ADAMSTOWN STREET DESIGN GUIDE

South Dublin County Council

Comhairle Contae
Átha Cliath Theas
South Dublin County Council

Adamstown

CONTENTS

1.0 INTRODUCTION

1.1 Street Design and Adamstown

1.1.1 There is a clear distinction between the design of a *road* and a *street*, which must be understood prior to the design of streets within Adamstown. The main function of a *road* is to distribute traffic. A *street* is multi-functional and is a place to live, work, walk, cycle, interact and spend time.

1.1.2 Traditionally cities, towns and villages within Ireland contained *streets* that were the focus for community life. In general, all streets were fronted with development and were lively and interactive places. The main street was the primary destination for most urban activity.

1.1.3 In recent decades, increased traffic volumes have led to a shift in design philosophy, away from the *street* and towards the *road*. The emphasis has been on vehicular movement and the *road* has become a means of distribution, hence the widely used term *distributer road*. In many cases users such as cyclists and pedestrians have been marginalised and in some cases excluded altogether.

1.1.4 The focus on vehicle movement has had a major impact on the design of the built environment. Communities have been packaged into 'neighbourhood cells' that are surrounded by *distributer roads*. These *roads* are devoid of development and are generally characterised by free flowing traffic, walls and fences. This segregates communities and creates higher speed traffic conduits that may be perceived as unsafe and are lacking in variety, character and a sense of place.

1.1.5 Another shift in design philosophy began to occur in the 1990s with the movement toward more sustainable densities and better connected layouts. This consolidated approach to building residential communities demanded a renewed design approach that required a more integrated approach to street design to promote walkable communities that can be more easily serviced by public transport.

Roads are primarily concerned with the movement of vehicles. Streets are multi-functional spaces within which people live and interact.

Examples of a typical lower density neighbourhood cell surrounded by distributor roads with limited points of vehicular and pedestrian access (left) and a typical street network as proposed within Adamstown with a permeable layout, particularly for pedestrians.

1.1.6 The *Adamstown SDZ Planning Scheme* seeks to establish a network of walkable streets that provide direct links between communities, public transport, shops and other local facilities. The *SDZ Planning Scheme* also recognises that streets are social spaces in which people live and interact and a renewed approach to street design is encouraged using more traditional place based values.

1.1.7 This document reflects the considerable efforts to implement place based street design standards within Adamstown by a range of technical and professional personnel within South Dublin County Council and the design teams working on behalf of the Adamstown Developers. This document details the design approaches and construction standards that have been agreed, including the 'taking in charge' standards for various components of the street. It also seeks to introduce greater scope for new innovative design solutions, based on desired outcomes.

1.1.8 This document also seeks to provide a best practice update for the SDZ Planning Scheme in relation to street design. Much of the design guidance provided within the Planning Scheme with regard to the general layout and dimensions of the different street types is based on UK documents such as *Design Bulletin 32* (1977, 1992) and *Places, Streets and Movement* (1998) which have recently been superseded by *Manual for Streets* (2007).

Comparative images between a typical village street in Ireland with an urban edge and direct frontage to the street (top), a typical distributor road in Dublin which is principally designed for vehicle movement (middle) and a street within Adamstown which draws on the characteristics of the traditional urban street.

1.2 Policy Background

National Planning Policy

1.2.1 *Sustainable Residential Development in Urban Areas* recognises the importance of street design in establishing a sense of place. The guidelines seek to promote places that are designed to reflect key characteristics such as:

- Connectivity
- Permeability
- Legibility
- Sustainability
- Safety
- Accessibility

1.2.2 The *Urban Design Manual: A Best Practice Guide (2008),* is a companion document to *Sustainable Residential Development in Urban Areas.* The Design Manual provides guidance on how more sustainable communities can be realised using best practice urban design methods. This includes examples and practical design measures that can be implemented so that streets are designed as places for people.

1.2.3 Both documents make reference to and draw upon many of the principles contained within the *Manual for Streets* (MfS). The MfS is a keynote guide used within England and Wales for the design of streets and is discussed below.

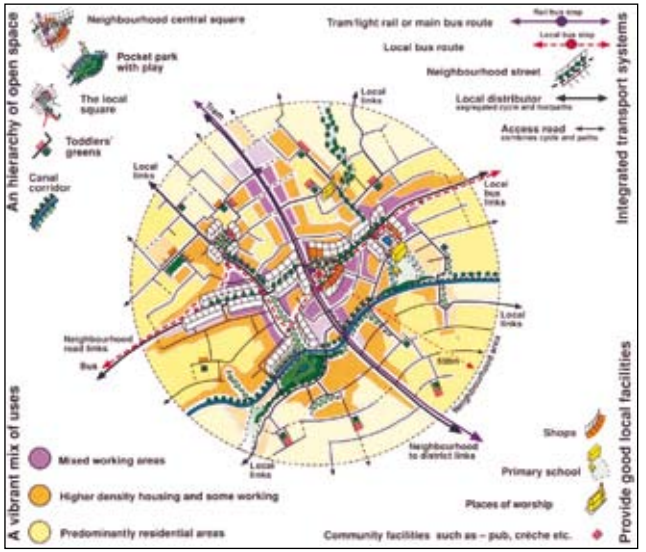
South Dublin County Council Development Plan 2004-2010

1.2.4 The South Dublin County Council Development Plan recognises the close links between sustainable place-making and the quality of life enjoyed by communities. The quality of the public realm, including the design of streets is highlighted as a critical aspect of place-making, particularly in areas of higher densities and civic importance.

1.2.5 The principles for street design are set out in Section 11.8 of the Development Plan. These principles outline the Council's requirements for high standards of design and materials in the layout and finish of footpaths, hard landscaping and pedestrian areas.

↑ Rather than relying on speed bumps, this design drawing for a development at Merlin Park in Galway uses layout to control traffic speeds with an indirect route, parking layouts and making clear thresholds into a 'home zone' street.

Extracts from Section 7 of the draft Urban Design Manual illustrating place based - safe street design.



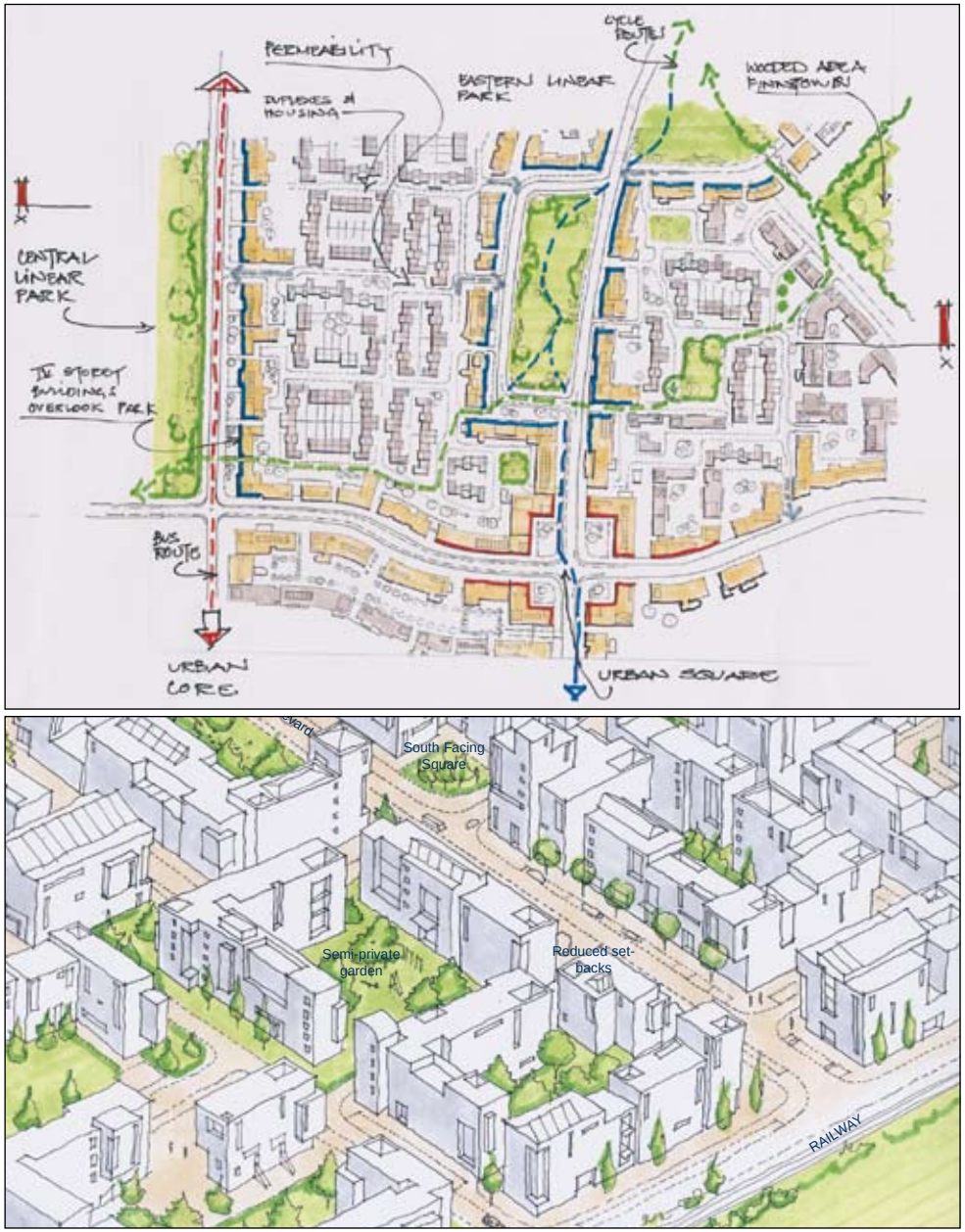
Extract from Section 11 of the SDCC Development Plan showing how new development is to reflect more sustainable or traditional neighbourhood forms.

Adamstown SDZ Planning Scheme

1.2.6 The Adamstown SDZ Planning Scheme places a high priority on quality of life for communities. The Planning Scheme also recognises that there is a close link between the design of the built environment and how it effects the day-to-day activities of its residents and the longer term sustainability of the community.

1.2.7 Section 2.3 of the Planning Scheme provides detailed guidance in relation to the design of the built environment including the relationship between streets and buildings, connectivity and permeability levels and the typical hierarchy of streets. These guidelines aim to promote a street environment that:

- is active, vibrant and perceived as safe as it is fronted with buildings that generate pedestrian activity and overlook the public domain;
- is permeable and connected by limiting block sizes and providing direct routes;
- is calmed through the employment of suitable carriageway widths, on street parking and surface treatments in preference to more intrusive physical measures;
- is focused on the needs of all users with priorities for pedestrian movement along clearly defined routes with safe crossings and wide footpaths; and
- encourages the use of decorative and landscaped elements to enhance the aesthetic qualities of the street.



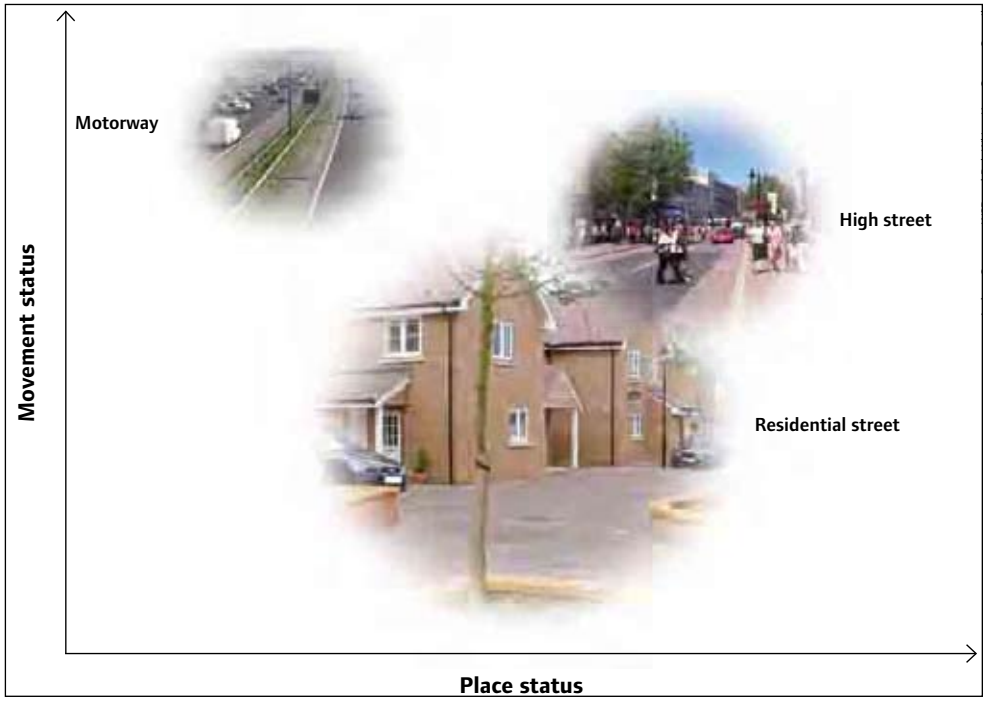
Extracts from the Adamstown SDZ Planning Scheme illustrating the sustainable and compact nature of development.

1.3 Manual for Streets and Other Influential Documents

1.3.1 The *Manual for Streets* (MfS) was prepared for the Department of Transport in the UK. The MfS provides detailed guidance of how a sense of place can be achieved through street design and was created by an extensive team of traffic engineers and urban designers, with additional input from various national and local government authorities in the UK. It is a thoroughly researched document and is accompanied by a second volume of *Evidence and Research* that contains the methodology for case study research as well as more detailed data in relation to street geometry.

1.3.2 The MfS is of particular relevance to this document as it is directly concerned with the design of safe streets as part of the place making process. It recognises that places which are most valued and have stood the test of time are those which have successfully balanced the movement of pedestrians and vehicles. It covers a broad spectrum of traffic management and place making issues and provides detailed design guidance, which covers all stages of the design process from analysis to implementation and from principle to technical standards.

1.3.3 There are several other documents that have emerged recently that provide well researched and detailed guidance in relation to the design of streets. Influential UK documents also include the *Urban Design Compendium* (2000) and *Urban Design Compendium 2* (2007), which provide valuable guidance in relation to street networks and place making that influence street design. For a full list of material used in the compilation of this guide, refer to Section 5 below.



Extract from the Manual for Street illustrating road/street types and their place and movement functions.

1.4 Relationship with Current National Guidelines

National Roads Authority Design Manual for Roads and Bridges (2001)

1.4.1 The design standards contained within the *National Roads Authority Design Manual for Roads and Bridges (*NRA DMRB) are often referred to as the 'regulations' for road design and are based on a UK document of the same name. Their application within residential/local streets is limited as the standards contained within the NRA DMRB are primarily intended for use on roads of national/regional importance which carry significant volumes of traffic. Section 1.5 of the NRA DMRB states:

> *The DMRB sets a standard of good practice that has been developed principally for trunk roads in the UK. Similarly the NRA DMRB sets a standard of good practice intended principally for national roads in Ireland.*

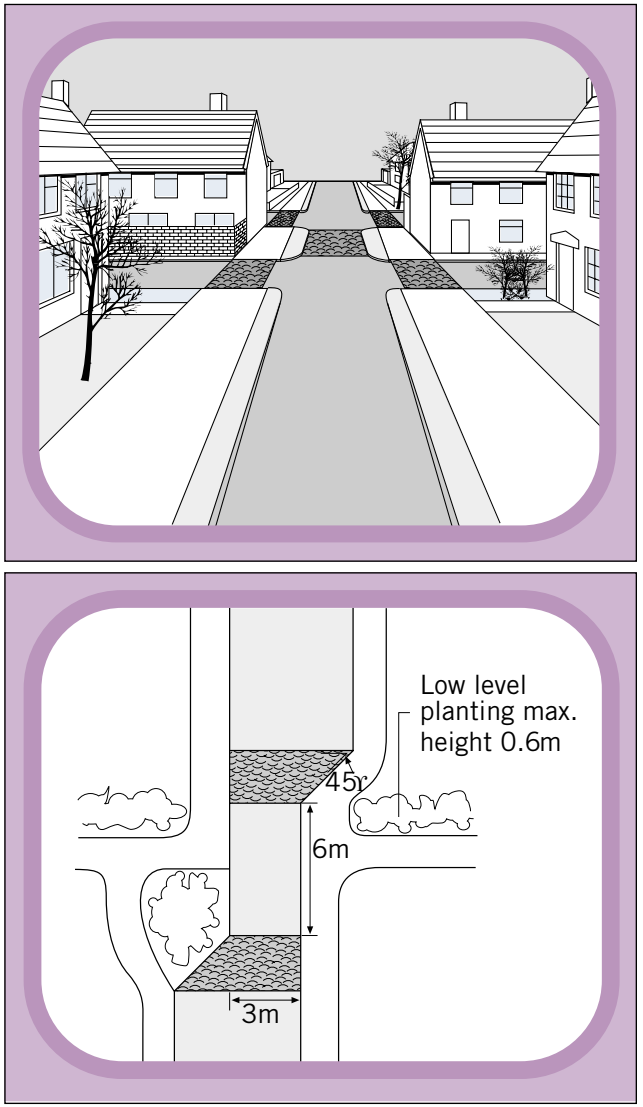
1.4.2 It is noted within the NRA DMRB that for residential/local streets the Local Authority is able to show discretion in relation to street design. With regard to the standards contained within the DMBR, Section 1.5 states:

> *Where they are used for local road schemes, it is for the local Road Authority to decide on the extent to which the documents in the manual are appropriate in any particular situation.*

Traffic Management Guidelines (2005)

1.4.3 The Traffic Management Guidelines (TMG) are a guidance document which provides more detailed advice in relation to residential streets. The TMG introduces the concepts of the living street and seek to encourage a more placed based approach to street design. Discretion also needs to be shown with regard to the application of the TMG as many of the technical standards contained within the document (such as forward visibility splays) reflect those contained within the NRA DMRB and may not suitable for local streets within higher density environments. The need for a contextual approach is recognised and encouraged by the TMG. Page 26 of the TMG states:

> *Local authorities can publish guidance on how new housing developments are to be designed. This should contain guidance on general layout and design of residential roads and footways/ cycleways.*



Extracts from the Traffic Management Guidelines illustrating traffic calming treatments within residential streets

Road Safety Audits

1.4.4 A set of Road Safety Audit Guidelines (RSAG) were published by the NRA in July 2004. These guidelines are derived from guidelines of the same name produced in the UK by the Institution of Highways and Transportation (IHT). The aim of the RSAS process is to identify road safety problems in order to minimise the number and severity of casualties. In many cases this results in the elimination of all risks associated with the design of a street.

1.4.5 There may be potential for conflict in the application of the RSA guidelines within Adamstown as, like the NRA DMRB, they contain guidelines that are principally designed for roads of national/regional significance. This problem has been identified in the UK where a third edition of the IHT Road Safety Audit Guidelines has been produced following the publication of the MfS. The third edition, and specifically Chapter 6 of the IHT RSAG specifically describes issues arising when undertaking Road Safety Audits on residential streets and how they should be applied in the context of the MfS.

1.4.6 There are two key assessment tools that need to br applied when undertaking an RSA in Adamstown. That of a "Quality Audit" and 'Risk Assessment'. A Quality Audit recognises the place based approach to street design and takes into account key considerations such as visual quality and how streets will be used by the community. A Risk Assessment acknowledges that risk may be a valuable traffic calming tool and that the removal of all risk may actually led to a greater number of collisions. A balanced approach is recommended that takes into account the degree of risk in terms of severity and frequency.

Extract from the IHT Road Safety Audit Guidelines noting that a low risk street environment does not always result in a better safety record.

1.1.5 How to Use the Document

1.5.1 This guide is divided into two main sections, with two accompanying subsections:

PART A

- Guiding Principles: This section illustrates the underlying principles of the document and discusses the general design approach which should be undertaken.

- Desired Outcomes: This section focuses on the various components of the street and contains examples of desirable design solutions.

PART B

- Street Typologies: This sections identifies the various street types within Adamstown and provides illustrative examples of their layout and finishes.

- Accepted Standards: This section contains a number of technical drawings that demonstrate construction standards that have been agreed and are being applied in the Adamstown area.

1.5.2 Whilst Part B of this document represents design types that are readily acceptable to South Dublin County Council, it is not the objective of this document to stifle innovation and creativity. South Dublin County Council is open to a number of design solutions which meet the objectives contained within PART A of this document, particularly where they represent up-to-date design philosophies and/or are more environmentally sustainable solutions. This document is also intended to evolve and grow as the Planning Scheme progresses. As new conditions arise and where new design solutions are agreed they will be added to Part B.

1.5.3 As noted in Section 1.2.3 above, this Document is also intended as a best practice update to the guidelines within the SDZ Planning Scheme. Section 2.3 (viii) of the Planning Scheme provides a general outline of the street hierarchy within Adamstown. It should also be noted that for the purposes of this document, this hierarchy has been refined to the following street types.

- Adamstown Boulevard
- Avenues
- Side Streets
- Back Streets

The layout and hierarchy of these street types is further illustrated below and in Part B of this document.

The Adamstown street network, illustrated to indicate the hierarchy of streets. The permeable nature of this layout and the strong relationship between the built form and street enables the implementation of place making street design principles.

Adamstown Boulevard

Avenue

Side Street

Back Street

PART A - Guiding Principles and Desired Outcomes

2.0 THE PRINCIPLES OF STREET DESIGN IN ADAMSTOWN

2.1 Purpose/Aims

2.1.1 The purpose of this document is to complement the *Adamstown SDZ Planning Scheme* 2003 by providing detailed guidance in relation to the design of streets to achieve the following:

- **Safe Streets** that passively manage vehicular behaviour through a holistic design approach and 'shared space' philosophy.
- **Accessible Streets** with a focus on the free movement of vulnerable users such as cyclists and pedestrians.
- **Attractive Streets** that enhance the areas sense of place and people's enjoyment of the urban environment.
- **Legible Streets** that direct and assists the most casual of users in finding their way around.
- **Cost Effective Streets** where materials, finishes and street furniture are rationally and strategically applied.
- **Innovative Streets** that continue to evolve through the application of best practice and contemporary design models.

Each of these design principles is discussed individually below.

2.2 Safe Streets

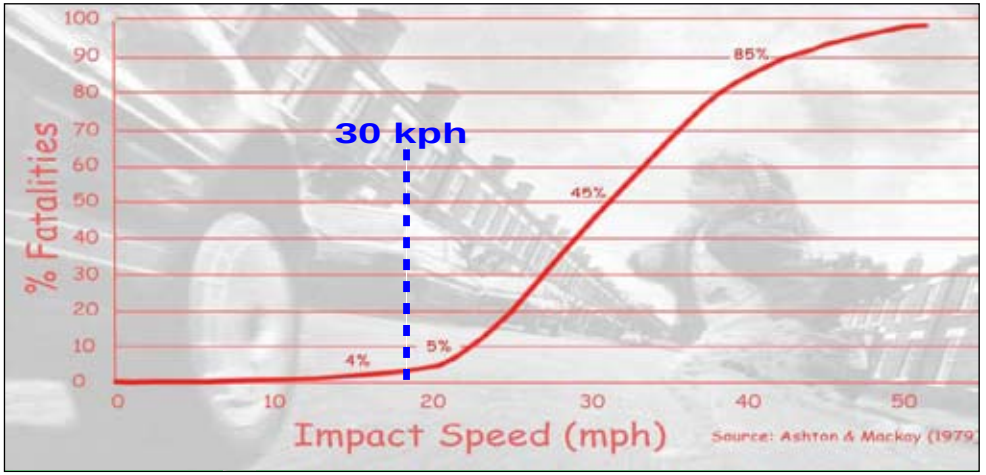
2.2.1 The merits of the distributor road/neighbourhood cell environment in promoting safer streets is questioned. Recent research suggests that this type of road environment is ineffective at managing vehicle speeds[1] and that drivers often travel at what they perceive to be a reasonable speed, even if this conflicts with the posted speed limit[2]. The distributor road environment typically provides wide, clear and unobstructed routes that are not fronted with development, encouraging people to drive faster and pay less attention to their surrounding environment.

2.2.2 Street design within Adamstown is motivated by a safe street agenda that seeks to slow vehicles down and passively manage driver behaviour. Research has shown that fatality rates exponentially increase with vehicle speeds over 30 kph. By reducing vehicle speeds the number and severity of accidents will be substantially reduced.

2.2.3 A more balanced and effective approach to managing vehicle speeds is required. The approach to be taken within Adamstown forces drivers to be aware of their surroundings, evaluate risk and slow down[3]. This is achieved via a holistic design approach that takes account the streets characteristics and function.

2.2.4 Lower design speeds are promoted within Adamstown by a built form which creates a sense of enclosure and greater pedestrian activity[4]. This is achieved by:

- The close proximity of buildings to the carriageway
- The continuous wall of buildings along the carriageway
- Frequent entrances onto the street
- Active ground floor uses



A graph showing the sharp increase in fatality rates for pedestrians hit by vehicles travelling above 30kph (18mph) (source Aston and Mackey 1979).

Close Proximity of Buildings

Continuous Street Wall

Active Ground Floor Uses

Pedestrian Activity

Photos and illustrative examples of the development characteristics of Adamstown which passively encourage lower vehicle speeds by requiring drivers to pay greater attention to their surrounding (Photomontage courtesy of Chartridge).

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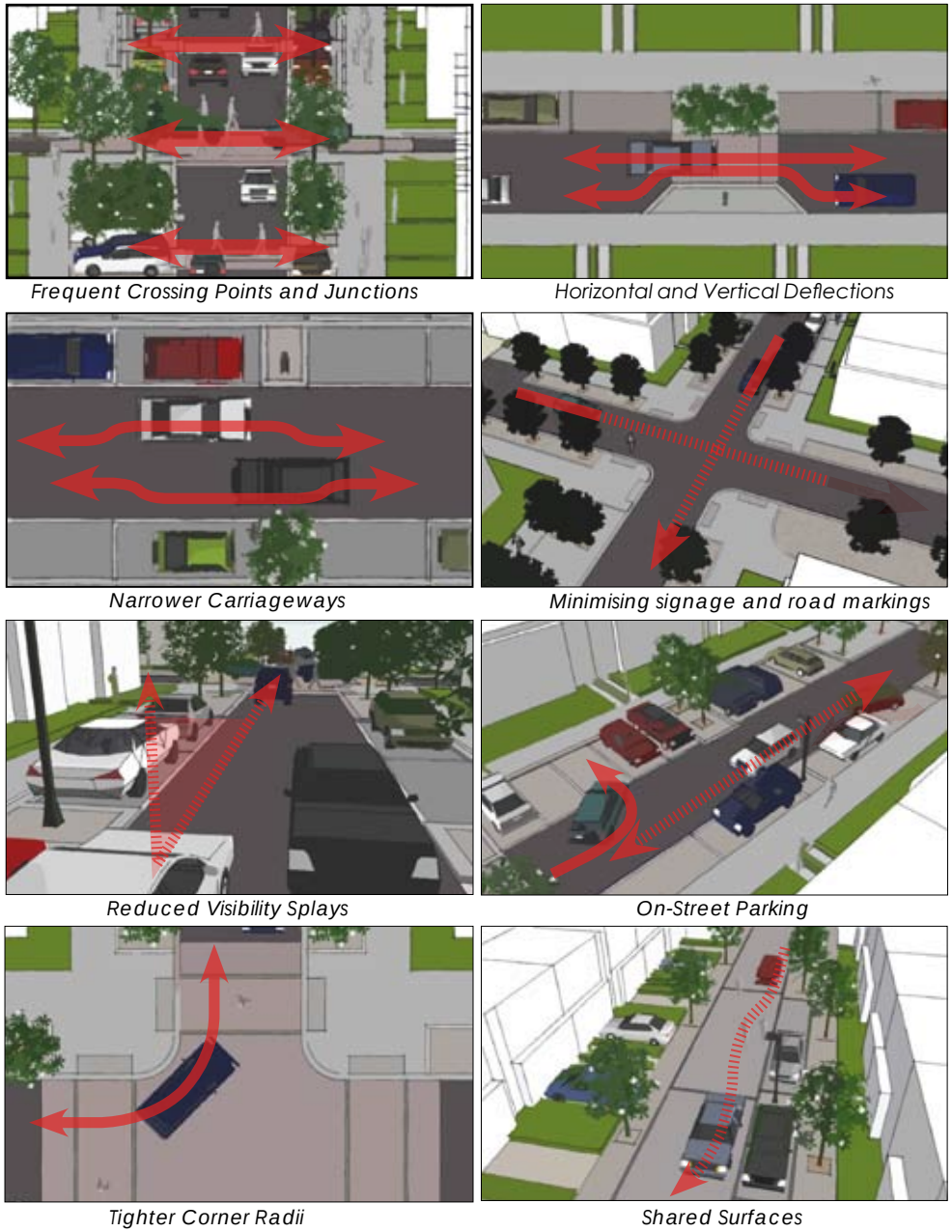
1 Section 2.4 of Manual for Streets. 2007.
2 Page 96, Urban Design Compendium 2. 2007.
3 Refer also to pages 57-68, Living with Risk. 2007.
4 Research has also shown that the presence of pedestrians on the street also cause drivers to travel more slowly. Refer to Section 2.2.5 of Manual for Streets.2007.

