Cerema

Centre d'études et d'expertise sur les risques, l'environnement, la mobilité et l'aménagement

Dedicated lane on motorways

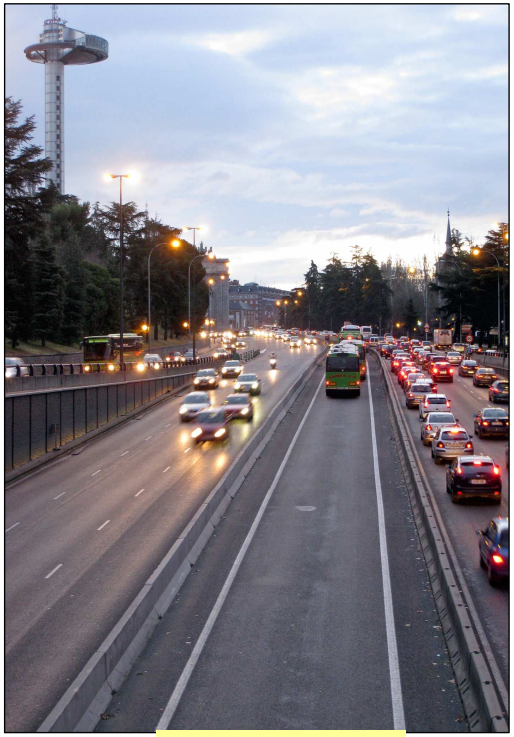
Assessment, strategies in France

François Rambaud – Cerema Territoires et Ville

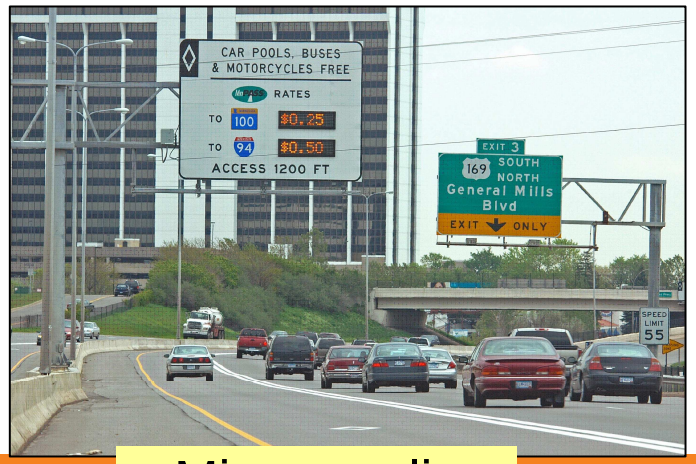
October 2016

Content

- What we know from abroad
- The Trends in France
- Key points of our next guide book « Buses on shoulder »
- Questions



Madrid



Minneapolis

Grenoble

Barcelona

Cerema

Case studies from abroad

- **USA / Canada : mostly HOV, HOT ..**

  USA : 5500 km of HOV – 400 for buses

  600 km of HOT, since the 90ties

  a new trend : HOT with congestion pricing

  Buses on shoulder : Minneapolis mainly (480km)

- **Spain :**

  Madrid : the Bus VAO – 16km (busses and carpooling)

  Barcelona : A new Bus VAO – 7km (buses, carpooling, clean vehicules)

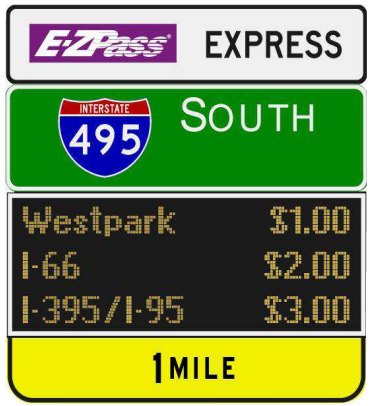
- **Netherlands :**

  Since 1995, Busses on hard shoulder, 20 projects, one in A9, 5km (Zuidtangent)

  One carpooling lane (+3) tested in 93, abandoned – A1

- **HOV in other EU countries :**

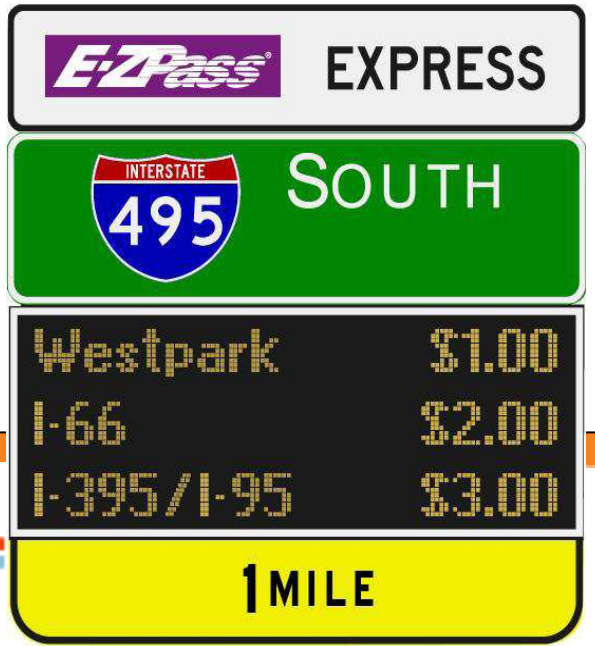
  UK : 2 projects in Bristol, in Leeds (1998 – 1,6km, 2+),
  Norway : 1 project in Trondheim, (2001 - 0,8km, 3+)
  Sweden : 1 project in Stockholm, (2000 - 8km, 3+)
  Austria: 1 project in Linz , (1999 - 2,8km, 3+).

