Senior Engineer: Csaba Madarász		**MÁV PLANNING INSTITUTE LTD.** Budapest, I. Mészáros u. 19. Levélcím: 1390 Budapest, Pf. 193 Telephone: (1) 212-06-64, int.: (01) 54-52, telefax: (1) 375-16-94			
Environment Engineer: Tamás Heiszig, Renáta Tóth Róbert Fenyvesi	Client:	**National Infrastructure Development Co.** **Project Directorate – Railway Development** **1134 Budapest, Váci út 45.**			
Checked by: András Kovács					
Office Manager: Tibor Gregó Head of Department: Project Manager: Árpád Pájer	Project:	**Reconstruction of Bp. – Esztergom railway line, Northern Railway Danube bridge (exc.) – Piliscsaba (incl.) line section, additional design for approval** **Supplement to the impact study prepared to the complete environmental procedure**			
Chief Engineer: Ferenc Kuna	Subject:	**Environmental study** **Volume II: Comprehensible summary**			
Managing Director: Péter Kralovánszky	Job No.: **11606/A/8**	Revisions:			Budapest, 02.2009 Page no.: 13

ANNEX I.

Reconstruction of Budapest – Esztergom railway line

Northern Railway Danube Bridge (excl) – Piliscsaba (incl.) railway line section

Environmental study

Comprehensible summary

Introduction

MÁV Tervező Intézet (MÁVTI) Kft. received an order for the preparation of the designs for approval of the Northern Railway Danube Bridge (excl.) – Piliscsaba (incl.) railway line section, to which the compilation of the preliminary study documentation (PSD) also belonged. Based on the prepared PSD submitted to the Inspectorate for the Environment, Nature Protection and Waters of the Middle-Duna-Valley (hereafter: Inspectorate) and based on Governmental order 314/2005.(XII.25.) about the environmental impact study and uniform procedure of granting permit to the use of the environment the Inspectorate stated by Decision no. KTVF: 811-30/2008 that the implementation of the project has significant environmental impact, therefore environmental study documentation (ESD) should be prepared. The National Infrastructure Development Co. also asked MÁVTI Kft. to prepare the EIS.

Background of the project

Similar to the practice establishing in Europe it is one of the objectives of the Hungarian transport policy to make the railway transport on the one hand more safe and comfortable, on the other to burden the living world and the environmental elements to the least possible. This is a complex task according to which the standard of the railway vehicles and the travel speed, the waiting time and service, the comfort and security of the passengers should be improved.

In 2007 NIF Zrt. contracted MÁVTI Kft. with the preparation of the preliminary environmental study documentation (PSD) of the Northern Railway Danube Bridge (excl.) – Piliscsaba (incl.) railway line section in the frame of the modernization of the Budapest – Esztergom railway line, which work was completed in November 2007.

In connection with the railway project a number of additional design work had to be completed, mainly aiming at the preparation of the designs for approval of railway crossings and stations, or stops. For this design task also MÁVTI Kft. was contracted, which also contained the preparation of environmental work parts of level crossings, stations and stops.

Presentation of the planned project:

According to the plans 4 new stops will be established in the frame of the modernization of the Northern Railway Danube Bridge (excl.) – Piliscsaba (incl.) railway line section: Aranyvölgy stop (earlier Bécsi út stop), Solymár stop, PEMÜ stop and Mátyás utca stop. The existing Aquincum stop can be found on the design section. The stop will be relocated closer to Szentendrei út, on the Óbuda side of the bridge being here.
On the design section the plan envisages double track execution on the Danube Bridge (excl.) – Pilisvörösvár (excl.) section. Design speeds: 100 km/h on the line section between Óbuda station (incl.) – section 146, from section 146 to Piliscsaba station (incl.) 60 km/h.
In the next phase of the rehabilitation of the line section the stations will be rebuilt, modern new passenger platforms will be built.
The technical content of the planned project is described in detail per stations/line sections in Annex 8 of Volume I. of the environmental study. The presented technical descriptions are the shortened, contracted versions of technical descriptions of the design for approval of the line. The studied railway line was divided into the following sections:

- Bridge at Szentendrei út – Óbuda
- Óbuda station
- Óbuda – Solymár
- Solymár stop and loading place
- Solymár – Pilisvörösvár
- Pilisvörösvár station
- Pilisvörösvár – Terranova
- Terranova shunting place
- Terranova – Piliscsaba
- Piliscsaba station.