2.2.5 The geometric features of the street are designed to complement the built form and further slow down traffic without the use of more intrusive measures such as speed ramps or excessive signage. The design of streets calm traffic by providing:

- Frequent crossing points and junctions
- Horizontal and vertical deflections
- Minimising formal signage and road markings
- Narrower carriageways
- On-Street parking
- Reduced visibility splays
- Shared street surfaces[5]
- Tighter corner radii

2.2.6 In general, the lower the desired design speed the more restrictively and/or more frequently the geometric measures listed above and illustrated to the right should be applied. The appropriate level of restrictions and frequencies are discussed further in Section 3 of this document.

2.2.7 These characteristics of the built form and street geometry need to be applied in a holistic manner. The SDZ Planning Scheme provides the framework for the built form features listed above, as well as geometric design measures such as reduced carriageway widths. It would not be appropriate to apply some of these measures in the absence of others. As such their application in some areas outside of Adamstown may be limited.



Illustrations of geometric street features that can be designed into a street network to passively calm the movement of traffic without the use of intrusive physical measures.

5 *Research has shown that changes in surface material alone (such as block paving) can reduce vehicle speeds by 4-7 kph. Refer to Section 7.2.15 of Manual for Streets. 2007.*

2.3 Accessible Streets

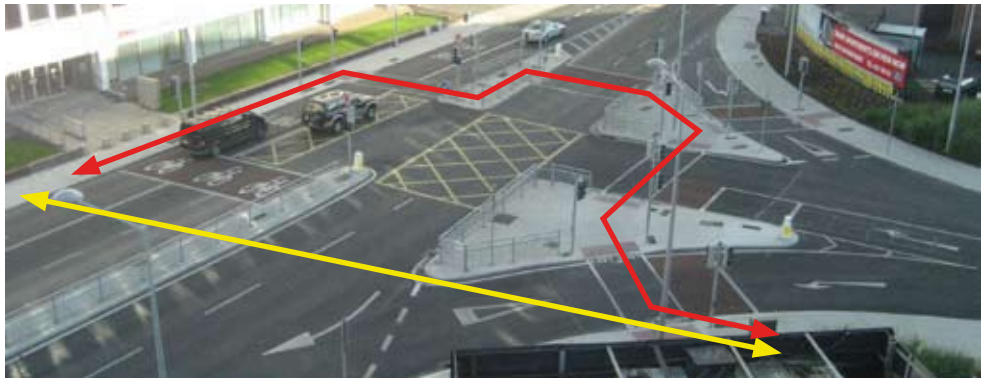
2.3.1 Roads which are characterised by wide carriageways, continuous lines of fencing, little or no frontage, limited points of access and infrequent crossings will discourage walking. Such environments may be perceived as unsafe by pedestrians due to the fast moving nature of vehicles, a lack of surveillance and a lack of exit points. Pedestrians are greatly inconvenienced and must walk greater distances to get where they want to go.

2.3.2 Adamstown is designed as a walkable neighbourhood. The *SDZ Planning Scheme* seeks to establish a network of permeable blocks that encourage more sustainable forms of transport by providing direct walking and cycling links to public transport and local shops/services which will reduce private vehicle dependency.

2.3.3 The road environment may also cause pedestrians to take greater risks. Pedestrians tend to follow the shortest route, even if this conflicts with the location of crossings and pedestrian control measures. The effectiveness of installations such as guard rails is questionable as people walk around them where they interfere with desire lines. Other vehicle priority installations such as roundabouts also have very limited application in Adamstown as they result in large splays which encourage faster turning traffic, divert pedestrian desire lines and are difficult to cross.[6]

2.3.4 The design of streets must take into account pedestrian desire lines and the needs of vulnerable groups, such as children or the elderly. Accessible streets are free of obstructions that interfere with pedestrian movement. Pedestrian crossing points need to be clearly marked, frequently provided and placed on pedestrian desire lines. This will alert drivers of pedestrian activity and calm traffic whilst ensuring that all pedestrians can be catered for, accessibility is maximised and the pedestrian environment can be traversed with ease.

Examples of distributor roads which focus on vehicle moment and force pedestrians to take greater risks to cross them (even when guard rails are put in place).



Examples of an indirect pedestrian crossing points along a busy road. The pedestrian desire line is in yellow and the actual route a pedestrian must take to reach the same point in red.

Examples of direct and clearly marked pedestrian crossings which provide a greater sense of pedestrian priority with tactile paving to inform the visually impaired.

6 *Refer also to Section 7.3.13-14 of Manual for Streets. 2007*

2.4 Attractive Streets

2.4.1 Road environments are often dominated by elements which greatly detract from the attractiveness of an area such as blanks walls (which often become a target for graffiti) and large tracts of fencing. Traffic management solutions often result in a proliferation of line painting, signs and other physical elements that detract from the attractiveness of streets.

2.4.2 The aesthetic qualities of streetscapes are a principal consideration for new development proposals in Adamstown. The SDZ Planning Scheme promotes a design approach whereby buildings are finished with high quality materials that collectively work together to create visually appealing streetscapes that are diverse, yet neatly coordinated.

2.4.3 The attractiveness of streets within Adamstown is further enhanced by landscaping and the palette of materials and finishes. Sufficient provision must be made in the first instance to allow the careful placement of items such as street tress and street furniture within designated areas (such as verges). The range of materials and street furniture utilised within Adamstown should be kept to a few complementary key choices. This will ensure that major clashes are avoided and that the overall effect is not overbearing.

2.4.4 Clutter also needs to be minimised. A coordinated approach must be undertaken, that begins at the design stage (though the street geometry) and is followed through to implementation. Designers should also begin from the principle of not being reliant on signs or line painting to direct people[7]. Problems such as excessive signage can occur incrementally over time as various agencies add different layers of signs that are concerned with the various individual functions of the street. O'Connell Street in Dublin city centre is an internationally renowned example of a simple and coherent approach that resulted in the successful rejuvenation of an important and iconic street[8].

Examples of blanks walls and fencing and poorly coordinated materials in Dublin (top images) and excessive and unattractive signs and pedestrian barriers in the UK (bottom image). UK image source: English Partnerships.

The successful regeneration of O'Connell Street is attributed to a material palette that is limited to a few complementary choices which are laid out in a coordinated manner. Image Source: CABE 2007.

7 *Refer also to Section 9.1.1 of the Manual for Streets. 2007.*
8 *Pg 9, The Way to Better Streets: Briefing Document. 2007.*

2.5 Legible Streets

2.5.1 In recent years suburban housing layouts have been characterised by a sense of sameness. Whole estates of housing are designed with little regard to the surrounding context and with similar layouts and little variation in the built form. These characteristics combined with a street layout that contains a proliferation of cul-de-sacs surrounded by faster distributor roads with limited access points making these environments extremely difficult to navigate.

2.5.2 The *SDZ Planning Scheme* requires the urban structure of Adamstown to be designed around on a clear hierarchy of streets and building types that work together to promote a highly legible environment. The height and form of buildings relates specifically to street types, with larger scale buildings on major streets and lower scale buildings on minor streets. The Planning Scheme also provides for the placement of landmark buildings at key locations, such as nodes, important corners and around areas of public open space. This assists people in identifying the importance of streets, the likely levels of connectivity and when they have reached destination points.

2.5.3 To further encourage the establishment of a legible environment, a more detailed level of design application is needed in terms of streetscape treatments. Legibility is enhanced by applying a different palette of materials for each of the street types identified within the street hierarchy. The choice of surface materials, landscaping and street furniture also helps create a distinguishable character that promotes a sense of place.

2.5.4 A hierarchical approach to the application of surfacing and street furniture will generally occur throughout Adamstown. Higher order materials are generally reserved for major streets and more standardised finishes may be applied to lower order streets. A different approach should be taken in each of the neighbourhoods identified within the Planning Scheme. South Dublin County Council is open to a range of neighbourhood based schemes. In general, more intensively developed areas should be finished with a robust urban feel, whilst less intensive outer areas and those adjoining major areas of open space may be finished with a softer green feel.

Examples of a typical neighbourhood cell/distributor road estates that are characterised by a sense of sameness and confusing road/street layouts.

Examples of how surface treatments can assists people in understanding the characteristics of the built environment (as well as having other traffic calming and amenity benefits)

2.6 Cost Effective Streets

2.6.1 Whilst it would be desirable for all streets within Adamstown to be finished with the highest quality materials, it is not economically feasible to do so. A strategic and rationale approach needs to be taken that maximises the benefits of higher quality materials and street furniture.

2.6.2 The use of higher quality materials should be reserved for those streets which are of the greatest importance. These higher specification areas include:

- On major streets such as *Adamstown Boulevard* and *Avenues;*
- Along strategic pedestrian/cyclist routes;
- In areas of higher density and activity;
- Within local and district centres;
- Around facilities of civic importance such as schools and parks; and
- To further distinguish landmark/gateway features.

More standard materials can be used in other areas. As noted above in Section 2.5.4, the application of materials in such a manner will also assist in achieving a more legible environment by highlighting and directing people toward those parts of Adamstown which are of greater civic importance.

2.6.3 Streets should be designed to ensure that they are finished in a manner where up front costs are balanced with longer term issues such as durability and maintenance. Up front costs can be decreased by reducing the need for physical elements such as signage and guard railing. This provides greater opportunity to invest in more robust finishes that can result in medium to long term savings provided the materials and street furniture used are durable and easy to maintain, suitable for its purpose and appropriate to the local context. The use of higher quality materials also has more far reaching economic benefits. For example along shopping streets research in the UK has shown that better streets result in better market prices, better rents and better retail sales.[9]

2.6.4 The sustainability of any product is also a key issue that must be considered in terms of its manufacturing process and recyclability. This will also have cost implications over the long term, with regard to the energy required to produce it and its ability to be reused should removal and replacement become and issue. Consideration should also be given to the environmental impact of the finished construction.

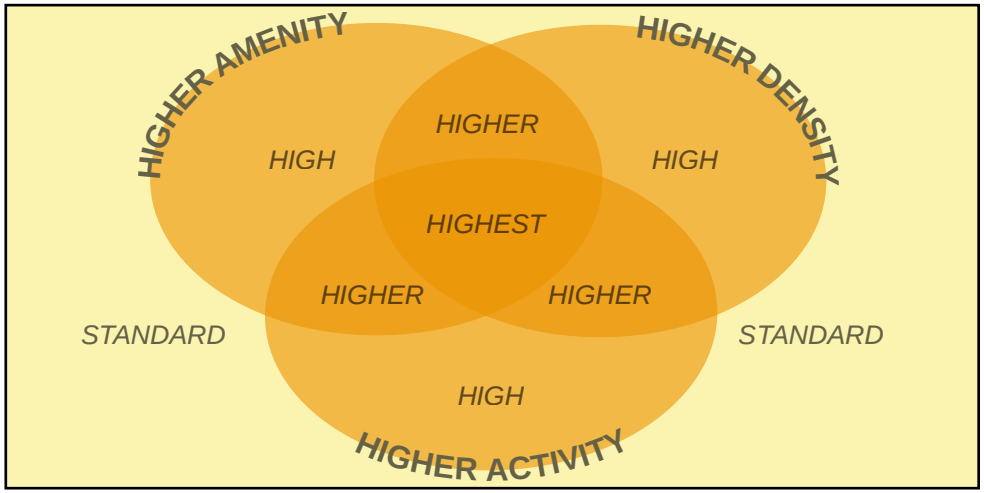


Diagram illustrating the general approach that should be take to applying finishes within Adamstown. The busier and more important the place, the higher the specification.

Examples of the contextual application of materials within Adamstown. Clockwise from top right: highest specifications proposed within the district centre; higher specifications within a home zone adjacent to a school; high specification along a main Street; and Standard specifications along a back street (photomontage courtesy of Chartridge).

9 *Page 15, Paved with Gold. 2007*

2.6 Innovative Streets

2.6.1 Adamstown is founded upon the principles of best practice urban design, which distinguishes it from some of the more recent urban expansions in Ireland. However, Adamstown should not be viewed as a complete model and should continue to evolve and incorporate local and international innovations to remain at the forefront of change.

2.6.2 One of the key impediments to change is the perception of risk and a tendency to stick to old guidelines that seek to segregate vehicular traffic from other users in an effort to minimise risk[10]. This defines the nature of this dilemma for authorities. Should they take on the responsibility of protecting people through complex engineering/design solutions that convolute walking and cycling routes, or should the various street users take responsibility for their own interaction in a shared environment?[11]

2.6.3 Until recently in the UK there had been a mixed response to the many place making design solutions put forward by urban designers that seek to modify behaviour by increasing risk[12]. Much of the resistance faced by designers in the UK was based on the perception that these place making design solutions were central European solutions that could not be applied locally. Designers in Ireland have faced similar resistance.

2.6.4 Places such as Poundbury in Dorset and Kensington High Street in London UK demonstrate that place based design solutions work. These examples show that increased interaction between users can actually improve awareness, modify behaviour and reduce risk.

2.6.5 The street network in Poundbury Village was designed around the principle of shared space. Reductions in vehicular speed are achieved by shared carriageways, loose surfaces, irregular and changing street widths and limited sightlines. The very nature of the street makes it difficult for cars to accelerate beyond 30 kph and promotes an awareness of pedestrians and cyclists. While the design of the street network in Poundbury was considered radical at its inception in the late 1980's, it has proved very successful, with very few accidents reported[13].

The shared street philosophy of Poundbury with its limited sightlines, narrow winding carriageways, shared surfaces and frequent junctions was considered radical at the time of its conception and have proved a great success.

The improvements to Kensington High Street which include the removal of guard railings and excessive signage, along with paving and lighting upgrades, has modified driver behaviour and reduced accident rates (Image source www.rbkc.gov.uk).

10 *Section 2.6.1, Manual for Streets. 2007.*
11 *Page 23. Living with Risk. 2007.*
12 *Section 7.2, Mixed Priority Routes. 2008.*
13 *ection 2.6.3, Manual for Streets. 2007.*

2.6.6 The remodelling of Kensington High Street involved the minimisation of signage and line painting and the removal of guard railings. It was found that driver behaviour was modified and speeds were reduced upon its completion in September 2003. Most significantly figures for September 2003 to August 2005 show 40 recorded casualties (four killed and 36 slightly injured). This is a reduction of 43%, against a reduction of 17% London wide in the same period[14].

2.6.7 The Kensington High Street project also inspired a number of shared space solutions to be applied to high streets throughout the UK with similar success. In all cases casualty rates have been reduced, with reductions of between 24% and 63%[15]. All of these examples demonstrate that design solutions should not be based on the worst case scenario or the irresponsible behaviour of a few, at the expense and inconvenience of the majority of users.

14 Page 59, Living with Risk. 2007.

15 Refer to Chapter 3 of Mixed Priority Routes, 2008.

3.0 DESIRED OUTCOMES

3.1 Carriageway Conditions

3.1.1 The design of the main carriageway should focus on calming traffic and delivering a street environment that is best suited to the intended design speed. Research has found that narrower carriageways are one of the most effective design measures that calm traffic[16]. Careful attention needs to be paid to carriageway widths and surface treatments in order to achieve this.

3.1.2 The main carriageways along *Adamstown Boulevard* and *Avenues* should generally be designed for a design speed of 50 kph (although lower speeds may be desirable in more heavily pedestrianised areas such as the district and local centres). They should generally be finished with a standard macadam/asphalt and be clear of any major obstructions.

3.1.3 Carriageway widths along *Adamstown Boulevard* and *Avenues* will vary depending on weather they contain bus or cycle lanes. In general the main vehicular carriageway (not including bus or cycle lanes) will be 6.5 - 7.0 metres. A minimum of 3.25 metres should be added per bus lane and a minimum 1.5 metres per cycle lane. These restricted lanes should be distinguished through the application of different surface treatments or contrasting colouring treatments to visually narrow the carriageway.

3.1.4 The main carriageways along *Side Streets* and *Back Streets* should generally be designed for a design speed of 30 kph. They can be finished with standard macadam/asphalt with sections of robust surface changes to calm traffic.

3.1.5 Carriageway widths along *Side Streets* and Back Streets should generally be 5.5 and 5.0 metres, respectively. Where perpendicular on-street parking is provided this should be increased to a maximum of 6.0 metres to allow cars to exit the parking space. The carriageway may also be periodically narrowed as an additional traffic calming measure to 4.8 metres (two way sections) or 3.0 metres (for a one way section).

Images of the different carriageway designs within Adamstown. From top 50kph Avenue; 30 kph Side/Back Street and 10 kph Homezone.

16 *The MfS defines two geometric factors as standing out above all others in terms of reducing vehicle speeds. That of reduced carriageway widths and reduced forward visibility. Refer to Figure 7.16 of MfS.*

3.1.6 Robust surface changes on *Side/Back Streets* should be provided at select junctions, mid block locations and/or at crossing points. These may be applied at grade or as part of a vertical deflection depending on the desired outcome (i.e. raised tables may be more desirable at crossing points to indicate a greater level of pedestrian priority[17]). As a general rule of thumb, a traffic calming measure (inclusive of junctions) should be provided every 70 metres on straight sections of road.[18]

3.1.7 Where *Back Streets* are designed as homezones they should have a design speed of 10kph. They should be fully finished with robust surface materials such as stone or concrete paving. The carriageway width should be no wider than 4.8 metres.

3.1.8 The use of robust surfacing across the full surface of a street should be considered on all streets in more heavily pedestrianised areas to promote a lower design speed. This will calm traffic by alerting drivers of pedestrian activity and giving the impression of a shared space. Such applications may be appropriate within district or local centres, near parks or squares and buildings of civic importance.

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An example of a mid block pitch point with a surface change and vertical deflection which also functions as an informal crossing.

17 *Refer also to Section 3.3 below.*
18 *Refer also to Section 7.4.4 of the Manual for Streets. 2007*

3.2 Forward Visibility Splays

3.2.1 Forward visibility splays refer to the distances drivers need to see ahead in order to stop safely should an obstruction enter their path. Forward visibility splays are calculated using the Stopping Sight Distance (SSD). The SSD is calculated using the speed of the vehicle approaching a junction, driver reaction time and the time it takes to stop. The SSD is referred to as the 'Y' value of the forward visibility splay. Visibility splays also refer to an 'X' value which is the distance a driver needs to see down the intersecting street to have a full view of any vehicle entering the junction.

3.2.2 The application of forward visibility splays within Ireland is generally based on those contained within the TMG and/or NRA DMRB. For 50kph streets the SSD is 70 metres[19]. This standard is derived from UK documents such as *DB32* and *PSM*. These standards were in turn based on highway standards contained with in the UK DMRB (1992).

3.2.3 MfS contained a major review of SSDs in the UK. Background research found that there was little robust evidence to support the visibility splays contained within DB32 and PSM.[20] It was also found that these visibility splays were overly conservative as:

- Driver reaction times and deceleration rates used to derive the SSD standards far exceeded those contained within the Highway Code.[21]
- The SSD standards did not take into account actual road design details.

3.2.4 The MfS research also included a survey of speed, road geometry and visibility. A minimum of ten junctions were studied within 23 case study sites.[22] With regard to forward visibility it was found that:

- The average speed of vehicles decreased with more limited forward visibility.
- The approach speed of vehicles toward junctions was generally lower than on the links between them.

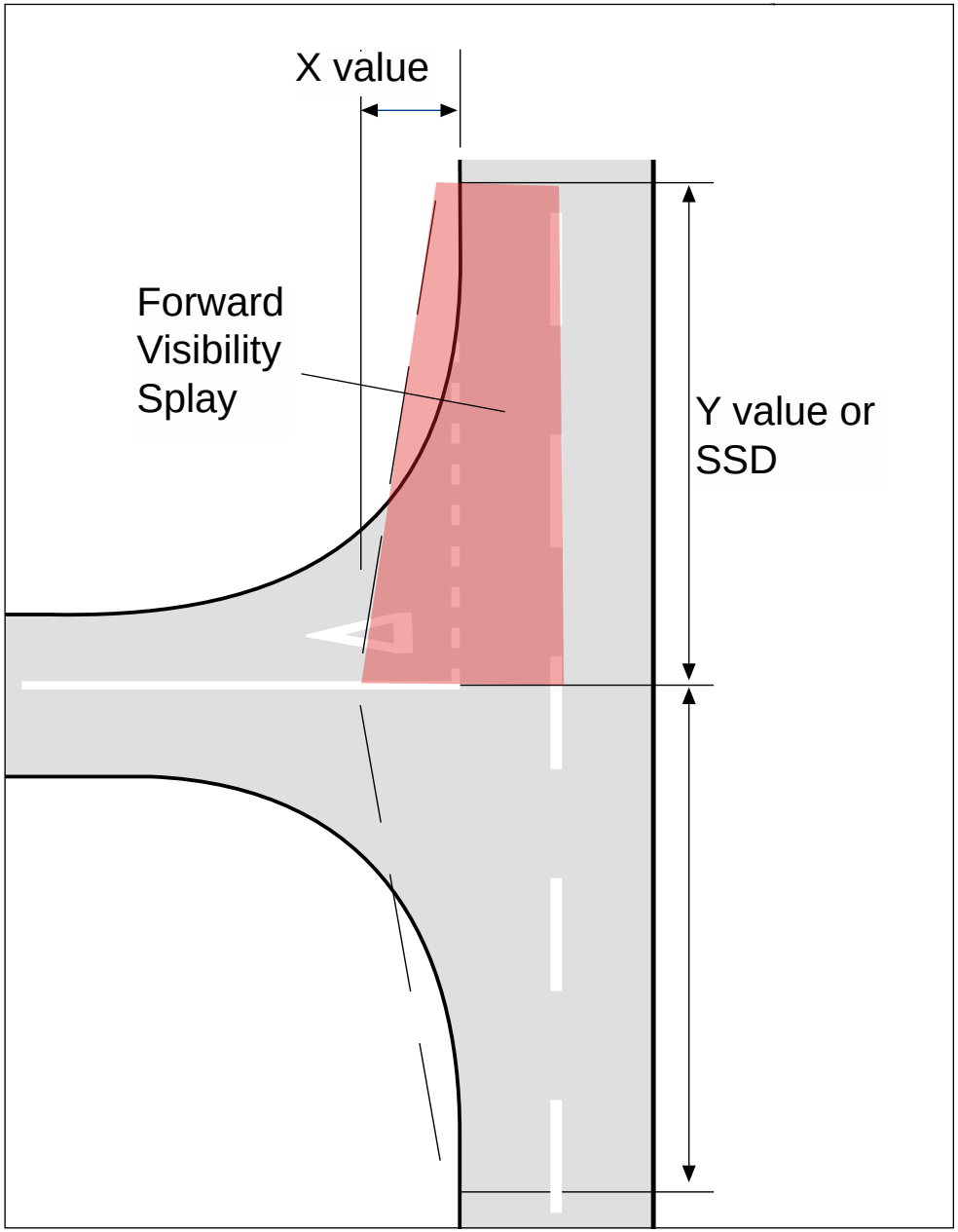

Illustration of visibility splays taken from Section 9.2 of the Traffic Management Guidelines showing the X and the Y values.

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19 *Note: Neither document contains an SSD standard for streets under 50 kph*

20 *Refer also to the volume of Evidence and Research that companions the MfS.*

21 *The Highway Code sets out the rules and regulations for road users in England, Scotland and Wales.*

22 *The findings of the research into forward visibility are fully detailed within the Manual for streets accompanying volume of Evidence and Research.*

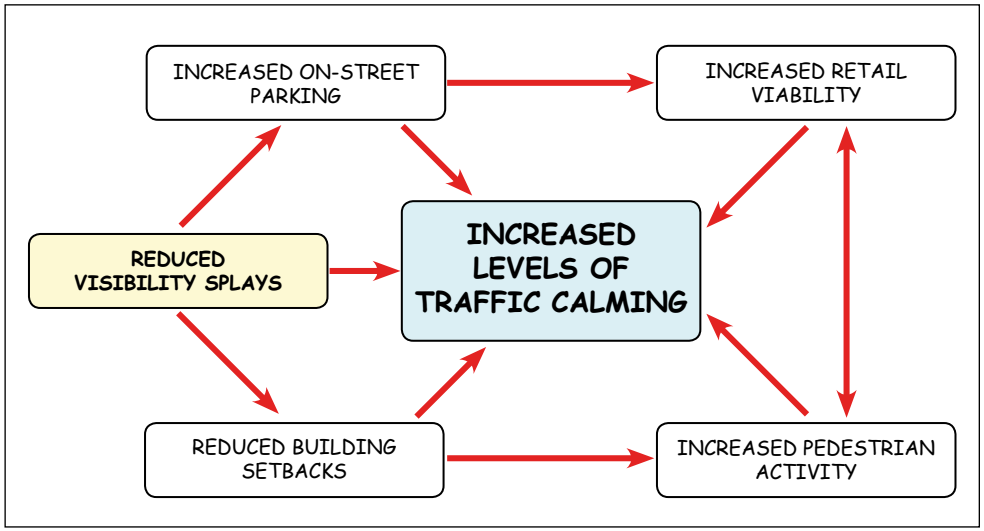
3.2.5 The MfS concludes that reduced forward visibility is one of the most effective measures to calm traffic.[23] The MfS contains revised SSD standards for streets with a design speed of between 16 and 60kph. These SSDs have become the accepted standard in the UK from which to calculate visibility splays.

3.2.6 Those visibility standards contained with the TMGs are based on documents which have been superseded and are more suited to highways/primary trunk roads. Visibility splays within Adamstown should be based on those recommended by the MfS. These are applied as 4.5m(x) x 45m(y) for 50 kph streets and 2.4m(x) x 23m(y) for 30 kph streets. Vision splays on shared surface streets, such as homezones, may be further reduced, and will be considered on a case-by-case basis with reference to those recommended in the MfS.

3.2.7 The findings of the MfS should not be viewed in isolation. Reduced visibility splays need to be applied as part of an integrated package of traffic calming measures. The *SDZ Planning Scheme* provides the framework for the supplemental features listed in Section 2.2.3 above as well as geometric design measures such as reduced carriageway widths[24] that allow reduced forward visibility splays to be implemented. As illustrated to the right, the integrated nature of these measures provides further traffic calming and place making benefits.

3.2.8 Forward visibility splays should be reinforced through the use of build outs. These should be provided on approaches to all junctions (except where bus lanes are present). Build outs may be finished so that they act as an extension of the pedestrian path, verge or as a separate landscape element depending on the context of their application (i.e. more robust treatments in mixed use/urban areas, softer treatments in outer areas).

Illustrations of the main two types of visibility splays used within Adamstown for 50 kph Adamstown Boulevard/Main Streets (top) and 30 kph Side Streets/Back Streets (bottom).



Flow diagram showing the inter linked traffic calming and place making benefits of reduced visibility splays.

23 *Refer to Figure 7.16 of MfS.*

24 *Refer also to Section 2 (vii) of the SDZ Planning Scheme.*

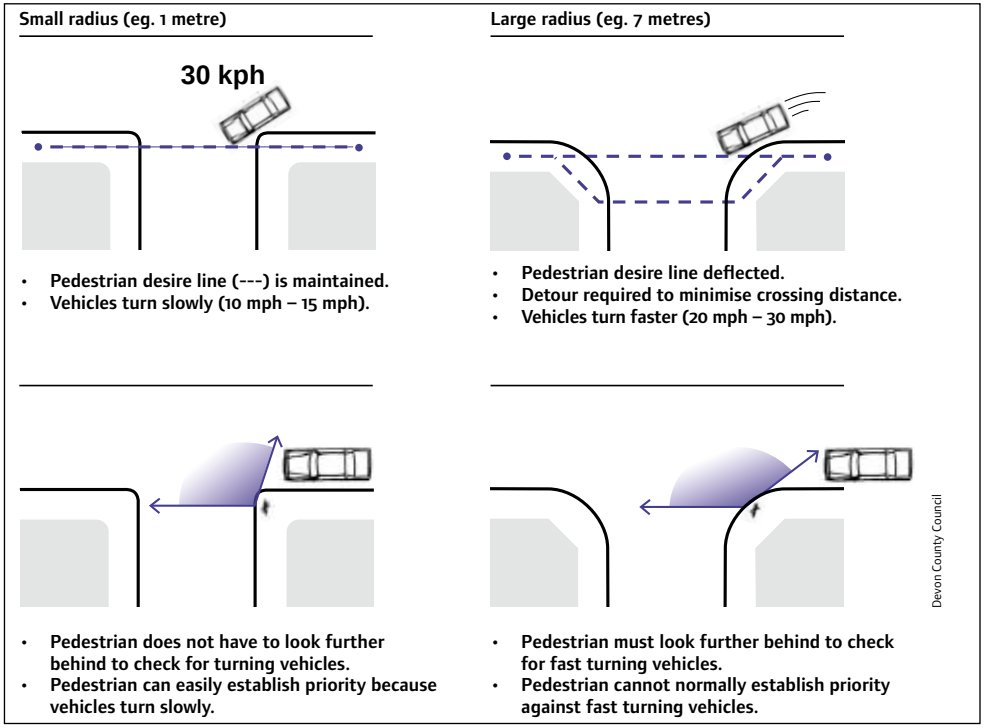
3.3 Corner Radii

3.3.1 Corner radii are generally determined by swept paths analysis that are based on the turning circles of large vehicles (such as trucks or buses). This approach will result in large turning radii for smaller vehicles which may encourage faster vehicle turning speeds and deflect pedestrians from desire lines (see illustration to the right). A balanced approach is needed so that all corner radii are made as tight as possible in order to calm traffic and better cater for pedestrian movement.

