AECOM

BOXFORD

Design Guidelines and Codes

locality
the power of community

FINAL REPORT

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Quality information

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Revision History

Revision	Revision date	Details	Name	Position
4	25-02-21	Review	Annabel Osborne	Locality
3	25-01-21	Review	Ben Castell	Director
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0	12-11-20	Research, site visit, drawings	Stela Kontogianni	Graduate Urban Designer

Contents

Introduction

01

1. Introduction

This section provides context and general information to introduce the project and the area of study.

1.1. Background

Through the Ministry of Housing, Communities and Local Government (MHCLG) Neighbourhood Planning Programme led by Locality, AECOM has been commissioned to provide design support to Boxford Neighbourhood Plan. This document provides advice to address the Parish Council's views and concerns on design related matters that are needed to be addressed in future developments in the area. It also supports Neighbourhood Plan policies that aim to guide development proposals in order to create distinctive places that are well-integrated with the existing settlement.

1.2. Purpose of the document

The main objective of this report is to develop design guidelines and codes for the Neighbourhood Plan, and to inform the design of future planning applications and residential developments in Boxford Parish. In particular, it elaborates on strategic design guidance, as well as on specific design codes that were agreed with the Neighbourhood Plan Steering Group at the outset of the project.

1.3. Process

Following an inception meeting and a virtual site visit with members of the Neighbourhood Plan Steering Group, AECOM carried out a high-level assessment of the village. The following steps were agreed with the Group to produce this report:

- Initial meeting between AECOM and the Boxford Neighbourhood Planning Group and as this was during the national Covid 19 lockdown, a joint virtual 'site visit' was carried out via Teams and Google Streetview;
- Urban design and local character analysis;
- Preparation of design principles, guidelines and codes to be used to inform the design of the Parish and future developments;
- Draft report with design guidelines and codes; and
- Final report.

1.4. Area of study

The Neighbourhood Plan Area includes Boxford village as well as Stone Street, Calais Street and Hagmore Green settlements located to the south. In addition, the parish is surrounded by other small settlements for example Sherbourne Street to the north west, Wicker Street Green north east and Whitestreet Green south east.

Boxford is a village and civil parish in the Babergh District of Suffolk, England. It is located approximately 6 miles east of Sudbury and 14 miles west of Ipswich.

The road network includes the main road, A1071, running to the south of Boxford village and the secondary roads, Swan Street, Sand Hill and School Hill, running through the village, as Figure 1 shows. Stone Street Road is running through Stone Street, a settlement located to the south of A1071. There is no railway service operating in the village; the closest station is in Sudbury.

There is an abundance of green spaces around the village, presented in more detail in the relevant section in Chapter 2, that allows people to be in close contact with nature. The water element is also present with River Box running into the village from the west and out to the south.

The village is equipped with some facilities. St. Mary's church and a primary school are located to the centre of the village core, whilst Broad Street accommodates pubs, commerce and retail.

In 2005, the parish had a population of 1,270 people decreasing to 1,221 at the 2011 Census.

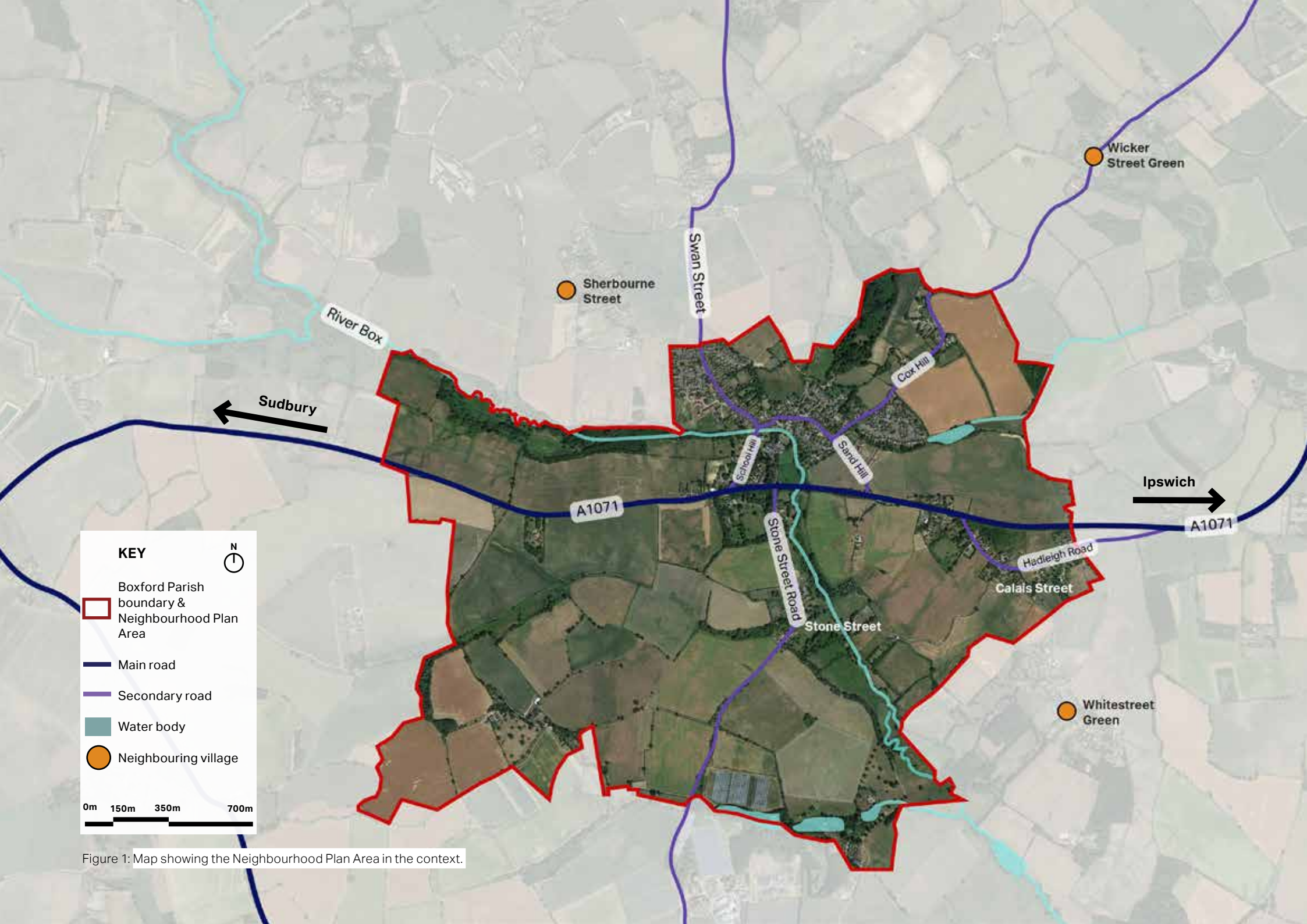


Figure 1: Map showing the Neighbourhood Plan Area in the context.

Local Character Analysis

02

2. Local Character Analysis

This section analyses the local context of the village, the key constraints and opportunities, as well as the special characteristics.

2.1. Boxford's structure

Boxford village is composed by a historic linear core developed along Swan Street, School Hill and Ellis Street, whilst later growth came approximately after 1920s, as Figure 3 shows.

There are two small settlements in close proximity to the village, which are satellite villages, Stone Street and Calais Street, connected through the main road, A1071, and secondary ones, Stone Street and Hadleigh Road.

The River Box played an important role in the formation of the village pattern, running along its historic core. In addition, it serves some linear green spaces that are set along its route connecting them back to the village and creating an interesting landscape. The rest of the parish, as Figure 2 shows, is countryside.

