WEST DUNBARTONSHIRE TAXI STUDY

TRi Taxi Studies Group
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The TRi Taxi Studies Group

The TRi Taxi Studies Group is a specialist research unit of the Transport Research Institute at Napier University. The Taxi Studies Group seeks to advance the science and understanding of the taxi industry worldwide.

The group has an established record in delivering high quality transport research and consulting projects, and regularly contributes to the transport science communities in the UK and internationally. The group's portfolio includes studies of:

- Regulation, impacts and reform within the taxi industry worldwide,
- Assessment of tariffs applied to the taxi industry
- Assessment of the demand for and supply if taxi services, including undertaking Significant Unmet Demand studies in the UK.

The Taxi Studies Group is also responsible for the design and delivery of the T2E Transport to Employment service operated by the group on behalf of the Highland Council. T2E is an innovative and novel method of providing in demand transport in circumstances where no other transport exists.

The group regularly contributes to work considering the supply of transport across modes, and have recently completed a study of the supply of transport in the night time economy. Members of the group have worked for local and national projects, including providing advice to the Department for Transport, the Scottish Executive and the Department of the Environment.

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1.0 Executive Summary

1.0.1 The TRi Taxi Studies Group have been requested to complete a study of taxi supply in West Dunbartonshire, seeking to determine the (lack of) presence of Significant Unmet Demand (SUD) in the supply of taxis, and the determination of the appropriateness of taxi supply in addressing the demand for taxi transport in West Dunbartonshire.

1.0.2 The taxi study have undertaken a four stage analysis of taxi supply comprising:

- Review of existing studies, including assessment of the legal framework, interpretation and application to the West Dunbartonshire survey design
- Completion of observation survey at stance
- Completion of public, disabled and driver surveys
- Reporting

1.03 The study has undertaken a series of surveys appropriate to the determination of SUD, the identification of issues in taxi supply affecting members of the public, and the determination of issues affecting those with specific accessibility requirements.

1.04 A further survey identifying the issues in supplying taxis has been undertaken, including a questionnaire sent to all drivers seeking information on work patterns, preferred times of operation, and inviting comment on matters affecting their work.

1.05 Observation surveys were completed at eight marked stance locations on the basis of both day and night observation, and at a number of unofficial ranking places, where night time pick up differed from marked ranks.

1.06 Pedestrian Surveys were completed in both Dumbarton and Clydebank zones, and provide detail of public attitudes and concerns in the supply of taxi services in West Dunbartonshire.

1.07 An Access survey was distributed with the assistance of the West Dunbartonshire Access Panel, and provides details of concerns and experiences in the supply of taxis experienced by those with specific access requirements.

1.08 Two focus group meetings were held, the first with taxi operators, the council licensing department and the police; the second with representatives of those with specific access requirements. Both meetings have informed and guided the conduct of the research, and provided input in the interpretation of the results.

1.1 Significant Unmet Demand

1.1.1 On the basis of the research undertaken in our study, it is our conclusion that neither the Dumbarton nor the Clydebank taxi zones demonstrate any extent of significant unmet demand. This indicates that the current numbers of licences remain appropriate to the supply of taxis in both zones.

1.1.2 There are some indications that the current numbers of taxis exceed the level required to provide an appropriate level of service. The issue of over supply is not addressed in the governing legislation, and has not been followed further in our study.

1.2 Taxi Accessibility

1.2.1 Taxi services performed well in carrying able bodied passengers in both zones, and few delays were experienced in engaging taxis by this group.

1.2.2 The needs of passengers with specific accessibility needs were well catered for in the Clydebank zone, and the study team observed few instances of significant delay in making use of accessible taxi types. Indeed, the use of a fully accessible taxi fleet also appeared to benefit taxi users with shopping and with children's buggies, and resulted in significantly faster access times than equivalent journeys in traditional saloon vehicles where the collapsing of buggies was necessary.

1.2.3 Observed use and reported issues in the use of saloon vehicles suggests this type of taxi less favourable to those with specific access needs, as well as those with children's buggies, or large amounts of shopping.

1.2.4 The study concludes that identifiable benefits would exist were taxi services in Dumbarton and the Vale of Leven supplied by accessible taxi vehicles.

1.2.5 The study concludes an immediate need exists for 23 Accessible Taxis to be provided within the Dumbarton zone, and would recommend consideration of a move to a fully accessible fleet over time.

1.3 Physical Issues at Taxi Ranks

1.3.1 The majority of taxi stances performed well, and few occurrences of delay observed or reported.

1.3.2 Some issues exist in the design of or actual use made of particular stances, and the adoption of minor enhancements may act to improve the levels of services in both zones. These are summarised as:

- Clyde Shopping Centre / UCI
  Re-determine street marking to move the boarding point to the Asda end.

- Clydebank, Alexander Street
  Address faulty lighting issues under the railway overbridge, and improve street markings to discourage illegal parking

- Clydebank, Dumbarton Road
  Move marked bays to coincide with the observed pick ups outside Buddha night club

- Dumbarton Central Railway Station
  Relocate station stance outside the Railway Bar, and improve signage within the station premises.

1.4 Further Issues in Taxi Supply

1.4.1 Overall taxi supply in West Dunbartonshire was felt to compare well with other similar authorities, and the study team found few issues in respect of service provision for able bodied passengers.

1.4.2 The study identifies a need to address demand for accessible taxis in the Dumbarton zone, and would recommend a long term move to a fully accessible fleet in this zone.

1.4.3 The study also would suggest consideration of a long term move to a single authority wide zone. The historic reasons for two zones are understood, and appear logical in some aspects, but are unlikely to have emerged in the creation of a taxi operating zone from scratch. There is merit in considering the long term benefit of moving to a single zone. Such a move would only be logical, in our view, where both zones have a unified accessible fleet.

2.0 Introduction

2.0.1 The TRI Taxi Studies Group has been requested to complete a study to assess the effectiveness of supply of taxi services on behalf of West Dunbartonshire council. The study brief included a survey to establish the presence (or otherwise) of Significant Unmet Demand (SUD), a review of the appropriateness of supply to disabled passengers, and assessment of the ability of the current fleet to deliver appropriate transport supply.

2.0.2 The study team undertook assessment in the period between February and April 2006, including completing an assessment of Unmet Demand, and Significant Unmet Demand, an assessment of the needs of the travelling public across both able bodied and disabled travellers, and methods by which such demand may be effectively supplied.

2.0.3 The work draws on the experiences of other studies measuring for the presence of unmet demand, but is not constrained to the exact duplication of modelling methodologies. Additional assessment set out to establish the wider needs of the travelling public, and specified user groups. The study has also included applying methods of assessing observed and latent demand.

2.0.4 The study allows for a directly comparable assessment between West Dunbartonshire and other authorities in the determination of SUD, and provides a wider ranging assessment of strengths and weaknesses of supply in West Dunbartonshire.

2.1 Work Packages

2.1.1 The study was split into four distinct work packages addressing the needs set out in the brief, completed concurrently, and drawn together in the final report to the Council. These include:

- Review of existing studies, including assessment of the legal framework, interpretation and application to the West Dunbartonshire survey design
- Completion of observation survey at stance
- Completion of public, disabled and driver surveys
- Reporting

2.1.2 In addition, the study completed two focus group discussions, one with the trade and the council, and a second focusing on the needs of travellers with disability needs.

2.1.3 The final report provides a synthesis of the findings of the study, its interpretation, and a number of recommendations specific to the future development of the West Dunbartonshire Taxi Fleet.

3.0 Review of existing studies and state of the art

3.0.1 The completion of taxi surveys is a regular part of the duties of licensing authorities in Great Britain. A number of differing approaches are reported, summarised in the report of the Office of Fair Trading (OFT 2003) which itself set out a number of alternative approaches in the delivery of taxi and private hire services.

3.0.2 The primary method of analysis relates to a standard model for the measurement of Significant Unmet Demand (SUD) following a definition for the determination of SUD set out by Halcrow Fox and Associates, and widely replicated in similar studies in Great Britain. The Halcrow model appears ubiquitous in its application, and sets out to address many of the requirements set out in governing legislation in England and Wales, and separate legislation applied in Scotland. No similar requirements exist in Northern Ireland.

3.0.3 While commonplace, and widely accepted as an appropriate starting point, the single model approach does contain a number of limitations, including a number of assumptions of stance performance, and an absence of detailed assessments of needs of specific needs users, including the needs of disabled passengers, and issues surrounding identification of latent demand.

3.1 Legal Framework

3.1.1 Several differing legal requirements exist in relation to the supply of taxi services in the countries of the UK. Controls can apply to quality, cost and in some instances numbers of taxis in each instance where taxis are provided. These reflect three main areas of regulation: quality control, including safety of vehicles; economic regulation, mainly regulatory controls placed on price charged; and quantity regulation – restrictions applied to the numbers of vehicles that may be licensed.

3.1.2 Quality and economic controls are common in the supply of transport, and are typified by minimum standards of vehicle fitness; and in terms of maximum tariffs applied. All Licensing Authorities set out or comply with regulations of vehicle fitness, and a majority of authorities determine maximum tariffs that may be applied in their area.

3.1.3 Quantity controls are applied to a lesser extent, and relate to a differing

requirement, set out in the 1985 Transport Act in England and Wales, and the 1982 Civic Government (Scotland) Act. No licence restriction is applied in Northern Ireland.

3.1.4 Scottish legislation, as with that in England and Wales, sets out the right of local authorities to retain discretion as to whether limits be placed on numbers of Licences. The retention of any such limit may only be applied if it can be shown that there is no significant unmet demand for taxi services.

3.2 The Civic Government (Scotland) Act 1982

3.2.1 The exact requirement to determine adequate supply, is contained within the meaning of the Civic Government (Scotland) Act 1982 (Section 10(3)), as amended, and is mirrored in similar legislation in England and Wales, under Section 48 of the Local Government (Miscellaneous Provisions) Act 1976, and the Transport Act 1985. These specifically prohibit the refusal of a Private Hire Vehicle (PHV) Licence and restrict the application of Quantity Regulation of Public Hire vehicles (Section 16 of the Transport Act (1985)) to specific circumstances where 'the grant of a Licence may be refused, for the purpose of limiting the number of hackney carriages in respect of which licences are granted, if, but only if, the person authorised to grant such Licences is satisfied that there is no significant demand for the services of hackney carriages (within the area to which the Licence would apply) which is unmet.

3.2.2 The wording of the governing legislation appears clear and unambiguous, permitting quantity regulation in instances where it is identified that no significant unmet demand is present.

3.2.3 Other legislative requirements include the definitions of quality regulation, most specifically the determination and supply of accessible vehicles, and in terms of minimum standards of fitness.

3.3 The Disability Discrimination Act (1995)

3.3.1 A further requirement, applied to transport supply in England and Wales, relates to the accessibility of public facilities – including public transport – as set out in the Disability Discrimination Act (1995) (DDA). Application of the Act differs by mode of transport, and by region within the UK. Interpretation and application to transport services in Scotland is a devolved matter, and subject to separate Scottish determination.

3.3.2 In its application in England and Wales, the DDA seeks to increase the

extent of accessible taxis available for use (Chapter 50, Section 32). The act seeks to ensure appropriate provision of taxis which allow for disabled persons to get into and out of taxis in safety; and to be carried in taxis in safety and in reasonable comfort. The act also provides that disabled persons in wheelchairs be conveyed in safety into and out of taxis while remaining in their wheelchairs; and be carried in taxis in safety and in reasonable comfort while remaining in their wheelchairs. (Sect 32 1a, and 1b).

3.3.2 The application of specific requirements for the carriage of disabled passengers in taxis in Scotland falls to the Scottish Parliament. At the time of writing, the specific circumstances of carriage of disabled passengers remain a matter for determination at a local level.

3.4 Modelling Framework

3.4.1 The West Dunbartonshire study follows a series of modelling approaches initially developed by Halcrow Fox Associates (the 'Halcrow model'). The main Halcrow model relates to the identification of unmet demand with reference to the waiting times experienced in taxi stances, and identified as queuing models in Table 1.

3.4.2 Comparable studies, including those completed by Halcrow, also make reference to the effects of increases in the numbers of taxis Licensed to operate, which has, in most instances, been seen as a method by which unmet demand may be addressed. These are identified as Extra Arrivals modelling (EA), Impact of Additional Arrivals (IAA) modelling, and Impact of a Larger Fleet modelling (ILF) which, when combined, provide an indication of the effectiveness of changes in the fleet size. Additional measurements, Matrix and Index assessment are included and precede detailed modelling, as a method of determining the likely presence of unmet demand prior to detailed analysis of its effect or methods of its reduction.

3.4.3 Where taken as an initial approach for assessment, the existing methods appear to be a good basis allowing comparative review and building consensus across differing licensing authority areas.

3.4.4 It is, however, appropriate to distinguish between generic approaches, these being the basis on which assessment is constructed and the determination of accurate methodologies for so doing. The latter being dependent upon site conditions where wide ranging assumptions may not be borne out in reality. The base conditions of the 'standard' models tend to assume generic circumstances, unlimited capacity at rank, stochastic supply, and an absence of site-specific engineering conditions - such as

sight lines, good vehicle access and exit conditions, which are not always accurate to physical conditions of locations being investigated.

