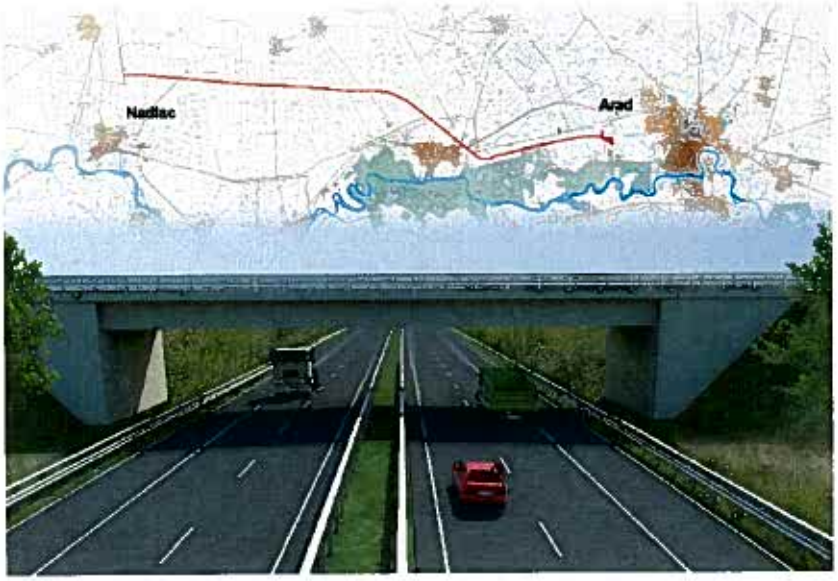
NON TECHNICAL SUMARRY

TECHNICAL ASSISTANCE FOR THE PREPARATION OF ROAD PROJECT PIPELINE FOR THE COHESION FUND CONTRACT NO. 1 DETAILED DESIGN AND TENDER DOCUMENTS

Task [Ii]: ORASTIE - SIBIU



2009

Beneficiary:	Romanian National Company of Motorways and National Roads
Designer (Consortium):	DIWI INTERNATIONAL CONSULT GmbH – Consortium Leader Roughan & O'Donovan Consulting Engineers iC consulenten Ziviltechniker Ges.m.b.H.
Contract object:	**Environmental Impact Assessment Issuance of the Environmental Permits** for „Technical Assistance for the Preparation of Road Project Pipeline for the Cohesion Fund, Contract no. 1: Detailed design and tender documents"
Project Code:	PRM – 4 – 10/29.05.07
Date:	2009

Signature List

SC UNIX SRL

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SOCIETATEA COMERCIALA UNIX S.R.L. Târgoviște DÂMBOVIȚA - ROMÂNIA

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Content

A. GENERAL INFORMATION

A.1. INFORMATION ABOUT THE PROJECT TITULAR

Romanian National Company of Motorways and National Roads represents the Contracting Authority, the final beneficiary and also the Project Implementation Agency.

Romanian National Company of Motorways and National Roads is a company under the authority of Transport Ministry.

Address: Dinicu Golescu Boulevard, no. 38, Bucharest, 1st district, phone: 021/314.05.28, Fax.021/318.66.45

A.2. INFORMATIONS REGARDING THE AUTHORIZED COMPANY WHICH ELABOARTE THE ENVIRONMENTAL IMAPCT ASSESMENT STUDY REPORT

At the elaboration of the report for environmental impact assessment study participated a consortium composed from the following companies:

S.C. KVB ECONOMIC SRL

Vulturilor Street, no. 35, sector 3, Bucharest,

Phone: 021 - 326.83.31, Fax: 021 – 320.83.31

S.C. UNIX SRL

Luceafarului Street, Targoviste

Phone: 031 - 105.09.34, Fax: 031 – 105.09.35

A.3. PROJECT TITLE

In present, the route of Nadlac - Sibiu motorway, which is part of TEN – T Corridor IV, is being revised as part of the project "Technical assistance for the preparation of road project pipeline for the cohesion fund contract no. 1 detailed design and tender documents", beneficiary being the Romanian National Company of Motorways and National Roads.

Nadlac – Sibiu motorway is divided in sections, as follows:

- Task Nadlac – Arad (i) which connects the Hungarian border area and the bypass of Arad – Timisoara – Lugoj;
- Task Arad – Timisoara – Lugoj (is divided into the following sections: Arad bypass, Arad – Timisoara motorway, Timisoara bypass, Timisoara – Lugoj motorway);
- Task Lugoj – Deva (iii) which connects Lugoj – Timisoara – Arad by pass and Deva town;

- Task Deva – Orastie (the route starts from Soimus, follows Mures river course, with two over passages up to Aurel Vlaicu area. The bypass is crossing the villages Soimus, Harau, Rapolt, Turda and the towns Simeria, Orastie and Geoagiu. Although, the road will have two discharging (motorway discharges): one at Soimus and another one at Simeria Veche, where a bridge over the railway is needed).
- Task Orastie – Sibiu (ii) which connects Deva Orastie by pass and Sibiu by pass;

Orastie – Sibiu task is evaluated in conformity with the specific environmental legislation.

A.4. DESIGNER

The project is being developed by a Consortium called "the consultant" composed from the following companies:

- DIWI Consult International GmbH (DIWI): consortium leader
- Roughan & O'Donovan Consulting Engineers (ROD): partner 2
- iC consulenten Ziviltechniker Ges.m.b.H. (iC): partner 3.

The environmental consultancy activities for the issuance of the environmental permits are being developed by the consortium composed from:

- SC UNIX SRL, Targoviste;
- SC KVB ECONOMIC SRL, Bucharest

A.5. FUNCTIONING PERIOD

Execution period is estimated at three years for the entire length of the motorway, task Orastie – Sibiu, between 2010 – 2012 and the motorway will be in operation starting with 2013.

Operation period cannot be estimated, being operational for a long period. The project is designed based on estimations regarding the traffic of 2030 and 2035, taking into consideration also the future motorway development.

B. PROJECT DESCRIPTION

B.1. EXISTING SITUATION

In present the ruttier connection between Orastie and Sibiu is realized by

- A national road sector, which was constructed in 1948-1949. This starts in east side of Orastie at the crossing with DJ 705 up to Sebes, where crosses DN 1.
- A sector of national road DN 1/7 was constructed between 1933-1935. This sector begins from Sebes up to the west side of the entrance in Sibiu;

The starting points and ending points of this sectors, locality crossing, crossings with railways, impose some restrictions like: speed limitation, specific safety measures. This determined the necessity of developing the motorway project, so that the traffic will be fluid and the localities avoided as much as possible.

B.2. SCOPUL SI NECESITATEA

Construction of the motorway is necessary due to the followings:

The motorway construction will lead to noxious and noise reduction, due to traffic reduction through localities, with positive results on life conditions and human community.

The motorway construction will lead to traffic capacity increment due to improvement of traffic fluency and reduction of accidents number, increased comfort fro drivers.

B.3. DESIGNED SITUATION

Task ii, Orastie Sibiu is crossing the county Hunedoara (6 km), Alba (40 km) and Sibiu (36km) and passes through the administrative territories of the following localities:

- Hunedoara: Orastie, Geoagiu, Aurel Vlaicu, Vaidei (com. Romos);
- Alba: Sibot, Balomiru de Camp, Tartaria, Pianu de Jos, Vintu de Jos, Lancram, Sebes, Rahau, Calnic si Cut, Cunta;
- Sibiu: Miercurea Sibiului, Aplodu de Jos, Amnas, Aciliu, Saliste, Sacel, Cristian si Sibiu.

The west side of task ii from Orastie to Sebes, is situated close to Mures River and of its tributaries (Sebes and Cugir), and in East side of the motorway route is close to Secas and Calnir River, Amnas, Pianu, Mag, Salciilor and Rusciorului.