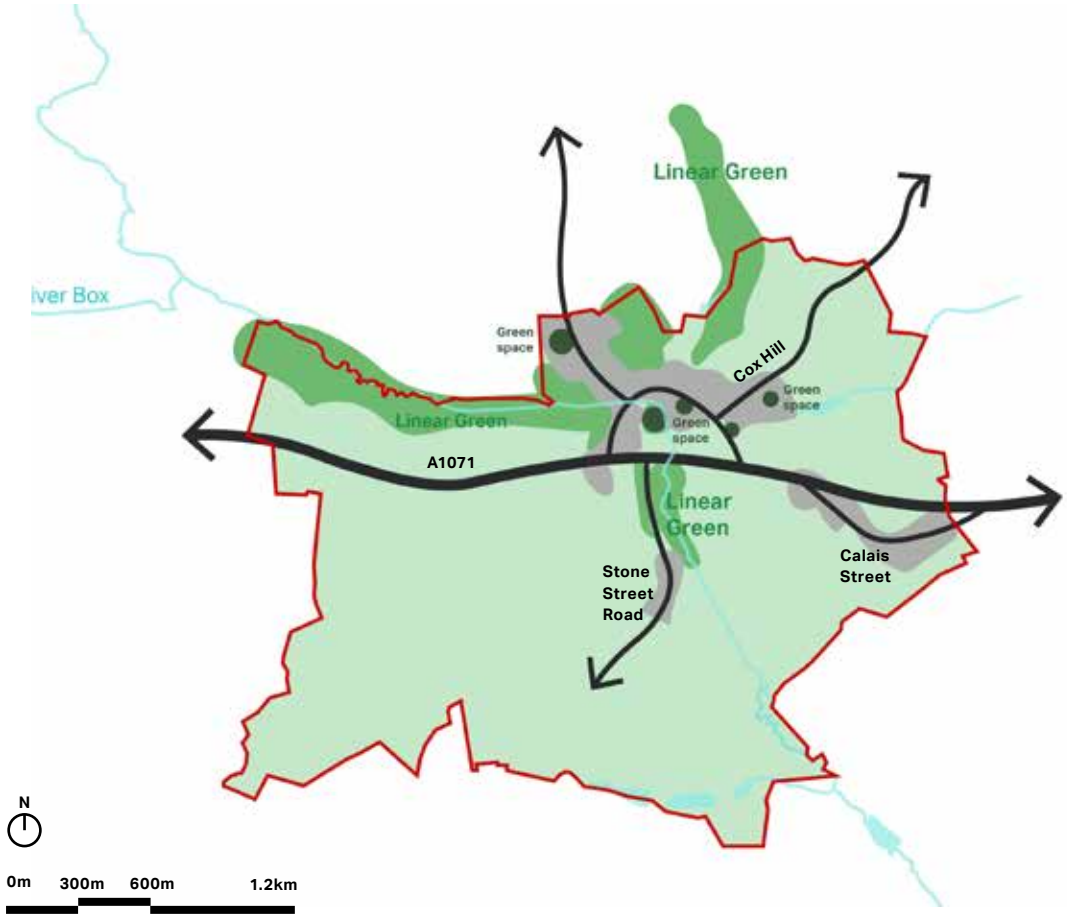


Figure 2: Diagram showing the structure of Boxford Neighbourhood Plan Area.

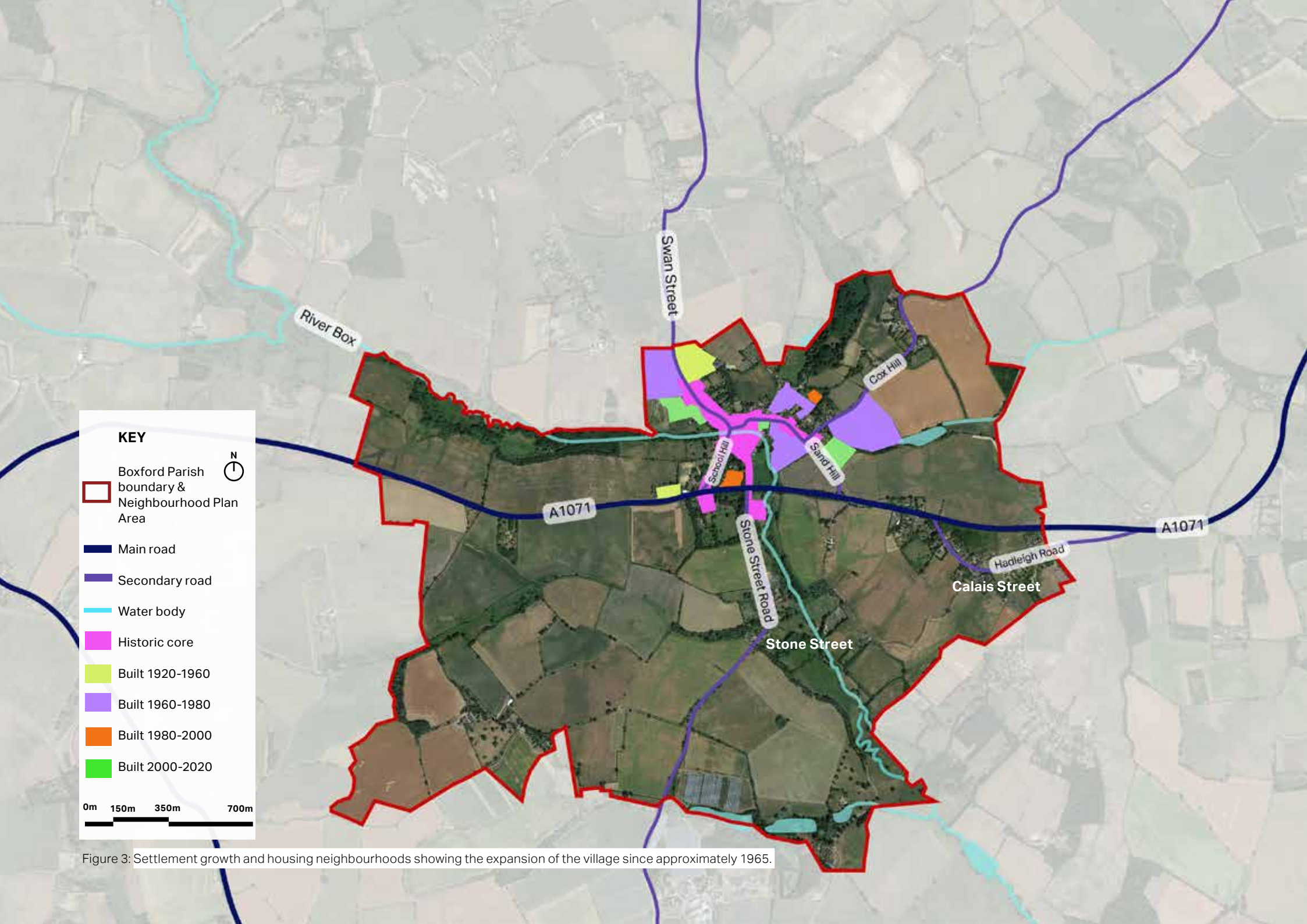


Figure 3: Settlement growth and housing neighbourhoods showing the expansion of the village since approximately 1965.

2.2. Heritage

Boxford village is characterised by a varied historic environment. The conservation area was originally designated by West Suffolk Country Council in 1973 and inherited by Babergh District Council in 1974. The most recent conservation area appraisal was released in 2011 containing 87 nationally listed buildings as shown on the opposite map[1]. Among the listed buildings, the St. Mary's church is Grade I and the Fleece public house is listed as Grade II*. The rest of the listed buildings are Grade II and the majority of them are domestic in scale, houses and cottages.

There are good examples of buildings throughout the village where Suffolk's local materials have been used. In particular, timber-framed construction, soft 'Suffolk red' bricks, 'Suffolk white' bricks, as well as the typical pastiche palette on the building façades. More details on materials and architectural details in Boxford village are found later in the report, in the relevant section in Chapter 3.

1. For more details on the conservation area appraisal (2011), please visit this link: https://www.babergh.gov.uk/assets/Conservation-Area-Appraisals/Boxford2011CAA.pdf

2.3. Green infrastructure & footpaths

TREE PRESERVATION ORDER

The area contains many mature trees of various species and a good deal of invasive Sycamore. Other TPO trees cover various strips, groups or just single specimens that occur for the most part to the rear of various properties. More details on maps illustrating the location of TPOs can be found in the Boxford conservation area appraisal (2011).

SYSTEM OF GREEN LINKS

There is a good green coverage in the area formed by woodlands, parks, playing fields, allotments, as well as green pockets within the village as shown on the opposite map. These elements, in addition to a good number of footpaths, shown in Figure 6, create a well-connected network of green spaces. In this way, those assets do not only improve the existing environment and landscape, but they also provide people with the opportunity to be in close contact with nature.

Primrose Wood[2], shown in Figure 5 and 6, is a 9 hectare picturesque pastureland, part of which is designated as a County Wildlife Site. The ground nearest to the village has been planted as woodland, whilst the rest is wet meadow to preserve water-loving plants such s orchids. The site is comprised of a variety of habitats, including 2.5 hectares of new planting. Oak, ash and alder are the dominant species with smaller amounts of small leaved lime, hornbeam, hazel and hawthorn.