3.4.5 While appropriate, therefore, as a basis of assessment, and to allow for comparison on a like for like basis between cities, our study suggests a need to enhance the generic approach specific to the conditions observed in West Dunbartonshire.

3.5 Review and interpretation

3.5.1 Methods currently in use set out a strong and well developed model for the assessment of Significant Unmet Demand. It is felt appropriate that the West Dunbartonshire study continue to employ models consistent with previous studies, and thereby allow a direct comparison of results between the findings of the West Dunbartonshire study, and those completed elsewhere.

3.5.2 However, reproducing a direct carbon copy of a single modelling approach is felt unlikely to fully account for the situation specific in West Dunbartonshire. The study therefore includes a number of additional elements (detailed in Table 1) specific to the assessment of Latent Demand, demands specific to wheelchair accessible vehicles, and the identification of issues at stance that may otherwise be overlooked in the traditional modelling approach.

Table 1: Model Structure and element definition

Element	Definition	Extent of Application	
		This Study	Preceding Studies
ISUD Matrix	Indication of the presence of SUD on the basis of peaking and delay	Yes	Most
ISUD Relative Value	Indication of the presence of SUD on the basis of measured comparative values	Yes	Many
Queuing models	Method for obtaining passenger delay figures through observation or estimation	Based on actual observed delay	Mainly based on synthetic delay estimation
Taxi Delay Models	Method for obtaining vehicle delay figures through observation or estimation	Based on actual observed delay	Mainly based on synthetic delay estimation
Public Expectation Model	Method for defining optimal service levels for public access. Allows for determination of latent demand.	Yes	Not Included
Disabled Supply Requirement	Method for defining optimal service levels for disabled accessible vehicles. Allows for determination of latent demand.	Yes	Few

4.0 Measurement for Unmet Demand

4.0.1 The initial elements of the West Dunbartonshire study follow the methodological approach applied in other locations, and are consistent with the traditional Halcrow model. Measurement for unmet demand seeks to identify as an output the existence (or otherwise) and extent of unmet demand for taxi services in West Dunbartonshire. Unmet Demand is defined as the desire to engage a taxi, but an inability to do so.

4.0.2 The method is based on the observation, at taxi stance, of waiting time between seeking and engaging a taxi, whereby the extent of waiting is used as indicator of the occurrence and shortfall of supply.

4.0.3 Further model elements exist to determine the impacts of increases in the size of the taxi fleet that may result from issuance of further licences, on the actual delivery of services.

4.1 The significance of unmet demand

4.1.1 Given the wording of the governing legislation, the need to identify the absence of Significant Unmet Demand, the determination of what can be classified as a significant level of Unmet Demand remains vital in the assessment of supply. To this end, the majority of studies highlight that no absolute definition as to what constitutes significant unmet demand exists.

4.1.1 Two primary alternatives are common, defined in some reports as 'a working solution', the first being based on the concepts of peaked demand; the second an assessment of relative values between cities, involving detailed measurement assessed against experiences identified in previous studies (ISUD).

4.2 Measurement for SUD

4.2.1 This study has approached the issue of determining the presence of SUD by testing against the criteria set out in the traditional modelled approach, and by reviewing of existing and intending passengers in West Dunbartonshire.

4.2.2 The two primary alternatives, defined as 'Matrix' method and 'Index value' approaches have been applied to West Dunbartonshire.

4.3 Matrix Method

4.3.1 The matrix method is a relatively simple first indication of the presence of SUD. Four conditions exist, two indicators specific to peaked demand, two relating to the extent to which delays exist at specified times.

Table 2 Likelihood of SUD using matrix method

	Delays exist during peak only	Delays exist during peak and at other times
Demand is Highly Peaked	Not a SUD	Possibly a SUD
Demand is not highly peaked	Possibly a SUD	Probably a SUD

4.3.2 Initial observation in West Dunbartonshire indicates a lack of significant peaking in demand, with such delays as do exist limited to the peaks in taxi use. These factors, applied to the matrix, indicate the possibility that Significant Unmet Demand is present in West Dunbartonshire.

4.3.3 The application of a matrix assessment can, however, only provide an indication as to the presence of SUD, and is commonly seen as an initial screen. The assessment does not detail impacts in varying peaked conditions, nor is it clear as to the definition of delay, definitions of which differ across studies. In its simplest form, this might be defined as any waiting incurred in accessing a vehicle. Most studies do, however, recognise the time taken to manoeuvre a taxi within a stance area, combined with the actual delay taken in passenger boarding as integral to the operation of taxis rather than an absence in their supply.

4.3.4 Many studies (Halcrow, TPI etc.) make allowance of 1 minute to allow for access and egress, this being a grace period in which delay is counted as zero. Although common at one minute, the definition of threshold is not universal. Some studies identify delay of two minutes and in one instance 5 minutes. Moreover, the time period over which delay is identified is not common or even clearly defined between studies. As an absolute value, a single vehicle with a delay over 1 minute outside the peak would indicate a variance suggesting the presence of SUD, while at the other extreme, averages determined over a large part of a day may underplay the significance of delay in non peak periods.

4.3.5 It is also significant to identify behaviour at stance as critical to efficiencies in fleet operation. Stance performance relates to passenger delays in accessing, vehicle delay in access and egress, and the physical design of individual highway and stance infrastructure. Achieving or improving on

stance performance plays a role in the ability of a fleet, regardless of size, to optimise service delivery.

4.4 Index Method

4.4.1 The second method, an assessment of relative values between cities, has also been tested in relation to West Dunbartonshire. The method, identified by TPI as 'a numerical indicator' has been applied in locations defined as ‘ambiguous’, effectively where the initial screen is not conclusive in determining a likely presence of SUD, or its absence.

The Index of SUD (ISUD) is detailed as:

ISUD= APD x ED x PI x HP

Where:

APD Average passenger delay across all time periods
ED Excess Demand, during the Monday to Friday daytime period
PI The proportion of taxi users travelling in hours where the overall average delay at the stance was greater than or equal to 1 minute
HP Adjustment factor where peaking is present (1 if no peaking; 0.5 in instances of peaked demand)

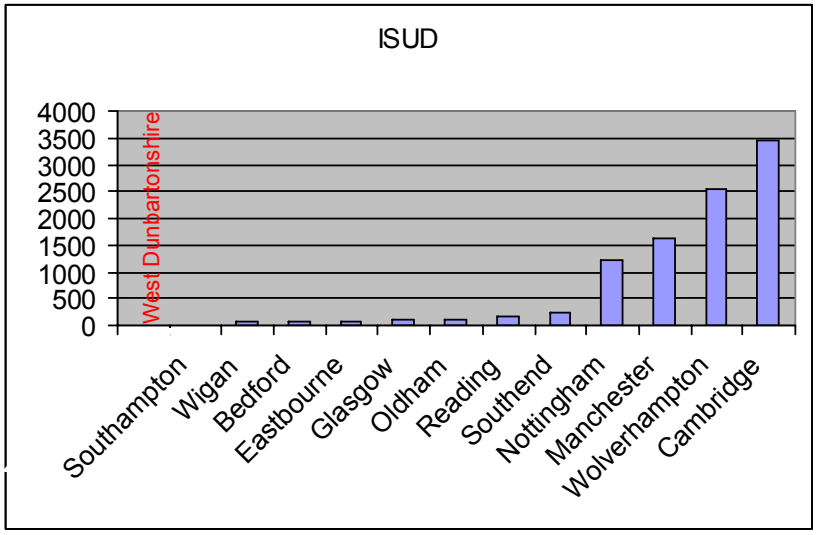
4.4.2 The method benefits from a consistency in methodological approach, reducing the potential for interpretive errors, and thus appears stronger in its results when compared to the matrix method. Its calculation is logical, and, given its purpose of comparing the performance of one city against experience in another, useful. Resulting values (ISUD = x) provider a comparator of the effectiveness of supply in one location where compared to others.

4.4.3 The relative value approach does pose some questions, as in the matrix method; these are primarily related to the definitions used in the determination of individual values, while its comparative nature effectively relies on other studies being accurate. The TPI assessments add a further note of caution, that comparisons between disparate markets should be treated with some caution. 'Districts vary according to density, population, public transport provision, car ownership and many other socio-economic and physical characteristics.

4.4.4 In previous analysis a widely differing range of values is observed. Lower end values ranging in the scale 0 -100, mid ranging up to 1200, and a number in the scale range from 2000-4000. The measure is not absolute, and, in accordance with the methodologies used in previous studies, the West Dunbartonshire value falls at the bottom end of the lower range.

4.4.5 The measurement of ISUD = 1.1 indicates that West Dunbartonshire does not have a significant level of unmet demand.

Table 3 Comparative ISUD Values



Source: Previous SUD studies

4.5 Presence of Suppressed Demand

4.5.1 Both Matrix and ISUD measurements relate to observed data, information gathered in relation to existing passengers. A third measure, that of latent or suppressed demand, seeks to establish the extent of journeys that are not made because of a lack of supply, and are thus not observed at stance. The measure is significant in that unmet latent demand is not included in studies reporting on observed data alone, while the presence of suppressed unmet reduces the effectiveness of solutions based on an increase in the numbers of Licences issued and determined by observation.

4.5.2 It is likely that the 1989 judgement: R v. Brighton Borough Council, which determined a requirement to identify Patent Demand, rather than suppressed (latent) demand, is the basis for a lack of detail on this measure.

4.5.3 The West Dunbartonshire study has included a measurement for the identification of Latent Demand in its pedestrian survey, detailed below.

4.6 Initial measurement of unmet demand.

4.6.1 Principal data collection was completed in March 2006. A systematic programme of observation was undertaken at eight official stances in

West Dunbartonshire, and further enhanced by observation of four unofficial ranking places.

Table 4: Observation Survey Locations at stance:

CLYDEBANK
• Alexander Street at railway station entrance
• Clyde Shopping Centre rear exit at UCI cinema
• Dumbarton Road
DUMBARTON
• Dumbarton Central Railway Station
• Riverside Lane at Church
• Riverside Lame at Royal Bank of Scotland
ALEXANDRIA
• Main Street
BALLOCH
• Railway Station

4.6.2 Additional observation was undertaken in instances where late night ranking occurred in non-stance locations, typically close to night time activities, such as pubs and clubs. Data obtained as a result of the surveys has been a primary input in an enhanced modelling exercise.

4.6.3 Detailed observations were made of passenger and vehicle movements, queue formation as well as site-specific factors such as stance engineering and other features affecting throughput.

4.6.4 It has been observed that very few instances of significant passenger delay occur at official stances in West Dunbartonshire, or at unofficial ranking places. ISUD values are low at all measured stances, see table 4, and even the worst performing stance, at the Clyde Shopping Centre, returns a very low level of ISUD.

Table 4: ISUD Values by stance:

Stance Location	ISUD Value
Alexandria Main Street	0.07
Balloch Station	0.50
Clydebank Alexander Street	0.06
Clyde Shopping Centre	7.05
Clydebank Dumbarton Road	0.33
Dumbarton Riverside at Church	0.43
Dumbarton Riverside at RBS	0.14
Dumbarton Central Station	0.53

4.6.4 Two further measures are common, excess delay, and passenger waiting profiles. These allow for identification of the extent of unmet demand arising by time of day, and impacts on fleet use.

4.7 Stance Characteristics

4.7.1 The nature of stance design is significant in that it impacts on the ability of stances to provide a level of service (throughput) appropriate to the demand for taxi services.

4.7.2 Specific issues were determined at all observed locations, and may be included in interpretation of flow characteristics at each location. It may also be possible to improve taxi services by simple physical measures where stance design is identified as an issue.

4.7.3 In Clydebank, the design of the Clyde Shopping Centre stance appears to require some consideration, in that taxis and their passengers have naturally moved away from pre-painted stance locations to form a single queue with the head of the rank located at the Asda end. It may be desirable to set out markings as appropriate to this. Similarly the stance at Alexander Street is in fact split between a 4 vehicle bay underneath the railway over-bridge, and a feeder rank further East along Alexander Street. The vast majority of pick-ups occurs at the railway bridge, and this forms the principal focus of the stance. Night time performance may be hindered by a lack of lighting, understood to be a faulty street light at the time of survey, hindering access to taxis, and promoting some confusion amongst users. The stance also appears to lack adequate street markings, as do the parking bays, with frequent illegal parking in the forward stance, and obstruction of the 'line of sight' between the feeder rank and the head of the stance.

4.7.4 The stance at Dumbarton Road, Clydebank, serves little purpose, as the marked bays exist too far West along the Dumbarton Road, and were not used at all during our observations. Actual pick ups occurred outside the Buddha night club, and this location appeared to work well. It would appear logical to move this street markings to coincide with the observed use.

4.7.5 In Dumbarton, the stance located at the Central Railway Station is poorly marked and consequently infrequently used. The location of the stance reduce the likelihood of trade other than that arising from inbound trains, and this causes a problem in that taxis will turn up for arriving trains but fail to meet slow walkers or those unaware of the stance location. The town exit may be a better location for this stance in that this would offer a

higher proportion of passengers from other (non-train) uses.