The motorway section has a total length of 82.070 km, with a platform width of 26m, the starting point is located at km 0+000 at the crossing with DJ 705, where is connected by the by pass Orastie-Deva and ends at km 82+070 at the crossing with DJ106, where connects with Sibiu by pass and includes a big number of objectives, respectively:

- 92 major structures: 9 bridges for water courses, 5 passages for other communication routs (railway, national and county road, rural road), 3 viaducts, 20 passages for other roads, 55 cachet structures.

Bridges for water courses over the motorway

No	Location		Dimensions (m)		Observation
	From	To	length	Width	
2.12	9+360	9+450	3 x 30 = 90	28.8	Bridge over Cugir river. Bridge angle 25°,

					Hmax=6.95m
2.17	13+268	13+303	1 x 35 = 35	28.8	Bridge over Cioara Creek and over rural road Hmax=11.3m, Hculee=11.3m (necessary for topographical surveys)
2.23	20+970	21+040	2 x 35 = 70	28.8	Bridge over Pianu Creek and over rural road, Hmax=10.96m
2.31	27+410	27+500	3 x 30 = 90	28.8	Bridge over Sebes River, H=5.9m
2.32	29+710	29+745	1 x 35 = 35	28.8	Bridge over Secas River, Hmax=6.98m
2.58	50+570	50+605	1 x 35 = 35	28.8	Bridge over Secas River and rural road Hmax=6m
2.59	53+425	53+460	1 x 35 = 35	28.8	Bridge over Secas River, Hmax=7.7m
2.61	54+395	54+415	1 x 20 = 20	28.8	Bridge over Amnas Creek at 34°, Hmax=7.2m
2.87	80+410	80+430	1 x 20 = 20	28.8	Bridge over Valea Salciei at 35° and over rural road Hmax=7.2m

Bridges for other communication objectives

No	Location		Dimensions (m)		Observation
	From	To	length	Width	
2.2	1+120	1+360	3 x 35 + 3 x 45 = 240	28.8	Bridge for the railway and DN 7 over the motorway. Twin bridges, Hculee=12m to Orastie: 2 x 45 + 2 x 35 + 45 + 35 = 240 to Sibiu: 35 + 45 + 2 x 35 + 2 x 45 = 240
2.8	7+500	7+520	1 x 20 = 20	28.8	Orthogonal Passage over the secondary railway and over the rural road,
2.20	16+690	16+760	2 x 35 = 70	28.8	Orthogonal Passage over DJ705B for the motorway. The County road will be relocated at 45°
2.35	32+130	32+270	4 x 35 = 140	28.8	Passage over the railway, Secas Creek and rural road, Hmax=15.78m
2.62	55+005	55+025	1 x 20 = 20	28.8	Passage over DJ106G to Apoldu de Jos, ay 50° obliquity

Viaducts

No	Location		Dimensions (m)		Bridge type	Observation
	From	To	length	Width		
2.69	62+495	63+475	45 + 55 + 65 + 8 x 80 + 70 + 60 + 45 = 980	28.8	B	Viaduct. Twin bridges Hmax=76.6m. Crosiing the valley, rural road and DC71
2.81	70+985	71+615	40 + 10 x 55 + 40 = 630	28.8	A	Viaduct. Twin bridges, Hculee=10m, Hmax=18.7m. Crosses a valley and forestry road
2.82	73+050	73+295	40 + 2 x 55 + 40 = 245	28.8	A	Viaduct. Twin bridges, Hculee=10m, Hmax=21.1m

Passages over otehr roads for the motorway

No	Location		Dimensions (m)		Observation
	From	To	length	Width	
2.1	0-035		1 x 35 = 35	12	Passage on DJ 705 (to Gelmar) over the motorway, with 35 m before km 0 ; is included in the project.
2.10	8+755		1 x 35 = 35	12	Passage on DN and over the motorway. DN 7 will be relocated from 42° to 20° obliquity
2.16	11+225		1 x 35 = 35	6	Passage on rural road over the motorway, relocated from 19° to 0° obliquity
2.18	14+530		1 x 35 = 35	11	Passage on DJ705E over the motorway
2.25	22+060		1 x 35 = 35	6	Passage for rural road over the motorway. DC will be relocated at 0° obliquity
2.28	24+065		1 x 35 = 35	12	Passage on DN 7 over the motorway as part of interchange: "West Sebes", obliquity 10°
2.30	27+075		1 x 35 = 35	12	Passage on DN1 over the motorway as part of interchange Lancram. DN will be relocated at 10° obliquity
2.43	38+920		1 x 35 = 35	11	Passage on DC 47 over the motorway to Cut village. DC will be relocated at 0°.
2.49	43+855		1 x 35 = 35	12	Passage on DJ106I over the motorway as part of Cunta interchange with cut and fill of de 7.5m
2.53	47+060		1 x 35 = 35	12	Passage on DJ106I over the motorway as part of Miercurea interchange .
2.54	*47+147*		1 x 20 = 20	12	Passage on DJ106I over the railway as part of Miercurea Interchange.
2.56	49+750		1 x 35 = 35	6	Passage on rural road over the motorway
2.60	54+055		1 x 35 = 35	11	Passage on DC 72 over the motorway to Singatin village.
2.73	66+290		1 x 35 = 35	12	Passage on DC67 as part of Saliste interchange.
2.74	*66+290*		1 x 20 = 20	12	Passage on DC67 over the railway as part of Saliste interchange.
2.79	70+370		1 x 35 = 35	11	Passage on DC65 over the motorway to Sacel village
2.80	*70+370*		1 x 20 = 20	11	Passage on DC65 over the railway
2.84	75+665		1 x 35 = 35	11	Passage on rural road over the motorway
2.88	81+355		1 x 35 = 35	11	Passage on DJ 143B over the motorway
2.92	82+070		1 x 35 = 35	12	Passage on DJ 106 B over the motorway as part of Sibiu West interchange, obliquity 10°

Cachet structures

No	Location		Dimensions (m)		Observation
	From	To	length	Width	
2.3	*1+320*		v		Cachet structure on DN 7 over the Vaideiu Creek.
2.4	*1+900*		v		Cachet bridge, over Vaideiu Creek, as part of Interchange Orastie.
2.5	2+750		v		Cachet bridge over Vaideiu Creek for the motorway.
2.6	3+640		v		Cachet bridge on the motorway as inferior passage for rural

					road.
2.7	4+215		v		Cachet bridge for motorway over a water course.
2.9	8+380		v		Cachet bridge for the motorway over water course .
2.11	9+075		v		Cachet bridge over water course for the motorway.
2.13	9+830		v		Cachet bridge over the motorway as inferior passage for DN 7 at 63°, intem weight are of 5/14m, width=30.8m, length=66.5m, Hmax=7.7m
2.14	11+135		v		Cachet bridge over Saratii Creek.
2.15	*11+135*		v		Cachet bridge on rural road over Saratii Creek.
2.19	14+615		v		Cachet bridge over Tartariei Creek on the motorway.
2.21	20+545		v		Cachet bridge as inferior passage over the motorway for DJ705B to Vinerea, open=12m la 30°.
2.22	20+705		v		Cachet bridge over water course for the motorway
2.24	21+410		v		Cachet bridge over Lisca Creek for the motorway and as inferior passage for rural road to Vintu de Jos
2.26	23+145		v		Cachet bridge over watercourse for the motorway
2.27	23+530		v		Cachet bridge for motorway over water course
2.29	26+090		v		Railway crossing with an angle of 27° for a width of 12 m, structure tunnel type, as inferior passage for the railway with an opening of 22 m at 27° obliquity, structure length is L=52m plus 45m + 45m, abutment wall for ramblei. Topographical studies needed.
2.33	30+395		v		Cachet bridge over Daia Creek for the motorway
2.34	30+460		v		Cachet bridge as inferior passage over the motorway for DJ106K at 10° obliquity
2.36	34+415		v		Cachet bridge as inferior passage for an access road
2.37	35+900		v		Cachet bridge over Netotului Creek
2.38	36+250		v		Cachet bridge over Valea Caselor
2.39	36+650		v		Cachet bridge over a water course
2.40	36+900		v		Cachet bridge as inferior passage for an access road close to Halta Rahau
2.41	38+320		v		Cachet bridge over Obrezeanului Creek
2.42	*38+700*		v		Cachet bridge over Obrezeanului Creek for rural road parallel with the railway
2.44	40+150		v		Cachet bridge inferior passage for access road
2.46	42+310		v		Cachet bridge as inferior passage for rural road
2.47	42+710		v		Cachet bridge over Cilnic Creek
2.48	43+455		v		Cachet bridge over Cilnicului Valley
2.50	44+820		v		Crossing the railway with an angle of 20° for a beam of 12 m: cachet structure tunnel type with an opening of 22 m as inferior passage, Rrailway=600m, structure length is L=130m, plus 60m + 85m, abutment wall form reinforce concrete for ramblei
2.51	45+285		v		Cachet bridge for a water course
2.52	45+835		v		Cachet bridge as inferior passage for rural road
2.55	49+365		v		Cachet bridge over Girbova Creek

