



VIBROCOMP

**M49 EXPRESSWAY M3 HIGHWAY, SECTION BETWEEN
ÖKÖRITÓFÜLPÖS
SECTION 21+510 KM - AND THE COUNTRY BORDER**

ENVIRONMENTAL IMPACT STUDY

CLEAR SUMMARY

Investor:

NIF National Infrastructure Development Private Limited Company

Client:

Roden Co. Ltd.

Seat - 1089 Budapest Villám str. 13.

Contact Person - Béla Felméri, architecture with diploma

Vibrocomp topic number - 093/2018

Vibrocomp representative - dr Mrs. Pál Bite | File name - 49_KHT_KÖF.pdf.

PARTICIPATED IN THE ELABORATION OF THE DOCUMENT

VIROSOME Acoustic and Computer Technology Commercial and Service Co. Ltd.

Seat: 1118 Budapest, Bozókvár str 12.

E-mail: info@vibrocomp.com

Phone: + 36 1 3107292 // Fax: + 36 1 3196303

Web: www.vibrocomp.com

Vibrocomp Co. Ltd.			
Dr. Mrs. Pál Bite	MMK: 01-0193	OKTF: Sz-035/2009	environmental protection engineer with diploma
Tímea Bencsik	MMK: 01-14704	OKTF: Sz-010/2013.	landscape engineer with diploma
Szabolcs Silló	MMK: 13-13573	OKTF: Sz-036/2009	regional and settlement development professional geographer with diploma
Ibolya Benkő			chemical engineer with diploma environmental protection engineer with diploma
Zsuzsanna Bolla			environmental engineer with diploma
Tímea Erdei			landscape engineer with diploma
Mrs. Kelemen Éva Ruckerbauer			landscape engineer with diploma
Enikő Kiss			environmental engineer with diploma
Gyula Kolozsvári			environmental engineer with diploma
Dániel Szilveszter Nagy			mechanical engineer with diploma
Sándor Nagy			electric engineer with diploma
Szabolcs Nerpel			geospatial professional engineer with diploma
Éva Váradi			agricultural engineer with diploma
Participated:			
Csaba Varga		OKTF: SZ-084/2010. OKTF: Sz-003/2015.	biologist-ecologist with diploma

Responsible designer:

Dr. Mrs. Pál Bite	MMK: 01-0193	OKTF: Sz-035/2009	environmental protection engineer with diploma	
-------------------	---------------------	-------------------	---	---

CONTENTS

1. INTRODUCTION, preliminaries.....	5
2. Main basic data of the planned activity.....	6
3. Introduction of the IMPACT PROCESSES AND IMPACT AREAS.....	9
3.1. Setting of the impact area.....	9
4. Expected change of the environmental conditions.....	12
4.1. Protection of SOIL, SUBSURFACE WATER and surface water.....	12
4.2. AIR PURITY PROTECTION.....	20
4.3. WILD WORLD: HUMAN AND SOCIETY.....	22
4.4. PROTECTION OF WILDLIFE.....	23
4.5. LANDSCAPE PROTECTION.....	25
4.6. BUILT ENVIRONMENT, PROTECTION of the cultural heritage.....	26
4.7. NOISE AND VIBRATION PROTECTION.....	27
4.8. WASTE MANAGEMENT.....	29
4.9. Climate protection.....	31
5. SUMMARY EVALUATION.....	34

MOST IMPORTANT STATEMENTS

1. The subject of the present environmental impact study (hereinafter KHT) ***M49 expressway M3 highway, km section 21 + 510 between Ökörítőfülpös - country border.***
2. The ***aim*** of the documentation ***is to investigate the environmental*** impacts of the planned investment, as well as determination of the recommendations as to the possible minimum reduction of the harmful effects. This will ensure ***fulfilment of the effective environmental protection stipulations, as well as, obtainment of the environmental authority contributions required for*** construction licensing and implementation. The activity is subject to ***environmental protection impact examination based on point 37. a) of enclosure No. 1 of Governmental decree 314/2005 (25th Dec).***
3. ***The content of the present Documentation has been drawn up with consideration to the effective environmental legal regulations, . the 53rd Act of 1995*** about the general rules of environmental protection, ***the 53rd Act of 1996*** as well as, the ***Governmental decree 314/2005 (25th Dec.)*** about the uniform authorization procedure of the use of environment.
4. Based on the performed examinations and assessments it was stated that in course of the ***implementation (construction) of the planned investment*** temporarily emerging unfavourable impacts may be mainly accounted for - ***in respect of noise- and air quality protection and the protection of wildlife***, but by observation of the recommended measures the development will not expectedly cause conflict at the neighbouring areas. ***Following the implementation and putting into use the expected impacts - in respect of the individual environmental elements are acceptable, and not significant.***
5. For the period of the implementation of the planned investment and for the time of the operation ***proposals/measures have been defined***, in the section dealing with the given environmental element, ***for the prevention of the estimated impacts, for their reduction and in respect of the individual environmental elements.***
6. ***By realization of the recommended measures the nature and measure of the expected environmental impacts*** preliminary revealed during the implementation and the operation of the planned investment ***can be considered as acceptable according to the effective environmental protection stipulations and legal rules. Implementation of the establishment meets the relevant environmental protection stipulations.***

1. INTRODUCTION, PRELIMINARIES

NIF National Infrastructure Development Private Limited Company announced a public procurement tender invitation in the subject of the “**elaboration of the development of the connection between M49 expressway, M3 highway - Mátészalka - country border, preparing of the environmental impact study and study plan for the section between Ökörítőfülpös - country border**”, (PST code: A049.01) and the tender was won by RODEN Engineering Office Co. Ltd. (company registration number: Cg. 01-09-160257, seat: 1089 Budapest, Villám str 13.

As a subcontractor VIBROCOMP Acoustic and Computer Technology Commercial and Service Co. Ltd. RODEN Engineering Office Co. Ltd., (company registration number: Cg. 01-09-166886, tax number: 10766323-2-43, seat: 1118 Budapest, Bozókvár str. 12.) will prepare the environmental impact inspection related to the project, the surveys of the wildlife and participate in the obtainment of the authority licences, as well as, it prepares the documentation about the examination of the environmental impacts spreading over the country border.

The section of the M3 expressway in question connects the part of M3 highway-Ökörítőfülpös with legally binding environmental protection licences, at the section 21+510 given in the licence.

The planned M49 2x2-lane expressway will later connect M3 highway with the Romanian border - bypassing Mátészalka.

The deficiencies of the present road network show their effect in the field of the economic life, too. The non-appropriate road network plays role in disadvantageous and difficultly developing economic situation of the region. At present, the road network of the region is composed of 2x1-lane main and side roads.

The design section ends at the Hungarian-Romanian border in the planned section of the selected track, at the joint border-crossing point, according to the existing bilateral agreements.

The section in question would be constructed as the continuation of the track that obtained environmental protection licence in 2014, into an expressway that; can be developed into 2x2-lane cross-sectional highway with 20,00 m of crest width; which investment requires obtainment of the environmental protection licence.

The expressway would ensure connection of M3 highway with the Rumanian border, it would relieve the present, over-loaded road network with unfavourable track alignment, thus enabling and promoting the economic development of the region.

Two tracks versions (“**B**” and “**C**” versions) have been examined in the environmental impact study.

The planned investment **is a part of the traffic infrastructure investment being of outlined significance in respect of the national economy**, based on point 1.301 of enclosure 1. of the Governmental decree 345/2012 (6th Dec) about the qualification of administrative, authority matters related to certain traffic development projects, to matters of outlined significance in respect of the national economy and about the appointment of the proceeding authorities.

The present environmental impact study does not include qualified data interpreted as per §.3. of 155th Act of 2009 *about the protection of qualified data* or business secret as per the interpretation of section (1) §. 2;47 of 5th Act of 2013 about the Civil Code.

2. MAIN BASIC DATA OF THE PLANNED ACTIVITY

The Governmental target of the construction of the expressway is reaching of the country border in the first place together with the promotion of the territorial development of Mátészalka - Csenger - Szatmárnémeti region.

In addition, the following goals can be defined in respect of the construction of M49 motorway:

- Reduction of the access time
- Provision of better travel comfort conditions
- Provision of higher level of service
- Improvement of the transport safety,
- Environmental protection (of the residents),
- Provision of reaching of the Cities with county rights through an expressway

Two tracks versions ("**B**" and "**C**" versions) have been examined in the environmental impact study. Based on point 37 a) of enclosure No. 1. of the Governmental decree 314/2005 (construction of expressways (highway, motorway) together with node elements) the planned investment is an activity subject to environmental impact assessment.

The construction of the planned Csenger-Ura road, whose impacts are examined by the present document belongs to the implementation of version "C", because it is an activity subject to preliminary examination as per point 87. b) of Governmental decree 314/2005 (25th Dec.).

The planned intervention concerns the administrative area of Ökörítőfülpös, Porcsalma, Tyukod, Pátyod, Csenger, Szamosangyalos, Csengerújfalú (as per the tender invitation) and Szamossályi, to a small extent.

The length of the section to be designed - depending on the versions is ~ 21,4 or ~ 23,8 km. The road sectioning is linked to version "C" with the environmental licence, in different section. In order to ensure comparability of the track versions the tracks were started from section 21+510 km, this is the "theoretical initial section".

The tracks satisfy the stipulations for the design speed $v_t=110$ km/h. Track versions developed during the revision of the design are the following:

Version	Initial section	end section	Length (m)	Length (km)
C	21+510	42+891.80	21381.80.	21.382
B	21+510	45+337.82	23827.82	23.828.

Technical characteristics:

- Road category: Design class - motorway type "A"
- Design speed (traffic engineering speed): 110 km/h,
- Terrain conditions: A

The main cross-sectional parameters of M49 motorway (motorway with 20.0 m crest width)

- Number of the traffic lanes: 2 x 2 lanes,
- Width of the road surface:
 - outside lane: 4.25 m
 - inside lane: 4.00 m
- Width of the safety lane: 0.25 m
- Crest width: 20.00 m

The main cross-sectional parameters of the planned Csenger-Ura road - in case of "C" track version: (in case of track "B" this road does not play a role in the national road network. Its construction is not necessary in respect of the M49 motorway.)