The environmental chapters of the design task relating to the railway project, roads, level crossings, P+R parking lots compose separate documents. The designs for approval were prepared in March 2008 (Plan no.: 1150/B/38-40g, 59) based on their technical content in March 2008 (Plan no.: 11520/B/163-182) the environmental chapter were completed parallel with the railway line design work.
The relating technical information is contained on the layout drawings and in the technical descriptions of the Annexes of Volume I of the environmental study.

The planned date of the implementation of the project according to the Investor is 2009-2010.

On the section between Pilisvörösvár station and Terranova shunting place the planned line modernization does not affect foreign lands, it can be implemented on areas owned by MÁV Zrt., the reconstruction of the railway line does not require expropriations.
On the remaining part of line modernization, on the territory of Budapest District II, of settlements Solymár, Pilisvörösvár, Piliscsaba expropriation is needed, because the planned design of the railway line also affects foreign lands. The expropriation plan is prepared by MÁVTI Kft.

Based on this the land requirements of the substructure of the planned railway line is non-uniform on the open line to the right, or to the left from the planned track center, in general ~5-10 m taking into account the local terrain conditions. Bigger differences are typical of the curve corrections. Such curve corrections are planned between sections 077+00 – 84+00; 90+00 – 113+00 – 146+00 on the section between Óbuda and Pilisvörösvár. In addition to the substructure the related works of the railway operation (structures, cables and other public utilities, electric overhead line system, telecommunication equipment, signaling equipment, passenger service facilities, etc.), as well as road corrections needed due to the reconstruction, P+R parking places also have land requirements.
The implementation of the planned project demands a lot of earthwork, large quantities of materials will be used.
In the present phase of the design work Bill of Quantities had not been prepared yet, there is no designated barrow pit and provisional deposit, and the transportation route is also unknown.
In the present design phase the actual construction technology to be used is also unknown. The method of construction will be determined by the winning Tenderer, thus during the study we could not take into account the relevant data.
These data will compose part of the construction, or organization plans.

Environmental impacts of the planned activity

The planned project and the reconstruction works have different impact on the quality of the environmental elements:

Concerning the subsurface and surface waters and the ground the stress on the environmental elements will not change after the reconstruction supposing purposeful operation. As to the ground the new track line will result land occupation. On the investigated route the permanent way crosses the Aranyhegyi creek on several places, and due to the planned curve corrections the bed of the creek should be arranged at the new crossing. The corresponding water licence was prepared by FŐMTERV Zrt. (address: 1024 Budapest, Lövőház u. 34), the authority procedure is ongoing right now.

In the case of the level crossings, parking places the pollutions resulting from the movement of the vehicles will settle and will leak into the ground with the ground water. According to the calculations up to an average traffic of 10 000 v/day the polluting materials produced by the growing traffic will not have significant impact on the environmental flora. The drainage of rainwater of the planned road sections, parking places will be made by evaporative trenches earth ditches, the media under the surface level and the water should be saved from damages. In order to protect the quality of the surface waters, depending on the sensitivity of the reservoir a treatment structure should be set up before the inlet. Most probably the structures have impact on the ground water conditions, but the impact will remain local due to the size, location of the works.
After leaking into the ground the rainwater falling on the area will get to the deeper layers through the cracks of the ground, until the level of karts water. In the course of this process the materials dissolved from the surface will follow the same route.