2.57	49+780		v		Cachet bridge over Pustia Creek
2.63	56+755		v		Cachet bridge as inferior passage for DJ143B to Amnas village
2.64	57+085		v		Cachet twin bridges over Amnas Creek, at 50° obliquity
2.65	58+115		v		Cachet bridge as inferior passage for rural road and passage for animals crossing
2.66	58+425		v		Cachet bridge as passage for animals crossing
2.67	59+365		v		Cachet bridge as inferior passage for rural road
2.68	60+540		v		Cachet bridge as inferior passage for an access road
2.70	65+500		v		Cachet bridge over water course
2.71	65+775		v		Cachet bridge over water course
2.72	65+965		v		Cachet bridge over water course
2.75	66+290		v		Cachet bridge over water course for connection roadside, as part of Saliste Interchange
2.76	66+520		v		Cachet bridge over water course for north side connection, as part of Saliste Interchange
2.77	67+740		v		Cachet bridge as inferior passage for rural road
2.78	68+540		v		Cachet bridge as inferior passage for rural road
2.83	75+625		v		Cachet bridge over water course
2.85	76+825		v		Cachet bridge as inferior passage for rural road
2.86	78+442		v		Cachet bridge as inferior passage for animals passing
2.89	81+650		v		Cachet bridge over Rusciori Creek, as part of Sibiu West Interchange
2.90	81+775		v		Cachet bridge over Rusciori river
2.91	82+065		v		Cachet bridge over Rusciori Creek, as part of Sibiu West interchange
2.93	82+365		v		Cachet bridge over Rusciori Creek, in west side, as part of Sibiu West interchange

- Some of the existing roads will be relocated in order to improve the motorway crossing. In the following table are presented the relocated roads, their position and length:

Road type	Location (Km)	Road length (m)
DJ705	0+035	380
Rural road	3+640	220
DN7	8+755	510
Rural road	11+225	325
DJ705B	16+650	390
Rural road	22+200	300+325
Rural road	36+900	920
DC47	39+920	395
Rural road	42+310	305
DJ106I	43+855	445
Rural road	49+750	320

Rural road	50+610	280
DC72	54+055	410
Stoned road	56+755	500
Rural road	58+115	395
Rural road	62+510	340
Rural road	67+740	195
Rural road	70+370	195
Forestry road	73+250	700
Rural road	75+665	270
Rural road	76+825	385
Rural road	80+420	475
DC66	81+355	530

- **Collection roads**

Location (Km)	Road length (m)
Km 15 +920– km 16+700	845
Km 50+600 – km 51+090	525

- **Interchanges**

Name	Location	County	Observation
Orastie interchange	km 1+400	Hunedoara	-
Sebes West interchange	km 24+065	Alba	-
Lancram interchange	km 27+075	Alba	-
Sebes North interchange	km 28+815	Alba	Is part of Sebes – Turda expres road
Sebes East interchange	km 32+650	Alba	-
Cunta interchange	km 43+855	Alba	-
Miercurea interchange	km 47+060	Sibiu	-
Saliste interchange	km 66+290	Sibiu	-
Sibiu West interchange	km 82+070	Sibiu	-

- Relocation of utility networks crossed by the motorway route

Designed works for gaze network relocation, in compliance with „Transgaz" SA Medias permit;

Designed works for relocation of telephone networks in compliance with Avizului Romtelecom no. 232/453/17 from 07.02.2008

Relocation works for electricity networks, in compliance with SC Electrica SA si Transelectrica.

- Noise protection works – panels for noise protection of objectives situated closer than 600 m from the motorway

Potential affected areas (localitati)	Noise protection measures	Length of noise panels	Height of noise panels/length of forestry curtain
Sibot (aprox.350 m)	noise panels	Aprox.800 m	2.5 m
Balomiru de Camp (aprox 340 m)	noise panels	Aprox.1000 m	2.5 m
Tartaria (aprox. 550 m)	noise panels	Aprox.500 m	2.5 m
Vintu de Jos (aprox. 550 m)	noise panels	Aprox.1000 m	2.5 m
Lancram (aprox. 300 m)	noise panels	Aprox.600 m	3 m
Cunta (aprox. 450 m)	noise panels	Aprox.500 m	2.5 m
Baile Miercurea Sibiului (aprox 60 m)	noise panels	Aprox.700 m	3 m
	Forestry curtain	Aprox. 700 m	10 m
Miercurea Sibiului (aprox 400 m)	noise panels	Aprox.1500 m	2.5 m
Apoldu de Jos (aprox 60 m)	noise panels	Aprox.1800 m	2.5 m
Sacel (aprox 450 m)	noise panels	Aprox.500 m	2.5 m
Cristian (aprox 300 m)	noise panels	Aprox.400 m	2.5 m
	Forestry curtain	Aprox.500 m	10 m

- Monitoring station – for air quality will be located in sensitive areas (close to inhabited areas located at distances smaller than 100m from the motorway);
- For water and soil protection, are proposed collection channels 4000m, ditches (23110m), discharging channels (100000m), drainage channels (1500m). Is estimated that for a km of motorway will be necessary one settling tank with an oil separator (aprox.195 systems);
- 2 maintenance centers – at km 24 and km 66;

The motorway passes close to Lancram and Sebes and is crosses the railway Orastie – Sibiu, between km 32+130 – km 32+270.

- **Section 4: km 37+070 – km 53+470**

On first 6-7 km, the motorway crosses a hilly area, where will be necessary cut and fillings which will not affect DN 1/7 and Sebes-Sibiu railway.

The route goes at a distance of 450 m from Cunta locality, at a distance of 400 m from Miercurea Sibiului and 60 m from Apoldu de Jos (noise protection measures).

Taking into consideration the crossing with Secas River and a rural road, is proposed a bridge and an inferior passage for rural road between km 50+570 – km 50+605.

After the land studies were elaborated, it was drawn the conclusion that a small safety distance from the hills from North side of the motorway, where landslips are possible.

Urbanism Certificate issuance was conditioned by the interchange located close to Miercurea, at km 47+060.

- **Section 5: km 53+470-km 82+070**

Between km 53+470 and km 56+000 in order to avoid the landslips areas identified on Dealul La Potca, the propose motorway route gets close to 60 m from Apoldu de Jos. Must be considered some impact reduction measures for this area.

Between km 56+000 and km 65+000 it is not needed the third roadside for slow vehicles, due to road slope 3%, fact that is very important for this section of the motorway located at 350 and 550 m.

Between km 57+075 - km 57+500 and km 63+450 - km 63+600, the route crosses the forest areas (Amnas Forest and Bucium Hill), where will be necessary clearance activities.

