

Optimisation of Planá u Mariánských Lázní – Cheb Line

NON-TECHNICAL SUMMARY

The “Optimisation of the Planá u Mariánských Lázní – Cheb Line” project is part of the modernisation of the 3rd Transit Railway Corridor of Cheb – Pilsen – Prague – Česká Třebová – Ostrava – Mosty u Jablunkova, to the implementation of which the Czech Republic is committed within international treaties. The goal of this optimisation, i.e. this construction, is to achieve higher speed parameters of the railway line to reduce the journey times of trains and also to modernize the existing railway structures and equipment in such a way that they comply with the currently required technical parameters and also to improve the rail traffic safety. The key benefit is to achieve clearance of rail vehicles of the D4 UIC line standard, UIC – GC loading gauge, modernisation of the current interlocking equipment, and securing of the required throughput. In the Planá u Mariánských Lázní – Cheb railway line section an increase in the maximum line speed to up to 150 km/h for vehicles with tilting technology and 130 km/h for conventional trains will take place.

The start of the construction is at km 413.497 and the end of the construction is at km 453.335, i.e. approximately 40 km. Within this construction, a total of six railway stations will be reconstructed (Chodová Planá, Mariánské Lázně, Valy u Mariánských Lázní, Lázně Kynžvart, Dolní Žandov, and Lipová u Chebu) and three stops (Stebnice, Všeboř, Salajna). The existing railway line is electrified with a 25 kV, 50 Hz AC traction and, with the exception of the double-track section Lipová u Chebu – Cheb, a single-track line in its entire length. There is bidirectional traffic on the line; there is right-hand traffic on the double-track section.

The subject of documentation under Act No. 100/2001 Coll., on Environmental Impact Assessment, is the reconstruction of the railway line for trains with electric traction.

In compliance with the classification of the plan under Act No. 100/2001 Coll., for purposes of the assessment the plan is characterised by basic information in the following scope:

- Technological changes – interlocking equipment (autoblock)
- Communication equipment (optical cables, information equipment at selected stations, as well as the public-address system, if applicable)
- Electric traction – new lines, contact supply line, protection against dispersion currents
- Reconstruction of the rail track substructure and superstructure
- The construction includes the reconstruction of bridge structures and culverts
- Ground constructions, modification of the public perimeter of the station, depending on the overall modernisation at selected stations, station underpasses for passengers, luggage tunnels
- The length of the treated railway line is 39.838 km

The solution will enable to increase the line speed to up to 150 km/h for cars with tilting technology and up to 130 km/h for conventional cars (from the current line speed of 95-100 km/h) and a reduction in the travel time in the Pilsen – Cheb section for EC trains (cars with tilting technology).

The construction will include the following activities, technologies, equipment and structures:

- Reconstruction of the line section with the goal of achieving line speed of up to 150 km/h
- Achieving spatial clearance for a UIC GC loading gauge and D4 UIC load category
- Technological changes – safety equipment (autoblock), line and station safety equipment
- Communication equipment (optical cables, information equipment at selected stations, as well as the public-address system, if applicable, automatic telephone switch board, electronic fire alarm, electronic safety systems)
- Dispatcher control equipment (DCE)
- Electric traction – new lines, contact supply line, protection against dispersion currents
- High voltage equipment – disconnecting station, mobile converter station, distribution stations, external grounding, switchboard, transformer station, public lighting, modification of distributions and connections, etc.
- Grounding of conductive structures

- Reconstruction of the rail track substructure and superstructure
- Reconstruction of bridge structures and culverts
- Ground constructions, modification of the public perimeter of the station, depending on the overall optimisation at selected stations, station underpasses for passengers, roofs, luggage tunnels
- Communications and hard surfaces – access ways to platforms, adjustment of a road and crossing, relocation of a cart road, temporary roads, landscaping, etc.
- Station platforms, roofs
- Railway crossings, pedestrian crossing
- Ground structures – modifications of the station building, technological building, converter station, operation building
- Fencing
- Map and direction system
- Demolition
- Anti-noise measures – anti-noise barriers, individual anti-noise measures at structures
- Piping – rainwater drainage, wastewater drainage, water main connections, sewage and gas lines
- Bridges and engineering structures – railway bridges, signal bridges, footbridges, breast wall, flyovers, retaining wall.

The construction site equipment areas are located according to the proposals of individual contractors of the major building structures (rails, bridges and culverts). The draft was made with consideration for the configuration of the terrain, presumed needs of the supplier, ownership relations to surrounding lands and their use. The construction site equipment areas are located primarily in such a way that they are accessible from existing roads or the railway body and are at the same time as close as possible to the structure under construction.

The central construction site equipment areas are proposed at individual railway stations. Here existing reinforced surfaces within the perimeter of the station are used to a decisive extent. Other construction site equipment areas are proposed at individual bridges and culverts.

The recycling station of reclaimed material is proposed at the Lázně Kynžvart railway station in areas by the station (in the possession of a private owner). The location of the recycling station is designed with regard to the construction stages (the recycling station will be used permanently during optimizing the line to Cheb).

Demolition is proposed for those structures which are in the way of the new track layout, structures, which are already obsolete due to their technical condition, structures which do not have any technical reason – functional purpose, structures which are in a bad condition, and structures which are not suitable to new technology.

