

# **Final Report**

## **Skopje Bypass Republic of Macedonia**

### **Revised Environmental Impact**

### **Assesment EIA-R**

**March 2006**

## **EXECUTIVE SUMMARY**

ERM GmbH, Germany in cooperation with ABC Consulting, Macedonia was commissioned by the Fund for National and Regional Roads FNRR, Macedonia to carry out an Environmental Impact Assessment for the realigned section of the Skopje Bypass (EIA-R) and to provide assistance in carrying out the necessary public consultation. Beside the EIA-R on hand a Public Consultation and Disclosure Plan PCDP has been prepared. Public Meetings were already held during the first quarter of 2006, where the main results and the proposed mitigation measures were presented and discussed.

### **Project Description**

The Republic of Macedonia is currently engaged in building a four-lane motorway bypass North of the capital city of Skopje (Skopje Bypass). The bypass is partly funded by the European Investment Bank (EIB) and by the European Bank for Reconstruction and Development (EBRD). An Environmental Impact Assessment (EIA) for the entire Skopje Bypass was prepared in 2000.

According to the original design (Alternative 1) the alignment was passing between two settlements, Singelic and Stajkovski, with more than 60 houses to be demolished. Because of the anticipated problems with respect to land acquisition and the number of houses to be demolished, the Fund decided to shift approximately 7 kilometres of the eastern half of the bypass further North (Alternative 2). The realigned section of the Skopje Bypass is running from the vicinity of the Hipodrom to the Smilkovci Lake (cf. Figure 1). Permission for construction on the modified alignment was granted by the Ministry of Transport and Communications in 2004.

Since the original EIA did not cover this new alignment, it has become imperative for an Environmental Impact Assessment (EIA-R; R for “re-aligned”) to be carried out on the new alignment, which in parts had been already constructed. The section between Smilkovci Lake and Stajkovci Interchange is nearly completed. Construction activities have been put on hold for the section, which is investigated in the study on hand.

North of Stajkovci the new alignment will be in parts very close to residential buildings. At two other sites East of Stajkovci demolishing of houses will be needed and the alignment will be close to the remaining dwelling houses. Another conflict point is the farm East of Singelic. This farm is at the moment not operated.

In order to optimise the already shifted alignment (Alternative 2), adjustments were therefore prepared by the Technical Planner for these two locations:

- Alternative 2a shifts the alignment at Stajkovci further to the North (distance between houses and edge of cut section approx. 30 m)
- Alternative 2b would avoid (at least to a certain extent) demolishing of the farm in Singelic. FNRR is at the moment not considering Alternative 2b. The case was handed over to the Government.

*Figure 1      Location of realigned Skopje Bypass section – in pink extension of built-up area*

Alternative 2a will need additional land acquisition and will increase the investment costs. Whereas on the other side substantial cost savings can be expected, if the available excess soil can be reused for a required noise wall on already expropriated land. The construction of a noise wall was not feasible for Alternative 2, as it was situated too close to the dwelling houses.

The settlements along the highway will have access to the bypass via 3 interchanges (Sindelic Stajkovci, Smilkovci). Crossing of the highway for local traffic, farmers, pedestrians and bike riders will be possible using several overpasses.

The surface water drainage system of the road will be piped. Collection will be via road gullies and side ditches, and outfalls will be equipped with oil separators to prevent environmental damages to the existing ground and surface water regimes.

The alignment is located on an embankment in the southern and the western section, whereas around Stajkovci the alignment is situated in a cut section with maximum depth of 4.7 m below ground level.

Illumination for the entire Bypass is planned as it is considered as a part of City Traffic System.

### **Description of Environment**

The investigation area covers a stretch of 500 m as a minimum on each side of the planned alignment. The baseline conditions are based on existing data like reports, maps and plans as well as literature; these sources are referenced in the respective chapters. The previous EIA study (ERM Lahmeyer 2000) served as main data source. However, the baseline was updated and new data was compiled considering the specific requirements of the realigned section. The data compilation was substantiated by field inspections. A habitat mapping and a recording of selected animal species and plants have been carried for the previous alignment in 1999. With respect to the biological setting the previous and the new alignment are comparable. This mapping was taken as a base and with the help of field inspections the biotopes in the new corridor have been depicted on the topographic map. For the purpose of the study on hand the data was checked and reviewed. It is unclear to which extent the already undertaken construction works including other activities in the area have led to displacement of species and it is questionable whether all in 1999 mapped species still occur in the area.