Between km 65+000 and km 71+000 the motorway route goes South from Aciliu and In North East form Sacel, at a distance of 1 km, north from DN1/DN7. The closest point from the inhabited area in at km 70+000, the proposed route goes to 450 m from Sacel locality (in this area will be needed noise protection measures).

Close to km 66+290 is proposed an interchange (Saliste interchange).

Between km 70+000 – 76+000, the route goes between the railway Sibiu – Deva and piscine arrangement (located close to Sacel).

Between km 70+985 – km 71+615 is proposed a viaduct with a total length of 630m. Between km 71+710 – km 73+500, the route is crossing a forest area (Dosu Mare Forest), where clearance activities will be necessary.

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Between km 76+000 – km 82+070, the route passes to distance of 300 m in North West side of Cristina locality (noise protection measures).

The last section of Orastie – Sibiu task includes 4.8 km from Sibiu Bypass project.

The end of section 5 and of the Orastie – Sibiu task is situated at the crossing with DJ 106 B, which is also the ending point of Sibiu bypass project, an interchange being located there. (Sibiu West interchange).

B.3.2. Proposed interchanges

Orastie Interchange (km 1+400)

Initially the project for the by-pass variant Deva – Orastie (DHV/ADO) had proposed a route junction for Orastie, having as linking point the county road DJ705.

The Orastie interchange was proposed at km 1+400 and consists of:

- A passage/viaduct for the motorway;
- A roundabout for the county road DJ705;
- A linking road for national road DN7, having the approximate length of 1 km, situated in the south-east. To avoid the intersection with the railway there was proposed a bridge above DN7 and the railways. There was included a loop towards the intersection with DN7 and a relocation of a segment (used for the loop) from the county road DJ705 at south-east of the national road DN7.

The bridge above the motorway for the county road DJ705, which belongs to the motorway project Orastie - Sibiu will not affect the temporary end of the motorway Deva - Orastie.

Sebes West Interchange (km 24+065)

The Sebes West interchange is located at the crossing point of the motorway with the DN7. The design provides a half clover leaf interchange with the ramps at the south-western and the north-eastern side of the motorway, and at the DN7 are at grade junctions with left turn lanes.

In conformity with the design standardthe junction arms of the interchange has an asphalted width of 6.00 m and is appropriete for a speed of 60 km / h (minim hortizintal radius being of 125m) and are separtaed by a median area with width of 3.00 m for the conformtiy woth required safty conditions.

Lancram Interchange (km 27+075)

At the request of Alba local Council it was proposed an interchange at Lancram (km 27+075) considered to be essential for deriving the traffic from the North side of Sebes River.

Sebes North interchange (km 28+815)

North from Sebes is proposed an interchange which will connect the road Sebes – Turda (design phase) and Orastie – Sibiu motorway section (Sebes bypass).

Sebes East Interchange (km 32+650):

However, as a supplement to the Sebes North interchange and in order to enablethe "survival" of commercial activities in that area (e.g. hotels/motels, restaurants,fuel station) a directional interchange has been considered, which provides the two connections:

- From Orastie/Alba Iulia to Sebes east; and
- From Sebes East to Sibiu.

Cunta Interchange (km 43+855)

Propose interchange is at Cunta, placed at approximately 1 km south from Cunta, at the crossing with DN 7 and DJ 106I. Due to the limited area, we propose an interchange, with rombowline shape having two roundabouts. This interchange will take the traffic from Dj 106I which connects Cunta and Dn7 and will make the connection with DN7.

Miercurea Interchange (km 47+060)

With regards to the rather difficult topography which the new motorway has to cross shortly after this area, i.e. the long ascent/decent between km 56 and km 65 (Apoldu de Jos to Aciliu/Saliste), an interchange is recommended to have access to the motorway for maintenance/emergency/rescue vehicles, diverting portion of the traffic in case of a major maintenance/repair on the large viaduct (from km 62+970), etc.

Saliste Interchange (km 66+290)

The proposed interchange at Saliste is the corresponding location to the Miercurea interchange.

With regards to reduced land take as well as costs a new location for the interchange has been determined a few kilometers further west at the DC67.

In the proposed solution for Saliste interchange, the communal road DC 67 will become a linkage road with DN1/7. In conformity with the legislation, the interchange junction arms have a total asphalted width of 6.00m being designed for a speed of 50 km /h (minimum horizontal radius is R=95m).

The junction arms are connected with relocated road DC 67 by roundabouts.

The determined solution for the Saliste interchange incorporates the DC67 as link road to the DN1/7.The DC67 will be upgraded to Class III Road Standard for a length of about 1.2 km, from the interchange up to the junction at the DN1/7.

Sibiu West Interchange (km *82+070*)

The end of the Orastie – Sibiu Motorway Section (Task [ii]) is at the crossing with the DJ106B where an interchange is planned to replace the intermediate roundabout solution of the Sibiu Bypass, which is presently under construction. The DJ106B provides access to the west of Sibiu, an expanding commercial area and the airport.

B.3.3. Maintenance and parking/resting places

For Orastie – Sibiu task was established a resting/parking place at km 60+000, located in Sibiu County. The traffic will be possible on both sides of the motorway. This location was chosen taking into consideration the social and landscape conditions.

The following locations were established for resting/parking place:

- km 20+150, a resting/parking place for every roadside of the motorway – Alba County;
- km 39+830, a parking/resting place for every roadside of the motorway – Alba County;
- km 76+150, a parking/resting place for every roadside of the motorway – Sibiu County.

Maintenance centre are designed so that will the vehicles involved in maintenance and repair cycle will move efficient and in safety conditions. The project will be sufficient flexible in order to permit the extension of these locations in time.

B.3.4. Works for environmental protection

On some section the pluvial water will be collected in open ditches and diluted in the discharging of adjacent catchment basins. A oil separator is proposed for every km, on each side of the motorway (195 oil separators).

In order to decrease the noise were proposed noise panels where the motorway gets closed to distances smaller than 600 m.

In order to protect the fauna and flora a fence is proposed to be placed close to forest areas in order to minimize the noise.

B.3.5. Design elements

Orastie - Sibiu section is part of Corridor IV TEN-T (Trans - European transport Network) that crosses Romanian territory starting from Nadlac (Hungarian border) to Pitesti and realizing the linkage with Constanta Town.

For the development of the Trans - European Corridors was established a framework which contains minimum standards in order to harmonize the

geometrical design standards and to obtain a consequence degree of road aspect, that will lead to traffic safety and comfort.

For the motorway design, when establishing the proper parameters for horizontal and vertical alignment, were considered design speeds between 100 km/h and 120 km /h, and in some cases as: abrupt locations, mountain areas or urban locations with heavy traffic, a speed of 80 km/h.

The geometrical characteristics for the roads that are part of Trans-European Corridors are defined by the minimum values recommended for the horizontal and vertical parameters that are presented in the table below:

- The roadway of the alignment should have a width of 3.50m.
- The minimum width for roadside verge is recommended to be between 2.50m for normal roads and 3.25m for motorways.
- In case of a motorway, the roadside verge must include one continuous roadway for urgent stops with a width of minimum 2.50m (3m were traffic is heavy), consolidated and asphalted in order to permit parking.
- The minimum width recommended for the median area of the motorway or of a road with separate traffic roadsides, is approximately 3m.
- For the alignment sectors, the transversal slope must have values between 2% and 3 % so the pluvial waters drainage can be assured.
- The minimum weight for the motorway cannot be less than 5.5m

Comparing with the Trans European Corridor requests and in order to harmonize the performance and safety of the motorway, the design parameters from Romanian, German and Great Britain were analyzed.

For other roads that must suffer improvements of the route or are passing over the proposed motorway, also were analyzed the geometrical design standards from Romania which must be considered, different from the motorway design standards.