3.3.2 Larger radii will be necessary at junctions between *Adamstown Boulevard* and/or *Avenues* to facilitate occasional use by larger vehicles. A corner radii of 6m should be sufficient to allow most larger vehicles to turn without crossing the centre line of the road.[25]

3.3.3 Where *Side Streets* meet *Adamstown Boulevard or Avenues*, sweep path analysis may indicate that there may be scope to reduce corner radii to less than 6m depending on the width of the carriageway and the presence of bus/cycle lanes. A raised table/entry crossing should also be used as a standard entrance treatment to reduce vehicle speeds and provide a greater sense of pedestrian priority.[26]

3.3.4 A rational approach should be taken to corner radii between *Side/Back Streets*. Due to the lower speed and volume of traffic in these areas larger vehicles may use the full carriageway to turn corners. In such circumstances corner radii should be reduced to 2m.



Extract from the Manual for Streets (pg 66) showing the benefits of tightened corner radii in terms of traffic calming and pedestrian amenity.

Example of a raised entrance treatment to slow traffic entering a 30 kph Side Street from a 50 kph Avenue.

25 *Refer also to Sections 6.9, 9.3 and 10.4 of the Traffic Management Guidelines (2003)*
26 *Refer also to Section 3.5 below.*

3.4 On-Street Parking

3.4.1 On-street parking helps calm traffic by visually reinforcing narrower carriageways and requiring drivers to pay more attention to their surroundings as parked vehicles may enter the carriageway. On-street parking also has place making benefits as it increases pedestrian activity and facilities more active uses on-street. On-street parking should be maximised along *Avenues and Side/Back Str*eets in favour of off-street parking or in-curtilage.

3.4.2 On street parking bays should be finished so that they are clearly distinguished from the main vehicular carriageway. Parking bays on *Avenues* should be finished in higher specification materials such as small sett stone or concrete block paving. A line of contrasting block paving trim should also be used to clearly demarcate individual parking bays and the road edge. Individual parking bays should not be demarcated by painted lines.

3.4.3 Concrete block paving parking bays are also preferred on *Side Streets* and *Back Streets*, in higher amenity areas. A more standard approach may involve the use of coloured macadam/asphalt finishes with a line of contrasting concrete block or brick paving provided as a trim.

3.4.4 To reduce the visual impact of parking, the number of spaces grouped together should be restricted to no more than two parallel or five perpendicular spaces. Each group should be broken up by landscaping treatments. These treatments should be 1.5-2 metres wide to facilitate the planting of a substantial street tree and may encroach into the main carriageway to provide a narrowing effect. Perpendicular spaces are discouraged on both sides of the same street as the volume of parked cars can be a major streetscape detractor as the streets appears more like a car park.

Example of on-street parking bays within Adamstown finished with block paving. Contrasting paving is used to demarcate the parking area as a whole and/or individual parking bays.

Example of landscaping and street trees used to separate groups of parking bays.

3.5 Pedestrian Crossings

3.5.1 Frequent crossing points are essential to promoting a walkable neighbourhood and calm traffic by requiring drivers to be more alert of their surroundings and possible pedestrian activity.

3.5.2 Along *Adamstown Boulevard* and *Avenues* the maximum distance between crossing points should be no greater than 100 metres.[27] The precise location of crossing points should be determined by the frequency of junctions, pedestrian desire lines and cycling routes.[28] Pedestrian crossings may also be desirable along *Side Streets* where a major pedestrian route is identified and/or at mid block locations as a traffic calming element.

3.5.3 In higher specification areas pedestrian crossings should be constructed with robust surface changes such as smooth concrete block paving or stone setts. Where paving is used they should be of a finish similar to the footpaths, with a moderate degree of contrast. A contrasting line of trim should also be provided to clearly demarcate the edges of the crossing to minimise the need for line painting.

3.5.4 Crossing points across *Adamstown Boulevard* and *Avenue* should generally be provided at grade. The use of raised crossings may be desirable within district centres, on walking routes to schools parks and/or around other areas of high pedestrian activity. Crossing points on *Side Streets* and *Back Streets* should generally be across raised tables. As noted in Section 3.3.2 above, raised table crossing points should also be provided where *Side Streets* intersect with *Adamstown Boulevard* or *Avenues* to act as raised entry treatments to slow turning vehicular traffic.

3.5.5 Pedestrian crossings at signalised junctions should not be staggered and should allow the pedestrian to cross the full width of the carriageway in a single movement. There may be some limited applications for staggered crossings on *Adamstown Boulevard* and *Avenues* where the carriageway exceeds 15 metres (ie 4 lanes of traffic) and where it is clearly demonstrated that there is a major benefit for both pedestrian and vehicle movements.

Example of a pedestrian crossing where paving has been continued across the carriageway to alert drivers and maintain a sense of pedestrian priority.

Example of entry treatment designed to slow drivers and maintain a sense of pedestrian priority.

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27 Refer also to Section 6.3.9 of the Manual for Streets
28 Refer also to the Adamstown Cycling Strategy

3.6 Use of Safety Installations and Signage

3.6.1 The use of guard rails within Adamstown should not be necessary as pedestrian desire lines are to be sufficiently catered for and other measures have been introduced to reduce vehicle speeds.[29] Where installations are used to direct pedestrians preference should be given to less intrusive measures such as bollards and tactile/contrasting paving. The careful placement of items of street furniture (such as planters, bicycle racks and benches) can also be considered as an alternative to protect pedestrians and guide them toward crossing points.

3.6.2 The use of bollards to prevent vehicles kerb mounting is increasingly common. However this should be carefully considered in the context of Adamstown where on-street parking is freely available. Narrower carriageways may also serve to discourage kerb mounting as mounted vehicles will directly impede the path of traffic. The excessive use of bollards can contribute greatly to cluttering and can be hazardous to cyclists and near sighted pedestrians. Where used, bollards should be demountable and of a uniform design that is of a simple/streamlined metallic finish. Where provided in close proximity to crossing points a contrasting band should be provided to assist the visually impaired.

3.6.3 Tactile paving is used to assist blind or visually impaired people in navigating the pedestrian environment. It must be provided at crossing points, pedestrian/cycle path junctions or other areas where different modes of transport intersect. Tactile paving at signalised crossing points should consist of red blister paving. However grey tactile paving should also be used within high specification areas to avoid the visual clutter associated with too many surface types or colours at crossing points. Grey blister paving should be used at all non-signalised crossings.[30]

3.6.4 All care should be taken in the construction of areas of tactile paving to ensure that they are applied in a neat and rational manner. Where possible, tactile paving should align with kerbs and other paving to form neat geometric patterns and avoid small slithers of tiles which may come lose. In all instances tactile paving must be aligned at right angles to the pedestrian crossing.

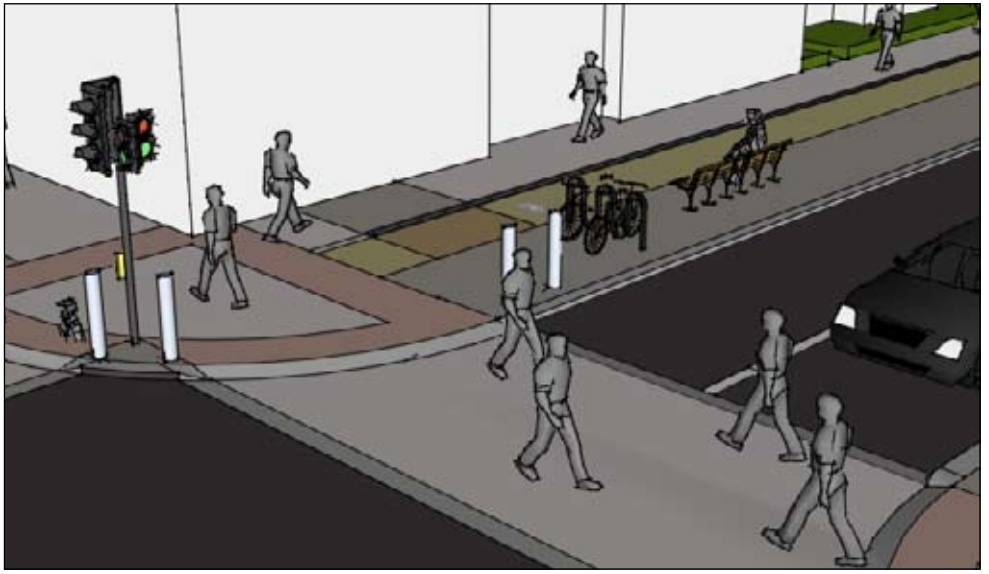
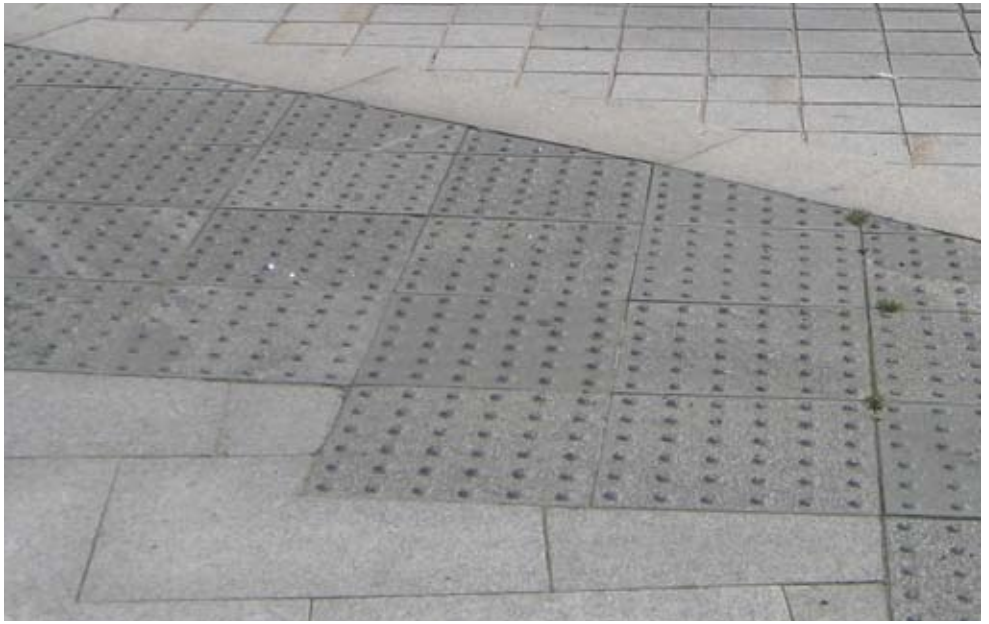


Illustration of safety installations (bollards) and street furniture (bicycle racks and seats) at a crossing point which guide pedestrians without 'penning' people in with physically intrusive measures such as guardrails.



An example of grey blister paving used at a signalised crossing in a high amenity area.

29 Refer also to Section 10.2.8 of the Manual for Streets

30 Refer also to the Use of Tactile Paving Surfaces by the Department of Transport and Section 2.0 of the Adamstown Access for All Strategy.

3.6.5 Signage should be minimised within Adamstown. Research has shown that excessive signage can serve to distract and confuse drivers making streets less safe. Conversely it has been found that lightly traffic streets with little or no signage can assist traffic calming as drivers are required to place closer attention in order to evaluate the street environment and other drivers[31].

3.6.6 Excessive signage can detract from the visual qualities of a street. The unnecessary duplication of signage also pushes up costs and directs finances away from more desirable street finishes. All efforts should be made to minimise and combine signage within the street. Where possible existing signage structures should be fully utilised and in general signage should be clustered together on a single pole, embedded within building or street surfaces or incorporated into other elements of the street (such as bollards).

3.6.7 Line marking should also be kept to a minimum on all roads. On paved surfaces painted lines should be avoided altogether in favour of contrasting paving sets that clearly demarcate road markings. Duplication should also be avoided. For example supplementary worded markings such as 'left turn' should not be used unless arrow markings have proved insufficient or 'stop' should not be painted across a road surface where it is also sign posted.

Examples of signage which has been embedded within a street surface and incorporated with other street elements to provide a more attractive alternative to signs fixed to poles.

An example of clustered street signage that greatly reduces clutter.

Examples of the use of hoop bollard that can be used to direct traffic and provide a sense of protection for pedestrians.

31 *Refer also to Section 9.1 of the Manual for Streets (2007) regarding the use of appropriate levels of signage.*

3.7 Lighting

3.7.1 Care needs to be taken with regard to lighting to ensure that both the vehicular carriageway and pedestrian paths are sufficiently illuminated, without the creation of unnecessary light overspill or hot spots. The level of lighting provided should reflect the street hierarchy where the importance of the route is reflected by the type of lighting provided.

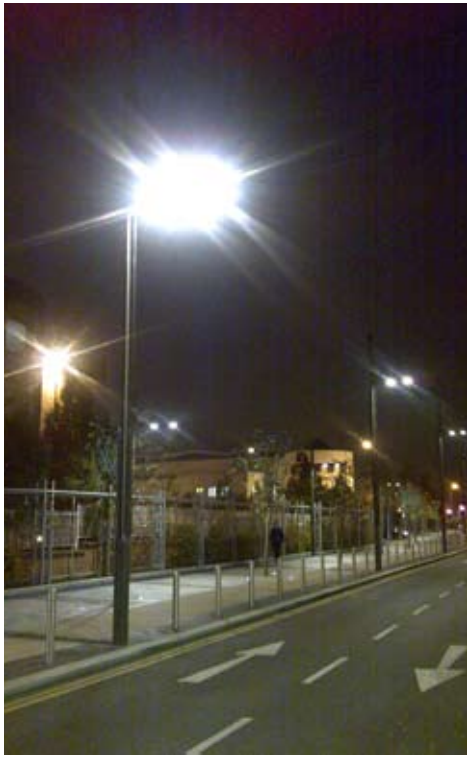
3.7.2 Lighting on *Adamstown Boulevard* and *Avenues* should be high pressure white light (SON) so as to highlight these areas as major vehicular/pedestrian routes at night and to maximise visibility and safety. Light installations should be placed on standard 12m columns, with a minimum clearance of 5m to the nearest tree canopy.

3.7.3 A greater range of lighting types may be used on *Side Streets* and *Back Streets.* However, these should be rationally applied in accordance with activity levels. For example white light should be provided within areas of civic importance and along important pedestrian routes. Softer honey coloured lights (SOX) may be used in residential areas. Energy efficient white light should also be considered. In residential areas light installations should be placed on standard 6m columns, with a minimum clearance of 2.5 m to the nearest tree canopy.

3.7.4 Pure white (metal halide) lights should be used in all areas of high pedestrian amenity such as district centres, on major pedestrian routes and along shared surface streets, such as homezones.

3.7.5 All lighting should be designed to focus illumination on both the vehicular carriageway and pedestrian/cycle path. This may require a second lower lamp over the pedestrian path. Supplementary lighting (such as in path uplighters) may also be considered within areas of high pedestrian activity/ amenity. All lighting should be placed within verges or build outs, where possible, so that they do not impede on the width of pedestrian or cycle paths.

An example of a dual light with a lower lamp the pedestrian footway. Source: http:// www.rbkc.gov.uk



An example of white lighting used to illuminate a higher amenity area.

An example of a small spot light provided within the path of a higher specification amenity area.

3.8 Footpaths

3.8.1 A hierarchical approach should be taken to the design of footpaths where the importance of the route is reflected by its width and quality of materials. In general all footpaths should be wide enough and remain free of obstructions to allow pedestrians to freely pass each other and to avoid potential hazards for blind or partially sighted pedestrians.

3.8.2 Footpaths along *Adamstown Boulevard* and *Avenues* should be wide enough to cater for higher pedestrian flows. Footpath widths (excluding the verge) should be a minimum of 3 metres within areas of higher activity (additional width should also be provided around areas of retail activity to allow for the placement of outdoor seating). A width of 1.8-2.0 metres may be acceptable on *Avenues* in outer areas and along *Side Streets* and *Back Streets* (Note: Path widths do not include verges).

3.8.3 Footpaths along *Adamstown Boulevard* and *Avenues* should be finished with paving. In higher specification areas natural or reconstituted stone should be used. In other areas concrete paving should be used. Footpaths along *Side Streets* and *Back Streets* can be finished in standard concrete finishes. Concrete block paving or paved banding/trim should also be considered on key pedestrian routes or within areas of civic importance.

3.8.4 Off road cycle tracks, with a minimum width of 1.5 metres, should be provided along all *Avenues* where on-street car parking is present[32]. Cycle paths should be demarcated by a slightly raised line of paving or brick that lays between the cycle path and pedestrian path. Preferred finishes for cycle lanes include large sett smooth paving or buff coloured asphalt.

3.8.5 A sense of continuity must be provided along all streets to avoid a patchwork of different materials which will result in visual clutter. Paving setts should be applied in an unobstructed manner. Where driveways cross the footpath the level of the footpath should be maintained across the vehicular crossing to allow continuous pedestrian movement and priority. Inspection covers should be laid parallel to the kerb. In higher amenity areas insert covers should be used.

Smooth cut block paving pedestrian paths (left: concrete, right: reconstituted stone) and cycle path finished in an asphalt buff. The example to the left is a high specification finish along an Avenue within Adamstown. The example to the right uses the higher specifications along a strategic pedestrian/cyclist link within a town centre.

Wide decorative stone block paving within a highest specification environment (district centre) to cater for higher pedestrian volumes and emphasise the areas civic importance.

32 *Refer also to Section 3 of the Adamstown Cycle Links Strategy, 2007*

3.9 Medians and Verges

3.9.1 Medians and verges provide buffer zones between vehicles, cyclists and pedestrians. They also provide an important functional and decorative element to the street, being the logical location for the placement of street furniture and landscaping elements such as street trees.

3.9.2 A central median should be provided along the full length of *Adamstown Boulevard* and should be wide enough (a minimum of 3 metres) to facilitate the planting of a continuous line of large trees and to allow periodic turning lanes. Medians may also be considered on *Avenues* on approaches to major junctions and to provide areas of pedestrian refuge at crossing points.

3.9.3 A large verge should be provided on *Adamstown Boulevard* and *Avenues* where a bus lane is present as a buffer or transition area between the vehicular carriageway and pedestrian/cycle path. On streets without on-street parking, the verge should be 1.5-2.0 metres wide to facilitate the planting of a continuous line of large trees. Where on-street parking is provided along *Avenues*, small verges of 0.8 metres[33] should also be provided between parking bays and cycle paths/pedestrian paths. Where on-street perpendicular parking is provided on *Side/Back Streets a* small verge, of 0.4 metres should be provided so that vehicles do not appear to overhang the main footpath.

3.9.4 Verges should also be provided on the edges of shared surface streets to provide areas of pedestrian refuge and provide a buffer between on street parking and private property lines.

3.9.5 Verges and medians should be finished in similar styles of block paving, so as to minimise the overall palette of materials. Rough cut paving is preferred on verges so as to clearly distinguish them from the main path as a transitional/buffer area. Where smooth paving is used an area of contrasting trim should be applied. Verges and medians in the highest specification areas should be finished in natural or reconstituted stone. In other areas concrete paving may be considered.

Examples of the use of verges to define different contexts. The example to the left is within a more urban area of Adamstown. The example to the right is from a more suburban context.

Verge adjacent to shared zone which provides an area of pedestrian refuge, allows for vehicle overhangs and facilitates the planting of street streets.

Illustration (left) and example from Adamstown (right) of a small verges between areas of on street parking and cycle lanes/pedestrian paths to allow for opening doors and vehicle overhangs, respectively.

33 *Refer also to Section 3 of the Adamstown Cycle*

3.10 Kerbs

3.10.1 Distinctive kerb elements should be provided on all streets where it is necessary to provide an edge to the vehicular carriageway and segregate pedestrian and vehicular activity. In such instances kerbs should consist of block elements that contrast and/or are distinctive from the footpath.

3.10.2 Lower kerbs should be considered on *Side/Back Streets* to provide a greater sense of shared space. Where appropriate the height of kerbs may be reduced from the standard 125mm to a lower height of 75mm.

3.10.3 Kerbs within the higher specification areas should be constructed with natural or reconstituted stone. More generally they can be finished in concrete. A distinctive kerb element (separate to the pedestrian path) may not be necessary on some *Back Streets* within outer areas. Kerbs will not be provided within shared surface areas such as homezones or mews.

3.10.5 Drop kerbs should be provided at all crossing points and on the corners of all intersections to assist the movement of cyclists, buggy/pram users and the mobility impaired. Where provided, a distinctive line should be maintained at the base of the drop kerb. Dished kerbs should be used at all driveway crossings and should maintain a level and continuous footpath.

Examples of distinctive kerb elements. The example to the right is constructed of reconstituted stone within a higher specification area. The example to the right is constructed with concrete blocks along an Avenue within Adamstown.

Example of a dished kerb where kerb lines and footpath levels are maintained.

3.11 Street Trees

3.11.1 Street trees provide a vital decorative role for the streetscape and break up the hard edges of the built environment. They also play an important role in promoting bio-diversity by providing areas of refuge for native fauna. Street trees should be provided at every opportunity on all streets within Adamstown. Street trees should be semi-mature in higher specification areas at the time of planting. Heavy standard trees may be planted elsewhere.

3.11.2 A continuous line of large street trees should be provided along the length of *Adamstown Boulevard* and *Avenues* to provide an avenue like effect. The distance between street trees will be dependent on species types and the requirement for other items of street furniture (such as public lighting) and on-street parking. However, every effort should be made to provide a formal line of planting with regular distances between each tree.

3.11.3 Street trees should be provided at regular intervals along *Side Streets* and *Back Streets*. The placement of trees will be dependent on on-street parking. Placement should be maximised by opportunistic placements in areas such as between sections of parking bays and within verges.

3.11.4 A neighbourhood by neighbourhood approach should be taken to species selection, with each neighbourhood characterised by a particular type of tree planting and design of tree pits. Cross area selection may occur along *Adamstown Boulevard*, *Avenues* and on major pedestrian walks to provide a sense of continuity along these routes.

3.11.5 Tree pits should consist of porous materials, which may include some paving or gravel. Where gravel is proposed, they should be enclosed (or partly enclosed) with metal grills.

3.11.6 The selection of street trees should have careful consideration to the width of verges and setbacks to adjacent buildings. Preference will be given to native species that improve biodiversity by providing habitats for native fauna.

3.11.7 Where larger species of trees are provided along *Adamstown Boulevard* and *Avenues,* trees should be planted within a continuous urban soil strip.

Illustration of opportunistic street tree planting along Side Street (ie at crossings, between parking bays and on approach to junctions).

Continuous line of street trees within the verge along a Avenue within Adamstown.

Tree pit topped with loose gravel contained within metal grill on Main Street within Adamstown.

4.0 CONCLUSION

4.1 The development of a more compact community, based on sustainable development patterns, has required a renewed approach to street design within Adamstown. The challenge for designers has been to move away from highway standards that have dominated suburban design models in more recent times and to implement new standards that create safe streets which enhance the areas sense of place.

4.2 This document presents examples of safe street/place making design solutions to street designs that have, or can be applied within Adamstown. It shows that even the smallest of measures, applied cumulatively, can create a street environment that is safe, active and vibrant and able to balance the needs of vehicles and pedestrians, without marginalising either.

4.3 These principles and solutions are supported by the A*damstown SDZ Planning Scheme* and are encouraged by national planning policy documents such as *Sustainable Residential Development in Urban areas and the Urban Design Manual.* Many of these philosophies are not new and are simply based on timeless design principles where the street is viewed as a community space. The solutions put forward in this document are based on well researched findings that have been successfully implemented both locally and internationally.

4.4 The successful implementation of these outcomes requires a multi-displined approach that involves engineers, urban designs, planners, architects and other built environment professionals with a willingness to change, an aptitude for innovation and a commitment to best practice. A cooperative approach is needed to determine the appropriate solution to a particular circumstance.

5.0 REFERENCE MATERIAL

Source Documents

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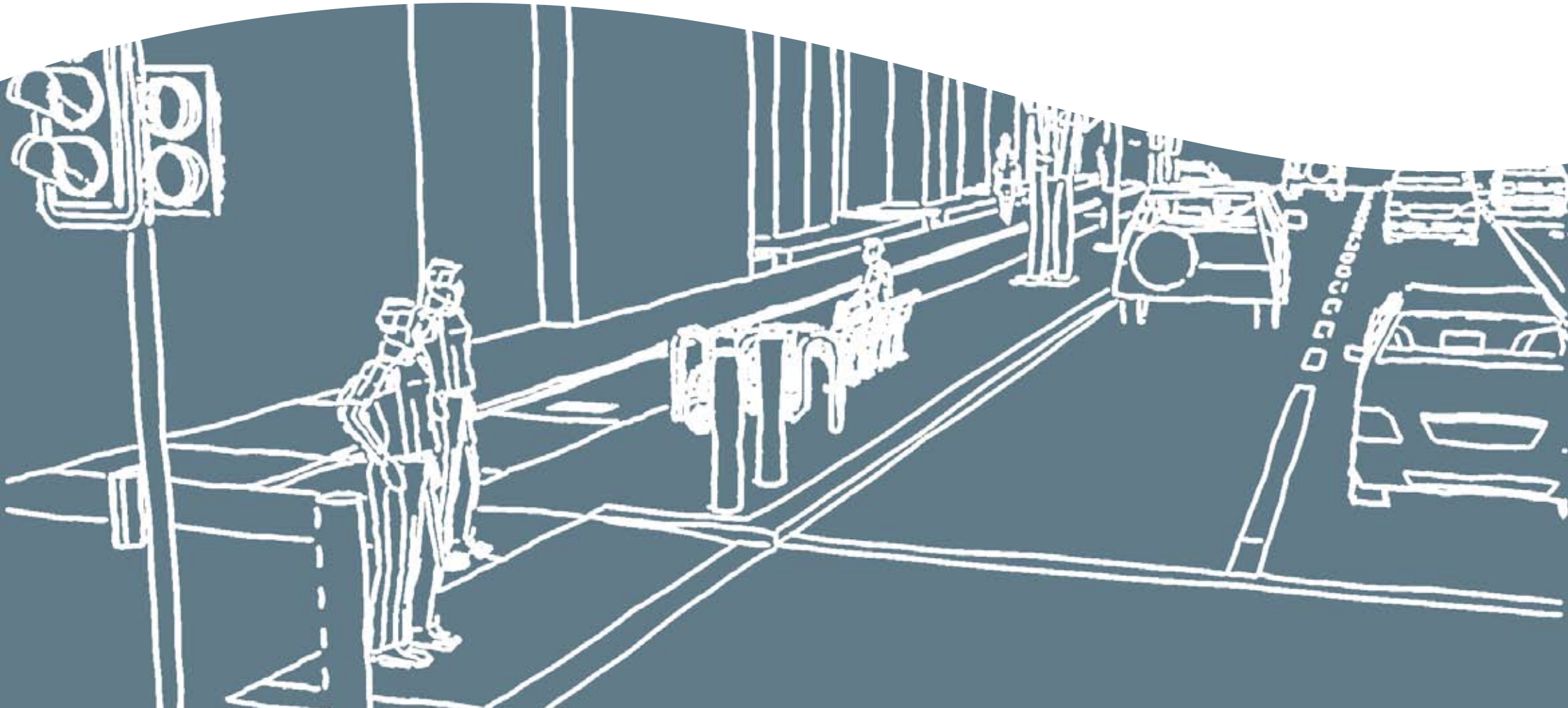
PART B - Street Typologies and Accepted Standards



6.0 STREET TYPOLOGIES AND EXAMPLES

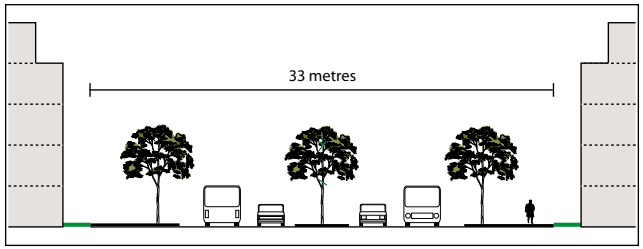
6.1 Adamstown Boulevard

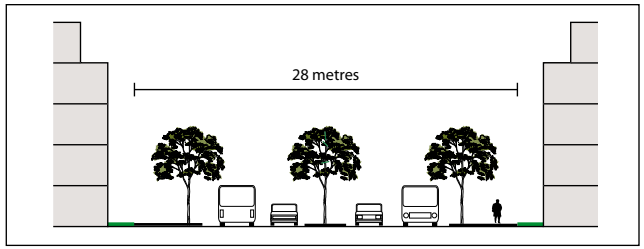
6.1.1 Location and General Specification

There is one major urban boulevard identified within the SDZ Planning Scheme, Adamstown Boulevard. This street runs north-south through the SDZ, forming its central spine. It will play a major role in terms of access to and circulation within the site. It will also be an important area of convergence for recreation, shopping and commercial uses and public transport.

