Údarás Náisiúnta Iompair
National Transport Authority

Draft Transport Strategy for the Greater Dublin Area

Demand Management Report

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Contents

1 Introduction

1.1 Context

The National Transport Authority (NTA) is preparing a new transport strategy for the Greater Dublin Area (GDA) which will consider the future of the transport system in the GDA for the period up to the year 2035. As a means towards informing the direction of the new strategy the NTA has defined eight Study Areas to be assessed for this review in order to understand more fully the 2035 travel demand coming from the Study Areas, and the public transport services that will be required to effectively meet that demand. To complement these studies, the NTA has also commissioned assessments of Park and Ride options and a desktop review of Transport Demand Management.

Jacobs Engineering Ireland (Jacobs) and SYSTRA provide consultancy services to the NTA through a Public Transport Technical Advisory Services Framework. By this means Jacobs and SYSTRA were commissioned by the NTA to undertake a desktop review of Transport Demand Management Measures and Park and Ride within the GDA.

1.2 This Report

This report details the findings of the desktop qualitative review of Transport Demand Management Measures and their applicability to the Greater Dublin Area to support the new transport strategy.

The remaining sections of this report are structures as follows:

- Section 2 outlines the issues and rationale for transport demand management measures;
- Section 3 describes potential transport demand management measures;
- Section 4 provides details of a desktop assessment of transport demand management measures; and
- Section 5 presents the recommendations for demand management measures for the Greater Dublin Area arising from the desktop assessment study.

2 Issues and Rationale for Transport Demand Management

2.1 What is Transport Demand Management

Transport Demand Management (TDM) is the implementation of programmes of measures which seek to change travel demand patterns by[1]:

- **Trip reduction** – to reduce the need to travel and thereby reduce overall travel demand
- **Reduction in vehicle use** – in particular, to reduce the amount of car travel
- **Increase in vehicle occupancy** – to reduce the amount of single occupancy car trips and increase car occupancy
- **Increase in travel by alternative modes** – this includes measures to encourage public transport use, walking and cycling in preference to car use
- **Trip retiming** – to encourage travel at less congested times
- **Offering alternative destinations** – to encourage travel to destinations that are closer, and that lead to less overall congestion
- **Reduction in trip length** – by planning for the provision of employment, retail and other services closer to where people live.

Transport Demand Management programmes are primarily demand oriented rather than supply oriented i.e. they attempt to manage people's travel rather than seeking to provide more physical capacity for travel (such as more roads, bus and train services etc). Transport Demand Management programmes can, however, complement supply oriented programmes which, for example, either reduce the capacity for private vehicles or provide priority in traffic for new or existing public transport services. An example would be where on-street parking availability is reduced as a demand management measure and the space is reallocated to provide for cycle facilities or improved pedestrian environment or public transport priority.

2.2 Transport Demand Management's Role within the GDA Transport Strategy

One of the primary aims of the GDA Transport Strategy is to significantly reduce demand for travel by private vehicles particularly during the commuter peaks and to encourage use of walking, cycling and public transport. The public transport measures proposed by the strategy will provide the capacity to cater for the future growth in travel demand up to the year 2035 and beyond. However, without complementary transport demand management measures, the full benefits of the Strategy will not be achieved.

Therefore, the GDA Transport Strategy recognises that demand management measures will be required to accompany a comprehensive public transport system. In particular, demand management will be required where it is difficult for the public transport system to achieve a distinct competitive advantage over the private car. Without such demand management, the public transport system will not operate as effectively and may be less efficient; car use will remain high; and congestion will continue to worsen.

To supplement the GDA Transport Strategy, transport demand management measures will be required to:

- protect investment in the strategic road network;
- support the efficient and effective use of the public transport system;
- maximise the benefits of the proposed investment in public transport; and
- to manage congestion in order to facilitate economic growth.

[1] Source: Greater Dublin Area Travel Demand Management Study, prepared by Booz Allen Hamilton on behalf of the NTA (formally the Dublin Transportation Office), October 2004.

3 Potential Transport Demand Management Measures

There are numerous transport demand management measures available which could be applied or expanded within the Greater Dublin Area. Potential measures have been explored and are grouped into the following categories, each of which is described in detail in the following sections:

3.1 Land Use

Land use measures seek to provide for development which reduces car dependency and encourages the use of alternative modes. Land use policies which support the provision of new development in locations, and at densities, which support walking and cycling and enable the efficient provision of public transport services are to be encouraged.

LU-01 Densities

Description of measure: Locating higher density developments in areas that can be well served by public transport.

Current situation: National guidance promotes increased residential densities at public transport nodes. Implementation of this guidance is evident in increased densities in locations such as Adamstown, Pelletstown, and Cherrywood. In terms of employment, higher intensities of development have been provided for and developed around Grand Canal Dock and Heuston stations, and other City Centre sites.

Future opportunities: Providing for sufficient density of development in well located areas is essential to the viability of public transport. There is potential to further concentrate development around high capacity public transport nodes and areas that are highly accessible by walking and cycling.

LU-02 Mixed Use Development Patterns

Description of measure: Providing for a mix of land uses in proximity to each other to support access to employment, services and leisure activities within walking and cycling distance.

Current situation: Whilst there has been an increase in the number of mixed use developments in recent years or in the provision for services within residential developments, such as crèches, retail and schools, there exists a legacy of segregation in most areas outside of town centres and Dublin city centre.

Future opportunities: Further, and more stringent implementation of planning policy could be employed to promote the provision of a mix of local services within walking distance of their surrounding neighbourhood.

LU-03 Providing for Permeability

Description of measure: Designing all developments with walking, cycling and public transport accessibility in mind.

Current situation: The NTA has supported a number of local permeability projects in conjunction with local authorities. Permeability objectives are provided for in general development standards and in the Design Manual for Urban Roads and Streets (DMURS). The NTA also recently published a Best Practice Guide on providing for permeability in existing urban areas[2]

Future opportunities: The implementation of the NTA's guidance in conjunction with DMURS would address permeability in both new and existing urban areas.

