

# Garden City Standards for the 21st Century

A Practical Guide for Active Travel Networks in New Communities

**A practical guide**

**‘I’d love to cycle there!’  
planning for active travel**



Almere Consulting are consultants working across regeneration and sustainable transport. The firm offers a multi-discipline approach examining transport, economics, development viability and land use planning.

The firm is currently working as part of a multidisciplinary team to develop a Locally Led Garden Village in Northumberland.

This guide is written to assist others working on similar projects and to promote better design for active travel across the industry.

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# **‘I’d love to cycle there!’ planning for active travel**

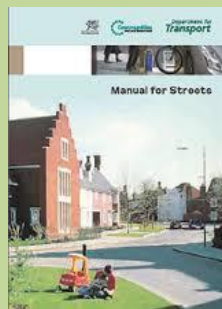
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# An Additional Guide

The TCPA have produced an excellent set of guides intended to help local authorities and promoters “ensure that new large-scale developments become socially and economically successful places – places that will improve over time, and in which people will want to live for generations to come”.

This additional guide has been produced by Almere Consulting to bridge the gap between the TCPA guides, Manual for Streets and current design guidance for walking and cycling endorsed by Department for Transport as defined in the Welsh Active Travel Design Guidance and the London Cycle Design Guidance.



This guide is intended to assist in the design of networks at masterplanning stage, it does not cover the detailed design of walking and cycling infrastructure. Descriptions are provided of types of infrastructure in order to develop understanding of the role that they play in creating a network, practitioners should refer directly to the London and Welsh guidance for design detailing.

The format and appearance of this document deliberately draws on the look and feel of the TCPA guides but represents only the views of the authors and has no official endorsement from the TCPA.

## The Garden City principles

The TCPA define a Garden City as “a holistically planned new settlement that enhances the natural environment and offers high-quality affordable housing and locally accessible work in beautiful, healthy and sociable communities.

The principles are an indivisible and interlocking framework for the delivery of Garden Cities, and include:

- Land value capture for the benefit of the community.
- Strong vision, leadership and community engagement.
- Community ownership of land and long-term stewardship of assets.
- Mixed-tenure homes and housing types that are genuinely affordable.
- A wide range of local jobs in the Garden City within easy commuting distance of homes.
- Beautifully and imaginatively designed homes with gardens, combining the best of town and country to create healthy communities, and including opportunities to grow food.
- Development that enhances the natural environment, providing a comprehensive green infrastructure network and net biodiversity gains, and that uses zero-carbon and energy-positive technology to ensure climate resilience.
- Strong cultural, recreational and shopping facilities in walkable, vibrant, sociable neighbourhoods.
- Integrated and accessible transport systems, with walking, cycling and public transport designed to be the most attractive forms of local transport.”

Further resources from the TCPA can be found at <http://www.tcpa.org.uk/pages/garden-cities.html>

# Summary

Garden Cities are exemplars of sustainable and healthy living, and as such they have to deal with the twin challenges of climate change and inactive lifestyles. It is hard to overemphasise how health and climate change affect every aspect of planning for new and renewed places with high quality active travel networks being key to good design.

The conditions in which people are born, study, work and grow old have a huge impact on public health which is now a statutory responsibility for Councils. Many local authorities are currently exploring how they make use of new opportunities to improve health through the multiple levers available in local government that shape these influences on health. The design of new communities can contribute to positive health outcomes through green spaces, housing, transport and public realm. Improving health and wellbeing is a requirement of the National Planning Policy Framework, good design is key to achieving this.

Transport accounts for around a quarter of UK greenhouse gas emissions and affects air quality at the roadside. The impacts of climate change are happening now. We are seeing an increase in extreme weather events, with knock-on effects on economies and societies. It is now inevitable that the earth will continue to warm, due to inertia in the climate system, and temperatures are very likely to increase by at least 2oC by the end of the century. The date at which global emissions peak and the speed at which they fall thereafter will determine whether the earth will see 2oC, 3oC, 4oC or even 6oC of warming.

This Practical Guide emphasises the need to undertake active travel network design early in the masterplanning process and to treat it as a serious undertaking based on scientific principles.

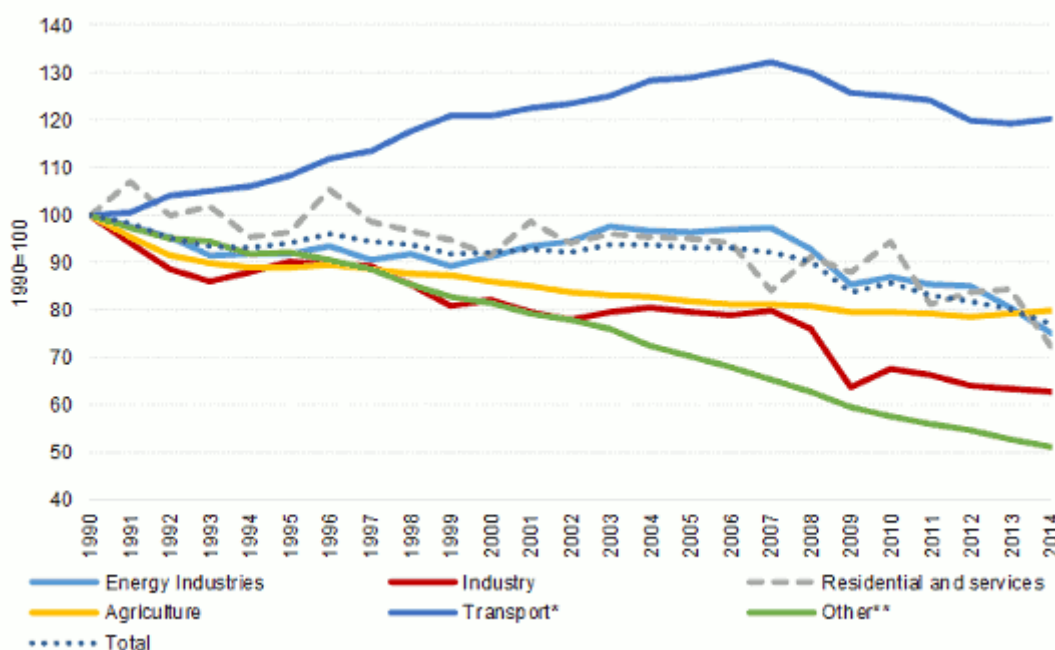
This Practical Guide has three main messages:

- A comprehensive and safe network implies dense provision of high quality walking and cycling infrastructure.
- To ensure that this infrastructure is affordable it must be located carefully and whilst some parts of the network will run through green space, many will not.
- Providing high quality infrastructure on principal streets in a development has implications for street width which must be confronted by designers without resorting to reducing the quality of provision.

# 1 Introduction

Human activities are already influencing the climate, resulting in extreme weather events around the world. In 2014 alone such extreme weather events included tropical cyclones in the Central Pacific, severe rainfall in Europe, drought in East Africa, and heatwaves in Australia, Asia and South America.<sup>1</sup> 2015 saw a high incidence of extreme flood events across the globe, including severe floods in Cumbria and Lancashire in the UK. Global average temperatures are already 1oC higher than in pre-industrial times – and are rising fast. As temperatures rise, so too does the risk of increases in both the frequency and the severity of extreme weather events.

Transport represents almost a quarter of Europe's greenhouse gas emissions and is the main cause of air pollution in cities. The transport sector has not seen the same gradual decline in emissions as other sectors: emissions only started to decrease in 2007 and still remain higher than in 1990 (see graph below<sup>2</sup>). Within this sector, road transport is by far the biggest emitter accounting for more than 70% of all GHG emissions from transport in 2014.



