EXPRESSWAY R2

ZVOLEN VÝCHOD - PSTRUŠA

The notice about the changes of the proposed activity according to the Supplement 8a of the Act No. 24/2006 Coll. on environmental impacts and amending certain laws

NON TECHNICAL SUMMARY

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NON TECHNICAL SUMMARY

I. THE PURPOSE OF CONSTRUCTION

The existing road I/50 in this section is part of the international road corridor E 571, (also E 58).The new expressway "R2-state border CR/SR Drietoma – Trenčín – Prievidza - Žiar nad Hronom – Zvolen – Lučenec – Rimavská Sobota – Rožňava – Košice" will take over this function. The purpose of the construction is to build an expressway in category R24,5/120 in the optimal alignment in terms of transport travelling speed and road safety and as well as of the impact on the population and environment during the construction and operation. The main purpose of the construction is to build a satisfactory expressway in terms of quality and capacity, which will take over a substantial part of transit traffic, as well as the function of the international road corridor. The existing road I/50 will mainly serve local regional transport and will connect and serve the communities in the adjacent territory in parallel with the expressway, i.e will be used by vehicles excluded from the expressway.

II. THE BRIEF DESCRIPTION OF TECHNICAL SOLUTION

The beginning of the section R2 Zvolen East - Pstruša (100-00) connects with the end of the previous section of construction R2 Zvolen East – Zvolen West at the interchange Zvolenská Slatina, with feeder on the road I/50. The end of the section is at km 7,850 28 before the interchange MÚK Pstruša (part of the section of R2 Pstruša – Kriváň, for which the documentation for the building permit is prepared).

The route of the R2 leads through hilly terrain of the Zvolenská kotlina, in cadastres of the villages Zvolenská Slatina and Vígľaš. The designed section begins at km 0,000 in the interchange Zvolenská Slatina, with a feeder from the road I/50. The expressway goes through the col (saddle) of a mountain in cutting, over the road II/591 and creek Slatinsky potok. It bypasses the village Zvolenská Slatina from the left side at a distance of 400- 550 m away from the nearest urban area. The route then follows by alternating through smaller cuttings and on embankments, crossing the local creek Rybny, nameless creek and Vigľaš. At km 2,936 the expressway crosses the relocation of the road III/050 90 with an underpass. The village Vigľaš is bypassed with a curved alignment on the right, away from the urban area some 350-550 m. The expressway after the two cut sections crosses the local road at km 5,629. The straight section at the end bypasses the protected site CHA Hrončiačka, crosses the creek Hradná and railway siding (to the PPS Group Inc.), railway track Zvolen - Fiľakovo (Vígľaš - Pstruša) and the River Slatina. The new section links with the planned section of the expressway R2 Pstruša – Kriváň at the interchange Pstruša. The new expressway width corresponds with category D 24,5/120. The total length is 7 850 m.

A large part of the expressway structures are: 2 interchanges, 6 bridges on the expressway (total length of bridges is 837 m), 4 retaining walls, 4 field roads, 7 treatment facilities for the water flows, 3 modifications of the roads, 3 noise barriers. Furthermore, part of the construction comprises the necessary relocations and modifications of overground and underground utility lines affected by the project. The expressway will be equipped with an information system (emergency call phones, variable traffic signs, camera monitoring system**,** weather station, and traffic counters) and surface water drains. The total length of the expressway is enclosed with a fence.

The route of expressway is designed in accordance with territorial plan of the self-governing region Banská Bystrica (VÚC).

Location of the project:
The project is located in the Banska Bystrica region, in the district of Zvolen and Detva, in cadastral areas Zvolenská Slatina, Vígľaš

Technical solution

- total length of motorway D1 : 7,850 28 km
- category of expressway R2 : R 24,5/120
- junctions : interchange Zvolenská Slatina
  – : roundabout on the road I/50

	feeder	: Zvolenská Slatina, in total length 1 312,63 m
–	bridges	: on the expressway R2 - 6 pcs
		: on the road of III.rd class - 1 pc
–	roads	: adjustment of the roads – 3 pcs
–	relocations of the field roads	: 4 pcs, in total length 2 314,66 m
–	retaining walls	: 4 pcs
–	treatment of water flows	: 7 pcs
–	noise barriers	: 3 pcs, in total length 3 500 m
–	other planned objects:	: fencing
		: drainage, water pipeline relocations,
		: relocations of air conduction lines VN, VVN
		: relocation of cable lines ST, VET, ORANGE, SSE, ŽSR
		: motorway information system
		: adjustment and relocation of gas pipeline (middle pressure (STL) and high pressure gas pipeline (VTL)

III. CHARACTERISTICS OF AFFECTED AREA

The route of the expressway R2 Zvolen East - Pstruša, runs through the Banskobystricky region in the district of Zvolen and Detva. The expressway R2 begins at chainage of km 0,000 before the interchange of Zvolenská Slatina, where it links to the previous section Zvolen East – Zvolen West. The route is located in the hollow Zvolenská kotlina, along the southern hilly slopes and ends in the flat area of the valley Slatina River. The end of the section is at km 7,850 before the interchange MÚK Pstruša, where it links with the planned next section of the expressway R2 Pstruša – Kriváň. The total length of this section of expressway is 7,850 km. This area is mainly used for agriculture; there are also forest communities, bank vegetation, meadows and pastures. The area has changed due to the influence of urbanisation and the origin ecosystems have been preserved only on islands and enclaves in the urbanized country. The agriculture which creates the image of intensively cultivated land is dominated. The sites with higher biodiversity are the habitats of the water flows, wet meadows and forests.

