Managing Transportation Impacts

(Incorporating Parking Standards)

Supplementary Planning Guidance

Consultation Draft
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CARDIFF
CAERDYDD

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Mae'r ddogfen hon ar gael yn Gymraeg / This document is available in Welsh

1. INTRODUCTION

Purpose of Guidance

1.1 The Welsh Government (WG) supports the use of Supplementary Planning Guidance (SPG) to set out detailed guidance on the way in which development plan policies will be applied in particular circumstances or areas. SPG must be consistent with development plan policies and national planning policies and guidance and may be taken into account as a material planning consideration in planning decisions.

1.2 This SPG sets out Cardiff Council's approach to assessing and managing the transport impacts of developments and supplements the transport and other related policies in Cardiff's Local Development Plan 2006-2026 (see Section 2). It applies to all categories of development for which planning permission is required, including new developments, extensions, redevelopments and material changes of use.

1.3 The SPG provides detailed guidance with regard to:

- How the Council will consider the impacts of development on the routes that make up the local highway network.
- The detailed information that applicants for planning permission must include with their submissions to enable the Council to make a fully informed assessment of transport impacts.
- The Council's approach to quantifying and assessing the transport impacts of development proposals as part of its determination of planning applications.
- The types of transport infrastructure and other mitigation measures which will be sought to address transport impacts.
- How the Council will seek to secure the transport infrastructure and other transport measures required to mitigate transport impacts, enable development to proceed and support the implementation of Transport policies in the Local Development Plan.
- The scope and content of Travel Plans that will be required as part of the overall package of measures to mitigate impacts and support the implementation of LDP transport policies.
- The parking standards which will apply to different types of development in specific areas of the city
- How the impacts of developments upon Public Rights of Way will be considered and the likely requirements for mitigation.

2. POLICY FRAMEWORK

UK and National Policies

2.1 Relevant policies are summarised in Appendix 1.

Cardiff Local Development Plan (January 2016)

2.2 Cardiff's Local Development Plan (LDP) covers the period 2006 to 2026 and sets out:

- the Council's Strategy, objectives and key policies relating to land use;
- Policies to promote and control development;
- Allocations of land for housing, employment and other uses;
- Policies and proposals to protect sensitive areas; and,
- Maps showing proposals and constraints.

2.3 The LDP provides for substantial growth in Cardiff's population and employment up to 2026. This expansion will produce significant increases in transport movements that will exert additional pressures upon Cardiff's transport network.

2.4 Modelling work undertaken to quantify the impact of the LDP indicates that demand for travel by car would increase by 41%, with 10% of new demand unable to be accommodated on the highway network due to lack of capacity. This would result in a 32% net increase in traffic and associated decrease in journey speeds and increase in journey times (approximately 41% or 7 minutes).

2.5 The LDP explains that adding to the capacity of the highway network to accommodate this increase in the volume of transport movements is neither affordable nor sustainable. Therefore, in order that the additional movements generated by urban expansion can be accommodated, the proportion of journeys made by car needs to decrease and the share of trips by sustainable modes of transport must increase to a level where there is a 50:50 split between car-based and walking, cycling and public transport journeys.

2.6 The LDP outlines the approach the Council will take to increase the proportion of people travelling by sustainable modes and to achieve the 50:50 modal split target. This will involve:

- enabling people to access employment, essential services and community facilities by walking and cycling through, for example, high quality, sustainable design and measures to minimise vehicle speed and give priority to pedestrians and cyclists
- developing strategic bus and rapid transit corridor enhancements and facilitating their integration with the wider transport network
- facilitating the transfer between transport modes by, for example, improving existing interchanges and developing new facilities such as strategically located park and ride facilities
- maximising provision for sustainable travel within new developments and securing infrastructure investment which can support modal shift within existing settlements.

2.7 These requirements are reflected in the following key transport policies which will be applied in the Council's assessment of the transport impacts of development proposals and determining mitigation measures required to make developments acceptable. The policies can be read in full in the LDP (www.cardiff.gov.uk/localdevelopmentplan).

Policy Reference	Policy Summary
KP2 (A-H): LDP Strategic Sites	KP2 (A-H) LDP Strategic Sites outlines the allocation of Strategic Sites A to H to "help meet the need for new dwellings and jobs". In policies KP2 (A) to KP2 (H), a detailed breakdown is provided for each Strategic Site setting out the key infrastructure and masterplanning requirements relating to each site. It outlines that the infrastructure requirements for these sites will primarily be delivered through planning obligations/ Section 106 Agreements with policies KP6 and KP7 providing the policy framework.
KP4: Master Planning Approach	KP4 outlines masterplanning general principles for major developments. The principles with particular relevance to transport include the following: • High density residential and mixed-use development is focused along public transport corridors and in neighbourhood centres with lower densities provided elsewhere to deliver an overall range and choice to meet different needs; • Dedicated sustainable transport corridors including provision for public transport, cycling and walking which will form key elements of the overall master plan and effectively link into the wider network; • Walking, cycling and public transport will be attractive, practical and convenient travel choices for all; • Provision of a full range of social and community facilities will be concentrated within mixed use neighbourhood centres located along public transport corridors and easily accessed by walking and cycling. The masterplanning, good quality and sustainable design principles set out in KP4 and KP5 will be used to provide a framework to consider planning applications relating to all Strategic Sites along with other development as defined in the policies.
KP5: Good Quality and Sustainable Design	KP5 sets out requirements in relation to achieving high quality, sustainable design and making a positive contribution to the creation of distinctive communities, places and spaces. The principles with particular relevance to transport include the following: • Providing legible development which is easy to get around and which ensures a sense of continuity and enclosure; • Creating interconnected streets, squares and spaces as distinctive places, which are safe, accessible, vibrant and secure and incorporate public art where appropriate; • Providing a healthy and convenient environment for all users that supports the principles of community safety, encourages walking and cycling, enables employment, essential services and community facilities;

	• Accessible by sustainable transport and maximises the contribution of networks of multi-functional and connected open spaces to encourage healthier lifestyles.
KP6: New Infrastructure	KP6 outlines the provision and/or contributions which will be required from new developments and the necessary infrastructure required as a consequence of the proposed development. With regard to transportation and highways, this may include access, circulation, parking, public transport provision, walking and cycling. It highlights that requirements will vary in different locations and will be dependent upon the scale and nature of proposed development. Indicative elements of transport infrastructure may include: • Routes and facilities for walking and cycling comprising both on-road and off-road improvements; • Rapid transit corridors, including heavy rail, light rail, tram train and bus rapid transit; • Key bus corridors and the wider bus network including bus priority measures and passenger facilities; • The rail network and rail services including new rail stations, station improvements and facilities for rail freight; • Transport interchanges to support integration between modes including bus and rail stations, facilities for bus and rail-based park and ride, park and share, passenger drop off, taxis, park and cycle, coach parking, overnight lorry parking and water transport; • Designated freight routes and freight transfer facilities; • The road network, particularly measures to make better use of existing highway capacity; • Transport by river (including Cardiff Bay); and • Port and shipping facilities. It emphasises the need for early identification of infrastructure requirements and a commitment from developers and service providers to work in partnership to ensure that all necessary infrastructure can be planned, delivered and managed in an orderly and timely manner.
KP8: Sustainable Transport	KP8 emphasises the impact of the location and form of developments on travel choices and demand. It sets out that "Development in Cardiff will be integrated with transport infrastructure and services in order to: i. Achieve the target of a 50:50 modal split between journeys by car and journeys by walking, cycling and public transport. ii. Reduce travel demand and dependence on the car; iii. Enable and maximise use of sustainable and active modes of transport; iv. Integrate travel modes; v. Provide for people with particular access and mobility requirements; vi. Improve safety for all travellers; vii. Maintain and improve the efficiency and reliability of the transport network; viii. Support the movement of freight by rail or water; and ix. Manage freight movements by road and minimise their impacts".

	KP8 also demonstrates that achieving the 50:50 split between travel by car and sustainable travel is "necessary for the transport network to accommodate movements associated with the growth envisaged within this plan in a way which avoids unmanageable levels of congestion on the highway network". This has been demonstrated through local knowledge of the transportation network and research of travel behaviour, patterns and trends in combination with modelling work carried out by the Council.
T1: Walking and Cycling	The purpose of T1 is to exploit the potential for encouraging modal shift towards active travel by favouring developments which include design features and facilities that make it easy for people to walk and cycle for everyday journeys instead of travelling by car. Encouraging 'active travel' will help to minimise car use and support the Council in fulfilling its legal duty under the Active Travel (Wales) Act 2013 to develop, improve and maintain local walking and cycling networks.
T2: Strategic Rapid Transit and Bus Corridors	T2 requires development to be served by effective public transport through the development of new rapid transit routes, key strategic bus corridors and improvements to the wider city bus network.
T3: Transport Interchanges	Providing for interchange between transport modes is essential to the efficient functioning of the transport network and making sustainable travel options more practical and attractive. This is particularly important in relation to the public transport network. This Policy provides support for all forms of transport interchange that help meet these requirements and deliver the modal shift objectives of the LDP.
T4: Regional Transport Hub	T4sets out the Council's requirements with regard to the functionality and aesthetic quality of a central interchange and its integration with existing and future development within the Cardiff Central Enterprise Zone. The Policy will be implemented through a process of master planning undertaken in collaboration between the Council, developers, transport providers, the public and key stakeholders.
T5: Managing Transport Impacts	The purpose of this Policy is to ensure that all new developments for which planning permission is required: i. Properly address the demand for travel and its impacts; ii. Contribute to reducing reliance on the private car, in line with national planning policies and the strategic transport objectives and policies of the LDP; iii. Make satisfactory provision for access, parking and circulation, particularly by pedestrians, cyclists, public transport users and disabled people with mobility impairments and particular access needs; and iv. Avoid unacceptable harm to safe and efficient use and operation of the road, public transport and other movement networks and routes.
T6: Impact on Transport Networks and Services	The purpose of T6 is to protect the transport network and its users from developments which may otherwise cause unacceptable harm to the operation and use of key transport networks and routes.

T7: Strategic Transportation Infrastructure	T7 provides support for three key elements of strategic transport infrastructure which are illustrated on the Constraints Map[1] with further detailed work informing the precise land take requirements.
T8: Strategic Recreational Routes	T8 sets out the Council's desire to develop a network of recreational routes that will allow everyone in Cardiff to gain easy access to local green spaces, and the wider coast and countryside. It also accords with Planning Policy Wales which seeks to promote provision of safe accessible, convenient and well-signed walking and cycling routes and to protect and enhance the national cycle network and long-distance routes and footpaths that are important tourism and recreation facilities, both in their own right and as a means of linking other attractions and local communities.
T9: Cardiff City Region 'Metro' Network	The Cardiff City Region Metro is a proposal for a metropolitan-style, integrated public transport network extending across Cardiff and South East Wales. The 'Metro' is likely to be developed in phases over a number of years. Its purpose is to significantly enhance public transport accessibility across the region.

[1] www.cardiff.gov.uk/localdevelopmentplan

3. MANAGING IMPACTS ON THE HIGHWAY NETWORK

Impacts on highway function

3.1 Through introducing new access points, and increasing flows or turning movements, new developments can potentially impact on the function of the highway. This can impact on a route for different modes of travel by:

- Making traffic queues longer at junctions
- Increasing bus journey times, makes services less reliable and attractive
- Reducing green time for pedestrians and cyclists at junctions and crossings
- Making roads busier and less safe and attractive as places and for people cycling and walking
- Worsening air quality impacts.

3.2 Such impacts can potentially impair the operation of the local highway network, add to congestion problems and conflict with the LDP's objectives to increase sustainable travel and achieve modal shift.

3.3 In considering development proposals, the Council will assess the impact of developments on the function of roads directly serving a development, within the immediate vicinity of the site and within the wider highway network.

3.4 For these reasons, it is essential that Transport Assessments provide all of information necessary to enable the Council to fully quantify and understand the impacts of development on the function of roads and wider highway network and to identify measures to mitigate these impacts and make the development acceptable in relation to the LDP's sustainable transport policies. Section 4 and Appendices 2 and 3 provide detailed information on what is required from Transport Assessments submitted to the Council through the planning process. These technical documents will be updated periodically and it should be ensured that the most up to date versions are used.

Movement and Place Function

3.5 The highway network in Cardiff is comprised of a number of different types of roads which have different functions (see Table 3.2 below). Manual for Streets (MfS) and Manual for Streets 2 (MfS2) also make the important distinction between Roads, which have a primary 'movement' function and Streets where the 'place' function (the attributes that make the street function as a social space) are considered to take precedence over the 'movement' function.

3.6 Development-related trips can also impact on the 'place' function of streets. Increases in motorised traffic through residential streets can diminish their amenity and safety for walking and cycling and other activities such as children's play. These impacts potentially conflict with the sustainable neighbourhoods and modal shift objectives of the LDP. Transport Assessments must identify these impacts and suitable measures for mitigation.

3.7 Crucially, MfS recognises that even roads with a primary 'movement' function can include sections where a 'place' function predominates or moderates the movement function, depending on the adjacent land uses. For example, where a Main or Secondary Distributor road passes through a district shopping centre or next to a school the 'place' function of the road may be accorded a greater degree of importance relative to the function of conveying through traffic.

3.8 In locations on a road where the 'movement' function is diminished by the 'place' function, this can present the opportunity to facilitate movement by other modes, particularly walking and cycling. For example, the introduction of new or improved crossing facilities for pedestrians and cyclists can help to reduce the severance effect of a road which carries high volumes of traffic and increase opportunities for walking and cycling.

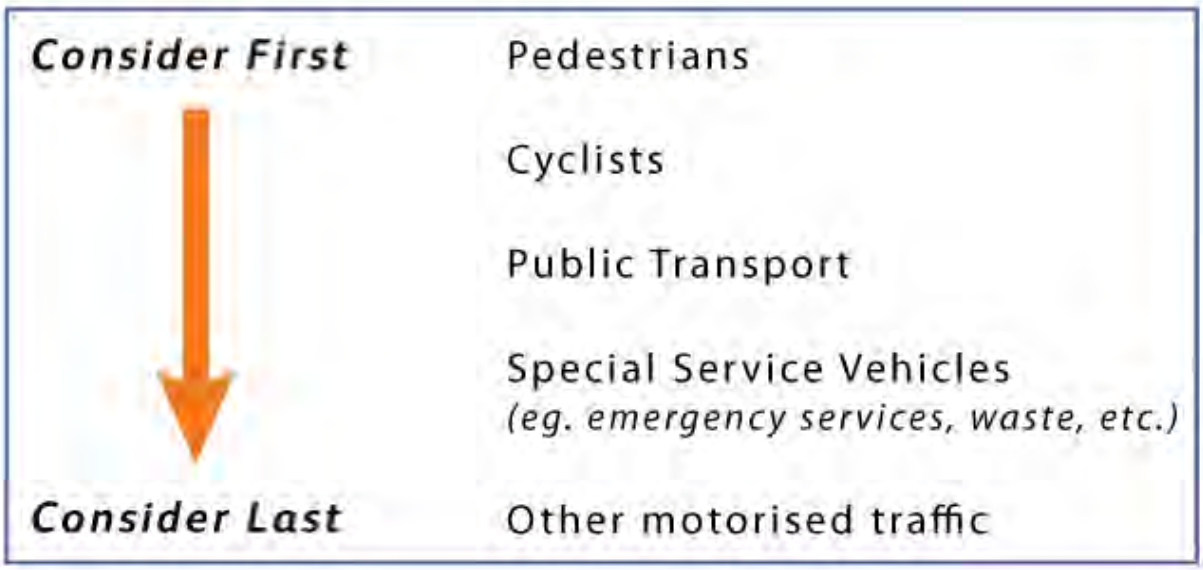
3.9 In addition to other requirements, Transport Assessments must therefore assess the impacts of developments on the 'movement' and 'place' functions of affected roads and streets in accordance with the principles in MfS and MfS2.

User Hierarchy

3.10 Policy T5 of the Local Development Plan 'Managing Transport Impacts' states:
"In assessing the transport and access aspects of proposals the Council will be more likely to give favourable consideration to developments which through their design and layout give priority to movements by sustainable travel modes and reflect the user hierarchy in Department for Transport Manual for Streets".

3.11 Transport Assessments (TAs) should explain how the MfS user hierarchy (see Figure 3.1) has been applied to the design of and layout of the development and the mitigation measures included in the Transport Implementation Strategy (TIS).

Figure 3.1: Manual for Streets User Hierarchy



Highway Network

3.12 The highway network in Cardiff is made up of roads defined within the Department for Transport (DfT) Carriageway Hierarchy (Well-maintained Highways Code of Practice for Highway Maintenance Management, London: DfT), shown in Table 3.2 below. The Hierarchy provides general definitions of the different types of roads within Cardiff's local highway network in terms of their function and characteristics. In addition to referencing the basic features of roads, the Hierarchy provides an indicative classification of each road category in terms of the 'Movement' and 'Place' functions as defined by Manual for Streets (MfS).

3.13 The Council will make reference to the Hierarchy when considering the impacts of development proposals on the characteristics and function of particular roads.

3.14 A flexible approach needs to be taken when using the Hierarchy to define the characteristics and function of particular roads/streets. This is because some roads may not wholly match all aspects of the description given within the Hierarchy. Furthermore, some routes which fall within the same category may actually differ in terms of the volumes of movements they experience, the number of trip attractors they serve or their relative importance as routes for buses, cycling or walking etc.

Table 3.2 The Carriageway Hierarchy

Carriageway Hierarchy				
Category	Hierarchy Description	Type of Road General Description	Type of Road Basic features	Examples of function (Manual for Streets classification)
1	Motorway	Limited access Motorway regulations apply	Routes for long distance traffic. Fully grade separated and restrictions on use.	Movement Function
2	Strategic Route	Trunk and some Principal 'A' roads between Primary Destinations	Routes for long distance traffic with little frontage access or pedestrian traffic. There are usually few junctions. Pedestrian crossings are either segregated or controlled and parked vehicles are generally prohibited.	Movement Function
3a	Main Distributor	Major Urban Network and Inter-Primary Links Short - medium distance traffic	Routes between Strategic Routes and linking urban centres to the strategic network with limited frontage access. In urban areas, parking may be restricted at peak times and there	Predominantly Movement Function, with some transitional areas where the Place function is stronger e.g. Penarth Road

			are positive measures for pedestrian safety.	
3b	Secondary Distributor	Classified Road (B and C class) and unclassified urban bus routes carrying local traffic with frontage access and frequent junctions	In rural areas these roads link the larger villages and HGV generators to the Strategic and Main Distributor Network. In built up areas these roads have very high levels of pedestrian activity with some crossing facilities including zebra crossings. On street parking is generally unrestricted except for safety reasons	Rural Areas: Movement Function between villages with stronger place function within village settlements e.g Michaelston Road, St Fagans. Urban Areas: Place Function. e.g. Merthyr Road, Cowbridge Road East
4a	Link Road	Roads linking between the Main and Secondary Distributor Network with frontage access and frequent junctions	In rural areas these roads link the smaller villages to the distributor roads. They are of varying width and not always capable of carrying two way traffic. In urban areas they are residential or industrial interconnecting roads with random pedestrian movements and uncontrolled parking	Rural Areas: Movement Function between villages with stronger place function within village e.g. Drope Road. Urban Areas Movement Function e.g Excalibur Drive
4b	Local Access Road	Roads serving limited numbers of properties carrying only access traffic	In rural areas these roads serve small settlements and provide access to individual properties and land. They are often only single lane width and unsuitable for HGVs. In urban areas they are often residential loop roads or cul-de-sacs.	Rural: Movement Urban: Place

Active Travel Network

3.15 Increasing the number of trips made by walking and cycling will make an important contribution towards achieving the 50:50 modal split target required by the LDP. By providing a practical alternative to the car, particularly for short trips, active travel infrastructure and other supporting measures will represent very important elements of the package of measures that the Council will seek to secure to mitigate development impacts.

3.16 LDP Policy T1 provides support for developments which enable daily travel by walking and cycling by combining high quality, sustainable design, permeable networks of routes, measures to manage vehicle speed, safe and convenient connections to the strategic cycle network and existing neighbourhoods and trip attractors and good supporting infrastructure.

3.17 Opportunities for travel by walking and cycling can be maximised through the master planning of development sites. Policies KP2(A) to KP2(H) of the Adopted Local Development Plan specify walking and cycling components of the 'essential/enabling' infrastructure that the Council will seek to secure when determining planning applications for those sites.

3.18 In considering proposals for development on smaller, non-strategic sites, the Council will also seek to secure development layouts and off-site improvements to routes and user safety which serve to maximise the ease of access by walking and cycling.

3.19 On-site active travel infrastructure will generally be secured by way of conditions of planning consent whilst off-site measures will be secured through S106 Planning Obligations, Section 278 agreements or Grampian conditions, as appropriate.

Strategic Bus Corridors and Wider Bus Network

3.20 Increasing the proportion of trips made by public transport will be essential in order to manage demand for car travel and achieving the LDP 50:50 modal split target.

3.21 Policies KP2 (A) to KP2(H) identify the development of on-site and off-site bus and rapid transit infrastructure as infrastructure which is essential to enable the development of the strategic sites covered by those policies.

3.22 Policy T2 of the LDP identifies specific roads as strategic bus corridors and provides support for their development and enhancement as well as support for the development of future rapid transit routes and the development and improvement of the wider city bus network.

3.23 Where the Council's analysis of TAs and other relevant information provides evidence of transport impacts, the Council will seek to secure mitigation of those impacts through the following courses of action (either individually or in combination):

- maximising the provision of public transport infrastructure including interchange facilities within the master plans and layout of development sites as required by Policies KP(A) to KP2(H);

- securing infrastructure on and/or off-site as appropriate including bus lanes, bus gates and junction modifications that enhance the function of roads identified as strategic bus corridors in Policy T2 by maximising service frequencies, minimising journey times and achieving maximum journey time reliability;
- Securing improvements to the wider local bus network by way of bus priority measures, interchange facilities, junction and service improvements.

3.24 Where necessary, on-site infrastructure will be secured through the development and agreement of site layout plans, masterplans and parameter plans and by way of conditions of planning consent. Provision of off-site measures will generally be secured by way of S106 Planning Obligations or Section 278 agreements and 'Grampian' conditions where appropriate.

3.25 Accessibility should be a primary consideration when designing for public transport facilities and infrastructure (e.g. bus stops and bus shelters). For example, ensuring bus stops are located in close proximity to key services and trip generators. Passengers are also pedestrians at either end of their public transport journey and so consideration also needs to be given to the wider physical environment and connectivity as well as the waiting environment. Under the Equalities Act (2010) services must also be fully accessible for people with disabilities and consideration should also be given to users with other accessibility needs such as parents/carers travelling with young children and prams/buggies. Transport for London (TfL) guidance on Accessible Bus Stop Design is a useful reference document.

4. TRANSPORT ASSESSMENTS, TRANSPORT STATEMENTS AND TRAVEL PLANS

Transport Assessments and Transport Statements

4.1 Transport Assessments (TAs) provide the means of identifying, quantifying and understanding the scale of anticipated transport impacts of a proposed development, including potential air quality impacts. TAs should provide information to enable decision makers to understand how the proposed development is likely to function in transport terms. They should also provide a comprehensive and consistent review of all the potential transport impacts of a proposed development so that they are easily understood by the Local Authority and the public. This will inform consideration of the physical infrastructure and other transport measures that will be required to mitigate the impact to ensure that a development accords with LDP policies with an agreed plan to mitigate any adverse consequences.

4.2 The strategic sites set out in the LDP include major greenfield sites which could have significant impacts on already congested corridors. Therefore it is important that modelling included in TA's take account of likely background growth in traffic on the network and the potential impacts of a specific development in combination with the likely impacts of other neighbouring sites that will be brought forward during the plan period. This is to ensure that impacts are not overlooked and that appropriate mitigation can be provided.

4.3 The WG policies on TAs within the planning process are contained in Planning Policy Wales (Edition 8 January 2016) (PPW). PPW (paragraph 8.7.2, p 128) states: "The Welsh Government expects that all applications for developments (including changes of use) falling into the following categories will be accompanied by a TA" (see Table 4.1 below).