Input data:

Soil:

Taking of land for the construction purposes will be conducted mostly from areas owned by Czech Railways and other land in the vicinity of the existing rail line and also from some forest land located in the path of the rail line. Permanent takings of land which is not in the ownership of Czech Railways are mostly the result of the necessity of modification of the track substructure, more specifically drainage work. The entire permanent taking from the Agricultural Land Fund called for by the construction equals **1.2232 ha**; the construction does not require any temporary long-term taking.

The farm land in the area of interest is comprised mainly of brown soils, brown acid soils and, in some places, alluvial soils. From the cultivation standpoint, approximately 2/3 of the acquisition is comprised of arable soil, approximately 1/3 of permanent grass land and a negligible part of a garden. Individual takings are of a very small size and comprise only narrow strips along the existing line.

On all the land acquired from the Agricultural Land Fund, removal of the cultivated horizon to the extent determined by the previous pedological survey will be conducted. Arable soil removed from the Agricultural Land Fund areas affected by the permanent acquisition will be spread on the remaining parts of the lots outside the permanent acquisition areas. During the removal and handling of arable soil all conditions required by the relevant state administration bodies must be adhered to. The

removed soil can also be used for some parts of the reclaimed areas of the construction, namely the construction yards.

In various cadastral areas along the proposed optimised railway line between Planá u M. L. and Cheb, there is a total of 0.197 ha of permanent forest land acquisition and also 0.0928 ha of temporary forest land acquisitions (due to construction site equipment and access roads). The taking of forest land (PUPFL) slightly exceeded 0.2 ha (forest growths are mostly comprised of spruce, clearings and pine and only limited amount of mixed growth or oak).

Protective zones

In relation to the protection of watercourses, the concurrence and crossing the line with a number of watercourses is important. There are ground water protection zones in the Planá u M. L. - Cheb line section. The railway line is adjacent to the Slavkovský Forest Protected Landscape Area and, as the case may be, it is located also inside a protected area of natural water accumulation (CHOPAV).

The construction intervenes in the following protection zones:

Sanitary protection zone	Stationing km
II. b Mariánské Lázně	414,255-442,449
Luční Kyselka II.	428,7-432,559
Lázně Kynžvart II.	on the land boundary to the right at km 429.478-430.430
Žandovské Kyselky II.	436,990-441,8
Františkovy Lázně II.	442,449-453,335
CHOPAV Chebská Basin and Slavkovský Forest	from km 453.335 to km 432.552, on the land boundary to the right at km 424.0-430.430

Also, the construction crosses or intervenes in a number of protective zones of technical infrastructure (service lines). The line crossing with other operational programmes and solving these conflicts will be specified in detail at the next stage of project documentation. The protection, concurrence and crossing of the construction with the affected service lines will be designed in accordance with the applicable Czech National Standards (ČSN).

Water:

During construction work it will be necessary to provide drinking water for work crews; the construction yards will serve this purpose and approximately six litres of water per person and day will be delivered. After the end of construction work the operation will require no further delivery of drinking water. Individual stations are already equipped with their own station drinking water connections, new stations or stops will be handled as needed and water for the use during operation will have to be brought into the newly built and reconstructed buildings on the line.

Water supply for construction sites and construction yards will be provided from existing public water supply network mains and hydrants.

To sites without existing water supply networks packaged water will be delivered as needed.

Process water

The need for process water during the construction is related to the following activities in particular:

- Manufacture of concrete and other mixtures
- Treatment of concrete when it is curing and hardening
- Sprinkling of pavement and modification of the superstructure
- On high-dust days, sprinkling of paths by municipalities and the construction site as well
- Sprinkling of piles during transport of excavation materials
- Sprinkling of access routes and material storage yards
- Cleaning of equipment etc.

Electric power:

With regard to the fact that the line in the assessed section Planá u Mariánských Lázní – Cheb is electrified, during operation it will have relatively significant demands on electric power consumption.

Electric power will be needed for the following purposes in particular:

- Supply of the contact line
- Supply of the interlocking system
- Operation of the communication equipment
- Operation of technological equipment at railway stations and stops
- Electrical heating of switches
- Operation of station buildings at stops and stations (heating, lighting, distribution of electric power for other purposes, etc.)
- etc.

During the construction, the electric power demand will be secured, in particular, by connecting to the existing distribution network of the ZČE (Western Bohemian Power Engineering Company) within the construction site equipment areas where it will be brought by overhead cable lines from the nearest connecting points.

Electric power for the contact line and supply of other devices from the contact line will be provided from the supply stations within the range of the line as it is now, i.e. Planá u M. L. and the reconstructed transformer station Jindřichov. According to the local conditions, the existing public distributions can be used for construction sites located in sections between stations. All station and interlocking devices have their own power supply at the railway station from reconstructed transformers.

In places where the contractor is not able to provide electric power connection or the construction equipment will be inefficient, mobile generator sets will have to be used.

Building materials

Input raw materials:

During the implementation of the construction, demands will arise for input raw materials involving primarily the one-off takeoff of the following types of materials:

- Earth suitable for embankments
- Rocks and sand-gravel
- Cement and various additives for concretes
- Material for covering pavements
- Grave and gravel recycled material for the rail bed
- Steel (reinforcement, safety fences, posts)
- Steel structures
- Prefabricates (drainage)
- Panels for access roads
- Material for anti-noise barriers

The overall consumption will be specified at the next stage of project documentation. The earth balance will be specified at the next stage of documentation and adjusted to the current state according to other resources.

Fuels for automobiles and the operation of emergency power generators will be procured by construction suppliers from their regular distribution network for wholesale prices. During transport operation fuels will be procured from the transporters' resources.

