Integration of guided busways in the urban environment

By

Sally Ellis, Institution of Civil Engineers, UK
Khaled Hassan, TRL, UK
Heather Ceney, Arup, UK

Integration of Guided Busways

- Sustainable transport
- The Guided Busway
- Design considerations

Sustainable Development

"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs"

(Brundtland, 1987)

Sustainable Transport

- ‘Allows the basic access and development needs of individuals, companies and society to be met safely and in a manner consistent with human and ecosystem health, and promotes equity within and between successive generations;

- Is affordable, operates fairly and efficiently, offers a choice of transport mode, and supports a competitive economy, as well as balanced regional development;

- Limits emissions and waste within the planet’s ability to absorb them, uses renewable resources at or below their rates of generation, and uses non-renewable resources at or below the rates of development of renewable substitutes, while minimising the impact on the use of land and the generation of noise’.

(European Union Council of Ministers of Transport)

Sustainable Transport

European policy highlights:

- Risk of congestion on the major arteries and regional imbalance
- Conditions for shifting the balance between modes
- Priority to be given to clearing bottlenecks.
- New place given to users, at the heart of transport policy.
- Need to manage the effects of transport globalisation

'Transport Policy for 2010: Time to Decide', (European Commission, 200



The conventional bus


Guided pneumatic-tyred systems



Trams

The Guided Busway

- **Dedicated route**
- **Specially adapted vehicles**

The Guided Busway

Kerb guide

- **Central guide rails**

The Guided Busway

- Light vehicles reduces impact on adjacent pavements and buildings
- Reduced cost of rolling stock
- No electrification required
- Travel service
  - reduces single occupancy car patronage
    - Leeds '*Superbus*' 75% increase in 30 months.
    - Ipswich '*Superoute 66*' 43% in 16 months
  - operates at relatively high speeds
  - routes in both urban and other locations

Guideway crossing, Essen, Germany

Staggered stop and pedestrian crossing, Essen

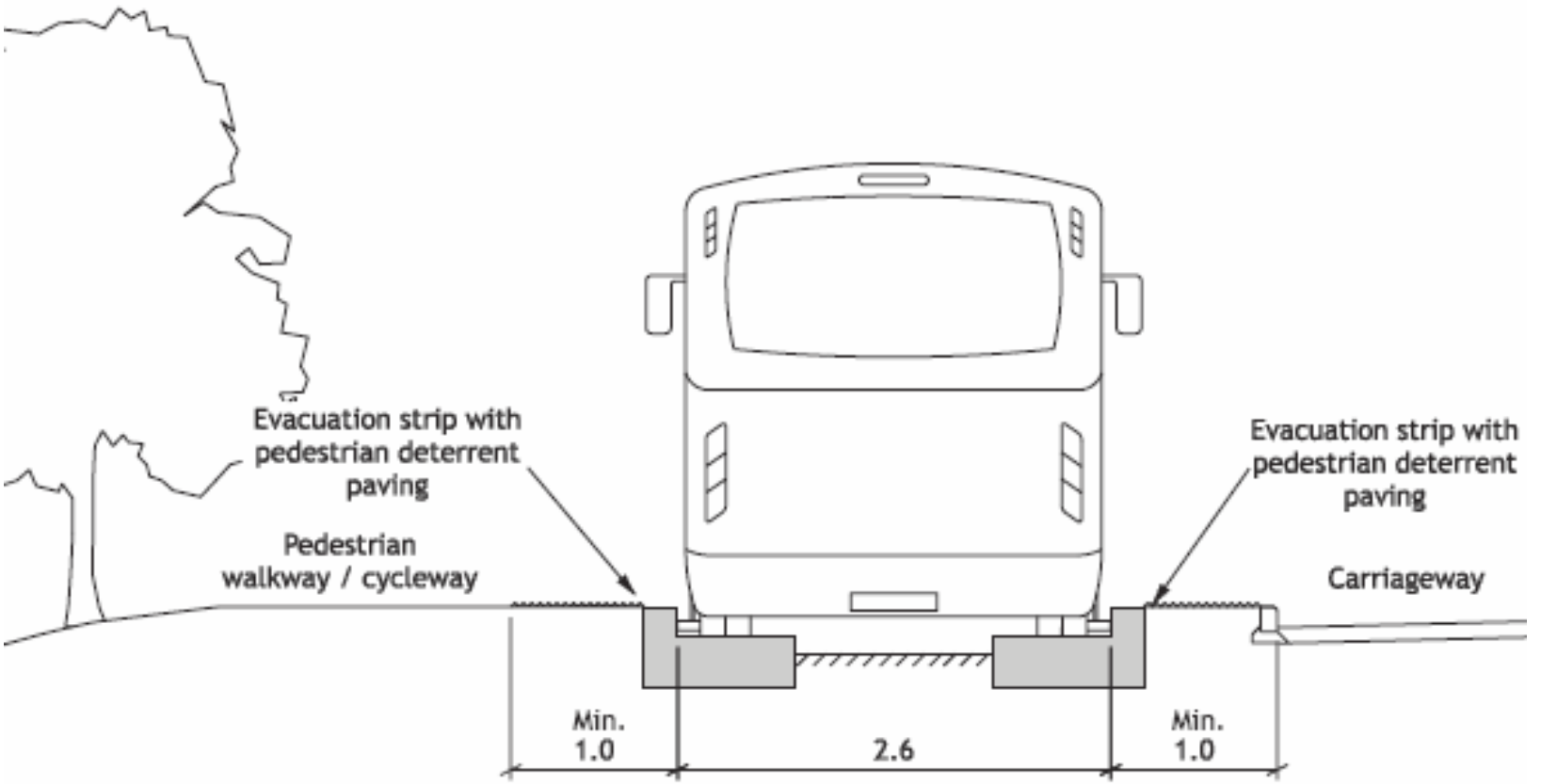
Car trap at a guideway entrance, Ipswich, UK

