ENVIRONMENTAL ASSESSMENT REPORT

MEDIAS BY-PASS

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FOR

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1. EXECUTIVE SUMMARY
2. LEGAL FRAMEWORK

The documentation is based on the specific laws regarding the health and safety issues or collateral regulations, which are prevalent. These are:


  The environmental protection Law represents the basic law for the environmental protection in Romania being based on the principles and strategic elements that lead to the sustainable development of the society.

  These principles and strategic elements are the following:
  
  o Principle of careful decision making;
  o Principle of anticipation of ecological risks and damages;
  o Principle of preservation of the biodiversity and the specific ecosystems within the natural bio-geographic frame;
  o Principle of the paying pollutant
  o Prioritize the removal of the pollutants, which directly put at a serious risk the people’s health;
  o Development of the national environmental monitoring system;
  o Maintenance, improvement of the environmental quality and reconstruction of the damaged areas;
  o Development of the framework for the involvement of the non-governmental organizations and the population in the process of the preparation and application of decisions;
  o Development of an international co-operation in order to ensure the environmental quality.

- *Ordinance No. 860 of MAPPM* for the approval of the Procedure of the Environmental Impact Assessment and the issue of the environmental agreement.

- *Ordinance No. 863 of MAPPM* for the approval of the methodological guides, which apply to the stages of the framework of the environmental impact assessment.


**Regulation regarding the Waste Material Disposal**

Regulations regarding the Water Quality Protection

A standard regarding the provision of the pollutants loading limits of the wastewater discharged into the natural receptors NTPA-001, Romanian HG no. 188/2002.
A standard regarding the conditions for the wastewater discharge into the city sewage or directly into the water cleaning station, NTPA-002/2002, Romanian HG no. 188/2002.

Surface water – categories and quality technical conditions, Standard 4706 – 88.


Ordinance 756 for the approval of the regulation regarding the assessment of the environmental pollution.

Regulation regarding the Protection of the Air Quality

Ordinance of the Ministry of Water, Forests and Environmental Protection for the approval of the technical conditions regarding the air quality and methodological norms to determine the air pollutants emission generated by the stationary sources, no. 462/1993.

Air in the protected areas – quality conditions, STAS 12574-87.

It applies to the atmospheric air and determines the maximum admissible concentration of pollutants around the protected areas. The maximum admissible limits are determined and complied with so that the unprotected population is safe against the negative impact of the pollutants.

STAS 12574-87 shall provide the following:

- values of the maximum admissible limits of the air pollutants in the protected areas, which shall not be exceeded for a number of 29 substances;
- maximum admissible quantity for substances with synergetic effect, which occur simultaneously in the air;
- maximum admissible quantity for sedimentary particles;
- standards regarding the sample taking and analysis methods.

MAPPM Ordinance no. 592 of 25.06.2002 for the approval of the Normative regarding the determination of the maximum values and the criteria and assessment methods for the sulfur dioxide, nitrogen dioxide, particles in suspension, lead, benzene, carbon monoxide and nitrogen in the atmosphere.

Ordinance for the approval of the norms of hygiene and recommendations regarding the environment for the population, no. 536/1997.

Regulation regarding the Soil Quality Protection

MAPPM Ordinance no. 756 of 3 November 1997 for the approval of the regulation regarding the environmental impact assessment:

- It determines the maximum admissible limits and the intervention limits for the concentrations of soil pollutants
3. PROJECT DESCRIPTION

3.1. Project Title

Construction of Medias Municipality By-Pass

Phase: Feasibility Study

3.2. Location

Administratively, the designed road is located in Sibiu County.

The designed road crosses Mediaş municipality, being administratively included in Sibiu county.

As a result of the local relief, through the center of Mediaş municipality is the location of railway Sighişoara – Sibiu and of the National Road DN14 Sibiu – Sighişoara, from which, still in the center of the city, the National Road DN14A Mediaş – Iernut is detaching (DN 15 – Cluj – Tg. Mureş).

3.3. Achievement and Operation of Scheme

The period of execution proposed for the bypass of Medias municipality is one year. The operation time and schedule of the scheme is not limited.

3.4. Investment Opportunity

Presently, Mediaş municipality is crossed by the auto traffic from direction North of the country – Bistriţa – Tg. Mureş to Sibiu Municipality on DN 14A, as well as from Direction East of the country – Sighişoara – Sibiu on DN 14.

These traffic volumes are intersecting through the center of the municipality.

On the area of Mediaş municipality, DN14 is located on the North of Teba Quarter, parallel with the railway Sighişoara – Sibiu, crossing this railway at grade in the central area of the city, penetrating into the historical area of the city on a length of approx. 1.5 km. After that, it continues on the South of the East industrial area, crossing again this railway at grade, at the exit from Mediaş municipality.

On DN 14A, to inscribe on the direction to Sighişoara city it is required to cross DN 14 in the southern part of the city historical area.

For the direction to Sibiu municipality, on the National Road DN 14A the road is deviated through the North-West Quarter, intersecting DN 14 in Teba Quarter.

Both national roads, DN 14 and DN 14A, have street profiles in the sections of crossing Mediaş municipality, being limited by reduced width pathways, by civil and industrial constructions, schools, hospitals, market and administrative areas.
The investment is to be implemented in order to eliminate transit traffic, especially from DN2, that crosses Medias municipality, as this transit traffic from Urziceni, Buzau and Ploiesti to the direction Bacau – Roman is actually crossing the locality, and as a result the main streets of the city are overcrowded by the criss cross traffic inside the city, this traffic being collected from five roads: DN 2, DN 22, DJ 203A, DJ202 and DC Medias – Podgoria.

Note that Medias municipality is also crossed by the transit traffic from DN 22 to Buzau or to Bacau municipalities.

Presently, the traffic is developing close to the municipality center and to the northern area, resulting difficult traffic conditions, degrading and wearing the road structure on the existent main roads as a consequence of the overstress resulted from the heavy and intense traffic, increasing the number of accidents, the significant environmental pollution on the entire surface of the central area of the city.

The traffic increase together with the improvement of traffic safety raise the necessity of black spots elimination over this section through the construction of a bypass that will make the connection between national, county and local roads and will lead to:
- increase of traffic capacity by the improvement of traffic flow;
- elimination of municipality traffic jams;
- development of a comfort plan for the road users;
- increase of traffic safety;
- reduction of accident number;
- improvement of municipality environment through the reduction of NOx and sonic pollution;
- possibility of approach to the future motorway of Corridor IX.

3.5. Project Description

The By-Pass of Mediaș Municipality was designed in vertical and horizontal alignment for a minimum design speed of 50 km/h.

The route of the by-pass detaches from DN 14 in the area km 50+500, on the West of Mediaș municipality.

This junction was designed at grade.

At km 0+990, the by-pass overpasses the railway, assuring the vertical and horizontal gauges required for a future railway. The overpass length is 396m.

Next, the by-pass detours the Water Supply Station to the East, crossing Târnava Mare River on a bridge of 150m length.

Between km 2+000 – km 2+500 was designed a curve to the right, intersecting the existent road which connects Teba Quarter with the Northern area, respectively the by-pass for DN 14A for the direction Tg. Mureș – Sibiu.
This junction, situated at km 2+475, was treated like a roundabout.

Between km 3+000 and km 4+000, with a curve to the left, the by-pass inscribes on the dam of Târnava Mare River RHS shore.

The location maintains on this Dam between km 3+500 and km 6+000. At km 4+825, the by-pass intersects DN 14A.

This junction, situated in the area limited by private properties and the bridge over Târnava Mare River on DN 14A, was treated like a roundabout.

At km 5+100, as a result of the existent reduced section between the border of proprieties and Târnava Mare River, was designed a viaduct of 350m length.

In the area km 6+000, at the confluence with Moșna Stream, there is required a local river bed correction for Târnava Mare River.

The entire section of the by-pass situated on the dam of Târnava Mare River RHS shore, the dam is designed to be pitched with cement concrete slabs on concrete beam and rockfills.

At km 6+450, on a bridge of 150m length, the by-pass inscribes on the North of the industrial area, crossing again the railway at km 7+950 with an overpass of 346m length, intersecting DN 14 at km 8+675 (km 58+100 of DN 14).

The road platform in cross section is 9.0m, from which the carriageway is 7.0m, having marginal lanes of 0.50m.

On bridges and passages the road width is 7.30m, having footpaths of 1.0m width.

The designed road structure is flexible, made of asphalt pavement.

The horizontal alignment is presented in Drawing No. 1.

The typical cross section was designed on the base of the subject matter requirements:

- Carriageway width: 7.00m
- Reinforced shoulders: 2x1.0m, from which 2x0.50m having the same road structure with the carriageway and 2x0.5m reinforced shoulders to prevent the degrading
- Platform width: 9.00m
4. EXISTING SITUATION

4.1. WATER

4.1.1. Surface Water

The hydrographic network of the area is included in the Western Hydrographic Systems Group, being tributary to Mureș River.

Târnava Mare River represents the main water course in the area, having as LHS affluents the rivers Buzd, Moșna and Ighiş and as RHS affluents the rivers Curciu and Paucea.

There are also valleys of semi-permanent or even temporary courses, mostly appearing in the periods of rich precipitations.

After collecting the menage and industrial waste waters from Mediaș municipality, in the section in the upstream of Copșa Mică city, Târnava Mare River is inscribed in the Quality Category III.

As concerns the water pollution, the designed road is not situated in critical areas.

4.1.2. Underground Water Quality

According to the genesis and the hydro-geological storage conditions, the underground waters in the area are differentiated in: phreatic waters and deep waters.

- **Phreatic Waters**

The sandy deposits of the Sarmatian and Pliocene, characteristic to the whole hilly area of the central Transilvanian Depression, offer relatively uniform storage conditions for phreatic waters. The most widespread are the adobe deposits of aquifer strata.

The quality of phreatic waters is inferior in the sarmatian deposits area, where the mineral concentration is approx. 1...3 g/l, the hydro-chemical type is mixed and sometimes even sulfated, and the toughness is high (20...800G). In the pliocene deposits, the water mineral concentration is reduced and the characteristics are specific to carbonates.

The relief floors in the area also determine an adequate depth for phreatic waters: 1...3m in meadows, 5...10m in the inferior terraces and 10...20m in the higher hilly areas.

- **Deep Waters**

The deep waters in Mediaș area are inscribed in the Transilvanian Depression Area, having a Brahi-anticlinal Marginal Structure.
In this area, the deep waters are not present in the fundament formations, but in the coverlet were found 3 subunits of deep waters, manifesting in ascension, in sub-gusher or even in gusher.

In the subunit of brahi-anticlinal corrugation, in Medias area there are cantoned strongly mineralized deposit waters (50...100g/l), especially containing sodium chlorides, sulfated, bromides, iodines and alkaline.

4.2. AIR

Air Quality in the Area

In the Report for the Environmental Impact Evaluation Study, the air quality in the bypass route area is based on the data from the local authorities for environmental protection.

As concerns the emissions, the gases with greenhouse effect (CO₂, CH₄, N₂O, NOₓ, CO) at the level of the county result mainly from the industrial activity, the road transport having a significant influence only for the SOₓ emissions.

The emissions of CH₄ and NH₃ resulted from road transport are insignificant at the level of emissions for the county.

Making an inventory at the level of the whole county for the emissions resulted from traffic, we note the following:

- **Greenhouse Gas Emissions (CO₂, CH₄, NO₂)**
  The greenhouse emissions resulted from traffic manifest by the emissions of CO₂ that represent more than 21% of the total emissions in the county. The emissions of CH₄ and NO₂ resulted from road traffic are insignificant comparatively to the total emissions.

- **Emissions of Substances that affect the Ozone (NOₓ, NMVOC, VOC)**
  The concentrations of gas emissions resulted from traffic, that affect the ozone in the stratosphere, is high for the NOₓ, representing approx. 46% of the total emissions on the county. The emission of NMVOC represent 5% of the total.