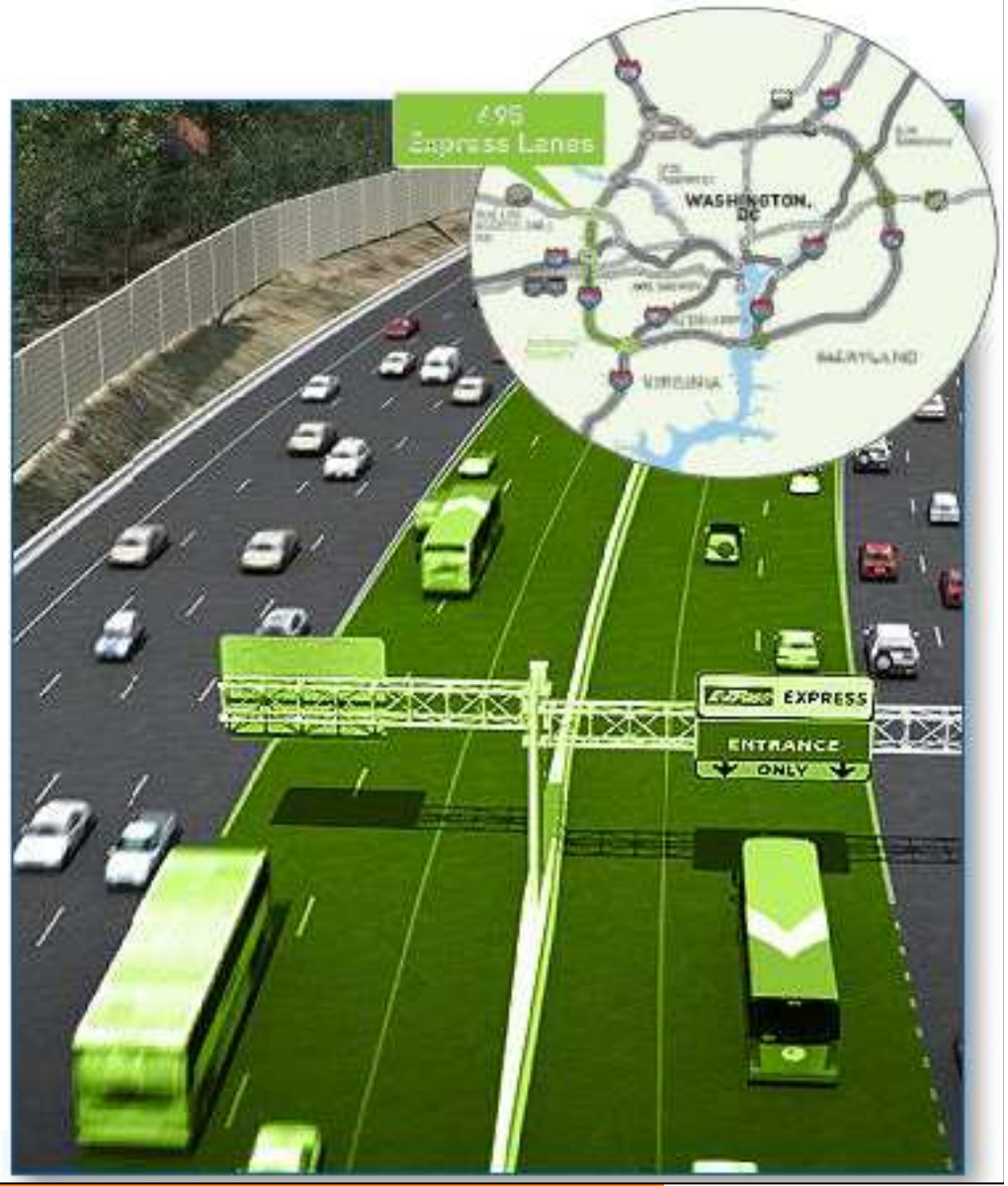


Virginia's P3 Projects - Open to Traffic

495 Express lanes (Virginia state)

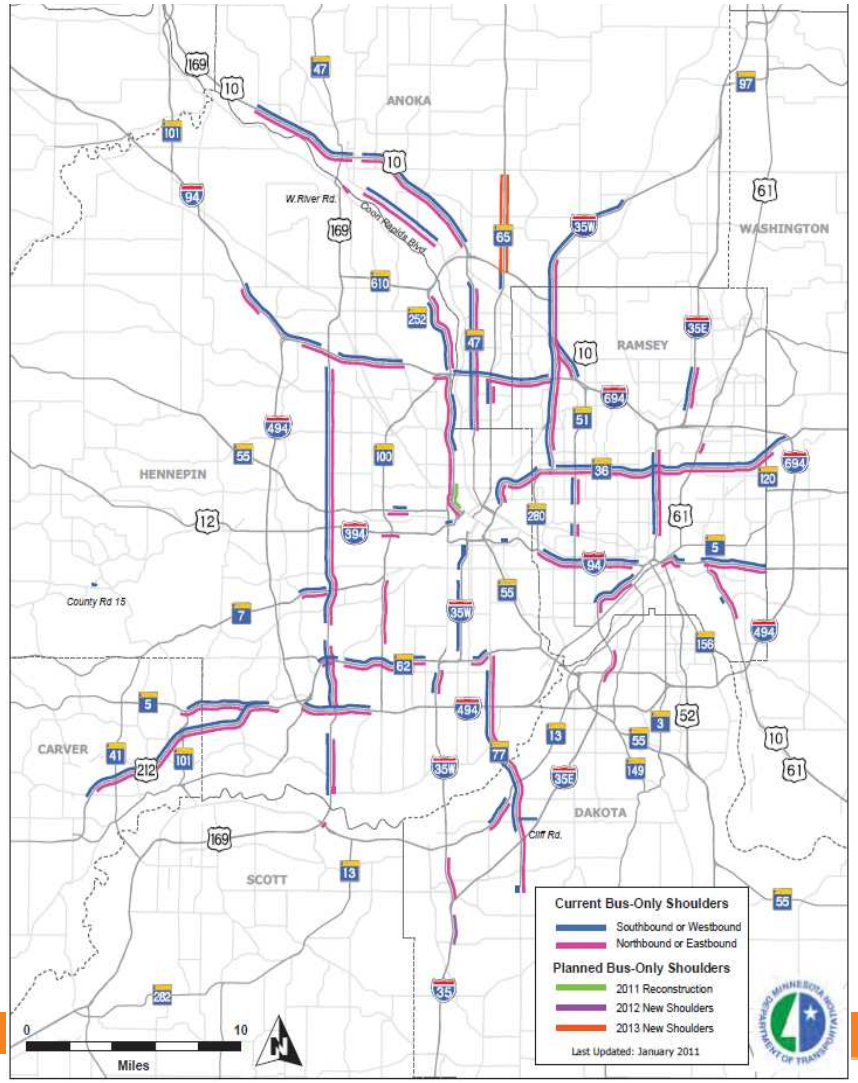
- opened in July 2012
- 22 km
- Big improvement of entrance/exit, with 2 billions $, into a PPP (80 years)
- **free : HOV+3 , buses, some trucks**
- **variable pricing for car "solo"**
- high penalties : until 1000$!

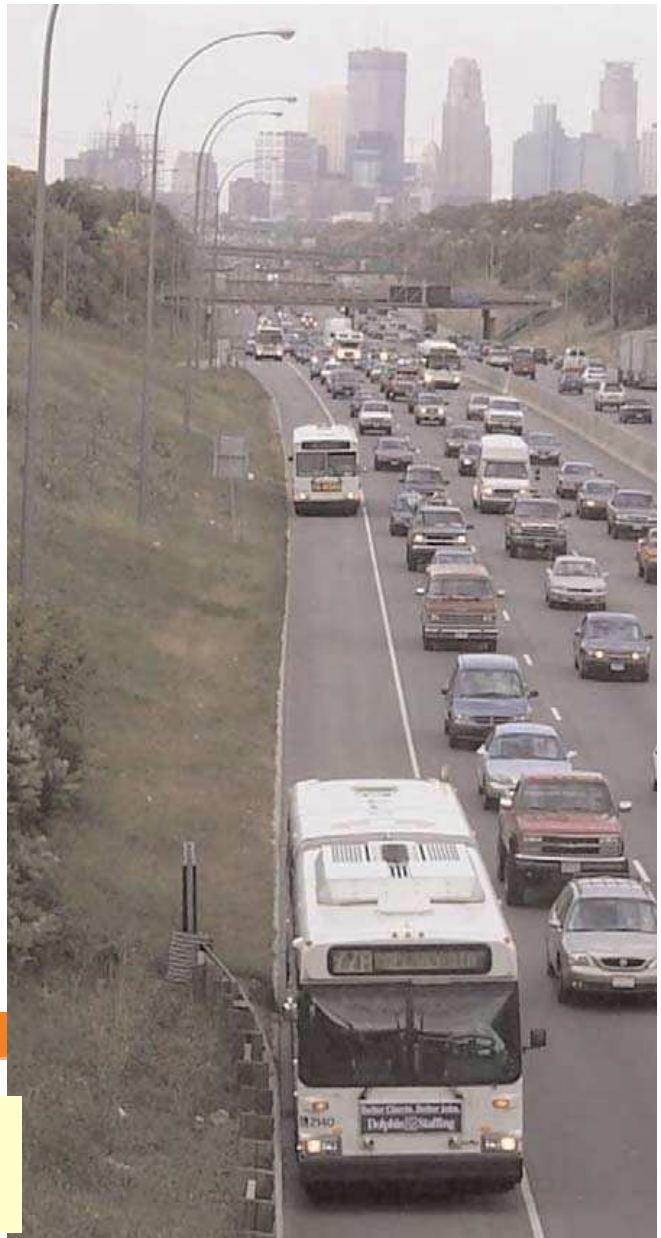




Buses on freeway shoulder - Minneapolis - Saint Paul, Minnesota, USA

In 1991, bus-only-shoulders were tested. Buses are allowed to use the shoulders only when the traffic speed drops below 56 kph.