IV. THE BASIC CHARACTERISTICS OF THE ENVIRONMENT

In terms of the regional geomorphological division of the Slovak territory (Mazúr – Lukniš, 1986), the affected area of the R2 Zvolen East – Pstruša is part of the inner Western Carpathians (Západné Karpaty). It belongs to the Slovak mid-mountains (Slovenské stredohorie), part of the unit Zvolenská hollow (Zvolenská kotlina) and subunit Slatinská kotlina, Detvianska kotlina (hollow) and marginally Rohy. The Slatinská kotlina (hollow) is a horizontally and vertically divided plane, belonging to the relief of morphotectonic depressions. The proposed alignment of the expressway has a fluctuating altitude of about 345-388 m above the sea level.

According to engineering geological zoning of the Western Carpathian (Západné Karpaty) the area of the floodplain of the Slatina river belongs to the region of neogene tectonic sag – 64 Slatinska kotlina and adjacent slopes and valleys are part of the region of neogene vulcanite – 51 Zvolenska vrchovina and volcanic mountains – 43 Javorie.
The Slatinská kotlina presents piedmont basin based on the fault system. Pre-quaternary subsoil of the floodplain of the Slatina River is formed by the colourful land cover of discontinuous distribution and various powers of quaternary. Quaternary is represented by sediments: fluvial (in the valley are clay and sandy – clay flood sediments), diluvial and fluvial-terrace sediments (clay on the lower terraces). The heels of southern slopes and partially the depression are covered by diluvial fragments.
The Zvolenská vrchovina (mountain) is formed mainly by diluvia (diluvia - fluvial) sediments – gravel and clay (Pliocene) and less vulcanogenic rocks (Miocene).
The Javorie (mountain) is built by pyroclastic deposits of andesite (Tortona - Sarmatian). The geological structure is formed by complex of the types of quaternary and pre-neogene soils and rocks.
In the area of the Slatina basin two systems of the tectonic lines can be expected: WSE - ENE and N-S, NW- SE, NE-SW. The fault tectonic is based on the older dislocation breaks. This development has been predominately accompanied by intensive andesitic and less by rhyolitic volcanism. The neotectonic faults are important in terms of seismicity. The long and deep valley of river Slatina and some of its tributaries (creeks Hradná and Vígľašský) are located on the tectonic line.

Geodynamic processes in the territory have resulted in a side erosion of surface flows, a scour erosion on the slopes, and a surface slippery of quaternary cover at the foot of the slopes. The uncovered volcaniclastic slopes are influenced by weathering and erosion processes. The subsoil of neogene clays is sensitive to volume changes.

In terms of seismicity, according to EN 1998-1/NA/Z2, the area of interest is located in a seismic hazard territory in Slovakia with reference values of peak acceleration a_{gR}=0.63 m.s^{-2}. The geological structure is formed by neogene fluvial sediments and fluvial alluvial deposits which belong to category B and neovolcanite rocks of category A.

The climatic conditions in the area correspond with the warm climate T7, which is moderately humid, with a cold winter (Atlas of SR, 2002). The Zvolenská kotlina (hollow) is type of basin with a large temperature inversion, moderately dry to humid climate, warm and moderately warm subtype. In the area and wider surroundings north-west flows are dominating.

The area of interest is located in the river-basin of the Hron, which recruits from the left side the biggest tributary Slatina River. This tributary runs along the proposed route up to the town Detva. In terms of the type regime of outfall the territory belongs to mountain - lowland areas with rain-snow type of outfall.
The untreated sections of main rivers Hron and Slatina represent areas with significant biological and aesthetical elements. The upper part of the basin Slatina with the area 71 km^2, is the protected area (CHVO) of Horny Ipeľ, Rimavica and Slatina with the basin of water supply Slatina River.
Slatina is a river in central Slovakia, which flows through the district Detva and Zvolen. It is 55.2 km long and belongs to water flows of III.rd order. There are two water works: the water-supply reservoir Hriňová and water supply reservoir Môťová near Zvolen. The Slatina rises in the Veporské hills, in the foothills Sihlianska planina, on the south-western slope of the hill Pätina (994.2 m above sea level) at an altitude of approximately 930 m n. m., in the cadastral area of town Hriňová and leads to Hron in the Zvolenska kotlina (hollow) on the western edge of the town Zvolen at an altitude of approximately 278 m n. m. It belongs to the water management major flows.

From a geological point of view, groundwater in the monitored area belongs in the following hydrogeological units:
- groundwater of quaternary; and
- groundwater of pre-quaternary subsoil.

A wider area of the proposed expressway R2 in the section of Zvolenska Slatina - Pstruša includes intensive tectonic faults and deep breaks, which lead free CO_2 to the surface, rich in the natural mineral carbonated water springs (mineral water - kyselka). The water springs are linked to the tectonic zones towards NE-SW direction (going from Detva through Klokoč towards Vígľašská Huta-Kalinka), NW-SE direction (Zvolen - Horny Tisovnik) and N-S direction (Vígľaš - Vígľašská Huta).
The natural mineral water is used for drinking in the vicinity by local people, but some is not used due to frequent pollution. The proposed expressway R2 does not cross the territory of the registered sources of natural mineral water. The possible occurrence of mineral waters in the area of the route R2 cannot be completely excluded, and should be given more attention during the next survey and construction works.
The fluvial sediments in the floodplain of the Slatina River are represented by fluvial gravel and gravel-sandy sediments from the bottom of valley Slatina, by alluvial clays with character of clayey sands and clays, and occasionally by fluvial sediments with character of clays and sands with an admixture of organic substances. The most saturated area is the group of beds of fluvial sediments where groundwater is mainly accumulated in the more permeable gravel and gravel-sandy sediments with lower volume of a fine-grained fraction. The most saturated area in the proposed route of the expressway is formed with gravel and gravel-sand sediments of different granulometric composition. On the group of gravel beds lies a variable thick layer of alluvial clay and loam.
On the adjacent area of the Slatina River the accumulated groundwater in a gravel and gravel-sandy alluvium creates a saturated horizon, which is in direct hydraulic connection with surface water flows. There is a substantial impact on the quantity and quality of groundwater (at a time when there is a bank infiltration). The level of ground water fluctuates depending on infiltrated rainfalls as well as from the level of the River Slatina and its tributaries.
On the basis of the lithological proportions the character of groundwater in quaternary sediments is open or moderately tensed, with pressure height to a maximum of 0.5 meters. In many cases,