- **Acidification Substances Emissions (NOₓ, SO₂, NH₃)**
  In Medias area, the precipitations have pH = 5.5 – 7.4 unit. pH. The acid character of the precipitations (pH<5.5) is a consequence of the emissions of SO₂ resulted from SOMETRA Copa Mică and from the economic agents from the industrial platform Medias. The road transport, as shown above, produces approx. 46% of the total NOₓ emissions. The emissions of SO₂ and NH₃ resulted from road traffic din have insignificant concentrations.

- Referring to the nitrogen dioxide annual average concentrations, they are situated under the MAC values, and the maximum values do not exceed the MAC for 24 hours.
• In Mediaş area, the concentrations of lead and cadmium from the powders in suspension and from the sediments recorded values that exceed the MAC values on average samples for 24 hours. The emissions of lead resulted from road traffic represent only 6% of the total emissions, and the cadmium concentration is insignificant. The exceeding of MAC values for lead and cadmium result from the industrial activities in the area.

• The annual average concentrations of the powders in suspension and the sediments exceed the MAC values, the concentration resulted from traffic being over 8%, compared with the other industrial activities in the area.

4.3. SOIL

4.3.1. Aspects regarding the Quality and Use of the Soils in the Area

At the county level, the soils affected by pollution represent a small percentage, approx. 3–4%, mainly distributed in the area of maximum pollution, i.e. Copşa Mică city area.

The geological erosion produces the degrading of approx. 6% of the soils, and landslips affect 37–38% of the soils.

In the area in study, the most part of the by-pas road is situated in the constructed area of Mediaş municipality, where the soils are strongly anthropic; being used for constructions and town arrangements.

The actual land use in the area is presented in Table No. 4.3.1-1.

Table No. 4.3.1-1: Territorial Fund Situation of the Administrative Area of Mediaş Municipality

<table>
<thead>
<tr>
<th>Land Destination</th>
<th>Surface</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(ha)</td>
</tr>
<tr>
<td></td>
<td>(%)</td>
</tr>
<tr>
<td>Total Inside &amp; Outside Constructed Area</td>
<td>6265</td>
</tr>
<tr>
<td>Total Agriculture Field:</td>
<td>3018</td>
</tr>
<tr>
<td>Arable</td>
<td>1728</td>
</tr>
<tr>
<td>Pastures – shrewdness</td>
<td>1132</td>
</tr>
<tr>
<td>Vineyards</td>
<td>127</td>
</tr>
<tr>
<td>Orchards</td>
<td>31</td>
</tr>
<tr>
<td>Forests</td>
<td>1903</td>
</tr>
<tr>
<td>Not productive</td>
<td>47</td>
</tr>
<tr>
<td>Waters, Roads, Constructions</td>
<td>1297</td>
</tr>
</tbody>
</table>

Taking into account the territorial fund situation of the administrative area of Mediaş Municipality, we note the following:
From the total surface administrated by Mediaş municipality, the agriculture surface represents over 48%, from which predominant are the arable lands (27.6%) and the pastures – shrewdness (18.1%).

The surface of forestry fund in the area is also predominant (30.4%).

The following factors have an impact on the soil quality in the road area:
- local lower fertility;
- erosion level and land slips
- green pollution by weeds growth on the uncultivated land
- industrial pollution on limited surfaces;
- strictly limited pollution within derelict zoo-technical farms.

4.4. BIO-DIVERSITY

4.4.1. Vegetation

The by-pass of Medias Municipality crosses several agricultural fields and pastures.

As concerns the physical and geographical conditions of the location, the by-pass is situated in the area of forest floor of the forests, meadow area, represented by secondary steppe-meadows with species such as Festuca Valesiaca, Festuca Pseudovina, feather grass (Stipa Capillata). Rarely we find hoary oak trees (Quercus pedunculiflora) with tartar maple (Acer tataricum) and ash tree or fluffy oak (Quercus pubesceus), or evergreen oak with hornbeam (Carpinus orientalis) and manna (Fraxinus ornus).

In the location of by-pass, the cultures are replaced by the forest-steppe vegetation, having as dominant species Festuca valesiaca, Koeleria grocilis, Stipa Capillata with bushes of: Prunus spinosa, Prunus chamaecerasus, Amygdalus nana.

The primary natural vegetation presented above was strongly modified as a result of human activities in the area, the fields being presently used for breeding, plantations, handicraft and industrial activities and for habitations.

4.4.2. Fauna

The forest area is characterized by the dominant forest species: lynx, marten, boar, hart, squirrel, and fox, wildcat. The forest-steppe fauna is represented by ground squirrel, ferret, striped mouse.

Târnava Mare meadow contains 2 important fauna domains, as: meadows domain and riverside coppice domain.

The meadow lawn – situated at the contact from the aquatic environment and terrestrial domain are under the influence of same special ecological conditions (periodical flooding and high humidity) are composed in the hill area of Medias, especially from amphibians – bittern (Bombina variegata), and birds – black gulls (Cinclus cinclus aquaticus), mountain codobatura (Motacilla cinerea), codobatura (Motacilla alba alba), bee eater (Merops apiaster), sand martin (Riparia riparia), etc.
The riversides coppice – concentrates on small surfaces, small alimentary resources abundant, which determines the existence, especially during summer, of same rich zoocenoze, with a high variety, dignifying - boicusul (Remiz pendulinus), riversides coppice grelusel (Locustella fluviatilis) and field eagle (Aquila heliaca), etc.

The non-zonal vegetation is characterized by riverside water meadows with species of alder, willow-tree and poplar, intercalated with meadow lawns with Agrostis stolonifera, Alopecurus pratensis, Agropyron repes and cultivated fields. Along with these, there is the hygrofilic and hydrofilic vegetation of the slopes in the meadows of the watercourses crossed by the road.

4.4.3. Natural Habitats, Natural Reservations

The area in study does not present entirely natural habitats. All the habitations initially natural are now anthropic-modified and the agricultural background fields have been degraded in time under the anthropic impact.

Among the natural habitats left we mention the following: fresh water habitats, grassland and shrubbery habitats and forest habitats.

The characteristics of the ecological systems in the bypass area are synthesized below.

The biocoenosis of the ecologic system of the area has suffered a major transformation along the years resulting in the replacement of spontaneous forest vegetation by agricultural crops in the process of natural system substitution.

As concerns the quality aspects, the agriculture cultures are reflected by one dominant specie, with secondary weed species found mainly on the margins of approaches around the cultivated parcels.

The dominant cultures are: corn, wheat, barley, rye and bean.

The weeds specific to the area, growing on the margins of cultivated areas and also penetrate into the crops are: the thistle (Onopordon acanthium), the wormwood (Artemisia absinthium) and graminaceae species such as Agrostis, Calmagrostis, Corex.

The main species of spontaneous flora from the agricultural crops are: Bromus sterilis, Bromus squarrosus and Aegilops cylindrica together with: Asparagus officinalis, Ballota nigra, Anagallis arvensis, Cirsium vulgare, Canabis ruderalis, Centaurea diffusa, Papaver rhoeos.

The areas of natural pastures are generally small including the same species of herbaceous dominated by Botrichloa ischaemum.

On the more steep slopes there is a natural vegetation which includes species like Fetusca vallesiaca and other herbaceous species like: Allium taurium, Stipa capillata, Poa bulbosa, Solanum dulcamara together with some wooden species: Morus alba, Acer tataricum, Ulmus.
The terrestrial fauna of the agricultural ecosystems in the designed road area include the representative elements specific to forest areas together with the species that occurred due to the agricultural crops.

4.5. LANDSCAPE

On Medias Town territory are not areas with especial landscape value, which will necessitate conservation measures.

The construction period is a stage with a limited duration therefore the natural equilibrium and the landscape will be improved after the completion of works. Therefore the landscaping works are not required during the construction stages.

Resinous trees and shrubs, which maintain their green foliage all the year, and deciduous trees with falling leaves, which have the advantage of seasonal chromatic variation, represent the vegetation proposed for the landscaping.

The main issue of landscaping works is the grass seeding. The grass strips on both sides of the route in the safety area form exclusively the vegetal scenery. They cover the embankments and have an important role in the soil stabilization. The grass areas also make evident the shrubs. In addition, the horizontal areas from yards and parking lots are proposed to be lawns with trees and shrubs.

4.6. SOCIAL AND ECONOMICAL ENVIRONMENT

4.6.1. Demographical Data and Population Health

The demographical data synthetically presented in this chapter are based on the “Report on the Environmental Factors” completed by A.P.M. Sibiu (year 2002).

In Medias municipality the urban population is 62000 inhabitants. The population density is over 180 inhabitants/sq.km.

The urban population represents over 40% of the county population and is decreased compared with the year 1992.

Note that the population natural growth is negative. The mortality index is high, mainly caused by the cardio-vascular diseases, as shown in the following table.

Specific Mortality for the Main Diseases:

<table>
<thead>
<tr>
<th>Class</th>
<th>Cases number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circulator system diseases</td>
<td>2908</td>
<td>61.32%</td>
</tr>
<tr>
<td>Tumors</td>
<td>897</td>
<td>18.91%</td>
</tr>
<tr>
<td>Accidents</td>
<td>306</td>
<td>6.45%</td>
</tr>
<tr>
<td>Digestive system diseases</td>
<td>231</td>
<td>4.87%</td>
</tr>
<tr>
<td>Respirator system diseases</td>
<td>188</td>
<td>3.96%</td>
</tr>
</tbody>
</table>
It can be ascertain that the population it is not negatively affected by the actual state of the environmental factors from the living areas. But it should be specified the fact that in the living areas with intense traffic, the pollution level with suspended maters and sedimentary solids could influence the population susceptibility, the infantile first of all, at the contacting of respiratory and allergic affections. It can be cited the possibility of southwest area pollution of Medias Town with nitrogen oxides and powders, with a high level of heavy metals (Pb, Zn, Cd, Cu) emanated by the activity SC SOMETRA and transported by the wind from Copșa Mică locality.

Not that the mortality is not determined by the actual situation of the environmental factors and in none of the cases may be identified any influence of road traffic on the population health in the area of Medias municipality by-pass.

The active population in the area is involved in services, industrial and agriculture activities.

4.6.2. Infrastructure and Public Utilities

As concerns the resources, Medias municipality is provided with the following: natural gas, power supply, potable water supply network, sewerage network, waste waters purification station, heating/thermal plants network.
5. ENVIRONMENTAL IMPACT

5.1. Impact on Water

5.1.1. Impact on Waters during the Construction Period

During the execution of by-pass, the possible water pollutant sources are: works execution, site traffic and site organizations.

Therefore, some fine particles of soil can be carried during the execution of earthworks, consequently getting into the surface waters. The manipulation and laying-down of construction materials (concrete, bitumen, aggregates, etc) determine emissions specific to each type of material and each operation. Accidental losses of material, combustibles, oils from the site machinery and plants may also occur. The inadequate manipulation of vehicles or plants transporting diverse materials near the watercourses may produce accidental discharge into the water.

The volumes of solid particles carried by erosion at the construction works are significant. According to the specialty literature, the volume of erosions specific to roads constructions may be approx. 2000 t/km.

The soil erosion, as a negative effect on surface waters, still manifests at present and shall manifest more intensively during the road execution period. The erosion affects the natural grounds, the unprotected slopes and the platform of the road in study.

In case of works executed near the intersected watercourses, all the works may directly produce water pollution. Also, the rain-washing of the site area may carry the deposits that indirectly get into the watercourses.

The heavy traffic specific to site activity determines emissions of diverse atmosphere pollutants (NO\textsubscript{x}, CO, SO\textsubscript{x} – characteristic to oil carburant, particles in suspension, etc). Also, another pollutant particles result from friction and weariness (from the running way, tires, etc). The atmosphere is also washed by rain, so that the pollutants in the air are transferred into the other environmental factors (surface and underground water, soil, etc).

As concerns the site organizations, as mentioned in a previous paragraph, their location is not determined yet. In these locations, a special care must be taken to the environmental protection.

The carburant supply stations and the plants and transport means maintenance stations are also potential sources of surface and underground waters pollution.