[2] https://www.nationaltransport.ie/wp-content/uploads/2011/12/Permeability_Best_Practice_Guide_NTA_20151.pdf

3.2 Fiscal Measures

Fiscal measures can introduce financial incentives towards sustainable transport modes or financial disincentives to travel by car, particularly at peak periods. The cost of transport has a significant influence on people's travel choices and fiscal demand management measures can be targeted to support public transport use or to influence desire to travel, the choice of route or the time of travel.

F-01 Road Tolling / Pricing

Description of measure: Fee charged to use a specific piece of road infrastructure at either a fixed point on the network or based on distance travelled.

Current situation: Within the GDA, tolling is applied at various points on the motorway network and is generally connected to schemes which were funded through public private partnerships. Dublin Port Tunnel uses tolling as a means to protect road space for HGVs.

Future opportunities: Tolling will continue to be a component of the GDA's transport demand management. The level of tolling will continue to be monitored and adjusted to ensure it is appropriate. Advancements in tolling may include further demand management measures such as the NRA's proposal to implement multi-point tolling on the M50 during peak periods to manage traffic levels on the route.

F-02 Congestion Charging

Description of measure: Fee charged to access a defined area (e.g. the City Centre) as a tool to reduce traffic demand and congestion.

Current situation: No current proposals to introduce congestion charging, though it has been recommended in previous studies. London is an example of a successful congestion charging model.

Future opportunities: The opportunity to utilise congestion charging as a transport demand management tool warrants further consideration for the GDA. A candidate area would be within the canal cordon.

F-03 Fuel Duty

Description of measure: Charge applied to the price of fuel to discourage car travel.

Current situation: Not specifically used as a transport demand management measure in Ireland to date.

Future opportunities: Potential to be applied. However, it would not allow for spatially targeted transport demand management as effectively as other measures.

F-04 Public Transport Fare Subsidies

Description of measure: Reduced fare tickets provided for target groups to encourage and support public transport use.

Current situation: Examples of existing fare subsidies include reduced fares for children and students. In addition, free travel passes are provided for OAPs, mobility/visually impaired, carers and other social welfare classes.

Future opportunities: Continued operation of current fare subsidies. Potential to adjust the age brackets for child fares, for example to increase the age limit for free travel. The ongoing introduction of the new Public Services Card will assist in reducing fraudulent use of free travel passes.

Parking Charges and Levies

See Section 3.5 Parking Restraint

F-05 Cycle to Work Scheme

Description of measure: The Cycle to Work Scheme is a tax incentive scheme which aims to encourage employees to cycle to and from work. Under the scheme employers can pay for bicycles and bicycle equipment for their employees and the employee pays back through a salary sacrifice arrangement of up to 12 months. The employee is not liable for tax, PRSI or the Universal Social Charge on their repayments.

Current situation: The Cycle to Work scheme is an unprecedented success; employers have integrated it into their benefits systems and have used it to promote active travel to the workplace. There has

been a 114% increase in AM peak cycling numbers crossing the canal cordon from 2006-2014.

Future opportunities: Opportunities exist for effective marketing to encompass a greater number of employees under Smarter Travel and encourage participation in the Cycle to Work Scheme.

F-06 Taxsaver Scheme

Description of measure: Employees can purchase seasonal public transport tickets from their gross salary, providing savings of either 31% or 51% depending on the level of Tax and PRSI that would otherwise be charged.

Current situation: Over 3,500 companies currently purchase Taxsaver tickets at the request of their employees.

Future opportunities: Continued marketing and promotion of the benefits of the Taxsaver scheme will support a continued growth in take-up. The integration of Taxsaver and Leap tickets will further enhance the ease of travel on public transport which should result in an increase in demand.

3.3 Intelligent Transport Systems

Intelligent Transport Systems (ITS) comprise the application of information technology and communications to provide information for travellers enabling them to make informed travel choices. ITS assists in the management of transport infrastructure by allowing for the communication of information on transport network performance in real time. ITS also supports measures to control travel demand in response to issues so as to allow for better overall network performance and transport demand management.

ITS-01 Real Time Passenger Information

Description of measure: Real Time Passenger Information (RTPI) systems communicate the anticipated arrival/departure time of services and assist passengers in using public transport.

Current situation: The National Transport Authority is currently providing a RTPI service for bus passengers in the Greater Dublin Area and the regional cities (Cork, Galway, Limerick and Waterford). Irish Rail and Luas also operate RTPI systems. 70% of surveyed passengers use RTPI. Almost two-thirds feel that RTPI has improved the reliability of the service. Almost 30% cite using the bus more often since the introduction of RTPI.

Future opportunities: Potential for expansion of the system to include all private operators.

ITS-02 Variable Speed Limits

Description of measure: Allowance for speed limits to be dynamically set to suit traffic conditions, so that flow is maintained, avoiding stop start conditions that arise from driver behaviour when congestion limits speeds to below the road's usual free flow conditions.

Current situation: Variable and Periodic Special Speed Limits are provided for both in legislation and in the Traffic Signs Manual. These speed limits are generally intended for use on specific sections of the road network. The Port Tunnel is enabled with variable speed limit signage.

Future opportunities: The National Roads Authority are proposing Variable Speed Limits during peak periods on the M50 to manage demand, alleviate congestion and reduce incidents.

ITS -03 Variable Message Signs

Description of measure: Interactive signs which can display messages to road users.

Current situation: Variable Message Signs (VMS) are currently located on various sections of the road network in the GDA and provide for the communication of real time journey information; active traffic management of unplanned events and incidents; weather events; management of planned events; road works; major national events; and safety campaigns.

Future opportunities: Potential to expand the number of signs and to provide further information on the benefits of alternative methods of transport and park and ride facilities.

ITS-04 Incident Detection Systems

Description of measure: Through the monitoring of traffic loops and static CCTV, the system is able to monitor traffic flow patterns and identify incidents (e.g. dramatic increases in congestion) quickly, thereby enabling a more efficient and appropriate response.

Current situation: Incident Detection Systems are currently in operation on the M50.