Almost two-thirds of adults and one-third of children in England are either overweight or obese; there is a similar picture across the UK. Obesity is a major risk factor for a number of diseases, such as type 2 diabetes, cancer and heart disease. It also can

<sup>1</sup> Explaining extreme events of 2014'. Webpage. National Centers for Environmental Information, National Oceanic and Atmospheric Administration, Department of Commerce, US Government.  
<https://www.ncdc.noaa.gov/news/explaining-extreme-events-2014>

<sup>2</sup> Reducing Emissions from Transport – European Commission  
[http://ec.europa.eu/clima/policies/transport/index\\_en.htm](http://ec.europa.eu/clima/policies/transport/index_en.htm)

affect people's self-esteem and their underlying mental health. Reducing obesity, especially for children, is a priority for Public Health England (PHE) and health agencies across the UK. The causes of rapid increases in the levels of obesity are complex, and the influence of the environment where people live is one of the factors.

Obesity has been described as a 'normal response by normal people to an abnormal environment'<sup>3</sup>. The physical environment influences how easy or difficult it is to maintain a healthy weight.

Specifically, a healthy-weight environment promotes physical activity of all sorts and ensures that sustainable transport and active travel is built into everyone's daily life.<sup>4</sup> It helps people to access and choose healthier goods and services that support them in choosing a balanced diet, leading an active lifestyle and maintaining a healthy weight.

The TCPA's "planning healthy-weight environments" suggests the following requirements in designing for active travel:

- Clearly signposted street network with destinations within 400-800 metres (5-10 minutes' walk).
- Streets are connected to a coherent wider network designed to facilitate walking, including to public transport stops.
- Streets and the public realm are safe and accessible for all ages, and levels of disabilities.
- Well-designed buildings overlook the streets without compromising home privacy and security.
- **Walking & Cycling are prioritised** over private car use, and the speed of vehicles is managed.
- **Direct, convenient, legible and safe cycling network design.**
- Appropriate segregation or shared surfaces between cyclists, pedestrians and vehicle traffic.
- Streets/cycle paths are connected to coherent wider networks.

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<sup>3</sup> 'Urgently needed: a framework convention for obesity control'. The Lancet, 2011, Vol. 378 (9,793), p. 741.  
<http://www.thelancet.com/journals/lancet/article/PIIS0140-6736%2811%2961356-1/fulltext>

<sup>4</sup> Everybody Active, Every Day: An Evidence-Based Approach to Physical Activity. Public Health England, 2014.  
<https://www.gov.uk/government/publications/everybody-active-every-day-a-framework-to-embed-physical-activity-intodaily-life>

## 1.1 The Garden City Opportunity

Garden Cities and Garden Suburbs have a history of challenging orthodoxy in street design and have led to lasting change.

When Unwin and Parker designed Hampstead Garden Suburb they overturned bye-laws which had encouraged overly wide roads and developed a new street hierarchy based on accommodation roads and residential streets.

There is potential for the new wave of Garden Cities, Towns and Villages to move forward best practice and challenge accepted practices in designing for active travel. Garden Cities have the potential to restore the connection between design for active travel in new developments and current best practice (for both detail & network planning).

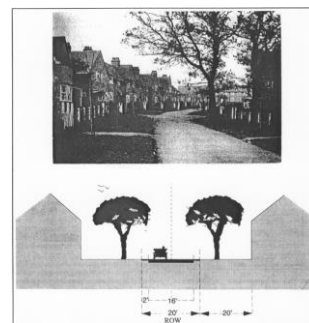


FIGURE 4. Hampstead Garden Suburb, residential street (Berry Parker & Regional Units, Architects, 1929)

New Garden Villages, Towns and Cities must be beacons of best practice – creating communities that are environmentally, socially and economically sound. They should be exemplar developments in terms of effective approaches to the creating direct, convenient, legible and safe walking and cycling network design.

## 1.2 Lessons from the New Towns

The UK's New Towns constructed during the second half of the 20<sup>th</sup> Century in many cases attempted to provide a segregated walking and cycling network. These networks have performed poorly. Key problems include:

- Providing a network density half that required.
- Terminating routes at the edge of the town centre rather than allowing movement through for all active modes.
- Attempting to construct networks entirely comprised of traffic free paths away from the carriageway, leaving the principal streets hostile to walking and cycling.

## 1.3 About this Practical Guide

This Practical Guide outlines what convenient, legible and safe walking & cycling network design means in practice. It sets out principles for developing an active travel strategy for a Garden City. It is intended not just for developers and planners, but also for those who will manage the new settlements and work with the new communities.



This guide is not intended as a detailed engineering guide, but instead concentrates on aspects of network design which must be considered at masterplanning stage.

## 2 Policy Context

### 2.1 2011 Transport White Paper

The Government's vision for a sustainable local transport system is set out in the January 2011 Transport White Paper: "Creating Growth, Cutting Carbon – Making Sustainable local Transport Happen." The White Paper acknowledges that transport provision is essential for economic growth if the Government is to improve the economic deficit which it is currently facing. The Paper also recognises however, that the current levels of carbon emissions from transport cannot be sustained if the nation is to meet its national commitments on climate change as well as creating a safer and cleaner environment in which to live. With this in mind, the Government highlights sustainable transport solutions as a means by which the economy can grow which will also see a positive impact on the local environment.

The Local Transport White Paper states that the Government's vision is for: "A transport system that is an engine for economic growth but one that is also greener and safer and improves quality of life in our communities. By improving the links that move goods and people around, and by targeting investment in new projects that promote green growth, we can help to build the balanced, dynamic low carbon economy that is essential for our future prosperity"

### 2.2 The National Planning Policy Framework

The National Planning Policy Framework (NPPF) has recently superseded the Planning Policy Guidelines that governed national policy and principles relating to specific aspects of the town planning framework. In replacing the previous guidance notes and remaining a material consideration in planning applications; the NPPF provides a framework for local communities and Authorities to develop relevant local development plans and strategies.

The NPPF has two key themes:

- Providing a greater level of integration and simplification of the planning policies governing new development nationally;
- Contribute to the achievement of sustainable development from an economic, social and environmental perspective.

One of the key changes relating to the NPPF is the new presumption in favour of sustainable development, which should be reflected in local development plans and frameworks to ensure that sustainable development and the needs of an area are identified and subsequently approved without delay.

The NPPF is based on a range of core planning principles, which are aimed at supporting the focus on sustainable plan-led development. Many of these core principles also formed part of the previous planning guidance notes, such as supporting mixed use developments, encouraging effective re-use of brownfield land and managing patterns of growth.

Transport specific policies play a key role in supporting and achieving the core planning principles and are intrinsically linked to the objective of sustainable development.

The NPPF seeks to encourage solutions to support reductions in gas emissions and reducing congestion which should be enshrined in Local Plans, the key Transport messages include:

- "...facilitating development but also contributing to wider sustainability ..."
- "The transport system needs to be balanced in favour of sustainable transport modes, giving people a real choice about how they travel".
- Provision of viable infrastructure to support sustainable development "the planning system should therefore support a pattern of development which, where reasonable to do so, facilitates the use of sustainable modes of transport".
- Supporting key interchange facilities;
- Provide a balanced land-use approach encouraging mixed use development which reduce the need to travel; and
- Create attractive town centre environments which are supported by appropriate car parking charging mechanisms.

The key public health messages include:

- "Take account of and support local strategies to improve health, social and cultural wellbeing for all"
- Developments should be located and designed where practical to give priority to pedestrian and cycle movements.... minimise conflicts between traffic and cyclists
- or pedestrians and establishing home zones"
- "Achieve places which promote opportunities for meetings between members of the community .....strong neighbourhood centres and active street frontages"

The core planning principles above provide a framework to provide inclusive, accessible, well connected and sustainable development.

## **2.3 Healthy Lives, Healthy People 2011**

Relevant strategies from the Department of Health can and should be referenced as part of the planning process. Healthy Lives, Healthy People is the public health strategy for England published as a command paper in 2011. Although it does not set out detailed policies, it can be material consideration and taken into account in Local Plan preparation and/or comments on planning applications. It references the role of Health and Wellbeing Boards in taking into account local strategies including local planning policies.