During the "Optimisation of the Planá u M. L. – Cheb" construction, there will be an excess of excavated material. The smaller part of the excavated material will be used for embankments and fills. The excess material will be transported to the dumps Černošín, Tisová u Sokolova and Třebeň, depending on the transport distance from the site.

Demands on transport and other infrastructure

The Planá u M. L. – Cheb railway line currently crosses thirteen level roads and cart roads. These include class I, II and III roads and roads of lower categories. In one case it is the current pedestrian crossing. All level crossings will be retained also after the construction implementation. The exception is the cart road crossing at km 415.158, which will be cancelled. The level crossings will be equipped with a new crossing adjustment according to the road category and requirements for the modernized

railway line. The elevation and direction of the connected parts of roads will be adjusted in the minimum necessary extent.

During the construction along the line, part of materials will be transported also by road freight transport. Most of materials will be transported by rail. Demands on the road network in the surroundings of the construction can be specified depending on the selected construction site equipment and contractor.

Transfer of materials and substances in the construction section of the double-track section Lipová u Chebu – Cheb will be organized preferable by rail.

In such cases when substances and materials cannot be transported by rail, i.e. in the single-track sections (larger part of construction), alternative types of transport will be used with truck transport being the most significant.

The main transport route for the construction will be the existing class I road 21 in the Planá u Mar. Lázní – Cheb section. Apart from this road, some class II and III roads and mainly local roads will be used in limited extent. In the Chodová Planá area, this will be class II road 201 and, in limited length, also class II road 230 outside the city of Mariánské Lázně. Out of class III roads, these will include No. 20170 Planá u M. L. – Kyjov, roads No. 2114, 2113, 2111 in the area of the Valy u M. L. – Lázně Kynžvart stations, No. 02111 in the area of Dolní Žandov - Salajna, No. 21413, 21410 in the area of Lipová u Chebu, and mainly No. 2148, 21413, 21228 in the area of Lipová – Cheb.

During the construction, there will be a very light increase in the load of the roads in the surrounding of the construction. According to the estimated amounts of transported materials and other data on the construction, the traffic intensity increase caused by the construction can be estimated to approx. 2 to 4 trucks per hour, which is insignificant with regards to the current intensities of other traffic on these roads.

Information on outputs

Air:

Due to the fact that the assessed track section Planá u Mar. Lázní – Cheb is electrified, it is not a source of emissions of pollutants during traffic.

The air quality along the railway line may only be affected by emissions of pollutants from operations during the track reconstruction which will include, among other things, reconstruction of the track superstructure and substructure, repairs of bridges, construction work on buildings, railway stations and crossings, new anti-noise barriers, relaying of cable routes, etc. During these operations, mainly building machinery with diesel engines will be used. At the same time, a certain amount of waste will be produced (excavated soil, gravel from the track, building and demolition waste, railway sleepers, iron scrap, trees and bushes from clearance, etc.) and it must be removed and, conversely, a lot of materials must be brought in. This transport will be provided, to a large extent, by the railway company alone and, to a smaller extent, it will be provided by trucks of the companies performing the reconstruction. A source of air pollution during the track reconstruction will be, apart from the recycling line, building machinery and trucks. Their diesel engines will emit, in particular, NO_x, CO and dust – particles with PM10.

The source of air pollution, particularly with dust particles, will be the operation of the recycling line of aggregates from the track bed, which will be located at the railway station in Lázně Kynžvart situated to the left of station rails at km 432.315. According to Act No. 86/2002 Coll., on air protection, and its implementing regulations, machines for the treatment and processing of aggregates (both natural and artificial) are classified in the category of medium air pollution sources. For the above-mentioned machines, it is necessary to reduce or eliminate all places and operations where solid pollutants are emitted to the air directly at the source. Or, with regards to technical possibilities, the source of pollution should be equipped with a water curtain, spraying, dust-collecting or misting equipment (the implementation of measures must be approved and regularly evaluated by inspection). At the border of the land where the ballast bed will be recycled by a machine for the processing of

aggregates the dust fall deposition limit according to Government Decree No. 350/2002 Coll. must not be exceeded. However, the recycling line is located outside the residential area of the village and will be started up rather occasionally for the processing of material. Due to the above stated, the recycling line operation will only have a small or very limited impact on the residential area or the natural environment, because air pollution drops with the quadrate of distance from its source, i.e. the nearest settlements, spas or natural features of landscape will be affected from a large distance and in a limited manner.

The yards of dusty building materials at the construction site installations will be limited sources of air pollution by dust.

Wastewater:

Within the construction, drainage of certain sections (primarily at the railway stations and stops) is proposed by a system of lengthwise pipe catch-drains. The majority of the drainage equipment is comprised of a system of lengthwise catch-drains between the rails or conducted outside of the rails by drainage piping into the sewer, the terrain or soaking equipment.

Drainage will be rebuilt in places:

- Where the modification of the track substructure creates new terrain conditions; there it will be necessary to restore the original drainage
- Where the modification of the track bed into its normalised form disrupts the existing drainage.

Along the line, drainage by open gutters, drainage channel walls, catch drains and soaking screens is combined. Catch drains are used at crossings and in places where the use of an open gutter would cause increased costs due to the making of a cut. Soaking troughs are used in places with unfavourable terrain and slope conditions.

Sewage water

Production of sewage water can be expected in connection with the operation of sanitary installations of construction sites during the construction of roads and installations of construction site. The current stage of construction preparation does not specify its amount (the numbers of workers or their dwelling at construction sites are not known), nor the manner of disposal of this water (mobile chemical toilets and sanitary installations will be used in the places where building workers will change clothes – in station buildings on the line). The manner of disposal of this water must be designed in the next project documentation level in such a way that neither surface nor ground waters are contaminated.

