



# Traffic assessment

Development site Hogebrug, B. Haitzemastraat  
in Winschoten

project number 0461326.100  
draft  
November 23, 2020

# Traffic assessment

Development site Hogebrug, B. Haitzemastraat in Winschoten

project number 461326  
document number 461326-HB-TA-001  
draft revision 0A  
November 23, 2020

## Author



## Client

Project Management Ltd.  
Killakee House, Belgard Square  
24 Tallaght, Dublin

date release  
11-24, 2020

description revision 0A  
draft

for approval  
J.A. Kruse

A blue ink signature, appearing to be 'J.A. Kruse', written over a horizontal line.

release  
A.J. Brandsma

A blue ink signature, appearing to be 'A.J. Brandsma', written over a horizontal line.

# Table of Contents

| Table of Contents |                       | Page |
|-------------------|-----------------------|------|
| 1                 | Introduction          | 1    |
| 2                 | Situation             | 2    |
| 2.1               | Access route          | 2    |
| 2.2               | Basic assumptions     | 3    |
| 2.3               | Traffic distribution  | 4    |
| 2.4               | Traffic generation    | 5    |
| 2.5               | Traffic intensities   | 6    |
| 3                 | Calculations          | 8    |
| 4                 | Conclusion            | 10   |
| Attachment        |                       |      |
| 1                 | Traffic calculations. |      |

# 1 Introduction

At the request of Project Management Ltd. Antea Group has performed a traffic assessment for the potential development site Hoogebrug on the B. Haitzemastraat in Winschoten. The topographical situation of the site is shown in figure 1.1.

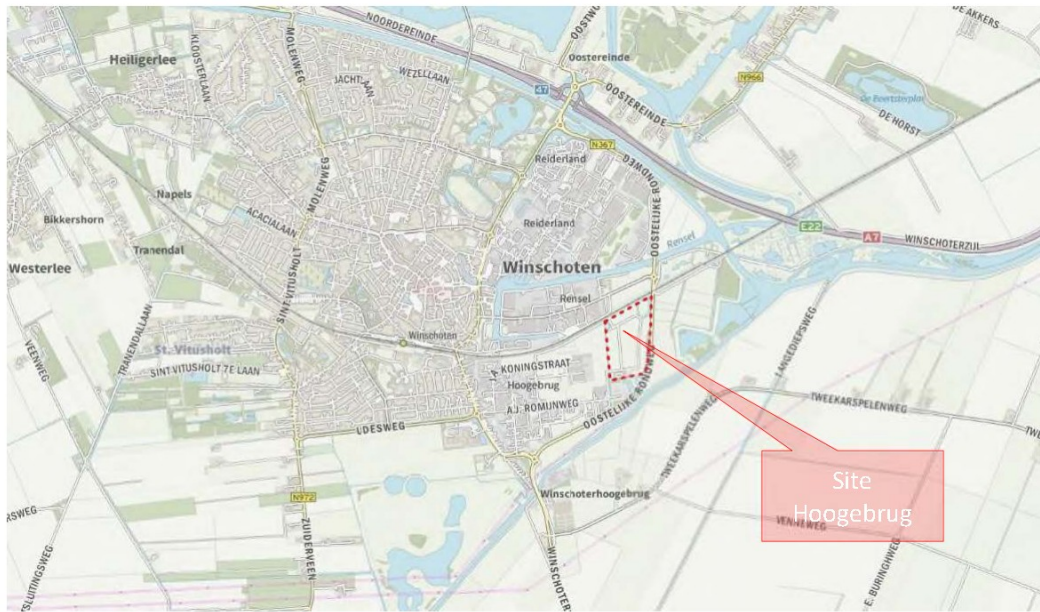


Figure 1.1: Topographical location Hoogebrug-site (source: Opentopo).

The traffic assessment was carried out to determine the increase in traffic resulting from the expansion of the site and to check if the existing infrastructure is sufficient to enable the traffic to reach its destination without jamming the public roads.

## 2 Situation

### 2.1 Access route

The development site is situated along the B. Haitzemastraat on the industrial estate Hoogbrug in Winschoten. De industrial estate Hoogbrug has three access roads, namely the B. Haitzemastraat, the A.J. Romijnweg en de M.J. van Olmstraat. These roads are categorized as area access roads (gebiedsontsluitingswegen) within the city limits with a maximum speed of 50 km/h. There are no plans for a new access route to the development site from the N367. The local situation with the access roads is shown in figure 2.1.

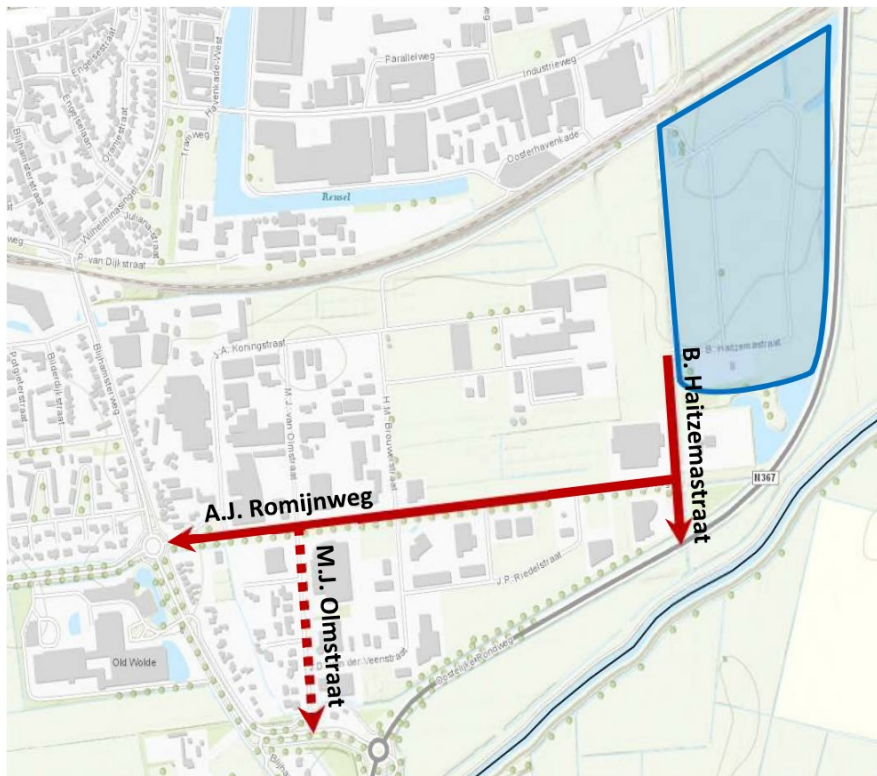


Figure 2.1: Hoogbrug-site and access routes (source: Opentopo).

The A.J. Romijnweg connects to the Blijhamsterweg and offers a connection to the city centre of Winschoten. This is the most probable route for employees living in Winschoten. The B. Haitzemastraat connects to the N367, which in turn connects to the national highway A7. The N367 is the most likely access route for employees from outside Winschoten. A third access route to the development site runs along the M.J. Olmstraat. As there are more direct routes to the site from any direction than the route along the M.J. Olmstraat, this route is unlikely to be taken by personnel or vehicles visiting the site. The route by the M.J. Olmstraat is therefore not taken into account in the remainder of this study.

The two likely access routes to the site are shown in figure 2.2.



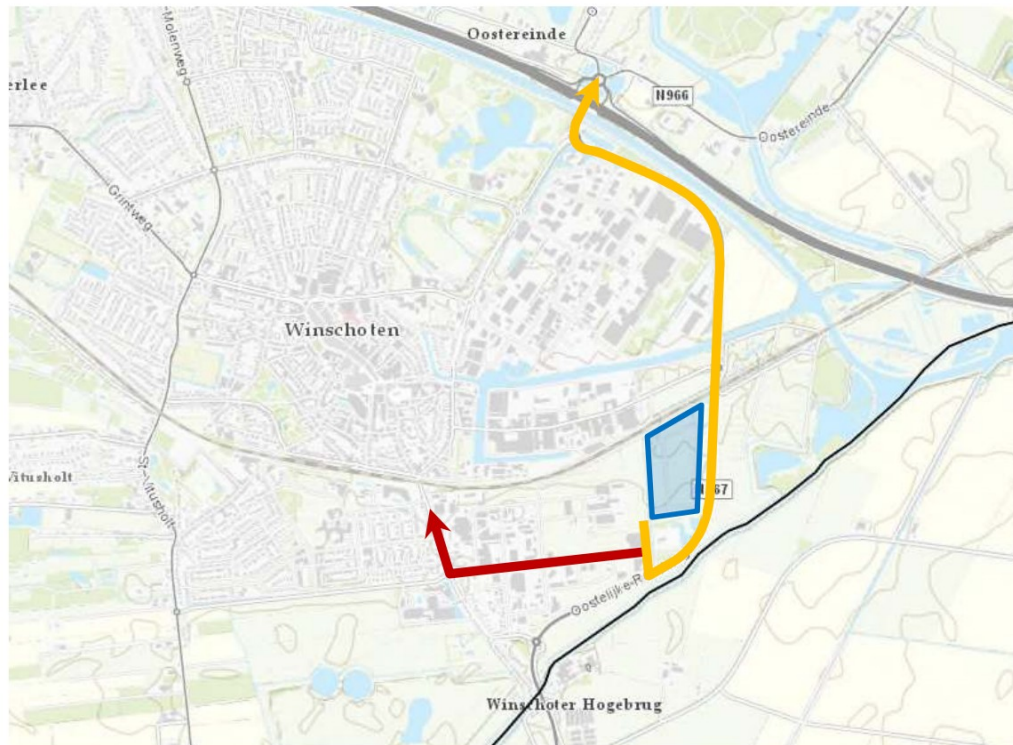


Figure 2.2: most probable access routes to the site (source: Opentopo).

## 2.2 Basic assumptions

For the calculation of the traffic generated by the new, expanded site, the following basic assumptions were made:

- Current and future traffic to the data center according to input provided by the client.
- Traffic intensities based on the count numbers of the Municipality of Oldambt.
- The traffic intensities on the road sections are converted to normative rush hours, both morning rush hour and evening rush hour.
- There are no figures on traffic intensity available for the A.J. Romijnweg. To obtain input information for this route, the traffic generation of the business premises along this road were estimated in the basis of the figures for traffic generation by businesses in the CROW-publication 381: "kencijfers parkeren en verkeersgeneratie 2018".
- For the calculation of traffic on crossroads the calculation tool Meerstrookse Rotondeverkenner ("multilane roundabout explorer") was used.
- For the calculation of the traffic on right of way intersections the calculation tool Omni-X was used.
- The traffic intensities at the crossroads themselves are unknown and were therefore estimated using calculation program Kalibrero.
- On the basis of CROW-publication 381, the following assumptions were made:
  - The traffic intensity in the morning rush hour is 9% of the traffic movements during the entire day.
  - The traffic intensity in the evening rush hour is 8% of the traffic movements during the entire day.

