



AUSTRALIAN CONGRESS FOR NEW URBANISM
Sydney August 2005

Public Transport as a Basis for Sustainable Urbanism

G Glazebrook
Principal, Glazebrook and Associates

Australian Congress for New Urbanism

ACNU
sydney



CONTENTS

1. Putting the “T” into TOD
2. What kind of Transit?
3. What the Public Wants
4. Sydney’s Public Transport:
 - The Bad News
 - The Good News
 - The Challenge



1 PUTTING THE “T” INTO TOD

- TOD / Smart Growth / New Urbanism aims to improve sustainability by shifting car trips to walk, cycle and PT.
- Often assumed that in older cities like Sydney with established transit systems, all that is needed is a land use response to take advantage of these systems.
- But failure to address capacity and quality issues has led to serious consequences in Sydney which could easily “derail” the future of TOD



Putting the “T” into “TOD”

- We need to ensure that a **high quality, high capacity, integrated** transit system is actually **built and operated** if TOD is to succeed
- Unless this is done
 - New Urbanism becomes new Sub-Urbanism
 - Smart growth becomes “not so smart growth”
 - TOD just becomes OD



2 WHAT KIND OF TRANSIT?

For public transport to be effective, it needs to be designed, built and operated to meet specific goals:

- Coverage (over both time and space)
- Competitive Travel Time
- Connected
- Comfortable, Secure and Safe
- Capacity to make a difference
- Cost-effective and Affordable

Coverage

Over time

- Early morning to late evening 7 days per week
- “Night rider” bus and DRT services for other periods
- Research shows that lack of evening and weekend coverage reduces public transport use generally

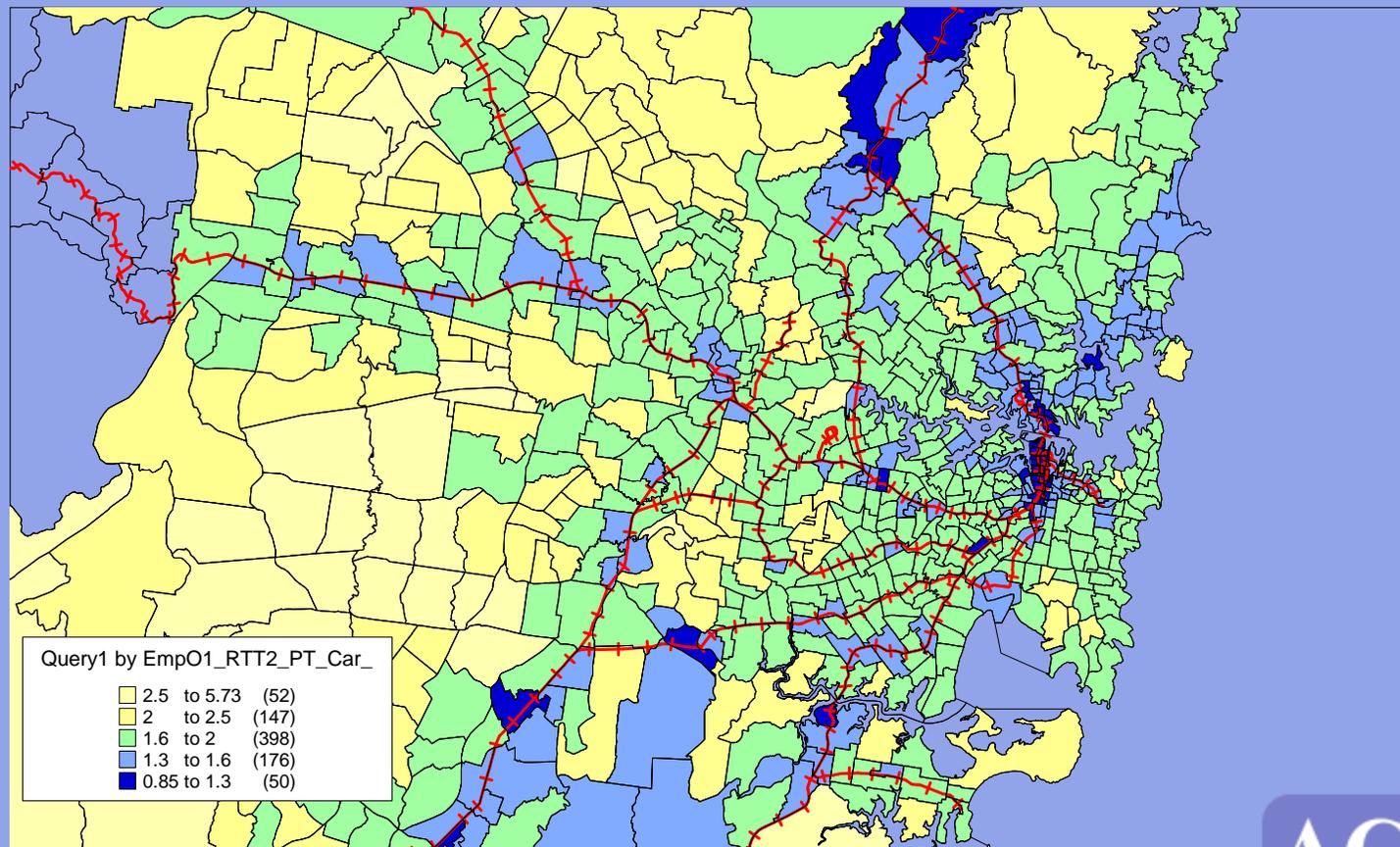
Over Space

- PT Network should cover all built-up urban areas
- At a minimum, should allow all residential areas to **easily connect** with both their local centre and with their CBD

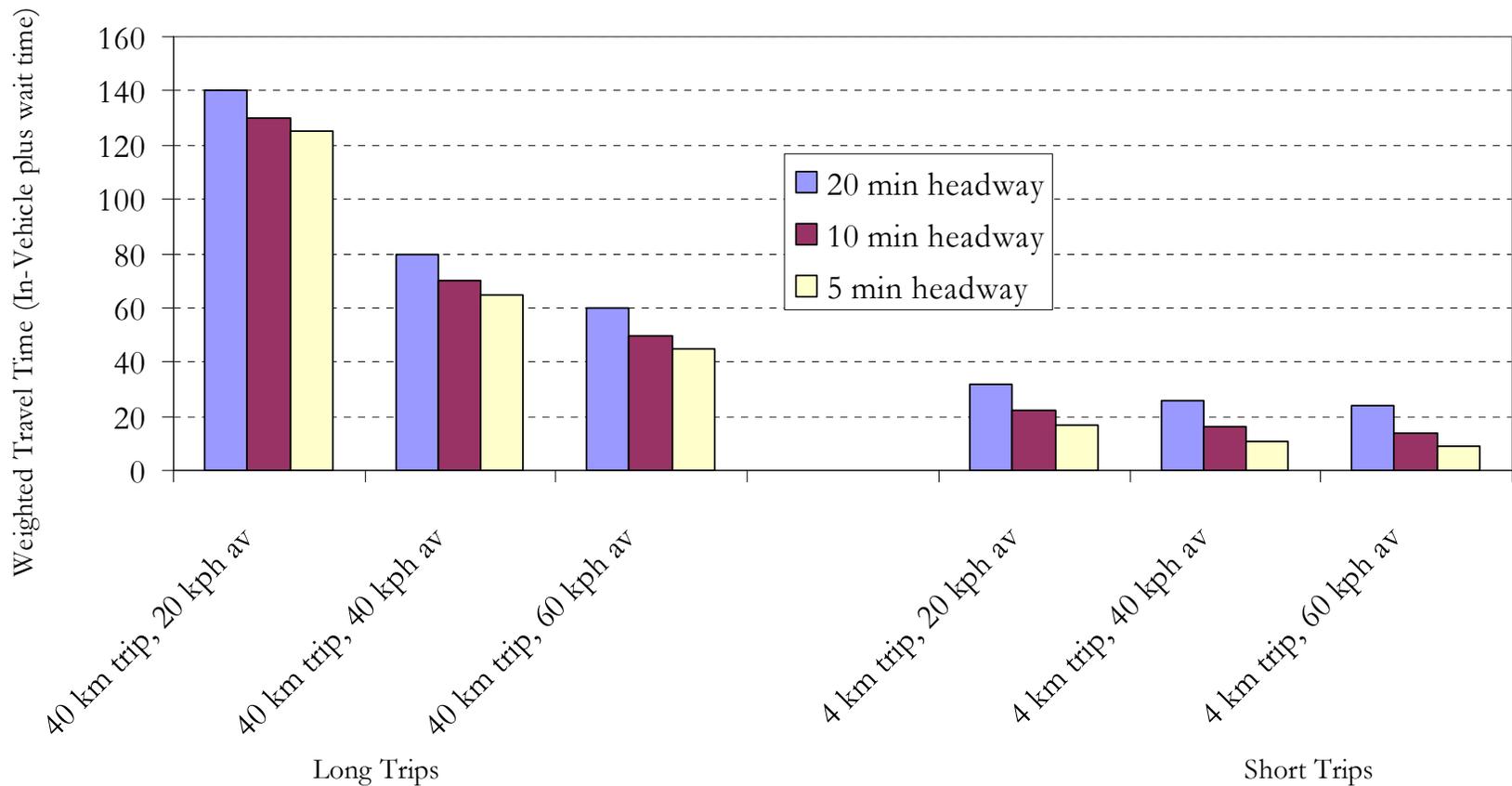
Competitive travel times...

Areas where PT is competitive with car (blue) are basically where high speed, high frequency services exist.