Precast concrete beams and sleepers, Adelaide, Australia

Steel guide rails on a concrete slab, Essen

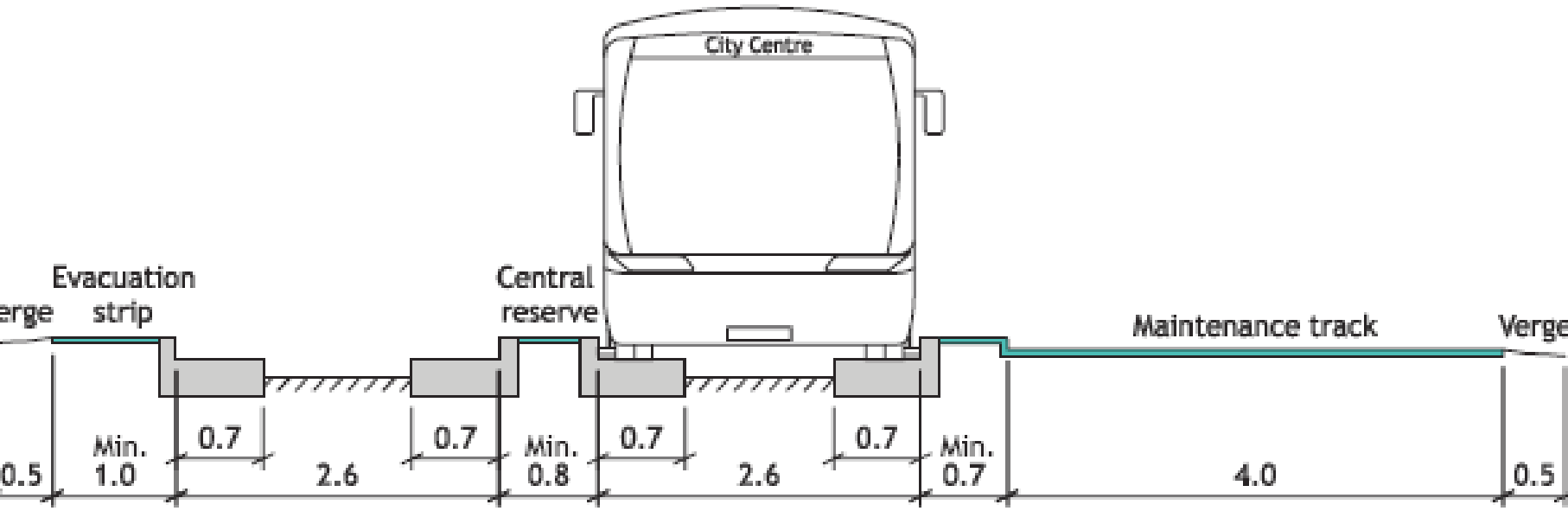
In situ concrete beams with pre-cast kerbs, Leeds, UK