2. For more details on Primrose Wood, its ecological evaluation and a photo gallery of all-season walks please visit this link: https://www.boxfordsuffolk.com/primroseWood.cfm

Figure 4: The Fleece Hotel is one of the listed buildings located along Broad Street.

Figure 5: Map showing the location of Primrose Wood. Please also see Figure 6 for more details on the green infrastructure in the village (Reference: Google Earth).

Figure 6: Boxford - heritage and green infrastructure.

2.4. Environmental and landscape designations

Boxford village is characterised by various landscape designations which should be taken into consideration in any future development.

FLOOD RISK ZONES

The village is situated in the valley of the River Box, which flows south-eastwards, suffering from flood risk in some parts along its route.

LANDSCAPE

The village in its valley presents underlying glacial sands and gravels, whilst the rest of the countryside is covered with an overlaying layer of boulder clay of 'High' Suffolk's claylands. A large part of the village is designated as special landscape area[1], whilst the area south of A1071 road is designated as environmentally sensitive[2].

The southern part of Boxford parish boundary sits on an area of outstanding natural beauty (AONB)[3], whilst priority habitat inventory[4] areas can be found to the north, east, west and south of the village settlement.

In addition, ancient woodland[5] and sites of special scientific interest[6] can be found in close proximity outside of the Neighbourhood Plan Area.

1. A countryside of very high visual quality. It is a combination of impressive landscape, buildings of architectural and historical significance and areas of ecological importance. For more information please visit this link: https://data.gov.uk/dataset/2348b8e7-be12-4295-a173-7268d662fa54/special-landscape-area & http://maps.midsuffolk.gov.uk/
2. For more information please visit this link: https://naturalengland-defra.opendata.arcgis.com/datasets/environmentally-sensitive-areas-england?geometry=0.803%2C52.014%2C0.940%2C52.032
3. An area of countryside that has been designated for conservation due to its significant landscape value. After 2012, the AONBs have the same status as national parks when it comes to planning decisions on landscape issues. For more information please visit this link: https://en.wikipedia.org/wiki/Area_of_Outstanding_Natural_Beauty
4. It includes the habitats and species which are of principle importance for the conservation of biodiverity in England. For more information please visit this link: https://advantageous/dataset/4b6ddab7-6c0f-4407-946e-d6499f19fcde/priority-habitat-inventory-england
5. It is a woodland that has existed continuously since 1600 or before in England, Wales and Northern Ireland. For many species of animal and plant, ancient woodland sites provide the sole habitat and for many others, conditions on these sites are much more suitable than those on other sites. This designation is formally defined on maps by Natural England. For more information please visit this link: https://data.gov.uk/dataset/9461f463-c363-4309-ae77-fdcd7e9df7d3/ancient-woodland-england
6. It is a conservation designation denoting a protected area. Most legal nature/geological conservation designations are based upon them, including national nature reserves, ramsar sites, special protection areas and special areas of conservation. For more information please visit this link: https://en.wikipedia.org/wiki/Site_of_Special_Scientific_Interest_

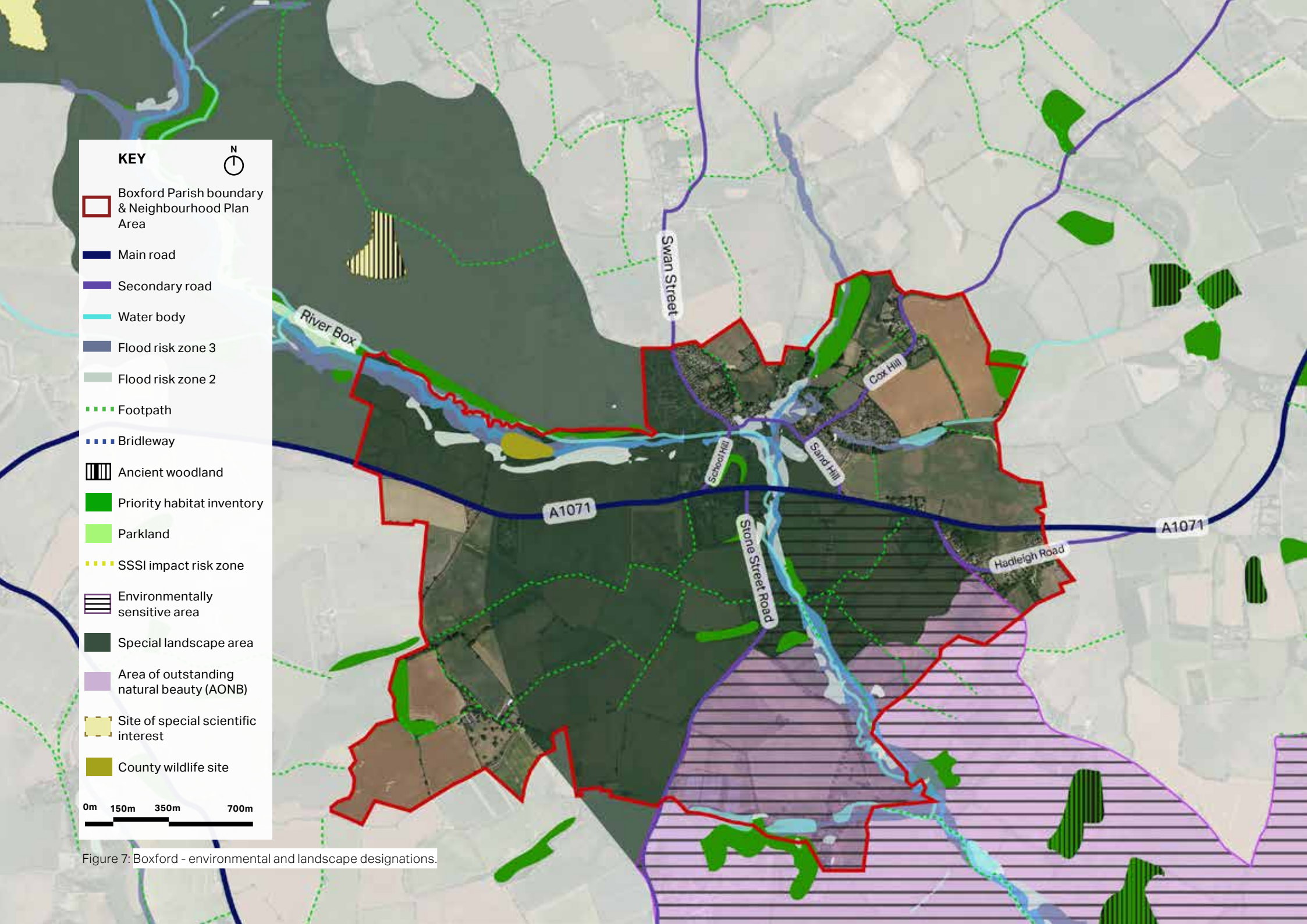


Figure 7: Boxford - environmental and landscape designations.

2.5. Character areas

The next pages will present a brief analysis of Boxford village into character areas based on street patterns, layout and age of the buildings, rooflines, car parking layouts and environment.

The character areas identified within Boxford Parish are three (3), presented below and shown in Figure 8:

Character area 1 - Village cores;

Character area 2 - Meandering neighbourhoods; and

Character area 3 - Linear neighbourhoods.

The elements that will be analysed for each character area are presented below:

- Building grouping;
- Building line;
- Boundary treatment;
- Heights & roofline; and
- Car parking.

There will be a separate section on materials and architectural details in a relevant section in Chapter 3.

