

## MANAGEMENT SUMMARY<sup>1</sup>

The project 'Rail Ghent Terneuzen' (formally the: 'Implementation Study for Optimization of Cross border Rail Infrastructure (ISOCRIP) investigates the possibilities of improved rail infrastructure in and around the Port area of Ghent and Terneuzen. These improvements support the realization of a future proof, environmentally friendly and safe cross border rail link. This in turn adds to an attractive business climate for the Ghent-Terneuzen port area.

This management summary describes the results of cluster 3, in which six infrastructural-elements are investigated. For each of these infrastructural-elements, 4 aspects are assessed:

- Study 3: Study on technical aspects
- Study 4: Land use and spatial planning
- Study 5: Geotechnical soil survey
- Study 6: Environmental impact assessment

The following infrastructural-elements are investigated (please refer to figure 1 for the locations):

- A1: Northern connection & expansion of shunting station Zandeken
- A2: Simultaneity passing Wondelgem.
- A3: South-East connection towards the 'Sluiskil'-bridge.
- A4: Railway connection track Axel – Zelzate (missing link).
- B1: Track-doubling Wondelgem – Zandeken.
- B2: North-East connection towards the 'Sluiskil'-bridge.

### Objectives

The objective of this study is to identify the feasibility, effects and risks of the proposed infrastructural elements. As such, it is not aiming at determining optimal design solutions. The latter should be considered in a follow up research, during the plan study phase, in which there is room for optimization.

### Problem statement

There are various developments in the port area of Ghent – Terneuzen. This concerns the construction of the new lock in Terneuzen, the realization of the Seine-Schelde canal and the merger of the ports of Ghent and Terneuzen. These developments are expected to contribute to a major increase in the ports freight transshipment volume. This will lead to increased pressure on the current rail infrastructure.

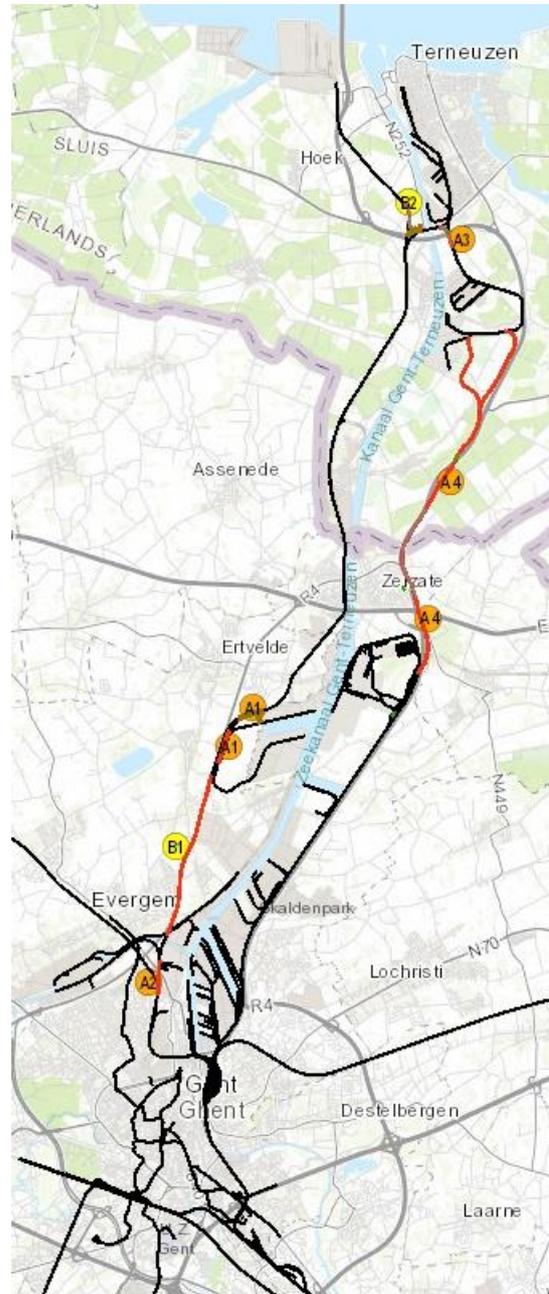


Figure 1: Location of infrastructural-elements

<sup>1</sup> Summary of Rail Ghent Terneuzen / ZSP10212, Implementation Study for Optimization of Cross-border Rail Infrastructure in the Port area Ghent – Terneuzen, Studie 3 t/m 6: Technische Studie elementen railinfra, Arcadis, RGT-3a01, Version C, February 1st, 2019

The current rail capacity however is limited and not enough to accommodate the expected growth. The local bottlenecks limit the development and expansion of the port, which also limits the economic and employment development in the region. Furthermore, the expected growth in freight volume will put additional pressure on sustainability goals as well as it could result in an increase of risks regarding external safety.

