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### Best Practices in Integrating Travel Plans with the Development Approval Process: Examples from the USA

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*Travel demand management is the application of strategies to encourage people to use alternative modes of transport to the private car. Travel demand management (TDM) can be implemented in the built environment through travel plans—customised plans to encourage public and active transport use for specific locations or user groups. Travel plans can be as small as those developed for an individual business, or they can cover an entire precinct or neighbourhood. They can be used at any point in the lifecycle of built assets and can be adapted over time to suit the changing needs of users. It is advantageous to apply TDM during the land use approval stage to mitigate the traffic impact of proposed developments.*

*TDM and travel plans are being considered and applied with increasing frequency in Australia; however, with a few exceptions, there are no mechanisms to require travel planning as part of land use approval.*

*TDM is strongly supported in US federal and state policies to reduce air pollution and increase mobility. Because of this policy and program support, travel plans are oftentimes required as part of the development approval process in many states and localities in the USA. The state of practice in travel planning during land use approval is explored, including the criteria which trigger travel plans, required elements, evaluation, and the role of Transportation Management Associations (TMAs).*

#### INTRODUCTION

Travel Demand Management (TDM) has been defined by the Institution of Engineers Australia as "...intervention (excluding provision of major infrastructure) to modify travel decisions so that more desirable transport, social, economic and/or environmental objectives can be achieved, and the adverse impacts of travel can be reduced." Travel demand management usually entails strategies to encourage people to use alternative modes of transport to the private car. Travel demand management has been in use for several decades in communities around the world.

Motivation for travel demand management comes from the realisation that delivering transport infrastructure, particularly roads and parking for private automobiles, is becoming increasingly difficult for social, economic and environmental reasons. Travel demand management allows a community to address its growing transport needs without widening or building more roads.

Travel demand management can be applied through policies and pricing, such as congestion charges and tolling; design elements such as complete streets; promotion, such as bike to work days and public transport marketing campaigns; and through outreach and behaviour change programs which attempt to influence the mode choice decisions of travellers. This paper is primarily concerned with TDM as applied through promotion and behaviour change programs.

TDM outreach and behaviour change programs are frequently delivered through travel plans. Travel plans address transport issues and impacts for a given location. Travel plans may be developed for institutions, existing businesses, residential communities, speculative developments, campuses or geographical areas.

Although travel plans can be determined at any stage in the land development process, it is beneficial to consider travel plans during planning for a development. Travel planning before construction can ensure that physical designs—elements such as showers, lockers and footpaths—are integrated with travel plans. Early travel planning can ensure that travel plans are operational as soon as the development is occupied, so that travel options can be encouraged before travel patterns emerge and solidify. Considering travel plans in the early stages of development also lets decision makers consider the mitigating effects of travel plans as part of development approval.

In Australia, travel plans are typically adopted voluntarily for existing workplaces. However, the value of conducting travel plans before development is approved is becoming apparent and travel plans are increasingly being considered earlier during the development approval process. Despite growing interest in TDM, there are very few examples where formal mechanisms exist to determine when and to what extent travel plans may be required.

In the United States, many localities have successfully integrated travel demand management into land use and transport planning. Some communities have adopted guidelines, plans, codes or laws to make TDM part of the development process. Requirements for selection, program elements, goals and financial considerations vary among localities. In any US example, local planning arrangements and TDM programs sit within a regional, state and federal framework which supports use of TDM. This paper will consider several programs in the United States which incorporate travel planning within the land use approval process. The differing regulatory and programmatic requirements will be considered as will the support offered to TDM programs through the federal, state and regional programs.

## **TDM IN AUSTRALIA**

TravelSmart began in 1996 in Western Australia as a voluntary travel behaviour change program (John, 2006). TravelSmart was licensed to all Australian states and territories, and it was supported by the Commonwealth Government. States and territories across Australia quickly gained experience with TDM and travel plans. Initial TravelSmart activities included institutions and residential neighbourhoods, when commonwealth program ceased in 2008, interest in workplace travel planning was increasing. The legacy of the Commonwealth TravelSmart program is that, in 2013, TravelSmart continues in each state and territory.

Austrroads guide to the traffic impacts of development states a case for considering TDM for new land use developments to mitigate traffic impacts. The guide indicates that workplace travel plans are voluntary in Australia, they are required in the US and Europe, and cites evidence that substantial traffic reductions may be realised (page 9).

