence of the investment proposal in terms of the expected impacts on the environment and human health and the relevant mitigation measures, where necessary, and form an informed opinion on the positive and negative consequences of the project's implementation.*

*The EIA Report has been supplemented in accordance with the instructions given in letters from:

1. Ministry of Environment and Water, ref. No. EIA-68-65/20.10.2025
2. Ministry of Health, ref. No. 04-09 -119/10.09.2025
3. B a s in Directorate "Eastern Black Sea Region" Plovdiv, ref. No. PU-010-808(2) dated 26.09.2025
4. Ministry of Environment and Water, ref. No. EIA-68-91/12.02.2026

The environmental impact assessment report for the investment proposal for "Extraction and processing of polymetallic ores from the Rosino deposit, area
The EIA report was prepared in accordance with Article 96, paragraph 1 of the Environmental Protection Act (EPA, State Gazette No. 91).

The EIA report has been prepared in accordance with Article 96(1) of the Environmental Protection Act (EPA, State Gazette No. 91/2002 , as last amended and supplemented) and Article 12(1) of the Ordinance on the conditions and procedure for conducting an EIA (*the EIA Ordinance*, State Gazette No. 25/2003, as last amended and supplemented).

The EIA Report and the final version of the Terms of Reference for the scope and content of the EIA reflect and take into account the comments and recommendations made during the consultations, including those of the competent authorities, on the scope and content of the EIA.

General information

1. Information about the Contracting Authority

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the Rosino deposit, Tintyava area, located in the territories of the villages of Rosino and Gugutka, Ivaylovgrad municipality, Haskovo region

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

This report concerns the investment proposal (IP) "Extraction and processing of polymetallic ores from the Rosino deposit, Tintyava area, located in the territories of the villages of Rosino and Gugutka, Ivaylovgrad municipality, Haskovo region.

By Permit No. 467/28.02.2017 of the Minister of Energy, Gorubso Kardzhali AD, Kardzhali, is authorized to conduct exploration and research of metal minerals, underground resources, in the Tintyava area, located in the territory of the municipality of Ivaylovgrad, Haskovo region, and the municipality of Krumovgrad, Kardzhali region. underground resources in the Tintyava area, located in the municipality of Ivaylovgrad, Haskovo region, and the municipality of Krumovgrad, Kardzhali region.

The rights and obligations under the Agreement of May 2, 2017, for the exploration and prospecting of metal minerals—underground resources under Article 2, paragraph 1, item 1 of the Underground Resources Act in the Tintyava area, concluded between Gorubso-Kardzhali AD and the Minister of Energy on the basis of Permit No. 467/28.02.2017 of the Ministry of Energy, were transferred to Tintyava Exploration AD through Additional Agreement No. 1 to the Agreement on the basis of Article 25, paragraph 1 of the Underground Resources Act and Article 61, paragraph 1, item 12 of the Agreement. The Agreement entered into force on July 17, 2017, after receipt of Decision No. 09-OS/2017 of the Minister of Environment and Water for assessing the likely degree of significant negative impact on the environment. On August 31, 2020, Tintyava Exploration AD and the Minister of Energy signed Supplementary Agreement No. 2 to extend the term of the Agreement by two years.

After submission of a comprehensive two-year report on the activities carried out and a reasoned proposal for the first extension of the term of the Agreement, and on the basis of Article 31(3) of the ZP, in conjunction with Article 2(6) and para. 7 of the Agreement of 02.05.2017, on 23.01.2023, Supplementary Agreement No. 3 was signed between Tintyava Exploration AD and the Minister of Energy to extend the term of the Agreement by another 2 years.

At the time of writing this report, no concession agreement has been concluded for the deposit. Pursuant to Article 37(1) of the Underground Resources Act (URA), the concession area includes the area of the deposit or its individual sections, as well as all areas necessary for the implementation of the concession activity, other than extraction. When determining the concession area, the following must be taken into account:

- the conditions of the underground resource deposit;
- the technical conditions for its full utilization;
- the additional areas needed for the disposal of waste, storage facilities, and technical infrastructure elements;
- the requirements of the ZPB for optimal extraction of natural resources, additional research work will be provided for in the overall and annual extraction projects
in order to achieve the fullest possible extraction of the reserves and resources of underground wealth from the deposit during their extraction, through the application of appropriate and environmentally friendly technologies.

The distances from the extraction sites to the boundaries of populated areas and the areas necessary to provide buffer zones around technical infrastructure facilities have been taken into account in relation to the protection of the environment and human health.

Therefore, the boundaries and size of the project concession area necessary for the extraction from the deposit and the processing of the raw material will be discussed and assessed here, and will be submitted for approval by the relevant state authorities in the concession award procedure.

The contracting authority plans to extract and process polymetallic (gold-silver) ores from the Rosino deposit, Tintyava area, with the future concession area

Non-technical summary of the EIA report on the investment proposal for "Extraction and processing of polymetallic ores from the Rosino deposit, Tintyava area, located in the territories of the villages of Rosino and Gugutka, Ivaylovgrad municipality, amounting to 2,753.4 hectares, of which the disturbed areas will amount to 1,179. Haskovo region

Non-technical summary of the EIA Report on an investment proposal for "Extraction and processing of polymetallic ores from the Rosino deposit, Tintyava area, located in the territories of the villages of Rosino and Gugutka, Ivaylovgrad municipality, amounting to 2,753.4 hectares, of which the disturbed areas will amount to 1,179. Haskovo region

The main activities included in the proposal are:

- open-pit mining of polymetallic ores;
- processing of the ore by flotation to obtain concentrate;
- construction and operation of the necessary accompanying infrastructure – roads, water supply, electricity supply, material storage facilities, mining waste facilities, etc.;
- gradual recultivation of the affected areas.

The concession term is set at 35 years.

The purpose of the investment project is the open-pit mining and processing of polymetallic gold-silver ore from the Rosino deposit, Tintyava area. The technological process of open-pit mining includes exposing the natural resources, performing drilling and blasting works (DBW) and crushing the ore. The ore will be processed by flotation to obtain a concentrate, which will be the final product for the installation. No block metal is expected to be obtained. The generated mining waste will be deposited in mining waste facilities.

The IP is not related to the maintenance and construction of a storage facility for explosives. Blasting works will be carried out on the basis of a written contract with a specialized company that has all the necessary permits and approval documents to store, deliver, and detonate the ore mass.

At the earliest stage, the client informed the Regional Inspectorate of Environment and Water Resources (RIEW) – Haskovo, the affected municipalities, mayor's offices, and the population. The investment proposal (IP) falls within the scope of item

19. "Open-pit mining in quarries and mines of raw materials - with an area of more than 25 hectares, or peat extraction - with an area of more than 150 hectares" of Annex No. 1 to the Environmental Protection Act and is subject to a mandatory environmental impact assessment (EIA).

At this stage, open-pit mining and processing of natural resources by flotation is outside the scope of Annex 4 to the Environmental Protection Act, and therefore no integrated permit is required under Chapter Seven, Section Two of the Environmental Protection Act in order to implement the project. Therefore, there is no need to prepare an assessment of the applicability of the best available techniques in relation to the proposed technologies.

The investment proposal does not provide for the storage of hazardous chemicals and mixtures on the site in quantities exceeding those specified in Annex 3 to the Environmental Protection Act, and therefore does not fall within the scope of Article 103 of the Environmental Protection Act. The explosives will be supplied by a licensed company whose warehouses are equipped and operated in accordance with the regulatory requirements for working with hazardous substances.

The future concession area does not fall within the boundaries of protected areas within the meaning of the Protected Areas Act, but falls within two protected areas (PA) of the Natura 2000 National Ecological Network:

- PA "Rhodopes - East", code BG0001032, for the protection of natural habitats and wild flora and fauna;
- Special Protection Area "Biala Reka", code BG0002019, for the protection of wild birds.

In accordance with the instructions given, the Contracting Authority has taken steps to prepare the necessary EIA documentation and a report assessing the compatibility of the investment project with the subject and objectives of the protected area (OS Report).

In connection with a letter from the Minister of Environment and Water, ref. No. 99-00-

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58/27.05.2024, pursuant to Article 96(1) of the Environmental Protection Act, a notification was prepared and sent to inform the potentially affected party, the Republic of Greece, in connection with the EIA procedure and in accordance with the requirements of the Convention on EIA in a transboundary context. The notification was prepared in accordance with Decision I/4 of the First Meeting of the Parties to the Convention.

By letter ref. No. EIA – 68/23.10.2024, the Ministry of Environment and Water received an official response from Greece confirming its willingness to participate in the EIA procedure as an affected party. With this, the competent authority for conducting the EIA procedure becomes the Minister of Environment and Water. The scope of the assessment examines in detail the transboundary aspects of the impact, with special attention paid to the "Water" component.

The investment proposal falls within the scope of the Eastern Black Sea Basin Directorate, Plovdiv. In letter ref. No. PU-01-183 (5)/26.05.2023, the Director of the BDIBR expressed the opinion that the IP is admissible, subject to the following conditions (some of which are attached):

- no pollution of surface and groundwater bodies from the activities related to the operation of the investment proposal shall be allowed;
- no activities that could lead to a negative change in the status of water body BG3MA100R270 shall be allowed;
- no direct or indirect discharge of hazardous and harmful substances into groundwater during the implementation of the IP;
- no cutting of natural coastal vegetation shall be allowed;
- water abstraction from surface or groundwater shall be carried out after a permit has been issued, in accordance with Article 44(1) of the Water Act;
- the construction of new facilities in a water body shall be carried out after a permit has been issued, in accordance with Article 46(1) of the Water Act;
- protection of drinking water sources in the area of the investment project in terms of their quantity and quality;
- the construction of drainage ditches around the perimeter of the mine field and the open pit mine shall be provided for, in order to collect rainwater and snowmelt from higher elevations and prevent surface water from entering the mine pit;
- to provide for appropriate measures for the reuse of rainwater, waste water, and drainage water, which should be included in a closed cycle, in order to reduce the planned water intake and ensure the efficient use of water.

All these requirements have been taken into account in the development of the conceptual design, and the relevant analyses will be made in this EIA report.

It should be noted that the Water Act does not provide for any prohibitions or restrictions with regard to the IP as presented.

The EIA report has been prepared on the basis of Article 96(1) of the Environmental Protection Act, in accordance with the consultations held with the affected parties and the public, additional studies conducted during the EIA procedure, including letters from the Ministry of Environment and Water ref. No. EIA-68-17/18.11.2024 and ref. No. EIA-68-28/14.02.2025.

The subject of description and analysis in the EIA report is *the territory* that will be affected by the IP in its entirety, including all additional or accompanying facilities and activities, in relation to the spatial and temporal dimensions, frequency and duration at significant impacts, which IP is likely to have.

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The impacts related to the implementation of the IP for the phases of its implementation – construction, operation, closure, and recultivation – have been identified, taking into account the degree of development/detail of the project design and the information provided by the Contracting Authority.

The possible cumulative impacts have also been assessed, taking into account the available and provided information on existing or planned other activities and intentions in the area of the investment proposal.

The expected impacts have been assessed, and general and specific conclusions have been formulated regarding the expected potential impacts, including their degree. Based on these conclusions, recommendations and measures have been proposed to reduce the impacts, resolve any future environmental problems and ensure the safe operation of the facility, guaranteeing the protection of human health, the environment and the sustainable development of the area.

3. Location of the investment proposal

The Rosino deposit, Tintyava area, is located in the territories of the villages of Rosino and Gugutka, Ivaylovgrad municipality, Haskovo region, about 1.2 km south of the village of Rosino. To the east and south is the border with Greece, and to the north and west are the municipalities of Lyubimets, Madzharovo, and Krumovgrad. It is located about 350 km (by road) east-southeast of the capital, Sofia. The

The Rosino deposit area is bordered to the south by the steep cliffs of the and is cut by the Byala River and its tributaries, which flow into the Arda River as a regional catchment area. The average altitude in the deposit area is about 470 m (in the northern part) and 300 m (in the south).

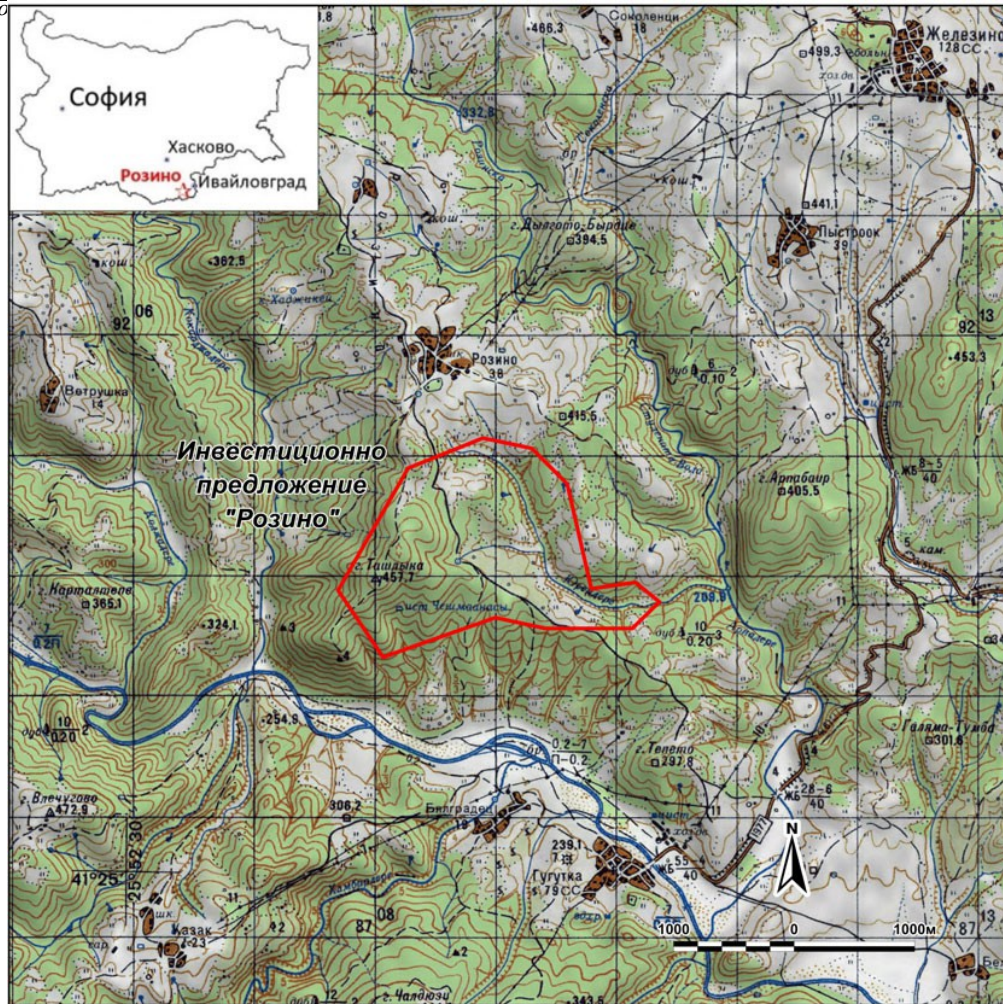


Figure 3-1. Location of the Rozino deposit, Tintyava area

The relief in the area is low mountainous and hilly, with flat hills predominating. It has a well-defined low ridge and valley character. The highest peak in the area, Kojale, at 1,267 m, is located on the Măglănik ridge. The altitude ranges from 70 to 700 m, with an average of 320 m. The relief in the area of the Tashlaka hill is heavily dissected by the Byala River and its tributaries - Dermene Dere, Kokardzha Dere, Arpa Dere, Hambar Dere, Yuruklerska, etc. The river basins are dominated by tectonically controlled river valleys, with rivers flowing from different directions into the main river in the region - the Arda River.

The area is entirely within the Gyumyurdzhinsko-Măglenshka physical-geographical sub-region. The winds are northwesterly, with active manifestation in the valleys and mountainous areas. There is also the appearance of snow. Average annual precipitation varies widely, from 800 to 1200 mm. It peaks in autumn and winter, in November and December. The frequent frontal and torrential nature of precipitation reaches up to 100 mm per day. This is one of the reasons for surface erosion. Snow cover lasts 5-10 days a year. The runoff module is from 5 to 25 l/sec/1m².

Areas required for the implementation of the investment proposal and road connections. Projected mining depth

The total planned concession area is 2,753.4 decares, of which 1,179 decares will be disturbed terrain. The buffer zone area is 1,574.4 decares. Part of

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The facilities will be developed in already developed/disturbed areas and no new land will be taken, with this "overlap" amounting to 261.9 decares. The distribution for each of the infrastructure sites is as follows:

No	Facilities	Areas, decares
1	Enrichment plant	51.4
2	Mine	261.9
3	External embankment-1 for earth and humus masses	14.5
4	External embankment-2 for earth and humus masses	37
5	External embankment for sterile rock mass (excavation)	247
6	Internal embankment (backfill) for sterile rock mass (excavation)	133.2
7	External facility for flotation waste after processing	438.4
8	Internal (backfill) facility for flotation waste after processing	128.7
9	Contact water reservoir. Covers: external facility for sterile waste after processing, mine, factory, and collection channels. Consists of a water mirror and retaining wall).	9.1
10	Clean water reservoir and collection channels (water mirror and retaining wall)	62.4
11	Service roads (outside the above infrastructure)	57.3
12	Overlapping areas - backfilling - internal embankment and internal facility for sterile waste after processing (This area is excluded from the total!)	-261.9
Total area required:		1179.0

No mining activities will be carried out in the buffer zone. It will provide protection for the facilities and installations and restrict accidental access by people and animals. It will ensure compliance with the obligations under the ZPB for additional exploration work with a view to the optimal extraction of reserves and resources from the subsoil.

The site plan shown in Figure 3-2 illustrates the elements of the IP that are in the conceptual phase. As the project progresses and moves on to the working design stage, the contours of the individual sub-projects may be changed slightly within the assessed areas without changing the impact analysis.

In compliance with the requirements set out in letter ref. No. PU-02-231/1/18.12.2024 of the BD ZBR, the construction of drainage ditches around the perimeter of the mine field and the open pit is planned in order to collect rainwater and snowmelt from higher elevations and prevent surface water from entering the mine pit. With regard to their illustration on the site plan, it should be emphasized that they are marked hypothetically, taking into account the geodesy of the terrain at the moment. Their exact location will be determined after engineering calculations and the development of specific technical designs, with a view to their maximum efficiency in relation to the technical parameters of the overall future project. Therefore, in some places, the contour of the hypothetical ditches extends beyond the proposed concession area, which will be corrected at the technical design stage and will be adjusted to the concession area provided, as they will be constructed within this area.

The coordinates along the contour of the future concession area are presented in the following table:

Table No. 3-1. Coordinate register of the boundary points of the project concession contour for investment intention (BGS 2005 system)

ID	East	North	Length, degrees	Width, 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	458760	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 site plan of the elements of the investment proposal is presented in the following figure.

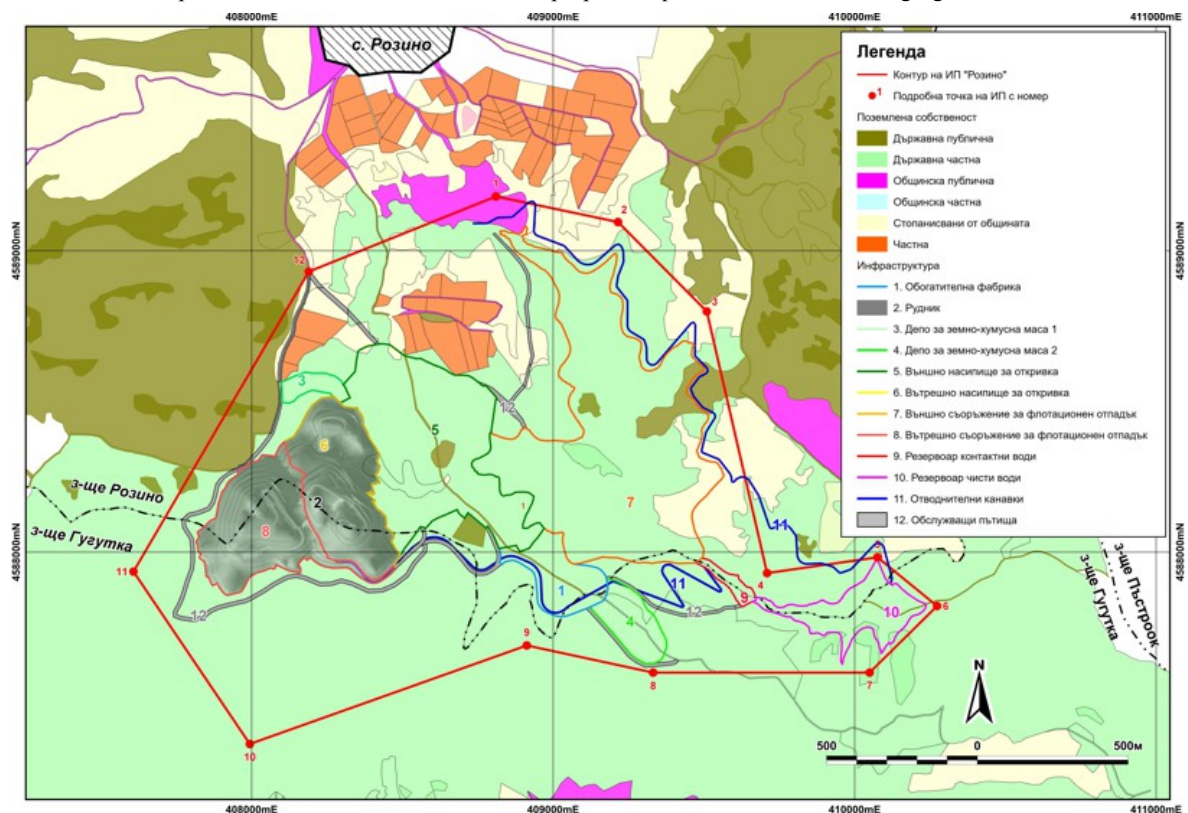


Figure No. 3-2. Site plan of the elements of the IP

The implementation of the investment proposal requires the construction of internal roads and access roads to the sites. The road connection to the Rozino mine will be provided by the existing dirt road through the villages of Rozino and Konnitsa, which connects to asphalt road II 59, linking the towns of Ivaylovgrad and Krumovgrad.

- option 1: via a new private road from the concession area to a third-class national road, with a length of 3725 m;
- Option 2: via a new private road from the concession area, with a length of 2,810 m, to a municipal road. The municipal road is 12,120 m long.

The options are illustrated in **Figure 3-3**.

The expected number of trucks for transporting the production is a total of 30 trucks/week, each truck with a payload of 25 t, distributed over three working days of the week.

It is estimated, without certainty, that the delivery of OHS will be once every three months, but it is unclear where the suppliers will be located, as none have been selected and it is not possible to do so before the concession for the extraction and construction of the OF is obtained.

The contracting authority plans to use fully electric trucks, as they do not emit harmful substances into the air or noise from internal combustion engines. Economic incentives and regulations in the European Union, such as the Euro 7 regulation, are paving the way for more electrified heavy-duty vehicles in the coming years. EU policy envisages the gradual phasing out of heavy-duty diesel-powered vehicles in favour of zero-emission vehicles. The Contracting Authority of the IP is also pursuing this policy. In 2023 alone, 5,279 new electric trucks were registered in the EU.

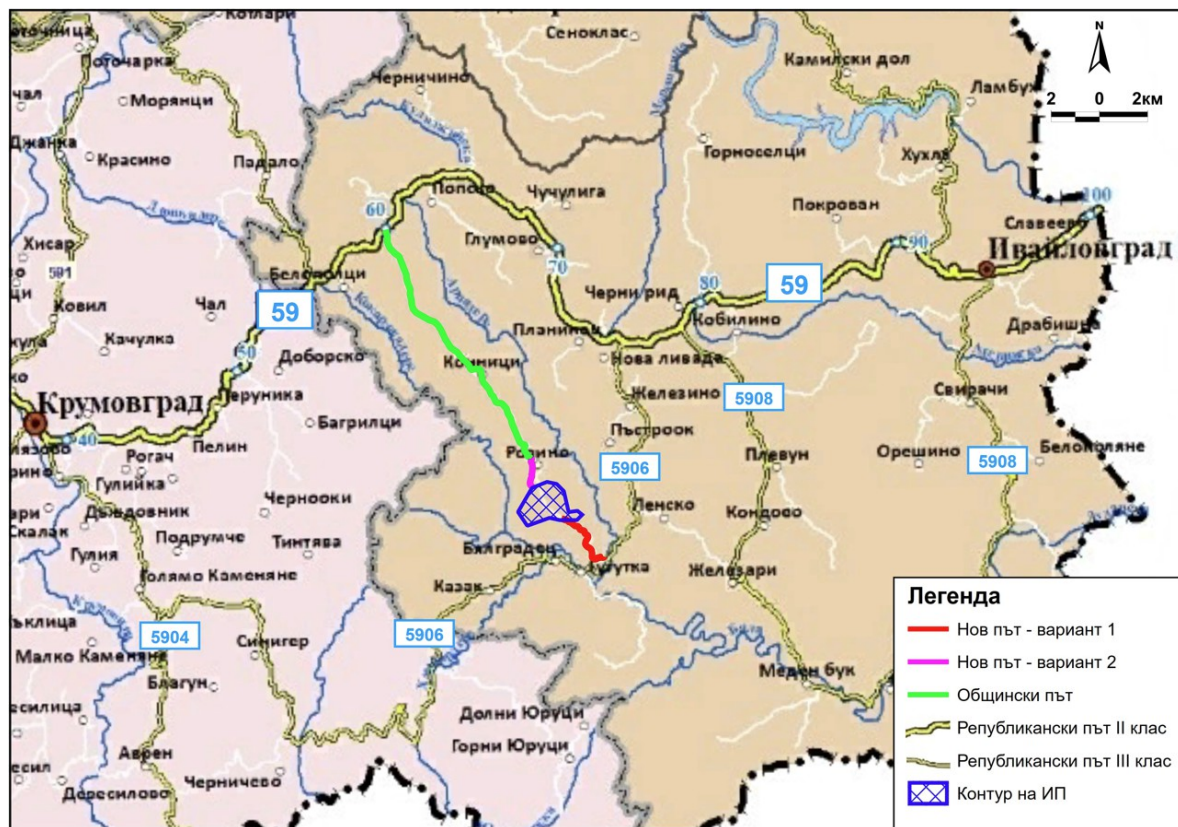


Figure 3-3. Hypothetical options for transporting finished products

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the Rosino deposit, Tintyava area, located in the territories of the villages of Rosino and Gvozdka, Ixaylovedad municipality, Haskovo region
The estimated reserves and resources extend to a depth of about 195 meters, with about 95% of them at a depth of less than 120 meters and about 1% below 140 meters. **The maximum depth of the mine pit is planned to be about 140 m from the surface.**

The fresh water reservoir is planned at an elevation of 315 m, and the mixed water reservoir is planned at an elevation of 325 m.

Productivity. Operating mode. Personnel.

The reserves at the Rozino deposit amount to 11.3 million tons of ore with a content of 1.33 g/t gold and 26.6 million tons of overburden, as described in the Appendix to the final Report on reserves. Taking into account the time required for mine construction, building the necessary infrastructure, procedures for settling the status of the land, investment risk, mining and geological risk, and recultivation, the site is expected to have a 35-year life span, with an average annual production of 0.87 million tons of ore per year.

The planned maximum annual production is:

- Ore – 1.77 million tons/year or 0.72 million m³/year;
- Overburden – 3.3 million tons/year or 1.3 million m³/year;

The planned average annual production capacity is as follows:

- Ore – 0.87 million tons/year or 0.36 million m³/year;
- Open pit mining – 1.65 million tons/year or 0.681 million m³/year;

To ensure the processing of the planned quantities of ore, the design capacity of the processing plant is 1.7 million tons of ore per year. The planned maximum capacity of the plant guarantees production security in case the planned maximum annual capacity of the mine is reached.

The operating mode of the mine and the processing plant is presented in the following table.

Table No. 3-2. Operating mode of the mine and the enrichment plant

No	Indicators	Measure	Quantity
1	Working days per year		
	- Total number of days per year	pcs/year	365
	- Number of holidays per year	No./year	0
	- Number of public holidays per year.	No.	14
	Total number of working days per year	No.	351
2	Working days per week	No./week	7
3	Working shifts per day	No./day	
3.1	for the mine:	No./day	2
3.2.	for the factory:	pcs/day	3
4	Duration of the work shift	hour	8

The number of employees at the site is determined according to the type of activities performed during operation, with an expected total **staff of 120 people**. According to current data, 50 people will be needed for the mining and extraction part, and a total of 70 people will be needed for the OF.

