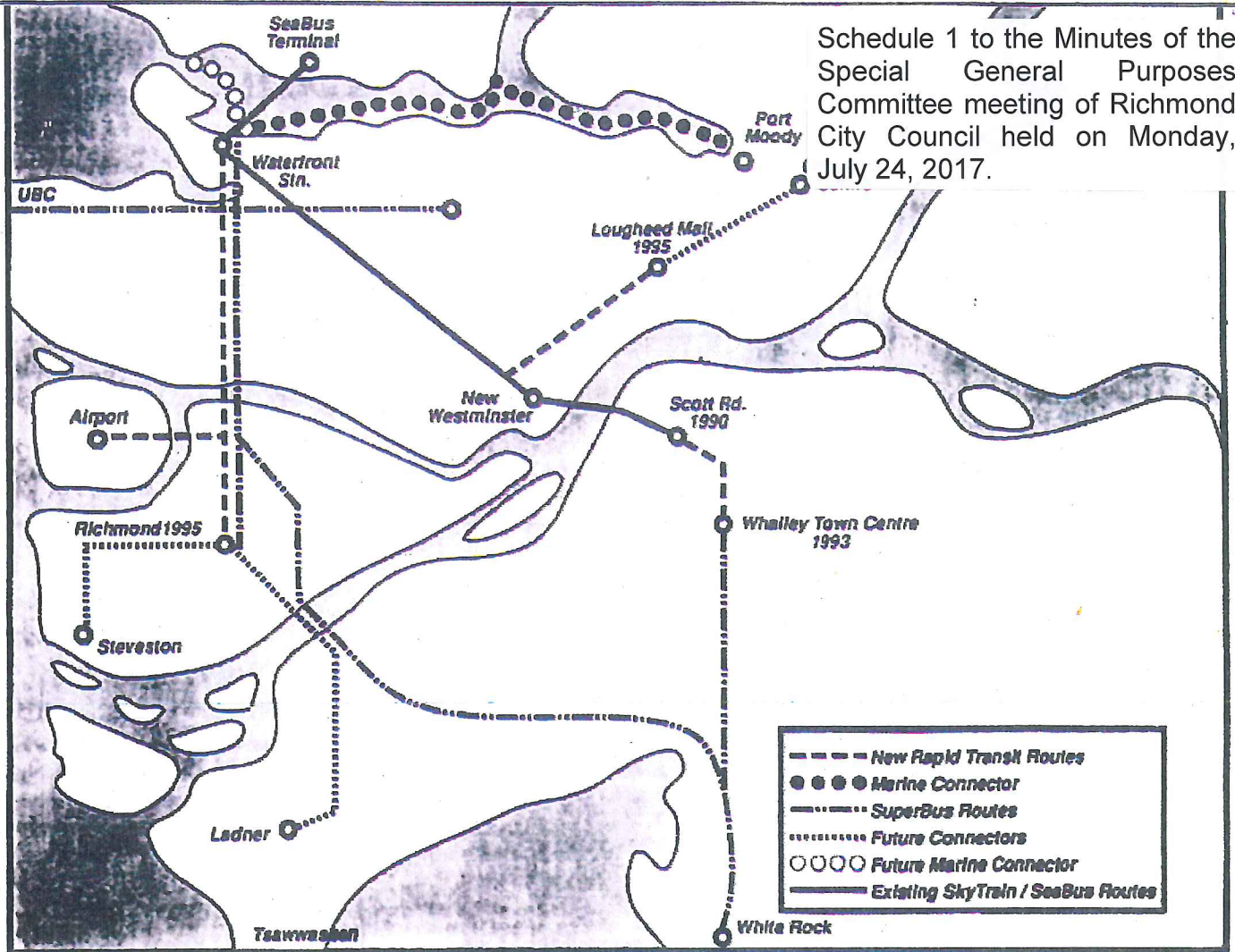


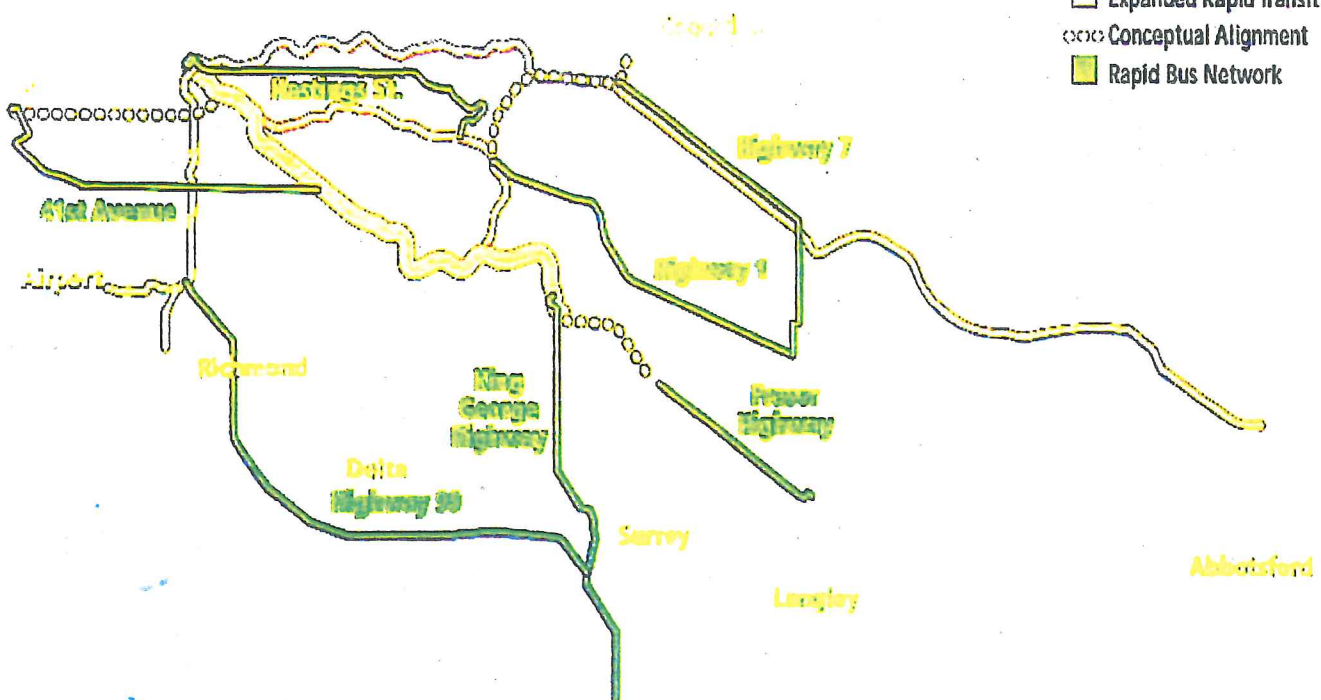
Schedule 1 to the Minutes of the Special General Purposes Committee meeting of Richmond City Council held on Monday, July 24, 2017.



Transit improvements announced

2020 RAPID BUS NETWORK

- TRANSIT NETWORK**
- Existing Rapid Transit
 - Expanded Rapid Transit
 - Conceptual Alignment
 - Rapid Bus Network



LOWER MAINLAND CRASHES - 2011 TO 2015
INCLUDES PROPERTY DAMAGE ONLY TO FATALITIES

RANK (FROM LEAST TO MOST)

TOTAL

1	CAMBIE STREET BRIDGE	58
2	PITT RIVER BRIDGE	99
3	BURRARD STREET BRIDGE	119
4	GRANVILLE STREET BRIDGE	122
5	OAK STREET BRIDGE	307
6	QUEENSBOROUGH BRIDGE	313
7	ARTHUR LAING BRIDGE	344
8	GEORGE MASSEY TUNNEL	388
9	SECOND NARROWS BRIDGE	486
10	MOSQUITO CREEK BRIDGE	606
11	PORT MANN BRIDGE	621
12	PATTULLO BRIDGE	703
13	LION'S GATE BRIDGE	803
14	ALEX FRASER	923
15	KNIGHT STREET BRIDGE	966