The route parameters for the horizontal and vertical plans of Orastie - Sibiu motorway were designed taking into consideration the other routes from project area. For Deva - Orastie bypass a design speed of 120 km/h.

B.4. METHODOLOGY USE FOR ENVIRONMENTAL IMPACT ASSESMENT

Regarding the impact of construction works on environment and population, the evaluation was realized for construction period and for exploitation period. Referring to the impact of the construction works on environment and population, the evaluation was realized for construction period and for operation period. Were evaluated all the pollution sources of water, air, soil and underground, flora and fauna, noise and vibrations, waste management, toxic and dangerous substances. Following was analyzed the impact on environmental factors: water, air, soil, human places and others; project proposed measures were analyzed and supplementary measures were recommended for minimizing or eliminate the negative impact and compliance with the admissible limits. A major importance for the measures has the proposed monitoring activities during construction

period; organizational recommendations were elaborated in order to maximize the efficiency of the monitoring.

During construction period, the site activities can have a significant negative impact on environment and human factor. The types and volumes of works necessary for motorway construction, the relatively short time of period until operation, the existing situations of land property and usage and others, classify this project as very difficult and important.

In order to evaluate the impact during construction period, is obligatory the analyze of the specific effects, in the context of permanent working point modification, importance of the developed activities, local morphological characteristics, hydro-geologic characteristics, land usage and others.

Must be mentioned that the analyzes and the proposed measures are not solving all the problems of environmental protection during execution period. This situation is justified, by the complexity of the activities and by the lack of information needed for environmental evaluation, information that must come from the General Contractor.

The general Contractor has the responsibility of choosing and designing of the auto park, site organizations locations, proper installations for asphalt and concrete, flux of works and others.

The general Contractor has also the responsibility for monitoring the site organization activities in order to comply with the legislation in force for environmental protection. The monitoring can be realized with own staff or by a neutral, licensed person/company.

The guidance, permits and control fro environmental protection should be assured by the local environmental protection authorities. The permanent collaboration with the general Contractor all along the construction period represents the condition for environmental impact compliance with the admissible limits. The potential exceptions of exceeding the limits are local and on limited time periods, being analyzed from case to case. These cases can refer to dust concentration exceeding on the working points or noise/vibration impact on some motorway sectors with heavy traffic, the population complains and the proposed measures must be considered and rapidly solved.

For the exploitation/operation period, the global analyze of the positive and negative effects, concludes that the positive effects are major. For this analyze weren't under evaluated the adverse effects from operation period, effects that are generated by exhaust emissions, noise from traffic properties separation or landscape modification. Due to the proposed measures (special panels for noise protection, "green belts", or earthworks), the negative impact was minimized, the predicted values in air, water, soil and underground, as well as the level of noise and vibrations being under the admissible limits.

Elaboration of impact assessment study is based on specific legislation: European Directives that are transposed and implemented into Romanian legislation and Romanian legislation:

- CD no.85/337/CCE environmental effects of some public and private projects modified and completed by CD 97/11/EC and CD 2003/35/EC regarding public participation on the elaboration of plans and programmes related to the environment
- Transposed into Romanian legislation by EO no. 195/2005 regarding environmental protection, approved by Law no. 265/2006, modified and completed by GD no. 1213/2006 regarding the framework procedure for environmental impact assessment and public and private projects.
- Romanian Ministerial Order No. 860/26.09.2002 (Ministry of Waters and Environment Protection) for approval of EIA and the issuance of environmental agreement procedure, published in Romanian Official Gazette No. 52/January 30, 2003; updated by the Ministerial Order no. 210/ March 25th 2004 published into the Official Gazette no. 307/ June 7th 2004 and by Ministerial Order (MWEP) no 1037/2005. EIA procedure (integrated permit) last maximum 167 working days (around 232 calendar days), and minimum 142 working days (around 195 calendar days).
- Romanian Ministerial Order No. 863/26.09.2002 for approval of the methodological guidelines applicable to the stages of the EIA framework procedure, published in Romanian Official Gazette No. 52/January 30, 2003.
- CD no. 2000/60/EEC, regarding water, transposed by Water Law no. 107/1996 modified and completed.
- GD no. 352/2005 that completes and modifies teh GD no. 188/2002 regarding the conditions for discharging of waste waters.
- GD no. 351/2005 regarding the approval of time scheduling for emissions and hazardous substances discharging, modified and completed;
- Law no.458/2002 regarding the drinking water quality modified and completed.
- Order no. 1612006 regarding the water quality classification in order to be established the ecologic conditions for waters.
- CD no. 75/442/EEC regarding the wastes, modified by CD no. 91/156/EEC transposed by EO no. 78/2000, approved by Law no. 426/2001 regarding the waste regime, modified and completed;
- CD no. 1999/31/CE regarding waste landfilling, transposed in Romanian legislation by GD no. 349/2005 modified and completed;
- GD no. 235/2007 regarding used oil management;
- GD no. 1057/2001 regarding batteries and accumulators;
- GD no. 621/2005 regarding waste management package modified and completed;
- Law no. 465/2002 for approval of EO no. 16/2001 regarding the industrial recyclable waste management, modified and completed;
- GD no. 856/2002 regarding waste rapports and approval of waste list, modified and completed;
- GD no. 804/2007 regarding the control of the risks accidents with hazardous substances;

- CD no. 96/62/CE regarding the evaluation and air quality management, transposed by EO no. 243/2000 regarding the air protection, modified and completed;
- Order no. 462/1993 for Approval if Technical Conditions related to air protection and Methodological Norms regarding determination of the emissions generated by stationary sources, modified and completed.
- Order no.592/2002 regarding admissible limits, criteria and methodologies for evaluates Sulphate dioxide, azotes dioxide and oxides, suspension particles (PM 10 and PM 2,5), Plumb, benzene, carbon monoxide and ozone in air, modified and completed;
- GD no.332/2007 regarding the procedure for engines approvals and measures for air protection;
- CD no. 49/2002/EC regarding the evaluation and management of noise, transposed by GD no. 321/2005, modified and completed.
- GD no. 1756/2006 regarding the level for noise emissions from the equipments used outside from the buildings;
- Order no.1397/2006 for approval of Guide for noise indicators determination of the activities developed in industrial areas, traffic and closed to airports;
- Order no. 1830/2007 for approval of Guide for noise maps elaboration;
- Project approval of admissible limits for Lzsn and Lnight noise indicators;
- CD no. 92/43/CEE regarding natural habitats conservation, wild flora and fauna, transposed by EO no. 57/2007 and by Order no.776/207 for community sites as part of European ecologic network Nature 2000 in Romania.
- CD no. 79/409/CEE regarding conservation of wild birds, transposed by EO no. 57/2007 for natural protected areas, observation of natural habitats, wild flora and fauna and by GD no. 1284/2007 regarding the special aquifaunista areas as part of European network Natura 2000 in Romania;
- Order no. 756/1997 for approval of environmental pollution evaluation;
- Order no. 708/2004 regarding the Technical Norms for environmental and soil protection when sludge is used in agricultural activities;
- Order no. 536/1997 for approval of Hygienic norms and recommendations regarding the population living conditions, modified and completed;

Although, for EIA report evaluation was used several standards and norms, as:

- STAS 10009/88 – Urban acoustic – Admissible limits for noise
- STAS 10144/1-80 – road types;
- STAS 6161-89 – Noise level outside the buildings
- STAS 6156 – Noise level inside the buildings
- STAS 12574/87 – Air from protected areas. Quality conditions
- STAS 9450/88 – technical conditions of waters for agricultural irrigations

Estimation and methodologies were realized for EIA report:

- AP-42 Methodology – European Environmental Agency

- Web site The Role of the Highways Agency in Local Air Quality Management, November 2003, England Highways Agency, www.highways.gov.uk/roads/projects/misc/airqual/
- Guide du Bruit des Transports Terrestres – Previsions des niveaux sonores, CETUR, 1980
- SETRA – „Protection des eaux contre la pollution d'origine routiere"

B.5. ENVIRONMETAL IMPACT

B.5.1. Impact on water

B.5.1.1. Impact on water during execution period

During construction period the potential pollution sources are caused by works execution, site traffic and site organization management. Thus, the main pollution sources are the followings:

- Domestic waste waters;
- Waste waters from the technologic losses;
- Pluvial waters from the working platforms of site organizations;
- Accidental losses from supply and maintenance stations and transport means;
- Difficult maneuvering of vehicles transporting construction materials;

We appreciate that the emissions of pollutants that may get directly or indirectly into the waters (surface or underground) are not significant and don't modifies the category of water quality.