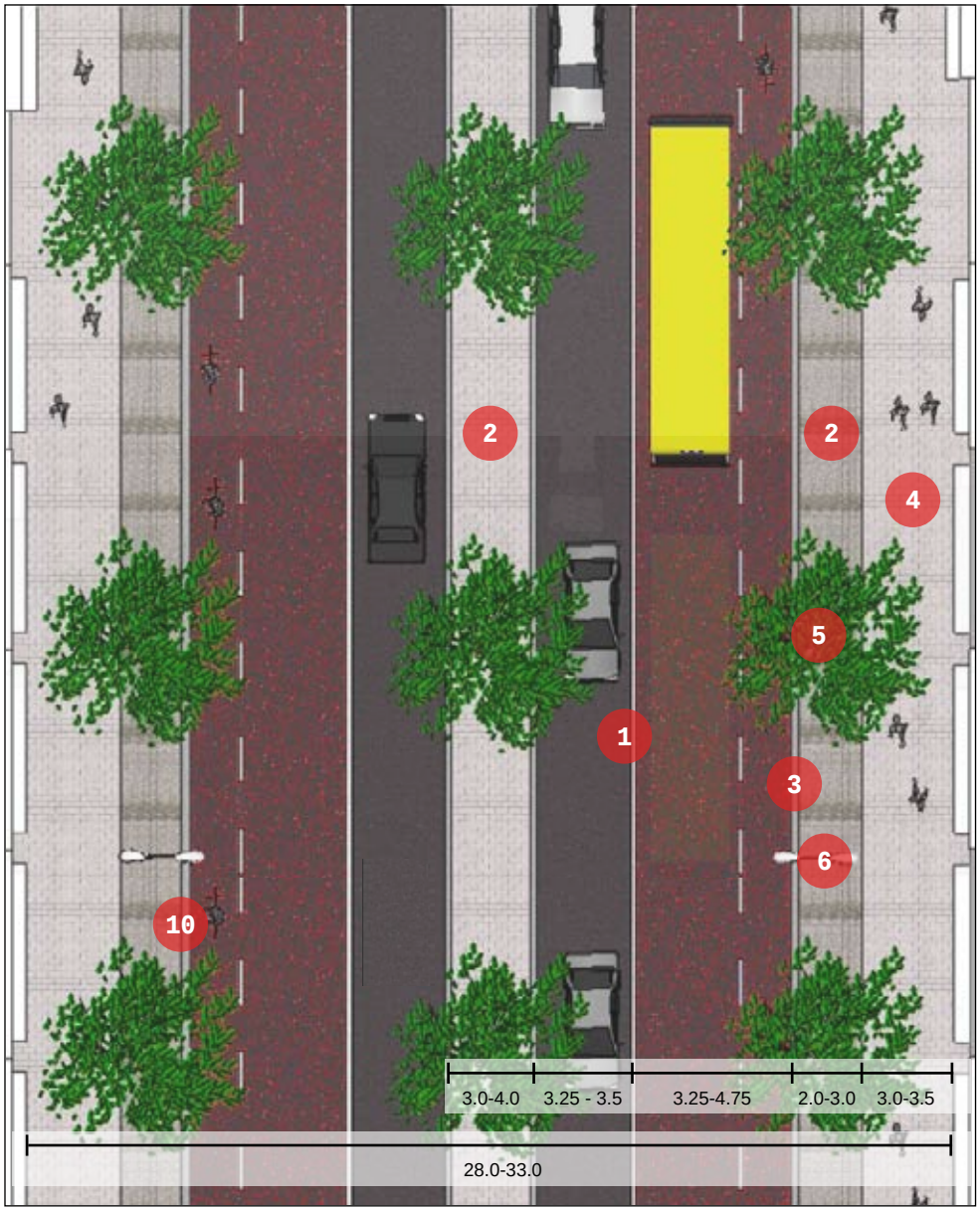
Adamstown Boulevard is the key defining street of the SDZ area. It is the gateway to the site from the north and into the district centre and station area. The importance of this street requires the use of the higher specifications throughout.

Design Speed:	**50 kph**
Street Reserve Width:	**28-33 metres**
Carriageway Width:	**15-17 metres**
Median:	**Yes**
Verge:	**Yes**
Bus Lane:	**Yes**
Cycle Lane:	**Yes (on road) (off road adjacent to parks)**
On Street Parking:	**No**

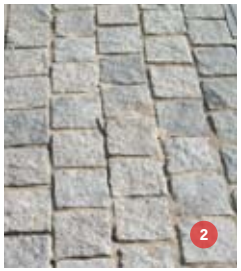


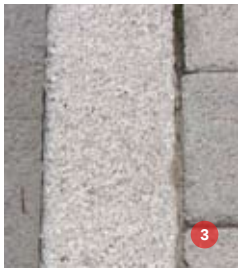


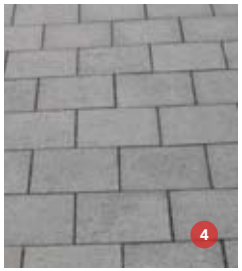
6.1.2 Typical Section



Typical layout for Adamstown Boulevard used for all sections where bus lanes are present.



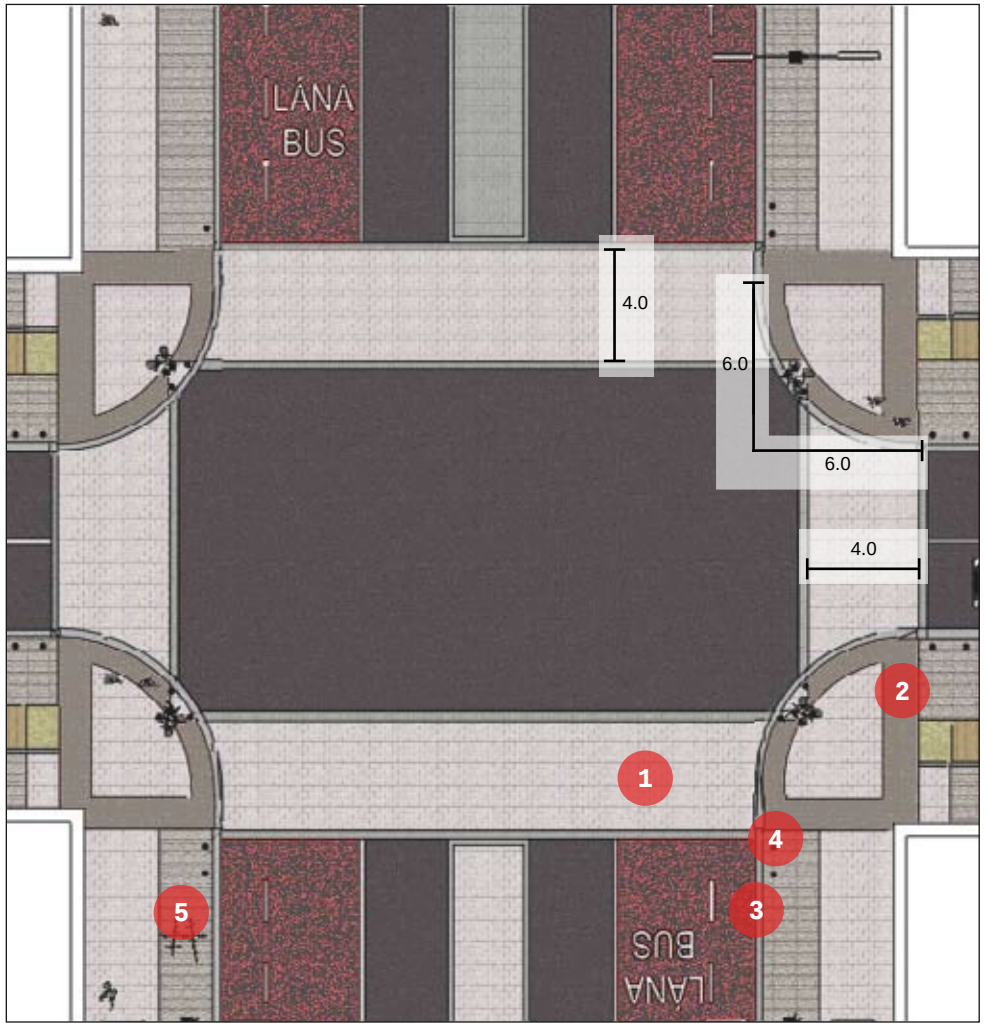




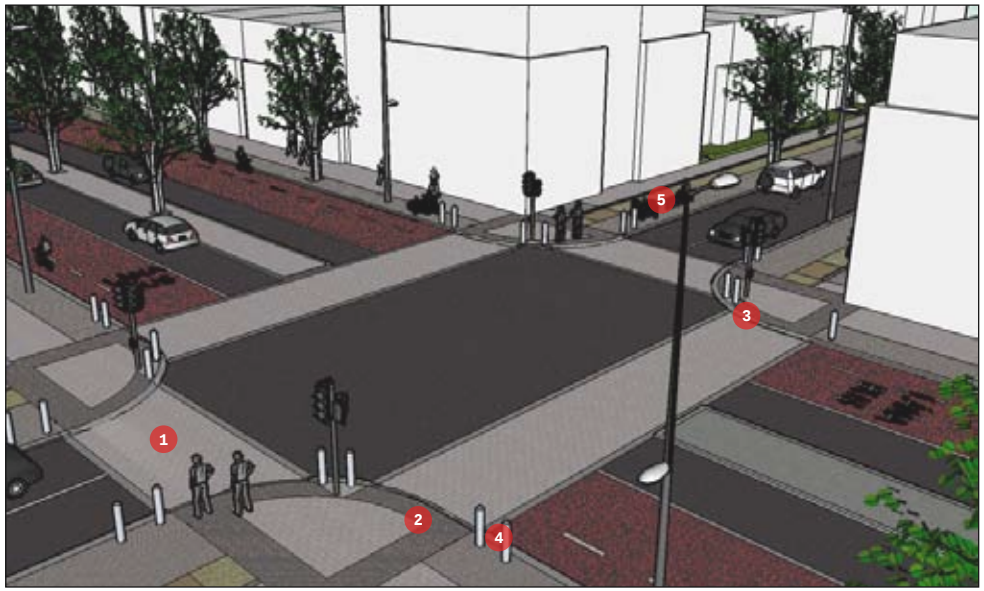
Component	Construction	Further construction detail see
1. Vehicular Carriageway	Vehicular Carriageway - macadam/asphalt Bus Lane/Cycle Lane - *natural red aggregate pre-coated chips embedded within the asphalt.*	7.1
2. Median and Verge	Rough cut *natural/reconstituted stone* or concrete paving in small to medium sets	
3. Kerbs	*Natural/reconstituted stone* or pre-cast concrete blocks	7.9
4. Paths	Smooth cut natural/reconstituted stone or *concrete* paving in medium to large setts.	7.8
5. Street Trees	Tree pits within continuous urban soil strip	7.10
6. Lighting	High pressure white light (SON)	

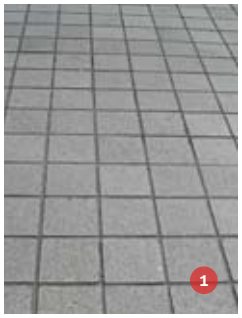
**Italics indicate illustrated examples*

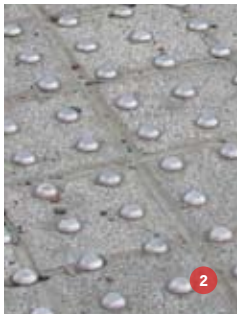
6.1.3 Typical Intersection

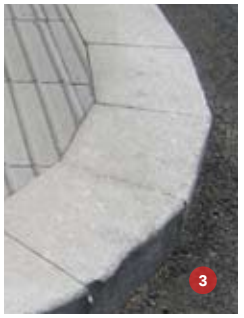


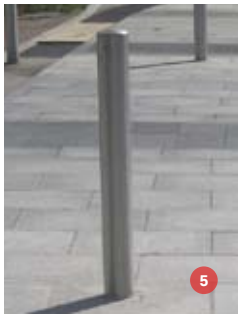
Typical major intersection on Adamstown Boulevard. Layout used for all intersections with an Avenue.











Component	Construction	Further construction detail see
1. Pedestrian Crossing	At grade smooth cut *natural/reconstituted stone* or concrete paving in small to medium sets.	7.7
2. Tactile Paving	*Natural/reconstituted stone paving* or concrete grey blister paving.	See Adamstown Access for All Strategy.
3. Kerbs	*Natural/reconstituted stone* or pre-cast concrete blocks	7.9
4. Safety Installations	*Metal bollards*	
5. Street Furniture	Metal frame bike stand, timber seat with metal frame	

**Italics indicate illustrated examples*

6.2 Avenues

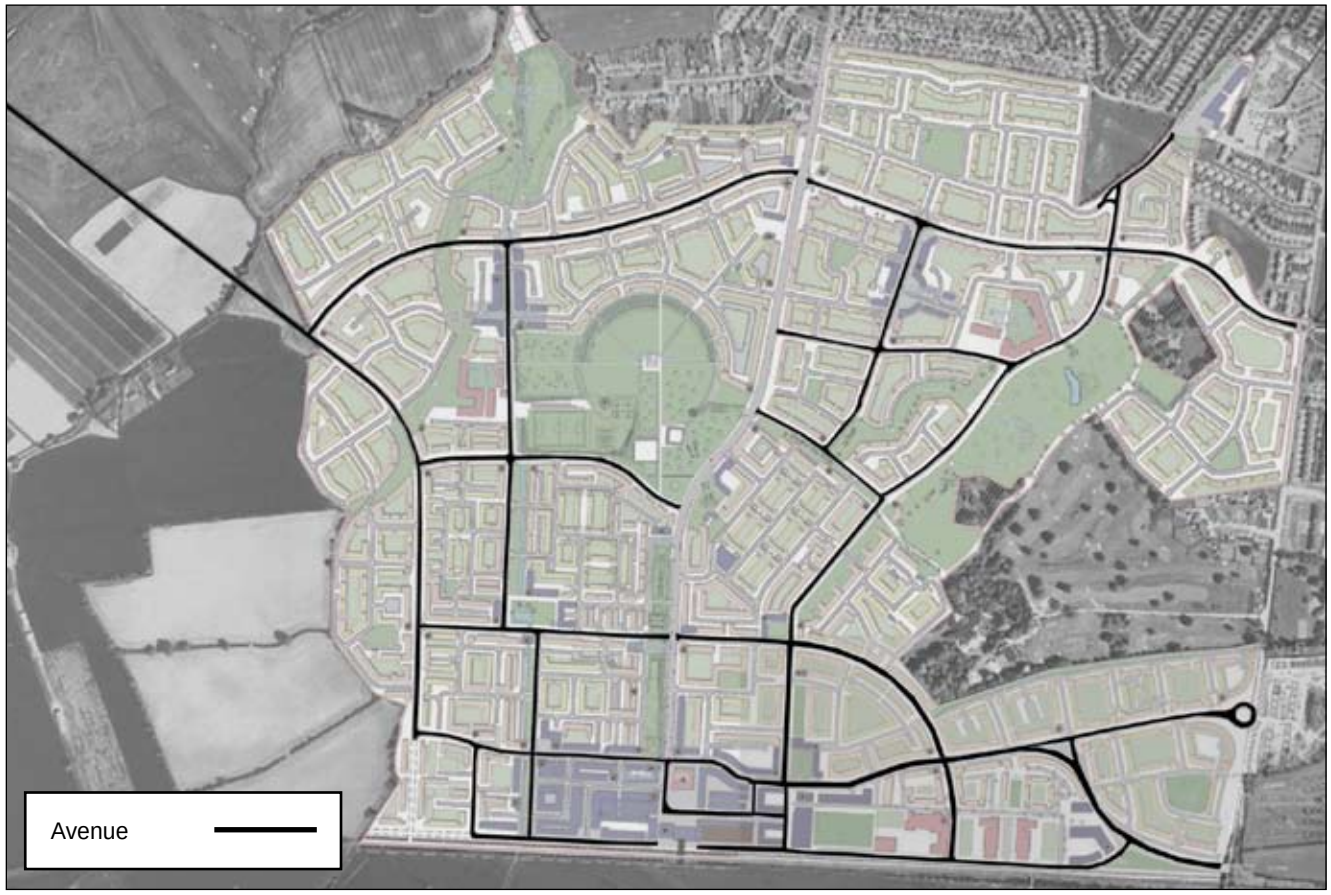
6.2.1 Locations and General Specification

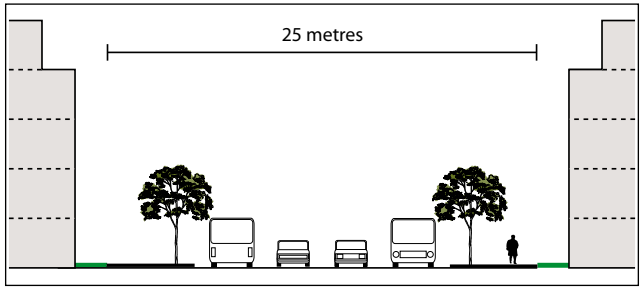
Avenues form the major network of vehicular, cyclist and pedestrian streets within the SDZ area. They are the principle means of access and circulation. They are also important areas of convergence where shopping and commercial uses are located and where public transport is accessed.

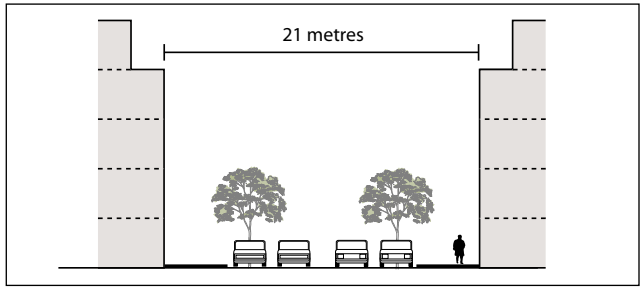
The varying function of these streets will require different approaches in terms of material choice and application. In areas of circulation the focus may be more on movement. In areas of convergence the focus may be more on traffic calming.

All surface treatments on these streets must reflect their importance with higher specifications throughout.

Design Speed:	**50 kph**[30]
Street Reserve Width:	**21-25 metres**
Carriageway Width:	**6.5-7.5 metres**
Median:	**Limited application**
Verge:	**Yes**
Bus Lane:	**Where identified**
Cycle Lane:	**On or off road**
On Street Parking:	**Yes** **(except where a bus lane is provided)**

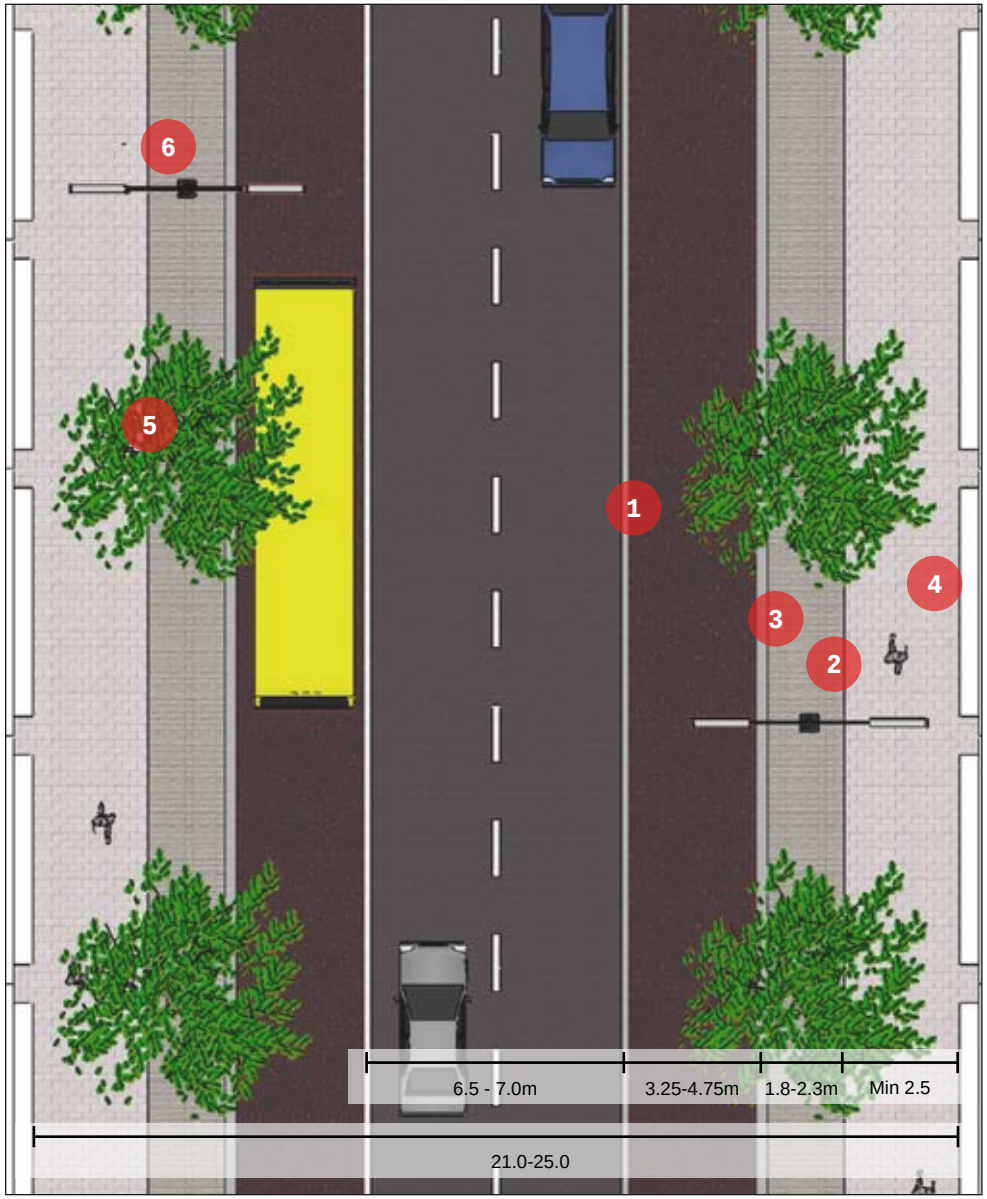




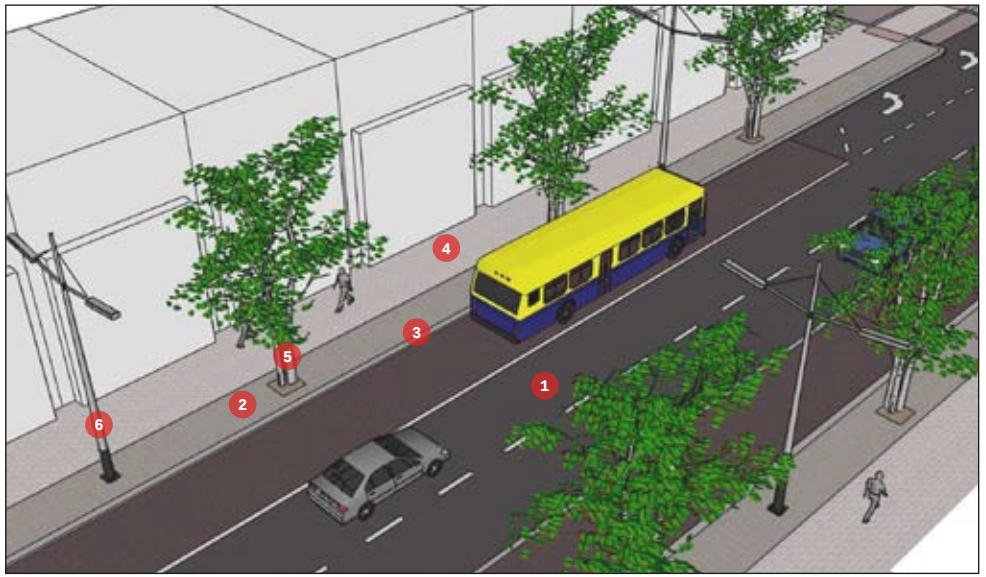


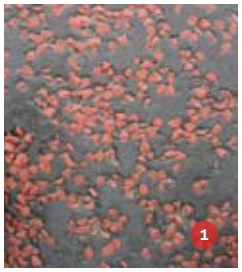
30. Lower design speeds of 30-40 kph may be desirable within the district and local centres and other areas of higher pedestrian activity such as schools.

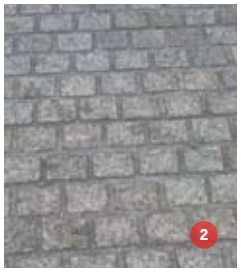
6.2.2 Typical Section with QBC

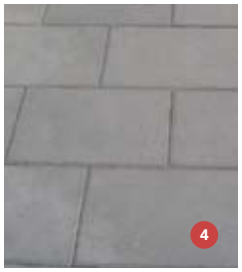


Typical layout used for all Avenues where bus lane is present (may also include on road cycle lane)





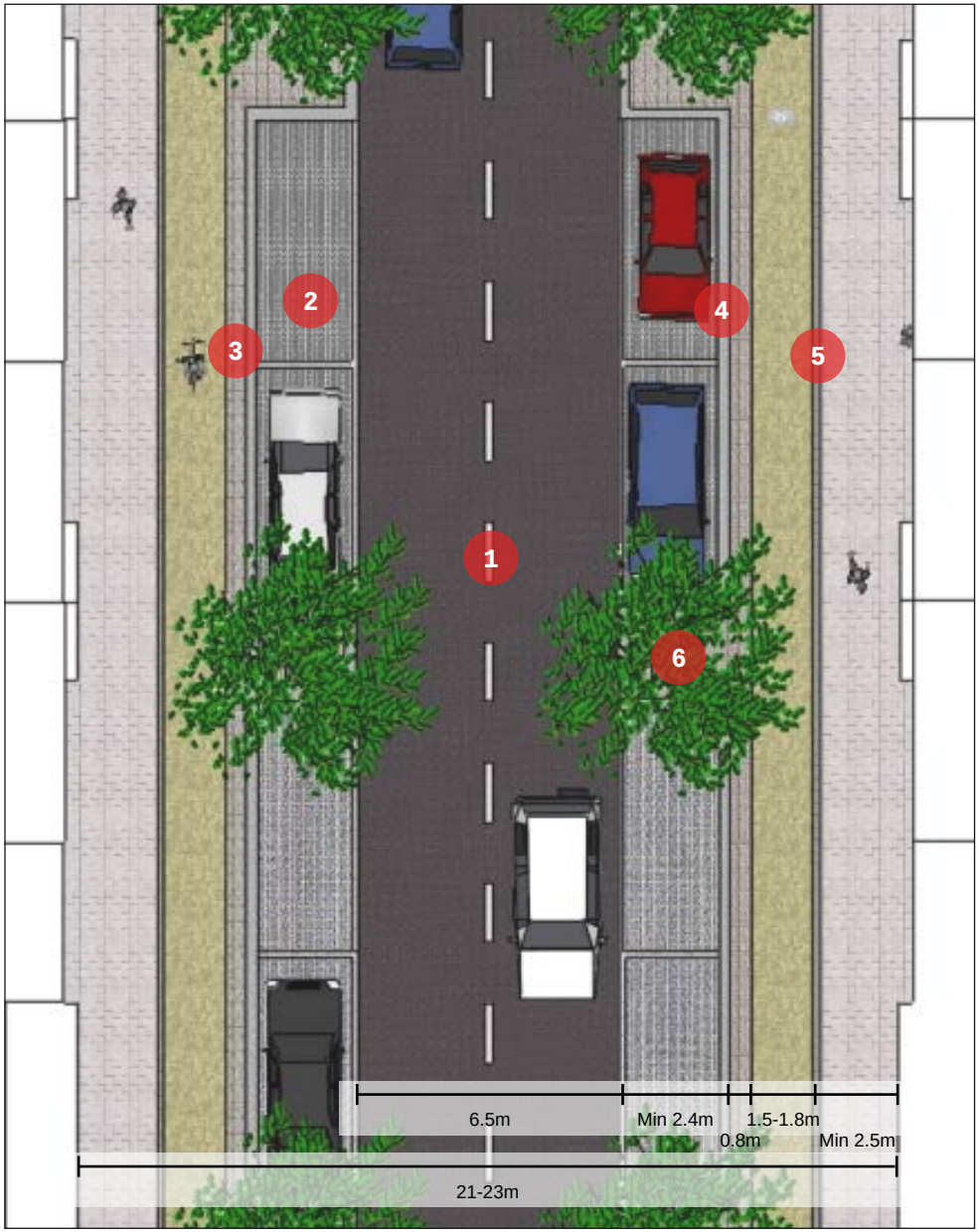




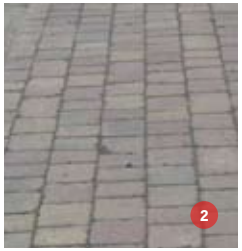
Component	Construction	Further construction detail see
1. Vehicular Carriageway	Vehicular carriageway - macadam/asphalt Bus Lane - *natural red aggregate pre-coated chips embedded within the asphalt*.	
2. Verge	Rough cut *natural/reconstituted stone* or concrete paving in small to medium sets	
3. Kerbs	*Natural/reconstituted stone* or pre-cast concrete/extruded kerbs.	7.9
4. Paths	Smooth cut natural/reconstituted stone or *concrete* paving in medium to large sets	7.8
5. Street Trees	Tree pits within continuous urban soil strip	7.10
6. Lighting	High pressure white light (SON)	

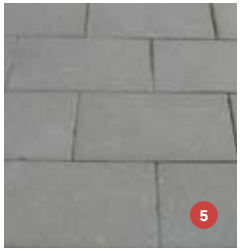
**Italics indicate illustrated examples*

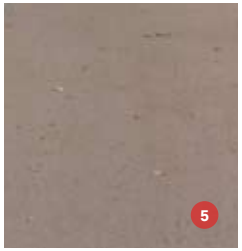
6.2.3 Typical Section

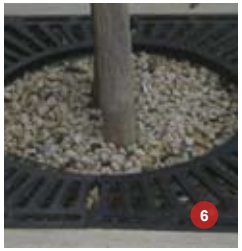


Typical layout for all Avenues with on-street parking and off road cycle tracks.