Table 4.1: Thresholds for Transport Assessments and Travel Plans

Use Class	Use	Indicative Thresholds by Use Class for Transport Assessments and Travel Plans
A1	Retail (food and non-food)	>1,000 m²
A2 & B1	Business	>2,500 m²
B2	General Industrial	>5,000 m²
B8	Warehousing & Distribution	>10,000 m²
C1	Hotels	> 1,000 m²
C2	Residential Institutions	>2,500 m²
C3	Dwelling Houses	> 80 dwellings
D1	Non-residential institutions	>2,500 m²
D1	Education	>2,500 m² (All new and expanded school facilities)
D2	Cinemas & Conference Facilities and Leisure Facilities	>1,000 m²
Other	Stadia	>1,500 seats
Sui Generis	Student Accommodation	> 25 students

4.4 TAN 18 (2007) indicates that the output of the TA should be a **Transport Implementation Strategy (TIS)** that addresses relevant transport objectives for the site, guided by policies in the development plan and the issues identified in the analysis of movements. A TIS will be required for all applications subject to a TA.

4.5 Requirements regarding the contents of the TA and the TIS are provided in TAN 18 Annex D. Annex D sets out that the TA should be based on the person and freight trips generated by a development. It gives the aims of undertaking the TA and producing a TIS as :

- understanding the transport impacts of the development;
- clearly communicating the impacts to assist the decision making process;
- demonstrating the development is sited in a location that will produce a desired and predicted output (for example in terms of target modal split);
- mitigating negative transport impacts through the design process and secured through planning conditions or obligations;
- maximising the accessibility of the development by sustainable modes;
- contributing to relevant development plan and RTP objectives relating to accessibility of services and modal share.

4.6 The guidance in TAN 18 further explains that any mitigation should be proposed in a TIS which should "set objectives and targets relating to managing travel demand". It states that the TIS should also include "targets relating to managing travel demand for the development and set out the infrastructure, demand management measures and financial contributions necessary to achieve them. The TIS should set a framework for monitoring the objectives and targets, including the future modal split of transport to development sites" (p. 36/37). Appropriate planning conditions and obligations may be used in relation to monitoring where necessary and where fairly and reasonably related to developments.

4.7 Section 9 of TAN 18 states that SPGs should be used to provide additional detail on the requirement for TAs to be produced alongside planning applications. Accordingly, this section should be read in conjunction with the explanatory notes, checklist of requirements and junction assessment tool which are provided in the appendices to this document (Appendices 2 and 3). These are intended to assist the progress of planning applications by providing guidance which will assist applicants in producing Transport Assessments (TAs) required through the planning process which can be approved in a timely manner and to ensure that any TA which is submitted to the Council contains all of the information which is required by the planning authority in assessing a planning application. A pre-application service is provided by the Council. Developers are encouraged to engage with the Council through this process as early as possible. The critical junctions to be included in the TA must be agreed with the Council.

4.8 Before submission to the Council, all TAs must be independently audited, using the Transport Assessment Guidance and Checklist. The Checklist has been developed to assist developers in producing TAs and to ensure that a robust methodology is used which properly quantifies and analyses the transport impacts of a development and provides the evidence necessary to inform the identification of appropriate mitigation measures.

4.9 Completed audit checklists must be submitted along with the TA and they will be reviewed by the Council. Where the Council considers that checklists have not been satisfactorily completed or deficiencies in the TA have been found as a result of the audit, the Council will communicate

this to the applicant. In such instances it is likely that amendments will be required and this may delay the progress of the planning application.

4.10 The Transport Assessment Guidance and Checklist is a live technical document which will be updated by the Council from time to time, as necessary. It should be ensured that the most up to date information is referred to.

4.11 In some cases, developments which fall below the size thresholds where a TA would be required may have transport impacts which warrant investigation and assessment. Examples of such developments could include developments which require direct access onto major arterial routes or strategic bus corridors or where they may affect parts of the highway network or specific junctions which experience particularly high volumes of traffic flows or other problems. In such instances, the Council will ask the applicant to prepare a Transport Statement (TS) providing a qualitative and quantitative assessment of the existing transport conditions in and around a development site and the transport impacts of the development in terms of trip generation. It should also set out in detail the measures that will be taken to address those impacts. Appendix 5 outlines what should be included in a Transport Statement. This technical document will be updated periodically as required and it should be ensured that the most up to date version of the guidance is used.

Travel Plans

4.12 A Travel Plan is a long term management strategy for an occupier (or group of occupiers) of a site that seeks to deliver sustainable transport objectives through positive action and is articulated in a document that is regularly reviewed (Good Practice Guidelines: Delivering Travel Plans through the planning process DfT 2009). Travel Plans are now considered an essential part of transport policy. The explanatory notes in Appendix 4 should be used in conjunction with the guidance and checklist of requirements to ensure that any Travel Plan which is submitted to the Council contains all of the information which is required by the planning authority in assessing a planning application. This technical document will be updated periodically as required and it should be ensured that the most up to date version of the guidance is used.

4.13 The thresholds at which Travel Plans will be required are outlined in Table 4.1. Travel Plans will also be required for:

- Smaller developments which could generate significant amounts of travel in, or near to, air quality management areas and in other locations where there are local initiatives or targets for the reduction of road traffic, or the promotion of public transport, walking and cycling
- Developments where a Travel Plan would help address a particular local traffic problem associated with a planning application which might otherwise have to be refused on local traffic grounds, for example, where overspill parking might occur from developments with low or nil off-street parking provision
- Smaller developments which may form part of incremental development, or be near to other developments and potentially contribute to an impact of overall area wide travel demand.

4.14 The Council will seek to secure travel plans and financial contributions towards their implementation through the planning process and using planning obligations where appropriate.

5. PLANNING CONDITIONS, PLANNING OBLIGATIONS AND TECHNICAL STANDARDS

Planning Conditions

5.1 Planning conditions may be imposed to secure on and/or off site transport measures and facilities as may be required by a proposed development, in line with paragraph 8.7.5 of Planning Policy Wales (January 2016) and Government standards set out in the Welsh Government Circular 016/2014 'The Use of Planning Conditions for Development Management'.

5.2 In relation to access, circulation and parking, conditions may be used to:-

- specify the number of parking spaces, their size and layout;
- control the management and use of parking spaces, (for example) to limit the use to certain categories such as Blue Badge holders;
- secure the removal of parking spaces after a specified period or when access to the site is improved by public transport, walking and cycling;
- control the design of delivery areas, specifications for goods vehicle parking and manoeuvring;
- secure the provision of cycle parking and changing facilities, and safe pedestrian and cycle routes;
- secure the provision of on-site facilities for public transport, such as bus lanes, stops, shelters, boarders, real-time information units and CCTV;
- require the preparation of a Travel Plan and/or aspects of a travel plan to be implemented;
- restrict permitted development rights, where an otherwise permitted change of use could cause a material deterioration in local conditions;
- Crime Prevention Through Environmental Design (CPTED) or community safety initiatives, such as improved street lighting, alley gating, ambassador schemes, provision of CCTV, etc;
- consideration/specification of surface finishes, including implications for sustainable drainage. Any works requiring new drainage will need consideration of the receiving drainage network and communication with the owner of that asset;
- ensure the housing and other layouts are designed to allow refuse lorries to manoeuvre and to ensure that the collection vehicle is able to reach within 25m of all dwellings.

5.3 Conditions attached to a planning permission are enforceable against any developer who implements the permission and any subsequent occupiers of the development.

Planning Obligations

5.4 Guidance on Planning Obligations is set out in the Cardiff Planning Obligations SPG (2017).

5.5 The requirement to prepare a Travel Plan and the implementation of specific components of the Plan can also be secured through Planning Obligations. Planning Obligations are normally the most appropriate means of securing the provision of physical measures outside the site boundary and financial contributions to support services or activities required for Travel Plan implementation. They are also likely to be the most effective mechanism for enforcing performance targets, for example, in relation to imposing sanctions and financial penalties where these are required to provide an incentive for Travel Plan delivery.

Section 38 and Section 278

5.6 Creation of New Highways for Adoption. Under section 38 of the Highways Act 1980, the highway authority[2] can enter into a legal agreement with a developer to adopt a highway provided the highway has been constructed to a specified standard and to the satisfaction of the local highway authority.

5.7 Alterations or Improvements to the Public Highway. Under section 278 of the Highways Act 1980, the highway authority can enter into a legal agreement with a developer (in order to facilitate development) for the developer to either pay for, or make alterations or improvements to, the public highway.

5.8 The approval process for Section 38 and Section 278s will vary as appropriate to the nature and scale of the development and a separate process will normally undertaken for both the Section 38 and Section 278 elements of the development. Guidance on these processes is provided in Section A – Typical Design Approval Process.

5.9 Where matters affected by the works forming part of S278s are subject to Planning Conditions, the Council will expect the developer's applicants to have had those conditions discharged prior to entering into a S278 agreement. It should also be ensured that the design of the works subject to the 278 are in accordance with the details agreed through the planning permission and discharge of conditions and approval/s.

Technical Design Standards for roads and highways

5.10 Technical Design Standards have been developed for matters relating to roads and highways. These are live technical document which will be updated by the Council from time to time, as necessary. It should be ensured that the most up to date information available is referred to and that other relevant design guidance is also referenced (see Section 8).

5.11 For residential roads, the general principle of the development should be in accordance with the Cardiff Liveable Design Guide[3]. The detailed design will require the application of the standards and guidance as set out in Section B – Residential Development Roads.

5.12 Industrial and Commercial Roads should be designed in accordance with guidance in Section C – Industrial and Commercial Estate Roads. Further reference should be made to Section B – Residential Development Roads, which provides guidance on design philosophy. Reference will also be required to Section D – Advice on Design Elements, which provides advice on implementing common highway features.

5.13 Standard details for construction of roads to an adoptable standard are set out in Section E – Highway Construction Details. The designer must seek guidance where it appears that there is

[2] Normally Cardiff Council except on Trunk Roads where this will be with the Welsh Government

[3] https://www.cardiff.gov.uk/ENG/Your-Council/Strategies-plans-and-policies/liveable-design-guide/Pages/default.aspx

a difference in the guidance between these standards and the principals set out in the Sections A to D or the requirements in documents referred to in those sections.

5.14 Where necessary designers may need refer to the standard details in the Manual for Construction of Highway Works – Volume 3: Highway Construction Details[4], but any use of these details should be agreed with the Council.

Audits

5.15 A Design and Access Statement (DAS) can ask for accessibility and access information where this is material. Carrying out this review at the design stage through the use of a suitable and sufficient schematic Audit (accompanying a DAS) should resolve issues to avoid an additional cost impact.

5.16 All planning applications that include changes to the highway and new roads for adoption need to be accompanied by a Combined Audit (CA) in accordance with Cardiff Council's CA Manual or other similar, agreed, standard (for example, the DfT manual 'Quality Audit in the Street Design Process'). The CA should be embedded in a TA or TS where appropriate. There is an expectation that Stage 1 is required as part of the design process.

[4] http://www.standardsforhighways.co.uk/mchw/vol3/index.htm

6. PARKING GUIDANCE AND STANDARDS

Parking Standards

6.1 The availability of parking spaces and their location can influence travel choices. Excessive provision can serve to stimulate demand for car travel and perpetuate reliance on the car. The application of parking standards to new developments is therefore an important tool in managing demand for travel by car and encouraging a shift to sustainable transport modes. These objectives are balanced against the need to manage pressures on on-street parking space and the negative impacts of oversubscription of space including congestion, hazards, visual intrusion and harm to residential amenity. Reference should also be made to the Council's Parking Strategy for further information on how parking is managed in Cardiff, including residents parking schemes.

6.2 The Council's parking standards are outlined in Tables P.1 to P.12 as follows. **The parking standards are maximum parking standards and should be used in conjunction with the guidance set out in this section.**

Table 6.1: Reference List

Table No	Use Class	Standards
P.1	A1	Retail and Wholesale: Shops, retail warehouses, hairdressers, undertakers, travel and ticket agencies, post offices, pet shops, sandwich bars, showrooms, domestic hire shops, dry cleaners and funeral directors.
P.2	A2	Financial and Business: Banks , building societies, estate and employment agencies, professional & financial services and betting offices, as well as call centres and conference facilities.
P.3	A3	Food, Drink, Entertainment: For the sale of food and drink for consumption on the premises - restaurants, snack bars and cafes. Public houses, wine bars or other drinking establishments (but not night clubs).
P.4	B1	Business: Offices, research and development, light industry appropriate in a residential area.
P.5	B2	General Industrial: Industrial process other than that falling within Class B1
P.6	B8	Storage or distribution: General industrial, storage or distribution (including open air)

P.1	C1	Hotels, boarding and guest houses where no significant element of care is provided.
P.8	C2	Residential: Residential care homes, hospitals, nursing homes, boarding schools, residential colleges and training centres. Family houses, or houses occupied by up to six residents living together as a single household, including a household where care is provided for residents.
P.9	C3	Dwelling houses: Family houses, or houses occupied by up to six residents living together as a single household, including a household where care is provided for residents.
P.9	C4	Houses in multiple occupation by unrelated residents with shared kitchen/bathroom amenities.
P.10	D1	Non-residential Institutions: Clinics, health centres, crèches, day nurseries, day centres, schools, art galleries, museums, libraries, halls, places of worship, church halls, law courts. Non residential education and training centres.
P.11	D2	Parking Standards for Assembly and Leisure: Cinemas, music and concert halls, bingo and dance halls (but not night clubs), swimming baths, skating rinks, gymnasiums or sports arenas (except for motor sports, or where firearms are used).
P.12	Sui Generis	Sui Generis e.g. garages, car sales, purpose built high density student housing, houses with multiple occupants with over 7 or more residents.

6.3 These SPG parking standards relate to specific land uses within the Town and Country Planning Use Classes Order 1995, but do not cover every possible land use or type of development. As such, any proposed land use or development not specifically mentioned will be considered on a site specific basis and on its individual merits. **The absence of parking standards for a specific use does not mean that no parking provision will be required or that there is no restriction on provision.**

6.4 Different standards are applied to the central area of Cardiff. The boundary for the Central Area is shown on figure 6.1.

6.5 The Central Area has been informed by two principal considerations:

i. The need to encourage modal shift in order to achieve the 50:50 modal split target in the LDP
ii. Policies relating to the management of Council-controlled on-street and off-street car parking in the Council's Parking Strategy.

6.6 The Central Area includes the City Centre and Cardiff Bay Areas and the large residential areas which extend outwards from the core shopping centre into the wards of Grangetown, Canton, and Cathays. A number of the city's principal trip attractors are located in the area including the City Centre, Cardiff Bay the Cardiff Enterprise Zone, and the LDP Strategic Site focussing on Cardiff Central Station and Central Square. The Central Area also includes a number of existing industrial/business land uses including the employment areas around Penarth Road/Leckwith Road to the west of the City Centre and employment uses around Ocean Way and Tremorfa to the east/south East.

6.7 The Central Area broadly aligns with the boundary of the Cardiff Controlled Parking Area (CPA) and Residential Parking Areas as defined in the Council's Parking Strategy.

6.8 Limiting the provision of parking in these central areas of the city is necessary to manage the demand for travel by car to central Cardiff and encourage travel by public transport, walking and cycling in order to achieve the Local Development Plan target of a 50:50 modal split.

6.9 The Parking Standards support these objectives by requiring a lower quantity of car parking spaces within new developments in the Central Area than the standards for developments in the Outer Area. In both the Central Area and Outer Area, the minimum level of cycle parking provision has been calculated using an analysis of TRICS in order to provide, where appropriate by use class, sufficient cycle parking for 30% of employees to travel by bike, in line with the 50:50 modal split target and aspirations for significantly increasing trips made by cycling.

6.10 For mixed use developments, the standards relating to each use should be used to calculate the overall total parking level.

6.11 There may be scope for applying standards flexibly in exceptional circumstances where the specific use or nature of development or its occupation or management warrants this. Where the standards are applied flexibly the Council may impose conditions to limit permitted development rights or to control management and occupancy.

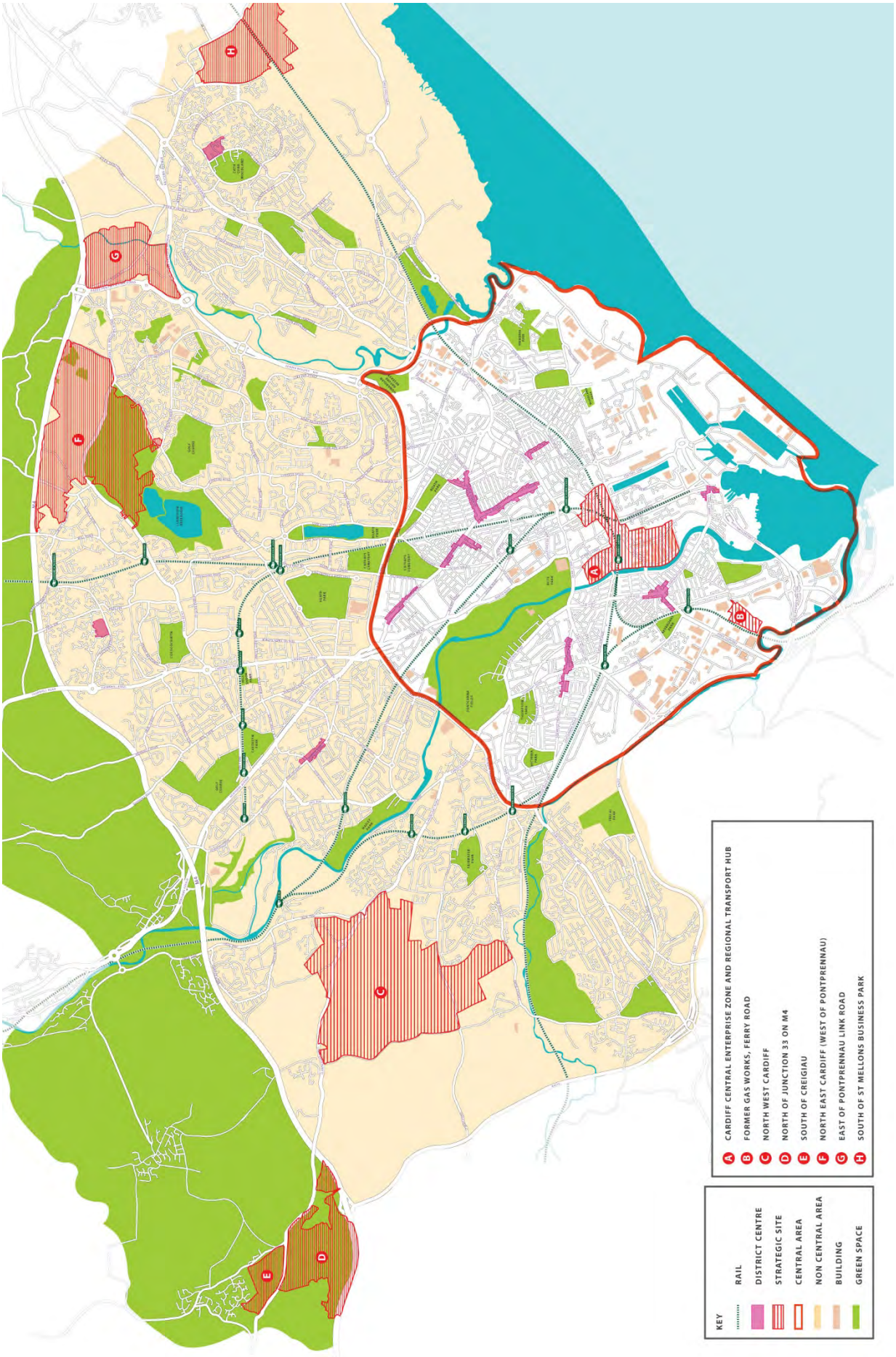
6.12 Changes of use will generally be subject to the same standards as new development for the same use class. Reduced numbers of spaces will be sought where the proposed use is demonstrably less traffic intensive than the previously approved use.

6.13 Changes of use involving the subdivision of properties to create additional units can potentially result in the intensification of use and an increase in the level of demand for car parking. In areas where there is a high concentration of single dwellings that are in multiple occupation, or have been subdivided into multiple flat/bedsit/apartment units, levels of on-street parking may already be oversubscribed. In locations where these circumstances exist, proposals for the further subdivision of existing dwellings will need to be carefully considered in light of the likely impacts of any intensification upon existing parking pressures. In exceptional circumstances, the likely parking impacts of a proposal may warrant a flexible application of the standards in this SPG with the effect that permission may not be granted unless additional off-street parking space can be provided within the curtilage of the building.

6.14 For the avoidance of doubt, parking standards that relate to floor area are GROSS floor area (GFA), unless stated otherwise.

6.15 The **Residential parking standards** do not include a requirement for visitor parking. The design and layout of parking spaces will be reviewed and may not be considered in accordance with the maximum standards if dimensions are found to be able to accommodate parking above the maximum permitted. For example, where due to its proposed dimensions a driveway to a dwelling can be shown to have the capacity to accommodate a greater number of vehicles than permitted under the parking standards, a reduction in the dimensions may be required. For the purpose of the standards, garages are not counted with the parking provision for residences.

6.16 Standards for **non-residential development** include both the operational parking space required for servicing a development (e.g. loading/unloading)/HGV parking and non-operational parking (e.g. employee and visitor/shopper parking).