Sewers and septic tanks (sumps) for toilets and sanitary installations will be built at those construction site installations where the sanitary base of the construction site will be located. In the areas of railway stations, the sanitary facilities of Czech Railways will be used. The construction and connection of site sanitary installations are part of the contractor's preparations. It is possible to connect to the current sewerage system in the current gully holes.

Chemical and mobile toilets will be used in places where it is not possible to connect to the current sewerage system and the building of septic tanks is unacceptable from the ecological or economical point of view.

Process waste water

At the stage of implementation, the construction will only produce a minimum amount of process waste water, e.g. from spraying concrete, cleaning machine equipment, dust-removal at some operations. Neither the quantity nor the quality of this waste water can be specified now (the contractor has not been chosen) and the problems will be solved sufficiently in the next project documentation of construction.

In the operation stage, the construction will not produce any process waste water, unless we include spring washing and cleaning of the spaces of the railway station and stops and a possible winter application of de-icer during impaired weather conditions at railway stations, etc. Neither can be sufficiently estimated as the consumption of process water will only be known during operation.

Waste:

During construction work of the “Optimisation of the Planá u Mar. Lázní – Cheb Line” project, a certain amount of waste of various types will be produced – both “other” and “hazardous” waste. The construction employer’s obligation is to provide all waste disposal in accordance with the relevant legislative regulations. These laws must be followed during waste disposal, i.e. the manner of its storage, transport, depositing and possible removal must be solved.

The construction project includes a summary of the expected amount of materials gained by construction work. Their possible utilization within the construction or their further use in accordance with the applicable legislation is specified. Also, the options for the disposal of possible waste are proposed and there is an orientation list of companies engaged in waste disposal in the given region.

The character of construction shows that prevailing types of waste will be materials excavated during reconstruction of the track superstructure and substructure. The level of its contamination was determined within the geo-technical survey. Taking the sources of contamination into consideration, the key excavated materials were divided to ballast bed, soil from sleeper subsoil under rails with a certain degree of contamination and soil without contamination, excavated outside the ground plain under the rails. Any excess soil removed will be taken to designated waste management dumps. The ballast bed will be recycled according to the construction procedure at the recycling station in Lázně Kynžvart. It is presumed that the ballast bed material will be transported to the recycling station by rail; the site is also accessible by road transport. Based on experience at other construction sites it is estimated that after recycling, approximately 80% of excavated volumes of ballast bed can be utilized as building materials.

Disassembled technical equipment for which there will be no utilization in railway traffic or for which there will be no possibility of or interest in retaining, will be scrapped.

In the project, the amount of potential waste is recorded overall for the entire construction by individual operating sets (PS) and building structures (SO) and the manner of its utilization or disposal is proposed. This includes, in particular, excavated soil, track superstructure ballast bed, waste after the recycling of track superstructure ballast, building and stone rubbish from demolitions, demolished concrete, disassembled metal structures, felled trees and cleared bushes from the construction site, remains of wooden structures, and others.

During the “Optimisation of the Planá u M. L. – Cheb” construction, there will be an excess of excavated material. The smaller part of the excavated material will be used for embankments and fills. The remaining excess material will be transported to the dumps Černošín, Tisová u Sokolova and Třebeň, depending on the transport distance from the site. Recycling of building waste in the maximum extent is recommended.

New usable material falling under the ambit of Czech Railways categories according to the “Guidelines for managing material acquired from RIA property managed by Czech Railways” is not the subject of the waste management solution. This involves, for instance, rails, sleepers, switch parts and small rail fasteners. This material is not waste, as it will be reused in railway operation.

Technology for removal of the ballast bed with subsequent recycling is proposed, which will take place at the recycling station. The recycling station is designed at the railway station Lázně Kynžvart, to the left of station rails at km 432.315. Gravel will be sorted there for subsequent use in the rail bed, in improved layers, fills, etc.

As part of the construction project, research of contamination of the sleeper subsoil was carried out. During chemical analyses, the detected concentrations of analysed substances from samples taken at the track reconstruction place were compared to the limit concentrations of organic harmful substances in solid matter according to Decree of the Ministry of the Environment of the Czech Republic No. 383/2001 Coll., on waste disposal details, and to the limit values of extraction rate classes according to Annex 6 to the above-mentioned decree.

Noise, vibrations

A noise study was prepared as part of the project for the construction. The noise study dealt with an overview assessment of the **perspective acoustic situation** in the area adjacent to the line after the completion of modernisation (i.e. operation on the new rail superstructure) and presents the possibilities for the solution of reducing the noise load on the neighbouring residential development and the spaces for use for living, recreation or sports according to the land use planning documentation. The study also includes a measurement of noise and vibrations from the existing railway transport by the closest residential development.

As part of optimisation of the railway line section, building machinery will be used and they will be a source of noise:

- They will move gradually along the line superstructure for the entire section of the line
- They will be operated locally for a limited time in places where the reconstruction of separate structures takes place
- They will be operated for a longer time in designated areas.