These stations must be approved during the project design phase and periodically verified during the operation as concerns the environmental protection.
5.1.2. Impact on Waters during the Period of Operation

The potential sources of water contamination during the period of operation are given by:

- Direct lay-down on water surface of pollutants resulted from traffic
- Discharge of not purified waste water directly into outlets; the pluvial waters that wash the road are considered to be waste water
- Discharge into outlets of water potentially polluted by toxic and/or dangerous substances resulted from traffic accidents

The estimation of residues directly on the water surface, resulted from the road traffic on the by-pass was performed based on the traffic forecasts for the year 2020, using a model of climatologic type adapted for the calculus of humid and dry deposits.

The Table below presents the lay-down monthly density for the pollutants resulted from the road traffic, comparatively with the value stipulated in STAS 12574/87.

### Pollutant Volume Weight – Year 2020

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Volume Weight</th>
<th>STAS 12574/87</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total particles (g/m² month):</td>
<td>7,22</td>
<td>17</td>
</tr>
<tr>
<td>From which Pb (g/m² month)</td>
<td>0,084</td>
<td></td>
</tr>
</tbody>
</table>

The weight rates and the nature of pollutants resulted from road accidents, potential pollutants for the watercourses or underground waters, cannot be evaluated. In case of traffic accidents, the intervention rapidity and efficiency represent the major elements for reducing the pollution risk.

**Influence on Aquatic Ecosystems and Water Usages**

The purification measures designed for the wastewaters shall assure a minimum risk of pollution for the aquatic ecosystems and the usages.

The pollutant substances evacuated into the watercourses shall not modify their quality class.

**Possible Positive Effects for Waters Quality**

As a result of measures designed (gutters, ditches, slope protections) to collect and evacuate the precipitation waters we appreciate the soil erosion and uncontrolled sediments in the road area to be reduced. Comparatively with the actual situation, the quantities and the concentrations of particles in suspension resulted from streaming waters shall be reduced, consequently improving the quality of surface waters referred by “materials in suspension”.
5.1.3. Water Protection Measures
5.1.3.1. Water Protection Measures during the Construction Period

At the actual phase, the Project does not provide the exact location of site organizations, nor their number, that must be subsequently established by the Constructor.

It is recommended for the site organizations to be located far from the surface waters, forests and outside the localities. However, in order to limit or eliminate the impact, are designed special works, such as: purifying installations for wastewaters (septic tank) resulted from site organizations, settler for the concrete plant, etc.

The Constructor must obtain Approvals and Certificates for the operation of these objectives and the installations they serve, from the Organizations in charge.

The locations where the site organizations will be constructed must be established so as to avoid affecting the natural or human environment (by atmospheric emissions, by accidents resulted from the site traffic, by the materials manipulation, accidental unloading into the water courses of the plants transporting materials, noise, etc). They must not be located next to sensitive areas (near water courses constituting water supply sources, near underground water captures) otherwise must be respected the conditions for their protection. Also, it is recommended to occupy areas as small as possible, to avoid taking out of the actual circuit of large fields.

For the site organizations and production bases must be designed a system for sewerage, purification and evacuation for sewage water resulted from the canteen, hygienic-sanitary spaces, as well as for meteoric waters that wash the site organization platform. According to the number of persons to use the water here in sewage purpose, the system to be adopted shall have one or many septic tanks, periodically emptied, or a purification station type mono-block to assure a high purification grade, so as the purified water to be discharged into an outlet or the neighboring fields.

The site organization platform must also be designed to assure the meteoric water collection by a system of paved ditches or gutters, where the particles might sediment before the water discharges, or there must be designed outflows conducting the water to the purification station for sewage waters.

During the works execution period, it is recommended to place settlers close to the watercourses.

5.1.3.2. Water Protection Measures during the Operation Period

The works designed to retain the pollutants during the exploitation must improve the quality of meteoric waters that wash the road platform before being evacuated into a natural receptor natural or the neighboring fields.

The works designed for capturing the meteoric waters (ditches, culverts) shall avoid the water standing on the road platform, keeping its surface in a good condition.
The water that washes the road platform contains diverse pollutants resulted from the road traffic (vehicles emissions, losses of oils and carburant, friction between tires and running way, etc) or being brought by the wind from the neighboring fields. We appreciate that a significant part of these substances shall be retained in the ditches.

To diminish the quantity of pollutants that may get into the surface waters or may infiltrate into the phreatic underground, also polluting the soil, must be designed oil settlers – separators, settling tanks and dispersion tanks.

To consider that a settler works efficiently if after the water purification the pollutants concentration shall diminish as follows: by 90% for the materials in suspension, by 75% for the chemical oxygen consumption (CCO) and for the bio-chemical oxygen consumption in 5 days (CBO₅), and by 85% for heavy metals (lead, zinc).

The settling tanks and the oil settlers – separators shall be periodically cleaned, and the collected dross (material sediments and oils) shall be transported to an arranged cesspit.

The constructions shall be inspected periodically to verify if the slot or the overflow are not sealed, and the grill shall be also periodically cleaned from large floating particles that may remain between its interspaces (branches, wrappers, etc).

We note that in all the forecast alternatives for the road section the pollutants concentration in the purified water do not exceed the valued admitted by NTPA - 001 (normative that specifies the admissible limits of pollutants concentration in waste waters at the evacuation into the water sources).

During the maintenance activities currently occur other pollution sources, the most significant being the salt (NaCl) spread on the road during the frost periods. We appreciate that in hard winters approx. 5t/year/km of salt is spread to thaw the carriageway. This salt is washed by waters and infiltrated into the adjacent fields. The systematic studies elaborated in other countries attest that the ions of Na are less mobile and they fix into the soil on the first 10-40 cm. The ion Cl is more mobile and it may get into the underground waters. No dangerous pollution was noted on the environmental factors as a result of salt washed from the carriageway. Large quantities of NaCl may infiltrate into the soil in case of inadequate storage.

The maintenance activity shall use fertilizers and herbicide for the green areas on slopes and in the parking areas. The areas are small and the quantities of dangerous substances are also reduced. We appreciate the impact of this activity is insignificant in the designed road area, preponderantly agricultural and industrial.

5.2. Impact on Air
5.2.1. Air Impact During the Construction Period

The main air pollution sources have been classified as follows:

- Construction Plants Activity
- Transport (construction materials, prefabricates, personnel, etc)
- Cement Concrete Preparation
• Asphalt Mixture Preparation

In the site are also carried out other activities with potential air pollution, such as: carburant supply for plants and transport means, plants maintenance and repairs, heating the offices and the sewage water. The air pollution resulted from these activities is reduced during the construction period.

The emissions of air pollutants can be classified in emissions specific to carburant combustion in the engines (NOx, CO, COV, SO2, CH4, powders/PM, etc) and emissions specific to traffic and plants activities (powders in suspension and sediments).

To evaluate the impact of these emissions, was analyzed their dispersion and were determined the potential concentrations of air pollutants.

As a hypothesis, was admitted that the construction activities are concentrated in a working section of 5.000 x 60m. In this section, the plants activity can be uniformly distributed on surface and the transport means traffic is carried out on an average distance of 10 km.

### Air Emissions in the Construction and Operation Period

<table>
<thead>
<tr>
<th>Pollutant Nature</th>
<th>Construction Period</th>
<th>Operation Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Emissions (kg/day)</td>
<td>Specific Emissions (kg/Km)</td>
</tr>
<tr>
<td></td>
<td>Daily</td>
<td>Hourly</td>
</tr>
<tr>
<td>Nox</td>
<td>171</td>
<td>8.55</td>
</tr>
<tr>
<td>CO</td>
<td>68.4</td>
<td>3.42</td>
</tr>
<tr>
<td>VOC</td>
<td>27.36</td>
<td>1.37</td>
</tr>
<tr>
<td>Powders</td>
<td>13.68</td>
<td>1.71</td>
</tr>
<tr>
<td>SO2</td>
<td>34.20</td>
<td>0.68</td>
</tr>
<tr>
<td>CH4</td>
<td>3800</td>
<td>190</td>
</tr>
<tr>
<td>N2O</td>
<td>171</td>
<td>8.55</td>
</tr>
<tr>
<td>Carburant Consumption (diesel oil +gas), [liters]</td>
<td>68.4</td>
<td>3.42</td>
</tr>
</tbody>
</table>

*For the operation period was considered the traffic for the years 2020

Examining the data presented in the Table above, we note that the hypotheses concerning the plants activity and the transport traffic, the hourly emissions of air pollutants, for 1km, during the construction period are comparable to those for the operation period.

The carburant consumption, also for 1km of road or by-pass section, during the construction period is approx. 2 times smaller than the consumption in the operation period.
Accepting an unfavorable working situation on the site, hypothesis where all the activity is concentrated in one working front of 5000 x 60m, the afferent emissions shall be 2 times greater than the values in the Table and approx. equal with the values in the operation period.

Considering these hypotheses, the concentrations of pollutants in the area of plants activity and on the transport means route may be situated between the following values:

- \( \text{NO}_x \), \( 0.04 – 0.08 \text{ mg/m}^3 \)
- \( \text{COVnm} \), \( 0.2 – 0.3 \text{ mg/m}^3 \)
- \( \text{CO} \), \( 0.6 – 1.2 \text{ mg/m}^3 \)

These values can appear on short periods, for unfavorable weather conditions (wind perpendicular to the road, having the speed under 1 m/sec).

Laterally to the road path, the pollutants concentrations decrease with the distance to the road, after 20 – 30 m having approx. 50% and after 50 m having approx. 30% of the maximum values found at the road margin. After approx. 100 m, the air pollutant concentrations are insignificant (less than 10% of the values at the road margin).

The maximum potential concentrations, appreciated according to the values above, are at least 3 times smaller than CMA.

The main pollution in the site area is appreciated by pollutants concentration of 3 – 10 times smaller than CMA. The conclusion is that during the construction period the maximum admissible values for air pollutants concentrations shall not be exceeded in the area of site activities and on significant areas (hundred of sq.m for plants activity areas and tens of sq.m along the site roads). This conclusion refers to chemical pollutants (NOx, CO, COVnm, etc) and does not include the air pollution with powders in suspension and sediments.

In the plants activity areas and on the transport means route the powders concentration in the air may frequently exceed 2 – 3 times the admissible concentration of 0.5 mg/cu.m (for protected areas).

The exceeding values may be greater in conditions of long time drought, earth roads, disregarding the minimum maintenance measures.

The effects of high concentrations of powders in the air are manifested, on people, by unpleasant sensations, discomfort, respiratory irritations, and even by sickness, after long term exposure. The dust sediments on plants diminish the photosynthesis; reduce the growth and the productions.

The areas of air pollution with powders/dust are relatively limited in space, manifesting in the neighborhood of working points and transport means. According to the appreciations of US-EPA / AP – 42, the particles having the diameter more than 100µm sediment in short time, the sediment area being under 10m from the road margin. The particles of dimensions between 30µm – 100µm sediment in the
first 100m lateral to the road. The particles of dimensions less than 30µm, respectively powders in suspension, sediment at distances of more than 100m.

During the construction period, the operations of cement and asphalt mixture plants represent activities of high potential for air pollution.

The pollution specific to asphalt plants manifests by emissions of toxic pollutants (NOx, CO, etc) resulted from combustibles combustion and emissions of powders/particles.

Generally, the modern asphalt plants are provided with filters for retaining the pollutants, assuring low concentrations values that comply with the atmosphere protection norms, particularly with the Order No. 462/1993 “Technical Conditions concerning the Atmosphere. Norms for Limiting the Pollutant Emissions for Combustion Installations”.

Choosing a proper height for gas combustion furnaces ensures the conformation with the legislation regarding emissions.

It is the contractor’s responsibility to provide asphalt plant and sites for these plants.

The monitoring of emissions and imissions is obligatory.

All mentions about asphalt plants are also applicable to concrete plants, for the concrete plants being required measures to limit emission of powders, including cement particles.

The monitoring of emissions and imissions is also obligatory.

5.2.2. Impact on Air during the Working Period

The air impact evaluation of pollutant educed by analyzed sites made of mathematical modeling of pollutant dispersion, using a gauss type of model, the climatic model Martin and Tikvart.