especially in the places where are poorly drained locations of clays or sandy clays, the character water levels change to tense with a pressure height of 0.6 m to 2.5 m.
In terms of permeability the gravel and gravel-sand sediments of Slatina River and its tributaries are high intergranular permeable, highly to moderately permeable. Fluvial sands can be classified as weakly to very weakly drained (to slightly permeable).

The current character of vegetation on the wider area is a result of significant long-term and extensive anthropogenic interference. In the broader area of interest is a wide range of plant communities that represent the following habitats.
Fragments of the original beech forests were preserved in the location of Rohy, where it dominates important habitat Ls5 Beech and mixed beech forests. On the southern and south-western slopes surrounding the hollow are found fragments of preserved hornbeams, the habitat of the national importance, Ls2 Oak-hornbeam forests, Ls 2.1 Oak-hornbeam Carpathian forests. There are fragments of fringe vegetation of the rivers Hron and downstream of Slatina - Alluvial forests with Alnus glutinosa which are directly linked on the riparian vegetation of Slatina River, Ls1.3 Ash - alder alluvial forests - habitat of European importance. On the route of the expressway is a very important habitat of national importance Lk7 - alluvial meadows, which represents of the dominant part of nature reserve PR Pstruša.
In the flow lines closer to the alluvium the habitat of national importance occurs : Lk6 Water flooded meadows of mountain areas. Near the village of Pstruša, the habitat of European importance follows the floodplain of the River Slatina: Lk5 Hygrophylous high-stem herbs on fluvial plain from lowlands. In this area is significantly formed the habitat of national importance – Lk10 tall sedge vegetation. In the wider area of the floodplain of the Slatina occurs habitat areas Lk11 cane wetland community. Near the River Slatina there is less occurrence of Kr9 community willow thickets on alluvial banks (habitat of national importance). All natural communities are currently subject to a significant anthropogenic impact. In the wider area ruderal vegetation prevails and ruderal habitats are dominant, mainly X5 Eels and extensively cultivated fields, X7 intensively managed fields and on the banks of River Slatina are registered X10 Growths of ruderal muddy banks. There are also fragments of vegetation X8 Growths of invasive neophytes - Canadian goldenrod (Solidago canadensis), the Jerusalem artichoke (Helianthus tuberosus) (floodplain of Slatina), mostly the altissima impatiens (Impatiens glandulifera).

The construction of R2 Zvolen East – Pstruša will interfere with the habitats of European importance:
Br2 Mountain streams and herbal vegetation along its banks (NATURA 3220) – narrow margins on banks of the Slatina River.
Ls 1.3 Ash - alder alluvial forests (91E0*)
Lk 1 Lowlands and submontane mowable meadows (NATURA 6510) – occasionally occurrence
Lk 5 Hygrophylous high-stem herbs on fluvial plain 6430 – occasionally occurrence

and biotopes of national importance :
Lk7 - alluvial meadows
Lk10 - tall sedge vegetation

In the monitored area is located the protected plant - Siberian Iris, (Iris sibirica), which is fixed on the habitat of high-stem herbs on fluvial plain of Slatina River. The tall-herb bogs and the lowland hay meadows on the floodplain of Slatina River are characterized with protected species of ostrich fern (Matteucia struthiopteris).
The nature reservation PR Pstruša and the protected site CHA Hrončianka are important with the existence of the hydrophilic meadow communities with a concentrated presence of protected and critically endangered species of flora in Slovakia - snake's head fritillary (guinea-hen flower Fritillaria meleagris).
On the route of the proposed expressway R2 are found dispersed tree and shrub greenery, accompanying vegetation of communications, accompanying and riparian vegetation of the Slatina River, accompanying vegetation of railroad, accompanying and riparian vegetation of water flows, roadside tree lines, raid greenery, hedgerows and field bounds on the agricultural landscape.

According to the segmentation of the animal regions (Čepelák, J., In: Atlas SSR, 1980) the fauna of the monitored area belongs to the province of Carpathians, area of the Western Carpathians, the internal circuit, southern district.
In addition to the anthropogenic modified areas, the evaluated territory is characterized by the occurrence of original zoocoenosis with a wide ecological range. The high diversity of species and

animal communities is determined by the large variety of geological subsoil, topography and rainfall conditions depending on the altitude and orientation of the slopes with regard to airflow.
There are presented the typical zoocenoses of the Western Carpathian mountain forests, and thermophilic Mediterranean (Sub-Mediterranean) and Pannonian species coming from the south. At the same time the fauna is completed by azonal zoocenoses of preserved sections of streams and also features of hilly and mountainous areas.

The protection of the most valuable parts of nature is secured with the Act no. 543/2002 Coll of Nature and landscape protection, as amended, which defines the territorial and species protection and protection of trees. On the territory of the Slovak Republic the first level of protection applies, which concerns the provisions about general nature and landscape protection. The areas that are protected in one of the categories, the 2nd to 5th level of protection applies. Nearby the area where the proposed expressway R2 passes, the following protected areas have been declared in order to ensure the protection of hydrophilic grassland communities with a concentrated presence of protected and critically endangered species of flora in Slovakia - snake's head fritillary (guinea-hen flower Fritillaria meleagris) :

- protected site CHA Hrončiarka (4th level of protection)
- protected reservation PR Pstruša (4th level of protection)

The route does not cross any large or small protected areas.