Also, regarding the pollution of underground water we appreciate that will be reduced. The carburant will have to be stored in special reservoirs and the plants and vehicles maintenance will have to be carried out in special arranged places.

For the waste waters resulted from the site organization, the limits of pollutants established in NTPA – 001 will have to be respected for the waste waters discharged into the natural receivers.

In case there will be evacuated into existing sewerage systems of a locality the maximum admissible concentration are specified in NPTA 002 "Normative concerning the conditions of evacuation for the waste waters into the localities sewerage networks". If after the treatment the waste water will be discharge on specific adjacent fields, we suggest to comply with the limits stipulated by STAS 9450 – 88 "Technical conditions of Quality for waters to be used for agricultural irrigations".

B.5.1.2. Impact on water during operation period

During exploitation period of Orastie - Sibiu section, the potential pollution sources for waters are:

- Direct deposit on water surface of pollutants coming from the traffic;
- Waste water discharges direct into natural receiver, are considered waste waters, the pluvial waters which are washing the road;
- Discharges directly in natural receivers of noxious waters generated by the ruttier accidents;
- Accidental discharges of potential polluted waters generated by the vehicles washing activities and maintenance activities during winter period.

Due to the proposed measures: settling tanks, oil separators for the pluvial waters collected from bridges and motorway route, the contaminated waters wil be treated before being discharged into the natural receivers, in compliance with the admissible limits for the pollutants, mentioned in the legislation in force.

It will be appreciated that the water courses and the underground water are not to be affected by the traffic on the designed route.

A significant impact during operation period can be generated due to the traffic accidents with vehicles transporting toxic substances.

B.5.2. Impact on air

B.5.2.1. Impact on air during execution period

The atmosphere is considered the most important pollution propagation factor, the noxious emissions affecting direct and indirect, the human factor as well as the other components of natural and artificial environment.

The emissions includes common pollutants (NOx, SO_2, CO and particles), toxic substances (cadmium, nickel, chrome and polycyclic aromatic hydrocarbons), azoth dioxide (N_2O) – responsible for stratospheric ozone damage, methane – which together with CO2 has significant effects on environment, being gases which conduct to green gasses generation.

The dust emissions vary from one day to another, depending on the activity level, specific and meteorological conditions.

The pollutants emissions are lower if the engine performances are higher, in present being developed engines with low consumption per power unit and strict control of emissions.

The main area for the emissions resulted from equipments activity is considered to be the working area, 25 – 30m one side of the road axel to another, in total a surface among 50 m width.

The construction period is characterized by the presence of some pollutants weight rate higher comparing to operation period.

On the working site, the pollutants repartition is considered uniform. The means of transport are linear sources for pollution. The equipments are moving on reduced surfaces on working site. Taking into consideration that all along the road are many working points, some of them fixed (concrete and asphalt plants)

and others temporary (earthworks for diggings, soil contamination pickling, road structure execution, road foundation execution, road pavement execution) it is estimated that the uniform repartition all along the road can be accepted as calculi hypothesis, mentioning that a detailed analyze of the equipments activity area should be realized.

Although must be mentioned that the vehicles/equipments that are being used, execution technology, works flux, all of these, are General Contractor responsibilities.

B.5.2.2. *Impact on air during operation period*

Impact evaluation of specific sources on air, during operation period, was realized in compliance with the methodology presented above.

The specific source of this period is the expected traffic of the motorway.

Mathematic modelling of the concentrations was elaborated with TRAFC model, which is based on Gaussian equations of turbulent diffusion and the formulas of Hanna for linear sources.

The calculus (and graphical representation for the following pollutants):

- NOx, CO and suspension particles (ca PM10), for year 2013 and for the highest expected intensity of the traffic - year 2035.

Thus, the highest values of the concentration can be:

Orastie – Sebes section

- **2013 Year :**
  - NO_x: 164.4 $\mu g/m^3$ (1.2 time smaller than VL) – hourly average;
  - CO: 90.7 $\mu g/m^3$ (110 times smaller than VL) – 8 hours average;
  - PM_{10}: 38.0 $\mu g/m^3$ (.3 times smaller than VL) – daily average

These values are meet for distance up to 50m from the traffic area. For distances of 150 m perpendicular on the traffic route, the values decrees up to 20 $\mu g/m^3$ for NO_x, 2 $\mu g/m^3$ for PM_{10} and to 5 $\mu g/m^3$ for CO.

The highest values of NOx average concentrations, on long term, can be reached up to 50m (22.1 $\mu g/m3$, 1.8 times smaller than VL, and 1.4 times smaller than the limit for ecosystems protection). For distances of 150m, the NOx average concentrations, on long term, decrees to 4 $\mu g/m3$. The highest value of the annual average concentration for PM10 is 5.1 $\mu g/m3$ – 8 times lower than the admissible limit.

- **2035 year:**
  - NOx: 134.7 $\mu g/m^3$ (1.5 ori times smaller than VL) – hourly average;
  - PM10: 40.1 $\mu g/m^3$ (1.25 times smaller than VL) – daily average;
  - CO: 145.1 $\mu g/m^3$ (69 times smaller than VL) – 8 hours average

For distances of 150 m, the value decrees up to: 48 μg/m3 for NOx, 5 μg/m3 for PM10 and 8 μg/m3 for CO.

The average concentrations, on long term, for distances of 50m are 18.1 μg/m3 for NOx (under VL and under the limit value for ecosystem protection, 3.4 μg/m3 pentru PM10. For distances of 150 m decresses up to 4 μg/m3 for NOx, and 0,5 μg/m3 for PM10.

Sebes – Sibiu section

- **2013 year:**
  - NOx: 165.0 $\mu g/m^3$ (1.2 times smaller than VL) – hourly average;
  - CO: 85.3 $\mu g/m^3$ (117 times smaller than VL) – 8 hours average;
  - PM10: 38.6 $\mu g/m^3$ (1.3 times smaller VL) – daily average

These values are meet for distance up to 50m from the traffic area. For distances of 150 m perpendicular on the traffic route, the values decrees up to 30 μg/m3 for NOx, 2 $\mu g/m3$ for PM10 and to 10 μg/m3 for CO.

The highest values of NOx average concentrations, on long term, can be reached up to 50m. (25.6 $\mu g/m^3$, 1.17 times smaller than VL, 1.4 times smaller than the admissible limits for ecosystem protection). For distances of 150m, the NOx average concentrations, on long term, decrees to 4 μg/m3. The highest value of the annual average concentration for PM10 is 5.5 μg/m3 – 7.2 times lower than the admissible limit.

- **2035 year:**
  - NOx: 155.1 $\mu g/m^3$ (1.3 smaller than VL) – hourly average;
  - PM10 : 42.8 $\mu g/m^3$ (1.16 times smaller than VL) – daily average;
  - CO: 130.6 $\mu g/m^3$ (77 times smaller than VL) – 8 hours average.

For distances of 150 m, the value decrees up to: 50 $\mu g/m^3$ for NO_x, 6 $\mu g/m^3$ for PM10 and 7 μg/m3 for CO.