The above mentioned is reason to address the current rail infrastructure of the Ghent-Terneuzen port area and its bottlenecks. As such, six infra-elements (weak links) in the area are determined and are investigated as part of this study.

## Infrastructural-element A1: Northern connection & expansion of shunting station Zandeken

The shunting station Zandeken is equipped with 5 stabling tracks with a usable length of 750 meter and two passing tracks on the northern side. Currently an area on which an extra 11 stabling tracks could be realized is reserved at the Zandeken site. This infrastructural-element includes the construction of 5 extra stabling tracks on the reserved grounds and the creation of a northern railway connection to the shunting station.

### Variant analysis

For this infrastructure-element no variants are considered as the expansion of the shunting station can be realized in a designated (reserved) space.

For the new northern connection of Zandeken, two variants are investigated for the railroad crossing with the 'Christoffel Columbuslaan':

- A level crossing, which proves not to be feasible due to safety risks and is unacceptable for the Belgian road and rail infrastructure managers.
- An overpass (grade separation). This variant is further investigated.

### Technical aspects

Within the reserved expansion area at the shunting station Zandeken, five stabling tracks are designed with a minimal usable length of 750 meter. These tracks are level in all directions. They are connected by 1:9 switches to the current southern and future northern railway connections. The northern side of the shunting station lies approximately 2 meters higher than the main tracks in the direction of Sas van Ghent. One of the two passing tracks at the northern side declines with a rate of 5‰, after which it crosses the Christoffel Columbuslaan and connects to the main tracks in the direction of Sas van Ghent and Terneuzen. To cross the railway, the Christoffel Columbuslaan is raised over a length of a few hundred meters. Because of the diagonal angle between the Christoffel Columbuslaan and the railway tracks, the crossing will be completed as a 'pergola construction'. This type of construction is needed to enable a future expansion of the Christoffel Columbuslaan towards a 2x2 lane configuration and a cycle path.

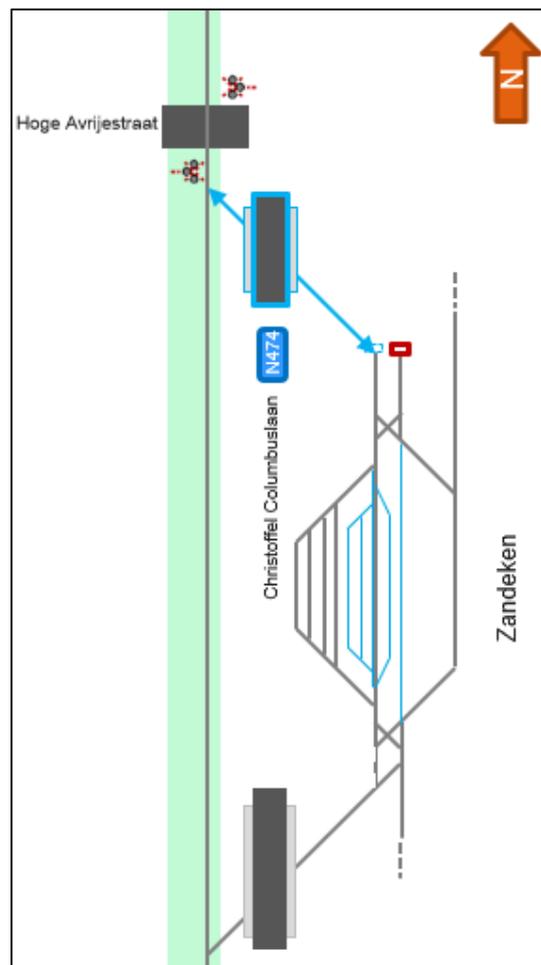


Figure 2: Infrastructural-element A1: Northern connection & expansion of shunting station Zandeken

## Environmental impact assessment

The environmental impact assessment resulted in one potential issue. A wind turbine is located close to the railway tracks (20 meter). Because of the low impact procedure in an industrial environment the environmental impact is considered low. A good connection of the local bicycle lane is a potential problem that may arise later. While the bicycle infrastructure is not considered within scope of this study, multiple potential issues may arise in the vicinity of the northern connection point, like the current level crossing and the crossing of bicycle traffic of the Christoffel Columbuslaan towards the 'Kluizendok'.