The network NATURA 2000 includes protected areas of birds and sites of European importance.
On the basis of the occurrence of habitats with rare plants and animals near the projected expressway R2, the following areas were proposed, adopted by the government of Slovakia and agreed by European Commission:

- **Protected birds areas Poľana (SKCHVÚ022**), declared in the Decree MŽP SR č. 24/2008,
- **Protected area of European importance Rohy (SKÚEV0247),**
- **Protected area of European importance Detviansky stream (SKÚEV0400)**.

In the affected area of expressway R2 Zvolen East – Pstruša there is no interference with, or proximity to the sites of European importance or bird's protected areas, because the sites are well away from the proposed activity.

According to the territorial plan UPN VÚC Banská Bystrica (1998) in the vicinity of the affected area occurs the biocorridor of regional importance RBK 11/8 water flow Slatina River. It is the last of the existing complex from the natural communities of riparian vegetation of alders and willows from 80 to 100 years old linked with alluvial hay meadows, tall sedge vegetation and other wetland communities, and associated endangered species of flora and fauna. There are registered the presence of 5 types of plant communities of national importance, 4 types of communities of European importance (pursuant to Regulation of Ministry of Environment MoE no. 24/2003 Coll) and a number of endangered taxa of flora and fauna. This site is known to have occurrences of river otters. In this biocorridor it is necessary to respect the principles and regulations concerning the protection and utilization of the natural sources, the protection of nature and landscaping, the maintenance of ecological stability, including the green areas of the existing riparian vegetation of River Slatina, by adding riparian vegetation in the localities where they have been damaged with the original allochthonous species.

V. OVERALL ASSESSMENT OF EXPECTED IMPACTS IN THE CASE OF NON IMPLEMENTATION OF THE PROPOSED ACTIVITY

The existing road I/50 in this section leads through the urban areas of villages and does not meet demand in terms of traffic capacity. The existing road in the project section follows the surrounding terrain and has an inadequate width arrangement (width from 7,5 – 8,0 m) and inappropriate horizontal alignment with the radius of curves from 100m to 250m. The road has many black spots without the possibility for overtaking and which, due to high concentrations of heavy traffic cause a decrease of driving speed and the formation of traffic congestion. The traffic suffers from increased energy consumption and time losses and an increased accident rate. Pedestrians are directly threatened by passing vehicles, mainly in the villages Zvolenská Slatina, Vígľaš, Kriváň and Mýtna. In terms of the horizontal alignment there is a dangerous section of road in the village Vígľaš with a radius of 100 m.

On the basis of traffic-engineering analysis and the traffic forecast it is evident that the capacity on the existing section of road I/50 Zvolenská Slatina – Pstruša is already exceeded. Due to this high traffic intensity, restricted manoeuvrability for road users, the traffic continuity is limited. In this section there are frequent traffic accidents, often with the tragic consequences.

The existing section of road I/50 belongs to the medium dangerous section of road with traffic accidents density from 1.22 to 1.83 DN / km / year. The designed section has 4 black spots, from which 2 are critical black spots according to the number of traffic accidents, 1 recurring black spot according to the consequence of accidents, and 1 critical black spot according to the consequence of accidents.

In the case of non-implementation of the proposed expressway the routing of traffic would remain on the existing road which will increase air pollution and noise from the traffic, because the road leads through the urban area of villages. Due to this reason the negative effects from transport on the directly affected population will increase, mainly from the traffic emissions and noise. In addition the increasing traffic accidents on the affected road network have to be considered. The traffic intensity will gradually require a further rehabilitation and reconstruction of the road surface and reconstruction of all traffic signs on the entire length of the road. It will also be necessary to eliminate the bottlenecks (black spots) and modify the entries and exits of the villages and to adjust the crossing sections through urban area in terms of decrease of traffic speed and improvement of safety for pedestrians and cyclists. It means the narrowing of the roads pavement and the extension of the pedestrian footpath, the modifications of entries and exits to the villages, the roundabouts in the municipalities and so on. Another method to improve the safety for pedestrians in the villages can be to set up traffic lights on the junctions and signaling signs on the crossings, including the increasing of the intensity of lighting at crossings. Expected modifications of the zero variant (existing road) :

- construction modifications in the village of Zvolenská Slatina
- light signaling in the village of Zvolenská Slatina
- anti-noise barriers in the village of Zvolenská Slatina
- modification at the junction of I/50 and II/591
- adjustment of the curve behind the village of Vígľaš including a new bridge
- construction work on the road I/50 in the village Vígľaš
- light signaling in the village Vígľaš
- anti-noise barriers in the village Vígľaš
- road marking
- widening of the road I/50 to category C 11,5/80 outside of the built-up areas in the whole section

In the case of non-implementation of the investment, in the zero variant, the demolitions will not be necessary. In the case of the widening of the road to the category C 11,5/80 the additional occupation of land will be needed.

Implementation of these changes in the zero variant can improve capacity of the road, but a higher average travelling speed than 70 km / h will not be reached. Due to limited access for motor vehicles to the planned expressway, the existing road I/50, even after its widening to expressway standards, cannot be used. It would require on a lot of sections to be built as new parallel roads.