## **2.4 Cycling and Walking Investment Strategy**

In March 2016 Government set out its vision that by 2040, walking and cycling should be a normal part of everyday life, and the natural choice for shorter journeys such as going to school, college or work, travelling to the station, and for simple enjoyment.

Key messages include:

- We want everyone in the country to have access to safe, attractive routes for cycling and walking.
- We want to make cycling and walking the natural choice for shorter journeys, or as part of a longer journey

## **2.5 Working within the policy environment**

The NPPF makes it clear that sustainable development should not be refused planning consent on Transport grounds except under exceptional circumstances. Sites must be allowed to be developed in a manner consistent with viability.

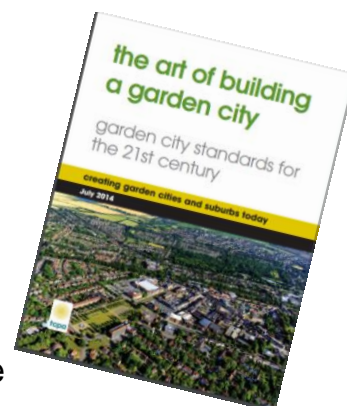
Garden Cities, Towns and Villages offer potentially more funding for infrastructure than might usually be the case from residential development. However, walking and cycling infrastructure must still be designed cost effectively if solutions from Garden Communities are to offer an exemplar of good design that can be applied across the industry.

Garden Cities, Towns and Villages have the potential to lead the way in using design to implement new ways of living and cater for much higher levels of walking and cycling.

## 3 Objectives

The TCPA's "the art of building a garden city" describes three key features of a Garden City:

- "Development that enhances the natural environment, providing a comprehensive green infrastructure network
- Strong cultural, recreational and shopping facilities in walkable, vibrant, sociable neighbourhoods.
- Integrated and accessible transport systems, with walking, cycling and public transport designed to be the most attractive forms of local transport."



"It is essential to ensure that neighbourhoods in new Garden Cities are walkable, offer easy access to a **safe and comprehensive cycle network**, and are also linked into an affordable, low-carbon public transport network for the Garden City and beyond.....Walking, cycling and low-carbon public transport should be the most convenient and affordable modes of transport in new Garden Cities. Design should allow for a comprehensive and safe network of footpaths and cycleways throughout the Garden City, with public transport nodes and neighbourhood facilities within a short walking distance (not more than 10 minutes) of all homes to reduce reliance on private cars. To promote healthy lifestyles for children, there should be a maximum walking distance of 800 metres from homes to the nearest school for children aged under 11".

### 3.1 What is a comprehensive network?

**A network is a 250 metre grid of routes optimised for walking & cycling**

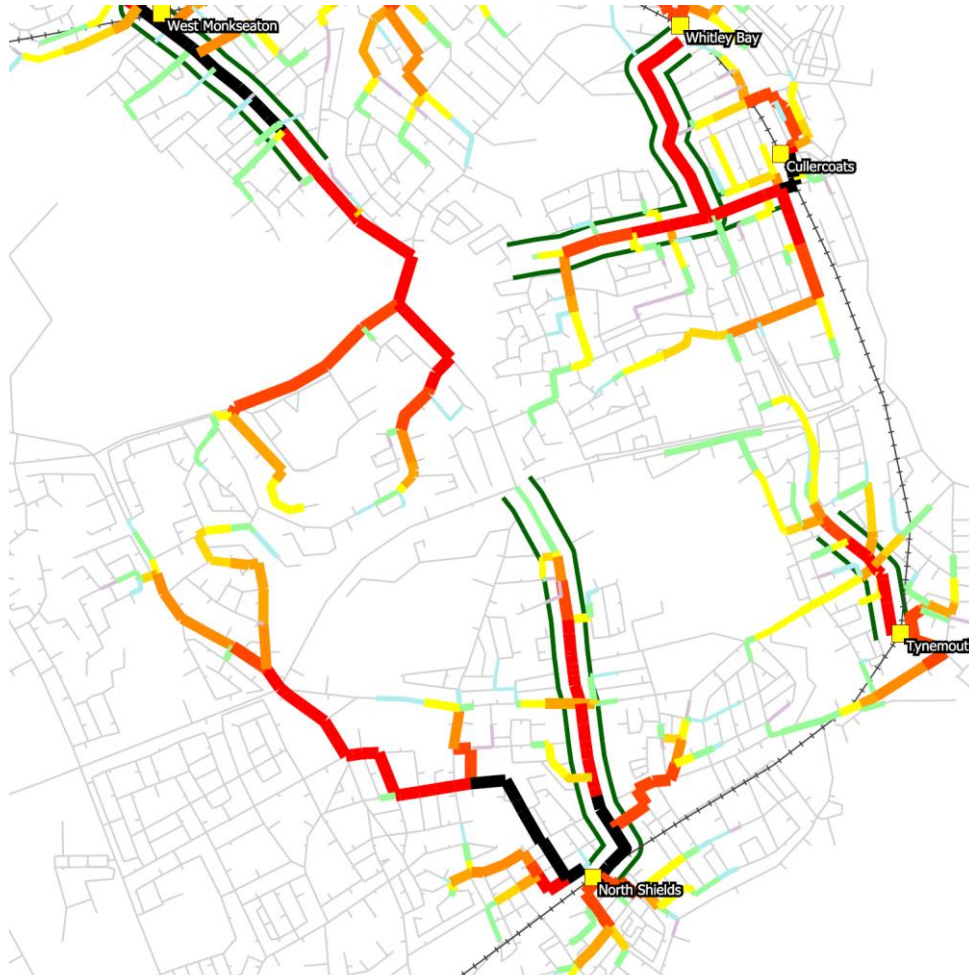
By this we mean a grid of paths and streets where surfacing, directness, legibility, & junction design are optimised for safe and efficient active travel.

A network is **not** "the **only** routes suitable for active travel", the existence of a network does not excuse the creation of unwalkable or uncyclable streets within or nearby a development.

A network runs through the middle of areas where people live, work and play. It is vital that network grid sections run through the centre of housing cells, not around the outside.



When we build local networks associated with a development or destinations where people live and need to travel, these local networks will naturally combine to form District Networks. The grid sections that will be used most heavily are those that connect to bridges across natural and man-made barriers such as rivers and rail lines.



*Figure 1 Network Plan – North Tyneside Towns, Villages & Light Rail Network (Sustrans)*

The Sustrans network analysis above looks at which routes are likely to be heavily utilised using a weighted score based on population and propensity to cycle. Routes running through the centre of neighbourhoods score highly whilst river and seafront routes score poorly even though these have traditionally been a focus for network development.

The 250 metre mesh density is specified in the Welsh Active Travel Design Guidance endorsed by the Department for Transport. Although there are other sophisticated ways to look at mesh density suggested by the CIHT Guide Planning for Cycling and the London Cycle Design Guide, for a new settlement a fixed network mesh is a more appropriate design tool.

The 250 metre mesh is specified for cycling networks and reflects a key objective that no resident should live more than 125 metres from the cycle network. These routes because of their qualities of directness and cohesiveness will also be attractive to pedestrians and should be designed for high levels of both walking and cycling.

The way that the grid is laid out is key to ensuring that it is affordable across a range of local housing markets. Running grid sections through the middle of neighbourhoods can imply building a shorter network comprised of higher capacity sections and more extensive use of cycle streets.