4. Structure, location, and main technological characteristics

4.1. Description of the physical characteristics of the investment proposal as a whole and, if applicable, the necessary demolition and destruction activities, as well as the requirements for the use of water and subsoil resources during the construction and operation phases. Reclamation.

Engineering-geological, hydrogeological, geological, and other experimental field and laboratory studies have been conducted to study the mining and technical conditions for the exploitation of the deposit. Given the nature of the deposit, its location, and depth, extraction will be carried out using open-pit mining methods.

The investment intention is based on the following initial parameters:

- ✓ No mining operations have been carried out in the Rosino deposit, Tintyava area.
- ✓ No enrichment plant has been built;
- ✓ Transport access to the deposit will be provided by existing roads, with some new roads to be built;
- ✓ The mine is not electrified and has no water supply;
- ✓ Production is ensured by conducting drilling and blasting operations;
- ✓ The exploitation of the deposit will be carried out in accordance with a comprehensive working project for the extraction and processing of the ore, prepared and agreed upon in accordance with the relevant procedure.

The discovery of the deposit and the construction of the mine are essential for the conduct of open-pit mining operations. Their proper and consistent implementation is crucial for the subsequent effective and safe exploitation of the Tintyava area.

The technological process of open-pit mining of polymetallic ores from the Tintyava area will include the implementation of PVR, crushing of the mine mass, its transport and processing in the OF, transport of the overburden (sterile rock mass) to the dump, transportation of flotation waste to the SMO.

Mine construction

The capital mining construction works envisage:

- **Year 1:**
 - rehabilitation of existing road connections and construction of new ones to the mine, to the installation, to the dumps, and to the water reservoirs;
 - excavation works related to the formation of soil depots – two for the earth and humus mass, which will be collected selectively where possible and stored separately, formation of SMO and development of a temporary dump for low-grade ore. It is expected that about 45% of the project area will be uncovered;
 - designation of a site for servicing mining equipment;
 - commencement of construction of the power transmission network;
 - clearing of the production site and commencement of construction of OF;
 - delivery of ISOBOX mobile trailers for the administrative and residential complex;
 - delivery and installation of a diesel generator to be used during mine construction and subsequently as a backup power source in case of a power outage;
 - delivery and installation of a mobile crusher for the needs of the retaining walls (dikes) of the SMO, the reservoirs, and for the construction and maintenance of roads;
 - clearing the land designated for the clean water reservoir and starting the construction of the retaining wall;
 - clearing of the sites, designated for the reservoir for contact waters and

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Non-technical summary of the EIA Report on an investment proposal for "Extraction and processing of polymetallic ores from the Rosino deposit, Tintyava area, located in the territories of the villages of Rosino and Gugutka, Ivaylovgrad municipality, commencement of construction of the retaining wall,

- clearing of the areas designated for the SMO, *Haskovo region*;
- clearing of land for the construction of a dike for a contact reservoir at the base of the SMO;
- starting to mark the first horizons, mainly on rock outcrops, in order to uncover and prepare ore reserves;
- delivery of chemical toilets for workers.

➤ **Year 2:**

- Continuation of selective removal of the topsoil, with expected to clear another 45% of the area, or a total of 90%, and continue its selective disposal for subsequent use in recultivation;
- Continuation of work on the SMO and the low-grade ore dump;
- All road connections between the individual sites will be completed;
- The retaining wall of the SMO contact water reservoir, mine, and factory will be completed.
- The retaining wall of the contact water reservoir of the low-grade ore dump will be completed;
- The retaining wall of the clean water reservoir, the contact water reservoir, and the clean water reservoir will be completed;
- The entire water management system for the contact reservoirs and the clean water reservoir will be constructed;
- The associated infrastructure will be built and operation can begin;
- At the end of the second year, the construction of the enrichment complex will be completed.

Table 4.1-1 shows the volumes of overburden and ore that will be mined during the first two years.

Table No. 4.1-1. Volumes to be utilized during mine construction

Production year	First		Second	
	Overburden, t	Ore, t	Open pit, t	Ore, t
Section 1				
Total:	8,621	3,837	708,689	178,947
Ore in stockpiles		3,837		178,947

All of the above activities mark the end of mine construction and the start of actual mining.

Operation

Actual mining will begin immediately after the completion of mine construction and the commissioning of the OF in normal operating mode.

The main mining processes are:

- excavation works;
- mining operations;
- ore processing.

Ore extraction

Work on soil and humus overburden (mass)

The main activities for collecting the earth mass are:

- clearing the designated areas of trees and shrubs;
- collection of soil piles using a bulldozer, noting that in some places the soil cover is missing or is less than 0.25 cm thick, making it technologically impossible to collect. In all other areas, the soil and humus will be collected in piles and loaded onto dump trucks using a front loader or excavator and transported to the two embankments designated for soil and humus.

These dumps will be developed during the mining construction period and will be closed after the end of recultivation.

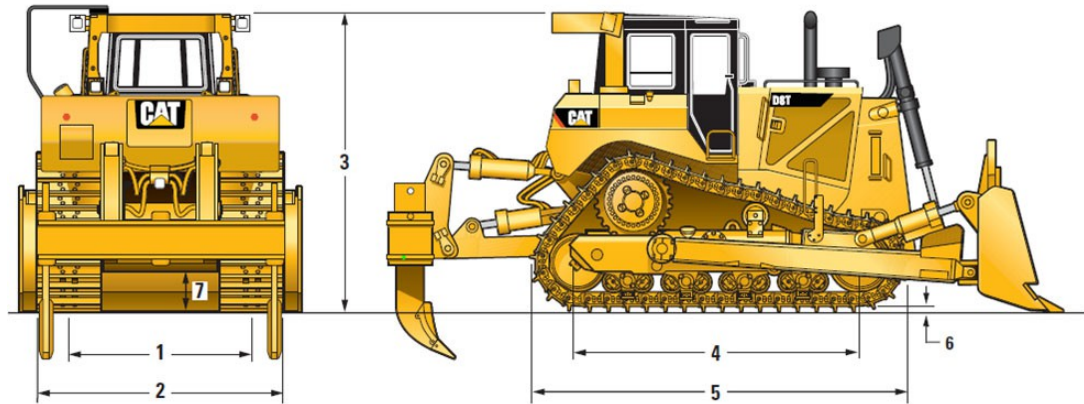


Figure No. 4.1-1. CAT D8T bulldozer.

Work on rock (barren) overburden

The following parameters of the open-pit mining and ore exploitation system have been adopted for the Rosino deposit:

- Working step height – 5 ÷ 10 m;
- Height of non-working step – 20 m (in the final non-working contour, the 5-meter steps are combined into groups of 4, or 2 10-meter steps are combined into groups of 2);
- Working step angle – 85÷90° ;
- Angle of non-working step – 70° ;
- Minimum width between two groups of non-working steps 12 m;
- Minimum width of working platform - 60 m;
- General angle of non-working board 36÷48° .

Due to the hardness of the rocks, it is accepted that the ore and rock overburden should be separated from the massif by drilling, followed by millisecond initiation and blasting using the NONEL system.

The rock overburden in the Rozino deposit, which does not contain any useful components but covers the ore-bearing rocks or is mixed with them, must be selectively removed and deposited.

In general, the processes involved in the selective removal of sterile waste are: conducting PVR with a millisecond delay to separate the sterile waste from the array, loading it onto dump trucks using a backhoe loader, and transporting it to a sterile waste dump.

Non-technical summary of the EIA Report on an investment proposal for "Extraction and processing of polymetallic ores from the Rosino deposit, Tintyava area, located in the territories of the villages of Rosina and Guevka, Hryatovered municipality, Haskovo region". The NON-EL (non-electric) detonation and blasting system is currently the most widely used technology in Bulgaria and the European Union over the last 30 years due to its advantages over electric and fire detonation, which were used in the past in almost all open-pit mines and quarries in the country. The advantages of the NONEL system are as follows:

- The safest system for transport, handling, and initiation;
- Possibility of controlled reduction of seismic impact to a minimum, thanks to a wide range of delays allowing the detonation of separate series of boreholes in a single blast field;
- Reduced sound effect;
- Better fragmentation.

The total design volume of sterile rock mass to be removed from the deposit amounts to approximately 26.6 million tons or approximately 10.8 million m³. Or a maximum annual amount of 3.3 million tons/year (1.3 million m³/year) is expected.

The planned volumes of sterile rock are to be dumped in the SMO, east of the mine pit.

After the fourth year (after the depletion of the reserves in section 1), the backfilling of the excavated areas will begin.

The height of the working steps per excavation is accepted to be 5 ÷ 10 m.

The loading of the open pit and ore is planned to be done with a hydraulic backhoe excavator with a bucket volume of 6 m³. After the blasting and ventilation of the mine, the excavator stands next to the blasted field and begins to load the blasted piles.

Figure 4.1-2 shows the general view of a CAT 930D excavator and its main technical parameters.

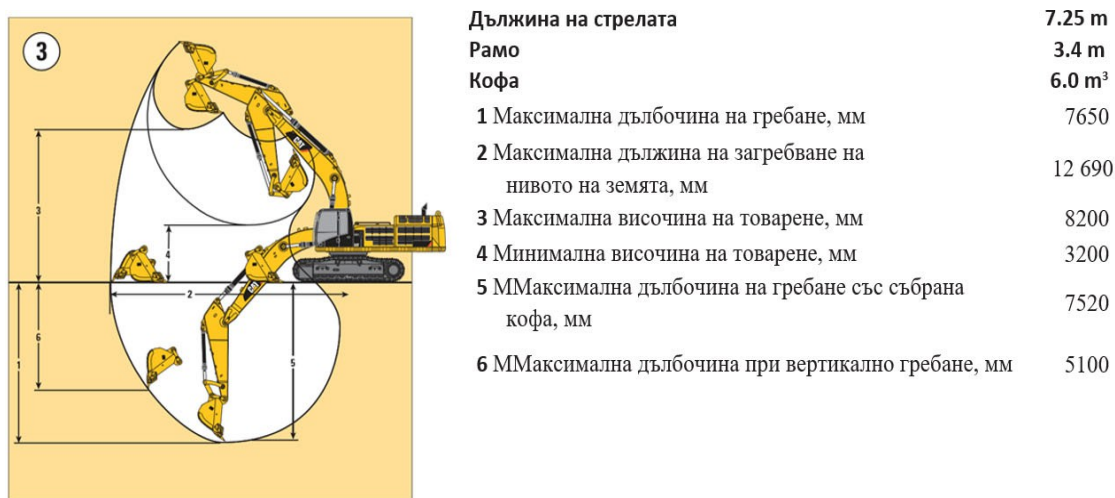


Figure 4.1-2. CAT 390D excavator and its main technical parameters

The transport of the excavated material is planned to be carried out by dump trucks with a total load capacity of about 55 t (33 m³) and a 10x4 wheel configuration, loading length of 7 m, loading width of 2.6 m, and unloading height of 1.96 m. The dump trucks will be equipped with modern engines that meet the EURO 6 emission standard.

A total of 12 machines are required for the excavation work.

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Table No. 4.1-2. Type of equipment for excavation work (topsoil and sterile rock mass), number

No	Type of equipment	Number required
1	Drill	1
2	Bulldozer	1
3	Excavator	1
4	Dump trucks	7
5.	Water tanker	1
	Total uncovered:	10

Based on the conceptual design and maximum annual production capacity of 3.3 million tons/year for open pit mining and 1.7 million tons/year for ore mining, the indicative parameters of the PDR for open pit mining and ore mining have been determined. The main parameters of the PDR are listed in Table No. 4.1-3.

Table No. 4.1-3. Main indicators of blasting works for open pit and ore

No	Parameters	Measure	Stope and ore average indicators
1	Foot height	m	5
2	Borehole diameter	mm	76.2÷110
3	Type of explosive charge	-	ANFO/E3000
4	Relative BB consumption	kg/m ³	0.36
5	Volume of rock mass removed from 1 blast field/blast per Open Pit	m ³	Approximately 30,000
6	Volume of rock mass removed from 1 blast field/ore blast	m	Approximately 15,000
7	Frequency of blasting per open pit on a weekly basis	No	Once a week
8	Frequency of blasting by ore on a weekly basis	No	Once a week

The total number of blasts per year will be 88. The purpose of the PVR is to ensure the productive and efficient operation of the excavation, loading, and transport machinery, as well as the primary crushing, through appropriate and optimal fragmentation of the material and a minimum amount of oversized pieces.

No explosives will be stored on site. The IP is outside the scope of Article 99b of the Environmental Protection Act.

The blasting works will be carried out by an external contractor who will deliver the necessary explosives immediately before the works are carried out, so there is no likelihood of explosives being present on site. The specified charge weight is mandatory when preparing the Project and Passport for each individual blasting operation.

The main explosive material to be used is expected to be an ammonium nitrate-fuel oil (ANFO) explosive mixture and/or emulsion explosives. Given the type and condition of the rock mass, the parameters of the PVR are determined for three different zones, as follows: Oxidized, Transitional, and Fresh Rocks, respectively for ore and waste rock.

The performance of special blasting works means that the explosive mass slides down on the spot and there is no "scattering" of fragments. Regardless of this, with regard to the safe performance of blasting works in the vicinity of populated areas, with a probability of

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"scattering of fragments, protective coverings against the scattering of rock fragments will be used. The protective coverings can be heavy coverings—rubber blasting mats, geogrids, or geotextiles—or light coverings—coarse and finer meshes combined with rubber conveyor belts that have been discarded after use. The effect of the protective covers is such that, when correctly placed on the blast area, they limit the scattering of fragments. Blasting mats reduce the noise and dust generated during blasting operations. The individual protective covers are placed in such a way as to allow the explosive gases to escape. This reduces the pressure from the explosive gases and allows the covers to stop rock fragments and dust. Another significant advantage is that the covers can be used multiple times.

In this regard, and in line with good practices in open-pit mining, the first 5 to 6 blasts are intended to adjust and refine the parameters of the PVR. Well-blasted/fragmented material saves the consumption of additional energy for the destruction of oversized fragments and generally improves the efficiency of mining and processing machines.

According to the Regulations for Occupational Safety in Blasting Operations in Open Mines and Quarries, the contractor performing drilling and blasting activities (PVD/ is licensed to work with explosives and is required to obtain a permit from the Regional Labor Inspectorate each year to carry out PVR for the respective year and, separately for each specific blasting, prepares a PVR Project and Passport, which is submitted for approval to the COS service at the district office of the Ministry of Interior. The specified safe charge mass is mandatory when preparing a Project and Passport for each individual blasting operation.

The contractor may not carry out any blasting that does not comply with the specified safe charge weight in terms of seismic impact on the quarry area. The legislator has provided for a strict control mechanism to protect the working environment and the life and health of local communities.

As part of the preliminary studies, experimental test blasting was carried out at the Rozino deposit, control measurements were taken, and their impact on the environment was recorded. The results are presented in *the "Assessment of the Side Effects of Blasting on the Environment, Site: Rozino. Final Report" (2020).*

Ore processing

The following operating system parameters have been adopted for both open-pit activities and ore mining:

- Working step height – $5 \div 10$ m;
- Height of non-working step – 20 m (in the final non-working contour, the 5-meter steps are combined in groups of 4 or 2, and the 10-meter steps are combined in groups of 2);
- Working step angle - $85 \div 90^\circ$;
- Non-working step angle – 70° ;
- Minimum width between two groups of non-working steps 12 m;
- Minimum width of working platform - 60 m;
- General angle of non-working board $36 \div 48^\circ$.

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The ore will be separated from the rock mass by drilling, followed by millisecond initiation and detonation using the NONEL system.

The advantages of the NONEL system are as follows:

- The safest system for transport, handling, and initiation;
- Possibility for controlled reduction of seismic impact to a minimum, thanks to a wide range of delays allowing detonation of separate series of boreholes in a single blast field;
- Reduced sound effect;
- Better fragmentation.

The following sequence will be applied during the extraction works:

- the prepared reserves of a given horizon will be drilled with a percussion-rotary drill equipped with a dust collection system;
- after the field has been drilled, it will be loaded, connected to an initiation system, and detonated.
- After ventilating the face, the ore will be loaded using a backhoe loader with a bucket volume of 6 m³ onto dump trucks and subsequently transported to the processing plant.

The expected maximum annual ore volumes are 1.75 million tons or 0.72 million m³.
A total of six machines will be required for ore extraction.

Table No. 4.1-4. Type of ore processing equipment, number

No	Type of equipment	Number required
1	Drill	1
2	Excavator	1
3	Dump trucks	4
4.	Water tanker	1
	Total ore:	6

The parameters of the ore processing plant are given in **Table No. 4.1-3.**

In order to ensure the quality indicators of the ore supplied to the factory, it has been decided that the Rozino deposit will be developed in two stages. This will guarantee the supply of ore of the required quality and quantity for the entire period of operation.

Stage 1: Section 1 is being developed

This stage is characterised by the fact that all mining operations are concentrated solely in Section 1.

Once the excavation works in Section 1 are completed, all equipment will be moved and concentrated on the excavation and preparation of Section 2. Only mining operations will continue in Section 1 until the planned geological reserves are fully depleted.

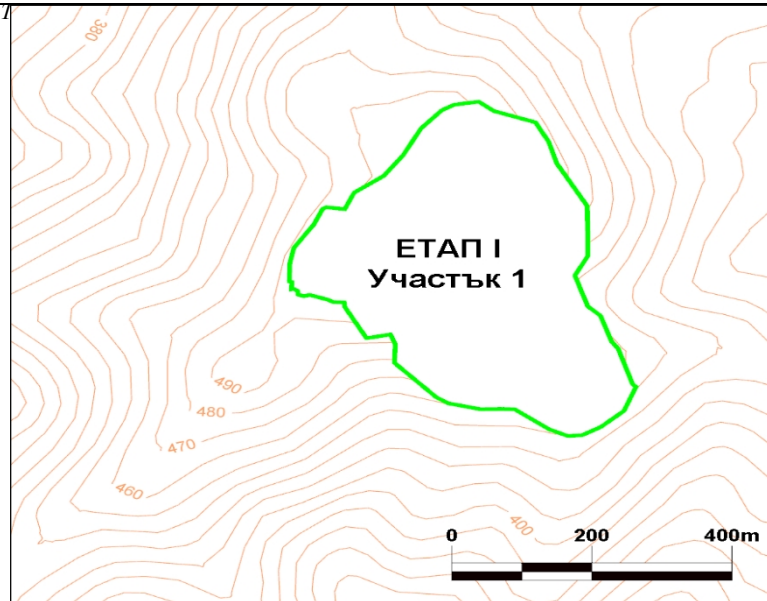


Figure 4.1-3. Stage 1, Section 1 of the deposit

Once the bottom of the reserves in Section 1 has been reached, backfilling of the pit in this section with sterile rock overburden and sterile material from production can begin (SMO will move from external to internal).

Stage 2: Sections 1+2

Stage 2 will begin with the start of excavation and preparatory work in Section 2. Mining operations in Section 1 will not yet be completed.

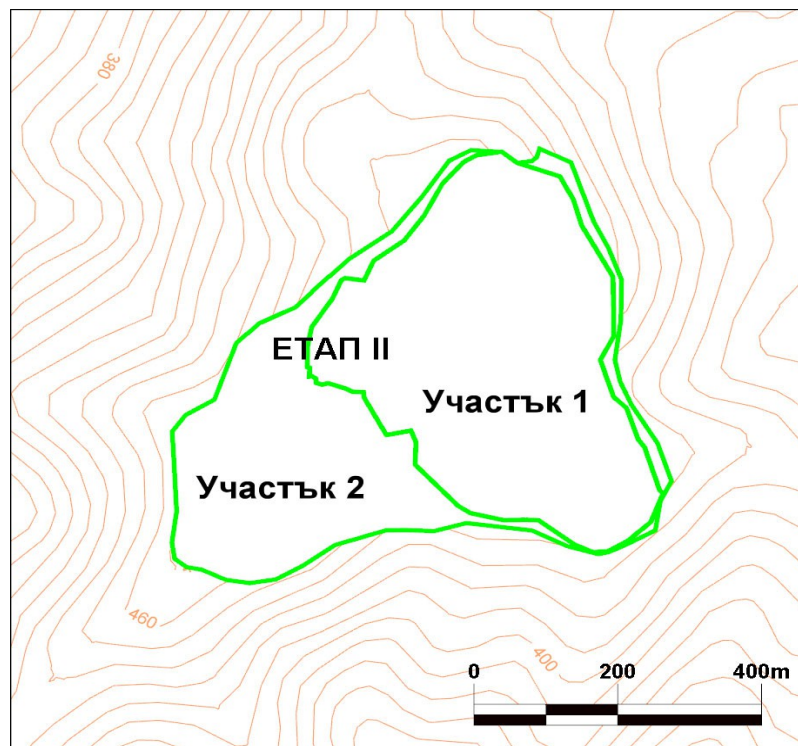


Figure No. 4.1-4. Stage 2, Section 1 and Section 2 of the deposit

The end of Stage 2 will occur after:

- complete depletion of reserves in Section 2;
- backfilling in Section 1 with sterile rock excavation and processing waste.

Embankment works

With regard to embankment works, a selective embankment formation technology using a bulldozer and motor vehicles is envisaged.

Selective/separate disposal of:

- Top soil;
- Sterile rock mass (overburden);
- Flotation waste.

This selective filling approach is in line with best international practices for the management and protection of soil and humus, which will be used to restore disturbed areas when recultivation begins.

Deposition of soil and humus mass

In total, two soil and humus mass landfills are planned for the deposit, as follows:

- Northeast with a single horizon at an approximate elevation of 495 m;
- Southwest with two horizons with approximate elevations of 377 m and 382 m

These dumps are expected to be developed during the mining construction period and will be closed after the end of recultivation. It should be noted that during the development of the overall project for the exploitation and recultivation of the affected lands, it is possible to choose a system of phased recultivation.

Deposition of sterile rock mass (overburden)

The rock dump is planned to be of the bulldozer type. The sterile rock mass loaded onto trucks will be delivered to the dump area and unloaded. Subsequently, the body of the dump will be shaped with a bulldozer.

It is planned to develop an external embankment and, after the fourth year, to start internal embankment formation in the mine pit.

The boundary between the external and internal embankments is conditional, following the contour of the pit in Section 1.

Table No. 4.1-5. Type of equipment for dumping works, number

No	Type of equipment	Required number
1	Bulldozer	2
	Total for earthworks:	2

Deposition of flotation waste

With regard to post-processing waste, it is planned to be deposited after compaction to 70-75% solid matter. This method is preferred over conventional tailings storage due to the following factors:

- Higher percentage of recycled water usage;
- Lower consumption of "fresh" water;

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- Smaller landfill area;

- Haskovo region

- Significantly increased stability coefficient of landfills containing compacted flotation waste;

- Significantly reduced risk of compromising the support structures;

- Significantly increased potential for phased reclamation.

When depositing flotation waste with a water/solid ratio of 25%/75%, the area and volume of the facility is reduced by about 10÷15 decares compared to conventional disposal, where the water/solid ratio is 45%/55%, i.e., the turnover water is reduced by about 20÷25%.

To reduce the water content in the flotation waste, a thickener is planned to be installed on the territory of the enrichment plant, where the flotation waste will be dewatered.

After the depletion of the reserves in Section 1 and the progress of mining operations in Section 2, it is planned to start backfilling the excavated areas, which again complies with best practices for open-pit mining. Backfilling is expected to start as early as the 4th or 5th year of operation.

The positive effects of backfilling are:

- Significant reduction in the area required for storage of sterile rock mass (overburden) and flotation waste after processing (if this option proves to be viable in terms of quality);

- Significant reduction in the time during which external dumping will be used and, respectively, much faster recultivation of the external dump and, possibly, the external facility for storing flotation waste.

Ore processing

Technological scheme and description of the processing plant for the extracted

Ore

According to pre-project studies, the technological sequence for processing the extracted ore includes the following main and related activities:

- crushing and transportation;
- storage of the crushed ore in a covered buffer warehouse, which is a reinforced concrete platform covered with a shed with a feeder underneath;
- grinding (ball mill);
- flotation;
- thickening of flotation waste and disposal of SMO;
- concentrate thickening and filtration;
- Accompanying activities – technological provision of: water, air, and reagents.

The basic technological scheme of the OF is shown in Figure 4.1-5.

Ore preparation

Crushing

The basis for the choice of the ore preparation scheme is the low working crushing index (4.7-8.92 kWh/t) and the moderate working grinding index Bond grinding index (11.2-12.5 kWh/t) for the different types of ore, which favors the use of a multi-stage crushing and ball milling scheme. The primary feeding device is a belt feeder that can withstand impacts from large pieces of ore falling into the ore hopper. A static grid is provided to separate all oversized pieces from the feed

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~~to the jaw crusher. The entire installation will be equipped with a sprinkler system to prevent secondary dust separation during the unloading of dump trucks and during the process itself.~~

The crushing scheme is designed to produce crushed ore with a size of 80-12 mm. It consists of three crushing stages: primary jaw crusher, followed by secondary and tertiary cone crushers. The ore is fed either directly from the pit or by a loader from the warehouse to the uncrushed ore bunker. A 700 mm x 700 mm safety screen prevents oversized pieces from entering the jaw crusher. A fixed 15 kW hydraulic hammer crushes oversized pieces to the required size. The ore feed conveyor (1300 x 6400 mm, 22 kW) feeds the primary jaw crusher (160 kW). The crushed ore is fed through a screen onto a conveyor. Steel scrap will be removed with a magnet in the scrap metal bunker.

The irrigation system will maintain air quality in each of the crushing buildings. A 5-ton lift is provided to assist with maintenance in the primary crusher building. The primary crushed material is screened using a double-deck screen (45 kW). The undersize material is transported to the crushed ore storage area, while the oversize material from the screens is sent to the secondary and tertiary cone crushers, respectively. The secondary and tertiary crushers operate in a closed cycle with a double-deck screen until all material is fed to the stored crushed ore as undersize material. Two belt scales are provided. There is one secondary crusher and two tertiary crushers. Assuming 16 hours of operation in two shifts and an average equipment availability of 75%, the crushing plant's capacity is estimated at 5000 t/day. The total installed power of the crushing section is approximately 1600 kW.

Covered buffer storage for crushed ore.

A buffer volume of crushed ore of 15,000 tons is planned to be provided after the crushing plant. This volume is sufficient to supply the grinding plant for three days.

The crushed ore will be stored in a temporary warehouse, which is a reinforced concrete platform with a feed hopper and covered with a metal shed to prevent uncontrolled dust emissions.