The 480-km. network of Bus Only Shoulders in the Twin Cities (Minnesota Department of Transportation)

Madrid

Alone and emblematic European BRT / HOV experience…

Buses + carpooling + motorcycle into the highway « A6 »

Interchange with the « metro » ring of Madrid

200 buses / hour - 44 lines in this corridor

Buses on shoulder of motorways

Since 2000

Netherlands

Zuidtangent : 5 km on shoulder during congestion

Case studies in France

- **A48 – Grenoble : 2X2, Buses on hard shoulder.**

  First phase opened in 2007 : 4 km

  Second phase opened in 2013 : 4 km

  Lane is managed by an operator (dynamic signalisation) – high cost

  Always, operated as an experimental solution (Signs not yet in our regulation)

- **A7 – AIX, Marseille : 2X3, Buses/ taxis on the slow lane**

  Opened in 2013, 60 buses + 15 taxi / hour

  The 2 last KM of the motorway

  Static signalisation

- **A51 – AIX, Marseille, 2X3, Buses on hard shoulder**

  Opened in 2015 - 1,5km

  A design like a bus lane, with a static signalisation : **soon our new standard**

  Extension will be opened soon (1,5km, upstream)

- **Many projects in Île de France (Paris region)**

  A10 : bus on shoulder , many other projects on studies..

  A1 : Bus lane on the left side, static signalisation, on study

  A6a : Bus and taxi lane on the slow lane, with a dynamic signalisation

Grenoble

Buses on shoulder on highway A48

North entrance of Grenoble,

opened in 2007, extended in 2014 : 8 km in total

Investment cost : 2 M€ / km

Dedicated lane opened by an operator (around 2 hours /day)

No freedom to enter, to exit – speed limit : 50 km/h

One crossing managed by traffic lights

Positive results, **25 / 30 bus /hour** , good safety

But, system considered now too rigid, too expensive

Always into an experimental status …

Marseille

A7 - Entrance in Marseille
Since 2013

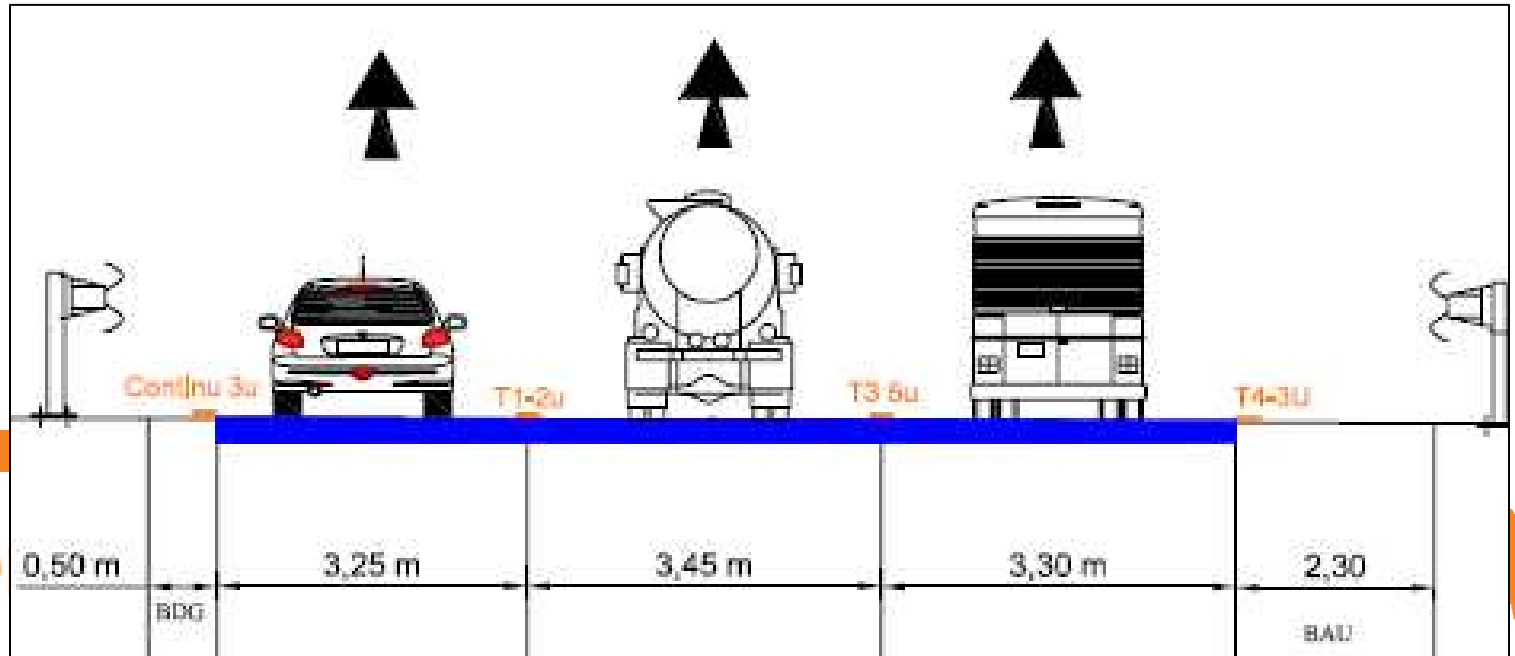
Bus lane into the slow lane - 2km ,

Safety :

- *Good feedbacks, good understanding*
- *Important fraud …*

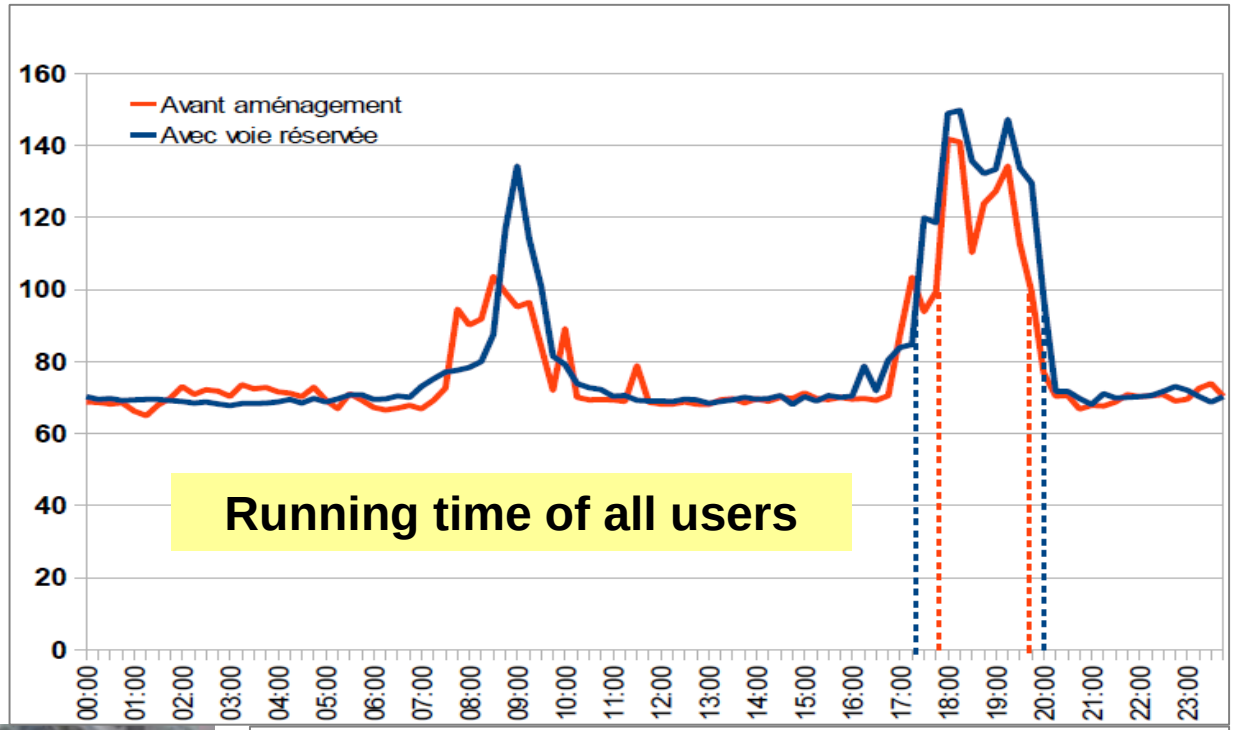
Good balance for PT : better regularity (55 coaches /h + 10 taxis/h)