Table – Construction Activities Considered during Line Optimisation

Construction activity for DAY	Construction activity for NIGHT
<ul style="list-style-type: none"> • Removal of the existing grid (sleepers and rails) • Removal of the ballast bed • Modification of the grade • Reconstruction of bridge structures and culverts • Laying and compacting of the new ballast bed • Laying of the grid with rails • Tamping • Grinding rails • Excavation work (cables, walls, anti-noise barriers) 	<ul style="list-style-type: none"> • Manual excavation work • Installation of temporary interlocking systems • Lime – cement stabilisation of the substructure • Manual repairs of support walls • Small-scale work – quiet (coatings) • Laying cables • Exchange or repair of the contact line • Installation of new networks • Installation of signalling and interlocking equipment • Assembly of anti-noise barriers

Noise load can also be expected from the transport of materials on access roads and from transport on by-pass routes. It is therefore necessary – according to the possibilities of the contractor – to relocate as much transport as possible to non-residential areas and to the railway line axis. The number of traffic routes must be reduced as much as possible by good organization of construction work. Construction sites where the permanent occurrence of noisy operations is possible, such as concrete plants, recycling stations, etc., are not designed near the residential area. Construction sites established in municipalities will minimise their noise levels by the designed measures (the construction manager is responsible). Where this is not possible, it is necessary to take suitable measures to reduce noise from construction work.

Also where temporarily exceeding the external noise level can be expected, the noise limits for internal space will be, in most probability, kept (the considered sound insulation of common windows is 25 dB, which is sufficient for keeping the daytime internal limit 40 dB even at the external noise of 65 dB. However, such situation will only occur sporadically. We also consider essential the psychological moment, when individual operations will be consulted with the local people in advance and all measures for eliminating the noise load will be communicated.

For the time of operation of the optimised Planá u Mariánských Lázní – Cheb line a noise study was prepared as part of the project documentation. The noise study deals with an assessment of the perspective acoustic situation in the area adjacent to the line after the completion of the optimisation and presents possibilities for the solution of reducing the noise load in the neighbouring protected and residential areas. The study also includes a measurement of noise and vibrations from the existing railway transport and provides notice about noise from construction activity.

Noise values higher by approx. 2.5 dB for the perspective state are given by the considered, substantially higher frequency of train traffic (**increase from 66 to 126 trains, i.e. by 91%**). Conversely, the reconstructed railway superstructure and substructure, long welded rails and other elastic fastening will take favourable effects.

To determine the actual current noise load of the outdoor space in the neighbouring residential area, a noise measurement was performed at 13 selected points, the scope of which was discussed and agreed by representatives of the Pilsen Regional Institute of Hygiene, Tachov Branch, and Karlovy Vary Regional Institute of Hygiene, Cheb Branch.

The measurement was performed to check the noise load on residential buildings around the line for the condition before the line optimisation, i.e. before the increase in frequency of transport and increase in travel speeds of passenger train assemblies. For most of the structures in the railway protective zone in the field of direct impact of sound waves, values above the limit for night, and in most cases for the day as well, were recorded.

Anti-noise barriers were proposed on the basis of the noise study calculations in order to adhere to limit values for noise during operation of the optimised line. The efficacy of the noise reduction measures will be verified by control measuring.

Where anti-noise barriers would not be sufficiently effective or where they would protect only individual buildings, individual anti-noise measures are proposed - for 105 buildings in all.

A measurement of vibrations was carried out to measure the load caused by vibrations from the railway before its modernisation, i.e. before the increase in frequency of transport and increase in travel speeds of passenger trains and the concurrent improvement in the track superstructure. At all reference points, values clearly under the limits were found. Given this fact, it is not necessary to install special anti-vibration elements in the line substratum. A slight improvement in the current condition is anticipated by the improvement in the track superstructure.

Landscaping:

The implementation of the Planá u M. L. – Cheb line will not mean a significant intervention in the landscape, nor will it require extensive or significant landscaping. Neither the route nor the vertical alignment of the line will be changed; in some locations merely a slight change in the direction and slope of the line will take place, to accommodate the parameters required for the necessary travel speed.

The reconstruction and repair of bridges and culverts will respect to the maximum extent the existing condition and character of these structures. At the same time any reconstruction or new construction of structures at the railway station will not require any landscaping of a large scale or intervention in the landscape.

Environmental impacts of the line optimisation project

All identified impacts of the assessed plan of optimisation of the Planá - Cheb line have been assessed and evaluated in detail in the previous chapters of documentation.

The following impacts may be regarded as direct impacts of the assessed line optimisation plan: air-pollution impact, noise condition impact, impact on rock environment and landscape morphology, impact on fauna, flora and ecosystems along the line route, soil impact, some impacts on population.

Most of the expected impacts (particularly adverse ones) will be relatively low or of little significance and will only have a local character shown in the track location or its near surrounding. Conversely, it can be expected that positive effects on the population and other environmental components will be more significant and will have a favourable influence on the overall ecological load of the affected region.

However, in no case can it be considered that any impacts could occur that would go across the state borders of the Czech Republic. The possibility of an occurrence of across-border impacts on the environments of neighbouring countries can be clearly eliminated.

Impacts on population

The population in the settlements along the line and its surroundings may be affected in the period of the optimised track traffic and in the period of its reconstruction during construction work. The expected impacts will be both favourable and adverse and it can be presumed that favourable impacts on both the population and environment will prevail. The main types and manner of impacts include, for example:

During operation:

- Impacts of noise from the operation of trains on the optimised track, noise load reduction;
- Impacts on the scenery, appearance and aesthetic values of the surrounding area due to the construction of designed anti-noise barriers or other structures;
- A temporary accentuated exposure of the track bed (including culverts and bridges) in the landscape after cutting down the existing greenery (especially outside forests) along the track;
- Improvement in the culture and comfort of travelling for the public;
- Improved safety during operation on the track;
- Improvement in conditions for people with impaired mobility.
- etc.