Although being predominantly voluntary, TDM has been considered during the land use approval process in Australia. Travel plans have been negotiated for specific developments in the past. Travel demand management initiatives were identified as part of the 2005 approval process for the Rouse Hill transit oriented development of a new town centre and residential neighbourhoods in Greater Sydney (Wiblin, et al).

A travel plan was negotiated during the 2007 approval process for redevelopment and expansion of the QEII Medical Centre in Nedlands, Perth, WA. The plan aims for a 27 per cent reduction in employee car commuting (Wake, 2012).

Darebin Council, in Melbourne, is one of Australia's few local councils to integrate TDM into transport planning (Meiklejohn and Wake, 2007). Large developments are required to submit a Travel Plan as part of the Planning Permit Application process if they consist of (Travel Plans):

- 20 or more residential units
- 500 square metres or more of office space
- 1,000 square metres or more of industrial space
- 1,000 square metres or more of retail space

Also in suburban Melbourne, the Maribyrnong City Council often requires developers to have a green travel plan as a condition for the granting of a planning permit (Maribyrnong City Council, Green Travel Plans). The recently adopted Maribyrnong Integrated Transport Policy commits the council to requiring Green Travel Plans for significant new developments (Maribyrnong City Council, MITS).

The 2010 Development Control Plan for the Macquarie Park Corridor in the City of Ryde in New South Wales requires travel plans for over 15,000 square metres or 300 employees. Large sites are required to employ a workplace travel co-ordinator (City of Ryde, 2010).

In Queensland, integrating travel planning during development approval is envisaged in the Draft Gold Coast City Transport Strategy. Key actions include introducing 'workplace travel plans' as a condition of planning approval on significant developments. The draft strategy notes: "These plans are used as a development assessment tool by other local governments to minimise the negative effects of travel on the environment" (City of Gold Coast, 2012).

Increased interest in TDM has been reflected in recent policies and plans at State and Territory government level. The NSW Long Term Master Transport Plan includes actions to pilot transport management associations (TMAs) to implement travel plans at precinct levels, support for travel access guides for large institutions, and continued promotion of workplace travel plans (NSW Government, 2012).

In the Australian Capital Territory, the Transport for Canberra Plan (ACT Government) commits the government to:

- support workplaces and institutions to develop travel plans
- improve information dissemination via personalised travel planning
- promote active travel options through improved information dissemination and travel training programs
- promote and support new ways of organising activities (e.g. telecommuting, video-conferencing and carpooling)

Despite the exciting examples noted above, there are few instances of formally organised and regular mechanisms to consider TDM or travel plans at the development approval stage.

## **TDM IN THE USA**

To understand local programs in the United States that require or encourage TDM as part of the development approval process, it is important to consider the policy and programmatic environment in which TDM plays a role.

Transportation demand management has received policy, program and funding support at all levels of government in the United States. Travel demand management began in the 1970's and 1980's in the United States in response to rising fuel costs and two fuel crises. In the 1980's concerns for air pollution and urban traffic congestion gave further impetus to TDM efforts. By the early 1990's TDM was required by federal air pollution and transportation law and the laws of several states.

### **Federal Requirements for clean air and metropolitan planning**

The Clean Air Act Amendments of 1990 require that transportation and air quality planning be integrated in areas which fail to meet national air quality standards for certain pollutants, including: ozone, hydrocarbons, nitrogen oxides carbon monoxides and particulates. In the nonattainment and maintenance areas (areas which have only recently met national targets,) federal funds for transportation projects are only available if transportation plans conform to air quality plans. Because both air quality and transport issues frequently cross jurisdictional boundaries, Metropolitan Planning Organisations, inter-jurisdictional governmental bodies which function for an entire metropolitan area, are tasked with coordinating these plans (US FHWA, 2007).

Many of the largest metropolitan areas in the United States fall under nonattainment or maintenance for air quality. A map of the Environmental Protection Agency's air quality designations shows that these designations affect almost every state, with concentrations in Northeast, West Coast, Mountain West and Midwest (US EPA).

Under the 2005 federal transport authorisation--Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)--all metropolitan areas over 200,000 population are required to adopt a Congestion Management Process (CMP) program that identifies traffic congestion problems and determines ways to overcome congestion and increase mobility (US FHWA).