The network grid will be comprised of the following components, each of which makes up approximately 1/3 of the network:



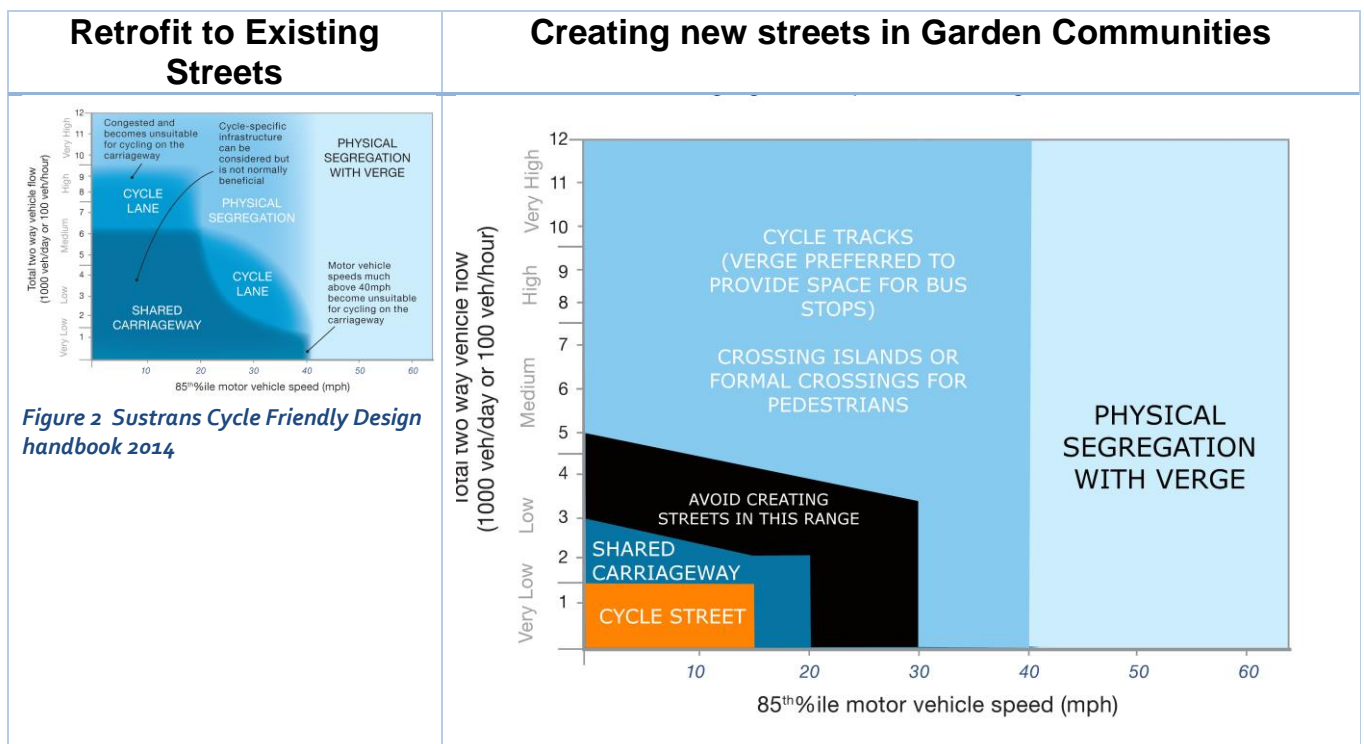
### 3.2 What is a safe network?

When retrofitting cycling infrastructure to existing streets practitioners typically use a matrix of motor traffic speed and volume such as that provided by Sustrans below. It is important to note that this methodology is designed to prioritise infrastructure spending in an often tight financial climate.

Perceptions of safety are important, with concerns over the traffic environment being consistently cited as a barrier to higher levels of walking and cycling. Infrastructure must also be socially safe with good lighting and natural surveillance.

In a new residential development it is unlikely that sufficient car parking enforcement would be in place to allow effective operation of cycle lanes. Creating streets that carry several thousand vehicles a day without cycling infrastructure is far from ideal.

It is important to note that this level of provision will only be possible with careful design to limit the number of streets within a development that carry heavy traffic.



### 3.3 What is an attractive Network

The excellent “Making Space for Cycling” by user campaign group Cyclenation sets out ten principles, which are often echoed by user groups representing pedestrians.

- **People need space for cycling** - mixing with traffic puts people off cycling, especially children.
- **People like simple, direct routes** - maintains momentum, and routes are shorter and wayfinding is easier.
- **People prefer cycling away from pedestrians** - shared-use pavements alongside roads benefit nobody. Such pavements are inconvenient, slow, and misappropriate space from pedestrians.

- **People want to maintain momentum** - stop-start cycling is very hard work. Cycle infrastructure should never involve 90° angle turns but instead should aim towards smoothness of movement. Cycle tracks along a road must not give way at every side road or driveway.
- **People want to be visible** - cycle infrastructure should be designed to allow people see each other regardless of what type of vehicle they are using.
- **People like level surfaces** – a route with constantly varying heights requires more effort to ride on and is less comfortable. At driveways and junctions the cycleway should not change height.
- **People want unobstructed routes** - Obstructions of any kind make cycling much more difficult, especially for those with disabilities, or using tricycles or trailers.
- **People want to cycle away from parked cars** - Car parking must be off-street rather than obstructing the carriageway. Parked cars result in dangerous manoeuvres.
- **People need somewhere to park their bike** - good quality cycle parking is essential for the start and end of a journey. This means providing secure stands near the entrance to a building and on-street.
- **People want well-maintained infrastructure** - cycle tracks should be laid to the same quality as streets designed to facilitate easy maintenance, to avoid overgrowing vegetation and enable winter treatment.

### 3.4 Common pitfalls




- Assuming every street is fit for walking & cycling, when user experiences can be poor.
- Offering single landmark traffic free path that spends the budget without delivering a comprehensive network
- Using vague terminology, “routes”, “paths”, “network” interchangeably
- Green corridors – often routes for wildlife & dog walking are confused with key routes for active travel
- Quality & detailing on principal streets can often fail to reflect best practice.
- Inappropriate use of “shared use” walking and cycling paths along an active frontage
- Failing to allow enough space to design junctions in a way that prioritises walking and cycling



## 4 Principles for success

### 4.1 Network Components

The network is made up of three core types of walking and cycling infrastructure. In a well designed active travel environment these components will often each make up one third of the network.

Component	Proportion of network (indicative)	
<b>Cycle Tracks &amp; Footways</b>  Next to (or considered part of) the carriageway.	1/3	
<b>Cycle Paths &amp; Foot Paths</b>  Away from the carriageway (Parks, green space, traffic free connectors)	1/3	
<b>Cycle Streets &amp; Footways (or Quietways)</b>  Low motor traffic, designed as legible routes optimised for walking & cycling.	1/3	



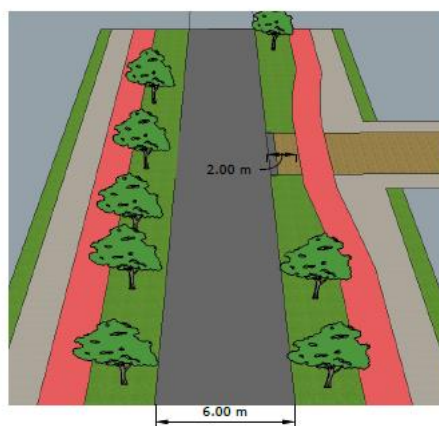
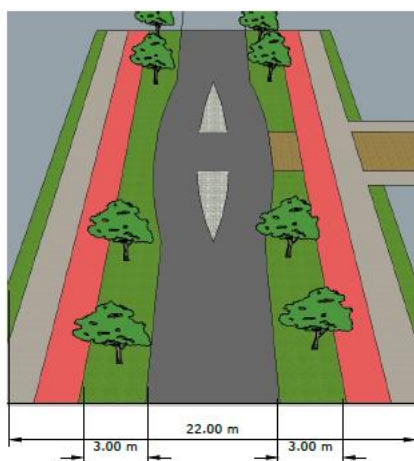
## 4.2 Main Street

The Main or Principal Streets in a development are those that carry higher volume of motor traffic and in most cases provide a bus route or routes through a residential development. Main Street should be designed with Cycle Tracks & Footways on both sides of the carriageway.