VI. COMPLIANCE OF THE ACTIVITY WITH THE TERRITORIAL PLAN

The proposed expressway R2 Zvolen – Pstruša is consistent with the territorial plan of:

The self-governing region of Banská Bystrica (ÚPN VÚC Banskobystrického kraja)
Residential unit of Zvolenská Slatina (ÚPN SÚ Zvolenská Slatina)
Residential unit of Vígľaš (ÚPN SÚ Vígľaš)

VII. EXPECTED IMPACT ON THE TERRITORY

The designed expressway is routed through an area where Ist level of protection in accordance with the Act. 543/2002 Coll. about Nature and landscape protection applies. There are no areas that require special protection under the law on the protection of nature and landscape. Near the construction, at about 6.0 km on the right side of the proposed expressway is the Protected Site Hrončiačka. The construction does not interfere with this area.

The most serious effects of the activity on the environment and measures for their reduction or elimination

Impacts on air pollution

Air pollution due to automobile traffic has a negative impact on the overall state of the environment. The existing road I/50 is the main source of air pollution in this section, and passes through the urban areas of villages. In the future, the main line sources of air pollution from the traffic will be expressway R2 Zvolen East – Pstruša. The production of emissions from the transport will be transferred to locations where it does not occur at the moment and at the same time the pollution from the traffic will be significantly relieved in the urban settlements. According to the results of the air pollution study, that modelled the increase of air pollution from traffic on the expressway R2, it can be concluded that the maximum permissible values of pollutants (NO2 and particles) in the assessed time horizon under the average normal weather conditions will not be exceeded.

In addition to pollutants from the exhaust of vehicles there will be a contribution to air pollution from increased dustiness which is caused by turbulence on the surface of the road and its vicinity. These negative effects will be felt especially during construction. It is assumed that the quality of the surface pavement, the drainage and the maintenance throughout the year will ensure the minimizing of the dustiness during the operation of the expressway. The earthworks will be carried out at the optimum soil moisture content which provides conditions for the minimizing of the dustiness. The access roads will be cleaned regularly during the construction in order to reduce the potential secondary dustiness in the adjacent areas of the construction and on the access roads.

Noise

The construction of the expressway R2 will cause the change in noise conditions along the road I/50.
There will be a reduction in traffic volumes compared to the current situation, and thus a decrease in the noise from the traffic on the adjacent area. At the same time the noise load will be transferred to the newly built expressway. Its construction will reduce the expected traffic intensity on the road I/50 by about 73-85%. The road I/50 goes through urban areas of the villages Zvolenská Slatina and Vígľaš. The reduction of traffic intensity results to a reduction of noise levels.
It is expected on the other hand that there will be an increase of noise emissions around the newly built expressway. According to results of the noise study based on the traffic forecast volume, the allowed noise levels on the R2 during the day and night time can be exceed in some areas of Zvolenská Slatina and Pstrusa. To eliminate these identified noise levels, anti-noise barriers are proposed in sections:

Zvolenská Slatina	km 0,850 – 2,250	length 1400 m / height 2 m on the right
Zvolenská Slatina	km 2,450 – 3,300	length 850/ height 2 m on the right
Pstruša	km 6,600 – 7,850	length 1250/ height 2 m on the right

Implementation of these noise barriers will ensure that the permitted noise levels in urban area of the municipalities are not exceeded.

Impacts on mineral and soil environment

The dominant effects of expressway construction on the mineral environment can be classified:
- disruption of slope stability caused by earthworks and activating landslides
- erosion and weathering
- storage of building material from the cuttings

The vertical alignment of the expressway was designed especially with regard to its inclusion in the countryside and to minimize the occupation of agricultural land. The route leads on a flat, sometimes hilly, territory, which is almost entirely used for agricultural. The priority was to ensure an adequate clearance over all crossing obstacles. The balance of earthworks was a secondary consideration, with main earthworks not significantly changed compared to documentation for territorial decision (DÚR).
In an overall assessment of earthworks there is a majority of embankments, with a total volume of 998 400 m3, compared to cuttings with a volume of 483 600 m3. The suitable material for embankments from excavations amounts to 61 400 m3. The rest is unsuitable or less suitable for embankments. The lack of suitable material will be solved by importing from borrow pits in the region. It is intended that to maximise the possible use of the excavated soil for the construction of project, less suitable soil will be modified (redrying, liming, sandwich type of embankment, etc.). It is considered that part of the less

suitable soil will be used in the section R2 Pstruša - Kriváň, where there is also a lack of material for the construction of embankments. Completely unsuitable soil for construction of the road body (gray clay, mud, etc.) will be taken to a landfill, or respectively will be used on the backfill of the excavated material in the quarry.
The construction of the expressway R2 Zvolen East - Pstruša will result in the permanent and also temporary occupation of agricultural land. The earthworks will proceed in accordance with the Act no. 220/2004 Coll., on the Protection and use of agricultural land and Regulation No. 508/2004 of the Ministry of Agriculture.
It means that for the permanent occupied land used for construction of the road body, the humus topsoil is removed and stored in temporary storage sites. For the temporary occupied land which is used for handling and working strips during the construction, the topsoil, respectively humus topsoil will be removed and stored in the storage sites. In the case of permanent occupation the removed topsoil will be used for other works - humus will cover of road slopes in overcoming terrain disparities. In both cases the careful handling of the humus topsoil is necessary in order to prevent erosion and degradation. This means that the thickness of humus topsoil should be carefully observed during the preparatory earthworks with a maximum move to a distance of 50 m.
The protection of agricultural land (PPF) during construction is necessary to minimize the occupation of land, encroachment of plant depots and sites for the temporary storage of materials. Protection against contamination of soil caused by construction equipment is only possible by ensuring proper maintenance of the equipment. The plant depots need to be situated on paved surfaces. The basic measure to protect agricultural lands is to remove topsoil or agricultural soil according to the Methodical instruction of the Ministry of Agriculture no. 2341/2006-910.

