

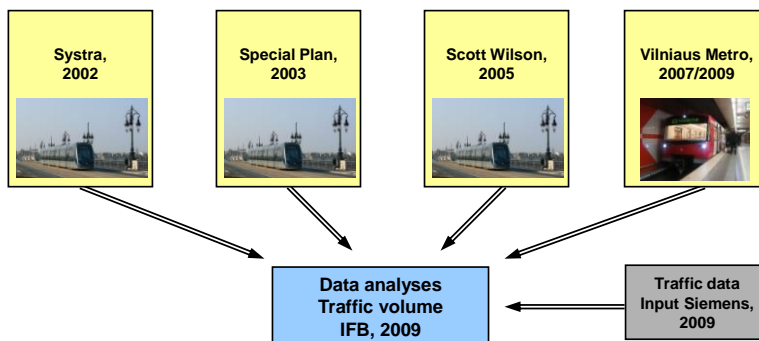
## New mass transit system for the city of Vilnius

### Volume of traffic, Lines, traffic system

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 Workshop Vilnius, 25.03.2010



### Previous Studies/ Current analyses



Passengers per peak hour per direction (pphpd)  
 Passengers per train  
 Possible systems and Lines

source: wikipedia



## Previous Studies

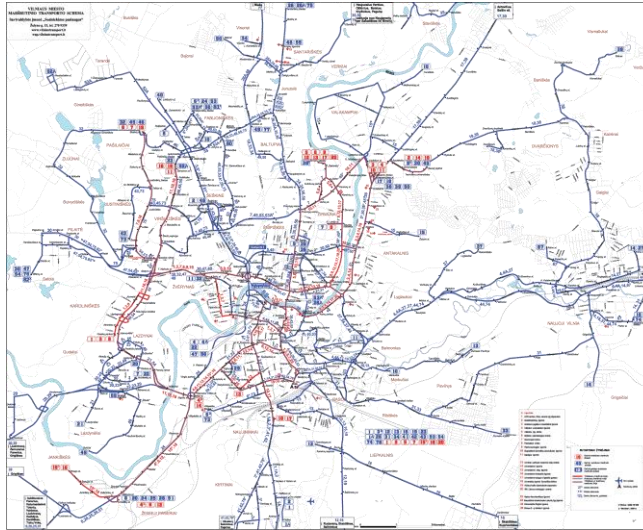
1. Systra, 2002: - 3 Tram lines,  
- Detailed analysis of line A: Stotis – Santariskes,
2. Special Plan, 2003: - Strategic plan for transport infrastructure of Vilnius,  
- Municipality of Vilnius together with Systra,  
- 3 Tram lines,
3. Scott Wilson, 2005: - Based on Systra-Study,  
- Volume of traffic on tram-line A,  
- Financing of suggested 3 Tram lines,
4. Vilniaus Metro, 2007: - Analysis on Special Plan, comparison to Metro system,  
- Metro-Network 3 lines,  
- Prognosis of traffic volume metro line 1 based on traffic censuses

## IFB-Investigations

- Analysis of previous studies concerning traffic volume and prediction,
- Review of traffic prediction data, of existing bus lines, of calculation basis,
- Preparation and analyses of actual traffic flow of intersection,
- Review of traffic censuses → comparison with automatically recorded data,
- Analyses of traffic volume of certain intersection.

**Results:** - Identification of main points of traffic (maximum of pphpd),  
- Derivation of pass. / h and per train of new mass transit system  
- Point out of possible lines

## Current Bus Lines in Vilnius



— Trolleybus  
(18 Lines)

— Bus  
(67 Lines)

source: www.vilniustransport.lt

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## Current Traffic in Vilnius

- City of Vilnius: ca. 550.000 inhabitants, and rising,
- 40% of inhabitants live in western districts (район),
- 40% of working places situated in the centre of Vilnius,
- 55% of travellers use public transport, 45 % use private cars,
- heavy increase of automobilization level, current ca. 600 private cars / 1000 inhabitants,
- decrease of users of public transport,
- during rush-hour → traffic jam,
- minimum headway of public transport: Trolleybus 3 to 4 min, Bus: 10 to 12 min,
- 589.000 daily users of public transport (thereof 313.000 in trolleybuses, 276.000 in buses).