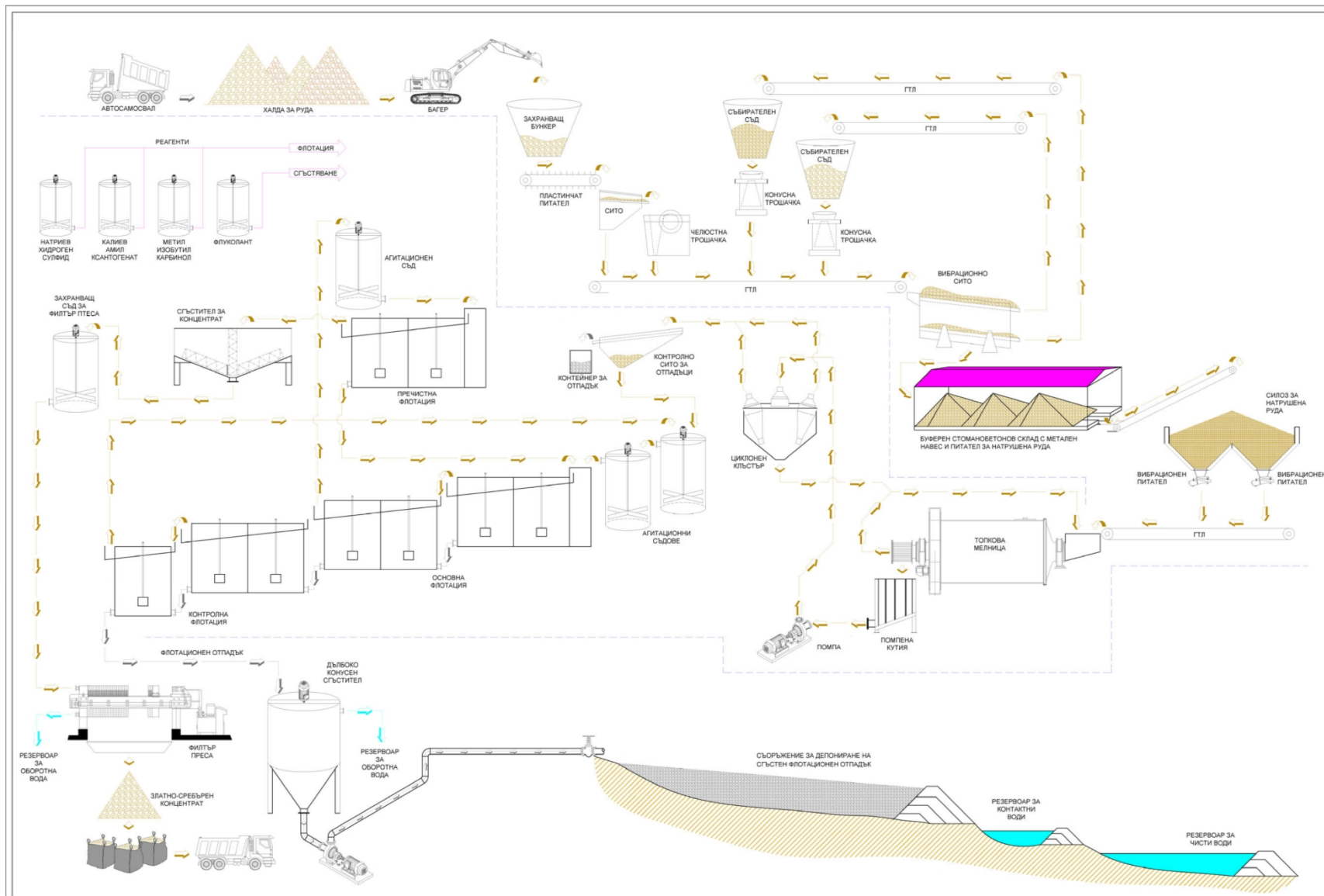


Figure No. 4.1-5. Technological scheme of the OF

Ore grinding. *Haskovo region*

Performed in a ball mill. The conveyor feeding the mill is equipped with the necessary devices for controlling the speed of ore feed to the mill and measuring capacity. A device for taking samples from a cross conveyor belt is provided for the purposes of technological balance.

The grinding zone consists of a ball mill operating in a closed circuit with a group of hydrocyclone classifiers. The grinding circuit is designed to produce particles with a size of P80 -75 µm. The ball mill dimensions are 4.88 m diameter x 7.62 m length with a 3500 kW motor. The ball mill installation includes lubrication of the support bearings and gearbox, cooling systems, and a control system. The ball mill discharges into a sump, which feeds the hydrocyclone group via a cyclone feed pump, in operation/standby mode. The cyclone group consists of 14 cyclones, of which only 12 are operational at any given time. The discharge from the cyclones passes into the flotation zone, and the sands are returned to the ball mill.

Any spillage along the grinding chain will be collected in a sump located under the mill. The sump will be equipped with a vertical slurry pump to return the spillage to the mill feed box.

The installed capacity in the grinding section is approximately 3700 kW.

Ore enrichment by flotation

High-volume flotation cells were selected for the flotation scheme as they are more cost-effective than multi-stage flotation machines (SFR) in terms of capital and operating costs. The sizing and selection of the flotation cells is based on the optimal laboratory flotation times obtained, with a correction factor for flotation time on an industrial scale of 2.5 and an aeration factor of 0.85.

The flotation scheme is a standard collective one, including primary and control flotation and pre-cleaning flotation to obtain a gold-bearing concentrate.

The crushed ore from the hydrocyclone cluster, before entering flotation, passes through a cleaning vibrating screen with a mesh size of 0.85 mm to remove all atypical impurities from the ore, such as wood, plastic, metals, and larger pieces of unground ore.

The undersize product from the cleaning screen is fed into two agitation tanks with a capacity of 50 m³ each. Connected in series, they provide the necessary agitation time for the pulp with the added reagents of 2x5 minutes.

Through a feed pump, the pulp after agitation is fed into the main and control flotation section, which consists of 6 high-volume flotation cells, configured 4 for main gold-containing flotation and 2 for control flotation. Each of the cells has an effective volume of 60 m³ or a total of 360 m³, which provides the necessary flotation time of 34 minutes. All electric motors of the flotation cells are 90 kW. The flotation cells are equipped with air mass flow control to allow each section of the cells to be controlled.

The chamber product from control flotation is final flotation waste and is fed to the deep cone thickener for dewatering before being deposited at the SMO. The concentrate from primary flotation is pumped to the pre-flotation section. Before entering the flotation cells, the pulp is conditioned in a 10 m³ agitation tank, ensuring a 5-minute agitation time of the pulp with reagents. The clean-up flotation section is configured with two cells with an installed capacity of 15 kW and an effective volume of 8 m³ each, or 16 m³ in total, which provides the necessary flotation time of 8.6 minutes.

Water sprays are provided in the discharge chutes of the flotation cells to

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~~assist in breaking up the foam and concentrate flow.~~ *Haskovo region.*

A device for sampling chamber product from control flotation (flotation waste) provides a sample for ongoing analysis.

The concentrate from the pre-flotation is a final concentrate and is fed to a sump for delivery to a thickener for the gold-bearing concentrate. The target gold concentration in the final concentrate is between 22 and 30g/t, depending on the contents of the feed ore.

The pump for repumping the gold-bearing concentrate is a fixed-speed chamber pump.

Reagent dosing is controlled automatically, with consumption rates entered by the operator. The addition of a foaming agent (methyl isobutyl carbinol - MIBC) and a collector (potassium amyl xanthate - PAX) is carried out by specialised pumps and dosing devices, which feed the individual points of the flotation process.

Sump pumps are installed on the floor of the flotation workshop to collect any spills from the circuit and transport them to the appropriate points in the flotation scheme.

The installed capacity in the flotation department is about 1000 kW.

Thickening and filtering of the concentrate.

The available results from static sedimentation tests were used to size the concentrate thickener. Filtration tests to determine the size and selection of the pressure concentrate filter block were not performed. Instead of test data, values from the database for similar types of concentrates and particle sizes were used for sizing. The design moisture content of the concentrate is 10 to 12% by volume. The concentrate thickening and filtration scheme consists of a 16 m diameter concentrate thickener and a pressure dewatering filter. The thickener will receive 11.3 t/h of concentrate with a feed density of 23% solids. The overflow from the thickener will be returned to the process water tank and reused in the grinding and flotation areas. The thickened product in the thickener (at 50 to 55% solids) will be discharged to the filter press via two 50 mm x 40 mm pumps, which will be in operation/standby mode.

The filter feed tank is equipped with a stirrer to prevent the settling of solids. The suspension from the concentrate filter feed tank will be pumped to the concentrate filter via two filter feed pumps (75 mm x 50 mm) that will be in operation/standby mode. The concentrate filter will be a vertical plate dewatering filter press designed to operate at 75% utilisation and produce 11.3 t/h of concentrate with a moisture content of 10 to 12%. The filter press has a dedicated compressor and air receiver.

The concentrate is placed in a storage bunker until it is loaded for processing by the end user.

Mechanization required for the enrichment plant:

- A front loader to feed the crushing plant;
- Bulldozer to serve the buffer storage facility for crushed ore;

Table No. 4.1-6. Type and number of machines required to service the enrichment plant

No	Type of equipment	Required number
1	Front loader	1
2	Bulldozer	1
Total for factory:		2

Flotation waste management *Haskovo region*

When selecting a technology for thickening and dewatering flotation waste, the following characteristics were taken into account:

- The physical and chemical properties of the waste after flotation – according to current data, there is no potential for generating acidic solutions;
- The yield point or yield stress – a property of the material corresponding to the yield point at which the material begins to deform plastically;
- Negative water balance;
- Best practices in dewatering of mining waste after processing;
- Best practices in the management of mining waste after extraction and processing.

Taking into account the above factors and based on a conceptual design for the conditions at the Rosino deposit, a technology has been selected for the disposal of flotation waste, compacted to 70-75% solid content, using a cone compactor.

Waste disposal involves separating water (thickening) before disposal. The thickener works as follows: the sludge flow enters radially into the center of the thickener, into a feed tank. While the solid phase settles, a paddle that reaches the outer edge of the thickener rotates slowly and transports the settled material to the central outlet. At the same time, as the solid particles settle at the bottom of the thickener, the water or solution at the surface becomes clearer, and with the introduction of more sludge, the water level rises and overflows into a chute along the outer perimeter, through which it returns to the process. The particles settled in the center of the thickener and the particles raked towards it exit through the central outlet pipe at the bottom of the thickener, containing significantly less water than the sludge with which they entered the thickener. The thickened waste can be transferred to the landfill using high-pressure sludge pumps.

The advantage of this method is its water efficiency and relatively favorable operating conditions compared to landfilling waste with a high water content. A second advantage is that, compared to other options, the landfilled waste has minimal potential for liquefaction (free sliding or flowing) or breaking the wall of the hydraulic structure. Typically, high-performance cone thickeners increase the concentration of solid particles (solid phase) to about 70-75%.

Cone thickeners provide the highest values at the yield point, which ensures a high degree of stability for the waste after it is deposited in the landfill facility.

The resulting waste has a water-to-solid ratio of 25/75.

Increased compaction allows for:

- a significant increase in the use of recycled water;
- a significant reduction in the use of "fresh" water.

The increased density makes the waste easy to handle – dumping and shaping the landfill where it is stored.

The reduced water content significantly shortens the evaporation time of the residual water and, accordingly, improves the stability of the landfill body, allowing for its gradual overbuilding with guaranteed stability.

The compaction of waste prior to disposal has an impact on the overall water consumption in the landfill, significantly improving the overall water balance.

The disposal of compacted flotation waste also complies with the natural geographical, geological, geotechnical, and geochemical conditions at the site. Considering that disposal is carried out from the highest point to the lowest point of the landfill, it should be noted that this creates conditions for the gradual recultivation of the worked slopes.

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Non-technical summary of the EIA Report on an investment proposal for "Extraction and processing of polymetallic ores from the Rosino deposit, Tintyava area, located in the territories of the villages of Rosino and Guguika, Ivaylovgrad municipality, note that this creates a prerequisite for the phased recultivation of the worked slopes.
Haskovo region

Closure and recultivation

Upon completion of the maximum production program, i.e., reaching an ore extraction and processing capacity of 1.7 million tons/year, the closure and recultivation of the worked-out areas can begin as early as the sixth year after the start of extraction.

The implementation of technical and biological recultivation after liquidation will ensure that the site achieves a sustainable and maintenance-free status. The proposed comprehensive strategy for recultivation of the site is as follows:

- Technical recultivation;
- Carrying out biological recultivation.

The technical recultivation activities actually started back in mine construction, when it is planned to collect and store selectively the topsoil layer.

Technical recultivation activities include:

- Cleaning and securing all non-working steps;
- Cleaning all horizons of residual rock fragments;
- Loading, delivery, and spreading of topsoil material on the areas designated for recultivation;
- Preparation of the areas designated for afforestation;
- Preparation of the areas designated for restoration for agricultural use;
- Ensuring normal surface water runoff.
- All areas cleared during the liquidation of the enrichment plant will be plowed (to increase water infiltration and reduce the potential for surface erosion and instability), leveled, and covered with approximately 0.15 m of soil layer (except for concrete structures).
- It is planned that the concrete slabs will remain in place and be covered with approximately 0.40 m of topsoil from the landfills.

After completion of the reclamation, proceed to biological recultivation. It includes:

- Reforestation of the areas intended to be returned to the forest fund by creating a nursery for planting and growing seedlings of local tree species (oak and black pine), which will be needed for recultivation;
- Grassing of the areas intended to be restored as agricultural land by purchasing grass mixtures, planting, and cultivation.

4.2. Required raw materials, materials, natural resources used, energy needs, and energy used.

The IP is for the extraction of polymetallic gold-silver ore, so **natural resources will be directly affected.**

The reserves in the Rozino deposit amount to 11.3 million tons of ore with a content of 1.33 g/t gold and 26.6 million tons of overburden, as described in the Appendix to the final Report on reserves.

Mineral composition of the ore

The following are observed in the analyzed ore samples:

- primary minerals: pyrite, chalcopryrite, sphalerite, magnetite.
- vein minerals: quartz, calcite
- supergene minerals: hematite/limonite, bornite.

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the Rosino deposit, Tintyava area, located in the territories of the villages of Rosino and Gugunka, Ivaylovgrad municipality, Haskovo region.

Of the primary minerals, pyrite is the most common. The other minerals occur as single grains. Pyrite is deposited as idiomorphic and hypidiomorphic grains and aggregates, most often alone, less often with chalcopyrite and sphalerite. Supergene minerals most often affect pyrite, which in places is completely replaced by hematite/limonite.

No native gold has been found in the ore.

Of the vein minerals, only quartz and calcite have been observed.

Of the supergene minerals, hematite is the most common, accompanied by limonite in many places. Several boron grains have been identified, probably the result of chalcopyrite alteration.

Fuels and hazardous chemicals and mixtures

Fuels, lubricants, and other hazardous chemicals and mixtures (HCCM) necessary for the ore enrichment process will be used and stored on the mining site.

The necessary equipment is as follows:

Table No. 4.2-1. Total required mechanization and equipment

No	Type of equipment	Open pit work	Ore work	Embankment work	OF	Required number, total
1	Drill	1	1	-	-	2
2.	Excavator	1	1	-	-	2
3	Dump trucks	7	4	-	-	11
4.	Water carrier	1	1	-	-	2
5.	Front loader	-	-	-	1	1
6.	Bulldozer	1	-	2	1	4
		Total 11	Total 7	Total 2	Total 2	22

Diesel fuel will be used for the loading and transport equipment and auxiliary self-propelled equipment used in ore mining. It will be stored in steel tanks with a total capacity of 42.5 tons (with an average density of 0.85) - 50,000 liters - 55 m³. The number and dimensions of the tanks will be in accordance with the Project for the Construction of a Gas Station under the Spatial Development Act.

Diesel fuel will be delivered by mobile tankers, with a maximum available quantity of 42.5 tons on site.

During the construction and operation of the mine and the OF, **fuel and lubricants** for the service equipment.

The necessary lubricants, hydraulic and cooling oils, and greases will be delivered in packaging that will be returned to the suppliers on a full-empty basis.

The following will be available on site in a storage room:

- Prista® M10 De engine oil, 2 barrels of 110 kg each, totaling 0.22 t, and
- Prista AN 68_100 lubricating oil, 2 barrels of 110 kg each, total 0.22 t.

The main explosive material to be used is expected to be an oil-nitrate explosive mixture (ANFO) and/or emulsion explosives. The total number of blasts per year will be 88. The blasting will be carried out by an external contractor who will deliver the necessary explosives immediately before the blasting, so there is no likelihood of explosives being present on site. **It is planned that the explosives will be provided by a specialized company and will not be stored on site.**

Haskovo region

No **chemicals or mixtures** are required in the extraction process. These will be used in the enrichment process. The reagent distribution area includes the storage and preparation of the following reagents:

Foam concentrate: methyl isobutyl carbinol (MIBC). The MIBC preparation system consists of a storage tank with a mixer and two distribution pumps that feed MIBC to the flotation zone in operating/standby mode. The maximum quantity available on site will be 6.6 tons, located in: a storage room, a solution storage tank with a total capacity of 480 kg – 500 liters – 0.6 m³, and a solution supply tank with a total capacity of 60 kg – 64 liters – 0.06 m³ with a solution dosing system.

Collector: potassium amyl xanthate (PAX). The maximum quantity available on site will be 18.7 tons, located in: a storage room, a solution storage tank with a total capacity of 1,440 kg – 9,600 liters – 10 m³ and a solution delivery tank with a total capacity of 480 kg – 3,200 liters – 3.5 m³ with a solution dosing system. The tanks also have two circulation pumps in operating/standby mode, which deliver the PAX solution to the flotation area;

Activating agent: copper sulfate (CuSO₄·5H₂O). The maximum quantity available on site will be 45 tons, located in: a storage room, a solution preparation tank with a total capacity of 3000 kg – 20000 liters – 20 m³ and a solution delivery tank with a total capacity of 1500 kg – 10,000 liters – 10 m³ with a solution dosing system.

Sulphidising reagent: sodium hydrogen sulphide (NaHS). The maximum quantity available on site will be 48 tonnes, located in: a storage room, a tank for preparing the solution with a total capacity of 3600 kg – 23980 litres – 25 m³ and a solution delivery tank with a total capacity of 1200 kg – 8000 liters – 8 m³ with a solution dosing system.

Collector: Aerofloat 404 (A404). The maximum quantity available on site will be 3.6 tons, located in: a storage room, a tank for preparing the solution with a total capacity of 360 kg – 2,400 liters – 2.5 m³ and a solution delivery tank with a total capacity of 60 kg – 400 liters – 0.4 m³ with a solution dosing system.

Flocculant (mixture). The maximum quantity available on site will be 2.2 tons, located in an automatic machine for the preliminary preparation of polymer solution doses. The flocculant distribution system includes a powder flocculant hopper, a feed screw, a mixing tank with a stirrer, a storage tank with a stirrer, and two dosing pumps. Tomal PolyRex, an automatic machine for the preliminary preparation of polymer solution doses, will be used. This allows for the correct preparation of the solution and aging of the flocculant. The two dosing pumps feed the mixed flocculant to the thickeners of both the concentrate and the production waste. Before being added to the thickener, each line will have a built-in mixer for further dilution of the flocculant to 0.02% by volume.

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

Electricity - to provide electricity for the machines, equipment, and installations in the enrichment plant and open pit mine, it is necessary to build a power line. At this stage, the design solution is to build a branch from the existing 10 kV power supply (marked with a black line in the figure below) and represents a transformer station in the village of Rozino. The length of the expected route to the plant is 2.4 km. The distance from the transformer station to the concession boundary is 583 m.

Water supply

The implementation of the investment project will require quantities of water for production needs (in the enrichment plant, for irrigation during dust suppression, and for drinking and domestic needs of the staff).

The hydrological survey, defined in a hydrogeological report, on the availability of water resources from surface water bodies **shows** that during the period January-May, when there is sufficient flow in the river, it is possible to use water from Arpa Dere, in the area of the Rosino pumping station (PS) "Rozino" at a flow rate that provides a minimum water quantity of 50 l/s (expected total volume of 648 000 m³), equal to 10% of the average annual water quantity, as **well as ensuring the ecological minimum in the river**. During this period, an open reservoir for non-contact water will be filled through continuous water pumping.

A possible option for water pumping is the construction of a pumping station in the area of the existing Rosino pumping station, which is used to supply drinking water to the village of Rosino. Due to the higher flow rate in February, March, and April, a higher flow rate of about 100 l/s can be used during these months to fill the non-contact water reservoir on days with higher rainfall.

Rainwater will accumulate within the catchment area in the Rosino mine pit, depending on the exposure of the mine over the years. This water will be drained into an open reservoir for contact water and will be used in the technological process.

A hydrogeological study conducted in the area of the deposit has established that the underground waters have an insignificant flow rate and their yield is extremely insufficient for technological needs.

For optimal water consumption, part of the water will be recycled where possible, for which an open contact water reservoir will be built.

Bottled water will be provided for drinking purposes.

For sanitary and domestic needs, a contract will be concluded with the water supply company for the supply of water from a reservoir owned by the water supply company, located 800 m from the domestic premises in the OF area. Such infrastructure is already in place and it is technically possible to connect it to the future facility. The exact routes will be determined during the working design phase.

The soil and biodiversity will not be used as a natural resource, but will be affected by the implementation of the investment proposal. The characteristics of their current state and the forecast for their impact are described in the relevant sections of this report.

5. Alternatives for the implementation of the investment proposal

5.1. Alternatives for the location of the

Regarding the location of the Rosino ore deposit area

"Tintyava", there are no other alternatives, as underground resources have been identified in this area and the boundaries of the reserve have been determined. The boundaries of the future concession area have been declared accordingly.

5.2. Alternatives for the location of the elements of the investment proposal

The location of the open-pit mines, their size and shape are predetermined by the geological structure of the ore bodies and the reserves designated for extraction, as the characteristics of the relief and geographical location largely limit the alternative options for the location of the accompanying infrastructure and facilities.

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Several options with a larger area required for the location of the accompanying facilities and infrastructure were considered, but they were rejected by the Contracting Authority with a view to maximising the protection of natural resources.

When considering the various alternatives for the design of the necessary facilities and their location, the following were taken into account:

- The ore extraction technology and the location of the relevant accompanying elements;
- Minimal land use;
- The requirements for environmentally sound management of mining waste.
- Minimal impact on areas of the Rhodopes-East Special Protection Area, code BG0001032, and the "Biala Reka", code BG0002019.

From a practical point of view, taking into account all these circumstances, there is no real better alternative for the location of the mines, other facilities, and infrastructure.

Difference in the affected areas compared to the notification submitted by letter ref. No. of RIEW – Haskovo PD-279/14.02.2023.

The concession area envisaged in the above-mentioned notification amounts to 3,044.7 decares, of which 1,189.8 decares are disturbed areas and 1,854.9 decares are buffer areas. With a view to optimizing the location of the facilities and reducing the directly affected areas, the total planned concession area subject to this assessment amounts to 2,753.4 decares, of which the disturbed areas will amount to 1,179 decares and the buffer zone area is 1,574.4 decares.

5.3. ore extraction technology alternatives

The open pit mine is used for the development of deposits with ore bodies located close to the surface, in large deposits with low content of valuable components. The main disadvantage of this mining option is the creation of a new negative form in the area (pit), which creates a certain problem in restoring the environment after exploitation. A new form with a significant volume may also be formed – a pile of non-ore mass.

Underground ore mining is used for richer deposits located at considerable depths in the earth's crust. In this case, the mined-out spaces must be filled. Mine filling is necessary both for more complete extraction of the reserves and for protecting the earth's surface above the ore bodies from collapse. The underground mine option facilitates the management of mining waste (non-ore rock mass) through the partial use of waste fractions for backfilling in the underground mine. For deposits close to the surface and low contents of valuable components, this option is economically unfeasible due to the increase in capital and production costs for the construction and operation of the mine.

For the conditions of the Rozino deposit, underground mining is not a viable option due to:

- the shallow depth of the ore bodies – 15-20 m;
- the low stripping ratio – 2.5, which makes underground mining systems economically unfeasible;
- the morphological type of ore deposit – vein-sprayed, which requires the accurate identification of the balance ores and, respectively, their correct and regular extraction, a goal that is difficult to achieve with underground mining. In the case of underground mining, it will be necessary to create additional areas for temporary stockpiles for the different types of ore and their subsequent averaging before delivery to the factory.

Other such alternatives could not be considered, as the mining technology is tailored to the location of the natural resources in the subsoil and the geological and mining ^{Haslavskiy region} specific activity. The open-pit method of extracting

In principle, there are three alternatives for processing the mined ore:

- *Alternative 1:* Mining and crushing of the ore within the concession area and sale to companies with their own processing facilities.

- This option includes the mandatory construction and operation of a processing plant, which is associated with an increase in the potential concession area in order to provide sufficient space for ancillary facilities such as: water and chemical solution tanks, a flotation waste storage facility, a finished product storage facility, etc. This option also involves additional water management – ensuring sufficient quantities of fresh water and sufficient volumes of circulating water.

- *Alternative 3:* Processing the ore into block metal as the final product within the concession area, which would include: mining, a flotation plant, cyanide leaching, and a block metal production facility. Given the proven reserves of natural resources, this option is economically and financially unjustified and excludes the need to use another chemical substance - cyanide.

Preliminary technical and economic assessments of the three options with an accuracy of +/-30% show a clear preference for *Option 2*.

- the remoteness of existing processing facilities. In addition to being economically unviable, transporting huge quantities of ore over such distances also places a significant burden on the road network with heavy goods vehicles, which in turn leads to increased emissions of harmful substances into the atmosphere, excessive noise, permanent disturbance to the environment and significant discomfort for people using these roads;

- the specified production capacities of the existing installations are limited to processing ore from specific deposits, with a specific capacity and specific ore composition. In practice, there is no free production capacity to take on additional quantities of ore from the Rosino deposit;

- The limited volume of existing mining waste facilities at the respective processing plants, which are designed for needs, conditions, and capacities.

Alternative 2, preferred by the Contracting Authority, allows for the production of a final product – gold-bearing concentrate, which is significantly smaller in volume than the ore mass, can be easily transported for further processing, with less impact on the transport network and, accordingly, less impact on the environment in the immediate vicinity of the transport

- *Alternative 1:* Conventional water disposal in a tailings pond, where the water-saturated waste is transported by a tailings pond, which is essentially a hydraulic engineering structure.

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• *Alternative 2:* Landfilling of waste after compaction. Additional dewatering of the flotation waste produces waste with a solid content of 70-75%, which is transported through pipelines to the waste storage facility after processing.

Considering the advantages of compacted waste disposal, the Contracting Authority plans to implement Alternative 2.

This technology has the following advantages over the disposal of waste with a high water content:

- Reduced consumption of "fresh" water by 20-25%, which leads to a reduction in the volume and area of the "fresh" water reservoir by up to 5%;
- Increased use of recycled water by 20÷25%, which leads to a reduction in the volume and area required for the construction of the "contact" water tank by up to 5%.
- Reduction in the area of the landfill facility by 10÷15% due to a reduction in the volume of waste deposited;
- Low moisture content in waste after disposal – up to 5%;
- Accelerated drying and hardening time of the waste – up to 1÷2 days in dry seasons;
- Increased overall stability coefficient of the landfill body and retaining wall due to reduced or complete absence of water in the waste;
- Reduced risks associated with the disposal of waste with high water content;
- Possibility of gradual recultivation of the land after reaching the design landfill level.

5.6. Application of a "zero" alternative

The "zero alternative" represents the non-implementation of the investment proposal. In this case, the proven polymetallic ore reserves located in the "Rosino" deposit, "Tintyava" area, will not be exploited and, accordingly, utilized. This would deprive the state and the municipality of Ivaylovgrad of revenue from direct and indirect taxes and fees, and local communities of jobs at the site itself and at other companies serving the site.

6. Description, analysis, and forecast assessment of the impacts on the components and factors of the environment and the material and cultural heritage that will be affected by the investment proposal: population, human health, biodiversity (e.g., fauna and flora), soil (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), tangible assets, cultural heritage, including architectural and archaeological aspects, and landscape (the description of the likely significant effects on the elements referred to in Article 95, paragraph 4 covers the direct effects and all indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the investment proposal and takes into account the environmental protection objectives relevant to the investment proposal)

6.1. Atmospheric air

Brief description and analysis of the climatic and meteorological factors relevant to the specific impact and quality of atmospheric air

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~~*the Rosino deposit, Tintyava area, located in the territories of the villages of Rosino and Gugunka, Ivaylovgrad municipality,*~~
Occupying the eastern parts of the Rhodope Mountains, the climate in the IP area falls within the transitional Haskovo region.

Mediterranean climate zone and is characterized as temperate continental to Mediterranean. The area is under the predominant influence of the Mediterranean climate, especially with regard to Mediterranean cyclones. In addition, due to its greater openness to the north during the winter half-year, the influence of cold continental air masses invading from the north is noticeably felt. Active cyclonic activity during the winter months is responsible for both the relatively high temperatures and the increase in precipitation, which is mostly frontal in nature. The average January temperature is positive and varies between 1 and 2°C. Sometimes the rainfall is very intense, with up to 80 mm of precipitation observed within 24 hours. It is precisely because of the high winter and autumn precipitation that the average annual precipitation values are relatively high, ranging between 650 and 750 mm. In most cases, precipitation is in the form of rain, with snow falling mainly in the second half of December, January, and February. It is rare for snow cover to remain for 5-6 days. The snow usually melts very quickly, leading to flooding of rivers, which can sometimes be violent.

Despite the relatively mild winter, spring warming does not occur very quickly quickly. Until mid-April, spring frosts and snow are observed, while further south the thermal conditions in spring are more favorable and the harmful frosts and snow end earlier than the dates mentioned above. According to the Geographic Atlas of Bulgaria (2010), the average amount of precipitation in spring for the period 1976-2005 is between 150 and 200 mm.