The CMP is intended to encourage demand management strategies which can reduce congestion while maintaining mobility. According to the US Federal Highway Administration (2007), a well-designed CMP should help the MPO to propose “alternative strategies that best address the causes and impacts of congestion.” TDM strategies are used extensively in CMPs to reduce congestion and increase mobility.

### **Congestion Mitigation and Air Quality Improvement (CMAQ) Program**

The 1991 federal transport authorisation bill—the Intermodal Surface Transportation Efficiency Act (ISTEA)—was ground breaking in its recognition of the importance of alternative modes and demand management strategies to improve transport. One of the many new programs under the bill was the Congestion Mitigation and Air Quality Improvement (CMAQ) Program. CMAQ was created to fund projects and programs that improve air quality and provide relief from congestion.

CMAQ funds are allocated to state departments of transportation, and metropolitan planning organisations in metropolitan regions according to a formula based on population and severity of air pollution. Since 1991, CMAQ has provided nearly \$30 billion for air quality and congestion improvements (US FHWA), including significant funds for local TDM programs.

Adoption of the most recent four-year transport authorisation, MAP-21, in 2012 continued CMAQ program with a new local match of 20 per cent and specifically designated telecommuting, ridesharing, carsharing, alternative work hours, and pricing projects as eligible (Pavulchuk, 2012).

### **Commuter Tax Benefits**

Since 1992, federal legislation has allowed employers to provide Transit and vanpool fares free from income tax (Best Workplaces for Commuters). Some employers allow employees to pay for commute expenses on a pre-tax basis; others pay for the expenses as a benefit. As of 2013, the tax free commuter benefit has parity with the parking benefit of \$245 (Ebeling, 2013). In addition to the tax free benefit for public transport, US income tax rules allow employers to offer up to \$20 per month for employees’ qualified bicycle commute costs (League of American Wheelmen). For many local TDM programs, encouraging and convincing employers to offer tax free commuter benefits is a major focus of their program.

### **Telework**

One important TDM measure is telework—reducing peak hour trips by working from home or another remote location. The federal government has shown leadership by being an early adopter of telework. Federal telework programs were mandated by public law in 2000 (USOPM). Successive enhancements have led to the most recent update, the Telework Enhancement Act of 2010 specifies roles and responsibilities of federal agencies to provide guidance, and establishes baseline performance expectations (Telework.gov).

## **National Capital Planning Commission**

In the National Capital Region of Washington, DC and surrounding jurisdiction in the states of Maryland and Virginia, the National Capital Planning Commission has planning and approval responsibility for all federal developments. The transportation element of the Comprehensive Plan for the National Capital seeks to encourage transit oriented development and smart growth. To do this, the policies require federal buildings to give preference to established urban areas, support compact development, and locate near public transport facilities (NCPC).

The plan allocates maximum parking rates by distance from the Washington, DC central employment area and walking distance from commuter rail stations. Transportation management plans (travel plans) are recommended for all federal workplaces, and required of any development which adds 100 or more employees in the NCR (NCPC).

## **States**

A recent survey of 51 state departments of transportation found that thirty-nine state DOTs (over 90 per cent of responding organisations) deliver TDM programs. Many of the states (43 per cent) used TDM for project-level activities, such as construction. Over a third of states with TDM programs fund local jurisdictions and Transportation Management Associations/Transportation Management Organisations (TMAs/TMOs). Over a third of States with TDM programs provide technical assistance to local TDM organisations. Many of the states provide funding and technical assistance and for local TDM efforts (Rooney and Grant 2010).

Washington State, in the US Pacific Northwest region, has had a Commute Trip Reduction law since 1991. The law requires travel plans for all workplaces of over 100 employees. Employers design and run their own programs based on local trip reduction and kilometres travelled. Over 500,000 employees in over 1,000 workplaces participate (Washington State DOT).

In 2006 Washington State adopted the CTR Efficiency Act which requires local governments in urban area with traffic congestion to develop programs that reduce drive-alone trips and vehicle miles travelled per capita. The law requires local governments in designated congested centres to establish programs for smaller employers, workers and residents to encourage people to use public transport, carpools, active modes or work from home to ease traffic and reduce air pollution.

## **Regional (Inter-jurisdictional)**

Metropolitan areas in the United States have regional (or inter-jurisdictional) planning agencies in place to address federal clean air and metropolitan planning requirements. These agencies, formed by the state and local governments in the metropolitan area have been formed so land use and transport facilities could be planned at the regional level. Because of the importance placed on TDM in the planning process, and because the considerations for and impacts of trip making decisions often cross jurisdictional lines, many regional governmental bodies have become direct providers of TDM services.