## Procedures to follow and estimated turnaround time

This infrastructural-element requires an environmental permit with project-m.e.r.-screening. Because of route next to current zoning plan, changes to the zoning plan may be required. This refers to potential changes in the 'Gewestelijk Ruimtelijk Uitvoeringsplan' (GRUP) with a plan-m.e.r. screening, and a subsequent 'Omgevingsvergunning' with project-m.e.r. screening. Based on the design and procedures, the turnaround time of the preparatory works is around 2 ¼ years and the construction time is approximately 2 years. If alternations to the zoning plan are required, the preparatory works will take around 3 ¼ years.

## Costs

The costs of this infrastructural-element are estimated to be € 32,6 million with a bandwidth of ± € 4,4 million.

## Infrastructural-element A2: Simultaneous passing Wondelgem

In the current situation, the Wondelgem station is located at a twin-track railway section. Next to the station, a level crossing (Kapiteinstraat) is situated. Directly north of the level crossing, the twin-track railway converges into a single-track section towards the port area of Ghent and Terneuzen. After around 50 meters on the single-track section, passenger railway branches off towards Evergem. This element (A2) includes the removal of the single-track bottleneck by adding a second track between the Wondelgem station and the Evergem branch off in order to let freight and passenger trains pass each other simultaneously.

## Variant analysis

Due to the restricted available space between the level crossing and the tracks towards Evergem only one switch is possible, the second switch will be situated after the branch off. The switch at Wondelgem is positioned in such a way that the passenger train can use both tracks from and towards Evergem.

## Technical Aspects

Between the 'Kapiteinstraat' level crossing and the rail connection towards Evergem there is insufficient space available to include two switches. Because the fact that the switch cannot be fitted between the level crossing and Wondelgem station, the twin tracks are placed beyond the connection to the branch towards Evergem. When the rail track towards the port area of Ghent and Terneuzen straightens, the twin-track section converges into single track. This means a bridge over the 'de Lieve' canal is not needed.

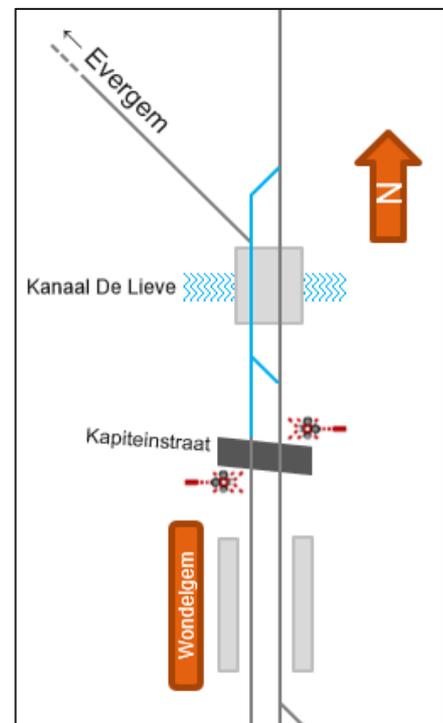


Figure 3: Infrastructural-element A2: Simultaneous passing Wondelgem

## Environmental impact assessment

There are two main points of concern that result from the environmental impact assessment:

- The proximity to residential housing next to the passenger railway tracks.
- The connectivity and fire safety of the industrial site at the Watlington street.

Based on the abovementioned the risks from an environmental point of view are graded as 'average'.

## Procedures to follow and estimated turnaround time

The realization of this infrastructural-element requires a change of the 'Ruimtelijk Uitvoeringsplan' and a 'plan-m.e.r.'. Afterwards the 'onthefing-project-m.e.r.' can be requested. Based on the procedures and the described design the turnaround time of the preparatory works will be an estimated 3 ½ years and the construction period will last around 1 ¼ year.

## Costs

The costs of this infrastructural-element are estimated to be € 6,9 million with a bandwidth of around ± € 0,95 million.