Summer is characterized by scarcer rainfall, extremely high temperatures, average July temperatures between 23 and 25°C, and many sunny days. It is precisely the influx of hot tropical air masses that causes periods of drought. The amount of precipitation in summer (June, July, August) for the period 1976-2005, as in spring, varies between 150 and 200 mm.

The area in question receives significantly more rainfall than the national average. Precipitation peaks in winter, which helps to limit unorganized dust emissions.

Overall, the climatic conditions in the area allow for year-round mining operations.

The air quality in the area under consideration is monitored by the Regional Inspectorate of Environment and Water Resources (RIEW) in Haskovo. The municipality of Ivaylovgrad, which includes the boundaries of the Rozina deposit, has good air quality.

Air quality is monitored through a system of monitoring stations. According to the areas for assessment and management of ambient air quality (Article 30, paragraph 1 of Ordinance No. 7 on the assessment and management of ambient air quality), the municipality of Ivaylovgrad falls within "areas" where the levels of one or more pollutants are between the respective upper and lower assessment thresholds. The municipality of Ivaylovgrad is not included in the national environmental monitoring system. The nearest station is AIS "Studen Kladenets" - Automatic - urban background station, located in the built-up area of Kardzhali, measuring the impact of emissions from production activities and emissions from the domestic sector. The station is located at a distance of over 40 km as the crow flies northwest of the IP boundaries and, accordingly, the data from the monitoring are not applicable to the IP. The station is located more than 40 km as the crow flies northwest of the boundaries of the IP and, accordingly, the data from the monitoring carried out are not applicable to the area under consideration.

There are no large industrial enterprises or environmental polluters in the area. There are no significant sources of pollution in the IP area: there are no roads with heavy traffic; there is no developed industry; there are no large settlements and, accordingly, no significant sources of pollution.

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There are no significant sources of pollution in the IP area: there are no roads with heavy traffic, there is no developed industry; there are no large settlements and, accordingly, domestic heating does not significantly affect the air quality.

Overall, there are no other sources of pollution in the area and it can be concluded that the air quality is within acceptable limits.

Conclusion:

From the analyses conducted so far, it can be concluded that the background levels of air pollutants relevant to the implementation of the IP are within the permissible limits for the protection of human health.

Within the boundaries of populated areas, the maximum possible average annual concentrations of PM₁₀ and PM_{2.5} are several times lower than the permissible limits.

In the area of the deposit, the maximum dust concentrations are within the permissible limit values for chemical agents in the air at the workplace, specified in Annex No. 1 to Ordinance No. 13 of December 30, 2003, on the protection of workers from risks related to exposure to chemical agents at work.

Sources of air pollution related to the implementation of the investment proposal – during construction, during operation, and during closure and recultivation

The company's investment proposal includes the phased development of the two sections of the Rosino deposit. Once the excavation work in Section 1 is complete, all equipment will be moved and concentrated on the excavation and preparation of Section 2. Only mining operations will continue in Section 1 until the planned geological reserves are fully depleted, i.e., simultaneous activities will be carried out in both sections.

This report covers the period of the project implementation during which maximum air pollution is expected. This is the first four years of the project implementation, when mining activities will be carried out simultaneously with the discovery of the deposit and the dumping of the overburden on an external dump. After the fourth year, internal dumping of the overburden in the mine pit will begin, which will result in significantly less unorganized dust emissions into the atmosphere compared to transport and dumping outside the mine pit.

During the development, operation, and closure of the Rosino deposit, activities will be carried out that will lead to the release of dust and gas emissions into the atmosphere. The sources of emissions will be **unorganized**.

By source type, unorganized emissions can be considered as area emissions (*drilling and blasting, removal and disposal of overburden and ore, loading and unloading of extracted materials, crushing of extracted raw materials, emissions of exhaust gases from internal combustion engines of construction equipment, etc.*) and linear (*dust and exhaust gases from internal combustion engines of transport equipment and from its movement on quarry roads*).

The implementation of the investment project does not envisage the operation of an organised source of emissions into the atmosphere.

Unorganized sources of pollution:

Construction, excavation, and mining works are sequential processes which, for the purposes of the analyses here, do not need to be considered separately. All activities related to unorganized dust emissions into the atmosphere can be carried out in one year.

Air pollution in the Rosino deposit area will be mainly due to dust emissions from:

- rock blasting activities;

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- loading and unloading of the overburden;
- loading and unloading of ore;
- processing of the mined ore using a crushing plant;
- the area of the spoil heap;
- the operation of internal combustion engines in mining (industrial) equipment for extracting and loading rock mass;
- the operation of internal combustion engines in heavy-duty equipment for quarry transport;
- the movement of mining equipment on quarry roads.

The industrial equipment required for mine construction, extraction, raw material processing, and quarry transport is: a drilling machine for drilling blast holes; a quarry-type excavator; a bulldozer; a front loader; a crushing and sorting plant; a water tanker; dump trucks for internal quarry transport (55 t load capacity); etc.

The following methods are applicable for determining and calculating emissions of harmful substances into the air:

- AP-42 8.19.2 Crushed stone processing, 1994—the document presents emission factors for drilling and blasting rock materials;
- Methodology of the European Environment Agency (EEA), developed under the European Monitoring and Evaluation Programme (EMEP) to the Convention on Long-range Transboundary Air Pollution, last updated in 2023.

Below are the calculations for emissions of harmful substances depending on the sources of emissions and activities that lead to unorganized emissions into the atmosphere.

Emissions of harmful substances are presented for the sources that will have the greatest impact on air quality in the area, namely:

- mining (industrial) equipment for extracting and loading rock mass;
- heavy-duty equipment for quarry transport;
- loading and unloading of mined material;
- processing of extracted construction materials using a mobile crushing plant;
- dump for overburden.

Emissions from the operation of industrial equipment:

Diesel fuel will be used to power industrial and transport equipment (*drilling rig, excavator, bulldozer, front loader*).

The operation of internal combustion engines of industrial equipment will release harmful gases into the atmosphere, which are generally: carbon oxides, nitrogen oxides, sulfur oxides, soot, unburned hydrocarbons, etc. The quantities of harmful gases can be calculated using the methodology of the European Environment Agency, updated in 2023.

Emissions from internal combustion engines are characteristic of this type of activity and are unavoidable, with the majority of these emissions being released within the site. The expected concentrations of pollutants in the ground-level atmospheric layer are below the MPC for gases in the air in the working environment. The exhaust gases from the internal combustion engines are released into the atmosphere at a high temperature, as a result of which they quickly disperse at height. The precipitation of pollutants in the ground-level atmospheric layer occurs at a short distance from the source (*up to 200 m*) and over a large area, which ensures compliance with the standards for air quality in the working environment.

Emissions from mining/blasting of rock mass:

The planned annual output is 5,070,000 t of rock mass (*ore + sterile rock mass*), with two blasts per week planned.

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the Rosino deposit, Tintyava area, located in the territories of the villages of Rosno and Gugunka, Ivaylovgrad municipality.
The dust emissions that will be released into the atmosphere from drilling and blasting activities are 205 kg/year. Haskovo region

PM₁₀ and PM_{2.5} or 0.0064 g/s.

In this particular case, the ore will be extracted using coarse-grained ammonium nitrate explosive mixtures (Emulit 100, ANFO, or RIOGEL), which have been selected for their proven qualities in practice.

The amount of toxic gases formed during an explosion is directly dependent on the oxygen balance of the specific explosive substance. In explosives with a positive oxygen balance, the amount of nitrogen oxides increases and carbon monoxide decreases. In explosives with a negative oxygen balance, carbon monoxide increases and nitrogen oxides decrease accordingly.

According to the manufacturer's data, a maximum of 933 l/kg of gases are generated during an explosion. It can be assumed that the explosion of 1 t of explosive generates approximately 933,000 l of gas products. According to data from the use of ANFO explosives with 94.5% porous ammonium nitrate and 5.5% diesel fuel (KB +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 cond. CO. The tests were performed according to standard BDSN 13631 – 16 in a 142 m³ pressure chamber in an existing test facility.

With the exception of dust, which settles at relatively short distances from the source, gas pollutants will mainly rise in height and disperse at great distances from the IP site. Performing 1-2 explosions per week is not likely to result in a violation of the established CAQ standards.

Calculation of greenhouse gas emissions from blasting rock:

Greenhouse gas emissions can be calculated based on the relative CO₂ emission value for 1 t of explosive – 176 kg/t CO₂. Using a maximum of 727,200 kg of explosive per year will result in up to 128 t/y of CO₂ emissions.

Emissions from loading the raw material and overburden and unloading the overburden:

The results of the calculations 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 loading activities carried out on the mine site (Area source No. 1);

➤ 287.06 kg/year (0.009103 g/s) PM₁₀ and 43.47 kg/year (0.001378 g/s) PM_{2.5} from unloading activities and scraping ore from the warehouse to the bunker for uncrushed ore in Enrichment plant (Area source No. 2);

➤ 267.6 kg/year (0.008486 g/s) PM₁₀ and 40.52 kg/year (0.001285 g/s) PM_{2.5} from unloading the overburden onto the open dump area (Area source No. 3).

Emissions from ore processing at the enrichment plant (Area source

No. 2):

A technology involving the crushing of the mined ore using a crushing plant has been adopted. The feed hopper of the crushing plant is loaded, which results in the release of unorganized dust emissions.

According to Table 3.2 of the section "Industrial processes and product use" –

"Quarries and extraction of minerals other than coal" (NFR Category 2.A.5.a), the emission factor for loading/unloading 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 are loaded annually into the receiving bunker of the TSI, which may result in unorganized emissions of:

➤ 973.5 kg/year (0.0309 g/s) PM₁₀;

➤ and 247.8 kg/year (0.0079 g/s) PM_{2.5}.

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The subsequent processing of the ore, by grinding in a ball mill (operating in a closed circuit with a group of hydrocyclone classifiers) and enrichment, does not result in emissions into the atmosphere.

Wind erosion from the area of the sterile rock mass dump (open pit):

The calculated wind erosion from the sterile rock mass dump area is as follows:

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

Transport emissions:

A dump truck is used to transport the ore and overburden.

The overburden is transported by road to the external dump during the first 4 years, after which internal dumping in the mine pit is planned. The heavier option will be considered, in which transport from the mine to the external dump is carried out via the following internal quarry road:

- internal unpaved road (gray line in Figure V.1.1-2) with a maximum transport distance of 4 km;

The ore is transported by road to the covered warehouse at the uncrushed ore bunker in the enrichment plant. This is done via the following internal road:

- an unpaved internal road (orange line in Figure V.1.1-2) with a maximum transport distance of 1550 m.

The concentrated end product is transported for processing to the end user via the national road network.

The expected number of trucks for transporting the production is a total of 30 trucks/week, each truck with a payload of 25 t, distributed over three working days of the week. The client plans to use fully electric trucks, as they do not emit harmful substances into the air or noise from internal combustion engines.

The quarry roads are marked in gray and orange in the following figure.

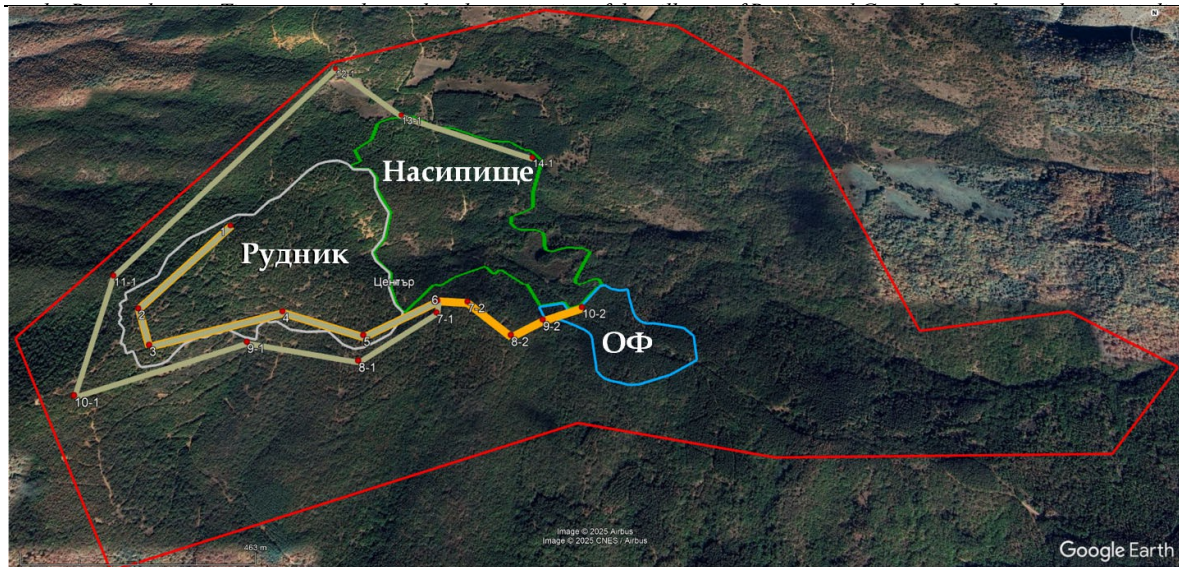


Figure 6.1-1. Internal quarry roads

Transport on unpaved quarry roads:

Unpaved quarry roads are located within the boundaries of the mine and the external spoil heap.

The results obtained for emissions from transport activities are as follows:

- 0.004860889 g/(m.s) PM_{10} and 0.000483796 g/(m.s) $PM_{2.5}$ when transporting the overburden on internal quarry roads at the site (*Linear source 1*);
- 0.002607211 g/(m.s) PM_{10} and 0.000259481 g/(m.s) $PM_{2.5}$ when transporting the ore on internal quarry roads to the enrichment plant (*Linear source 2*).

Transportation on paved quarry roads:

Paved quarry roads are roads outside the mine boundary within the mine boundary and the external spoil heap.

The results obtained for emissions from transport activities are as follows:

- 0.000694358 g/(m.s) PM_{10} and 0.000184805 g/(m.s) $PM_{2.5}$ when transporting the overburden on internal quarry roads at the deposit (*Linear source 1*);
- 0.000372446 g/(m.s) PM_{10} and 9.91248E-05 g/(m.s) $PM_{2.5}$ when transporting the ore along internal quarry roads to the enrichment plant (*Linear source 2*).

Total emissions from the development of the Rozino deposit:

The main pollutant that will be emitted throughout the entire period of operation of the deposit is dust. The sources are divided according to their type (*area and linear sources*).

Table No. 6.1-1. Emissions from area sources

Activity	PM10	PM2.5
	g/s	g/s
Emissions from mine operations - Area source 1		
Drilling and blasting operations	0.006	0.0064
Loading of mine waste and overburden onto dump trucks	0.013037	0.001974
Activity	FPCH10	FPCH2.5
	g/s	g/s
Total emissions from Area source 1	0.019437	0.00837
Emissions from the landfill - Area source 2		
Unloading of the excavation	0.008486	0.001285
Wind erosion from the external embankment	0.0382	0.01528
Total emissions from Area Source 2	0.046686	0.016565
Emissions from OF activity - Area source 3		

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Unloading of ore in the warehouse to the bunker for uncrushed ore	0.009103	0.001
Scooping ore with an excavator to load the TSI bunker		
Unloading of ore onto the TSI	0.0309	0.007
Crushing in the TSI (primary, secondary, and tertiary)	0.064	0.022
Screening in TSI	0.08	0.005
Unloading from TSI into covered buffer storage for crushed ore	0.0013	0.0004
Overloading through the crushed ore silo and to the ball mill	0.0026	0.0007
Total emissions from Area Source 3	0.1890	0.036

Table No. 6.1-2. Emissions from linear sources

Linear source No.	FPCH10	PM2.5
	g/(m.s)	g/(m.s)
Linear source No. 1 Emissions from internal quarry transport, from Mine to Stockpile	0.000694358÷ 0.002433758	0.000184805÷ 0.000242231
Linear source No. 2 Emissions from internal quarry transport, from Mine to OF	0.000372446÷ 0.001305397	9.91248E-05÷ 0.000129915

Assessment of the impact on atmospheric air and climatic factors in accordance with the norms and standards in force in the country

a) During construction and operation

The analyses in the EIA report show that the activities to be carried out at the project site are mainly a source of dust in the atmospheric air.

The activities to be carried out at the IP site will generate a total of three area sources and two linear sources (*internal transport with 55-ton trucks from the Mine to Nasipishte and from the Mine to OF*) of pollution.

Dimensions of the studied area of airspace: - length (*east-west*) – 4,000 m; - width (*north-south*) – 4,000 m.

The methodology used allows for the calculation of maximum single and average annual concentrations emitted from area and linear sources. In this case, the main pollutant of the atmospheric air will be dust, for which the SDN and SGN are determined in the fraction with a particle size of 10 μm and the SGN in the fraction of 2.5 μm . The results of the program's calculations for average annual concentrations of pollutants in the atmospheric air are presented below. The program is not applicable for calculating average daily concentrations.

Due to certain limitations of the program, two simulations of linear sources were performed consecutively – first, a model of Linear Source 1 was created, followed by a model of Linear Source 2. This was followed by a separate model of area sources. The results obtained from the linear sources, recorded in text (DAT) files, are summed using the SUPERPOSITION module from the Traffic ORACLE package in order to comply with the principle of superposition. This is followed by summing the total file for the linear sources with

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the file for area sources. The results for the calculated average annual values (AAV) expressed by isolines are superimposed on a satellite image of the area using the Surfer program.

The results for the average annual concentrations of PM_{10} and $PM_{2.5}$ from linear and area sources are presented in an appendix – working files from the program to the EIA report.

The results of the summation of all sources of pollution in the Rosino deposit area

The results of the summation of all sources of pollution in the area of the Rosino deposit, using the SUPERPOSITION module from the Traffic ORACLE package, are recorded in a text (DAT) file (*attached to the EIA report*).

Overall, the exploration and mining activities in the concession area of the Rosino deposit will not have a significant impact on the ambient air quality of the nearby settlements. The maximum calculated AACs for PM_{10} and $PM_{2.5}$ are significantly below the permissible levels for the protection of human health.

Characteristics of the potential impact on atmospheric air:

Based on the modeling performed, it can be concluded that the exploitation of the will not lead to atmospheric air pollution above the permissible levels. Within the boundaries of the settlements, dust concentrations will be within the permissible levels for the protection of human health.

b) During closure and recultivation

Reclamation activities (*technical and biological*) have a significantly lower impact on atmospheric air. The sources are again unorganized and consist of dust and exhaust gases from the equipment used—excavators, bulldozers, and dump trucks. In this phase, mining machinery and technological equipment are not in operation.

Due to the significantly smaller volume of work compared to the construction activities and the operation of the deposit, it can be concluded that the closure and recultivation will have a negligible impact on the ambient air quality in the area of the investment proposal.

Summary conclusions on the impact on atmospheric air:

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

By territorial scope of impact: local, mainly on the concession area;

Frequency of impact: constant, daily, until the closure of the activity and recultivation of the disturbed areas;

By duration of impact: continuous, for the term of exploitation of the deposit, recoverable to a certain extent, with well-executed recultivation activities;

Cumulative and combined environmental impacts: The IP will not have a significant cumulative effect on the CAQ in the area.

6.2. Surface and groundwater Surface water

The investment proposal for "Extraction and processing of polymetallic ores from the Rosino deposit, Tintyava area" falls within the basin of the Byala River.

The site of the current investment proposal is located in the municipality of Ivaylovgrad, Haskovo region, southern Bulgaria, immediately south of the village of Rozino. The Biala River, the Luda River, and their tributaries are the main water sources in the area, with the site located between two tributaries of the Biala River (the Kokardzha Dere and the Arpa Dere). The Biala River drains the Muglenik, Irintepe, and Sirt ridges of the Eastern Rhodopes and has a total catchment area of 594 km². The river's outflow at the village of Dolno Lukovo is approximately 7.53 m³/s and is mainly fed by precipitation.

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The closest surface water bodies to the boundaries of the Rosino deposit are the Byala River 650 m to the south, the Kokardzha Dere River 550 m to the west, and the Arpa Dere River 560 m to the east.

The project plans to completely close the circle of waters affected by the mine for internal use under normal operating conditions.

An integrated approach to water quality management within the production site has been developed. The report on integrated and sustainable water management is presented as an appendix to the EIA report. It is based on the division of surface water into two streams:

- water affected by mining activities - water from production cycles, tailings storage facilities, ore pits, and open-pit mines;
- water that has not been in contact with production - surface water, rainwater, runoff water, water from undisturbed forest areas.

Impact assessment

a) During construction

From the start of construction activities at the mine until the end of the second year, construction work will be carried out to build the walls of the tailings storage facility. There will be no production activity and the water at this stage is classified as construction water. Surface water will be managed by permanent and temporary open channels. The catchment areas are shown in Figure 6.2-1.

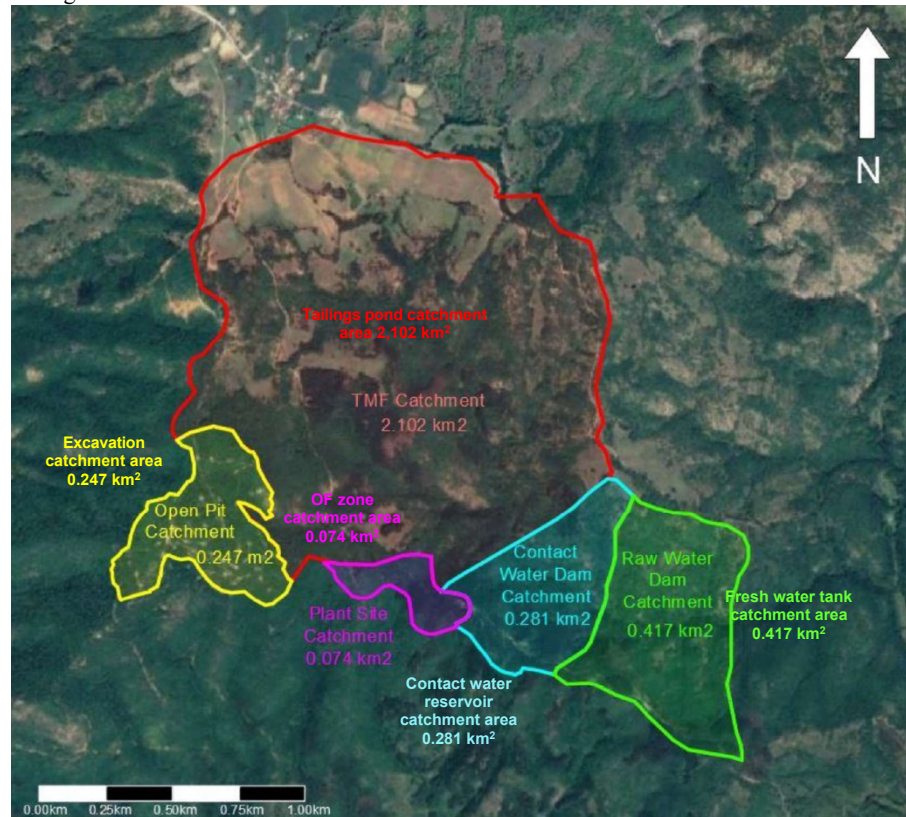


Figure 6.2-1 Catchment areas during construction (until the second year).

During the construction period, temporary sedimentation ponds will be constructed along the watercourse to capture solid runoff and discharge clarified water into the Yuren Dere valley.

No negative impact on surface waters is expected during the construction phase due to the absence of objective reasons for this.

b) During operation

To manage the outflow from the areas above the facilities during the operation of the site, two channels have been developed - a northern diversion channel along the northeast side and a southern diversion channel south of the site. They will discharge collected water to the fresh water storage reservoir and, respectively, to the contact water storage lake. From the beginning of year 3 onwards, the northern diversion channel will start operating at the northeast end of the tailings storage facility, extending to the fresh water storage reservoir area north of the site. This configuration will remain unchanged until the end of mining operations prior to closure.

The catchment areas formed during the mine's operation are shown in Figure V.2-2.

The bottom of the mine is expected to reach an elevation of 435 m. According to the drilling work carried out, no groundwater has been reached at this elevation and therefore no additional water inflow to the pit is expected other than that from rainfall and snowfall.

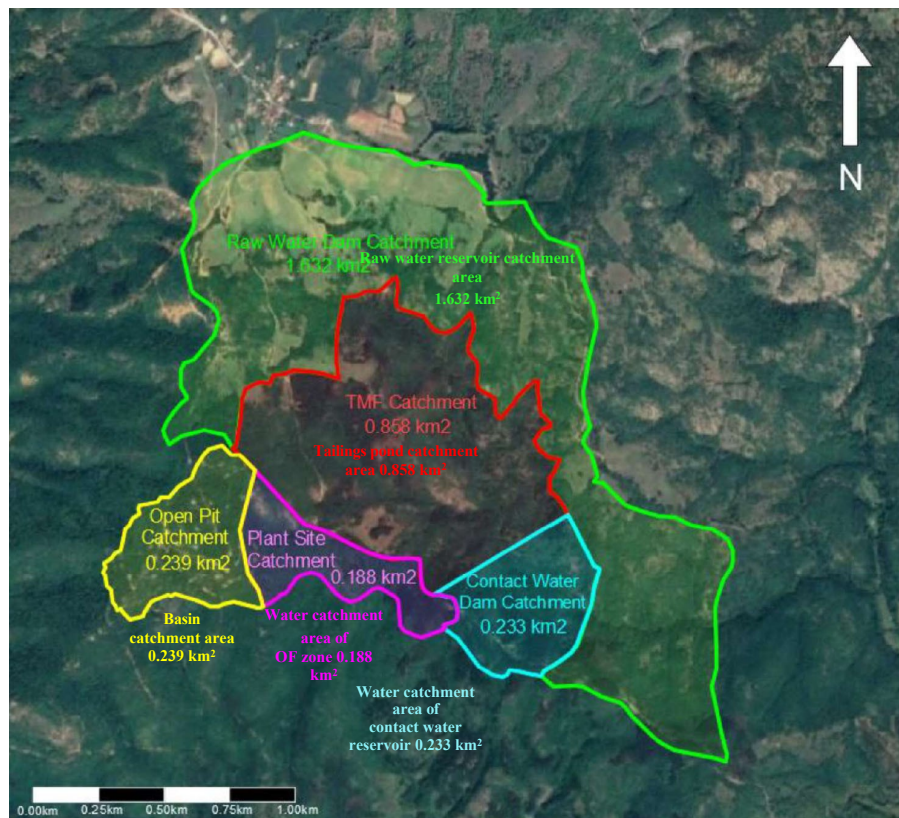


Figure No. V.2-2 Catchment areas during operation

The water quantities falling within the boundaries of the mine and the dumps as a result of rain and snowfall will be directed to the lowest parts of the respective facility.

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No central sewerage system is planned due to the lack of a treatment plant in the vicinity of the site. As an alternative, the possibility of using mobile sanitary facilities is being considered, which will be maintained by a specialized company that will periodically collect the generated water according to a schedule and transport it to a licensed treatment plant. Another option is to design and build a mobile treatment plant tailored to the site's consumption, which will be removed after the site has been decommissioned and closed.

According to the preliminary design, to compensate for the expected annual water deficit of approximately 125,000 to 310,000 m³ in the plant's water supply, water will be supplied from a pumping station on the Arpa River located approximately 1.7 km east of the site.

It is planned to pump water directly from the Arpa Dere River during the wet months of the year (from January to May inclusive). The water intake from the Arpa Dere River will be close to the confluence with the Yuren Dere River and adjacent to the existing pumping station in the village of Rozino. This pumping station is designed to pump water from a spring that flows into the whirlpool. The flow rate of this spring varies between 6 and 11 l/s throughout the year, depending on the season. It has been calculated that the flow rate required to maintain the village of Rozino is in the order of 0.34 l/s. The excess water from the spring, after the relevant justification, could be used for the industrial needs of the site throughout the year. It is planned that the water intake will be carried out from a naturally formed pool without the need to build a dam or other construction works blocking the river.

Surface runoff from the open pit mine will be used as the primary source of water for the production facility. This water is pumped from the open pit sumps to the OF reservoirs. The water stored in the tailings pond is the second source of water for the plant, with the fresh water reservoir being used as a supplementary water source (third source) if the water from the open pit mine and tailings pond is not sufficient or of the required quality to meet the factory's water needs.

During the operational phase, no negative impact on surface waters is expected due to the absence of objective reasons for this.

C) During closure and reclamation

The possibilities for introducing accelerated evaporation technology to remove water from the contact water reservoir and the system as a whole during site closure and reclamation have been studied.