The environmental features and conditions in the project area can be described as follows.

#### *Relief and Landscape*

The investigation area is located Northeast of Skopje, the capital of Macedonia. Generally, in the area where the alignment is located the relief is plain. In the North the Skopska Crna Gora-Hills are located. Agricultural activities are the dominating land use. In the southern part (Gornji Samak) intensive farming activities with large sized fields and growing of cereals is typical, whereas in the area around Sindelic and Stajkovci greenhouses and growing of vegetables is common. Beside the farmland the investigation corridor covers parts of the residential areas of Sindelic, Stajkovci and Smilkovci (belonging to the Municipality of Gazi Baba) with a typical rural

forming. The residential areas are larger sized than indicated on the topographic base maps. The maps prepared indicate the actual situation and extension of the housing areas based on field mapping and evaluation of satellite imagery. The lake at Smilkovci (at the edge of the investigation area) is used for fishing by local people.

#### *Geology & Soils*

The bypass is located in the Skopje basin, where tertiary tectonic activities resulted in a deep depression filled with clastic sediments of significant thickness. The alignment passes through Quaternary sediments (Organic marsh sediments, Diluvial sediments, Piedmont sediments) and Miocene sediments.

In the southern section at Hipodrom to Sindelic soils with a high organic content occur. The groundwater table in this area is high; high clay content leads to impeded drainage, which can result in periodic stagnant water. The soils in this section are fertile having a high agricultural value. In the section from Sindelic to the North of Stajkovci soils developed on the diluvial sediments consisting of sand-clay-gravel components. The top layer consists of clay loam with a thickness of 0.5 m. The soils are agriculturally used and greenhouses and vegetable gardening are wide spread in the area. In the remaining western section soils mainly developed on Tertiary sediments consisting of marley-clay, clayey-marl, clays, and sand alternating over short distances.

#### *Climate & Ambient Air Quality*

The Skopje valley is situated at an altitude of approx. 240 m above sea level. The average annual air temperature is 12.1 °C. The summers are quite hot and average monthly air temperatures during winter season are above zero. The yearly precipitation amounts to 510 mm. Temperature inversions are recorded throughout the year.

The air pollutants potentially relevant for traffic emission sources are carbon monoxide CO, nitrogen dioxide, sulphur dioxide, dust/particulate matter PM10, lead aerosols (in future with clearly less significance), and other heavy metals. For the project area no information on air quality was available, whereas for Skopje town data from monitoring stations indicates some exceedance of the Maximum Permitted Concentration for CO and PM10 in January (month with normally highest ambient air pollution). However, it can be assumed that the concentrations in the more rural area of the new alignment are in general well below those found in the urban Skopje area.

### *Noise*

In general, the area of the future infrastructure is an open and plain territory where dispersion of sound is not shielded significantly by terrain, vegetation or other barriers. Currently, the main sources of noise are the daily activities of the people in the settlements, traffic on existing roads, and activities in the rural areas.

### *Surface Water & Groundwater*

The density of watercourses especially Northeast of Skopje in the Skopska Crna Gora-Hills is high. Most of the streams are temporary and run straight. The Creshevka stream is located West of Stajkovci (N-S running, approx. km 6) and is more or less perennial. Heavy precipitation or sudden snowmelt around the headwaters result in a freshet with overflowing of its banks. The Peripheral Channel (approx. km 4) runs from Singelic towards Aracinovo (West to East), all streams coming from the Skopska Crna Gora hills between Butel and Aracinovo flow into this channel. The Peripheral Channel is important for the water retention. It protects the Skopje basin from flooding due to the water runoff from the Skopska Crna Gora-Hills. At the western edge of the investigation area at Smilkovci two artificial lakes have been created by damming of the Burinaracki temporary stream and by additional water discharge of surplus well water. The eastern lake was dry during field inspections.