Impacts on surface and groundwater

The construction and operation of the expressway could affect the quality of surface and groundwater and their related water management. From a qualitative point of view the most likely possibility of contamination by oil is caused by accidents or defects in construction equipment. There is also a risk of erosion of the soil into the beds of affected streams, with increasing turbidity, which may cause adverse changes of water flow. The negative possible impacts on surface water, related to their accessibility, resulting with an increased possibility of direct contamination during the construction or operational phases. Generally the most vulnerable are the flows of small surface streams, especially during the construction phase.
The degree of vulnerability of groundwater depends on permeability and thickness of sub-base, hydrogeological characteristics, the position of water collectors, and groundwater levels. A higher measure of permeability of water collector generally creates better conditions for relatively rapid migration of contaminants through groundwater flows. In emergency situations and inadequate treatment of the surface, there is a risk of degradation of water quality due to the cumulative effects. Threats and vulnerability of surface water is tied mostly to the sections, where the new road respectively approaches and crosses the surface flows.
A potential risk is also presented by the plant depot and site installations (leak of wastewater and the presence of contaminants in ground water).
During the construction and operation of the expressway R2 technical and organizational measures have to be followed to ensure no contamination of the groundwater and occurrence of negative impacts on other components of the environment. In this area the degree of vulnerability of groundwater depends on thickness and permeability of the sub base, the thickness of the zone of aeration and hydraulic properties of layer containing the water.
The most critical points for influencing of quality of groundwater are the crossing of route with surface flows. Therefore, it is necessary during the construction to prevent of contamination of groundwater.
The work team on the construction must be aware of the existence of the Protected Site (CHA) Hrončiačka and its protection zone and the risks of activities involving fuels, oils, and lubricants. The construction equipment must be technically in very good condition, fitted with capture tank to catch potential leaking fuel and oil, and also it is important to have as absorption material – such as vapex for immediate action during the accident. The maintenance and repairs of construction vehicles and equipment must be done on special designated areas outside of the protection zone where there is sufficient thickness of the sub base to prevent the transfer of pollutants to groundwater.
The surface alignment of the expressway in embankments, the drainage of its surface, the separators with treatment devices (ORL), technical and organizational measures during the construction and in plant depots, will reduce the risk of contamination to the lowest possible level.

Impacts on nature and landscape

The route of the expressway leads into an area with 1st level of nature or landscape protection. There are no protected areas under the law on the protection of nature and landscape.
Impacts on habitats most notably take effect during the construction of expressway in open country, namely:
- direct liquidation of habitats
- interference and influencing functions of habitats (modification of surface streams)
- creating, respectively strengthening, barrier effects in migration corridors
- impacts of noise, emissions and grit on habitats nearby the expressway

Construction of the project requires necessary cutting of trees/ shrub plants in the route of the expressway. There is vegetation on crossing water flows, dispersed landscape greenery in farmland, greenery around the field and local roads or on the route of relocated utilities. Bank vegetation will be removed only to the extent necessary in the width of the expressway and its protective zone and in the space of adjustment of water streams. Based on the inventory of necessary cutting of trees and shrub plants, the calculated overall social value amounts to 315 842,27 €.

The construction of the expressway R2 Zvolen East – Pstruša interferes with the following habitats of European importance:
Br2 Mountain streams and herbal vegetation along its banks (NATURA 3220) – narrow margins on banks of the Slatina River
Ls 1.3 Ash - alder alluvial forests (91E0*)
Lk1 Lowlands and submontane mowable meadows (NATURA 6510) – occasional occurrence
Lk 5 Hygrophylous high-stem herbs on fluvial plain 6430 – occasional occurrence

and biotopes of national importance :
Lk7 - alluvial meadows
Lk10 - tall sedge vegetation
The interference to habitats of European or national importance must be approved by the relevant district office of environment.

As part of the re-cultivation, biological revitalization of the areas is proposed which includes, in addition to vegetation treatment, revitalization of bank vegetation in areas of water flows and revitalization of temporary occupied lands on the localities with original occurrence of the protected habitat Lk7 alluvial meadows (habitat of national importance).

In the areas of treatment and relocation of water flows, mainly original bank vegetation will be cut. Planting on the slopes on the treated water-flows will be achieved by the embedding of willow cuttings or stakes, which should be removed from the original parent tree. It is recommended to strengthen the bank vegetation with species: Alnus glutinosa (alder), Fraxinus excelsior (Ash), Padus avium (European bird cherry), also Populus tremula (aspen). From the shrub forms of willows: S. fragilis (s. fragile), S. viminalis (osier), sometimes also S. purpurea (purple s.). On the bank margins different types of trees will be planted: alder, white willow, European bird cherry, European ash and aspen poplar. The aim of the proposed measures is to enhance the vitality of bank vegetation, as well as protection against leakage of water and the strengthening of migration in the area.
Riparian and associated vegetation of the water flows in predominantly agricultural country generally become biocorridors and a refuge for animals. The designed bridges over water flows will enable the migration of animals along these streams.
To protect of the habitat in the affected area, fencing is proposed in locations where the expressway is directly adjacent to continuous vegetation, to prevent collisions of animals with vehicles. In order to maintain animal migration numerous bio corridors are designed, especially along waterways, with sufficiently high and wide bridges and large diameter culverts. At present the above mentioned measures are missing on the existing road I/50 and it is supposed that after reducing of the traffic intensity on the existing road the collision of vehicles with animals will be eliminated.

During the reconstruction and relocation of overhead electricity lines, a technical solution must be used which prevents the killing of birds, under § 4 of 4 of the Act no. 543/2002 Coll. of nature and landscape protection, as amended.