4.7.6 The stances in Dumbarton town appear to operate well, with a question over the daytime use of the Riverside Lane stance located alongside the Royal Bank of Scotland. This stance has very few observed passengers, and may be more appropriate were it relocated to the High street as a night time only stance.

4.8 Excess Passenger Delay

4.8.1 Excess delay is defined as periods of the day in which either user or supplier experience delay in excess of an equilibrium point, the point at which supply and demand are matched. Observations at each taxi rank identified the numbers of passengers and/or vehicles waiting, equilibrium existing where supply equates demand. Excess supply results in excess delay to vehicles, insufficient supply results in excess delay to passengers.

4.8.2 The determination of Excess Delay to passengers provides an overview of instances and locations where passengers regularly queue for taxis. The measure relates to the proportion of time where passenger delay exists, rather than its extent (incidence rather than length), and is a preliminary indicator of stance performance.

4.8.3 Table 5 indicates the levels of Excess Delay experienced by passengers at observed stances in West Dunbartonshire across 4 time periods, Weekday daytime, weekday night-time, weekend daytime and weekend night-time. The occurrence of excess delay is particularly limited, and should suggest that passenger delays are not a significant issue.

Table 5 Occurrence of Excess Passenger Delay

Proportion of time where Excess Passenger Delay observed	Weekend Night time ED	Weekend Daytime ED	Weekday Night time ED	Weekday Daytime ED
Alexandria Main Street	0.00	0.00	0.00	0.00
Balloch Station	2.08	1.39	1.39	0.00
Clydebank Alexander Street	4.17	0.00	0.00	1.39
Clyde Shopping Centre	2.78	0.00	1.39	2.78
Clydebank Dumbarton Road	5.56	0.00	0.69	0.00
Dumbarton Riverside at Church	4.17	0.00	4.86	0.00
Dumbarton Riverside at RBS	0.00	2.08	0.00	1.39
Dumbarton Central Station	7.64	1.39	2.08	1.39
Authority Wide	3.30	0.61	1.30	0.87

4.8.4 Of the observed stances, Dumbarton Central Station displays the most significant level of delay occurrence, specific to demand at weekend night times. This may in part be attributable to the stance location, and the fact that demand is almost exclusively allied to train arrival times. There is little reason for a taxi to approach the stance outside of known train arrival times, and this may result in missing passengers delayed on the railway platform, or unsure of taxi stance location.

4.8.5 Clydebank Dumbarton Road also displays an extended instance of passenger delay. The site of the official stance in this location is not ideal to demand, and a pragmatic relocation of taxis has occurred. Taxis typically rank outside the Singers Pub and Buddha night club (400 metres East) rather than in the marked taxi stance.

4.8.6 Other observations suggest that queues are less of an issue in daytime hours, many locations experiencing minimal passenger queues, and less significant in village, rather than town, locations.

4.8.7 Of the non-urban locations, Alexandria Main Street returns a zero occurrence of Excess Delay, indicating that supply either matched or exceeded demand at that location over the period of observations. Similar results exist for daytime supply in most locations.

4.9 Passenger Waiting Profiles

4.9.1 A more detailed assessment of excess delay relates to the extent of time experienced in waiting to access a taxi, the most common measurement of which is the number of minutes delay experienced at stance. The greater the number of minutes an individual spends waiting at a taxi rank, the less appropriate the supply to that stance. Measured on an authority wide basis, the waiting profile can be used as an indicator of the presence of unmet demand.

4.9.2 Some delay is inherent in the use of taxis, positioning and boarding times are inherent in the use of a taxi, and should not be included in the measurement of delay. In addition, stance design and physical conditions may also affect the efficiencies of stance use, and should be considered in the determination of fleet performance.

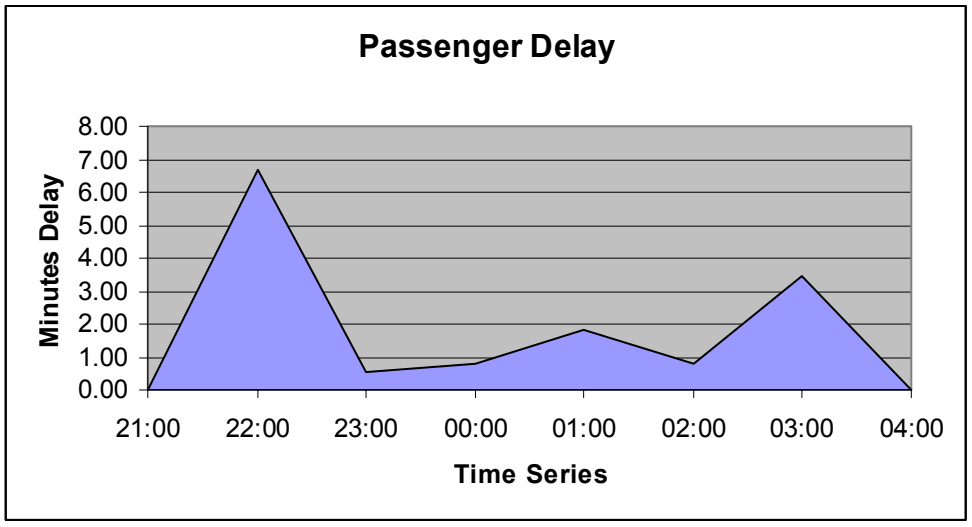
4.9.3 Delays arising from positioning and accessing vehicles have not been included, and have been calculated on the basis of a grace period, of one minute, below which delay is not identified.

Table 6: Passenger Delay Characteristics

Minutes: Average Passenger Waiting Time	Weekend Night time PD	Weekend Daytime PD	Weekday Night time PD	Weekday Daytime PD
Alexandria Main Street	0.00	0.00	0.00	0.29
Balloch Station	0.82	0.21	0.50	0.05
Clydebank Alexander Street	0.11	0.00	0.00	0.11
Clyde Shopping Centre	0.36	0.18	0.36	0.27
Clydebank Dumbarton Road	1.18	0.00	0.13	0.00
Dumbarton Riverside at Church	0.44	0.00	0.97	0.00
Dumbarton Riverside at RBS	0.00	0.02	0.03	0.44
Dumbarton Central Station	0.92	0.13	0.00	0.44
Authority Wide	0.48	0.07	0.25	0.20

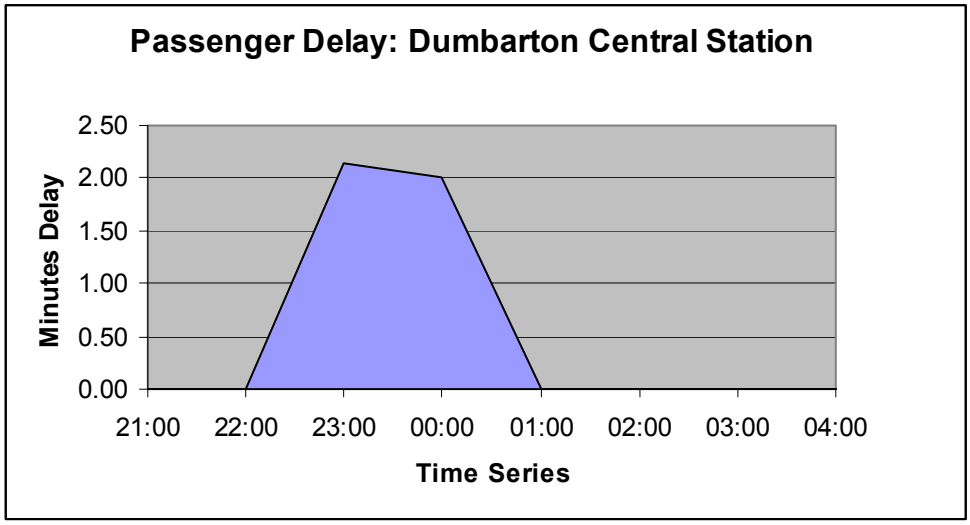
4.9.4 Very few observed stances display any significant waiting times, with no average delay exceeding 2 minutes. Clydebank Dumbarton Road and Dumbarton Central Station do display higher waiting times than other locations, particularly at weekend night times, and at Dumbarton Riverside Lane at Church, displaying slightly higher delays at weekday night time. These are quantified on a time series below.

Table 6.1: Clydebank Dumbarton Road, Weekend Night Time



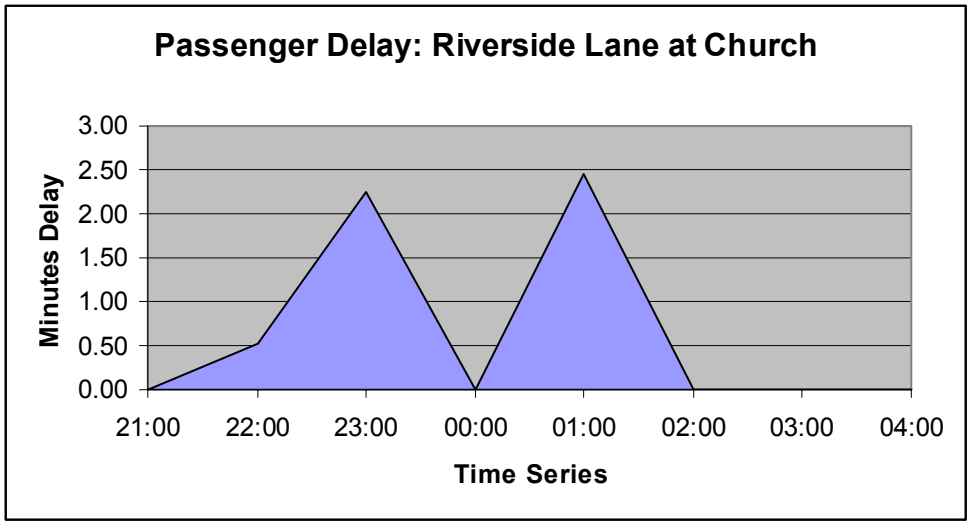
4.9.5 Delays experienced at Clydebank Dumbarton Road remain low, with a maximum peak value of under 7 minutes. This is unlikely to represent a significant unmet demand, rather a natural pattern of use. The two peaks at 01.00 and 03.00 represent a typical pattern for pub and club closing times, while both remain small. The earlier peak at 22.00 may represent a lack of taxi services stopping at the location, rather than an excessive number of passengers waiting.

Table 6.2 Dumbarton Central Station, Weekend Night time



4.9.6 Dumbarton Central Station experienced a period of delay coinciding with arrival of late night train services, although this delay was short, and does not represent a significant level of unmet demand.

Table 6.3: Riverside Lane at Church, Weekday Night-time



4.9.7 Riverside lane in Dumbarton serves the town centre, and has two taxi stances, one located at each end. Neither stance experiences significant delays, but the stance located at the Church end of Riverside lane has a higher overall number of users.

4.9.8 Two peaks occur late at night, and these are consistent with the pattern in other locations with a night time demand. Neither peak represents a significant unmet demand.

5.0 Pedestrian, Accessibility and Driver Surveys

5.0.1 A further element of the work was designed to compliment and inform modelling through the use of three surveys, a pedestrian user survey, a questionnaire specific to accessible taxi use, and survey of driver attitudes.

5.0.2 The pedestrian survey was completed using a clipboard approach, on street in three locations: Clydebank centre, Dumbarton centre, and in suburban locations (Alexandria and Balloch). A total of 350 pedestrian surveys were undertaken concurrently with the observation surveys at stance.

5.0.3 Accessibility and driver surveys were both completed using a post out and post back method. A prize draw was included to encourage responses.

5.1 Pedestrian Surveys

5.1.1 The pedestrian survey was primarily aimed at identifying the issues experienced in using taxis in West Dunbartonshire, to identify the extent, if any, of suppressed demand (latent demand), and establish values appropriate to interpretation of modelling results.

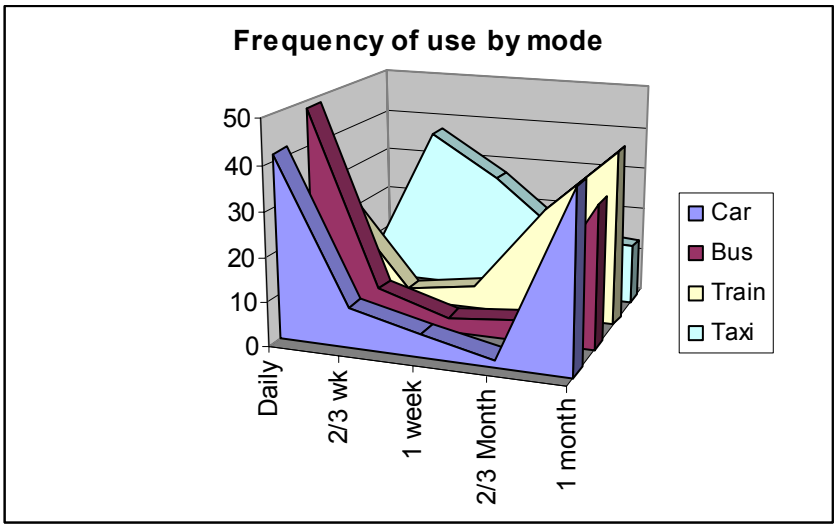
5.1.2 The public survey was completed concurrently with the observation surveys, and resulted in 307 valid responses, matching a cross section of all residents by age and gender.