KEY
RAIL
DISTRICT CENTRE
STRATEGIC SITE
CENTRAL AREA
NON CENTRAL AREA
BUILDING
GREEN SPACE
A CARDIFF CENTRAL ENTERPRISE ZONE AND REGIONAL TRANSPORT HUB
B FORMER GAS WORKS, FERRY ROAD
C NORTH WEST CARDIFF
D NORTH OF JUNCTION 33 ON M4
E SOUTH OF CREIGIAU
F NORTH EAST CARDIFF (WEST OF PONTPRENNAU)
G EAST OF PONTPRENNAU LINK ROAD
H SOUTH OF ST MELLONS BUSINESS PARK

Parking Standards by Land Use

Table P.1: A1 Retail							
Area	**Development Type**	**Maximum car parking spaces**	**Minimum staff cycle parking – undercover, secure and suitable for long term use**	**Minimum visitor cycle parking**	**Maximum Powered two-wheeler parking**	**Disabled parking provision**	
						Where car parking provision is up to 200 car parking spaces	Where car parking provision is over 200 car parking spaces
Central	Retail	1 per 400sqm	2 per 100sqm	1 per 100sqm	1% - 5% of total parking spaces	6% of total parking spaces, and a further 6% of spaces should be enlarged standard spaces	4 spaces plus 4% of total capacity, and a further 4% of spaces should be enlarged standard spaces
Non central	Retail (<300sqm)	1 per 60sqm	2 per 100sqm	1 per 100sqm			
	Retail (301 – 1200 sqm)	1 per 40sqm	2 per 100sqm	1 per 200sqm			
	Retail (>1201sqm) Shopping malls addressed on individual unit size	1 per 20sqm	2 per 100sqm	1 per 250sqm			

Table P.2: A2 Financial and Professional Services							
Area	**Development Type**	**Maximum car parking spaces**	**Minimum staff cycle parking – undercover, secure and suitable for long term use**	**Minimum visitor stay cycle parking**	**Maximum Powered two-wheeler parking**	**Disabled parking provision**	
						Where car parking provision is up to 200 car parking spaces	Where car parking provision is over 200 car parking spaces
Central	Provision of; Financial, Professional and other services (public facing)	1 per 250sqm	2 per 100sqm	1 per 500sqm	1% - 5% of total parking spaces	5 % of total parking spaces, and a further 5% of spaces should be enlarged standard spaces	6 spaces plus 2% of total parking spaces , and a further 2% of spaces should be enlarged standard spaces
Non central	Provision of; Financial, Professional and other services (public facing)	1 per 50sqm	2 per 100sqm	Min. 4 plus 1 per 1000 sqm			

Table P.3: A3 Food and Drink							
Area	**Development Type**	**Maximum car parking spaces**	**Minimum staff cycle parking – undercover, secure and suitable for long term use**	**Minimum visitor stay cycle parking**	**Maximum Powered two-wheeler parking**	**Disabled parking provision**	
						Where car parking provision is up to 200 car parking spaces	Where car parking provision is over 200 car parking spaces
Central	All food and drink	0 (Any drop off spaces must be in curtilage)	2 per 100sqm	1 per 100sqm	1% - 5% of total parking spaces	6% of total parking spaces, whichever is greater, and a further 6% of spaces should be enlarged standard spaces	4 spaces plus 4% of total parking spaces, and a further 4% of spaces should be enlarged standard spaces
Non central	All food and drink	1 per 10 sqm					

Table P.4: B1 Business							
Area	**Development Type**	**Maximum car parking spaces**	**Minimum staff cycle parking – undercover, secure and suitable for long term use**	**Minimum visitor stay cycle parking**	**Maximum Powered two-wheeler parking**	**Disabled parking provision**	
						Where car parking provision is up to 200 car parking spaces	Where car parking provision is over 200 car parking spaces
Central	Offices. Highly technical and light industry. Offices for research and development processes.	1 per 250sqm	2 per 100sqm	4 plus 1 per 1000 sqm	1% - 5% of total parking spaces	5 % of total parking spaces, and a further 5% of spaces should be enlarged standard spaces	6 spaces plus 2% of total parking spaces, and a further 2% of spaces should be enlarged standard spaces
Non central	Offices. Highly technical and light industry. Offices for research and development processes.	1 per 50sqm	2 per 100sqm				

Table P.5: B2 General Industry							
Area	**Development Type**	**Maximum car parking spaces**	**Minimum staff cycle parking -– undercover, secure and suitable for long term use**	**Minimum visitor stay cycle parking**	**Maximum Powered two-wheeler parking**	**Disabled parking provision**	
						Where car parking provision is up to 200 car parking spaces	Where car parking provision is over 200 car parking spaces
Central	All industry	1 per 1000sqm	2 per 100sqm	1 per 200sqm	1% - 5% of parking spaces	5% of total parking spaces, and a further 5% of spaces should be enlarged standard spaces	6 spaces plus 2% of total capacity parking spaces , and a further 2% of spaces should be enlarged standard spaces
Non central	Industrial units (<500sqm)	1 per 50sqm	2 per 100sqm	1 per 1000sqm			
	Industrial units (501 - 1000sqm)	1 per 60sqm	2 per 100sqm	1 per 1000sqm			
	Industrial units (1001 >)	1 per 120sqm	2 per 100sqm	1 per 1000sqm			

Table P.6: B8 Distribution							
Area	**Development Type**	**Maximum car parking spaces**	**Minimum staff cycle parking – undercover, secure and suitable for long term use**	**Minimum visitor cycle parking**	**Maximum Powered two-wheeler parking**	**Disabled parking provision**	
						Where car parking provision is up to 200 car parking spaces	Where car parking provision is over 200 car parking spaces
Central	All wholesale warehousing	1 per 1000sqm	2 per 100sqm	1 per 200sqm	1% - 5% of total parking spaces	5% of total parking spaces, and a further 5% of spaces should be enlarged standard spaces	6 spaces plus 2% of total parking spaces, and a further 2% of spaces should be enlarged standard spaces
Non central	Wholesale warehousing (<500sqm)	1 per 50sqm	2 per 100sqm	1 per 1000sqm			
	Wholesale warehousing (501 - 1000sqm)	1 per 60sqm	2 per 100sqm	1 per 1000sqm			
	Wholesale warehousing (1001>sqm)	1 per 120sqm	2 per 100sqm	1 per 1000sqm			

Table P.7: C1 Hotels, Hostels and All Other Lodgings					
Area	**Maximum car parking spaces**	**Minimum cycle parking (all to be secure and undercover for overnight use)**	**Maximum Powered two-wheeler parking**	**Disabled parking provision**	
				Where car parking provision is up to 200 car parking spaces	Where car parking provision is over 200 car parking spaces
Central	0 (Any drop off and servicing spaces must be in curtilage)	Minimum of 5 plus 1 per 20 beds	1% - 5% of total parking spaces	6% of total parking spaces, and a further 5% of spaces should be enlarged standard spaces. For hotels, there should be one designated car parking space per accessible bedroom.	4 spaces plus 4% of total parking spaces, and a further 4% of spaces should be enlarged standard spaces. For hotels, there should be one designated car parking space per accessible bedroom.
Non central	1 space per 2 guest bedrooms				

Table P.8: C2 Residential institutions					
Area	**Development Type**	**Maximum car parking spaces:**	**Minimum cycle parking**	**Maximum Powered two-wheeler parking**	**Disabled parking provision**
Central and Non central	Residential institutions (boarding schools, care homes, nursing homes)	1 per 4 beds	Min. of 5 plus 1 per 10 beds	1%-5% of total parking spaces	1 per disabled staff member plus 5% of the total parking, and a further 5% of spaces should be enlarged standard spaces.
	Hospitals	Operational vehicle space AND 1 per bed	Min. of 5 plus 1 per 20 beds		Up to 200 spaces 6% of total parking spaces, and a further 6% of spaces should be enlarged standard spaces Over 200 spaces - 4% of total parking spaces, and a further 4% of spaces should be enlarged standard spaces.
	Sheltered housing	1 per 4 units	Min. of 5 plus 1 per 10 beds		Provided in car parking allocation

Table P.9: C3 and C4 Dwelling properties				
Area	**Development type**	**Maximum car parking spaces per unit**	**Minimum cycle parking**	**Disabled parking provision**
Central	All dwelling properties	1 per unit	1 per unit (house) 1 per bedroom(flat) See also 6.23.	Provided in car parking allocation.
	Houses of multiple occupation (3 – 6 unrelated residents and 7+ unrelated residents)	1 per house	1 per bedroom	
	Elderly person dwellings	1 per unit	1 per 10 units	
Non central	1 bedroom dwelling properties	1 per unit	1 per unit (house) 1 per bedroom(flat)	
	2+ bedroom dwelling properties	2 per unit	1 per unit (house) 1 per bedroom(flat)	
	Houses of multiple occupation (3 – 6 unrelated residents and 7+ unrelated residents)	1 per unit	1 per bedroom	
	Elderly person dwellings	1 per unit	1 per 10 units	

Table P.10: D1 Non-residential institutions							
Area	**Development Type**	**Maximum car parking spaces**	**Minimum long stay cycle parking**	**Minimum short stay cycle parking**	**Maximum Powered two-wheeler parking**	**Disabled parking provision**	
						Where car parking provision is up to 200 car parking spaces	Where car parking provision is over 200 car parking spaces
Central	All types	Nil	As non-central	As non-central	1% - 5% of total parking spaces	6% of total parking spaces, and a further 6% of spaces should be enlarged standard spaces	4 spaces plus 4% of total parking spaces, and a further 4% of spaces should be enlarged standard spaces
	Schools/ places of education	1 per 30 pupils	1 per 10 pupils plus 1 per 10 pupils scooter parking for primary schools 1 per 5 for secondary schools	1 per 4 long stay spaces			
Non central	Health centres and surgeries	2 per consulting room	1 per consulting room	1 per consulting room			
	Crèche, day centre, nursery	1 per 20 children	1 per 10 children	1 per 4 long stay spaces			
	Schools/ places of education	1 per 30 pupils	1 per 10 pupils plus 1 per 10 pupils scooter parking for primary schools 1 per 5 for secondary schools	1 per 4 long stay spaces			
	Museums/ Galleries/ Exhibition room	1 per 50sqm GFA	Min. 5 plus 1 per 50 sqm				
	Public hall/ Place of worship	1 per 10 capacity	Min. 5 plus 1 per 50 sqm				
	Library	1 per 75sqm GFA	Min. 5 plus 1 per 50 sqm				

Table P.11: D2 Assembly and Leisure						
Area	**Development Type**	**Maximum car parking spaces**	**Minimum cycle parking**	**Maximum Powered two-wheeler parking**	**Disabled parking provision**	
					Where car parking provision is up to 200 car parking spaces	Where car parking provision is over 200 car parking spaces
Central	All types	0	As Non-central	1% - 5% of total parking spaces	6% of total parking spaces, and a further 6% of spaces should be enlarged standard spaces. For sports facilities, levels may be determined according to the usage of the sports facility. For further information, see Accessible Sports Facilities (Sports England) and Guide to Safety at Sports Grounds (Green Guide).	4 spaces plus 4% of total parking spaces, and a further 4% of spaces should be enlarged standard spaces. For sports facilities, levels may be determined according to the usage of the sports facility. For further information, see Accessible Sports Facilities (Sports England) and Guide to Safety at Sports Grounds (Green Guide).
Non central	Cinema/ Concert hall/ Bingo/Casino	1 per 10 capacity	1 per 10 capacity			
	Sports and leisure facilities	1 per 20sqm	Min. 5 plus 1 per 20 sqm			

Table P.12: Sui Generis						
Area	**Development Type**	**Maximum car parking spaces**	**Cycle parking**	**Maximum Powered two-wheeler parking**	**Disabled parking provision**	
					Where car parking provision is up to 200 car parking spaces	Where car parking provision is over 200 car parking spaces
Central	All sui generis	Bespoke with a presumption of 0	Bespoke	Bespoke	5 % of total capacity, and a further 5% of spaces should be enlarged standard spaces.	6 spaces plus 2% of total capacity, and a further 2% of spaces should be enlarged standard spaces.
Non central	Garages and service stations Private hire and vehicle hire	2 per service bay + appropriate waiting spaces to cater for the facility	Min. of 2			
	Car sales premises	1 transporter space 1 per 50sqm				
	Driving schools, licensed taxis	1 space				
All areas	Purpose built, high density student housing	1 space per 25 beds for operational parking A condition will also be applied requiring the submission of a Parking and Traffic Management Plan.	1 per 2 beds	Bespoke	1 per disabled student room + 2 spaces	

Cycle Parking Standards

6.17 The importance of cycling facilities such as changing rooms, showers and lockers in encouraging more people to cycle cannot be underestimated. Such facilities will be sought in appropriate circumstances where long stay cycle parking is required, as determined by the land use above. At employment developments where the location makes it possible for employees to travel to work by active modes, the Council will seek to ensure that the development incorporates changing and shower facilities to facilitate anticipated levels of trips in the short term and sufficient to accommodate anticipated growth in these modes and modal shift in line with the 50:50 modal split. This approach is also supported by the Active Travel Act (Wales) 2013 and the Active Travel Design Guidance should be referred to[5].

6.18 The standards for the provision of cycle parking for different types of development set out within Tables P.1 to P.12 represent minimum provision for all areas of Cardiff, which must be provided in addition to other vehicle parking.

6.19 Cycle parking must be provided in a safe, secure and convenient position and also be located close to the intended destinations. Wherever possible, it should be located within the curtilage of the development. Stands should be visible and positioned so they do not obstruct pedestrians or people with disabilities. They should be clearly signposted and highlighted by defined areas, such as the use of surface changes, colour or texture. In order to maximise security, cycle parking should be prominently located in places which maximise surveillance. They should be overlooked by passers-by, well lit and, where possible, viewed by CCTV or security guards.

6.20 Sheffield-type stands, which provide two cycle parking spaces and allow both the frame and wheels to be secured onto the 'n' shaped stand, are considered appropriate for short stay parking for most situations. Alternatives will be considered, but must offer at least the equivalent capacity, robustness and degree of protection for users. Stands which incorporate effective security and innovative design will be encouraged.

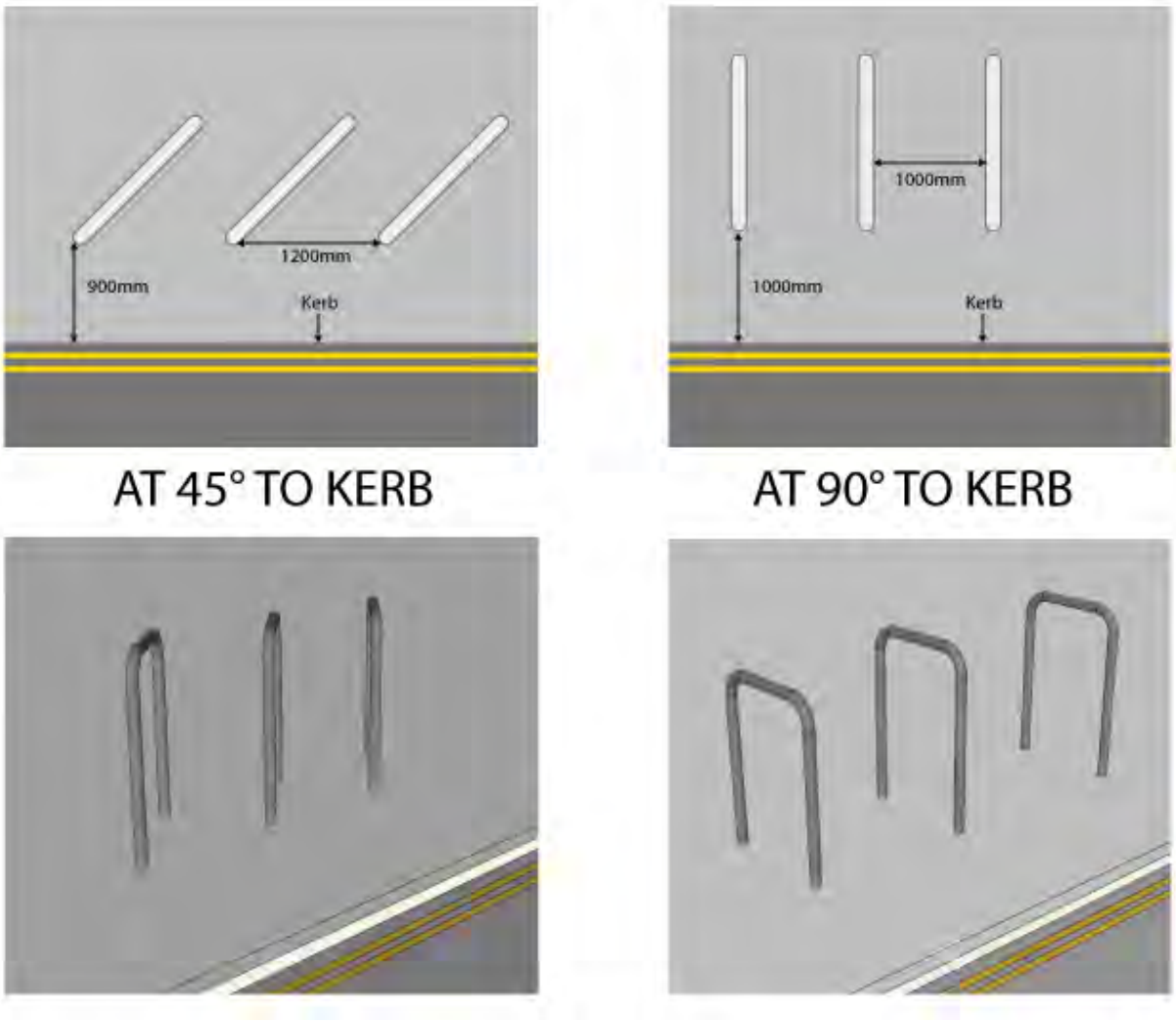
6.21 Short stay parking, which provides for the needs of visitors or customers to a building for a few hours, should be located as close as possible to the visitor entrances of a building and, ideally, within 30m. Long stay parking, which provides for the needs of employees, commuters and residents for longer periods, is more appropriately provided undercover, within a building where possible and should be overlooked or provided with surveillance.

6.22 Residential and long stay cycle parking must be secure and sheltered. The shelter may be in the form of accommodation within buildings, in cycle sheds or other sheltered structures and can include cycle lockers or cages located in close proximity to the main building access. For houses, where cycle parking cannot be accommodated within individual dwellings (e.g. where garages and/or outside space are not available), appropriate alternative secure and sheltered provision should be made. It is often better to have several small groups of stands rather than one large facility. Cycle provision should be designed into a scheme from the outset to ensure adequate provision is made available from first occupation. Reference should be made to the Cardiff Residential Design Guide and other relevant guidance.

[5] http://gov.wales/topics/transport/walking-cycling/activetravelact/implementation

6.23 Stands should be positioned so that they can be properly used and do not cause a safety hazard. The diagram below outlines the positioning which is expected for on-street cycle parking. Reference should also be made to the Active Travel Design Guidance (for example, p.276) to ensure that the footway meets the minimum footway width requirements set out in the guidance.

Figure 6.2 Cycle Parking



Car Parking for People with Disabilities and Mobility Impairments

6.24 Standards on the number of designated parking bays for disabled people are set out in Tables P.1 to P.12. Previously these have been based on advice contained within the 'Parking Guidelines of the Standing Conference on Regional Planning in South Wales' (Revised Edition 1993) and the Department of Transport Traffic Advice Leaflet 5/95 'Parking for Disabled People' and have now been updated in line with BS8300, 'Design of buildings and their approaches to meet the needs of disabled people'.

6.25 The parking standards for people with disabilities represent minimum provision and should be provided in addition to the standard car parking provision. Where a reduced number of car parking spaces below the maximum level are provided, the level of car parking provision for disabled people should be maintained in the same proportion as if the overall number of spaces was up to the maximum level. At certain locations, and where the proportion of disabled people

is known to be higher, the ratio of parking for disabled people may need to be increased. The needs of disabled people (including designated spaces) will also need to be considered in developments where no off-street car parking is proposed. Enlarged standard spaces are 3.6m by 6m. These spaces provide flexibility as they can be adapted to be parking spaces designated for use by disabled people.

6.26 Parking layout guidance and appropriate streetscapes for use by disabled people can be obtained from Inclusive Mobility: A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure DfT (2002) and Part M: Access to and use of buildings – Volume 2: Buildings other than dwellings (2015). Such an approach is required by the Equalities Act, 2010.

6.27 Part M (Access to and use of buildings) provides technical guidance on Buildings Regulations about access to and use of buildings. Guidance on access in the planning system ('Planning and Access for Disabled People – A Good Practice Guide' published by the Office of Deputy Prime Minister 2006, BS 8300: 2010 'Design of buildings and their approaches to meet the needs of disabled people - Code of Practice' 2009 and Design Commission for Wales, Design and Access Statements in Wales 2017 recommends provision of an access statement to identify the philosophy and approach to inclusive design adopted, the key issues of the particular scheme, and the sources of advice and guidance used. An additional benefit of providing an access statement is that it should set out, at the time of the planning application, most of the information needed by a building control body, thereby assisting the dialogue between the applicants and building control. Design of disabled parking provision must comply with all current legislation.

Car Parking for People with Young Children

6.28 In shops and buildings to which the public have access and in public car parks, spaces should be reserved for people needing to transfer young children to and from the car. Parking for people with young children must be:

- Marked with a suitable symbol;
- Provided at a medium width of 3.6m, to include 1.2m access zone between parking bays;
- Located close to the main accessible entrance to the building.

Parking Layout and Design

6.29 The principles outlined in Chapter 8 of the Manual for Streets should be taken into account for the layout and design of parking areas. Through good design, car parking (public and private) must give consideration to safety for pedestrians, cyclists and vehicles and also address issues of security, visual amenity and access requirements. It is also important that the provision and design of car parking space is well integrated with a high quality public realm. Pedestrians should be considered first in the design process, in accordance with the user hierarchy set out in Manual for Streets.

6.30 Access and circulation arrangements must accommodate the needs of all users with a particular emphasis on vulnerable groups. Entrances and exits must not present a hazard to road users, pedestrians and cyclists or interfere with safety and the movement of traffic.

6.31 Car parking spaces should have an absolute minimum dimensions of 4.8m x 2.4m (Manual for Streets 2007), with a minimum manoeuvre space behind a car parking bay of 6.0m. Where parking spaces are parallel to the road, a minimum length of 6.0m is required.

6.32 Garages must have a minimum internal width of 3.2m with an internal length of 6.0m. Where garages are provided, a minimum driveway length of 5.5m is required.

Parking Standards for Motorcycles

6.33 Well-placed and designed motorcycle parking can help to improve the appearance of an area, reduce obstructions to pedestrians by reducing random parking, reduce theft and damage to secured motorcycles.

6.34 Parking must be provided in a safe, secure and convenient position with good surveillance and, wherever possible, within the curtilage of the development. Standard spaces should be 2.5m by 1.5m. Parking must be positioned so as not to obstruct pedestrians or people with disabilities. Motorcycle parking should also be on a level surface and be clearly sign-posted and well-lit. Consideration should also be given to the provision of appropriate anchor points.

6.35 Best practice guidance on the design of Powered Two Wheeler parking is provided in the Department of Transport, Local Government and the Regions' Traffic Advice Leaflet 2/02.

Design for Refuse Collection

6.36 For guidance on access for refuse collection vehicles and refuse collectors please refer to the Council's current guidance on Waste Collection and Storage Facilities.

Car Clubs

6.37 Car club parking spaces can be provided at workplaces and/or residences and on-street. Car Clubs can contribute to mitigating transport related impacts and there are a number of advantages to developers in providing car clubs and their use in meeting parking standards and environmental mitigation. Existing planning guidance emphasises the benefits of high density housing development and for developments where a reduced amount of parking is sought, a developer may be required to be provide on-site car club provision, including appropriate parking reserved for the scheme.

6.38 Carplus, a national charity promoting responsible car use and which seeks to establish a national network of car club providers, is a useful source of car club information.

Electric Vehicles

6.39 The availability of and demand for electric vehicles is projected to increase. Further to KP5 viii, provision to enable charging for electric vehicles will be encouraged, particularly within public and/or communal car parks. Electric Vehicle charging is a developing technology and Cardiff Council will seek to ensure that charging points are installed in line with the current technical requirements at the time of application. Where there is an opportunity for developments to include vehicle charging points the Council will encourage their provision and seek to secure an appropriate level of provision through the planning process.

7. PUBLIC RIGHTS OF WAY

Introduction

7.1 Public Rights of Way (PRoW) have an important role as part of Cardiff's transport network and Strategic Recreational Routes, as set out in the LDP policies T5, T6 and T8 (see also Section 2 and Appendix 1).

7.2 This section provides advice on:

- How to identify whether a proposal affects a PRoW
- What must be considered if PRoWs are within a development site
- When existing paths should be retained and situations where diversions may be acceptable
- When new paths are needed and how they should be located within a development
- Issues to consider when designing paths.

7.3 These considerations are especially relevant for new housing developments, but may also need to be considered for other kinds of development if these are likely to affect the alignment of an existing PRoW or increase its usage.

Guidance on Policy Implementation

The need to identify paths at the outset

7.4 There are a number of categories of PRoW serving different user groups. Types of rights of way are set out below:

1. **Footpaths** for use by walkers
2. **Bridleways** for use by horse riders, cyclists and walkers
3. **Byways Open to All Traffic (BOATs)** have footpath, bridleway and vehicular rights (there are current no BOATs in Cardiff)
4. **Restricted Byway (RBs)** have footpath and bridleway rights and rights for non-motorised (i.e. horse drawn) vehicles.

7.5 Existing PRoWs should be identified at an early stage of the development process, using the Definitive Map and Statement of Rights of Way. This is a legal record of all rights of way existing within Cardiff.

- The Definitive Map and statements are public documents which may be viewed by contacting the Highways Department within the Council.
- The map and statement are conclusive proof as to the existence, status, width and position of a public right of way.
- The fact that a legal right of way is shown on the Definitive Map but does not physically exist on the ground is not evidence that no right of way exists.
- The map does NOT include paths the public have access to use on private land which the landowner allows (sometimes known as giving 'permissive access').

7.6 As the Highway Authority, the Council has a legal responsibility to protect highways maintainable at the public's expense as outlined in the Highways Act 1980. Their responsibility in relation to the PROW network is outlined briefly below:

- Under Section 130, protect the public's right for the use and enjoyment of the right of way network.
- Maintain the rights of way network to ensure the paths are accessible for all to use (i.e. way marking; vegetation clearance; clear of obstructions, etc.).
- Retain and update the Definitive Map and Statements as legal events are confirmed (i.e. Diversions; Extinguishments; Creation Orders, etc.).