## Infrastructural-element A3: South-East connection towards the 'Sluiskil'-bridge

In the current situation, freight transports by rail from and towards the 'industrial area 'Axelse Vlakte' has to change direction in Terneuzen. It is not possible to reach the Axelse Vlakte directly from the west side of the canal. This Infrastructural-element includes the construction of a direct connection between the 'Sluiskil'-bridge and the 'Axelse Vlakte'. This means trains from and towards the 'Axelse Vlakte' can run directly towards Ghent.

## Variant analysis

The limited available space, as well as the height difference that need to be overcome, are a defining factor for this infrastructure-element. Two variants are developed:

- A variant that crosses the Sluiskil-tunnel and passes by the front (East) of the Sluiskil-tunnel technical building
- A variant that crosses the Sluiskil-tunnel and passes by the back (West) after the Sluiskil-tunnel technical building

Because there is enough space available between the current railway tracks and the technical building of the Sluiskil-tunnel, the location of the preferred solution passes in front of the technical building.

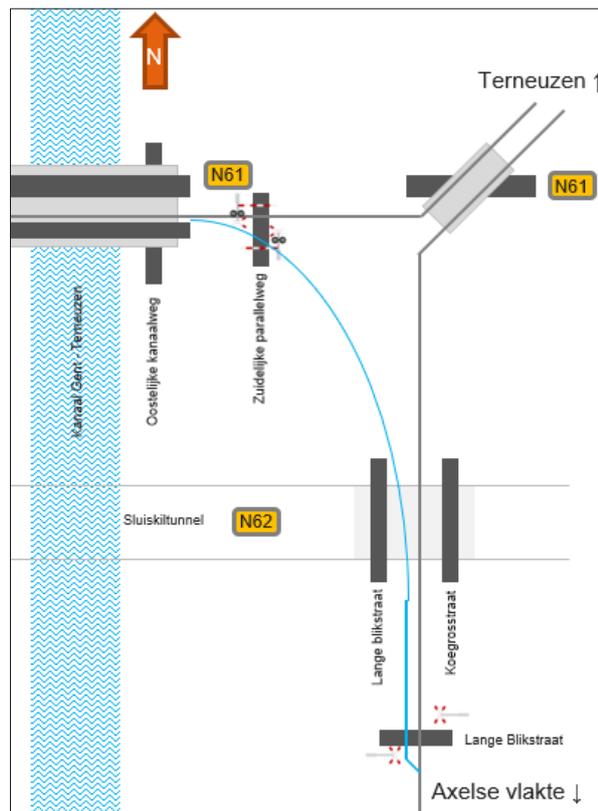


Figure 4: Infrastructural-element A3: South-East connection near the 'Sluiskil'-bridge.

## Technical aspects

To cross the height difference of 6 meters between the Sluiskil-bridge and the tracks towards the Axelse Vlakte 900 meters of track is required. The 'Blikstraat' will need to be crossed, closed off and will have

dead ends at both sides. The level crossing 'Zuidelijke parallelweg' and the level crossing 'Lange Blikstraat' will both become double-track sections. Due to the low car traffic intensity on both roads, in combination with a low train traffic intensity, this proves to be acceptable for both level crossings. The South-East connection will cross the 'Sluiskil' tunnel. Because the tunnel is not prepared to handle the extra load of tracks and earthworks, a new construction needs to be built. Also, a 50 kV electrical cable needs to be extended to make space for the planned construction. Finally, safety modification needs to be applied for the crossing of several pipelines (carrying hazardous materials).

## Environmental impact assessment

The environmental impact is considered as 'low', due to the characteristics of the surrounding (being industrial) and the earlier described technical aspects.

## Procedures to follow and estimated turnaround time

For this infrastructural-element the zoning plan and possibly the 'Tracébesluit' or 'provinciaal inpassingsplan' are required in combination with a m.e.r.-assessment with limited procedural requirements. After the proposed introduction of a new zoning law (omgevingswet) around 2021, these requirements may change. Based on the procedures and design as described above, the turnaround time of the preparatory works is estimated to be 2 ¾ years and the construction period is expected to last 2 ½ years.

## Costs

The costs of this infrastructural-element are estimated to be € 15,5 million with a bandwidth ± € 2,2 million.