The average concentrations, on long term, for distances of 50m are 23.4 μg/m3 for NOx (under VL and under the limit value for ecosystem protection), 8.4 μg/m3 for PM10. For distances of 150 m decrees up to 4 μg/m3 for NOx, and 0,5 μg/m3 forPM10.

B.5.3. Impact on soil and underground

B.5.3.1. Impact on soil and underground during execution period

The pollutants mentioned in the manuals for environmental quality, recommended by the International Union Organization for Forest Research (IUOFR) for vegetation that are generation significant negative effects are the followings: SO_2, NO_2 and O_3.

A factor that affects the environment, specific to execution period is the damage of the existing flora and close vegetation areas. The works execution can generate major damages for ecological balance, in case the environmental protection measures are not respected.

- De capping of vegetal soil and construction of an artificial profile due to executed works on both roadsides;
- Erosion;
- Lose of soil characteristics due to the storage of fertile soil in improper conditions or storage locations;
- Removal/degradation of fertile soil layer in the areas where will be realized new technological roads or deviations of the existing roads;
- Isolation of some soil surfaces, from the natural ecological circuits by concreting;
- Accidental discharges on soil of some substances;
- Un controlled storage of waste, construction materials or technological waste;
- Potential discharges of sewerage network;
- Qualitative modifications of soil under the influence of the pollutants from air. (qualitative and quantitative modifications of geochemical local circuits.)

B.5.3.2. *Impact on soil and undergound during operation period*

The pollutants which characterize the air quality during operation period are the one resulted from vehicles transport. The most dangerous for soil contamination are the suspension particles, NOx and SOx.

In our country, until present, land pollution was not significant, except some urban areas. The concentration of Pb, Ni, Zn in soil , close to the roads are in compliance with the previsions of Order no.756/1997, regarding the environmental pollution, being even under the alert levels for less sensible soils.

From the total emissions, resulted from traffic, it is estimated that 90 % will settle on soil, up to 100m on both roadsides. Also is possible the delimitation of a sensitive area, for the total length of the motorway and a width of 30 m both roadsides (in this area will be a significant pollution - 80% from the pollutants will settle).

Resulted from the combustion process of the vehicles engines which uses Benzine with Pb, the weight rate of Pb will register decrees in time, due to the reduced number of users. Pb is accumulated in soil, having an after effect of hundred years.

The precipitations have an important role for soil load with different pollutants. We must mention that in the same time with atmospheric "washing" from pollutants and their settlement, the soil is also washed, helping to pollutants transport into the natural receivers. Thus, the precipitations favor soil and the underground water pollution.

It is recommended a periodic monitoring of soil quality, in order to identify the situations when the concentrations of heavy metal exceeds in the area of alignment

B.5.4. Impact on biodiversity

B.5.4.1. Impact on biodiversity during execution period

The pollutants mentioned in the manuals for environmental quality, recommended by the International Union Organization for Forest Research (IUOFR) for vegetation that are generation significant negative effects are the followings: SO2, NO2 and O3.

A factor that affects the environment, specific to execution period is the damage of the existing flora and close vegetation areas. The works execution can generate major damages for ecological balance, in case the environmental protection measures are not respected.

During execution period, the main pollution sources with a negative environmental impact are:

- Working site activities – land temporary use, potential soil pollution, temporary waste landfills, all these having negative impact on vegetation;
- Noise, personnel and equipments traffic – all these modifying the natural habitat.

The woks impact on vegetation has the following negative consequences:

- Microclimate modification in the vegetation area;
- Depreciation of flora species;
- Damage of the habitat by the noise generation sources;
- Modification of underground water flow regim, which can be blocked by the new constructions;
- Modification of wild animals migration habits;

For motorway construction are necessary clearance works on a surface of 19.53 ha - from which a surface of 16.55 ha represents forest and 2.9 ha forestry vegetation which is not part of forestry fund – and on a surface of 18.2 ha orchards.

The impact caused by orchards clearance is similar with the impact caused by forest clearance.

After clearance activities some changes can appear:

- Degradation of landscape, due to new elements which will not fit into the new forest landscape;
- Changes of forest micro clime;
- Changes of landscape;
- Reduction of habitats from the forest;
- Increase of the area affected by the clearance activities

So that the impact will be reduced it is need that the following measures to be taken:

- Maximum limitation of clearance activities;
- Planting new trees for the ones that will be cut, as the National Forestry department recommends;

It is estimated that in time the works are being executed and the working points are closed, the quality of biodiversity will increase to the initial ones, before execution period.

B.5.4.2. *Impact on biodiversity during operation period*

During operation period, the main pollution source is the expected traffic, which affects the flora and fauna as it follows:

- Noxious substances in air;
- Noxious substances on soil and plants;
- Noxious infiltration in underground water;
- Noise and vibrations;
- Damages of wild animals habitats;
- Natural resources pollution.

The emissions from the traffic contribute to atmospheric acidity increment and help the troposphere ozone to form, having direct and/or indirect effects on all the environmental components (vegetation, fauna, soil and water). The presence of exhaust gases affects soil and water quality and also flora and fauna.

Although a soil pollution can happen, due to different oil products from the transport means/ vehicles and different substances generated by the accidents, this having a direct impact on local flora and fauna.

The vegetation can be affected also by temporary works for maintenance of the pavement system or by pluvial waters which washes the motorway pavement. During winter period, for melting the ice formed on the motorway and for snow cleaning, the specialized companies use salt or chemical compounds. A small part of these are dispersed by the wind and the rest are flowing from the motorway pavement in the same time with the surface waters, so that the vegetation from the area is affected and the soil also, becoming saturated.

The noise generated by the traffic is another factor which has a significant impact on wild animals. Noises and vibrations have significant consequences on wild animal's life, which even changes the migrations routes and other habits.

B.5.5. Potential impact on protected areas

In what regards the impact on Protected areas for task ii Orastie – Sibiu (km 16 + 000, at a distance of 3.5 km, the area called ***Pajistile lui Suciu,*** close to Lancram interchange km 27 + 455 the motorway route goes close to 1 km of Natura 2000 sit ROSCI 0211 – Rapa Rosie) must we mention that the potential impact during execution and operation phase is reduced.

Must be mentioned that the impact on natural protected areas caused by execution works and activities from operation period is reduced due to the distances that complies with the legislation in force.

During execution period will not be placed production plants and site organizations and will not be placed borrow pits in the neighborhood of protected areas.

The execution timing will take into consideration avoiding the temporary occupation of land in order not to affect the species and plants mentioned in table 54.

The designed works are not extended and are not affecting the geological reservation Rapa Rosie.

During operation period, the reservations Rapa Rosie and Pajistile lui Suciu are not in direct contact with the motorway section Orastie Sibiu.

We recommend that truism activities will not be developed closed to Rapa Rosie area.

The plant species that were mentioned in table 54 will not be affected by the traffic, due to the fact that the motorway route pass by a considerable distance so that the pollutants emission will not affect the vegetation. In the annexed maps are presented maps for pollutant dispersion.

The conclusion of specific studies elaborated (pollution dispersion) was that the two protected areas will not ne affected by the motorway project.

In what regards the amphibiens and reptiles (pajistile lui Siciu), we must say that will not be affected by motorway traffic wich takes place at 3.5 km from the protected area pajistile lui Suciu.

B.5.6. Impact on economic and social environment

During execution period, as well as on operation period, the project generates a significant positive impact on social conditions and economic activities, as it follows:

- Possibility of new jobs for local population;
- New employee personnel will contribute at commercial exchanges from the area;

The analyze of the proposed investment has a positive impact, by increasing the jobs during execution and operation period. The labour market will be influenced in a positive way (qualified workers in construction activities, for execution period and workers for services during operation period).

Is predicted that the proposed project will not have a negative impact on local economic conditions and will not generate reasons for complains of the local population.