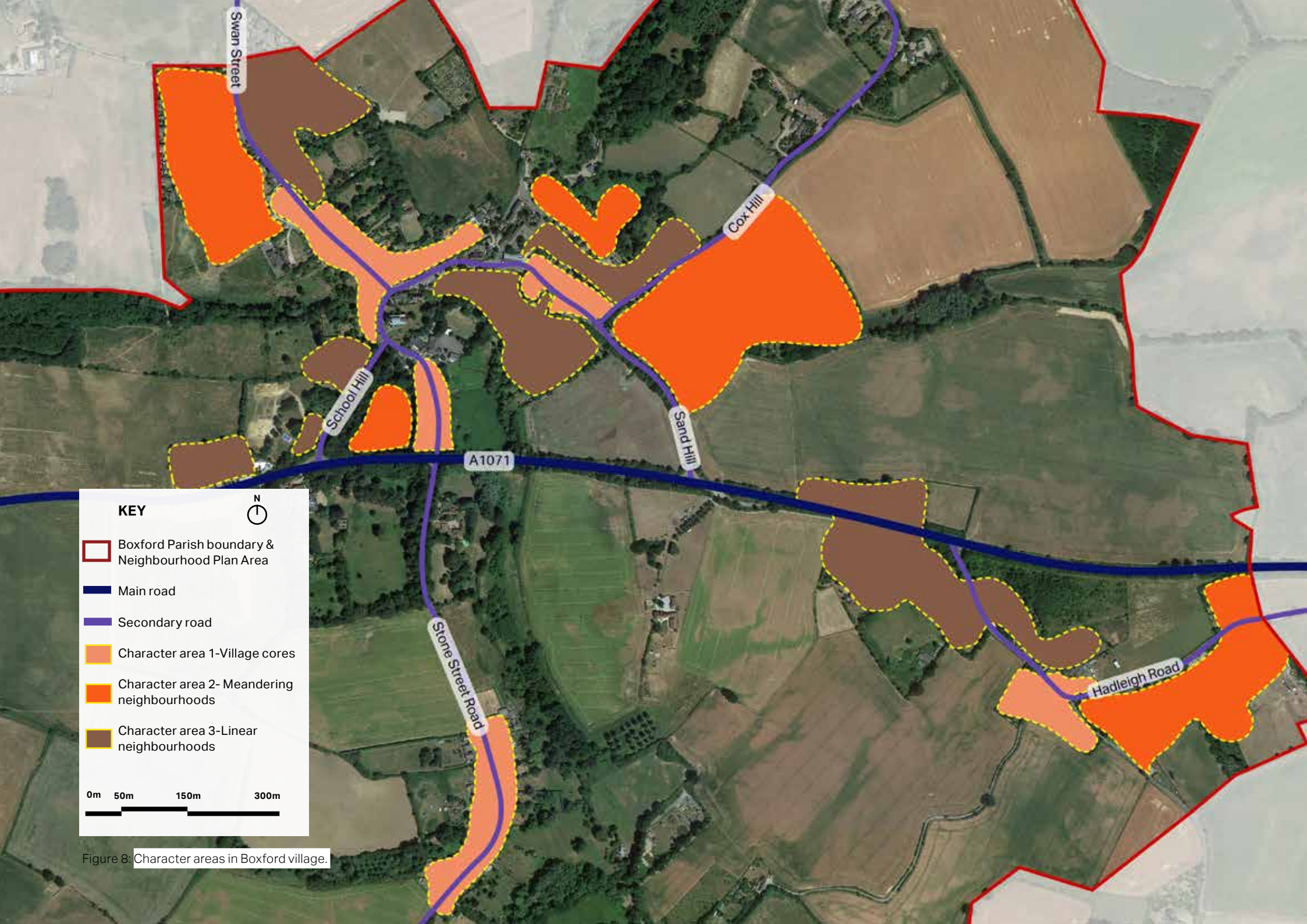


Figure 8: Character areas in Boxford village.

Character area 1 - Village cores

BUILDING GROUPING	The buildings follow a linear development pattern along Swan Street, Ellis Street, Stone Street and Hadleigh Road which is also characterised by a continuity of building façades with occasional narrow gaps, usually every 3-4 buildings. The colourful palette used on the continuous façades is typical of Suffolk and helps to create character and a good visual impact along the narrow streets.
BUILDING LINE	The building setbacks are consistent, following the continuity of building façades, being approximately 1.3m offset from the carriageway. The footways are relatively narrow, whilst the materials used for the public realm are consistent throughout the village offering a visual continuity and flow in movement.
BOUNDARY TREATMENT	In this character area, the buildings have no front gardens and the main entrances to the houses are facing directly onto the footway. There are, however, cases where plant pots have been added in the front of the houses as an attempt to include some soft green elements along the public realm.
HEIGHTS & ROOFLINE	Building heights range between 2 and 2.5 storeys. The roofline is continuous, due to this type of building grouping, and inconsistent interrupted by chimneys and dormers. The prevailing roof type, in this character area, is gable roof, but cross-gabled and hip roofs are also found.
CAR PARKING	On-street parallel parking is the prevalent parking layout in this character area, however, on-plot garage and on-plot side parking typologies are found in some properties as well.

Figure 9: Use of the local colour palette on the continuous façades creates a good visual impact for pedestrians and drivers and enhances the local vernacular.

Figure 10: The continuity on the building façades creates interesting perspective views and roofline along curved roads.

Figure 11: Lack of front gardens and narrow footways offer limited options for plants and flowers to decorate the building frontages.

Figure 12: The narrow width of the main road and the existing parking layout, on-street, creates issues of congestion during rush hours, junction of Swan St and Broad St.

Opportunities to be used as an inspiration in Design Codes

- Use of the local colour palette on continuous building façades to give a good visual impact and break the monotony;
- Consistency of the materials used for the public realm to allow for a positive aesthetic outcome;
- Small differences on building heights and architectural details (e.g. chimneys, dormers etc.) create an inconsistent roofline and add to the architectural character of the village;
- Architectural variety in terms of materials, colours, details (e.g. chimneys, fenestration etc.) enhances the character of the area; and
- Linear development with consistent building setbacks adds emphasis on the continuity of the façades.

Issues to be addressed in Design Codes

- The typology of building hard on pavement creates less opportunities for privacy for the owners of the properties; and
- On-street parking layout along busy and narrow streets creates congestion during rush hours and decreases the feeling of safety for pedestrians.

Character area 2 - Meandering neighbourhoods

BUILDING GROUPING	The majority of the buildings in this character area are detached and semi-detached houses. This type of building grouping allows for filtered views to the surrounding countryside. In particular, Daking Avenue, Brook Hall Road and Fen Street are some examples where this type of setting can be found. The street network is mainly composed by meandering roads in the form of cul-de-sacs, however, there are also examples of permeable networks along Daking Avenue and Hadleigh Road.
BUILDING LINE	The building setbacks are relatively inconsistent as each building has a different offset from the carriageway creating an interesting visual result. The front gardens vary in size, approximately from 4-10m, whilst there are also examples where front gardens are replaced with on-plot parking spaces and hard landscape.
BOUNDARY TREATMENT	The lack of physical boundary treatments creates the impression of a shared space with minimum separation between private and public space. The hard landscapes prevail over the soft ones, however, limited planting, flowers, hedges or low height timber fencing can be found as well.
HEIGHTS & ROOFLINE	Building heights range between 2 and 2.5 storeys. The roofline is not continuous due to the type of building grouping. The majority of roof types are gable and cross-gable roofs.
CAR PARKING	On-plot parking is the prevalent parking layout in this character area, ranging between front parking, on-plot side parking and on-plot garages. However, on-street parallel parking is found as well.

Figure 13: Adding vegetation and using a more natural colour palette for the ground gives the impression of a more pedestrian friendly and less car-dominated place.

Figure 14: Use of different colours in materials on the public realm, as well as appropriate signage to indicate the footpath entrance, improve legibility and encourage people walking and cycling.

Figure 15: Green spaces surrounded by houses create a positive feeling of enclosure for the people living there and enhance the 'green' character of the village.

Figure 16: Replacing front gardens and soft landscapes with hard surfaces gives the impression of a car-dominated place.

Opportunities to be used as an inspiration in Design Codes

- Gaps between houses are useful when they allow for views to the countryside;
- Building groupings in clusters with open spaces in the centre create a good feeling of enclosure in the area;
- Clear indication of footpaths could encourage people to use them and walk to the centre alleviating the traffic on the busy roads; and
- Adding green features along the public realm helps to give the impression of a less car-dominated place and create pleasant routes for pedestrians.

Issues to be addressed in Design Codes

- Lack of boundary treatments creates a less pleasant environment and a less clear separation between public and private space;
- Lack of soft surfaces and prevalence of hard surfaces of grey colour palette gives the impression of a more car-dominated place and discourages people from walking; and
- Favouring a shared surface, with no clear indication of the footways can make people feel less comfortable when walking.