- Number of the traffic lanes: 2 x 1 lane,
- Width of the traffic lane: 2 x 3.50 m
- Width of the road surface: 7.50
- Outside security lane: 2 x 0.25 m
- Crest width: 12.00 m

Crossings and nodes

National public road crossings and nodes at the design road sections are found at the below places:

Version-C:

NATIONAL ROADS

name of the public road	km section
crossroad marked 4926	31+060
road of the self-government	37+290
crossroad marked 4924	39+270

EARTH ROADS

name of the earth road	km section
Earth road marked KF1	23+220
Earth road marked KF2	24+775
Earth road marked KF3	28+140
Earth road marked KF4	29+365
Earth road marked KF5	33+200
Earth road marked KF6	41+091

Version-B:

NATIONAL PUBLIC ROADS

name of the public road	km section
main road No. 49.	27+800
crossroad marked 4138	32+140
access road marked 41142	36+555
main road No. 49.	38+100
road of the self-government	38+530
crossroad marked 4924	41+735

EARTH ROADS

name of the earth road	km section
Earth road marked KF1	23+225
Earth road marked KF2	25+030
Earth road marked KF3	30+230
Earth road marked KF4	34+990
Earth road marked KF6	43+510

Bike tracks and pedestrian crossings

At the design section - between Örkötfülöpös and Porcsalma, Pátyod and Csenger (or the roundabout of Csenger) at the Southern side of the concerned section of main road No. 49, there is a parallel, bidirectional, independent bike road. These should have been considered during the design phase, so these bidirectional bike roads were passed through at the nodes of different levels through the planned engineering structures with 2.50 m width - at the following places:

Version-B:

name of the public road	km section
main road No. 49.	27+800
main road No. 49.	38+100

Railway crossings

Version-C:

There is no railway crossing on the track.

Version-B:

RAILROADS

name of the public railroad	km section
MÁV 114 Mátészalka-Csenger	26+545
MÁV 114 Mátészalka-Csenger	40+080

Main details of the Applicant for authorization

NIF National Infrastructure Development Private Limited Company

1134 Budapest, Váci str. 45.

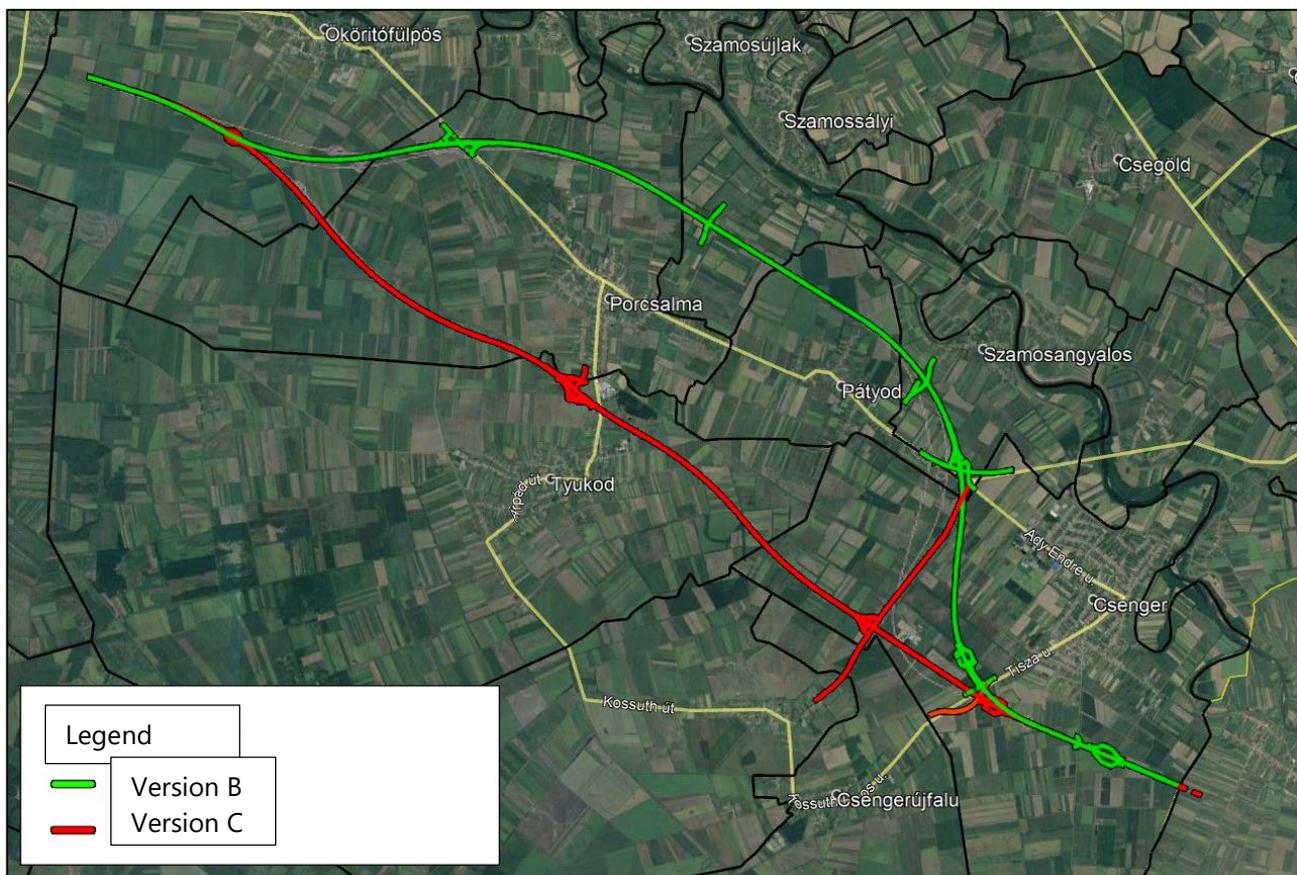
Client ID (KÜJ): 100365768

Statistical code: 11906522-4211-114-01.

Dates and stages of realization and operation

Assuming an optimistic scenario the beginning and finishing of the construction of the section in question - despite the fact that the section in question is not included in the Governmental decrees - 1371/2016 (15th July) and 1505/2016 (21st Sep) - concerning realization of short- and medium-term public road development of Hungary - Can be expected, as follows:

- planned beginning: years 2020/2021
- planned finish years 2022/2023



3.1.1. Examined versions

3. INTRODUCTION OF THE IMPACT PROCESSES AND IMPACT AREAS

3.1. SETTING OF THE IMPACT AREA

Impact area is the area where the effects can be sensed in the degree fixed by the legal rules. When separating the impact areas, we take due consideration to enclosure No. 7. of Governmental decree 314/2005 (25th Dec).

Direct impact area

According to enclosure No. 7. of Governmental decree 314/2005 (25th Dec). The direct impact area "may be the areas which can be assigned to the individual impact factors,

- the spreading areas of certain material- or energy emissions into the earth, water and air in the concerned environmental element,
- the areas of direct use of earth, water, wildlife and built environment."

Indirect impact area

According to enclosure No. 7. of Governmental decree 314/2005 (25th Dec). "The areas of the indirect impacts are the areas where the impact processes spread through due to the environmental changes in state at the areas of the direct impacts, which are affected by any of the impact processes."

Delimitation of the impact areas as per the individual environmental elements are included in the chapters of the certain professional sectors. Delimitations of the impact areas on the map are seen in the enclosures E.II. Environmental protection layout drawing.

Extraordinary events

Extraordinary event (contingency) a non-expected event occurring on the construction or staging area, in normal operation or in the technological processes, requiring immediate intervention and involving the possibility that the process becomes uncontrollable.

Disaster situation

Occurrence of an accident or accidents in itself/themselves does not mean the development of a disaster situation. It is difficult to judge whether mass-sized series of accidents might develop from the given situation. As a directive we stipulate that emerging of such a situation is very probable, if

- there is a great traffic;
- the visual conditions are bad (e.g. fog);
- the road conditions are bad (wet, greasy road, slipperiness etc.)
- Based on statistical data this situation occurs most frequently from November till March.
- The most frequent causes of the disaster situations:
- Damage to the load in case of the accident of the vehicle transporting dangerous goods, danger of the material;
- Natural disasters among others e.g. sleet, snowstorm, sandstorm, downpour, earthquake, extensive forest fire, and their consequences;
- In summer, long-term congestion at extremely high temperature, and persistent high temperature.

Other emergency situations may emerge in traffic (not disasters) in the below cases: malfunction of the transport vehicles; malfunction of the construction equipment; fuel leakages or in case of a mortal accident. Damage prevention is basically determined by the type and degree of the emergency situation.

Type of the emergency situation

Malfunction: malfunction occurring during normal operation, that can statistically occur during operation (e.g. fuel, lubricant dripping, leakages).

Emergency operation: damage caused by important malfunction occurring during normal operation (e.g. puncture or damage of the reservoirs, injury of the sewage pipe).

Disaster: it is a damage causing important harm to the environment (e.g. subsurface water contamination).

Ground and subsurface water

In case of a contingency, spreading of the contaminating material must be prevented, in the present case it may be done by localization of the contaminant, blocking with ballast sacks. The operator must have the appropriate emergency organization and materials.

Surface water

In cases of a contingency the water flow may be directly reached by the contamination; this can be mainly localized and eliminated in the framework of damage prevention. The size of the impact depends on the water yield of the watercourse, the condition of the bed and not at least of the fall conditions of the bed. From among the contingency contaminations that can occur during operation of the road the hydrocarbon derivatives can have the most unfavourable impact on the water quality of the water flows and not at least on the wildlife. The impact of contingency situations occurring possibly near the surface waters is much less on the surface waters and the

wildlife (or perhaps there is no impact) in case the precipitation water receiving water flow is equipped with a biofiltration trench, an alluvion catch and other protecting-cleaning engineering structures before the introduction of the precipitation water.

However, the probability of occurring of a contingency - and just near to the water flows - is very low.

Air

A contingency occurs when environmental pollution is essentially exceeding the permitted values. In this case it may occur even in normal operation of the track section. e.g. in case of air pollution, if the traffic with the highest emission occurs at the same time with the most unfavourable spreading conditions.

Contingency contamination can mainly occur during *operation* in case of an incidental malfunction, which, due to its nature cannot be forecast, in case of transporting liquids and gaseous materials.

However, much higher is the probability of that type of accidents, when due to a road accident, the delivered dangerous goods get on the road surface, or in the atmosphere of the road environment. Transportation of the dangerous goods is regulated by international conventions, the European Agreement about the Public Road Transportation of Dangerous Materials (hereinafter: ADR (Accord Dangreuses Route), Which also determine the necessary steps for these cases.

Contamination of the road environment may also occur due to the effects of meteorological, geographical and natural factors (storm, flood, forest fire).

In respect of the consequences the impact of the contingency occurring near to the inhabited area may be significant. Then air pollution reaching either multiple of the limit value can occur for a short time, that would strongly influence the indirect affected parties (soil, water, wildlife, human being).