Two aquifers have been described for the project area: a deeper artesian aquifer in the southern part and an upper aquifer in the quaternary sediments. The artesian aquifer is located 40-50 m below the surface and is protected by none permeable strata. This aquifer is used by several artesian wells for individual dwellings in the area. The groundwater level of the upper aquifer varies between -1.5 m to - 4.3 m in the flat area of Gornji Samak in the South and even can rise up to the surface during high water. North of the Peripheral Channel groundwater levels are in general deeper than 10 m below surface. Groundwater flow direction in the upper aquifer can be assumed to occur mainly from North to South towards the Peripheral Channel. Few people use groundwater for irrigation of their gardens from the upper aquifer. Water protection zones for drinking water abstraction are not assigned in the area. There are no springs located in the alignment corridor or in close vicinity.

Due to hydrogeological and geological situation, as well as the fact that groundwater is not used in the area for drinking water purposes, the project related sensitivity can be assessed as low for the main parts of the alignment. Whereas for the section North of Hipodrom the sensitivity is higher due to the high groundwater level.

### *Flora and Fauna*

A habitat mapping and a detailed recording of animal species and plants for the previous alignment have been carried out in May 1999. With respect to the biological setting the previous and the new alignment are comparable. This mapping was taken as a base and substantiated by field inspections in the corridor of the realigned section. It is unclear to which extent the already undertaken construction works including other activities in the area have led already to a displacement of species and it is questionable whether all in 1999 mapped species still occur in the area.

Main parts of the new alignment pass through agricultural land and orchards with a low ecological value. Vegetables are cultivated close to Singelic and Stajkovci in greenhouses. The arable land is mainly intensively used and has a low structural diversity. The whole section has a low value for natural flora. On the shores of the lake South of Smilkovci reed vegetation growth and the littoral zone is populated with submersed macrophytes. The lake has a high ecological value, based on the typical vegetation and the rareness of wetland habitats in the study area. The smaller eastern lake was dry at the time of field investigation. The vineyard North of the lake has a medium structural diversity and species richness.

For the avifauna the section from Hipodrom to Smilkovci is of medium importance and four species are protected by the European-Wild-Bird-Directive EWB. The preferred habitats are areas with trees and shrubs, which are not very common in the study area between Hipodrom and Smilkovci. The channels are assigned a medium importance for amphibians and reptiles. The wetland habitat at the Smilkovci Lake is important for birds and amphibians. With 57 identified birds the area<sup>1</sup> is rich in species, eight of them are protected by the EWB-Directive (e.g. White Stork). However especially the White Stork is endangered by the density of overhead power lines near the transformer station of Butel (West of the investigated corridor). Amphibian and reptiles species recorded in/at the lake comprise important species like Green Toad, European Pond Turtle and Grass Snake. The lake and the shores can be assigned a high value for birds, amphibians and reptiles.

### *Cultural and Historic Features*

Archaeological sites of former ancient times or other important cultural or historic remains are not known to exist in the alignment corridor.

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<sup>1</sup> The area covers mainly sites outside the recently investigated corridor as the lake is described as a functional unit

## **Environmental Impact Assessment**

The Project has the potential to cause adverse environmental impacts as a result of the Construction activities as well as due to its physical structures and the operation of the infrastructure.

### *Air Pollutant Emissions*

Impacts of road construction activities on air quality are caused by handling of materials (excavation, piling, filling, earth works) and movement of lorries (engine, abrasion). Dust emission can be minimized by keeping the material covered or wet and a restricted driving speed of vehicles on unsealed hauling roads in the vicinity of settlements. Additionally, emissions of truck engines may become a nuisance in or near settlements, which can be mitigated operating modern high efficiency vehicles, and by avoiding unnecessary idle running at these locations.

During future operation of the bypass, air pollutants are emitted from the vehicles' engines. The actual quantity and composition of the exhaust gases depend on various factors like: type of fuel used, type of vehicle, speed, efficiency of combustion, catalyst. Future ambient air ground level concentrations of pollutants were calculated based on the expected traffic load for carbon monoxide (CO), sulphur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), particulate matter (PM10), lead, and benzene. In general, the applicable ambient air quality standards will be met. Only the short-term standard for PM10 might be exceeded in a narrow band of 20 m along the bypass. In the section of Stajkovci North where buildings are situated very close to the alignment an adverse impact by air pollutants will be avoided due to the presence of a noise reduction wall, by which air pollutant concentration alee of the wall at the buildings is reduced.

With regard to lead and other heavy metals, vehicle traffic causes emissions from engines as well as from tyre and brake wearing and abrasion of road surface. Significant impact from these sources will be limited to a few meters off the alignment's kerb. The emission of lead will cease due to legally foreseen phasing out of leaded gasoline.