Character area 3 - Linear neighbourhoods

BUILDING GROUPING	The majority of the buildings, in this character area, follow a linear development pattern along Homefield, Cox Hill, A1071 and Hadleigh Road. The majority of the buildings are detached and semi-detached houses, whilst a limited number of bungalows can also be found. There is no continuity on building façades which allows occasional filtered views to the countryside.
BUILDING LINE	The building setbacks are relatively consistent, evenly offset from the carriageway with well-sized front gardens. Therefore, the main façades of the buildings are not directly facing the footway, like in character area 1, but a soft green surface is interrupting in between.
BOUNDARY TREATMENT	There is a clear separation between properties and private and public space, due to the elements used for boundary treatment. In particular, there is a variety of low brick walls, hedges, hedgerows, trees, flowers and timber fencing decorating the front gardens. In addition to this, the current building typology, detached and semi-detached houses, helps to better separate properties and create a clear layout for the area. The public realm is also equipped with street trees adding more to the feeling of being close to nature.
HEIGHTS & ROOFLINE	Building heights range between 2 and 2.5 storeys. The roofline is not continuous due to the type of building grouping, but it gets interrupted. The roof types range between hip, gable and cross-gable roofs, whilst clerestory roof can be found as well, on The Causeway road.
CAR PARKING	The car parking typologies found in this area are on-street parallel parking and on-plot parking; the latter ranges between front parking, on-plot side parking and on-plot garages.

Figure 17: Well-sized front gardens equipped with plants and vegetation offer clear pleasant views to people living in the area and pedestrians walking by.

Figure 18: Variety in boundary treatment techniques offers a good visual impact and breaks the monotony of repetitive styles of fencing or planting.

Figure 19: Gaps between buildings offering great views to the surrounding countryside and street trees along the public realm reinforce the feeling of being close to nature.

Figure 20: Linear development patterns with consistent building setbacks create clear views for the pedestrians and drivers.

Opportunities to be used as an inspiration in Design Codes

- Gaps between houses are useful when they allow for views to the countryside;
- Well-sized front gardens offer opportunities for planting and vegetation improving the quality of the place;
- Consistency in building setbacks creates clear and unobstructed views;
- Variety in boundary treatment techniques offers a good visual impact for the people living there or for pedestrians; and
- Variety in roof types adds to the architectural character of the place and creates an interesting roofline.

Issues to be addressed in Design Codes

- Variety in building typology can add to the architectural character of the area and also serve the needs for a bigger range of people; and
- Clear indication of footpaths could encourage people to use them and walk to the centre alleviating the traffic on the busy roads.

Design Guidelines and Codes

03

3. Design Guidelines and Codes

The aim of this chapter is to develop specific design guidelines and codes for future development that consider the local character and can enhance local distinctiveness by creating good quality developments, thriving communities and prosperous places to live.

3.1. Introduction

This chapter is divided into two parts:

Section 3.2 includes a set of general principles that are applicable to any development that may take place throughout the Parish.

Section 3.3 includes specific guidelines for each character area in the village.

The elements that are more general are what we mean by design guidelines. Other elements that are more prescriptive or set out parameters are the design codes.

This section is set out in a way that is straightforward to interpret. It is accompanied by descriptive text, general guidelines and principles, images from Boxford or other relevant case studies, illustrations and explanatory diagrams.

3.2. General design principles for Boxford

This section provides guidance on the design of development, setting out the expectations that applicants for planning permission in the village will be expected to follow.

The guidelines developed in this part focus on residential environments. However, new housing development should not be viewed in isolation. Considerations of design and layout must be informed by the wider context, considering not only the immediate neighbouring buildings, but also the villagescape and landscape of the wider locality.

The local pattern of streets and spaces, building traditions, materials and the natural environment should all help to determine the character and identity of a development, recognising that new building technologies are capable of delivering acceptable built forms and may sometimes be more efficient. It is important with any proposal that full account is taken of the local context and that the new design embodies the "sense of place" and also meets the aspirations of people already living in that area.

Reference to context does not mean to copy or use pastiche solutions; new buildings should be distinguished from old in some manner. What is around should be used as inspiration and influence and it could be a contemporary solution that is in harmony with the surroundings. This guide will outline the elements that make an important reference point.

There are a set of general design principles that are specific to Boxford. These are based on the analysis of village character presented in Chapter 2 and on discussions with members of the neighbourhood plan steering group on the village walkabout.

STRATEGIC PRINCIPLES AND BEST DESIGN PRACTICE

BUILT FORM

STREET TYPOLOGIES AND CAR PARKING

ENVIRONMENTAL AND ENERGY EFFICIENCY

3.2.1. Strategic principles and best design practice

Consider the context

- New development must demonstrate an understanding of the landscape sensitivities and designations of the area, presented in Section 2.4. Areas that are designated as environmentally sensitive, special landscape areas, AONB areas and priority habitats, should all be protected and respected in future development.
- New development must respect the existing street patterns and evaluate any traffic issues in the area in order to better address them. In particular, any new development should avoid causing traffic pressure along Swan Street and the Sand Hill/Cox Hill junction and aim to improve connectivity in order to address any current issue in the area.
- New development should prioritise creating a well-connected green system and promote alternative ways of transportation. There is an abundance of existing green assets within and around the village, presented in Section 2.3, that could be better linked in order to improve connectivity and therefore, walking and cycling.
- New development should respect the character of each area within the village. In particular, three character areas, presented in Section 2.5, were identified based on street patterns, building layout, orientation, massing, enclosure, facade rhythm and architectural details, Thus, any new design should be a good fit for each character area in order to preserve their unique characteristics.
- Development which is of high density and does not reflect the current grain of the village shall be avoided. Proposals need to consider existing density and the relationship between buildings and plot sizes.
- The use of a repeating type of dwelling along the entirety of the street should be avoided to create variety and interest in the streetscape. However, having too many different building types should be avoided, as it can lead to a confused and chaotic street scene.
- Boundaries such as walls or hedgerows, whichever is appropriate to the street, should enclose and define each street along the back edge of the pavement, adhering to a clear building line that can allow minor variations for each development group. In areas where properties are set back from the edge of the road with small gardens, consideration should be given to the most appropriate site boundaries.
- Where appropriate, new properties should aim to provide rear and front gardens. However, where the provision of a front garden is not possible, like along the Village Core character area, small buffers to the public realm such as planting strips could be beneficial.
- Edges must be designed to link rather than segregate existing and new neighbourhoods. A belt of hedges that defines the existing settlement edge can be integrated into the new neighbourhood by providing a shared back hedge.

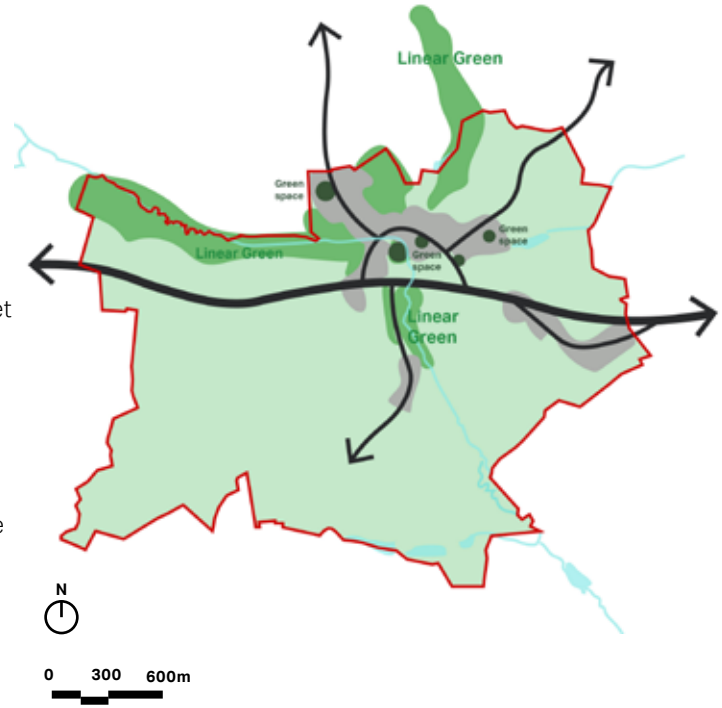


Figure 21: New development should gain a good understanding of the existing structure of the village, the important assets and aim to preserve and enhance them.