- Segregated space for walking and cycling often takes more width than that for buses and cars.
- Provide for cycling on both sides (mix of 2 Way & Unidirectional depending on desire lines)
- Adding green space &/or SUDS will result in a street over 20 metres wide
- Although a verge is not required for 30mph streets, a multifunctional verge or flexible strip can be necessary in order to accommodate car parking and bus stops.

The width and the cost of constructing streets of this type means that they have to be used frugally within a Garden City, Town or Village.

There are significant implications for car & bus networks, if too many of these streets are included in a development designers will find that costs mount and segregated infrastructure competes with SUDS for space within the development.



Main Street as a 22 metre Boulevard, running from the gateway of the development with first two housing cells either side.

Two way street with three metre wide landscaping (SUDS + Large Trees) and one metre secondary landscaping.

2 metre footways and unidirectional cycleways.



Figure 3 Example Main Street profile, 22 metres wide, unidirectional cycle tracks

### 4.3 “Secondary” Streets

Conventional masterplanning practice dating to before the introduction of Manual for Streets uses Secondary Streets as part of a hierarchical street pattern to deliver motor traffic from primary streets into cul-de-sacs and tertiary streets.

If designers follow Manual for Streets this category of street is unlikely to be required. Higher traffic residential streets can cause particular problems in designing for active travel. For streets carrying motor traffic in the range 2,000 to 4,000 vehicles:

- There is almost no comfortable design solution for cycling that does not result in “over engineering”.
- Crossing the road becomes uncomfortable for pedestrians
- Junctions with Main Street are problematic

### 4.4 Cycle Streets

A cycle street is a road so designed that cyclists dominate visually and motorized traffic is tolerated as a guest. They look like street-wide cycle track on which motorized traffic is allowed. Legally, a cycle street is a mixed traffic road.<sup>5</sup>

Cycle Streets are an essential tool in delivering a network that runs into the heart of housing estates cost effectively. Their use allows a complete high capacity active travel network whilst still being able to lay out an estate efficiently and provide residents with the ability to store a motor vehicle close to each dwelling.

Cycle Streets require footways and parking bays, so are more expensive than private shared drives / courts but comparable in cost to a conventional tertiary street. A complex set of design requirements means that more design time and specialist engineering expertise is required that will result in higher design costs.

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<sup>5</sup> Presto Fact Sheet: Cycle Streets [https://ec.europa.eu/energy/intelligent/.../sites/.../presto\\_fact\\_sheet\\_cycle\\_streets\\_en.pdf](https://ec.europa.eu/energy/intelligent/.../sites/.../presto_fact_sheet_cycle_streets_en.pdf)



Figure 4 Cycle Street (Fietsberaad)

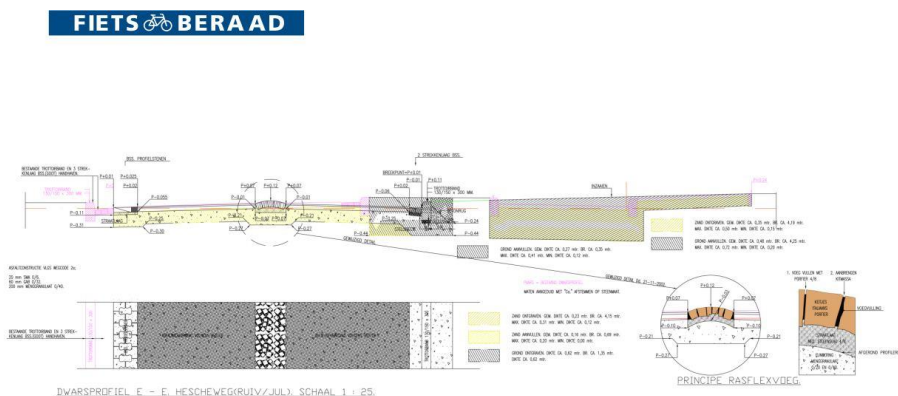


Figure 5 Cycle Street Construction Details (Fietsberaad)

It is important that designers are aware that not every tertiary street in a development can or should be a Cycle Street. A Cycle Street is not a home zone, being designed for movement, albeit walking and cycling.

## 4.5 Traffic Free

Traffic free paths should be designed as “streets” with the same attention to detail and relationship to surrounding buildings as for a street carrying motor traffic.

- In an urban context traffic free paths will offer over 4 metres of usable width, they can have a significant impact on landscape & housing layout.
- Lighting columns are required along with winter maintenance to ensure paths are usable at all times of the day and year.
- Traffic free paths are best used as short sections / links.
- Paths through parks and green space will attract users, but not every green space can or should accommodate a route for movement.

- Wide well-lit urban paths are expensive – if designers rely too heavily on this single type of infrastructure, network density & quality may suffer

## 4.6 Shared Use

The decision on whether it is appropriate to mix pedestrians and cycles on paths or tracks depends on a number of factors including the number of users and the context. The existing highway network provides many examples of shared arrangements that are less than ideal.

**It is never appropriate to mix pedestrians and cycles along an active frontage within a new development.**

A shared use path is two-way for cycling, which requires more space at junctions than a unidirectional track. A shared use path that gives way at minor roads offers a poor user experience and should not form part of a Garden Village active travel network.

In town centres it may be appropriate to run a secondary cycle route through an area with very high pedestrian footfall. In this situation areas along the frontage of buildings should be kept for pedestrians only. A central delineated area or “shared space” may be defined where cycles and sometimes some motor traffic are allowed within a pedestrian priority zone.



*Figure 6 Pedestrian Priority Area, with cycling and delivery vehicles in a central delineated zone, Newcastle*



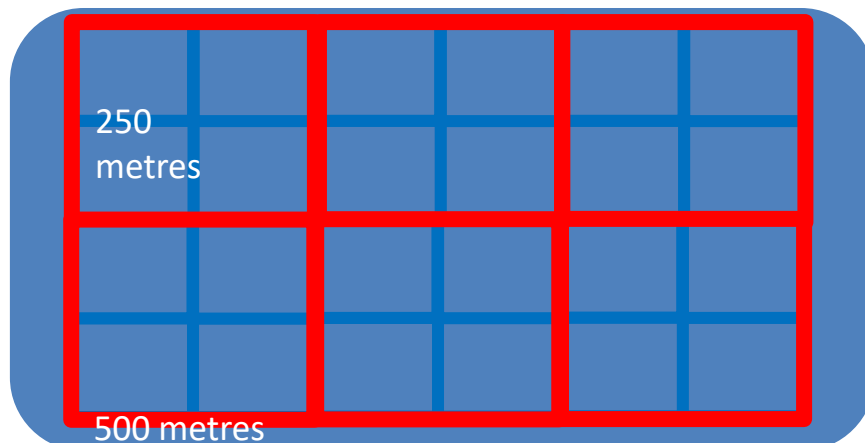
Away from buildings a sensible approach is provide more than the minimum width first, and then take decisions on how to share. In areas where user types fluctuate at different times of the day a single flush surface with indicative changes in surface materials can be a good solution to maximise capacity but reduce conflict.



Figure 7 Path near a secondary school, single surface with indicative change in materials (Sustrans)

## 4.7 The Grid

Continental network design practice takes the concept of a 250 metre grid and further subdivides this into primary and secondary routes. Primary routes are spaced at 500 metre intervals.