Traffic congestion : almost the same

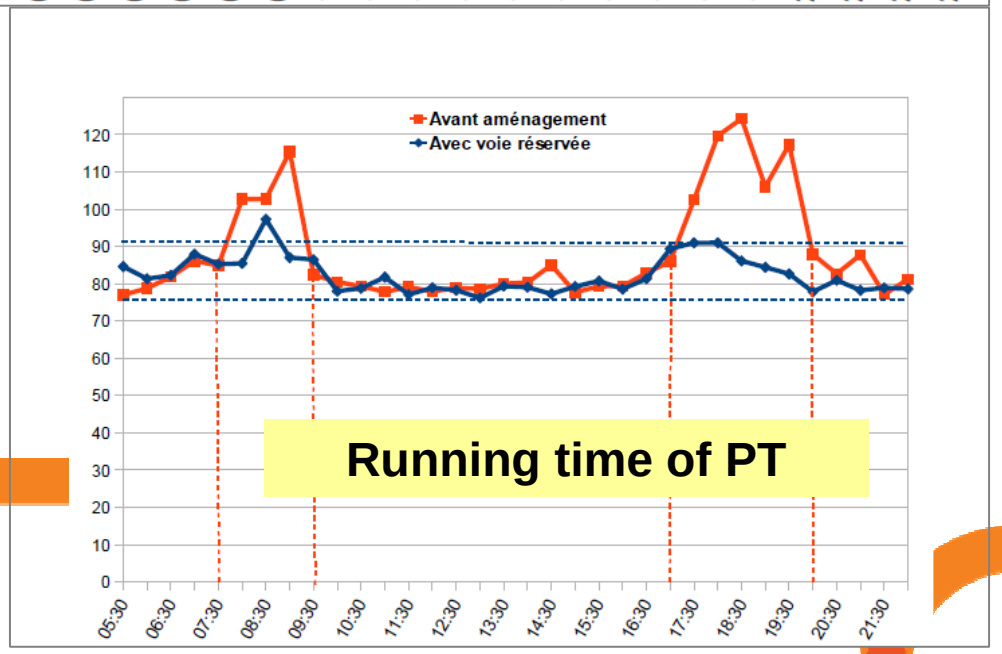


Dedicated lane on A7
Assessement

Marseille



Running time of all users



Running time of PT

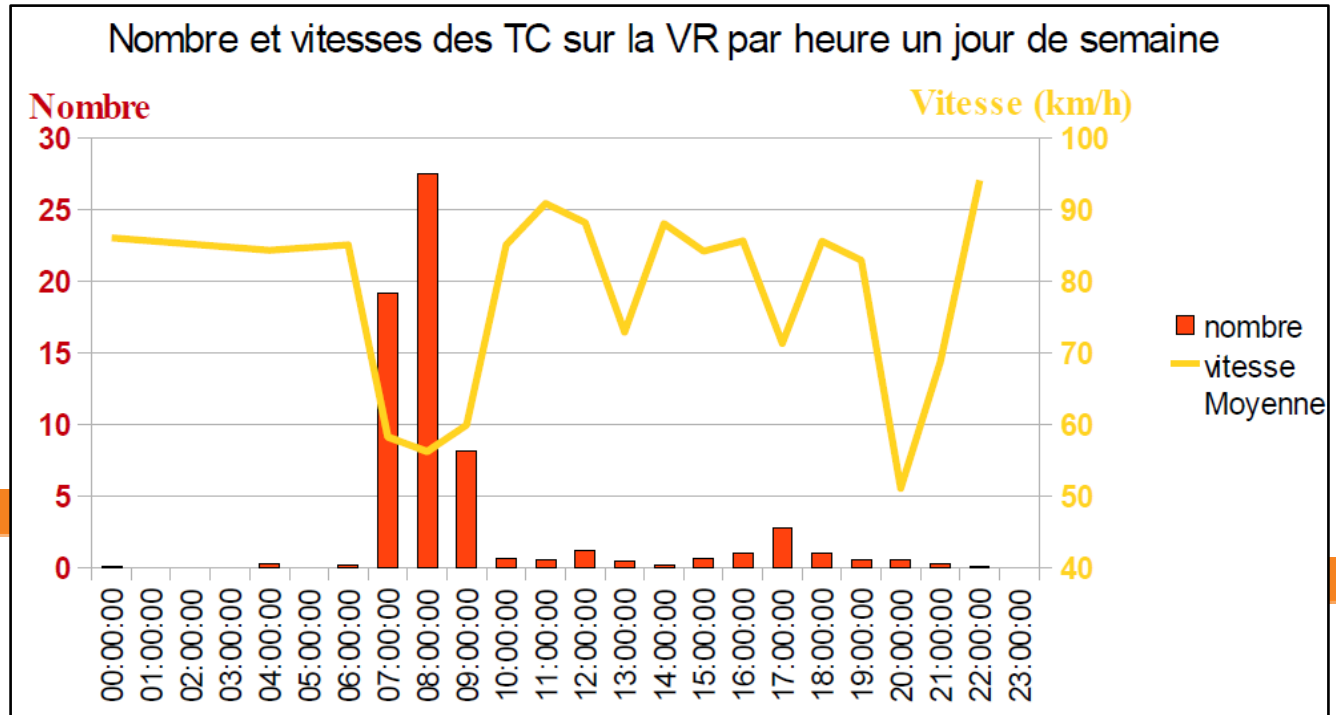
Cerema

Aix-Marseille

Buses on shoulder on highway A51

Between Aix and Marseille,

- *1st phase opened in April 2015*
- *Congestion between 7h – 10h*
- *Static signalisation*
- *speed limited at 50 Km/h, but not displayed*
- *30 buses / hour*