Future opportunities: There is potential for increased roll out of Incident Detection Systems throughout the GDA.

ITS-05 Ramp Metering on National Routes

Description of measure: Ramp Meters are generally traffic signals placed on motorway entrance ramps which operate when demand levels are high to control the flow of vehicles accessing the motorway. They are designed to improve the average speed of all vehicles on the mainline motorway by decreasing congestion that can result when too many cars enter at certain points.

Current situation: Commonly used throughout Europe but not yet implemented as a transport demand management tool in Ireland.

Future opportunities: Potential for application in connection with the national road network within the GDA to manage demand on its motorways and to support these routes in fulfilling their strategic functions.

ITS -06 Car Park Space Availability Electronic Displays

Description of measure: Interactive signs which can display messages to road users on the availability of car parking spaces.

Current situation: A number of signs are in operation on main approaches to the City Centre.

Further opportunities: Potential to expand the use of electronic signage and possibly link to the provision of information on park & ride spaces.

3.4 Traffic Management

Traffic management measures, in terms of transport demand management, largely comprise road infrastructure measures aimed at reducing capacity for private cars and giving public transport and high occupancy vehicles priority. Traffic management measures can be particularly effective in addressing the relative difference in the performance of public transport and private car traffic, for example in the case of bus priority. This can result in a competitive advantage being afforded to public transport thereby encouraging modal shift. Traffic management can also impact on the transport environment so as to improve conditions for walking and cycling by slowing down or removing vehicular traffic.

TM-01 Traffic Calming

Description of measure: Physical infrastructure measures aimed at either slowing down traffic in particular areas through speed control, or reducing the number of vehicles travelling on particular streets through volume control.

Current situation: Among the traffic calming measures currently in use in the GDA are speed ramps, chicanes and roundabouts, modified junctions and weight restrictions.

Future opportunities: Traffic management measures will continue to be an integral part of the GDA transport demand management.

TM-02 Bus Priority Measures

Description of measure: Local traffic management measures that give priority to buses by means of bus lanes, bus lane violation detection, bus gates and traffic signal pre-emption. Bus gates comprise restrictions placed on roads to allow access for buses and cyclists. These can be physical barriers or simply notified exclusion zones. They can be permanent or implemented during peak times.

Current situation: There are a number of localised bus priority measures located around the GDA which facilitate improved bus operation. The College Green Bus Gate has had the effect of reducing bus journey times through the City by 12% after its introduction.

Future opportunities: Potential to increase the number of bus gates in the GDA, particularly through the City Centre. Further potential for the development of bus priority at the local level to address delays in the bus network.

TM-03 Quality Bus Corridors

Description of measure: The provision of priority for buses along selected corridors. QBCs also provide for cyclists and taxis along almost all sections.

Current situation: There are a number of QBCs located throughout the GDA. These provide a clearly defined, reliable route for buses, partially segregated from other road traffic. These have had the impact of improving bus journey times and reliability.

Future opportunities: Expansion and upgrading of the QBC network will further decrease journey times and encourage modal shift. Measures which may be deployed include the removal of on-street parking, improvements to bus priority at junctions, and the provision of more continuous bus lanes.

TM-04 Pedestrianisation

Description of measure: Specific zones designated for pedestrians within urban areas.

Current situation: A number of streets within the City Centre have been pedestrianised, facilitating deliveries at certain authorised times. This has the effect of reducing car traffic within the City Centre.

Future opportunities: Potential for an increased number of pedestrian areas within the City Centre to reduce congestion and emissions and improve the public realm, as proposed in the current Dublin City Centre Transport Study.

3.5 Parking Restraint

Parking restraint measures include pricing and supply controls which make car use more expensive and less convenient, thereby increasing the attractiveness of non-car modes. Parking has a significant influence on people's travel behaviour as has been demonstrated over many years in Dublin City Centre. Transport demand management through parking restraint can be targeted to locations where accessibility by alternative modes is high thereby encouraging mode shift to public transport, walking and cycling. Parking restraint can also be applied as a fiscal measure or alongside land use planning demand management measures.

P-01 On-Street Parking Charges

Description of measure: Parking fares can be set to discourage all-day commuter parking and contribute to greater parking turnover for non-commuting purposes.

Current situation: Currently applied throughout the GDA, particularly within City Centre, in various town centres and other areas of retail or other commercial activity.

Future opportunities: Potential to implement further on-street pay & display demand management measures. There is also potential to review existing Pay & Display schemes to further support transport demand management by adjusting the hours of operation, charges, restrictions for non-permit holders and permitted duration of parking.

P-02 Parking Standards for New Developments

Description of measure: A reduction in the number of parking spaces on offer, particularly where there are high levels of public transport accessibility such as the City Centre.

Current situation: New developments are becoming less and less focussed on the provision of car parking facilities. Maximum parking standards are applied within all local authorities within the GDA.

Future opportunities: Limits on the number of parking spaces within new developments. Potential to further link the level of parking provision with the availability of public transport.

P-03 Reductions in the Availability of Parking

Description of measure: Reductions in the availability of existing parking spaces generally combined with the reallocation of space to support alternative modes.

Current situation: Some parking stock has been reallocated to other uses both on-street and off-street. Examples include spaces being used for Bus priority; the allocation of dedicated spaces to car hire schemes and to those participating in car-pooling; and the reallocation of parking spaces to cycle parking bays.

Future opportunities: Potential to further reduce the availability of parking, particularly within older developments with an oversupply of parking when they are regenerated. Potential for further reallocation of on-street parking to other uses such as public transport priority, pedestrian facilities, cycle facilities, taxis and loading.

P-04 Workplace / Private Parking Levies

Description of measure: Fee applied to the provision of parking spaces, usually connected to workplace parking in certain locations.

Current situation: Limited charging for private parking spaces, specifically applied to the user. Previous government initiatives examined workplace parking levy charges in urban areas, but these were not implemented.

Future opportunities: The opportunity to utilise parking levies as a transport demand management tool warrants further consideration for the GDA.