Protecting existing paths

7.7 Under Section 130 of the Highways Act 1980, the Council has a duty to protect the public's right to use rights of way. Most PRoWs are long-established and many provide an important local movement and recreational function as well as forming part of a larger strategic network of transport and recreational routes which includes Promoted Circular Walking Trails, River Corridor Trails, Permissive Bridle Routes and other paths.

7.8 For these reasons, the developer must make every endeavour to incorporate and maintain the legal alignment of an existing PRoW within the layout of a development.

PRoWs in development sites

7.9 When designing their proposals, developers should give consideration to whether any public paths or rights of way cross the development site and whether they could be affected by the proposed development. Policy T6 (IMPACT ON TRANSPORT NETWORKS AND SERVICES) of the LDP seeks protect Public Rights of Way from developments which would cause unacceptable harm to their function and use. Therefore, where a development is likely to affect the existing legal alignment of a PRoW, developers should seek to minimise this impact. This may be achieved by either incorporating the legal alignment of the path within the development or by diverting it along an alternative alignment.

7.10 In determining applications for developments which would affect the existing legal alignment of a PRoW and require its diversion, the Council will assess the merits of the alternative diverted route relative to the existing alignment in terms of its quality, safety, convenience and attractiveness. In some cases, the route proposed for the diversion may offer demonstrable advantages over the existing PRoW for users in respect of these attributes. A development may also provide the opportunity to create a more convenient route or to enhance the quality of a route, particularly on large sites.

Diversions and stopping up – legal processes

7.11 In certain cases it will not be possible to incorporate the legal alignment of the PRoW within the development or developers may not wish to do so. In such instances, the developer will need to demonstrate to the Council's satisfaction why retaining the existing alignment would prejudice an otherwise acceptable development or layout and why a diversion or stopping up of a PRoW is necessary. Where having considered these matters, the Council accepts there is a valid case for not retaining an existing alignment, once planning permission has been granted, the

developer must apply for a diversion or extinguishment (if proven necessary). This process is open to public consultation and changes may not be confirmed if objections are deemed reasonable.

7.12 A diversion or stopping up may be acceptable where provision of an alternative alignment would offer a route of acceptable quality in terms of its quality, safety, convenience and attractiveness or otherwise offer demonstrable advantages.

7.13 When determining an application for a diversion or stopping up order, the Council will need to be satisfied that it is necessary (not just desirable or preferable) for the path to be altered in order for the planning permission to be granted.

7.14 Where a diversion or stopping up is deemed necessary, the Council can only use the powers of section 257 of the Town & Country Planning Act 1990 while the development is taking place and the following must be considered:

- Once Planning consent has been granted, the applicant must apply for the Section 257 order to be processed.
- The full cost of making the order will be borne by the developer.
- Until the legal order is completed and confirmed, the original definitive line must be retained.
- Any additional changes made to the rights of way following completion of a development will require administration made under the *Highways Act 1980* legislation and open to public objection.

7.15 If changes to rights of way require re-alignment of an existing path, the developer will need adequate consideration for the time required to process the legal order to determine the outcome. Where a stopping up or diversion order are required it is likely to take up to a year to come into effect. Until that time the original definitive line must be kept open at all times.

Protecting Public Rights of Way during construction

7.16 Rights of Way must remain open and unobstructed at all times until the necessary statutory procedures, which authorise closure or diversion or the path/s, are completed as confirmed orders. Obstructions to the rights of way network, even in ignorance, may lead to enforcement action, prosecution and blighted property.

7.17 Temporary Diversions/Stopping up orders can be applied for from the Council, to allow works to be undertaken or prevent a danger to the public. This restriction is only temporary and the route must be reopened. These orders cannot be used in lieu of a permanent order and again the developer will be expected to pay the costs of producing and implementing the order. A temporary diversion/stopping up does not allow the original definitive path to be obstructed or damaged during the development.

7.18 Developers are responsible for ensuring PRoWs are managed and remain unobstructed throughout the construction process. Failure to meet this responsibility can result in the Council taking enforcement action:

- Even where planning permission has been granted, or is not required, this does not entitle a developer to obstruct, interfere with or move a Public Right of Way.

- Under the Highways Act 1980 Section 131 clearly states "if a person, without lawful authority or excuse (b) removes any soil or turf from any part of a highway, except for the purpose of improving the highway and with the consent of the highway authority for the highway is guilty of an offence."
- The Council may take proceedings in a Magistrates' Court against any person obstructing a Public Right of Way. The Countryside Rights of Way Act 2000, Section 64 under section 137ZA of the Highways Act 1980, where there is penalty for wilful obstruction provides the court the power to order the offender to remove the obstruction.
- The Local Authority has the power to require the developer to reinstate the right of way, even development has already occurred.
- Temporary Diversions/Stopping up orders can be applied for to allow works to be undertaken or prevent a danger to the public (see 7.9).

New paths

7.19 New paths may be needed to supplement the existing network. This is especially relevant for new housing developments where new path links will be required where they are necessary to create convenient access to work, services, leisure, through public open space and countryside primarily for those who live on the site. Such paths should be permanent and made up to adoptable standard i.e. constructed to conform to the requirements of the Council's *Highway Standards Manual.*

7.20 Under Section 25, Highways Act 1980, a public path creation agreement can be made when a local authority enters into 'an agreement with any person having the capacity to dedicate a footpath, bridleway or restricted byway over land in their area'. The public path creation agreement requires:

- The Council to consult with other local authorities or local members in whose area the land concerned is situated;
- Where it is agreed that a creation order under Section 25 is necessary the full cost of making the order will be borne by the developer;
- Agreement of limitations or conditions affecting the right of way over it;
- The Council to take necessary steps for securing that the footpath, bridleway or restricted byway is dedicated with the above agreements;
- And the dedication of the right of way is advertised in at least one local newspaper in which the land to which the agreement relates is situated.

7.21 On larger sites, the public rights of way network should be considered in a comprehensive manner and as part of the network of off-road routes for moving round the site, and linking with surrounding communities and countryside. The builder/developer is required to follow guidance as outlined in the Green Infrastructure SPG to ensure new and existing paths are created cohesively within green spaces.

Design Considerations

Detailed design of paths

7.22 All paths whether existing or new should be designed to accommodate their intended use and to minimise the risk of disturbance to neighbours and opportunities for crime. Further guidance is set out in the Green Infrastructure SPG section specifically for Public Rights of Way.

Developer Contributions

7.23 There may be occasions where the Council requires a financial contribution from a developer for off-site works. This would be to ensure that proposed improvements and enhancements within a development site link effectively with the existing network of routes and are constructed to an appropriate standard for the increased use likely to result from the completion of the development.

7.24 Where paths contain an adjoining soft landscape area this strip will require a commuted sum for ongoing maintenance if it is to be transferred to the Council.

7.25 Paths which will require a legal order to divert, extinguish or create will require compensation to cover the legal fees, advertising and potential public enquiry costs.

Summary

7.26 For best practice follow the checklist below:

- Take account of all relevant national and local planning guidance, including the Green Infrastructure SPG.
- Check if a Public Right of Way, claim or anomaly affects the proposed development site.
- Design the layout to take account of any existing Public Rights of Way.
- Consider if a new Public Right of Way can be incorporated into the site following guidance from Green Infrastructure SPG, Public Rights of Way section.
- Leave sufficient time to implement temporary/permanent changes to the Public Rights of Way network.
- Liaise regularly with the Council's PROW Team to ensure problems are avoided and appropriate guidance can be provided.

Reference

Rights of Way Improvement Plan Guidance (Produced as part of the Council's statutory duty under the Countryside and Rights of Way Act 2000).

Right of Way: A Guide to Law and Practice, Fourth Edition by John Riddall and John Trevelyan

8. USEFUL PUBLICATIONS

Welsh Government

Planning Policy Wales (Edition 8, January 2016)
Design Guidance Active Travel (Wales) Act 2013
Design and Access Statements in Wales (June 2017)
Technical Advice Note 18: Transport (2007)

Cardiff Council

Cardiff Local Development Plan 2006-2026
Cardiff Local Development Plan Masterplanning Framework
Liveable Design Guide: Placemaking, urban design, architecture
Cardiff Cycle Design Guide
Cardiff Parking Strategy
Cardiff Public Art Strategy
*Cardiff Public Realm Ma*nual
Rights of Way Improvement Plan Guidance (Produced as part of the Council's statutory duty under the Countryside and Rights of Way Act 2000)
Technical Design Standards

Supplementary Planning Guidance

Green Infrastructure
Infill Sites Design Guide
Open Spaces
Planning Obligations
Trees and Development
Waste collection and storage facilities

UK Government

Webtag
Department for Transport (2013 revisions) Well-maintained Highways Code of Practice for Highway Maintenance Management, London: DfT
Department for Transport (2012) Quality Audit in the Street Design Process, London: DfT
Department for Transport (2007) Manual for Streets, London: DfT
Department for Transport (2010) Manual for Streets 2: Wider Application of the Principles, London: DfT
Department for Transport (2005) Inclusive Mobility, London: DfT
Part M (Access to and use of buildings)
Planning and Access for Disabled People – A Good Practice Guide' Office of Deputy Prime Minister 2006
BS 8300: 2010 'Design of buildings and their approaches to meet the needs of disabled people - Code of Practice' 2009

Other Publications

Right of Way: A Guide to Law and Practice, Fourth Edition by John Riddall and John Trevelyan
Design Commission for Wales, Design and Access Statement 2008
Transport for London (TfL) guidance on Accessible Bus Stop Design 2017

Appendix 1 UK and National Policies

1.1 **The Community Infrastructure Levy Regulations 2010 and subsequent Amendments allow Local Authorities to raise funds from developers who are undertaking new building projects in their area. The Levy (or 'CIL') is a charge per square metre of new development and is collected as development is implemented. The money can be used to pay for a wide range of infrastructure that is needed to support growth. This can include things like transport schemes, schools and community facilities. Detailed information is available through www.cardiff.gov.uk.**

1.2 **The Active Travel Act (Wales) 2013 places a legal duty on** local authorities in Wales to map and plan for suitable routes for active travel, and to build and improve their infrastructure and facilities for walking and cycling every year, as well as to promote walking and cycling as a mode of transport. Highways authorities are required to consider the needs of walkers and cyclists and make better provision for them.

1.3 **Planning Policy Wales (February 2014)** sets out the Government's planning policies as they apply in Wales. It includes guidance on car parking provision (paras 8.4.1 – 8.4.6), which is viewed as a: '*major influence on the choice of means of transport and the pattern of development*'. It outlines that local authorities should: '*ensure new developments provide lower levels of parking*'. Therefore, **minimum** parking standards are no longer seen as appropriate.

1.4 8.3.4 states that 'where development can only take place with improvements to public transport services, local authorities should consider the use of planning conditions and/or planning obligations'. Planning conditions 'may legitimately be imposed on the grant of planning permission to secure on-site transport measures and facilities as part of the proposed development. Planning obligations may also be used in appropriate circumstances to secure off-site improvements in public transport, walking and cycling, where such measures would be likely to influence travel patterns to the site involved'.

1.5 The importance of conducting Transport Assessments is identified as these can 'provide the basis for negotiation on schemes, including the levels of parking, and measures to improve public transport access, walking and cycling' (8.7.2).

1.6 Planning Policy Wales also encourages local authorities to collaborate with neighbouring authorities when considering parking issues in order to '*establish **maximum** levels of parking for broad classes of development*', together with a: '*threshold size of development above which such levels will apply*' (8.4.3).

1.7 **Planning Policy Wales - Technical Advice Note 12: Design 2014** [TAN 12, 2016] supplements Planning Policy Wales and provides additional guidance and detailed advice on promoting sustainability through good design and planning for sustainable buildings within the planning system. Good design has the potential to assist environmental sustainability, economic growth and social inclusion.

1.8 TAN 12 provides advice on the way in which areas function and the connections between people and places as well as aesthetic considerations and emphasises that design should take into account:

- Movement – promoting sustainable modes of travel
- Access – ensuring ease of access for all
- Character – for example, promoting local character and legible development
- Environmental Sustainability – for example, designing for change
- Community Safety - for example, ensuring attractive, safe public spaces.

1.9 In relation to transport, elements of design and the planning of movement in developments, TAN 12 sets out that planning should be based on the understanding of the local context via an analysis of the needs and potential of the local area.

1.10 The document states that the siting, layout and detailed design of development will often be critically important to the success of efforts to provide genuine alternatives to car travel and to achieving quality in the environment as a whole: "Good site location, building and street design can play an important role in achieving a reduction in car traffic and speed and short distance motorised journeys, as well as encouraging a wider choice of more sustainable modes of travel" (5.9.1).

1.11 TAN 12 sets out that the emphasis should be on safe, accessible movement of people and goods along routes that are both attractive and appropriate to the environment through which they pass. The layout of infrastructure should contribute to the promotion of walking, cycling and public transport, including ensuring direct and attractive routes for pedestrians and cyclists and giving particular attention to the needs of disabled people, children and older people. This extends to larger developments where the potential for public transport interchanges should be considered and accommodated, as well as the benefits of locally based traffic management measures.

1.12 The guidance indicates the need to avoid severance and community fragmentation when design is considered, promoting permeable access for all. Issues such as gradient, lighting and security are seen as important along with coherent, legible, direct, attractive, safe and unobstructed routes. It emphasises the need for early stakeholder involvement in transport and movement issues so that the needs of users and operators are understood and reflected in design solutions, with the needs of disabled people, children and older people given particular attention.

1.13 **Planning Policy Wales - Technical Advice Note 18: Transport 2007** [TAN 18, 2007] supplements Planning Policy Wales and provides additional guidance on achieving a sustainable and integrated land use planning and transport system. TAN 18 emphasises that local authorities should consider the need for introducing or reviewing parking standards and requirements, and the parking needs of disabled people. Car parking policies should address the provision and management of both on-street and off-street parking, and the standards to be applied to new developments, reflecting the differing needs of various land uses. Additionally, it states that neighbouring authorities should co-operate to achieve a more consistent regional approach.

1.14 TAN 18 also indicates that the extra traffic generated by a proposed development may produce the need for transport improvements in the vicinity, and beyond. It states that where improvements are necessary, local planning authorities may grant planning permission subject to a condition requiring that improvements are completed prior to the commencement/occupation of the development. Furthermore, it says that developers will be required to pay the cost of any highway improvements where the need is directly created by their development. Such improvements may be secured under section 278 of the Highways Act 1980, whilst the use of planning obligations may be appropriate in some circumstances.

1.15 TAN 18 sets out the position with respect to **Transport Assessments** and **Transport Implementation Strategies**. Transport Assessments are used to assess the likely impact of a development in transport terms. A Transport Implementation Strategy is the output of a Transport Assessment detailing the measures a developer will use to mitigate the transport impacts: '*The transport assessment process should include the production of a Transport Implementation Strategy for the development. This should set objectives and targets relating to managing travel demand for the development.*'

1.16 Paragraph 9.22 of TAN 18 states that 'planning authorities may use planning obligations to secure improvements in roads, walking, cycling and public transport, whether as a result of a proposal on its own or cumulatively with other proposals and where such improvements would be likely to influence travel patterns either on their own or as part of a package of measures'. Paragraph 9.25 makes clear that the objective of using planning obligations in relation to transport should be to 'secure satisfactory accessibility to sites by all modes with the greatest degree of access being achieved by public transport, walking and cycling'.

1.17 TAN 18 also sets out the most recent position with respect to **Travel Plans** in Wales and states (paragraph 9.14) 'The Assembly Government wishes to promote the widespread adoption of Travel Plans by businesses, schools, hospitals, tourist attractions and other significant travel generating uses'. Guidance for Transport Assessment and Travel Plans is contained in section 2 of this SPG.

1.18 **Welsh Office Circular 5/93 'Rights of Way'** provides advice on recording, maintaining, protecting and modifying the rights of way network.

1.19 **Manual for Streets (MfS, Department for Transport 2007)** states that 'a clear distinction can be drawn between streets and roads. Roads are essentially highways whose main function is accommodating the movement of motor traffic. Streets are typically lined with buildings and public spaces, and while movement is still a key function, there are several others, of which the place function is the most important.'

1.20 **Manual for Streets 2 (MfS 2, Chartered Institution of Highways & Transportation 2010)** is endorsed by the Department for Transport (DfT), the Homes and Community Agency (HCA), the Welsh Government, the Commission for Architecture and the Built Environment (CABE), the Association of Directors of

Environment Economy Planning and Transport (ADEPT) and English Heritage. MfS2 does not supersede MfS1 but rather it explains how the principles of MfS1 can be applies more widely.

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1.0 Introduction

1.1 Purpose of guidance

1.1.1 Transport Assessments (TAs) are an important mechanism for setting out the scale of anticipated impacts a proposed development, or redevelopment, is likely to have. They assist in helping to anticipate the impacts of development so that they can be understood and catered for.

1.1.2 The Welsh Government's policies on TAs within the planning process are contained in Planning Policy Wales (Edition 8 January 2016) (PPW). This document expands on the available guidance, providing detailed guidance on all aspects of TAs including modelling. The checklist below is not exhaustive and adaptation may be required to reflect the type and scale of the proposed development. Webtag and other source references were correct at the time of writing.

1.1.3 The guidance is intended to expedite the progress of planning applications. Following the guidance will assist applicants in producing TAs required through the planning process which can be approved in a timely manner. The explanatory notes below should be used in conjunction with the checklist of requirements at the end of the document to ensure that any Transport Assessment which is submitted to Cardiff Council contains all of the information which is required by the planning authority in assessing a planning application. Where essential information is omitted, this may result in a delay in determining an application as any outstanding material may be required through the determination period. A pre-application service (discretionary) is offered by the Council and it is recommended developers use this service to ensure engagement at the earliest possible opportunity.

1.1.4 Before submission to the Council, all TAs must be independently audited, using the below checklist. Where TAs are submitted for consideration at pre-application stage or with a planning application, the Council will also use the list to audit the submission to check that it contains all the appropriate details and information to enable the Council to properly assess and understand the transport impacts of development proposals and determine the transport mitigation measures necessary to address such impacts.

2.0 Transport Assessment Requirements

2.1 Baseline data, existing site information and proposed development

2.1.1 Baseline conditions need to be established accurately to understand fully the context of the development proposal. A full description of existing site information should be provided as well as a detailed description of the proposed use or uses of the site. The description should include the elements outlined in the checklist as a minimum.

2.2 Public Transport and Walking/cycling assessment

2.2.1 A key issue in seeking the most sustainable solution for a particular development is the need to encourage trips made by walking and cycling and the use of public transport. TAs should include but not be limited to the elements in the checklist.

2.2.2 Public Transport Network Assessment and Planning is an integral part of the TA process. For major developments, it is important to identify the spare capacity on buses and trains in order to establish the ability of the public transport network to accommodate any increase in demand associated with a proposed development, particularly for rail. Public transport journey times and reliability should also be referenced.

2.2.3 Such assessments will inform later stages in the TA process in respect of determining modal split, travel plan objectives and, in appropriate cases, public transport infrastructure enhancements and improvements to the local cycleway and footpath network as part of an overall mitigation package. The TA should also demonstrate the principles of design for the walking and cycling network and urban realm and how these principles follow guidance in Manual for Streets, Manual for Streets 2 and the Welsh Government's Active Travel Design Guidance.

2.2.4 A suggested methodology for assessing the capacity (i.e. the maximum number of people that can be accommodated on the route within the licensing laws of that particular mode) of the public transport network is set out in the checklist. Detailed guidance relating to all aspects of modelling can be found in Section 3.

2.3 Safety Considerations and Accident Analysis

2.3.1 The assessment should identify any significant highway safety issues and provide an analysis of the recent accident history of the study area. The extent of the safety issue considerations and accident analysis will depend on the scale of the proposed development and its location. The need to minimise conflicts between vehicles and other road-user groups, particularly vulnerable users, should be adequately addressed.

2.4 Appraising the Impact of the Proposed Development - Weltag

2.4.1 It should be noted that in the Welsh context the Welsh Transport Planning Appraisal Guidance (Weltag) process should be used. Weltag enables practitioners to set transport objectives, plan, evaluate and monitor initiatives in accordance with the Wales Transport Strategy. Appraisal is centred around three main impact areas, the pillars of sustainable development: Economy, Environment and Society (including Accessibility, Integration and Safety). The criteria in the checklist below should also be

referenced by the appraisal. TAs should demonstrate that appropriate reference has been made to Weltag in carrying out the assessment of issues relating to the three impact areas.

2.4.2 In line with the Weltag process, the environmental impacts of any significant development need to be addressed. Environmental impacts which are set out in an environmental impact assessment (EIA) should be cross-referenced in the TA. This will help ensure that the significance of the predicted impacts and the scope for mitigating them are properly addressed at the outset.

2.4.3 The Local Highway Authority and/or the Highway Agency would require assessment of the environmental impact from any increase of traffic on the highway network where statutory limits might be breached. The same is true if any highway mitigation measures were to be proposed as a result of the development.

2.5 Promoting Smarter Choices via Travel Plans

2.5.1 Smarter Choices are techniques for influencing people's travel behaviour towards more sustainable options. They also include measures such as travel plans, individualised marketing, personalised journey plans, public transport information and marketing initiatives, car sharing schemes and car clubs, plus measures that reduce the need to travel, such as video conferencing and teleworking.

2.5.2 Travel Plan (TPs) should be tailored to address the site-specific issues relating to the proposed development. Whenever a site-specific TP is proposed, the developer should ascertain the existence of an area-wide TP and integrate the site-specific TP with this. Appendix 4 provides the Cardiff Council TP Guidance and Checklist for detailed information on TP requirements.

2.6 Transport Impacts and Mitigation Measures

2.6.1 Preference should be given wherever possible to sustainable travel solutions rather than the construction of new roads, for example through facilitating walking and cycling as well as accessibility to the local public transport infrastructure; and improvements to the local public transport network.

2.6.2 Where mitigation is proposed, appropriate conditions may be attached to any planning permission granted. The conditions or obligations should specify the improvements that will be required to accommodate the proposed development's trips by all modes. They should also ensure the safety of all road users, including non-motorised users or vulnerable users. Conditions or obligations may require that necessary mitigation measures be completed before first occupation of units on the site, or before work on the development site itself commences if construction traffic is a major issue.

2.6.3 As outlined in TAN 18, as a broad guide the Welsh Government regards an increase in turning movements in the order of 5% as material in most cases, that is, a 5% increase of traffic using any link of a junction. Where the capacity of a junction is near to, or is

being, exceeded a smaller percentage increase on a link would normally be material, as would any additional turning movements which in the case of, for example, heavily laden slow moving vehicles, might have serious safety implications for road users. The critical junctions to be included in the TA must be agreed with the Council.

2.6.4 Where a development will have a material impact on the highway network, the level of impact at all critical locations on the network should be established as well as conditions which may be unique to the network in the local area. In respect of the strategic road network, it will be necessary to assess the degree of impact on all junctions that would be affected by the movements generated by a development. The impacts upon the functioning of the strategic network will also require assessment. In this regard, the functional attributes of the network to be assessed and measured should include queue lengths, delays caused by queuing, journey time impacts (all modes), the configuration of traffic signal cycle times at junctions and the level and quality of access afforded to pedestrians, cyclists and public transport at road junctions and along links between junctions. The additional vehicular movements generated by a development can potentially reduce the capacity of the road network and make journeys by sustainable modes less safe, convenient or attractive. Examples of this could include:

- where additional flows through junctions can only be accommodated by reducing the 'green time' for pedestrians and cyclists at junction crossings or modifications to junctions that introduce or increase the degree of staggered pedestrian/cycle movements or prevent the introduction of pedestrian/cycle crossings.
- where additional flows prevent the reallocation of road space to sustainable modes.

2.6.5 Further to policy T6 of the LDP, the core principals required of a development are defined below, whereby the developer will need to demonstrate that these have been adhered to and to propose any necessary mitigation measures accordingly –

- The development will not cause unacceptable harm to new or existing pedestrians, cyclists and public transport users, while larger developments will be expected to provide improvements to these modes;
- The development will not cause unacceptable harm to the safe and operation of the highway for example queuing back (maximum rather than average queue length) to an extent such as to affect access or block upstream junctions;

2.6.6 In line with TAN 18 (9.1), the TA process should also include the production of a Transport Implementation Strategy (TIS) which should "set objectives and targets relating to managing travel demand for the development and set out the infrastructure, demand management measures and financial contributions necessary to achieve them". The elements set out in the checklist should be included as a minimum.