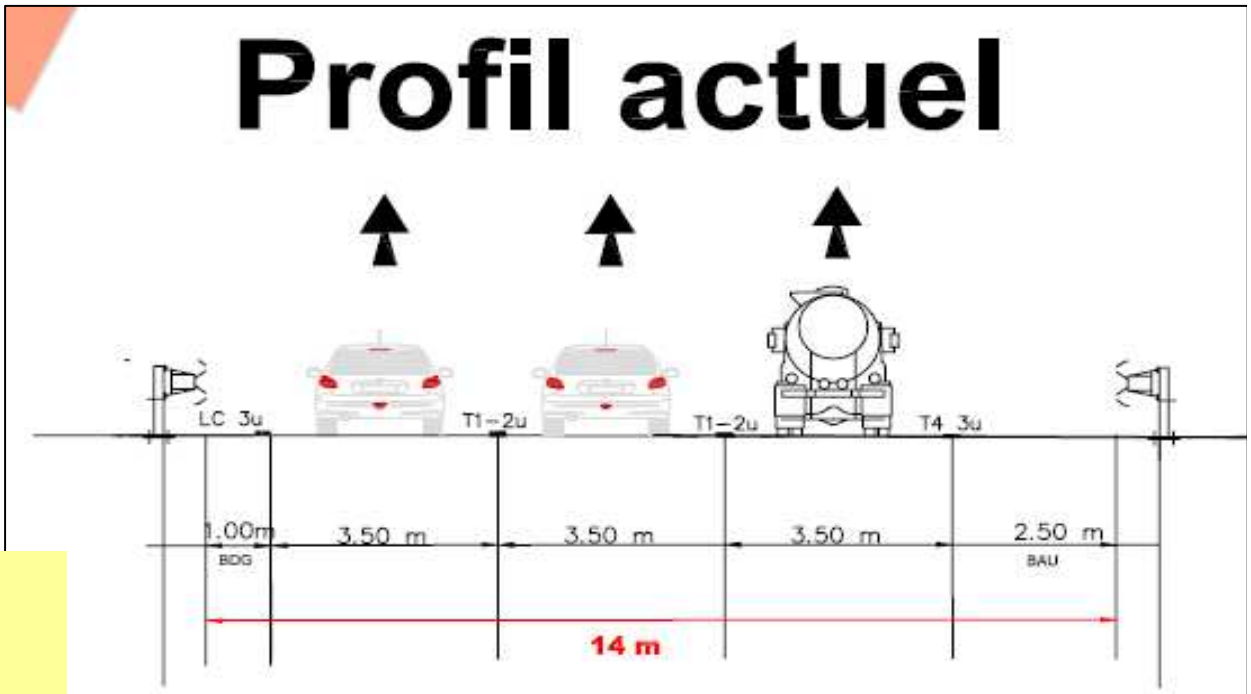
Cerema

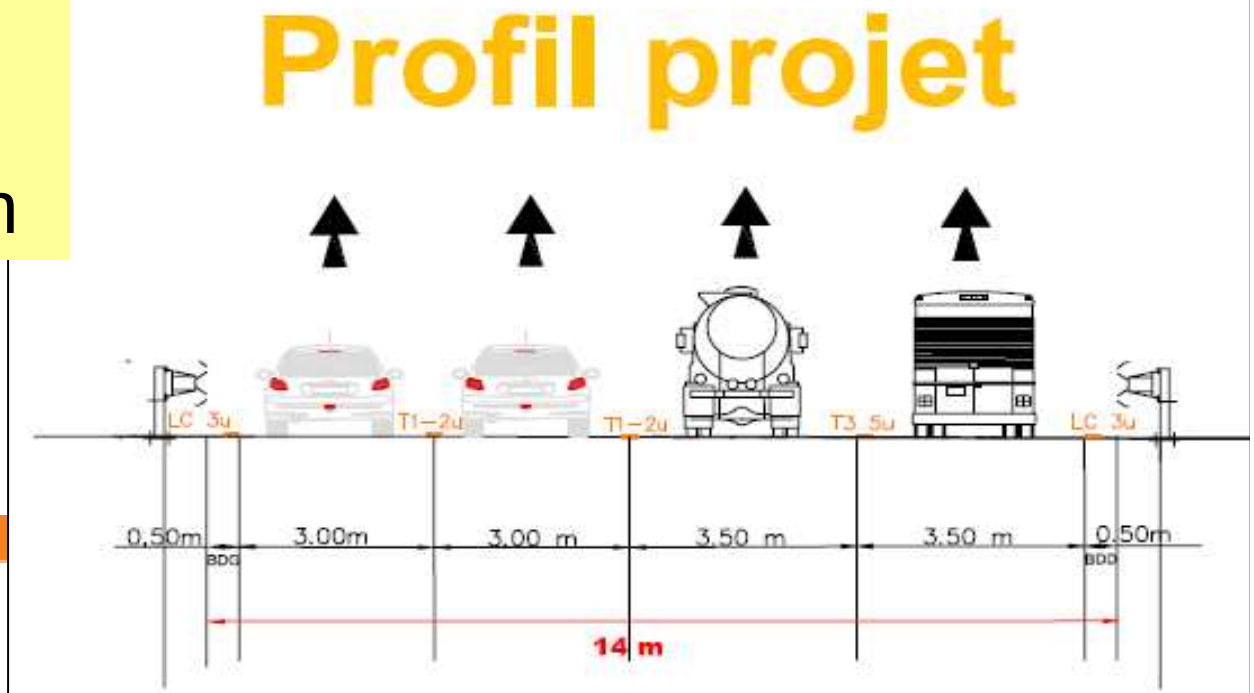
Aix-Marseille

A51 (mai 2015)