3.6 Travel Plans and Awareness

Travel plans comprise a package of measures aimed at reducing single-occupancy car use, especially for travel to work and education. The NTA manage the Smarter Travel Workplaces and Campuses programme directly and administer the Green Schools Travel Module on behalf of the Department of Transport, Tourism and Sport (DTTAS), which is run by An Taisce. Requirements for Travel Plans are set out in local authority development plans. AS such, the local authorities also play a significant role in the review and monitoring of Travel Plans.

TP-01 Workplace Travel Plans

Description of measure: The Smarter Travel Workplaces programme supports large employers to promote travel choices among their staff. Free expert advice and support for workplaces can be given to encourage employees to move to smarter ways of traveling; whether on foot, by bike, public transport, or through car sharing.

Current situation: The NTA runs the Smarter Travel Workplaces programme which supports over 100 of the largest workplaces in the state, including companies such as the ESB, DELL and Pfizer, and major hospitals. Organisations in the Smarter Travel Workplaces programme have achieved an average reduction of 18% car use so far. Requirements for Workplace Travel Plans are set out in local authority development plans. Local authorities also support the implementation of travel plans.

Future opportunities: There are opportunities for further marketing of workplace travel plans demonstrating to employers the benefits of initiatives such as this; helping to cut costs for employers, and increase health and well-being of staff.

TP-02 Smarter Travel Campus

Description of measure: Smarter Travel Campus is a programme which supports third level institutions to implement campus travel plans. These encourage and support students and staff to walk, cycle, take public transport or car share on the commute to campus.

Current situation: The NTA runs the Smarter Travel Campus programme which supports a growing number of third level institutions including Dublin City University and Dublin Institute of Technology.

Future opportunities: There are opportunities for further expansion of campus travel plans.

TP-03 Green Schools Programme

Description of measure: Travel is a specific theme within the An Taisce Green Schools programme which is an international environmental education programme. As part of their Action Plan, participating schools set their own travel targets, with the ultimate aim of increasing the number of pupils walking, cycling, parking and striding, car-sharing or using public transport.

Current situation: Green schools travel was rolled out nationally in September 2008 after a successful pilot programme 50 schools in the GDA. Over 1,400 schools around the country have participated in the promotion of sustainable travel to school through the programme. Green schools have dedicated Travel Education Officers providing support to schools. Green schools travel is managed by the NTA on behalf of DTTAS and run by An Taisce.

Future opportunities: Similar reductions in car use to Smarter Travel can be achieved by schools embracing this initiative. A target for 100% participation should be set for the GDA.

TP-04 Travel Awareness

Description of measure: Making people aware of their options with regard to sustainable methods of transport.

Current situation: Currently all information regarding travel options is available online. There is, however, little emphasis placed on specifically targeting certain demographic groupings.

Future opportunities: Innovative marketing campaigns can be used to target specific groups of people who are less inclined to use sustainable transport methods.

3.7 Further Measures to Encourage Sustainable Travel

Measures to promote access to alternative travel options such as walking, cycling and car-pooling and sharing. In terms of transport demand management, supporting measures play a role in widening the travel options available to people and can promote the use of alternative modes to the private car.

FM-01 Public Bike Hire Scheme

Description of measure: Provision of accessible on-street bicycles for rent.

Current situation: Over 1,500 bicycles are now available for hire in the capital after Dublin City Council officially launched its new city bike scheme. By September 2014, nearly 8 million Dublin Bike journeys had been recorded.

Future opportunities: Opportunities exist to expand the number of available bicycles and to extend the areas encompassed under the scheme.

FM-02 Workplace Destination Facilities

Description of measure: Provision of bike storage, lockers and shower facilities for those who choose to walk/run/cycle to work.

Current situation: Many offices within the city provide facilities to cater for walking and cycling modes. Local authorities set out standards for facilities within new developments, for example the requirements for secure cycle parking, shower facilities and lockers set out in the Dublin City Development Plan.

Future opportunities: There is an opportunity to encourage all workplaces to provide facilities for those wishing to walk or cycle to work.

FM-03 Car-sharing

Description of measure: Two or more people arranging to travel to work together.

Current situation: Carsharing.ie is an initiative of the National Transport Authority and Smarter Travel Workplaces. This website allows people to access a database of people with similar travel arrangements and to organise car-pooling.

Future opportunities: Further marketing will allow for greater development of this travel option. This initiative could be supported through the reallocation of parking spaces to car-pooling (see Section 3.5, measure P-03).

FM-04 Behavioural Change Incentives

Description of measure: The use of monetary payments, or monetary related rewards, to effect transport behavioural change.

Current situation: Various pilot schemes are underway internationally, particularly in the Netherlands

Future opportunities: Depending on the experiences gained internationally, some of these measures could be considered for trialling or implementation in Ireland.

3.8 New Technologies: Communications, Information and Integration Measures

New technology has an increasingly important role in transport demand management as it influences communications, information and integration measures which in turn affect the need to travel and the choice of travel mode. For example, a greater number of people have the capacity to work and shop from home, thereby reducing travel demand. Mobile applications and information-based websites allow for information regarding public transport options. New technologies, such as smartcard ticketing, seek to support and promote sustainable transport modes through improved ease of use and better connectivity and integration between modes.

NT-01 E-working

Description of measure: The ability to work from remote locations, in particular home.

Current situation: Advances in broadband and communications capabilities have allowed for greater numbers of people working from home. The 2011 Census indicated that 2.3% of people in Dublin work mainly from home.

Future opportunities: Further advancements in broadband speeds and ICT capabilities will allow for increased functionality, previously only possible in the workplace.

NT-02 Internet / mobile apps

Description of measure: Mobile applications and websites are readily accessible with real time information on public transport.

Current situation: A multitude of applications and websites have been developed for bus, rail, Luas and Dublin Bikes, such as the National Transport Authority's Real Time Information App and National Journey Planner App.