### *Climate*

Local climate can be affected by barriers created by project structures and change of surface characteristics. Given the design of the alignment, the general regional wind field will not be modified significantly. Changes in the local wind field are only anticipated in the close vicinity of the bypass where an embankment is constructed. The planned culverts will avoid creation of cold air lakes.

### *Noise*

Noise generating activities during construction comprise operation on work sites by heavy machinery and noise from construction related traffic. As a general mitigation requirement, contractors will be required to use modern noise silenced equipment and to keep to usual daytime work hours. Especially in the vicinity of residential buildings operation of noisy equipment should be limited as far as possible and/or noise shielding provided, e.g. by placement of equipment apart of residential buildings and/or behind natural sound barriers, piles, containers which can serve as shielding.

Vehicle traffic on the bypass will generate noise, which will affect the people living in the settlements in the vicinity of the bypass. The noise levels generated by the vehicle traffic on the bypass were predicted and revealed that noise mitigation measures are necessary to meet the applied noise standards (50 dB(A) at night time). The bypass section North of Stajkovci runs in a cut, which already reduces noise impact in the neighbourhood. However, to reduce the noise levels in the nearby settlement to the required level, the construction of a noise wall (embankment) is required. Overall, a noise barrier of 2,780 meters length is proposed with a height of mostly 4 meters above ground level. Installation of noise reducing windows will be required for approx. 16 buildings, where noise protection by other means is not feasible. The potential Stracinci overpass must not impair effectiveness of the foreseen noise barrier.

#### *Vibration*

Impact by vibration generated by construction activities and future vehicle traffic might become relevant for buildings, which are located very close to the alignment. The potential for resonance of these buildings shall be investigated to identify potentially sensitive structures.

#### *Soils*

In general, soils are mainly affected through sealing of surfaces, cut and fill operations. Inadequate protection of cut and fill areas may result in soil erosion. During construction and operation there is also a risk of soil pollution in case of accidental spills.

Construction and working sites must be limited as much as possible to reduce loss of soils. The loss of soil can be reduced by re-use of the topsoil as far as possible. The soils in the vicinity of the construction and working sites must be protected against soil compaction by heavy machines. Temporary soil depots shall be located in areas, which are not subject to occasional stagnant water or with high groundwater table. Especially in the section South of Sindelic interchange construction activities must follow good practice to limit impact on the sensitive soils in this section. Appropriate procedures should be used for the separate stripping, handling, storage and replacement of top and sub-soils.

Spillage of fuel and lubricants during the construction period can be prevented by ensuring that all fuel storage and handling takes place in secure areas. Similar conditions will apply to lubricant oils, chemicals and liquid wastes. Should a spillage occur, contaminated soils must either be cleaned up or removed for appropriate disposal or incineration. Particular attention should be given to areas with a high groundwater table, i.e. the area North of Hipodrom.

The sealing of natural soils will result in a total loss of soils affected including their functions. The sealed area will cover an area of approx. 15 hectares. With respect to sealing of natural soil, no real mitigation is feasible. It can however be minimised by careful removal of the soil, careful storage and handling to avoid deterioration of the soils, and the provision of suitable storage, taking into consideration appropriate weather conditions. Eventual re-use of these soils is then possible.

In cut areas or on the slopes of embankments, measures to protect soils against erosion are needed. Furthermore, planting of hedges and bushes will also stabilize the slopes and will reduce surface water run-off and will result in an enhanced infiltration capacity. All mitigation measures should be installed as soon as possible in order to prevent damages, which will make later planting more difficult.

Care has to be taken to avoid soil and water contamination through accidental spills of hazardous liquids during operation. Road run-off contains many pollutants of which PAH (Polycyclic Aromatic Hydrocarbons) and heavy metals are the most important ones. These compounds arise from spills, corrosion, wear of tyres and brake linings, and general wear of the car. The highest contamination with e.g. lead and cadmium, occurs in a small zone up to about 1 to 5 metres along the roads, whereas at an average distance of 10 m the pollution level in soils do not give concern with respect to agricultural use of the soils. Where the road is traversing areas under agricultural use this

relevant strip along the road will largely be still within the footprint of the embankments resp. within the right of way.