- In the morning rush hour 76 % of the traffic arrives at the industrial estate and 24 % leaves the industrial estate.
- In the evening rush hour 78 % of the traffic leaves the industrial estate and 22 % arrives at the industrial estate.

## 2.3 Traffic distribution

The development of the site will lead to an increase in traffic. These traffic movements will take place along the following routes:

- Roundabout Blijhamsterweg - Udesweg.
- T-junction N367 - B. Haitzemastraat.
- Roundabout N367 - Industrieweg.
- Roundabout N367 - Beertsterweg.
- Roundabout N367 - N966 - A7.

For the traffic analysis it is assumed that the employees in the day shift arrive at the same moment that the night shift leaves the site during the morning rush hour. For the evening rush hour it is assumed that the day shift leaves simultaneously with the arrival of the night shift.

The following assumptions were made regarding the routes the employees will take to the site:

- 75 % of the employees will use the N367 as access route. Of these 90 % will come from Groningen and 10 % will come from the direction of Germany.
- 25 % of the employees will use the Blijhamsterweg as access route. Of these 95 % will arrive from the direction of the city center and 15 % from the Udesweg.

The above is illustrated in figure 2.3.

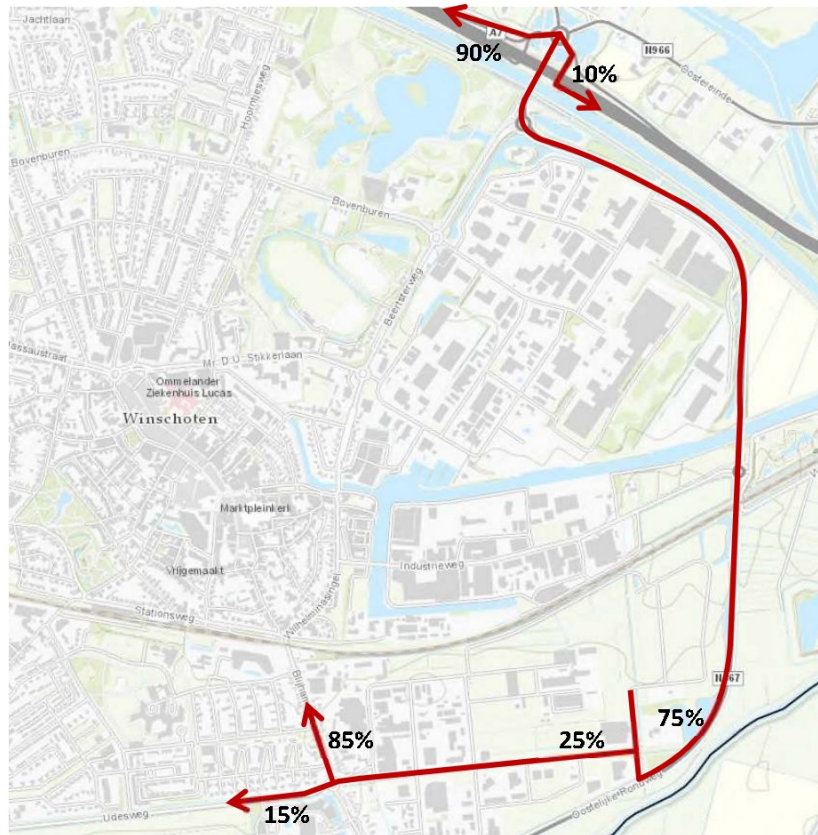


Figure 2.3: assumed distribution of employees' routes to the site (source: Opentopo).

## 2.4 Traffic generation

The prognosis of the client is that a total of 150 extra motor vehicles will travel to the site on a daily basis, consisting of 140 cars and 10 trucks. Each vehicle will lead to 2 movements, one arriving and one leaving the site. The extra traffic that is generated by the site therefore amounts to 300 daily vehicle movements. The extra traffic resulting from the development of the site is shown in table 2.1.

Table 2.1: extra traffic generated because of the development of the Hoogebrug-site

| Hoogebrug                  | Cars       | Trucks    |
|----------------------------|------------|-----------|
| Day shift (8:00-18:00 h)   | 100        | 10        |
| Night shift (18:00-8:00 h) | 40         |           |
| <b>Total</b>               | <b>140</b> | <b>10</b> |
| <b>Vehicle movements</b>   | <b>280</b> | <b>20</b> |

It is likely that a small part of the vehicle movements will take place during the day, outside morning and evening rush hours, e.g. supplier by truck or mini vans. For the calculations the worst case assumption was used however, that all vehicles travel during the rush hours.



The traffic generation during the construction of the site was not considered, as this represents a temporary situation. Only the traffic generation of the finished site was considered.

## 2.5 Traffic intensities

The count numbers of the Municipality of Oldamt date from 2014, 2015 and 2017. The figures include traffic intensities per day and per road section. As the population in East Groningen shrinks, it is expected that the count numbers of 2014 are representative for the current situation. Figure 2.4 shows the traffic intensities.

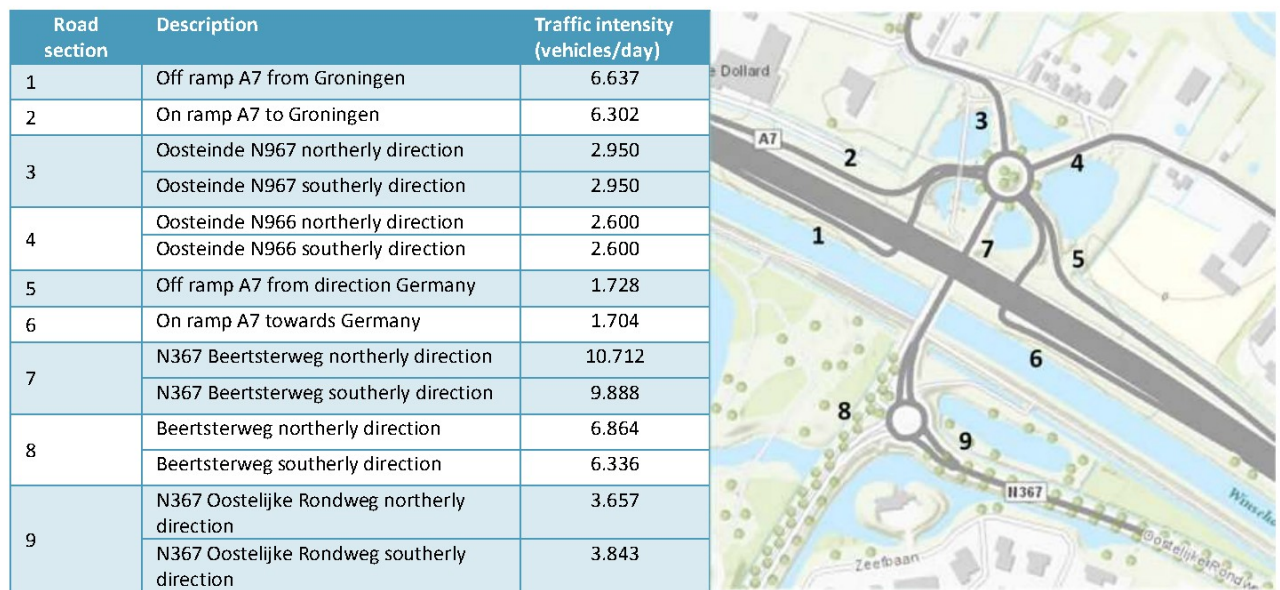


Figure 2.4: traffic intensities (source: Municipality of Oldamt and Opentopo)

### Traffic at roundabout Industrieweg - N367

In compliance with the CROW-publication 381, the calculation of the number of vehicles is based in the net surface of the industrial estate along the Industrieweg. The net surface is 77 % of the total surface area of the industrial estate. The general average for mixed industrial areas is expressed as a number of vehicles per ha of net surface area. For a mixed industrial estate the average is 128 cars and 30 truck per ha per day (a total of 158 vehicles).

The total surface area of the industrial estate along the Industrieweg is 23 ha. Therefore the net area is 17.7 ha. The number of vehicles movements based on the above mentioned averages is than 2796 vehicles per day. The industrial estate along the Industrieweg can be reached from the east via the N367 and from the west via the Wilhelminasingel. As no count numbers are available, a distribution of 75 % of the cars accessing by the N367 and 25 % accessing from the Wilhelminasingel is assumed. Trucks are obliged to use the N367. This implies that 3069 vehicles will use the roundabout N367 - Industrieweg on a daily basis.

### Traffic at intersections B. Haitzemastraat - N367 and A.J. Romijnweg - Blijhamsterweg

Industrial estate Hoogebrug has a total surface area of 33.6 ha and a net surface of 25.9 ha. Based on the previously mentioned averages the total generated traffic amounts to 4096 vehicles per day. As no count numbers are available, the distribution along the access routes is assumed to be as follows:

- 45 % via the A.J. Romijnweg.
- 35 % via the M.J. Olmstraat.
- 20 % via the B. Haitzemastraat.

This means that on a daily basis 1841 vehicles use the A.J. Romijnweg and 818 vehicles use the B. Haitzemastraat.