The concept of accelerated evaporation is to disperse approximately 5 l/s of water from the tank (for each device) 18 m into the air with an average droplet size of less than 100 µm. This is achieved with mobile mechanical evaporation devices, allowing the goal of "zero discharge" at the site during the mine closure phase to be achieved. The devices are mounted either on the ground or on floating platforms. This allows for operational flexibility and relocation depending on wind direction. With this system, all water that has not evaporated is captured within the reservoir's catchment area.

The forecast for accelerated evaporation, even at a minimum efficiency of 30%, is up to 3028 m³ per month per device. The equipment will be actively used in the mine closure process (as provided for in the investment intention 5-year period of active conservation) when the collected drainage water in the contact reservoir will evaporate during the summer months to provide sufficient free volume for drainage water during the winter period when evaporation is ineffective.

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The climate in the area is favorable for enhanced evaporation. The high average temperatures and relatively low humidity during the months of April to September indicate that this could be the optimal period for enhanced evaporation.

Also, upon closure of the facility, the suction pipe of the pumping station drawing water from the Arpa River during the operation of the facility will be dismantled with minimal impact on the riverbed.

During the closure and recultivation phase, no negative impact on surface waters is expected due to the absence of objective reasons for this.

Groundwater

The area of the site subject to the IP falls within the boundaries of an underground water body (UWB) with code BG3G000PtPg049 Fractured waters - Eastern Rhodope complex, in an area that is part of the Eastern Rhodope block, which is composed of Precambrian, Paleogene, and Quaternary rock formations. The GWB is borderline, with the state border predominantly running along the watershed ridges.

According to the hydrogeological zoning of Bulgaria, the studied site falls within the Eastern Rhodope region of the Rila-Rhodope area and is part of the Arda River basin. In the studied territory, part of the Arda River basin, the waters circulating in the alluvial deposits of the Biala River and its tributaries Arpa Dere, Hambardere, Yuruklerska, etc. are of the greatest practical importance. The Paleogene sediments form a layered aquifer complex with predominantly low water abundance.

General conclusions about the impact on water:

- ***Surface waters***

During all stages of implementation of the investment proposal for "Extraction and processing of polymetallic ores from the Rosino deposit, Tintyava area," the impact on surface waters is determined to be insignificant. The surface water used from the Arpa Dere River is up to 10% of the average annual water volume and **is not expected to have a negative impact (including transboundary)**, respectively, no discharge of waste water into surface water bodies is planned. A "zero discharge" approach has been adopted.

- ***Groundwater***

The implementation of the investment proposal for "Extraction and processing of polymetallic ores from the Rosino deposit, Tintyava area **is not expected to have a negative impact** on groundwater and will not lead to a deterioration in the chemical and quantitative status of the affected groundwater body BG3G000PtPg049 Fissure waters - Eastern Rhodope complex.

As a technological option, a variant for water abstraction from the terrace of the Arpa Dere River is envisaged through the construction of a pumping station in the area of the existing PS "Rozino".

Extraction is planned to take place 1,300 m from the buffer zone with a radius of 1,000 m and 2,300 m from the catchment itself, so no negative impact on the drinking water protection zone is expected. A clean water reservoir will be built at the point closest to the catchment area within the concession area.

The impact on the chemical status of groundwater will be neutralized by lining the bottom and walls of the contact water reservoir with an insulating screen and by constructing a system to capture any breakthroughs, including a drainage curtain and an injection barrier.

6.4. Land and soil

Size of affected areas

The total planned concession area is **2,753.4 decares**, of which **1,179 decares** will be disturbed terrain. The buffer zone covers an area of 1,574.4 decares. Part of the facilities will be developed in already worked/disturbed areas and no new land will be taken, with this "overlap" amounting to 262 decares.

Sources of pollution

Soil contamination during the implementation of the IP may occur directly—from spills of petroleum products and lubricating oils—and indirectly from emissions.

Petroleum products and fuel lubricants that may be released in the event of accidents in the machines for extraction and processing of the raw material are potential soil pollutants. These are local and insignificant and are immediately localized and removed. They cannot affect the soil of the adjacent areas. If the operating instructions for the equipment are followed and proper maintenance is carried out, the risk of such contamination is minimal.

Dust emissions may originate from the following sources:

- from mining activities (non- e dust emissions - with a limited radius of impact);
- during stockpiling (geological materials are usually wet, and this can only be expected during the driest months of the year - with a limited radius of impact);
- soil contamination from open linear sources (internal and external transport routes) - with a limited radius of impact, mainly on both sides of the roads;
- from PVR, salvo and single blasting.

A primary jaw crusher will be used to crush the ore, followed by secondary and tertiary cone crushers, which are of the closed type. In addition, an irrigation system will maintain air quality in each of the buildings where the crushers are located.

The dust emissions generated in the mining and stockpiling processes do not differ in chemical composition from that of the soil-forming rocks in the area and therefore do not pose a risk of changing soil properties and fertility.

Deposition of other emissions: Result of deposition on the surface of aerosols and gases containing toxic organic compounds. Possible sources of soil contamination are blasting, construction machinery, and transport vehicles. The combustion gases released into the atmosphere contain CO, NO_x, SO₂, CH₄, and dust. Emissions are limited in time and quantity.

Compaction from construction and operational mechanisation. This type of degradation impact is expected mainly during the preparatory activities in the mine fields, the preliminary removal of overburden, and the construction of accompanying facilities, including water reservoirs. The type of damage is temporary.

The rock masses from the excavation operations, which will be dumped in the designated filled-in areas, are not a source of toxic substances and do not pollute the soils adjacent to these areas.

Impact assessment

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The topsoil and soil cover will be separated and temporarily deposited. The deposited soil materials will be used for the recultivation of the areas disturbed by the activity.

The mining operations will be designed in such a way as to prevent the conditions for intensive erosion processes.

As a result of the open-pit mining method, a significant part of the land will be disturbed by human activity, while the rest will be degraded.

a) Construction

The impact on the soil will begin with the start of preparations for mining activities, the construction of the OF, the mining waste facility, the deployment of mining equipment, mobile toilets, etc. According to Article 43 of the Environmental Protection Act, the topsoil layer is subject to special protection, therefore, before construction begins, the topsoil layer will be removed and deposited separately in soil depots. These activities shall be carried out without causing contamination or damage to the soil in the neighbouring areas. Subsequently, the topsoil and soil shall be used for the recultivation of the land.

The impact during the excavation activity can be defined as mechanical disturbance of the soil genetic profile, resulting from the removal of the soil cover and the associated qualitative and quantitative losses.

The main man-made disturbances are the pits, followed by the embankments, the OF, the SMO, the water reservoirs, the humus/soil depot, and the internal roads.

The most significant impacts are precisely at this stage.

As a result of the excavations, the soil will be directly disturbed, but in order to reduce the impacts, the next stages will involve backfilling the worked-out areas and gradual technical and biological recultivation. Technical recultivation mainly involves filling the excavated areas and forming horizontal surfaces where possible, while biological recultivation will be carried out using plant species suitable for the region.

b) Operation

For the disposal of flotation waste, a technology has been selected for thickening to 70-75% solid content using a thickener, where water is separated from the waste (thickening) before disposal. This technology achieves several positive effects:

- efficiency in terms of water use;
 - minimal potential for liquefaction (free sliding or flowing) or rupture of the wall of the hydraulic structure, which would be a risk to the adjacent land;
 - easy handling – filling and shaping of the landfill, with a view to minimizing the impact on the surrounding terrain;
 - improved stability of the landfill body, allowing for its gradual upgrading due to reduced water content;
 - compliance with the natural geographical, geological, geotechnical, and geochemical conditions at the site.
- Considering that the landfill is carried out from the highest point to the lowest point of the landfill, it should be noted that this creates a prerequisite for the gradual recultivation of the worked slopes.

The activities in the concession area during operation will not have a significant physical impact on the surrounding land and soil, except for dust from the movement of motor vehicles and construction machinery. To

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Provided that the technological and environmental regulatory requirements are complied with by the workers, no physical degradation processes (acidification, significant alkalization, over-moistening, swamping, salinization, etc.) or contamination with toxic organic and inorganic chemicals (harmful aerosols, sudden pollution, etc.) are expected during operation.

After completion of the extraction and processing works, a comprehensive recultivation of the disturbed areas will be carried out using soil materials from the construction phase.

c) Closure and recultivation

In connection with environmental restoration, it is necessary to design future technical and biological recultivation. A good practice is to carry out a preliminary assessment of the proposed recultivation activities, the advantages of the proposed rehabilitation measures, and the minimization of negative impacts on the environment.

It should be noted that on older open-cast mining dumps, as a result of self-established vegetation, gray-brown soils with signs of soil formation and a granular-crumbly structure are found in the top 10-20 cm.

Leaving the concession area involves carrying out a certain amount of work on the technical and biological recultivation of the disturbed land and removing unnecessary facilities.

Detailed projects will be prepared in the working phase for all activities related to leaving the concession area. Technical recultivation includes levelling work on the terrain.

The easement strips along the outer boundary of the pits and embankments, as well as the disturbed areas used, are planned to be restored through biological recultivation.

The soil materials needed for the recultivation of the land will be provided from those that will be removed during their exploitation.

In order to create more favorable soil conditions and a more favorable nutrient regime for the recultivated areas, fertilization with appropriate fertilizers is planned. The care required, for example, for grasslands for the regulatory period of 5 years, includes watering, early spring fertilization, and mowing.

In conclusion, it can be summarized that the implementation of the investment proposal is expected to have the following impact on this component of the environment:

Summary conclusions on the impact on soils:

In terms of impact: significant, negative within the mining areas, as well as under all adjacent facilities (soil depots, SMO, OF, water reservoirs, internal roads) and insignificant for the neighboring territories. In case of non-compliance with production discipline, there is a risk of trampling of adjacent lands and dust pollution spreading beyond the boundaries of the concession area.

Territorial scope of the impact: local, within the disturbed areas of the concession area;

Frequency of impact: constant, daily, until the closure of the activity and recultivation of the areas;

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Duration of the impact: long-term, for the duration of the concession, recoverable to a certain extent, with well-executed recultivation activities;

Cumulative and combined impacts: not expected, given the significant distance to other active deposits in the vicinity.

6.4. Subsurface resources and mineral diversity

The Tintyava area is located in the Eastern Rhodope Depression, east of the Belorechki Dome. It is situated in a Paleogene graben typical of the Eastern Rhodopes, filled mainly with coarse-grained material and finer-grained sediments.

The impact during the individual stages of implementation of the IP is as follows:

a) Construction (exposure and preparation for extraction of reserves)

The impacts at this stage are related to the start of development of the sites and the commencement of mining activities, namely mine construction, during which the mineral deposit is exposed and additional facilities are built – embankments, SMO, OF, water reservoirs, internal roads, power lines. At this stage, the impacts on the subsoil are direct in terms of the formation of the future mine and indirect in terms of the other accompanying facilities.

b) Exploitation (extraction of reserves)

The exploitation of the deposit involves two main ways of impacting the geological environment: the formation of artificial voids in the geological environment (excavations) and artificial seismic impact during drilling and blasting operations in mining.

Seismic impact on the geological environment is generated during blasting operations planned for the extraction of the mineral resource. The specifications for each of the PVRs will be developed in detail in the relevant working designs, which must take into account the distances to existing buildings, facilities, and infrastructure in the vicinity.

For the purposes of the EIA, experimental blasting has been carried out on site and under similar conditions to assess the side effects of the explosion on the environment and to make recommendations for the management of technological blasting operations during the exploitation of the Rosino deposit in an open manner, with the results obtained through measurements with specialized equipment. The assessment of the explosive-seismic impact and the UVV was made according to the generally accepted methodology in global explosive practice (including that embedded in the software application of specialized seismographs, based on the interrelationship between the impact of the explosion (seismic effect/shock wave) with the amount of explosive material detonated and the distance to the protected objects, expressed as the so-called "equivalent distance").

The report assessing the side effects of the explosion on the environment for the Rosino deposit is presented in an appendix to the EIA report.

The following conclusions can be drawn from the assessment of the impact of blasting operations on people and the environment:

➤ The PVR technology envisaged for the development of the Rosino deposit complies with the standards for safe impact on people and buildings outside the boundary of the danger zone when applying drill-and-blast rock breaking at all three diameters of the blast holes provided for in the conceptual design (76, 89, and 102 mm) when detonating each drill charge with a separate (independent) delay interval, with the maximum mass of the drill charge not exceeding 30 kg, according to the forecast calculations based on the experimentally established dependencies of the lateral impact of the explosion on the distance and mass of the charge;

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~~the Rosino deposit, Tintyava area, located in the territories of the villages of Rosino and Gugutka, Ivaylovgrad municipality,~~
Given the location of the deposit in the Natura 2000 area, the PVR technology should be applied with the minimum possible side effects of ~~Haskovo region~~

blasting operations on the environment. Within the specified parameters of the PVR (Table 9), the blasting technology with the lowest levels of side effects is the use of charges with a mass of up to 14 kg. If there are no other aggravating conditions for the PVR technology, it is recommended to work with a diameter of the blast holes $d=76\text{mm}$.

➤ With the development of deep mining, working conditions change. In this regard, periodic control measurements with specialized equipment, updating mathematical dependencies (3) and (5) with specific data for the deposit, determining the levels of impact and, if necessary, adjusting the parameters of the PVR.

Of particular importance in the design and implementation of the PVR is to find the most acceptable option in which the side effects of the explosion are minimized, does not exceed the permissible norms and at the same time ensures the maximum effect of the explosive destruction of the massif, in accordance with the expected parameters, such as: achieving the specified grain size distribution of the broken rock mass, minimal displacement of the blasted material, minimal losses and depletion of the ore, etc.

It should be noted that with the development of the mine below the upper boundary contour, the impact of UV and noise will be further limited by the barrier function of the non-working boards.

In the case of open-pit mining of minerals in the vicinity of urban areas, the blasting time is agreed with the local community in order to avoid the surprise effect and to establish the most acceptable time for blasting works with a view to reducing the unpleasant effect on the comfort of local residents – most often this is during daylight hours within the working day.

Additional recommendations

It is recommended that measurements and expert analysis of the explosive-seismic impact be carried out in order to take measures in the design and implementation of technological blasting works to preserve the stability of the non-working and working steps with the development of the mine in depth.

For all sites in the mine complex falling within the hazardous zone of impact of blasting works, the design and implementation of technological blasting works shall be carried out in accordance with the requirements of Chapter Six of the PBTW: "Special Blasting Works".

c) Closure and reclamation

Closure and reclamation is the final stage in the life of mining sites. During this stage, activities are carried out for the closure, decommissioning, and subsequent reclamation of mining and processing facilities, sites, equipment, and unnecessary infrastructure. This stage also includes mandatory monitoring.

During technical liquidation (dismantling of machinery and equipment, removal of used equipment) and reclamation, no impact on the geological environment is expected.

Summary conclusions on the impact on the subsoil:

By type of impact: negative and irreversible for natural resources

By territorial scope of impact: local, on the territory of the extraction sites;

Frequency of impact: continuous, throughout the concession period

Cumulative and combined impacts: could be expected with the depletion of gold-bearing ore reserves in the region.

6.5. Landscape

a) Construction and operation

As a result of the implementation of the investment proposal, the landscape in the area of the sites will be further affected by human activity, and in particular by industrial activity. No changes are expected in the dominant landscape features for the area as a whole, but an area with an industrial landscape will be created. The exploitation of the deposit will change the main type of landscape locally, but with well-organized work, no significant changes in the internal structure and functioning of the landscapes that could cause additional disturbances to the ecological balance will be allowed.

The unfavorable anthropogenic change will have a greater impact on the relief, soil cover, vegetation, and fauna. The impact will be local, with a territorial scope within the working areas of the concession area. It will be permanent in duration – for the period of the concession term, with a complex and cumulative nature in relation to the territory of the mining areas and the industrial site, but not outside it. The implementation of the project will result in a complete change of part of the landscape into a technogenic one (high degree of anthropogenisation), but for the neighbouring undeveloped areas, the sustainability of the landscapes will be preserved in their functioning.

The areas will be developed using open-pit mining, which will inevitably involve blasting and excavation work, as well as the movement of heavy machinery and equipment. The implementation of the project will significantly change the appearance of the territory, creating a modified relief with a pronounced elevation difference and no vegetation. The functioning and structure of the landscape will change from horizontal to vertical and will encompass the components of geological base, relief, soils, and vegetation. The purpose of the land that will form "technogenic landscape."

The adverse impact resulting from the operation of the facility will manifest itself in several ways:

- physical removal of land;
- destruction of vegetation;
- temporary change in the quality of the components of the natural environment.

b) Closure and recultivation

In order to minimize to a certain extent the negative consequences of the mining operations and to restore the landscape in the area, it is planned to carry out phased recultivation measures on the worked-out areas through technical and biological recultivation. The aim of recultivation is to achieve a better organized space, in line with the terrain and more suitable for future use. The recultivation measures will restore to a certain extent the altered functional state of the worked-out areas in the deposit and the surrounding area and restore the disturbed landscape.

Summary conclusions on the impact on the landscape:

By type of impact: direct, with a high degree of anthropization for the extraction sites and accompanying facilities, and indirect for adjacent areas in close proximity to them, in terms of expected visual changes;

By duration of impact: long-term - for the duration of the concession;

Cumulative and combined impacts on the environment: the cumulative impact on the landscape at this stage could not be observed due to the remoteness of other developed underground resource deposits.

6.6. Flora and fauna

Flora

The impacts on the flora that such projects may have are:

1. Direct destruction of vegetation within the boundaries of the project elements. The entire area of the individual project elements plus small areas enclosed between them, in particular between the individual elements and the access roads to them, is considered to be affected. The area directly affected thus amounts to 146.58 ha.

2. Damage to vegetation as a result of pollution during extraction and drilling and blasting operations (including seismic impact, shock waves, debris, dust, and NOx). According to the pollution analysis, no excessive levels of dust and NOx are expected outside the concession area. Seismic impact, shock waves, and debris alone cannot cause permanent damage to vegetation or species habitats. This is also supported by field observations around other active mines and quarries in the country, where natural habitats have been found immediately adjacent to their edges.

3. Fragmentation - when an area (polygon) occupied by a given type of vegetation is affected in such a way that the remaining part(s) of it are insufficient in size to retain the characteristics of the affected type of vegetation, or these characteristics are negatively affected. The deterioration or even loss of these characteristics is due to the so-called "edge effect", whereby the abiotic factors (e.g. sunlight, air humidity, soil moisture, etc.) and/or the biotic factors of the environment (species composition of the tree, shrub, or grass layer) change in the strip immediately adjacent to the boundary of the polygons occupied by a given type of vegetation (according to Andren 1994, Bennett & Saunders 2010, Didham 2010, Fahrig 2003, Franklin et al. 2002).

4. Destruction of individuals of plant species *within the boundaries of the IP elements*. This impact is assessed only for conservation-significant species, if any are present within the boundaries of the directly affected area. The assessment of other species is included in that for the direct destruction of vegetation.

5. Invasion of non-native and/or invasive plant species when using such species in *biological recultivation*. When using species characteristic of the area, no impact is expected, so it will not be assessed separately.

According to our mapping of the vegetation in the IP area, polygons or parts thereof of 9 habitat types fall within the boundaries of direct impact (of the 11 identified; Table No. V.6.1-1, Annex No. V.1.1-1 of the EIA). Four of them are included in Annex 1 of the Biodiversity Act and are subject to protection in the Rhodopes-East Special Protection Area. The impact on them is assessed in the EIA.

Of the remaining 5 with more limited distribution (in terms of area), only C2.31 Upper reaches of permanent, slow-flowing rivers and streams is included. We have included the middle reaches of the Yurendere in this habitat type, even though it dries up during the hot summer months. This fact, as well as its rocky bottom, determines the complete absence of macrophytic vegetation. This makes the habitat of low conservation value. The remaining 4 types of vegetation are of secondary origin, widespread both in the area and in the country, and sometimes occupying large areas. Some of them are undesirable from a nature conservation point of view, as

they occupy areas of conservation-significant habitats, e.g., coniferous crops. Most often, their spread is the result of human intervention, either direct or indirect, due to the adaptability of the species that make up these habitats. Since this type of vegetation is precisely the one that settles in the place of fragmented areas of conservation-significant habitats (with the exception of coniferous crops), its fragmentation cannot change its characteristics or affect the type of vegetation. In the case of coniferous crops, their fragmentation will lead to an increase in the participation of autochthonous species and the gradual "absorption" of individual fragments by neighboring vegetation types.

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

The data from our field studies and information on the biology and ecology of the relevant plant species show that the IP will affect or may affect individuals of five species with higher conservation value – Black Sea rockrose, underdeveloped limodorum, butterfly orchid, autumn spiral, red helleborine. All five species are widespread in the Eastern Rhodopes and/or in the country, but usually with small populations. The exception is the red helleborine, which, for example, is numerous in the Madzharovo area. Its absence in the IR indicates that even if it is present here, its populations will be small. A huge population of butterfly orchid was found outside the IR, west of the village of Rozino, covering an area of about 150 decares. From this, it can be concluded that even if the implementation of the IP leads to the destruction of specimens of these five species, these will be isolated individuals. In combination with their relatively wide distribution and/or the wide distribution of suitable habitats in the area and/or their relatively good adaptive abilities, the impact on these species can be considered **insignificant**.

Fauna

The impacts on fauna that such projects may have are:

1. Direct destruction of species habitats within the boundaries of the IP elements. The entire area of the individual IP elements plus small areas remaining enclosed between them, in particular between the individual elements and the access roads to them, is considered affected. Thus, the directly affected area amounts to 146.58 ha.

2. Damage to species habitats as a result of pollution from mining and drilling and blasting operations (including seismic impact, shock waves, debris, dust, and NOx). According to the pollution analysis, no excessive levels of dust and NOx are expected outside the concession area. Seismic impact, shock waves, and debris alone cannot permanently damage vegetation or species habitats. This is also supported by field observations around other active quarries in the country, where natural habitats have been found immediately adjacent to their edges. Damage to the habitats of species associated with the aquatic environment may occur during mine construction due to increased water turbidity.

3. Fragmentation of species habitats - when an area (polygon) occupied by a habitat of a given species is affected in such a way that the remaining part(s) of the same are insufficient in size to preserve their characteristics as a habitat for that species. Many species require a certain size of polygons with potential habitats in order to be used by the species in question, and this size is species-specific.

4. Barrier effect resulting from the development of the mine, when dividing polygons with species habitats or biocorridors, so that individuals of the species in question do not have free access to the separate parts of the polygon. This may be due to the inability of individuals of some species to cross the quarry field, or

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"reluctance" to do so, caused by anxiety. The results are impossible or difficult migration (in the broad sense of the word, it can be daily, related to feeding, or seasonal, related to certain abiotic factors or reproduction, or during dispersal), and/or fragmentation of the populations of the affected species. The nature of the IP does not suggest a barrier effect for birds and bats due to its low height and the high mobility of these groups.

5. Disturbance to animal species from *the movement and operation of construction, mining, and transport equipment and people*, as well as from *drilling and blasting operations*. There are not many studies dealing with the impact of noise on biodiversity. Even fewer are available. For example Hirvonen (2001) measured an equivalent noise level threshold of 56 dBA, above which a significant impact on water birds nesting near a newly built motorway was observed. Based on a review of the available literature, Archer (2014) predicts a significant impact of impulse noise on biodiversity, resulting in abandonment of the area at maximum noise levels above 80 dBA. Shannon et al. (2015) review the existing literature on the subject (68 publications on terrestrial fauna). On this basis, the authors calculate a median of 60 dBA equivalent noise level as the threshold above which noise-induced impacts on terrestrial fauna are observed, which is supported by a substantial number of publications.

The impact may lead to abandonment of habitats in the area of concern, reduced nesting success, and/or abandonment of nests with eggs and/or young by more sensitive species (some mammals, birds). The impact of disturbance is species-specific. For the most sensitive species, the maximum range of this impact from the generated noise is set at 110 m from the elements of the IP during normal operation. At this distance, the expected equivalent values are around 55 dBA. During blasting operations, disturbance may be caused by seismic impact, shock waves and debris, as well as impulse noise. At the GUSV quarry (Studen deposit), about 650 m from the blasting field (with 61 boreholes), an equivalent noise level of about

54 dBA (EIA for the IP for the extraction of construction materials – dolomites from the

"Studen", section "Zavodski Stroezi 2", in the territory of the villages of Studen and Krapets, Pernik municipality). During the experimental blasting carried out in connection with the current IP, maximum levels of 64 dBA on average were recorded at 800 m. From the above, it can be concluded that there will be no significant disturbance at a distance of more than 700 m from the boundaries of the mine.

6. Mortality of animal species during *the movement and operation of transport and construction equipment*. This impact will be observed mainly during the mining construction period, as there is a possibility of the presence of animal species within the boundaries of the project elements. Small, slow-moving species or small individuals of all species inhabiting the construction area that do not move well may be affected. During the exploitation period, such an impact is not expected or will be insignificant due to the unsuitability of the IP site for habitation by these species.

Bird mortality can also be observed from power lines. When using poles with an inappropriate design, this can be caused by electric shock in the case of 20 kV power lines. In the case of higher voltage power lines, there is no risk of electric shock, but there is a possibility of birds colliding with the lightning protection cable.

Reclamation will not have any additional negative impact on animal species.

Invertebrates

The development of this type of IP is invariably associated with the direct destruction of the entire set of biotic components within the IP boundaries.

There will be direct destruction of habitats. This phase involves the felling of trees and shrubs, deforestation, removal of soil substrate, and exposure of open mines. Changes in vegetation will lead to changes in the composition of invertebrate fauna. The geobiotic, stratobiotic, and epigeobiotic invertebrate fauna will be affected. The habitats in these areas will be destroyed. There will also be changes in the fauna of the soil substrate and rock mass disposal sites.

There will also be fragmentation of habitats of species requiring a wider range of their living territory. Given the specificity and lifestyle of invertebrates, this effect can be considered insignificant.

A barrier effect for invertebrates is also unlikely.

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

During operation:

At this stage, the impacts will be the same, given the phased development of the mine. They may be somewhat mitigated, as most of the animals will have already left the area or died.

Permanent changes in the local fauna are expected in the areas where sterile rock masses will be deposited. The areas where the earth mass will be removed and stored will be most affected. In addition to the top layer, the rock layer will also be disturbed during the opening of the mine and will also be deposited.

During closure and recultivation:

The recultivation of these areas is a very difficult and slow process. At this stage, improvement of the environment and some restoration of habitats and populations are expected. The factors of disturbance, mortality, and dust and gas pollution will continue to have an impact, but to a lesser extent.

Such "interventions" in the natural environment usually lead to a change in the edifying plant species, resulting in uncharacteristic succession rather than habitat restoration ("imitation" of primary succession). Pioneer species and communities of invertebrates characteristic of the early stages of succession will appear. The areas where the earth mass will be removed will be most affected.

If recultivation is not carried out properly, there is a risk of invasion by aggressive species (introduction of alien, invasive, and synanthropic animals that will change the species structure, being enemies and competitors of local species).

The undesirable consequences for invertebrate fauna can be mitigated by implementing the entire package of proposed measures to mitigate the negative impact of the IP on biodiversity as a whole.

Vertebrates

During our field studies, including work on other projects, in this part of the Eastern Rhodopes, where the IP is located, we have identified, or, based on the available habitats, could be found in the area, 139 species of vertebrates (Table No. IV.6.1-1 of the EIA). Some species of amphibians and reptiles, storks, birds of prey, nightjars, blue tits, some woodpeckers (grey, black, middle spotted) and songbirds, and wolves have a higher conservation status. All of them are subject to protection in the two protected areas in which the IP is located – SPA "Rhodopes - East" (under the Habitats Directive) and SPA "Biala Reka" (under the Birds Directive). Exceptions are the yellow-bellied flycatcher, the goshawk, the red-breasted flycatcher, and the wildcat.

The yellow-bellied flycatcher has not been recorded in the IP. Given its habitat preferences, the IP offers little habitat for this species – grassy and shrubby habitats and

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sparse forests in its northern periphery, a small part of which are directly affected. Therefore, the impact on its habitats will be **insignificant**. Their peripheral location relative to the IP determines an **insignificant** barrier effect. The species is vulnerable to being run over, but given that it has not been recorded in field studies, its population in the area is small, and there is a risk to individual specimens. With the implementation of the measures provided for in the EIA with regard to reptiles, the impact can be **eliminated**.