The Cross-sections, before, after

Speed limited at 90 Km/h



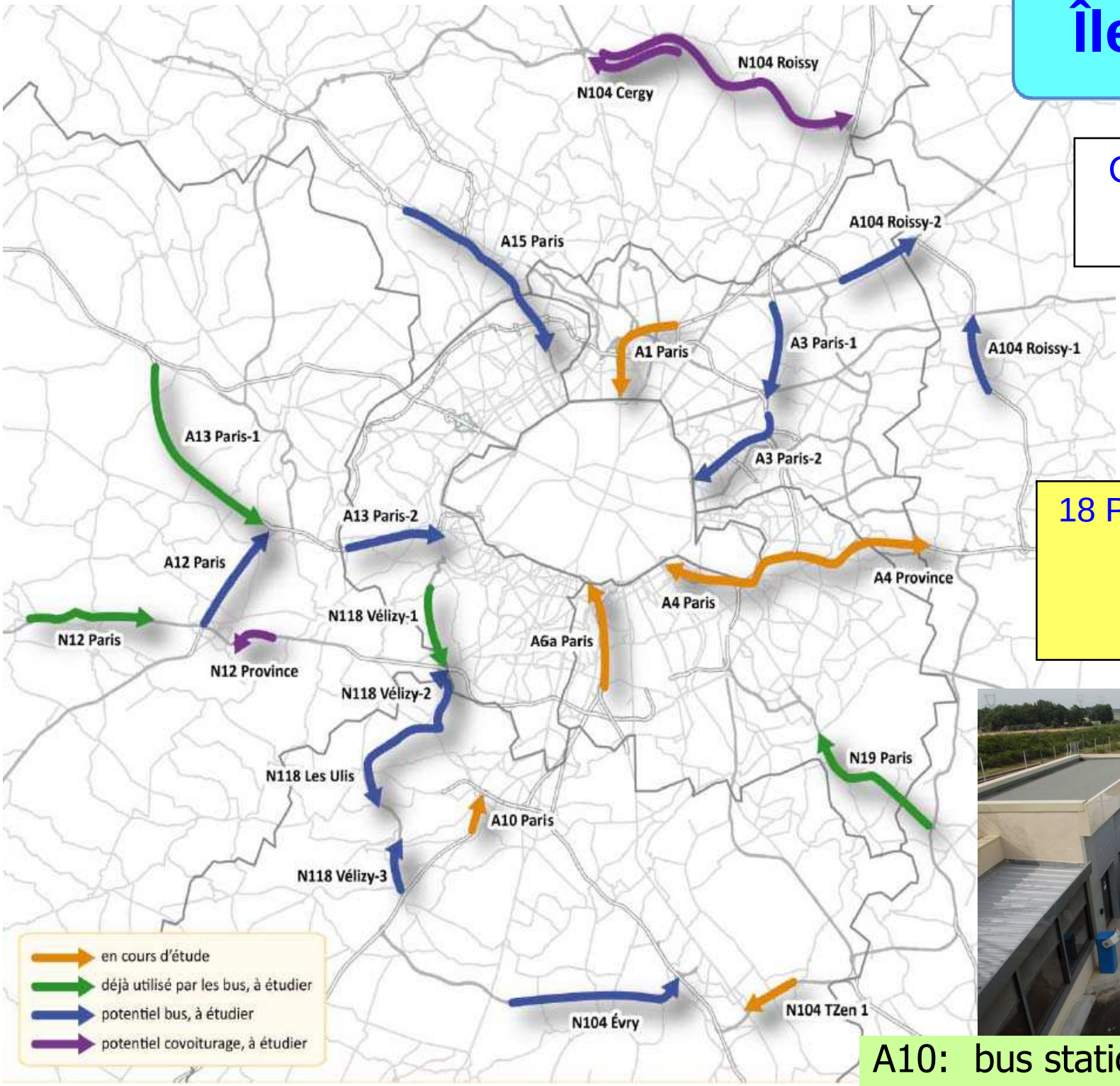


Cerema

Île de France

On urban motorways,

for buses, taxis



18 Projects in study : 83 Km

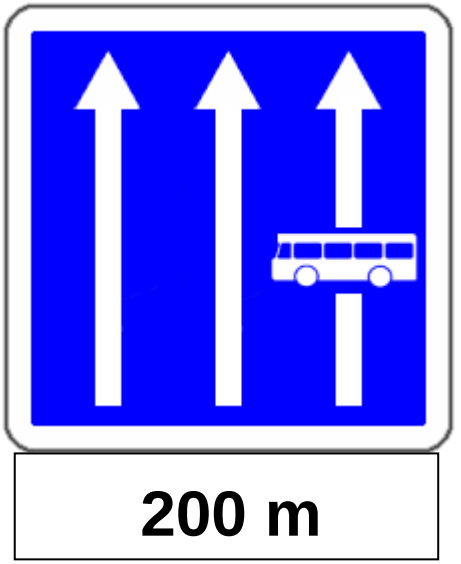
Total : 220 M€

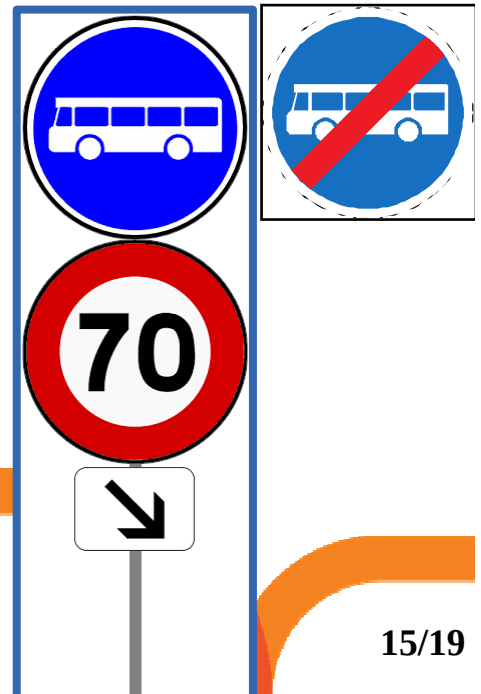
Rate : 2,6 M€ / Km

A10: bus station for Briss sur forges

Key points for our new guideline « Bus on shoulder »

- Design like an additional climbing lane, without hard shoulder
- Buses only, (no taxis, no tourism buses,...)
- Limited traffic : < 100 buses /hour
- Static signalisation, like a bus lane (without direction signing)
- Freedom to enter, to exit from anywhere
- A supervision by the road operator
- Refuge islands are no more required (before, every 500m)
- Speed limits : < 70 , 50 km/h, according to visibility constraints
- Differential speed not managed
- The speed limit should be displayed
- Junctions with exit or entrance are suggested





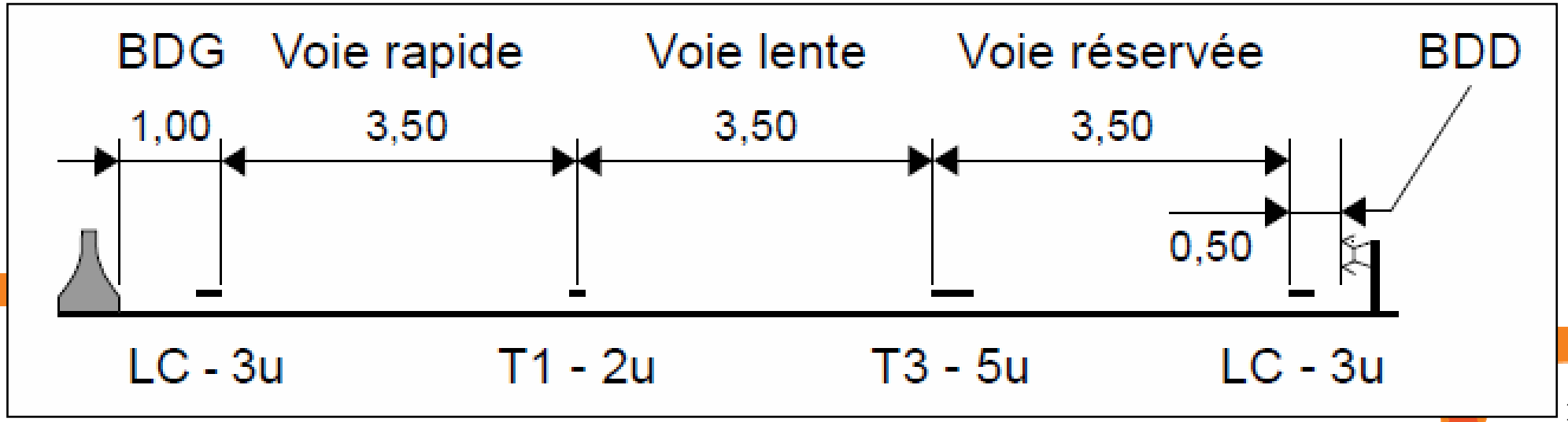
Cerema

Main design characteristics

- Width of the bus lane

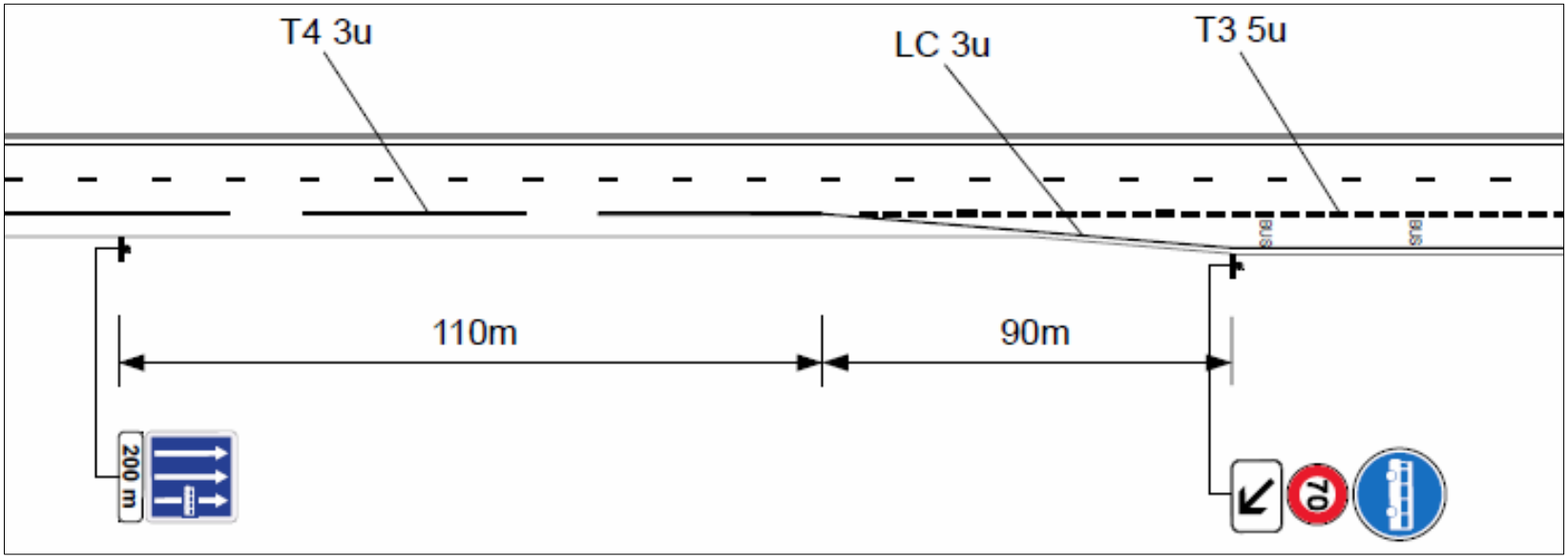
< 30 km/h	50 km/h	70 km/h
3,20 m	3,30 m	3,50 m