Future opportunities: The real time information could be further developed to encompass all private operators. The provision of open data to allow for app. development could also be expanded. The National Journey Planner should also be kept up to date and refined and improved as necessary. Marketing and promoting the journey planner would support its increased use. Enhancements that are in development include Real Time Passenger Information inputs, inclusion of more Rural Transport programmes / demand responsive services, fares information for journeys and cycle planner functionality.

NT-03 Leap Card

Description of measure: Leap card is the GDA's multi modal, multi operator smart card ticketing system.

Current situation: In 2013 20% of public transport journeys taken in GDA used Leap. Leap allows for pay-as-you-go trips, has provision for daily and weekly single mode and multi-modal caps, transfer discounts and can be loaded with selected pre-paid tickets such as the Dublin Bus Rambler and TaxSaver tickets.

Future opportunities: Leap Card will continue to add more functionality on a phased basis, including the introduction of more TaxSaver tickets and more transport operators in the GDA. Future changes to fares and ticketing will make the Leap Card more attractive such as larger differentials between fares for leap and non-leap equivalent tickets, simplification of the fare and ticketing structures, and greater integration between fares including the possibility of a zonal fare structure for all modes. New methods payment methods will be made available as new technologies, such as mobile phone payment facilities, mature.

3.9 Control Measures

Control measures support the efficient and effective operation of transport systems by improving the monitoring of performance and management of operations. Examples of the effectiveness of these measures would include coordinating traffic signals to prioritise public transport.

CM-01 Traffic Control Centres

Description of measure: Traffic Control Centres allow for the monitoring and management of traffic through CCTV, signal control and communication systems.

Current situation: Control centres are in operation in local authorities and within the NRA to manage traffic, signals, incidents, events, etc.

Future opportunities: Traffic Control Centres will likely play an increasingly important role in the GDAs transport demand management.

CM-02 Public Transport Control Centres

Description of measure: Public Transport Systems allow for the efficient and effective monitoring and management of public transport operations through technologies such as CCTV, Automatic Vehicle Location (AVL), communications and signal control systems.

Current situation: Dublin Bus, Luas and Irish Rail maintain sophisticated control centres each of which supports the GDAs real time passenger information systems.

Future opportunities: There is potential for further integration of control measures between different public transport modes. The upgrading of systems is likely to be required to ensure benefits of the latest technology are accrued. Irish Rail is currently planning and designing for the development of a new centralised control centre.

4 Qualitative Assessment of Transport Demand Management Measures

Following on from the overview of potential transport demand management measures a qualitative assessment of how these measures could apply to the GDA Area was undertaken. This assessment considered strengths, weaknesses, opportunities and constraints of the various proposals. Consideration was also given, on the basis of professional judgement, to the following criteria:

- how efficient is the transport demand management measure;
- how effective is the transport demand management measure;
- the transport demand management measures' contribution to sustainability; and
- how easy the transport demand management measure is to deliver.

Land Use					
Measure	Strengths	Weaknesses	Opportunities	Constraints	Comment
LU-01 Densities	Improves public transport catchment and supports the provision of public transport systems with higher levels of service	Difficult to deliver. Doesn't resolve issues caused by existing land use.	Targeted approach. Potential to integrate with transport strategy.	Requires higher capacity public transport and a coherent spatial planning strategy to implement.	Effective TDM measure which delivers long term benefits in supporting sustainable modes. Challenging to deliver and requires multi-agency support.
LU-02 Mixed Use Development Patterns	Improves accessibility by walking and cycling	Difficult to deliver. Doesn't resolve issues caused by existing land use.	Widely applicable. Scale, form and uses can be varied to suit location.	Requires demand for mixed uses. Providing for mixed use does not guarantee uptake.	Effective TDM measure which reduces travel distances. Challenging to deliver and requires multi-agency support. Can be efficiently delivered as part of large planning schemes.
LU-03 Providing for Permeability	Improves public transport catchment and accessibility by walking and cycling.	Perceived anti-social behaviour problems can result in pressures to close links.	Can be applied to both existing and new developments	Subject to physical constraints. Land ownership and public opposition may have impacts on delivery in existing areas.	Effective in encouraging shift to more sustainable modes of transport. Requires good planning and design. Can be linked to new public transport provision.

Fiscal Measures					
Measure	Strengths	Weaknesses	Opportunities	Constraints	Comment
F-01 Road Tolling / Pricing	Manages demand at strategic level along major road corridors. Free flow tolling is a success. Targets specific users.	Negative perception issues. Can result in traffic rerouting from strategic to local roads to avoid tolls.	Opportunities to directly link charges to distance travelled and preserve the major road corridors for higher value strategic trips during peak periods. May avoid the need to increase parking charges.	Selection of most appropriate locations.	Efficient in directly targeting private car trips. Limited applicability to selected roads / routes. Proven to be deliverable.
F-02 Congestion Charging	Focused on private car use in specific areas. Could address both strategic and local demand.	Affects multiple trip purposes and users. Can cause issues at boundaries and redistribution of car trips.	May avoid the need to increase parking charges. Revenue may be re-invested in improving the availability of alternative modes and enhancing the public realm in the city centre,	Appropriate area identification	Would be effective in reducing car trips to the cordoned area. Challenging to deliver and may result in potential wider impacts. Has been successfully implemented elsewhere.
F-03 Fuel Duty	Would affect all private car travel by increasing the cost. Directly linked to car use.	Affects all trip purposes and all users regardless of availability of alternative travel options. Not linked to specific trips and less targeted than alternative measures.	Could be applied in similar manner to existing fuel taxes. Revenue may be re-invested in improving the availability of alternative modes, e.g. enhancing public transport services.	May have to be implemented as part of the budget and applied nationally.	The impact on demand may lessen over time as people adjust to the costs. Delivering high duty levels will be challenging and smaller amounts may have little effect on TDM.
F-04 Public Transport Fare Subsidies	Targeted at specific public transport user groups. Can influence the future behaviour of users, i.e. children.	Can make fares for non-subsidised tickets appear more expensive. Some levels of fraudulent use, e.g. young adults availing of child fares.	Ongoing introduction of new Public Services Card and student Leap ID cards will assist in reducing fraudulent use.	Applicable to targeted groups only.	Efficient as a target demand measure to promote the use of public transport within specific groups. Proven to be deliverable and supportive of sustainable transport.