3.0 Modelling Specific Requirements

3.1 Modelling Core Principles

3.1.1 As a general principle, all TAs should be compliant with the appropriate guidance, including TAN 18', 'DfT WebTAG' and 'Design Manual for Roads and Bridges (DMRB)'.

3.1.2 The assessment must take into account the following core principles, as discussed in 'TAG Unit M2 (Variable Demand Modelling)'; and should be considered part of an overall iterative process. Links to relevant discussion in relation to each of these aspects is provided below –

- Trip Generation [Ref: Par 3.6.1-3.6.2.]
- Mode Choice [Ref: Par 3.6.3.]
- Time Period Choice [Ref: Par 3.3.8.]
- Trip Distribution (Destination Choice) [Ref: Par 3.6.6-3.6.8.]
- Trip Assignment (Route Choice) [Ref: Sect 3.3.]

3.1.3 All assumptions and methodologies must be consistently applied and appropriately documented. All models, calculation spreadsheets and associated documentation; including the 'Appraisal Specification Report' and 'LMVR' as described in 'TAG Unit M3.1 (Highway Assignment Modelling)', should be made available to the Council, and submitted electronically (i.e. not simply scanned hard copies) along with the Transport Assessment; i.e. all aspects must be auditable.

3.1.4 All software used in the assessment process (e.g. models, TEMPRO, TRICS etc.) should be current, unless there is a valid reason otherwise. The applicant should adhere to best practice and any guidance specific to the use of each software application.

3.2 Scope of Study

3.2.1 The scope of the study area for the proposed development shall be provided to the Council during the preliminary stages of the application, and should be based on the area of significant influence from the development. A balance needs to be sought between drawing the study boundary close to the scheme, with the need to provide sufficient information so as to be able to make robust decisions, as described in 'DMRB Vol.12 Sect.1 Pt.1 (Traffic Appraisal Manual)'.

3.2.2 Where a development is a component part of a future larger scale development, then suitable consideration should be made of the larger development as a whole, including approved developments within the study area, so as not to prejudice the delivery of the

wider strategy for sustainable travel. TAN 18 provides further details regarding assessing the cumulative effects of development through TAs.

3.2.3 As a minimum, the study period for any assessment should be a midweek 'AM Peak' and 'PM Peak', typically 08:00-09:00 and 16:30-17:30, respectively; however this should be determined from in combination, the analysis of the development trip generation profile and flow profile on the adjoining network. Significant land uses other than residential may require the need to look at additional time periods such as the inter-peak or during the weekend.

3.2.4 The type of surveys undertaken will in part be determined by the type of analysis to be undertaken, as explored in 'TAG Unit M1.1 (Principles of Modelling and Forecasting)', however as a minimum requirement these will involve peak classified turning movements, recorded in at least 15 minute increments, and the applicant will need to demonstrate their detailed understanding of the issues from having undertaken specialist site visits.

3.2.5 The suggested categories for classified surveys are as follows – 'Lights' (Cars/LGV), 'OGV1', 'OGV2', 'PSV' (Buses/Coaches), 'Bicycles', as described in 'DMRB Vol.7 Sect.2 Pt.1 (Traffic Assessment)', and consistent with the 'DMRB Vol.13 COBA 11 Manual'. Numbers of pedestrians crossing at a junction should also be routinely surveyed, even if no formal crossing facility exists.

3.2.6 Queue Lengths (at 5 minute intervals), Journey Times by bus/car (minimum of 5 runs for statistical significance), ATC counts (to account for flow variations), Origin-Destination surveys (for matrix estimation), Public Transport surveys, Parking surveys, Stated Preference surveys, and other types of data may be required for model calibration and validation; especially for detailed modelling and for larger scale developments.

3.2.7 Signal timing data (e.g. LOTU, AVSP) and associated plans should be sought from the Council's Network Management Group (Contact: Dave Kinnaird – 029 2087 3321 / Paul Jones – 029 2087 3305) for all signalised junctions and crossing facilities within the study area. A copy of all survey data should be provided electronically to the Council.

3.2.8 All surveys should be conducted during neutral time periods, so as to be reflective of typical traffic conditions. Further guidance on data collection methodology is provided in 'TAG Unit M1.2 (Data Sources and Surveys)' and 'DMRB Vol.12 Sect.1 Pt.1. (The Application of Traffic Appraisal to Trunk Road Schemes) Ch.6'.

3.3 Analysis Approach

3.3.1 In essence, the extent and complexity of any analysis undertaken should be commensurate with the scale of development and its likely impacts. Fundamentally, the purpose of the modelling is to demonstrate mitigation of the impacts of the development, with a view to sustainability, as discussed in 2.6.6.

3.3.2 For situations where there is no interaction between junctions, then subject to the limitations below, these can be modelled in isolation using Junction Assessment Tools such as – OSCADY (signalised junctions), PICADY (priority junctions), ARCADY (roundabouts), TRANSYT or preferably LINSIG.

3.3.3 Where a series of junctions are to be modelled within comparatively close proximity on an urban or congested network, often within the same SCOOT UTC region, then a TRANSYT or preferably LINSIG Network Model shall be required as a minimum.

3.3.4 Where there is likelihood in these situations for queues to extend back from a junction thereby interfering with other junctions downstream, or where there are complex interactions that cannot be adequately represented in any of the above programs, then a Micro-simulation Model shall also be required, i.e. VISSIM or preferably S-PARAMICS.

3.3.5 Micro-simulation models are inherently data hungry, and will typically involve a significant data collection exercise. Matrices should be fully profiled in 5 minute increments, with use of suitable 'warm-up' periods. Bus services must be expressly modelled (NPTDR and NaPTAN are useful data sources for this), together with all significant junctions and signalised crossing facilities within the study area. Account must also be taken of natural variation in traffic flow, ideally through running models a number of times using different/random seeds, then aggregating the results.

3.3.6 For larger scale developments, one or more of the above should be considered in conjunction. Furthermore, where a development is of sufficient scale such as to influence distribution, modal split and route choice on the wider network; then more Strategic Analysis methods shall also be employed, such as the use of – WebTAG compliant 'Logit' or 'Variable Demand Elasticity Assignment' Models, and/or software such as – OmniTRANS, SATURN, VISUM, CUBE etc.

3.3.7 The above strategic analysis methods are based on iterative assignment, therefore the results of model convergence should be suitably monitored and documented, as discussed in 'TAG Unit M3.1 (Highway Assignment Modelling)'.

3.3.8 Furthermore, for large scale developments, account should be made of more complex changes in travel behaviour in response to differences in travel cost, such as – Trip Suppression/Induction, Trip Redistribution, Modal-Shift, Peak Spreading, and Traffic Rerouting; as explored in 'TAG Unit M2 (Variable Demand Modelling)'.

3.3.9 Whichever approach has been taken, due consideration must be made of non-car based modes, mindful of the need to encourage sustainable travel, in particular to account for public transport, as discussed in 'TAG Unit M3.2 (Public Transport Assignment Modelling)'.

3.3.10 More detailed guidance is provided in 'TAG Unit M1.1 (Principles of Modelling and Forecasting', 'TAG Unit M2 (Variable Demand Modelling)', 'TAG Unit M3.1 (Highway Assignment Modelling)', 'TAG Unit M3.2 (Public Transport Assignment Modelling)' and 'TAG Unit M4 (Forecasting and Uncertainty)'.

3.4 Calibration & Validation

3.4.1 A statement of validation shall accompany all assessments, detailing the acceptability of a model for use in scenario testing, the core principles of which are discussed in 'TAG Unit M3.1 (Highway Assignment Modelling)', however in essence any model must strive to achieve the following targets –

- Modelled Screenline flows within 5% of observed counts in nearly all cases
- Modelled Link/Turn flows (less than 700) within 100 vehicles of counts in 85% of cases
- Modelled Link/Turn flows (700 to 2,700) within 15% of counts in 85% of cases
- Modelled Link/Turn flows (more than 2,700) within 400 vehicles of counts in 85% of cases
- Modelled Link/Turn flows with a GEH of less than 5 in 85% of cases
- Modelled Journey Times within 15% (or 1 minute if higher) of surveyed times in 85% of cases.

3.4.2 In addition, where large-scale strategic models are required, there will also be need for calibration and validation to be undertaken of and reported on the following – Network, Trip Matrices and Route Choice.

3.4.3 As part of the calibration process, all departures from default program parameters and values should be clearly documented and justified. The model itself should be constructed and labelled properly, such as to avoid confusion and to aid interrogation by any third party.

3.4.4 Where a model is particularly complex, e.g. in the instance of a micro-simulation model, the applicant should be prepared to demonstrate the model in operation to Council officers and other relevant stakeholders. In such cases, a valid Base Model representative of existing conditions and agreed by the Council, is a prerequisite before undertaking any further analyses.

3.5 Forecasting

3.5.1 The scenarios required to be tested will be based on those discussed in 'TAG Unit M1.1 (Principles of Modelling and Forecasting)' and 'TAG Unit M4 (Forecasting & Uncertainty)', these are summarised below –

- **Base Year**
- **Forecast Year: Do Minimum** Reference Case accounting for TEMPRO Growth and committed development
- **Forecast Year: Do-Nothing** Development Case Without-Intervention
- **Forecast Year: Do-Something** Development Case With-Intervention

3.5.2 The forecast year will be 10 years post completion unless specified otherwise by the Council. Background growth assumptions for use in forecast years should be calculated on the basis of factors derived from the transport planning software TEMPRO. The methodology, which will be specific to a given application, is discussed in detail in Appendix 1. In some instances, observed historic local trends can provide a useful steer on likely future background growth.

3.5.3 However as a general principle, this must demonstrate that sufficient consideration has been given to committed development and development plan allocations, as identified by the Council, and should aim to ensure that background trips are neither double-counted nor under-counted. Larger scale developments, in particular those near the periphery of Cardiff, will also need to take into account cross-boundary effects.

3.5.4 There is likely to be more than one 'Do-Something' in most instances, in order to represent different possible interventions. For sites where new associated infrastructure is required/proposed, then separate scenarios with different underlying assumptions will need to be established to represent these, and an iterative approach based on a multi-stage model should be adopted.

3.6 Trip Generation & Distribution

3.6.1 Vehicular Trips rates and Person Trips (where available) by time period, should be sought for each land-use/aspect of the development, ideally from surveys of existing local comparable sites, but otherwise through use of an industry standard database such as TRICS, which should be used in accordance with best practice, e.g. the 'TRICS Good Practice Guide'.

3.6.2 A balance should be sought between trying to select sites with comparable characteristics to the development (e.g. walking/cycling/PT accessibility, demographics, urban density etc.) and the availability of data, with a view to achieving representative samples. Where no comparable sites exist, in particular for large mixed-use developments, then 85th percentile trip rates should be determined from a sample size of 5 or more sites.

3.6.3 The applicant should be mindful that non-vehicular trips are often under recorded in such surveys; and therefore while databases such as TRICS may provide some steer with regards modal-split, ultimately any assumptions on trips by mode should be viewed within the context of available local data, e.g. '2011 Census: Method of Travel to Work', 'Ask Cardiff Survey', 'TEMPRO' etc.

3.6.4 Data from TRICS and other similar databases provide no indication of what proportion of their reported trips for a given site will be new to the network. For exclusively residential developments it should be assumed that all trips are new to the network; but for other development types, or non-residential elements of a larger mixed-use site (i.e. where some trips may remain internal to within the site), then it may be necessary to make certain adjustments to vehicle trip rates.

3.6.5 Potential adjustments would be to account for the following – 'Pass-by' trips, 'Linked' trips, 'Diverted' trips and 'Transferred' trips,

which are explored in more detail in relevant guidance. Any adjustments made should be reasonable/ appropriate and ideally be evidence-based.

3.6.6 For localised assessments of comparatively small developments, it may be sufficient to use turning movements as the basis for trip distribution, by utilising simple furnessing techniques against known trip-ends. Schemes of a more strategic nature, however, will require a more detailed knowledge of trip origins and destinations, and will typically involve employing some form of Matrix Estimation (ME2) in constructing demand matrices for modelling.

3.6.7 In the case of these larger developments, the '2001 Census: Origin-Destination Workplace Statistics' can provide a useful starting point, albeit that this dataset is now fairly old and only covers Home-Based Work (HBW) trips. Data from the National Trip End Model (NTEM), TEMPRO and the National Travel Survey (NTS) may also be of use. Ultimately however, it may be necessary to undertake local origin-destination surveys such as – Roadside Interview surveys (RSI), Household Interview surveys or ANPR/Registration Plate surveys; as discussed in 'TAG Unit M1.2 (Data Sources and Surveys)', and explored further in 'DMRB Vol.12. Sect.1 Pt.1' and 'DMRB Vol.5. Sect.1 Pt.4 TA 11/09 (Traffic Surveys by Roadside Interview)'.

3.6.8 The above in many instances however, may be prohibitively difficult to undertake, and provide no mechanism to forecast Trip Redistribution; in which case, some variation of a WebTAG compliant Gravity-based Trip-Distribution Model should be employed, as discussed in 'TAG Unit M2 (Variable Demand Modelling)'.

3.7 Model Outputs

3.7.1 Specific outputs will vary depending on the tools that have been used in the assessment. However as a general principle, there will be a need to effectively demonstrate statistically robust comparisons of the following between the Base and Forecast models –

- Capacity (PRC/RFC/Saturation)
- Journey Times/Delays (by mode)
- Queue Lengths (average and maximum)
- Traffic Flow comparisons, and
- Traffic Signal Timings and Staging.

3.7.2 The above outputs should be clearly presented through the use of appropriate tables and diagrams, such that the Council can arrive at a balanced and robust decision as to the acceptability or otherwise of the development.

4.0 Cardiff Council TA Guidance: Checklist

This checklist is provided as a means for applicants to demonstrate their compliance with 'Cardiff Council Transport Assessment Guidance Note: Modelling'. Furthermore, it provides a basis against which an assessment can be independently audited, and as a mechanism for evaluation by Council planning officers. Please complete the form below, by marking 'Y', 'N' or 'n/a' accordingly, providing explanatory comments where necessary.

GUIDANCE REQUIREMENT	Y / N	COMMENTS
2.1 Baseline data, existing site information and proposed development		
• For full applications - detailed location plan, showing proposed and existing uses and the scale of development • For outline applications - master plan with indicative layout, land uses and transport network/links and development phasing.		
Existing site access layout and access constraints: • Public Transport facilities • Pedestrian and cycle routes • Local network classification • Vehicular capacity on road network in vicinity, including any abnormal load uses • Assessment of attractiveness of travel modes to and from the site e.g. journeys times, availability • AQMAs/air quality, noise and carbon emissions information • Current personal injury records (3 – 5 years) • Planned transport improvements in the area • Operating hours (weekly including weekends) • Proposed access and servicing arrangements • Traffic impact of construction work		

• Existing parking facilities and potential impact of development on these, with reference to the Cardiff Council Parking Strategy.		
2.2 Public Transport, Walking and cycling assessment		
Detailed assessment of public transport, walking and cycling, including: • Existing services, capacity and patronage • Potential improvements to services/capacity • Indicative demand forecasts How target modal share and patronage will be reached, to include: • Bus stop placement and walking access from 400m catchment • Journey times and trip distribution for bus and rail • Service frequencies and vehicle capacity required • On and off site bus infrastructure provision, including physical constraints e.g. corridor width, priority features • Bus provision in relation to the phasing of the development, where appropriate, including service levels at different stages and any risks to delivery • Compatibility with existing services including time tabling • Potential funding streams		
Provides appraisal summary tables, having regard to Stage 1 WelTAG appraisal principles.		
Assesses the available capacity of the existing cycleway and footpath network in the area of the development and Identifies any required walking and cycling network enhancements, demonstrating how the design principles follow the relevant active travel and Manual for Streets/Manual for Streets 2 guidance.		
Demonstrates walking and cycling access to key local facilities.		
Provides door to door travel times, on-site and to key trip destinations by specific routes).		
2.3 Safety considerations and accident analysis		
Identifies any significant highway safety issues and provides an analysis of the		

recent accident history of the study area to determine if the proposed development will exacerbate existing problems or whether any proposed highway mitigation works or traffic management measures will help to alleviate the problems. Including a comparison with local/national statistics as appropriate, particularly where the Strategic Road Network (SRN) is involved.		
Site inspections have been conducted to determine if the proposed location and design of access roads (including visibility/sight distance restrictions) would create an increased potential for accidents.		
Road safety audit carried out where appropriate.		
2.4 Weltag: Economy, Environment and Society		
Assessment has followed Weltag guidance with regard to identifying and evaluating issues relating to each of the key strands – Economy, Environment and Society – and evidence of this is provided.		
2.5 Transport Impacts And Mitigation Measures		
• Identification of problems & mitigation. • Required walking and cycling improvements (on/off-site). • Current access to local public transport infrastructure. • Required public transport network improvements. • Timetable for implementation, in line with development phasing where appropriate. • Assesses whether is material impact. • Uses appropriate design guides and parameters.		
2.6 Transport Implementation Strategy (TIS)		
Identifies what policy objectives and requirements are set by the development plan in terms of access to the development and movements in and around the site.		
Identifies what access arrangements are required for a successful development (meeting the needs of the developer, end user, addressing impacts on neighbours and existing movements surrounding the site).		
Specifies the package of physical, management and promotional measures needed to accommodate the requirements identified above, such as physical		

infrastructure, the design and location of buildings, parking management, financial incentives and dedicated travel plan co-ordinators.		
Contributes to development plan, including any objectives to overcome particular localised difficulties, for example, for an area of particularly significant congestion, an historic area requiring protection or an air quality management area.		
Transport objectives for the development will also need to consider commercial requirements and environmental constraints and includes a package of measures needed to achieve its objectives. These should include physical measures including the site layout, management and promotional measures such as demand management through parking restrictions or the employment of a travel plan co-ordinator.		
Travel Plan, where appropriate, integrating smarter choices with the physical design of the development. See also the Travel Plan Checklist.		
Suitable financial information relevant to the implementation of the strategy, including conditions/obligations to secure implementation.		
Sets out proposed scheme of monitoring.		
3.1.1. Key Modelling Guidance		
Has the assessment complied with key guidance (e.g. *TAN18*, *DMRB*, *WebTAG*)?		
3.1.2. Core Assessment Principles		
• Trip Generation? • Trip Distribution / Destination Choice? • Mode-Choice? • Trip Assignment / Route Choice?		
3.1.3. Assumptions, Methods & Documentation		
• Have all assumptions & methodologies been consistently applied &		

documented? • Have all models, files & documentation been submitted electronically? • Is all software used up-to-date? • Has software best practice been applied?		
3.2.1. Study Area and Time Periods		
• Is the study area as per provided previously to the Council? • AM Peak? *(specify time opposite)* • PM Peak? *(specify time opposite)* • Off-Peak? *(specify time opposite)* • Saturday Peak? *(specify time opposite)*		
3.2.2. Constituent Sites		
If the development is a component part of a future larger site, then has the larger site been taken into account?		
3.2.4. Surveys & Data		
• Have Turning Movement Counts been undertaken? • Have Site Visits with observations been undertaken? • Have Cars, HGVs & Buses been surveyed? • Have Bicycles been surveyed? • Have Pedestrians been surveyed? • Queue Lengths? • Journey Times by Bus /Car? • ATC Counts? • O-D Surveys? • Public Transport Surveys? • Parking Surveys? • Stated-Preference Surveys? • Other surveys? • Have Signal Timings been obtained from Telematics & used for the Base model? • Do the surveys reflect current typical traffic conditions?		

• Is the extent of analysis consistent with the scale of development?		
3.2.5. Modelling		
• Have **individual junctions** been modelled, and if so which software has been used? *(specify opposite)* • Have nearby junctions been modelled as a **network**, and if so which software has been used? • Are junction interactions sufficiently complex such as to require a micro-simulation model, and if so which software has been used?*(specify opposite)*		
3.3.1. Modelling Methodology		
• Are matrices fully profiled? *(specify interval opposite)* • Have suitable 'warm-up' periods been used? *(specify opposite)* • Have all bus services & stops within the modelled area been coded? • Have all junctions & crossings within the modelled area been coded? • Has account been taken of variability in flow (e.g. seeding)? • Has sufficient consideration been given to the modelling non-car modes, with a view to 'Sustainable Travel'? • Has *WebTAG* modelling guidance been followed?		
3.3.2. Wider Strategic Effects		
3.3.6. Will the development influence wider distribution, mode-split & route choice, and if so then which tools have been used to model these effects? *(specify tools opposite)*		
3.3.3. Iteration & Convergence		
• Has an iterative approach been employed? • Has model convergence been documented?		
3.3.4. Changes in Travel Behaviour		
• Trip Suppression/ Induction? • Trip Redistribution? • Modal-Shift?		

• Peak Spreading? • Traffic Rerouting?		
3.4.1. Model Validation		
• Has a statement of validation been produced? • (specify overall validation % opposite) • Modelled Screenline flows within 5% of observed? • (specify % opposite) • Modelled Link/Turn flows (<700) within 100 of observed? • (specify % opposite) s • Modelled Link/Turn flows (700-2,700) within 15% of observed? • (specify % opposite) • Modelled Link/Turn flows (>2,700) within 400 of observed? • (specify % opposite) • All Modelled Link/Turn flows with a GEH of less than 5? • (specify % opposite) • Modelled Journey Times within 15% or 1 minute of observed? (specify % opposite)		
3.4.2.Strategic Validation Criteria		
• Network Validation? • Trip Matrix Validation? • Route Choice Validation?		
3.4.3. Model Parameters & Nomenclature		
• Have all departures from default model parameters been documented & justified? • Has the model been suitably labelled to avoid any confusion (e.g. filenames & annotation)?		
3.4.4. Model Acceptance		
Have the models been demonstrated to the Council & relevant stakeholders?		
3.5.1. Baseline Scenarios, Background Growth and Committed Development		
• 'Base Year'? *(specify year opposite)*		

• 'Do-Minimum' (DM)? *(specify year opposite)* • Has *TEMPRO* growth been accounted for? • *(specify growth % opposite)* • Have observed local historic trends been considered? • *(specify growth % opposite)* • Has committed development been accounted for? • *(specify assumptions opposite)* • Have plan allocations been accounted for? • *(specify assumptions opposite* • Has growth in cross-boundary movement been considered?		
3.5.2. Forecast Scenarios		
• 'Do-Nothing' / Development Scenario? *(specify residential units & jobs and GFA for employment, retail, education & leisure opposite)* • 'Do-Something' (DS) Scenarios? *(briefly summarise scenarios opposite)*		
3.6.1. Development Trip Generation		
• Has *TRICS* been used to derive trip-rates? • Person Trip-Rates? *(specify trips arriving/departing for each period opposite)* • Vehicle Trip-Rates? *(specify trips arriving/departing for each period opposite)*		
3.6.2. Representative Sample Size		
• Has a site/s been selected on the basis of similar characteristics to the development? • Have 5 or more sites been used as a basis for calculating trip-rates? • *(specify no. of sites opposite)* • Has an 85^{th} percentile been used?		
3.6.3. Modal-Split		
• Existing area mode-split for all journey purposes? • Development mode-split, <u>without</u> interventions? • Development mode-split, <u>with</u> interventions?		

(specify source of mode-split data for each, and provide % split for each mode opposite)		
What percentage of travel is by Sustainable Modes (i.e. walking, cycling, public transport)? *(specify % opposite)*		
3.6.4. New Trips		
What percentage of trips will be new to the network? *(specify % opposite)*		
3.6.5. Existing Trips		
• 'Pass-by' trips *(specify % opposite)* • 'Linked' trips *(specify % opposite)* • 'Diverted' trips *(specify % opposite)* 'Transferred' trips *(specify % opposite)*		
3.6.6. Trip Matrix Construction		
• Have matrices been constructed from 'furnessing' turning count data? • Has Matrix Estimation (ME2) been used to construct matrices?		
3.6.7. Origin-Destination Data Sources		
Has the *'2001 Census O-D Workplace Statistics'* data been used as the basis to assume trip distribution for the development? *(specify assumptions opposite)*		
Has data from *NTEM/TEMPRO* been used as the basis to assume trip distribution for the development?		
Has data from *NTEM/TEMPRO* been used as the basis to assume trip distribution for the development?		
Have RSI surveys, ANPR counts or Household Interview data been used as the basis to assume trip distribution for the development? *(specify opposite)*		
3.6.8. Trip Distribution / Redistribution		
Has a Trip Distribution / Gravity Model been used?		
3.7.1. Model Outputs		
• Have the results been shown to be statistically robust?		