Areas off the rail network mostly have very poor relative access to car (areas shown in tan or yellow)



Impact of speed and headways on travel time



Competitive Travel Times

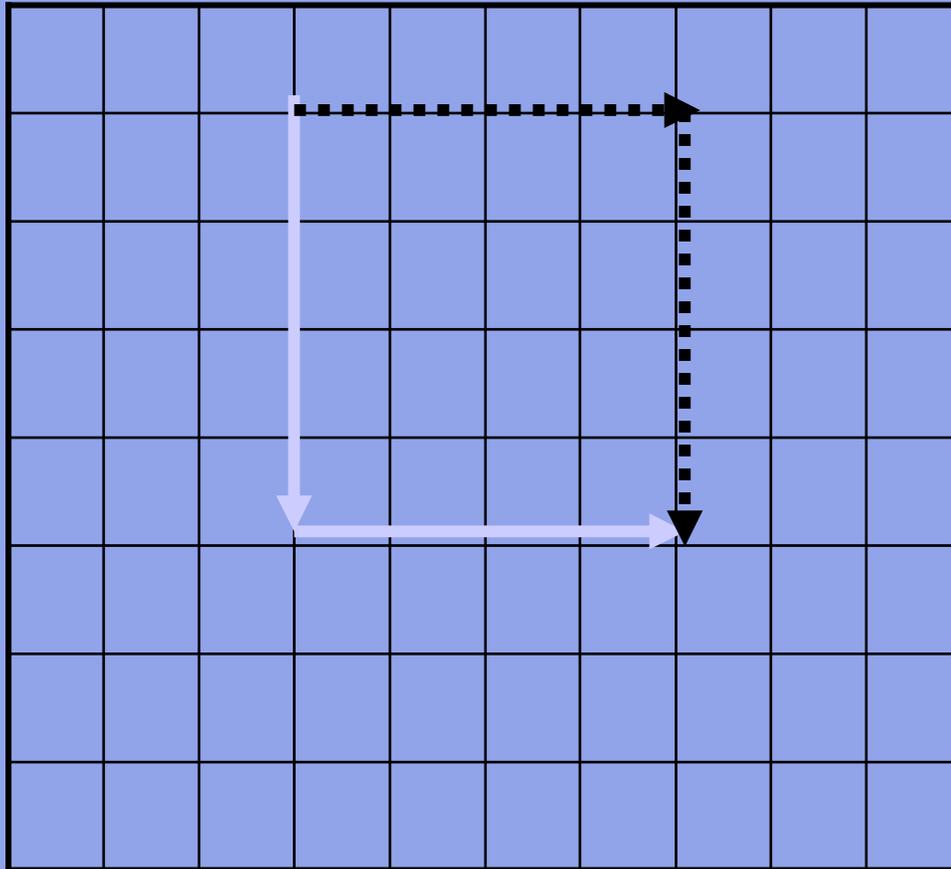
- **Speed, frequency and connections** are all important
 - For **long** trips travel *speed* is vital.
 - For **short** trips *frequency* and headways are vital
 - For trips **other than to the local centre or CBD**, at least one change of mode/ vehicle is usually required.
 - ***Seamless interchange*** is needed, otherwise significant time and convenience penalties are incurred (usually modelled as an extra 10 minutes)



Connectedness and integration: Land Use - Transport

- The whole essence of TOD / New Urbanism is to integrate transport (particularly public transport) with land use
- Currently this focuses on “ped sheds” around stations or major bus stops
- Equally however, remaining urban spaces need to be allocated to uses which don’t generate high volumes of personal movement – eg industrial/ warehouse; extensive recreation such as golf courses; agriculture and scenic buffers / water catchment areas; and low density housing.
- Usually these uses will be priced out of locations with good public transport access. But particularly for new urban areas consideration is needed up front in land use planning to optimise the potential for public transport

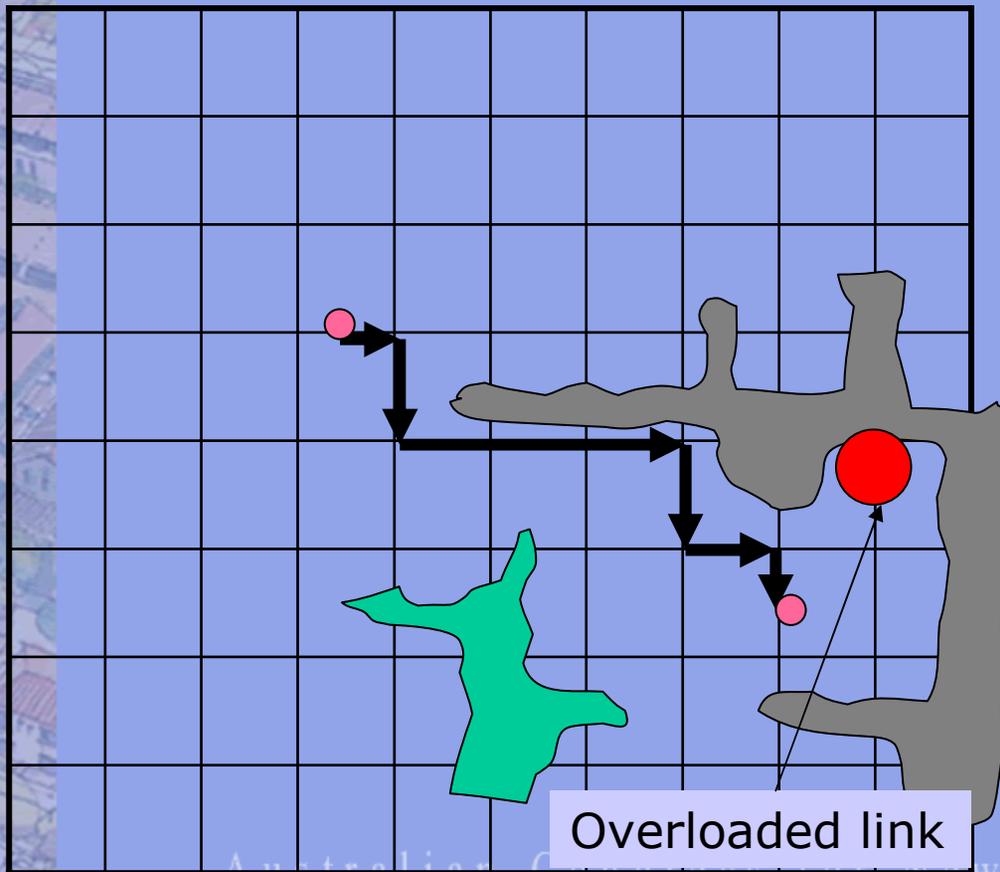
Connectedness and Integration: Public Transport Network Design



- Idealized Uniform Grid provides superficially appealing network solution for a city:
 - Uniform accessibility
 - Can travel from anywhere to anywhere with only one transfer
 - Doesn't favour any particular locations
 - Avoids congesting any one route

Connectedness and Integration

- But the simple uniform grid doesn't work in practice, especially in cities like Sydney, for at least seven reasons:

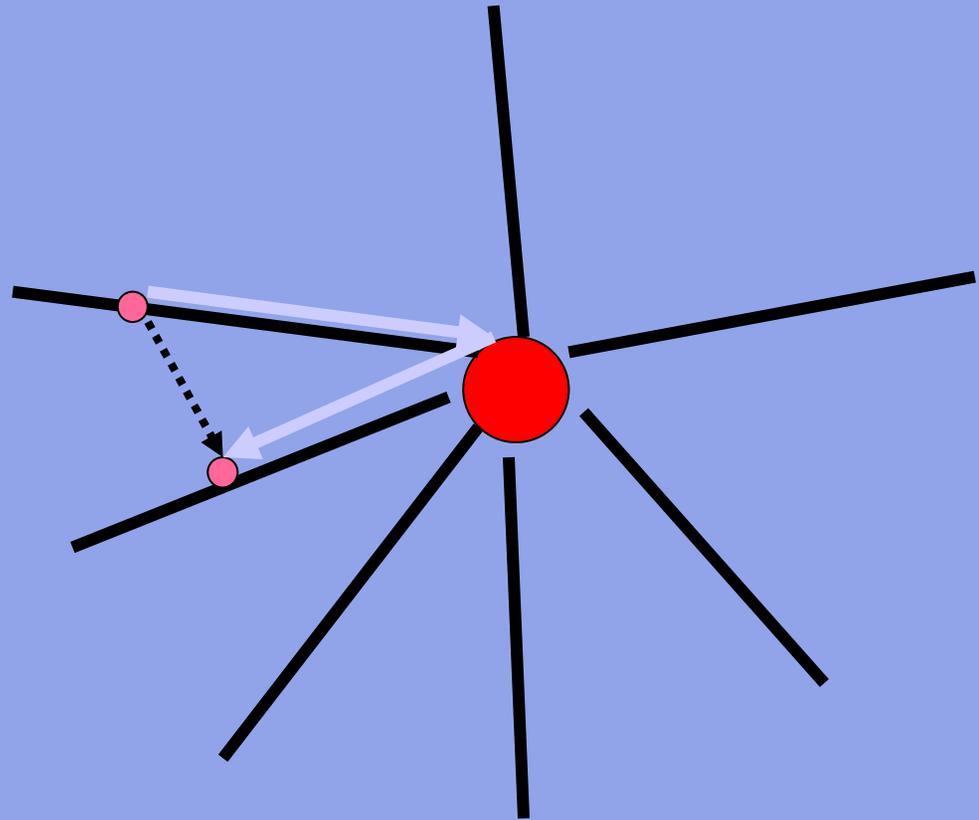


- 1) Many trips don't start at nodes (unless grid is every 500m).
- 2) Numerous topographical breaks mean four or more transfers required for "anywhere-anywhere" connectivity
- 3) Roads don't follow a grid
- 4) Insufficient capacity to serve CBD and other key centres
- 5) Uneven demand on most routes dependent on geographic variations in land uses
- 6) Slow travel speeds for long trips unless both express and all stops provided on each route
- 7) Difficult to find sufficient high quality corridors