**New mass transit system independent from individual traffic is required!**

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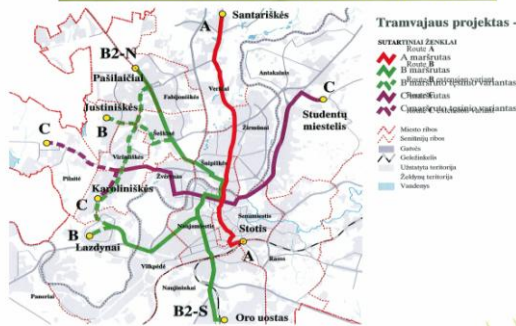
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## Systra-Study, 2002

### Tram Lines (SYSTRA Project)



- 3 lines should reach:  
48% of inhabitants,  
59% of working places and  
67% of pupils/students,
- Line A Stotis – Santariskės  
length ca. 10 km, 18 stations  
min headway 3'45 min,
- 300 Pass./train  
(4 Pass./m<sup>2</sup> area for standig  
passengers),
- Capacity: 3.000 – 5.000 pphpd



**Data status 1998,  
Meanwhile some main points of traffic shifted to other places!**

## Special Plan, 2003

Content of study concerning traffic volume:

- Overview of passenger stream in peak hours (status 2002):
  - Bus: up to 4.500 Pass./h,
  - Trolleybus: up to 3.900 Pass./h,
- Traffic prediction for 2015 (tram lines Systra-Study):
  - Line A: max. 13.640 Pass./h both directions,
  - Line B: max. 19.320 Pass./h both directions,
  - Line C: max. 12.570 Pass./h both directions



**Unknown basis for calculation of traffic prediction!**

## Special Plan, 2003

### Traffic prediction peak hour in the morning

Variant 1 year 2015	Tram line A	Tram line C
Routing	Stotis - Santariskes	Karoliniskes - Sauletekis
Length of line	10,10 km	13,06 km
Pass. / peak-hour	13.640	9.260
Pass. peak-hour per direction	6820	4630
max. Pass./train, 5-min-headway	568	386
Variant 2 year 2015		
Routing	Stotis - Santariskes	Pilaite - Sauletekis
Length of line	10,10 km	14,59 km
Pass. / peak-hour	13.640	12.570
Pass. peak-hour per direction	6820	6285
max. Pass./train, 5-min-headway	568	524



**ca. 600 passengers per train required!**

## Scott Wilson, 2005

- Basis: tramway-system of Systra-Study,
- Traffic volume of new transportation system only based on overlap of planned tram line A with existing systems:
  - Trolleybus: average overlap 14%,
  - Bus: average overlap 27% (IFB-calculation),
  - Microbus: average overlap 36%,

→ Now the frequency of service of public transport is 25% higher than data of study (2005) → IFB-calculation (based on real public transport + road traffic)



→ 54.000 Pass./day without private transport  
→ 64.000 Pass./day with private transport

## Predicted passengers at tram line A, basis Scott-Wilson-Study 2005

Private transport	Passengers per year	Passengers per day	Passengers per direction, peak hour (10% of daily traffic volume)	max. passengers per train (5-min-headway)
excluded	19,8 Mio.	54.322	2.716	226
included	23,3 Mio.	63.952	3.198	266

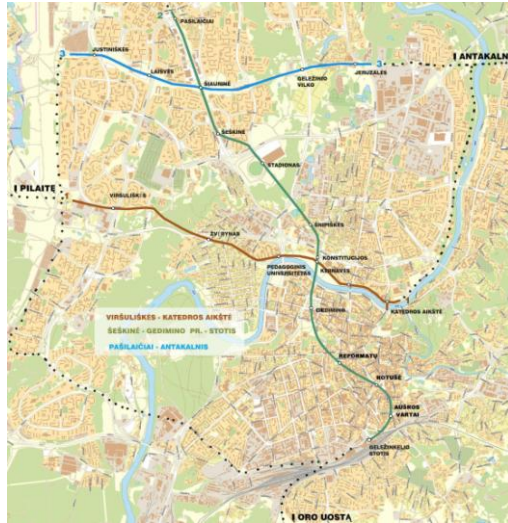


- passengers who change the transportation system only corresponding to line overlap (14% ... 36%) - real potential is probably higher!
- significant lower traffic volume than Systra study/Special Plan
- no prognosis concerning increase of traffic volume

## Vilnius Metro, 2007

- comparison Systra-Study / Special Plan with Metro network,
- suggested Metro lines:
  - Line 1 (from north-west to south-east): Virsuliskes – Katedros Aikste,
  - Line 2 (north-south, optional circle line): Seskine – Gelezinkelio Stotis,
  - Line 3 (west – east direction): Justiniskes – Antakalnis,
- passengers along the suggested Metro Line 1 (traffic censuses at Narbuto g. to city centre, 7 – 9 a.m.):
  - 9.000 pass. in busses, 7.000 pass. in private cars,
- capacity of new metro train up to 600 passengers,
- minimum headway 3 min, up to 20.000 pass./h,
- there are „normal“ geological conditions for alignment of metro line 1