In the Washington, DC metropolitan area, the regional government body is the Metropolitan Washington Council of Governments. MWCOG runs “Commuter Connections” to encourage “commuters to use alternatives to driving alone to from work, and includes the promotion and operation of transportation demand management strategies such as ridesharing, transit, telecommuting, bicycling, and walking”

Commuter Connections was founded in 1974 to provide carpool ride matching services. By 1997, the service was supported by every jurisdiction in the metropolitan region, and had grown to offer not only carpool and vanpool matching services, but also public transport service information, a guaranteed ride home program, bike to work information, park-and-ride lot, and HOV lane information, a telework program and employer services (Commuter Connections). The TDM work program is included in the region’s long range transport plan (MWCOG).

## **LOCAL TDM / LAND USE APPROVAL PROGRAMS**

Five local TDM programs which link TDM to land use approval will be considered. All vary in program design and implementation, but all take advantage of the federal, state and regional TDM initiatives already discussed.

### **Arlington County, Virginia**

Arlington County, Virginia is an inner suburban jurisdiction within the Washington, DC metropolitan area. Arlington County is home to approximately 200,000 residents. Headquarters for many federal government agencies are located there, including US Department of Defense headquarters at the Pentagon.

Five Arlington neighbourhoods are recognized and mixed-use activity centres by the Metropolitan Washington Council of Governments for regional planning purposes. The Pentagon and Regan National Airport are recognized as employment centres. The activity centres are grouped into activity clusters. Two activity clusters—the Rosslyn-Ballston Corridor and Pentagon/Regan Airport contain over 200,000 jobs, or 7% of all jobs in the region (MWCOG). Each of these activity clusters is located along Metro commuter rail lines; separate activity centres surround each Metro station.

Arlington County has a long and successful history with travel demand management. In the 1960’s and 70’s Arlington lobbied vigorously for an underground Metrorail route along its commercial corridors rather than in the median of a planned highway. The county began to plan for compact urban development along the Metrorail line. Throughout the redevelopment of the County, a smart growth policy of compact urban development along existing and planned public transport infrastructure was followed. The Rosslyn / Ballston corridor has become a frequently cited example for transit oriented development. In 2002, Arlington won a Smart Growth Award from the US Environmental Protection Agency (Arlington County).

To meet its smart growth planning objectives, Arlington relies on residents, workers and visitors to use active travel and public transport. To encourage this, Arlington operates a large and full-featured travel demand management program. Arlington

County Commuter Services operates as Transportation Management Agency (TMA) for the entire county. Founded in 1989, ACCS promotes, provides information for, and sells fare media for public transport, walking, biking, carpooling, vanpooling, telecommuting and other options that reduce the demand for private car transport.

Arlington County requires travel demand management agreements through its Site Plan Process. Developers applying for increased density may provide TDM agreements in exchange for development approval. Site plan agreements are only available in areas with existing or planned public transport facilities. The goals of the program are dense, walkable, mixed use urban villages. TDM agreements are like travel plans for the developments. They are attached to the projects zoning and remain in force as long as the zoning is not renegotiated (typically for the life of the building). TDM agreements can include:

- TMA membership
- transportation coordinator
- information kiosks
- on-site facilities (bike racks & showers, transit stores)
- off-site facilities (bus stops, footpaths, trails, etc.)
- parking cash out
- car sharing
- guaranteed ride home
- carpool / vanpool
- transit contributions
- employee transit subsidies
- flexible schedules
- telework
- parking management plans

TDM agreements are for service provision. Larger developments are required to have more TDM program measures. There are requirements for employee surveys and in some cases, traffic counts, but commitments do not include mode share goals. County officials regard this as easier and less costly for developers and for the County to implement and administrate (Durham, 2009).

Arlington County spends approximately US\$8 million each year on travel demand management. In recent years, federal CMAQ funds have accounted for about half of this budget, with other significant contributions coming from Virginia State and regional funds. The site plan program does require payments from some developments—these funds have accounted for under US\$200,000 per year; however their share is expected to increase in future years (ACCS, 2012, Strategic Plan).

Arlington County has found that its combined TDM efforts remove over 40,000 vehicles from the region's roads on a daily basis by shifting approximately 20,000 two-way trips to transit, carpool, vanpool, telework, biking and walking. Through surveys the county has found that drive alone mode shares are 79% in workplaces without TDM, versus 57% in workplaces with TDM (ACCS, 2012, Annual Report).