Endangered places

Based on the above described cases the probability of occurring of a contingency situation is very different, depending on the type of the emergency situation and on the endangered environmental element and system. In case of several contingency situations it cannot be clearly determined whether it can occur because of a more endangered road section - or only as usual - due to the proximity of the endangered environmental elements: e.g. at the frontier of the periphery and the inner town, or in the proximity of the surface waters.

Road sections can be determined, where the nature and track of the road or the use of the nearby landscape involve a greater chance of the accident or the development of emergency situations caused by the extraordinary weather. Such road sections are:

- roads with greater curvature, especially where there are forests along both sides of the road (danger of accident, somewhere wild danger);
- road sections provided with at least 1 km long engineering structure (e.g. 1 km long viaduct or tunnel), where a defect of a vehicle or road accident requiring life- and property protection measures and implementation of the rescue would deserve greater attention due to limited access directions;
- road sections passing along arable lands, where there are less woody vegetation along the road, especially when the road leads in a kerf (certain parts of road sections are dangerous because of snow blowing, which must be protected by the competent public road management).

Preventive measures

It is the most important to emphasize from the measures for preventing dangerous situations the observation and enforcement of the traffic and road safety rules. The probability of occurring of accidents can be reduced by

observing the speed limits, by limitation of the permissible speed of the heavy trucks (the carriageway will not become damaged), to appropriately enforce rest time and driving time of the truck drivers.

Based on the professional judgement snow blowing - being the task of the public road management of the dangerous road sections - can be prevented by installing snow protecting plastic mesh or other temporary technical facilities.

In case of a contingency the police, the disaster management authority and the environmental protection authority must be immediately notified.

The recommended separate measures and methods of damage prevention are described below, divided into the concerned environmental media.

Soil, sub-surface water

In case due to the accident of the vehicle transporting dangerous material, the delivered matter pours on the soil, professional and quick implementation of the protection procedure must be begun by the driver and his attendant, if possible (provided that they are not injured). After arrival of the competent authorities damage prevention should be performed according to their instructions and supervision. The vehicle must be equipped with the means as per the ADR stipulations of the transported dangerous material.

Surface water

In case of rollover accident of a tanker, the actually contaminated part of the affected trench section must be quickly blocked with ballast sacks in order to prevent pollution of the surface water and soil water.

Prohibitory engineering structures must be placed on the overflow beds. In case of a contingency spreading of the pollutants can be prevented by placing wooden planks, because the water will stay in the trench until the contamination will be removed from the trench and neutralized.

4. EXPECTED CHANGE OF THE ENVIRONMENTAL CONDITIONS

4.1. PROTECTION OF SOIL, SUBSURFACE WATER AND SURFACE WATER

Soil and subsurface water

The **direct impact area means in respect of the soil** the expropriated area of the track, including the precipitation water draining trenches, the stage and spoil area as well as the established extraction places. Soil can be impacted within this area in the phase of the construction and we can account for direct pollution in this area in case of a contingency.

In respect of the sub-surface waters direct impact area can only be indicated with modelling (soil, as the mediating agent, its effects). In case of careful designing and implementation of the investment no pollution of the sub-surface waters is expected, so the impact area should not be delimited.

Soil conditions of the design area

Based on the agro-topographic map of Hungary (<https://maps.rissac.hu:3344/webappbuilder/apps/2/>) the track versions affect meadowy acidic soils at the beginning and meadowy alluvial soils on the longest section. At the end of the design section the soil of paludal forests is affected. Version C and the agricultural earth roads cross - at a short section marshy, meadowy soils, too. The alluvial soils characteristics for the large part of the design area are mainly strongly water-bearing, clay and clayey loam soils.

Based on the Country planning design of Szabolcs-Szatmár-Bereg county there is no arable land with excellent site quality characteristics in the design area.

The design area does not affect hydrocarbon and natural gas resources, neither the area of solid mineral raw material research.

Sub-surface water conditions

Based on the subsoil water map of Hungary (<https://map.mbfisz.gov.hu>) the level of sub-surface water in case of version "B", in the region of Ökörítőfülpös, Porcsalma and Pátyod runs along at 2-4 m depth, while in the region between Pátyod and Csenger it is higher, between 1-2 m. At the initial section of version "C" in the region of Ökörítőfülpös the subsoil water level is between 2-4 m, between Porcsalma and Csenger it is between 1-2 m.

Deeper subsoil water level is characteristic again at the section before the country border in case of both examined versions.

Sensibility test of the examined area

Based on the KvVM decree 27/2004 (25th Dec) about the classification of settlements on sensible areas in respect of the condition of sub-surface water Each of the concerned settlements are located at sensible sub-surface water quality protection area.

Based on the enclosures of the National and Szamos-Kraszna Water-collection Plan supervised by the planned investment altogether 2 pcs of drink water taking, operating, sub-surface drinkwater bases are affected. Version "C" crosses the "B" hydrogeologic protecting zone (30+823 – 32+710 km section) of Tyukod region. The edge of protecting zone "B" of the Water Works of Csenger is reached by version "B" between 41+97-42+410 km sections and version "C" at around 39+600 km section at the axle weight measuring station.

When designing highway and motorways the stipulations of Governmental decree 123/1997 (18th July) about the protection of water bases, prospective water bases and water establishments serving for drink water supply must be taken into account.

Due to the fact that the affected and crossed water bases are having only estimated protective profiles and they are not vulnerable no construction of watertightly covered precipitation water trench system is necessary in case of building highways and motorways as per the enclosure No. 5. of Governmental decree 123/1997 (18th July) at the section crossing or touching the water basis.

The full area involved in the investment is qualified as nitrate-sensitive.

Impacts exerted on the geological medium and on the sub-surface waters during the construction

Quality and surface reduction of the soil is inevitable in respect of the investment, the area occupied by the carriageway and the related facilities will be the part of the infrastructural establishment.

The examined track runs through mainly agricultural areas, so the establishment involves important use of the territory, however no areas with excellent site quality characteristics are affected, so the unfavourable influence of area occupation will be less important in this respect.

For temporary extracting of the areas - occupied by the investment, the staging and depositing areas - from the cultivation must be licenced by the territorially competent land registry.

The upper humus layer must be produced according to the humus-management plant, then stored selectively in the temporary deposits, and after the implementation it can be used again.

During the construction works the soil will become impacted because of the use of heavy-weight machinery.

Public utility replacements related to the investment involve extra expropriation in respect of the sub-surface waters, however no direct impact area can be indicated. In case of a transmission line the foundation of the columns can modify the spatial position of the soil water mirror, but the columns can be considered as point like and their impact is minimal.

Despite of the possible contingency situation on the working areas no soil contamination should be accounted for. For the case of a contingency the operator must have an appropriate contingency plan for the operation.

Impacts exerted on the geological medium and on the sub-surface water during the operation

Dewatering of the road is characteristically performed with gutters in the earth bed, covered trench will be constructed on sections where the track touches water basis protecting zones.

Soil and sub-surface water contamination during the operation may arise from the emissions of road traffic, from the contaminants absorbed by the dust settling from the air and due to the oily contaminated dust grains along the road. These are the wearing materials, the lubricants, the petrol and diesel drops and the liquid from winter salting, as well as the settling dust. In case of normal operation these materials pass away from the carriageway by the precipitation and they are caught by the shoulder and the trench.

The expected pollutants, CH derivatives and heavy metals leak into the soil to a small degree, however on the basis of the results of the professional literature and the research this contaminants are absorbed in the upper 30 cm thick layer of the soil and the pollutants wash to the trench with the precipitation are deposited in the form of a thin mud layer, absorbed by the soil grains. The penetrating pollutants are decomposed by the biofilm living in the root zone of the plantation. CH derivative removal of the uncovered earth-bedded trenches along 500 m in case of low volume of precipitation of 70-80 %. This means that their volume is negligible when they reach the reservoir. The storing water draining system further reduces the pollution concentration.

The concentration of the air contaminants diffusely falling out will be diluted and its does not exert important influence on the areas next to the road.

Winter anti-slippery activity may also contaminate the soil or the sub-surface waters by leaking in during operation. Its risk is importantly reduced because the harmful effect emerges for a relatively short time and within the 10-15 m distance from the axle of the road, in a decreasing concentration when moving away from the edge of the road.

Strongly water-retaining clay and clayey loam soils are characteristic in the design section, which have very poor water absorption and water draining capacities both in vertical and horizontal directions. As a result, a possible pollutant can reach the deeper layers or leak into the sub-surface water more difficultly.

The implementation of the planned investment does not change the existing water flow conditions, and the relations between the surface and sub-surface waters.

By observing the protection measures (e.g. modern, environmentally friendly machines and technological equipment) the realization of the public road development does not mean unfavourable impact on the sub-surface waters.

Evaluation of the versions:

Analysis of the versions in respect of the protection of the geological medium

- Area occupation on the basis of the track length

The length of the track zone is an important index because the longer is the planned section the ratio of the covered surface will be longer, that may result in ceasing of the original function of the soil, that is the growth of the length can be considered unfavourable in respect of the aspects of soil protection.

Track version	Area occupation on the basis of the track length
„B”	23827 m
„C”	21381 m

Considering the whole track length in respect of area occupation version "C is shorter by about 2.5 km, so it is the more favourable version.

None of the tracks involves arable lands with excellent site quality characteristics or mining areas, so no difference can be shown between the versions in this respect.

Version analysis in respect of the sub-surface water protection

Because the track versions affected or crossed water bases are having only estimated protective profile, and they are not vulnerable, therefore the construction of water tightly covered precipitation trench system - in case of constructing highway and motorway as per enclosure No. 5. of the Governmental decree No. 123/1997 (18th July) about the protection of the water bases, of the prospective water bases and the water establishments serving drinkwater supply - is not required at the crossed section, so during the design no difference must be made between the individual versions as to the involvement of the water bases protecting areas.

Based on the enclosure of KvVM decree 27/2004 (25th Dec) about the classification of settlements none of the versions involves settlements on intensely or especially sensible areas in respect of the condition of sub-surface waters, so no difference can be made between sub-surface water protection.

Measures proposed for the protection of sub-surface waters

Temporary and final utilization of agricultural lands for different purposes is subject to licencing. The real estate authority may licence utilization of the agricultural areas, the staging paths, storing and deposition areas for other purposes, if they are extracted from cultivation temporarily or finally. The licence must be preliminary obtained, before beginning utilization of the arable land (for other purposes).

The humus deposits must be kept continuously weedless until using up. Weeding must be kept controlled on the surface of the temporary spoil banks. Reaping must be applied for preventing weeding before bringing seeds.

After finishing of the works the arable lands temporary occupied by the staging areas, containers, mobile mixing machines must be recultivated.