SOURCE:

<http://www.icbc.com/about-icbc/newsroom/Pages/Lower-Mainland-Crash-Map.aspx>

Projects (/projects/) » Rotterdam: Landmark

Rotterdam: Landmark

Because of its aesthetic and experiential qualities

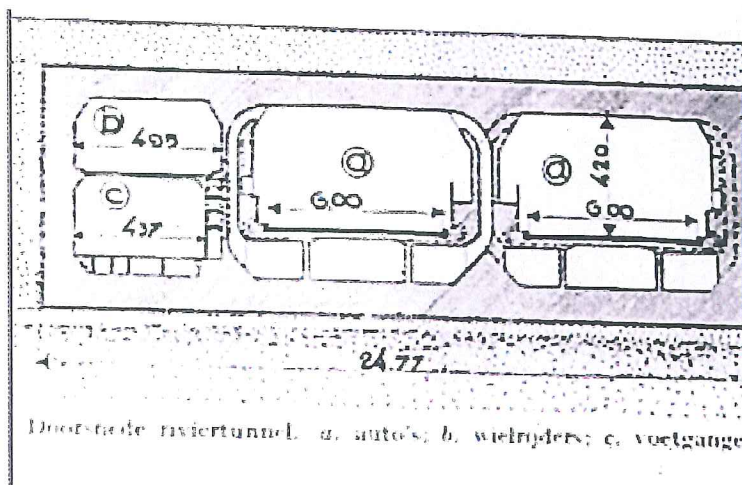
The Maastunnel was the first traffic and underwater tunnel in the Netherlands. This tunnel can be found in Rotterdam where it connects the North and South bank of the river the 'Nieuwe Maas'. The tunnel is used on a daily basis by 75.000 motor vehicles and a large number cyclists and pedestrians which makes it an important part of Rotterdam's infrastructural network. The tunnel is recognizable above ground level by its characteristic access and ventilation buildings, which were constructed on both sides of the river. These high architectural quality buildings transformed the Maastunnel into a landmark for Rotterdam.

Decision making process

The first ideas of constructing this tunnel arose already at the beginning of the 20th century. The increasing amount of traffic could no longer be served by the small steel bridge (Willemsbrug) and the few steamboat ferries. After the First World War, plans for a second fixed link between North and South became more concrete. Rotterdam was by now in desperate need of a second cross-river link, however it appeared difficult to decide whether it should become a bridge or a tunnel. Rotterdam was by then one of the busiest ports in the world (from 1962 to 2004 it was even the busiest port in the world) and although the construction of a bridge was more common at that time, it could limit sea ship traffic. The department of public works had a preference for a 60 meters high suspension bridge, but such a high bridge had both technical as financial challenges. Therefore in 1933, it was decided that a tunnel would be the best solution. The construction of the Maastunnel started in 1937 and construction works were still going on when World War II reached the Netherlands in May 1940. The tunnel was spared and even completed during the Nazi occupation, while they acknowledged the value of this new connection. The tunnel was opened at the 14th of February 1942, however the opening proceeded without any official ceremony, since the war was still going on.

The tunnel

As you can see on the old drawing below, the tunnel comprises four tubes: two for cars (a) and two stacked narrow tubes, one for cyclists (b) and one for pedestrians (c). The tunnel was constructed using the immersed tube method. Nine prefabricated tubes were constructed elsewhere on shore, floated to the tunnel site and sunk into the dredged trench. Next, the separate parts were linked, the partitions were removed and the tunnel was finished. The total length of the Maastunnel is 1,4 kilometers (including access roads). The underground part is about one kilometer in length.