## **Montgomery County, Maryland**

Montgomery County, in the State of Maryland is a suburban jurisdiction of the Washington, DC Metropolitan Area. It has a population of approximately 1,000,000 people. Montgomery County is served by the Red Line of the Washington Metrorail commuter rail system.

Montgomery County has established five transportation management districts. The TMDs are established around commuter rail stations. TMDs are focus points for transportation demand management. A transportation management agency is established to operate each TMD—two are operated on contracts, while three are run by County staff.

Montgomery County Code Chapter 42A establishes the travel demand management requirements for workplaces and developments within TMDs. Every employer with 25 or more employees must nominate a contact to receive and distribute transport information and materials, display county-provided alternative commute materials, submit a traffic management plan, participate in an annual commuter survey and file an annual report.

The county's TDM law also requires proposed developments seeking higher density within the Transportation Management District to complete a traffic mitigation agreement to ensure that public transportation facilities will be adequate to meet non-driver mode share targets, which range from 37 to 46% (Brecher and Schwartz, 2010). Traffic mitigation agreements are effectively travel plans for the entire development, and may include measures to reduce parking, and to encourage carpooling, public transport use and cycling or walking (Trombka and Renkema, 2008).

The owners of newly occupied commercial space must pay a tax of US\$0.10/square foot (currently AU\$1.06/m<sup>2</sup>) of gross floor area to support travel demand management. The TMDs are funded only partly by these taxes. Other funds come from parking fees collected within each district and the county's mass transit fund (Orlin, 2012).

## **Fairfax County, Virginia**

Fairfax County, Virginia is a large (population 1.1 million) suburban local government area within the Washington, DC metropolitan region. Fairfax County is further than Arlington from the commercial core of the region; however, it is home to several large employment centres and suburban activity centres. The county is home to ten Fortune 500 headquarters offices (Economic Development Authority).

The county is currently completing the first stage of construction of an extension to the Washington Metro commuter rail system through Tysons Corner, the largest non-core employment centre in the region and home to over 90,000 jobs. The rail line will have four stops in Tysons before connecting through several other well-developed centres on its way to Washington Dulles International Airport, the region's airport for long-haul flights.

In anticipation of increased urban development in the Tysons activity centre, the county has recently adopted plan language that requires TDM plans in the district. The county

has a long history of accepting TDM agreements in exchange for increased density in districts with favourable public transport conditions. Previous TDM agreements relied on language in the policy section of the transportation elements of the county's Comprehensive Plan which required consideration of, and encouraged support for, TDM agreements (Fairfax County, 2009).

In 2010 the Tysons Corner activity centre was rezoned in anticipation of the opening of the new rail stations. The Tysons Comprehensive Plan envisions the district becoming Fairfax County's new downtown by adding 100,000 residents and doubling commercial development to accommodate 200,000 jobs by 2050. The plan relies on Tysons becoming a dense urban centre with many of its residents and workers using active modes and public transport. To help achieve this, the Tysons Comprehensive Plan includes far-reaching TDM requirements for all new development in the district (Fairfax County 2010).

- transportation Management Association should be established
- trip reduction goals established in the plan
- TDM implementation plans, which should include (at least)
  - evaluations of potential TDM measures
  - TDM measures to be provided
  - alternate TDM measures which may be provided
  - phased trip reduction goals
  - implementation budgets
  - monitoring arrangements and funds to guarantee performance

The plan considers that the highest TDM trip reductions should occur in areas closest to the rail stations and these areas should have higher transportation demand management requirements. All reductions are from peak hour rates published by the US Institute of Transportation Engineers (ITE).

TDM Vehicle Trip Reduction Goals					
Development Totals	Forecast Term	TOD Location			Non TOD locations (> 800 m)
		0 – 200 m	200 – 400 m	400 – 800 m	
4.4 million m <sup>2</sup>	before 2020	45%	35%	30%	25%
7.8 million m <sup>2</sup>	2020 – 2030	55%	45%	40%	35%
8.9 million m <sup>2</sup>	2030 – 2040	60%	50%	45%	35%
10.5 million m <sup>2</sup>	2040 – 2050	65%	55%	50%	45%

**Table 1 Tysons Plan peak hour vehicle trip reductions**

The trip reductions aggregate to total trip reductions for Tysons of over 30%, 40% and 50% in each of the forecast terms (Fairfax County, 2010).