## Infrastructural element A4: Railway connection track Axel – Zelzate

In the current situation is the railway network in 'Zeeuws Vlaanderen' region only connected to Belgium via the western bank of the canal. Freight trains to and from the industrial complex 'Axelse Vlakte' or Terneuzen run via the Sluiskil bridge to the western bank to reach Belgium. Because the Sluiskil bridge is a movable bridge, that regularly opens for ships, the bridge is an obstacle for freight traffic by rail. The infrastructural element discussed here is a new direct connection between the Axelse Vlakte / Axelse Sassing industrial complex in the Netherlands and the existing stabling yard of ArcelorMittal just south of Zelzate in Belgium. The new rail connection would be an estimated 12 km long.

## Variant analysis

For this infrastructural-element a few variants for several elements are investigated:

- De connection to the Axelse Vlakte: de new railway connection must be accessible from both the Axelse Vlakte and Terneuzen. Due to the recent modifications to the 'Tractaatweg' (N62), the local roads and the existing tracks towards the Axelse Vlakte this would result in multiple costly crossings between the railway and the 'Tractaatweg' (N62). Because of this, a variant is considered in which the rail tracks split before Axelse Sassing. In this way, the railway network forms a triangle with the points: Axelse Vlakte, Axelse Sassing (existing track towards Terneuzen) and the new tracks towards Zelzate. This solution means that all destinations remain accessible.
- The connection between The Netherlands – Belgium: between the Axelse Vlakte and Zelzate, two variants are investigated. In the 'bundled' variant, the railway tracks are bundled as much as possible with the Tractaatweg (N62). A disadvantage of this variant is that many grade-separated crossings are required. In the 'straight edge' variant the new tracks follow a straight line from the Axelse Vlakte towards Zelzate. The disadvantage of this variant is the larger amount of fragmentation of the surroundings, the need to acquire more grounds of many different land owners and a larger impact on the surrounding environment.

The 'bundled' variant is further detailed.

## Technical aspects

The railway track from Axel – Zelzate primarily runs parallel to the ‘Tractaatweg’ (N62), N423 and R4. This requires several grade-separated crossings and level crossings. The tracks cross the roads R4 (at Gent-North near ArcelorMittal) and the A11, via grade-separated crossings which are constructed as part of the R4WO-project<sup>2</sup>. Due to the height of the current connection of the N449 Walderdonk towards the R4 and the crossing of the R4 with the A11, the railway is constructed partially below ground level. This lowered section has a length of circa 1.400 meter. The N449 Walderdonk to Wachtebeke crosses the rail tracks by means of a bridge.

The Sint-Stevenstreet in Zelzate crosses, by means of a bridge, both the railway as well as the N423. In the Netherlands the tracks remain primarily at ground level. The tracks cross the ‘Tractaatweg’ (N62) with a ‘Girder bridge’. The weak ground conditions are a concern going forward. In the Netherlands there are several crossings with local roads, which will be equipped with a level crossing installation. This is acceptable due to the low traffic intensity at these roads. At ‘Zwartenhoek’ the track splits. One connection runs towards the Axelse Vlakte, the other towards Axelse sassing and Terneuzen. This enables that all destinations are accessible by using the new Axel – Zelzate track. In both Belgium and the Netherlands, the railway track crosses several pipelines that transport dangerous goods. Also, in The Netherlands a pipeline runs parallel to the proposed tracks which is also a point to address in future studies.



Figure 5: Infrastructural element A4: Railway connection track Axel – Zelzate.

## Environmental impact assessment

A possible risk was identified during the environmental impact assessment, being the exceedance of critical nitrogen deposition figures. A Quick Scan calculation was made using AERIUS. The results indicate a potential bottleneck for the Natura 2000 areas where more than 0.05 mol/hectare.year is added, while the spatial development space is limited. This is the case for 38 areas for which a new permit needs to be applied for at the province of Zeeland. The project effects range between 0,01 and 0,11 mol, which are considered very low. In the Netherlands this is compensated by measures from the ‘Programmatische aanpak Stikstof’ (PAS) program. The future of this PAS program remains unclear due to legal issues. In May 2019 the future of this program will be clearer. Nitrogen deposition figures therefor remain an important bottleneck for this project. Because the future of PAS is a national problem which affects many other projects, the most important control measure is to be informed on the PAS debate and remain in contact with the province of Zeeland about possible effects for this project.

<sup>2</sup> During the Design sessions this baseline was established. At the start of 2019 the consideration will be made with Infrabel which construction projects will be part of the R4WO-project scope. This may result in change of the scope and budgets for both projects.