Connectedness and Integration

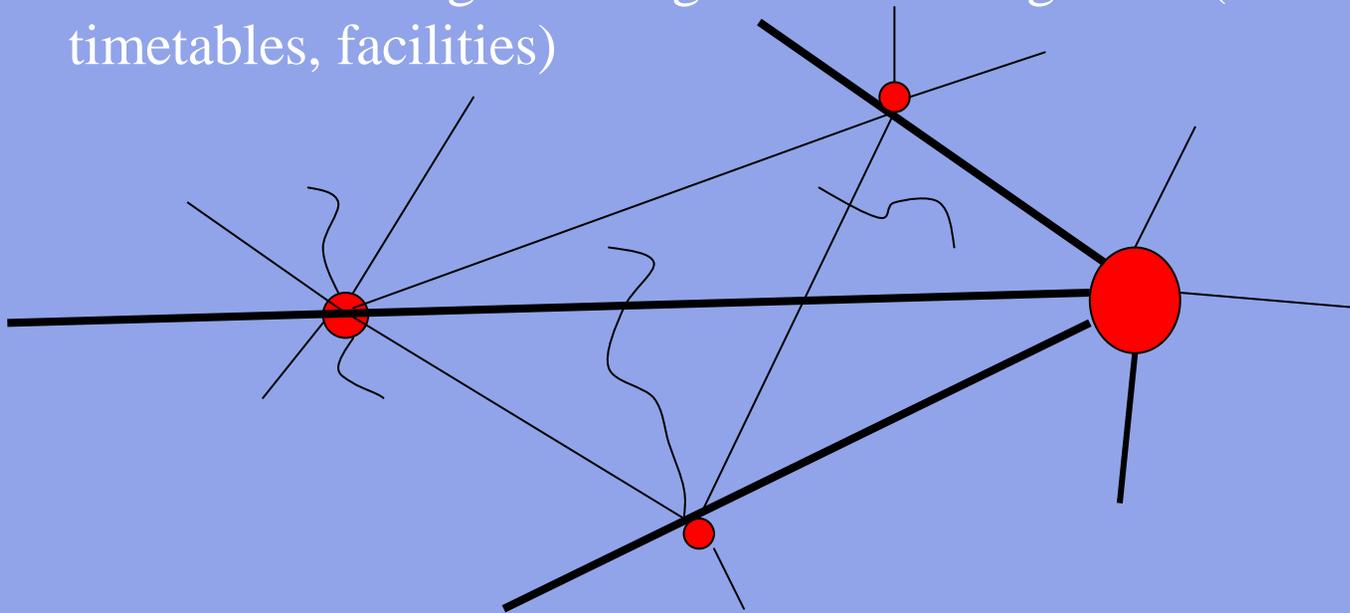
Pure radial only network not ideal either:

- Reinforces centre too much
- Creates congestion in centre
- Long journey lengths for cross-suburb trips



Connectedness and Integration

- Best solution for real cities is combination of radial routes serving major centres, plus cross-regional and feeder routes
- DRT services are needed to supplement (and in some cases replace at night) fixed route services to provide better local accessibility
- Some changes of mode / operator are unavoidable. Indeed they can offer opportunities for transactions, while transfer penalties can be minimised with good design and full integration (ticketing, timetables, facilities)

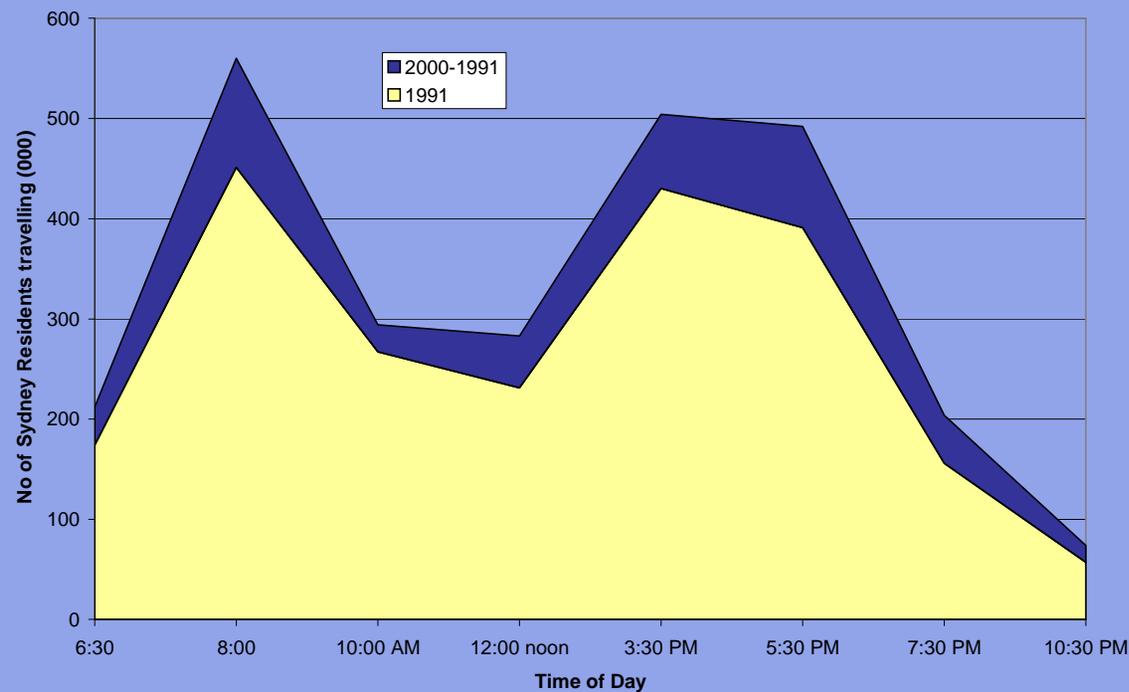


Comfort, security and safety

- Air conditioning needs to be standard, as well as higher quality seating, ride quality, passenger information etc
- Security
 - historically concerned with night time security, especially on trains, platforms, station car parks etc
 - New concerns with terrorism
- Safety
 - Rail historically significantly safer than cars, but accidents more “visible”.
 - Large ramifications of Waterfall accident.
 - Some issues for buses, but not a major concern

Capacity

- Public transport capacity is focused on peak periods (which includes many education and other trips as well as work trips)
- There is already some peak spreading in large cities, scope for increasing this probably limited without efficiency losses
- Public transport capacity will need to increase to match population and job growth combined with increased mode shares if it is to increase sustainability



Cost-effectiveness

- Over-design of systems can be expensive
- Equally, transport systems lose efficiency when approaching capacity limits
- Need to design systems with appropriate capacity to the task required
 - Heavy rail generally most effective >6,000 pass/hr/direction
 - Light Rail generally most cost-effective 2,000 – 6,000 pass/hr/dir
 - Buses generally most cost-effective below 2,000 pass/hr/dir
 - Demand-responsive (DRT) can be cost effective for very low demand situations (eg evening, special needs)
 - Specialist modes can be useful in specific situations.
 - Choice of mode depends also on corridor length, stopping patterns, topography and other factors

Horses for Courses

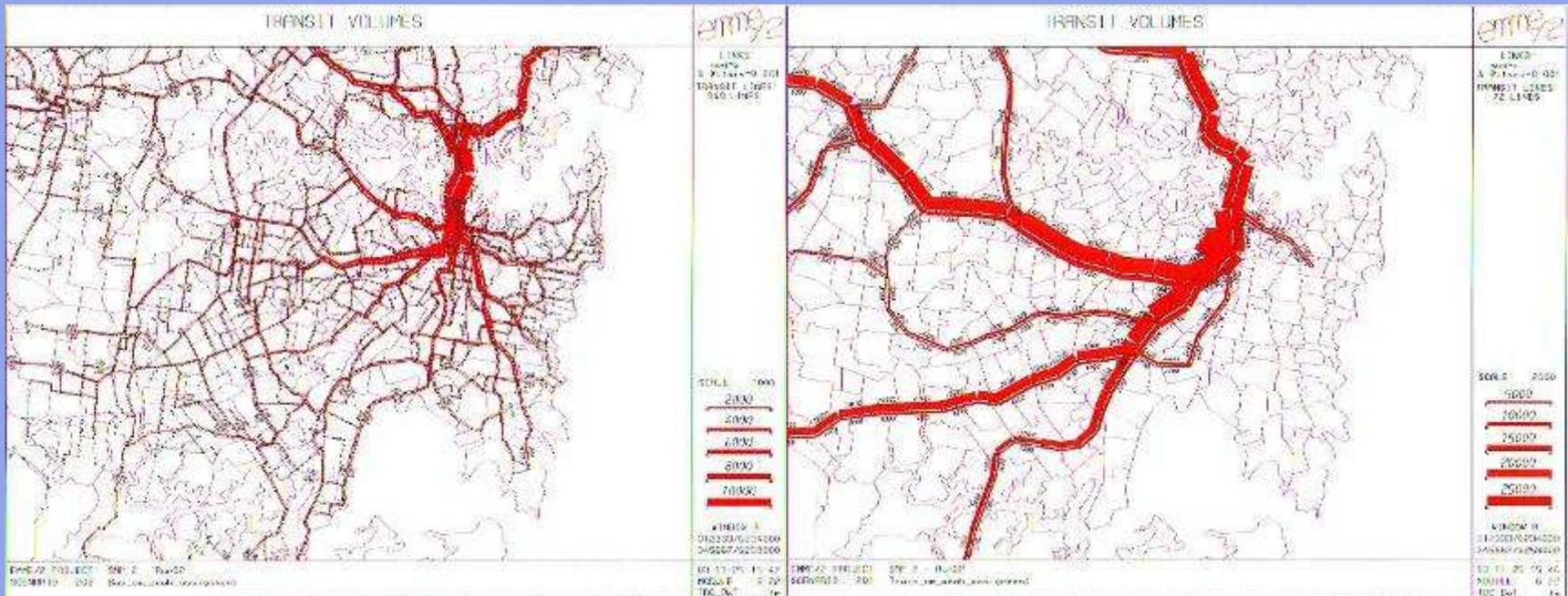
Cricket Team A

- Hadyn
- Langer
- Ponting
- Martin
- Katich
- Hogg
- Gilchrist
- Warne
- Lee
- Gillespie
- McGrath