In order to prevent pollution only machines and transporting means in excellent condition may be used, whose regular technical supervision is obligatory. In course of the implementation getting of the pollutants into the environment may be prevented by keeping of the technological discipline.

In case of a possible contingency immediate measures must be taken against spreading of the pollution. The drained pollutants together with the saturated medium (soil) must be collected into a closed reservoir and treated as per the stipulations of Governmental decree 225/2015 (7th July).

In course of the construction only mineral raw materials (stone, gravel, sand, clay or their mixture in any ratio) extracted on the basis of legally binding and effective authority licence may be used. When selecting the raw material resources the places nearer to the construction sites have been chosen in order to reduce the transportation distances.

Soil is getting impacted during the road construction; its measure can be minimized by reducing of the size of the working area, by avoiding wider trampling than necessary, by shorter loading time of the machinery and good labour organization. After finishing of the construction, the soil must be recultivated by soil loosening.

In the protection area of the water bases attention must be paid to preventing pollution during the construction, to observation of the technological discipline and to the maintenance of the machinery. One must be prepared for the probably occurring contingencies, prevention of soil water contamination must be separately dealt with in the contingency plan.

Surface water

In case of the surface waters the direct impact area is determined by the emissions of the road traffic, the contingency situations on the track and the precipitation drainage system developed along the auxiliary establishment. In these areas the impacts of the surface contaminations getting washed with the draining precipitation can be effective. The impact area referring to the surface waters can extend to the precipitation drainage trenches developed along the auxiliary establishment and the upstream side of the receiving water flows up to about 25-50 m and up to 100 m on the downstream side.

Sub-surface water conditions

The affected area belongs to the water collection territory of the Eastern channel, whose receiver is Szamos. The planned track crosses inland water draining channels, treated by FETIVIZIG, Ecsediláp - Kraszna left bank Water Economy Association and the concerned self-governments.

More important inland water channels affected by track version "B":

- | | |
|--|---|
| <ul style="list-style-type: none"> - Channel of Pusztalak - Channel of Ökörítő - Channel of Németi road - Channel of Német member - Eastern channel - Channel of Balázsne meadow - Channel of Szomita - Channel of Madarassy - Channel of Tibola - Channel of Sás-bed - Channel of Recsege hill | <ul style="list-style-type: none"> - Larger channels concerned by track "C" - Channel of Pusztalak - Channel of Ökörítő - Channel of Német member - Channel of Mátyás-gorondi - Channel of Gulya-well - Eastern ...channel - Channel of Szilonta - Channel of Nagytagos - Channel of Falu-gátja - Channel of Tibola - Channel of Sás-bed - Channel of Recsege hill |
|--|---|

Based on the data supply of Water Affairs Directorate of the Upper Tisza Region the examined track versions do not affect ameliorated, drained areas.

Based on the Country planning design of Szabolcs-Szatmár-Bereg county the great area of the design territory is situated on inland water fields. Based on the data supply of Water Affairs Directorate on the Upper Tisza Region the design area concerns the territory of the inland water system of Szamos-Kraszna square.

Based on the Country planning design of Szabolcs-Szatmár-Bereg county, there is no large river basin in the design territory.

The examined area, that is found within the design unit of Szamos-Kraszna, based on the probable potential flooding maps of 30 years (3,3 %) is not endangered by flood, however, based on the 100-year (1 %) and 1000-year (1 %) probability, potential flooding maps (source: www.vizugy.hu/Árvízi_kockázatkezelés) it is endangered by flood in the territory between Ökörifülpös and Porcsalma.

The planned "B" and "C" track versions pass through the floodplain bay of Szamos-Kraszna square. The level and structure of the planned tracks are safely above the flooding level everywhere, so the planned tracks meet both the evacuation and the relocation aspects in both versions.

Introduction of the planned water drainage

According to the plans the precipitation waters flowing from the carriageway and the neighbouring site are gathered, drained and led to the crossed water drainage channels by the characteristically earth-bedded gutters at the two sides.

Before introducing the gutters into the receiver alluvium-catch-inhibitor engineering structures m located. By using the inhibitor spreading of the contamination from a probable contingency can be limited.

Based on the declaration of FETIVIZIG the extra water delivery capacity of the channels used as receivers is limited, the conditions of the water flows and water system are deteriorated.

Because of the condition and the capacity of the receivers the trenches ... are constructed with reservoir function, delaying and significantly reducing the water yields loading the receiving channels. The gutters with extended section are sectioned with water permeable "earth cores", so the developing storing space cannot drain forward the receiver by leakage, but the solution greatly reduces the extra loading of the receivers.

Impacts exerted on the surface waters during the construction

The impacts exerted on the quality of the water flows and other surface waters can be significant during the construction. The examined tracks cross several channels. In course of the construction unfavourable impacts can be induced by making machine maintenance or repair in the neighbourhood of the water flows and channels. So, care must be taken not to pollute the water flows during the construction of the engineering and the carriageway structures.

The establishment will exert influence - out of the elements of water economy balance, - on evapotranspiration and leakage of the surface waters. Thanks to the covered surfaces evaporation of the area increases, however, leakage in the same place is reduced and balance is kept. There will not be sensible impact of the establishment on the water economy.

The track running on the embankment can change the water collecting areas, it may cut them in pieces. However, this impact can be counterbalanced with culverts, bridges and careful designing of the trench system.

Impacts exerted on the surface waters during operation

The impacts influencing the condition of surface waters will be regulated by the method and efficiency of water drainage of the new road section in the period of operation. The geological features and public utility supply of the area must be considered during planning of water drainage.

During the operation the surface water flows may be affected by contamination mainly indirectly. This can each reach the water flows by the mediation of the sub-surface waters, through the metal, rubber parts from wearing of the vehicle parts, from leaking fuels, other oils and pollutants, the dust coming from the wearing road cover and the anti-slippery materials scattered on the road surface. Due to the diluting effect of water coming from snow melting, the unfavourable impact of salting can prevail only for a short period of time and to a small extent.

The water flows may be directly impacted by contamination; this can be mainly localized and eliminated in the framework of damage prevention. The size of the impact depends on the water yield of the watercourse, the condition of the bed and not at least of the fall conditions of the bed. From among the contingency contaminations that can occur during operation of the road the hydrocarbon derivatives can have the most unfavourable impact on the water quality of the water flows, as well as, on the wildlife. However, the probability of occurring of a contingency - and just near to the water flows - is very low.

The crossed channels serve as the receivers of the road's precipitation waters. The stipulations of KvVM decree 28/2004 (25th Dec.) about the limit values referring to the emission of water pollutants and certain rules of their application must be observed in respect of the quality of water that can be drained into water flows.

We have determined the measure of pollution referring to covered and earth trenches (table 4.1.1) based on the calculation used in the study titled "TPH contamination of the precipitation water draining from the highways and large traffic public roads" made by the Water public works and Environmental engineering professorship (dr. Kalman Buzás and Péter Budai) of the University of Technology and Economics of Budapest (BME).

4.1.1.: The measure of contamination for covered and earth trenches

Road section	Traffic (th/hour)	The measure of contamination for covered trenches (mg TPH/l)	The measure of contamination for earth trenches (mg TPH/l)
Győrtelek – Porcsalma	544	1.85	1.11
Porcsalma - Csenger	549	1.87	1.12
Csenger - Country border	404	1.24	0.74

According to enclosure No. 5. of KvVM decree 28/2004 (25th Dec). based on the individual limit values stated by the authority for direct draining into the receivers (the lowest value for the total aliphatic hydrocarbons (TPH) is 3 mg/l, the highest is 20 mg/l) no pollution exceeding the expected limits values is envisaged on the whole design section of M49 neither in case of the covered nor of the earth trenches. Accordingly, no reduction of the concentration (using of oil catching engineering structures) is needed at the inlets.

However, before introducing the gutters into the receiver alluvium-catch-inhibitor engineering structures are envisaged. By using the inhibitor spreading of the contamination from a probable contingency can be limited.

Comparison of the versions:

- **Surface water flow, number of the channel crossings**
- During evaluation of the track versions it is an important aspect in respect of the protection of surface waters, how many water flows, channels are crossed by the examined version. In this respect the version crossing the less water flows can be considered more favourable, because this way fewer engineering structures should be constructed and the measure of impacts loading the water flows is lower.
- **Involvement of the irrigated areas**
- The planned versions involve the areas of several irrigation sites, that should be considered during planning. In respect of the involvement of irrigated areas the version crossing such areas at a shorter section should be considered more favourable.
- **Involvement of the areas with inland water**
- Those versions that involve areas with regular inland water at short sections can be considered more favourable in this respect than those crossing such areas at longer sections.

Track version	The number of water flow crossings	Involvement of the irrigated areas (m)	Involvement of the areas with inland water (m)
„B”	22	828 m	7800 m

Track version	The number of water flow crossings	Involvement of the irrigated areas (m)	Involvement of the areas with inland water (m)
„C”	32	212 m	6754 m

Version “B” crosses less channels and water flows than version C”, so it can be considered more favourable in this respect.

In respect of the involvement of irrigated areas version “C” can be considered more favourable, because it crosses irrigated areas at much shorter section, than version “B”.

Considering the involvement of areas with inland water version “C” can be considered more favourable again, since this version crosses the area with inland water at shorter section.

Measures proposed for the protection of surface waters

The technological equipment and establishments must be operated, and the working processes must be organized so that the activity would not cause water contamination. On the average, it is recommended to use up-to-date, environmentally friendly machines and technological equipment.

In order to avoid extraordinary, unexpected contamination observation of the technological regulations and the technical condition of the equipment must be increasingly and continuously controlled.

During the construction time care must be taken during cleaning of the machines, that the contaminated water would not get into live water flows. In the environment of water flows concerned by the tract no activities involving pollutant leakage can be performed (maintenance of the machinery, fuel filling etc.) and no site for storing of the machines can be made. Cleaning of the vehicles may exclusively be performed in washing places meeting the purposes.

Construction of the water flow crossings and bed corrections must be performed in the period of low water levels, it should be coordinated with the operators before beginning of the works and the professional supervision must be ordered for the works involving the channel.

When constructing the water flow crossings and culverts free flow of the waters must be ensured and the affected water flow bed must be reconstructed after finishing the construction.

The precipitation waters of the road trenches next to the engineering structures (culvert/bridge) can be connected to the channel through an estuary engineering structure, combined with sand catch in order to protect the receiver (VGT2).