During construction work:

- Traffic restrictions during construction work (closings on the line);
- Possible substitute bus transport during closings in individual sections;
- Impairment of conditions for people with impaired mobility;
- Lower comfort of service for passengers;
- Adverse effects related to performing construction work (increased dust formation, noise, increased intensity of road haulage).

Individual adverse effects on the population will be eliminated to the maximum extent by the technical solution of construction and a suitable schedule of construction work (maximum shortening of the time of construction work, reduction of the construction site space, etc.). Possible adverse effects will be relatively small, they will be of an irregular character which is limited in time and it is not possible that they will affect the health condition of the population in the surrounding area.

Compared to the current condition, a significant favourable effect on the population in the surrounding of the track will be a lower noise load from railway operation by adhering to the set health limits, and so no adverse effects of the health condition of population can be expected.

The optimised track will have favourable effects in social and economic areas. Travelling comfort and handling of passengers will be improved, the increased frequency of trains on the line will improve the service for the villages along the line, an increase in the travelling speed will mean shortening the travelling time and time savings for passengers.

The track optimisation will have also an economic benefit, because local companies (building, transport and others) may participate in the construction work as subcontractors or cooperating organizations.

Impacts on air and climate

During operation the optimised electrified line will not be a source of emissions of pollutants into the air. The operation of the railway line in the assessed section Planá – Cheb will not impact the quality of the air in the surrounding area in any way.

The quality of the air in the affected territory may be slightly affected only from sources during the construction of the surroundings. These are both the building machinery and means of transport used, primarily with diesel engines, which produce exhaust gases with numerous pollutants and which are also a source of secondary dust during travel, as well as the recycling line for the recycling of ballast from the rail bed, which will be located in the operating area of the Lázně Kynžvart railway station and which will primarily be a source of dust.

Impacts on the noise situation

The assessment of the anticipated noise load during the construction period was carried out for the three noisiest, or long-acting, activities involved in carrying out the optimisation of the line:

- a) Reconstruction of the track superstructure
- b) Reconstruction and construction of separate structures
- c) Recycling of the rail bed (construction waste).

The determination of noise emissions from the operating area of building machinery was based on Government Decree No. 9/2002 Coll., which sets technical requirements for products as regards noise. The analysis of the set of machines used for reconstruction work has shown that demolition work using demolition and pneumatic chippers falls into the category of the noisiest operations. When they are used, it can be expected that the limit value equivalent to sound pressure level A for the construction period $L_{Aeq} = 60$ dB (in the daytime between 7:00 and 21:00) will only be reached by a noise reduction by distance already at the distance of approx. 50 to 60 m from the place of operation. During the subsequent construction work, the loading of the outside space will be lower.

For future operation on the optimised railway, noise limits would be exceeded – the highest permissible equivalent levels of acoustic pressure A - in particular through the impact of the increased number of trains, increased speed of trains and due to the fact that these limits are already being exceeded under the current condition.

For that reason, sufficiently effective anti-noise measures - anti-noise barriers and individual anti-noise measures on structures - were proposed based on the results of the acoustic study, so that the stipulated noise limits are adhered to during future operation.

In total, 9,581 m of anti-noise barriers have been proposed.

Through the implementation of anti-noise barriers, a significant reduction in the noise load of residential buildings and a significant improvement in the acoustic climate will take place; in most locations limit values in the outdoor space in the protective zone of Czech Railways will be achieved.

For the closest structures, where even after the building of highly effective anti-noise barriers (reduction by 10 – 11 dB(A)), the limit level of outdoor noise will be exceeded, and where due to other technical means being used to protect the railway line it will not be possible to secure adherence to the limit values in the outdoor space of the protected territory in accordance with Government Order No. 502/2000 Coll., appropriate individual anti-noise measures in compliance with Section 12 of the Government Order will be implemented.

For the optimisation of the Planá u Mar. Lázní – Cheb line construction, all possibilities for the reduction of the noise load of the outdoor space (and the interior space of protected structures) were used around the railway line so that adherence to the stipulated noise limits under valid legislation is guaranteed and so that after line optimisation the negative impact of operation on the public health is excluded.

Impact of vibrations

Due to the fact that at the present time the stipulated vibration limits are not being exceeded (as proved by measuring) by the railway operation and that vibrations will be reduced by 5 – 7 dB as a result of the implementation of technical measures during optimisation, it is likely that during the operation of the optimised line, the spreading of vibrations in excess of the limit into the surrounding

development will not take place. The assessed plan of the optimisation of the Zbiroh – Rokycany line will not have an impact on its surroundings by vibrations which might have an impact on surrounding residents from the health perspective.

Water impacts

From the perspective of surface water protection as a whole, the Optimisation of the Planá – Cheb Line construction does not represent a real threat to its quality. Apart from the reconstruction of bridge structures, the construction does not affect surface waters, nor does it handle them in any way. The current discharge conditions will not be changed by the construction. During reconstruction of bridges, no interference with streams or modifications of river beds are anticipated.

The above-mentioned reconstructions and constructions, with the exception of bridge structures and possible culverts, should not interfere with ground water circulation. A permanent change in the flow mode is not anticipated during construction work. The planned reconstructions of culverts should contribute to problem-free drainage of reconstructed structures and the easy discharge of rainwater and should secure the passage of watercourses by the railway embankment. Changes to the river beds are not designed.