5.1.2 The pedestrian survey covers four main elements, current use of taxis by purpose, experiences in current taxi use, (perceived) waiting time experienced in using taxis, and a fourth section looking at the perceptions of using saloon taxis, and wheelchair accessible taxis.

5.2 Pedestrian Survey Findings: Frequency and trip purpose

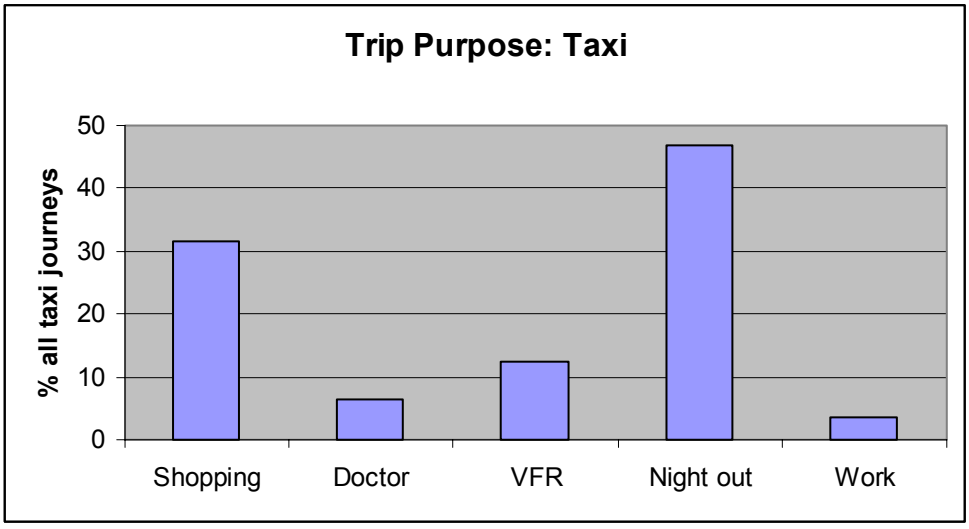
5.2.1 Taxis were widely used on a regular but infrequent basis, with typical use occurring on a 2 or 3 times weekly to weekly frequency. This correlates to two main uses, travel home from a night out, and in returning home from shopping. Although frequent, these represent very differing purposes, and are likely to reflect differing socio-economic groupings. Methods of engagement also differed between the two journey purposes.

Table 7: Frequency of use, main modes of transport



5.2.2 Car and bus services form the principal form of transport for regular daily transport, while train services are used less frequently.

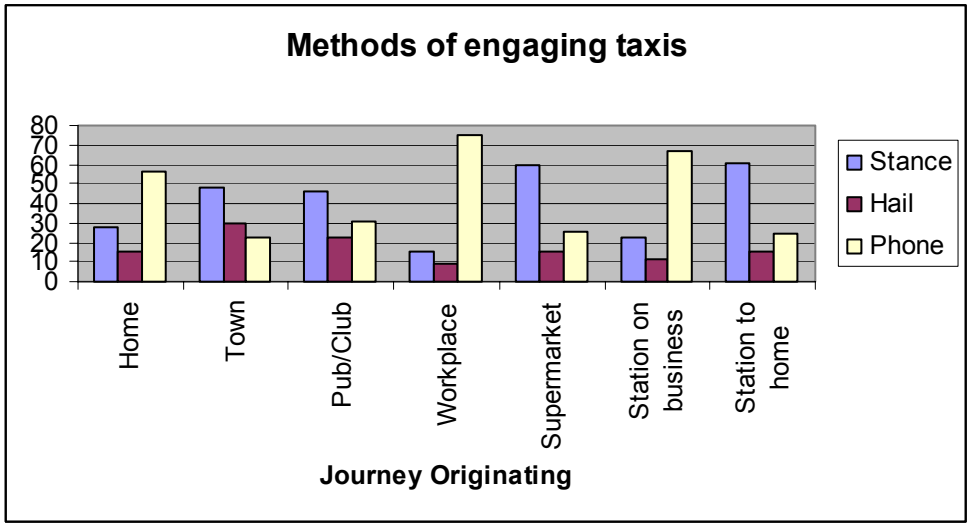
Table 8: Main Trip purposes: Taxi



5.2.3 The principal uses of taxis split evenly between travelling home from a night out (46%), and returning home from shopping (31%).

5.2.4 The two main uses differ significantly in the needs and demands for taxi use, and reflect a widely observed split in demographic groups' use of the mode. It is also observable that very few journeys are made on work business (3.4%).

Table 9: Methods of engaging taxis



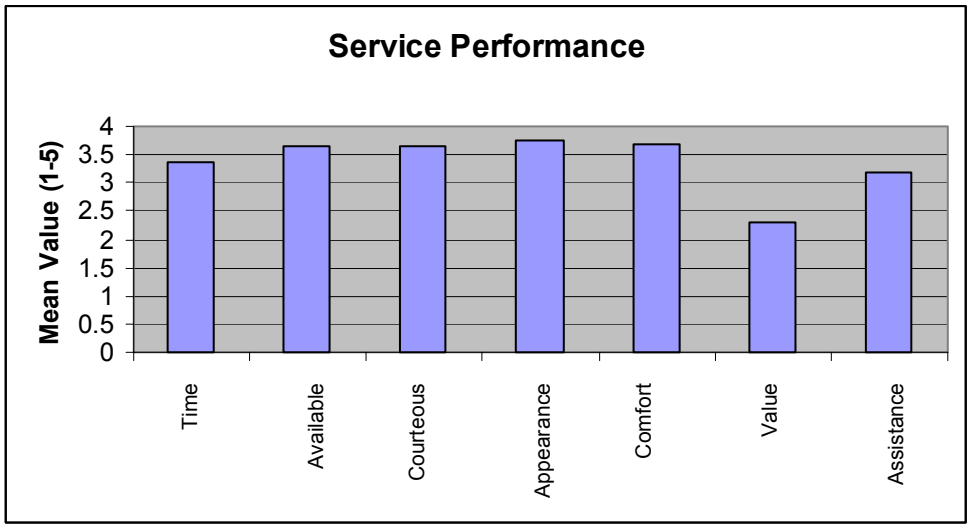
5.2.5 Differing uses of taxis are reflected in differing methods of engagement, but it appears that a number of trends exist. Travel on the main purpose, home from pub and club, makes use of all three methods of engagement, being engagement at stance, hailing, and telephone booking. The majority method of engagement for this use is at stance. Travel from supermarket, the second most common use of taxis, relies even more on engagement at stance, and probably reflects the availability of stances at or near to supermarkets both in Dumbarton and Clydebank.

5.2.6 Home originating journeys have limited choice, and pre-booking is most significant. Business uses are also dominated by the pre-booked market, while travel from station on non-work journeys relies on availability at stance.

5.3 Pedestrian Survey Findings: Service Performance

5.3.1 The second element within the pedestrian survey sought to establish the perception of taxi service delivery. The questionnaire identified seven (7 no.) aspects of service delivery, asking respondents to grade performance on a 5 point scale, ranging from Very Poor to Good.

Table 10: Service Performance



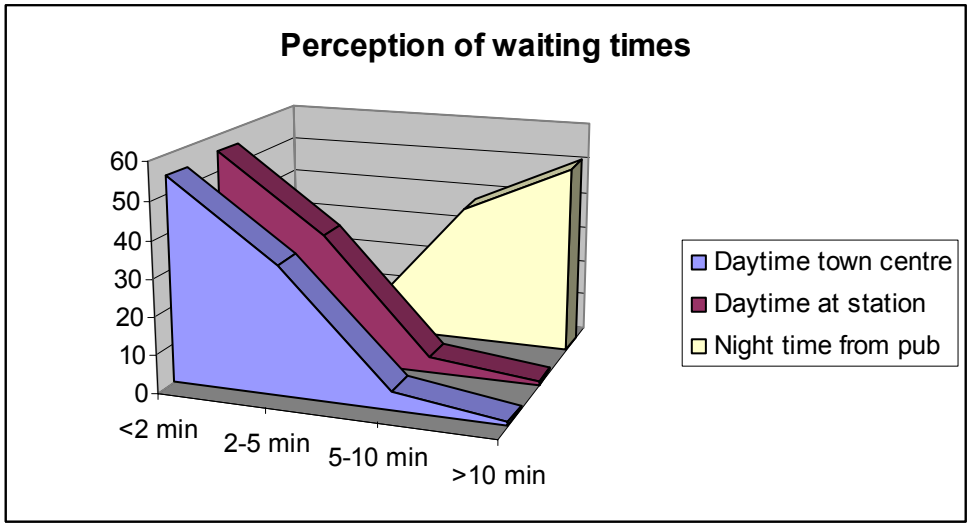
5.3.2 Most indicators scored well, values over 3 indicating good or very good performance, with availability, courtesy, comfort and appearance of vehicle all scoring highly. Value scored poorly, below median, indicating a low perception of value for money.

5.4 Pedestrian Survey Findings: Waiting Times

5.4.1 Waiting times are significant in that their measurement is a primary element of both questionnaire and modelled assessment. The modelled incidence, based on observation at stance, indicates a low incidence of delay and low waiting times at stance.

5.4.2 A separate question addressed the perceived extent of delay experienced in engaging a taxi in three situations: for journeys originating on a weekday in the town centre, journeys originating on a weekday from the station, and for journeys originating on a Friday night from a pub or club.

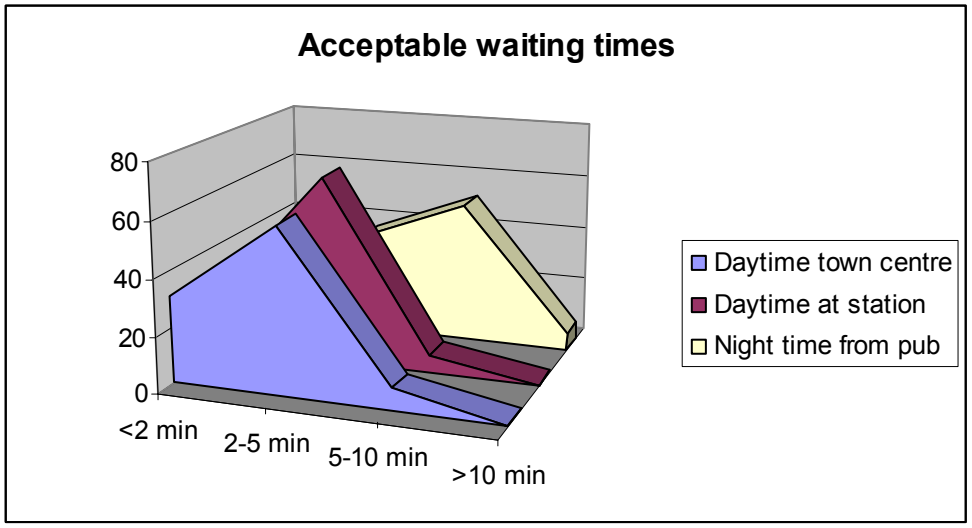
Table 11: Waiting Times Experienced



5.4.3 Journeys in both daytime scenarios (travelling from the town centre and from the station) demonstrated a low value of perceived waiting times, borne out in observation, while night time transport home from pubs and clubs was perceived to require longer waiting times. This is also borne out in observed data, but not to the extent of perceived waiting times, with observed waiting times approximating half the wait perceived.

5.4.4 A further question sought to identify the amount of time that would be considered acceptable for waiting times in accessing a taxi in the same circumstances.

Table 12: Acceptable Waiting Times



5.4.5 Expectation of reasonable waiting time proved positive and in line with perceived waiting time experienced for both daytime measures, but were more demanding than perceived night time performance.

5.4.6 Mode average expectations for daytime delivery suggest a waiting time between 2 and 5 minutes is acceptable, and achieved. The mode mean suggests an acceptable waiting time of 5 – 10 minutes at night time, but this is felt to be missed by just under half of all night time departures.

5.4.7 Observation surveys do not fully support the perceived night time waiting times, with mean waiting times falling within the 'acceptable' 5-10 minutes range.

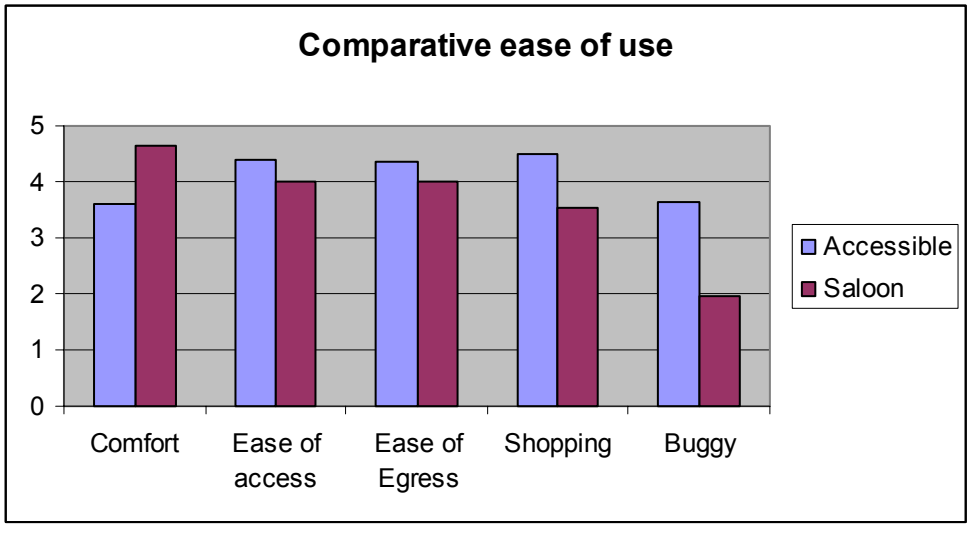
5.4.8 It is reasonable to expect a difference between observed and perceived waiting times, as perceived times tend to exceed measured times.