The water quality of the precipitation water to be led into the receiver must always meet the stipulations of Governmental decree 220/2004 (21st July) about the rules for the quality protection of surface waters, as well as ,the instructions of KvVM decree 28/2004 (25th Dec) about the limit values referring to the emissions of water pollutants and certain rules of their application.

The emission limit values determined as per the regional water quality protection categories, referring to the direct water inlets into the receiver are given in enclosure No. 2. of KvVM decree 28/2004 (25th Dec.). The design area includes water flows belonging to the regional water quality protection category “3. temporary water flow” and “4. general protection”, where the measure of the organic solvent is 5 mg/l in case of category 3 and 10 mg/l in case of category 4.

Communal wastewaters generated at the site of the works during the construction must be collected in closed tanks and their disposal must be performed at a wastewater treatment site with pre-treatment facilities.

4.2. AIR PURITY PROTECTION

Introduction of the present conditions

The air quality values characteristic for the wider region are available from the nearest automatic measuring station in Nyíregyháza (Széna square), being part of the National Air Contamination Measuring Network (OLM). The measuring station measures air contamination from the town traffic, so in respect of the basic air contamination lower air loading can be considered as compared to the below data. The nearest manual measuring station works in Mátészalka (Kórház str. 2.).

Considering the past 5 years the annual limit values were not exceeded in case of any of the examined components, at the automatic and manual measuring stations nearest to the design area, consequently the air quality of the examined area can be considered good. That is, the basic air contamination of the examined area: NO₂: 20.2 µg/m³, CO: 460.8 µg/m³, CO: 39.0 µg/m³, PM10: 26.3 µg/m³, SO₂: 2.3 µg/m³, O₃: around 21.7 µg/m³.

Air contamination during the construction

Based on the values of the above tables it can be stated that in case of track version B - due to the distance of the residential building (~170 m) dust loading can exceed the 24-hour health limit value in windless weather. In case of the prevailing wind velocity the dust loading is expected to be around the limit value.

In case of track version C, air contamination examination was made for the construction period, with consideration to the residential building nearest to the Tyukodi exit.

Based on the Governmental decree 306/2010 (25th Dec). about air protection - § 17, 29 (1) "In case of establishing highway or motorway - except for the building related to the operation of the highway and the motorway - no residential building, resort, training and educational institutes, social and administrative buildings are allowed to be placed within 50 m from the axle of the traffic road, in case of establishing one- and two-digit national public roads and railway lines within 25 m from the axle of the traffic road.

In case of track version C there is a residential building at more than 50 m from the main axle of the highway, at ~32 m from the exit of Tyukod, in case of which building dust loading (without taking any measure) can exceed the health air purity protection limit value determined by the legal rule and in case of both wind velocities. Dust-producing activity is expected in wet clay condition of the soil and by observing the below detailed "Recommended measures" and the relevant environmental protection stipulations for the period of the construction the unfavourable impacts can be sufficiently reduced.

Air contamination during the operation

Air contamination due to traffic is mainly determined by the total emissions of the vehicles and the conditions of spreading, which depend on the following factors:

- size and composition of the traffic, specific emission of the vehicles,
- velocity and obstruction of the traffic,
- geometrical development of the road,
- meteorological conditions,
- conditions of built-up density,

Track version B

In case of the track version B the nearest building to be protected is at ~170 m. Air loading does not have important impact at this distance, so this version can be considered more favourable.

Air loading during operation will be expectedly negligible at this distance. More than 20 % of traffic reduction is expected at each examined section of the existing road No. 49 in case M49 motorway is realized.

Track version C

The nearest building to be protected in case of version C will be at ~32 m from the Tyukod exit, at more than 50 m from the main axle of the highway, of the planned track. Dust loading at this distance can be considered as exceeding of the limit value, however by the observation of the proposed protection measures it can be reduced to the required measure. During the operation no exceeding of the health limit value is expected at this distance. More than 20 % of traffic reduction is expected at each examined section of the existing road No. 49 in case M49 motorway is realized. Traffic increase over 20 % is expected at the section of the road 4923 between Porcsalma and M49.

On the whole track version B can be considered more favourable due to its distance from the buildings to be protected.

Recommended measures

Before beginning of the construction works it must be ensured that in case of the establishment of the highway or motorway line sources - except for the building related to the operation of the motorway and the highway - no residential building, resorts, training, education, health, social and administrative buildings may be located based on section (1) §.29. of the Governmental decree 306/2010 23rd Dec) about air protection (hereinafter: Gov. decree 306/2010 (23rd Dec.).

No residential buildings, resort, training, education, health, social and administrative buildings can be located along the inferior roads of the junction exit within 25 m.

The working area should be developed, operated and maintained during the construction that the possible least air contaminants would enter the environment.

The material resources should be selected to the nearest to the tract and the transportation routes should be designated bypassing the inhibited areas, if possible.

The sites for the machines and equipment used for the construction must be designated the nearest to the track and the farthest from the inhibited areas, and unnecessary movements should be avoided.

It is advisable to bypass crossroad 4923 due to built up density with the deliveries to the construction, in case version C will be built.

Delivery of the materials used for the construction must be performed in closed containers or containers with temporary covering preventing dusting and spillage, or special purpose machines, delivery vehicles meeting these conditions must be used, to exclude air loading.

The machinery and the transporting means must meet the air protection requirements specified by the effective legal rules. Using of the available best technological equipment (BAT)

Machinery suitable for public road traffic must have effective registration, in case of machines not suitable for public road traffic, then they must have the appropriate relevant licences, certificates that prove that their emission of harmful materials does not exceed the permissible level.

Unnecessary idle run of the machinery must be avoided.

By optimized operation of the machinery and the transporting vehicles the emission of air contaminants must be reduced.

Outdoor storing of the materials must be developed so that the possible least air contaminant would enter the environment.

During loading appropriate measures must be taken to prevent air loading by the moved materials.

Earthwork must be watered at appropriate intervals - as per the technological instructions - and in case the earthwork has suitably consolidated, then it is not necessary to water according to the technological instructions, however if building in of the CKT layer is envisaged on weeks, months later, then watering should be continued against dusting, if no raining occurred for more than 5 days.

The slopes should be grassed on the built sections as soon as possible and plantation be performed in order to reduce dusting.

It is prohibited during to construction to cause such an air - and stink load that would lastingly exceed the limit values in the narrow, 50 m wide environment of the construction site and the delivery routes measured from the axle.

Transporting routes without cover and being in the environment of inhabited areas must be bypassed. In case it is inevitable, then the track must be regularly watered (especially in drought time).

4.3. WILD WORLD: HUMAN AND SOCIETY

Impact of the construction

Public road construction is a temporary activity for a transitional period of time, when the impacts of the construction are manifested:

- in the separable, direct working area and in its environment, or
- on the access road network of the examined area by the deliveries.

These impacts are mainly temporary - in social and economic sense - (due to the fact that the individual areas are temporarily occupied by the constructing companies), and they cause less impacts than the operation of the road.

Impact of the operation

Generally, it can be said that the greatest benefit of the operation of the planned public road network development is that due to the construction, and by bypassing the zones of the settlement centre loaded with passenger traffic they ensure safer traffic possibilities for the drivers and reduce the unfavourable environmental impacts of the traffic on the inner parts of the settlements.

They exert favourable influence on the settlements in the following aspects:

- reduction of the access time,
- improvement of the producing and service sectors (e.g. operation of the industrial-commercial units) and
- relieving of the main roads passing through the settlements from the loading.

In addition, however, the operation of the road may also have negative impacts, e.g.

- environmental effects caused by the traffic (impacts on the earth, the surface and sub-surface waters, the air, the wildlife, the landscape and the concerned population.)

The above said impacts can be eliminated and/or reduced to the minimum with the appropriate (environmental protection) measures.

In case of track version B - due to the distance of the nearest building to be protected (~170 m) dust loading can exceed the 24-hour health limit value only in windless weather. In case of track version C there is a residential building at more than 50 m from the main axle of the highway, at ~32 m from the exit of Tyukod, where dust loading (without taking any measure) can exceed the health air purity protection limit value determined by the legal rule. **Dust-producing activity is expected in wet clay condition of the soil and by observing the relevant**

environmental protection stipulations for the period of the construction the unfavourable impacts can be sufficiently reduced.

Air loading during operation will be expectedly negligible at this distance. More than 20 % of traffic reduction is expected at each examined section of the existing road No. 49 in case M49 motorway is realized. Consequently, we can account for improvement of the air quality in these sections, because the new M49 highway will relieve important traffic from the existing road. Traffic increase over 20 % is expected at the section of the road 4923 between Porcsalma and M49. Based on the immission calculations the health limit value can be safely fulfilled.

Summing up, in respect of noise protection it can be stated that **version C** approaches best the inhibited area from the planned track versions of the direct impact zone, where the noise loading affecting the buildings to be protected will be around the limit value, therefore **construction of a noise shielding wall is recommended**, here.

4.4. PROTECTION OF WILDLIFE

In respect of the protection of the wildlife **the direct impact area** is the most important, where all of the stationary creatures will die and from where - those with great movement capacities - will move away. Space demand of the carriage way and the related establishment (including the other technical specifications) will be ensured by expropriation. This zone is the area where the original state will be completely changed, so this can be considered as the direct impact area by all means.

The width of the **indirect impact area importantly** depends on the affected species, the surface forms, the use of the area, the plantation and other disturbing effects. As we know significant impact has not been evidenced so far in case any of the highways at the distance of more than 200 m from the axle of the road. Starting from this, our survey areas covered the zone, where the impacts expected by roads with similar parameters can endanger natural assets or they can detectably be shown.

The design area is situated in a strongly transformed, essentially in an agricultural landscape. The greatest part of the present peripheral land cover is arable land. Using of the arable lands for other purposes is a process going on even now, mainly forests are installed instead. Grassland cultivated as pasture or meadow for decades is rarely found in the design area. 90-95 % of the grassland of the seventies have been plowed and transformed into apple garden and tree plantation. It follows that the great majority of the grassland of today was transformed from the left arable lands. There is no undisturbed grassland in the impact field with special species and of natural state.

The nearest area to the investment site protected with individual legal rule is the nature reserve Cégénydányád park (74/TT/60) situated at about 3 km North of the B tract version, on the other bank of Szamos. Further areas with national protection are the ex lege marshes: Tunyogmatolcs-Holt-Szamos (its nearest point is at 1800 m North) and Szamossályi-Holt-Szamos (at more than 1600 m). The previous one is a special nature preservation area with the same name (identification number HUH20159).

The two track versions and the related establishments cross or touch the elements of the ecological corridor of the national ecological network.