The risk of oil leaks from building machines could pose a certain complication for the quality of water. Therefore, increased attention should be paid to the condition of vehicles in the construction sections in the protective zones of water sources and natural therapeutic sources, and daily inspections should be carried out.

During the track reconstruction, an increased risk of threat to the quality of waters and rock environment will not occur if the protective measures are taken. During the reconstruction of contaminated parts, these or excavated materials will not be used for ground work, but polluted soils will be decontaminated or removed from the area of interest for disposal according to valid regulations. This also concerns material from switches contaminated by oil substances.

Soil impacts:

The impact of the line optimisation construction on the Agricultural Land Fund (ALF) will comprise the permanent taking of agricultural land; the construction does not call for temporary long-term takings of ALF. Temporary takings of ALF will be only short-term for the construction site, for a maximum period of 1 year including the time needed for restoring the land to its original condition.

As mentioned in Chapter B.II.1. Soil, the construction will be implemented mainly on the plots of land owned by the Czech Railways (CD). Permanent takings of land not owned by Czech Railways are primarily called for by the implementation of directional modifications of the line body and shifting of roads.

The overall permanent acquisition of the ALF brought about by the entire construction is **only 1.2232 ha** (of which approx. 2/3 is arable land, approx. 1/3 is permanent grass land, and a piece of garden); the construction does not require a temporary long-term acquisition. Individual takings are of a very small size and comprise only narrow strips along the existing line. For individual parcels ALF takings for the most part range on the order of tens to a few hundred m²; in certain cases this involves only individual square metres. Taken areas are typically neighbouring to the Czech Railways land, on which the rail bed is located. The areas for acquisition are for the most part comprised of the edges of meadows and fields immediately neighbouring with the rail bed; they are often neglected and used only marginally for agricultural purposes.

By implementing the line optimisation construction, no agricultural land will become inaccessible and no land plots that cannot be cultivated will be created.

Acquisition of forest land (PUPFL) will also be necessary for the line optimisation construction: This involves a total of 0.197 ha of permanent acquisition of forest land and also 0.0928 ha of temporary acquisition of forest land (due to construction site installations and access roads). The acquisition of

forest land (PUPFL) has slightly exceeded 0.2 ha (forest growths are made up, in particular, of spruce, clearings and pine and there is only a limited amount of mixed or oak growths) and it is spread on more than one cadastral area, therefore its danger as regards the protection of landscape and nature is very low.

After the completion of the construction, the areas for construction site installations during the track construction will be reclaimed and restored to their original condition.

Impacts on the rock environment and natural resources

Neither the construction nor the operation of the optimised Planá u Mar. Lázní – Cheb line will have significant or recognisable impacts on the rock environment or on natural resources in the area of interest.

The project involves only the reconstruction of the existing line, the vertical alignment of the line will be not changed. For the construction and reconstruction of connected structures, no significant excavation work or laying of foundations to a more extensive depth is expected, which could have an impact on the rock environment.

Flora, fauna and ecosystem impacts:

In relation to the construction, no endangered and rare animal and plant species will be affected. The construction of the located railway line rerouting is situated outside natural complexes and protected parts of landscape, it leads across a long-time agriculturally and industrially utilized area with a large deprivation of biota in the landscape and a larger number of secondary and ruderal areas of extra-forest greenery. The value of growths in the route of the designed railway line rerouting is very low and it shows a low level of growth maintenance in the open landscape in the present time. As regards fauna, no protected or rare animal species have been found in the route of the proposed railway line, which also proves the level and current degradation of the landscape.

The survey of the named plant and animal species (in previous chapters) indicates that these are species scatters in the agricultural and urbanized landscape, according to the designed railway line in various, mostly not too quality localities. No actual liquidation of valuable biotopes (including natural complexes or biotopes significant in relation to Natura 2000 as such) will be caused due to the construction and, therefore, the construction work can be compensated by a preliminary survey on the construction site (in 2006) and by possible rescue transfers connected with a suitable selection of the time of construction (June – July). It is fundamental to carry out construction work in the summer period, when the majority of animals will already be outside the area and it will be possible to replant any rare plant species.

No fundamental impacts on natural ecosystems are recorded in the construction surroundings (practically, they do not occur). However, special attention should be paid to the sensitivity of interventions in the substratum and in potential successive localities which will further develop.

Landscape impacts

In the landscape area (a wider range in the landscape point of view) around the proposed rerouting of the line, as regards landscape and landscape character, mainly the reconstructed bridges of local roads will take marginal effect; they have a chance that they will grow with vegetation relatively quickly and, in the open, slightly hilly landscape, they will visually disappear gradually as a whole or partly. The construction integration in the landscape is related to the time from starting the line traffic and from creating greenery. If it is possible, it is useful to perform suitable planting of accompanying greenery in selected places sufficiently in advance or simultaneously, not after the completion of the entire structural and technical part of the line.

It is necessary to retain old trees not only as regard the landscape character, but mainly for maintaining the foundation of greenery for the restoration and reclamation of the line and its surroundings.