The northern goshawk was observed in the Yuren Dere area. The species nests in tall forests in the mountains and plains, in riparian forests, and in coniferous plantations. It hunts practically everywhere (Golemanski 2011, personal observations). The impacts on it will be the same as those described in the EIA for the sparrowhawk (*Accipiter nisus*). If activities commence during the nesting season, in the presence of a nest within or near the IP, there is a risk that it will be destroyed or abandoned, leading to the loss of eggs and/or young. If this happens, the impact on the population of the species in the area could be **significant**. Mortality can also be observed from the power line. If poles with an inappropriate design are used, this may be caused by electric shock in the case of 20 kV power lines. In the case of higher voltage power lines, there is no risk of electric shock, but there is a possibility of birds colliding with the lightning protection cable. The impacts can be **eliminated** by applying the measures provided for in the EIA with regard to the bird species subject to protection in the Biala Reka Special Protection Area.

The red-breasted flycatcher has only been recorded during migration. The species nests mainly in old beech forests with a natural structure at 600-1550 m above sea level (Golemanski 2011). During migration, it is found in a variety of habitats, including urban parks (personal observations). Therefore, the impact on its habitats during migration will be **insignificant**. Since the species does not nest in the area, disturbance to migrating individuals will also be **insignificant**. **There will be no mortality.**

The wildcat in Bulgaria prefers old, tall forests, but in their absence it settles in a variety of other habitats – forests, scrublands, where it makes its dens and raises its young. It prefers to hunt in open habitats (Pesev et al. 2004, Macdonald & Barrett 1993, personal observations). The IP includes potential habitats for the species, but these are widespread throughout the Eastern Rhodopes, so the impact on them will be **insignificant**. The species has not been recorded in the IR, but its presence here is possible. Even if this is the case, when disturbed, mammals move their dens, including their young, out of the area of disturbance. The impact on any individuals inhabiting the area will be **insignificant**. **There will be no impact on the population of the species in the area.**

The impacts on the species included in Annex 2 of the Biodiversity Act are discussed and analyzed in detail in the EIA.

The other species, although included in Annex 3 of the Biodiversity Act or in the Red Book of Bulgaria (with the category "Near Threatened"), are widespread and have relatively large populations both in the Eastern Rhodopes and in the country. Therefore, the impact on their habitats during migration will be **insignificant**. They use a wide range of habitats, some of which are anthropogenic. Therefore, the impact on their populations and habitats in the area will be **insignificant**.

Summary conclusions on the impact on flora and fauna, from the perspective of the EIA report:

By type of impact: direct and indirect, insignificant in scale;

By territorial scope of impact: local to the IP site and indirect, partially up to a maximum of 700 m;

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Frequency of impact: daily, during working hours, and twice a week for the IVR;

By duration of impact: for the period of the concession;

National ecological network

Protected areas

The project area falls within two protected areas (PA) of the Natura 2000 National Ecological Network (Figure No. 6.6-1):

- PA "Rhodopes - East", code BG0001032, for the protection of natural habitats and wild flora and fauna;
- Bjala Reka Special Protection Area, code BG0002019, for the protection of wild birds.

Protected areas

The area covered by the IP does not affect protected areas within the meaning of the Protected Areas Act. The nearest such area is the Protected Area (PA) "Hambar Dere" (Figure No. IV.6.6-1), located approximately 1.6 km from the concession (distance between the nearest points of the concession boundaries and the PA).

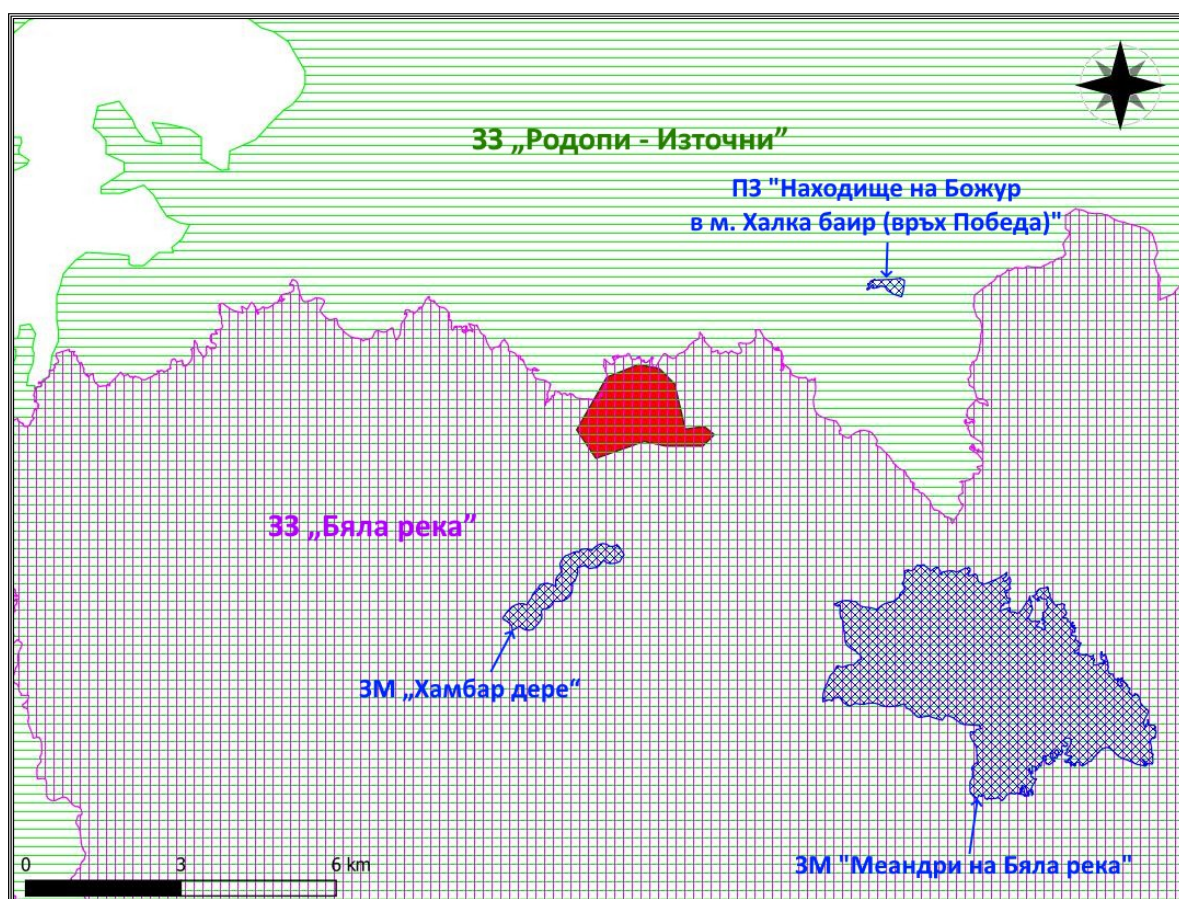


Figure No. 6.6-1: Location of the IP in relation to SPAs and PAs. Red polygon – concession area; green horizontal line – SPA under the Habitats Directive; purple vertical line – SPA under the Birds Directive; blue diagonal line – protected areas under the Protected Areas Act.

6.7. Cultural and historical heritage

This part of the EIA report has been prepared in order to determine the extent to which known cultural heritage sites will be threatened by the implementation of the investment proposal for "Extraction and processing of polymetallic ores from the deposit

"Rozino," Tintyava area, located in the territories of the villages of Rozino and Gugutka, Ivaylovgrad municipality, Haskovo region. The analysis was carried out by collecting and processing data on known cultural values. Various sources of information were used to determine the existence, location, and current condition of the cultural heritage sites, including the "Archaeological Map of Bulgaria" computer system, the registers of the National Institute for Cultural Heritage, reports from field surveys along the railway line and other infrastructure projects in the area, specialized publications related to archaeological studies already conducted, as well as analysis of topographic maps and orthophoto maps.

The nature of the investment initiative suggests that its implementation may threaten 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 eras, located or discovered in the earth's strata, on their surface, on land and under water, for which field studies are the main sources of information. Immovable and movable archaeological sites have the status of cultural values of national importance or national wealth, respectively. The diversity of human activities and the enormous chronological period in which they were created and existed determine the significant diversity of this type of site.

During the analysis, the known cultural values located in the vicinity of the investment proposal were identified and the measures for their protection, as defined by the specialized regulatory framework, were specified. All sites whose preservation could be positively or negatively affected by the implementation of all activities under the project "Extraction and processing of polymetallic ores from the Rosino deposit, area

"Tintyava."

The area in which the investment proposal is located has been little studied and the number of known archaeological sites is relatively small. To date, a total of ten archaeological sites have been registered in the territories of the villages of Rozino and Gugutka. Four of them are located nearby, but outside the boundaries of the Tintyava area. It is possible that there are unregistered archaeological sites in the area that may be threatened by future exploration or mining activities.

Registered archaeological sites near the boundaries of the concession area:

1. AKB No. 1590350. Medieval fortress in the Kaleto area, located 2.5 km south-southwest of the village of Rozino and 0.25 km from the southwestern border of the concession area. GPS coordinates: 41.43391667 25.89338333.
2. AKB No. 1590322. Early Iron Age settlement located 0.5 km southeast of the village of Rozino and 0.3 km from the northern border of the concession area. GPS coordinates: 41.45247 25.9094.
3. AKB No. 10003863. A burial mound located 2 km northwest of the village of Gugutka and 0.4 km from the southern border of the concession area. GPS coordinates: 41.42944 25.90336.
4. Site without AKB number. Ancient building located 2.6 km south of the village of Rozino and 0.2 km from the southwestern border of the concession area. GPS coordinates: 41.431842 25.896716.

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Impact forecast

Construction works pose a significant threat to the integrity of cultural values. First and foremost, the most serious threat to archaeological sites is posed by earthworks—the removal of topsoil and its temporary storage; geological exploration excavations, mining activities, and the recultivation of disturbed land. All types of excavation work can affect cultural layers, destroy archaeological structures, or destroy artifacts. In addition, there is a risk that the implementation of the IP may threaten unknown archaeological sites.

The degree of threat to archaeological sites also depends on their specific characteristics – type, chronology, thickness of the cultural layer, presence of architectural elements, parameters of the protection zones, etc. The sites closest to the areas where active excavation activities will take place are most seriously threatened.

As a result of the preliminary analysis of the expected negative impacts of the activities related to the implementation of the investment proposal, it has been clarified that each of them may, to varying degrees, pose a potential threat to the integrity of cultural values.

a) Construction

Negative impacts on cultural heritage sites may occur during excavation works within the concession area. Archaeological cultural values are most seriously threatened, as they are also the most difficult to identify due to their specific characteristics. It is very likely that unknown archaeological sites will also be affected by the construction works. For this reason, and in accordance with the requirements of Article 161(2) of the Cultural Heritage Act, archaeologists must monitor the construction works. In the event of archaeological sites being discovered, Articles 148 and 160 of the Cultural Heritage Act shall apply.

b) Operation

The operation of the investment proposal for "Extraction and processing of polymetallic ores from the Rosino deposit, Tintyava area" may pose a threat to cultural values located within its boundaries. The change in the cultural and traditional landscape in the area should also be noted as an indirect impact.

c) Closure and recultivation

At this stage, negative impacts on cultural heritage sites can be expected in the event of humus extraction outside the concession area.

Summary conclusions on the impact on cultural and historical heritage:

By type of impact: direct, insignificant when applying regulatory requirements;

By territorial scope of impact: local, within the work areas;

Frequency of impact: temporary, until removal of the top soil layer; recultivation of the land;

By duration of impact: for the of construction and operation;

Cumulative and combined impacts: none expected if legal measures are implemented.

6.8. Waste

The waste generated by the activity should be divided into two groups: waste falling within the scope of the Waste Management Act and mining waste falling within the scope of the Mining Act.

The waste that will be generated and managed in accordance with the requirements of the Underground Resources Act is:

- code 01 01 01 - waste from the exploration and extraction of metal minerals, which will be deposited in a sterile rock mass dump;
- with code 01 03 06 - enrichment residues other than those mentioned in 01 03 04 and 01 03 05, which will be deposited in the form of paste.

The waste within the scope of the Waste Management Act that will be generated is as follows:

During construction:

The construction phase is largely related to the organizational activities for developing the deposit, *as well as preparation for extraction by exposing the reserves.*

Typical construction works will be carried out during the construction of the OF and other necessary facilities. After the issuance of a building permit for the specific site, a Construction Waste Management Plan will be developed in accordance with *the Ordinance on Construction Waste Management and the Use of Recycled Construction Materials.*

The expected types of construction waste are:

- 17 01 01 concrete;
- 17 02 03 plastic;
- 17 04 05 iron and steel;
- 17 05 04 soil and stones other than those mentioned in 17 05 03

✓ Hazardous waste

During construction and preparation for extraction, hazardous waste will mainly be generated from the construction equipment at the site (above-ground complex, OF), for the excavation works and preparation for the extraction of reserves.

13 01 10 – Non-chlorinated mineral-based hydraulic oils.*

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

base

16 01 07 – Oil filters*

16 01 13 – Brake fluids*

16 06 01 – Lead-acid batteries*

15 02 02 – Absorbents, filter materials (including oil filters,*

not otherwise specified), wiping cloths, protective clothing contaminated with dangerous substances.

✓ Other non-hazardous waste

15 01 01 – Paper and cardboard packaging

15 01 02 - plastic packaging

15 01 03 - packaging made of wood materials

✓ Mixed municipal waste

20 03 01 - Mixed municipal waste

◆ Waste generation during the operation of the investment proposal

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During mining activities, the exploitation of the deposit and the processing of the raw material, the following waste activities will be carried out:
Haskovo region

Hazardous waste

Some of the waste may be generated by quarry equipment for extraction, loading, and transportation during the operation of the deposit only in the event of an emergency/unforeseen replacement on the territory of the extraction site.

13 01 10* – Non-chlorinated mineral-based hydraulic oils.

13 01 11* – Synthetic hydraulic oils.

13 02 06* – Synthetic engine and gear oils and lubricants

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

15 01 10* – Packaging containing residues of dangerous substances or contaminated with dangerous substances

16 06 01* – Lead storage batteries

No hazardous waste will be stored on the territory of the IP, but will be transported away in a timely manner.

Mixed household waste

20 03 01 – mixed household waste

◆ Waste expected to be generated during closure and recultivation

The waste that will be generated during the recultivation of the site is similar to the waste generated during the construction activities and preparation of the site for operation – concrete, contaminated rags, household waste, with the exception of mining waste.

All waste will be transferred on the basis of written contracts with persons holding the relevant permits or registration documents issued in accordance with the Waste Management Act.

Household waste will be collected in containers and periodically transported to a landfill site on the basis of a contract with the local household waste transport company serving the municipality of Ivaylovgrad.

The waste generated, in terms of how it is generated, its name, quantity, place of origin, and method of treatment, is described in detail in section V.8 of the EIA report.

Summary conclusions on the impact of waste:

By type of impact: insignificant;

By territorial scope of impact: limited, within the work areas;

Frequency of impact: for waste falling within the scope of the Waste Management Act - temporary; for waste from mining activities - permanent, daily, until the closure of the activity and recultivation of the land;

Duration of impact: continuous, for the term of operation of the deposit, reversible;

6.9. Hazardous substances

During the construction and operation of the quarry, **diesel fuel** will be used for the loading and transport equipment and auxiliary self-propelled equipment used in ore extraction. It will be stored in steel tanks with a total capacity of 42.5 tons (with an average density of 0.85) - 50,000 liters - 55 m³. The number and size of the tanks will be in accordance with the Project for the Construction of a Gas Station under the Spatial Development Act.

Diesel fuel will be delivered by mobile tankers, with a maximum available quantity of 42.5 tons on site.

During the construction and operation of the mine and the OF, **fuel and lubricants** for the service equipment.

The necessary lubricants, hydraulic and cooling oils, and greases will be delivered in packaging that will be returned to the suppliers on a full-empty basis.

The following will be available on site in a storage room:

- Prista® M10 De engine oil, 2 barrels of 110 kg each, totaling 0.22 t, and
- Prista AN 68_100 lubricating oil, 2 barrels of 110 kg each, totaling 0.22 tons.

The main explosive material to be used is expected to be an oil-nitrate explosive mixture (ANFO) and/or emulsion explosives.

No **chemicals or mixtures** are required during the extraction process. These will be used in the enrichment process. The reagent distribution area includes the storage and preparation of the following reagents:

Foaming agent: methyl isobutyl carbinol (MIBC). The maximum quantity available on site will be 6.6 tons, located in: a storage room, a solution storage tank with a total capacity of 480 kg – 500 liters – 0.6 m³, and a solution delivery tank with a total capacity of 60 kg – 64 liters – 0.06 m³ with a solution dosing system.

Collector: potassium amyl xanthate (PAX). The maximum quantity available on site will be 18.7 tons, located in: a storage room, a solution storage tank with a total capacity of 1,440 kg – 9,600 liters – 10 m³ and a solution delivery tank with a total capacity of 480 kg – 3,200 liters – 3.5 m³ with a solution dosing system. The tanks also have two circulation pumps in operating/standby mode, which deliver the PAX solution to the flotation area;

Activating agent: copper sulfate (CuSO₄·5H₂O). The maximum quantity available on site will be 45 tons, located in: a storage room, a solution preparation tank with a total capacity of 3000 kg – 20000 liters – 20 m³ and a solution delivery tank with a total capacity of 1500 kg – 10,000 liters – 10 m³ with a solution dosing system.

Sulphidising reagent: sodium hydrogen sulphide (NaHS). The maximum quantity available on site will be 48 tonnes, located in: a storage room, a solution preparation tank with a total capacity of 3600 kg – 23980 litres – 25 m³ and a solution delivery tank with a total capacity of 1200 kg – 8000 liters – 8 m³ with a solution dosing system.

Collector: Aerofloat 404 (A404). The maximum quantity available on site will be 3.6 tons, located in: a storage room, a tank for preparing the solution with a total capacity of 360 kg – 2,400 liters – 2.5 m³ and a solution delivery tank with a total capacity of 60 kg – 400 liters – 0.4 m³ with a solution dosing system.

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Flocculant (mixture). The maximum quantity available on site will be 2.2 tons, located in an automatic machine for the preliminary preparation of polymer solution doses. The flocculant distribution system includes a powder flocculant hopper, a feed screw, a mixing tank with a stirrer, a storage tank with a stirrer, and two dosing pumps. Tomal PolyRex, an automatic machine for the preliminary preparation of polymer solution doses, will be used. This allows for the correct preparation of the solution and aging of the flocculant. The two dosing pumps feed the mixed flocculant to the thickeners of both the concentrate and the production waste. Before being added to the thickener, each line will have a built-in mixer for further dilution of the flocculant to 0.02% by volume.

Delivery, transport, preparation of solutions, use, disposal, and treatment of packaging shall be in accordance with regulatory requirements.

Reclamation works will be carried out in stages and will be completed at the end of the concession period. For this purpose, a technical and biological reclamation project will be developed, which is not related to the use and storage of hazardous substances.

Summary conclusions on the impact of hazardous substances By type of impact:

insignificant;

By territorial scope of impact: local, within the work areas;

Frequency of impact: temporary

Duration of impact: for the term of operation of the deposit, recoverable;

Cumulative and combined impacts: not expected due to the territorial limitation of the impact.

6.10. Physical factors. Hazardous energy sources and radiation

Forecast of the expected noise pollution of the environment during the construction, operation, closure, and recultivation of the investment proposal.

The implementation of the investment proposal is associated with noise emissions from the industrial machinery, mining and technological equipment used, and from the PVR.

a) Construction and operation

The construction phase of the investment proposal includes activities related to the construction of internal quarry roads, preparation of sites for embankments (*for topsoil and overburden*), an enrichment plant, and the construction of a working front.

The construction phase will run parallel to the mining activities, which will be carried out during the first year of the project's implementation, but the phase can be conditionally divided into the construction of the enrichment plant and the other activities related to the gradual uncovering and mining of the raw material and its processing.

Noise from industrial equipment:

During the construction phase and development of the deposit, typical open-pit construction and deposit development equipment will be used: excavators, bulldozers, dump trucks, wheel loaders, drills, jaw crushers, and rotary percussion drills with equivalent noise levels of 68/ to 110 dB(A)

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With regard to this source of intermittent noise, a test explosion was carried out and a report was prepared on the assessment of the side effects of the explosion on the environment for the site: Rosino deposit, Kardzhali municipality (attached to the EIA). b) Closure and recultivation

The site is located in a protected area, which is why the closure and recultivation of the site is planned in accordance with the requirements of the Environmental Protection Act and the Environmental Impact Assessment Act.

The heavy-duty and industrial equipment used does not differ significantly from the equipment used during the construction phase. In this phase, industrial sources for the extraction and processing of the already extracted underground resources are not exploited, so it can be assumed that the impact is significantly weaker compared to the phase of discovery and extraction of the deposit.

Assessment of the expected noise impact Noise from the construction of the OF:

During the construction activities for the construction of the OF, noise will be generated mainly from the operation of construction equipment.

Depending on the technical condition of the equipment, the expected noise levels immediately adjacent to the source will be in the range of $80 \div \max 105 \text{ dB(A)}$. To calculate the distance at which there will be a negative impact from the operation of the machines (noise above the permissible standards for residential areas and zones – 55 dB(A)), the Method for measuring noise from local and industrial sources was used – "Regulation No. 6 of 2006 on environmental noise indicators..."

According to the calculations based on the methodology, within a radius of 100 m from the noise source, the maximum noise load will be up to 55 dB(A) , and at $150 \div 200 \text{ m}$ from the noise source, the maximum values will be up to 45 dB(A) and the impact on the environment will be insignificant.

The maximum noise level at the protection sites (the nearest residential building is 1580 m away from the OF site) is expected to be a maximum of only 25 dB(A) , which is 30 dB(A) below the noise level limits for residential areas and territories.

Noise from industrial equipment during exploration, extraction, and processing:

Activities at the quarry site will be carried out until 2 p.m. during the day and in the evening hours. Activities at the OF site will be carried out around the clock. Several industrial noise sources with corresponding contours and geometric centers will be located at the Rosino deposit site. The most severe possible scenario for the operation of the deposit has been considered - operation of all noise sources in close proximity to residential buildings. These are the following sources of industrial noise:

- contour around the equipment servicing the external spoil heap for excavation – the geometric center is located about 1800 m from the nearest residential building in the village of Byalgradets;
- contour around the mining equipment (excavator; bulldozer; front loader; dump trucks) – the geometric center is located about 1800 m from the nearest building in the village of Byalgradets;
- contour around the enrichment plant – the geometric center is located approximately 1700 m from the nearest building in the village of Byalgradets. Its location is stationary.

In the area of sensitive sites subject to enhanced noise protection, the maximum noise levels reach insignificant values - $18.5 \div 21.9 \text{ dB(A)}$, with permissible levels of $45 \div 55 \text{ dB(A)}$. It is important to note that at these noise levels (up to 21.9 dB(A)), the actual mining activities at the IP site will not be heard by people in nearby settlements.

Noise from transport equipment:

The calculated equivalent noise level at a distance of 5 m from the internal quarry roads does not exceed 40 dB(A). No change in background noise levels from heavy equipment traffic is expected within the boundaries of the nearest settlements.

Noise from explosive activities:

When explosives are detonated to break up rock formations during open-pit mining, part of the energy released by the explosion is transferred to the air, generating a shock wave that propagates at a speed of over 600 m/s. As it moves away from the site of the explosion, its speed decreases and, after reaching 343 m/s, this SAW becomes a sound wave.

Due to the specific nature of technological explosions, it is considered that there is no uniform standard for comfort in the field of explosives from the impact of noise from explosive works for urbanized areas near open mines and quarries, within the meaning of Ordinance 6 of 2006. (*maximum permissible standard for residential areas during the day - 55 dBA*).

The forecast values from the experimental blasting works, determined by the derived dependence when detonating charges corresponding to the parameters of the preliminary design of the PVR for the implementation of the technological blasting works in the development of the Rosino deposit in terms of the side impact of the UBB/noise from the explosion - under the most severe conditions - borehole diameter 102 mm and charge mass up to

30 kg, detonated at a delay interval, show that the predicted impact level at a distance of 1200 m (to the first buildings in the village of Rozino) is 108-109 dB(A), which is classified as "Moderately loud noise" and is within the impact range between "normal conversation in a group" and "telephone conversation".

At the same time, it should be noted that the exposure time to the noise generated by technological blasting operations on the scale of mineral extraction in Bulgaria is in the order of 1-2 s, while safe exposure at such an impact value (up to 109 dB(C)) is more than 8 hours.

In order to take into account the comfort of people living near open-pit mines and quarries, it is planned to use the most commonly applied approach in the development of mineral deposits – consultation with the public in the area on the most appropriate/acceptable time for carrying out technological blasting works.

When mining operations are carried out below the upper contour level, the impact of UV radiation and noise will be further limited by the shielding function of the non-working boards.

Conclusions in accordance with the Report on the Assessment of the Side Effects of the Explosion on the Environment for the site: Rosino Deposit, Kardzhali Municipality:

The measurements taken using specialized equipment during experimental explosions in the Rosino deposit area show seismic impact values lower than the maximum permissible standards, including the standard for ensuring comfort in protected areas, in accordance with Regulation No. 9 of February 12, 2010 on the maximum permissible vibration values in residential premises.

The values of the recorded results from the measurement of the impact of UVV/noise at a distance of 800 m from the site of the experimental blasting carried out within the boundaries of the Rosino deposit are significantly lower than the maximum permissible standards of the regulatory framework in force in Bulgaria for safe impact and the restrictions adopted in global blasting practice.

The impact of noise from the blasting works is lower than the registered background noise measured the day before and on the day of the experimental blasting works.

According to those present at the explosion, the sensation at a distance of 600 m and 800 m was like "distant thunder."

The values recorded from the measurement of the lateral impact of the explosion in the Rosino deposit area are consistent with the results obtained from studies conducted in Bulgaria under similar mining, natural, and technological conditions. This allows the mathematical formulas derived from these studies to be used to calculate the explosive seismic impact and the impact of the UAV for the conditions at the Rosino deposit, depending on the distance to the protected object and the mass of the explosive charge detonated at a delay interval.

The following conclusion can be drawn from the assessment of the impact of blasting operations on people and the environment:

➤ the PVR technology envisaged for the development of the Rosino deposit complies with the standards for safe impact on people and buildings when the application of drill and blast rock breaking for all three diameters of explosive drill holes (76, 89, and 102 mm) when detonating each drill charge with a separate (*independent*) delay interval.

Vibrations and radiation

Vibrations

Excessive levels of general vibrations – it is known from literature that heavy-duty machines generate excessive levels of general vibrations. These are more pronounced in older machines. Drivers of heavy-duty trucks, excavators, and bulldozers will be exposed to general vibrations. General vibrations mainly damage the musculoskeletal system and the vascular system, and through the resonance effect, they also have an adverse effect on a number of internal organs.

Local vibrations – Drivers of machines servicing the mine will be exposed to local vibrations. The adverse health effect is manifested in damage to the sensory and microvascular systems of the upper limbs. This effect is more pronounced when working in a supercooled microclimate.

Operators of excavators and heavy-duty machinery will be exposed to general and local vibrations. With new and modern equipment, these may not exceed the permissible limits.

Radiation

Laboratory tests show that the samples from the site and the materials comply with the requirements specified in Annex No. 3, Table 3 of the NRZ for the specific activity of natural radionuclides, for the release of large quantities of materials from regulation. There is no danger to the environment, to workers at the site, or to the population, and therefore no specific measures or actions need to be taken to ensure radiation safety.

The results of gamma spectrometric analyses presented above, compared with the standards under the applicable regulations, show that the materials removed from the site do not pose a threat to the environment and would not lead to a change in the natural radiation background at the site. The measured radioactivity in the surveyed layers is low enough not to cause contamination and spread of radioactive isotopes to other components of the environment.

Mining activities in the productive horizon are not a source of increased radionuclide content and will not lead to a sudden or gradual

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Welding activities will be carried out during the construction of the enrichment plant. Welding activities involve a combined effect of chemical exposure and radiant energy—ultraviolet and infrared, as well as rays from the visible spectrum. The intensity of infrared radiation varies from 100 to 2450 W/m² depending on the technical characteristics and mass of the heated metal. For ultraviolet radiation, the total spectral density at a distance of 1 m is specified. From the heating zone - 0.4 - 162 W/m². Infrared and ultraviolet radiation affect the visual analyzer, so it is necessary to work with personal protective equipment such as goggles or helmets.