Provide safe and meaningful connections

This means that streets should be connected with each other and different travel options and routes should be considered. Good practice favours a generally connected street layout that makes it easier to travel by foot, cycle, and public transport. A more connected pattern creates a 'walkable neighbourhood'; a place where streets are connected and routes link meaningful places together. Boxford village consists of permeable street networks in its core, as well as, cul-de-sac layouts in the surrounding neighbourhoods.

Any new development should improve the existing street network by:

- Providing direct and attractive footpaths between neighbouring streets and local facilities. Streets must be designed to prioritise the needs of pedestrians and cyclists. Establishing a robust pedestrian network: a) across any new development; and b) among new and existing developments, is key in achieving good levels of connectivity among any part of Boxford.
- Proposing routes laid out in a permeable pattern, allowing for multiple connections and choice of routes, particularly on foot. Any cul-de-sacs should be relatively short and provide onward pedestrian links.
- Proposing short and walkable distances that are usually defined to be within a 10 minute walk or a five mile trip by bike. If the design proposal calls for a new street or cycle/pedestrian link, it must connect destinations and origins.
- Avoiding design features such as barriers to vehicle movement, gates to new developments, or footpaths between high fences.

Figure 22: Boxford village already has an abundance of green spaces of various scales and types. New development should take advantage of the existing green assets and create a well-connected network of cycle lanes, footpaths and permeable streets that will encourage people walking and cycling, alleviating traffic along busy roads and bringing people closer to nature.

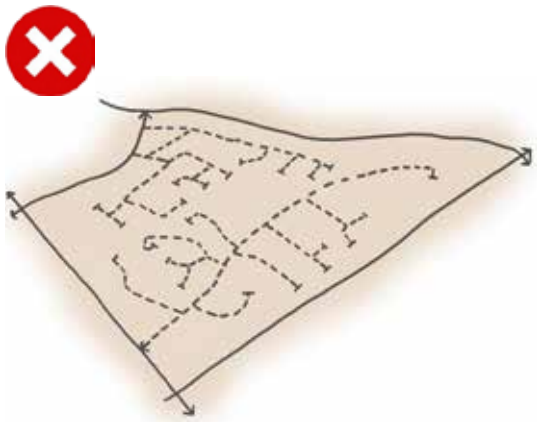


Figure 23: A layout dominated by cul-de-sacs encourages reliance on the car for even local journeys.

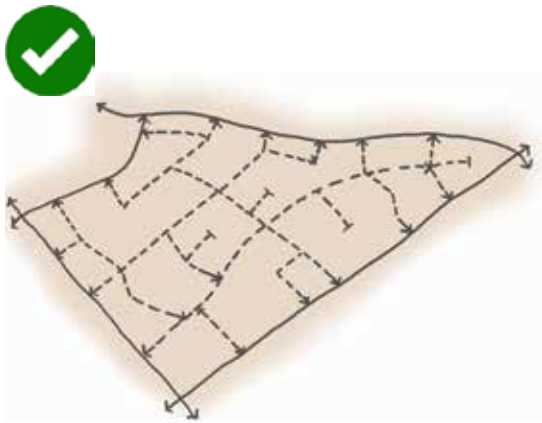


Figure 24: A connected layout, with some cul-de-sacs, balances sustainability and security aims in a walkable neighbourhood.

Enable wayfinding

When places are well signposted, they are easier for the public to comprehend. People feel safer when they can easily memorise places and navigate around them. It is easier for people to orientate themselves when the routes are direct, particularly for people with dementia and related cognitive and sensory challenges.

- A familiar and recognisable environment makes it easier for people to find their way around. Obvious and unambiguous features should be designed in new development.
- Buildings which are located at corners, crossroads or along a main road could play a significant role in navigation.
- At a local level, landmark elements could be a distinctive house, public art, or even an old and sizeable tree.
- Signage is a common way of helping people to find their way to and around a place. New signage design should be easy to read. Elements likes languages, fonts, text sizes, colours and symbols should be clear and concise, and avoid confusion.
- Signage can also help highlight existing and newly proposed footpaths and cycle lanes, encouraging people to use them more.
- Signage elements and techniques should be appropriate to the character of the area and be a nice fit to the existing architectural style and details.

Figure 25: Buildings located at corners and crossroads can be used as landmarks and enhance legibility.

Figure 27: Wooden signage element to signalise the entrance to a footway is a good fit to the surrounding context, Goodlands development.

Figure 26: Examples from elsewhere that are used for wayfinding purposes and could be a good fit in Boxford village. Any proposal should be composed by local materials to enhance the character of the area, aim to highlight key assets in the village and encourage people walking (Left photo: Nature sign design made from Forest Stewardship Council United Kingdom, Middle left photo: Meadow garden, Pennsylvania, Middle right photo: Samford village, Australia & Right photo: Meadow garden, Pennsylvania).

Enhance walkability by creating well-linked green spaces

- New development should offer a variety of open spaces that can host a diverse range of activities and accommodate different users.
- Open spaces should respond to local character and encourage civic pride.
- Development adjoining public open spaces and important gaps should enhance the character of these spaces by either providing a positive interface (i.e. properties facing onto them to improve natural surveillance) or a soft landscaped edge.
- New and existing landscapes and open spaces should be located within walking distance from their intended users. If appropriate, these should be linked to form connected green networks. The networks are often more useful to create visual amenity, for recreational use and wildlife corridors than isolated parks. Where direct links are not possible, it may be appropriate to link these together through green routes, shared surfaces and streets. Tree lined avenues can achieve a visual and physical connection to open space.
- New developments should incorporate existing native trees and shrubs and avoid unnecessary loss of flora. Any trees or woodland lost to new development must be replaced. Native trees and shrubs should be used to reinforce the more rural character of the area.

Figure 28: New development should propose a variety of types of green spaces (e.g. allotments, playing fields, parks, sport fields etc.) in order to encourage a diversity of activities taking place and therefore, meeting the needs of a larger group of people.

Figure 29: The three green entrances to the village give a Green context to Boxford which should be reflected in any new development.

3.2.2. Street typologies and car parking

- Streets must meet the technical highways requirements as well as be considered a 'safe place' to be used by all, not just motor vehicles. The design of new developments must include streets and junctions that incorporate the needs of pedestrians, cyclists and, if applicable, public transport users. It is also important that on-street parking, where introduced or retained, does not impede the access of pedestrians, cyclists, and other vehicles.
- Within the settlement boundaries, streets must not be built to maximise vehicle speed or capacity. Streets and junctions must be designed with the safety and accessibility of vulnerable groups such as children and wheelchair users in mind, and may introduce a range of traffic calming measures.
- New streets must generally be linear with gentle meandering, providing interest and evolving views while helping with orientation. Routes must be laid out in a permeable pattern allowing for multiple connections and choice of routes, particularly on foot. Any cul-de-sacs must be relatively short and provide onward pedestrian links.
- The distribution of land uses must respect the general character of the area and street network, and take into account the degree of isolation, lack of light pollution, and levels of tranquillity. Pedestrian access to properties must be from the street where possible.
- Streets must incorporate opportunities for landscaping, green infrastructure, and sustainable drainage. For example, swales could be inserted into the landscaping to address flooding issues. Swales are shallow, broad and vegetated channels designed to store and convey runoff. They are easy to incorporate into landscaping and the maintenance cost is low. Rain gardens are easy to retrofit, and the land take is minimal.
- Where appropriate, some narrow low-traffic streets may be closed to vehicle traffic and transformed into attractive pedestrian- and cycle-only spaces. Service delivery and emergency vehicles can be granted access when needed through the means of rising or collapsible bollards.
- The next pages introduce suggested guidelines and design features including a range of indicative dimensions for street types in the new residential areas.

Pedestrian and cycle connectivity

- All newly developed areas must provide direct and attractive footpaths between neighbouring streets and local facilities. Streets must be designed to prioritise the needs of pedestrians and cyclists. Establishing a robust pedestrian network a) across any new development and b) among new and existing development is key in achieving good levels of permeability through the settlements.
- Footways must be included in new developments and integrated with the existing pedestrian routes. New pedestrian connections between existing developments and blocks must also be sought where appropriate.
- A permeable street network at all levels provides people with a choice of different routes and allows traffic to be distributed, in general, more evenly across the network rather than concentrated along heavily trafficked roads.
- Design features such as controlled gates to new developments or footpaths between high fences must be kept at a minimum and the latter must be avoided.
- On high-traffic and/or high-speed roads, cyclists must be kept away from moving traffic and parked vehicles as much as possible through the use of traffic calming, physical separation, and road markings and signage. On streets with lower traffic and speed limits no higher than 20 mph, the road can be shared between different modes.