Cricket Team B

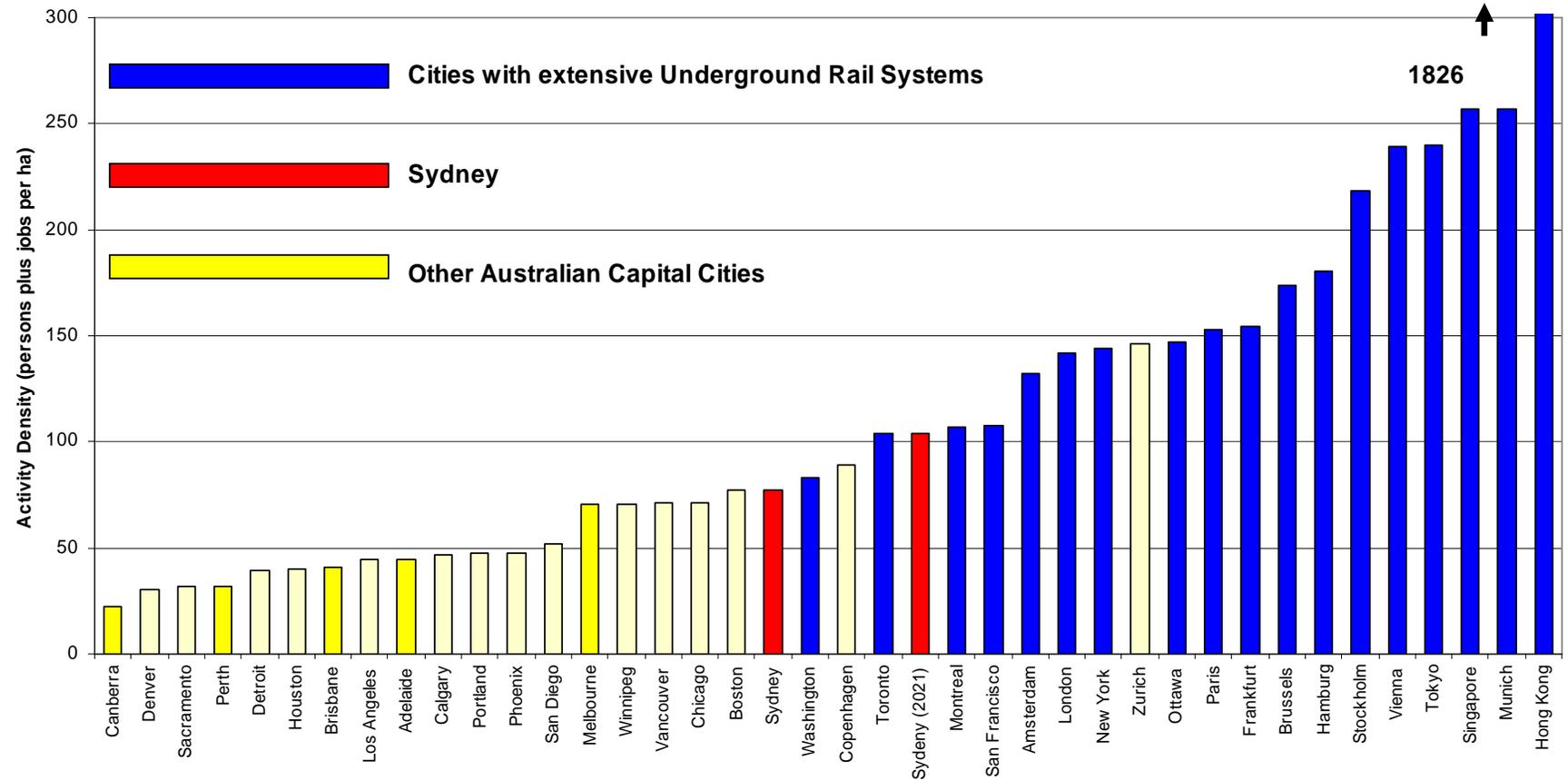
- McGrath

Cost - effectiveness

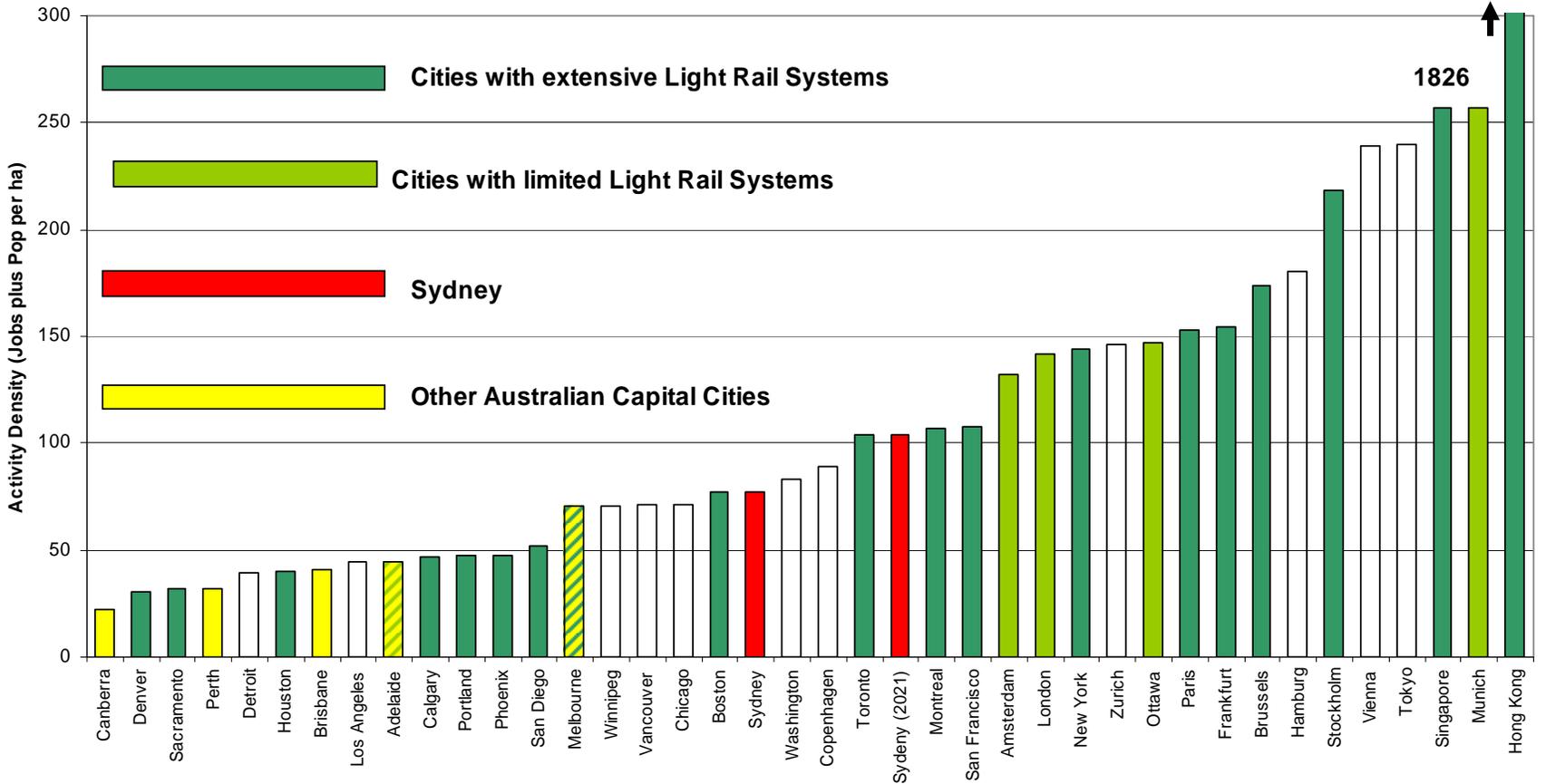


- Demand varies dramatically across a city and over time.
- Most large cities have multiple modes for specific tasks: eg
 - Some cities have 5 or more modes and most have multiple operators
 - metros are common where inner suburb activity densities >100
 - Light rail is common where inner urban densities > 25
 - buses and taxis or other DRT are universal

Inner Suburbs Density and Presence of Extensive Metro Systems



Inner suburbs density and presence of light rail



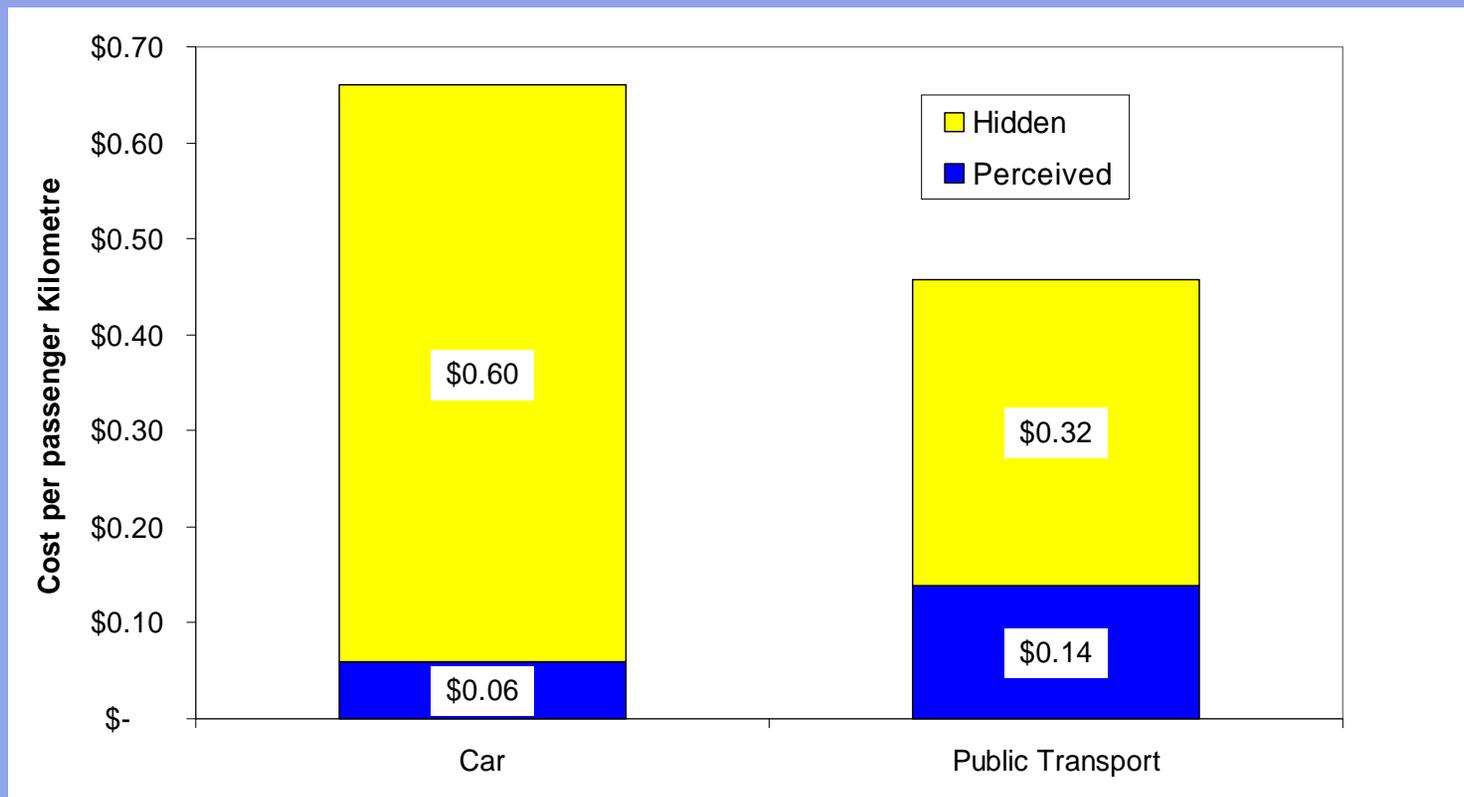


Affordability

- Cost-effectiveness to the community depends on the overall social cost of transport, including externalities
 - Public transport in Sydney overall has lower social costs than private cars
- Affordability to the public depends on fares (and hence on cost effectiveness and on subsidy policy)
 - Cost recovery varies widely across and within cities
 - Some wealthy countries deliberately provide high levels of subsidy to achieve overall social and environmental goals
- These are therefore related but not the same thing

Perceived versus overall social costs

Car drivers usually only perceive petrol costs (about 6c / pass-km). Their fixed costs as well as society's costs (externalities) don't enter their travel decisions.