The resulting traffic intensities are shown in figure 2.5.

| Road section | Description                                 | Traffic intensity (vehicles/day) |
|--------------|---|----------------------------------|
| Wegvak 1     | N367 Oostelijke Rondweg northerly direction | 3.657                            |
|              | N367 Oostelijke Rondweg southerly direction | 3.843                            |
| Wegvak 2     | Industrieweg westerly direction             | 1.535*                           |
|              | Industrieweg easterly direction             | 1.535*                           |
| Wegvak 3     | N367 Oostelijke Rondweg northerly direction | 3.950                            |
|              | N367 Oostelijke Rondweg southerly direction | 4.150                            |
| Wegvak 4     | B. Haitzemastraat northerly direction       | 410*                             |
|              | B. Haitzemastraat southerly direction       | 410*                             |
| Wegvak 5     | N367 Oostelijke Rondweg northerly direction | 3.950                            |
|              | N367 Oostelijke Rondweg southerly direction | 4.150                            |
| Wegvak 6     | A.J. Romijnweg easterly direction           | 920*                             |
|              | A.J. Romijnweg westerly direction           | 920*                             |
| Wegvak 7     | Blijhamsterweg northerly direction          | 3.224                            |
|              | Blijhamsterweg southerly direction          | 2.976                            |
| Wegvak 8     | Udesweg easterly direction                  | 3.276                            |
|              | Udesweg westerly direction                  | 3.024                            |
| Wegvak 9     | Blijhamsterweg northerly direction          | 5.150                            |
|              | Blijhamsterweg southerly direction          | 4.750                            |

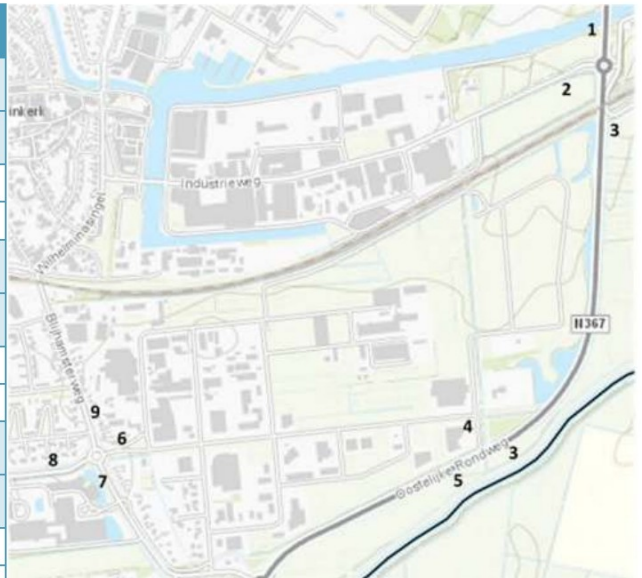


Figure 2.5: traffic intensities (sources Municipality of Oldambt and Opentopo)

### 3 Calculations

The calculation tools Multilane roundabout explorer and Omni-X calculates the IC-ratio of the roundabout on the basis of the traffic intensities (daily or rush hour) The IC-ratio is the ratio between intensity and capacity. An IC-value below 0.7 shows that no traffic bottleneck is to be expected. IC-ratios between 0.7 and 0.8 imply a risk of hindrance but there is still some leeway. At IC-ratios above 0.8 an undesirable situation ensues.

| Score               | Toelichting                          | Interpretatie                |
|---------------------|--------------------------------------|------------------------------|
| Lower than 0,7      | Futureproof                          | Preferable situation         |
| Between 0,7 and 0,8 | Risk of hindrance, still some leeway | Grey area, risk of hindrance |
| Between 0,8 and 0,9 | Risk of congestion in                | Unwanted situation           |
| Higher than 0,9     | Structurele congestie                | Unwanted situation           |

The calculation results for the various crossroads are presented and discussed below. The calculations are shown in attachment 1.

#### Roundabout Blijhamsterweg - Udesweg

The following values are calculated:

- Morning rush hour: IC-ratio is 0.33.
- Evening rush hour: IC-ratio is 0.28.

Both figures are clearly below the threshold value of 0.80-0.85.

#### T-junction N367 - B. Haitzemastraat

The following values are calculated:

- Morning rush hour: IC-ratio is 0.16.
- Evening rush hour: IC-ratio is 0.36.

Both figures are clearly below the threshold value of 0.80-0.85.

#### Roundabout N367 - Industrieweg

The following values are calculated:

- Morning rush hour: IC-ratio is 0.27.
- Evening rush hour: IC-ratio is 0.29.

Both figures are clearly below the threshold value of 0.80-0.85.

### Roundabout N367 - Beertsterweg

The following values are calculated:

- Morning rush hour: IC-ratio is 0.73.
- Evening rush hour: IC-ratio is 0.61.

Both figures are clearly below the threshold value of 0.80-0.85.

### Roundabout N367 - N966 - A7

The calculation results are shown in table 3.1. For the road sections the reader is referred to figure 2.4.

Table 3.1: Calculation results for the roundabout N367 - N966 - A7

| Branche | Road section | Morning rush hour |                      | Evening rush hour |                      |
|---------|--------------|-------------------|----------------------|-------------------|----------------------|
|         |              | I/C-ratio         | Average waiting time | I/C-ratio         | Average waiting time |
| 1       | 1 + 2        | 0.81              | 21 sec               | 0.64              | 11 sec               |
| 2       | 3            | 0.56              | 14 sec               | 0.45              | 11 sec               |
| 3       | 4            | 0.51              | 13 sec               | 0.43              | 11 sec               |
| 4       | 5 + 6        | 0.37              | 13 sec               | 0.29              | 11 sec               |
| 5       | 7            | 0.93              | 37 sec               | 0.82              | 18 sec               |

The highest IC-ratio in the morning rush hour is 0.93 and in the evening rush hour 0.82. These values are higher than the threshold of 0.80. The average waiting time for the roundabout is 37 seconds, where 35 seconds is generally accepted as being the maximum allowable waiting time.

### Current traffic at the roundabout A7 - N367

The congestions mainly occurs on the N367 - Beertsterweg (branche 5) across the Winschoterdiep. This is the main access route to Winschoten. In order to determine the influence of the planned development of the Hoogetbrug-site, the traffic intensity is also calculated with the current traffic intensities (i.e. without the extra traffic generated by the future Hoogetbrug-site). The current IC-ratio is approximately 0.85. This implies that in the current situation congestion also occurs. The extra traffic generated by the developed Hoogetbrug-site further increases the IC-ratio, but without this traffic there is already a bottleneck at this roundabout.

Opening of the adjacent bridge across the Winschoterdiep will cause extra waiting time and extra stagnation of the traffic, probably extending as far back as the roundabout itself and possibly the on and off ramps of the A7. Opening of the bridge is especially expected in the summer period when pleasure yachts frequent the Winschoterdiep.

## 4 Conclusion

From the traffic assessment the following conclusions can be drawn:

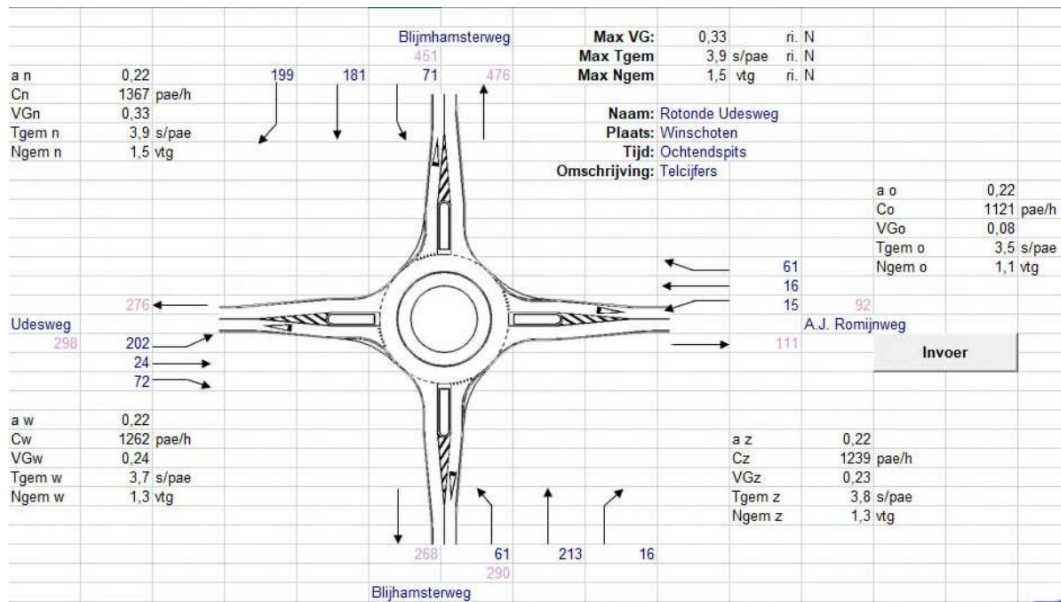
- The road network on the existing industrial estate Hoogebrug and the adjacent crossroads is of sufficient capacity to allow the additional traffic generated by development of the Hoogebrug-site by the client.
- The 5-branched roundabout connecting the N367 to the A7, which is part of the most important access route to the development site forms a bottleneck however. This roundabout is already a bottleneck in the current situation, without the extra traffic resulting from the development of the Hoogebrug-site. Especially in the morning rush hour there is a risk of congestion. Opening of the bridge across the Winschoterdiep, which is adjacent to the roundabout, can result in long jams with a backlash to the traffic on the roundabout itself. The impact of the extra traffic generated by development of the Hoogebrug-site on this specific roundabout is relatively small (113 motor vehicles/day on a total intensity of 20,500 motor vehicles/day on the N367 at the connection to the A7, i.e. 0.5 % of the total traffic intensity).