- Width of the runing platform

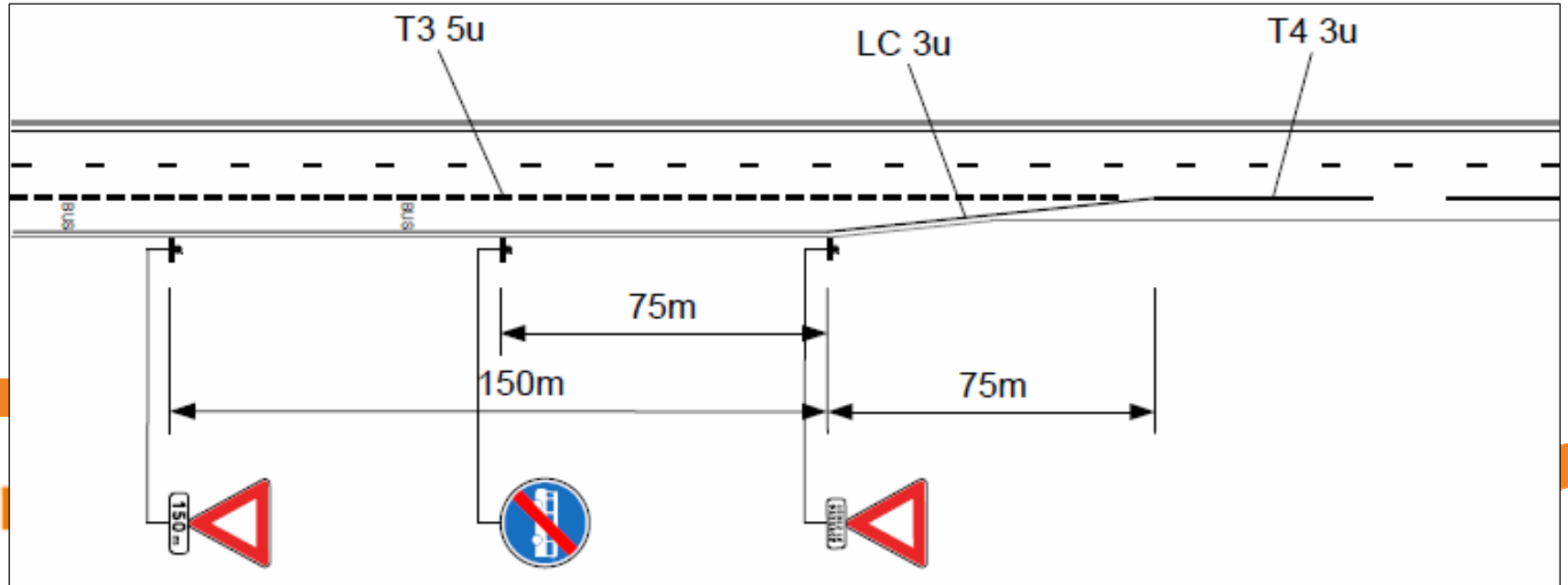


Layout plan suggested (1)