In addition to the abovementioned, there are some other potential issues to consider:

- Expropriation (both housing and farming grounds) and concerns about environmental issues (noise nuisance, closure of the 'Leegstraat', external safety of the transport of dangerous goods).
- The crossing of three protected nature reserves of the 'Nature network Zeeland' in the Axelse Vlakte and around the border between the Netherlands and Belgium.
- Forest compensation for the 'Klooster' forest.
- High expected probability of finding unexploded conventional explosives.
- Crossing of multiple water streams.
- Crossing of archeological sites.

Due to the points discussed, the risk and complexity of this infrastructural-element (new railway in urban and rural area) the environmental risk is believed to be high.

### **Procedures to follow and estimated turnaround time**

This infrastructural-element requires (based on the new 'omgevingswet') a 'projectbesluit' and going through a full 'm.e.r.-procedure'. For the Belgian side a change of the 'Gewestelijk Ruimtelijk Uitvoeringsplan' and 'plan-m.e.r.' is required, after which an 'omgevingsvergunning' with 'project-m.e.r.' can be requested. Based on these procedures and described design the turnaround time will be an estimated 5 ¼ years for preparatory works and a construction period of 3 ½ years.

### **Costs**

The costs of this infrastructural element are estimated to be:

- Dutch section: € 61,3 million with a bandwidth of ± € 7,6 million.
- Belgian section: € 102,1 million with a bandwidth of ± € 14,8 million.

## **Infra-element B1: Track-doubling Wondelgem – Zandeken**

In the current situation there is a single-track section of railway between Wondelgem and Zandeken. Between the crossing with the 'Ringvaart' canal and Zandeken, the route is prepared to handle a second track. This infrastructural-element includes the construction of a double track section between Wondelgem and Zandeken. This infrastructural element connects to the A2 infrastructural-element option: Simultaneous passing Wondelgem.

### **Variant analysis**

After a first scan of the section Wondelgem – Zandeken a large part of the required alterations proved to be needed between Wondelgem and the crossing with the 'Ringvaart' canal: here, several constructions are needed and a lot of branches towards industrial complexes are situated which require several railway switches. Two variants were developed, and both are further elaborated upon in this study:

- Partial doubling of the tracks: in this variant only a 5 km section is doubled between the crossing with the 'Ringvaart' canal and Zandeken. This variant uses the existing embankment.
- Full doubling of tracks: in this variant the full 7 km section between Wondelgem and Zandeken is doubled. This variant is equal to the partial doubling between the crossing with the 'Ringvaart' canal and Zandeken.

### **Technical Aspects**

The doubling of tracks starts south of the shunting yard of 'Zandeken'. A double connection is considered because this means the train between shunting yard 'Zandeken' and Wondelgem can run simultaneously with train in other directions. Between Zandeken and the crossing with the 'Ringvaart' canal the construction is already prepared for double tracks so relatively few infrastructural adjustments need to be made. North of the canal the partial doubling of tracks ends. Between de canal and Wondelgem, the section remains single track for 2 km. When considering the full doubling of track, a

new steel arch bridge crossing the 'Ringvaart' canal will be constructed. Between this canal and Wondelgem expansion of the tracks is required to handle the doubling of the tracks. The railway connection to Evergem is to be adjusted. To keep all company connections open, new switches are needed. The construction 'Zeeschipstreet' is already prepared for double tracks. The (informal) connection towards the 'Spesbroekstreet' is lost. Near Wondelgem, the section joins the infrastructural element A2: Simultaneous passing Wondelgem. Element A2 is required before the B1 element can be realized.

## Environmental impact assessment

Environmental impact assessments show that the crossing of waterways is a point of concern. Also, the connectivity of the 'Zeeschipstreet' area is a concern because this uses the same space as the B1 element requires. Also, the moving of the L216 railway track needs to be considered.

The points indicated and the fact that the railway will be constructed on top of an existing embankment, means the environmental risks are considered to be low.

## Procedures to follow and estimated turnaround time

For this infrastructural-element with a full doubling of the tracks, the 'Gewestelijk Ruimtelijk Uitvoeringsplan' needs to be changed by means of a 'plan-m.e.r.'. For partial doubling of tracks applying for a 'omgevingsvergunning' with a 'onthefing-project-m.e.r.' is enough. Based on the procedures and the design as discussed, the turnaround time of the preparatory works are estimated to last 4 ¾ years for full doubling of tracks and 3 years for a partial variant. The construction period will last an estimated 3 years for the full doubling variant and 1 ¾ for the partial variant.