5.5 Pedestrian Survey Findings: Accessible Taxis

5.5.1 The third element addressed in the public survey relates to the use of 'accessible taxis', generally defined as wheelchair accessible taxis and distinguished from saloon taxis.

5.5.2 The two groups of vehicles, accessible and saloon offer differing facilities, and are likely to differ in use. The study sought to establish perceived benefits of each vehicle against five measures, Vehicle Comfort, ease of getting in and out, ease of carrying shopping, and ease of carrying a child's buggy.

Table 13 Comparative Vehicle benefit



5.5.3 A five point scale was used indicating the perceived performance from very poor to very good.

5.5.4 A clear split exists between vehicle comfort and ease of use, with saloon taxis considered favourable for vehicle comfort. For ease of access, egress, and in carrying shopping and children's buggies accessible taxis were considered good or very good.

5.6 Driver Survey

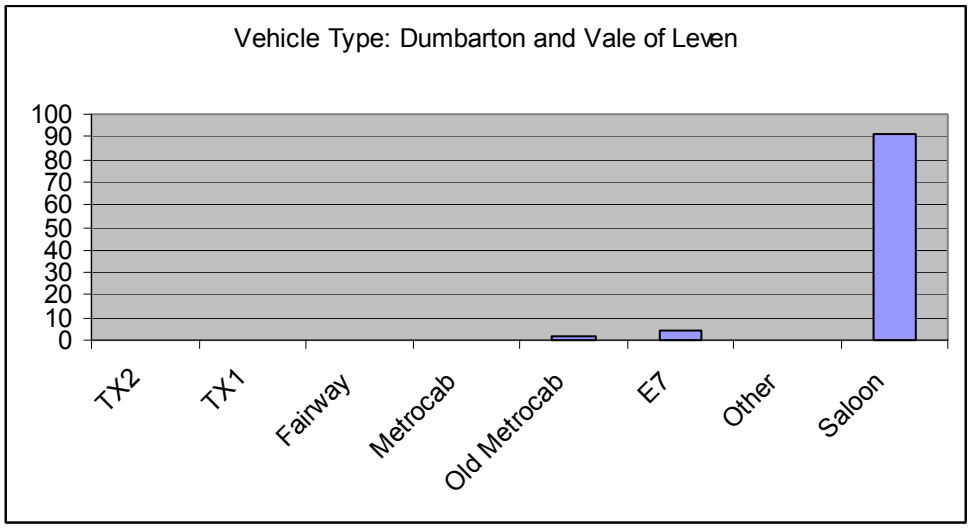
5.6.1 A second survey sought to establish driver perceptions toward supply in West Dunbartonshire, and to identify issues that impact on current supply. A postal survey was completed in March 2006, and received 96 responses.

5.6.2 The survey has also sought to identify the structure of the West Dunbartonshire Taxi fleet, age of vehicles, and provide opportunity for drivers to comment on specific issues in the supply of taxis, or in the stances served.

5.7 Driver Survey Findings: Vehicle Types

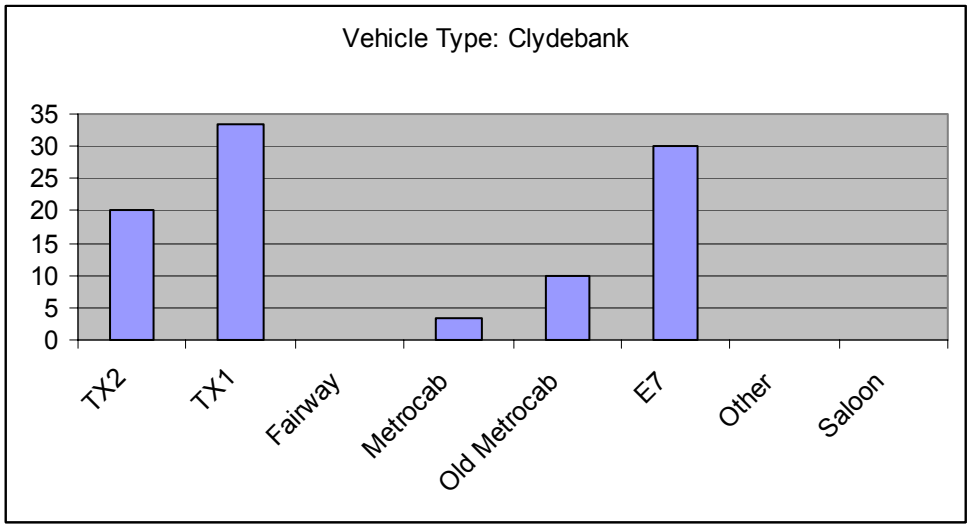
5.7.1 The choice between accessible and saloon vehicles appears to rest on the dominant types currently in use. Those operating where saloon vehicles are allowed tend to choose to operate such, while those operating where wheelchair accessible vehicles are required operate a variety of accessible vehicles.

Table 14.1 Vehicle Type, Dumbarton



5.7.2 The Dumbarton zone does operate a small number of wheelchair accessible vehicles, mainly E7 and older style metrocabs, but these account for a small proportion of the total number of vehicles available in the zone.

Table 14.2 Vehicle Type, Clydebank



5.7.3 Clydebank zone is provided for mainly by London Taxis (LTI) vehicles, either TX1 or TX2 models, and by the Peugeot E7 Eurotaxi. Both the LTI and E7 vehicles appear appropriate to accessible use.

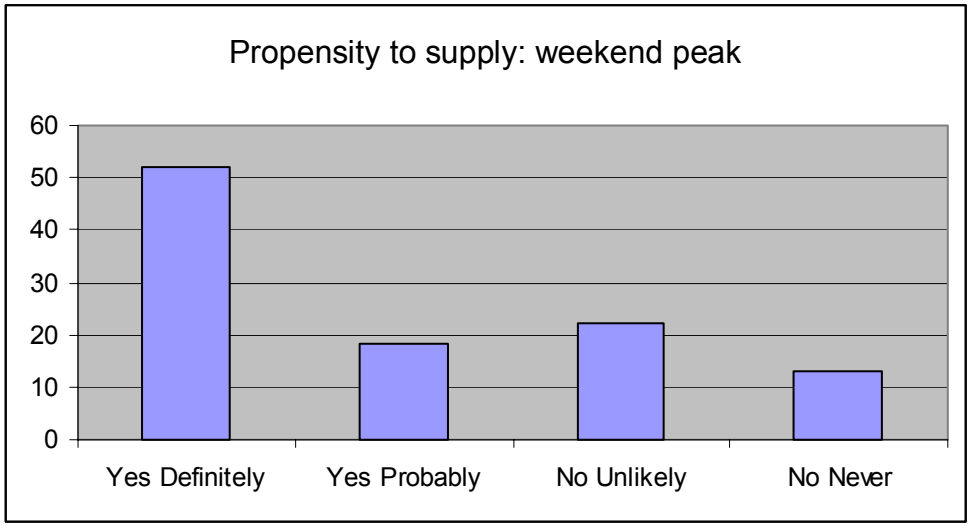
5.8 Driver Survey Findings: Shift Patterns

5.8.1 The majority of West Dunbartonshire Taxi drivers (88%) report that they follow regular shift patterns operating at the same or similar times of the day and over similar days of the week. Choices of shifts are primarily determined (73%) on the basis of personal preference, as opposed to availability of vehicles (which accounts for 12% of stated factors affecting choice).

5.8.2 A small number (17%) cited safety issues as a factor that affected their choice of shifts, with a significant number (36%) stating that a lack of customers would influence their choice.

5.8.3 Supply at weekend night, the point of peak demand, was not considered a significant issue by most drivers (69% indicated they would be willing to supply services at these times).

Table 15 Propensity to Supply at weekend peak



5.8.4 The pattern of supply tends to support the argument that most demand can be sufficiently well met from the existing fleet.

5.9 Accessibility Issues in using Taxis

5.9.1 A further survey sought to establish the range of issues, experiences and opportunities specific to disabled users of taxi services. The survey took the form of a postal questionnaire, distributed to individuals with a personal experience of special needs for transport. A postal questionnaire was sent out with the assistance of the West Dunbartonshire Access Panel to c. 400 interested parties, and has resulted in 81 valid responses.

5.9.2 The questionnaire specifically addresses issues of taxi use, as well as identifying the experiences in using the current fleet.

5.9.3 Respondents represented a cross section of disability needs, and included those with, physical, mental or personal handicaps in access, and those providing support to such individuals. Over half of the survey respondents reported mobility handicap, but only 18% actually used a wheelchair.

Table 16 Respondents by handicap

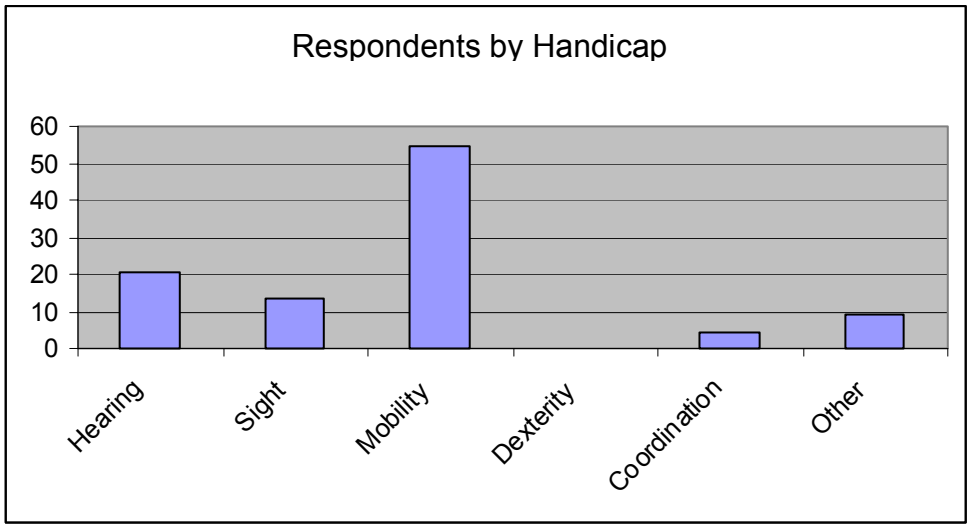
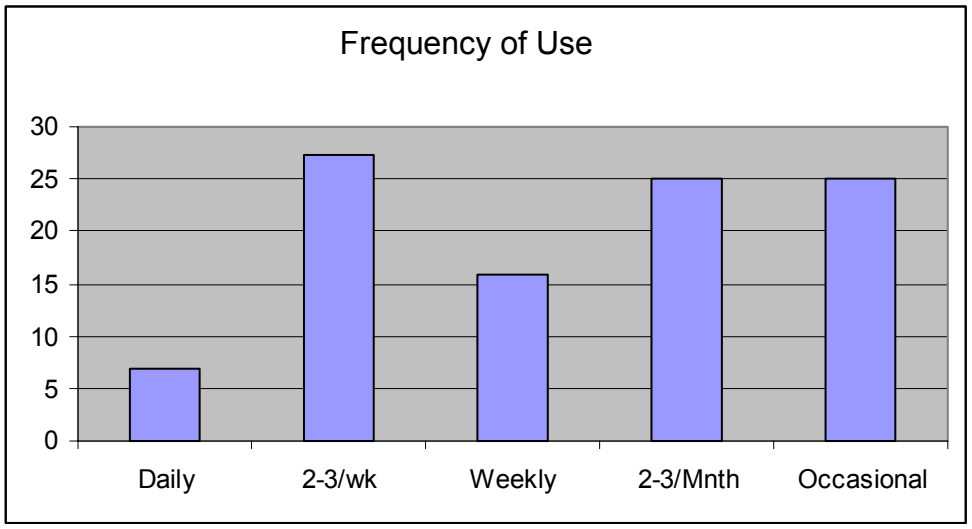


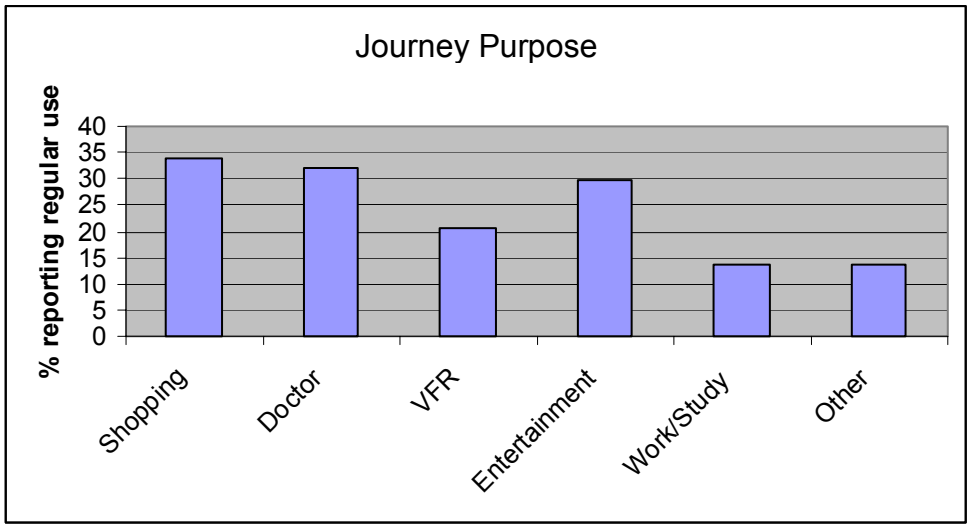
Table 17 Frequency of use



5.9.6 Individuals with an access handicap tended to use taxis less often than able bodied travellers, with just over 45% using a taxi service weekly or more frequently, about half the frequency of able bodied users.