Antea Group  
Heerenveen, November 2020

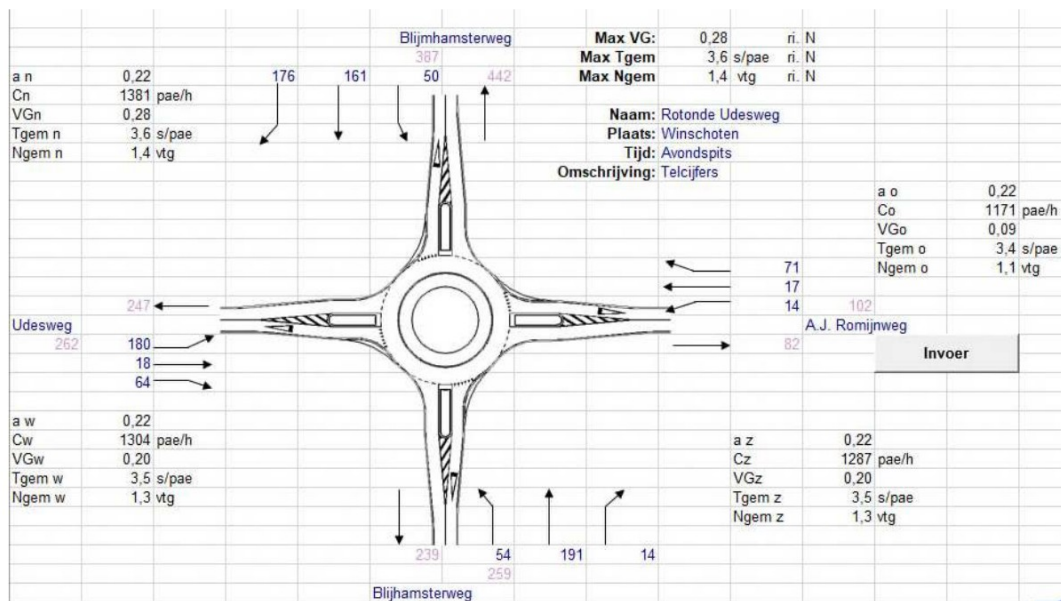


## **Attachment 1: Traffic calculations**

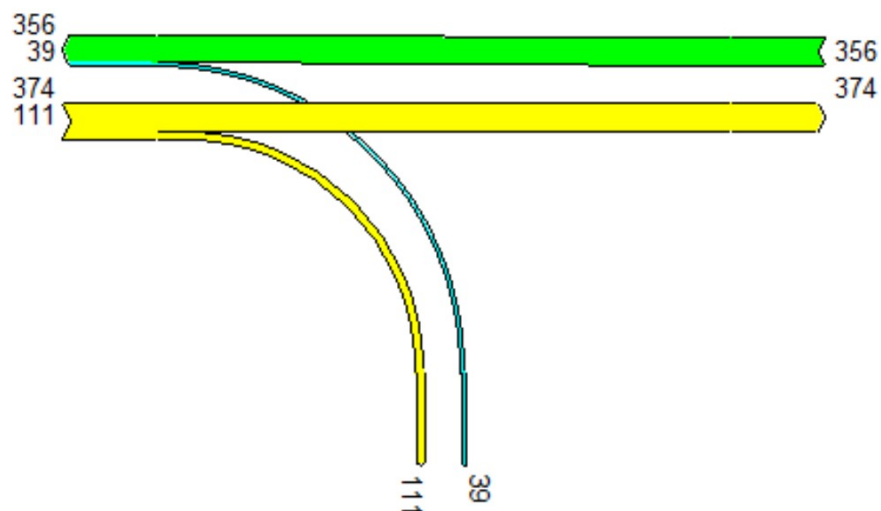
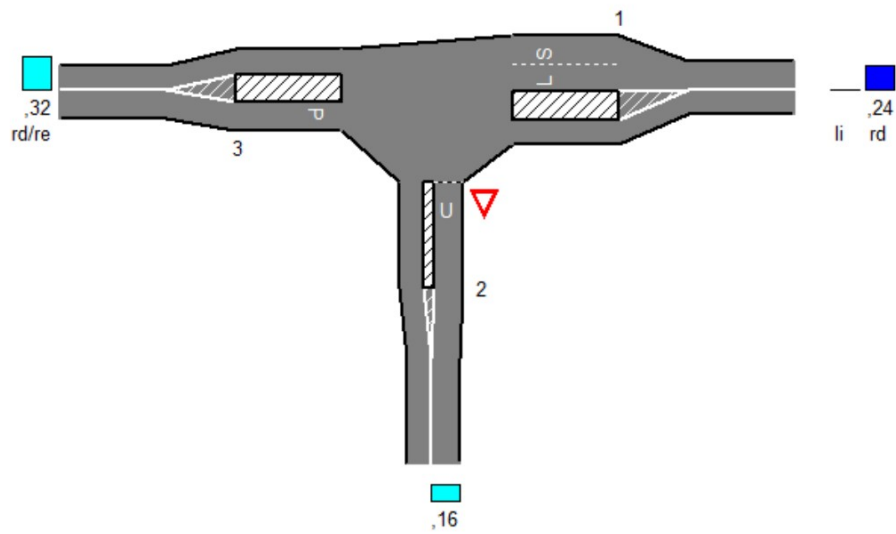
### Roundabout Blijhamsterweg - Udesweg morning rush hour



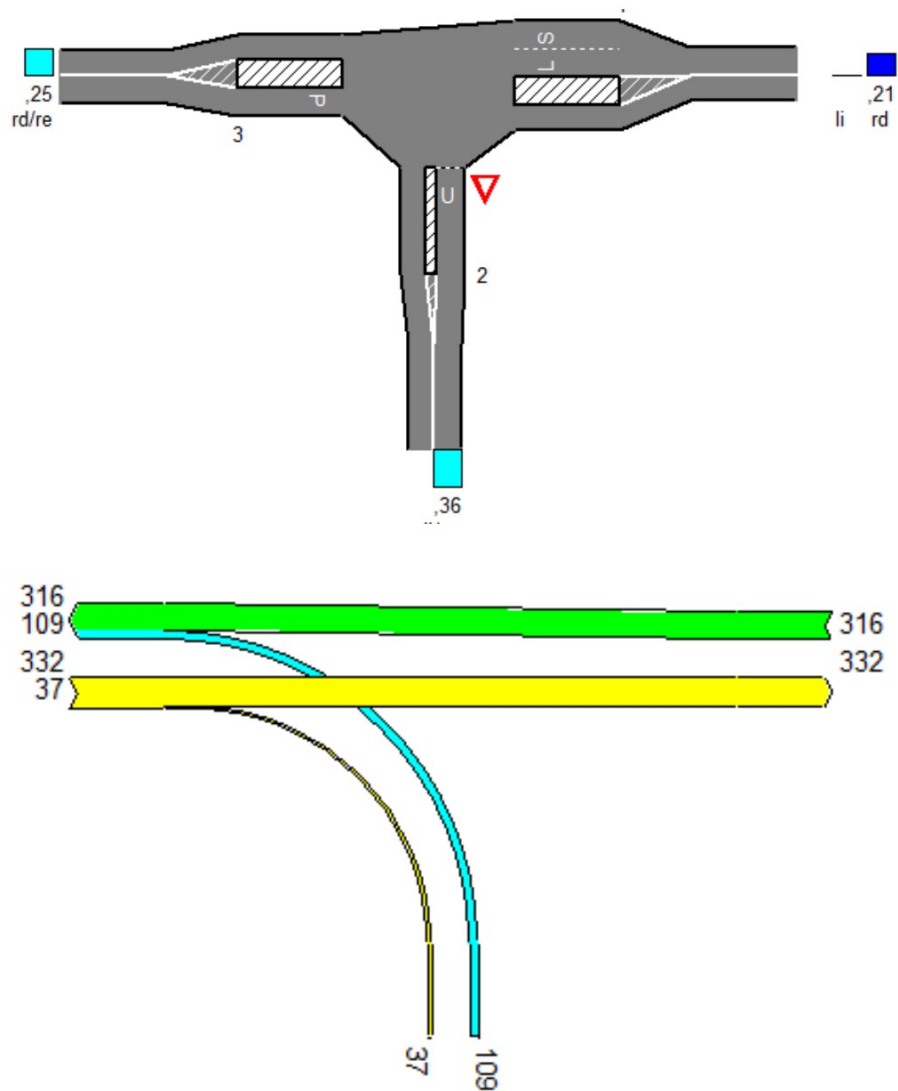
### Roundabout Blijhamsterweg - Udesweg evening rush hour



### T-junction N367 - B. Haitzemastraat morning rush hour



### T-junction N367 - B. Haitzemastraat evening rush hour



**Northbound Approach (N367):**

|        |            |
|--------|------------|
| a n    | 0,22       |
| Cn     | 1446 pae/h |
| VGn    | 0,27       |
| Tgem n | 3,4 s/pae  |
| Ngem n | 1,4 vtg    |

**Westbound Approach (Industrieweg):**

|        |            |
|--------|------------|
| a w    | 0,22       |
| Cw     | 1257 pae/h |
| VGw    | 0,03       |
| Tgem w | 2,9 s/pae  |
| Ngem w | 1,0 vtg    |

**Central Island:**

**Southbound Approach (N367):**

|        |            |
|--------|------------|
| a z    | 0,22       |
| Cz     | 1459 pae/h |
| VGz    | 0,24       |
| Tgem z | 3,2 s/pae  |
| Ngem z | 1,3 vtg    |

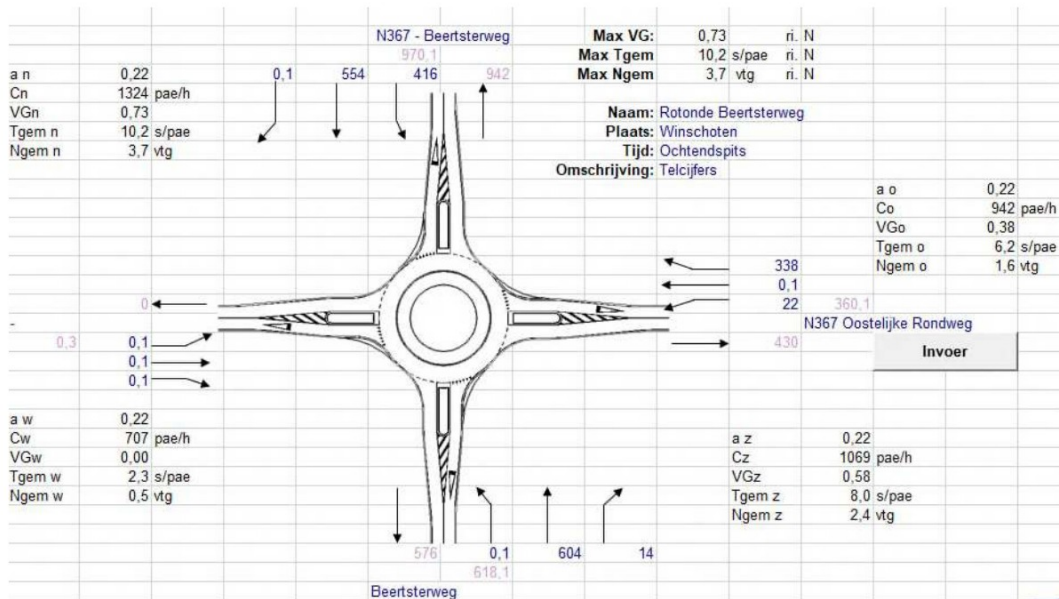
**Eastbound Approach (Invoer):**

|        |            |
|--------|------------|
| a o    | 0,22       |
| Co     | 1233 pae/h |
| VGo    | 0,00       |
| Tgem o | 2,3 s/pae  |
| Ngem o | 0,8 vtg    |

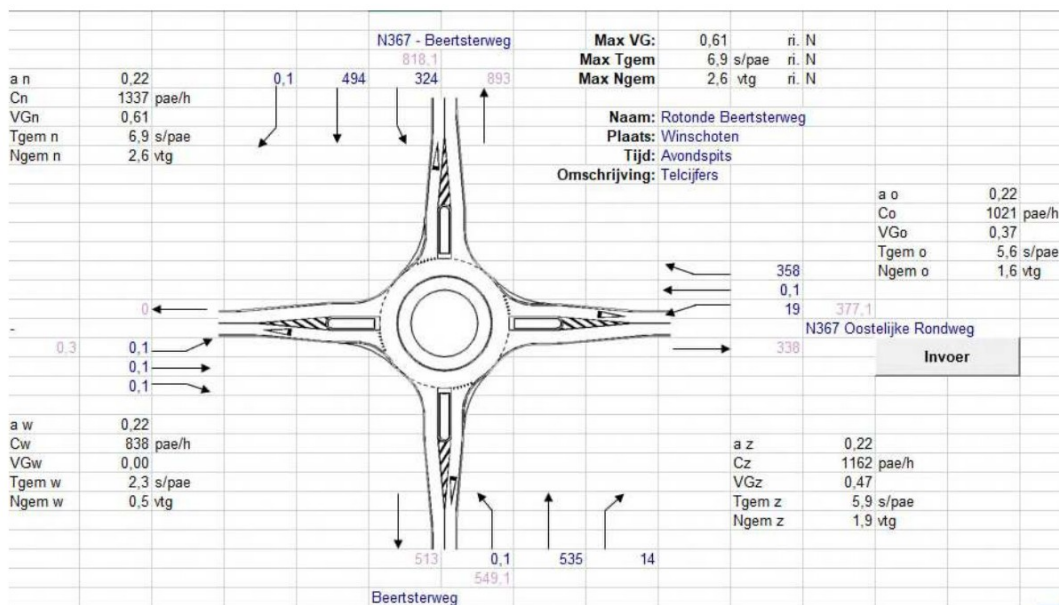
[illegible]