• Junction Capacity? • Journey Times / Delays? • Queue Lengths? • Traffic Flows? • Signal Timings (provided to Telematics)?		
3.7.2. Development Impacts & Mitigation		
Have all necessary results been appropriately presented?		
What is the net effect of the development on: • General traffic? • Bus Services? • Cycling? • Pedestrians? *(specify 'Detriment', 'No Significant Impact' or 'Improvement' opposite)*		
Have the effects of the development been effectively mitigated? *(provide justification opposite)*		
4. TA Audit		
Has the TA been independently audited using this guidance/checklist? Is a copy of the audit available for submission with the TA as part of the relevant planning application?		

Cardiff Council Modelling Technical Note: Modelling Background Growth

Introduction

1. The process by which background traffic growth is typically forecast is through the use of the DfT's National Trip End Model (NTEM) dataset, which can be interrogated through use of the Trip End Model Presentation Program (TEMPRO). The current relevant procedures are discussed in detail within Transport Analysis Guidance (TAG) UNIT M4 (Forecasting and Uncertainty; November 2014).
2. The specific methodology to be utilised depends on whether a variable demand model (multi or uni-modal), fixed demand model or whether no model is to be used; the scale of the development to be assessed; and the scope of the study area (national, regional, local authority or NTEM zone).
3. Essentially TEMPRO provides separate estimates of growth by spatial area, year, journey purpose, mode and by time period/car availability, provided as origins/destinations or productions/attractions.
4. Traditionally, in the absence of a model and in order to calculate local growth factors on specific roads or junctions, published National Road Traffic Forecasts (NRTF) factors were manually applied to TEMPRO derived growth. NRTF has since been superseded by the published National Transport Model (NTM) growth factors.
5. However as of version 6.1, NTM has been incorporated within TEMPRO, and these calculations can now be done automatically within the software. It should be noted however that this is a "…very approximate approach which would not normally be used in forecasts for the appraisal of major transport schemes." (TAG Unit M4; Par 9.1.2).
6. For a fixed demand model, TEMPRO derived NTEM growth factors are required to be factored to account for income and fuel adjustment factors, as can be calculated using the published WebTAG Data Book (December 2015).
7. It should be noted that TEMPRO doesn't account for significant local or regional public transport or walking/cycling interventions such as the proposed Cardiff Metro, and the resulting likelihood for modal-shift to occur, but rather assumes that mode-choice will remain broadly the same in future as is existing.
8. Nor does it take into account the level of saturation on the local highway network; in recognition that simply applying unfettered NTEM growth to an already congested link/s or junction/s may yield unrealistic results, as to do this takes no account of resultant changes in travel behaviour in order to minimise delay, such as the potential for rerouting, peak spreading, mode-shift, or even trip suppression. It also does little to inform the specific distribution of trips.
9. Similarly, TEMPRO "makes no assumptions about whether or not individual land use developments go ahead" (TAG Unit M4; Par 7.3.4), nor is it updated annually to accurately reflect the true number of households/jobs in recent years (the current NTEM dataset version being 6.2; April 2011).

10. TEMPRO therefore provides an 'alternative assumptions' facility, whereby the number of households and jobs can be adjusted in order to better reflect existing and future conditions based on more recently available local planning data.
11. This also provides a mechanism whereby the number of housing/jobs for selective major developments can be excluded from the calculations, in order to avoid double counting, which would otherwise occur by simply adding development traffic on top of TEMPRO factored flows. In other words, at least some of the future growth will already have been accounted for by development traffic and is implied within the NTEM forecasts.

Applying Background Growth to LDP Developments:

12. From the LDP Deposit Plan, we have it that over the plan period; if all developments are realised, then a potential 41,273 dwellings (42,363 households) and 40,000 jobs can be delivered between 2006 and 2026. The key figures are illustrated in the table below –

Table 1: LDP Planning Assumptions

	Dwellings	**Jobs**	**Households**	**Population**
2006 LDP Reference Year	138,735 1	193,600 2	132,108 3	323,766 3
Land Bank, Adjustments & Allowances	26,775 1	-	-	-
LDP Strategic Sites	13,950 1	-	-	-
LDP Non-Strategic Sites	548 1	-	-	-
TOTAL (excl. 10% Flexibility)	41,273 1	40,000 1	42,363 3	71,612 3
2026 LDP Deposit Plan (Full Build-Out All Development)	180,008 1	233,600 2	174,471 3	395,378 3

Sources:
1 LDP Deposit Plan
2 LDP Background Technical Paper No. 4
3 LDP Background Technical Paper No. 1

13. By way of illustration of the previous discussion; for example as a basis for establishing unfettered background growth against which to assess the Churchlands development (1,200 households) within the context of the LDP, then by following current guidance as discussed in TAG Unit M4, the below methods should be employed.

Establishing Local Growth Factors in the Absence of a Model:

14. The limitations notwithstanding, the methodology for establishing local growth factors in the absence of a formal model is discussed within Chapter 9 of TAG Unit M4.
15. Comparing the assumptions underpinning NTEM 6.2 predictions within TEMPRO for Cardiff between 2006 and 2026, with those observed for 2006 and predicted for 2026 within the LDP evidence base, we have the following discrepancies –

Table 2: NTEM vs. LDP Planning Assumptions

	NTEM	**LDP**
Households (2006)	135,913	132,108
Households (2026)	161,049	174,471
Household Increase	25,136 (18%)	42,363 (32%)
Jobs (2006)	198,342	193,600
Jobs (2026)	222,065	233,600
Jobs Increase	23,723 (12%)	40,000 (21%)

16. It is not clear why the outturn for 2006 should be different between data sources, however the difference in the forecasts are unsurprising given that the NTEM 6.2 figure is based around 2007 planning data for Cardiff and 2003 dwelling trajectories, and is set within the context of no adopted LDP or UDP at that time.
17. For consistency with the LDP Deposit Plan, it is therefore necessary to amend NTEM planning assumptions as per the values above (albeit with the future households reduced by 1,200 to 173,271, in order to account for the Churchlands development). This is done by using the 'alternative assumptions' facility within TEMPRO, as discussed in Chapter 7.3.7 of TAG Unit M4.
18. From having made the above adjustments, through use of the NTM AF09 dataset within TEMPRO, we are able to establish the following unfettered local car traffic growth factors by road type and time period; against which to assess the Churchlands development traffic –

Table 3: TEMPRO (NTM AF09) Local Growth Factors, 2006-2026

	AM Peak:		PM Peak:	
	Urban	**Rural**	**Urban**	**Rural**
Motorway	-	1.4902	-	1.4901
Trunk	1.4011	1.3699	1.4009	1.3697
Principal	1.3811	1.3766	1.3809	1.3765
Minor	1.3999	1.3643	1.3997	1.3641
All	1.3911	1.3867	1.3909	1.3865

Establishing Wider Area Growth for a Fixed Demand Model:

19. The methodology for establishing the wider area growth for Cardiff (trips to/from and within), in the absence of a demand model, is discussed in Chapter 7.4 of TAG Unit M4.
20. As per (17.) previous, the alternative assumptions are again applied. The resulting NTEM 6.2 growth rates generated by TEMPRO (AM: 1.2898; PM: 1.2897) are required to be multiplied by income and fuel adjustment factors; which for the period 2006-2026 are calculated to be 1.1000, using TAG Data Book Table M4.2.1 (December 2015).
21. The resulting unfettered wider area growth factors (averaged from origins and destinations), against which to assess the Churchlands development traffic, are given below –

Table 4: TEMPRO (NTEM 6.2) Wider Area Growth Factors, 2006-2026

AM Peak	**PM Peak**
1.4190	1.4188

Appendix 3 Junction Assessment Tools from First Principles

Background

1.1 More effective and efficient tools are needed to enable developers and their agents to understand what is expected of them when they undertake junction assessments. The quality of transport assessment work undertaken on behalf of developers by consultants is often inconsistent making it difficult for the Council to comprehensively understand the potential impacts of development on the performance of existing junctions and how any new junctions might perform. There are several possible reasons for this inconsistency:

- There is a wide range of junction modelling software available on the market and they all include their own assumptions and methodologies that sometimes contradict each other making it difficult to compare the outputs on a consistent basis if different models are used;
- The assumptions used in models are not always explained in a transparent way;
- Traffic models use varying degrees of sophistication in their methods of analysis;
- Model outputs are reported as absolute values and do not provide an understanding of variance;
- Junction modelling is a highly specialised technical skill that is subject to significant error if the modeller and/or their supervisors do not have the qualifications, engineering judgement and experience to determine the appropriate assumptions and inputs to use in the models and interpret the results to make suitable recommendations; and
- The data collected for use in the models may not be robust and/or appropriate.

1.2 The following guidance provides tools developed from first principles that will help to address these inconsistencies. The templates provided should be used in the first instance to assess the existing capacity and undertake option tests. Preferred options can then be tested in more depth using traditional junction assessment and/or micro-simulation modelling tools.

1.3 It is the responsibility of developers to detail the measures proposed to improve access by public transport, walking and cycling and reduce the number of motorised journeys and their impacts associated with the proposals (Section 9 of TAN 18). The following guidance will help support the developers in undertaking junction assessments to identify relevant junction improvements or mitigating measures to achieve this obligation.

1.4 The outcomes expected from applying this guidance are as follows:

- More effective, efficient and transparent junction assessment;
- Reduced number of options to model in detail;
- Appropriate, effective and efficient data collection;
- Guidance that overcomes contradictory advice from research and/or within modelling software;
- Variance in traffic flows, saturation flows and signal timings are explicitly understood;
- Mutual understanding of junction performance and the improvements and/or mitigating measures required.

1.5 It should be noted that this is a working document and the tools and techniques in this guidance may change over time if other information, guidance, research or methodologies demonstrate a need to modify it.

Methodology for Assessment of Priority Controlled Junctions

1.6 Traditional gap acceptance methods and formulae derived from empirical evidence are the two key ways of estimating the capacity of priority controlled junctions and roundabouts. The Council has reviewed these methods, the caveats and lack of consideration of variance concluding that there is no single type of model that accurately represents the capacity and performance of these types of junctions as they behave from day to day. The following text explains a pragmatic methodology that has been developed by the Council.

1.7 The traditional method for identifying the capacity of existing priority controlled junctions involves measuring the time in seconds between vehicles on a major road that is opposing the minor road traffic (the gap). The traffic that exits from a minor road between traffic on the major road is recorded as accepting a gap in the traffic (referred to as gap acceptance). The gap acceptance for vehicles on the minor road that follow a vehicle that has already accepted a gap in the traffic is typically lower than the gap acceptance of the vehicle that it followed (referred to as follow-up headway). For example, if a vehicle on the minor road has a gap acceptance of 4 seconds and the gap available on the major road is 6 seconds, the vehicle following behind may also be able to exit the minor road during the same gap if their follow-up headway is 2 seconds but not if it is higher. The gap acceptance varies depending on a number of factors including the local environment, visibility and driver ability. Many research studies report the results of applying this method and typically use probability theory to define capacity formulae that best represents observations. They also graph the relationship between opposing major road traffic flows and the capacity for traffic exiting from minor roads. This research and the resulting formulae and graphs can be used to predict the capacity of priority controlled junctions and roundabouts.

1.8 In 1976 (and subsequently for roundabouts in 1980), R M Kimber offered an alternative approach because gap acceptance was not easily measured (note: current technology has significantly improved the ability to measure gap acceptance using vehicle detection or video techniques). The alternative was based on empirical evidence from measurements of traffic flow and geometry and correlating these parameters to the junction capacity. The work resulted in a series of linear equations that could be used to estimate the capacity of turning movements given an opposing flow and associated geometry (see Design Manual for Roads and Bridges, DMRB 6.2.6 - TD42/95 and roundabouts in the Transport Research Laboratory (TRL) research reports LR942 and LR1120).

1.9 Typically models also assume the maximum capacity estimated can be attained. In practice, when measured queues and delays are compared with those estimated based on Queuing Theory there can be significant variance when the demand exceeds 80% of the theoretical capacity. There can be no accurate way to forecast queues and delays when demand exceeds this level of capacity. Simulation techniques provide a method for modelling the potential range of variance in traffic demand and help identify how queues and delays might vary but the accuracy is reliant on the number of simulations undertaken and assumptions used in the

methodology. Therefore, the threshold of 80% of capacity (Ratio of Flow to Capacity of 0.8 also described as the 80% Degree of Saturation) is the practical capacity limit below which queues and delays experienced by those using the junction are likely to be reliable.

1.10 The pragmatic graphical method described below is appropriate for assessing priority junctions and roundabouts in situations when the traffic demand is no more than 80% of the capacity. Where the traffic demand exceeds 80% of the capacity, alternative improvements or mitigating measures may be required in order to ensure journey times through the junction are reliable and users do not experience large variations in queues and delays.

1.11 The Design Manual for Roads and Bridges (see Figure 2/2 in DMRB 6.2.6 - TD42/95) provides a graphical method to identify appropriate types of junction for a given range of minor and opposing major traffic flows based on Annual Average Daily Traffic (AADT) flows. It recommends that simple priority junctions provide capacity at the lower limits and roundabouts (or other type of control) provide capacity at the higher limits. This approach is helpful for quickly identifying how well a junction is likely to perform and what types of junction improvement may be required. **Figure 2** below can be used in a similar way.

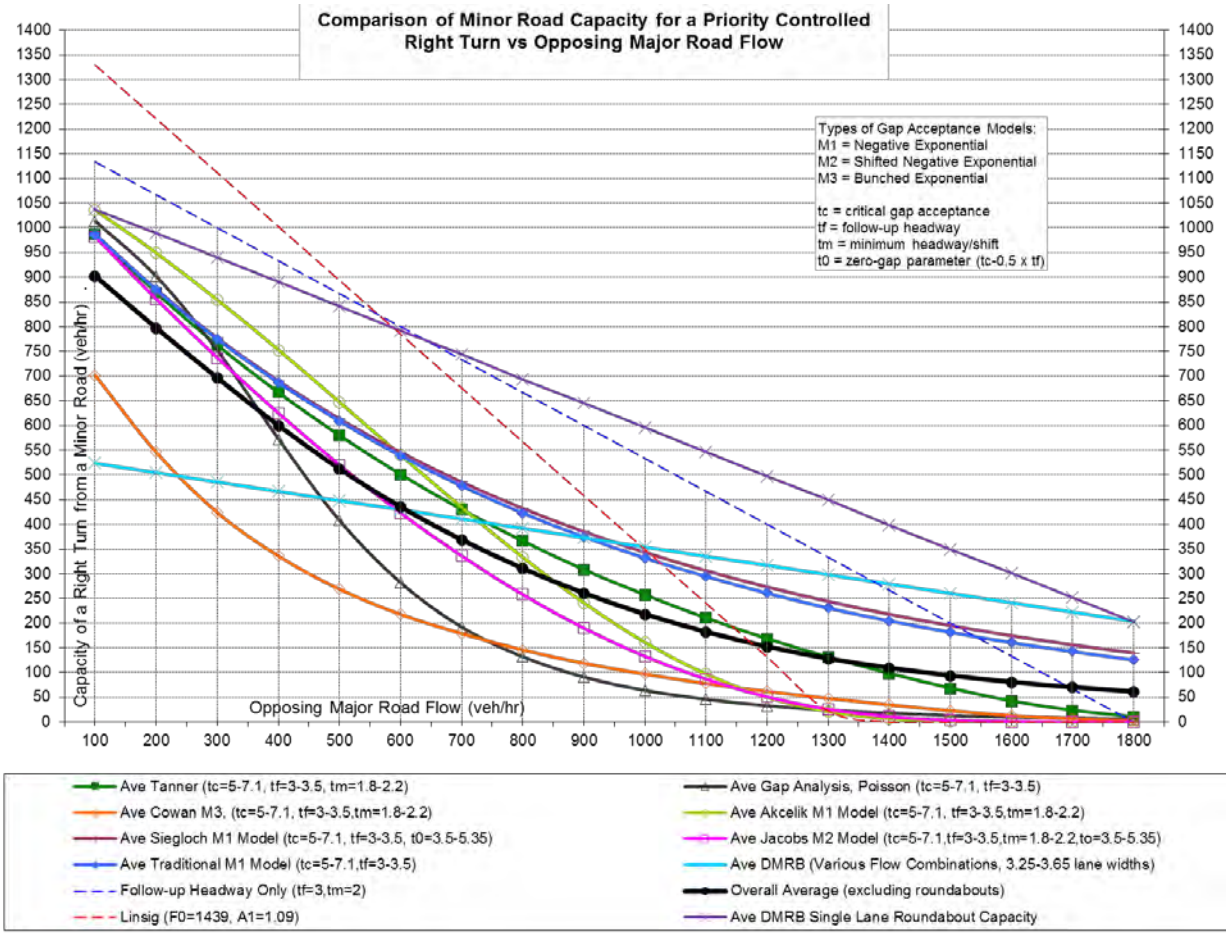


Figure 1: Comparison of Results from Queuing Theory and Other Established Methods

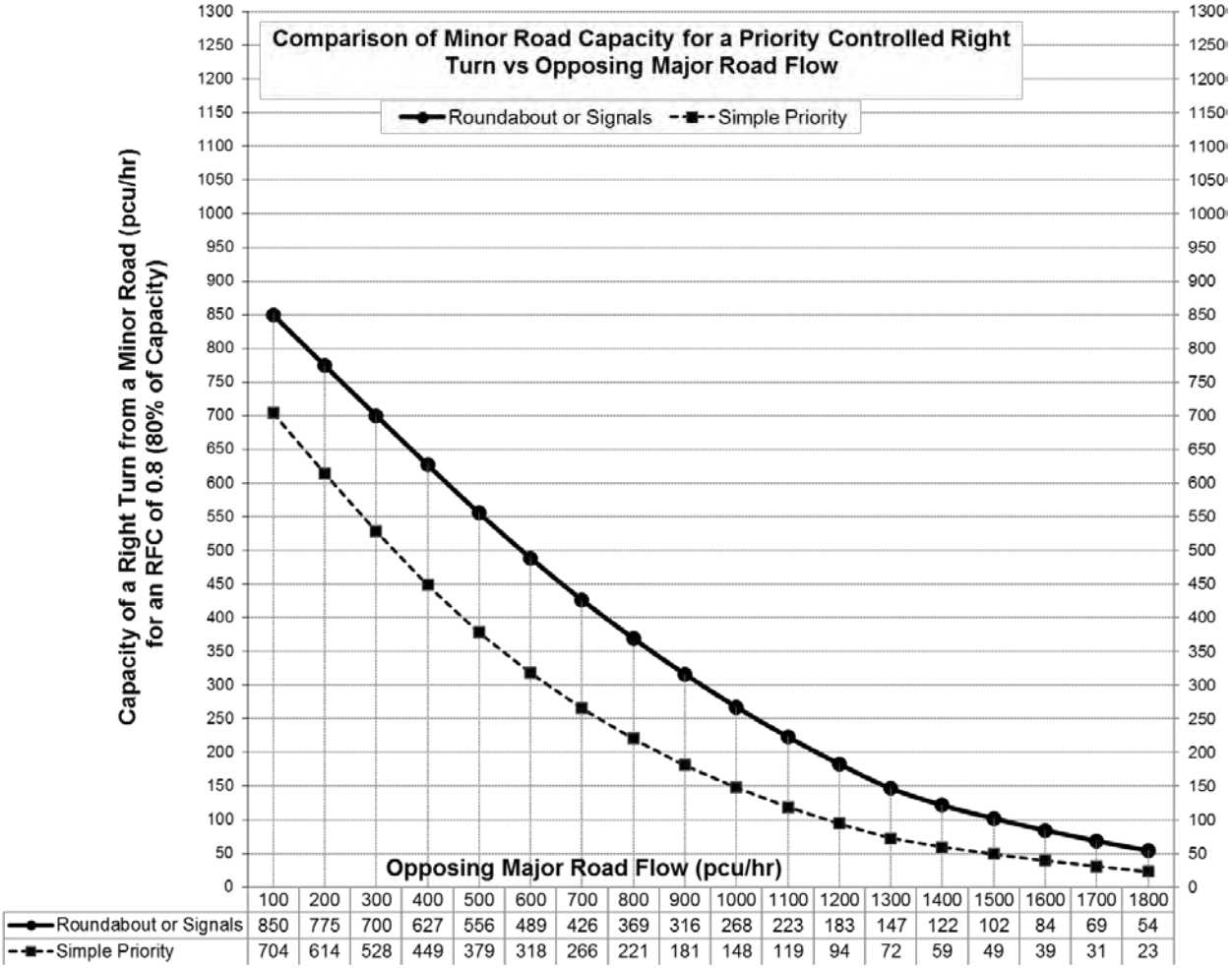
1.12 It can be seen from **Figure 1** that the results of models can be very different depending on the method used. Further analysis was undertaken using these models to develop upper and lower thresholds of capacity for a simple priority controlled junction that can also be used for

assessing roundabouts. The analysis used the gap acceptance and empirical formulae for priority junctions as described above with the relevant range of upper and lower parameters along with linear models including the formula used in Linsig. The results were then averaged, multiplied by a factor of 0.8 and plotted on the graph illustrated in **Figure 2** to show the lower and upper limits of practical capacity for priority controlled junctions and approaches on roundabouts.

1.13 To use the graph in **Figure 2**, the traffic flow for a right turn at a priority junction is plotted against the major road opposing traffic flow (see notes a, b and c below). The upper and lower limits of flows based on measured variance for each movement can be plotted resulting in an area that illustrates the likely combination of potential flows within a range. It is likely that a simple priority junction would operate within the limits of practical capacity if most of this plotted area is below the lower line shown on the graph (note: the key in **Figure 2** illustrates it as a dashed line). An alternative junction treatment is likely to be more appropriate if most of the plotted square of traffic flow combinations is above the line. Alternatively, other mitigation measures may be required to reduce traffic demand. The same method is applied for traffic travelling straight ahead crossing the opposing major road traffic.

1.14 For roundabouts, the traffic per lane on the approach is used as the minor road traffic flow rather than the individual turning traffic flows assuming that all of this traffic gives way to the opposing circulating traffic. The junctions on the approach roads with the gyratory are treated as priority T-junctions for the purpose of using **Figure 2**. It is likely that a roundabout would operate within the limits of practical capacity if most of the plotted square of traffic flow combinations is below the upper line shown on the graph (note: the key in **Figure 2** illustrates it as a solid line). An alternative junction treatment is likely to be more appropriate if most of the plotted area of traffic flow combinations is above the line. Alternatively, other mitigation measures may be required to reduce traffic demand.

1.15 The same method described above can be used to test priority controlled options to identify what option/s for improving the junction/s may require more detailed modelling depending on the type of mitigation needed.