The drainage of the railway substructure and the permanent way shall ensure the protection of the substructure against subsidence and frost damages due to soaking. Therefore besides the correct loading capacity the substructure should also be well drainable.
The smaller part of the rainwater getting on the railway line removes by evaporation, the bigger part leaks through the crushed stone ballast and the sandy gravel protective layer into the substructure crown. From its surface the water leaks further to the trenches next to the permanent way, or to deeper grounds. The drainage of the railway embankment is ensured on the open line by the side trenches mostly running parallel with the track, and in the railway stations by the drains under the track.
Now and in the future modern Siemens Desiro trains will communicate on the railway line, the toilets of which is of closed system. On the motor train the selective waste collection is also ensured. According to the plans of MÁV Zrt. Bombardier Talent type electric motor trains will travel on the Esztergom railway line after the electrification. On these trains also closed system lavatory and toilet cabins are at disposal. In case of both types of trains the discharging of tanks is made on a central place using closed technology.
Pollution may be produced when different quality and composition material is falling, spilling, dropping or outpouring on the ground or on the ballast. This can be the result of incorrect packaging of the transported goods, the bad condition of the technical devices and equipment, lack of attention of the personnel and negligence, too. By using professional and safe loading technology, with the keeping the labour rules, by using packaging, covering materials the problem can be avoided.
The maintenance of the permanent way and the trains can also produce pollution endangering the water basis. During the maintenance of the railway track these pollutions can be prevented by keeping the technological instructions. The maintenance of the railway cars is made on the sites of MÁV reserved for this purpose.
On the pollution-sensitive areas the drainage of the permanent way and of waters drained from the track shall be made through trenches covered by pre-fabricated concrete elements, or (in case of the foreground of the stations) by closed ditches. In the case of parking places built in the foreground of the stations there is a danger of pollution of the covered pavement by mineral oil products. Therefore during the establishment of the parking places mud and oil collectors will be set up on the end points of the closed rainwater drainage systems. In order to get permit for their establishment basic water permit application shall be submitted based on the designs of FŐMTERV Zrt.

As to the living world, the natural environment and the landscape the final railway line designs were prepared with the consideration of the protection of the natural values, and were revised several times.
During the preparation of the study we have mapped, defined the habitats affected by the modernization of the railway line, we have determined their classification, values, natural condition, the sensitivity of the living world. During the survey we have found that in general the rehabilitation – with the exception of the four curve correction sections – does not affect natural, landscape values to be protected, since the used territories are mainly artificial, or degraded, weedy natural surfaces. On sections where curve corrections are made in order to increase the travel speed, new lands should be involved.

Among the habitats of the newly expropriated lands natural values worth of protection or to be protected can also hardly be found, thus we do not have to calculate with the danger of cutting the habitat into pieces, with harmful impacts of the intervention or with other nature protection risks.

Only the section between 132+00 – 136+00 of the railway line modernization north of Solymár is endangering known natural values, where although the modernization does not result the fragmentation of the habitat, but penetrates into Nature 2000 site and gets close to places, where the workers of the Duna-Ipoly National Park found the sites of protected plant species, the European Common Twayblade (*Listera ovata*) and of Southern adderstongue (*Ophioglossum vulgatum*).
In case of the ecological corridor running on the design area and of the Natura 2000 site located along one section of the railway line the problem of the reduction of the area of protected or to be protected natural values is posed, but during the permit granting procedure it should be considered, if the reduction of the territory is proportionate to the environment protectional benefits of the modernization of the railway line (e.g. the harmful material exhaustion of the railway is more favourable compared to the public road traffic).
When a new transport route is established there is a bigger danger that the invasion species (mainly those favouring disturbances) invade into the areas not conquered by them before. The railway embankments, gravel ballasts are typical habitat of certain species. In the present case, since the route with its invasion places is already existing, we need not be afraid of new invasion. For the living world the disturbances of the construction, the growing noise harms, dust pollution means more harm, which will disappear after finishing the construction and the original condition will be restored.
Certain habitat to be found along the railway line and determined precisely by the study should increasingly be saved during the construction, here the natural values will not be damaged if the work is done carefully, with the lowest possible surface disturbance and use of land, with time limitation.