## Vilnius Metro, Metro lines



- Line 1: Viršuliškės – Katedros Aikštė,
- Line 2: Seskinė – Geležinkelio Stotis,
- Line 3: Justiniskės – Antakalnis,

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## Vilnius Metro, Traffic data collection 2009

### Intersection Narbuto g. – Laisves pr.

	Vilnius Metro	IFB same calculation like Vilnius Metro based on real public transport data (timetables)	
Passengers public transport + cars	205.594	148.060	148.060
Passengers due to increase of traffic	88.804	70.249	70.249
Total passengers	294.398	218.309	218.309
Percentage of pass. change system	34%	34%	50%
Passengers per day using new system	100.095	74.225	109.155
Percentage peak-hour of daily volume of traffic*	15%	15%	10%
Passengers/direction, peak-hour	7.507	5.567	5.458
max. passengers per vehicle (5-min-headway)	626	464	455

\* derived from traffic censuses (cars and busses)/automatically recorded data

➡ max. Passengers / vehicle: 500 ... 600 based on 5-min-headway

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## Siemens Traffic Measurement System Vilnius

- modern traffic lights system incl. online monitoring and centralized control,
- lane specific detection and counting of vehicles / hour,
- IFB analysed and evaluated traffic flow/hour of 21 heavily loaded intersections
- significant peaks in daily traffic flow, dependently on running direction,
- variety of most highly loaded streets :

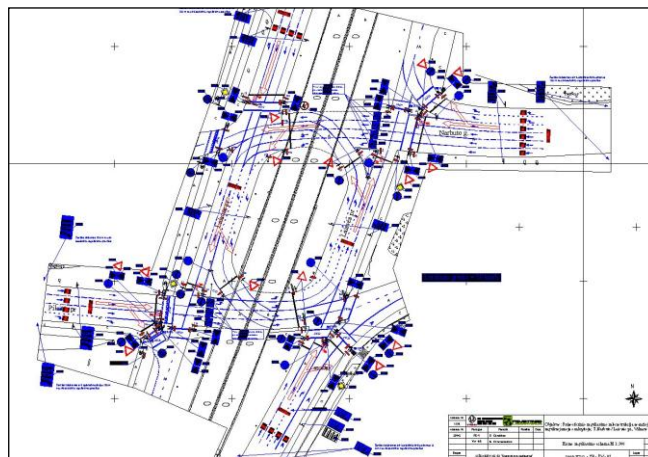
Intersection	max. number of cars/hour at intersection
Ukmerges g. / Gelezinio vilko g.	7.500
Gostauto g. / Kalvariju g.	6.300
Savanoriu pr. / Vilkipedes g.	6.000
Laisves pr. / Rygos g.	5.400
Gelezinio Vilko g. / Gerosios Viltis g.	5.000
Laisves pr. / Narbutos g.	4.700
Kalvariju g. / Ozo g.	4.100
Savanoriu pr. / Zemaites g.	4.000

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## Siemens Traffic Measurement System Vilnius

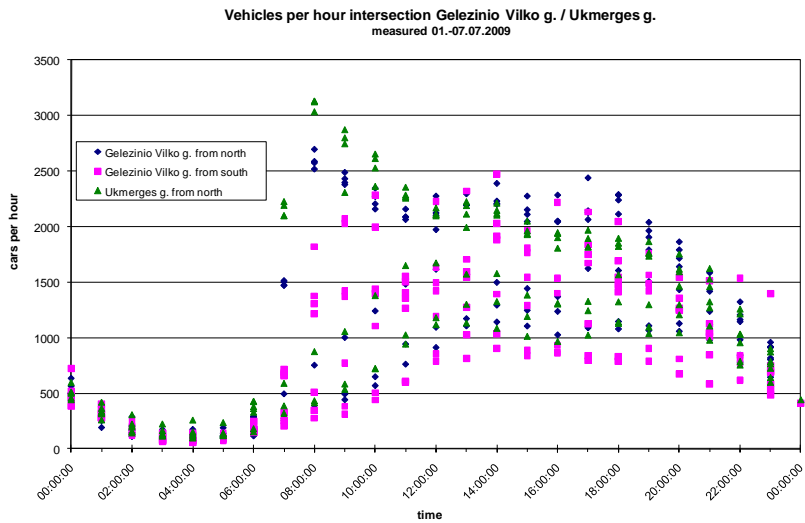
### Intersection Narbuto Str. – Laisves Str.



