

Appendix 2 – Environmental factors

General overview

The two-year environmental investigation programme will be finally concluded around 1 March 2011 and the investigations in many of the specialist fields involved have thus been concluded and reporting on the individual programmes is in progress.

The preparation of the EIA (Environmental Impact Assessment) according to German and Danish guidelines, respectively, has been planned and initiated.

Since the project can simultaneously have environmental consequences for the Natura 2000 areas and species that exist in the area around the fixed link, parallel Natura 2000 consequence assessments for each of the potentially affected areas are being conducted.

A preliminary environmental assessment shows that the two projects **will not have significant environmental consequences**, but that inevitably, permanent as well as temporary environmental impacts will occur both on land and in the marine area, which was also the case for the Great Belt and Øresund projects.

Both projects involve temporary (workplaces) and permanent **areas of land consumption** on land (road and railway construction on land) and on the sea territory (coastal land reclamations/ramps and bridge piers). The areas of land consumption will be the largest for the tunnel solution (approx. 5 km² against approx. 1 km²), primarily as a result of the larger excavation volume (15-16 mill. m³ against 1-3 mill. m³), which must be deposited.

The deposit areas on the Fehmarn side are placed east of the ferry harbour in Puttgarden and on the Lolland side, both east and west of the ferry harbour. The deposit area east of Rødby Harbour is located relatively close to the Rødsand Lagoon, which is a Natura 2000 area with a habitat type priority, which is why there is particular focus on the design of the deposit area so that significant impacts may be avoided.

Furthermore, a bridge solution will entail a minor impact on the **water flow** (approx. 0.3 – 0.5 percent) through the Fehmarnbelt between Kattegat and the Baltic Sea. This impact may affect the salt and oxygen ratio primarily in the deeper parts of the Baltic Sea. As with the construction of the Great Belt and Øresund links, this "blocking effect" cannot be compensated for through dredging of the seabed (the Zero solution) since the Fehmarnbelt Fixed Link is not located in a threshold area. The effect will never be measurable and it would be small compared to the naturally occurring year-to-year variations and the projected long-term changes as a result of climate change.

Since the Fehmarnbelt is also a **transport route** for fish eggs and larvae, these might also be affected by the bridge solution. However, this environmental impact is also considered as being very small.

A bridge solution is assessed as having certain effects on **bird life in the area** since common eiders and common scoters, among others, may perceive the bridge as a “barrier”. Whether this will have significant effect on the population of these birds in the area is uncertain, but knowledge about other bridges shows that a change will occur in the birds’ migration patterns as has been seen with the Øresund Bridge and Kalmarsund Bridge. This might have indirect effects on the population sizes which is why there is special focus on the Natura 2000 area on the west side of Fehmarn.

With a bridge solution, the occurrence of **harbour porpoises and harbour seals**, both of which are protected species, might be affected, but the impact will be slight provided that construction methods used do not generate severe underwater noise.

A number of **temporary environmental impacts on flora and fauna** in the immediate area will perhaps also occur with a tunnel solution as a result of sediment spillage from the substantial excavation work. These impacts can be limited through careful environmental management where the spillage is limited (excavation and transport methods) and so that the excavation work is time and space managed in relation to the “sensitivity” of the natural features, preservation of good bathing water quality, etc.

Moreover, certain changes in the seabed will occur in the tunnel’s alignment and width, given that the tunnel will be covered in a protective stone layer, as a result of which it will take a few years for natural conditions to be re-established.

Natura 2000

Pursuant to the Habitats Directive, projects that could directly or indirectly impact Natura 2000 areas must be approved by the authorities. Therefore, separate environmental risk assessments must be conducted for each of the Natura 2000 areas which are located in the area around the Fehmarnbelt Fixed Link if there is a risk of impacts. The assessments must be conducted according to a 4-step process of which the first one is a so-called “screening”.

Since the environmental investigations have not yet been concluded, only preliminary screening of the two technical solutions can be conducted at present.

The consequence assessments must be conducted for each of the two technical solutions given that the solution that carries the least environmental risk of impact on the protected

areas or species must be selected. This principle may be departed from only as dictated by significant societal considerations (e.g. concern for public safety).

If Natura 2000 areas are impacted, mitigation measures must be implemented to minimise the environmental impacts and measures to compensate for residual environmental impacts must be established. The authorities in the two countries must approve these mitigation measures.

If there is a risk that significant impact on prioritised habitat types and/or species might occur, the EU Commission must be involved in the approval process at the request of the national authorities.

The preliminary environment screening shows that there are potentially eight Natura 2000 areas that might be impacted by the project – either temporarily or permanently. Whether the impacts will be significant cannot be determined at this stage of the investigation. However, it is probable that the number will be reduced given that the preliminary assessments have been conducted on the basis of preliminary, cautious assumptions about the execution of the construction work.

The preliminary environmental assessment shows that the risk of significant environmental impacts of Natura 2000 areas is highest for the bridge solution. This is due firstly to the presence of bridge piers in the Natura 2000 area in the middle of the Fehmarnbelt, which will entail a permanent change to the seabed because of local changes in the water current conditions.

Secondly, the bridge could have a barrier effect on waterfowl, for example on the common eider, common scoter and long-tailed duck, which may have particular consequences for the local population during harsh winters with the icing up of the inshore waters. A further environmental optimisation (preventative measure) will not be able to counteract these potential consequences.

During the construction phase, the tunnel solution may impact the nearby Natura 2000 areas. This is because the seabed materials that are spilled into the water during dredging will be spread by the current and may potentially affect bottom-dwellers, such as mussels and seabed vegetation, for instance eelgrass due to covering and the effects of shadow.

The seabed material that needs to be dredged up for the construction of the tunnel solution is unpolluted and the spillage will thus not have any chemical effect on plants and animals.

The spillage of seabed materials can be limited and controlled so that negative impacts on the environment can be limited, similar to the Øresund project. Experiences from Øresund have shown that this can be done without delaying the construction work.

On the whole, the assessment based on the existing, preliminary basis is that pursuant to the stipulations of the Natura 2000 directives there is a high probability that an immersed tunnel solution will be nominated as the technical solution that has the least permanent environment impacts and thus will also require the least compensatory measures.

On the basis of current environmental knowledge, it is likely that the stipulations of the Natura 2000 directives will underlie the choice of solution.