Cross Section



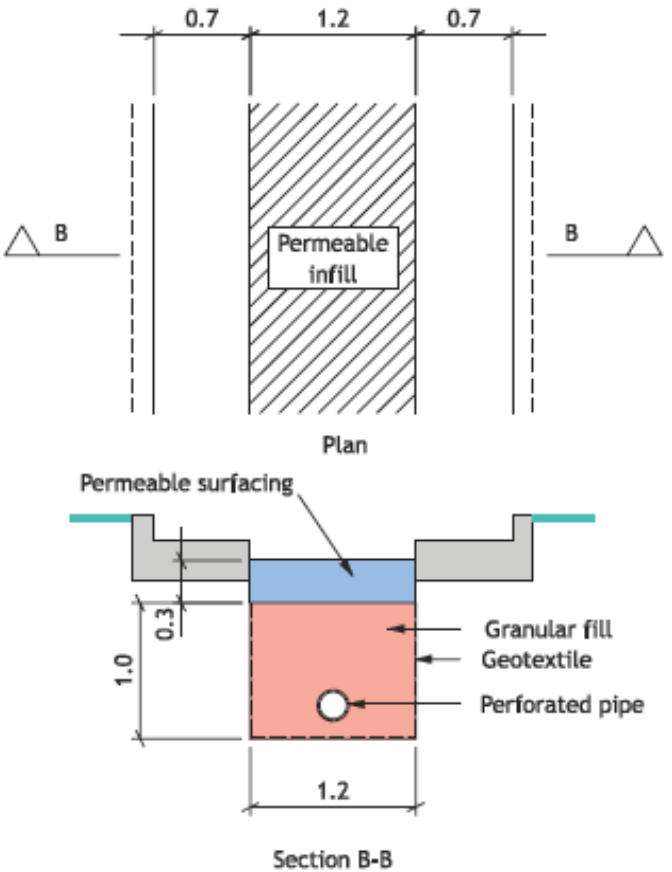
Single lane guideway adjacent to highway

Cross Section



Typical at-grade with maintenance track

Cross Section



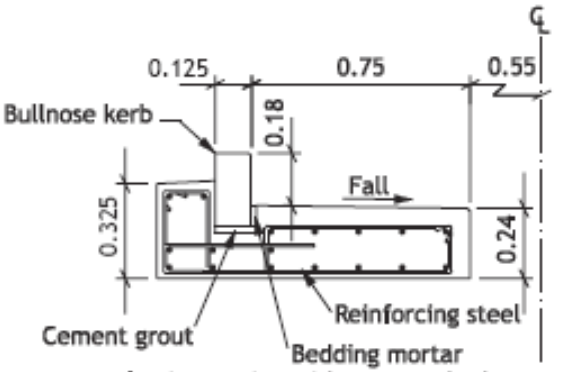
Typical sustainable drainage detail

Guideway with central planting and landscaping, Essen, Germmany

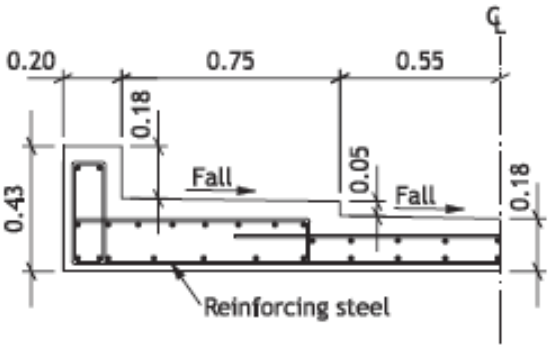
Design Considerations

- Operations
- Vehicles
- Loading
- Geometrics
- Safety
- Pavements

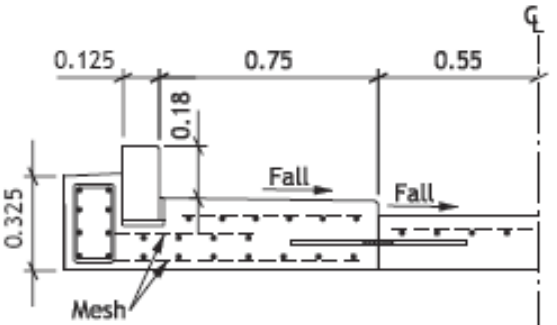
Cross Section



In-situ section with pre-cast kerb, designed as a beam
(Example from Leeds guideway)



Continuous slipformed section, designed as a slab
(Example from Fastway phase 1)



Continuous slipformed section, designed as a pavement
(Example from Fastway phase 2)

Typical construction details

Reinforcement cage anchored into a base slab, Edinburgh, UK

Transverse texturing on a slip formed guideway
Edinburgh, UK

Slip-forming the guideway, Crawley, UK

Concluding remarks

- For urban environments the guideway is a durable development
- Exclusive public transport
- Chance to change the urban environment with the greatest profit for people
- Surfacing techniques need to be well controlled to make a success of a good integration
- It is important to control all the technology for these stressed structures to reduce maintenance and avoid failures

Essen, Germany

Adelaide ‘O-bahn’ Australia

Crawley ‘Fasttrack’ UK

Leeds, UK

Concluding remarks

- Reduce congestion on the major arteries and can aid the balance of regional transport.
- Promote conditions for transport to shift between transport modes.
- Aid the clearing bottlenecks and has demonstrably done so.
- Considers the transport user to provide a safe, convenient and reliable transport service.

Integration of guided busways in the urban environment

By

Sally Ellis, Institution of Civil Engineers, UK
Khaled Hassan, TRL, UK
Heather Ceney, Arup, UK