Assessment of the impact of drilling and blasting operations

The results obtained show that, when the specified technological parameters are observed during blasting operations, the predicted levels of seismic impact at various distances outside the mine perimeter are:

➤ below the requirements of Article 1 of Annex No. 7 "Instructions for determining safe distances for blasting operations" to Article 141 of the PBTWR;

➤ below the permissible maximum vibrations that do not disturb human comfort, in accordance with the requirements of *Ordinance No. 9 of February 12, 2010, on the maximum permissible vibration values in residential premises*;

➤ the calculated values of the explosive-seismic impact are significantly lower than the permissible standards: for people, buildings, and facilities, including below the requirements for ensuring comfort.

It is recommended that, in the case of explosive drilling at a distance of less than 300 m from a populated area, protective geotextiles be used as a precautionary measure to prevent the scattering of rock fragments and the risk to the population and the environment.

Conclusions

1. As a result of the implementation of the IP, the impact of noise will be localised to the site. There will be no increase in background noise in residential areas above the permissible levels.

2. The movement of heavy equipment will not lead to a significant increase in background noise levels.

3. In the protected area, no sites subject to enhanced protection or residential areas will be affected during the blasting works.

4. The degree of impact will be insignificant for workers when preventive measures and personal protective equipment are used.

No disruption of background radiation or radioactive contamination of the air, water, or soil is expected within the IP territory. The machinery and equipment used in exploration, extraction, closure, and recultivation are not sources of magnetic, electromagnetic, thermal, or other types of radiation.

The sources of **noise and vibrations** will be unorganized with limited territorial coverage. The impact will be short-term and of varying frequency.

In terms of impact: insignificant;

Territorial scope of impact: local;

Frequency of impact: temporary, during the operational phase (*on weekdays*)

Duration of impact: periods of construction, operation and closure, and recultivation

Cumulative and combined impacts: insignificant.

Radiation

The machinery and equipment used in exploration, extraction, closure, and recultivation are not sources of magnetic, electromagnetic, thermal, or other types of radiation.

Under normal operating conditions, the implementation of the IP will not lead to radioactive contamination of environmental components.

Summary conclusions on the impact of radiation on the natural radiation background

By type of impact: not expected under normal operating conditions; in possible emergency situations – insignificant negative impact, without cumulative effect;

By territorial scope of impact: local, within the concession area; no impact on the local population and protected areas;

Frequency of impact: very low

Duration of impact: for the period of operation, but only in an emergency situation;

Cumulative and combined impacts on the environment: **The IP will not have a measurable cumulative effect on the radiation parameters of the area**

6.11. Assessment of the health and hygiene aspects of the environment and the risk to human health

Assessment of the risk and impact on health during construction

The construction phase of the IP includes activities related to the construction of internal quarry roads, preparation of sites for embankments (for topsoil and overburden), an enrichment plant, and construction of a working front.

A. Risk factors and impact on workers

Bottled water will be provided for the drinking needs of workers. Water from a clean water tank will be used for domestic needs (for sanitary facilities). ISOBOX mobile trailers are planned for the administrative and domestic complex.

Construction activities are characterized by specific working environment conditions such as a complex of production factors – microclimate, noise and vibrations, dust, toxic gases. The analysis of their impact is as follows:

Unfavorable microclimate

Exposure to an unfavorable microclimate (high or low temperatures, humidity, rain, snow, ultraviolet radiation) is associated with the following effects overheating or cooling of the body (overstrain of thermoregulation) risk of colds, and given the trends in climate change, more and more temperature and precipitation anomalies are expected, and therefore more frequent occurrences of an unfavorable climate.

Risks are minimized by wearing appropriate work and protective clothing, tailored to specific weather conditions, providing rooms for warming up and resting, and providing appropriate fluids (hot drinks in winter and fruit drinks in summer).

High noise levels – The source of noise is construction and transport equipment, as well as drilling and blasting operations. The equivalent noise levels of the main machinery to be used in the operation of the deposit range from 68 to 110 dB(A). The effects on workers are categorized as specific (auditory effects of noise) and non-specific (extra-aural effects of noise).

Technical measures include soundproofing the cabins of construction and transport equipment and selecting the correct speed for vehicles. The use of ear defenders is mandatory for workers outdoors.

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General and local vibrations *Haskovo region*

Truck, excavator, and bulldozer drivers will be exposed to general vibrations. General vibrations mainly damage the musculoskeletal system and the vascular system, and through the resonance effect, they also have an adverse effect on a number of internal organs.

Workers operating jackhammers and tamping machines will also be exposed to local vibrations.

Radiation - Welding activities will be carried out during the construction of the enrichment plant. Welding activities involve a combined effect of chemical exposure and radiant energy - ultraviolet and infrared, as well as rays from the visible spectrum. Infrared and ultraviolet radiation affect the visual analyzer, so it is necessary to work with personal protective equipment such as goggles or helmets.

Air pollution – Has a negative impact, primarily damaging the functions of the respiratory, cardiovascular, and immune systems. The main pollutants are: *Dust (PM10 and PM2.5); Carbon monoxide; Nitrogen and sulfur oxides; Exhaust emissions from diesel engines.*

According to the assessment of the impact on air quality carried out in the EIA Report, the expected concentrations of pollutants in the ground-level atmospheric layer are below the MPC for gases in the air in the working environment. The exhaust gases from the internal combustion engine are discharged into the atmosphere at a high temperature, as a result of which they quickly disperse at altitude. The deposition of pollutants in the ground-level atmospheric layer is at a short distance from the source (up to 200 m) and over a large area, which ensures compliance with the standards for ambient air quality in the working environment.

Physical strain - The work involved in the extraction and processing of limestone is largely mechanized. At the same time, there are also work operations that require manual labor and considerable physical effort. In terms of physical effort, it can be categorized as moderately heavy and heavy physical work. The effects are managed with appropriate work schedules and instructions for performing activities, including changing work posture and taking breaks during the work shift.

Work-related injuries – these are associated with risks of slipping, tripping, falling, as well as being struck by falling objects, working in awkward positions, and injuries from machinery and equipment. They are prevented by applying specific instructions for safe work.

In summary, the impact on workers is short-term, fully controllable, and reversible, which makes it insignificant in terms of degree and significance.

B. Risk factors and impact on the nearby population

Based on the results, the impact of the construction/preparatory activities on the extraction areas and facilities on the other components and factors of the environment assessed in the EIA Report, the risks and impacts on the health and hygiene aspects of the environment in the nearby settlements, respectively for the nearest sites subject to health protection, are as follows:

- With regard to the quality of ambient air in nearby settlements

:

According to the analyses in the EIA Report, the expected concentrations of pollutants in the ground-level atmospheric layer are below the MPC for gases in the air in the working environment. The deposition of pollutants in the ground-level atmospheric layer is at a short distance from the source (*up to 200 m*) and over a large area, therefore atmospheric pollutant concentrations are not expected to reach the nearest populated areas.

- With regard to water, including drinking water sources and facilities:

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According to the assessments carried out in the EIA Report, no negative impact on surface water is expected during construction activities. The analysis of the impact on groundwater for this stage shows that the planned design solutions (lining with an insulating screen on the bottom and walls of the contact water tank, drainage curtain, injection barrier) will prevent groundwater contamination. No deterioration in the quantitative status of the affected groundwater body is expected either.

- With regard to soil quality in the area:

The soil cover is directly affected only in the extraction area as a result of its removal to expose the reserves. The impact on the soil of adjacent areas is solely due to emissions from vehicles, which are deposited in the immediate vicinity of the road – to a low degree, with low significance, local in nature and reversible.

- With regard to harmful physical factors (noise, vibrations, non-ionising and ionising radiation):

The analysis and assessment of noise impact (carried out in the EIA Report) show that during the construction activities for the construction of the OF, the maximum noise load within a radius of 100 m from the noise source (construction equipment) will be up to 55 dB(A), and at 150÷200 m from the noise source, the maximum values will be up to 45 dB(A) and the impact on the environment will be insignificant. The maximum noise level in the protection areas (the nearest residential building—1548 m from the OF site—in the village of Bialgradets) is expected to be a maximum of only 25 dB(A), which is 30 dB(A) below the noise level limits for residential areas and territories.

- With regard to waste and hazardous chemicals:

The management of generated **waste** in accordance with regulatory requirements ensures no impact or risks to the health of the nearby population.

When **hazardous substances** are used correctly (during the construction phase, these include diesel fuel in the tanks of construction and transport equipment and fuel and lubricants) in accordance with regulatory requirements and safety data sheets, no impact on human health is expected. No explosives will be stored on the site.

- With regard to climate change:

The consequences of climate change are only relevant to workers on site, as they (if current climate change trends continue, particularly in terms of temperature and precipitation) will be exposed to more extreme weather events. The impact is controllable and adjustable with appropriate work clothes and personal protective equipment, by choosing the right time for work and rest, and by providing suitable living and sanitary conditions. Accordingly, no consequences for the nearby population are expected.

- Visual impact:

The relief features and the presence of tree vegetation in the areas between the disturbed areas and the nearest settlements, including the planned buffer area within the concession area, will prevent the visual impact of mining activities, as the disturbed areas are not expected to be visible to the population.

Risk and impact assessment during operation (extraction of reserves and processing of raw materials in the OF)

A. Risk factors and impact on workers

The risk factors for **outdoor workers** (50 people) involved in mining activities, at the stockpiles and at the flotation tailings facility overlap with those for the construction phase, with the addition of risks associated with **drilling and blasting** operations (**DBO**).

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Drilling and blasting **operations (DBO)** are associated with the sudden release of toxic gases, dust, intense noise, vibrations, and shock waves.

The impact of the blasting is within the permissible limits in compliance with the relevant regulations related to the correct determination of safe distances during blasting (including dangerous areas in terms of flying rock fragments, the distance of seismic action of the explosion, the safe zone in relation to the shock wave, the safe distances in relation to the toxic gases), compliance with the rules and standards for drilling and blasting operations, and the use of appropriate personal protective equipment by workers. For the specific IP, additional measures are provided to secure and limit the scope and degree of impact of the PVR – use of protective covers against flying rock fragments.

The risk factors for **workers in the mining facility** (70 people) are determined by the nature of the activities performed – crushing and transportation, storage of crushed ore in a covered buffer warehouse, grinding, flotation using reagents (foaming agent: methylisobutylcarbinol (MIBC), collector: potassium amyl xanthate (PAX), activating agent: copper sulfate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$), sulfidizing reagent: sodium hydrogen sulfide (NaHS), collector: Aerofloat 404 (A404), Flocculant (mixture)), thickening of flotation waste, thickening of concentrate, and filtration.

During ore enrichment, workers are exposed to aerosols with a complex composition (dust in the crushing units and vapors in the flotation units), noise, vibrations, and an uncomfortable microclimate.

Workers operating the crushing units and conveyor belts do not have a fixed workplace, as they move between different machines and are mainly exposed to dust and an unfavorable microclimate. Accordingly, the necessary personal protective equipment will be provided for them.

Reagents are stored in an isolated, separate storage facility, from where they are fed through an automated system to the flotation departments. Workers have no direct contact with them.

Workers in the flotation departments hold operator positions, as the processes are controlled automatically, which minimises exposure to toxic chemical reagents. The vessels in which flotation takes place are open, and the content of harmful substances in the vapors is minimal, within the limits permissible for the working environment, according to design data. Adequate ventilation is provided.

The processes are automated and controlled by monitors and sensors that detect any possible deviation from the normal production process, in which case the operation of the installation is automatically stopped.

Design measures have been taken to limit the release of pollutants, such as a sprinkler system to prevent secondary dust emission, including during unloading and during the crushing process itself. This will maintain good air quality in each of the crushing buildings. The storage facilities for the crushed material are covered, which will prevent dust dispersion.

Sump pumps are installed on the floor of the flotation workshop to collect any spills from the circuit and transport them to the appropriate points in the flotation scheme.

With regard to noise in the working environment, the Contracting Authority will fulfill its obligations in accordance with the requirements of *Ordinance No. 2 on the protection of workers from risks related to exposure to noise at work* by ensuring maximum noise levels in the working environment of no more than 85 dB(A), and, if necessary, the necessary organizational measures to reduce the harmful effects of this factor (appropriate work and rest regime for workers, personal protective equipment, etc.).

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Safety instructions are prepared and implemented for each job position, and compliance with them ensures the prevention of health risks, incidents, and accidents.

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

B. Risk factors and impact on the nearby population

- With regard to the quality of ambient air in nearby populated areas

Places:

The assessment of the impact on ambient air carried out in the Report on

The EIA shows that in the worst-case scenario (the period of implementation of the investment project during which maximum air pollution is expected, or the first four years of implementation of the investment project, when mining activities will be carried out simultaneously with the opening of the deposit and the dumping of overburden on an external dump) the activities will not have a significant impact on ambient air quality, as the maximum calculated average annual values of PM_{10} and $PM_{2.5}$ are significantly below the permissible levels for the protection of human health.

- With regard to water, including drinking water sources and facilities:

According to the assessments carried out in the EIA Report, no negative impact on surface water is expected. The analysis of the impact on groundwater shows that the planned design solutions (lining with an insulating screen on the bottom and walls of the contact water tank, drainage curtain, injection barrier) will prevent groundwater contamination. Furthermore, no deterioration in the quantitative status of the affected groundwater body is expected.

- With regard to soil quality in the area:

The soil cover is directly affected only in the extraction area as a result of its removal to expose the reserves. The impact on the soil of adjacent areas is solely due to emissions from vehicles, which are deposited in the immediate vicinity of the road – to a low degree, with low significance, local in nature and reversible.

- With regard to harmful physical factors (noise, vibrations, non-ionising and ionising radiation):

The assessment of the expected noise impact made in the EIA Report shows that:

- Noise from industrial equipment during exploration, extraction, and processing shows that the expected noise levels reaching the nearest objects subject to health protection – residential buildings in the villages of Byalgradets, the village of Gugutka, and the village of Rozino, are significantly below the norm of 45÷55 dB(A), including the noise levels from each source – Table No. V.10.2-4, as well as the total noise levels – Table No. V.10.2-5 above. In the area of sensitive sites subject to enhanced noise protection, the maximum noise levels reach insignificant values - 18.5÷21.9 dB(A), with permissible levels of 45-55 dB(A). It is important to note that at these noise levels (up to 21.9 dB(A)), the actual mining activities at the IP site will not be heard by people in nearby settlements;

- The noise from transport equipment, calculated as an equivalent level at a distance of 5 m from the internal quarry roads, does not exceed 40 dB(A). No change in background noise levels from heavy goods vehicle traffic is expected within the boundaries of the nearest populated areas.

- The noise from blasting activities has been determined on the basis of experimental blasting works - the predicted impact level at a distance of 1200 m (to the first buildings in the village of Rozino) is 108-109 dB(A), which is classified as "Moderately loud noise" (see Table No.

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Non-technical summary of the EIA Report on an investment proposal for "Extraction and processing of polymetallic ores from the Rosino deposit, Tintyava area, located in the territories of the villages of Rosino and Guguika, Ivaylovgrad municipality, V.10.2-7) and is within the range of impact between "normal conversation in a group" and

"telephone conversation" (see Table No. V.10.2-6). At the same time, the exposure time to the noise generated by technological blasting operations on the scale of mineral extraction in Bulgaria is in the order of 1-2 s, with safe exposure at such an impact value (up to 109 dBC) being more than 8 hours.

No disturbance of background **radiation** or radioactive contamination of the air, water, or soil is expected on the territory of the IP. The machinery and equipment used in exploration, extraction, closure, and recultivation are not sources of **magnetic, electromagnetic, thermal, or other types of radiation.**

- With regard to waste and hazardous chemicals:

The management of generated **waste** in accordance with regulatory requirements ensures no impact or risks to the health of the nearby population.

When **hazardous substances** are used correctly in accordance with regulatory requirements and safety data sheets, no impact on human health is expected. No explosive substances will be stored on the site.

- With regard to climate change:

The implementation of the IP has no potential to impact the local climate, as the consequences of climate change observed and predicted for the country and the specific area will not be affected by the implementation of the IP. In this regard, no climate change-related impact on the nearby population is expected as a result of the IP.

- Visual impact:

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

Risk and impact assessment during closure and recultivation

Reclamation activities on land disturbed by extraction and processing of raw materials will include technical and biological reclamation. Phased reclamation during operation and final reclamation are planned.

Liquidation in the mining areas will consist of the evacuation of mining machinery, production and logistics facilities.

The risk factors during recultivation activities are: toxic gases from the internal combustion engines of the equipment used, dust, noise, and vibrations—the impact is mainly on workers—similar to the construction phase.

During closure and recultivation, no adverse health effects on the population of the surrounding settlements are expected.

Conclusions on the impact on human health:

By type of impact: direct and indirect – for workers at the site, with no significant adverse effects (no exceedances of environmental and human health protection norms and standards are expected) for the nearby population;

Territorial scope of impact: local, mainly for the areas with activities and in the immediate vicinity, with no significant impact on the nearest sites subject to health protection;

Frequency of impact: daily, during working hours;

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

Cumulative and combined impacts: insignificant – in terms of atmospheric air and noise.

6.12. Transboundary impacts

In connection with a letter from the Minister of Environment and Water ref. No. 99-00-

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58/27.05.2024, pursuant to Article 98(1) of the Environmental Protection Act, a notification has been prepared and sent to inform the potentially affected party – the Republic of Greece – in connection with the EIA procedure and in accordance with the requirements of the Convention on EIA in a transboundary context. The notification was prepared in accordance with Decision I/4 of the First Meeting of the Parties to the Convention.

By letter ref. No. EIA-68/23.10.2024, the Ministry of Environment and Water received an official response from the Greek side confirming its willingness to participate in the EIA procedure as an affected party. In view of this, the assessment examines in detail the transboundary aspects of the impact, with particular attention being paid to the "Water".

It should be expressly noted that, within the framework of the EIA procedure, the analysis of potential impacts has been assessed and confirmed, including through the use of appropriate mathematical models and forecasts **made for the most severe operating conditions of the deposit at maximum production capacity.**

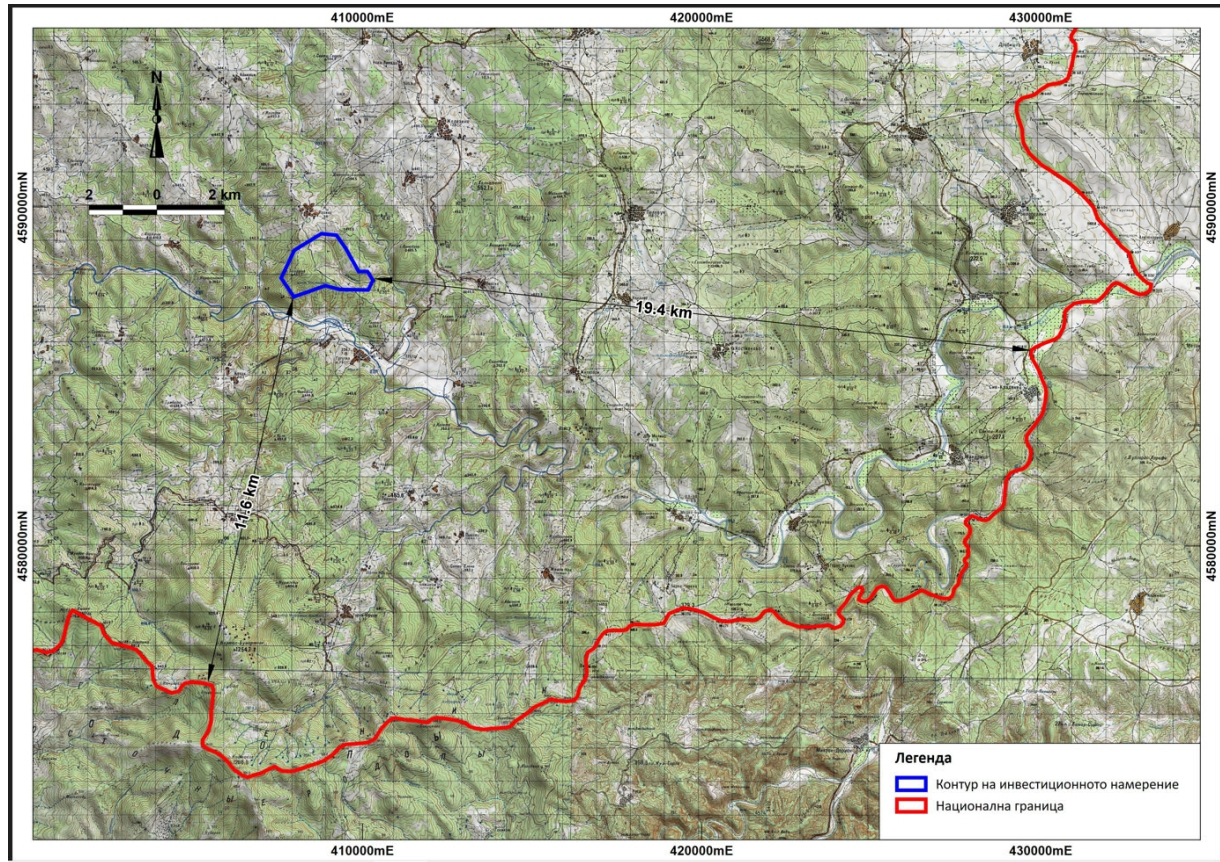


Figure No. 6.12-1. Distance from the Rosino deposit to the border with Greece

The following impacts can be predicted for the various environmental components and factors:

Atmospheric air

The emission of dust and gas emissions during the various phases of the project implementation will be limited to the area of the deposit, making it local, with the pollutants settling at short distances around the work sites. **It is not possible to emit pollutants that would overcome the relief features of the area (presence of mountain elevations and river valleys) and reach the territory of Greece**

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Non-technical summary of the EIA Report on an investment proposal for "Extraction and processing of polymetallic ores from the Rosino deposit, Tintyava area, located in the territories of the villages of Rosino and Guguika, Ivaylovgrad municipality, especially in concentrations that would cause air pollution.
Haskovo region

Surface and groundwater

At all stages of construction, operation, and reclamation of the Rosino deposit, no transboundary impact on the ecological and chemical status of surface waters, runoff, and water quantities entering the territory of the Republic of Bulgaria is expected. , no transboundary impact is expected on the ecological and chemical status of surface waters, runoff, and water quantities entering the territory of the Republic of Greece from the Luda and Byala river basins.

No impact on surface waters is expected, either in terms of quality or quantity. The IP provides for the construction of two consecutively located reservoirs (the second of which is for non-contact water, i.e. conditionally clean), which eliminates even the slightest possibility of water separated from the IP entering water bodies. There are no plans to discharge industrial and domestic sewage into surface water bodies or into the sewage network of populated areas. All collected water will be reused in the technological cycles.

No impact on the chemical and quantitative status of groundwater bodies is expected either. A hydrogeological study has been carried out in the area of the deposit, which has established that the groundwater has an insignificant flow rate. Given the planned depth of the mine, there is no reason to believe that there could be a direct impact on groundwater bodies or drinking water sources, with corresponding sanitary protection zones and permits for exploitation in accordance with the Water Act.

In view of this, no impacts can be assumed that would negatively affect the quantity and quality of water in Greece.

Subsurface resources

The harmful impact is mainly concentrated on the geological environment, as non-renewable natural resources will be extracted. The data from the geological surveys and the proposed extraction technology for the deposit give reason to believe that, if the investment proposal is implemented, part of the territory will be affected by the extraction activity, **but the entire area will not be affected in a way that would lead to changes in the sustainability of the geological environment and its quality characteristics, let alone lead to transboundary effects.**

Land and soil

Given the nature of the activity—open-pit mining of natural resources—the soils will be directly affected, locally and only on the territory of the Republic of Bulgaria. This could in no way have an impact on the soils in the neighboring country. **After timely phased technical and biological recultivation, they will be restored to the maximum extent possible.**

Noise

The analyses and calculations in Section V prove that the implementation of the IP will not lead to an increase in background noise in nearby settlements. The maximum noise levels that will reach the sites subject to enhanced noise protection are lower than the background noise in the settlement and the surrounding natural environment.

Due to the remoteness of the territory of the Republic of Greece, it is not possible for increased equivalent noise levels to reach it. The noise from the excavation, extraction, and dumping activities and the processing of the ore will be completely eliminated in the vicinity of the IP site. It is not possible for the area of Greece to have an impact on background noise levels.

With regard to blasting operations, the experimental blasts carried out

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prove that no negative transboundary impact can be expected. Blasting works have lower levels than the registered background noise even in nearby protected sites, measured before and on the day of the experimental blasting works.

Biodiversity

Given that two protected areas of the Natura 2000 ecological network are affected, an assessment will be made of the compatibility of the IP with the subject and objectives of conservation in these areas. The Byala River is a protected area for the conservation of wild birds, and the habitats of protected bird species must be protected, as well as activities to restore habitats must be carried out if necessary to improve their conservation status. **It is unacceptable to have a significant negative impact on the areas of the Natura 2000 national ecological network, which in turn is a prerequisite for preventing damage to biodiversity in the territory of Greece. The activity will only be possible after the IP has been approved in accordance with the Biodiversity Act.**

Waste

The proposed method of treating the waste generated by the activity does not give rise to any assumptions of environmental risks from its management. The deposited flotation waste will have minimal moisture content, and two consecutive water reservoirs will be built under the SMO, the second of which will be for non-contact (conditionally clean) water. **This eliminates the possibility of pollutants entering the water, even in the event of disasters, and reaching the territory of Greece.**

Landscape

Due to the significant distances to the border of the Republic of Greece, taking into account the hilly and mountainous terrain, which is a natural barrier both to the spread of pollutants in the atmosphere and in visual terms, **no visual or landscape impacts are to be expected.**

Health risk

The assessments and analyses of the impact of the IP at the various stages of implementation (construction, operation, closure, and recultivation) show that the adverse impacts are local in scope—mainly within the boundaries of the directly affected areas and within the concession area. The nearest populated areas are affected by insignificant concentrations of dust particles and noise, well below the relevant standards. Given the significantly greater distance of 11.6 km from the boundary of the concession area, the analyses show that **there are no prerequisites to suggest a cross-border risk to the health of the population in the border areas of the Republic of Greece, as evidenced by the assessments of the other components and factors of the environment, including air quality, noise, water, soil, and hazardous chemicals.**

7. Description of the likely significant effects of the investment proposal on the environment

Construction and operation of the investment proposal, including demolition, dismantling, and decommissioning activities, if applicable

The various stages of implementation of the investment proposal are described in detail in Section II of the EIA Report. They include mine construction, operation of the deposit, and closure and recultivation.

The likely consequences of the impact of the investment proposal on the environment resulting from the implementation of the various stages are discussed in detail in Section V of this report, with a summary of the impact presented for each component and factor. Based on

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the assessment, no significant negative impacts have been identified that would make the implementation of the IP impossible. The proposed measures should be implemented to mitigate the identified impacts.

Use of natural resources, in particular subsoil, soil, water, and biodiversity, taking into account, as far as possible, the sustainable availability of these resources

Subsoil

Given the nature of the IP, ***the subsoil*** will be directly affected by the development of the mining site and the extraction of natural resources. The reserves at the Rozino deposit amount to 11.3 million tons of ore with a content of 1.33 g/t gold and 26.6 million tons of overburden, as described in the Appendix to the Final Report on Reserves.

The consequences of the impact on the earth's interior are directly related to the optimal extraction of useful minerals within the boundaries of the mines. A phased technical and biological recultivation is planned, whereby the mined areas will be restored to the maximum extent possible.

The soil will be directly affected by mining and processing activities. It is planned to remove the surface layer for subsequent use in the recultivation phase. The future concession area covers **2,753.4 decares, of which 1,179 decares will be disturbed**. These areas include the land required for open-pit mines, sterile rock dumps, soil dumps, industrial sites, mine roads, and water reservoirs. The expected impacts on land and soil during the construction and operation of the deposit are mechanical disturbance and destruction of the integrity of the soil profile on the aforementioned areas. Technical and biological recultivation will minimize these impacts to a certain extent.

Water

The use of surface water is related to the planned water intake from the Arpa Dere River in the period from January to May inclusive. The flow rate will provide a water quantity of about 50 l/s (expected total volume of 648 000 m³), equal to up to 10% of the average annual water quantity, thus ensuring the ecological minimum in the river. It is planned that the water intake will be carried out from a naturally formed pool without the need to construct a dam or other construction works blocking the river. A strategy has been developed for the minimum use of fresh water and its maximum reuse within the production site.