The examination comprising the second half of the vegetation period showed a single **protected species**, the meadow aster (*Aster sedifolius subsp. sedifolius*) from the area. The plant appears at many points in the 200 m zone and outside it, there is a stock of 100-200 plants, along the railroad, West from the B track after km section 39. but they are not threatened by the construction

The impact area is an agricultural region poor of natural assets, its zoological values or lack of them come from its regional position and it can be attributed to the nearness of the territories being important in respect of nature protection in its neighbourhood. There are no areas, habitats being significant in respect of zoology. White stork broods in several settlements. Black stork was noticed a single time on the grassland before joining of the two

tracks. An outstanding natural value of Szatmár-Bereg-plane is the corn-crake (*crex crex*). The bird last bred at several points of the area in the specially wet year of 2010. Despite of regular monitoring it has not been noticed since then. In the framework of the present impact assessment we have inspected all of the earlier nesting places, but due to the drought year and partly as a consequence of the condition and treatment of the areas, it was not a surprise that we could not meet even one bird.

The impacts of the establishment include, that during the construction vegetation finally ceases as the direct impact of the construction in the width of the carriageway and it causes at the same time liquidation of the living space and of the habitat. The increased disturbance caused by the construction and the transportation can importantly change the usual behaviour of the animals in certain periods (e.g. in the reproduction period, or in the period of winter nutrition scarcity, when several species collect into teams).

However, species being especially sensitive to disturbance, may occur in the impact area only occasionally. A single bird species must be outlined, the corn-crake (*Crex crex*) being under increased protection, being sensible, in addition to disturbance also to the fragmentation of its habitat. In 2018 it did not breed in the area (moreover, important nesting data come from the already mentioned, especially wet 2010), so we can only indicate the possible breeding places in case of this species. At present, we can identify maximum four grasslands in the impact area, that can be mentioned as possible habitats.

A single protected plant the meadow aster (*Aster sedifolius subsp. sedifolius*) can be found at several places in hundreds. These locations are mainly habitat fragments and are characteristically of artificial origin (road, baulk along the railway road, trench bank, grassland grown or left arable lands. The plant appears at many points in the 200 m zone and outside it, there is a stock of 100-200 plants, along the railroad, West from the B track after km section 39. but they are not threatened by the construction

Fragmentation, based on the measurable features, will not be important. None of the tracks cuts valuable and large habitats.

The following impacts can be accounted for **during the operation:** running over, light contamination, noise contamination and visual disturbance, chemical effects (in the soil, the surface and sub-surface waters and in the air). Indirect and possibly occurring impacts (changing area use along the road).

Recommended measures

The possible smallest area should be used from the non-cultivated zone and care must be taken to cut out the possible least native trees.

Invasive plants mainly endanger the non-cultivated and non-disturbed areas outside the expropriated areas, and the territories deprived of their vegetation. Cleaning mowing of the concerned areas must be continued for several (at least 3) years, until more or less resistant vegetation grows back against the invasion of the invasive plants.

Native species and species characteristic for the local habitats should be preferred when installing plants. It is important that no pines, thuja, acacias, hackberries, ailanthus and American ash be planted.

Certain gateways for the big games are inevitably necessary in versions C and B: In C track version the site proposed by a competent hunting group was selected (**34+360 km section**). **In B track version** the alternative in the Eastern direction (**33+400 km section**) was marked for further planning instead of the recommended gateways West from the road leading to Szamossály (around 31+500 km section). The earlier would promote passing through at a forest strip cutting, the latter would make possible passing through at a forest strip and the coppice.

Further, in case of the animals, the damages can be reduced to a certain degree by means of appropriate scheduling. Where necessary, the trees and shrubs must be cut out inevitably, before the nesting period, possibly

until 15th March. In case corn-crake is noticed at certain points then it must be taken into account that no works causing important disturbance should be made until the end of July.

Monitoring of the big game gateways during operation is recommended.

4.5. LANDSCAPE PROTECTION

In respect of landscape protection, the direct **impact area** is the same as the actually used territory (border of expropriation), indirect impact area includes all the territories from where the planned track together with it related establishment can be seen (max. 500 m distance).

Considering landscape use of the region concerned by the investment in question, agricultural use is having characteristically the largest spatial extent, irrigated arable lands can be found at several places and a part of them is concerned by the examined tracks.

Considering the relief characteristics of the concerned landscape, it is plane on the whole section, divided with some smaller channels. The structural construction of the landscape detail is utilized characteristically with contiguous agricultural cultivation (mainly as arable land, to a smaller extent as orchard) with mosaically impacted forests, grasslands and settlements.

In addition, the following elements, groups of elements can be considered as valuable and outstanding landscape forming components:

- The elements of the National Ecological Network and the areas under nature protection;
- water flows;
- turfy, scrubby and woody areas along the valleys;
- grassy and forest areas and orchards;
- lines of trees along the road;
- individual landscape values.

Within the expropriation border individual landscape values can be found in case of versions "B", out of them expectedly one will be concerned by the prospective road construction (crucifix beside the existing main road No. 49).

The implementation of the public road development can be manifested in **the ways of landscape use, in the impacts exerted on the valuable landscape elements**, in certain sections in cutting through the connections, transformation and **changing of the landscape**.

Changes occurring in the way of landscape use can fundamentally arise in the areas for expropriation: the earlier cultivation branches, natural regions, and individual landscape values can be ceased by the development of the traffic areas instead of them, should the area be involved in the development.

The planned development involves or approaches unique landscape values (nearest to the highway is found the crucifix at the border of Szamosangyalos and Pátyod), so attention must be paid to their protection.

The most conspicuous change in respect of the given project that affects the landscape is that the existing vegetation along the new track section will completely disappear in the planned crest width; the partial or full liquidation of the agricultural, forestry or orchard areas or parts of them which are affected directly by the use of the territory; the establishment of the new carriageway; liquidation of the existing earth roads and construction of new ones.

The biologically active surfaces on the design are characteristically arable lands, grasslands, forest patches, orchards, certain parts, edges of which will be split or liquidated as a result of the use of the planned expressway

zone, consequently small degree reduction of the value of biological activity of the area is supposed. The planned motorway runs in the embankment on the whole length. The embankments are characteristically 1.5-3.5 m high, with the exception of the MÁV crossings, where the carriageways have overhead crossings.

Recommended measures

In order to reduce the unfavourable impacts exerted on the landscape **it is recommended** to develop the staging routes with saving of the landscape values, rehabilitation of the used areas after the implementation (with outlined attention to the ecologic corridors, and the environment of the water flows), matching of the slope areas into the landscape and planting.

4.6. BUILT ENVIRONMENT, PROTECTION OF THE CULTURAL HERITAGE

In respect of the built environment, we can speak about **direct impact** reason, if involvement of artificial values and archaeological findings can be expected along the track as a result of the area occupation by the public road development. **Indirect impact** areas are those territories, from where the planned investment appears as a noticeable change from the settlements - this distance cannot be exactly defined, it changes point like.

The track runs mainly on the periphery, it involves areas of agricultural use, so it does not exert important impact on the built environment.

The bypass sections of the planned road will reduce the traffic of the inner roads; thus, the life quality of the inhabitants will improve in the settlements, and it promotes preservation of the buildings and of the built environmental elements.

According to the Spatial Planning of Szabolcs-Szatmár-Bereg county the tract does not involve the zone of historical settlement areas and the zone of the world heritage or candidate zones for world heritage.

According to www.muemlekem.hu and the available spatial plans the planned tracts do not affect any monument.

Várkapitányság Nonprofit Plc. elaborated the preparatory part of the Preliminary Archaeological Documentation "M49 expressway section between Ökörítófülpös - Country border" (ERD-I). Our statements referring to the cultural heritage protection have been worked out in compliance with ERD-I.

Tract "B" and "C" involve 14 pcs of archaeological sites on the examined area.

The track of the planned crossroad between Csenger and Ura in version "C" involves further 3 archaeological sites and 2 more sites are found in the 50 m environment of the tract.

The majority of the planned tracks runs through cultivated areas, they also involve apple orchards and only a small part of them lead through pastures and forests. The earthworks of the planned investment may endanger or even liquidate the involved heritage elements.

Recommended measures

The proposals of ERD-I must be observed during further planning and implementation, too.

According to the act 64 of 2001 about the protection of cultural heritage (shortly Kötv) the elements of the archaeological heritage may only be moved from their original position in the framework of archaeological excavations. The archaeological sites are under general protection as per Kötv.

Should any archaeological finding occur during the earthworks then one must proceed as included in the relevant instructions of the heritage protection act and the Directorates of the Competent Museums must be immediately be given notice of it.

4.7. NOISE AND VIBRATION PROTECTION

Noise loading in the direct environment of the tract to be established is characteristically determined by the noise load from the further loads and the sounds of the nature. We have examined the noise conditions of the impact areas of the connecting roads in case of roads - 49, 4923 and 4924.

The present noise immission of the buildings to be protected in the design are and its field of impact was determined by measurements and calculations and it can be stated that noise loading under the present conditions exceeds the limit value specified by the legal rule by 1.2-2.6 dB in daytime and 5.2-7.0 dB at night in the environment of main road No. 49.

The nearest residential building to the planned road construction

- In case of track B version - is at 170 m (Pátyod, Rákóczi F. str. 72, lot number: 38)
- In case of C track version, it is at 70 m (Tyukod, Bem str. 76. lot number :847)

The impacts of the construction

Noise pollution at the construction works is determined by the construction technology, the machinery, the loading processes and the transportation traffic.

The noise protection plan must be prepared at the level of the construction plan and in aware of the organization plan with the purpose of keeping the unfavourable effect at minimum level and observation of the limit values.

Delivery of the materials is performed through public road, using the main road No. 49 and the track of the highway to be constructed. No important noise increase should be accounted for by appropriate organization and avoidance of night transportation and construction.

It is important to note that **it is not recommended to** choose road number 4923 in settlements Porcsalma and Tyukod **for transportation** because of the near built-up density.

In the vicinity of the design area, buildings to be protected from noise can be found in suburban and rural territories, built-up with residential and economic buildings.

The permitted A equivalent sound pressure levels coming from the construction works are included in enclosure No.2. of the joint decree of KvVM-EüM No. 27/2008 (3rd Dec.) Prior to beginning of the construction, due to the vicinity of the buildings to be protected noise emission limit values must be asked for from the environment protection authority.

The construction noise can be qualified as bearable with the appropriate noise protection measures.

Impact of the operation

Track "B" runs on the periphery, the nearest settlement is Pátyod, the nearest residential building is at 170 m. Due to the distance the noise protection impact area does not involve the nearest residential buildings of the settlement. There is no reason for noise protection measures.