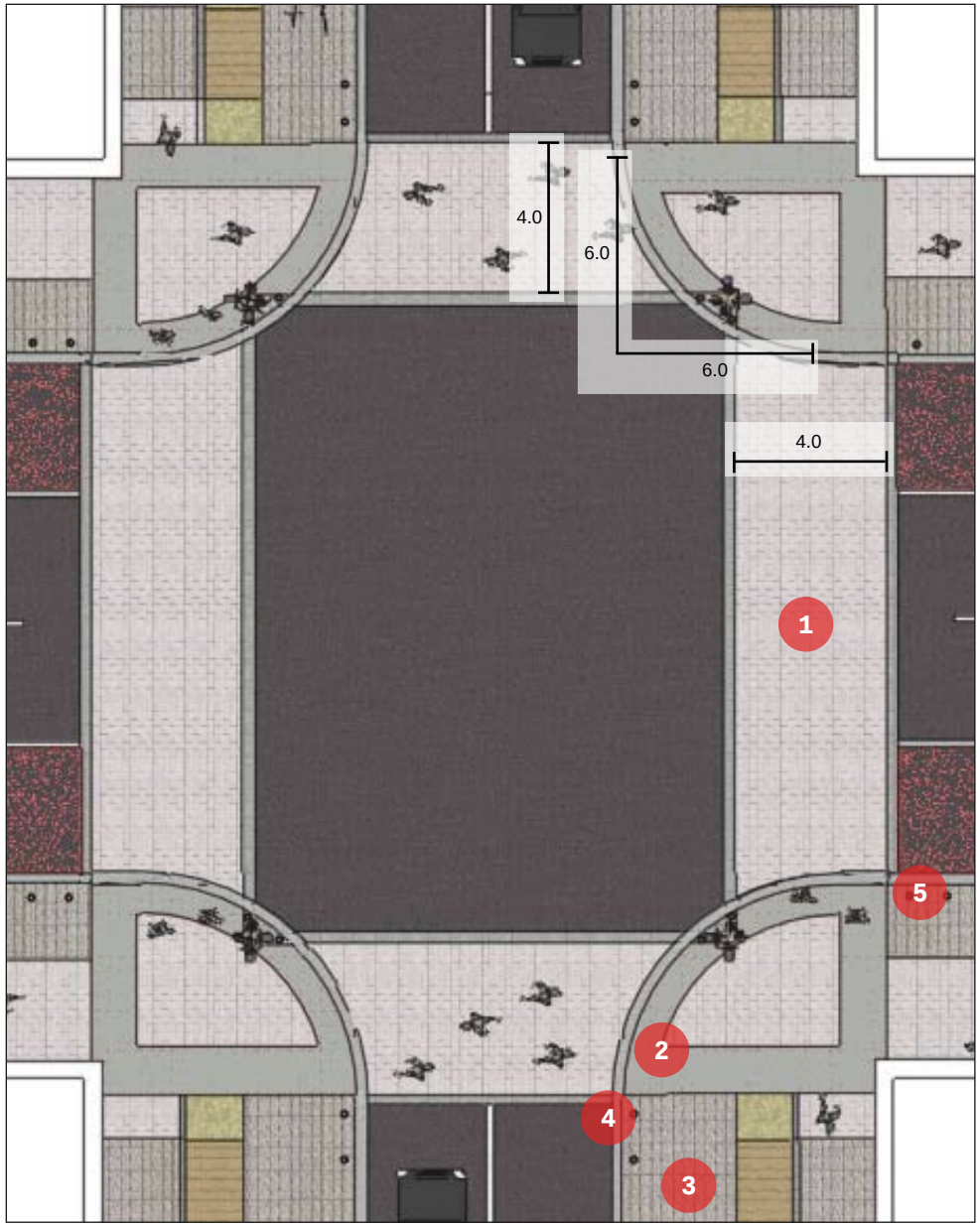




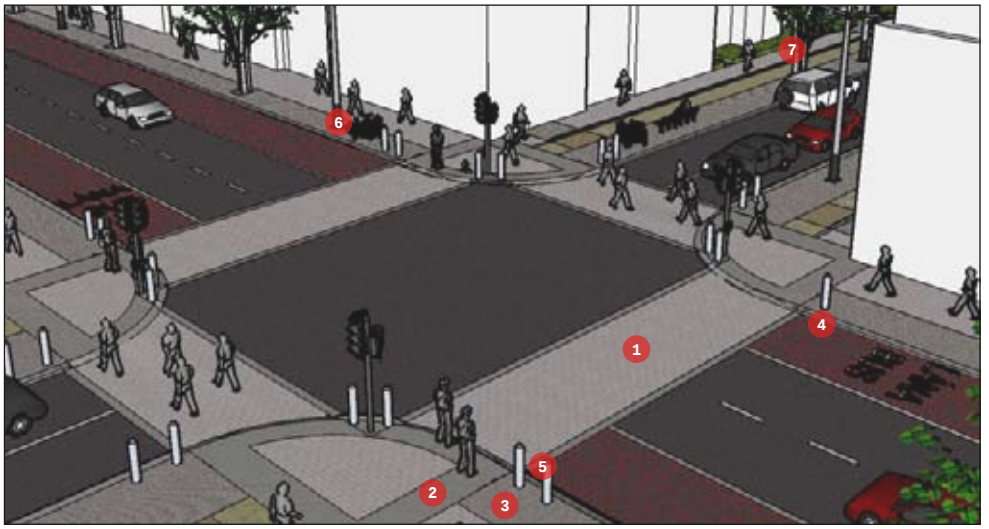
Component	Construction	For Further Detail See
1. Vehicular Carriageway	Macadam/asphalt	
2. On-Street Parking	Smooth or rough cut natural/reconstituted stone or *concrete* paving in small to medium setts	7.6
3. Verge	Rough cut natural/reconstituted stone or concrete paving in small to medium sets	
4. Kerbs	Natural/reconstituted stone or pre-cast concrete/extruded kerbs.	7.9
5. Paths	Pedestrian - Smooth cut natural/reconsti-tuted stone or *concrete* paving in medium to large sets. Bicycle - *macadam/asphalt.*	7.5, 7.8
6. Street Trees	*Individual tree pits*	7.11
7. Lighting	High pressure white light (SON)	

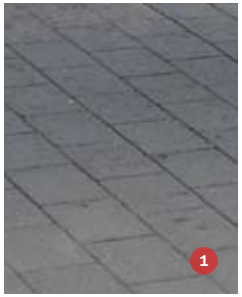
**Italics indicate illustrated examples*

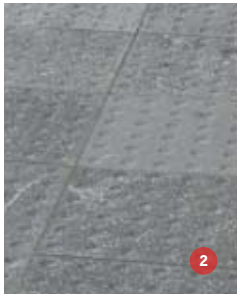
6.2.4 Typical Intersection between Avenues

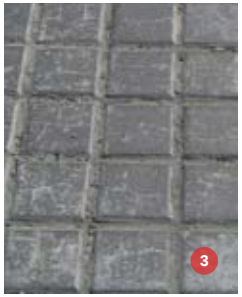


Typical layout for major intersection between Avenues





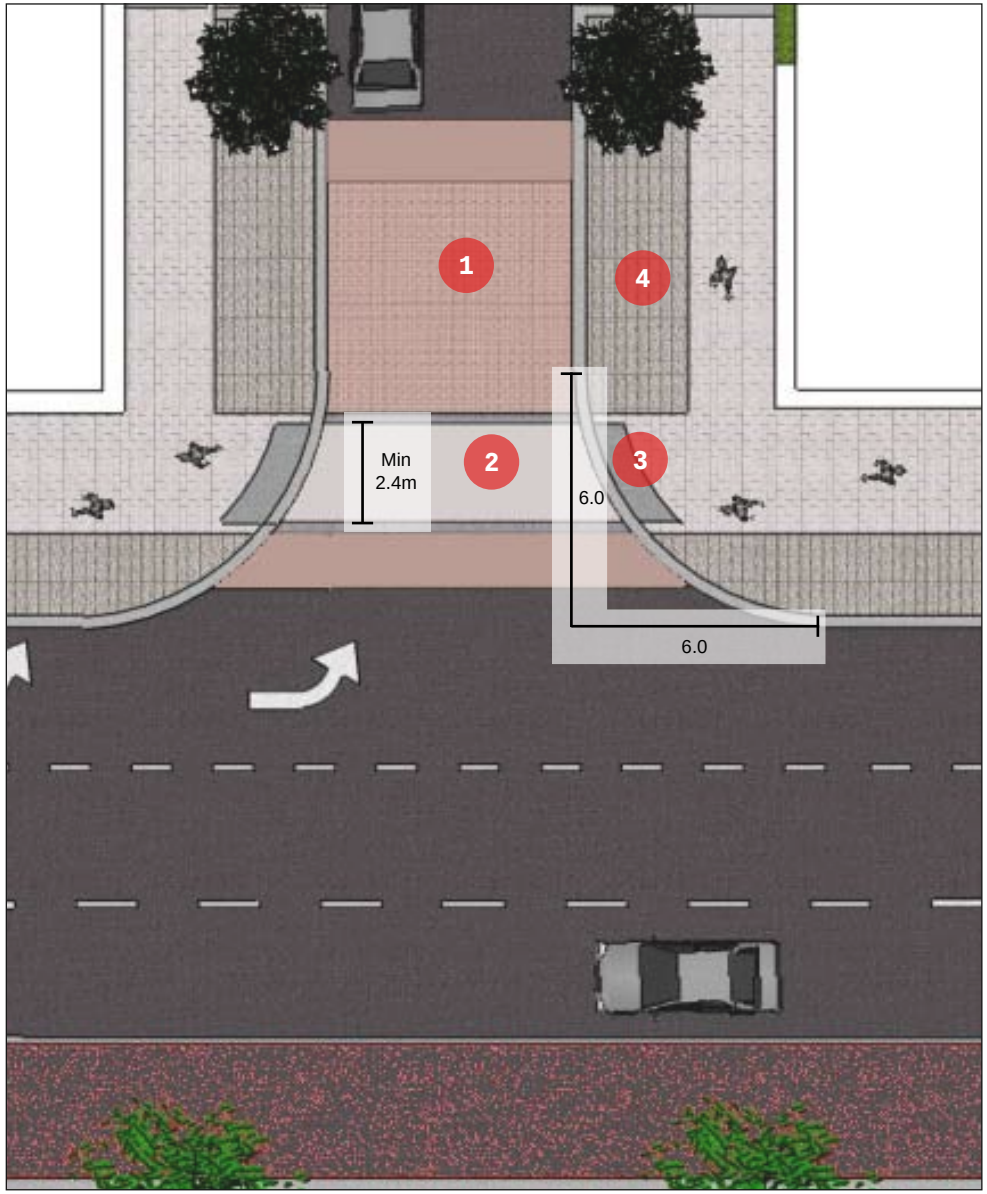




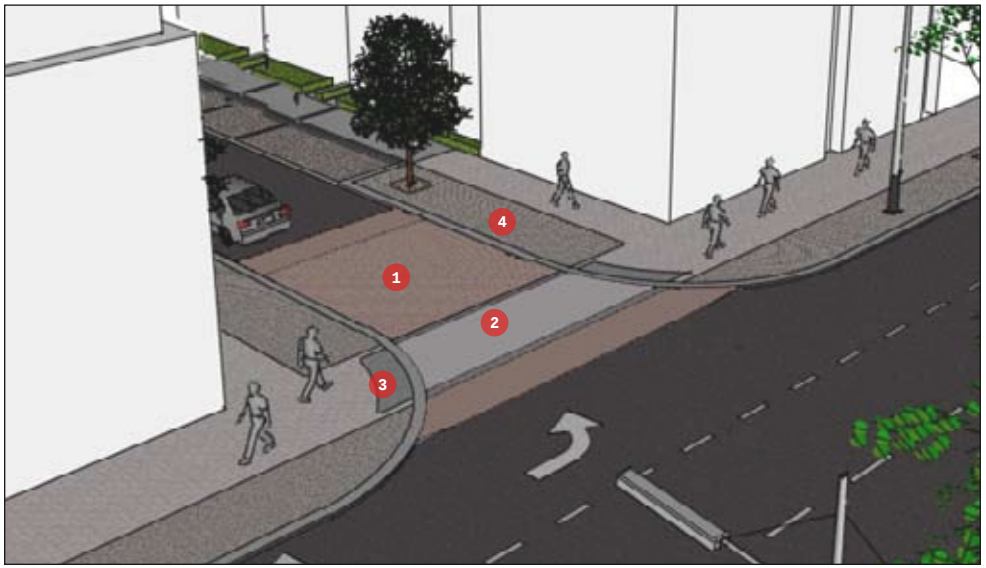
Component	Construction	For Further Detail See
1. Pedestrian Crossing	Pedestrian - Smooth cut natural/ reconstituted stone or concrete paving in small to medium sets.	7.7
2. Tactile Paving	Crossings - Grey or red blister paving. Pedestrian/cycle path - concrete buff ladder and grey corduroy paving	
3. Verge	Rough cut natural/reconstituted stone or concrete paving in small to medium sets	
4. Kerbs	Granite, reconstituted stone or pre-cast concrete blocks	7.9
5. Safety Installations	Metal bollards	
6. Street Furniture	Metal frame bike stand, timber seat with metal frame	

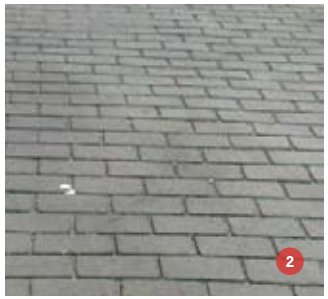
**Italics indicate illustrated examples*

6.2.4 Typical Entry Treatment to Side Street



Typical treatment for minor intersection on Avenues (with side streets). Also applicable to minor intersections along Adamstown Boulevard.





Component	Construction	For Further Detail See
1. Raised Entry Treatment	Smooth or rough *concrete* paving or imprinted grey or red asphalt.	7.3
2. Pedestrian Crossing	Smooth cut *concrete* paving or imprinted asphalt with concrete block or brick trim.	
3. Tactile Paving	Rough cut *natural/reconstituted stone* concrete grey blister paving.	
4. Verge	Rough cut natural/reconstituted stone or concrete paving in small to medium sets	

**Italics indicate illustrated examples*

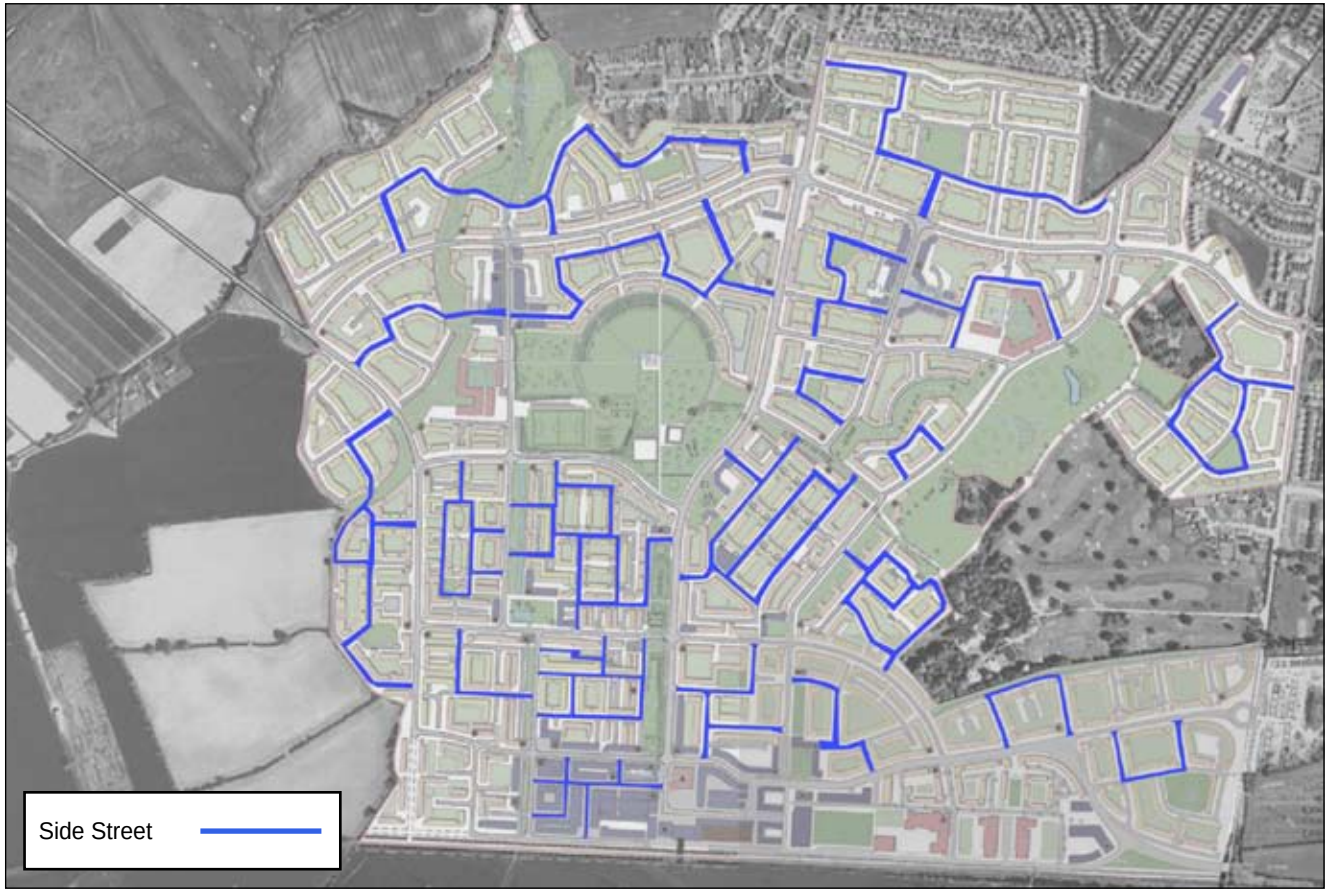
6.3 Side Streets

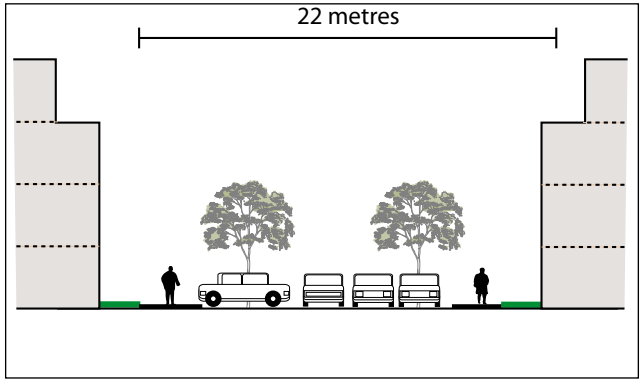
6.3.1 Locations and General Specification

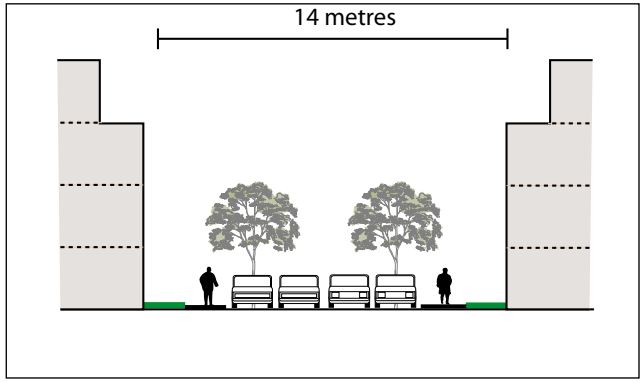
Side streets provide mid block access to connect residents to the Main Street network. They are unlikely to carry high levels of vehicular traffic, but can form an important part of the pedestrian and cycle network, particularly in areas around parks and schools.

Varying surface treatments will reinforce the traffic calmed structure. In most areas standard finishes will be used. However higher specification treatments may be employed around areas of civic importance, along pedestrian and cycling routes and at junctions on streets within high density/amenity areas (such as district or local centres).

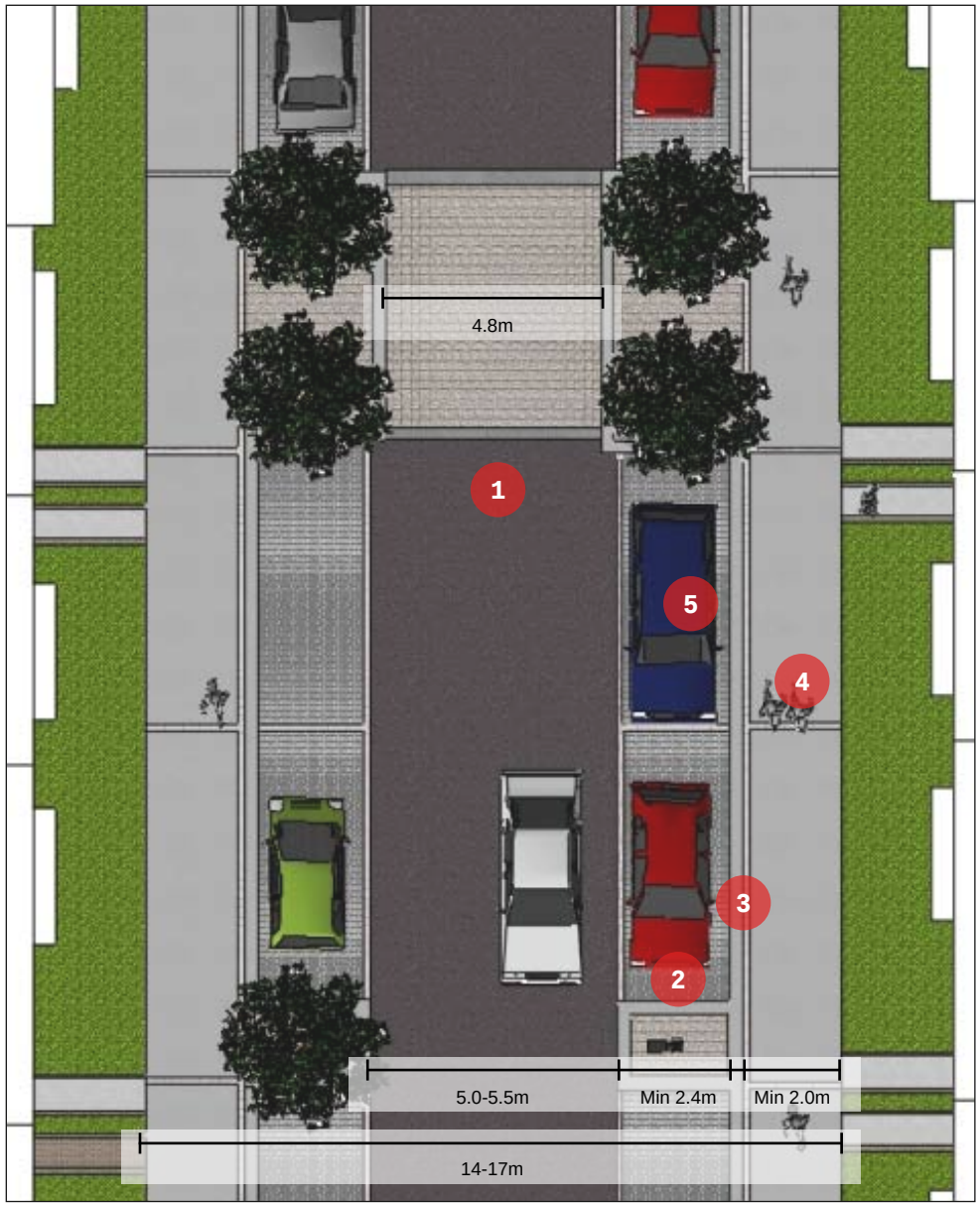
Design Speed:	**30 kph**
Street Reserve Width:	**12-14 metres (parallel parking)**
	18-22 (with perpendicular parking)
Carriageway Width:	**5.5-6 metres (4.8 in limited sections)**
Median:	**No**
Verge:	**Optional**
Bus Lane:	**No**
Cycle Lane:	**No**
On Street Parking:	**Yes**



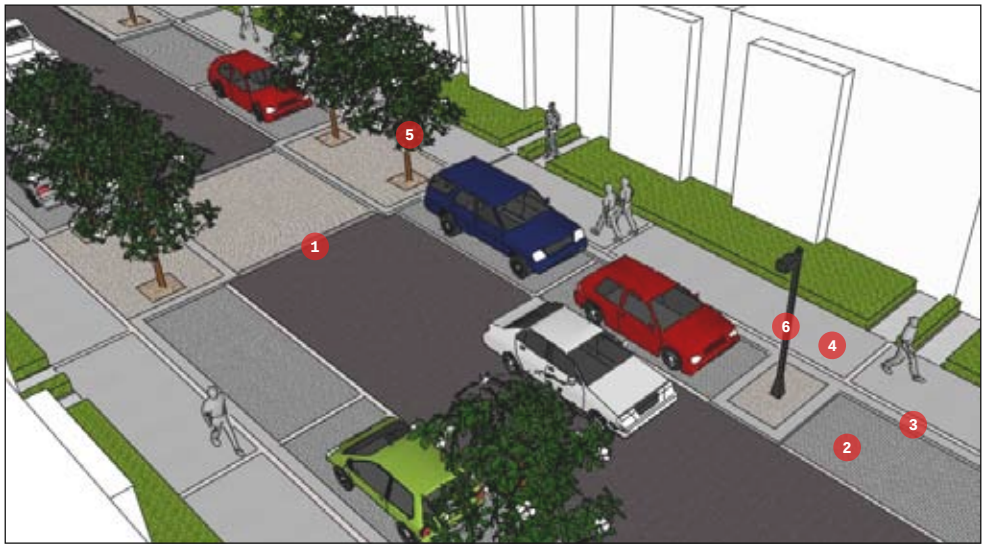


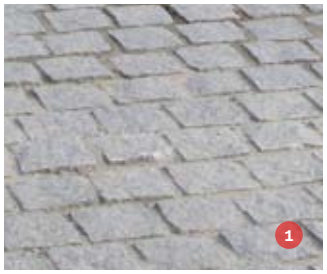


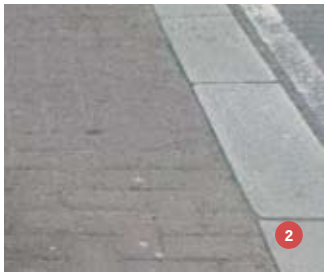
6.3.2 Typical Section



Typical treatment for Side Street within inner areas of Adamstown or in close proximity to local centres, along major pedestrian routes and other higher amenity areas.