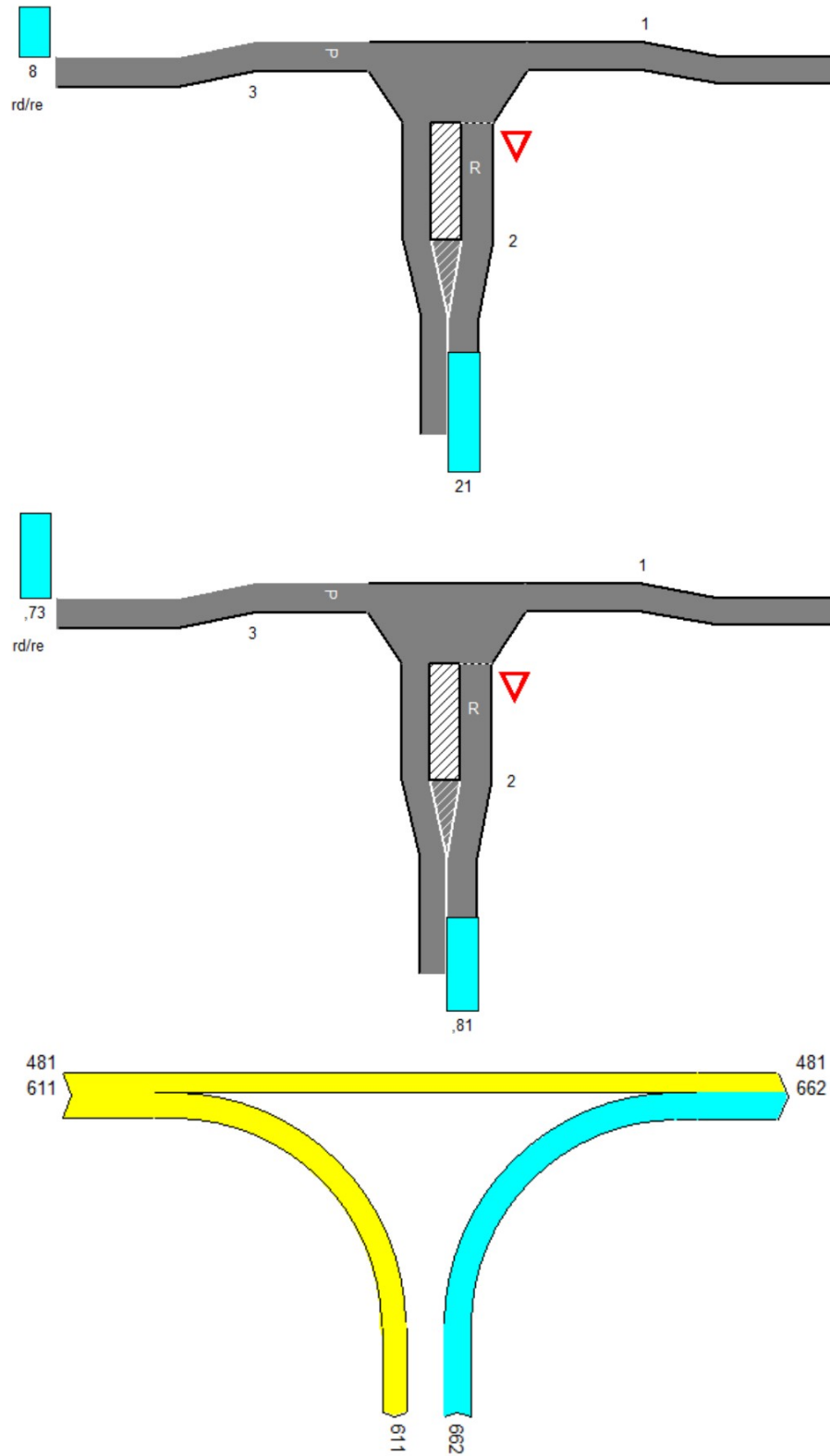
### Roundabout N367 - Beertsterweg morning rush hour



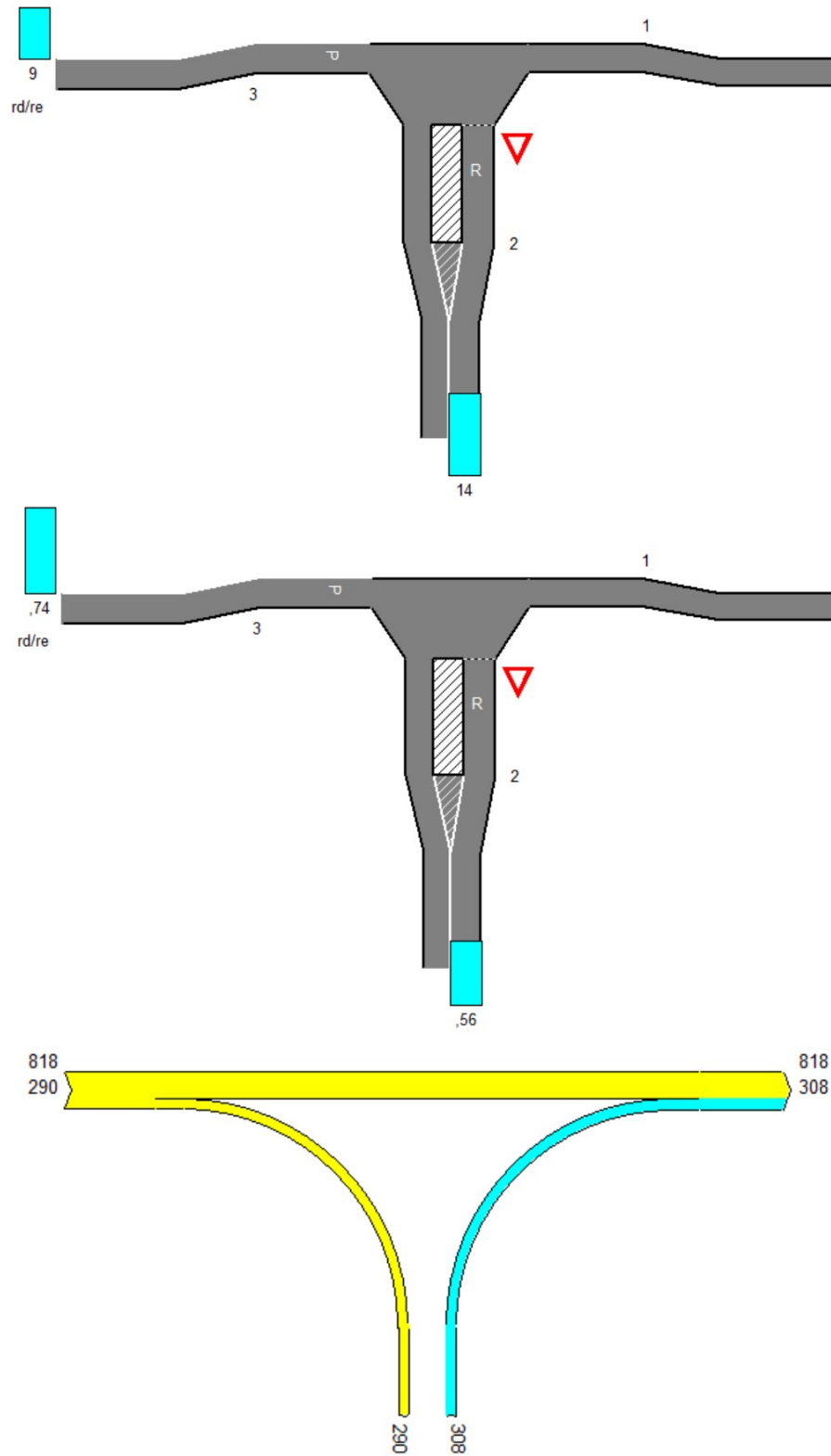
### Roundabout N367 - Beertsterweg evening rush hour