Traffic born pollution can be best minimized at the source. It is expected with advancements in vehicle technology, and due care and maintenance of vehicles, and cleaner fuels this emission source will be reduced in the future. It is anticipated that lead emissions will be very limited if any as Macedonia has implemented the legal requirements to ban leaded gasoline.

As the area is intensively used for agricultural purposes additional protection measures are recommended. Planting of vegetative screens with bushes along the embankments will in addition have a filtering effect and limit the dispersion of pollutants. This is also recommended in order to prevent soil erosion on the slopes of the embankments.

With implementation of the proposed mitigation measures, significant impacts on soils can be excluded.

#### *Surface water and Groundwater*

During the construction phase the surface water and groundwater could be severely affected by water pollution (construction sites, dumping of excavated material). The construction works at the Smilkovci Lake are already well advanced, meaning that future construction activities will be very limited at this place.

The drainage channels located on or close to construction sites should be protected from disturbance as far as possible. No dumping of waste or excess soil should be allowed in the direct vicinity and discharge of sediment spills should not be allowed. After finalizing the construction works, the channels shall be re-established in case of any disturbance. The runoff from the construction sites should be protected from pollution of lubricants and oils.

Water pollution could cause conflicts in the operation phase. Oil, tyre/road abrasion, fuel combustion, solid particles, and salt in winter will be discharged with the surface water runoff. Severe impacts on the surface water could occur by accidents when high amounts of water with hazardous substances may be discharged. The surface water drainage system of the road will be piped. Collection will be via road gullies and side ditches, and outfalls will be equipped with oil separators to prevent environmental damages to the existing ground and surface water regimes. For cases of road accidents an emergency plan should be established to respond and quickly deal with threats from water pollution. To avoid potential surface water pollution,

herbicides should not be used on the road shoulders or embankments for maintenance.

A surface water drain for the road, discharging into the lake situated close to the highway, was deemed to be too risky for the lake, which might have become polluted. The drainage system with oil separators was therefore connected to a drain leading the water to the eastern side of Smilkovci overpass into the drainage system. This mitigation measure has been already implemented and due to this installation, pollution of the lake during operation can be prevented.

The culvert for the Creshevska stream is already constructed. Reportedly, during a freshet the water was not flowing through this structure or was blocked, and the water was flowing further in the East. The Technical Planner is investigating this event and will propose appropriate additional measures to prevent flooding in the future.

The cut section at Stajkovci will be well above the groundwater level, which was not reached in this section during the exploration drillings. There are no water sources for drinking water in the immediate vicinity of alignment, which could be affected during the construction stage and the operation.

When working close to the groundwater table (meaning South of Sindelic interchange) extra care should be taken to avoid spillage of water endangering substances such as oils and lubricants, and immediate clean-up action is to be taken in the event of an accidental spill.

Under normal circumstances – meaning that the groundwater is protected by an effective soil layer – groundwater pollution caused by a normal operation of a road is not a concern if a proper environmental management is applied.

The groundwater in the area North of Hipodrom is vulnerable to pollution due to accidental spill. This refers to the upper aquifer where the groundwater is close to the surface, whereas the deeper artesian aquifer is protected by impermeable strata.

If proper management is applied, impacts on groundwater and surface water are considered unlikely to appear due to construction and normal operation of the road.

### *Flora & Fauna*

During the road construction, habitats of plants and animals will be used in order to set-up construction sites, work areas and intermediate dumping of material. These installations will lead to additional loss of vegetation and habitats. Therefore, the construction site should be as narrow as possible. Due to the mainly low ecological value, impacts on flora and fauna will be limited. The construction works at the sensitive Smilkovci Lake are nearly finalised.

The construction of the road and the embankments consume space. Biotopes with crop fields and other agricultural fields were evaluated as being of “low importance”. Most of these habitats are anthropogenic and could be restored and within a short time. Habitats of rare or protected plant species are not expected to be damaged.

An amphibian culvert and corresponding amphibian guidance installation (concrete stones) have been constructed at the lake. Whether there is a need for additional culvert(s) depends on migration route of the amphibians, which might have been altered due to construction, the embankment as well as a temporary depot, which has been implemented at the other roadside in this section. Therefore a monitoring of amphibian crossing is necessary in this section.

Ecological measures should be implemented to compensate the impacts occurred due to the construction of the bypass section at the Smilkovci Lake. Generally, upon completion of the road works, impacted biotopes should be restored.