As to the built environment it can be said, that the stations – the buildings to be found there and other constructions needed to the running of transport – are outdated, their condition is destructed, on the other hand they represent significant architectural and real estate value for the concerned local government. The designs for approval for the renovation, reconstruction of the buildings will be prepared in the later phase of the project. On the investigated section the building works do not affect monument type constructions.

As to the air condition positive changes can be expected, because after the implementation of the project electric motor traction is planned on the railway line. Today there is Diesel traction on the examined line section, the electrification of the line is a long term (10 years) project. In order to correctly evaluate the impact on the project on the air conditions, we have studied the present and future, without the implementation of electrification impacts of the railway air pollution. In order to determine the produced emission values we have made calculations with a transmission model.
In summary, comparing the calculated data with the air quality limit values it can be stated, that as a result of the present and future emission of railway air polluting materials certain emission concentrations developed in the critical residential area and on the border of the required 25 m protection lane will not reach the air quality limit values.

In spite of the many environmental advantages of the railway transport one of the most important harmful environmental impact is **noise pollution** threatening the residential zone next to the railway line, for this reason this is regarded a key point by the present study.

The main purpose of the noise investigation of the railway transport is to determine as precisely as possible the future noise situation to be expected on the long run (after about 15 years) after the implementation of the reconstruction of the railway line section.

In the frame of the noise and vibration protection work parts of the project the following tasks were performed in connection with the railway line and the construction of levels crossings regarded as additional investments:

- Noise measurements were made in the base condition on typical points of the design area and on the impact zone of the facility.
- We have identified all the buildings to be protected on the territory of the railway.
- We have surveyed the technical parameters, locations of the screening constructions (or of the ones providing natural shading).
- With making calculations based on the long term traffic conditions we have determined the prospective noise harms on the construction to be protected expectable as a result of modernization, reconstruction and the extent of the change.
- We have formulated the noise reduction measures ensuring the meeting in full of the environmental noise protection requirements defined by the rules.
- In order to determine the noise protection impact zones we have determined by calculations the critical distance from the track center (within which limit value exceeding can be expected on the observation points), plus the impact area distance within which the noise harm will potentially be limit value -10 dB. All these impact areas were defined by noise map modeling, using IMMI noise mapping software.

Basic noise emission data:
After making calculations based on the traffic data and processing the measurement data we have found the following present and planned railway and public road noise pollution basic values (Laeq(25) railway noise emission, and Laeq(7,5) public road noise emission) in the typical critical cross-sections on the investigated area. The study also covered other noise events in connection with the activities in the station, from noise pollution point of view these did not prove to be decisive.

Noise level “emission” requirements:

In the surrounding of the studied line section small town like residential zone is located which need to be protected, the limit value shall be determined according to no. 2 category of the territorial classification of noise protection zones. During the investment the different noise sources can have the following limit values:

Limit value RAILWAY:	daytime: 65 dB,	night 55 dB,
Limit value PUBLIC ROAD (main road):	daytime: 65 dB,	night 55 dB,
Limit value PUBLIC ROAD (other):	daytime: 60 dB,	night 50 dB,
Limit value P+R PARKING:	daytime: 60 dB,	night 50 dB,
Limit value WAITING train:	daytime: 65 dB,	night 55 dB,

Limit value Passenger information (public address), train arrangement, loading activity:
daytime: 50 dB, night: 40 dB.