Track "C" runs on the periphery, the nearest settlement is Tyukod, the nearest residential building is at 70 m (Bem str. 76. lot number: 847)- Due to the increasing noise load of road number 4923 and the relative closeness of the track and of the node to be constructed to the settlement noise protection measures are recommended, here.

Recommended measures

In case of "C" track version, due to the increasing noise load of road number 4923 and the relative closeness of the track and of the node to be constructed **noise-shielding wall construction is** recommended in about 400 m

length on the right side of the planned road, because the joint noise load of the public road will be around the limit value.

Track version	Staking		Length of the noise shielding wall (m)	Height of the noise shielding wall (from the track level) (m)	Requirement
"C" (Tyukod)	31+250	31+650	400	2.5	Absorption class A4 at both sides

Acoustic requirements for the noise shielding walls:

Only certified noise shielding wall, meeting the above conditions and the requirements of standard MSZ EN 14388:2016 and having a CE compliance certificate issued by an accredited laboratory may be built.

After construction the noise-shielding walls must be checked with the below on-site examinations:

- MSZ EN 1793-5:2016 Noise-shielding equipment of public loads - examination methods for the determination of the acoustic characteristics, Part 5: *Essential* characteristics - values of on-site measurement of *sound reflection* under direct noise conditions
- MSZ EN 1793-6:2013 Noise-shielding equipment of public roads - examination methods for the determination of the acoustic characteristics, Part 6: *Essential* characteristics: On-site values of airborne noise inhibition under direct noise conditions

For architectural, safety and static designing of the noise-shielding wall the stipulations of e-ÚT 03.07.46 "Narrow public road noise-shielding walls" Design guidelines must be considered.

The additional requirements are summarized in the below table:

Relevant standard		Requirement	
Sound absorption category (for opaque wall elements): According to standard MSZ EN 1793 :2017		The stipulations of the standard must be considered so that sound absorption would meet the classification of A4 as per the withdrawn standard MSZ EN 1793-1:2013.	
Airborne sound inhibition category: According to standard MSZ EN 1793-1:2017		The stipulations of the standard must be considered so that airborne sound inhibition would meet the classification of B3 as per the withdrawn standard MSZ EN 1793-2:2013.	
Property		Method of examination and checking	Requirement
Mechanical properties and stability requirements	Aerodynamic loading	EN 1794-1 enclosure A	Certificate of compliance
	Net weight	EN 1794-1 enclosure B	
	Dynamic loading due to snow clearance	EN 1794-1 enclosure E	
General safety and environmental requirements	Resistance to the burning of the undergrowth	EN 1794-1 enclosure A	2nd category:
	Danger caused by falling debris	EN 1794-1 enclosure B	1st resistance class

Property		Method of examination and checking	Requirement
	Environmental protection	EN 1794- enclosure C	Emission of dangerous materials is not permitted.
	Escape routes	EN 1794-1 enclosure D	Certificate of compliance
	Requirements for safety, against theft and for contact protection	Requirements determined by the operator	

In case of the implementation of the proposed noise shielding wall, in case of the residential buildings involved in important noise load increase without noise shielding, the expected noise loading increase will be sensibly reduced as compared to the present condition. Noise protection impact of the investment is of bearable level with the proposed noise protection measure.

We have to note that the place and the dimensioning of the noise-protection walls is of appropriate accuracy in compliance with the present design phase. Due to the fact that in the present phase of the design there is no cross section or geodetic survey available that would enable for exact dimensioning, the dimensions of the noise-shielding walls can only be considered as informative. At the time of making the authorization plan and the construction plan (these stages have the scales and geodetic surveys enabling for exact dimensioning) the dimensions of the walls must be checked!

4.8. WASTE MANAGEMENT

In course of the construction works of the establishment (including also the material resources) generation of non-dangerous, dangerous and communal wastes must be accounted for in the whole period of the investment, in compliance with the schedules of the working activities. The volume cannot be estimated in the present phase.

The impacts of the construction

The wastes will be collected on the staging (organization) territory as per the legal rules and the Construction plan includes the details as to the collection, management and certification of the wastes.

The main groups of the generated wastes are:

- construction materials (cement, concrete, brick etc.) debris, waste.
- waste of the packing and insulation materials,
- bitumen wastes,
- paints, varnishes and other coating, corrosion-protection material wastes,
- contaminated thinners and solvents,
- metal wastes (iron, steel),
- wooden wastes,
- wastepaper
- plastic wastes
- oil and oily wastes,
- other wastes.

Depending on the number of the workers on the investment site communal waste is continuously generated.

The important part of the generated wastes is non-dangerous construction wastes.

The generated **non-dangerous wastes and communal wastes** belonging to the 17 main groups cannot be considered dangerous wastes, these must be disposed in the waste deposits of Szabolcs-Szatmár-Bereg county in the first place, observing the principle of vicinity and economicalness, preferring in each case the method of management with waste recovery.

Non-dangerous wastes that can be sold or utilized must be collected separately, sold and utilized as it is possible.

The dangerous wastes generated by the construction and demolition works (ID code 13) and their earth blends must be separately collected. The stipulations of the Governmental decree 225/2015 (7th Aug.) must be observed as to the generated dangerous wastes, and they must be handed over for a licenced receiver for disposal, with observation of the principle of vicinity and economicalness and always preferring the treatment methods involving recovery.

Transportation of the wastes is performed through the routes of material delivery, until reaching the built roads.

If in case the important part of the produced demolition materials can be recovered, then reusable material can be made of the waste.

Consequently, inert waste deposit would only be utilized in case of the non-recoverable materials and the volume of the waste could be significantly reduced this way.

In course of the construction classification, treatment, disposal of the produced materials as well as the detailed management rules of the generated wastes must be settled within the Construction Plan.

During the implementation following the design phases minutes and plan sheets must be kept as to the treatment of construction-demolition wastes, in compliance with the joint decree of BM-KvVm No. 45/2004. (26th July) about the detailed rules of managing construction and demolition wastes.

Impacts of the operation

On the area of the road section - following the construction and putting into use - one must account on the generation of a small volume of dangerous and non-dangerous wastes. Their kinds are only partly known now, or they can be only prognosed, there is no information about their exact volume as per types in the present stage of the design.

In the present phase of the design repair and maintenance activity and their demand for means and materials are not exactly known.

The regulations referring to the operation period will be included in the treatment plans. Procedures and data supply obligations specified by the relevant legal rules must be observed both in the construction and the operation periods.

Recommended measures

During the construction-demolition works care should be taken to minimalization of the volume of the generated waste, to utilization of the generated construction-demolition materials within the implementation and to keep appropriate records of the generated wastes as per the legal rules.

We can hand over only for a licenced receiver for disposal, with observation of the principle of vicinity and economicalness and always preferring the treatment methods involving recovery.

Delivery of the wastes must be performed through the indicated material delivery routes.

The temporary reservoirs of wastes and dangerous wastes generated by the construction works and the fuel tanks of the earth machinery must be placed on already covered surfaces or surfaces supplied with an insulation layer, using damage recovery vessels and excluding the possibility of contamination to the soil and sub-soil waters.

Collection and disposal of the different types wastes must be performed by the Constructor during the construction and by the competent public road operator during the operation. Deposition is recommended into the solid waste deposits operated by the county or settlement self-governments.

Using of the set soil must be done in compliance with the stipulations of the Soil Protection plan.

In course of the construction classification, treatment, disposal of the produced materials as well as the detailed management rules of the generated wastes must be settled within the Construction Plan.

By completion of the construction the construction site - including also the temporarily used areas - must be cleared off the wastes, construction debris and unnecessary construction materials.

The regulations referring to the operation period will be included in the treatment plans.

Procedures and data supply obligations specified by the relevant legal rules must be observed both in the construction and the operation periods.

Inert wastes generated during the construction (construction debris not containing dangerous materials) must be deposited at the nearest, licenced inert waste deposit.

Municipal solid waste generated during the construction and operation (communal waste) must be collected in closed water reservoir and it should be regularly transported to the non dangerous waste deposit (communal waste deposit).

Collection and disposal of the different types of wastes must be performed by the Constructor during the construction and by the competent public road operator during the operation. Deposition is recommended into the solid waste deposits operated by the county or settlement self-governments.

Dangerous waste generated by the construction and the operation must be collected separately, as per the stipulations of the legal rules, excluding the possibility of environmental pollution, records must be kept of them, they must be reported and their further treatment or disposal in the dangerous waste deposit must be arranged. Transportation and treatment of dangerous wastes may only be performed by an authorised, licenced company. Possible waste treatment facilities in the vicinity of the design area can be found on the basis of the Electronic Waste Management Information System, too. (See <http://web.okir.hu/sse/?group=EHIR>)

Considering the length of the built sections - due to the volume of the generated waste from the construction - version "C" is shorter by ~ 2,5 km than tract version "B". In respect of waste management there is no significant difference between the planned "B" (23.828 km) and the "C" (21.383) versions.

4.9. CLIMATE PROTECTION

Variability of the climate and the different extreme weather and hydrometeorological phenomena have always left significant traces in our socio-economic life and natural environment. Based on the observations the number and the intensity of these extreme phenomena have further increased during the past decades.

From the threatening events related to climate change the extreme temperature increase, growing precipitation intensity, stormy weather, raising frequency of inland waters and forest fires may have harmful effect on the area covered by the planned investment.

Having determined sensitivity of the investment in respect of the primary climate protection factors and the secondary impacts/climate protection risks, then on the exposure of the area affected by the climate change the vulnerability of the investment was stated. The investment in question can be considered vulnerable to the following impacts:

- slow increase of the average temperature of the surface air,

- increasing number of the hot days,
- increasing number of the days with heat wave,
- increasing intensity of precipitations,
- increasing wind force,
- increasing number and intensity of the stormy weather events,
- increasing frequency of developing of inland waters
- increasing frequency of forest fires.

Risks and consequences (primary impacts) to be treated with priority due to the vulnerability of the investment:

- reduced lifetime and accelerated ageing of the road cover,
- washing out of the road base, reduction of the stability of the embankment,
- tearing of the roadway,
- flooding of the low road sections,
- bad visibility (sandstorm, fog),
- deteriorated traffic relations.

Further, secondary impact may only appear, which may affect even the whole society and economy. So, consequences which have to be considered but which mean less risk:

- deformation of the pavement, rutting,
- cracking and potholes,
- reduced loading capacity and sinking,
- damage to the additional infrastructure.

These impacts can be treated as risks in respect of climate protection.

Recommended measures

The traffic establishment can mainly be damaged by the events of extreme weather: stormy wind, intensive precipitation, heat waves, therefore it must be when developing the adaptation strategies that not each possible negative impact can be avoided.