To support the overall mode share goals of the district, the county sought to make sure parking is not oversupplied in the redeveloped centre. Minimum parking requirements are eliminated within 800 of rail stations, and reduced outside of TOD areas. Maximum parking requirements are set for all areas. Shared parking and the use of existing excess off-site parking are encouraged. (Fairfax County, 2010)

Since the plan was adopted, 17 applications have been submitted for 3.3 million square metres of new development. Four applications have been approved under the

plan. Buildout of the current rezonings would be expected to take at least 20 years (Fairfax County Planning Department, 2012).

### **Cambridge, Massachusetts**

Cambridge, Massachusetts is an incorporated city of approximately 100,000 population within the Greater Boston area. Cambridge is just across the Charles River from Boston. It is home to Harvard University and the Massachusetts Institute of Technology.

Cambridge enacted its Parking and Transportation Demand Management Ordinance in 1998 to reduce congestion and air pollution, and promote sustainable modes such as walking, bicycling and public transport.

Participation is triggered when an owner of non-residential property proposes to add or build new parking. Participation consists of preparing and implementing a PTDM plan. Large project PTDM plans are required for projects adding 20 or more spaces. These plans include:

- mode-share commitment (usually 10% fewer single occupant auto users than 1990 Census mode shares)
- transportation demand management (TDM) measures
- annual monitoring and reporting

A small project PTDM Plan, with a commitment to implement three TDM measures, but no mode share goal or monitoring, is required if 5 to 19 parking spaces are being added (City of Cambridge, PTDMO).

Cambridge allows project owners to determine the measures they wish to include in their PTDM Plan. Many different TDM measures are used; however the city reports the most common include: public transport subsidies, reserved parking for carpools, bicycle parking, showers and changing facilities for walking and cycling commuters and employee shuttles to public transport. Other measures in use include financial incentives for walking and biking, transportation information fairs and using car sharing services for workday trips.

Cambridge conducts a TDM outreach programs for employers, workers and residents (City of Cambridge, TDM Outreach Program). TDM outreach and marketing is also conducted by the Charles River Transportation Management Association--the local Transportation Management Association for Cambridge employers. Although it is now funded by its member organisations, CRTMA was founded with nine other greater Boston TMAs that received seed money from CMAQ funds in the mid-nineties. The TMA helps members with implementing their PTDM plans and operates the EZ Ride shuttle service between rail stations and employment areas. The EZ Ride service was also a recipient of CMAQ funds during its start-up period. (Gascoigne, 2009)

The ordinance requires the PTDM officer to prepare an annual report to on the effectiveness of the program. In 2011, 37 employee surveys were conducted. Sixty-two per cent (23) of projects met their mode split commitments. The PTDM planning officer indicated projects not meeting mode share commitments tended to be further from

public transport facilities and many had excess parking available due to vacant tenancies (Groll, 2012). In 2012 it was reported that traffic fell by 14 per cent in one Cambridge commercial area despite a 40 per cent increase in development (Moskowitz, 2012).

### **Boulder, Colorado**

Boulder, Colorado is an incorporated city with a population of 100,000. Boulder is located approximately 40 kilometres northwest of Denver, the largest city in Colorado. Boulder is home to the main campus of the University of Colorado. The University's student body of approximately 30,000 comprises a large portion of the city's population.

Boulder has a long history of concern and positive action for the environment. It was one of the first US municipalities to enact a tax to purchase open space, and in 2006, it enacted one of the first local carbon taxes in the USA. Boulder boasts a bicycling rate 20 times higher than the US average (Simon, 2010).

The city adopted its first Transportation Master Plan (TMP) in 1989. This plan called for shifting away from relying on single occupant vehicle trips to satisfy mobility and access needs, and recognised the need to "preserve what makes Boulder a good place to live by minimising auto congestion, air pollution and noise". The first TMP created a TMA that would become Go Boulder.

Boulder is a leader in travel demand management—particularly in the areas of public transport, TDM and active modes. Boulder's over-arching transport plan goals are no increase in vehicle miles travelled, and reducing driving alone to 25 per cent of all trips (City of Boulder).