5.9.7 Journey purpose also differed, while shopping and travel from entertainment continue to represent high levels of use, other trip purposes also scored highly for those with access needs.

Table 18 Main trip use



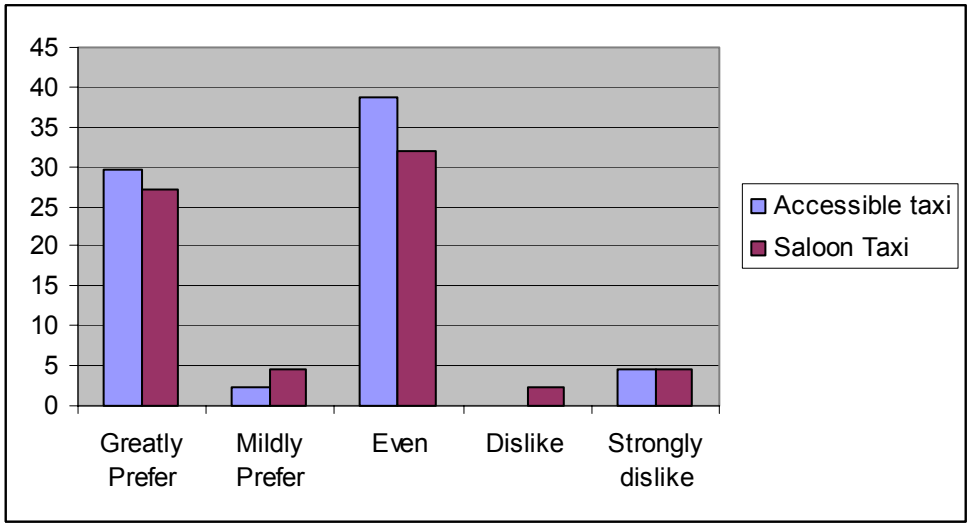
5.9.8 The second element of the survey sought to establish preferences for particular types of taxis, and issues in using either saloon or accessible taxis.

5.9.9 Both wheelchair accessible and saloon taxis were felt to offer particular benefits to users, either in terms of comfort, seen as a benefit in saloon taxis, or ease of access, a benefit in accessible vehicles.

5.10 Access Survey Findings: Vehicle Preferences

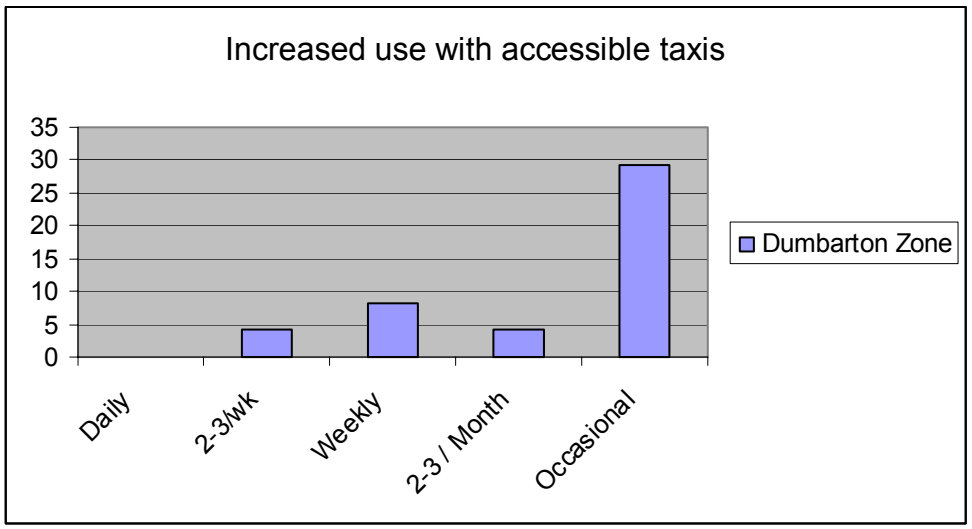
5.10.1 The study sought to identify preferences on the basis of a five point scale ranging from greatly prefer to greatly dislike by vehicle type.

Table 19 Vehicle Preferences



5.10.2 A similar and small number of respondents reported strong dislike for both saloon and accessible vehicles, while a higher number of respondents preferred accessible vehicles to saloon type taxis. The impacts of a change in vehicle type on use was also sought, with the aim of identifying the impacts of a change in fleet from one taxi type to the other.

Table 20 Increased use arising from introduction of accessible taxis



5.10.3 At present the Dumbarton taxi zone (Dumbarton and the Vale of Leven) is not required to operate accessible vehicles. Respondents living in this zone indicated only a small propensity to increase use as a result of such a change. A combined increase in 2 to 3 weekly and more frequent use of c.15% would result from such a change. An additional 29% indicated occasional use arising from the change.

5.10.4 In addition to the issue of most appropriate vehicle type, a number of other barriers were felt to exist in the provision of a fully accessible taxi service. These include the ability to access taxis at stance, by hailing or by pre-booking.

Table 21 Propensity to engage taxi by pre-booking

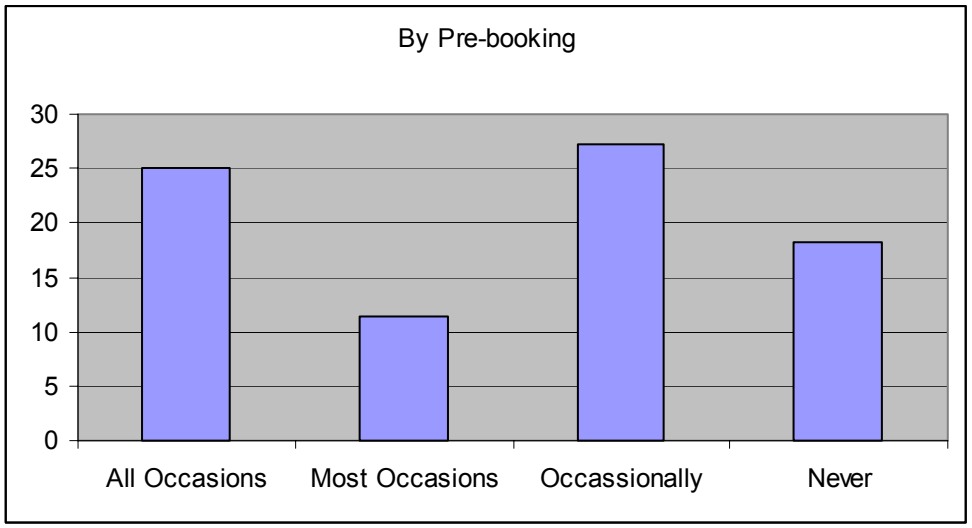


Table 22 Propensity to engage taxi at stance

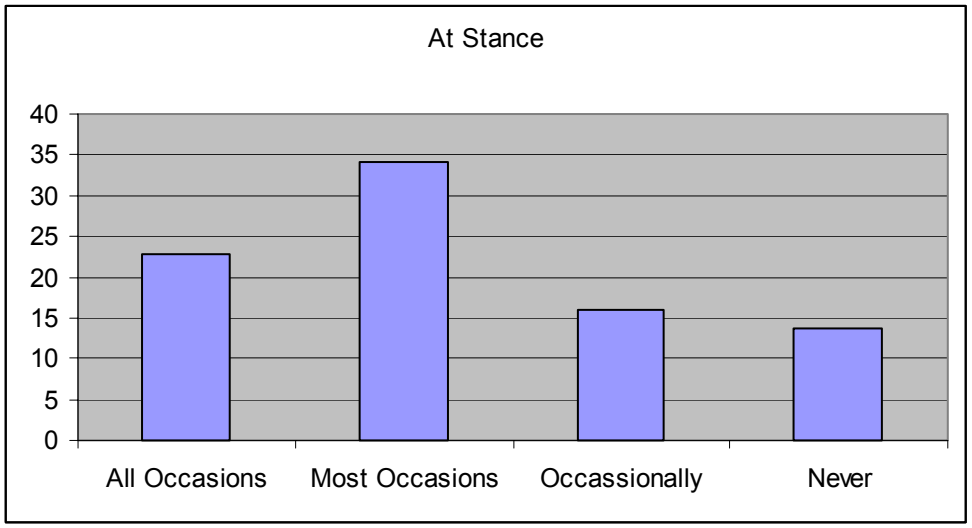
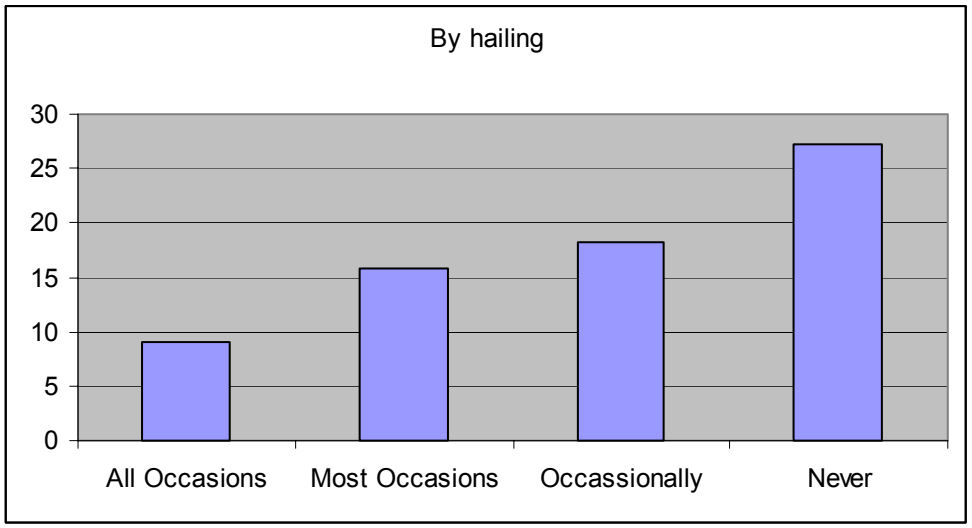


Table 23 Propensity to engage taxi by hailing

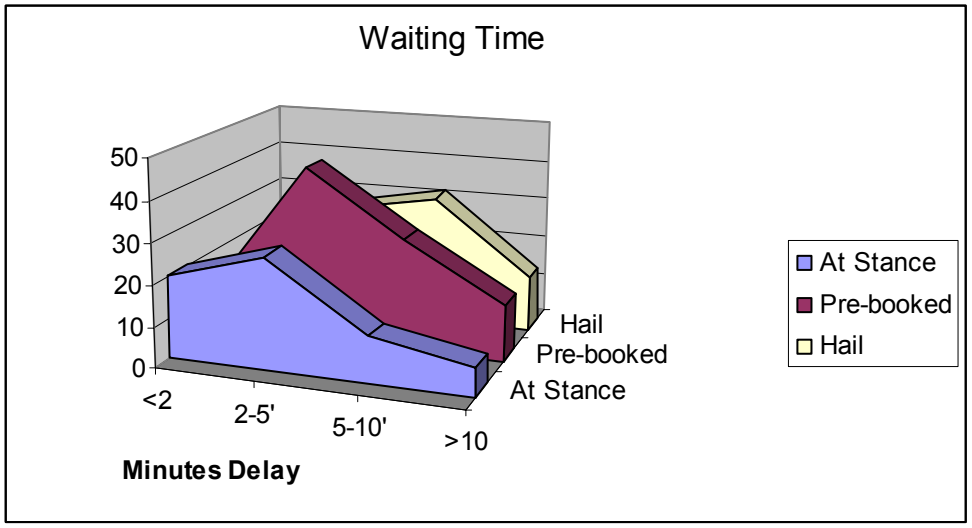


5.10.4 The greatest number of respondents indicated their highest preference was to engage taxis by pre-booking, though combined first and second preferences would indicate engagement at stance to be preferred to other forms of engagement.