## Costs

The estimated costs of this infrastructural-element are:

- Full doubling of tracks: € 38,1 million with a bandwidth of ± € 5,1 million.
- Partial doubling of tracks: € 11,4 million with a bandwidth of ± € 1,2 million.

## Infrastructural-element B2: North-East connection towards the 'Sluiskil'-bridge

In the current situation the rail freight traffic to and from DOW runs via the western bank of the canal. When infrastructural element A4: Axel – Zelzate is to be realized is it preferable to also be able to run on the eastern bank of the canal. This infrastructural-element includes the construction of the connection between the DOW and the 'Sluiskil' bridge: The North-East connection.

## Variant analysis

The limited available space west of the 'Sluiskil' bridge, the difference in height and the road connection between the N61 and the N252 are determining factors for this infrastructural-element. As far as the track is concerned, one variant is the obvious choice. For the crossing of the N61, several variants are possible, but due to the choice to do a limited investigation for this element only 1 of those options is discussed in this study. North of the element location, there are some pipelines that are preferable avoided. The road design between the proposed tracks and the pipelines is optimized in coordination with the municipality of Terneuzen and the Province of Zeeland.

## Technical aspects

To cover a height difference of 8 meter between the 'Sluiskil' bridge and the tracks towards DOW a lengths of 1100 meter is required. The new railway connection crosses the N61. Due to the traffic intensity of the N61, a level crossing is not acceptable. After the construction of the 'Sluiskil' tunnel (N62) the importance of the N61 in the infrastructure network will decline, which means a devaluation to a lower road category is acceptable. It is proposed to construct a new roundabout in the connection road between N61 and N252. The N61 is extended towards this roundabout. The railway tracks of the north-east connection crosses one of the extended parts of the N61 on separate levels. To have an open character, a single span is preferred. At the norther part of the north-east connection the tracks cross the 'Noord' road. This level crossing will be double track and need to be equipped with active train safety systems.

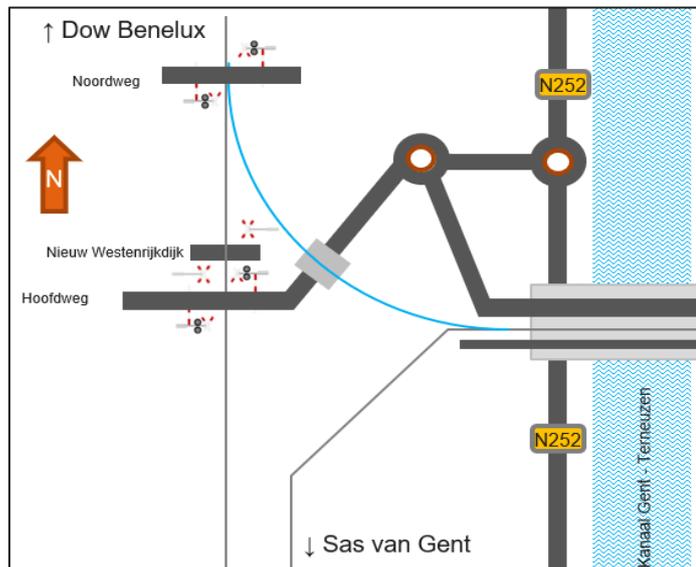


Figure 6: Infra-element B2: Infrastructural-element: North-East connection towards the 'Sluiskil'-bridge

At the norther part of the north-east connection the tracks cross the 'Noord' road. This level crossing will be double track and need to be equipped with active train safety systems.

## Environmental impact assessment

There is some point to consider following the environmental impact assessment.

- External safety, because the tracks cross several high-risk cables and pipelines (natural gas, ethylene)
- Possible effect on the flood defense. This may be a risk for the planning, timely contact with the regional water authority is advised.
- Purchase of real-estate (recently divided lots).

Duo to the concerns identified above and the rural area around the element the risk is considered average.

## Procedures to follow and estimated turnaround time

For this infrastructural-element the 'projectbesluit' or 'omgevingsplan' are needed in conjunction with a full 'm.e.r.-procedure'. Based on the design as described the turnaround time of the preparatory works will last an estimated 3 ¾ years and the construction time will be an estimated 2 ½ years.

## Costs

The costs of this infrastructural element are estimated to be € 17,1 million with a bandwidth of ± € 2,3 million.