Fiscal Measures					
Measure	Strengths	Weaknesses	Opportunities	Constraints	Comment
F-05 Cycle to Work	Targeted at promoting cycling. Benefits from support from cycle retailers who assist people in availing of the scheme.	Can make bicycle costs appear high to those who cannot avail of the scheme.	Potential to encourage more employers and employees to participate.	Scheme only available through participating employers.	Efficient in promoting cycling. Proven to be deliverable and supportive of sustainable transport.
F-06 Taxsaver Scheme	Targeted at supporting commuter trips by public transport	Applies to annual and monthly season tickets only. Less attractive for short public transport trips and part time workers.	Potential to encourage more employers and employees to participate. Potential in increase ticket options available.	Tickets only available through participating employers	Effective in increasing the relative attractiveness of public transport for commuters. Proven to be deliverable and supportive of sustainable transport.

Intelligent Transport Systems					
Measure	Strengths	Weaknesses	Opportunities	Constraints	Comment
ITS-01 Real Time Passenger Information	Targeted at making public transport easier to use. Improves perception of public transport reliability.	System and infrastructure must be kept up to date to be reliable.	Potential for expansion to more locations and to include more private operators.	No significant constraints	Effective TDM measure which supports public transport.
ITS-02 Variable Speed Limits	Can improve the road network efficiency and safety by reducing incidents	Not suitable to all roads.	Potential to be implemented within the strategic road network. Can be targeted and responsive to issues in the network.	Suitable for a limited number of routes. Too much variation in speed limits may result in confusion and non-compliance.	Provided for in legislation. Delivery likely to be limited to strategic roads. Effectiveness in the GDA is untested and may require enforcement which would affect efficiency.
ITS-03 Variable Message Signs	Can improve the road network efficiency and safety.	May result in redistribution of congestion.	Potential to expand the number of VMS locations. Potential to link to information on alternative mode options.	Too much information can reduce its effectiveness.	Efficient, for example in managing traffic to major events. Difficult to ascertain its effectiveness as a TDM measure. Proven to be deliverable.

Intelligent Transport Systems					
Measure	Strengths	Weaknesses	Opportunities	Constraints	Comment
ITS-04 Incident detection systems	Can improve the road network efficiency and safety. Reduces monitoring costs.	Effectiveness is not maximised unless linked to other TDM such as variable speed limits and variable message signs.	Potential to expand operation of incident detection systems. Can collect data for better planning of road infrastructure.	Limited application to suitable roads.	Effective in managing traffic. Can be linked to variable message signs.
ITS-05 Ramp Metering on National Roads	Can improve the road network efficiency and safety.	May result in redistribution of congestion.	Potential to be implemented within the strategic road network. Can be targeted and responsive to issues in the network.	Limited application to congested strategy roads.	Likely to be effective, but ease of delivery is uncertain and may be limited due to physical constraints.
ITS-06 Car Park Space Availability Electronic Displays	Facilitates more efficient journey planning. Can reduce the volume of traffic headed to full car parks and the resulting extra travel required to find a space	May encourage car trips if spaces are available	Potential to expand the number of electronic signs and possibly link to park & ride space availability	Suitable where demand for parking is high and congestion occurs	Efficient means of TDM. Proven to be deliverable. Does not support sustainable modes.

Traffic Management					
Measure	Strengths	Weaknesses	Opportunities	Constraints	Summary
TM-01 Traffic Calming	Targeted measures which can be tailored to local needs.	Generally fixed measures that cannot respond to varying demand levels. Can negatively impact on bus and cycle movements, though can also be positive if designed appropriately.	Widely applicable and very suitable to residential areas.	Physical constraints can arise.	Efficient and effective means of protecting sensitive areas and vulnerable road users. Proven to be deliverable and supportive of sustainable transport.

Traffic Management					
Measure	Strengths	Weaknesses	Opportunities	Constraints	Summary
TM-02 Bus Priority Measures	Targeted measure. Design and operation can be varied to meet local needs.	Control measures (e.g. moving barriers, Garda enforcement) required to support operation.	Significant potential to expand the level of bus priority in the GDA.	Physical constraints can arise. Must be integrated with the bus network.	Efficient and effective in providing for bus priority and accessibility. Challenging to deliver in some locations.
TM-03 Quality Bus Corridors	Targeted measure. Very effective at re-allocating road space from private car to public transport. Can be integrated with cycle facilities.	Can result in redistribution of congestion. Requires Garda or camera enforcement	Potential to upgrade existing QBCs to provide for more continuous bus priority.	Physical constraints can arise. Must be integrated with the bus network.	Efficient and effective in providing for continuous bus priority. Challenging to deliver in some locations.
TM-04 Pedestrian Only Areas	Targeted measure which can be linked to urban realm improvements. Increases the attractiveness of walking.	Can result in redistribution of congestion. Can have negative impact on bus and cycle movements.	Potential for increases in pedestrian only areas within the City Centre and Town Centres.	Limited number of suitable locations.	Effective and efficient in encouraging walking and improving accessibility. Proven to be deliverable and supportive of sustainable transport.

Parking Restraint					
Measure	Strengths	Weaknesses	Opportunities	Constraints	Summary
P-01 On-Street Parking Charges	Targeted measures which provides for good control of parking stock.	Perceived as impacting on commercial activity (e.g. shopping). Enforcement is unpopular. Can result in redistribution of parking demand to surrounding locations.	Widely applicable	Perceived impact on local economy can affect buy in.	Effective and efficient in reducing private car use. Proven to be deliverable and supportive of sustainable transport.