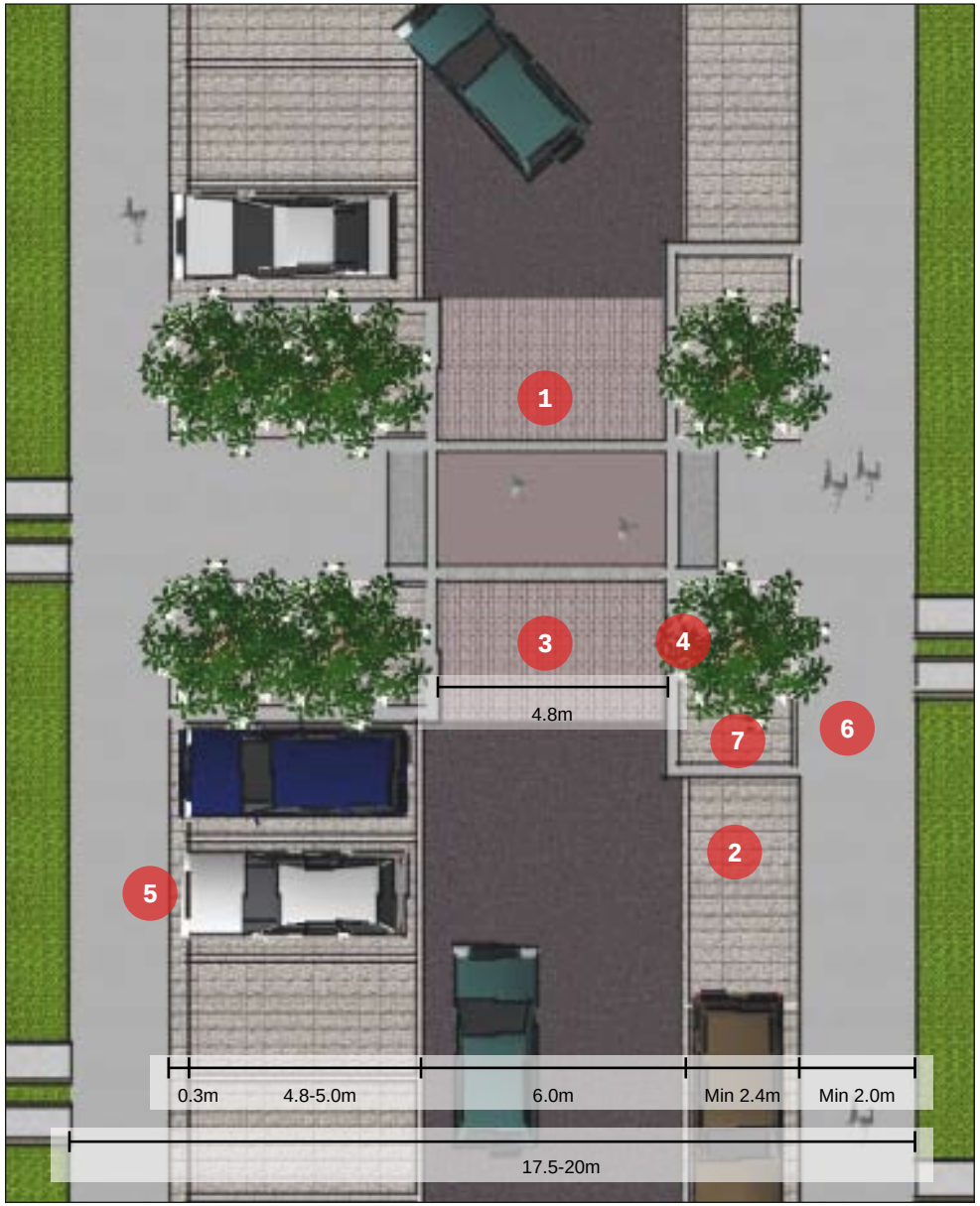




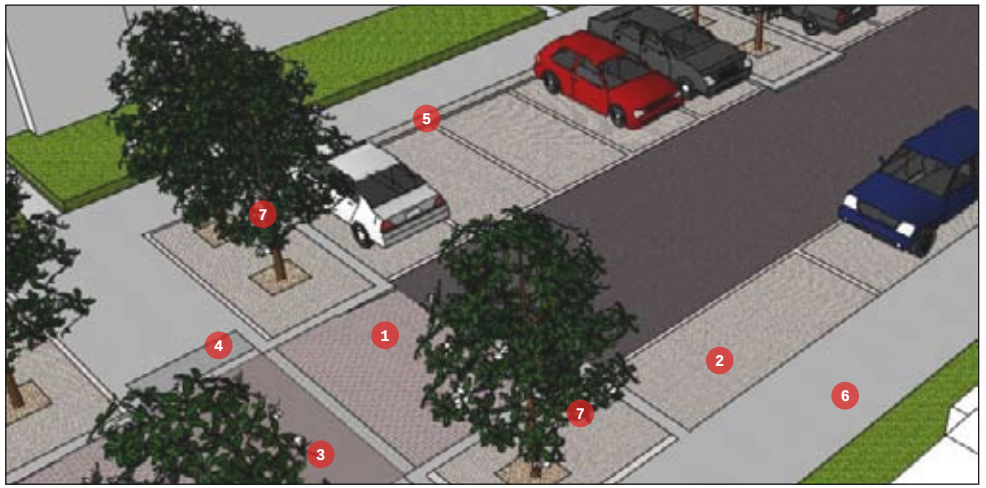
Component	Construction	For Further Detail See
1. Vehicular Carriageway	Macadam/asphalt with mid block surface change to rough cut *concrete* paving in small to medium sets or imprinted asphalt	
2. On-Street Parking	Smooth or rough cut concrete paving in small to medium sets or *coloured/imprinted asphalt with paved trim*	7.6
3. Kerbs	Concrete blocks/extruded kerbs	7.9
4. Paths	Brushed concrete (shown with brick trim)	
5. Street Trees	Individual tree pits	
6. Lighting	Honey light (SOX) or energy efficient white light	

**Italics indicate illustrated examples*

6.3.3 Typical Section



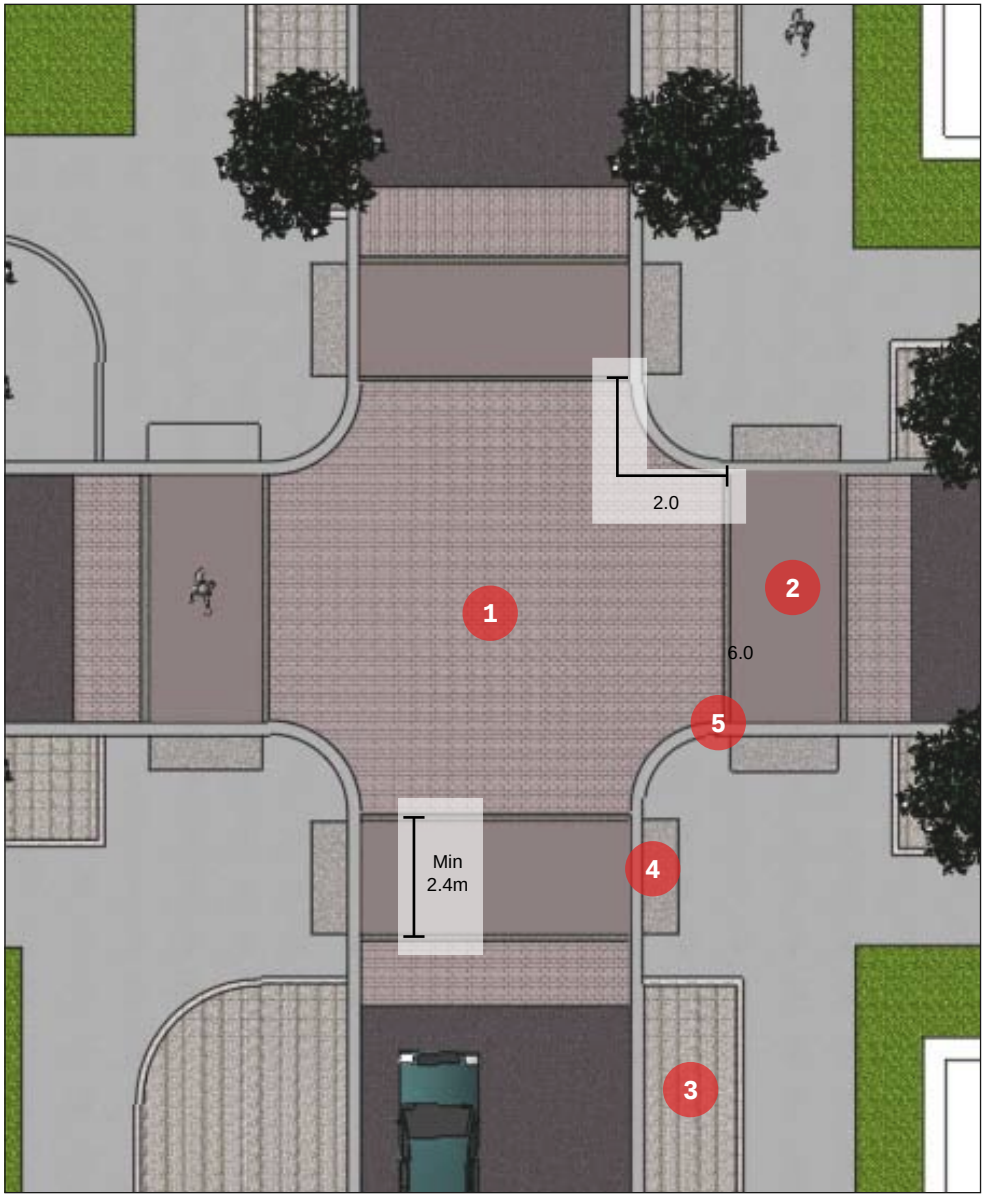
Typical treatment for Side Street throughout outer areas of Adamstown.



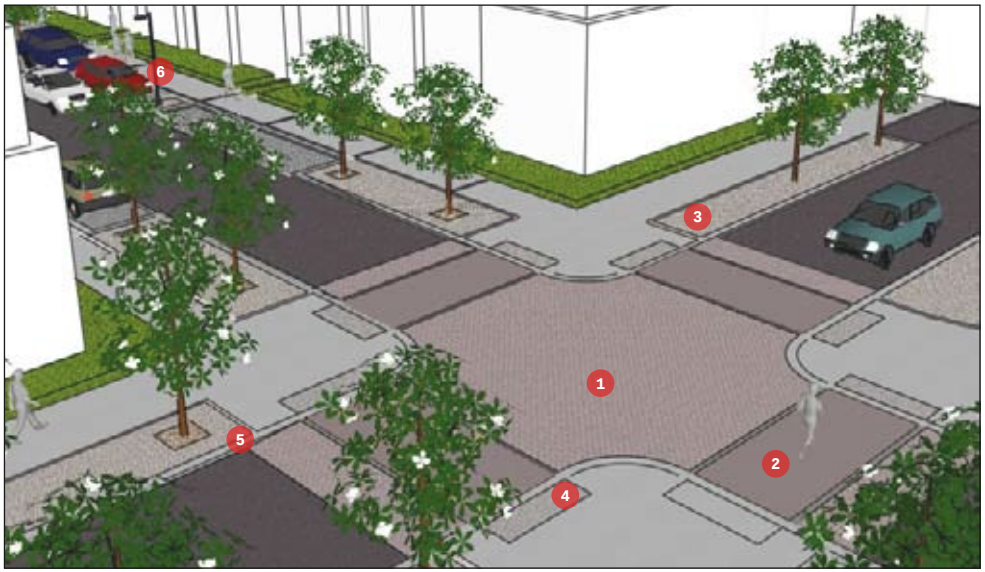
Component	Construction	For Further Detail See
1. Vehicular Carriageway	*Macadam/asphalt* Mid block raised table with red or buff imprinted asphalt.	
2. On-Street Parking	*Coloured macadam/asphalt* with brick or concrete block trim.	7.7
3. Pedestrian Crossing	Smooth red asphalt on raised table with brick or concrete block trim.	(see 7.3 for similar detail)
4. Tactile Paving	Standard grey concrete blister paving.	
5. Verge	*Smooth* or rough cut *concrete* block paving	
6. Paths	Brushed concrete	7.8
7. Street Trees	Individual tree pits	
8. Lighting	Honey light (SOX) or energy efficient white light	

**Italics indicate illustrated examples*

6.3.4 Typical Intersection



Typical junction treatment for Side Streets where traffic calming is desirable (Note: Also applicable to Back Streets)



Component	Construction	For Further Detail See
1. Vehicular Carriageway	*Red* or grey *imprinted asphalt* on raised table	
2. Pedestrian Crossing	*Smooth red asphal*t on raised table with brick, concrete block or imprinted trim.	7.3
3. Build Out	Smooth or rough cut concrete paving in small to medium sets	
4. Tactile Paving	Standard grey concrete blister paving	
5. Kerbs	Concrete blocks/extruded concrete pre-cast blocks.	7.9
6. Lighting	Honey light (SOX) or energy efficient white light	

**Italics indicate illustrated examples*

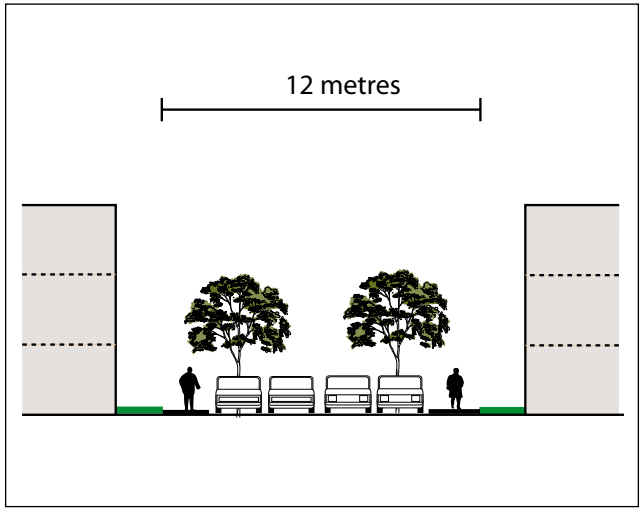
6.4 Back Streets

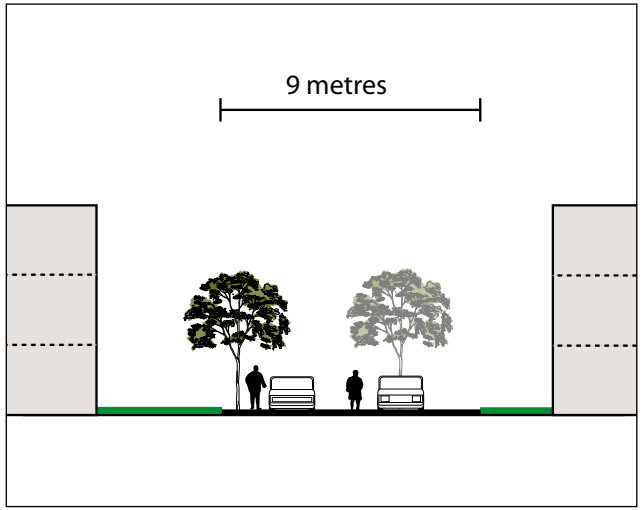
6.4.1 Locations and General Specification

Back streets provide access to small groups of residential dwellings, service access to commercial development and mid block links. They carry low levels of all types of traffic.

Varying surface treatments will reinforce their traffic calmed nature with a focus on creating a shared vehicular/cyclist/pedestrian environment. This may require more higher specification finishes in shared areas such as homezones.

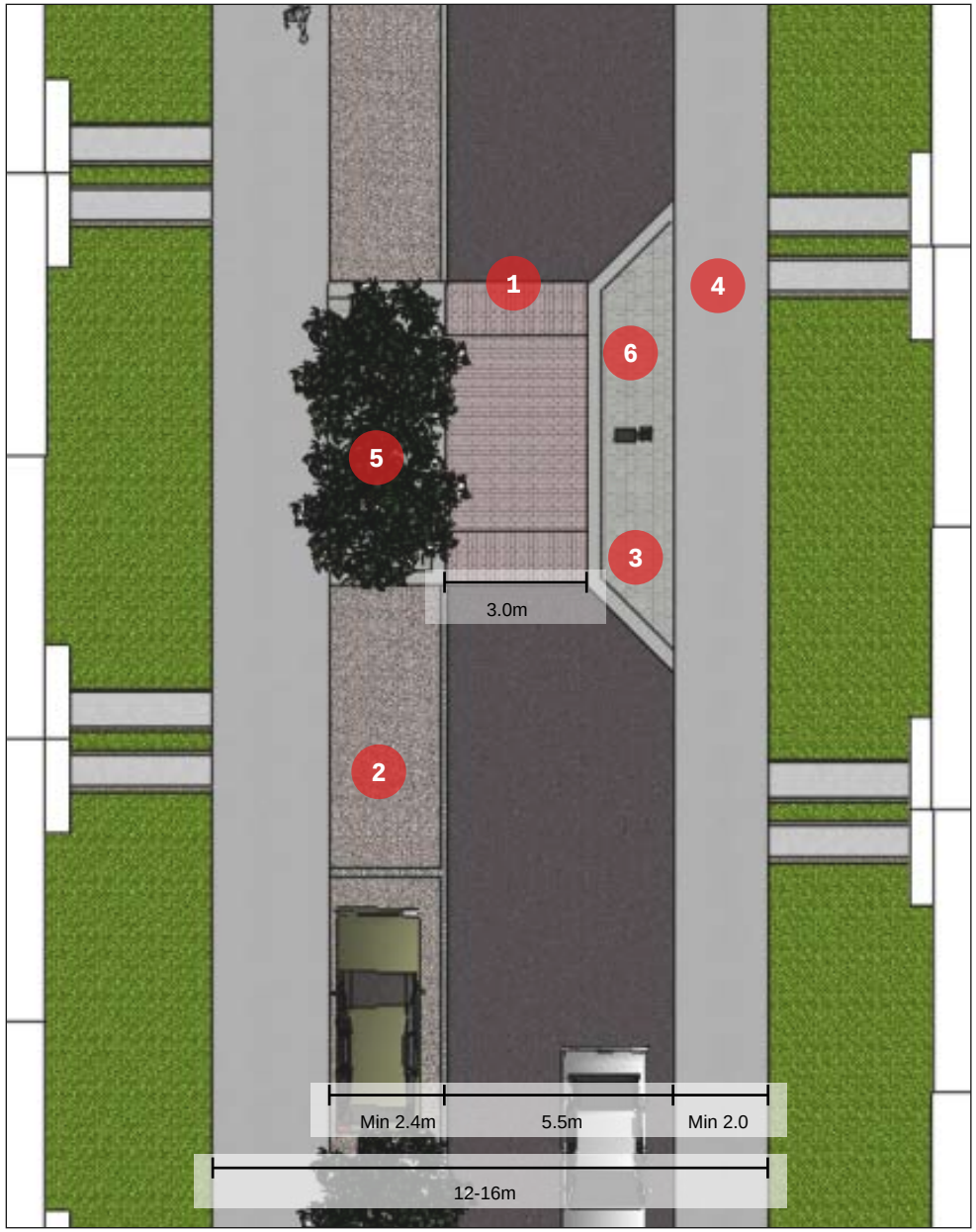
Design Speed:	**30 kph** [31]
Street Reserve Width:	**9-12 metres**
Carriageway Width:	**4.8-5.0 metres** **(3.0 in limited sections)**
Median:	**No**
Verge:	**Optional**
Bus Lane:	**No**
Cycle Lane:	**No**
On Street Parking:	**Yes**



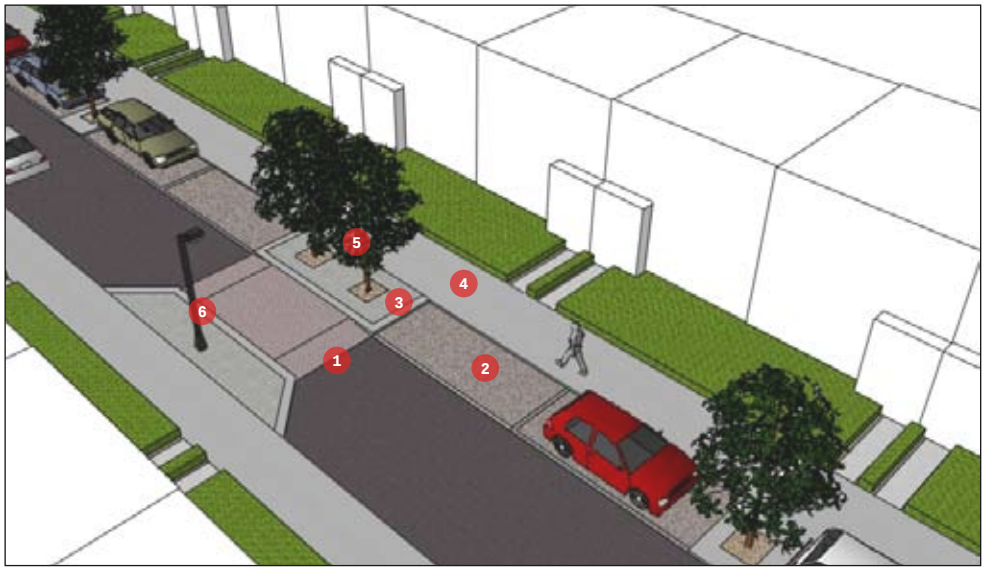


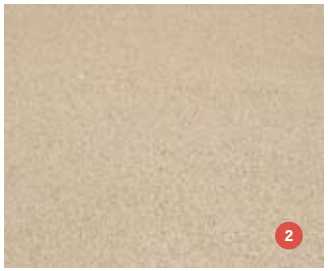
31. Lower design speeds of 10 kph are to be applied to shared surface streets such as homezones.

6.4.2 Typical Section



Typical treatment for Back Street throughout Adamstown

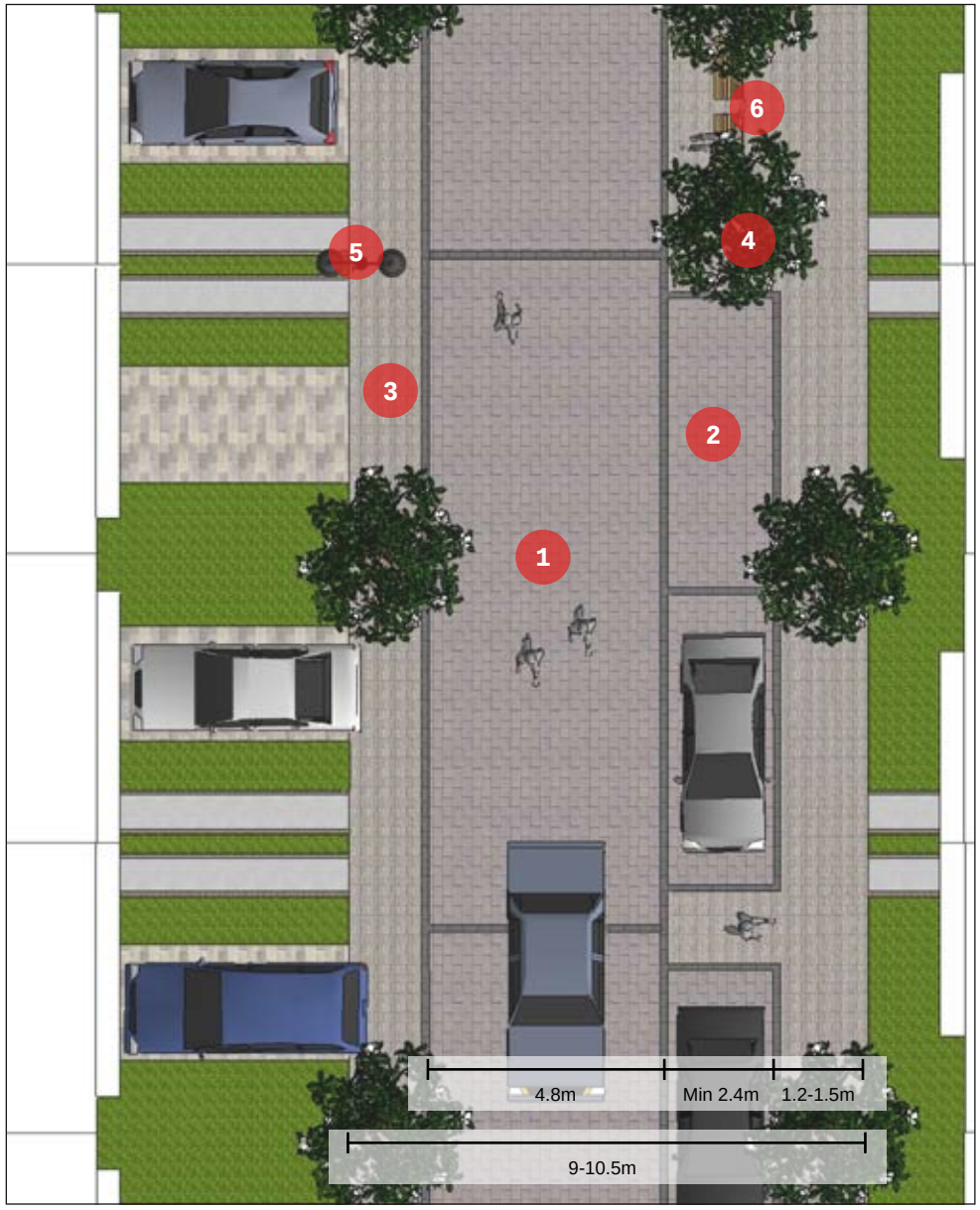




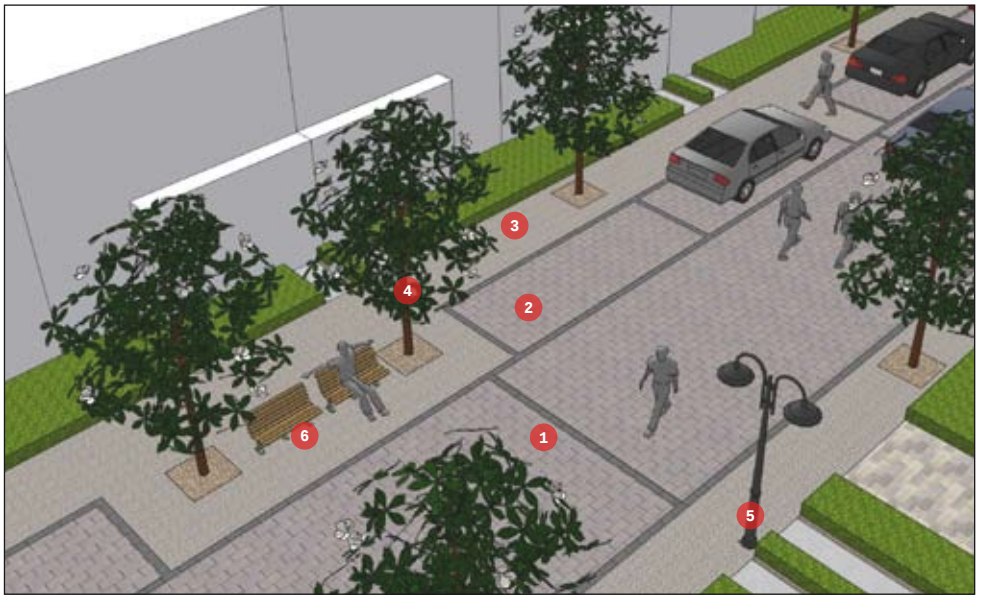
Component	Construction	For Further Detail See
1. Vehicular Carriageway	Macadam/asphalt Mid block traffic calming with raised *imprinted red asphalt* table	7.3
2. On-Street Parking	*Coloured macadam/asphalt* with brick or concrete block trim	7.7
3. Build Outs	Rough cut concrete paving in small to medium sets	
4. Paths	Brushed concrete	7.8
5. Street Trees	Individual tree pit	7.11
6. Lighting	Honey light (SOX) or energy efficient white light	

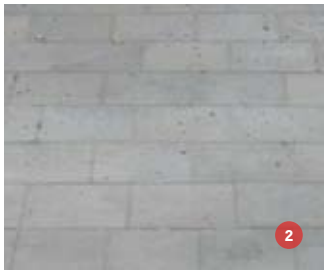
**Italics indicate illustrated examples*

6.4.3 Typical Section



Typical treatment Back Street designated as homezone/shared surface street. For application throughout Adamstown on where suitable streets are identified.