VIII. COMPENSATION MEASURES

Compensation measures are introduced to offset any damage suffered, mostly to property and economical and environmental damage.

in social impact assessment :

During construction of the expressway, the close cooperation between investors, contractors and the affected municipalities is anticipated in order to minimize the effects of expressway construction on villages and their populations. Agreement will be needed to ensure approval, particularly in determining of the traffic route, traffic regime, the method of local road maintenance (cleaning, spraying to reduce dust) and subsequent repair of damaged sections from the passing of heavy machinery. In determining the traffic route, agreement will be needed to ensure travelling speed and road safety (speed limit, entrance etc.) and to ensure the mitigation of negative impacts on the quality of life on the affected population (elimination of the heavy traffic close to homes at night, on holidays, etc.)

A sensitive area is the property losses of the affected population. Mitigation of this impact can only be performed by adequate compensation for losses to the satisfaction of the population in accordance with valid legislation (Regulation of Ministry of Justice no. 492/2004 Coll. about determining the value of property), individually in close cooperation with investor, affected people, and city or municipal council.

for occupation of agricultural land

Compensatory measures concern the occupied land resulting from the relevant legislation, namely the Act No.220/2004 Coll. on the Protection and use of agricultural land and from the amending Act No.245/2003 Coll., concerning integrated prevention and control of environmental pollution, respectively. Act No. 219/2008 Coll., amending and supplementing Act No. 220/2004 Coll..

for cutting of wood plants growing outside of forest

Compensatory measures for cutting of trees shall be resolved in accordance with the Act No. 543/2002 Coll. about nature and landscape protection and with executing Edict of the MoE SR No. 24/2003 Coll., which determines the social value of plants (resp. pursuant to Edict No. 579/2008 Coll., which amends the Edict of MoE SR 24/2003 Coll.) The nature protection authority (municipality) will specify the conditions for cutting of trees and compensation in the form of replacement planting or financial social value of the liquidated trees.

for damage, respectively destroying of habitats

Based on discussions with experts from the Administration of Protected Landscape Area CHKO Poľana, which took place during the preparation of project documentation, within a survey of habitats and performed inventory of habitats and during the site visit, dated on 26/04/2012, three (3) specimens of critically endangered species of snake's head fritillary (guinea-hen flower (Fritillaria meleagris), were found within the habitat Lk7-alluvial meadows on the route of the R2 at about 7.5 km (between Slatina River and rail). These individuals were marked and on 31/05/2012 they were transferred by administrators of CHKO Polana to the protected site CHA Hrončiačka, where they are the subject of protection. In close vicinity to the discovery of snake's head fritillary the endangered species (under the red list of plants in Slovakia, Category EN), yellow or common meadow rue (Thalictrum flavum), which is not protected, was also observed in late May. On the basis of previous research the monitoring of protected habitats was proposed, which will be performed in two locations: namely approx. at 7,715 km (5x5m monitoring area) and approx. at 7,690 to 7,919 km (2x100m monitoring area on the left and right banks of the River Slatina). The subject of monitoring of the protected habitat is Ls1.3 Ash - alder alluvial forests - habitat of European importance, which represents the rest of alluvial forest of high value of protection.

IX. COMPARISON OF VARIANTS

The construction of the expressway R2 in the whole section from Zvolen to Lovinobaňa was assessed in 2004 under the act concerning environmental impact assessment. In the Final Statement of the Ministry of Environment (MoE), dated 17/02/2006 adjustments were recommended which were reflected in the next stages of the project documentation. In the Final Statement it was recommended to assess the options for variants on the sub section from km 0.0 to 6.0 in the separate technical study, including a new environmental assessment. In the section of Slatinka - Zvolenská Slatina the route leads in a blue variant further away from the village up to the boundary of Zvolenská Slatina and Očova. The further recommended alignment goes in a blue variant from app. km 10,0, which coincides with the red variant up to Vígľaš – Pstruša, i.e km 14,5 to the interchange MÚK Pstruša. Based on these recommendations, during the preparation of the next stages of project documentation, the expressway R2 begins at chainage of km 0,000 before the interchange of Zvolenská Slatina, where it links to the planed previous section Zvolen East – Zvolen West.
The beginning of the expressway is designed in order to allow the connection in the direction to Zvolen with variants C2, C3, C4 and C5, proposed in the technical study of 2006. The alignment of the R2 expressway between the villages Zvolenská Slatina and Vígľaš, part of Pstruša, was approved during the meetings with the municipalities of Zvolenska Slatina and Vígľaš, through the territories of which the expressway R2 passes. The main basis for the routing of the expressway R2 was the proposal of the territorial plan of village Zvolenska Slatina and the letter from the municipality office relating to the confirmation of the alignment of the expressway R2 in compliance with this proposal. The other important reference for the routing of the expressway R2 is the required technical standards for the expressway, especially in terms of vertical alignment with the impact of the Slatina River and other crossing streams, roads and railways.
Differences between variants recommended by the Final Statement of MoE and the designed solution are caused by the changes of the alignment of the expressway R2 near the village of Zvolenská Slatina, in the location of interchange MÚK Zvolenská Slatina and in the location of the feeder from the road I/50 at the beginning of the section.

1. The change of the alignment at the beginning of the section by shifting app. 700m to the north. This shift allows the connection on variants C2, C3, C4 and C5 from the technical study 2006.
2. In km 0.000 to 6.000 the alignment of expressway was shifted to the north app. 20 to 700m as a result of recommendations from the Final Statement of MoE. Near the village of Zvolenska Slatina it is app. 200 m, near the village Vígľaš about 50 m.
3. The changes in the longitudinal alignment as a result of detailed geodetic survey of crossing routes, railways and water flows.
4. The category of expressway is due to the changes in standard STN 73 6101 proposed on R 24.5 / 120
5. The changes to the interchange "Zvolenská Slatina" were designed due to the reason:

- The elimination of the noise load on the road II/591, passing through the built-up area of the village Zvolenská Slatina. In the original solution the road II/591 acted as a feeder to the expressway R2 linking with the road I/50.
- The conflict with the road I/50 before the village Zvolenská Slatina was solved with a crossing of the expressway R2 by the road I/50 without any connection.