Key Points

- Public transport makes economic, as well as social and environmental sense
- But it needs subsidy (as well as a move to road pricing and demand management). You won't get quality public transport on the cheap.
- Care is needed in designing and operating a quality and cost-effective public transport system
- Beware of people saying only one mode will suffice for all travel tasks in a big and complex city like Sydney



3 WHAT THE PUBLIC WANTS

- Warren Centre Research
 - Congestion the most important transport problem
 - More spending on public transport even at expense of road budget
 - Preparedness to pay
 - Urban consolidation OK if properly done and preferable to uncontrolled sprawl



4 SYDNEY'S PUBLIC TRANSPORT

- The BAD News
 - A long way short of ideal
- The GOOD News
 - Sydney has the most heavily used public transport system in Australia, and still has a good “platform” to work from
 - Some major initiatives are planned
- The CHALLENGE
 - To get the announcements implemented and to maximise their effectiveness
 - To move beyond them to build and operate a world class public transport system which can put make new urbanism more than just a buzz word



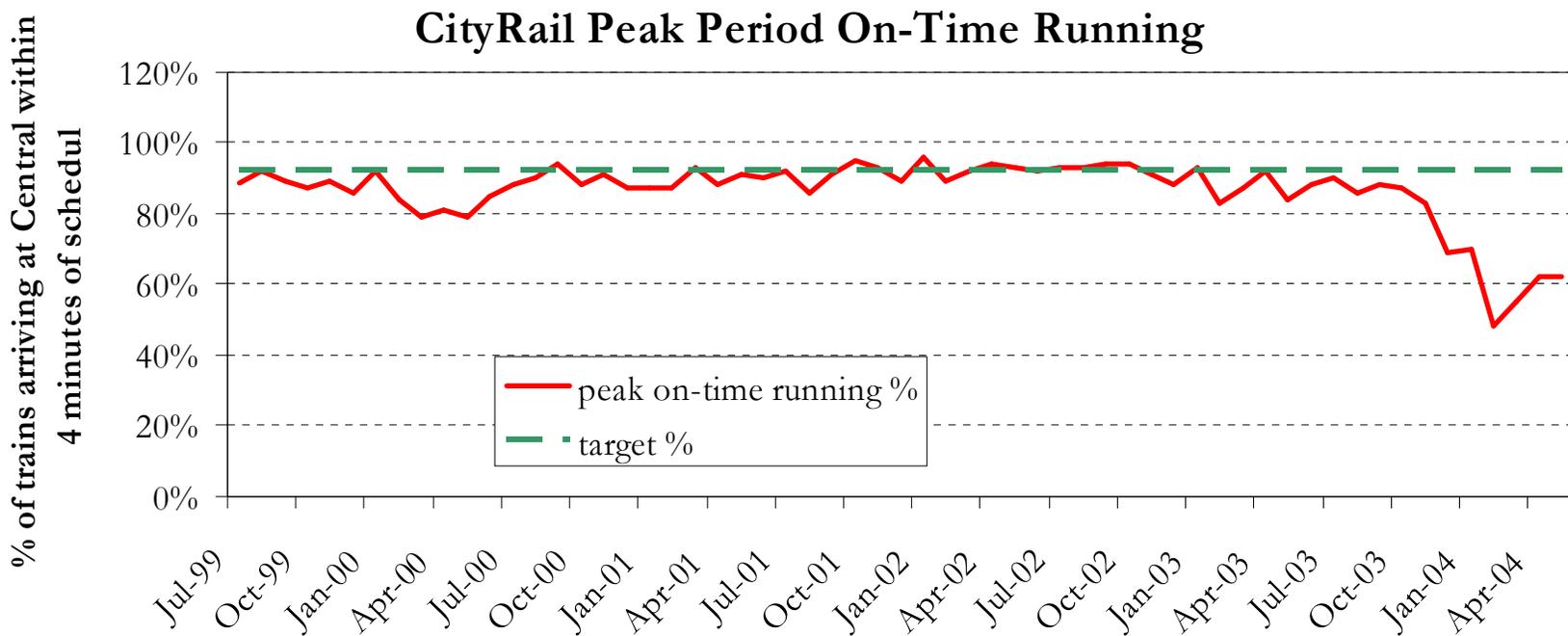
The BAD News

Sydney's public transport system has serious problems

- Rail problems / deficiencies
- Bus problems
- Integration Problems

Rail – on-time running

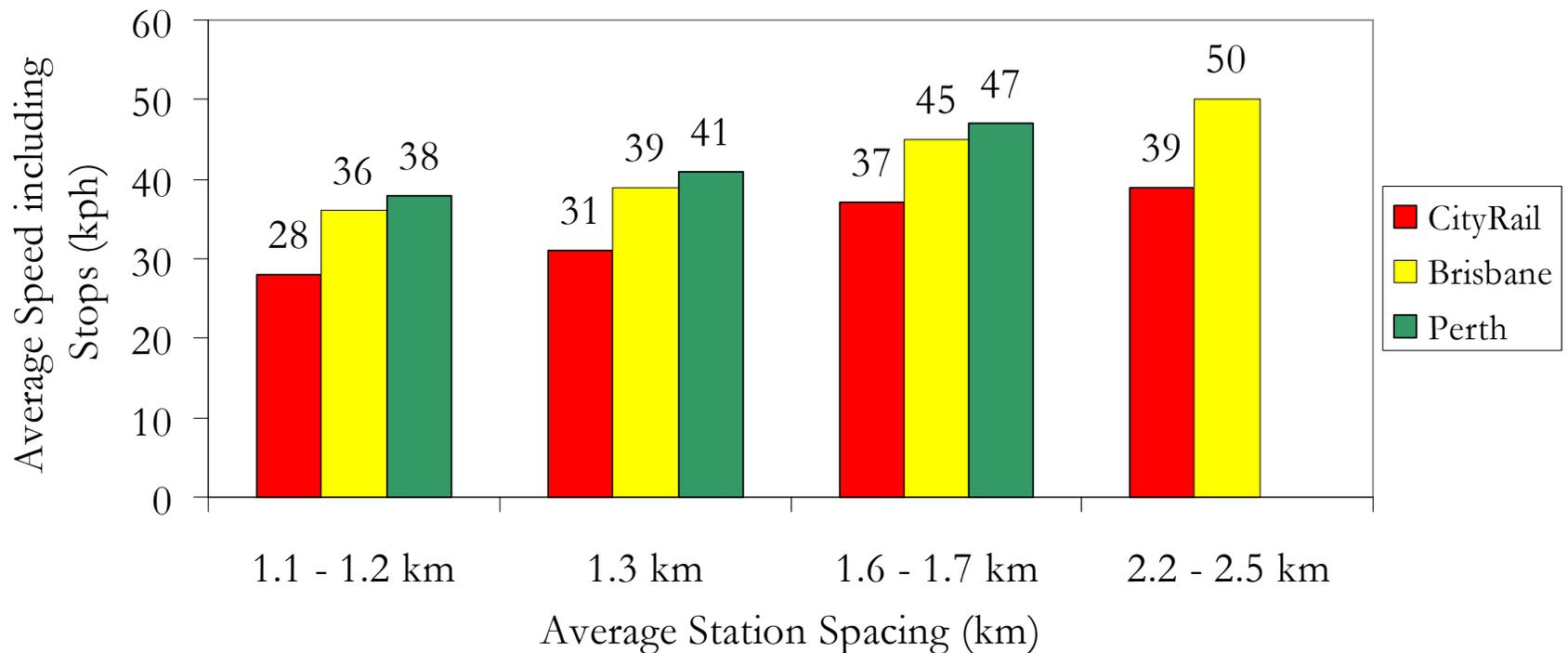
On-time running dropped alarmingly in 2003 (to 49% for peak periods) and the 92% target is well below world's best practice (e.g. MTR is 99.9%)



CityRail - Speed

Cityrail trains are slow compared with other Australian systems

Average Speed for Sydney, Perth and Brisbane Suburban Trains



The Sept timetable will slow services down even more

Australian Congress for New Urbanism



Daily Telegraph, August 4, 2005
“THE Iemma Government is under pressure to revive the nine-year-old Cumberland rail line before it becomes a \$50 million white elephant.