Noise emission data of assessment points close to the railway.
Concerning all residential buildings under critical noise harm close to the studied railway line and affected by the additional public road investment we have calculated the noise emission (transport noise emission) on the assessment points taken on the building facade to be protected, at 2 m distance and in 1,5 m height in front of the windows of the rooms to be protected by adding the planned railway and public road noise emissions and using the corrections taken into account in noise harms. We have evaluated the results (data of the different assessment points, their affectedness, the planned noise control and possibility of noise screening) in a graphical way, this made possible a complex overview of transport noise harms (railway + public road) of the assessment points, resulting the optimization of the possible noise protection solutions.

Findings, proposals in connection with noise protection

According to point 4. (2) of Order no. 93/2007.(XII.18.) KvVM the noise emission and noise harms of the line transport noise sources shall be determined by calculations based **on Annex 4 of Order no. 25/2004.(XII.20.) KvVM.** Based on this and knowing the presented data it can be stated that after the implementation of the project the railway noise conditions during day and night on the long run will not have a harmful effect on the assessment points in the surrounding of the studied line section, therefore **based on this evaluation no noise control interventions are needed in connection with the project. Based on this calculation critical extent of noise harm will not develop on any of the residential buildings close to the railway line.**

In agreement with the legal regulations the planned noise level should be reduced under the limit value during the investment, but minimum to the present noise level. **In the present case this can be achieved "most actively" by using modern, silent vehicle park,** this is mostly achieved already, but will be realized in 100% in the planned condition.

The currently applied technology is Diesel traction and Desiro trains are traveling on the line section. On the long run after the implementation of the project the line will be electrified using electric traction and Talent type trains will communicate on the line. After the completion of the project the number of the trains will double during daytime and will decrease by 30% during the night periods. Consequently the noise level will increase during daytime and will reduce during the night, the noise level during the night should be regarded as standard critical condition.

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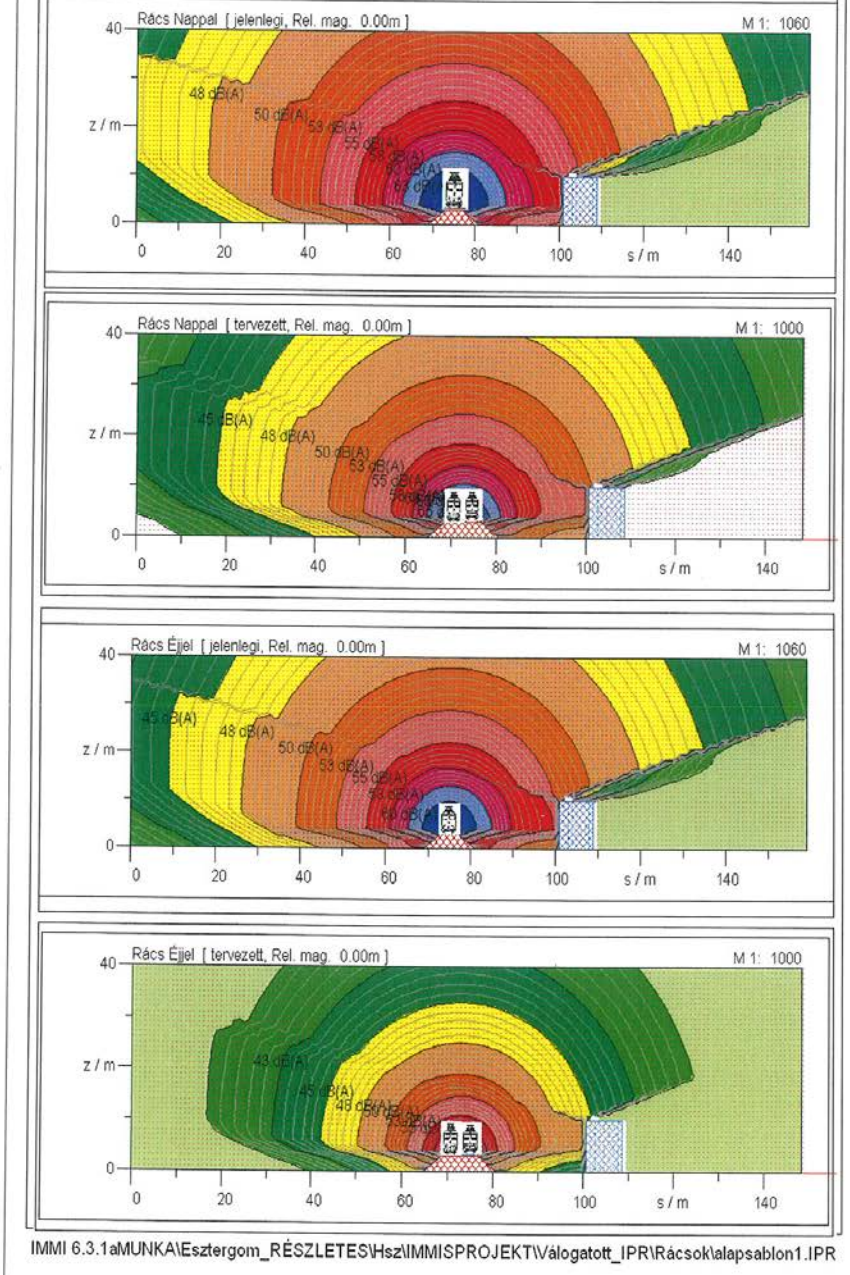
É.ö.Duna híd - Piliscsaba KHV