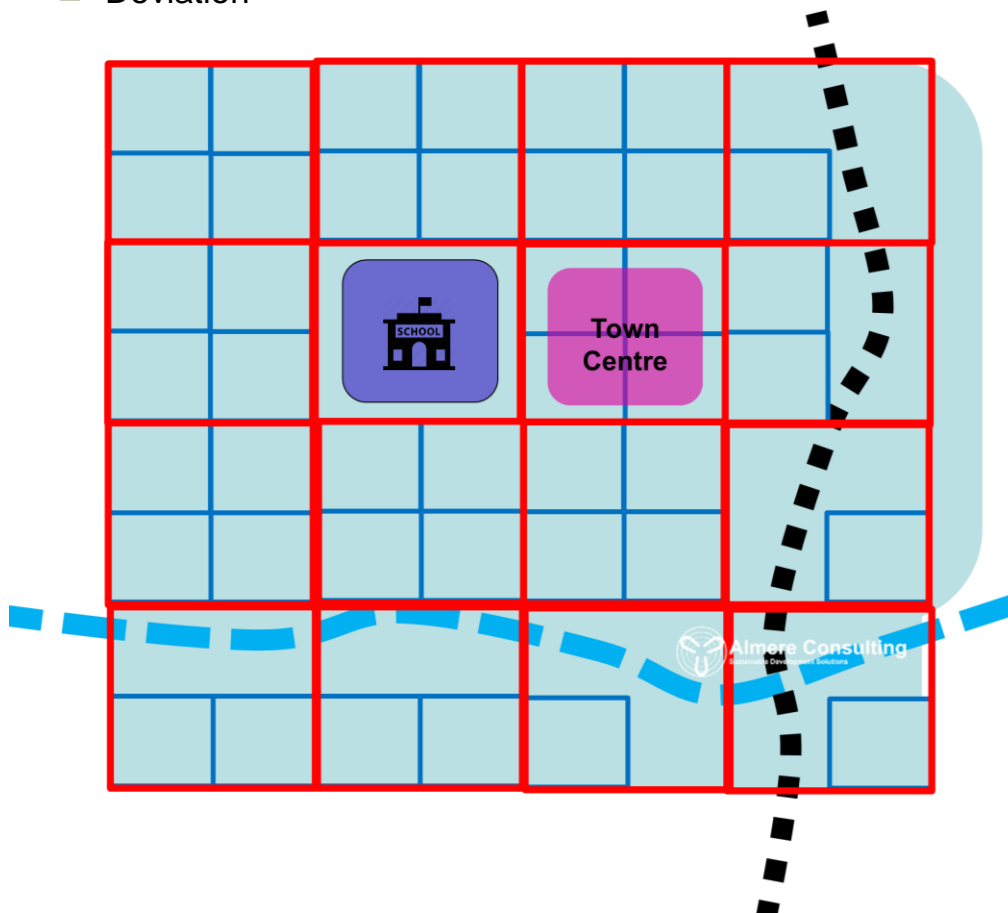




This concept should be used with care, primary and secondary routes should have uniform quality. In some cases a secondary route connecting into a key destination such as a rail station might be wider than it's adjacent primary route.

Where the concept of primary and secondary routes becomes useful is when considering:

- Natural & man made barriers
- Deviation



Primary routes must cross barriers but will avoid impermeable uses such as schools, ideally they will pass either side or through the fringe of a town centre, with secondary routes passing through.

#### 4.8 Deviation Factor (Welsh Guidance)

Deviation should be tested for Primary Routes to key destinations. To allow for deviation outside a development, primary routes within often need to be very, very direct.

Factor	Design Principle	Indicators	Critical	0 (Red)	1 (Amber)	2 (Green)
Distance	Routes should follow the shortest option available and be as near to the 'as-the-crow-flies' distance as possible.	Deviation of route		Deviation factor against straight line or shortest road alternative <20%	Deviation factor against straight line or shortest road alternative 20 - 40%	Deviation factor against straight line or shortest road alternative >40%

Figure 8 Welsh Active Travel Act - Guidance

Secondary routes can follow landscape features & drainage patterns, primary routes sometimes can't. The Grid does not need to have a regular shape or pattern.

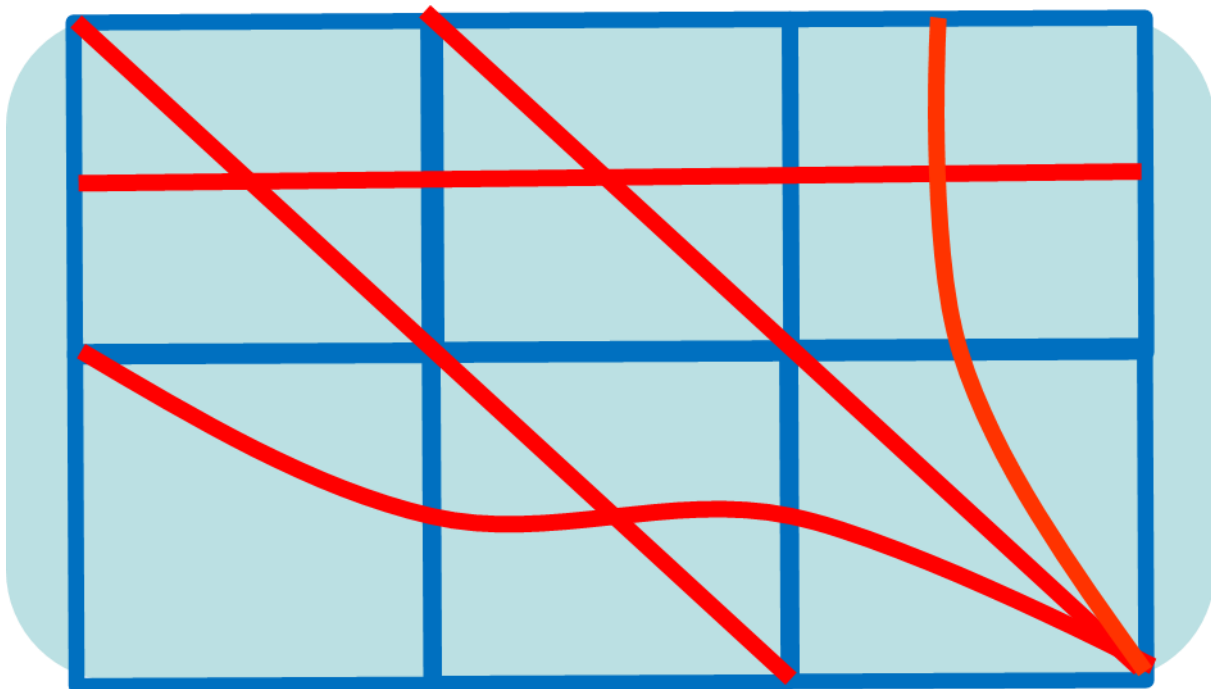
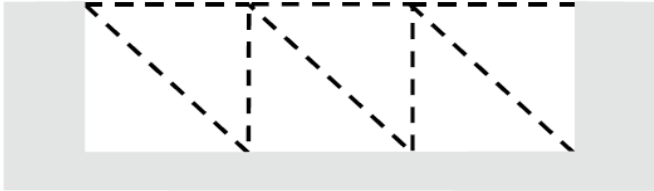


Figure 9 irregular grid, primary routes aimed at key trip generators, secondary routes following landscape

## 4.9 Implications for Street Widths

Following MfS makes life easier in designing a network, but sometimes harder in getting the detail right. There are design challenges associated with:

- Side Roads
- Frontage Access
- Street Widths



1:3 ratio is generally effective.

Figure 10 Height to width guidance, MfS

Providing for walking and cycling within principal streets can present challenges in ensuring a good building height to width ratio.

Sustainable Urban Drainage systems can compete for width with Sustainable Transport Infrastructure.