The city offers a very powerful TDM tool in the Eco Pass—a heavily discounted public transport pass purchased by employers and residential developments. The passes are packaged and priced so that all eligible employees or residents must receive a pass. This discounts the passes for regular riders, and also helps attract new riders. The city has found that employees with Eco Pass are five to nine times more likely to use public transport (City of Boulder, 2012).

Boulder has required a Transportation Demand Management Plan for all developments requiring a traffic study (generally commercial developments generating over 100 peak hour trips or residential developments generating over 20 peak hour trips). The plan is intended to determine trip reduction opportunities and strategies for the development, the goal being a "significant shift" in vehicle trips. TDM measures were nominated by applicants, and commitments were made to a set of measures and a monitoring scheme.

Boulder is currently considering code changes to improve the effectiveness of TDM plans. Staff is developing a TDM "toolkit," with various TDM strategies packaged together to ensure that trip reductions are significant (City of Boulder, 2011).

## CONCLUSION

Each of the United States TDM programs is unique because they have developed in different communities with differing policy environments and transport issues. However, certain themes are consistent among the programs.

Most of the programs are written into the municipal code or in the plans of their respective jurisdiction. This ensures that TDM requirements are transparent and consistent for all participants in the process. Most of the guidelines have a geographic focus and/or development levels to trigger requirements for travel plans.

All of the programs are supported by and work with existing transportation management agencies. The TMAs involved are either privately organised by local business or civic organisations, or are run by a public agency. In the programs studied, a common TDM measure was appointment of a transportation coordinator. This is a critical component for administration of the program and to provide a conduit for public marketing efforts to on-site users.

Funding strategies vary, but each program is requiring users (developers and employers) to cover most of the costs of their own program. Some of the programs are recouping overhead costs by charging user fees or taxes, but none are recouping the full cost of the program. All of the programs take either impetus, funding or program support, or are indirect beneficiaries of one or more of the regional, state and federal TDM policies and programs already discussed.

Jurisdiction	Authority	Geography	Trigger	Program / Requirements	Reporting	Funding
<b>Arlington County, Virginia, USA</b>	1990 Policy	Countywide  Near public transport	Application for additional density	Transportation Coordinator Require direct TDM services for future users	Transportation Coordinator  Employee surveys  Annual report	Approx. 50% federal CMAQ funds  Minor contribution from fees
<b>Montgomery County, Maryland, USA</b>	County Code Chapter 42A	Transportation Management Districts at rail stations	All workplace over 25 employees  All applications for additional density	Employee transport coordinator  Workplace travel plan  Display areas	-Employee Surveys  -Annual report	Fees charged for new commercial space  Parking revenue  County funds

<b>Fairfax County, Virginia, USA</b>	County Policy  Tysons Comprehensive Plan	Countywide near public transport &  Tysons District	Applications for additional density  All zoning applications	Transport coordinator  Site travel plans  Commitment to meet trip reduction goals  Remedies and penalties for non-compliance	Annual reporting  Employee Surveys  Traffic Counts	Programs are self-funded by applicants  County TDM activities are paid for with local and State of Virginia funds
<b>Cambridge, Massachusetts, USA</b>	Parking and TDM Ordinance 1998	Citywide	Adding 20+ new commercial car parks	Mode share commitment of 10% fewer drivers than 1990 Census mode share	Annual reports and employee surveys	Employer Programs are self-funded  Cambridge uses CMAQ funds for TDM outreach
<b>Boulder, Colorado, USA</b>	Code requirement	Citywide	Land use approvals generating over 100 peak hour trips (commercial) or over 20 peak hour trips (residential)	Choice of measures  Option for Eco Pass public transport passes  Demonstrate a "significant shift" in vehicle trips.	Monitoring required	Employer Programs are self-funded  Boulder uses CMAQ funds for TDM activities

**Table 2 Summary of example US TDM / land use programs**

Currently in the United States, travel demand management is broadly supported and applied in most transport plans, especially in metropolitan areas and areas with high congestion or poor air quality. Local jurisdictions in the US have created programs to consider TDM and travel plans as part of the development approval process. These examples may be useful for consideration of TDM efforts in Australia; however care should be taken to understand how the policy and program context surrounding the US examples contribute to their successful operation.

A realisation is emerging among American transport planning officials that TDM should be better integrated with the transport planning process (US FHWA, 2012). In the US context, this entails applying TDM in all planning activities and also considering TDM in operations. This may serve to underscore that even in a transport planning system with well-articulated travel demand management programs and policies; work still needs to be done to integrate demand management with existing processes.

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