Opposing Major Road Flow (pcu/hr)	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800
Roundabout or Signals	850	775	700	627	556	489	426	369	316	268	223	183	147	122	102	84	69	54
Simple Priority	704	614	528	449	379	318	266	221	181	148	119	94	72	59	49	39	31	23

Figure 2: Minor Road Capacity vs Major Road Flow

Notes:

a) All traffic data used in the junction assessments needs to be converted to passenger car units (pcu) using the vehicle conversion factors provided in Department for Transport WebTAG guidance (see TAG Unit A5.4 as of December 2015).

b) Under heavily congested conditions, the process of simple gap-acceptance may be replaced by a more interactive one in which major road vehicles adjust their headways (the gap they leave between them and the vehicle in front) to allow minor road vehicles to enter. This type of behaviour is indicative of a network that cannot sustain additional traffic demand. Therefore, such circumstances have been excluded from the analysis by putting an upper limit on the opposing flow of 1,800 pcu per hour.

c) This analysis does not account for traffic conditions that result in platoons of traffic in the opposing flow (note: platoons result from bunching effects where there are groups of vehicles that follow closely behind each other with larger gaps between these groups). In such circumstances, the capacity of a turning movement from a minor road can be higher than the above analysis would suggest because the follow-up headway becomes a greater proportion of the gap acceptance pattern. For example, if three vehicles needed 4 seconds each to exit from the minor road and the gap in the opposing major road was 4 seconds, the average gap acceptance would be 4. However, if the vehicle at the front of the queue on the minor road needs 4 seconds to exit from the minor road and the two vehicles behind need 2 seconds follow-up headway, the average gap acceptance would be approximately 2.7 seconds

assuming bunching occurs on the major road providing gaps of 8 seconds. Further evidence may be needed to demonstrate such circumstances.

d) This analysis does not account for situations that can occur at roundabouts where drivers on an approach anticipates the behaviours of drivers on other approaches resulting in lower gap acceptance and follow-up headway being achieved. Further evidence may be needed to demonstrate such circumstances.

The following is an outline of the steps involved in using **Figure 2** to estimate the capacity of a movement at a priority controlled junction or roundabout.

Step 1: Obtain the Data

The data required includes:

a. The major road opposing flow +/- variance (vph)
b. The minor road approach flow +/- variance (vph)

The traffic data needs to be classified so that it can be converted into passenger car units (pcu). The accuracy of the variance in traffic data will be lower if sample sizes are small. More accurate representations of variance can be obtained from statistical analysis of data collected over a longer time period. In some locations in congested conditions it may be appropriate to sample traffic flows for the same time of day over a number of days for a shorter period of time (e.g. 15 minutes during the peak period for 5 to 10 weekdays). Traffic flows should be assumed to vary by a minimum of 10% on a daily basis to account for fluctuations and seasonal differences.

Step 2: Calculate the Range of Traffic Flows from Variance

Convert both (a) and (b) into pcu/hr. Add and subtract the range of variance to get the higher and lower figures for both. It is recommended that a minimum 10% variance is assumed from counts that are based on observations of up to a few days.

Step 3: Use these values to plot them onto Figure 2 as a box.

Step 4: Interpret the Results

If the box that is plotted on the graph is mostly below the dashed line, it is likely that the simple junction will operate within practical capacity most of the time during the relevant period of the day. If it is between the dashed line and the solid line, it is likely that additional capacity improvement measures may be required. Additional measures to reduce traffic demand may also be required because most of the time the junction will be congested. If most of the plotted box is above the solid line the junction will need a roundabout (if appropriate for the pattern of traffic flows) or traffic signals to improve capacity and/ or demand management to reduce traffic flows.

Worked Example: Priority junction capacity analysis

Step 1: Survey Data

Major flow = 900 cars and vans + 100 hgv's, minor flow = 135 cars and vans + 15 hgv's

Step 2: Range of Traffic Flows (pcu)

Major flow = 900 cars & vans x 1.0 + 100 hgv's x 1.9 = 1,090 pcu +/- 10% = 981 to 1,199 pcu

Minor flow = 135 cars and vans x 1.0 + 15 hgv's x 1.9 = 164pcu +/- 10% = 148 to 180 pcu

Step 3: Plot the results

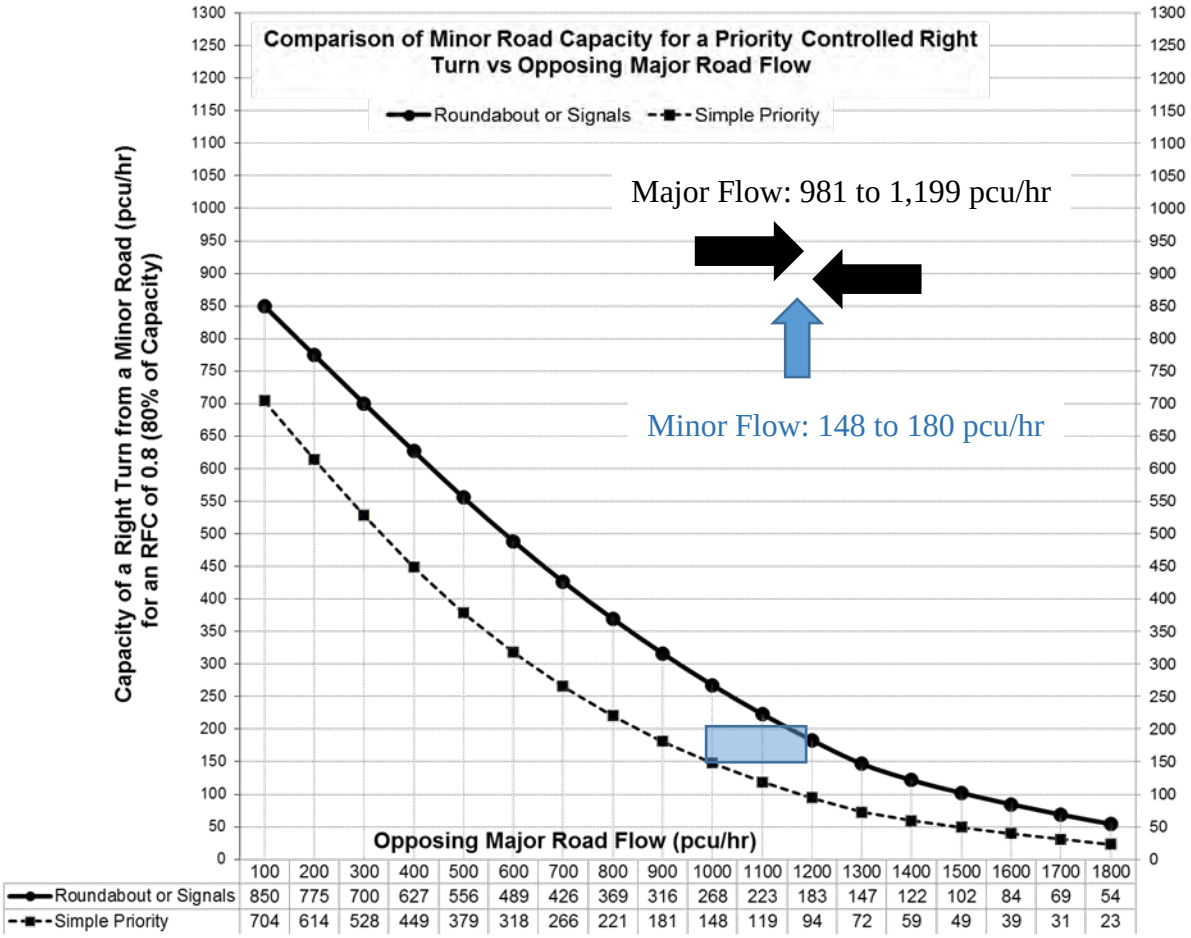


Figure 3: Example of Plotting the Range of Traffic Flows

It can be seen from the plotted blue box on the graph in **Figure 3** that the simple priority junction arrangement will be congested most of the time. Therefore, junction improvements and/or demand management measures are required.

Methodology for Assessment of Traffic Signal Controlled Junctions

There are a number of software packages available that can model traffic signals. However, it is often difficult to interpret the results without fully understanding all of the parameter settings and assumptions made. The following methodology for assessing the performance of signal controlled junctions is more transparent based on first principles and applies the advice of the manual preliminary assessment method described in the Department for Transport Traffic Advisory Leaflet 01/06, "General Principles of Traffic Control by Light Signals" (TAL01/06). The terminology in this guidance is consistent with TAL01/06 which should be used as a companion reference.

Reference for TAL01/06: https://www.gov.uk/government/collections/traffic-advisory-leaflets

Additional guidance is provided below regarding how to assess junction performance in a realistic way by applying a graphical method. It is expected that more detailed junction assessment will need to be undertaken following this initial assessment using specialist software packages. This graphical approach will also be useful for interpreting the output from the software packages used in the detailed assessment and identifying any unrealistic results which could also indicate errors in the models.

Step 1. Collect the relevant data for the existing junction

The data collected at the junction needs to enable a thorough assessment of the demands (traffic and people movement), performance and safety. The following data needs to be collected as a minimum requirement:

- Classified counts for all movements through the junction by mode (including pedestrians, cyclists, vehicle occupancy and bus patronage);
- Lane utilisation (proportion of a movement demand that uses each lane);
- Proportion of traffic in mixed movements;
- Queue lengths (enabling the calculation of total demand and existing delays);
- Saturation flows;
- Signal timings; and
- Collision history.

The data collected needs be thorough enough to enable the variance in the counts, queues, delays and saturation flows to be understood. Vehicle queue lengths need to be collected for the critical movements as a minimum. The method of measuring queue lengths needs to enable the calculation of existing traffic delays. This information can then be used to calibrate and validate models used for detailed junction assessment.

Lane utilisation needs to be recorded at the same time that the turning counts at the junction are surveyed.

All traffic data needs to be converted to passenger car units (pcu) as described in TAL01/06 for the purpose of the junction performance assessment.

The results of the surveys need to be reported to enable an understanding of the existing numbers of people using the junction by mode.

The movements of pedestrians and cyclists need to be surveyed and reported separately (with a diagram if the desire lines are difficult to describe).

Observations of desire lines used by pedestrians and/or cyclists (such as using unpaved areas or verges or crossing the highway where there is no formal crossing facility) may indicate an opportunity to improve their journey time, accessibility and/or safety through or near the junctions. Such opportunities need to be included in the assessment.

Step 2. Identify the range of traffic flows to use in the assessment

Traffic flows can vary significantly. Sufficient traffic data should be collected to establish design reference flows as described in the Design Manual for Roads and Bridges guidance (DMRB 6.2, TA23/81), Department for Transport WebTAG (TAG Unit M1-2, Jan 2014) and COBA manual. The design reference flows need to be defined as a range that accounts for the variation in flow for the purposes of the preliminary assessment (see page 14 of TAG Unit M1-2, Jan 2014). Traffic flows should be assumed to vary by a minimum of 10% on a daily basis to account for fluctuations and seasonal differences.

For some critical movements, it may be appropriate to establish the variance more accurately but minimise the costs of data collection by surveying a shorter period over a number of days e.g. 15 minutes over 5 days at the same time of day. In such circumstances, an appropriately sized sample will need to be collected that demonstrates and appropriate level of statistical significance.

Traffic queues will form when the demand is higher than the available capacity. Therefore, for the purposes of the assessment the number of vehicles in the queue at the end of the counting period needs to be included in the total traffic demand rather than just the numbers of vehicles crossing the stop line.

Step 3. Identify the range of Saturation Flows to use in the assessment

The saturation flows used in the assessment need to be realistic (see part 3 of TAL01/06). It is more realistic to use a range of saturation flows than a specific average or mean because the variance can be significant. Transport Research Laboratory Report RR067, "The Prediction of Saturation Flows for Road Junctions Controlled by Traffic Signals", by R M Kimber, M McDonald and N B Hounsell, 1986 indicates that standard error of the sample mean was 1.1% and the standard deviation was between 8 and 9% of the mean. Therefore, applying a 10% range will ensure that realistic saturation flows are used in the assessment. The lower value will be the key constraint on the junction performance. Assuming the range of saturation flows are normally distributed, at least 85 percent of the time the saturation flow will be higher than this value (i.e. the cumulative distribution above one standard deviation below the mean is at least 85%).

RR067 indicates that saturation flows reduce by 6% in wet weather conditions. For the period from 1981 to 2010, the Met Office reported that weather was wet in Cardiff for 148.6 days per year on average (approximately 40% of the year). Therefore, the range of upper and lower limits of saturation flows in dry conditions should be reduced by 6% to account for wet conditions and then combined in proportion (60% dry and 40% wet) to establish a realistic range of saturation flows throughout the year.

Met Office Reference: www.metoffice.gov.uk/public/weather/climate/gcjszmp44

For existing signalised junctions, the range of saturation flows need to be measured to achieve a statistically representative sample size. The type of weather conditions that the surveys were conducted in need to be recorded. The range of saturation flow values used in the analysis need to be adjusted to account for the weather conditions to represent a realistic range of saturation flows throughout the year.

If the junction is not already signalised, the range of saturation flows needs to be calculated using RR067. The range of upper and lower saturation flows for each unopposed critical movement can be calculated using the standard errors of the relevant parameters in the research report (a spreadsheet to assist with these calculations is available upon request). An alternative approach will be required to determine the capacity of critical movements that are opposed during a signal stage (e.g. micro-simulation). Gap acceptance analysis is not likely to be appropriate given the bunching effect of platooned traffic. Site observations will confirm whether gap acceptance analysis is appropriate for existing signalised junctions.

Step 4. Identify the critical movements (phases) in each stage of the cycle

If the saturation flows for each movement during a stage were identical, the critical movements would be those with the highest traffic demand. However, saturation flows vary and there can be circumstances where they are significant enough to make a lower flow movement require a longer green time than the higher flow movement. Therefore, the "y-ratio" method of identifying critical movements according to TAL01/06 needs to be used.

Step 5. Identify the appropriate cycle time

If the junction is already signalised, the cycle time needs to be based on measurement. Typically, traffic signals will operate at their maximum during peak periods but this will vary by site and the level of pedestrian and traffic demands (see **Figure 4** that illustrates the variance in cycle time that can occur). The length of the cycle time will depend on the traffic demand, saturation flows and number of stages. The maximum cycle time is often set to 128 seconds. However, the average cycle time used by SCOOT may be closer to 120 seconds. Some junctions may operate at 60 seconds particularly if there are short lane effects or there are only 2 or 3 stages.

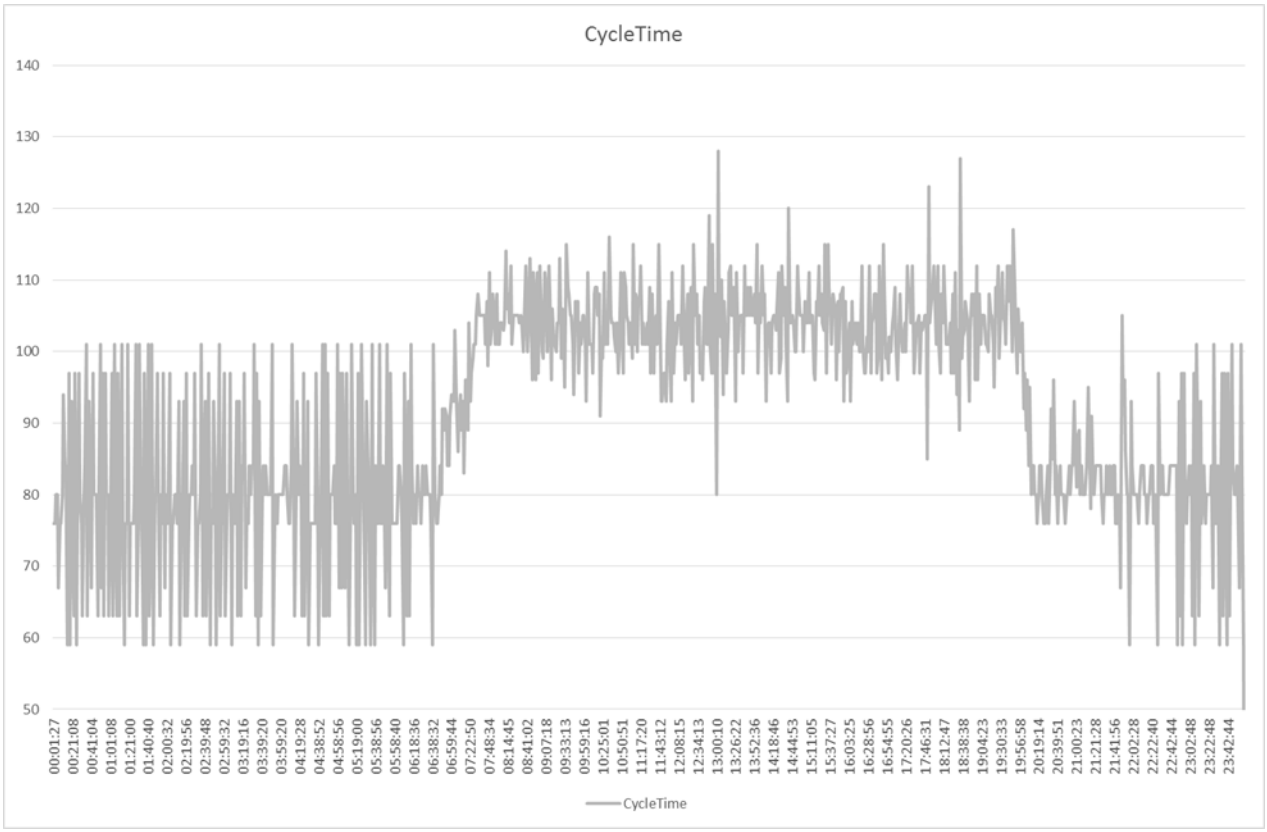


Figure 4: Example of daily variance in cycle time at a signalised junction in Cardiff

The TAL01/06 guidance offers a method for identifying minimum and practical cycle times. However, the method has limitations and does not reflect the variance in cycle times that are assigned by the SCOOT traffic signal control system. It is more realistic that SCOOT uses a range of cycle times to allocate the green time to each stage efficiently according to demand. For the purposes of the preliminary assessment it is recommended that a cycle time of 60 or 120 seconds is used. Local conditions or specific circumstances (e.g. coordination of traffic signals within a signal control region or shorter cycle times to minimise queuing where there are short flares - "short lane effects") may require a different cycle time to be used. Such circumstances will require agreement with the relevant officers in the Council.

Step 6. Calculate the available green time

If the junction is already signalised, the total available green time during the cycle is calculated by subtracting critical pedestrian stages and the sum of the inter-green times for each stage from the cycle time. If it is not already signalised, a range of cycle times may be more appropriate for testing options (e.g. 60 to 120 seconds). Lower cycle times may be more efficient if there are short lane effects (e.g. flared lanes).

Step 7. Proportion the available green time to each stage

The green time to be allocated to each stage needs to be in proportion to the sum of the y-ratios of the critical movements. There may be circumstances where the existing green time does not correlate with what would be expected. The reasons for this difference needs to be identified as there may be network management requirements or signal faults. Such circumstances will need agreement with the Council regarding what green times would be appropriate to model.

The minimum green time to use in the assessment is 7 seconds as described in TAL01/06.

Step 8. Graphically Plot the Range of Traffic Flows, Saturation Flows and Green Times

The range of traffic flows, saturation flows and green times for the critical movements need to be plotted on the graph illustrated in **Figure 5**. The graph has been derived from first principles based on the relationship between movement capacity, cycle time, green time and saturation flow. Given the discussion above regarding the uncertainty of traffic conditions over 80% of capacity, the grid has been adjusted to reflect this capacity threshold. Other grids can be generated for differing cycle times and capacity thresholds. The spreadsheet for deriving alternative timings and capacity thresholds can be made available upon request.

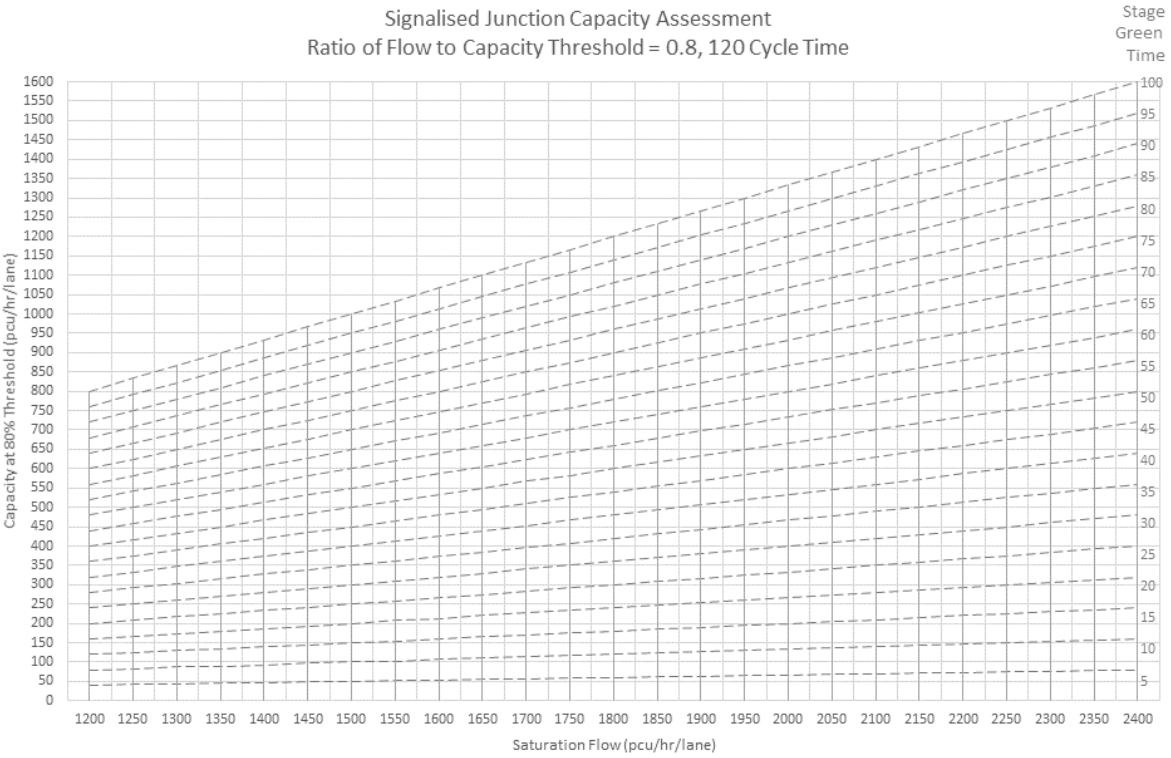


Figure 5: Graph for Assessing the Capacity of Movements at Signalised Junctions

The capacity envelope is drawn on the grid using the range of movement green times observed based on the axis on the right hand side of the graph. This is just a line on the grid if the green time does not vary during the period being assessed drawn from the axis on the right hand side of the grid parallel to the angled lines across to the right hand side of the grid. For example, the capacity envelope is plotted as shown in **Figure 6** if the green time for a movement is observed to vary between 35 and 50 seconds.

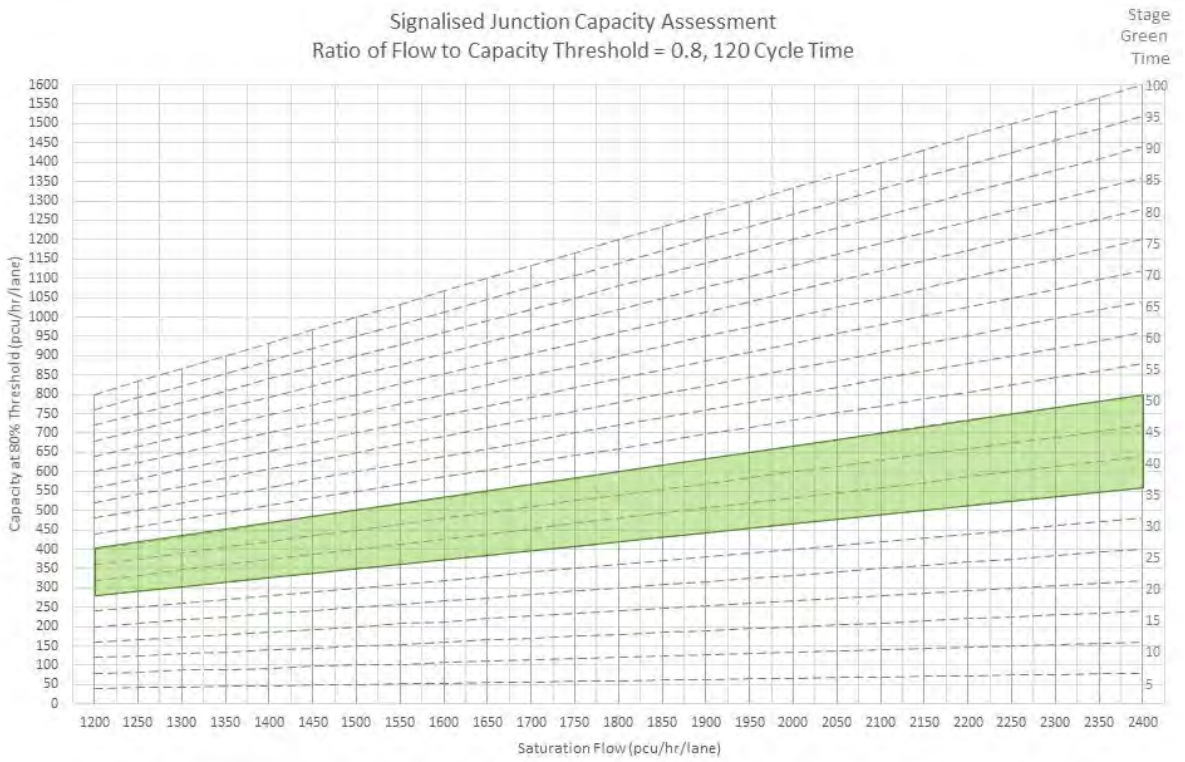


Figure 6: Capacity Envelope for a Green Time (35-50 sec) and Cycle Time (120 sec)

The traffic demand flows and saturations flows are drawn as a box on the grid according to the vertical and horizontal respectively using upper and lower ranges. The values should vary no less than 10%. For example, the box is plotted as shown in **Figure 7** if the traffic demand flows for a movement is observed to vary between 500 and 600 pcu/hr and saturation flows vary between 1,700 and 1,800 pcu/hr/lane.