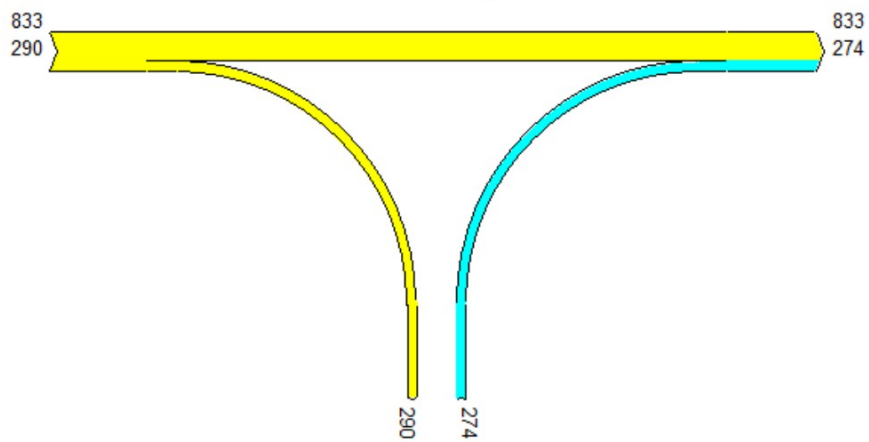
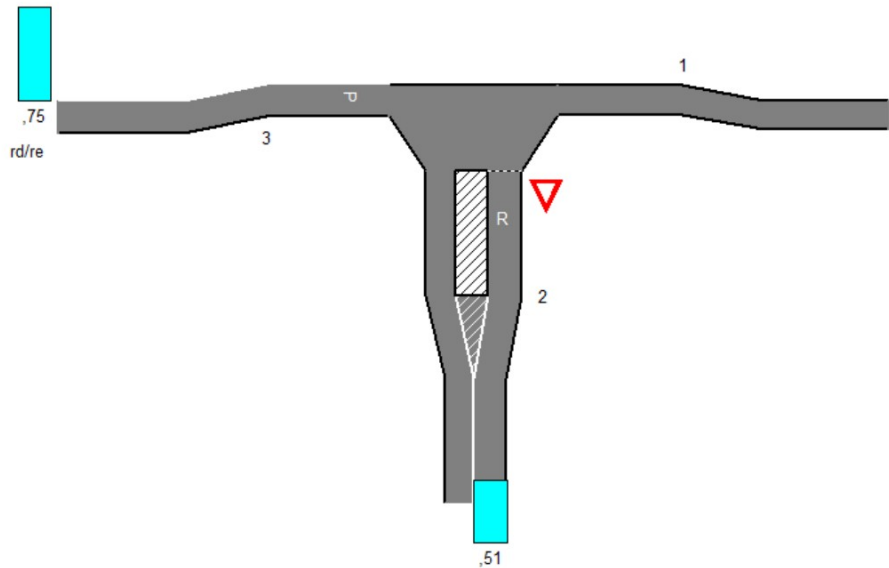
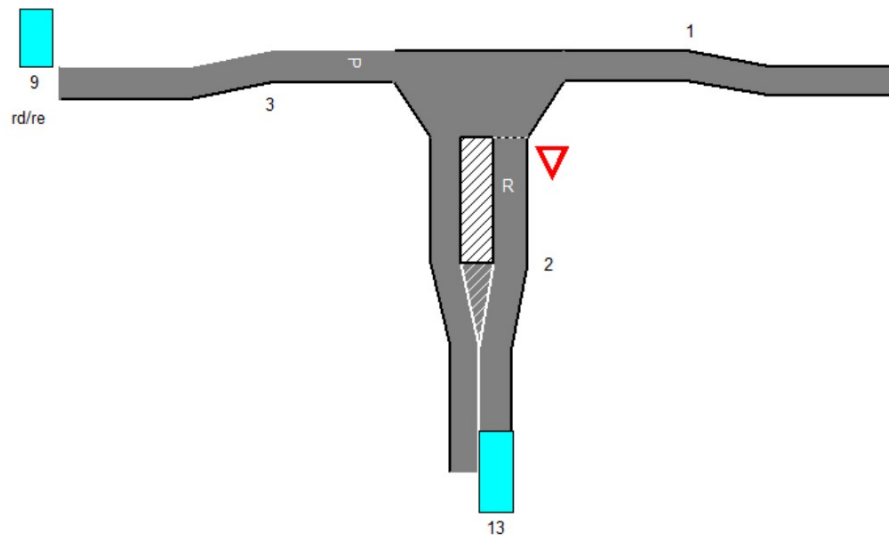
**Roundabout N367 - N966 - A7, branch 1, morning rush hour**



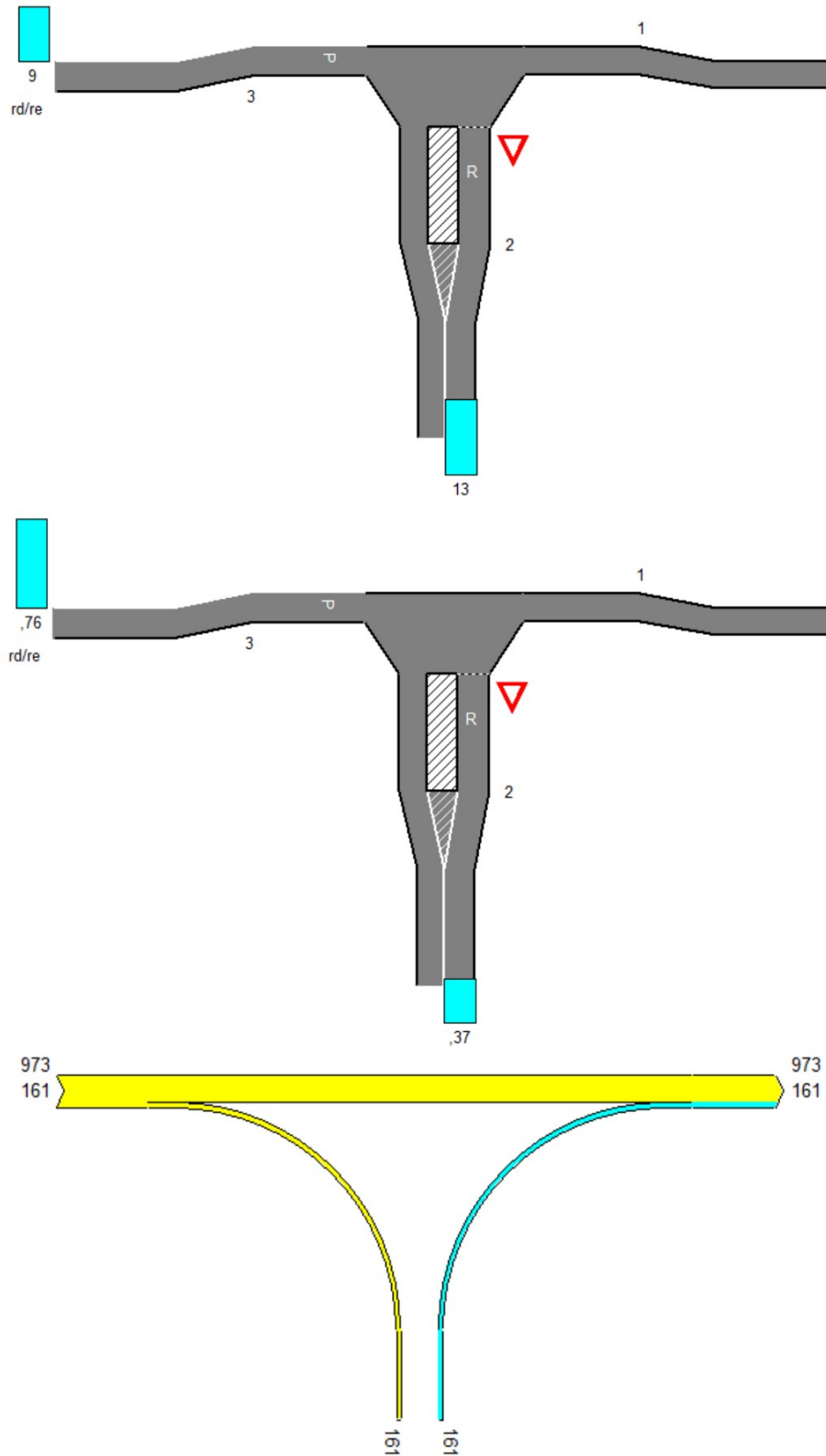
**Roundabout N367 - N966 - A7, branch 2, morning rush hour**



**Roundabout N367 - N966 - A7, branch 3, morning rush hour**

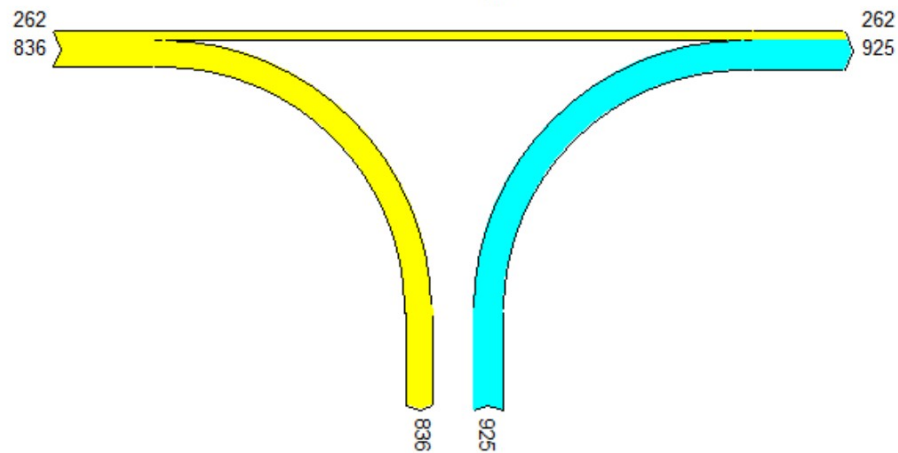
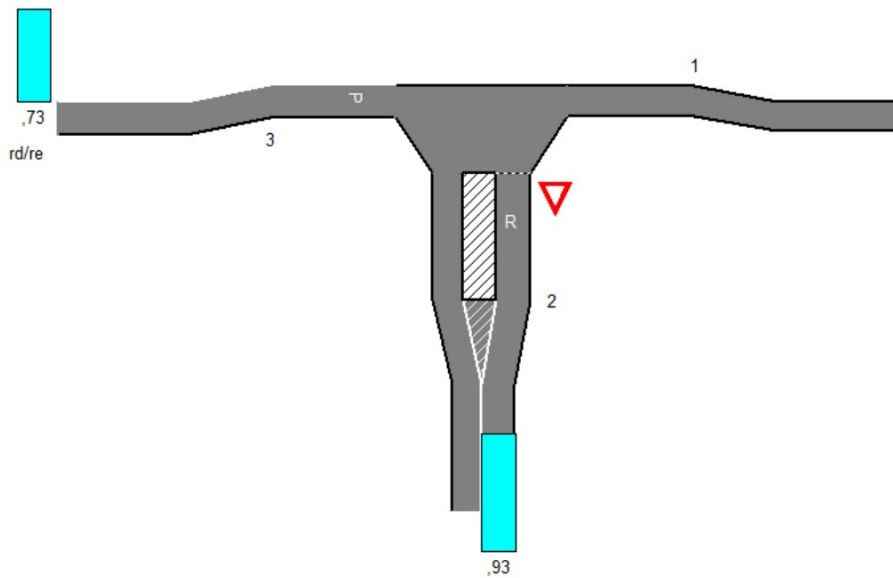
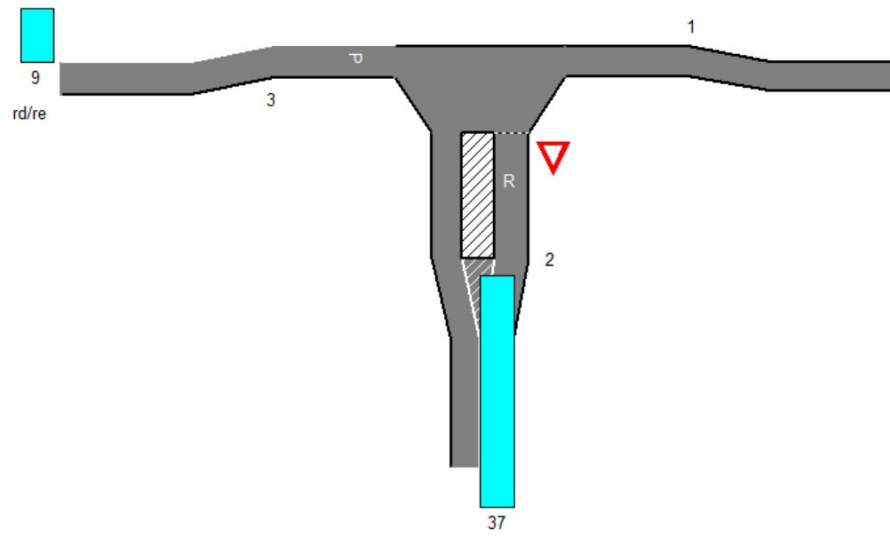