(Picture source: bikeportland (<http://bikeportland.org/2013/06/06/in-rotterdam-a-peak-at-dutch-road-design-in-an-american-style-city-87873>))

Ventilation buildings



Project info 'The Maastunnel'

Project program: Four tubes; two for cars, one pedestrian and one cyclist tunnel + two ventilation buildings

Project location: Rotterdam, the Netherlands

Client: City of Rotterdam

Construction: 1937 - 1942

Construction method: Immersed tube method

Renovation: 2017 - 2019

Renovation costs: ?

Size/Length: 1373 metres, the underground part is 1070 metres

Tunneling method: immersed tube method

Sustainability aspects: Landmark

Sources:

<http://www.rotterdam.nl/demaastunnel>
(<http://www.rotterdam.nl/demaastunnel>)
<http://nl.wikipedia.org/wiki/Maastunnel>
(<http://nl.wikipedia.org/wiki/Maastunnel>)
<http://www.aviewfromthecyclepath.com/2011/rotterdam.html>
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<http://www.nieuws.top010.nl/maastunnel>

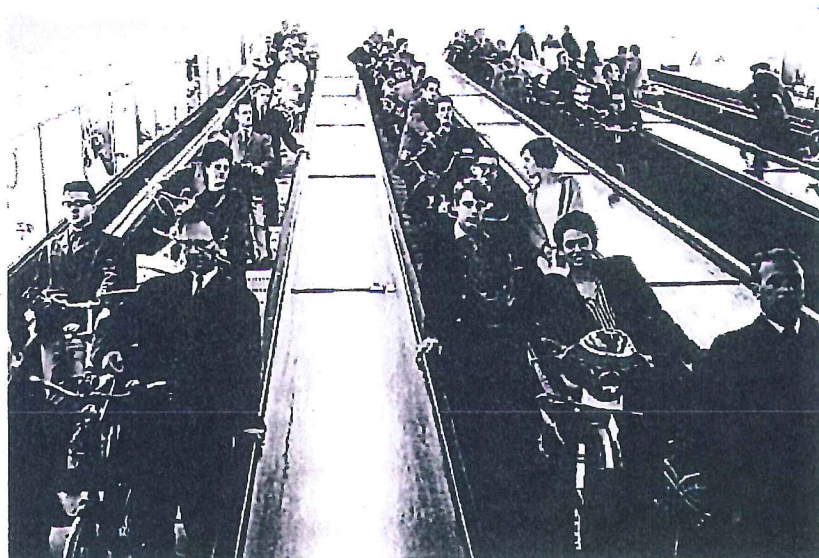
Rotterdam: Landmark » Tunnel Visions

This tunnel is not only a work of civil engineering, but also of remarkable architecture. Two striking filter/ventilation buildings, designed by city architect Van der Steur, are among the most remarkable architectural appearances of the late thirties. These ventilation buildings represent the entry points for the bicycle- and pedestrian tunnel and the presence of these buildings transformed the Maastunnel into a landmark for Rotterdam.



(picture source: S.J. de Waard, 2008)

The filter buildings consist of high concrete shafts and a lower part with a copper dome where the fresh air intake takes place. The total height of the building is 60 meters: from which 34 meters above ground and 26 meters underground. The bike and pedestrian tunnel can be accessed via long escalators present in these buildings.