5.10.5 The hail and ride sector resulted in the highest level of non-use, 27% never engaging a taxi in this manner.

5.10.6 Waiting times at the three locations indicates an extended waiting time experienced in engagement away from home or stance locations.

Table 24 Waiting times by location of engagement



6.0 Study Review

6.0.1 The West Dunbartonshire study sought to establish performance of the West Dunbartonshire taxi fleet in three key areas, being:

- The presence, or otherwise, of Unmet Demand
- The nature of fleet performance against passenger expectation
- The nature of fleet performance against the needs of disabled users

6.0.2 Having established key indicators, the study has sought to review the nature of current supply within the fleet, the extent to which current supply matches the demands for taxi transport, including latent demand, and recommend methods by which such supply may be optimised to the benefits of the travelling public.

6.1 Methodology

6.1.1 The study has employed a traditional approach in the determination of unmet demand, and carried out surveys appropriate to the identification of passenger needs, suppressed or latent demand, and impacts of changes in the supply of taxis in West Dunbartonshire.

6.1.2 The authority area effectively covers two taxis zones, one in Clydebank and its constituent parts, and the second covering Dumbarton and the Vale of Leven. The two areas have a historic difference in the supply of taxis, and currently differ in vehicle type. Surveys and modelling have been applied to both areas, and identified by area where appropriate to the assessment.

6.2 Assessment for the presence of Unmet Demand

6.2.1 The determination of the presence, or otherwise, of Significant Unmet Demand is a requirement of the Civic Government (Scotland) Act 1982, and is applied in instances where licensing authorities determine maximum numbers of licences that may be issued in respect of hackney taxi services.

6.2.2 On the basis of the methodologies that have been applied in other locations, and replicated in the West Dunbartonshire licensing area, there appears to be no incidence of significant unmet demand whether based on the entirety of supply, or where split by licensing zone.

6.2.3 It is observable that in many instances supply significantly exceeds demand for vehicles, although there are no mechanisms within the current

legislation allowing for a reduction in the size of a fleet. It is unlikely that, in current usage, the fleet will require further Licences to be issued until the extent of demand rises significantly.

6.3 Performance of the fleet: Waiting times

6.3.1 The current fleet of taxis in both zones appears to satisfy demand for its supply. Waiting times were observed as in line, and lower than the stated maximum levels felt appropriate by the public, and are significantly lower than those reported for other authority areas, including those neighbouring West Dunbartonshire.

6.4 Performance of the fleet: Vehicle Type

6.4.1 The taxi fleet is split evenly between accessible vehicles, operating in Clydebank, and saloon type taxis, prevalent in Dumbarton and the Vale of Leven. Opinion as to the appropriateness of the vehicles is also split between those preferring wheelchair accessible vehicles, and those preferring saloon vehicles.

6.4.2 A slight preference exists in that saloon cars are considered to provide a more comfortable vehicle, while accessible taxis out-perform saloon vehicles in access and egress, and in the loading of shopping and children's' buggies.

6.4.3 The Clydebank zone is currently fully operated by Wheelchair accessible vehicles, while the Dumbarton zone has a small number operating, mainly based on E7 and older LTI vehicles. A question arises whether it is appropriate to harmonise vehicle types across both zones, or move toward a percentage of the Dumbarton zone fleet to be operated by accessible vehicles.

6.4.4 Further arguments also exist in relation to the use of and access to a taxi fleet by those with a disability, for whom particular vehicle types may be preferable to others.

6.5 Performance of the fleet: Accessibility Requirements

6.5.1 The desire to provide access to taxi services across all sections of the community reflects a wider desire to increase access to facilities and services, a right held in law and applied to transport and many other services through the Disability Discrimination Act 1995.

6.5.2 On the basis of stated responses it appears possible to determine a desire to increase the numbers of vehicles that are accessible to those in the Dumbarton zone.

6.5.3 Table 20, which relates to the Dumbarton zone alone, suggests that a wider availability of accessible vehicles would result in an increased use of taxi services (suppressed demand) of c. 15% increase in use on a regular basis (2-3 times per month and greater) resulting from the availability of accessible vehicles, and a further 29% take up in occasional usage. This compares with experience documented in three Spanish municipalities where accessible taxis were introduced:

- 18.6% of users increased their use significantly
- 21.6% of disabled users 'often' increased their use of taxis
- 20.4% of disabled users 'sometimes' increased their use of taxis
- 14.3% of disabled users 'scarcely' increased their use of taxis
- 22.9% of disabled users 'did not change' their use of taxis
  Source: ECMT 2001

6.5.4 Although comparable in stated versus observed increase, most commentary is based on adoption of an all or nothing approach, either a fleet is fully compliant, or not at all. Little work has been completed to relate to the sensitivity of supply to a proportion of a fleet being provided by accessible vehicles.

6.5.5 Furthermore, some criticism does exist as to the appropriateness of particular vehicle types to the needs of disabled passengers. Respondents to the Scottish Executive Survey (Reid Howie 2004) identified that even taxis identified as 'accessible' need not be accessible to all disabled passengers.

6.5.6 The issue of the cost of accessible taxis is also identified, and appears consistently through discussion in West Dunbartonshire with taxi drivers, and is documented in other studies. Costs of new vehicles differ significantly between new saloon vehicles appropriate for use as taxis, and the cost of purpose built taxis.

7.0 Fleet Accessibility

7.0.1 The need to establish vehicle fleets appropriate to use of that fleet will necessarily include consideration of the role of accessible vehicles in taxi supply.

7.0.2 In some authority areas, the provision of access to all has been achieved through the adoption of fully accessible fleets, in which all vehicles are

'accessible', a definition of which is included in the DDA and applied in England and Wales.

7.0.3 Other authorities and jurisdictions have tended to adopt more pragmatic approaches, including partial or proportionate fleets, in which specified numbers of fully accessible vehicles are made available. Others have adopted a gradual move to fully accessible vehicles over time.

7.0.4 City and large urban authorities have been more likely to adopt fully accessible fleets than rural or largely rural districts, which in turn reflects the significance of vehicle costs in the economics of vehicle supply, and the need to ensure that services are maintained as appropriate to the needs of the authority area. An excessively expensive vehicle impacts on the ability of an operator to continue to operate.

7.1 Developing Accessible Taxi Services in Dumbarton

7.1.1 Taxi services in West Dunbartonshire split evenly between those operated by accessible vehicles, and those operated by saloon type vehicles. These also split geographically between two taxi zones, taxis operating in Clydebank being exclusively operated by accessible vehicles, while the majority of services in Dumbarton and the Vale of Leven zone are operated by saloon vehicles.

7.1.2 While both public and access surveys suggest there is a need to address the lack of accessible taxis in the Dumbarton zone, it is also clear that real issues exist in relation to the method by which accessibility is achieved within the fleet, the method by which numbers of accessible vehicles are determined, or methods by which partial or proportionate fleets ensure availability of accessible vehicles at point of need.

7.1.3 The West Dunbartonshire study identified three potential scenarios that may be appropriate in relation to the development of accessible fleets. These are summarised as:

- The introduction of accessible vehicles as a proportion of the fleet
- The introduction of a fully accessible fleet
- A staged introduction of a fully accessible fleet

7.1.4 Each scenario has been reviewed to establish impact and likely benefits, including those experienced by individuals currently unable to make journeys, as well as assessing likely impact on the fleet.

7.2 Introduction of accessible vehicles as a proportion of the fleet

7.2.1 The logic behind a proportional number of accessible vehicles reflects the fact that a number of journeys, often the majority of journeys, made will not specifically require a fully accessible vehicle.

7.2.2 Trade representatives have consistently argued that the cost of fully accessible vehicles represent a significant increase on that of saloon alternatives, and that the additional cost of purchase will effectively reduce the ability of the trade to fully serve the public. This may in turn risk a reduction in the levels of service offered to all passengers, including those requiring fully accessible vehicles.

7.2.3 It is not argued that no change is required, rather that the trade provide sufficient fully accessible vehicles to provide access as required. The argument precipitates a need for correct determination of the appropriate numbers of vehicles that would be required to achieve a level of access consistent with need for such vehicles.

7.2.4 Counter arguments are forwarded amongst individuals with a knowledge of access difficulty, that access should be provided on an equal basis between those requiring fully accessible vehicles, and those for whom vehicle type is less important. Access should not rely on partial availability of a proportionate vehicle fleet, rather be available to all on an equal basis.

7.2.5 It is also pertinent to question the validity of arguments specific to impacts of more expensive vehicles, most specifically the extent of differentials in price quoted in some discussions between (new) fully accessible vehicles, which can cost in excess of £30,000 for some purpose built taxis; and saloon type vehicles, with a range of average values less than the fully accessible vehicle. Where made such comparisons would require consistency in relation to vehicle age, residual value, and potential service life.

7.3 Model of proportional demand

7.3.1 A fundamental question in adopting a proportional approach to accessible taxi supply relates to the determination of appropriate numbers of vehicles.

7.3.2 Factors used in determination:
The determination of an appropriate number of accessible vehicles should seek to ensure that sufficient numbers of vehicles are available to satisfy the likely demand for such vehicles. Factors identified include:

- Supply of accessible taxis should be sufficient to cover periods of peak demand
- Supply should take account of driver availability, and likelihood of a number of vehicles being unavailable at any given time
- Consideration should be given to suppressed demand as well as current (observed) use.

7.3.3 Development of supply model

The supply model is calculated to take account of current demand for accessible transport, future demand, and the factors in providing sufficient supply to meet this demand. It seeks to determine numbers of vehicles required within the existing fleet, and is based on:

Vehicle Number (VN) = QD x JP x SF x VU

Where
QD = Increased quantity demanded where accessible vehicles available, determined on the basis of revealed preferences in the access survey
JP = Factor to identify demand for peak journey numbers by Journey Purpose
SF = Supply Factor to identify proportion of fleet available at point of peak demand
VU = Vehicle Utilisation Factor to determine the effective numbers of journeys completed by the same vehicle

The model determines the numbers of vehicles within the entire fleet which would be required to ensure appropriate supply in a specified peak period. The calculations provide a total number based on stated propensity to supply over a peak period. It does not determine the actual delivery, which may vary depending on the personal choices of the driver, nor does it take account of the effect of geographical or temporal spread within the Dumbarton zone, concentrations of vehicles in one place at given times.

7.3.4 Demand (QD)

The extent of increased demand which is likely to result from an accessible taxi fleet has been determined from responses to the access survey. An increase of 14% in demand for taxi use results, on the basis of answers within the access survey, where accessible taxis become available.

For 100 individuals currently identified as having accessibility needs when accessing taxi services, 114 journeys would result from provision of an accessible fleet.

QD = CQD + %△QD

Where
CQD = Current quantity demanded
%ΔQD = % change in quantity demanded

For 100 current users
QD = 100 + 14
QD = 114

7.3.5 Journey Purpose Factor (JP)

Given that not all journeys occur at the same time, or are made for the same purpose, the calculation is further developed to identify the effect of peaks in demand. Responses in the access survey also allow for identification of points of peak demand, by journey purpose and by time of day. As with the more general use of taxis, the most concentrated peak occurs in travelling home from entertainment, peaking at weekend night times (30% of all demand), concentrated on a peak hour. Other peaks included shopping and attending doctor or hospital appointments, although these were more spread through the day.

The Journey Purpose factor is applied to determine the number of journeys requiring accessible transport are likely to occur during the evening peak period.

JP = QD*DP/LP

Where:
QD = Total journeys requiring accessible vehicles
DPH =Stated demand for travel in a peak period
LP = Length (hours) of identifiable peak period (Evening peaks occur over 2 hours)

JP = (114*0.33)/2
JP = 37.62 journeys in the peak period for every 100 current journeys
JP = 0.38/LP
JP = 0.19

7.3.6 Supply Factor (SF)

The extent of supply available at any one time will vary by time of day, and by day of the week. There is no compulsion on a taxi driver to drive their vehicle at any particular stage of the day, and many will choose to operate at times felt convenient or attractive.

The Survey of Taxi Drivers sought to establish typical working patterns, and asked which hours were driven regularly by taxi drivers. Of the responses received, 52% of taxi drivers would choose to drive during the

peak period of weekend night times.

The supply factor is therefore calculated to identify, in the instance of accessible taxis being distributed evenly across all taxi drivers, the actual number of accessible vehicles required to ensure sufficient supply at the point of peak demand.

SF = TTF / ATF

Where:
TTF = Total Taxi Fleet
ATF = Proportion of taxi fleet available

SF = 1.923

7.3.7 Vehicle Utilisation (VU)
The extent to which a single vehicle is able to complete multiple journeys. Typically a taxi leaves the available fleet as it is engaged to complete a journey, and returns to the fleet as it drops off passengers and seeks re-engagement. A taxi engaged for a 15 minute journey re-enters the fleet at the conclusion of its journey, and could in theory complete 4 such journeys in an hour.

Practically, however, the vehicle concludes its journey away from town centre or stance location, and would effectively require a similar time to return to the stance from whence its journey originated. This would suggest effective availability for 2 journeys in the hour.

Journey lengths also differ dependant on journey purpose, pick up point, and the desire of the driver to return to the original pick up point to seek re-engagement.

An average journey time of 10 minutes would result in a potential for the same vehicle to operate 3 journeys within any given hour.