As a technological option and only when necessary, there is a plan to draw water from the terrace of the Arpa Dere River (underground water body BG3G000PtPg049) by building a pumping station in the area of the existing Rosino pumping station.

Biological diversity

The IP does not envisage the use of natural resources originating from flora and fauna. All possible impacts on biodiversity, including indirect/indirect ones, are assessed in section V of the EIA report.

Emissions of pollutants, noise, vibrations, non-ionising radiation and radiation; the occurrence of harmful effects and the disposal and recovery of waste

With regard to pollutants in the ambient air

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A quantitative and qualitative assessment of the pollutants emitted into the ambient air from the implementation of the IP is given in section V.1 of the EIA report. The maximum expected hourly and annual average levels of pollutants in populated areas are within the permissible limits for the protection of human health.

With regard to harmful physical factors

During all three stages of the implementation of the IP, the activities carried out on the territory of the deposit are not expected to be a source of excessive noise for the residential areas in the region.

With regard to radiation

Laboratory tests show that the samples from the site and the materials comply with the requirements specified in Annex No. 3, Table 3 of the NRZ for the specific activity of natural radionuclides, for the release of large quantities of materials from regulation. There is no danger to the environment, to workers at the site, or to the population, and therefore no specific measures or actions need to be taken to ensure radiation safety.

The results of gamma spectrometric analyses presented above, compared with the standards under the applicable regulations, show that the materials removed from the site do not pose a threat to the environment and would not lead to a change in the natural radiation background at the site. The measured radioactivity in the surveyed strata is low enough not to cause contamination and spread of radioactive isotopes to other components of the environment.

Mining activities in the productive horizon are not a source of increased radionuclide content and will not lead to a sudden or gradual increase in radioactivity in the sterile rock mass, mine waste, and waste water.

With regard to waste

The extracted overburden and flotation waste will be transported to the SMO, which is classified in category "B" according to the requirements for mining waste facilities under Article 22b, paragraph 4 of the ZPB.

The limited amount of hazardous and non-hazardous production waste from the operation of machinery and equipment will be transferred for subsequent treatment, on the basis of written contracts, to persons holding the relevant document under Article 35 of the Waste Management Act for the specific type of waste.

Household waste will be generated from the daily activities of the personnel. It will be collected in containers for mixed household waste located on the production site. This waste will be transported periodically, based on a contract with the company that transports household waste in the municipality of Ivaylovgrad.

The investment proposal does not provide for the disposal and recovery of waste on the concession area.

The waste generated, in terms of how it is generated, its name, quantity, place of formation, and method of treatment during the individual phases and stages, is described in detail in section 5 of the report.

Risks to human health, cultural heritage, or the environment, including as a result of accidents or disasters

A detailed analysis of the risks to *human health* and an assessment of these risks are provided in section V.11 of the EIA Report, both in relation to the population and to workers on the affected sites. The results of the analysis and

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assessment show that the population and workers on the site of the project, during all stages of implementation of the project, are not exposed to significant risks, since:

- under normal operation, no exceedances of environmental and human health standards are expected in the nearest populated areas, and for workers, occupational health and safety instructions, appropriate and reasonable work and rest schedules, and appropriate personal protective equipment will be implemented to minimize exposure, risks and discomfort characteristic of the specific activities;
- the activity is not related to the storage of hazardous chemicals in quantities that could cause a major accident;

An emergency plan will be implemented for the stages of the project's implementation, setting out specific actions

Risks in emergency situations and accidents

The production processes involved in ore extraction and processing involve the use of machinery, which can cause serious accidents. As a result of emergencies and accidents involving mechanization, transport equipment, and equipment in the OF and SMO, leaks and spills of petroleum products (oils, fuels) may occur. These would be small in quantity and cover an insignificant area when the equipment used is new or technically sound. They can be easily and quickly eliminated by ensuring the constant availability of absorbents for fuel and lubricants at a location specified in the emergency plan. It is also expected that cases of specific pollution will be extremely rare, as they represent deviations from the normal technological regime.

Accidents and injuries to personnel are possible if the requirements of the regulations for healthy and safe working conditions are not complied with.

There would be risks to ***cultural heritage***, including as a result of accidents and disasters, if the requirements of the Cultural Heritage Act are not complied with.

There is a possibility that there are archaeological sites in the concession area which, due to their characteristics, cannot be located using non-destructive methods. In the event of traces of archaeological substance being found, Articles 72 and 160 of the Cultural Heritage Act shall apply.

Risks to ***the environment*** and human health may arise in the event of the following natural disasters:

Earthquakes

According to the current seismic zoning of the Republic of Bulgaria, the area of the deposit falls within a territory with a probability of an earthquake occurring with an impact level of I-VII on the MSK scale. The seismicity coefficient for the area is $K_s = 0.10$.

Depending on the impact of the earthquake, the following damage can be expected:

- up to VI degree – minor
- VI-IX degree – severe.

There are no infrastructure facilities built on the territory of the deposit, with the exception of existing forest roads.

Landslides

There are no registered landslides in the area of the deposit, according to the landslide register and map prepared by Geozashchita EOOD – Pernik branch. There are two registered landslides in the town of Ivaylovgrad – on Yane Sandanski Street and Paisiy Street.

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There are two registered landslides in the territory of the town of Ivaylovgrad – on Yane Sandanski Street and Paisiy Street.
Haskovo region

The area of the deposit is not located in an area with significant potential risk of flooding.

The area of the deposit is not located in an area with significant potential flood risk.

Combining the impact with the impact of other existing and/or approved investment proposals, taking into account all existing environmental problems related to areas of particular ecological importance that are likely to be affected or related to the use of natural resources

Summary of cumulative impacts:

❖ ***Atmospheric air:***

The impact on atmospheric air quality is local in scope and does not is expected to have a cumulative effect.

❖ ***Land and soil:***

The land affected by mining will be more than 1 km away from other exploration areas areas, preserving the current use between them and without forming large areas with changed purpose. In accordance with the regulations and in the event that the exploration areas are granted concessions for extraction, all natural resource extraction operations must have developed plans for the recultivation of the affected areas, which include the use of the soil layer for recultivation.

❖ ***Subsoil, mineral diversity:***

Subsoil is directly affected by extraction activities. Due to the significant distance between the various active deposits for the extraction of polymetallic ores and gneisses from each other, there would be no impact on the subsoil that could lead to negative geological phenomena such as increased seismic activity, subsidence, landslides, rockfalls, surface ruptures of the earth's crust, etc. Control over the extraction of established reserves is exercised by the state, through the Ministry of Energy, in accordance with *the National Strategy for the Development of the Mining Industry* (2015) and through the terms and conditions of the concession agreements for extraction. According to data from the mining strategy drawn up in 2015, Bulgaria ranks third in copper production and fourth in gold production in Europe, which shows our country's leading position in European ore mining. The vision of the "2030" strategy is for the Republic of Bulgaria to be a regional leader in the rational use of underground resources and the development of mining communities. The mining industry in the Republic of Bulgaria is a structurally important sector and one of the main drivers of economic development. The mining industry is developing through the effective, comprehensive, and long-term utilization of underground resources in accordance with the requirements for sustainable development, covering three main aspects: economic, environmental (green mining industry), and social (corporate social responsibility).

❖ ***Landscape:***

The type of landscape changes during the development of surface mining sites. This change is limited to the size of the concession area. The distance between the sites and the relief do not allow for the creation of large areas with a man-made landscape. As an additional measure to limit the impact, recultivation plans are implemented to restore the landscape to a state as close as possible to the original landscape type.

Noise from the extraction, processing, and transport of the extracted raw material:

◆ *Population and human health*

Impact of the investment proposal on the climate (e.g., the nature and extent of greenhouse gas emissions) and the vulnerability of the investment proposal to climate change

The measures that can be implemented to reduce greenhouse gas emissions are as follows:

- In view of the above, the operation of the Rozino deposit will have a minimal effect on climate change, with the impact being expressed in emissions from the internal combustion engines of the operating equipment.

Technologies and substances used

Blasting will be carried out by a specialized company, which will deliver the explosives immediately before blasting.

Hazardous chemicals, preparations, and products, as well as diesel fuel for the equipment used, will be used in the OF. Their use will be in accordance with safety standards.

A technology for compacting and dewatering flotation waste has been selected in order to reduce the impact.

The recultivation activities will use almost the same equipment as at the start of development.

8. Plan for the implementation of measures to prevent, reduce or, where possible, eliminate significant adverse effects on the environment

Plan for the implementation of the measures under Article 96(1)(7) of the Environmental Protection Act

No in order	Measures	Implementation period	Results of implementation
ATMOSPHERIC AIR			
1.	Development of effective blasting technology with reduced toxic gas and dust emissions	Design	Limiting the release of toxic gases and adverse effects on workers' health at the site
2.	Irrigation of indoor and external transport roads in dry and windy weather	Construction and operation	Reduction of dust pollution in the area and soil protection
3.	Periodic irrigation of the terrain in the loading and unloading areas	Construction and operation	Limiting of dust emissions in the ground-level layer of atmosphere
4.	Development and approval of working instruction for the performance of loading and unloading work	Construction and operation	Limiting of dust emissions in the ground layer of atmosphere
5.	Do not overload vehicles	Construction, operation and closure and recultivation	Limitation of dust emissions in the layer of the atmosphere
6.	Use technically sound mechanization, maintaining good technical condition of excavation, extraction, processing and transport equipment	Construction, operation and closure and recultivation	Reduction of harmful emissions into the atmosphere. Protection of water and soil
7.	Prevent mining and transport equipment from idling	Construction, operation and closure and reclamation	Reduction of emissions from combustion engine gases
8.	Blasting activities shall be carried out when the wind is blowing in the appropriate direction – from the nearest populated area towards the mine.	Operation	Ensuring of the dispersion of gas and dust emissions in the opposite direction to the populated direction
9.	Use of protective coatings when carrying out of explosive	Operation	Limiting of dust emissions during

No.	Measures	Implementation period	Results of implementation
	work in the circuit of mine from nearby populated areas		of blasting activities
10.	Ensure and maintain a minimum height of the piles of extracted materials	Operation	Limiting the release of dust in the atmosphere
WATER			
11.	Do not allow work under static water level of groundwater.	Operation	Prevention of direct pollution of groundwater.
12.	Restriction of activities that increase the risk of direct or indirect discharge of hazardous substances or other pollutants into groundwater.	Construction, operation, closure, and recultivation	Preventing direct pollution of groundwater.
13.	Prevention of discharge of waste water, including domestic sewage, into surface waters and/or its discharge into groundwater water.	Operation	Prevent direct pollution of surface and groundwater.
14.	Use of serviceable construction and transport equipment within the concession area	Construction, operation, closure and reclamation	Prevention of surface and groundwater pollution.
15.	Prevention of pollution of the Biala River, the Arpa Dere, Yulan Dere, and Kokardzha Dere tributaries with construction materials and fuel and lubricants materials from transport equipment.	Construction, operation and	Achievement of the objectives for BG3MA100R270 Biala River and its tributaries set out in the third RBMP - maintaining good ecological status and preventing deterioration.
16.	Preventing the storage of waste in areas with removed soil layer.	Construction	Prevention of groundwater pollution.
17.	Initiation of a procedure for issuing a permit/permits for water abstraction from the Basin Directorate East Aegean region.	Construction	Compliance with the regulatory framework for water use and protection.
18.	Maintenance of the water supply network for clean and contact water, including the adjacent facilities from the cycle of water and	Operation	Prevention of spills of waste (including contact) water and contamination of surface and

No.	Measures	Implementation period	Results of implementation
	conduct of periodic monitoring and prevention.		groundwater.
19.	Prohibition on carrying out repair works within the boundaries of the investment proposal, except in cases of emergency	Construction, operation, closure and reclamation	Prevention of surface and groundwater pollution.
20.	Ensuring restricted access to the water intake facility/facilities.	Operation	Prevent spills and overuse of natural resources.
MINERAL RESOURCES			
21.	When developing the Comprehensive Project for extraction from the deposit, include the implementation of phased technical and biological recultivation, in accordance with the technical characteristics of the sub-sites and the specific vegetation.	Design	Restoration of the affected areas to the maximum extent
22.	All activities related to extraction and processing shall be carried out within the boundaries of the concession area	Construction, operation and	Compliance with the ZPB
23.	Strict compliance with the approved Comprehensive and Annual Work Plans for mining and reclamation of the site	Construction, operation, reclamation and	Compliance with the regulatory framework of
24.	Strict compliance with the approved Mining Waste Management Plan	Construction, operation and	Compliance with the ZPB
25.	Application of techniques to minimize the side effects of the explosion, such as: - increasing the length of the drive, - reducing the mass of the charge (smaller diameter boreholes, spaced charges); - application of appropriate blasting schemes (directing the demolition front and the direction of movement of the blasted rock mass, minimizing the charge mass in a delay interval, etc.); - use of protective coverings.	Operation	Ensuring safety at work
26.	In open-pit mining	Operation	Ensuring

No.	Measures	Implementation period	Results of implementation
	minerals near urban areas, The time of blasting is agreed with the public in the area in order to avoid the surprise effect and to establish the most acceptable time for carrying out blasting works with a view to reducing the unpleasant effect on the comfort of residents in the area – most often this is during daylight hours within the working day. working day.		Safety at work
LAND AND SOIL			
27.	Removal and storage of soil and humus from the concession area, in accordance with the requirements of Ordinance 26/02.12.1996 (last amended and supplemented in State Gazette No. 22/2002). The locations for temporary storage of humus within the boundaries of the designated for the designated site.	Construction operation and	Use of soil and humus for reclamation activities
28.	Development of a plan and monitoring of soils in accordance with Article 29, paragraph 1, item 2 of the Soil Act.	Construction, operation, closure, and recultivation and	Timely identification of negative processes occurring in the soil and forecasting their development, with ultimate goal protection
29.	Gradual recultivation of the affected areas and use of soils and materials from excavation, stored in landfills.	Operation Closure Reclamation and	Prevention the occurrence of dangerous physical-geological phenomena
30.	Prevention soil of outside the territory of the work sites.	Operation	Soil protection in the area
WASTE			
31.	The waste generated shall be collected separately and delivered in a timely manner for transport and subsequent treatment.	Construction, operation, closure reclamation and	Prevention of waste dispersion and soil contamination and water
32.	The waste generated shall be transferred for subsequent treatment, on the basis of written contracts, to persons holding the relevant document under Article 35 of	Construction, operation, closure, and recultivation and	Management of waste in accordance with the Waste Management Act.

No.	Period of implementation	Implementation period	Results of implementation
	WMA.		
33.	Use of technically sound vehicles for the transport of hazardous and industrial waste within and outside the concession area. Hazardous waste shall be transported only in closed metal containers/barrels.	Construction, operation, closure, and recultivation	Prevention of waste dispersion and soil and water pollution
34.	Waste oil from emergency replacement shall be collected in a manner that allows for its regeneration – in closed containers that are chemically resistant, prevent spillage or leakage, are marked, and are stored indoors.	Construction, operation, closure, and recultivation	Prevention of spillage and pollution of soil and water. Waste management in accordance with the Waste Management Act
35.	In cases of accidental spillage of oils or other pollutants, the contaminated soil shall be removed immediately and transported to a waste site that has a document under Article 35 of the Waste Management Act for this type of waste.	Construction, operation, closure, and recultivation	Prevention of spillage and pollution of soil and water. Waste management in accordance with the Waste Management Act
36.	Placement of containers for household waste	Construction, operation, closure and reclamation	Waste management in accordance with the Waste Management Act
HAZARDOUS SUBSTANCES			
37.	The use of hazardous substances (diesel fuel, oils, greases) shall be carried out in accordance with the measures for the prevention of accidents, emissions or spills and for the control of exposure, as specified in the relevant regulatory/administrative act, in the Safety Data Sheets and the instructions for safe use.	Construction, operation, closure, and recultivation	Protection of the environment and human health from the effects of hazardous chemical substances
LANDSCAPE			
38.	Design of technical, biological and landscape	Design	Ensuring natural inclusion of

No.	Measures	Implementation period	Results of implementation
	planning Reclamation in adjacent Compliance Landscapes		restored areas in the adjacent landscape
39.	Implementation of phased and timely reclamation (technical and biological) of the disturbed areas, to be carried out in accordance with the approved projects for reclamation	Operation, closure, and recultivation	Acceptable landscaping of the site, integration of the recultivated terrain to the local landscape
BIOLOGICAL DIVERSITY			
40.	For outdoor lighting, use lighting fixtures with sodium lamps (emitting mainly in the red and yellow part of the spectrum, which have a significantly weaker attraction effect on nocturnal insects compared to with mercury-vapor lamps, which emit significant amounts of blue and ultraviolet light). Limit the number of lamps to 2 per hectare.	Design, construction, and operation	Limit the strong attraction effect of lamps, which leads to disorientation of nocturnal insects and their easy death. Reduce the mortality of insects, including those subject to protection in the SPA.
41.	Only tree and shrub species native to the country should be used for recultivation. The list of species should be approved by an expert botanist.	Designing and recultivation	Preserving the character of the vegetation in the area, including natural habitats natural habitats, subject to protection in the area. Preventing the spread of invasive species.
42.	No movement of machinery outside the roads and approaches to the individual elements of the IP shall be allowed. Movement shall be carried out along pre-determined routes, marked with clear and permanent markings.	Construction, and operation	Prevention of further destruction of vegetation in the areas of traffic of equipment, including natural habitats subject to protection in the SPA. Restriction disturbance disturbance of animals and their mortality, including for species subject to protection in the SPA. subject to protection in the SPA.
HARMFUL PHYSICAL FACTORS			

No.	Measures	Implementation period	Results of implementation
43	During implementation the Investment Proposal, use modern mechanisation, leading to a reduction in noise pollution in the environment, which is in accordance with the requirements of the Ordinance on the essential requirements and conformity assessment of machinery and equipment operating outdoors with regard to noise, emitted by them into the air (State Gazette No. 11/2004).	Design, construction, operation and closure and recultivation	Lower noise emissions in the environment from the machines and motor vehicles used
44.	Rational selection of the parameters of the charge design (length of the pre-drilling, charge length, driving length, charge spacing, borehole diameter), selection of suitable inert material for driving, correct selection of bottom or top initiation of charges, application of appropriate blasting schemes (direction of the demolition front and direction of movement of the demolished rock mass, minimization of the charge mass in a delay interval, etc.); and a system for charges	Operation	Control of side effects during blasting operations (including the impact on the subsoil, protected buildings and facilities)
45.	Systematic control shall be carried out to ensure compliance with the permissible limit values for noise levels in the environment and the living environment habitation	Operation	Minimization of the impact of noise on workers
46.	Performing own periodic measurements of noise indicators in accordance with Art. 27 of Ordinance No. 54/2010 on the activities of the national system for monitoring environmental noise and on the requirements for conducting own monitoring and providing information from industrial sources at noise at the environment	Operation	Control of the hygiene standard of 70 dBA for industrial areas

No.	Measures	Implementation period	Results of implementation
	Environment		
47	Yes no yes allowed work of mining and transport equipment idling	Operation	Noise reduction
48.	Use of protective coatings when carrying out blasting work in the outer contour of the mine near populated areas places	Operation	Limiting dust emissions when carrying out blasting activities
CULTURAL AND HISTORICAL HERITAGE			
Preliminary archaeological studies – searching for archaeological sites within the future concession area, in accordance with	Preliminary archaeological studies – searching for archaeological sites 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 sites and taking measures for their preservation.	Before the start of construction and extraction activities	For to not prevent destruction of unknown archaeological sites
50.	Rescue excavations (in case archaeological sites are found on the land that will be directly affected, within the concession area)	Before the start of construction and extraction activities	If archaeological sites are registered. In case of discovery of structures and finds that show signs of cultural value, the activity shall be stopped immediately and Article 72 of the Cultural Heritage Act shall apply.
HEALTH AND HYGIENE - ASPECTS			
51.	A Health and Safety Plan shall be drawn up for the construction, operation, closure, and reclamation phases, providing for periodic control measurements of workplace factors, including chemical agents, and, based on the results, adjust the parameters of activities (including PVR) and measures for the protection of workers' health.	Before the start of construction	Ensuring of safe and healthy working conditions for workers on site during the various stages of project implementation

52.	Workers shall be provided with appropriate work clothing and personal protective equipment, depending on the work performed. Yes checks on suitability	Construction, operation a nd closure a nd reclamation	Reduction of negative impacts on workers' health
No.	Measures	Implementation period	Results of implementation
	and their proper use.		
53.	Development and implementation of a work and rest regime during work.	Construction, operation a nd closure a nd reclamation	Reduction of occupational injuries
54.	Providing workers with cold and hot drinks during hot and cold periods of the year, respectively cold periods of the year.	Construction, operation a nd closure a nd reclamation	Ensuring of healthy and safe conditions for working
55.	Mine workings and access routes to them that pose a danger of falling for people or animals, as well as sinkholes, collapses, and landslides within the boundaries of the mine, shall be marked with warning signs and fenced off with concrete posts and metal mesh or barbed wire	Construction, operation a nd closure a nd reclamation	Prevention of occupational accidents
56.	Regular conducting of briefings for workers on site, training, initial and periodic medical examinations	Construction, operation a nd closure a nd reclamation	Provision of healthy and safe conditions for working
57.	Trained persons shall be provided on site to render first aid in in case of accidents, as well as a first aid kit with the necessary medicines and dressing materials.	Construction, operation a nd closure a nd reclamation	Provision of healthy and safe working conditions

9. Description of the expected significant adverse effects of the investment proposal on the environment and human health resulting from the vulnerability of the investment proposal to the risk of major accidents and/or disasters that are relevant to it; the relevant information must be obtained through a risk assessment; the description shall include the applicable measures envisaged to prevent or mitigate the significant adverse effects of these events on the environment and human health, as well as details of preparedness and proposed response to such emergencies

1. Description of the expected significant adverse effects of the investment proposal on the environment and human health from the risk assessment

There are no conditions for a major accident to occur at the IP site according to the criteria for reporting a major accident in Annex 5 of the Environmental Protection Act.

2. Description of the applicable measures envisaged to prevent or mitigate the significant adverse effects of a major accident

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Environment

The main conclusions regarding the estimated degree of impact expected as a result of the implementation of the investment proposal for "Extraction and processing of polymetallic ores from the Rosino deposit, Tintyava area, located in the territories of the villages of Rosino and Gugutka, Ivaylovgrad municipality, Haskovo region, can be summarized as follows:

The harmful impact is mainly concentrated on the geological environment, as non-renewable natural resources will be extracted. The atmospheric air, soil, landscape, vegetation, and wildlife will also inevitably be affected, given the nature of the investment proposal—open-pit mining of metal minerals. The duration of their impact is limited to the period of the future concession, which is up to 35 years.

It should be expressly noted that the analyses of the impacts, the modeling of emissions that will be released into the atmosphere, the impacts of drilling and blasting operations, the impacts of noise, discomfort to the population, and the forecasts in this report are made for the most severe conditions of operation of the deposit at maximum production capacity.

Atmospheric air

Upon implementation of the measures specified in Section VII of this EIA, the impact on ambient air quality during the various phases of the project implementation will be limited to the area around the deposit. No change in the background levels of pollutants in the atmospheric air is expected in the nearest populated areas. No negative impact on human health is expected. The cumulative pollution on the urban environment will be negligible. Based on the calculations and models of the spread of emissions from the implementation of the IP, it can be concluded that no transboundary impact is expected.

Surface and groundwater

During all stages of implementation of the investment proposal for "Extraction and processing of polymetallic ores from the Rosino deposit, Tintyava area," the impact on surface waters is determined to be insignificant. The planned water intake from the surface waters of the Arpa Dere River (VT BG3MA100R270 Biala River and its tributaries) will be in quantities up to 10% of the average multi-year water quantities and is not expected to have a negative impact (including transboundary) on the Biala River catchment. The water at the site will be included in a closed cycle with minimal replenishment from water abstraction, rainwater, and treated process water, and there are no plans to discharge wastewater into surface water bodies. A "zero discharge" approach has been adopted.

Implementation of the investment proposal for "Extraction and processing of polymetallic ores from the Rosino deposit, Tintyava area is not expected to have a negative impact on groundwater and will not lead to a deterioration in the chemical and quantitative status of the affected groundwater body BG3G000PtPg049 Fractured waters - Eastern Rhodope complex. Mining operations will be carried out in the infiltration zone without reaching the water level. Passive groundwater inflow will be pumped to the installation as a priority in order to meet the requirements of the technological installation.

The impact on the chemical status of groundwater will be neutralized by lining the bottom and walls of the contact water tank with an insulating screen

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as well as the construction of a system for capturing any breakthroughs, including a drainage curtain and an injection barrier.
Haskovo region

As a technological option, limited water abstraction from the terrace of the Arpa Dere River is envisaged through the construction of a pumping station in the area of the existing Rosino pumping station.

There is no cumulative impact on water – no discharge of waste water is planned

Based on the analyses in this report, no transboundary impact is expected.

Based on the analyses made in this report, no transboundary impact on water is expected.

Subsoil

The analysis of the current state of the subsoil and the proposed extraction technology for the deposit give reason to believe that, if the investment proposal is implemented, part of the territory will be affected by the extraction activity, but the entire area will not be affected in a way that would lead to significant changes in the stability of the geological environment and its quality characteristics. In compliance with the approved working projects for mining and recultivation and the mine waste management plan, it can be assumed that the underground resources will be extracted fully and without losses (waste), in accordance with the regulatory requirements.

Noise

The activities during the various phases of the project implementation will not lead to a change in the background noise levels in the nearby residential areas. The impact on noise levels in the area is local in scope and no cumulative effect is expected. Based on the calculations of noise propagation from the implementation of the IP, it can be stated with a sufficient degree of certainty that there is no possibility of cross-border impact.

Radiation

The results of gamma spectrometric analyses, compared with the standards under the applicable regulations, show that the activity does not pose a threat to the environment and would not lead to a change in the natural radiation background of the assessed site and its surroundings. The measured radioactivity in the surveyed strata is low enough not to cause contamination and spread of radioactive isotopes to other components of the environment. There is no danger to the environment, to the workers at the site, or to the population, and therefore no specific measures or actions need to be taken to ensure radiation safety.

Biological diversity

If the proposed measures are followed, the implementation of the investment project will have a minor negative impact on the plant and animal world.

Health risk

The main impact of the implementation stages of the IP is on the workers at the site, which is typical for this type of activity (mining industry). With appropriate personal protective equipment and compliance with the relevant requirements for healthy and safe working conditions, it will be reduced to insignificant, without endangering the health of workers.

No significant impact on the nearby population and facilities subject to health protection is expected, as the IP does not lead to exceedances of environmental and human health protection standards. With the measures proposed in the EIA Report, including those for air quality

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the Rosino deposit, Tintyava area, located in the territories of the villages of Rosino and Gugutka, Ivaylovgrad municipality,
air, harmful physical factors, and water, adverse effects will be prevented/limited to the minimum possible.
Haskovo region

For the other components and factors of the environment, including waste, the impact is insignificant, as it affects the territory that will be included in the future concession area and after the end of the operational life of the mine areas and the closure of the mining site, the terrain will be recultivated to the maximum extent possible.

In accordance with the nature and extent of the anticipated negative impact, the team of experts who prepared this EIA report has made recommendations and proposed measures necessary to prevent, reduce, and, where possible, eliminate harmful effects on the environment and human health.

Based on the conclusions of the environmental and human health impact assessment, the conclusion of the team of independent experts who prepared the EIA report is that no significant negative impact on the environment and human health is expected as a result of the implementation of the assessed investment proposal, provided that the recommendations and proposed measures for prevention, reducing and, where possible, eliminating harmful effects on the environment and human health.

Based on the detailed analysis of the impacts of the construction, operation, closure, and recultivation of the investment proposal for "Extraction and processing of polymetallic ores from the Rosino deposit, Tintyava area, located in the territories of the villages of Rosino and Gugutka, Ivaylovgrad municipality, Haskovo region on humans, the components of the environment and the factors affecting it, the authors of this EIA report recommend that the Higher Expert Environmental Council to the Ministry of Environment and Water APPROVE the implementation of the investment proposal of TINTYAVA EXPLORATION AD, subject to mandatory implementation of the proposed measures to reduce the potential impacts identified in this assessment.