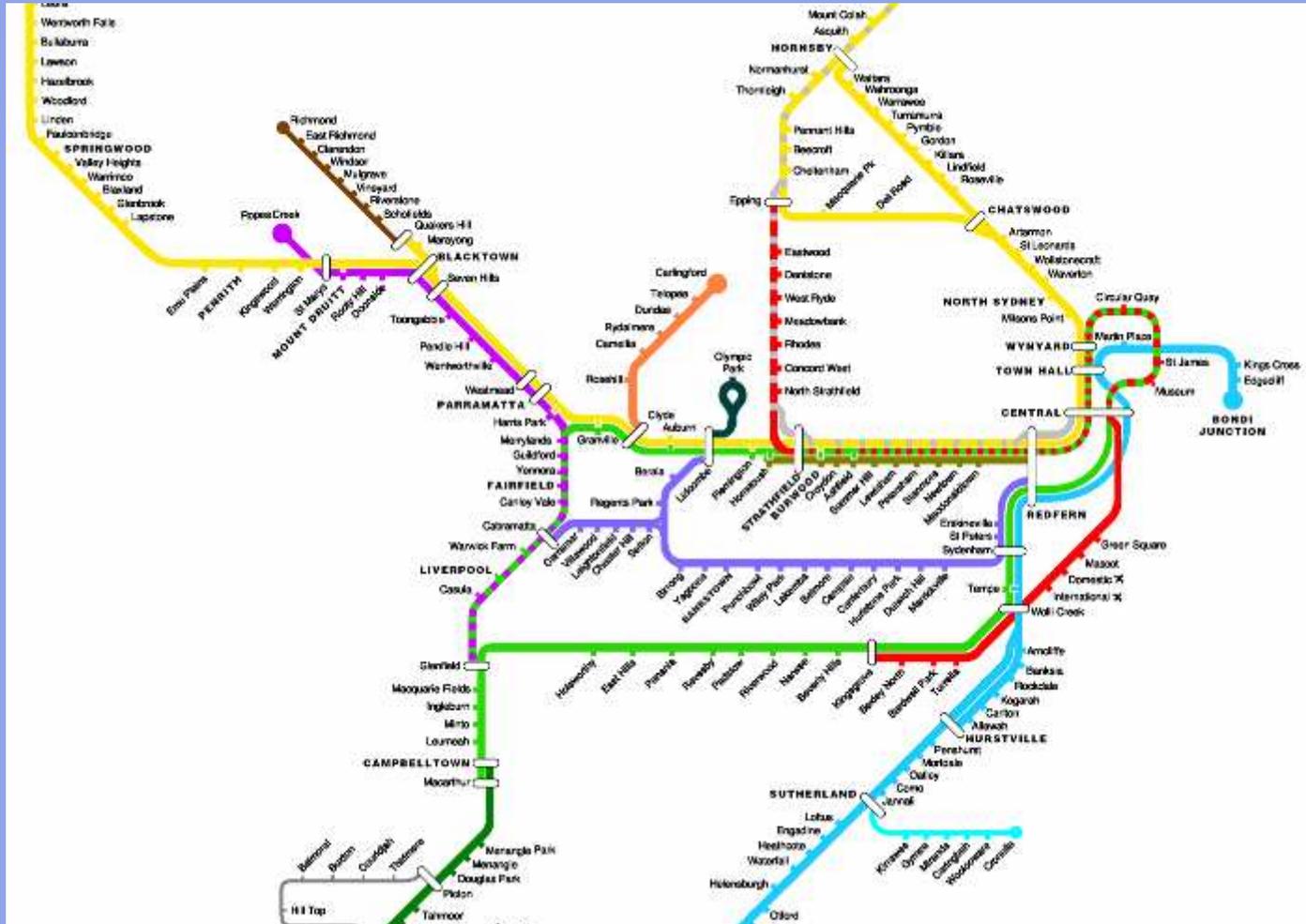
Launched amid jubilant scenes in 1996 when a packed CityRail train burst through a wall of polystyrene, services on the line have now been all but shelved. Back then, 70 trains a day were scheduled on the line. But from September 4, just two services a day will run in one direction and three in the other.”

Daily Telegraph, August 1st
TRAIN journeys will take longer in 2005 than they did in the 1930s under CityRail's new timetable.
Analysis of the new timetable by *The Daily Telegraph* found a daytime service from Bankstown to Circular Quay that currently takes 40 minutes will take 45 minutes after September 4. Campbelltown to Circular Quay, via Granville will take an extra eight minutes, while Strathfield to the city will be another two minutes travelling time.

On each of the major lines, off-peak services will take significantly longer than when "red rattlers" moved Sydneysiders around town in 1938.

The Cityrail System:

Complex network, even more complex operating philosophy

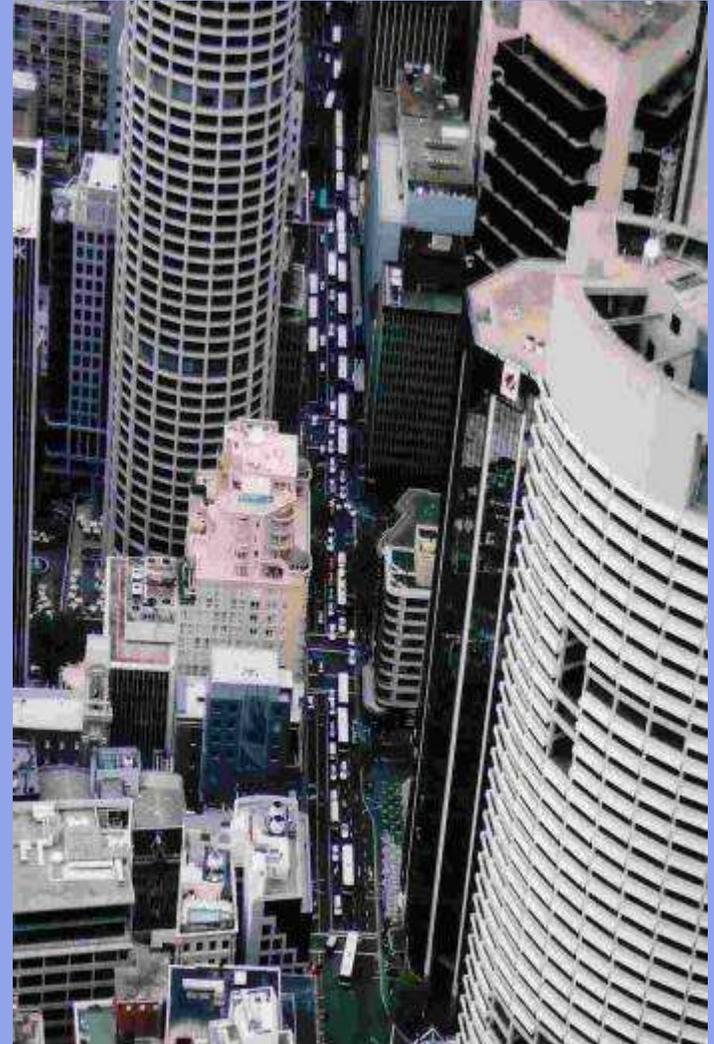


The Tangara Tango...

From	Via	Approach to City	CBD Track
	Chatswood	N Shore	
North	Macquarie	Epping-Chats	
	Strathfield	Main North	Harbour Bridge
West	Strathfield	West Main	Sydney Terminal
	Strathfield	West Suburban	Shore (Nth)
	Granville	West Local	C Circle (Outer)
South	Lidcombe		C Circle (Inner)
	E Hills	Airport	E Suburbs (Nth)
Illawarra	Bankstown	Illawarra Local	E Suburbs (Sth)
	Wolli Ck	Illawarra Main	
East	M Place	E Suburbs	

Sydney's transport...buses

- Westbus went into receivership recently (largest private bus operator)
- No DRT services to speak of (commitment to implement new service patterns lacking)
- Proposed network of priority bus routes will require substantial investment
- Already 7400 STA buses a day through CBD (plus private buses and coaches) – highly inefficient and impacts adversely on amenity
- Recent data that STA buses are being slowed by rising congestion on roads such as Victoria Road



Integration..

- **Integrated Fare collection** (ticket-less by preference) required across all modes including taxis and DRT.
- **Fare structures can vary by quality** (eg taxis, ferries and fast trains can have premium fare structures per km) but integrated fares should avoid multiple “flag falls”. Unless this happens, passengers transferring will be penalised.
- **Interchanges** - some high quality interchanges exist or are under construction, but many more small-scale interchanges required with RT info etc
- **Park and ride** – Some provided at outer stations, but none for busways or inner stations. Parking need not be free but can be integrated with fares.
- **Information** – RT info for trains is problematic, and virtually non-existent for buses. Compare with Brisbane for example, or Melbourne with RT info available over mobile phones. Major effort needed to get use new technology effectively.

The GOOD News

- Sydney's public transport system is the **most heavily used** in the country (per head of population), carrying over 600 million passengers annually.
- The reason for this is the CityRail system, which is the backbone of the public transport system, catering for **two-thirds** of the PT travel task.
- It is also the **most cost effective mode** per passenger kilometre in terms of total costs
- It remains a major asset in the public transport system, although performing well below par.
- But **all modes are necessary** as part of a complementary, integrated network

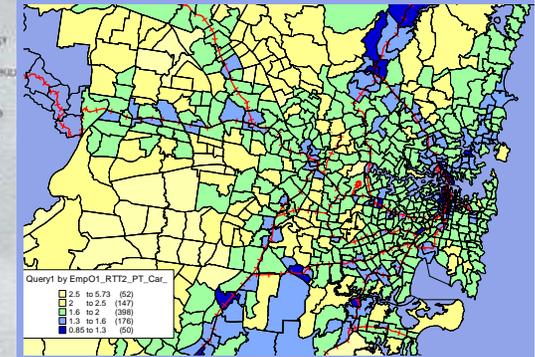
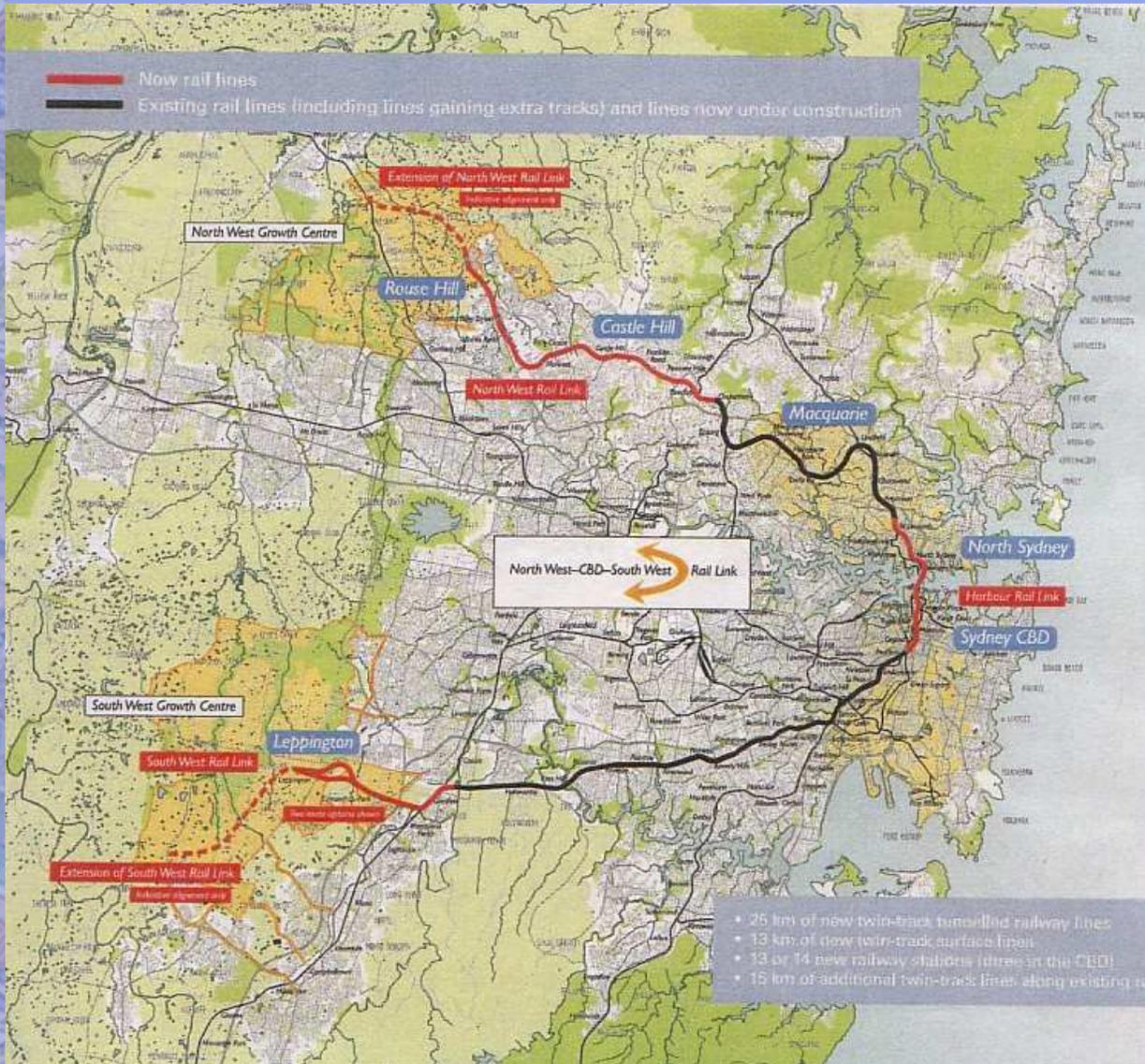
Rail and Bus Modes in Sydney