- Entrance of a bus lane

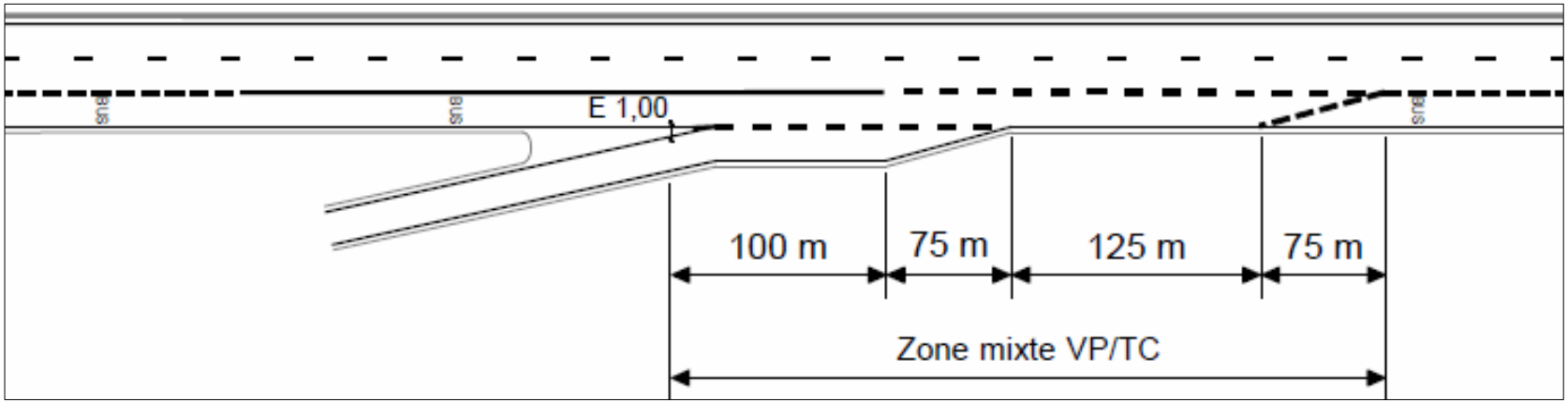


- Exit of a bus lane

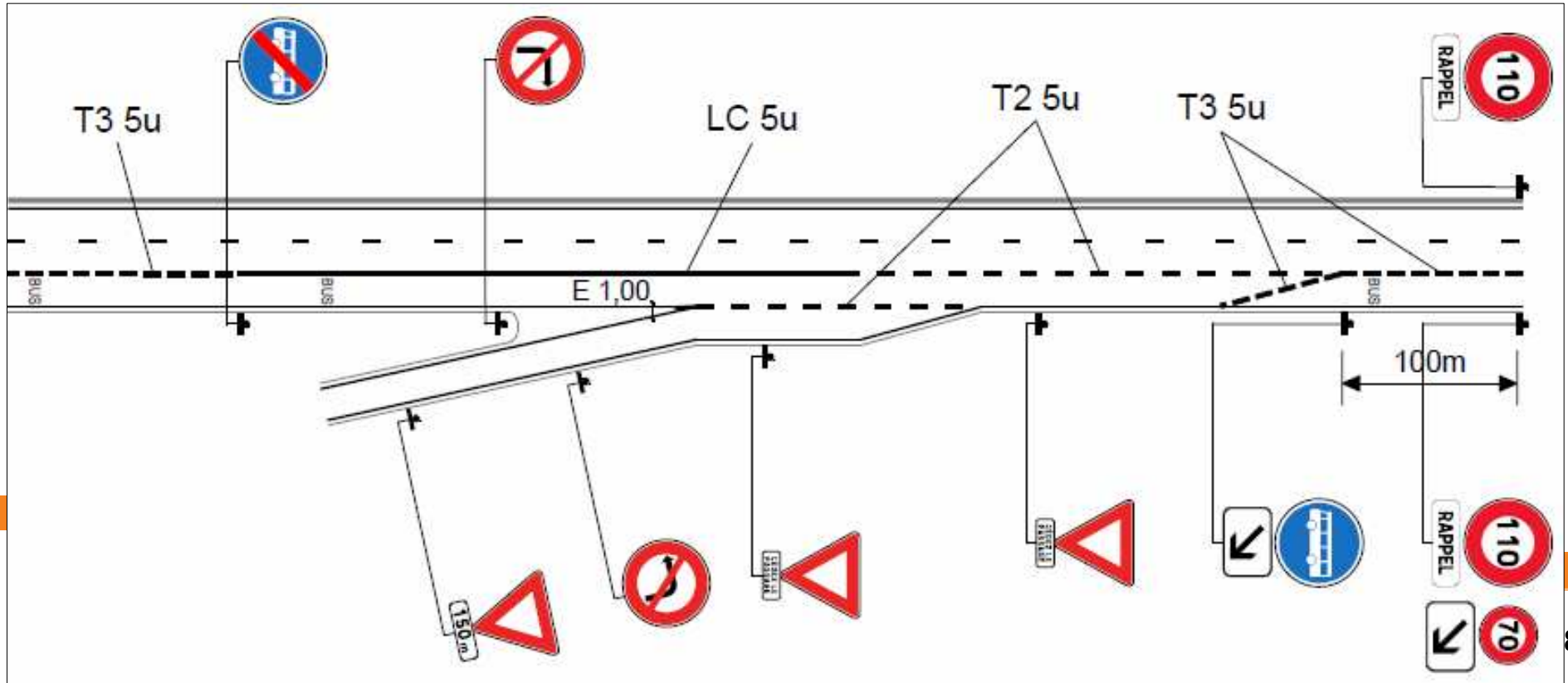


Layout plan suggested (2)

- Crossing through an entrance - design

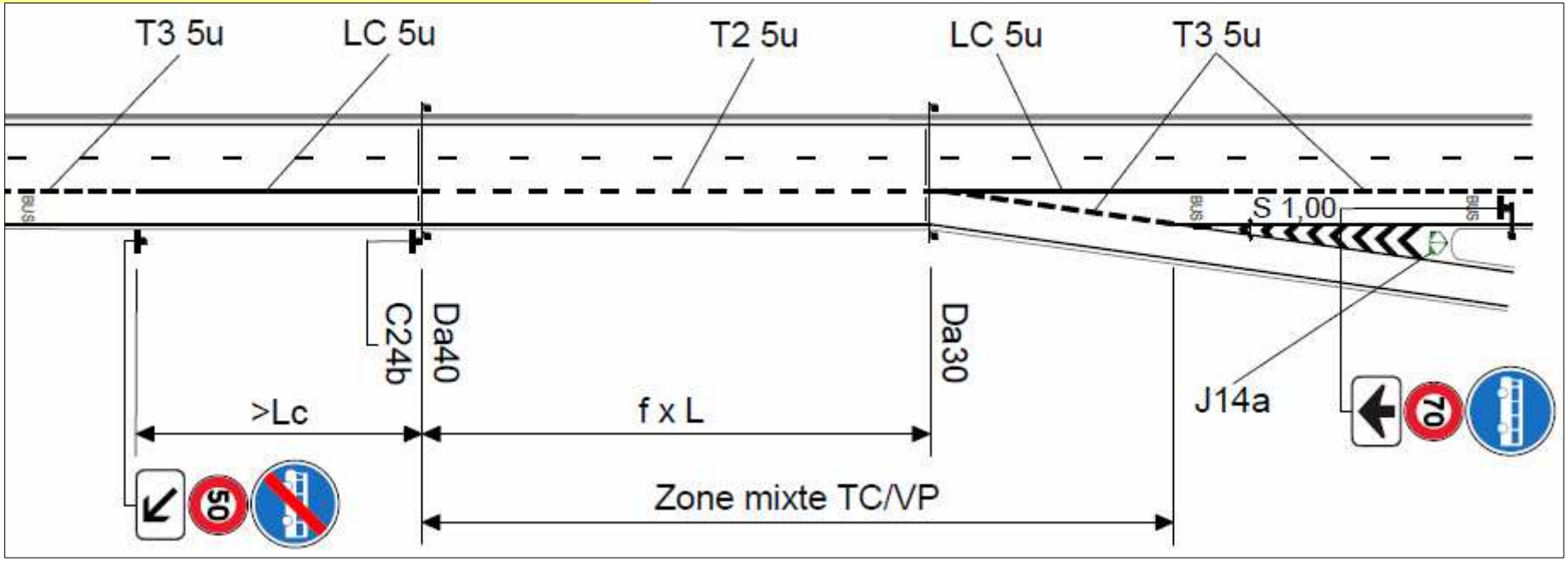


- Crossing through an entrance - signalisation

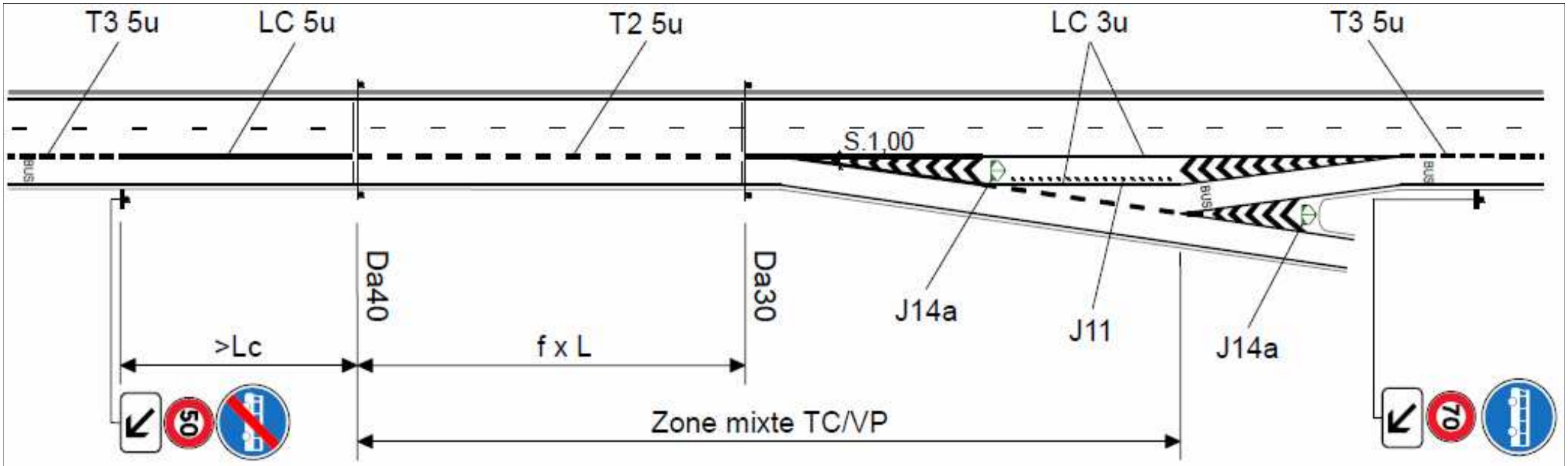


Layout plan suggested (4)

- Crossing through an exit - A



- Crossing through an exit - B



Remarks, discussion …

What assessments do you get today, from your « bus on shoulder » experiences ?

- regarding the safety
- regarding the PT benefits, the traffic impact
- regarding the acceptance of the users (fraud ? …)
- regarding your design strategies, is there any evolution going on?

Have you some new projects of bus lane (shared lane) , taking the slow lane, the rapid lane, the shoulders ?...

Have you experimented some dedicated lanes , with a dynamic signalisation

Your Opinion, your trends regarding carpooling lanes

Cerema

Centre For Studies and Expertise on Risks, Environment, Mobility, and Urban and Country Planning

Thank you for your attention

www.cerema.fr