The total concentration for a given mediation period is the sum of all sources’ concentrations for that period.

For short-term evaluation of air pollutant concentration on road area, the worst dispersion situation is atmospheric steadiness or weak wind perpendicular to the road direction.

A 1m/sec wind speed, perpendicular on road, was taken into consideration for modeling.

The highest pollutant concentration is at road margin. At approx. 100m from the roadside, the pollutant concentration in the air is approx. 20% of the highest values.
Evaluation of air pollution on by-pass area is presented next, in comparison with the maximum accepted concentration set in STAS 12574 – 87 “Air in Protected Areas” and MAPM Order no. 529/2002.

We note that the maximum air pollution resulted from the traffic on the by-pass is given by the emissions of nitrogen oxides NOx, for which the maximum side road concentration, for short period (1 hour), in bad conditions of dispersion, may represent 5.4% of CMA. For the other analyzed pollutants, in the same conditions, the concentrations do not exceed 2%.

The annual concentrations of the traffic pollutants in the road area, resulted from traffic, does not exceed 2 – 3 % of MAC for NOx and NMVOC and 1% of MAC for the other analyzed pollutants.

In conclusion, it can be said that the air pollution in the by-pass area, for the working period after 2020, will inscribe into the accepted limits for that period. From all analyzed pollutants, the nitrogen oxides NOx can induce major short term pollutions of approx. 30% of MAC at the junctions with other important roads, and of approx. 30% in the other situations.

The accepted limit for synergetic pollutants is not exceeded. Air pollution evaluation in working period (after 2010) is based on the fact that present pollution is percent of MAC, and it will be maintained after 2010, in accordance to Ord. 592/2002.

Road traffic pollution has significant values on the roadside, up to 50 – 100m distances. The concentrations of pollutants, up to 50 – 100 m from the roadside, represent 10 – 20 % of the maximum concentration at the platform margin.

The appreciations made in this chapter regarding air quality in the by-pass area must be considered sufficient. Emission flows were analyzed according to the EURO 1 requests. The percent of high performance cars shall be continuously raised due to vehicles import, significantly reducing the pollutant emissions.

5.2.3. Measures to Decrease the Impact
5.2.3.1. Protection Measures for the Air during the Construction Period

- Air contamination sources related to the activities on the road location and borrow pit areas are free open sources, disseminated on large areas with different characteristics from industrial sources or such. Therefore, the collecting-cleaning-evacuation devices of the polluted air/gas are out of the question.

The question of the collecting-evacuation devices and the powder retaining is available for the site area, for asphalt and cement concrete plants.

- installing collecting-evacuation devices it is necessary for the following devices:
  - Lime and cement silos: sack filters (with recovery by vibration-shaking) = 99,9% efficiency;
  - Asphalt plant: local polluted air retaining plant in the aggregates drying and mixing area, with sack filters = 99,9% efficiency;
- Filer bunker: local polluted air retaining plant with cyclone = minimum 75% efficiency.

For decreasing the emissions from the asphalt and cement concrete preparation plants it is advisable to use modern technology plants, as less pollutant.

- Vehicles emissions must be according to the technical specifications set out during the periodical technical inspections, as required for all registered cars in the country.

- Works regarding site organization must be proper conceived and performed with modern endowment in barrack camp and plants, in order to decrease the emission of air pollutant in the air, water and soil. Setting all of them in one site is good for the minimizing the impact areas and encouraging a proper and controlled service.

- Cement and lime flow will be strictly supervised from the railways stations up to the silos by acquiring closed compressed air systems, filters for silos, bunkers, tank cars with specialized spreading.

- Portal type structures will be installed at the exit of the borrow pits, to spread water on the ground, forming a crust, stopping the soil spreading due to wind or traffic.

- The plants and the transport means shall be periodically checked for carbon monoxide level and exhaust gas level and shall be put in operation only after removing any dysfunctions. For that, the construction sites must be provided with the necessary testing instruments.

It is recommended to use only plants and transport means with diesel engines, which do not evacuate Pb, and produce less carbon monoxide.

- The transport means shall be supplied with carburant only at site organization central gas station. The fuel truck can refuel the plants on the site, but only in locations with no dust emissions.

- Dusty technological operations, such as soil fillings, shall be reduced during windy weather or the surface areas more intensely moistened. Special care shall be taken for laying down the first layer, as it involves dust lime spreading.

5.2.3.2. Protection Measures for Air during the Operation Period

For the main pollution source, on current working period, which is the traffic on the by-pass, the devices for collecting-purification-dispersion are out of discussion.

Road traffic pollution emission systems are in low proportion in Romania. With the evolution of local engines technologies and the national legislation in this domain these systems will evolve, with good effects on the environmental quality.

The plants and the transport means shall be periodically checked for carbon monoxide level and exhaust gas level and shall be put in operation only after removing any dysfunctions. For that, the construction sites must be provided with the necessary testing instruments.
5.3. Soil Impact
5.3.1. Impact on Soil during the Construction Period

The main impact on soil during the construction period is as the consequence of temporary land occupying for temporary roads, platforms, supplying and production bases, site organizations, waste deposits, etc. The ecological reconstruction of the area is compulsory.

The impact on soil resulted from all the activities performed during the execution period is important. All the areas taken over will induce soil structural changes.

The types of impact on soil, identified during execution period are:

- Vegetal soil removal and construction of an artificial profile resulted from the execution of embankments on the road territory.
- Soil profile degradation on 3-5 m depth resulted from the borrow pits exploitation.
- Soil erosion
- Loss of fertile soil genuine characteristics by improper storage from road unbinding.
- Fertile soil removing/degradation in area of technological roads or deviations of actual access roads.
- Splitting soil areas from ecological circuits, by using concrete.
- Accidental overflows of substances directly on the soil.
- Uncontrolled storage of waste, construction materials or dumps.
- Potential leaking from waste waters sewers/collectors.
- Qualitative changes of the air, determined by the pollutants existent in the air.

Below there are presented the atmosphere pollutants impact on soil, with the mention that the effects will appear mostly on the areas situated close to the sites. The “sensitive” areas are those situated 30m from the working area.

- Dust particles (from soil manipulation, construction materials removal and fuel burning).
  Fine powders resulted from the construction materials manipulation shall also be taken into consideration.

- \textit{SO}_2\textit{ and NOx}  
  These oxides are considered to be the main pollutants producing acid settles on soil.
  Settling of acids begins with pollutants from air that, in contact with the light and water vapors, results in acid compound. Sometimes gas carries away dust particles that end up dry on soil. Acid compound may appear at various distances, being difficult to identify the source and to measure the
concentration on soil level.

The effect of these settlements, especially of the acid rains is the acid soil, and the destruction of the fauna from the soil, creating proper conditions for anabiosis of some plant species and decreasing of the productive capacity of the soil.

Following the project provisions and air impact monitoring is compulsory for the responsible institutions in order to limit the pollution effects on soil during the construction period.

5.3.2. Impact on Soil during the Operation Period

The main pollutants eliminated by the vehicles exhaust gas are: carbon monoxide (CO), nitrogen oxides (NO\textsubscript{x}), paraffin and aromatic carbohydrates (Hc), sulfur oxides (SO, SO\textsubscript{2}), particles (fume) – in case of diesel oil = lead and lead compounds – resulted from the use of lead additives.

Along with the direct impact on the environment, these pollutants have also indirect effects. Rains wash the atmosphere, so that pollutants in the air are transferred into the other environmental factors (surface and underground waters, soil, vegetation, fauna) and end up affecting the human health.

The calculus for the concentrations of pollutants evacuated in the atmosphere from the road traffic on the by-pass has shown values inferior to the maximum admissible limits.

In our country, up to present, land contamination due to traffic has not been obvious. Pb, Ni, Zn concentrations in soil close to road area were within the values set by Order 756 / 1997 regarding environmental contamination evaluation, without reaching the alert values for less sensitive soil.

5.3.3. Soil Protection Measures
5.3.3.1. Measures for Soil Protection during the Construction Period

The calculus performed in the previous chapters have shown that the values of pollutant emissions in the air, water and soil, as well as the noise level resulted from the site activities during the execution period are mostly lower than the acceptable concentration values at their highest limits.

However, along with the general measures previously mentioned, it is recommended to make use of special constructions and equipment to reduce the impact.

It is recommended for the plant platform to be provided with concrete and crushed stone surface, in order to avoid or reduce pollutant infiltrations.

Still referring to the production base, the platform for plants cleaning and maintenance should be provided with a slope so as to collect the waste water (resulted from machines washing), the oil and fuel remains, and to conduct it to a settler that should be periodically cleaned, the sediments to be evacuated to the closest purification station.
Within the site organizations must be provided a drainage system to assure the evacuation of meteoric waters that wash a large area, in order to avoid the infiltration of diverse substances into the soil, polluting it as well as the underground waters. These waters may be drained to the closest outlet or even on the adjacent fields after being passed through a settler.

Wastewaters resulted from the site should be evacuated into a septic tank that should be periodically cleaned.

Special funds are allocated during the execution period and it is the Constructor’s obligation to take all environmental protection measures for all pollutant factors (production base, materials deposits, site organizations, soil quarries). It is also the Constructor’s obligation to carry out the ecological rebuild of the affected areas.

The works monitoring shall ensure all necessary environmental protection measures.

5.3.3.2. Measures for Soil Protection during the Operation Period.

To reduce the environmental impact of the road traffic, special works shall be carried out. In addition, some general recommendations will be made.

For improving the quality of meteoric water that washes the by-pass before being drained into the outlet, were designed settlers and grease separators.

For the protection of underground waters and of soil quality, septic tanks were designed to collect wastewaters, to be cleaned afterwards.

Still as a general measure, the storage of dump resulted from these utilities and also from the activities to be carried out close to the by-pass must be avoided next to the running waters. Waste should be stored only in proper cesspits accepted by the authorities in charge.

5.4. Impact on Fauna and Flora

5.4.1. Flora and Fauna Impact during the Construction Period

The previous chapter referring to the assessment of air impact concluded that for the chemical air pollutants (NO$_x$, CO, COVNM, NH$_3$, etc.), resulted from burned fuel, the possible values during the construction period are inferior to MAC limits. The potential concentrations are not dangerous for the vegetation.

Generally, the air pollution in the area during the construction period is inferior to the one for the by-pass operation, resulted from road traffic (referring to the forecast traffic values).

As the air pollution is not dangerous for the vegetation as concerns the chemical composition, the pollution with particles in suspension (dust) may generate negative effects.

Referring to fauna, this shall not be affected by the imissions of pollutants, but there
are other negative factors specific too construction sites, such as noise, site traffic, limited approach to some areas, etc.

The site activities impact on the flora and fauna is very complex. Air pollution reduces the photosynthesis process and inhibits the normal growing of the plants.

The site has generally a negative complex impact on vegetation. Temporary field occupation, soil potential pollution, dump deposits, etc. all these have negative effects on vegetation, i.e. minimizing the vegetation areas.

The wild fauna is also affected by the site activities.

Noise, site traffic, site activities etc, modify the natural habitat, having significant effects on fauna. General situation of the habitat will be back to normal parameters during the ecological reconstruction works.

The culverts designed on the by-pass, represent as well underground passages, that may also be used by the animals.

5.4.2. Flora and fauna impact during operational period

The pollutants mentioned in IUFRO guidelines for air and vegetation quality, that have negative impact, are the following: SO$_2$, NO$_2$ and O$_3$.

**Sulfur Dioxide**

The chemical and physiological effects that may occur depend on the SO$_2$ quantity/unit of time: chlorophyll degradation, decrease of photosynthesis, increase of respiratory rate, changes in proteins metabolism and in lipids number and water, in enzymatic activity.

Changes in plants communities balance: reducing the variety of species, that may produce the alteration of structure and functions for the whole community.

The International Organization of Health recommends a limit of 30 $\mu$g/m$^3$ as annual average.

**Nitrogen Oxides**

Up to certain nitrogen oxides concentrations, they have positive effect on plants, helping them to grow. However, it was noticed that in these situations the sensibility to insects and climatic conditions increases.