	Cityrail	STA Bus	Private Bus	Total Bus
Annual Patronage (mill)	273	198	142	340
Av Trip Length (km)	18.7	6.2	8.8	7.3
Total Pass- Km (billion)	5.11	1.23	1.25	2.48
Total Cost pa (\$m)	\$1970	\$532	\$517	\$1049
Total Cost / pass-km	39c	43c	41c	42c
Farebox Revenue \$m	\$518	\$275	\$254	\$529
Farebox Rev / pass-km	10c	22c	20c	21c
Cost of Main Infrastructure Included?	Yes	No	No	No

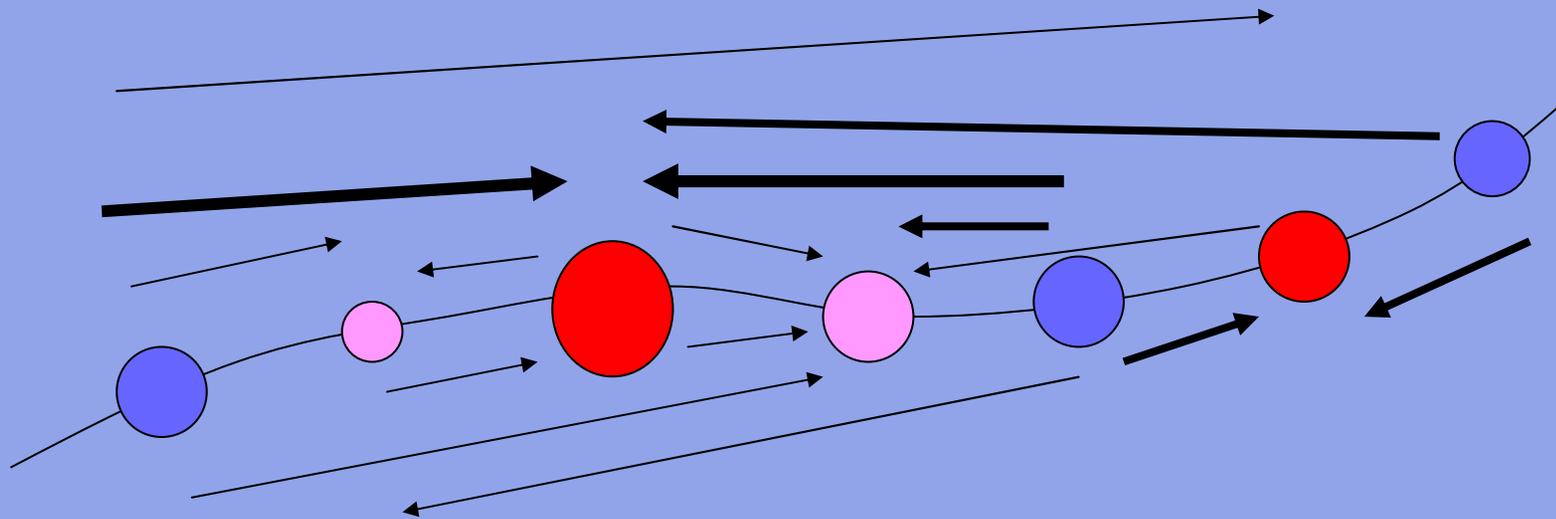
New initiatives

- Rail
 - \$1 billion “clearways” program to unblock the rail system
 - \$8 billion new NW – SW rail with new harbour crossing and extra tracks to add capacity
 - \$1.5 billion for 500 new rail carriages – fully air conditioned fleet
- The New NW-SW rail link will:
 - Extend the network to the two major greenfields growth corridors
 - Provide extra capacity through the CBD as well as N Sydney, St Leonards, Chatswood, Airport, Macquarie.
 - This will increase efficiency by serving multiple centres “peals on a string”

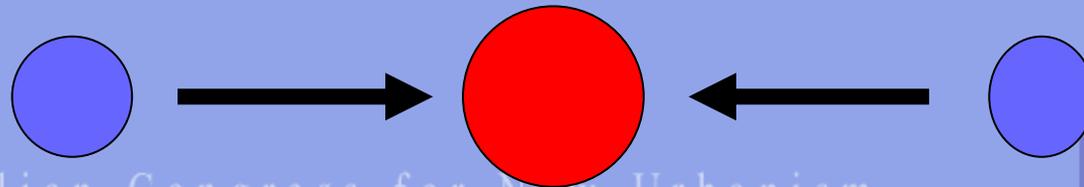
NW-SW Rail Link



Pearls on a String



- Mainly Residential
- Mixed
- Mainly Commercial



Australian Congress for New Urbanism

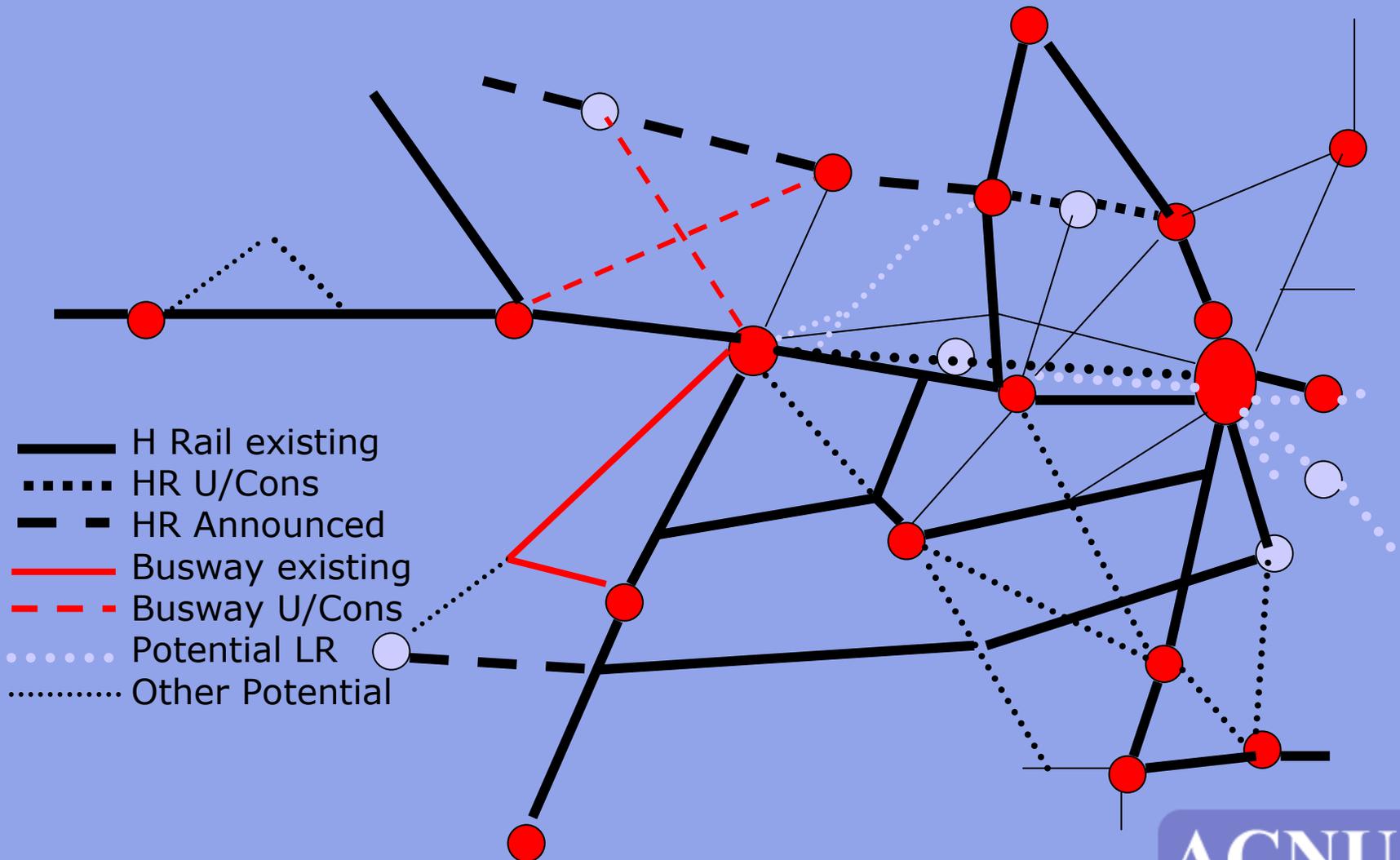
ACNU
sydney



New initiatives - other

- NW Bus transitway under construction
- New interchanges at Parramatta and Chatswood under construction
- Cross-regional bus network planned
- New low-floor buses being purchased
- Simplification of bus contracting arrangements, first new services to be rolled out shortly
- Some trials completed with smart card ticketing
- Some rationalisation of bus fares between eastern and western Sydney

Strategic PT Network is developing



Australian Congress for New Urbanism

ACNU
sydney

The CHALLENGE

The challenge is to improve the PT System across the board

Criteria	Improvements needed
Coverage	Extensions to outer suburbs, more evening and weekend services
Competitive Travel Time	Faster rail services, bus priority, higher frequencies, especially for shorter trips
Connected	Single PT Organisation to handle marketing, fares, ticketing, passenger information and planning
Comfort, Safety, Security	Upgrade fleets; secure park and ride; better urban design at stations and stops
Capacity	Increase total system by 50-100%
Cost-Effectiveness	Use best modes for specific jobs – eg introduce light rail for inner suburbs, introduce DRT Improve efficiency for existing modes



Example 1

Making the most of the new NW-SW Rail line

- The new rail line can allow the Cityrail system to “untangle the Tangara Tango”, increasing reliability, speed, frequency, capacity and cost effectiveness
- To maximise the benefits, the new line should be operated as a separate system (rather than allowing timetables to be even more complicated and inter-dependent). This also allows the new route to take advantage of worlds best practice such as platform doors (in CBD stations), automated operation, high acceleration rollingstock, new signalling systems etc.