©Aart Jan / nfa, coll. Nederlands Fotomuseum

Cyclists in the Maastunnel, 1966

Renovation plans

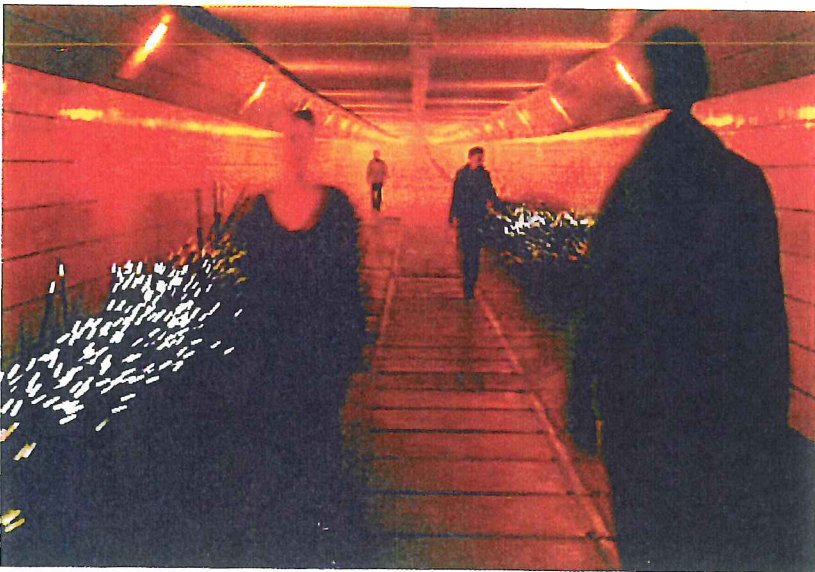
At the day of writing this article -14th of February 2015- it is exactly 73 years ago that the Maastunnel was officially opened. Today it is still an important part of Rotterdam's infrastructural network. This has at least proven the durability of this tunnel, both of the structure as its functionality. Nevertheless, after all these years, the city of Rotterdam has made plans for large-scale renovation. This renovation is necessary while concrete decay

was found in the ventilation system underneath the road during earlier restoration works. Furthermore, the tunnel needs to comply with new Dutch tunnel safety regulations which, for example, demand emergency exits every 100m for immersed tunnels. Renovations will start in the summer of 2017 and will be finished in the summer of 2019.

"After all these years the tunnel still lays there, solid as a rock. And when the renovation works are complete, it will last for at least 50 more years," concludes Van der Plas, retired Director of Maastunnel project owner Public Works Rotterdam. "The Maastunnel is truly the pride of Rotterdam."

Dune installed in pedestrian tunnel

The older generations of Rotterdam citizens, living close to the Maastunnel, are said to have warm feelings towards the Maastunnel. Although it is still often used today, pedestrians seem to have a less pleasant experience. The escalators are old and weathered; the tunnel is yellowish and aloof tiles cover the walls. To improve the experience of the tunnel for pedestrians the Rotterdam City of Architecture, had asked studio Daan Roosegaarde to transform this place into a more attractive passage. This studio installed 'dunes' which are pictured and described below.

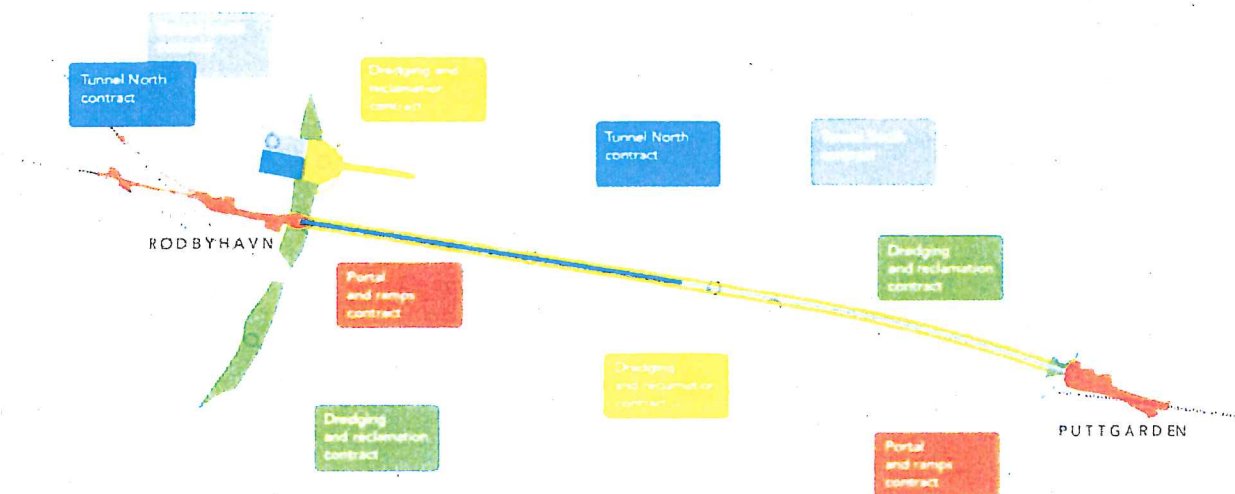
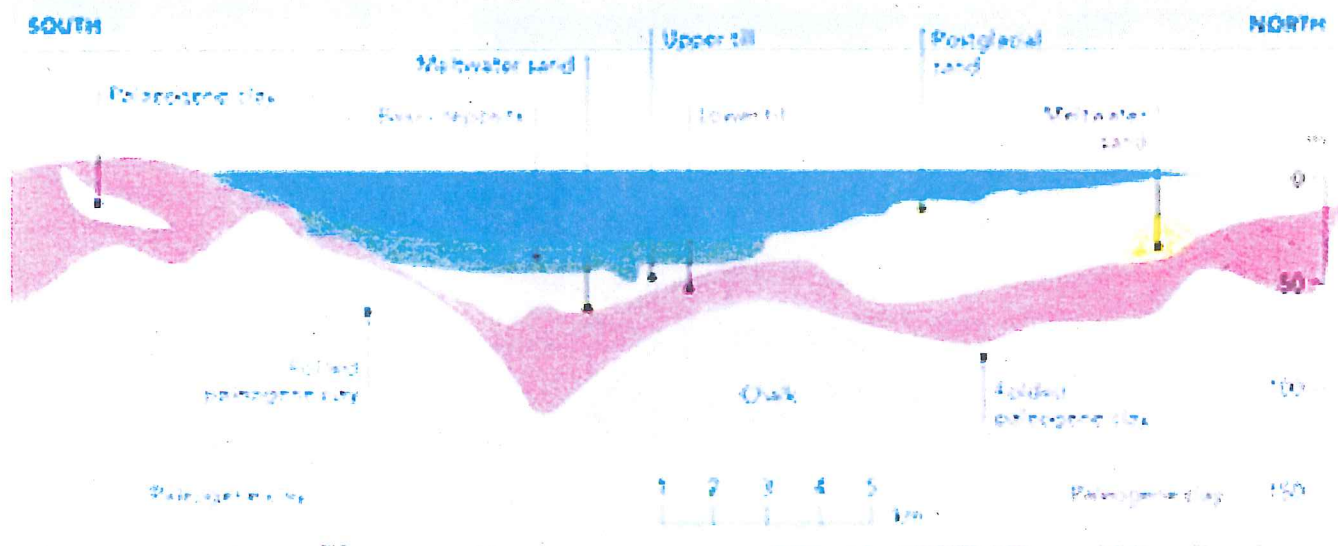


(Picture source: Studio Roosegaarde (<https://www.studio Roosegaarde.net/project/dune/photo/#dune-4-1-maastunnel>))

"Dune is the public interactive landscape that interacts with human behavior. This hybrid of nature and technology is composed of large amounts of fibers that brighten according to the sounds and motion of passing visitors. Evolving through several contexts Dune 4.1 enhances social interactions in the public pedestrian Maastunnel." As explained on the website of Studio Roosegaarde (<https://www.studio Roosegaarde.net/project/dune/info/>).

Dune 4.1 was a temporary public interactive landscape in the pedestrian tunnel of the Maastunnel, on the occasion of Rotterdam City of Architecture in 2007. Its goal was to make the pedestrian tunnel more interactive and therewith peoplefriendlier. According to Roosegaarde it enhanced social interactions, and it became an intuitive and playful environment. The Dunes transformed the experience of the tunnel, it even became a hotspot: wedding pictures were taken in the tunnel.

Later a permanent Dune (4.2) was placed alongside the Maas River in Rotterdam, investigating nature in a futuristic relation with urban space.



The tunnel across Fehmarnbelt