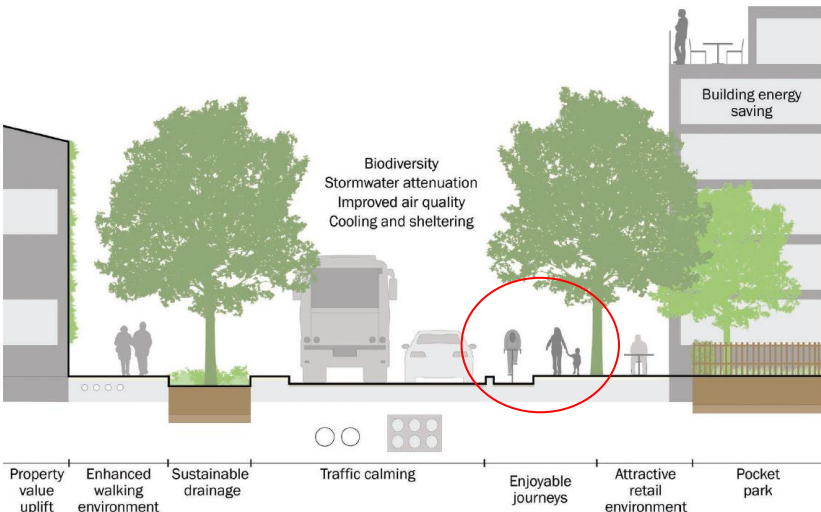
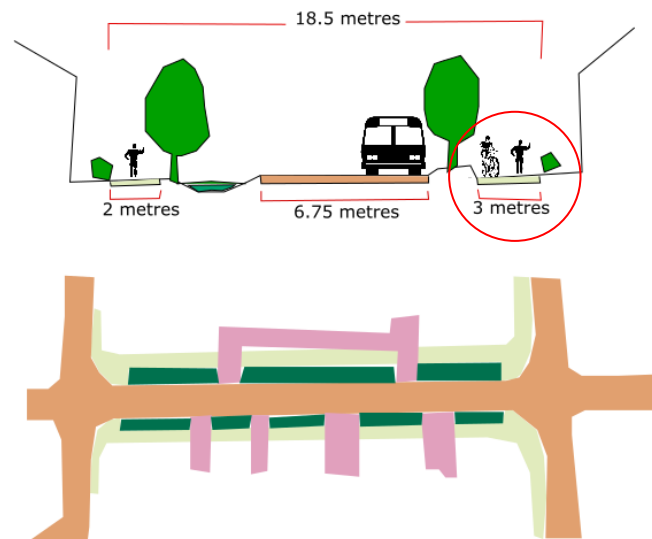


Figure 19.1 How trees can enhance an urban street (after TDAG, 2014)

Figure 11 Example Street Profile with insufficient width for walking and cycling CIRIA

Attempting to create a principal street less than 20 metres wide with SUDS taking up some of the street width can leave designers tempted to relegate cycling to a shared use arrangement.



*Figure 12 Example profile which uses an unworkable solution for walking and cycling, sharing a path across an active frontage with inadequate space to deal with side roads*

Designers must recognise that there will not always be width in the street to provide everything that they might want to see. However, compromising on the design quality for active travel should not be an option.

With a street pattern based on Manual for Streets principles, shared use paths will not be appropriate. Designers will need to confront the technical challenges of building cycle tracks with priority over minor roads and accesses in a complex urban environment.

Main Street will need sufficient width to provide high quality facilities for walking and cycling, this may imply a narrower main carriageway.

## 4.10 Transit Integration

Multi-mode commuting offers established potential for walking and cycling to form part of longer trips as an alternative to car use. Designers should keep in mind that the distances that residents will walk or cycle to a transport hub for a multi-modal trip are much less than would be applicable for a single mode trip.

Typically for commuting trips using light rail users will walk up to 400 metres from home to access a Transit Stop or Station. Use begins to decline at around 300 metres with only smaller numbers of residents being prepared to walk to the service beyond this distance.

Cycling is a popular method of accessing Transit across Northern Europe. When high quality bicycle parking facilities are provided at Transit Stops residents will cycle in significant numbers. For masterplanning designers should assume that cycle-rail commuting is viable for distances out to 1.2 km after which usage will decline as multi-mode commuting becomes less efficient.

#### 4.11 The role of a Community Trust

Garden Communities differ from conventional housing estates in that it is envisaged that a Community Trust will be endowed with assets created by the development and take on some aspects of ongoing management.

It is common practice for residential travel plans to assume that responsibility for administering the plan will pass to the community within 3-5 years for initiation. A community trust may provide a much more robust long term vehicle for continuing the travel plan.

It is also possible that a community trust might take on the maintenance of some paths and streets within a development. Winter maintenance is particularly important for traffic free walking and cycling infrastructure. In establishing a long term maintenance regime for the Garden Village consideration should be given to equipping the community trust with plant for winter maintenance to allow it to maintain active travel as a viable option twelve months of the year.



*Figure 13 Winter maintenance plant - Cambridge Guided Busway*

#### 4.12 Leadership & Governance

Delivering a high active travel mode share Garden City will require strong political leadership, embedded in the corporate strategy of the chosen delivery vehicle. TCPA Practical Guide 2 sets out how these wider principles might work in relation to different methods of delivery. The delivery team leading the development of the Garden City will need to be prepared to set out the moral and the scientific case for why

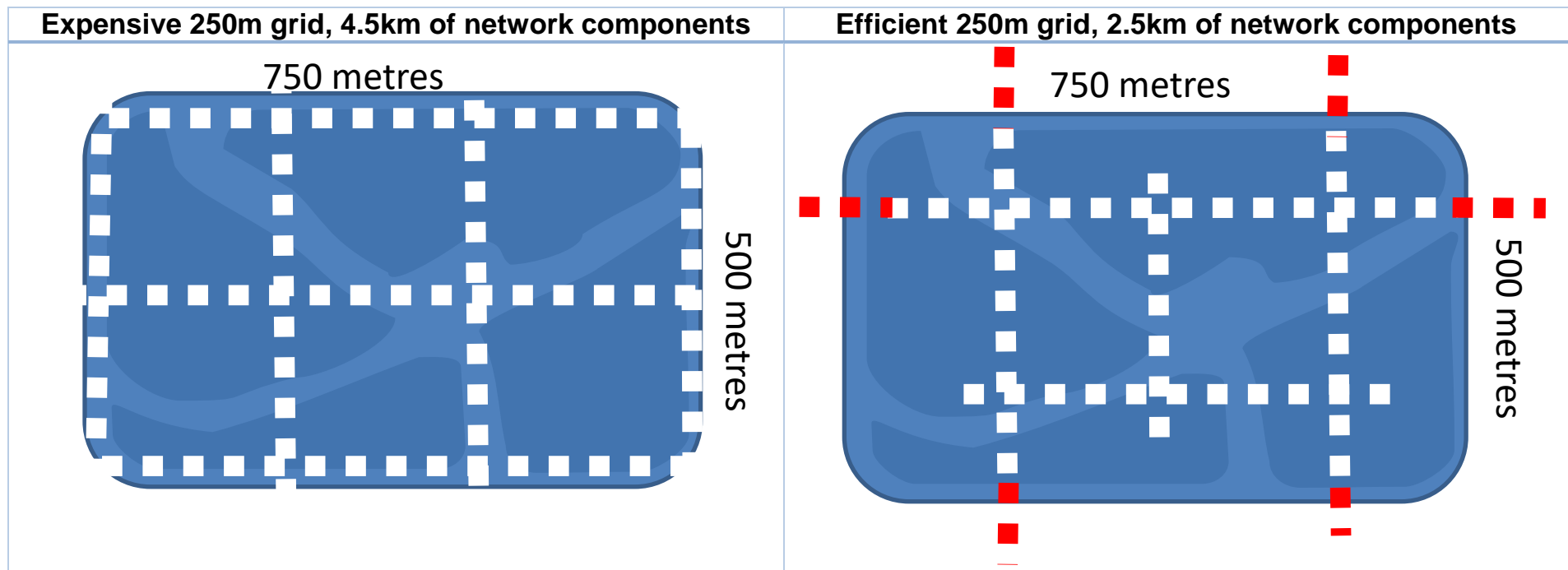


development must be engineered to prioritise walking and cycling. A strong communication strategy is vital in building public understanding and enthusiasm for new ways of living.