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## Siemens Traffic Measurement System Vilnius



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## Prognosis of traffic *Ukmerges g. / Gelezinio Vilko g.*

per direction	Calculation IFB	
	basis traffic flow, public transport service	
Passengers public transport + cars	100.426	100.426
Passengers due to increase of traffic	20.838	20.838
Total passengers	121.264	121.264
Percentage of pass. change system	34%	50%
Passengers per day using new system	41.230	60.632
Percentage peak-hour of daily volume of traffic*	10%	10%
Passengers/direction, peak-hour	4.123	6.063
max. passengers per vehicle (5-min-headway)	344	505

\* derived from public transport service and automatically recorded data



ca. 500 passengers / vehicle if 50% of passengers change transportation system and 10% of daily traffic flow in peak-hour

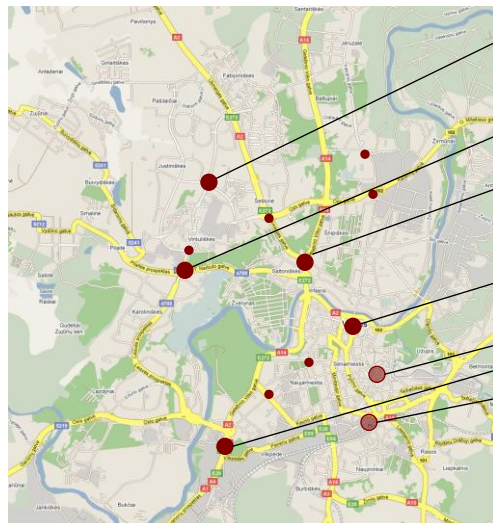
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## Traffic flow with high density



Laisves pr. / Rygos g. / Buivydiskiu g.

Pilaites pr. / Laisves pr. / Narbuto g.

Ukmerges g. / Gelezinio Vilko g.

Gostauto g. / Kalvariju g.

Historic centre

Savanoriu pr. / Laisves pr. / Gelezinio Vilko g.

Main station

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## Comparison of prognoses of traffic volume

### Prognoses of max. traffic volume in the analyzed studies

	Systra /Special Plan 2002/2003	Scott Wilson 2005	Vilnius Metro 2007/2009	IFB 2009
max. Passengers per direction, peak-hour	6.800	3.200	7.500	6.000
Passengers / train 10-min-headway	1.133	533	1.250	1.000
Passengers / train 7,5-min-headway	850	400	938	750
Passengers / train 5-min-headway	567	267	625	500

➔ New system with capacity of approx. 600 passengers is required

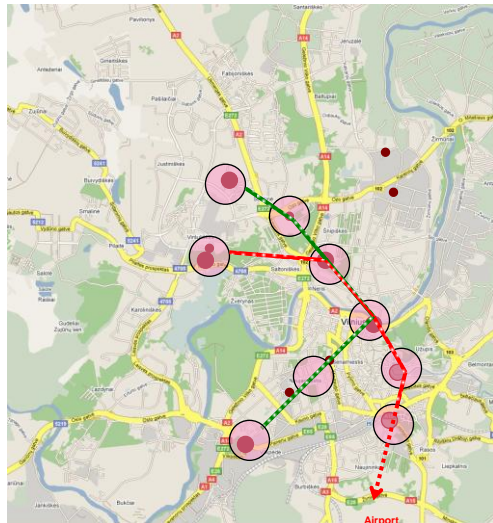
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## Main points of traffic volume / possible lines



Length of line ca. 8 km

Length of line ca. 6 km

Total length of lines ca. 14 km

In inner city / historic centre only underground installation possible

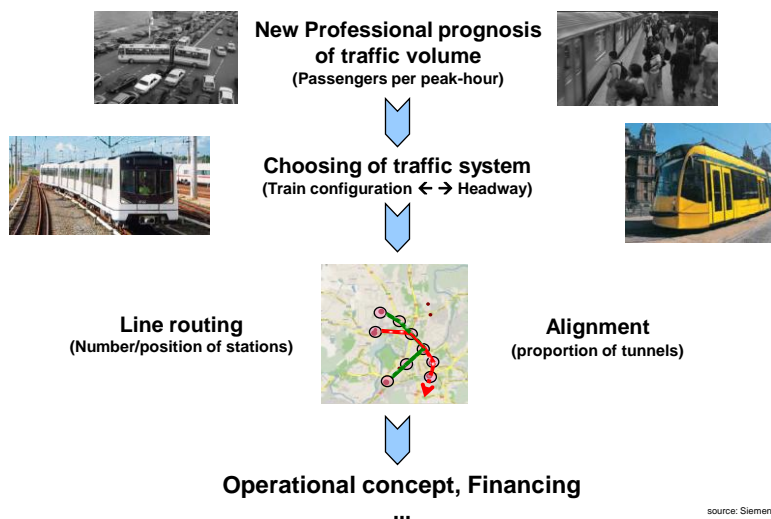
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## Next steps



source: Siemens AG, Vilnius Metro

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# Thank you for your attention!

**New mass transit system for the city of Vilnius**

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Workshop Vilnius, 25.03.2010