Therefore, careful construction and selection of the asphalt mixture is recommended.

When selecting the grain structure, the adhesive content and quality and the modifying agents, those solutions must be preferred which result in appropriately rigid and fatigue-resistance carriageway structure against exposure to high temperature values.

When determining the bituminous content, the medium range is advised, not only the minimum requirements.

Increased UV radiation can lead to accelerated ageing of the bitumen, and it can contribute to the development of surface cracking. In addition, it also reduces the comfort feeling of the users. By the increasing ultraviolet radiation bitumen is more quickly ageing at the upper part of the wearing layer, it will be more rigid. As a result, it can take the developing stresses more difficultly and the wearing layer cracks. Plantation along the road can contribute to this, if it can be located so that it would promote shielding of the road. This would require improved road supervision. In the summer months regular provision of liquid is recommended for the users of the establishment.

Due to increasing **wind force** snow blowing will occur more frequently and it can result in traffic jams. Stormy wind can turn signal lamps, trees etc. on the road, and it would result in serious damages.

Therefore, continuous cleaning of the roads may become necessary. The condition of the trees along the road and their boughs must be checked and removed, if they could cause accident.

In case of the climatic change the most important adaptation measure is provision of the **appropriate water drainage**. Appropriate water drainage requires good quality meteorological, hydrological and geomorphological data. Efficient prevention and draining of the water from the establishment should be solved with the help of appropriate water economy infrastructure. In course of planning water drainage, the sub-surface water flows must be managed, must get prepared for the volume of precipitation generated by intensive raining and the route of drainage of the flood waves.

The destroying effect of the high intensity **precipitation** increases, so the road must be protected against washing out. As an expected effect of climate change the increased precipitation intensity will cause problems, too. Water getting in and collecting in the carriageway structure can result in separation of the bitumen from the stone frame.

Occurrence of **inland waters** is affected by many local factors, therefore prognosing of the inland water danger involves many uncertainties. However, based on the results of the climate models increasing frequency of developing of inland waters can be clearly estimated. The roads are definitely sensible to the effects of the inland waters.

Damages to the additional infrastructure due to **stormy events** can be solved mainly with post repairs.

This can be avoided by improvement of water drainage (slope, trench, drains) by suitable selection and taking care of the vegetation along the road.

Prevention of the harmful effects of flood waves generated by extreme precipitation could be promoted by water yield regulation to be jointly implemented with the neighbouring countries.

Cleaning or reconstruction of the water draining trenches can become necessary in the area affected by the planned investment. These interventions must not be disregarded, since the large volume of precipitation falling down at a time, which becomes more frequent in our country, and it can create serious problems and risks of accidents.

Long droughty periods also deteriorate the stability of the engineering structures (causing settlement of the soil). Increased probability of sand/windstorms affecting visibility is also expected, so the risk of accidents will raise.

Appropriate plant installation, in addition to promoting adaptation to the climate change (e.g. slope stabilization, protection against UV radiation by shielding) also contributes to the reduction of the unfavourable impact of the space occupation of the road, as an indirect risk factor.

By solving plant installation along the road, replacement afforestation using of the biologically active compensating surfaces utilized by the road can be compensated. The implementation of landscape adequate plant installation along the road can indirectly affect soil protection and improve the climate.

Based on the above the planned investment is *vulnerable* in respect of the impacts expected from climatic change. Further, the effect of the planned investment is *low* on the climate change - due to its volume. Appropriate application of the proposal serving reduction of the enlisted effects of climate change can significantly mitigate the expected negative impacts of the planned investment.

5. SUMMARY EVALUATION

In respect of the **protection of soil and sub-surface waters** the negative impacts of the construction period are space occupation of the investment, size of the earthworks, involvement of the areas and water bases of increased and outlined sensitivity.

The examined track runs through mainly agricultural areas, so the establishment involves important use of the territory, however no areas with excellent site quality characteristics are concerned.

The planned investment affects hydrogeological "B" protective area of 2 water bases. Because the track versions concerned or the crossed water bases are having only estimated protective profile, and they are not vulnerable, therefore the construction of watertightly covered precipitation trench system in case of constructing highway and motorway as per enclosure No. 5. of the Governmental decree No. 123/1997 (18th July) about the protection of the water bases, of the prospective water bases and the water establishments serving drinkwater supply is not required at the crossed section.

According to the plans the precipitation waters flowing from the carriageway and the neighbouring terrain are characteristically gathered by the earth-bedded trenches at the two sides. The studies prove that the pollutant retaining effect of the earth-bedded trench catches about 60 % of the contamination possible generated by the water washing from the carriageway and leaking in. The storing water draining system further reduces the pollution concentration.

During the operation of the planned road the volume of the contamination can be considerable, mainly in respect of the contingencies and the accidents of the trucks.

During operation of the road no contamination effect is expected that would cause quantitative or qualitative changes of the surface waters by the leaking waters.

Considering the above, the planned investment can be implemented in respect of earth protection.

The impacts influencing the condition **of surface waters** will be regulated by the method and efficiency of water drainage of the new road section in the period of operation.

The planned road tracks cross water flows, channels and deep strands in the terrain, which are used for receiving drainage.

Water drainage of the planned highway is performed with earth trenches.

During the operation the surface water flows may be affected by contamination mainly indirectly. This can enter the water flows by the mediation of the sub-surface waters. In addition to the pollutant retaining effect of the earth-bedded trenches the storing water draining system further reduces the pollution concentration.

The water flows may be directly impacted by contamination; this can be mainly localized and eliminated in the framework of damage prevention. The alluvial catching-prohibiting engineering structures installed before the receivers serve for reducing the impacts of the possible contingencies.

The concentration of the air contaminants diffusely falling out will be diluted and its does not exert important influence on the areas next to the road.

During operation of the road no contamination effect is expected that would cause quantitative or qualitative changes of the surface waters by the leaking waters.

Based on the above, the planned investment can be implemented in respect of water protection, with observation of the specified environmental protection recommendations.

Air purity protection

Based on the data of the nearest measuring station it can be stated that air pollution of the region is good, the annual limit values were not exceeded in case of any of the examined components.

Air pollution by the transporting vehicles is inevitable to a certain degree during the construction, but by observation of the proposed protection measures and careful implementation its measure can be reduced.

In case of the track version B the nearest building to be protected is at ~170 m. Air loading does not have important impact at this distance, so this version can be considered more favourable.

The nearest building to be protected in case of version C will be at ~32 m from the Tyukod exit, at more than 50 m from the main axle of the highway, of the planned track. Dust loading at this distance can be considered as exceeding of the limit value, however by the observation of the proposed protection measures it can be reduced to the required measure. During the operation no exceeding of the health limit value is expected at this distance.

In respect of air protection none of the tract versions can cause conflict. On the whole, track version B can be considered more favourable due to its distance from the buildings to be protected.

Protection of wildlife

The design area is situated in a strongly transformed, essentially in an agricultural landscape. The greatest part of the present peripheral land cover is arable land. Using of the arable lands for other purposes is a process going on even now, mainly forests are installed instead. Grassland cultivated as pasture or meadow for decades is rarely found in the design area. There are practically no habitats of natural condition in the impact area. There is no protected natural area, no Natura 2000 area on the impact area, the track versions cross only some elements of the ecological corridor of the National Ecological Network which have mainly lost their importance in respect of nature protection by now. Track version C approaches grasslands and forests under local protection in the vicinity of Ura.

In respect of nature protection version B is a bit more favourable. Although it is longer than version C and it is closer to the watery habitat to the North, valuable in respect of nature protection, but the locally valuable areas, including habitats of the past and of possible corncrake are not affected.

There is no professionally grounded exclusion reason of the implementation in case of any version, the investment can be implemented in the region without failing of determined nature protection targets.

In respect of landscape protection, the landscape details are dominated with agricultural use (arable land, orchards) in the affected region.

Forestry can be considered as an area use determining the landscape character of the region affected by the project to a lesser degree. The full section characteristically bypasses the larger, contiguous forest block, forest block group if we consider the terrain properties and the proportions of area utilization, but it involves at certain sections scheduled forest regions.

In summary, landscape disturbing effect in respect of landscape protection and changing of the present landscape structure can cause small-sized unfavourable impacts, because the new track and the related establishments result in changes in the ratio of the artificial landscape forming elements.

In respect of the **protection of built environment** the planned track does not directly affect any monument on the basis of "www.muemlekem.hu". Based on the Preliminary Archaeological Documentation (2019) prepared for the examination of the area both tracks of the planned development directly affects 14 identified archaeological sites.

The track of the planned crossroad between Csenger and Ura in version "C" involves further 3 archaeological sites and 2 more sites are found in the 50 m environment of the tract.

According to the instructions of the documentation rescuing of the archaeological findings, objects and relations can only be performed in the framework of archaeological excavations. Due to the fact that at the present phase of the design the technical parameters and the exact width and depth of the earthworks are not available, so the further recommendations of heritage protection may change later on, in aware of the construction plans.

In respect of noise- and vibration protection it can be stated that from the track versions planned for the direct impact field version "C" approaches best the inhibited area, where the noise loading of the buildings to be protected will be around the limit value, so building of a noise shielding wall is recommended.

The construction noise is qualified to be bearable, based on the calculations made on the estimates by applying the noise protection measures noise loading will meet the requirements of the legal rules.

The planned establishment can be implemented in respect of noise protection with the proposed noise protection conditions.

In respect of waste management, in case the best available technology will be applied during the construction-demolition works, then the volume of the generated waste can be reduced. By using the generated construction-demolition materials within the construction and by their utilization the environmental loading can be minimized.

The planned road construction can be implemented in respect of waste management if the referred legal rules and principles are observed.

Considering the length of the built sections - due to the volume of the generated waste from the construction - version "C" is shorter by ~ 2,5 km than tract version "B". In respect of waste management there is no significant difference between the planned "B" (23.828 km) and the "C" (21.383) versions.

In respect of the assessment of climate risk replacement of the biologically active surfaces, using of pavement resisting the extreme weather conditions and installation of the appropriate water drainage system can be defined as an impact reducing proposal (as a summary).

The measures applied in the design, implementation and operation phase manage the identified risks, partly eliminate them and partly ensure flexibility of the system against the change of the climate.

It can be stated in summary, that the planned investment is vulnerable in respect of the impacts expected from climatic change, however its impact on climatic change is low - because of the volume. Appropriate application of the proposals serving reduction of the effects of climate change can significantly ease the expected negative impacts.

There is no significant difference between the planned "B" (23.828 km) and the "C" (21.383) versions in respect of the risk of climate.

11th April, 2019