## 5 The theoretical 40 Ha Neighbourhood

Consider a theoretical dense suburban development constructed over 40 Hectares, with schools external to the site, providing 1200 dwellings. The development could be expected to generate around 6,500 car trips per day.

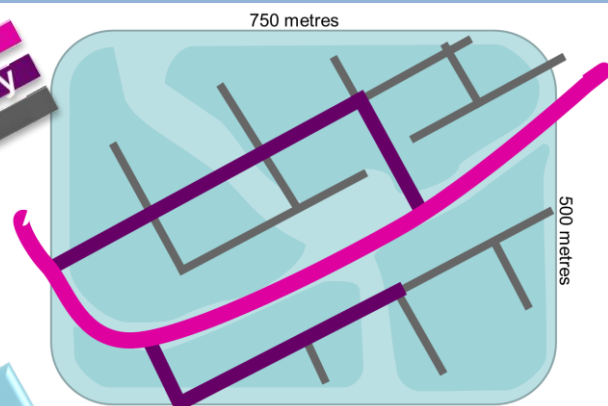
Locating walking and cycling routes at the edge of development is significantly less efficient in creating a 250 metre grid. Although building through the heart of housing cells may be more expensive per linear metre, the length of network needed can be nearly half that for a network which skirts the fringes of development. The more efficient network shown delivers access to the network within 125 metres of all dwellings, connecting to primary routes outside the development.



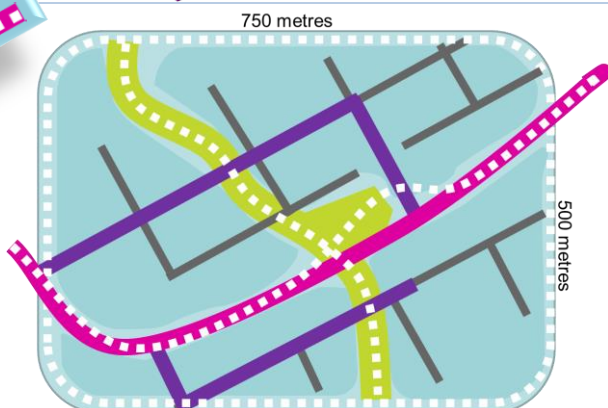
The type of street pattern that a network must be constructed alongside and through is a key factor influencing design. The three illustrations below demonstrate the problems caused by a hierarchical cul-de-sac based street pattern. In situations where a permeable Manual for Streets layout is not possible then Dutch suburban network patterns offer a good solution.

## Pre-MfS Cul-de-sac Development

Primary  
Secondary  
Tertiary



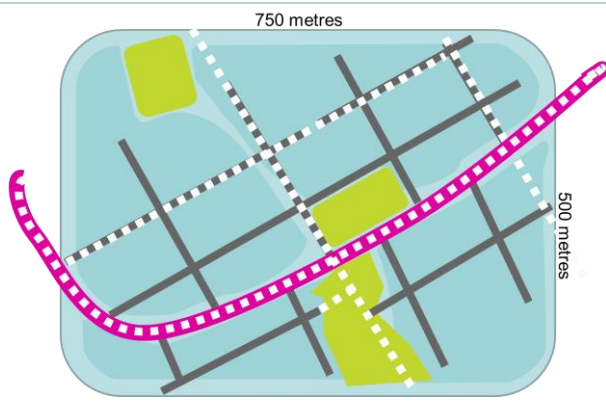
With Cycling



- Expensive traffic free paths at perimeter
- Sections of Primary Street left untreated
- Secondary Roads hostile
- Network density too low



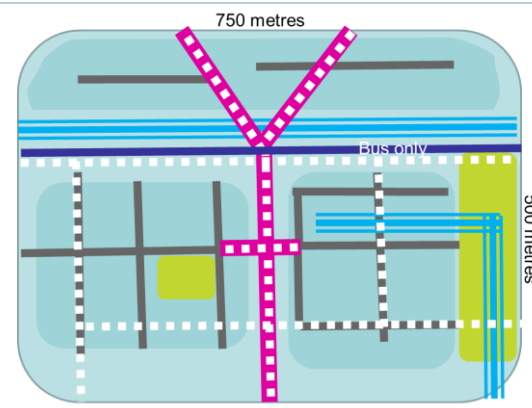
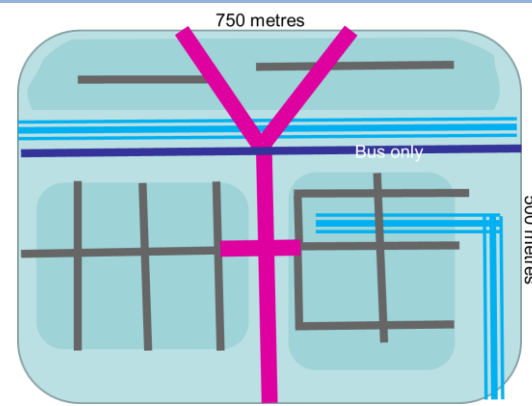
## MfS inspired filtered grid



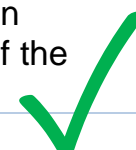
- Only one street carries > 1,000 vehicles per day
- Easy & Cost Effective (If you use Cycle Streets)



## Dutch Suburban



- If you can't use a more permeable street pattern then can be a good approach.
- More use of cycle tracks next to primary streets, offset by fewer traffic free paths.
- Cycle Streets remain approximately 1/3 of the network.



## 6 Case Study: Dissington Garden Village

Case Study to follow, September 2016:

Dissington Garden Village is an evolving masterplan for a 1,800 dwelling Garden Village located North West of Ponteland, Northumberland.

*Figure 14 Main Street*

*Figure 15 Cycle Street*

## 7 Sources of further information

- Advisory Team for Large Applications (ATLAS)  
<http://www.atlasplanning.com/page/index.cfm>
- Welsh Active Travel Design Guidance  
<http://gov.wales/docs/det/publications/141209-active-travel-design-guidance-en.pdf>
- Sustrans <http://www.sustrans.org.uk>
- TfL – International Best Practice Infrastructure Study  
<https://tfl.gov.uk/corporate/publications-and-reports/cycling>
- Cyclenation Cycling Environment Assessment Tool  
<http://ceat.cyclenation.org.uk/>
- Cyclenation “Making Space for Cycling Guide  
<http://www.makingspaceforcycling.org/>
- House of Lords National Policy for the Built Environment Committee  
<http://www.parliament.uk/built-environment>
- Manual for Streets 2 [www.gov.uk/government/publications/manual-for-streets-2](http://www.gov.uk/government/publications/manual-for-streets-2)
- Design manual for bicycle traffic: CROW-25 (The Netherlands)  
[www.crow.nl/publicaties/design-manual-for-bicycle-traffic](http://www.crow.nl/publicaties/design-manual-for-bicycle-traffic)
- Department for Communities and Local Government  
<https://www.gov.uk/government/organisations/departments-for-communities-and-local-government>
- Design Council Cabi <http://www.designcouncil.org.uk/our-work/cabi/>
- Homes and Communities Agency <http://www.homesandcommunities.co.uk/>
- Letchworth Garden City Heritage Foundation  
<http://www.leitchworth.com/heritage-foundation>
- Local Government Association <http://www.local.gov.uk/>
- National Community Land Trust Network  
<http://www.communitylandtrusts.org.uk/home>
- National Custom & Self Build Association <http://www.nacsba.org.uk/>
- Planning Advisory Service <http://www.pas.gov.uk/>
- Town and Country Planning Association  
<http://www.tcpa.org.uk/pages/garden-cities.html>
- TCPA New Communities Group <http://communitiesgroup.org.uk/>