The project will encourage the followings:

- Traffic capacity increment;
- Traffic fluency in localities;

- Increased comfort in traffic;
- Increase of traffic safety;
- Reduction of accidents number;
- Improvement of environmental conditions due to pollutants reduction and noise pollution reduction;

B.5.7. Potential impact on cultural, archaeological and historical locations

Referring to the potential archaeological sites, the contracts between the Client and the County Department of Arad Museum will be signed, with the main scope of identifying and monitor the archaeological sites during execution period. Thus, the Arheological discharge Certificate will be obtained, after the preliminary evaluations will be finalize, the continuous monitoring during execution period being proposed to be realized by specialized person/company.

All the requested conditions will be complied, as mentioned in the permits from "Cultural Department and national patrimony in Hunedoara County".

The necessary costs for these activities were included in the general bill of quantities. Based on Law no. 182/2000 regarding the national cultural patrimony protection, with modification and completions and Law no. 422/2001, regarding the Historical monuments protection, with modification and completions, the beneficiary/executants of the project supports the costs for archaeological diggings that should be realized, having the obligation, to modify the project if the discoveries needs to be conserved and protected and marked on the surface.

B.6. IDENTIFICATION AND DESCRIPTION OF THE AREA WHERE THE IMPACT IS OBSERVED

The areas where the impact is significant are the ones where the pollutants dispersion develops during execution and operation period.

These areas are:

- Working points, the site and production bases;
- Traffic and transport routes for the construction materials;

During operation period, due to the pollutants dispersion generated by the motorway traffic, the area where the impact is significant is reduced, around the motorway alignment on a distance of 150-200m on both sides of the motorway.

B.7. MEASURES FOR MINIMIZATION OF THE IMPACT FOR EACH ENVIRONMENT COMPONENTS

B.7.1. Measures for decreasing/elimination of the impact during construction period

For environmental factor protection are necessary the following measures tat will minimized the impact for each environmental components:

For water protection

- Collection of waste waters and discharging into the proposed settling tank. The waters are discharged in the sewerage networks (if possible) or directly on lands after the treatment phase.
- Collection of pluvial waters loaded with pollutants from the sites and discharging into the settling tank (hydrocarbon separation phase).
- Collection and discharge of domestic waters into the sewerage networks or directly on lands.

For air protection

- Aggregates, rockfills and technologic roads sprinkling in order to avoid the dust and particles emissions;
- Filling Materials transport (ballast, rockfills) should be realized with proper equipments/vehicles covered during transport;
- Concrete fabrication in installations with filters for dust retention;
- Compliance with the time scheduling for the technical revisions of the transport vehicles, in order to respect the limits;
- Maintenance of the vehicles and equipments in order to minimize the emissions from the atmosphere generated by the vehicles engines.

For soil and underground protection

- Proper organization of working points (concreting the platforms for oil changes, equipments maintenance, rockfillings storage, concrete plant and others), so that the technological and pluvial waste waters will not infiltrate or discharge into the natural receiver.
- Collection and land filling of the waste generated by the construction activities.
- Endowment of working points with ecologic installations.

For human community protection

- Adapting the working schedule in order to respect the resting period of the living population;
- Marking and fencing of the production bases and sites with noise protection panels, fences and publicitary boards.

For biodiversity protection

- During exploitation periods will be place special panels for noise protection in order to minimize the impact on natural habitats.
- For flora and fauna protection special maintenance works will be realized: drainage channels, oil separators, septic fosse in order to reduce the possibility of animal infestation and vegetation damage.
- When crossing river courses and irrigation channels, special technical solutions will be adopted and also water protection measures will be implemented.

B.7.2. Measures for decreasing/elimination of the impact during operation period

During operation period, the traffic from the motorway doesn't generate a significant impact on the environment. The following measures are proposed:

Designing and construction of the motorway in compliance with the standards in order to assure the requested safety conditions.

- Design and construction of the motorway in compliance with comfort and traffic safety;
- Pluvial polluted waters are collected in special ditches and discharged in settling tanks and oil separators (50 settling tanks with oil separators on each side of the motorway) in order to avoid water sources pollution and soil pollution;
- Proper maintenance of motorway during operation period, oil separators and waste collection;
- Must be mentioned the motorway constructions an important measure for human factor protection, due to traffic decrement, reduction of noxious and noise and also accidents number decrement;
- Provision of three passages for animals in order to reduce the local effect of fragmentation: km 58+115, km 58+425, km 78+442;
- Placement of a metallic fence (during operation period);
- Proper management of waste, periodically elimination from service and parking places;

Also, must be mentioned the measures proposed by the designer and local authorities for traffic safety on the motorway.

Due to motorway construction it is estimated that the traffic will be reduced on national roads crossing inhabited areas with 30 %, the noise will be reduced with 14 dB due to heavy traffic, atmospheric pollution also will be reduced with 30-40 %.

B.8. MAIN CONCLUSIONS OF ENVIRONMENTAL IMAPCT ASSESMENT EVALUATION

The environmental impact is generated by the motorway traffic and is not significant.

The negative elements and most important for environmental impact are generated during execution period of the motorway as follows:

- Dust in atmosphere, settled on soil and water, generated by the construction materials on working points and production bases; concrete fabrication;
- Atmospheric emissions from carburant burning of the equipments and transport means engine;
- Technologic and domestic waste waters from production bases;
- Pluvial waters loaded with pollutants from the production bases;
- Noise and vibration from the production bases;

- Landscape aspect generated by the site activities comparing to the existing landscape aspect;

The recommended measures within the EIA report for minimizing/elimination of the impact during execution period are summarized as follows:

- Collection of waste waters and discharging into the proposed settling tank. The waters are discharged in the sewerage networks (if possible) or directly on lands after the treatment phase.
- Collection of pluvial waters loaded with pollutants from the sites and discharging into the settling tank (hydrocarbon separation phase).
- Marking the site points with reflectorizing panels;
- Marking and fencing of the production bases and sites with noise protection panels, fences and promoting boards.
- Proper waste management generated from the execution works;
- Adapting the working schedule in order to respect the resting period of the living population;

During operation period the environmental impact is caused by pollutants emissions from the burning gases generated by vehicles and the noise.

Also the land occupation and the changes of actual use of some surfaces of land generate some environmental impact.

Must be mentioned that the pollutant emissions generated by vehicles are limited to one roadside of 100-150m on each side of the motorway, the concentration being situated in the admissible limits for human health protection, animals protection and fauna protection.

Noise pollution is extended to each roadside of the motorway at distances of 550-600 m, where the admissible limit is 50 dB (A) – STAS 10009. In case that the distances from the motorway is less than 600 m, the designer proposes protection measures like noise panels and more layers of windows.

Must be mentioned that the most important impact generated by the project is land usage and permanent occupation of some land surfaces for afferent constructions, parking places, maintenance. In order to reduce the impact some measures will be taken in design phase when the motorway alignment is established in order to avoid inhabited and protected areas.

For the exploitation/operation period, the global analyze of the positive and negative effects, concludes that the positive effects are major. For this analyze weren't under evaluated the adverse effects from operation period, effects that are generated by exhaust emissions, noise from traffic properties separation or landscape modification. Due to the proposed measures (special panels for noise protection, "green belts", or earthworks), the negative impact was minimized, the predicted values in air, water, soil and underground, as well as the level of noise and vibrations being under the admissible limits.

B.9. LIFE QUALITY AND SOCIAL CONDITIONS IN THE "AFFECTED" COMUNITIES

The project implementation has a positive impact on life quality and social conditions, by:

- Generates new jobs;
- Increase commercial exchanges;
- General economic and social development of project area;
- Construction of the motorway helps in reducing the noxious emissions and noise, by diverting the traffic from the localities on the motorway, with significant positive aspects for life quality;

This development compensates the negative effects generated by project implementation, especially during execution period.