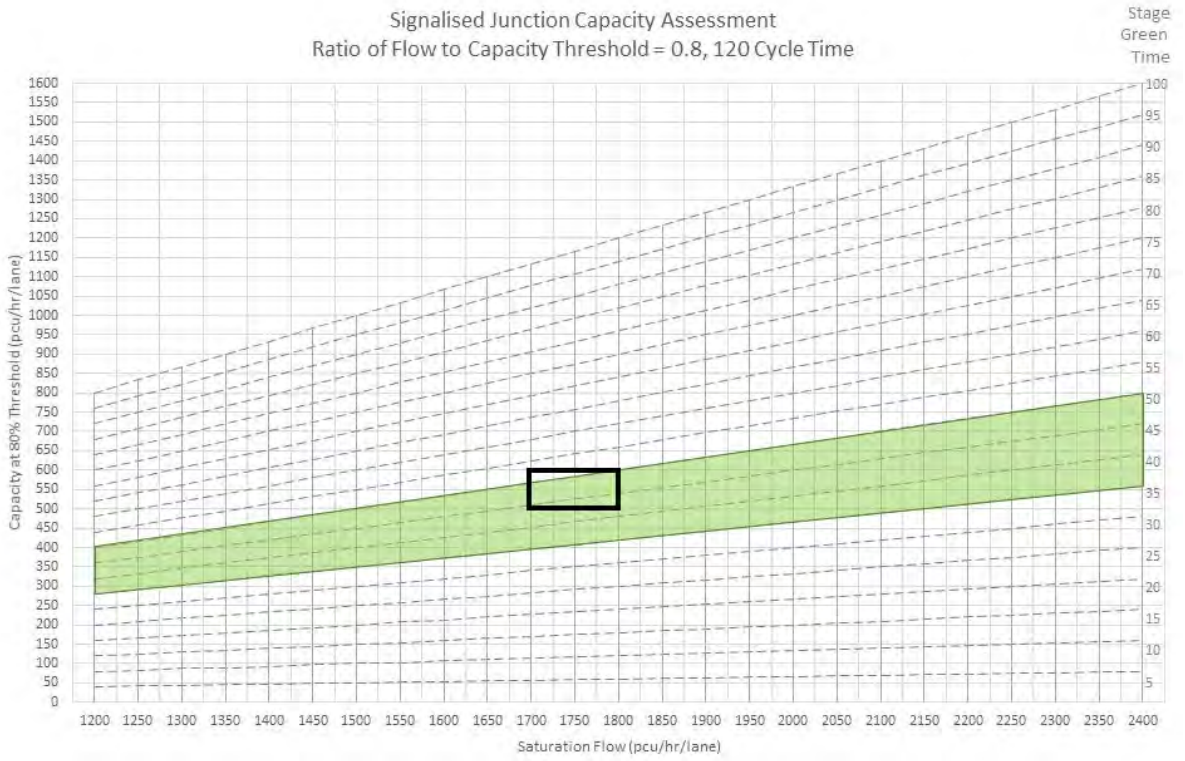


Figure 7: Box Plot of Traffic Demand Flows and Saturation Flows of a Movement

Step 9: Interpret the Results

For the example illustrated in Figure 7, most of the box is below the upper limit of the capacity envelope suggesting that for most of the time the movement operates within 80% of the available capacity. However, the movement would always be congested during the same period if the green time was fixed at 40 seconds.

Scope of Using the Graphical Approach for Signalised Junction Analysis

Separate graphs can be used for different movements if the grid becomes cluttered by overlaying them. If they are overlaid, they would need to be appropriately colour coded and referenced to avoid confusion.

Short lane effects may be accounted for to some extent using these graphs by adjusting the saturation flows due to the underutilisation of the relevant lanes for the movement. However, other methods may be better able to provide the detail needed to understand the interactions (e.g. micro-simulation).

Coordination with Telematics

The assessment of signalised junctions will require extensive coordination with the Telematics team in order to obtain the necessary junction plans, controller information, signal timing information and verify that any future proposed signal staging can be accommodated within UTC in practice.

Collision Analysis

The junction assessment will need to include collision analysis using COBA predictions. This information will identify if there are any safety improvements that can be made to the junction.

Other considerations

The following is a list of issues and considerations that could help inform the junction assessment to understand the impacts of development and/or identify appropriate mitigation measures:

- Observations of interactions/local behaviours of users;
- Pattern of traffic arrivals on the approaches due to upstream platooning effects;
- Route choices (travel time comparisons, network capacity remote from the junction/gating effects, pinch points);
- Public transport (e.g. movements to and from bus stops, lane changing and bus priority);
- Access for emergency services, taxis and goods vehicles;
- Trip Growth (traffic forecasts, mitigating measures to encourage mode shift, people moving capacity, location, proximity and access to jobs, shopping, education, leisure, and community facilities); and
- Geometry or local conditions that may impact on safety or capacity of the junction (e.g. visibility, gradients, signage, lane widths, radii, vehicle tracking, street furniture, landscaping, lane markings, flares/merges/diverges, upstream/downstream conditions, lane length/queuing capacity, pedestrian crossings, driveways/side road access, parking, laybys, bus stops, loading, disabled parking).

This is not an exhaustive list and there may be other relevant matters that need to be considered.

Walking, cycling and public transport need to be prioritised as attractive alternatives to travelling by car irrespective of the results of the junction assessment.

Note: References above are correct as of the time of writing but may be subject to change by the organisation it is sourced from.

Using Micro-Simulation Models

Since simulation models describe a dynamic process in statistical and pictorial formats, they can be used to analyse a wide range of applications in the following circumstances where:

- deterministic models (LinSig, Transyt etc.) are not able to accurately represent the complexity of a situation;
- congested network of closely linked junctions;
- the profile of arriving traffic over the hour is particularly exaggerated, and extensive queuing or blocking-back is likely to be a frequent occurrence;
- short-lane effects have a significant impact on the capacity available; or
- There is a need to view vehicle animation displays to gain an understanding of how the system is behaving in order to explain why the resulting statistics were produced.

Appendix 4 Cardiff Council Travel Plan Guidance and Checklist Contents

4.1 Purpose of guidance

4.1.1 Together with Transport Assessments, Travel Plans (TPs) are an important tool in anticipating the impacts of development so that they can be understood and catered for. This document should also be used with reference to the Council's Transport Assessments Guidance and Checklist which forms part of the suite of supporting documents for the SPG. The checklist is not exhaustive and adaptation may be required to reflect the type and scale of the proposed development.

4.1.2 The guidance set out in this document is intended to assist the progress of planning applications. Following the guidance below will assist applicants in producing Travel Plans required through the planning process and enable them to be assessed by the Council in a timely manner. The explanatory notes below should be used in conjunction with the checklist of requirements at the end of the document to ensure that any Travel Plan which is submitted to the Council contains all of the information which is required by the planning authority in assessing a planning application.

4.1.3 The Welsh Government's policies on Transport Assessments and Travel Plans within the planning process are contained in Planning Policy Wales (Edition 8 January 2016) (PPW) and the Technical Advice Note 18 (TAN 18).

4.1.4 A number of resources are available to assist in the development of TPs. The checklist below is derived from the Transport for London ATTrBuTE web based application and sets out the Council's requirements for Travel Plans prepared to accompany planning applications.

4.1.5 Where essential information is omitted, this may result in a delay in determining an application as any outstanding material may be required through the determination period. A pre-application service is offered by the Council and it is recommended developers use this service to ensure engagement at the earliest possible opportunity.

4.1.6 Where TPs are submitted for consideration at pre-application stage or with a planning application, the Council will use the list to audit the submission to check that it contains all the appropriate details and information to enable the Council to properly assess and understand the necessary transport mitigation measures required to address the transport impacts of the development proposals.

4.1.7 Additional travel planning resources are available from

www.keepingcardiffmoving.co.uk. The Department for Transport (DfT) guides 'Making Residential Travel Plans Work' (2005) and 'Delivering Travel Plans through the Planning Process' (2009) are also useful resources.

4.2 Travel Plans

4.2.1 A TP is a package of site-specific initiatives aimed at improving the availability and choice of travel modes to and from a development. It may also promote practices or policies that reduce the need for travel. The TP should be tailored to address the site-specific issues relating to the proposed development.

4.2.2 The use of area-wide travel plans for multiple organisations and/or sites is also an important mechanism in the underlying aim to manage vehicle trips at source. Whenever a site-specific TP is proposed, the developer should ascertain whether an area-wide TP exists and integrate the site-specific TP with this where appropriate.

4.3 Travel Plan Design and Contents

4.3.1 Travel Plans will vary according to the type of development. These specific requirements are addressed below.

4.3.2 **Organisational Travel Plans** - A Travel Plan should be specifically tailored to the needs of the organisation/site for which it is written, taking account of individual circumstances and requirements. It should describe proposed sustainable travel measures and measures to reduce the need to travel. For new developments, a full Travel Plan may not be possible prior to commencement of development, as appropriate information regarding the end user and their travel patterns will not be available. This will require the production of an interim or 'Framework' Travel Plan, as outlined below.

4.3.3 **Framework Travel Plan –** The Framework Travel Plan should specify any measures which will be implemented before occupation (for example, improvements for pedestrian and cycle parking facilities etc.). It should outline a firm commitment and timetable for production and implementation of the Final Travel Plan which should be submitted to the Council for approval within 6 months of the commencement of occupation. Delay in developing and implementing the Travel Plan following occupation should be mitigated by setting clear timescales for roll out and maintaining contact with the Council during this time.

4.3.4 **Multi-occupancy sites -** The cumulative transport impacts of a number of smaller organisations or developments within one site may justify an 'umbrella' Travel Plan for the whole site. This should be provided and administered by an appropriate contact, for example, the agent of the developer/site manager. Additional Travel Plans for individual organisations may be required in respect of the smaller 'units' which directly relate to and integrate with the umbrella Travel Plan. Where possible, it should include the requirement to produce an organisational Travel Plan (a Travel

Plan relating to an individual organisation that sits within an Umbrella Travel Plan) as a part of the lease.

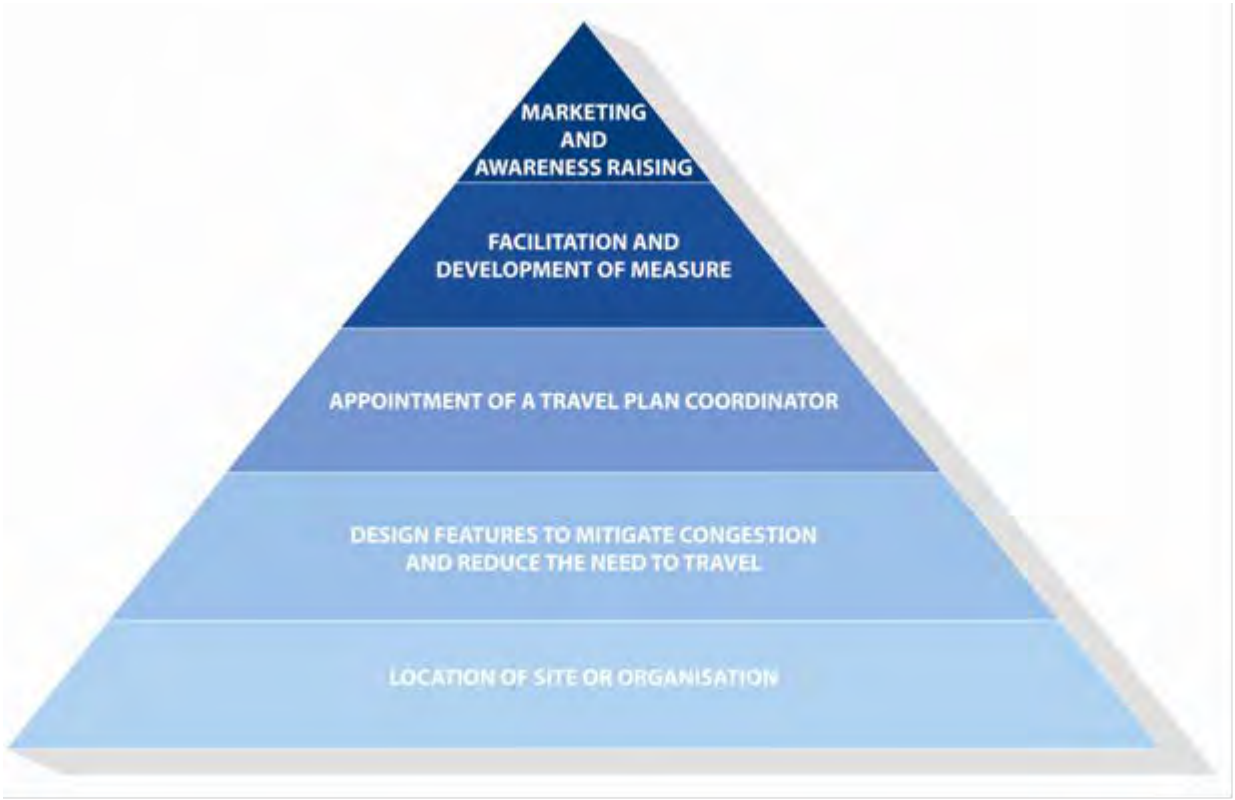
4.3.5 **Residential Travel Plans -** These differ from other Travel Plans in that they deal with complex varied patterns of journeys and journey types from a place of origin. Residential Travel Plans require that an ongoing Travel Plan management and organisational structure be put in place to continue and coordinate Travel Plan implementation. The scope of Residential Travel Plans varies significantly with the type, location and scale of the residential development involved and how it integrates with the local area in which the Travel Plan is operating e.g. part of a mixed use development.

4.3.6 **School Travel Plans** – These are designed specifically to address the transport needs of pupils and staff. Each plan will vary according to the nature of the education provided and the catchment area of the school. Close liaison with school transport services is recommended.

4.3.7 **Travel Action Plans** - In smaller, less complex sites a Travel Action Plan can be sufficient to set out key measures, responsibilities, a communication plan and a timescale for implementation, as well as a strategy for monitoring and reporting results to the Local Authority.

4.3.8 All Travel Plans comprise a 'package' of measures and actions, as illustrated in the 'Travel Plan pyramid' below (Figure 1.1).

Figure 1.1: Travel Plan Pyramid



Cardiff Council TP Guidance: Checklist

Requirement	Yes/No	Comments
The development		
1. Does the travel plan include: a) full address of the development/organisation? b) contact details for the person responsible for preparing the travel plan?	Yes No	
2. Where appropriate, does the travel plan include: a) a breakdown of the different land uses expected on site? b) details of the size of each type of land use? c) details of how build-out of the development will be phased?	Yes No	
3. Does the travel plan include details of the number of users expected on site, including: • Employees • Residents • Deliveries • Visitors. **Note:** As much detail as possible should be provided e.g. breakdown of Full-time/Part-time employees, number of staff expected on site at any one time, number of deliveries expected.	Yes No	
4. If a framework travel plan has been submitted, does it include a commitment for occupiers of the site to develop individual travel plans within the context of the overarching plan? **Note:** Where thresholds are met occupiers should develop site-specific travel plans.	Yes No	
Site assessment		

5. Does the travel plan clearly describe the accessibility and quality of existing transport networks and initiatives and existing travel initiatives available to all users? This should include the below, where appropriate. • Walking environment: quality onsite and on local streets, focusing particularly on routes to local transport and other amenities. • Existing cycle infrastructure: quality and availability around the site and connections to the wider network. • Planned cycle infrastructure: parking and other facilities (e.g. showers, lockers, drying room) that will be introduced as part of the development. • Promotion of cycling: e.g. organisation policies and other initiatives that will influence the take up of cycling such as tax free cycle schemes, cycle training. • Car related initiatives: car park management policies, car clubs in the local area, car sharing, pool cars. • Public transport: options, routes available, hours of operation and frequency of services, quality of stops and stations including lighting, cleanliness, cover of real time information, organisational policies that influence travel by public transport e.g. provision of season ticket loans.	Yes No	
Surveys		
6. Does the travel plan propose: a) site user travel surveys? b) an agreed date with the authority for the surveys to take place? **Note:** The TP should specify when travel surveys will be undertaken, this will usually be within three months of occupation.	Yes No	

7. Is a baseline modal split (actual trip numbers and percentage of all trips) estimated for the site?	Yes No	
Objectives and Targets		
8. Does the travel plan include objectives which reflect: a) Welsh Government policy and strategic guidance? b) local policy and guidance? c) the challenges and opportunities specific to the site?	Yes No	
9. Are there targets linking directly to each objective?	Yes No	
10. Where required, have targets appropriate to the phasing of the development been set? **Note:** Targets should relate back to the TA.	Yes No	
TP Co-ordinator		
11. Has a travel plan co-ordinator been identified, or is there agreement upon when a co-ordinator will be in place? **Note:** A nominated point of contact should be provided in absence of a named TP Coordinator.	Yes No	

12. Has the travel plan co-ordinator: a) clear roles and responsibilities? b) been allocated a sufficient amount of time to spend on the travel plan? Note: Roles may include development/ management/distribution of marketing and promotional materials, providing personal travel planning advice, managing welcome packs for residents/new staff, and travel plan monitoring.	Yes No	
Measures		
13. Do the site-wide measures: a) support the objectives of the travel plan? b) reflect the context of the site? **Note:** Measures must support the TP objectives and enable the targets to be met. They also must be site specific as different measures will have different levels of success depending on the surrounding area. The following measures may be appropriate but are not an exhaustive list: • Walking measures: routes in and around the site and facilities e.g. showering, changing, drying and lockers. • Cycling measures: infrastructure e.g. cycle parking and shower, changing, drying and locker facilities. Operational policies and other initiatives that encourage cycling should be considered e.g. cycle mileage for business travel, bike maintenance sessions. • Public transport measures: season ticket loans, signage to local public transport facilities and personalised travel planning • car share/car club measures this could include the appointment of a car club operator for the site or designated car share parking bays. • Other measures: internet shopping, working from home, flexible working hours, teleconferencing.	Yes No	

14. Is an action plan provided which includes: a) short / medium / long term actions? b) timescales and responsibilities?	Yes No	
Umbrella Travel Plans		
15. Is the action plan clear on how and when travel plans will be developed among occupying organisations?	Yes No	
Monitoring		
16. Is a clear monitoring programme included? **Note:** Monitoring should occur in year one as a baseline and as agreed thereafter.	Yes No	
17. For a site-wide or area TP, is it clear who is responsible for site-wide monitoring?	No Yes	
Securing and enforcement		
18. Is it clear how the travel plan will be secured? **Note:** The TP should state which measures are in place to ensure it is undertaken effectively e.g. sanctions tied into S106. Relevant excerpts from the S106 agreement or planning conditions should be included in the TP.	Yes No	
19. Does the Travel Plan set out the agreed life of the Plan?	Yes No	
20. Does the Travel Plan include reporting requirements and measures which can be put into place with any failure to meet targets etc? This should reference any funds secured by s106 if appropriate.	Yes No	
Funding		

21. Has a budget been set for the site-wide: a) travel plan co-ordinator post? b) measures? c) monitoring programme? **Note:** A good budget should identify how each element of the travel plan delivery would be paid for including the travel plan coordinator, marketing components and physical measures.	Yes No	
22. If appropriate, have funding streams been identified for a site-wide: a) travel plan co-ordinator post? b) measures? c) monitoring programme? **Note:** It is important that a funding stream for the implementation of the TP is secured in the early stages of the development process. Identifying a funding stream is a good indicator of commitment to the plan.	Yes No	
Comments		
23. Do you have any final comments?	Yes No	

Appendix 5 Transport Statements

1.1 A Transport Statement (TS) may be required where a development falls below the threshold for a Transport Assessment (TA), but may still have an impact in transport terms.

1.2 A TS should set out the transport issues relating to a proposed development site, both the existing conditions and also details of the development proposals.

1.3 The developer should provide a full description of:

- existing site information – describing the current physical infrastructure and characteristics of the site and its surroundings, including a site location plan showing the proposed development site in relation to the surrounding area and transport system;
- baseline transport data – background transport data and current transport infrastructure details.

1.4 This information should be accurately established to understand the context of the development proposal. The description should include as a minimum:

- the permitted and existing use of the site;
- the existing land uses in the vicinity of the site, including development plan allocations, or potential future use in the case of undeveloped sites;
- existing site access arrangements including access constraints, where appropriate;
- whether the location of the site is within or near a designated Air Quality Management Area (AQMA);
- any abnormal load uses of the current site.

Baseline transport data

1.5 A full set of baseline data should be provided, included, where appropriate:

- a qualitative description of the travel characteristics of the existing site, including
- pedestrian and cyclist movements and facilities, where applicable;
- existing public transport provision, including provision/frequency of services, location
- of bus stops/train stations, park-and-ride facilities;
- a description and functional classification of the highway network in the vicinity of the site;
- an analysis of the injury accident records on the public highway in the vicinity of the site access for the most recent three-year period, or five-year period if the proposed site has been identified as within a high accident area.

Proposed Development

1.6 The developer should provide a full description within the TS including, as a minimum:

- plans and drawings showing the proposed site layout, particularly the proposed
- pedestrian and vehicular access points into the site;
- the proposed land use;
- the scale of development, such as numbers of residential units and/or gross floor area
- (GFA), subdivided by land use where appropriate;
- the main features (design layout and access points) of the development;
- the person-trip generation of the proposed development and distribution of trips across mode;
- a qualitative and quantitative description (based on recent site observations) of the travel characteristics of the proposed development, including pedestrian and cyclist facilities/movements, in the vicinity of the site;
- proposed improvements to site accessibility via sustainable modes of travel, such as provision/enhancement of footpath and cycle path linkages, public transport
- improvements, and servicing arrangements where appropriate;
- a proposed parking strategy and internal vehicular circulation (including number of spaces, parking accumulation, parking layout in relation to other site elements, method of car park operation, overspill parking
- considerations, disabled parking, motorcycle parking, cycle parking, taxi drop-off
- points);
- residual vehicular trip impact;
- the transport impacts of site construction, including the requirements of abnormal loads
- in the construction, use and decommissioning the present development;
- the transport impacts of freight or service operations; and
- if the site of the proposed development has a current use or an extant planning
- permission with trip patterns/volumes, the net level of change that might arise out of the new proposals should be set out.

1.7 The above requirements are not exhaustive and there may be a need for supplementary information that takes account of local conditions as well as other material considerations.

1.8 However, not all proposed developments that are considered to require a TS would necessarily need all of the above matters to be considered. Therefore, it is important that the scope of the TS is agreed at the pre-application discussion stage between the developer and appropriate authorities.