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Directly after the line rehabilitation the significant reduction of the **present noise level can be expected** since on the very deteriorated permanent way the fished joints will be replaced by welded joints and the today so typical clicking of train (which can be heard already from a distance) will disappear.

The study also covered other noise effects, too (e.g. train waiting for the continuation of its route, public address, loading, arrangement), but they had not proved to be significant from noise harm point of view. Based on the noise measurement diagrams (Piliscsaba, Pilisvörösvár) the noise harm of the train waiting for the continuation of route can be well determined. The noise level of the waiting does not influence significantly the railway's noise level. Based on the performed calculations it can be stated as to the public address that the operational activity of the public address system on the station of the line section will not produce critical noise level in the case of the residential buildings.
In view of the expected volume of loading activity and with good coordination of works no critical environmental harms can be expected as a result of the loading activity neither in the vicinity of the loading area, nor along the transportation routes. Based on the tests and of the results of noise mapping the noise level in the level crossings to be reconstructed and in the planned P+R parking lots will not exceed the limit values in case of any of the residential buildings.

Studying the vibration level of the railway line section it can be stated, that compared to the present situation as a result of ballast replacement and the applied technical solutions the vibration level will decrease to such an extent that it will not reach the critical level in case of any of the residential buildings.

All activities in connection with waste management are controlled by regulations of the General Manager and Service General Director of MÁV Zrt., including the technical and legal questions of railway operation and development, as well as the taking of responsibility.

Waste will be produced during the implementation and after the completion of the planned project. The correct waste disposal shall be managed by MÁV Zrt. of by the contractor selected in a tender procedure based on the relevant legal regulations.

The sources of wastes produced during railway transport are similar to the sources of direct soil contamination:

- throwing out of different things from the trains by the passengers (communal wastes),
- use of toilet (the excrement got on the permanent way from the toilets of the passenger trains in general decomposes easily, the quantity is negligible),
- spilling, flowing out of different materials transported in the freight cars,
- operation of trains.

During the implementation of the planned project, in the building phase the following non-harmful wastes can be produced:

- ballast materials
- earth and slag, metal waste produced during the removal of sub and superstructures
- concrete bases, concrete poles,
- asphalt rubbles,
- packaging and covering materials,
- other auxiliary materials of assembly.

The significant part of the above-mentioned waste is good for further use, is valuable material, while the rest of the non-harmful materials can be placed in communal waste deposits. The produced non-harmful, inert waste can be stored openly, should be transported from site during the recultivation works and should be correctly disposed of.