Component	Construction	For Further Detail See
1. Vehicular Carriageway	Smooth cut *concrete* paving in small to medium sets	7.2
2. On-Street Parking	Smooth cut *concrete* paving in small to medium sets with contrasting trim	7.6
3. Verges	Smooth or rough cut concrete paving in small to medium sets	
4. Street Trees	Individual treepit within topsoil	7.11
5. Lighting	Pure white (metal halide) lights	
6. Street Furniture	Timber seating on metal frame	

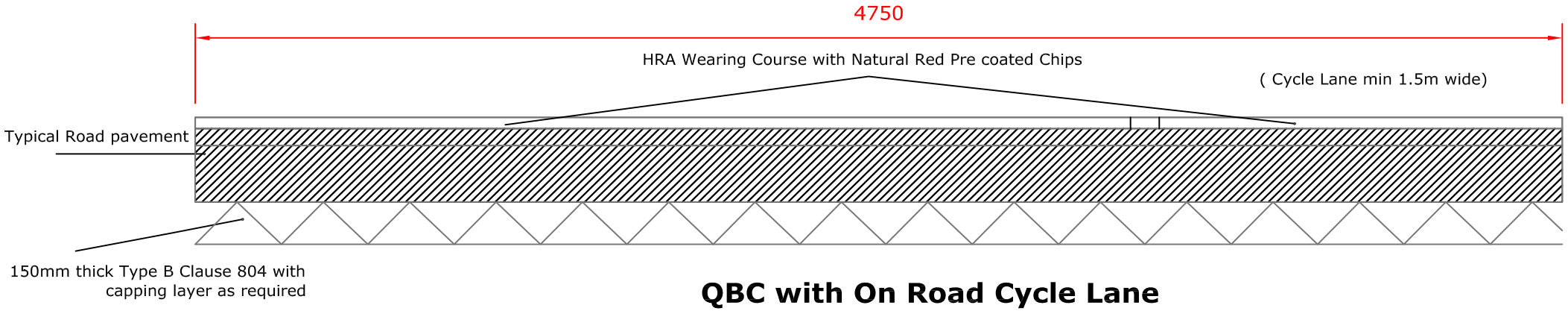
7.0 ACCEPTED STANDARDS

7.1 Combined QBC and Cycle Lane

Application

Adamstown Boulevard

Avenues



QBC with On Road Cycle Lane

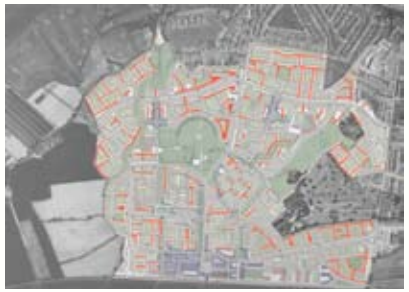
QBC with On Road Cycle Lane

Material: HRA Wearing Course with Natural Red pre coated Chips to Bus Lane and Cycle Lane
Used on Avenues where QBC lanes are required
Minimum 4750mm wide.

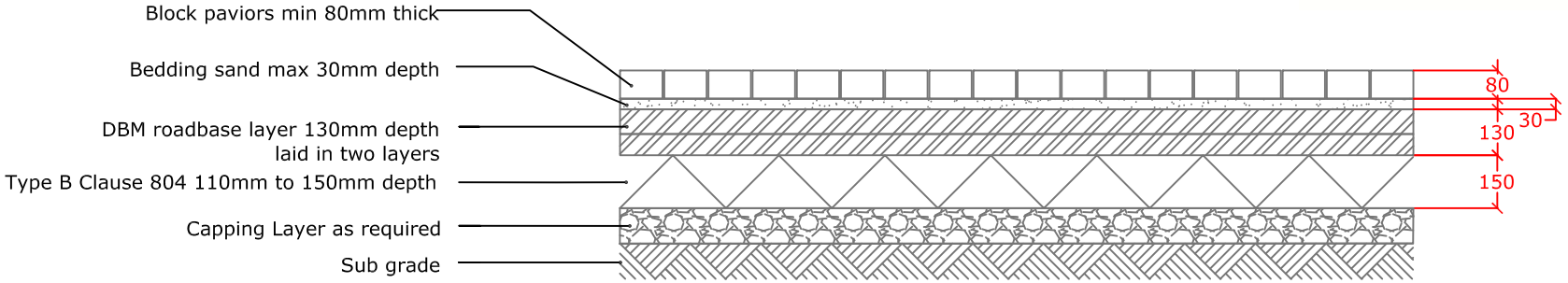
Adamstown Boulevard and Avenues
Scale 1:20

7.2 Homezone Shared Carriageway

Application



Back Streets



Homezone Paved Areas

Home Zone Paved Areas

Materials: Block Pavior

Used for all home zones within Adamstown

NOTE: No roadside kerb upstands required in home zones in Adamstown. All manhole covers to be surrounded with a header course of uncut paviors, smaller cut blocks to be incorporated behind header course if necessary.

Home Zones

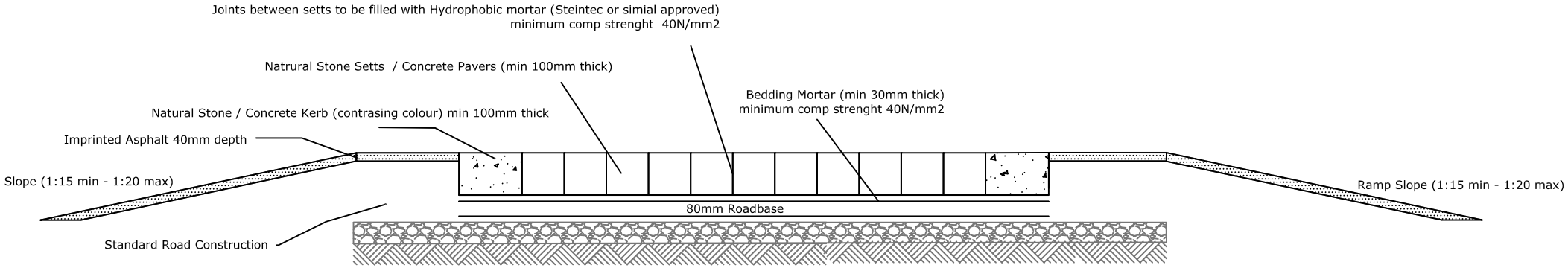
Scale 1:20

7.3 Entry Treatments/Raised Tables

Application

Adamstown Boulevard

Avenues



Raised Entrance Treatment with Paved Crossing

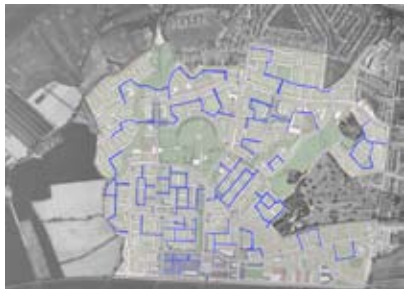
Raised Entrance Treatment with Paved Crossing

Materials: Imprinted Asphalt / Block Pavers or Stone Pavers

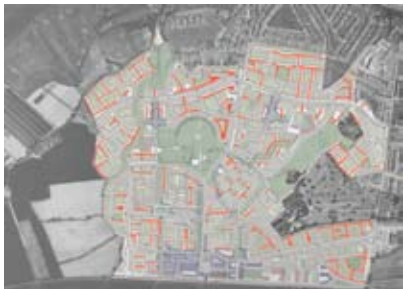
NOTE: Paved Crossing area should be a minumum of 2.0m wide with a contrasting kerb to deliniate extent of crossing area

Adamstown Boulevard Avenues
Not to Scale

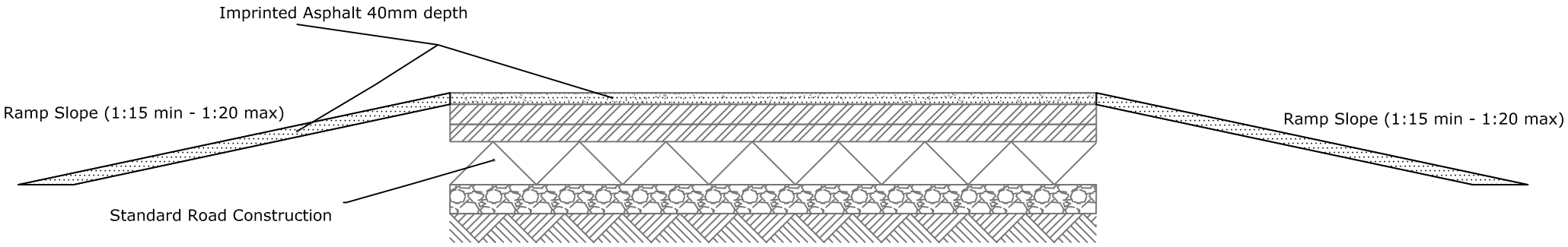
Application



Side Streets



Back Streets



Raised Entrance Treatment

Raised Imprinted Asphalt Crossing

Materials: Imprinted Asphalt

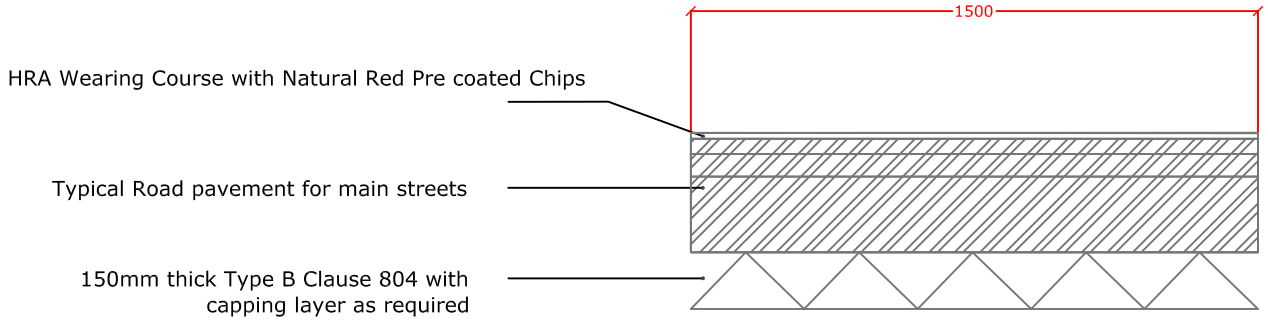
NOTE: Crossing area should be a provided as smooth non printed ashalt (minimum 2.0m width)

Side Streets and Back Streets
Not To Scale

7.4 On-Road Cycle Lane

Application

Avenues



On Road Cycle Lane

On Road Cycle Lane

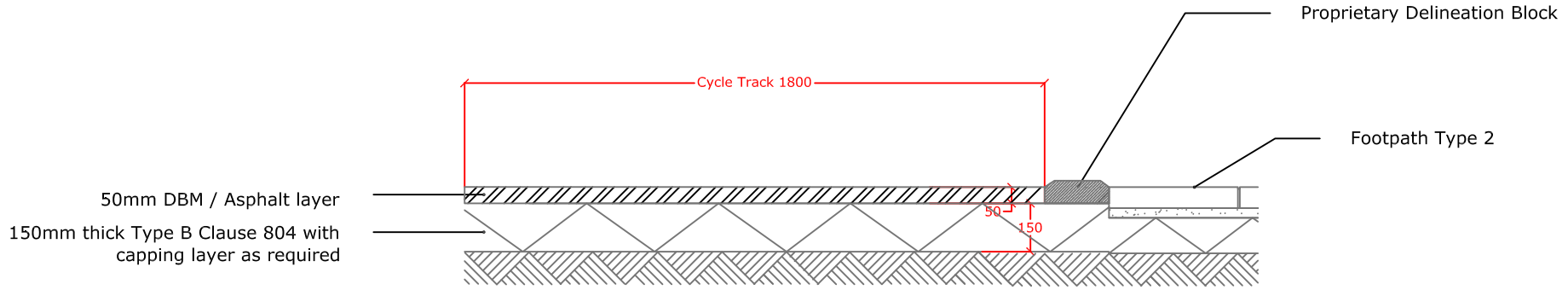
Material: HRA Wearing Course with Natural Red Pre-coated Chips
Used on Avenues where cycle lanes are required (See Adamstown Cycle Strategy)
Minimum 1500mm wide.

Avenues
Scale 1:20

7.5 Off-Road Cycle Lane

Application

Avenues



Off Road Cycle Track

Off Road Cycle Track

Material: DBM / Asphalt

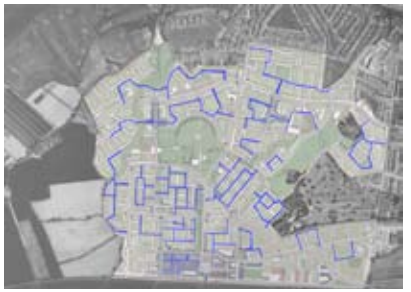
Used along Avenues where off road cycle tracks are required (See Adamstown Cycle Strategy)
Segregate from pedestrains by horizontal segregation (proprietary delineation block).
Minimum 1800mm wide.

Avenues
Scale 1:20

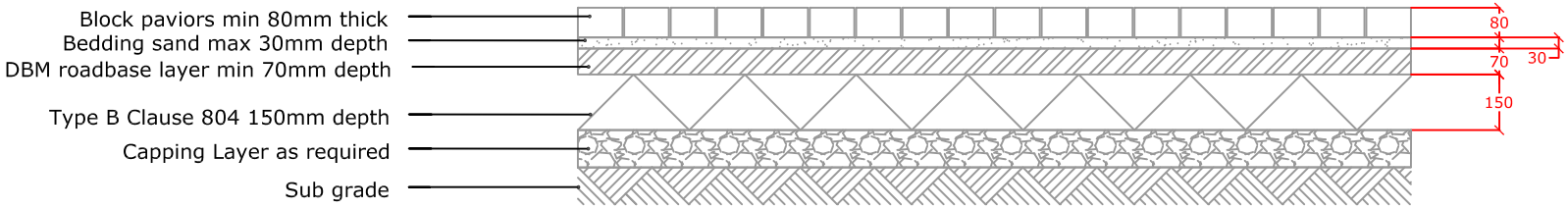
7.6 Parking Bays

Application

Avenues



Side Streets



On Street Parking Bay

On Street Parking Bay

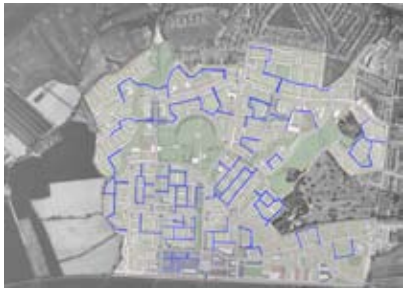
Material: Block Pavior

Used along Avenues and Side Streets where on street car parking is proposed

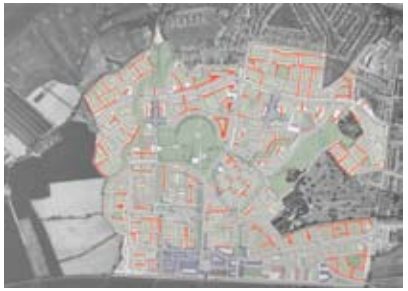
Note: Where paviors are used all manhole covers to be surrounded with a header course of uncut paviors, smaller cut blocks to be incorporated behind header course if necessary.

Avenues and Side Streets
Scale 1:20

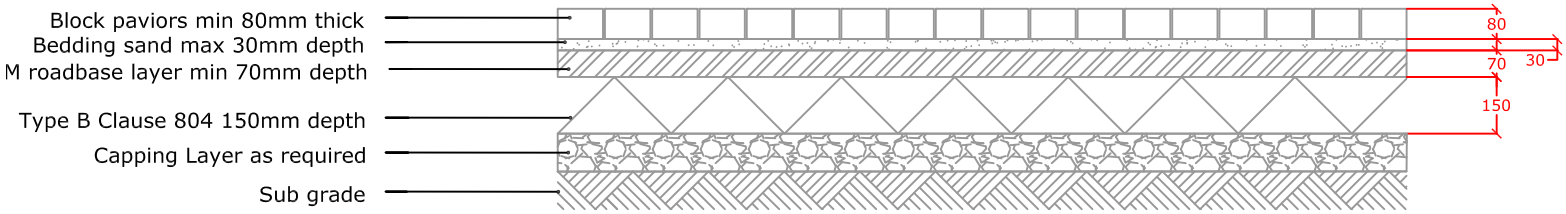
Application



Side Streets

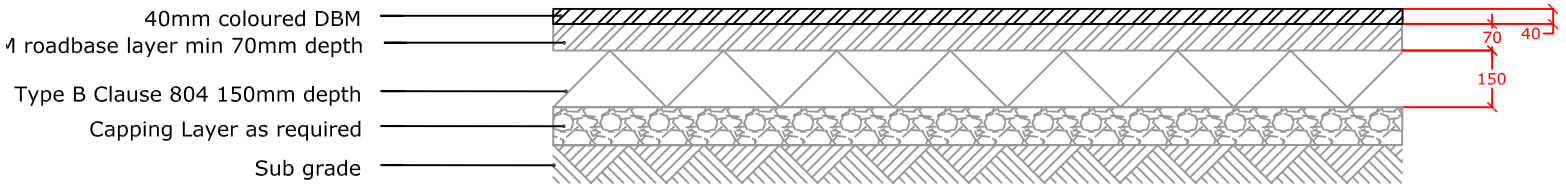


Back Streets



On Street Parking Bay (Block Pavior)

OR



On Street Parking Bay (Coloured DBM)

On Street Parking Bay

Materials: Block Pavior and/or Coloured DBM

Used on Side streets, Back Streets or Home Zone areas where on street car parking is provided.

Note 1: Where concrete paviors are used all manhole covers to be surrounded with a header course of uncut paviors, smaller cut blocks to be incorporated behind header course if necessary.

Side Streets / Back Streets / Home Zone areas

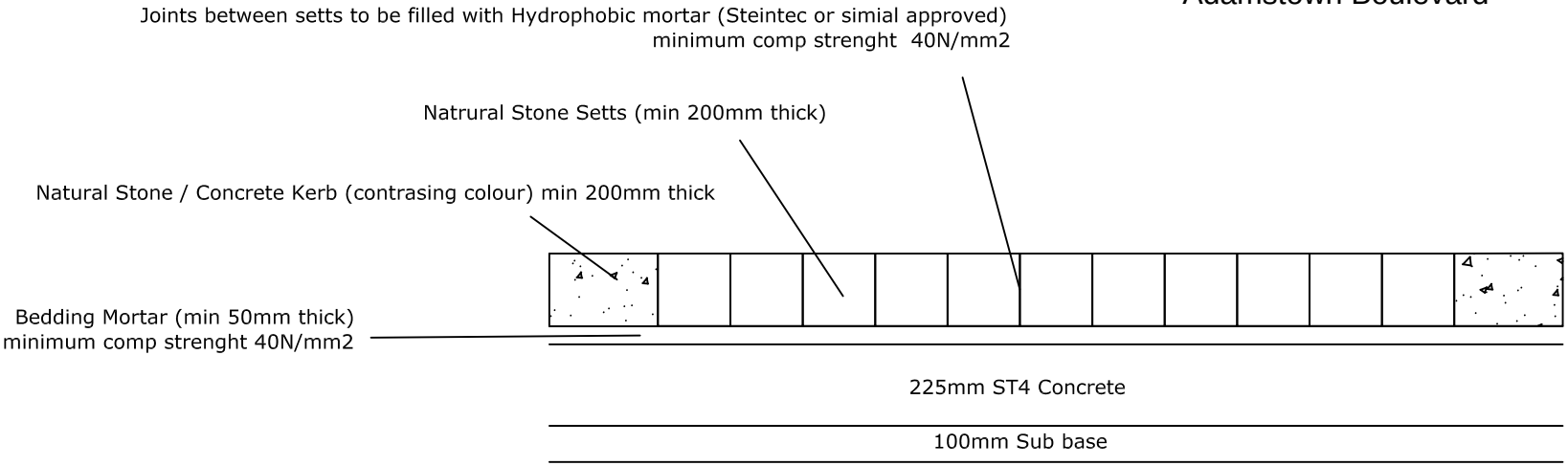
Scale 1:20

7.7 Pedestrian Crossing

Application

Adamstown Boulevard

Avenue



Pedestrian Crossing on Adamstown Boulevard and Avenues

High Specification At Grade Pedestrian Crossing

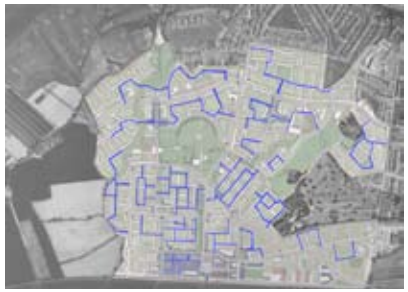
Materials: Natural Stone Setts

Used for At Grade / Raised Pedestrain Crossings within Adamstown along Adamstown Boulevard and Avenues

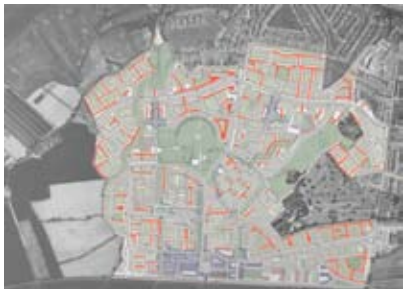
NOTE: Kerb of contrasting colour to crossing area to be used to deliniate the extent of the crossing width

Adamstown Boulevard and Avenues
Scale 1:20

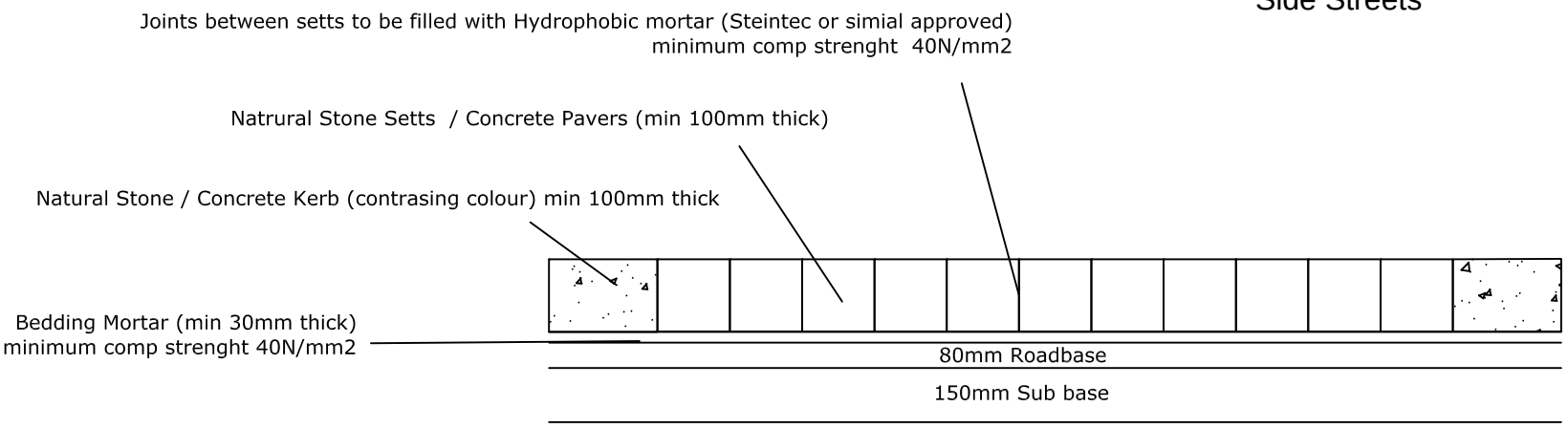
Application



Side Streets



Back Streets



Pedestrian Crossing on Side Streets and Back Streets

At grade Pedestrian Crossing

Materials: Natural Stone Setts / Concrete Pavers

Used for At Grade / Raised Pedestrain Crossings along Side Streets and Back Streets within Adamstown

NOTE: Paved Crossing area should be a minumum of 2.0m wide with a contrasting kerb to deliniate extent of crossing area

Side Streets and Back Streets

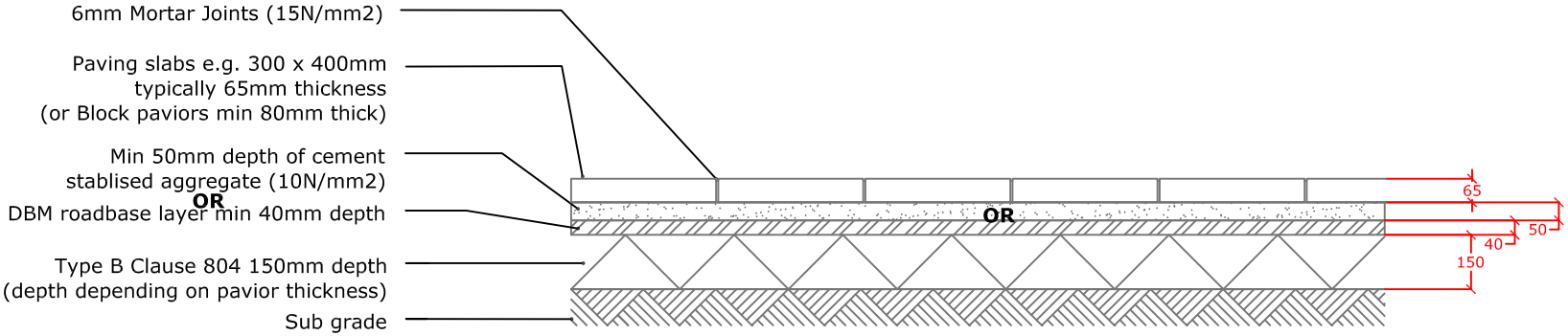
Scale 1:20

7.8 Footpaths

Application

Adamstown Boulevard

Avenues



Footpath / Pavement Type 1

Footpath / Pavement Type 1

Material: Paving Slab / Flagstone

Used along Avenues where occasional vehicle incursion may occur (nothwithstanding use of bollards)

Note: Where concrete paviors are used all manhole covers to be surrounded with a header course of uncut paviors, smaller cut blocks to be incorporated behind header course if necessary.