Main entrances to the village (edge lanes)

- Main entrances to the village should promote the existing countryside by preserving, if possible, any type of green asset.
- Edge lanes should be low-speed roads that front houses with gardens on one side and a green space on the other. Carriageways typically consist of a single lane of traffic in either direction, and could be shared with cyclists.
- The lane width can vary to discourage speeding and introduce a more informal and intimate character. Variations in paving materials and textures can be used instead of kerbs or road markings.
- Swales and rain gardens could also be added into the landscaping to address any flood issue.
- Edge lanes should be continuations providing high level of connectivity and movement. Cul-de-sacs must be avoided where possible.

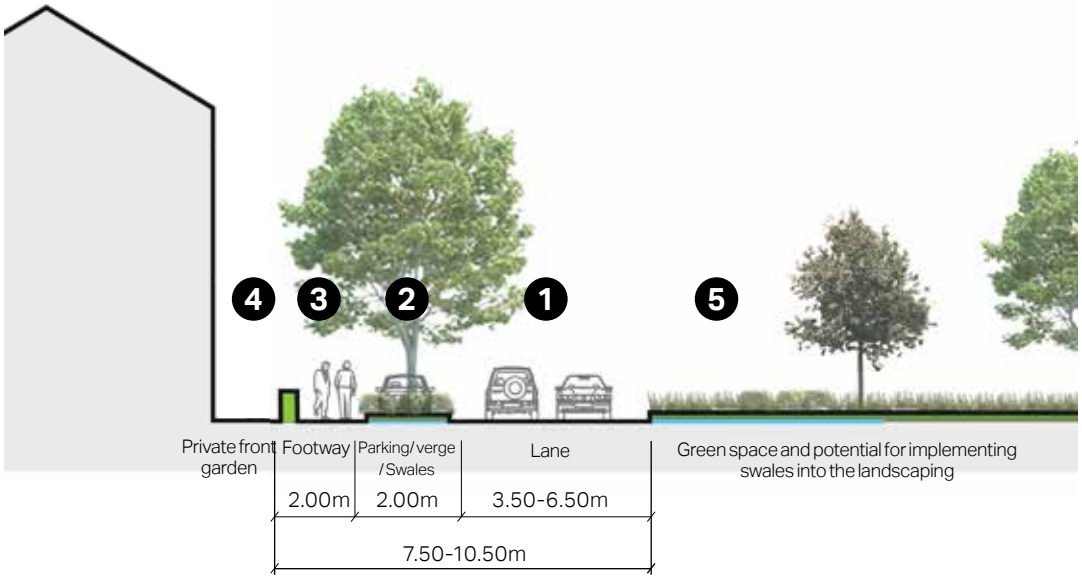


Figure 31: Section showing indicative dimensions for edge lanes. The lane width may vary to discourage speeding.

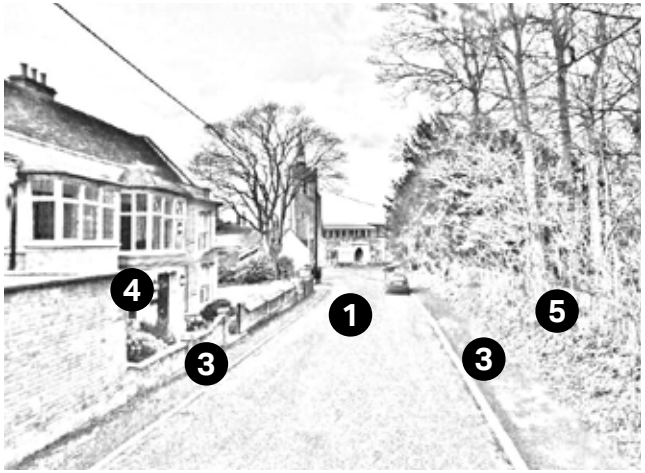


Figure 30: Main entrance to the village via School Hill Road.

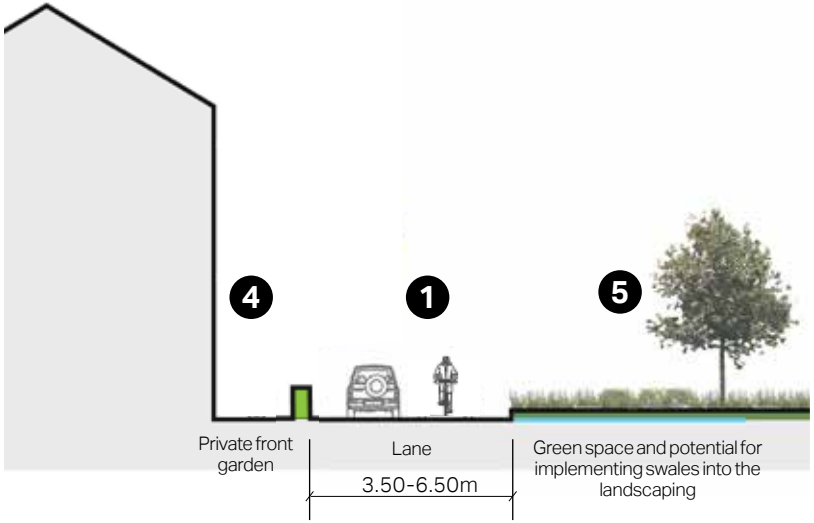


Figure 32: Section showing indicative dimensions for a shared edge lane.

1. Shared lane (local access) - width to vary.
2. Green verge with trees. The latter are optional but would be positive additions. Parking bays to be interspersed with trees to avoid impeding moving traffic or pedestrians.
3. Footway.
4. Residential frontage with boundary hedges and front gardens.
5. Green space and potential for implementing swales into the landscaping.

Residential streets

- Residential streets have a strong residential character and provide direct access to residences from the secondary roads. They must be designed for low traffic volumes and low speed.
- Carriageways must accommodate two-way traffic and parking bays. These roads must also accommodate footways with a 2m minimum width on either side where possible and must be designed for cyclists to mix safely with motor vehicles. Traffic calming features such as raised tables can be used to prevent speeding.

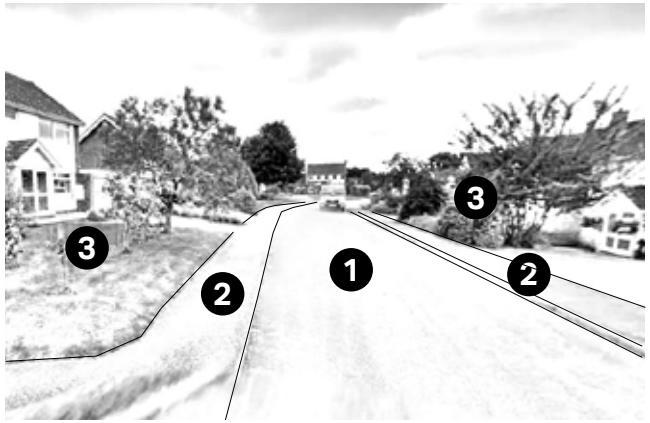


Figure 33: Brook Hall road could benefit from adding more physical boundaries to better separate private and public spaces.

1. Shared carriageway (neighbourhood traffic). Traffic calming measures may be introduced at key locations.
2. Footway.
3. Residential frontage with boundary hedges and front gardens.

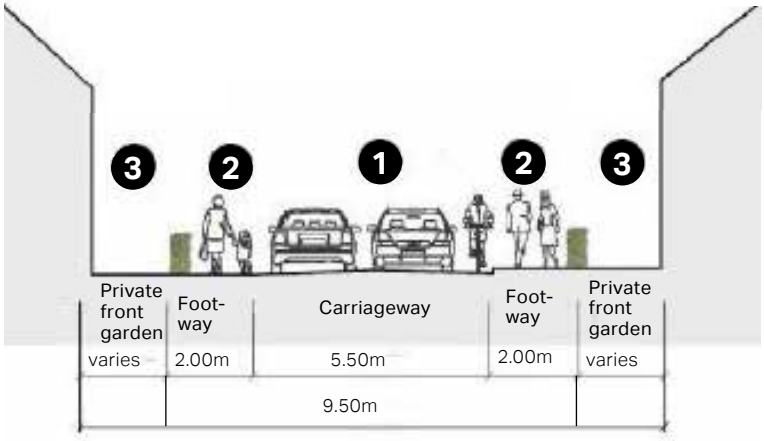


Figure 34: Section showing indicative dimensions for residential streets.