Impacts on cultural and archaeological landmarks:

It is necessary to consider the territory where the railway line optimisation construction is being performed a territory with archaeological findings in the meaning of Section 22 (2) of Act No. 20/1987 Coll., on state preservation of monuments. The construction is not routed close to any historically protected structure, nor does it pass through a historically protected territory. During construction work archaeological findings may occur and therefore it is necessary to secure archaeological supervision of the construction. The investor has the obligation to meet the requirements which §22 and §23 of Act No. 20/1987 Coll. impose, specifically:

- To notify the Archaeological Institute of the Academy of Sciences of the Czech Republic, the Western Bohemian Museum in Pilsen and the Cheb Museum in Cheb, as the applicable archaeological workplaces, of the plan to perform earthwork from the time of construction preparation;
- To announce any archaeological findings;
- To enable rescue archaeological research;
- Compensation for protective archaeological research is governed by the provisions of Section 22 (2) of the above mentioned act.

If the mentioned obligations on the part of the investor and suppliers of the construction are adhered to, the construction will not have an unfavourable impact on archaeological monuments.

No structure entered in the Central List of Cultural Monuments (cultural monument in accordance with Act No. 20/1987 Coll.) will be directly affected by the planned construction, and neither will any territory with comprehensive historical protection (preserve with monuments, monument zone, their protective zone).

In the vicinity of the proposed construction and according to the opinion of the Municipal Office in Tachov, there is a former chateau park in the area of the Chodová Planá chateau. The chateau in Chodová Planá including its part is registered as an intangible cultural monument. In the case of possible interventions in this area, an opinion of the relevant authority of the state preservation of monuments must be obtained in advance. Within the construction, felling trees in the park area is not proposed.

The project documentation proposes other reconstructions and demolitions of buildings at stations and stops. Historical station buildings or also other structures in the station areas are structures of heritage interest.

The Municipal Office Mariánské Lázně, Building Office - preservation of monuments, agrees with the construction provided that the following conditions are met:

- Restoration of historical station buildings shall be consulted with the National Heritage Institute.
- The newly designed technological facility shall be located in a sufficient distance from the historical station building of the M. Lázně station.
- The application for the opinion as regards the preservation of monuments on the project documentation shall be accompanied with photographs of structures proposed for demolition.
- In cooperation with the National Heritage Institute, the most valuable communication and interlocking system, which will be replaced, will be chosen for a specialised museum.

The National Heritage Institute requires that the designs of reconstructions of buildings in the area of stations are consulted.

In cooperation with the preservation of monuments, it will be useful to set uniform rules for repairs and adaptations of these structures.

It can be stated that when the investor and contractors will cooperate with the relevant national heritage authorities, the planned construction will have rather favourable effects on the structures of the heritage interest.

Impacts on tangible property:

In relation to the line optimisation construction, the railway body and railway stations and stops located along it, including buildings, operating and technological equipment and other related structures and devices can be considered tangible property.

Through the line optimisation, this tangible property will be affected, in significantly larger or smaller extent, by the planned modernisation, construction work and adaptation or replacement of technological and operating equipment.

It can be stated that the optimisation of the entire line from Planá u Mar. Lázní to Cheb (the brief description of which is provided above in Chapter B.1.6 – Brief description of the technical and structural design) represents a major investment in this line which will make the tangible property of this line considerably more valuable.

The following are considered possible sources of negative impacts on the health of the population and the environment:

- Temporarily polluted air
- Temporary impact on the quality of water and soil
- Limited impacts on fauna and flora in the places of construction work
- Slightly increased noise load

Impacts on health due to water and soil contamination in normal operation are practically eliminated. Direct social impacts of the construction on the local people can be considered little significant. Impacts on the air quality will reach a range of tens of metres. A significant air quality impact will be related to the immediate surroundings of roads for trucks within tens of metres. The expected increase in the emission load will be accompanied by a decrease in the emission load along the existing roads which will be subject to a decrease in traffic intensity after the completion of the construction section. The most significant impact will be effects on a noise increase when it will be necessary, within measures taken to reduce noise level, to check a larger number of houses along the line after the completion of the construction and to build several hundreds of metres of anti-noise barriers in towns and villages. Noise effects during construction work are not quantifiable at this moment and even if they will be lower than it appears in calculations in a number of places, it will be necessary to reduce and compensate the noise level by the construction work organization.

Mitigating measures

The mitigating measures are proposed primarily for the line optimisation construction period, since the construction activity and the activities connected with it (construction transport, recycling of materials, waste removal etc.) will have significantly larger and more significant negative impacts on the lives of the population, or on the public health, than the following period of traffic on the optimised line. Measures for the prevention and exclusion of negative impacts and for the best possible course of the construction without conflict with the environment are specified for the construction preparation period, the construction implementation period and the operating period on the optimised line and are focused in particular on the components of the environment, for which negative impacts can be presumed.

The measures are directed, in particular, to the areas of:

- protection against noise load,
- protection against air pollution,
- protection of surface and ground water and soil against contamination by toxic substances,
- protection of nature and landscape, protection of greenery,
- protection of agricultural and forest land,
- protection of cultural, archaeological and palaeontological monuments.

The measures are formulated in detail for individual areas in Chapter D.IV. or in individual chapters dealing with the given problems.

Provided that the proposed measures are realized and observed, it can be said that the construction “Optimisation of the Planá – Cheb Line” will not have significant adverse impacts on the environment and public health and its possible impacts and risks will be reduced to an acceptable level common in similar construction projects.

Conclusion:

During the assessment of the impacts of the “Optimisation of the Planá u M. L. – Cheb Line” project, no significant adverse environmental impacts were identified. The project will not adversely affect, in a significant way, the current overall ecological load of the given region and, conversely, it will reduce the current load in some aspects. **The project can therefore be considered acceptable in the given locality and its implementation can be recommended if the measures and conditions for the protection of individual components of the environment and population are observed.**