The shift of the route in the section km 0.000 to 6.000 was about 20 to 700 meters in the northerly direction away from the urban areas of villages Zvolenská Slatina and Vígľaš, resulting from the demands of citizens of Zvolenská Slatina, which were subsequently reflected in the recommendations of the Final Statement of the MoE. It can be noted that the modifications have not resulted in significant impacts in terms of land occupation and cutting trees, but have a significantly positive impact in terms of noise and emission load on the population living in the villages Zvolenská Slatina and Vígľaš. It has been demonstrated that the modifications have no negative impact in relation to the surface and ground water.
The re-aligned route of the expressway leads through the registered archaeological site no. 1 in the location of Rybníky (km 2.000 to 3.000), which will require the execution of archaeological research. The re-aligned expressway also runs through the melioration area.

In the EIA Report the interference with water flows in each of the proposed options was considered, but its extent was not quantified. The designed changes will require interventions with water flows in the affected area in the following range: adjustment of Slatinský creek at km 1,183 R2 in total length app.60m, adjustment of Rybný creek at km 2,340 in length app.63,7m, adjustment of Vigľaš creek at

km 4,368 in total length 136m, treatment of drainage sewer at km 5,640 in total length 70m, adjustment of Hradná creek at km 7,023 in length app.63,7m which consists only of the reconstruction of the damaged bed caused by building equipment during the construction of the bridge, adjustment of Slatina River at km 7,465 R2 in total length app.60m consists of the treatment and strengthening of the bed in the existing shape and route and adjustment of unnamed creek at km 7,780 R2. During the construction phase some qualitative changes are expected (turbidity of water, removal of bank vegetation, etc.). These changes will only have a temporary effect. The aim of the proposed measures is to enhance the vitality of bank vegetation, as well as protection against leakage of water and strengthening of migration in the area.

It is unlikely that implementation of the project will have an impact on qualitative or quantitative properties of water sources.

The recommended variant and proposed modifications are located in areas where there are no large or small protected areas and in accordance with the Act on the Protection of nature and landscape there is I.st level of protection applied. The proposed expressway leads near the protected site CHA Hrončianka, which is important due to the existence of the hydrophilic meadow communities with a concentrated presence of protected and critically endangered species of flora in Slovakia - snake's head fritillary (guinea-hen flower Fritillaria meleagris).

The nearest sites of NATURA 2000 are:

- **Protected birds area Poľana (SKCHVÚ022),** declared in the Decree MŽP SR č. 24/2008
- **Protected area of European importance Rohy (SKÚEV0247)**

In the affected area of the expressway R2 Zvolen East – Pstruša there is no conflict, respectively approaching to the territories of European importance or protected bird areas, because they are sufficient distance away from the proposed activity.

Compared with the EIA during the development of project documentation additional surveys were performed - inventory of tree and habitats of European and national importance. In the inventory of trees the necessary cutting of trees or shrub plants in the route of the expressway was quantified. During the site visit and inventory of habitats, measures to save protected species of plants were undertaken (a rescue transfer of three (3) specimens of Fritillaria meleagris on the site Hrončiačka CHA was performed). Based on discussions with experts from State Conservatory of Nature of Administration CHKO Poľana, specific revitalisation measures were proposed in areas with the treatment of water flows and accompanying vegetation damage.

Compared with the EIA Report during the development of DUR and DSP, documentation was updated for a range of noise measures according to the Noise study, where the impacts of traffic on existing urban areas were evaluated, after putting the project into operation. At the time of the processing of the DSP, the Regulation of the Ministry of Health (MoH) of the Slovak Republic, on 15th January no. 237/2009, amending Regulation of MoH No. 549/2007, laying down the details on permitted values of noise, infrasound and vibration and about requirements on objective assessment of noise, infrasound and vibration in the environment was applied. Under this regulation the noise study and its results were used in the design of noise barriers.

In the EIA Report the anti-noise measures were proposed to protect the urban area of Zvolenská Slatina. The range of noise barriers was increased from 400 m (EIA Report) to 1 750 m (DUR) up to 3 500 m (DSP). In section R2 Zvolen East - Pstruša, 3 noise barriers on the expressway in the total length of 3 500 m were proposed.
Modification of noise measures in the project development resulted from changes in the relevant legislative regulations.

In the DSP the following anti noise measures were proposed:

241-00 anti noise barier on R2 v km 0,850 – 2,250 right
242-00 anti noise barier on R2 v km 6,600 – 7,850 right
241-01 anti noise barier on R2 v km 2,450 – 3,300 right

The anti-noise barriers are integrated into the expressway R2, they do not require a separate occupation of land. It results in a significant positive impact on the population in the affected areas.

With regard to length of noise measures in this section it could be slightly negative with regard to the visual impact.

Modifications of the proposed activity can be assessed positively, because they will improve the traffic situation in the area and will significantly increase traffic safety and impact on the population. The most positive impacts will be felt by residents of municipalities through which all transit traffic currently passes. Implementation of vegetation adjustment incorporates this technical structure into the countryside, which will positively influence the image of landscape of this area.

Air pollution and noise due to automobile traffic has an indirect negative impact on population during the operation of the project. Construction of noise barriers will ensure that noise limits are not exceeded.

The project will be implemented on the basis of the building permit. All conditions for implementation have been taken into account to meet all applicable legislative provisions aimed at eliminating negative effects on the population.

Bratislava, October 2012 Elaborated by: Ing. J. Longa