Over the toxic limits, nitrogen oxides have very clear toxic effect.

The size of damages suffered by the vegetation depends on the pollutant concentration, time of exposure, plants age, light and moisture conditions. The symptoms are “invisible” and “visible”. The invisible ones are the decrease of photosynthesis and perspiration.

**Nitrogen Oxides in combination with Other Pollutants**

The studies highlighted the synergic effect of the nitrogen dioxide and dioxide sulfur, as well as the effect of these two gases with the ozone.
By determining the concentrations, we may conclude that the impact of the by-pass on vegetation and fauna is minimum and there are no special protection measures required.

As a conclusion, the air pollution has a small effect upon flora and fauna.

The traffic on the by-pass, except for the air pollution, may affect the flora and fauna by other components resulted from traffic.

To reduce the accident risks involving wild and domestic animals, some passageways were designed. For animals crossing from one side of the road to the other, were designed culverts with spans of 2m, 3m and 4m. These culverts, together with the passages, ensure the animal crossing in the area.

In the forest areas, the wild life shall mainly be affected by the noise. Consequently, in the areas near the road location, the nestling and reproduction places shall be changed, but with no significant modification of the number of population. This appreciation is the same with the opinion of forestry authorities.

5.4.3. Measures for Fauna and Flora Protection

5.4.3.1. Measures for Fauna and Flora Protection during Construction Period

The measures for fauna and flora protection during construction period must be taken even in the period of design and works organization, as follows:

- During the phase of selecting the solution for the road location, avoiding the sensitive and protected areas, as well as crossing forest areas.

- The location of site organizations, production bases, borrow pits and access roads are selected so as to have minimum impact on the environment. These locations must avoid nestling and reproduction areas, as well as the watering places. The surface of temporary occupied lands during the construction period must be reduced as much as possible.

- To avoid accidents that may involve people and animals, the Constructor shall build fences to stop the access in the dangerous or exposed areas.

- The unsupervised storage of barren and vegetation resulted from the embankment works must be avoided, strictly respecting the areas allocated by the local environmental protection authorities.

- The Designer mentioned special funds to be allocated were established for ecological restoring on the land temporary occupied.

5.4.3.2. Measures for Flora and Fauna Protection during Operation Period

For the protection of fauna during the operation period, the designer must specify measures to assure the road safe crossing:
- Road crossing by small and crawling animals can be done under the designed culverts and bridges. The humid areas situated under the culverts and bridges will attract the animals on these routes.

- As the most part of the route is located within the built-up area, there is not required to design special passages and tunnels for big size wild animals, as they cannot be found in the area in study.

For the protection of flora and fauna protection during the operation period, the maintenance works shall be carefully carried out, respectively the cleaning of ditches, settlers and oil products separators, culverts, septic tanks, as well as the dumps existent along the road, in order to stop the potential diseases that could affect the animals and the normal growth of the vegetation.

The road alignment does not cross-forest areas.
6. ALTERNATIVES ANALYSIS

The analysis in conceiving, design, execution, exploitation and monitoring of an investment from the Environmental Protection point of view can refer to the following elements:

- The choosing of the location
- The choosing of the technical and technological solutions of production including the equipment, the raw, the packing, in the end the cycle of life of the products.
- The choosing of the technical and technological solutions of execution including the equipment and the materials.
- The choosing of the construction time and of the duty cycles.
- The choosing of the best techniques available in all stages.

In all the cases the alternatives will take into consideration the Solution “0”, respectively the consequences in all the domains, in case the investment shall not be carried out any more.

In case of a passageway, such as a by-pass, the specific alternatives may be:

- Choosing the alignment
- Maximal speed of movement (traffic)
- Safety traffic degree
- Type of pavement
- Technology, equipment and materials used in execution
- Level of comfort offered to traffic participants
- Periods of execution

These elements are presented and analyzed next:

1. Analysis of Solution “0”.

The Solution “0” cannot be taken into consideration as the roads modernization in Romania it is not only a condition for the integration of our country in The European Community, but it is also a condition of our economical and social development. Romania is considerable left behind in the domain of its substructure, the transport network in general and the road network in special must be rapidly developed and lined up to the international circuits, but at the same time it must assure the conditions of security and comfort and for internal traffic, for population in essence.

The Solution “0” cannot be taken into consideration, as it is absolutely necessary to deviate the transit traffic, especially the hard traffic, from Medias municipality, to improve the air quality, and to decrease the sound pollution level in the city.

2. Analysis of the Alignment

In the feasibility study elaborated are analyzed the following options:

- Option 1
The by-pass, strips off from DN 14 at km 50+500 with a curve at the left, 1500 m radius, eschewing at the east the purification plant, and crossing the railroad 300 Brasov - Oradea.

After an alignment of 495 m, from km 2+000 a right curve was designed, with a radius of 350 m, crossing Târnava Mare River and intersecting the existing road from Teba ward.

After a 517 m alignment, at km 3+125 by a left curve with the radius of 620 m, the route inscribes on the right bank dyke of Târnava Mare River.

The route follows the dyke between km 3+500 - km 6+000 by curves successions that ensures a minimum speed designed at 60 km/h.

From km 6+000 on an alignment of 1160 m Târnava Mare River is crossed.

After that the road route inscribes on a curves at the right with a radius of 1500 m, which eschews on the north the industrial area, crosses the railway and links at DN 14 at km 58+100.

The longitudinal profiles declivities inscribes in 0,3 - 4% interval, and the minimum convex vertical radius is 4000 m.

From the total length of 8,425 km, bridges and passageways have a length of 1,185 m.

The route ensures the maintaining of agricultural terrains undivided, ensures the intersections with the local roads network and superior crossing of the railways.

- **Option 2**

  Option 2 links at DN 14 on the same sections as Option 1.

  For Option 2 was analyzed the possibility of a route on the north of Medias town.

  The south by-pass option due to the construction and landscape cannot be taken into account.

  Option 2 was analyzed between km 0+000 and km 9+000 in two sub-options:

  **Sub-option 2A**

  Sub-option 2A has a commune route with option 1, until km 2+500, sector were the railway 300 and Târnava Mare river are sub-crossed.

  Before the intersection with the road of Teba ward, the sub-option inscribes, on the north direction, in a succession of serpentines on Ceahlaul and Colibelor hills, and after 6 km with a speed of 25 km/h arrives on a route of forest sector, from the quote 290 m until the quote of 491 m, with a average declivity of 3,35%.

  On this sector are necessary two viaducts with a total length of 4,20 m.

  The transversal profile belongs to the hillside, were consolidations and are necessary upstream and downstream.

  **Sub-option 2A**

  The route strips off from option 1 (at the railway 300 crossing, going in the north direction thru Băile Bazna).

  The landscape characteristics conduct at the same solving way of geometrical elements in plan; longitudinal and transversal profile the same as sub-option 2A, the viaducts being not necessary.

  From km 9+000 sub-options becomes commune with the appellation of option 2.
Option 2 from km 9+000 goes south-east on DN 14A, were it superimposed at the Trafo point, and after 1 km abandons this route, going into a sinuous route with a designing speed of 40 km/h on Valea Lungă, crosses Târnava Mare at km 16+000 and the railway 300 at km 17+000 from were is superimposed on option 1.

The total length of option 2 is 18,030 km.

Those options, 1, 2A, 2B, were presented in the public consultation, were because of the higher length with about 9 km and because of the forest crossing, the instability of hills area crossed, option 2 was eliminated.

3. Maximum traffic speed imposed by the actual Norms is 80 km/h, because of the by-pass sinuous alignment. The problem was to find technical solutions for its implementation without risks, respectively to assure the compliance with the Norms concerning the curves radius, the declivities and the comfort in traffic.

4. Traffic security grade is assured by the selection of alignment and on the specifications of point 3, as in this domain there are no variants to be analyzed.

5. Choosing the Pavement Type. The solutions analyzed for structure were: cement concrete and bituminous complex structures.

The by-pass pavement shall have bituminous structure, as this is the most frequent solution used for roads and has the main advantage of the most facile maintenance and repair.

Taking into account that during the execution the preparation of concrete – bituminous or from cement – is performed out of the road territory, the solution of bituminous structure specified by the designer considering other reasons as well, is adequate.

6. Technology, Materials and Equipment used in Execution.

This matter is presented in Chapter 2. “Technological Processes”. To have the guarantee that in the period of execution the emissions of noxa agents produced by the mechanized processes, the elaborators of the present Environmental Impact Evaluation Study acted as follows:

- They have chosen the most complex technologies, detailing the respective works.
- They have chosen the construction equipment of current type – older, in other words – having high fuel consumption so that in case the Contractors use equipment of more performance, the emissions will be smaller.
- It was suggested however to use only equipment and transport means with Diesel oil which produce more reduced lead emissions.

Therefore have been obtained the maximum possible values for emissions, and consequently their significant effects can be evaluated, to indicate the required measures.

7. Site Organization Solution
This option is in fact the Contractor’s obligation, and he must complete the documents requested by the Environmental Protection Authority.

We suggest to avoid arrangements such as Site Organizations located in the alignment, for the following reasons:

- The alignment is inserted on narrow corridors, close to Medias River, and the water can be easily polluted by the site activities.
- The additional pollution in the city is much more distributed in space and the economical production companies must anyway take measures for Environmental Protection.
- Some works executed on the alignment involve special prefabricated parts which can be executed only in specialized factories.

In conclusion, the present Study recommends avoiding the execution of arrangements and activities such as site organizations on the by-pass route.

From the point of view of environment protection, option 2 conducts definitely occupancy or changing of actual destination for same terrains three times higher than option 1.
Also option 1, crosses forest areas with and important impact on fauna.
## 7. ENVIRONMENTAL MANAGEMENT PLAN FORMAT
### 7A. MITIGATION PLAN