During the implementation of the planned project, in the building phase the following harmful wastes can be produced:

- dead oil, materials contaminated with oil (mainly produced by the maintenance of machines),
- used insulating materials, bituminous wastes,
- asbestos cement (AC) pipes, pipe and cable pieces,
- used painting devices, packaging materials, solvents and diluents,
- wastes the surface of which is contaminated by harmful materials,
- lead batteries.

During the construction and the operational activities – based on the experiences of other similar projects – waste disposal will be made taking into account the relevant legal regulations, thus the produced wastes will not pollute the environment significantly. This will be achieved by MÁV Zrt. ensuring that

- in case of non-harmful wastes – concerning the workplace and plant collection places – the existing systems will be improved continuously, new collection places will be established, and selective collection per material type of the packaging materials will be introduced,
- in order to reduce the volume of harmful wastes preference will be given to the use of materials being less harmful to the environment (longer lifetime, large bulks, environment friendly products), selective collection of the harmful wastes produced by the technologies will be extended.

In addition to the above-written the treatment (disposal) of the produced waste is ordered by MÁV Zrt. from authorized special companies. Thus the pollution of the environment by the waste is impossible.

In connection with the harms caused to the built environment during the construction it can be stated that based on the calculated data neither on the building area, nor along the public roads used for transportation will significant changes occur if the building activities are correctly coordinated.

The below table summarizes the most important, outstanding characteristics of factors found by us during the impact study.

Section of activity	**Impact factor**	**Environmental element**	**Period of effect**	**Extension of impact**	**Rating**
Installation	Land occupation	Ground	Persistent	Change of route	limiting
	Land occupation	Living world	Persistent	Change of route	terminating
	Building-earthwork: air pollution(dust, exhaust gas)	air, residents	temporary, short time	local, building area	tolerable
	Building-earthwork: noise and vibration	Artificial elements	temporary, short time	local, building area	tolerable
	building-transport.: air pollution	air, residents	temporary, short time	along transport route	tolerable
	building-transport: noise and vibration	Artificial elements	temporary, short time	along transport route	tolerable
	building-demolition: waste production	settlement environment, ground	temporary, short time	local: area of change of route	tolerable
	demolition: taking up of existing art. elements	artificial elements, settl. environment	persistent, final	existing route, regional	terminating
	Building: appearance of new art. elements	Artificial elements, residents, landscape	persistent, final	local	improving
	Building: preparation, loading	Landscape, settlement environment	temporary, short time	local and along transport route	tolerable
	Reconstruction modernization	Residents, art. elements, settlement env.	persistent, final	regional	improving
Operation	Traffic: improving inter-settlement relations	Residents, settlement env.	Persistent	regional	improving
	Traffic: noise and vibration	Art. elements	Temporary	Local: env. of railway line	tolerable
	Traffic: air pollution	Artificial elements, residents	Temporary	Local: env. of railway line	tolerable
	Track maintenance: weed cutting	Soil, living world	Persistent	Local: env. of railway line	limiting
	Waste treatment	Settlement env., ground	Persistent	Railway environment	disturbing
	Damage	Earth, water, air, living world, art. el.	Occasional	variable	variable

In summary we can state about the environmental impacts of the reconstruction of the Northern Railway Danube Bridge (excl.) – Piliscsaba (incl.) railway line section that it will not result significant changes in the soil, ground water, surface waters, living world-landscape, built environment, air and waste disposal, no environmental investments are needed for the control of noise harms. The construction of the planned second track and of the relating level crossings will occupy lands, thus this will result on several places the use of the natural environment. During the construction works special care should be taken of the natural environment, mainly of the protected sites.

Based on studies we could be perform in the present planning phase it can be confirmed that the planned project does not produce significant risk to the environment, its long term economic and indirect environmental impacts are positive, the negative effects appear locally, during the period of construction.