VU = TP / (AJT + VRT)

Where:
AJT = Average Journey Time
VRT = Vehicle Return Time
TP = Time Period

VU = TP / 8 + 8
VU = 3.75 Trips / Hour
VU = 0.266

Calculation of journey times is determined in relation to stated journey distance specific to passengers travelling within the Dumbarton zone, and calculated on the basis of driven miles. The calculation does not take into account delays experienced at rank in boarding a vehicle, or at destination in alighting.

Vehicle return time is based on returning to the same point at the same driven speed.

7.3.8 Calculation
A base calculation, to identify demand for 100 current disabled passenger journeys determines:

Vehicle Number (VN) = QD x JP x SF x VU
Per 100 pass journeys =

VN = 114 x 0.19 x 1.92 x 0.27
VN = 11.22

Increase in accessible fleet required for peak demand =
11.22 Additional Accessible Vehicles / 100 disabled passengers

The addition of 12 (11.22 rounded up) accessible vehicles to the fleet is required for every 100 disabled passenger journeys.

7.3.9 Application
The determination of the appropriate numbers of vehicles required to serve the Dumbarton zone is based on the numbers of passengers travelling with ambulant impairment. This is calculated on the basis of observed use at stance, and stated use where taxis are engaged by advanced booking.

7.3.10 In addition to those with ambulant impairment, the study identified a further two categories where accessible vehicles may be appropriate, passengers with shopping (determined as multiple shopping bags), and mothers with buggies. Neither have been included in the calculation but both would benefit from the adoption of accessible taxis.

7.3.11 Within the Dumbarton and Vale of Leven zones, a total of 97 journeys were observed for individuals with a discernable level of ambulant impairment. This figure is ‘grown’ to account for engagement using other methods, such as engagement by pre-booking or by hailing, where observations are not possible.

7.3.12 Responses within the access study indicate that 48% of engagement occurs at stance, 31% by pre-booking, with 21% of vehicles engaged by

hailing.

7.3.13 Where applied to observed engagement at stance, this suggests a total current demand for 202 journeys by passengers with ambulant access needs.

7.3.14 The likely numbers of accessible vehicles required within the Dumbarton zone using the proportional method = 23 vehicles (22.66 rounded up).

7.4 Critique of proportional approach

7.4.1 The adoption of the proportional model relates to a method of satisfying peak demand, and is likely to represent the highest number of additional vehicles required on the basis of a proportional fleet approach. The factor appears similar, to proportions adopted in other EU countries adopting this approach. (Finland = 15% accessible taxis). Stated increase in taxi use (access survey) may also appear low in comparison to the actual effects experienced in locations which have adopted fully accessible taxis (Dumbarton estimate = 14% increase in all journeys, compares to 18.6% of users 'significantly increasing journeys' in Spain).

7.4.2 The proportional approach does, however, have a number of significant drawbacks, not least that any vehicle, once engaged, is removed from the fleet for the duration of the journey being undertaken. Where a particular user is reliant on that vehicle type, the removal of a vehicle from the fleet effectively limits that individual's ability to travel to an extent not experienced by able bodied passengers for whom any taxi is appropriate.

7.4.3 The fact that some vehicles would be accessible and others not, may lead to confusion in engagement on stance with individuals seeking accessible taxis choosing to look further back in a queue of vehicles to choose a vehicle type felt appropriate to need. This may extend to include passengers without ambulant impairment but with a preference for an accessible vehicle, for example those carrying shopping, or those with a child's buggy.

7.5 Direct introduction of a fully accessible fleet

7.5.1 An alternative to the proportional approach in providing accessible taxis is to move to a fully accessible fleet, in which all taxis can be defined as accessible to all users. The aim to provide a fully accessible fleet is included in the DDA, as applied to England and Wales, and identified south of the border as appropriate in larger towns and locations with tourist attractions where an additional level of access may be appropriate

to accommodate the needs of visitors. Scottish legislation applied to the supply of particular taxi types may appear more pragmatic, with decisions specific to local areas resting with district and city licensing authorities.

7.5.2 Within the West Dunbartonshire area, taxi services operating within the Clydebank zone are already operated by a fully accessible fleet, and the extension of accessible vehicles to Dumbarton is likely to provide significant benefits in passenger access to and use of taxis. A direct and full move to a fully accessible fleet offers the quickest method of achieving equal access to all users, but may also impact in the economic equilibrium of the market for the supply of taxi services.

7.5.3 The primary arguments forwarded against the move to a fully accessible fleet relate to the initial costs of accessible vehicles compared to saloon vehicles. Accessible vehicles can cost more than saloons, and the effect of an increased capital cost can, it is argued, impact on the numbers of vehicles available in a fleet. This argument is taken further in relation to the DDA application in England and Wales, where authorities may apply for exemption from the requirement to provide a fully accessible fleet by 2012, by demonstrating (Chapter 50, Section 35) that a move to a fully accessible fleet would result 'in an unacceptable reduction in the number of taxis'. The argument of an excessive initial cost of vehicles, and the demonstration of unacceptable reduction in fleet availability actually relating to the same concept.

7.5.4 Though common in much discussion, the comparison between vehicle costs is not always addressed in terms of full vehicle costs over serviceable life, and therefore may not effectively compare like for like. The argument is summarised (ECMT 2001) where the concept that change to accessible cabs will result in 'an excessive increase in the capital costs of operation…', 'is not, in fact, a realistic assumption. Provided a reasonable period of time were allowed for the change over from non-accessible saloons to accessible taxis' on the basis of the growth of a second hand market in accessible taxis. Accessible taxis may be purchased, in time from a second hand market, assuming that their introduction is new and similar vehicles are not already available, and that the costs of a second hand accessible vehicle with an effective serviceable life of 5 years need not significantly exceed that of a traditional saloon vehicle with a similar remaining serviceable life.

7.5.5 The market for second hand accessible taxis, in fact, already exists, in Scotland with second hand black taxis regularly used in the fleets in Clydebank and surrounding authorities, with continued service – and thus residual resale values, including markets in other UK regions.

7.5.6 This said, the additional cost of an 'accessible taxi' does represent an

additional expenditure when compared to saloon. Most drivers have invested in currently serviceable vehicles, and would stand to loose remnant values were an immediate move to accessible taxis a requirement. A lesser impact is felt in a staged roll out, where vehicles are replaced at the end of their serviceable life rather than midway through it.

7.6 Staged Introduction of a fully accessible fleet

7.6.1 While it is likely that an immediate move to a fully accessible fleet will cause financial pressures within the existing provision, and that this may impact negatively on the numbers of vehicles available within the fleet, it is also noted that the ultimate provision of a fully accessible fleet offers a number of advantages that can not be achieved through the proportional approach to such supply. A fully accessible fleet offers a higher level of service to those with ambulant impairment seeking taxi transport in that it does not necessitate identification of particular vehicle types within a taxi rank, treating all passengers on an equal basis. Accessible vehicle types are also observed as being favourable to those with shopping and children's buggies, and scoring more highly in most measures of vehicle preference in the pedestrian survey.

7.6.2 A staged introduction of an accessible fleet is likely to achieve benefits in terms of vehicle type and availability in the short term, and provide for the move of a fleet to fully accessible vehicles over a time. The move allows for a transfer from saloon to accessible vehicles without creating an immediate impact in the economics of operation, or a slump in the resale market of saloon vehicles.

7.6.3 Two options exist in the staged introduction of accessible taxis. A requirement for all new licences to move to accessible vehicles with immediate effect, or secondly, that increasing proportions of the fleet are provided by accessible taxis, for example on renewal of vehicle or at specified vehicle age.

7.6.4 The introduction of new Licences specifying accessible taxis has been a common and widespread practice in cities that have adopted an accessible fleet requirement. It is also predicated in England and Wales under the DDA. Its success relies on the uptake of new licences, where demand exists, and is limited in West Dunbartonshire on this basis. The Dumbarton fleet already appears to fully meet the numbers of able bodied passengers, and is unlikely to prompt numbers of new licence applications sufficient to move toward an accessible taxi fleet over a reasonable period of time. This approach, therefore, is not considered a realistic option for West Dunbartonshire.

7.6.5 The requirement for drivers to move to accessible vehicles on fleet renewal may offer a more realistic method of attaining an accessible fleet over a realistic time period. Vehicles reaching specified ages within the fleet would need to be replaced by accessible taxis. This provides a gradual move to accessible taxi services, not exceeding the length of time for all vehicles to be replaced naturally within the fleet.

7.7 Recommendation for adopting an accessible fleet

7.7.1 It has been observed, in the course of this study that stated desires for accessible taxis within the taxi fleet appear justified, and appropriate for consideration. Accessible taxis represent a more appropriate vehicle for the carriage of individuals with ambulant impairment, but also serve to offer advantages to other passengers, most specifically those with shopping, and those with children's buggies. The use of accessible taxis in the Clydebank zone is ubiquitous, prompts very few issues in access and egress, and provides significant benefits in terms of time taken to access taxis and time taken for the taxi to depart.

7.7.2 Accessible taxis consistently score more highly in terms of stated vehicle preference both in questions addressed to those with specific access needs, and to the general public.

7.7.3 The adoption of a proportional fleet, where a specified number of accessible taxis are required in the Dumbarton and Vale of Leven areas, offers an appropriate method of achieving increased access with immediate effect, but may not fully achieve the aim of providing appropriate levels of access to all passengers as no mechanism exists to dictate the times or locations of supply. Moreover, the fact that only a small number of the overall fleet would be operated by fully accessible taxis is likely to cause confusion at stance where individuals may choose to use a particular vehicle type rather than engage the first taxi in the queue. We feel that this would not be limited to those with a clear disability need, but may extend to individuals with a preference for a particular vehicle type.

7.7.4 The findings of our study would tend to support a graduated move to an accessible fleet in the Dumbarton zone.

8.0 Conclusions

8.0.1 The needs of the travelling public appear well catered for in the supply of taxis in West Dunbartonshire. The authority area has a low level of excess demand, measured as an index of significant unmet demand, delivering a significantly better level of service by availability than many other

authorities in the UK.

8.0.2 The authority splits operation of taxis between two zones, Clydebank and Dumbarton, and these demonstrate slightly differing characteristics, and performance, although both offer high levels of supply measured by availability.

8.0.3 The Clydebank zone operates a fleet of 100% fully accessible taxis, and these are widely available. The service levels are good, and the extent of waiting at stance appears low. There are few reported instances of unmet demand, and the waiting profile is in line with stated desires.

8.0.4 SUD levels observed in the Clydebank zone were felt to be low, and unlikely to indicate any presence of Significant Unmet Demand. The highest value (ISUD = 7.05) was observed at the Clyde shopping centre, though this does not represent any occurrence of SUD (traditionally defined as ISUD values greater than 80).

8.0.5 Taxi services in the Dumbarton zone are operated by a mixed fleet comprising a majority of saloon vehicles. The zone includes a number of suburban and non-urban communities, and appears to operate well. Issues exist in relation to the use of non-accessible taxis, and these are addressed in relation to increasing the availability of accessible vehicles within the zone.

8.0.6 The study observed five locations in the Dumbarton zone, and observed few extended periods of delay. The highest level of ISUD (ISUD = 0.53) was measured at Dumbarton Central Railway station, and this does not represent any occurrence of Significant Unmet Demand.

8.1 Conclusions specific to Accessible Taxis

8.1.1 The Clydebank zone operates a fully accessible fleet, and this appears to serve the needs of the travelling public well. Some questions arise in terms of the relative comfort of the accessible taxi compared to saloon vehicles, but this was not identified as a significant issue in the public survey. The provision of a fully accessible fleet has significant advantage in allowing individuals to access their taxi regardless of their accessibility needs, and this must be seen as a positive aspect of these vehicles.

8.1.2 The study team also noted the high level of use of accessible taxis by people with shopping and those with children's buggies. Access and departure times were very good with children's buggies being rolled onto the vehicle with apparent ease.

8.1.3 The Dumbarton zone operates a mixed fleet, but this is dominated by saloon type vehicles. The extent of accessibility is good for able bodied passengers. However, the vehicle type scores less well than accessible taxis on all access aspects.

8.1.4 It appears appropriate to conclude that an increase in the extent of accessible vehicles is timely for application in the Dumbarton zone.

8.1.5 It is our conclusion that a fully accessible fleet be a desirable long term goal, with a move toward that aim based on a proportional increase in accessible taxis no less than that set out in our proportional recommendation.

8.1.6 A minimum of 23 accessible vehicles should be made available within the Dumbarton zone in order to cater for the needs of those travelling with ambulant mobility impairment. This number would address the needs of the current travelling public and take account of an increase in use resulting from provision of accessible vehicles based on current stated needs.

8.1.7 A long term desire may include the wish to provide a fully accessible fleet, and it is our conclusion that this would provide a significant benefit to the needs of all passengers.

8.1.8 The study supports the concept that a graduated introduction of accessible vehicles represents the most appropriate method of achieving a fully accessible fleet, and vehicles within the fleet be replaced with accessible taxis at the time of their replacement. A maximum saloon vehicle age would determine the exact timescale over which a fully accessible fleet may become available.

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