<table>
<thead>
<tr>
<th>Phase</th>
<th>Issue</th>
<th>Mitigating Measure</th>
<th>Cost (euro)</th>
<th>Institutional Responsibility</th>
<th>Comments (e.g. secondary impacts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td><strong>Noise and vibrations</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Monthly maintenance of the technological roads, by occluding the hole, completions and leveling 5000 linear meters</td>
<td>2200</td>
<td>Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Demarcation of the speed limits areas and the signalization of those near the localities of Apalina and Solovastru, sets = 2 pieces</td>
<td>250</td>
<td>Contractor</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td><strong>Waste disposal</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Installing ecological toilets at the working fronts and at the production recons, 3 pieces</td>
<td>8250</td>
<td>Contractor</td>
<td>Contractor (hiring and exploitation trough specialized firms)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Periodical removal of the waste from the production recons and from the working fronts by specialized firms on the basis of a contract, 3 collecting points</td>
<td>5500</td>
<td>Contractor</td>
<td>Contractor (hiring and exploitation trough specialized firms)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cleaning and removing the mud from the decantation areas and septic tank in the production recon and in the site organization trough specialized firms on the base contract, collecting points 2</td>
<td>1500</td>
<td>Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Construction of special hole for the inactive and un-dangerous waste 1 piece.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td><strong>Surface waters, ground waters, soil, fauna, and flora</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Construction of the production recon and site organization on a project base and Environmental Impact Study 1 pieces</td>
<td>3250</td>
<td>Contractor (specialty designers)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prevent accidental spillage at the carburant supplying</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- The supplying will be made in special arranged places (concrete platforms) and endowed with oil products separators, 2 supplying points, (concreting surface = 50 m²)</td>
<td>750</td>
<td>Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Elimination of the meteoric and residual water pollution from the production recon, by constructing the decantation areas 3 pieces</td>
<td>3000</td>
<td>Contractor</td>
<td></td>
</tr>
<tr>
<td>Environmental Domain</td>
<td>Description</td>
<td>Cost</td>
<td>Reference</td>
<td>Executor</td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
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</tr>
<tr>
<td><strong>Air</strong></td>
<td>Restricting the cars washing at Mures and Gurghiu rivers through the construction of special ramps endowed with oil products separators and suspended maters, 1 piece</td>
<td>2500</td>
<td>1000</td>
<td>Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stopping and reduction of the infiltrations of pollutant substances in the ground waters through the construction of concrete within the production recon 2000 m²</td>
<td>44000</td>
<td>_</td>
<td>Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Using the systems for caption – eviction (particles retaining) at the following execution from the production recons: cement silos, filter and lime 4 pieces, and at the installations for the preparing of asphalt mixtures, 1 piece</td>
<td>Constructor's task</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Permanent maintenance of the site roads and the platforms from the production recon, by sprinkling and mechanical sweeping, 42,000 m²</td>
<td>-</td>
<td>42000</td>
<td>Contractor</td>
<td></td>
</tr>
<tr>
<td><strong>Economic and social environment</strong></td>
<td>Sprinkling installations execution at the quarries, 1 pieces</td>
<td>-</td>
<td>64000</td>
<td>Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Site organization emplacement, production recons, technological roads, the borrow pits should be dimensioned at the minimum necessary and fenced with fences of 1.6m high, 1 km</td>
<td>30000</td>
<td>_</td>
<td>Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Marking the working front with reflecting bands 1800 linear meters</td>
<td>3600</td>
<td>_</td>
<td>Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Presentation to the people's trough public consultation, to the pollution level and measures taken, 2 public consultations.</td>
<td>2000</td>
<td>_</td>
<td>Beneficiary</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sever control of the concrete and asphalt transportation in order to prevent accidental spillage or uncontrolled washing of the cars, 2 traffic controllers</td>
<td>_</td>
<td>12800</td>
<td>Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Soil cleaning points placing of the vehicles tires, before entering the public roads 2 pieces</td>
<td>1000</td>
<td>2000</td>
<td>Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Procuring mobile sanitary installations for the working fronts, 2 pieces</td>
<td>7000</td>
<td>2400</td>
<td>Contractor</td>
<td></td>
</tr>
<tr>
<td>PHASE</td>
<td>WHAT PARAMETER IS TO BE MONITORED?</td>
<td>WHERE IS THE PARAMETER TO BE MONITORED?</td>
<td>HOW IS THE PARAMETER TO BE MONITORED/TYPE OF MONITORING EQUIPMENT?</td>
<td>WHEN IS THE PARAMETER TO BE MONITORED-FREQUENCY OF MEASUREMENT OR CONTINUOUS?</td>
<td>WHY IS THE PARAMETER TO BE MONITORED (OPTIONAL)?</td>
</tr>
<tr>
<td>-------</td>
<td>----------------------------------</td>
<td>----------------------------------------</td>
<td>---------------------------------------------------------------</td>
<td>---------------------------------------------------------------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>0</td>
<td><strong>SOIL</strong> – general chemical indicators, including the heavy metals and extractible substances</td>
<td>The samples will be drawled from km 0+500; km 4+000;</td>
<td>Solid, spade, plastic bags</td>
<td>Before the works start 3 samples</td>
<td>In order to establish the initial soil quality</td>
</tr>
<tr>
<td></td>
<td><strong>AIR IMISIONS</strong>: SO\textsubscript{2}, NO\textsubscript{x}, NH\textsubscript{3}, total suspended powders, sedimentary powders</td>
<td>Air samples will be taken from km 3, km 5 and km 6.</td>
<td>Gaseous, drawing pomp with filter for suspended powders and absorption columns with specific reactive</td>
<td>Before the construction activity start 3 samples</td>
<td>In order to establish the initial air quality</td>
</tr>
<tr>
<td></td>
<td><strong>NOISE</strong> – noise level</td>
<td>Sound level meter QUEST-2900 Near the houses from the road route: km 3, km 5 and km 6</td>
<td>Noise levels, Sound Level Meter Quest Suite Professional</td>
<td>Before the construction activity start 4 samples</td>
<td>For the measurement of noise level</td>
</tr>
<tr>
<td></td>
<td><strong>WATER</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground water</td>
<td>From the fountain from the road route</td>
<td>Liquid, Plastic recipients</td>
<td>Before the construction activity start 2 samples</td>
<td>In order to determine the NO\textsubscript{x} presence and the physical – chemical characteristics of the ground water</td>
<td>66.426</td>
</tr>
<tr>
<td>Surface water</td>
<td>From: Tarnava Mare River</td>
<td>Liquid, Plastic recipients</td>
<td>Before the construction activity start 2 samples</td>
<td></td>
<td>66.426</td>
</tr>
<tr>
<td><strong>Constru ction phase (1an)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SOIL</strong> – general chemical indicator, including heavy metals and extractible substances</td>
<td>Samples will be taken from the working fronts</td>
<td>Solid, spade, plastic bags</td>
<td>2 samples every month</td>
<td>For the determination of polluting factors resulted from the working activity</td>
<td>797.112</td>
</tr>
<tr>
<td>Production recon</td>
<td>Solid, spade, plastic bags</td>
<td>2 samples every month</td>
<td></td>
<td></td>
<td>797.112</td>
</tr>
<tr>
<td><strong>AIR - IMISIONS:</strong> SO\textsubscript{x}, NO\textsubscript{x}, NH\textsubscript{3}, total suspended powders, sedimentary powders</td>
<td>Near the houses from the localities were the working fronts are situated</td>
<td>Gaseous, drawing pomp with filter for suspended powders and absorption columns with specific reactive</td>
<td>2 samples every month</td>
<td>For the determination of NO\textsubscript{x} concentration</td>
<td>797.112</td>
</tr>
<tr>
<td>At the concrete station</td>
<td></td>
<td></td>
<td>1 sample every month</td>
<td></td>
<td>398.556</td>
</tr>
<tr>
<td><strong>AER-EMISIONS:</strong> SO\textsubscript{2}, NO\textsubscript{2}, CO</td>
<td>At equipments</td>
<td>Gaseous, Gas portable analyzer MSI 150-4 Pro 2-I</td>
<td>2 determinations every month</td>
<td>For the determination of NO\textsubscript{x} concentration from the gases emanated by the equipments</td>
<td>797.112</td>
</tr>
<tr>
<td>At the asphalt station</td>
<td></td>
<td></td>
<td>2 determinations every month</td>
<td></td>
<td>797.112</td>
</tr>
<tr>
<td><strong>NOISE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sonorous fond at the equipments</td>
<td>At the production recon</td>
<td>Noise levels, Sound Level Meter Quest Suite Professional</td>
<td>1 determination every month</td>
<td>For the determination of noise level from the production recon</td>
<td>398.556</td>
</tr>
<tr>
<td>Noise level at the working fronts</td>
<td>At the working fronts that are situated near the localities La</td>
<td>Noise levels, Sound Level Meter Quest Suite Professional</td>
<td>2 determinations every month</td>
<td>For the determination of acoustic pressure within the localities</td>
<td>797.112</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>---------------------------------------------------------------</td>
<td>---------------------------------------------------------</td>
<td>-----------------------------</td>
<td>---------------------------------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td><strong>WATER</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground water</td>
<td>From the fountains of the localities were the working fronts are situated</td>
<td>Liquid, Plastic recipients</td>
<td>2 samples every month</td>
<td>For the values determination of physic – chemical indicators</td>
<td>797.112</td>
</tr>
<tr>
<td>Surface water</td>
<td>From: Tarnava Mare River</td>
<td>Liquid, Plastic recipients</td>
<td>Simultaneous 2 samples</td>
<td>For the values determination of physic – chemical indicators</td>
<td>797.112</td>
</tr>
<tr>
<td>Residual water</td>
<td>At the production recon</td>
<td>Liquid, Plastic recipients</td>
<td>2 samples every month</td>
<td>For the determination of the pollutants from the used waters discharged in the natural receptors</td>
<td>797.112</td>
</tr>
<tr>
<td><strong>OPERATE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SOIL</strong> – general chemical indicators, including heavy metals and extractible substances</td>
<td>La km 0+500; km 4+000; km 8+500</td>
<td>Solid, spade, plastic bags</td>
<td>Quarterly 3 samples</td>
<td>For the determination of NOx from the determined solutions from the traffic</td>
<td>398.556</td>
</tr>
<tr>
<td><strong>AER - IMISSIONS:</strong> SOx, NOx, NH3, total suspended powders, sedimentary powders</td>
<td>From the living area</td>
<td>Gaseous, drawing pomp with filter for suspended powders and absorption columns with specific reactive</td>
<td>Quarterly 1 samples</td>
<td>For the determination of NOx from the determined solutions from the traffic</td>
<td>132.852</td>
</tr>
<tr>
<td><strong>NOISE AND NOISE LEVEL</strong></td>
<td>From the living area km 3+500, km 5+000 and km 6+000</td>
<td>Noise levels, Sound Level Meter Quest Suite Professional</td>
<td>Quarterly 3 samples</td>
<td>For the determinations of the noise level generated by the traffic</td>
<td>398.556</td>
</tr>
<tr>
<td>---</td>
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</tr>
<tr>
<td><strong>WATER</strong></td>
<td>Ground water</td>
<td>From the fountains of the living area km 4 and km 6</td>
<td>Liquid, Plastic recipients</td>
<td>Quarterly 2 samples</td>
<td>For the determination of physical – chemical indicators, after the exploitation date</td>
</tr>
<tr>
<td></td>
<td>Surface water</td>
<td>From Tarnava Mare River, km 6+450 and km 2+100</td>
<td>Liquid, Plastic recipients</td>
<td>Quarterly 2 samples</td>
<td>For the determination of the physical – chemical indicators, after the exploitation date</td>
</tr>
<tr>
<td><strong>DECOMISSION</strong></td>
<td>SOIL – general chemical indicators, including the heavy metals and extractible substances</td>
<td>From the production recons and km 5+000</td>
<td>Solid, spade, plastic bags</td>
<td>At the works finish 3 samples</td>
<td>For the determination of chemical indicators after the exploitation date</td>
</tr>
</tbody>
</table>
### 7C. INSTITUTIONAL STRENGTHENING