**Roundabout N367 - N966 - A7, branch 4, morning rush hour**

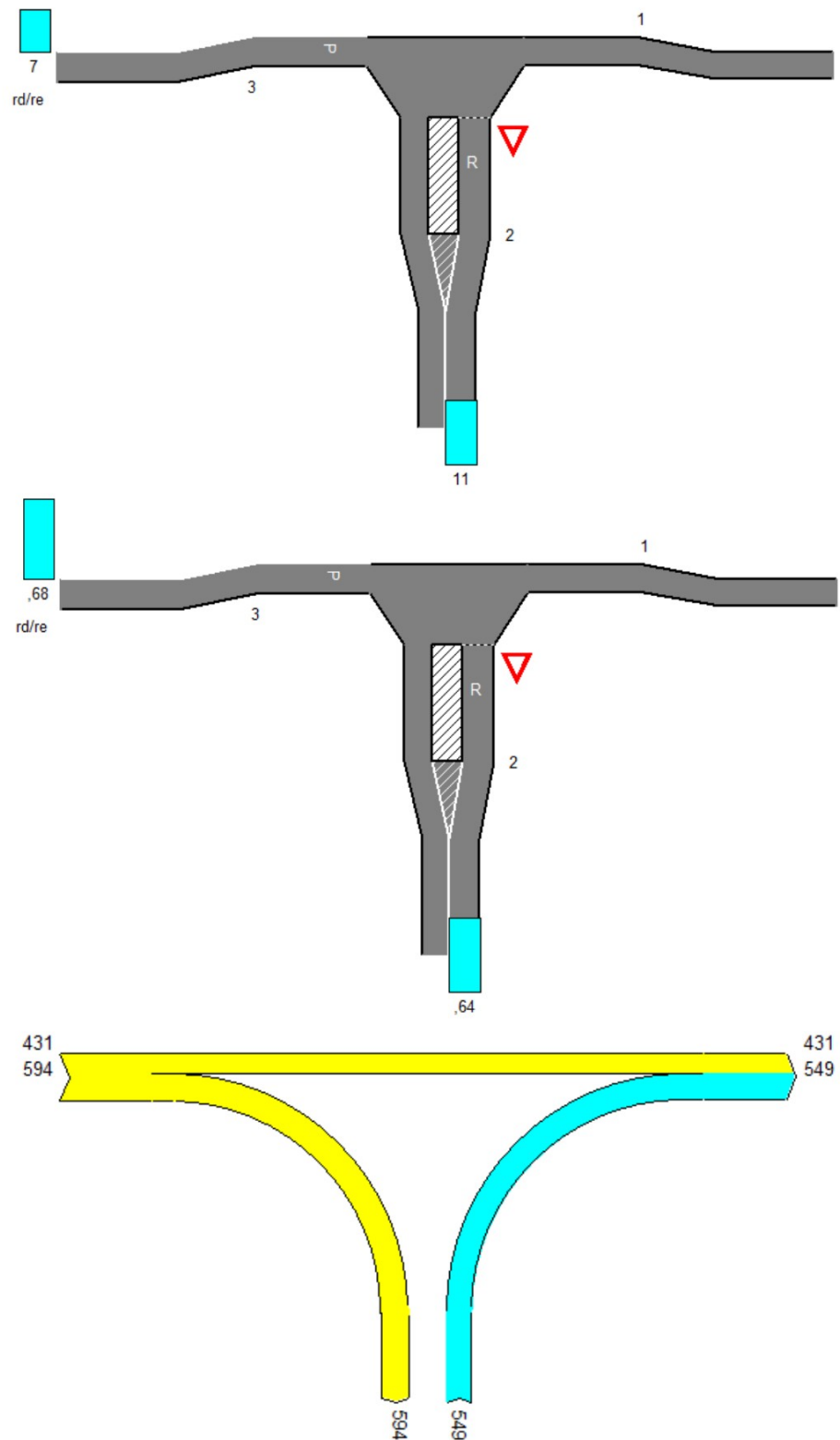




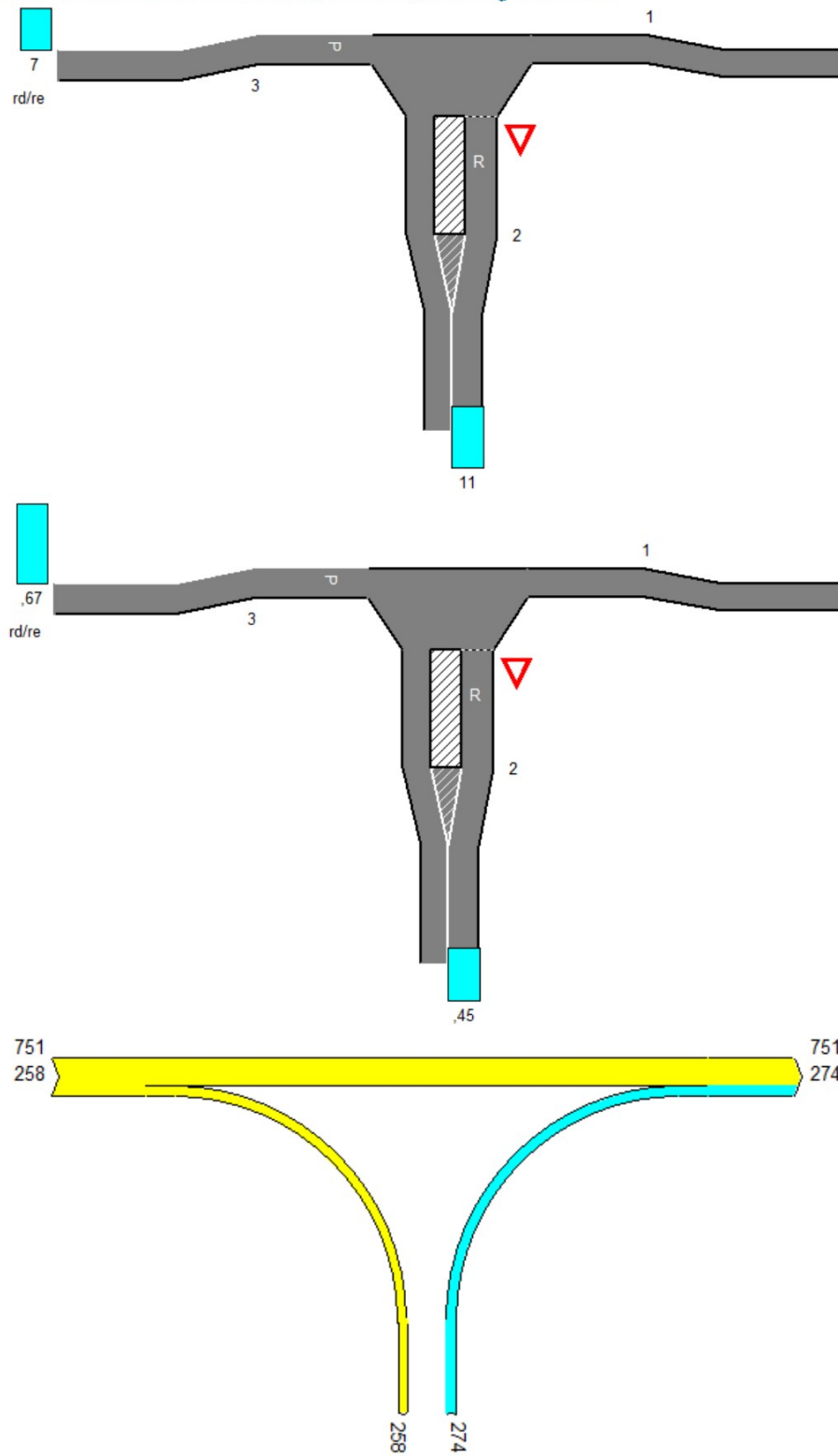
**Roundabout N367 - N966 - A7, branch 5, morning rush hour**



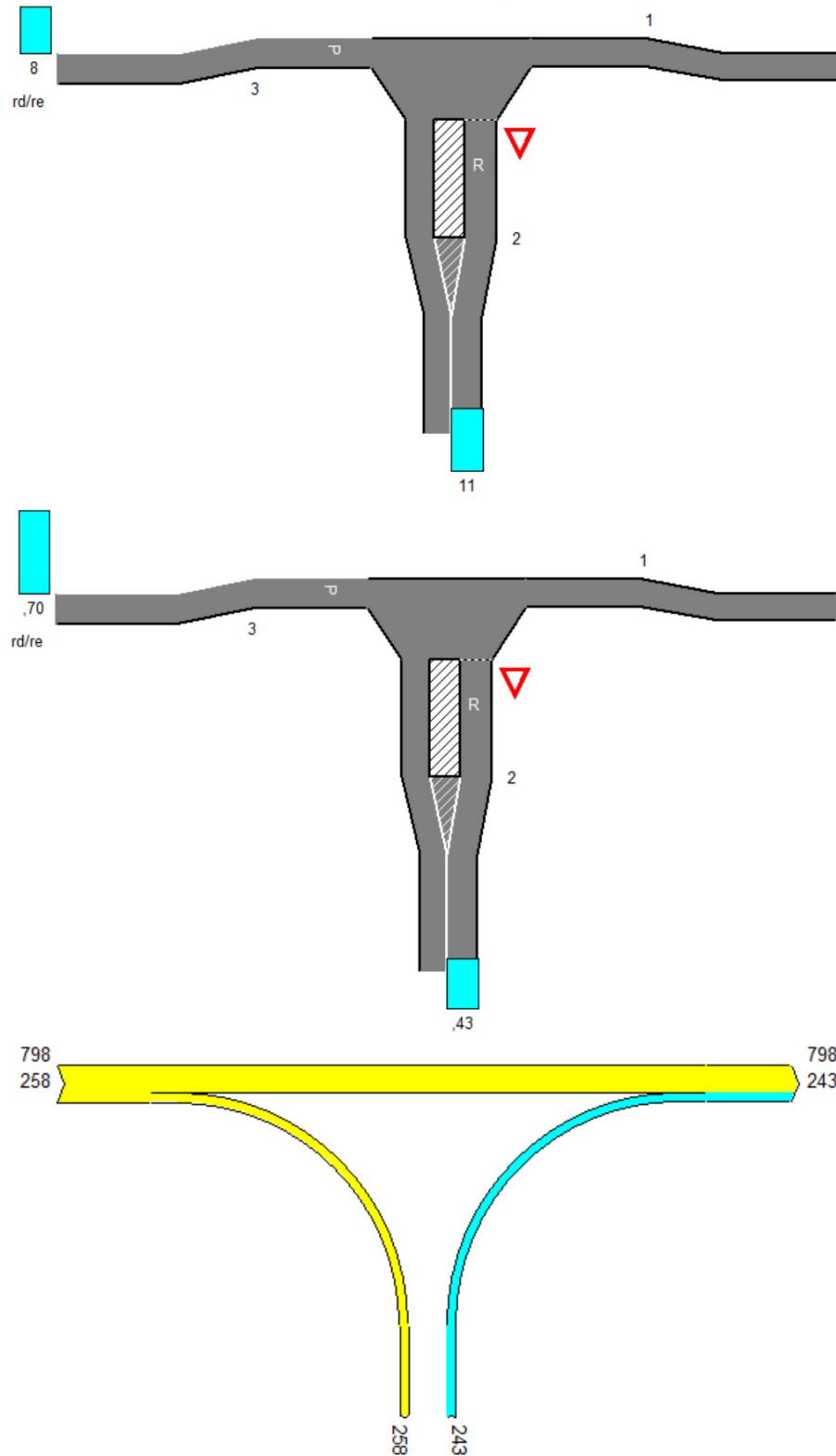
**Roundabout N367 - N966 - A7, branch 1, evening rush hour**