Parking Restraint					
Measure	Strengths	Weaknesses	Opportunities	Constraints	Summary
P-02 Parking Standards for New Development	Targeted measures which provides for good control of parking stock.	Only applicable to new developments	Opportunity to further link the level of parking provision with the availability of public transport	Demand for parking spaces is high. Can result in redistribution of parking to surrounding areas.	Effective in supporting lower car ownership. Requires multi-agency support. Easily deliverable through local development standards.
P-03 Reductions in the Availability of Parking	Targeted at reducing use of private car.	Can be combined with the reallocation of space to sustainable modes.	Reallocation of space for other purposes e.g. improve public realm, public transport priority.	Perceived impact on local economy can affect buy in.	This measure is effective and efficient in reducing private car use. Proven to be deliverable. Supportive of sustainable transport particularly if combined with reallocation of space to sustainable modes.
P-04 Workplace / Private Parking Levies	Would complement other measures, and reduce need or level of tolling. Charging strategies successfully delivered in many cities. Opportunity for revenue to be re-invested in sustainable transport alternatives.	May not impact existing free parking capacity. May not impact higher salary band. Available capacity is already constrained, so cost impact may have a lower impact than other measures.	Widen and increased parking charges could be implemented immediately.	Available capacity is already constrained, so cost impact may have a lower impact than other measures.	Efficiency dependent on scheme. Delivery is challenging. Would support sustainable modes.

Travel Plans and Awareness					
Measure	Strengths	Weaknesses	Opportunities	Constraints	Summary
TP-01 Workplace Travel Plans	Proven to deliver reductions in private car use. Benefits from multi-agency support.	Best results require tailored plans	Opportunities to extend workplace travel planning to encourage higher levels of participation.	The lack of availability of alternative transport options could impact on effectiveness in some peripheral locations.	Effective and efficient in increasing levels of sustainable travel.

Travel Plans and Awareness					
Measure	Strengths	Weaknesses	Opportunities	Constraints	Summary
TP-02 Smarter Travel Campus	Similar benefits to workplace travel plans.	Best results require tailored plans	Opportunities to extend campus travel planning to encourage higher levels of participation.	The lack of availability of alternative transport options could impact on effectiveness in some peripheral locations.	Effective and efficient in increasing levels of sustainable travel.
TP-03 Green Schools Programme	Proven to deliver reductions in private car use. Benefits from multi-agency support.	Requires the support of everyone involved – teachers, parents and children.	Opportunities to extend the green schools travel programme to encourage higher levels of participation.	The lack of availability of alternative transport options and the location and design of schools could impact on effectiveness in some peripheral locations.	Effective and efficient in increasing levels of sustainable travel.
TP-04 Travel Awareness	Can allow for innovative measures that target specific groups.	Does not provide for an understanding of travel needs in the same way as other travel planning measures do.	Opportunity for travel awareness campaigns.	Difficult to provide for efficient communication with some hard to reach groups.	Effective in promoting sustainable travel.

Further Measures to Encourage Sustainable Travel					
Measure	Strengths	Weaknesses	Opportunities	Constraints	Summary

Further Measures to Encourage Sustainable Travel					
Measure	Strengths	Weaknesses	Opportunities	Constraints	Summary
FM-01 Bike Hire	Targeted at increasing sustainable transport use. Can increase accessibility to public transport. Can be self-financing through user fees and advertising.	Requires management to cope with peaks and troughs. The tidal nature of demand can put pressures on the system.	Some potential to extend the scheme further. Could extend to large urban areas outside the City Centre (e.g. Tallaght and Dun Laoghaire).	Some constraints as to the geographic coverage of the scheme so that it operates efficiently. Physical constraints in locating stands. Suitability of locations is important to the efficient operation. The standard of the cycle network may also act as a deterrent.	Effective in increasing levels of cycling and opening up cycling to the wider population. Proven to be deliverable and very supportive of sustainable travel.
FM-02 Workplace Destination Facilities	Targeted at increasing sustainable transport use.	Mainly applicable to new developments	Complements the reduction in workplace car parking.	Requires support from employers and landlords. Physical space constraints may be a factor.	Effective in supporting sustainable travel.
FM-03 Car-sharing	Increases car occupancy and reduces car trips. Provides for alternative means of travel to the private car where other options are limited.	Requires tailored planning and organisation. Still results in car trips on the network.	Can be incorporated into workplace travel plans	Limited market.	Effective in reducing private car use under certain conditions.. Delivery is challenging.
FM-04 Behavioural Change Incentives	Directly rewards those who travel in the manner being promoted by policy.	The level of incentive required to effect mode shift may be prohibitive in terms of cost and may favour those living and working in areas where alternatives are readily available.	Can be incorporated into, or based on, existing schemes such as Bike to Work and Taxsaver.	May require legislative changes and significant administrative overheads.	Such schemes have not been rolled out or piloted to the extent by which their potential effectiveness can be fully understood.

New Technologies: Communications, Information and Integration Measures

Measure	Strengths	Weaknesses	Opportunities	Constraints	Summary
NT-01 E-working	Reduces the need to travel.	Reduces social interaction	Some opportunity for increased levels of e-working. Could be integrated within workplace travel plans.	Requires the support of employees and employers.	Widespread effectiveness is limited.
NT-02 Internet / mobile apps	Can encourage and support public transport use. Relatively cost efficient.	Quality control of data may rest with external parties such as the app developer	More open data could be provided to allow for the development of apps	Requires the user to have a smartphone, tablet or internet access.	Efficient and effective in supporting the use of sustainable modes.
NT-03 Leap Card	Encourages and supports public transport use.	Increased functionality, such as transfer rebate and capping, also increases the complexity of charging making it difficult for people to understand their travel costs.	Potential to increase levels of Leap Card use and the integration with ticket options.	No significant constraints in terms of TDM.	Effective in supporting public transport use. Proven to be deliverable.

Control Measures					
Measure	Strengths	Weaknesses	Opportunities	Constraints	Summary
CM-01 Traffic Control Centre	Allows for better management of infrastructure. Cost effective.	Requires ongoing operations management, maintenance and upgrading of control centre and associated infrastructure.	Can be used to manage congestion and provide for public transport priority and provision for active modes.	No significant constraints in terms of TDM	Effective integration of transport systems thereby maximising their efficiency.
CM-02 Public Transport Control	Allows for better management of public transport infrastructure and supports greater utilisation.	Requires ongoing operations management, maintenance and upgrading of control centre and associated infrastructure.	Can be used to provide for better utilisation of transport infrastructure. Potential to support public transport systems in response to incidents and events.	No significant constraints in terms of TDM	Effective integration of transport systems thereby maximising their efficiency.