<table>
<thead>
<tr>
<th>Crt. No.</th>
<th>Type of equipment</th>
<th>Number of units</th>
<th>Unit cost</th>
<th>Total Cost</th>
<th>Local or International Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>FIELD GEAR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>SOUND LEVEL METER QUEST SUITE - 2900, Measuring domain 30-140 dB(A), with a measurement error of +/- 0,5 dB(A).</td>
<td>1</td>
<td>2485 euro</td>
<td>2485 euro</td>
<td>International USA</td>
</tr>
<tr>
<td>2</td>
<td>DRAWER WITH 4 CHANNELS P 491 - 12 Vcc CAST, for air analyses (missions)</td>
<td>1</td>
<td>1010 euro</td>
<td>1010 euro</td>
<td>Local</td>
</tr>
<tr>
<td>3</td>
<td>PORTABLE ANALYSER DRAGER MSI 150-4 PRO 2-I, for air analyses (missions)</td>
<td>1</td>
<td>3610 euro</td>
<td>3610 euro</td>
<td>International</td>
</tr>
<tr>
<td></td>
<td><strong>LABORATORY DEVICES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>SPECTROPHOTOMETER NANOCOLOR LINUS, for soil analyses</td>
<td>1</td>
<td>9045 euro</td>
<td>9045 euro</td>
<td>International</td>
</tr>
<tr>
<td>2</td>
<td>PH - METER CAST, water samples analyzer</td>
<td>1</td>
<td>410 euro</td>
<td>410 euro</td>
<td>Local</td>
</tr>
<tr>
<td>3</td>
<td>CONDUCTOMETER CAST, water samples analyzer</td>
<td>1</td>
<td>380 euro</td>
<td>380 euro</td>
<td>Local</td>
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<td>4</td>
<td>PHOTO - METER PF 11 - water samples analyzer</td>
<td>1</td>
<td>1735 euro</td>
<td>1735 euro</td>
<td>International</td>
</tr>
<tr>
<td>5</td>
<td>SPECTORPHOTOMETER VARIAN, for atomic absorption</td>
<td>1</td>
<td>14280 euro</td>
<td>14280 euro</td>
<td>International</td>
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<tr>
<td>6</td>
<td>Drying stove thermo-adjustable 200 l and 500 l</td>
<td>2</td>
<td>1880 euro</td>
<td>1880 euro</td>
<td>Local</td>
</tr>
<tr>
<td>7</td>
<td>Laboratory specific glassware</td>
<td>set</td>
<td>216 euro</td>
<td>216 euro</td>
<td>Local</td>
</tr>
<tr>
<td></td>
<td><strong>CALCULUS TECHNIQUE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Intel Pentium Celeron 600 MHz</td>
<td>1</td>
<td>764 euro</td>
<td>764 euro</td>
<td>International</td>
</tr>
<tr>
<td>2</td>
<td>Intel Pentium 4, 1,8 GHz</td>
<td>1</td>
<td>978 euro</td>
<td>978 euro</td>
<td>International</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>---</td>
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<td>--------------------</td>
</tr>
<tr>
<td>5</td>
<td>Printer MINOLTA QMS 9100</td>
<td>1</td>
<td>500 euro</td>
<td>500 euro</td>
<td>International</td>
</tr>
<tr>
<td>6</td>
<td>QUEST SUITE PROFESSIONAL, for noise level measurement</td>
<td>1</td>
<td>542 euro</td>
<td>542 euro</td>
<td>International</td>
</tr>
<tr>
<td>7</td>
<td>BEEEST FOR WINDOW, for air pollutant dispersion</td>
<td>1</td>
<td>815 euro</td>
<td>815 euro</td>
<td>International</td>
</tr>
<tr>
<td></td>
<td>OTHER DEVICES</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Auto laboratory</td>
<td>1</td>
<td>6730 euro</td>
<td>6730 euro</td>
<td>Local</td>
</tr>
<tr>
<td>2</td>
<td>Digital photo camera SONY</td>
<td>1</td>
<td>500 euro</td>
<td>500 euro</td>
<td>SONY</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td></td>
<td>45880 euro</td>
<td>45880 euro</td>
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</tr>
<tr>
<td></td>
<td>REACTIVES</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>SOIL</td>
<td>1 set</td>
<td>2910 euro</td>
<td>2910 euro</td>
<td>International</td>
</tr>
<tr>
<td>2</td>
<td>WATER</td>
<td>1 set</td>
<td>730 euro</td>
<td>730 euro</td>
<td>International</td>
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<tr>
<td>3</td>
<td>IMISSIONS</td>
<td>1 set</td>
<td>812 euro</td>
<td>812 euro</td>
<td>Local</td>
</tr>
<tr>
<td></td>
<td>TOTAL REACTIVES</td>
<td></td>
<td>4452 euro</td>
<td>4452 euro</td>
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</tr>
<tr>
<td></td>
<td>TOTAL GENERAL</td>
<td></td>
<td>50332 euro</td>
<td>50332 euro</td>
<td></td>
</tr>
</tbody>
</table>
2. **Training/Study Tours**

Type of Training:

- Environmental Management, containing the mitigation and monitoring measures (actions) to be taken by the teams directly involved in the implementation of the project.

- Environmental Legislation: laws and norms regarding the environment protection

- Strategies of pollution preventing

- Waste management

The training is for the organizational unit CNARD (AND), institution that will be monitoring the project (projects); environmental trainings, health and safety at the working place for the workers categories directly implicated in the construction activity and road exploitation.

Institute or Organization to Provide Training

ICIM Bucharest

Cost (Local and Foreign)

150 euro for each student

3. **Consultant Services**

Type of Service: consultancy and training provider

Terms of Reference to be established based on the above decisions (what type of training and how many)

Justification: increase the awareness for the environmental aspects; transfer experience in implementing the environmental mitigation measures.

4. **Special Studies - is not the case**

Justification

Terms of Reference

Cost
7D. SCHEDULE

Present (preferably in Chart Form) Start Dates and Finish Dates for:

- Mitigation Activities
- Monitoring Activities
- Training Activities

This information should be on the same chart defining the overall project schedule (Project Implementation Plan)

7E. INSTITUTIONAL ARRANGEMENTS
7F. CONSULTATION WITH LOCAL NGOs AND PROJECT-AFFECTED GROUPS

Locations were the consultations were held:

Who was invited at the first consultation?

Who was invited at the second consultation?

Who attended the first consultation?

Who attended the second consultation?

Meeting Program/Schedule for the first consultation contained the following topics:

Meeting Program/Schedule for the second consultation contained the following topics:
### 7. ENVIRONMENTAL MANAGEMENT PLAN FORMAT
#### 7A. MITIGATION PLAN

<table>
<thead>
<tr>
<th>Phase</th>
<th>Issue</th>
<th>Mitigating Measure</th>
<th>Cost (euro)</th>
<th>Institutional Responsibility</th>
<th>Comments (e.g. secondary impacts)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Install</td>
<td>Operate</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td></td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Monthly maintenance of the technological roads, by occluding the hole, completions and leveling 5000 linear meters</td>
<td>-</td>
<td>2200</td>
<td>Contractor</td>
</tr>
<tr>
<td></td>
<td>Noise and vibrations</td>
<td>Demarcation of the speed limits areas and the signalization of those near the localities of Apalina and Solovastru, sets = 2 pieces</td>
<td>250</td>
<td>-</td>
<td>Contractor</td>
</tr>
</tbody>
</table>
|       | Waste disposal | Installing ecological toilets at the working fronts and at the production recons, 3 pieces                                                                                                                     | -          | 8250                        | Contractor
(hiring and exploitation trough specialized firms) |
|       | Surface waters, ground waters, soil, fauna, and flora | Periodical removal of the waste from the production recons and from the working fronts by specialized firms on the basis of a contract, 3 collecting points | -          | 5500                        | Contractor
(hiring and exploitation trough specialized firms) |
|       |       | Cleaning and removing the mud from the decantation areas and septic tank in the production recon and in the site organization trough specialized firms on the base contract, collecting points 2 | -          | -                           |                                  |
|       |       | Construction of special hole for the inactive and un-dangerous waste 1 piece.                                                                                                                                   | -          | 1500                        | Contractor                       |
|       |       | Construction of the production recon and site organization on a project base and Environmental Impact Study 1 pieces                                                                                              | 3250       | -                           | Contractor
(specialty designers)             |
<p>|       |       | Prevent accidental spillage at the carburant supplying                                                                                                                                                    | 750        | -                           | Contractor                       |
|       |       | Elimination of the meteoric and residual water pollution from the production recon, by constructing the decantation areas 3 pieces                                                                                | 3000       | -                           |                                  |</p>
<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Cost 1</th>
<th>Cost 2</th>
<th>Responsible Party</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Restricting the cars washing at Mures and Gurghiu rivers through the construction of special ramps endowed with oil products separators and suspended mats, 1 pieces</strong></td>
<td>Restricting the cars washing at Mures and Gurghiu rivers through the construction of special ramps endowed with oil products separators and suspended mats, 1 pieces</td>
<td>2500</td>
<td>1000</td>
<td>Contractor</td>
</tr>
<tr>
<td><strong>Stopping and reduction of the infiltrations of pollutant substances in the ground waters through the construction of concrete within the production recon 2000m²</strong></td>
<td>Stopping and reduction of the infiltrations of pollutant substances in the ground waters through the construction of concrete within the production recon 2000m²</td>
<td>44000</td>
<td></td>
<td>Contractor</td>
</tr>
<tr>
<td><strong>Using the systems for caption – eviction (particles retaining) at the following execution from the production recons: cement silos, filter and lime 4 pieces, and at the installations for the preparing of asphalt mixtures, 1 piece</strong></td>
<td>Using the systems for caption – eviction (particles retaining) at the following execution from the production recons: cement silos, filter and lime 4 pieces, and at the installations for the preparing of asphalt mixtures, 1 piece</td>
<td></td>
<td></td>
<td>Contractor</td>
</tr>
<tr>
<td><strong>Permanent maintenance of the site roads and the platforms from the production recon, by sprinkling and mechanical sweeping, 42,000 m²</strong></td>
<td>Permanent maintenance of the site roads and the platforms from the production recon, by sprinkling and mechanical sweeping, 42,000 m²</td>
<td></td>
<td>42000</td>
<td>Contractor</td>
</tr>
<tr>
<td><strong>Economic and social environment</strong></td>
<td></td>
<td></td>
<td></td>
<td>Contractor</td>
</tr>
<tr>
<td><strong>Sprinkling installations execution at the quarries, 1 pieces</strong></td>
<td>Sprinkling installations execution at the quarries, 1 pieces</td>
<td></td>
<td>64000</td>
<td>Contractor</td>
</tr>
<tr>
<td><strong>Site organization emplacement, production recons, technological roads, the borrow pits should be dimensioned at the minimum necessary and fenced with fences of 1,6m high, 1 km</strong></td>
<td>Site organization emplacement, production recons, technological roads, the borrow pits should be dimensioned at the minimum necessary and fenced with fences of 1,6m high, 1 km</td>
<td>30000</td>
<td></td>
<td>Contractor</td>
</tr>
<tr>
<td><strong>Marking the working front with reflecting bands 1800 linear meters</strong></td>
<td>Marking the working front with reflecting bands 1800 linear meters</td>
<td>3600</td>
<td></td>
<td>Contractor</td>
</tr>
<tr>
<td><strong>Presentation to the people’s trough public consultation, to the pollution level and measures taken, 2 public consultations.</strong></td>
<td>Presentation to the people’s trough public consultation, to the pollution level and measures taken, 2 public consultations.</td>
<td>2000</td>
<td></td>
<td>Beneficiary</td>
</tr>
<tr>
<td><strong>Sever control of the concrete and asphalt transportation in order to prevent accidental spillage or uncontrolled washing of the cars, 2 traffic controllers</strong></td>
<td>Sever control of the concrete and asphalt transportation in order to prevent accidental spillage or uncontrolled washing of the cars, 2 traffic controllers</td>
<td></td>
<td>12800</td>
<td>Contractor</td>
</tr>
<tr>
<td><strong>Soil cleaning points placing of the vehicles tires, before entering the public roads 2 pieces</strong></td>
<td>Soil cleaning points placing of the vehicles tires, before entering the public roads 2 pieces</td>
<td>1000</td>
<td>2000</td>
<td>Contractor</td>
</tr>
<tr>
<td><strong>Procuring mobile sanitary installations for the working fronts, 2 pieces</strong></td>
<td>Procuring mobile sanitary installations for the working fronts, 2 pieces</td>
<td>7000</td>
<td>2400</td>
<td>Contractor</td>
</tr>
</tbody>
</table>
### 7B. MONITORING PLAN