Eutrophication and altering of plant communities by air pollution might be effective only within a 10 metres buffer along the road. Soil pollution with heavy metals or organic pollutants is normally limited to the direct vicinity of the road.

Considering proposed mitigation measures, significant impacts on the biocoenoses can be excluded.

### *Landuse and Agriculture*

Direct land use conflicts from the new road will result from land consumption, overbuilding and sealing of agricultural land. For the compensation for losses or impairment of agricultural plots, an agricultural bonity evaluation of each plot has been/will be used as a calculation base. The main impact for the farmers will be disruption of local paths.

The local farmers addressed their concern in the public meeting with respect to the future quality of their agricultural products considering traffic borne

pollutants. However, impacts on soils will only occur in a very narrow strip along the alignment, which will be mainly within the right of way. Organic farming is possible in the direct vicinity of a highway in case that vegetative screens were planted according producer guidelines from organic farming associations. In addition to planting of vegetative screens it is recommended to avoid application of herbicides for maintenance of road shoulders or embankments. This will prevent agricultural products from contamination by wind drift during application.

The Sindelic Farm will be adversely impacted by the new alignment and approx. one fourth of the plot needs to be expropriated. Mitigation measures will be difficult to implement. At least some kind of noise protection would be required, however there are no established noise standards for such a kind of use. Negotiations between the owner and the Fund reached a deadlock and the case was handed over to the Government. The future situation of the then smaller sized farm West of the bypass and in the South limited by the bridge of the Sindelic overpass, is seen as not appropriate for such kind of use. An appropriate use of this area in direct vicinity to an interchange could be e.g. by a haulage company.

### **Alternatives**

The realigned section (Alternative 2) and especially Alternative 2a) has clear advantages compared with the previous alignment (Alternative 1). The need for noise protection for the shifted alignment (2 and 2a) is still given and will require comprehensive measures. However, compared with the previous alignment they will be much more limited. The new alignment is located at the border of the settled area and therefore has clearly lower separation effects for the local residents. The villages of Sindelic and Stajkovci remain as an entity.

Alternative 2b (Singelic Farm) would avoid to a certain extent demolishing of the farm. However, the alignment would be still located in direct vicinity of the farm. FNRR does not consider Alternative 2b at the moment. Reportedly, the owner rejects Alternative 2b as well. Considering other environmental aspects Alternative 2b and 2 are comparable.

Alternative 2a will need additional land acquisition and will increase the costs. Whereas cost savings can be expected when the excess soil can be reused on the already acquired land instead of dumping at another place and at the same time reducing required height of potential noise protection walls. With respect to other environmental aspects Alternative 2a and 2 are comparable. Considering all aspects, Alternative 2a is assessed as an improvement of the realigned section.

### **Mitigation Measures and Environmental Management**

Specific mitigation measures have been described which are tailored to the need of the project. These measures will be effective for enhancement of the project and the specifications will ensure that the design, construction and operation of the project will be in an environmentally acceptable manner and compliant with both national and European Union regulations and standards. The mitigation measures, respectively recommendations where mitigation is not feasible or justified in economic terms, includes the following main items

- Construction of noise barriers and in single cases of noise reducing windows
- Solve the unsatisfying situation for remaining few houses around kilometre 4
- Planting of slopes with bushes and trees
- To carefully integrate Stracinci overpass (if it will be realized) into the noise barrier
- Ecological enhancement at Smilkovci Lake and development of a compensation scheme for a wetland area to be designated
- Find a mutual agreement for the Singelic Farm
- Establishing a landscaping plan.

Implementation of the proposed mitigation measures, as well as monitoring requirements during construction, are outlined in the Environmental Management Plan (EMP) to avoid adverse impacts during construction. It is recommended to include into the road construction contract, the environmental obligations the constructor has to fulfil. To ensure the effective implementation of the Environmental Management Plan (EMP) an Environmental Inspector has been already commissioned to undertake a program of environmental supervision and monitoring during construction. The contractor should be obliged to follow a proper environmental practice during all construction work activities and to keep damage to vegetation, soil, ground water, surface water, landscape as well as disturbance to settlements to a minimum. The contractor shall provide proper documentation prior to the works, which will give details with respect to environmental issues (removal of vegetation, planned temporary storage sites etc).