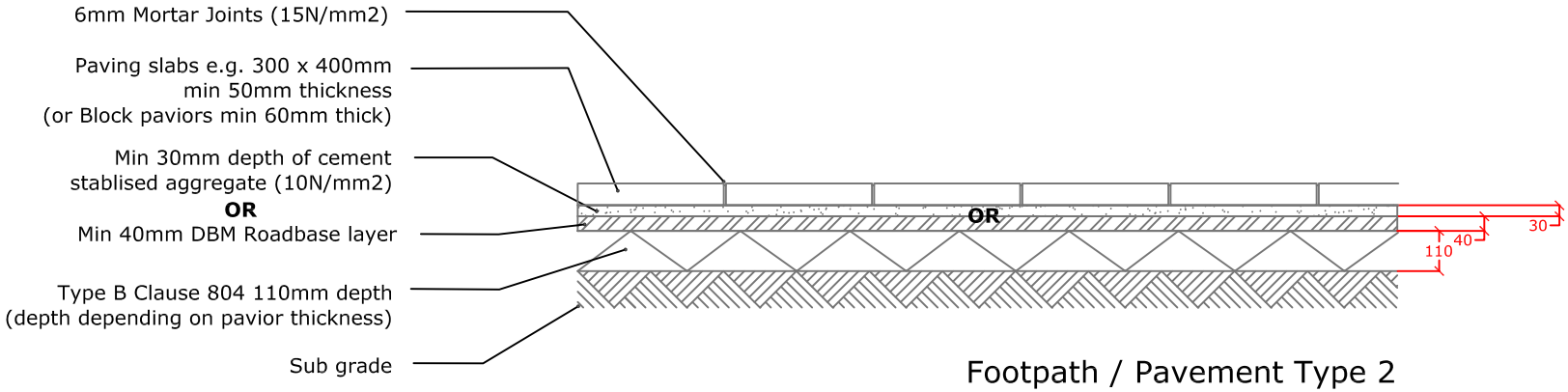
Avenues

Scale 1:20

Application

Adamstown Boulevard

Avenues



Footpath / Pavement Type 2

Footpath / Pavement Type 2

Material: Paving Slab / Flagstone

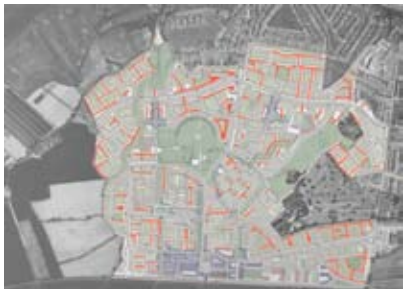
Used along Avenues where paving is not adjacent to the roadway and not subject to vehicular loading (i.e. behind a cycleway or planting strip)

Avenues

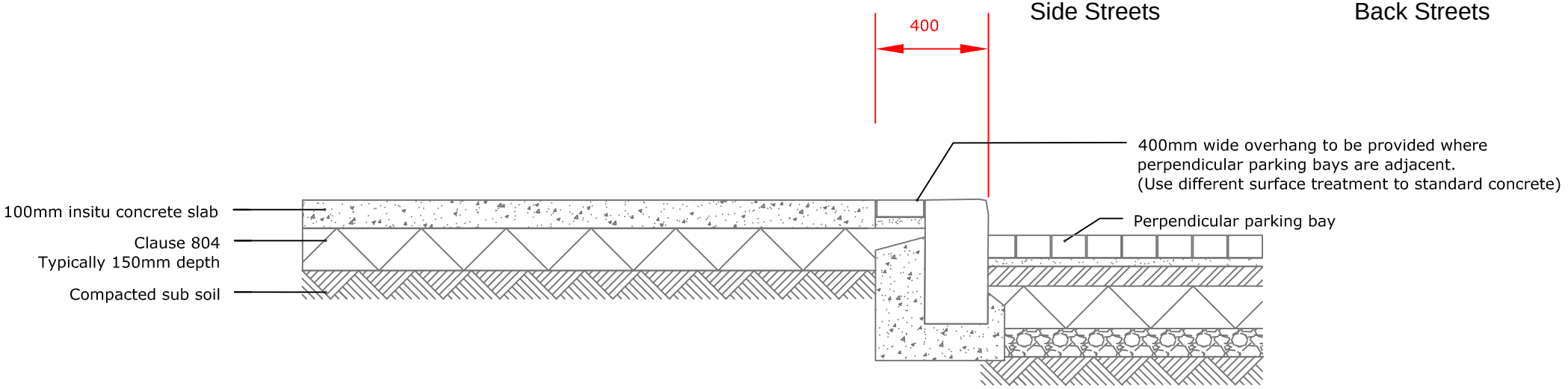
Scale 1:20

Application

Side Streets



Back Streets



Standard Concrete Footpath

Standard Concrete Footpath

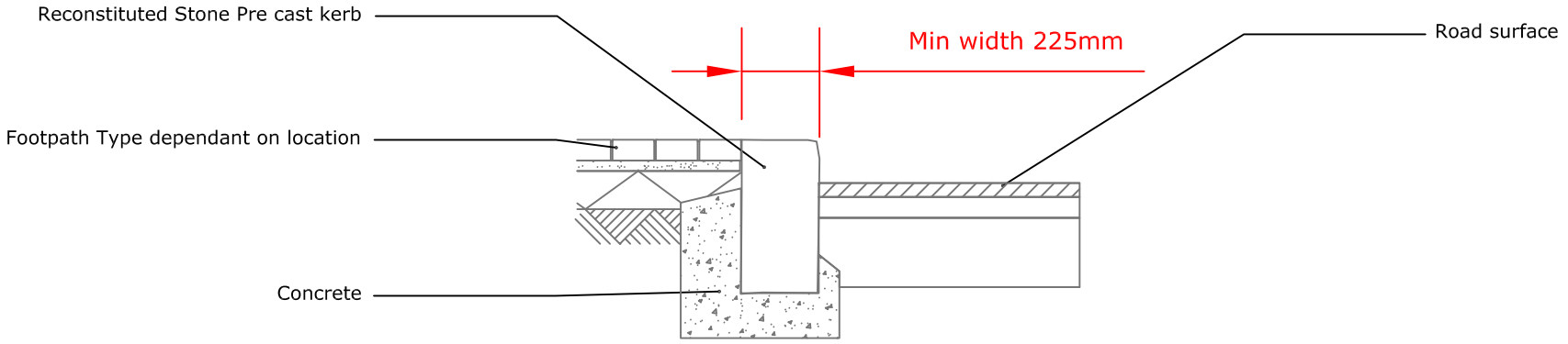
Used in all Side Streets and Back Streets as standard footpath detail

Back Streets / Side Streets
Scale 1:20

7.9 Kerbs

Application

Adamstown Boulevard



Natrural Stone or Reconstituted Stone Pre Cast Kerb

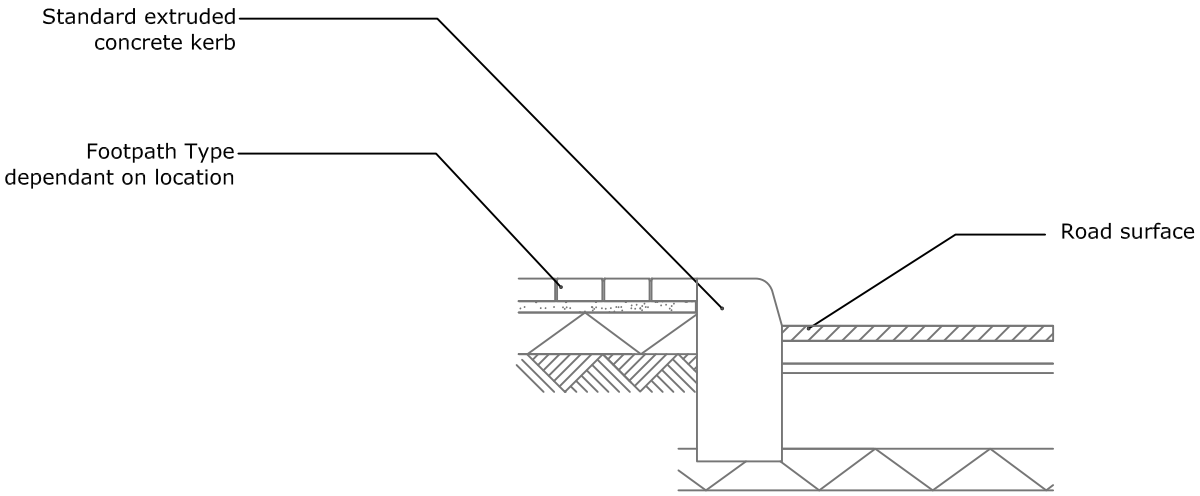
Natural Stone or Reconstituted Stone Pre Cast Kerb

Used along Adamstown Boulevard and within Adamstown District Centre

Adamstown Boulevard and District Centre
Scale 1:20

Application

Avenues

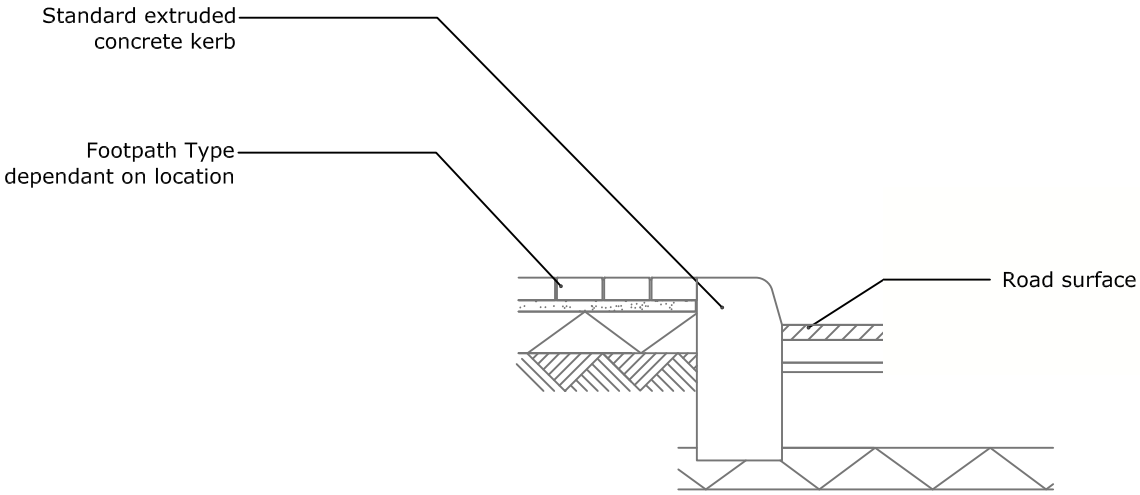


Standard Extruded Concrete Kerb

Standard Extruded Concrete Kerb

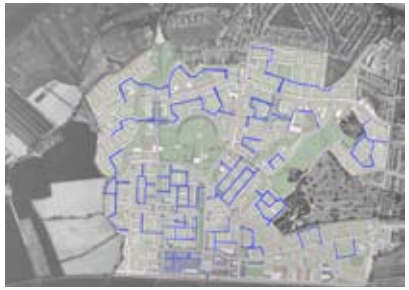
Used along Avenues as standard road edge treatment
EXCEPT: Adamstown Boulevard and within Adamstown District Centre

Avenues
Scale 1:20

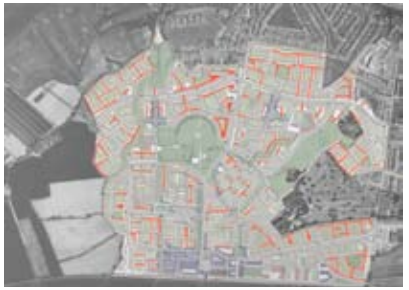


Standard Extruded Concrete Kerb

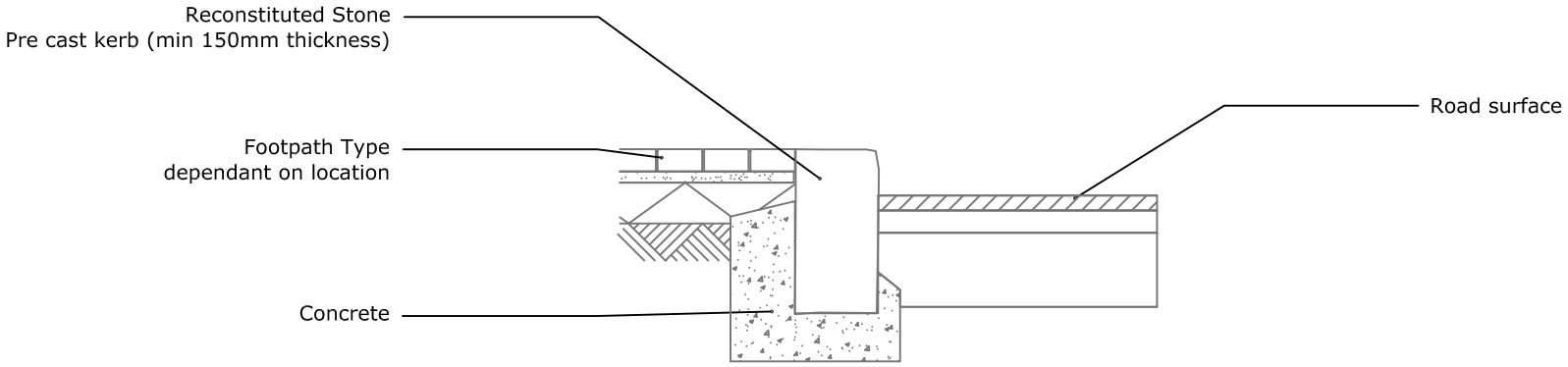
Application



Side Streets



Back Streets



Reconstituted Stone Pre Cast Kerb

Standard Extruded Concrete Kerb or
Reconstituted Stone Pre cast Kerb

Used as standard road edge treatments on all Side Streets and Back Streets as desired.

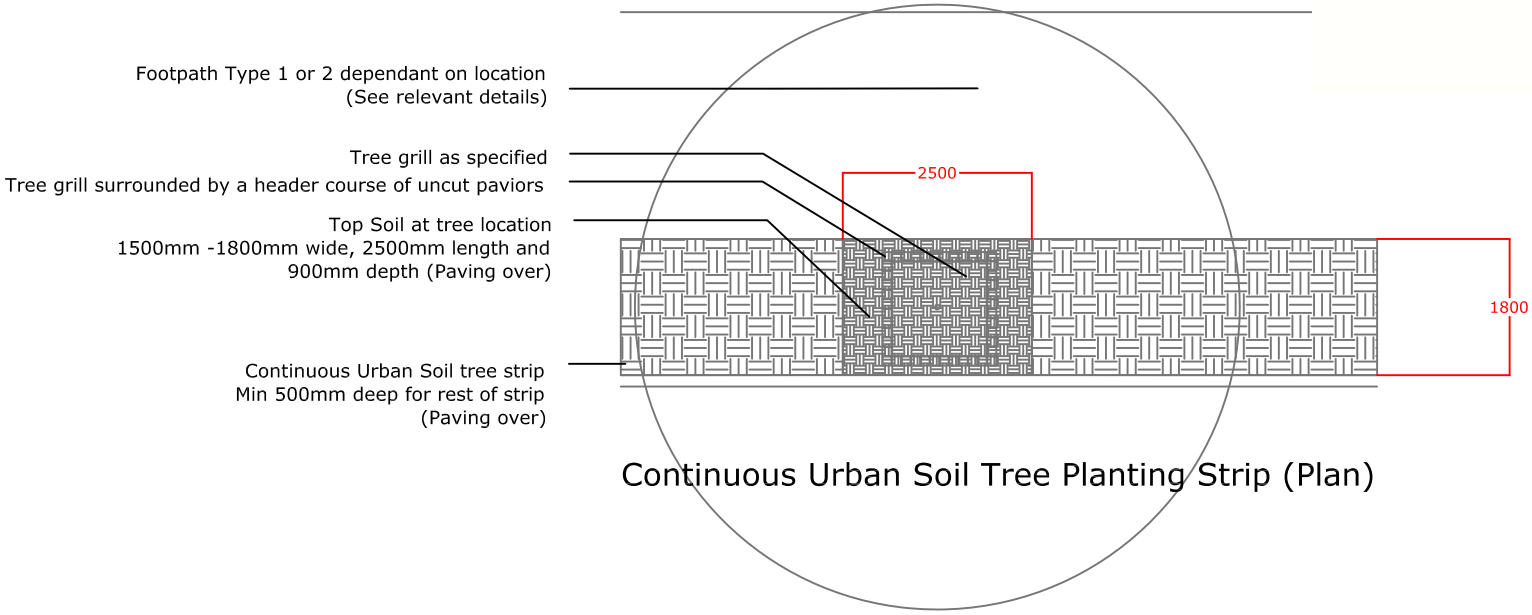
Side Streets / Back Streets
Scale 1:20

7.10 Continuous Urban Soil Tree Planting Pit

Application

Adamstown Boulevard

Avenues



Continuous Urban Soil Tree Planting Strip (Plan)

Continuous Urban Soil Tree Planting Strip

Plan (See section for further detail)

Used along the Adamstown Boulevard and Avenues where a continuous tree line is proposed

Adamstown Boulevard / Avenues
Scale 1:100

Application

Adamstown Boulevard

Avenues

Continuous Urban Soil Tree Planting Strip (Section 1)

Continuous Urban Soil Tree Planting Strip

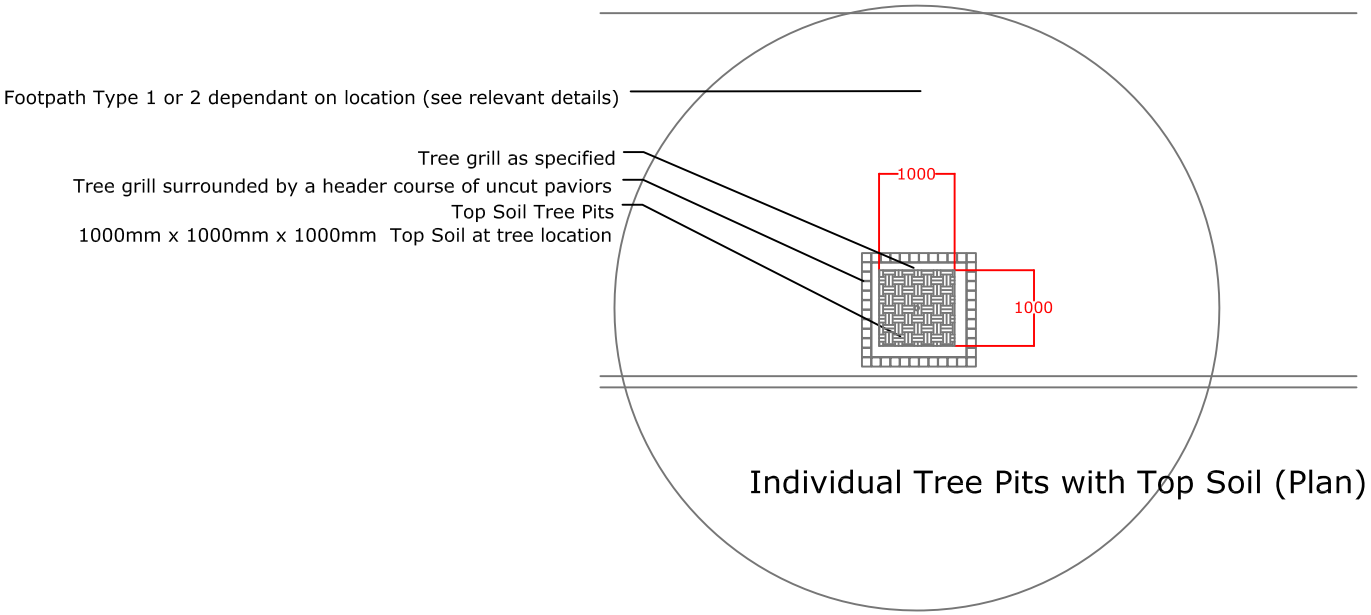
Section through Tree Pit (See plan for further detail)

Used along Adamstown Boulevard and Avenues where a continuous tree line is proposed

Adamstown Boulevard and Avenues

Scale 1:50

7.11 Individual Tree Pit with Top Soil



Individual Tree Pits with Top Soil (Plan)

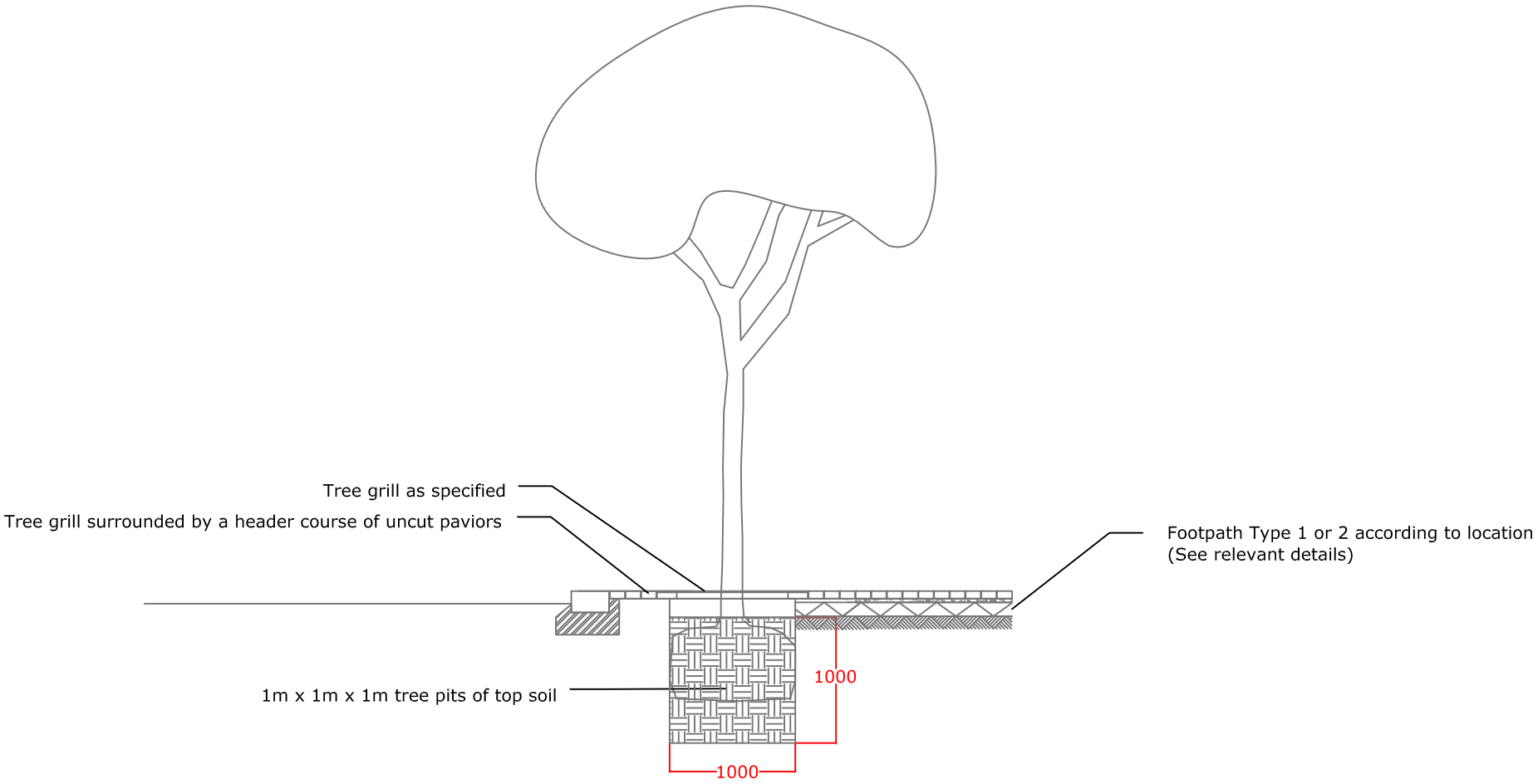
Individual Tree Pits with Top Soil

Plan (See section for further detail)

Used on all streets where individual tree planting is proposed.

All Streets

Scale 1:100



Individual Tree Pits with Top Soil (Section)

Individual Tree Pits with Top Soil

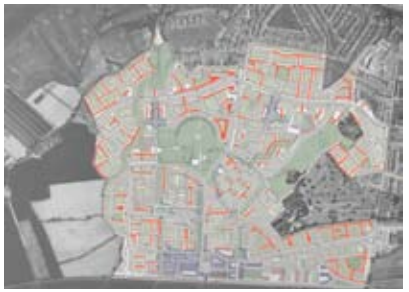
Section (See plan for further detail)

Used on all Streets where individual tree planting is proposed.

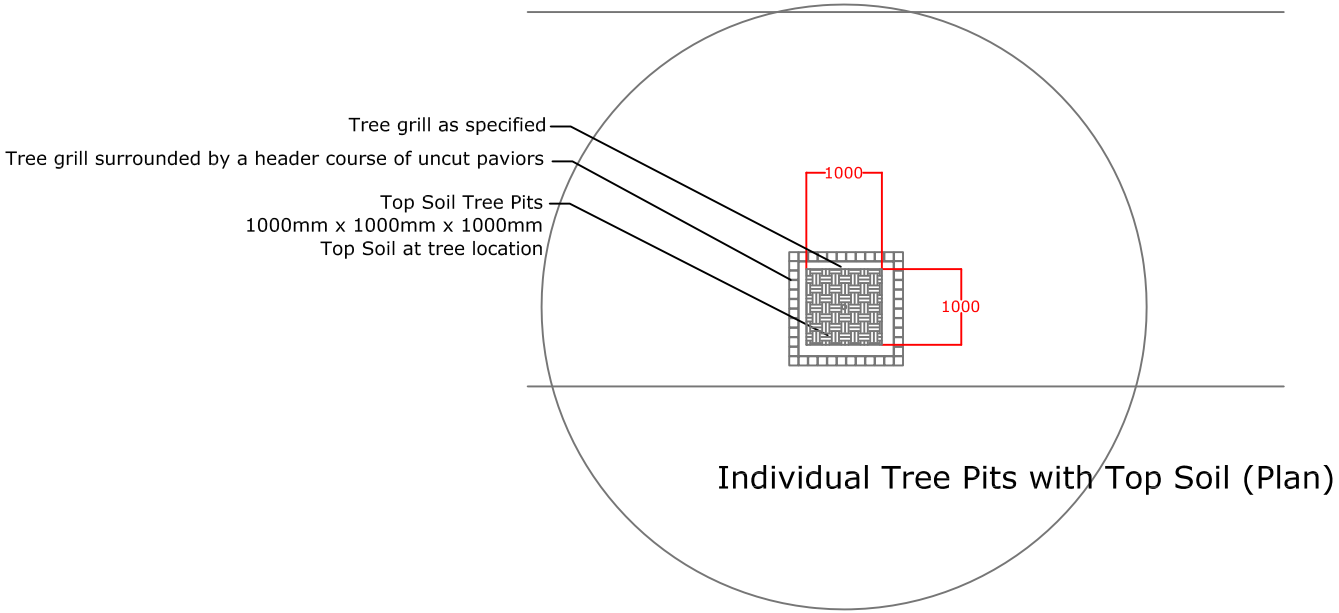
All Streets

Scale 1:50

Application



Back Streets



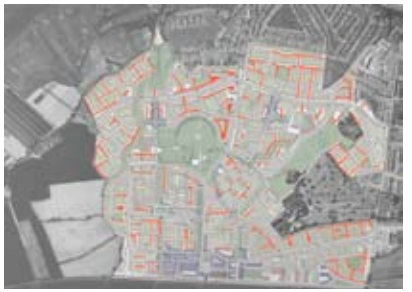
Individual Tree Pits with Top Soil (Plan)

Individual Tree Pits with Top Soil

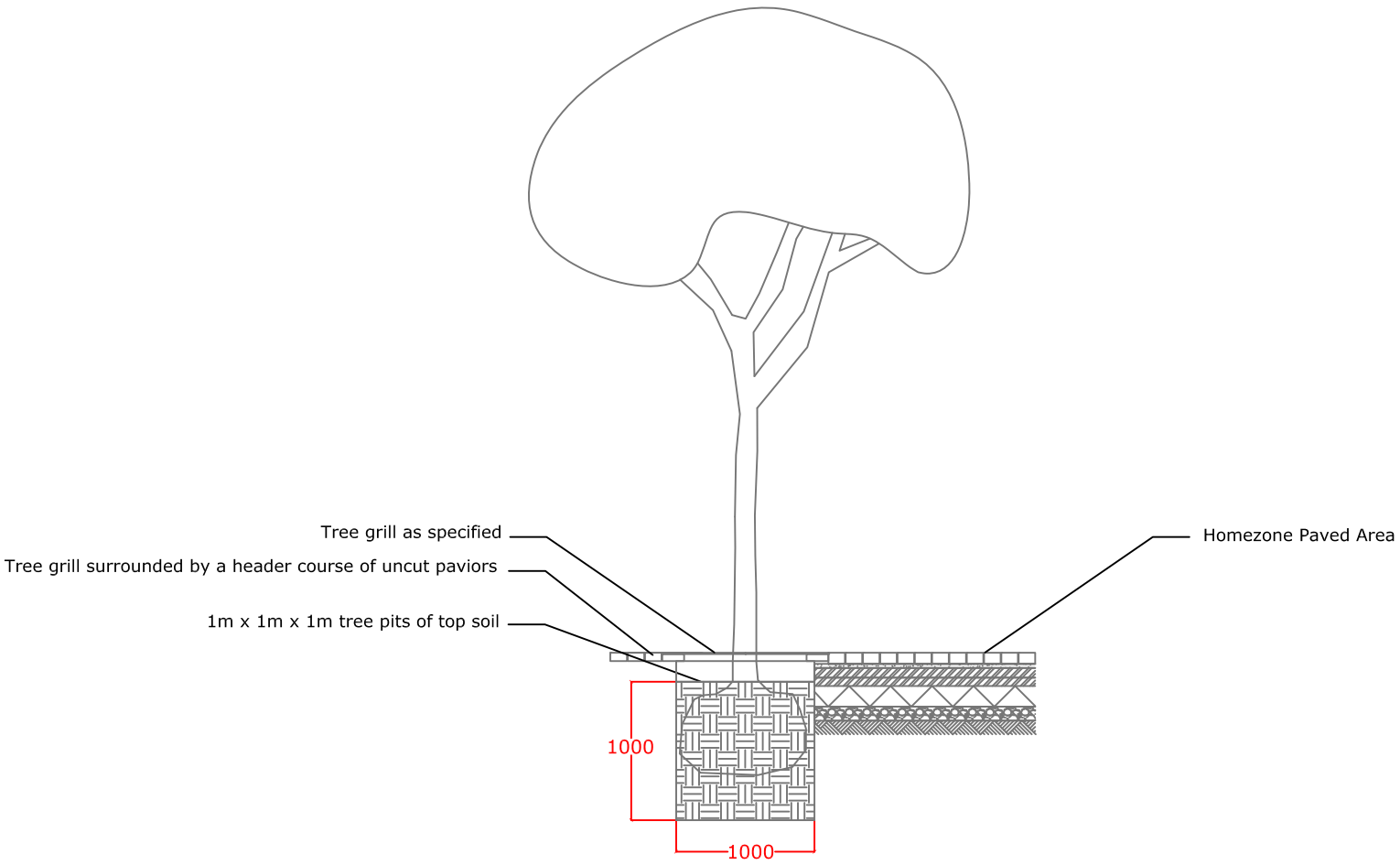
Plan (See section for further detail)
Used in home zones where trees are planted
at regular intervals within a trafficked area

Home Zones
Scale 1:100

Application



Back Streets



Individual Tree Pits with Top Soil (Section)

Individual Tree Pits with Top Soil

Section (See plan for further detail)
Used in home zones where trees are planted at regular intervals within a paved trafficked area.

Home Zones
Scale 1:50