<table>
<thead>
<tr>
<th>PHASE</th>
<th>WHAT PARAMETER IS TO BE MONITORED?</th>
<th>WHERE IS THE PARAMETER TO BE MONITORED?</th>
<th>HOW IS THE PARAMETER TO BE MONITORED/EQUIPMENT?</th>
<th>WHEN IS THE PARAMETER TO BE MONITORED-FREQUENCY OF MEASUREMENT OR CONTINUOUS?</th>
<th>WHY IS THE PARAMETER TO BE MONITORED (OPTIONAL)?</th>
<th>COST (euro)</th>
<th>RESPONSIBILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td><strong>SOIL</strong> – general chemical indicators, including the heavy metals and extractible substances</td>
<td>The samples will be drawled from km 0+500; km 4+000;</td>
<td>Solid, spade, plastic bags</td>
<td>Before the works start 3 samples</td>
<td>In order to establish the initial soil quality</td>
<td>99.639</td>
<td>Contractor</td>
</tr>
<tr>
<td></td>
<td><strong>AIR - IMISIONS:</strong> SO₂, NOₓ, NH₃, total suspended powders, sedimentary powders</td>
<td>Air samples will be taken from km 3, km 5 and km 6.</td>
<td>Gaseous, drawing pomp with filter for suspended powders and absorption columns with specific reactive</td>
<td>Before the construction activity start 3 samples</td>
<td>In order to establish the initial air quality</td>
<td>99.639</td>
<td>Contractor</td>
</tr>
<tr>
<td></td>
<td><strong>NOISE</strong> – noise level</td>
<td>Sound level meter QUEST-2900 Near the houses from the road route: km 3, km 5 and km 6</td>
<td>Noise levels, Sound Level Meter Quest Suite Professional</td>
<td>Before the construction activity start 4 samples</td>
<td>For the measurement of noise level</td>
<td>132.852</td>
<td>Contractor</td>
</tr>
<tr>
<td></td>
<td><strong>WATER</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Notes:**
- SOIL
  - General chemical indicators, including the heavy metals and extractible substances.
  - The samples will be drawled from km 0+500; km 4+000; and km 5.
  - The parameter is monitored using solid, spade, plastic bags.
  - Before the works, start 3 samples.
  - The purpose is to establish the initial soil quality.
- AIR - IMISIONS
  - SO₂, NOₓ, NH₃, total suspended powders, sedimentary powders.
  - Air samples will be taken from km 3, km 5 and km 6.
  - Gaseous, using a drawing pomp with filter for suspended powders and absorption columns with specific reactive.
  - Before the construction activity, start 3 samples.
  - The purpose is to establish the initial air quality.
- NOISE
  - Noise level.
  - Sound level meter QUEST-2900 near the houses from the road route: km 3, km 5 and km 6.
  - Noise levels, using Sound Level Meter Quest Suite Professional.
  - Before the construction activity, start 4 samples.
  - For the measurement of noise level.
- WATER
| Ground water | From the fountain from the road route | Liquid, Plastic recipients | Before the construction activity start 2 samples | In order to determine the NO₃ presence and the physical – chemical characteristics of the ground water | 66.426 | 86 | Contractor | Contractor |
| Surface water | From: Tarnava Mare River | Liquid, Plastic recipients | Before the construction activity start 2 samples | | 66.426 | 86 | Contractor | Contractor |

**Construction phase (1an)**

| SOIL – general chemical indicator, including heavy metals and extractible substances | Samples will be taken from the working fronts | Solid, spade, plastic bags | 2 samples every month | For the determination of polluting factors resulted from the working activity | 797.112 | 840 | Contractor | Contractor |
| Production recon | Solid, spade, plastic bags | 2 samples every month | | | 797.112 | 840 | Contractor | Contractor |

**AIR EMISIONS:** NOₓ, NOₓ, NH₃, total suspended powders, sedimentary powders

| Near the houses from the localities where the working fronts are situated | Gaseous, drawing pomp with filter for suspended powders and absorption columns with specific reactive | 2 samples every month | For the determination of NOₓ concentration | 797.112 | 480 | Contractor | Contractor |
| At the concrete station | | 1 sample every month | | 398.556 | 240 | Contractor | Contractor |

**AER-EMISIONS:** SO₂, NO₂, CO

| At equipments | Gaseous, Gas portable analyzer MSI 150-4 Pro 2-I | 2 determinations every month | For the determination of NOₓ concentration from the gases emanated by the equipments | 797.112 | 840 | Contractor | Contractor |
| At the asphalt station | | 2 determinations every month | | 797.112 | 480 | Contractor | Contractor |

**NOISE**

<p>| Sonorous fond at the equipments | At the production recon | Noise levels, Sound Level Meter Quest Suite Professional | 1 determination every month | For the determination of noise level from the production recon | 398.556 | 150 | Contractor | Contractor |</p>
<table>
<thead>
<tr>
<th>Noise level at the working fronts</th>
<th>At the working fronts that are situated near the localities La</th>
<th>Noise levels, Sound Level Meter Quest Suite Professional</th>
<th>2 determinations every month</th>
<th>For the determination of acoustic pressure within the localities</th>
<th>797.112</th>
<th>300</th>
<th>Contractor</th>
<th>Contractor</th>
</tr>
</thead>
</table>

**WATER**

**Ground water**
- From the fountains of the localities where the working fronts are situated
- Liquid, Plastic recipients
- 2 samples every month
- For the values determination of physic – chemical indicators
  - 797.112
  - 1032
  - Contractor
  - Contractor

**Surface water**
- From: Tarnava Mare River
- Liquid, Plastic recipients
- Simultaneous 2 samples
- For the values determination of physic – chemical indicators
  - 797.112
  - 1032
  - Contractor
  - Contractor

**Residual water**
- At the production recon
- Liquid, Plastic recipients
- 2 samples every month
- For the determination of the pollutants from the used waters discharged in the natural receptors
  - 797.112
  - 1032
  - Contractor
  - Contractor

**OPERATE**

**SOIL – general chemical indicators, including heavy metals and extractible substances**
- La km 0+500; km 4+000; km 8+500
- Solid, spade, plastic bags
- Quarterly 3 samples
- For the determination of NOx from the determined solutions from the traffic
  - 398.556
  - 420
  - Beneficiary
  - Beneficiary

**AER - IMISSIONS: SOx, NOx, NH3, total suspended powders, sedimentary powders**
- From the living area
- Gaseous, drawing pomp with filter for suspended powders and absorption columns with specific reactive
- Quarterly 1 samples
- For the determination of NOx from the determined solutions from the traffic
  - 132.852
  - 80
  - Beneficiary
  - Beneficiary
<table>
<thead>
<tr>
<th>Category</th>
<th>Source Details</th>
<th>Measurement Details</th>
<th>Frequency</th>
<th>RC</th>
<th>Beneficiary</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOISE AND NOISE LEVEL</td>
<td>From the living area km 3+500, km 5+000 and km 6+000</td>
<td>Noise levels, Sound Level Meter Quest Suite Professional</td>
<td>Quarterly 3 samples</td>
<td>For the determinations of the noise level generated by the traffic</td>
<td>398.556</td>
</tr>
<tr>
<td>WATER</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground water</td>
<td>From the fountains of the living area km 4 and km 6</td>
<td>Liquid, Plastic recipients</td>
<td>Quarterly 2 samples</td>
<td>For the determination of physical – chemical indicators, after the exploitation date</td>
<td>265.704</td>
</tr>
<tr>
<td>Surface water</td>
<td>From Tarnava Mare River, km 6+450 and km 2+100</td>
<td>Liquid, Plastic recipients</td>
<td>Quarterly 2 samples</td>
<td>For the determination of the physical – chemical indicators, after the exploitation date</td>
<td>265.704</td>
</tr>
<tr>
<td>DECOMISSION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOIL – general chemical indicators, including the heavy metals and extractible substances</td>
<td>From the production recons and km 5+000</td>
<td>Solid, spade, plastic bags</td>
<td>At the works finish 3 samples</td>
<td>For the determination of chemical indicators after the exploitation date</td>
<td>99.639</td>
</tr>
</tbody>
</table>
## 7C. INSTITUTIONAL STRENGTHENING

<table>
<thead>
<tr>
<th>Crt. No.</th>
<th>Type of equipment</th>
<th>Number of units</th>
<th>Unit cost</th>
<th>Total Cost</th>
<th>Local or International Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>FIELD GEAR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>SOUND LEVEL METER QUEST SUITE - 2900, Measuring domain 30-140 dB(A), with a measurement error of +/- 0,5 dB(A).</td>
<td>1</td>
<td>2485 euro</td>
<td>2485 euro</td>
<td>International USA</td>
</tr>
<tr>
<td>2</td>
<td>DRAWER WITH 4 CHANNELS P 491 - 12 Vcc CAST, for air analyses (missions)</td>
<td>1</td>
<td>1010 euro</td>
<td>1010 euro</td>
<td>Local</td>
</tr>
<tr>
<td>3</td>
<td>PORTABLE ANALYSER DRAGER MSI 150-4 PRO 2-l, for air analyses (missions)</td>
<td>1</td>
<td>3610 euro</td>
<td>3610 euro</td>
<td>International</td>
</tr>
<tr>
<td>4</td>
<td>LABORATORY DEVICES</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>SPECTROPHOTOMETER NANOCOLOR LINUS, for soil analyses</td>
<td>1</td>
<td>9045 euro</td>
<td>9045 euro</td>
<td>International</td>
</tr>
<tr>
<td>2</td>
<td>PH - METER CAST, water samples analyzer</td>
<td>1</td>
<td>410 euro</td>
<td>410 euro</td>
<td>Local</td>
</tr>
<tr>
<td>3</td>
<td>CONDUCTOMETER CAST, water samples analyzer</td>
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<td>380 euro</td>
<td>380 euro</td>
<td>Local</td>
</tr>
<tr>
<td>4</td>
<td>PHOTO - METER PF 11 - water samples analyzer</td>
<td>1</td>
<td>1735 euro</td>
<td>1735 euro</td>
<td>International</td>
</tr>
<tr>
<td>5</td>
<td>SPECTORPHOTOMETER VARIAN, for atomic absorption</td>
<td>1</td>
<td>14280 euro</td>
<td>14280 euro</td>
<td>International</td>
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<tr>
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<td>Drying stove thermo-adjustable 200 l and 500 l</td>
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<td>1880 euro</td>
<td>1880 euro</td>
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<td>7</td>
<td>Laboratory specific glassware</td>
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<td>216 euro</td>
<td>216 euro</td>
<td>Local</td>
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<tr>
<td>8</td>
<td>CALCULUS TECHNIQUE</td>
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<td></td>
</tr>
<tr>
<td>1</td>
<td>Intel Pentium Celeron 600 MHz</td>
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<td>764 euro</td>
<td>764 euro</td>
<td>International</td>
</tr>
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<td>Intel Pentium 4, 1,8 GHz</td>
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<td>978 euro</td>
<td>978 euro</td>
<td>International</td>
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<tr>
<td></td>
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<td><strong>Printer MINOLTA QMS 9100</strong></td>
<td>1</td>
<td>500 euro</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6</td>
<td><strong>QUEST SUITE PROFESSIONAL, for noise level measurement</strong></td>
<td>1</td>
<td>542 euro</td>
</tr>
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<td></td>
<td></td>
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<td><strong>BEEST FOR WINDOW, for air pollutant dispersion</strong></td>
<td>1</td>
<td>815 euro</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>OTHER DEVICES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td>Auto laboratory</td>
<td>1</td>
<td>6730 euro</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td>Digital photo camera SONY</td>
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<td></td>
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<td><strong>REACTIVES</strong></td>
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<tr>
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<td></td>
<td></td>
<td>SOIL</td>
<td>1 set</td>
<td>2910 euro</td>
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<td>2</td>
<td></td>
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<td>IMISSIONS</td>
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<td><strong>TOTAL REACTIVES</strong></td>
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<td><strong>TOTAL GENERAL</strong></td>
<td></td>
<td><strong>50332 euro</strong></td>
</tr>
</tbody>
</table>
2. **Training/Study Tours**

Type of Training:

- Environmental Management, containing the mitigation and monitoring measures (actions) to be taken by the teams directly involved in the implementation of the project.

- Environmental Legislation: laws and norms regarding the environment protection

- Strategies of pollution preventing

- Waste management

The training is for the organizational unit CNARD (AND), institution that will be monitoring the project (projects); environmental trainings, health and safety at the working place for the workers categories directly implicated in the construction activity and road exploitation.

Institute or Organization to Provide Training

ICIM Bucharest

Cost (Local and Foreign)

150 euro for each student

3. **Consultant Services**

Type of Service: consultancy and training provider

Terms of Reference to be established based on the above decisions (what type of training and how many)

Justification: increase the awareness for the environmental aspects; transfer experience in implementing the environmental mitigation measures.

4. **Special Studies - is not the case**

Justification

Terms of Reference

Cost
7D. SCHEDULE

Present (preferably in Chart Form) Start Dates and Finish Dates for:

- Mitigation Activities
- Monitoring Activities
- Training Activities

This information should be on the same chart defining the overall project schedule (Project Implementation Plan)

7E. INSTITUTIONAL ARRANGEMENTS
7F. CONSULTATION WITH LOCAL NGOs AND PROJECT-AFFECTED GROUPS

Locations were the consultations were held:

Who was invited at the first consultation?

Who was invited at the second consultation?

Who attended the first consultation?

Who attended the second consultation?

Meeting Program/Schedule for the first consultation contained the following topics:

Meeting Program/Schedule for the second consultation contained the following topics: