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The Environmental Impact Assessment for Stage One of the Aarhus LRT

As a consequence of the continual increasing load on the entire traffic system, the city of Aarhus has for some years been working to establish a Light Rail Transit (LRT) system. The first stage of the LRT encompasses a connection of the two existing railways (Odderbanen and Grenaaabanen) and the construction of approximately 12km of new light rails. The Environmental Impact Assessment (EIA) together with the local authority plan supplement for the first stage of the LRT system has recently been through the second public hearing, and the project has been well received by the public. Therefore, planning for the future work will soon be in place.

Background

For some years there has been great focus on giving high priority to the public transport in the Aarhus area. This is caused by the continual increasing load on the entire traffic system and large future city development projects.

In 2007, a Light Rail Transit Secretariat was established in Midttrafik (the public transport administrator for the Jutland region). The primary target of the Secretariat is to unite forces to realise the vision of one LRT system for the Aarhus area and to carry through the EIA for the first stage of the LRT.

The first stage of the LRT comprises the connection of the local railways of Odderbanen and Grenaaabanen and the construction of approximately 12km of new light rails. The new light rail trains are intended to run on the existing rails of both the Odderbanen and Grenaaabanen, and the two railways will have common timetables. The new rails will go from the harbour in Aarhus city to the north of Randersvej, past Aarhus University via Aarhus University Hospital in Skejby, and further in their own track to Lisbjerg. From Lisbjerg, the track will continue eastwards and connect to Grenaaabanen at Lystrup. In this way, the LRT system will serve one of the most intensive

The LRT system will serve a number of considerably large urban development projects including that of the local harbour areas, the expansion of Aarhus University Hospital in Skejby and the establishment of new neighbourhoods between Lisbjerg and Lystrup. See Figure 1. These areas will provide a large new basis for passengers, and it is therefore important to ensure the operation of an effective public transport service.

In recent years, there has been a growth in the number of commuters to Aarhus from surrounding cities. At the same time, there has

transport corridors in the whole Aarhus area. The first stage of the LRT system can be seen in Figure 1.

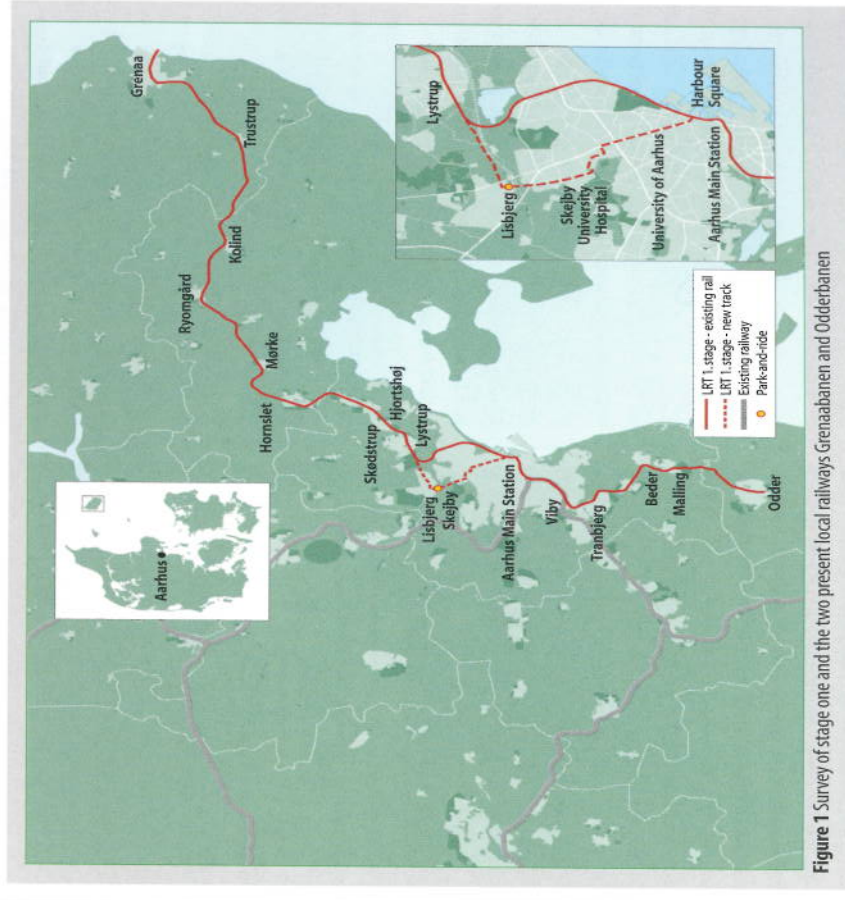


Figure 1 Survey of stage one and the two present local railways, Grenaaabanen and Odderbanen



Helsinki is known for its excellent public transport system

5. Status in 2010

The importance of tram services has grown in the city; route 9 was opened in 2008 and the tram network to a new residential area in the southern part of the city is under construction – service will be started gradually in 2011-2013.

In addition to the goals mentioned here, there were plenty of other goals which will be reached by 2012. Of course, there were also goals which will not be reached.

Perhaps the most important result of the strategy can be shown in investments in public transport. In *Eurotransport* issue 4 2004, I wrote:

"No strategy can be implemented without adequate financing. In addition to money spent on rolling stock, implementation of this strategy will require investment totalling some €280 million, an average of €35 million a year, in infrastructure and systems over the period 2005-2012. This includes exceptionally large investments such as modernising and automating

the Metro access control system as well as Helsinki's share of the cost of building the western Metro line. The financing framework is realistic, because the corresponding level of investment over the preceding eight-year period 1996-2003 was €200 million or an average of €25 million per year."

» **Automation of the metro is in progress (finalised in 2014) and the western extension of the metro is under construction (open for service in 2015)** ◀

After 2004, there has been a tremendous change for public transport investments. Certainly the discussion of climate change has encouraged the decision-makers to fight against the climate change by investing in public transport but at least a part of the increase in investments can be seen as a result of the accepted public transport strategy. This year, Helsinki is investing €139 million in public transport and according to the investment plan,

the investment level will be kept on the same level during the next five years.

By 2015, Helsinki and the Helsinki region will build 16km of tramways, build 14km of metro, automate the present metro, buy new trams (€100 million) and new metro trains (€100 million). At the same time, in spite of increasing car traffic, Helsinki will keep its transport network-flowing.

Matti Lahdenranta

M.Sc. Matti Lahdenranta has worked as the Managing Director of Helsinki City Transport since 2003. Mr. Lahdenranta has had a long career in public transport business. Previously, he has managed Helsinki City Transport's Bus Unit in 2001-2002. In 1989-1996, he worked as the Managing Director in one of the biggest bus companies in Finland, Vantaan Liikenne Oy / Oy Linjebuss Finland Ab and in 1984-1989 as a Managing Director in a smaller bus company Porin Linjat Oy. Before 1984 and 1996-2000, Mr. Lahdenranta worked as a consultant, mainly focusing in public transport issues. Between 1996 and 2000, the consultant projects included a lot of strategic development projects for organisations in various business areas.



also been a considerable dispersion of work and training places in Aarhus. A considerable number of commuters head for the northern part of Aarhus. In the long-term, an extension of the light rail transit will provide several of the large work and dwelling areas in the Aarhus area with a faster and more effective public transport system.



Figure 2 Visualisation of the LRT at the harbour front stop

In the first stage it will be necessary to relay tracks at Aarhus Main Station. Light rail stops and some passing points must be established as well as depot and workshop facilities. In addition to this, park-and-ride facilities are being planned close to the big radial roads and the new motorway section 'Søften-Skødstrup' in order to ensure optimal conditions for change from car to LRT and vice versa.

Train units of a type that can run on both diesel and electricity will be used. In the city areas, the trains will be powered by electricity via wires, while on the existing stretches to Odder and Grenaa they will be powered by electricity by a diesel powered generator installed in each train unit.

The LRT will be the backbone of the public transport in the neighbourhoods where it will run, and therefore bus services must be adjusted to the new infrastructures. Bus traffic will, to a higher extent, be working as 'feeder-lines' to the LRT system, but at the same time a bus system must be maintained to service the local areas.

The EIA together with the local authority plan supplement for the first stage of the LRT has recently been through the second public hearing, and the project has been well received by the public. In the following, a short insight

into some of the results which have appeared in connection with the EIA work will be presented.

The incorporation of the LRT system in the city and the landscape

One of the EIA subjects has been the incorporation of the LRT system into the city and the landscape. The work is based on the German

When the LRT system runs on roads, a green track is wanted. See Figure 4 on page 17. On selected stretches this will be constructed with grass paving stones. Outside the road systems, green tracks or ballasted tracks will be chosen.

The LRT track runs through areas which Aarhus Municipality has pointed out for future urban development areas at Lisbjerg East and Elev. Detailed plans for these areas have not been elaborated yet and therefore it has been difficult to determine the precise layout for the LRT track in the EIA. In this respect, it has therefore been necessary to work with buffer zones within which the layout of the LRT track in connection with the future plans for the areas can be more precisely determined.

The LRT system will be led across the stream of 'Egå' (a significant biological spreading passage) and the Djursland Motorway via a large infrastructural construction – an approximately 550m-long valley bridge. See Figure 5 on page 17. The valley bridge across the Egå will in itself function as an effective wildlife passage, while the valley crossing and the interplay with the other infrastructural constructions in the area will need architectural consultancy.

LRT stops

Nineteen stops are planned on the new LRT section from Aarhus Main Station to Lystrup Station. The stops will be designed either as

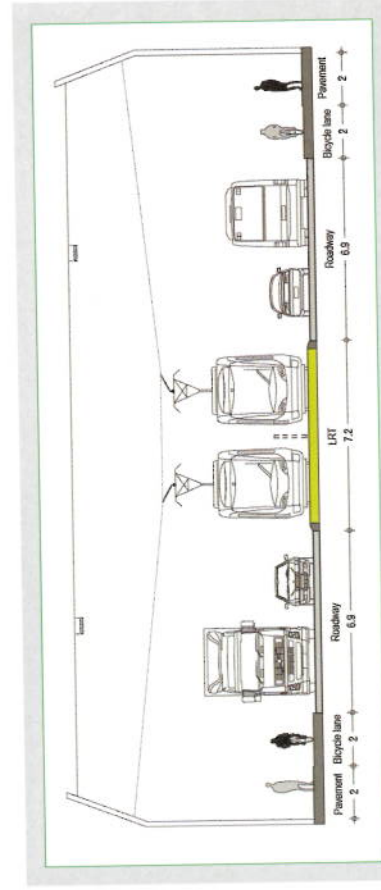


Figure 3 Cross profile with wire suspension

of a better integration between the harbour and the city. The visualisation of the stop can be seen in Figure 2.

Through the EIA there has also been considerations regarding the wires and how to handle them on various stretches along the track. One of the considerations is to fasten the wires to house-fronts or utility poles on the outer edge of the pavements on the parts of stretch where this is possible. See Figure 3. On other stretches, middle poles are considered.

Grenaa. It has therefore been incorporated into the design of the section along the harbour that it must be possible to service both LRT and freight trains. The freight trains will operate on so-called shunting conditions, implicating slow speed operation. A possibility will be open to allow freight trains to run in the evenings and nights. As the freight trains are wider than the

increased number of passengers in the total public transport service.

The passengers on the LRT system have partly been transferred from the buses and the Grenaa-Odder railways and are partly former cyclists, pedestrians or motorists. The assessments show a drop in the number of passengers in both the urban and regional buses, while the



Figure 4 Visualisation of the LRT with a green track

LRT trains, the eastern LRT track will be designed with a free profile matching the freight trains. This means that the platforms servicing this track will have a broader gap and will be lower

or the trains have to be equipped with an extendable step.

Transfer potential

Calculations of the LRT impact on the traffic have been carried out using the traffic model for



Figure 5 Basic diagram for the valley bridge crossing of Egådalene (the Egå valley)

Aarhus. The assessments have been made for 2015, when the first stage of the LRT is expected to run. The assessments show that establishing the first stage will generate an

24 hours will decrease by 4,000. However, only about 4,500 car trips will be transferred to the LRT system per 24 hours. One of the reasons for this rather small transfer is that the conditions of

the LRT system presuppose that the LRT in principle must not reduce road system capacity. If it is a wish to transfer more car trips to the LRT system, measures must be implemented that will either limit the capacity or inflict a disadvantage on the car users with respect to time or money. Aarhus Municipality is able to use such instruments as capacity and parking policy. Other instruments like fuel prices, taxes etc. are determined by other authorities.

Construction work and costs

Design basis, local plans, detailed project and regulatory processing with appurtenant approvals must be initiated this year. The parties involved aim to start construction work during the year 2011 in order to be able to put the first stage of the LRT system into operation in 2015. The construction costs are estimated at DKK 1.2 billion of which the Danish state has pledged to grant DKK 500 million. In parallel with the first stage of the project, work is ongoing concerning new stages of railways and light rail tracks that will unite the larger East Jutland towns.

The consultant to the builder of the project is the firm of COWI A/S, who also assists the LRT Secretariat in coordinating the EIA report of the first stage of the LRT and further extensions.

Please visit www.letbanerimidtrafik.dk where you can find more information about the project and also subscribe to the LRT newsletter.



Ole Sørensen

Mr. Ole Sørensen is a MSc in geography. Ole has been working with planning of public transport in Aarhus, Denmark, for 13 years. Previously Ole was Manager of the Planning Department of the organisation Midtrafik Aarhus, and in connection with the Light Rail Transit (LRT) plans he is now Project Manager in the Light Rail Secretariat and Project Manager for the work dealing with a new public transport plan for the town of Aarhus.



Lisa Bak Jensen

Ms. Lisa Bak Jensen is a MSc (Eng.), Civil Engineering, in physical planning from Aalborg University, Denmark, and has been working with EIA (Environmental Impact Assessments) for over 10 years.

For the past few years, Lisa has been working as a process consultant responsible for the EIA process, project coordination and planning, and involvement of citizens in a number of large infrastructure projects in Denmark, including among others the Light Rail Transit (LRT) project in Aarhus, a new ring connection south of Aarhus and a harbour tunnel under Møselis Boulevard in Aarhus.