Potential Capacity

(Service per hour am peak approaching City / Parramatta)

Services (7:30 - 8:30am)	Current	Sep-05	2020	L Term
West Local	12	12	15	15
West Suburban	16	16	18	20
West Main	16	14	12	14
Illawarra Main	13	13	16	18
Illawarra Suburban	16	12	15	15
Airport	8	8	12	15
E Suburbs	13	12	16	18
North Shore	13	12	18	20
Cumberland (North)	2	0	5	5
Cumberland (South)	2	1	5	5
NW - City	0	0	12	15
SW - City	0	0	12	15
Second New North	0	0	0	15
Second New South	0	0	0	15
TOTAL	111	100	156	205

Cost effectiveness

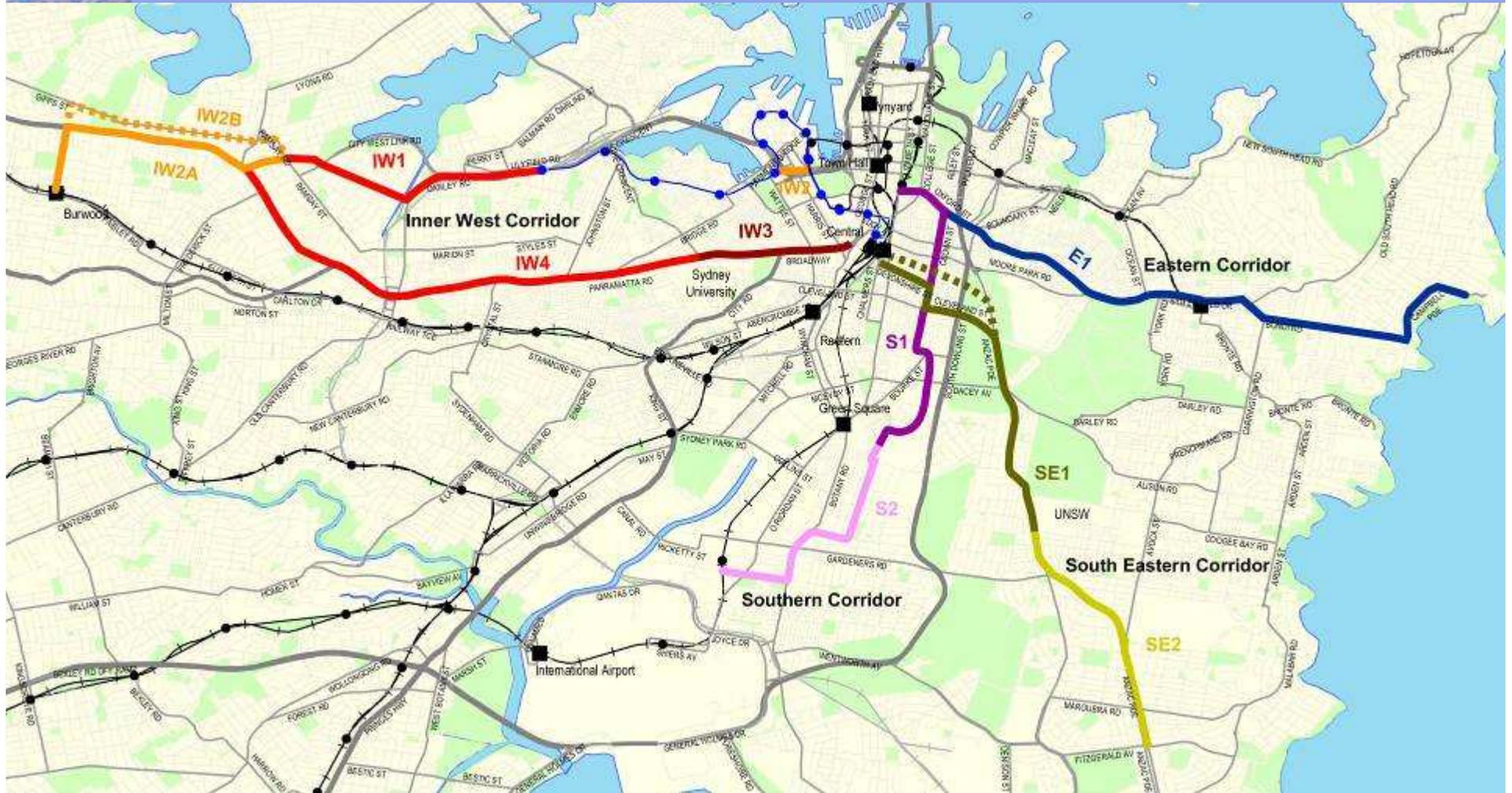
- Significant increase compared with current CityRail average (27% cost recovery) from:
 - More intensive utilization of existing network (40% more pass / station/track-km)
 - Highly efficient new network added (with faster trains, more boardings / station, more pass-km / track km and 30% of total patronage by 2040)
 - Premium fares for new network (eg 40% premium based on higher speeds, greater reliability, equivalent or better comfort and facilities, very high frequency etc)
- Overall, can expect:
 - Revenues to increase to at least \$1200 million in today's dollars
 - Total costs to rise only modestly (to say \$2400 million pa)
 - Farebox cost recovery to rise to almost double to 50%

Example 2: Light Rail

- 100 cities world wide have installed new or expanded existing light rail networks
- Light rail fits with Sydney's activity density, especially in the inner suburbs
- Light rail is needed to allow a more livable city centre and inner suburbs
- UK studies show light rail is more cost effective than buses for corridors on which there is more than 2,000 passengers/ hr / direction
- A light rail network is needed for the CBD and inner suburbs, and possibly selected other routes (eg Parramatta – Epping, Parramatta – Homebush - Strathfield)



Inner City Light Rail Network



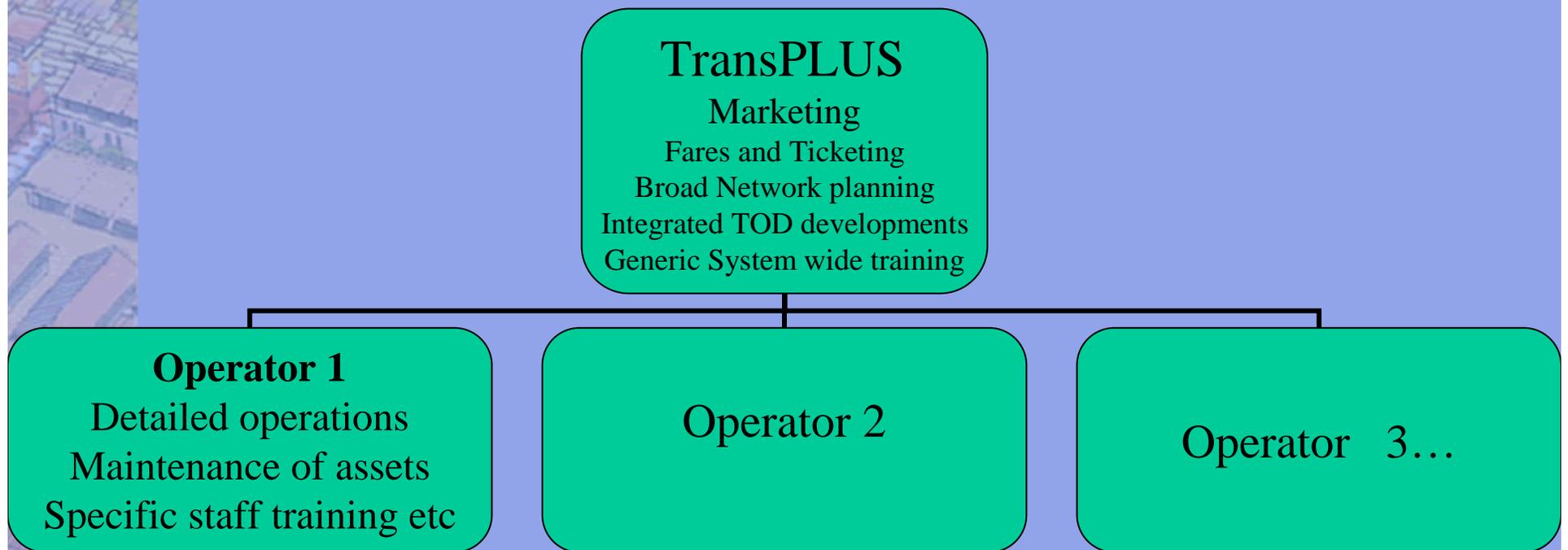
Example 3: Ultra Light Rail

- Austrans has potential for specific applications e.g:
 - Wynyard to Millers Point
 - UNSW – Uni Syd via Green Sq
 - Macquarie / North Ryde Network
 - Westmead Complex
 - New release areas (design in from start)
- Need to support such innovative technology to get first commercial system as it faces both technical and market risks



Example 4: New PT Organisation TransPLUS

(Transport Planning, Land Use and Services)



CONCLUSIONS

- TOD and new urbanism needs high quality transit to be effective
 - Sydney has the basis of a good public transport system, but needs some new approaches to develop a world class system
 - The recent announcement to build the NW, SW and cross harbour link provides an opportunity to revamp and modernize the network
 - Other priorities include full integration of all modes into a single system, and adoption of light rail and ultra-light rail where appropriate
- 
- The alternative is for Sydney to evolve into a US style freeway dependent city with large environmental, social and economic costs