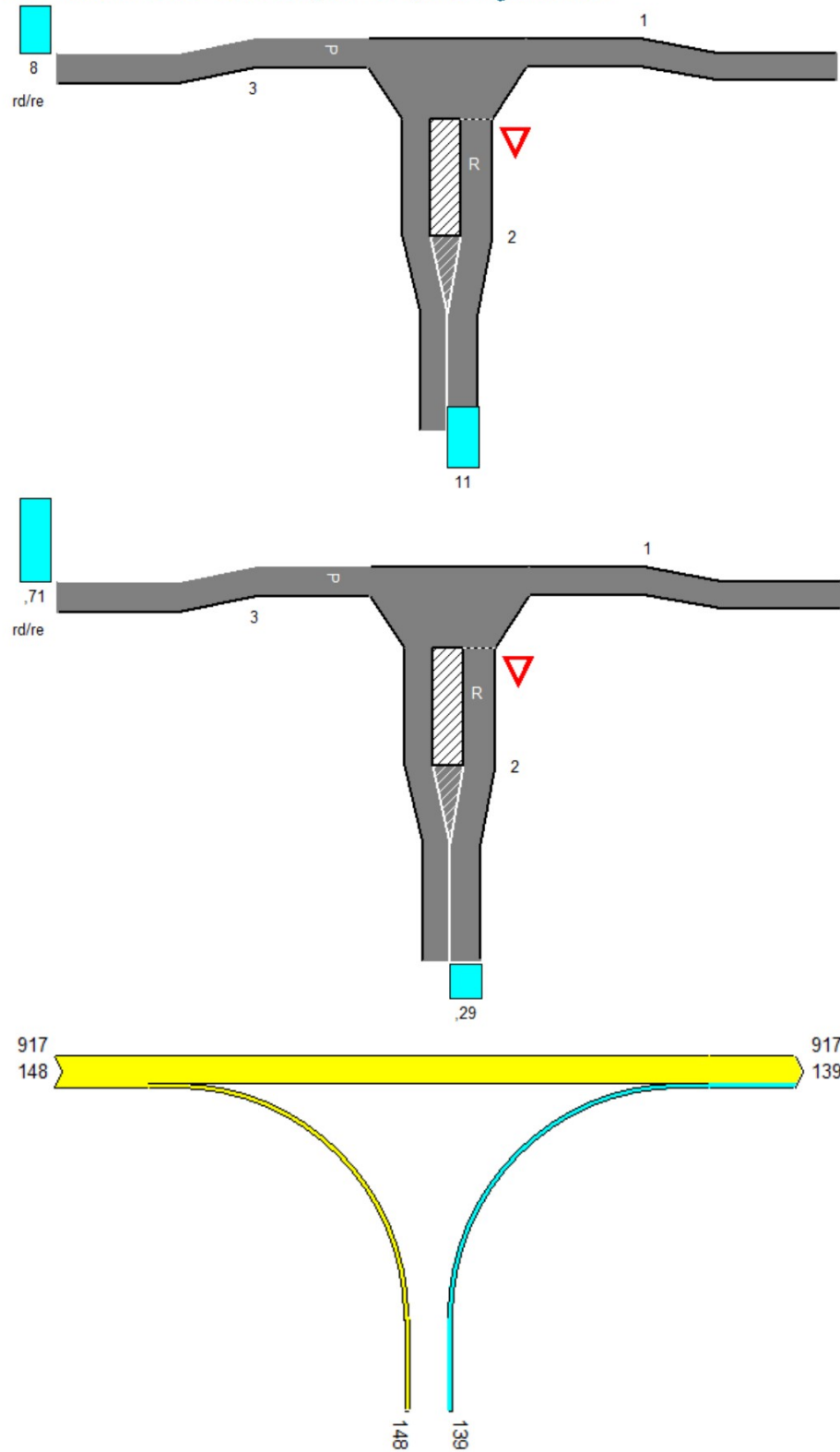
**Roundabout N367 - N966 - A7, branch 2, evening rush hour**



**Roundabout N367 - N966 - A7, branch 3, evening rush hour**

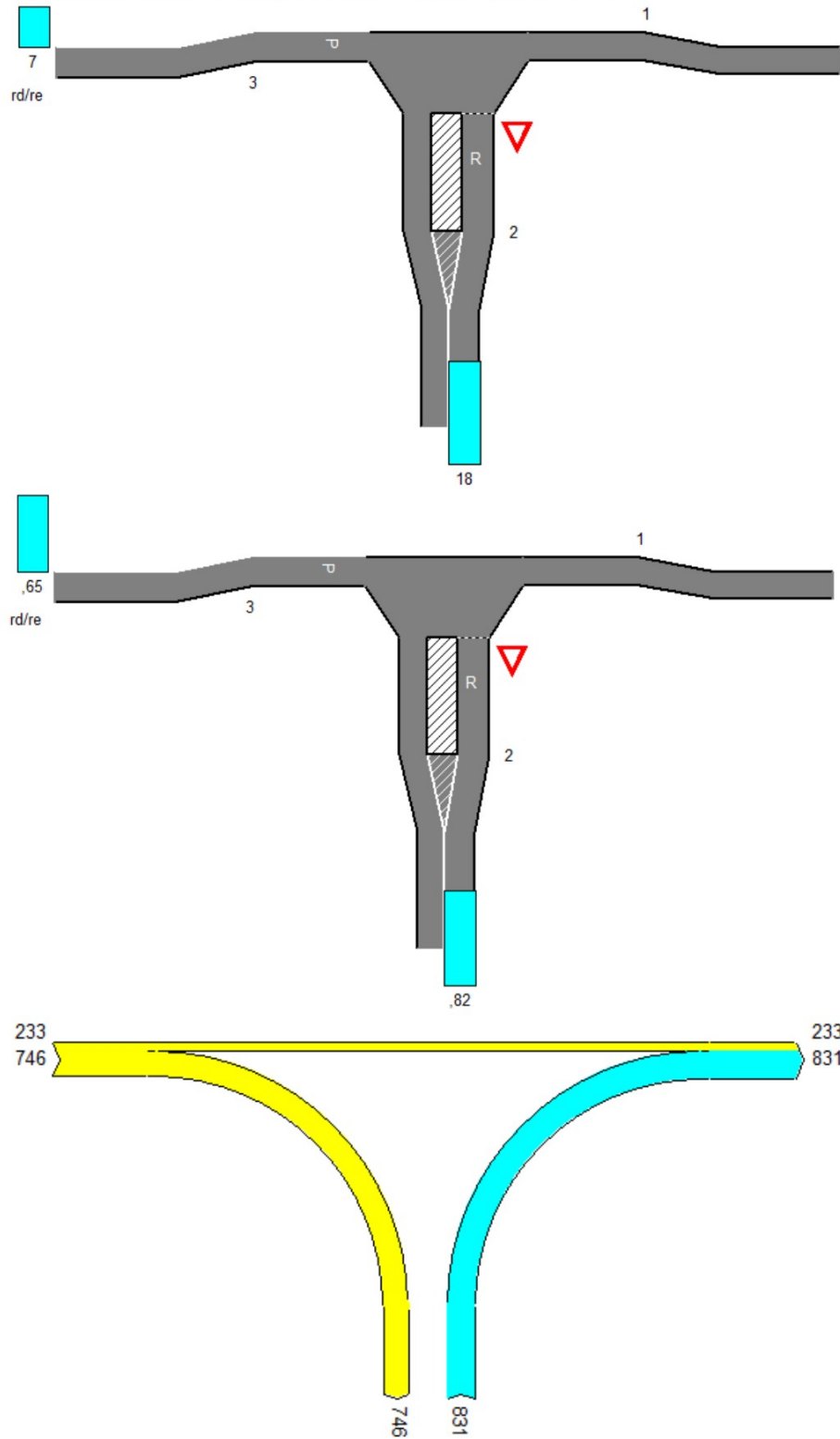


**Roundabout N367 - N966 - A7, branch 4, evening rush hour**





**Roundabout N367 - N966 - A7, branch 5, evening rush hour**



---

## About Antea Group

From city to countryside, from air to water: Antea Group's engineers and consultants have been contributing to our living environment in the Netherlands for years now. We design bridges and roadways, and create residential neighborhoods and water structures. But we are also involved in areas such as the environment, safety, asset management and energy. Under the name Oranjewoud, we expanded into an all-round, independent partner for companies and government bodies. As the Antea Group, we also apply this knowledge at a global level. By combining valuable knowledge, including on technical matters, with a pragmatic approach, we make solutions attainable and workable. Goal-oriented, with an eye for sustainability. In this way, we anticipate today's questions and tomorrow's answers. Just as we have been for over 60 years now.

---

## Contact information

57, Tolhuisweg  
8443 DV HEERENVEEN  
P.O. Box 24  
8440 AA HEERENVEEN  
T. -  
E. [info@anteagroup.com](mailto:info@anteagroup.com)

**[www.anteagroup.nl](http://www.anteagroup.nl)**

### Copyright © 2019

No part of this publication may be reproduced and/or published by means of print, photocopy, electronically or any other medium without the prior written consent of the authors.