5 Study Recommendations

Following the desktop review of the available transport demand management measures, recommendations are put forward which are deemed applicable to the GDA and will support the strategy. These are categorised as follows:

- Recommended for continued implementation, development and expansion;
- Recommended for further consideration and potential future implementation.

It should be noted that the recommended measures outlined below will require further detailed analysis and planning to fully determine their suitability and their implementation as part of the GDA Strategy.

5.1 Transport Demand Management Recommendations for the GDA

Measure	Recommendation
LU-01 Densities	Continue to implement higher density development in areas at or close to existing or proposed public transport nodes. Should be supported through other measures such as parking controls and providing for permeability.
LU-02 Mixed Use Development Patterns	Encourage an appropriate mix of land uses to balance residential development, services such as schools, employment, jobs and other uses. Should be supported through other measures such as parking controls and providing for permeability.
LU-03 Providing for Permeability	Identify schemes which will address permeability needs and support walking, cycling and access to public transport. Seek to improve permeability where necessary in conjunction with the development of new public transport schemes. Support the permeability of new developments.
F-01 Road Tolling / Pricing	Support appropriate levels of road tolling / pricing to manage demand on the strategic road network. Potential to provide for multi-point tolling that will link pricing more directly to distance travelled and trip purpose.
F-04 Public Transport Fare Subsidies	Provide for appropriate levels of public transport fare subsidies to target groups. Support measures to reduce fraudulent use of subsidised tickets.
F-05 Cycle to Work	Support the continued operation of the Cycle to Work scheme. Promote as part of Workplace Travel Planning activities.
F-06 Taxsaver Scheme	Support the continued operation of taxsaver scheme and ongoing promotion to encourage take up from employers and employees. Promote as part of Workplace Travel Planning activities.
ITS-01 Real Time Passenger Information	Increase the availability and accuracy of Real Time Passenger Information (RTPI) for bus, BRT, rail and Luas services.
ITS-02 Variable Speed Limits	Support the operation of variable speed limits to provide for appropriate demand management of the strategic road network.
ITS-03 Variable Message Signs	Support the ongoing operation and expansion of variable message sign use along the strategic road network. Seek to use VMS technology to promote alternative travel choices.

Measure	Recommendation
ITS-04 Incident Detection Systems	Support the operation of the M50 incident detection system and potential introduction of similar systems elsewhere on the strategic road network.
ITS-05 Ramp Metering on National Routes	Give further consideration to the potential benefits of introducing ramp metering on strategic routes.
ITS-06 Car Park Space Availability Electronic Displays	Support the expansion of use of car park space availability electronic displays. Seek the potential to promote alternative modes, such as park and ride, when spaces are limited.
TM-01 Traffic Calming	Support traffic calming measures, particularly those which seek to benefit public transport, walking and cycling.
TM-02 Bus Priority Measures	Provide for the provision of bus priority measures where necessary to address bus operational issues.
TM-03 Quality Bus Corridors	Provide for the ongoing operation and enhancement of Dublin's QBC network. Upgrade QBCs to BRT, in line with the Transport Strategy measures.
TM-04 Pedestrian Only Areas	Support the introduction of new pedestrian only areas in suitable locations with high pedestrian volumes.
P-01 On-Street Parking Charges	Support the introduction and expansion of on-street parking controls and pricing that aim to reduce commuter parking.
P-02 Parking Standards for New Developments	Seek the development and application of maximum parking standards for all new developments. The level of parking provided for should be linked to the availability of public transport.
P-03 Reductions in the Availability of Parking	Seek reductions in the availability of workplace parking to discourage commuting by car.
TP-01 Workplace Travel Plans	Support and facilitate the continued operation and expansion of Workplace Travel Plans for all large employers.
TP-02 Smarter Travel Campus	Support and facilitate the continued operation and expansion of the Smarter Travel Campus programme with the aim of 100% participation from all major third level institutions.
TP-03 Green Schools Travel Programme	Support and facilitate the continued operation and expansion of the Green Schools Travel programme with the aim of 100% participation from all schools in the GDA.
TP-04 Travel Awareness	Provide for further development of travel awareness tools such as clear and easily understood public transport maps and service information.
FM-01 Bike Hire Scheme	Seek the expansion of Dublin Bikes. Aim to introduce similar schemes in other large urban centres in the GDA.
FM-02 Workplace Destination Facilities	Support the continued development of workplace destination facilities. Seek the development and application of facilities requirements for all new developments.
FM-03 Car-sharing	Support and facilitate car-sharing.

Measure	Recommendation
NT-01 E-working	Promote the potential benefits of e-working in terms of travel demand.
NT-02 Internet / Mobile Apps	Support the development of internet / mobile apps through the provision of suitable and appropriate open data.
NT-03 Leap Card	Provide for further development of the Leap Card with new products and services. Support further up-take in the Leap Card by simplifying the fares structure.
CM-01 Traffic Control Centres	Support the continued operation and enhancement of Dublin's traffic control centre.
CM-02 Public Transport Control	Develop a new train control centre to manage the operation of the existing and future rail network. In conjunction with the new rail control centre, consideration should be given to providing for the co-location of other transport related control centres to enhance co-ordination between transport modes.

5.2 Recommended for Further Consideration and Possible Future Implementation

Measure	Recommendation
F-02 Congestion Charging	Give further consideration to the potential benefits of introducing congestion charging.
F-03 Fuel Duty	Give further consideration to the potential benefits and possible limitation of introducing fuel duty as a transport demand management measure.
P-04 Parking Levies	Give further consideration to the potential benefits of introducing suitable parking levies, particularly in relation to commuter parking.
FM-04 Behavioural Change Incentives	Depending on the outcome of international trials, consider scope for application of pilot schemes.