Residential streets

- Green verges and street trees should be integrated in the design, where possible, to improve the visual result and create good quality neighbourhoods.
- Residential frontages should be accommodated with rich vegetation and planting in order to provide a virtual separation between public and private spaces and secure privacy for the owners.
- Where on-street parking is proposed, it should be interspersed with trees to avoid impeding moving traffic or pedestrians.

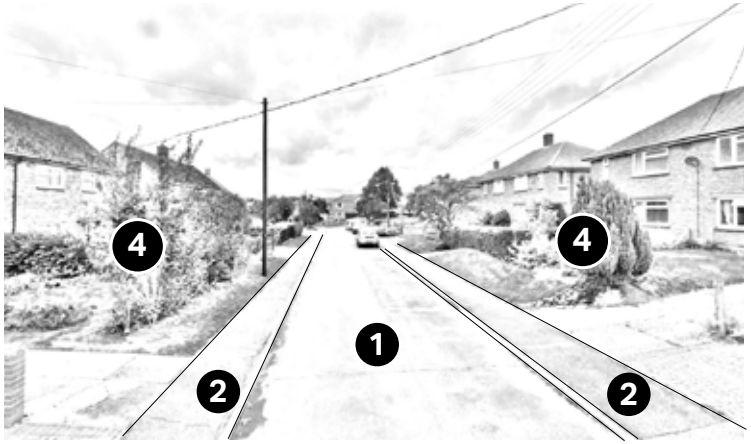


Figure 35: Homefield road could benefit from adding some designated on-street parking bays and cycle lanes.

1. Shared carriageway (neighbourhood traffic). Traffic calming measures may be introduced at key locations.
2. Footway.
3. Green verges and street trees.
4. Residential frontage with boundary hedges and front gardens.

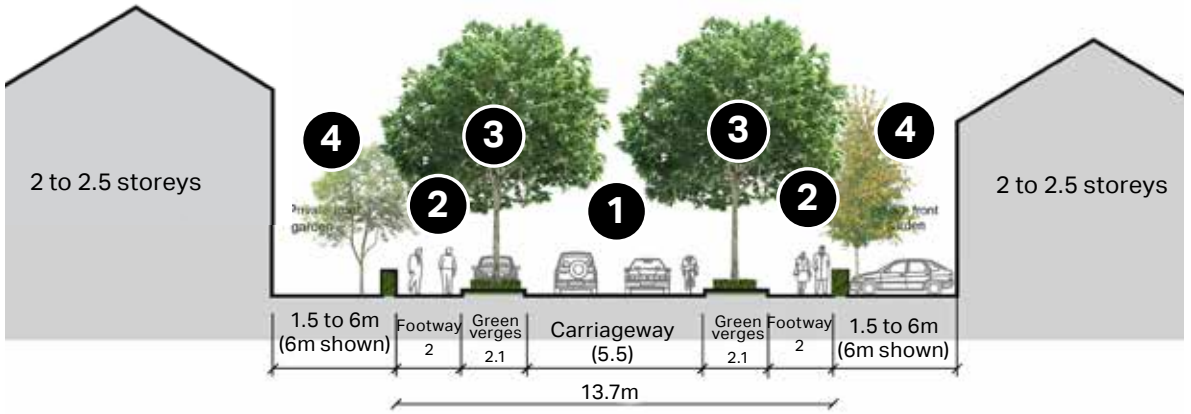
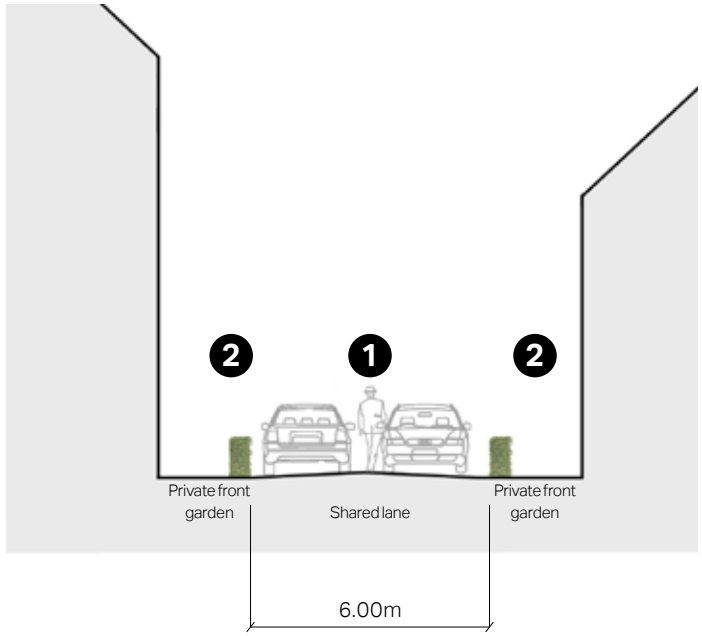


Figure 36: Section showing indicative dimensions for residential streets.

Lanes/private drives

- Lanes and private drives are the access-only types of streets that usually serve a small number of houses. They must be minimum 6m wide and serve all types of transport modes including walking and cycling, and allow sufficient space for parking manoeuvre.
- Opportunities to include green infrastructure, hedges, and/or private gardens to soften the edges must be maximised.
- Note: some local authorities may prefer to maintain pedestrian and vehicle spaces separate to help partially sighted pedestrians orientate themselves. For this purpose, new streets may retain a slight kerb upstand between the footways and carriageways and incorporate contrasting materials and surface textures.



1. Shared lane (local vehicle access, cyclists, and pedestrians).
2. Residential frontage with boundary planting and gardens

Figure 37: Section showing indicative dimensions for lanes and private drives.

Figure 38: Private drive in Goodlands, where there is a shared surface for pedestrians and vehicles.

Use of trees on the streets

The abundance of trees is an important asset for a place. They provide shading and cooling properties, absorb carbon dioxide, act as habitats and green chains for species, reduce air pollution and assist water attenuation and humidity regulation. For people, they help to alleviate stress and anxiety, help with ill health recovery, and create a sense of positive mental health and well-being. In addition, they add life to the landscape and enhance open spaces.

The following guidelines focus on the design aspects and appearance of planting and trees in private gardens as well as public open spaces and streets.

- Aim to preserve existing mature trees. Incorporating in the new landscape design and using as landmarks where appropriate.
- Consider canopy size when locating trees; reducing the overall number of trees but increasing the size of trees is likely to have the greatest positive long term impact.
- Size of tree pit should allow sufficient soil around the tree. Ensure tree stems are in the centre of the verge to provide a 1m clearance of the footway or carriageway.
- Existing tree root zones should be protected to ensure that existing trees can grow to their mature size. Root barriers must be installed where there is a risk of damaging foundations, walls, and underground utilities.
- New trees should be added to strengthen vistas, focal points, and movement corridors while retaining clear visibility of amenity spaces. They should however not block key view corridors and vehicular circulation sight lines.
- New trees should be integrated into the design of new developments from the outset rather than left as an afterthought to avoid conflicts with above- and below-ground utilities.
- To ensure resilience and increase visual interest, a variety of tree species is preferred over a single one. Species must be chosen according to climate change resilience, adaptation to local soil conditions, environmental benefits, size at maturity, and ornamental qualities.

Regulations, standards, and guidelines relevant to the planting and maintenance of trees are listed below:

- Trees in Hard Landscapes: A Guide for Delivery.[1]
- Trees in the Townscape: A Guide for Decision Makers.[2]
- Tree Species Selection for Green Infrastructure.[3]
- BS 8545:2014 Trees: from nursery to independence in the landscape - Recommendations.[4]
- BS 5837:1991 Guide for trees in relation to construction.[5]

[1] Trees & Design Action Group (2012). Trees in Hard Landscapes: A Guide for Delivery. Available at: http://www.tdag.org.uk/uploads/4/2/8/0/4280686/tdag_trees-in-hard-landscapes_september_2014_colour.pdf

[2] Trees & Design Action Group (2012). Trees in the Townscape: A Guide for Decision Makers. Available at: http://www.tdag.org.uk/uploads/4/2/8/0/4280686/tdag_treesinthetownscape.pdf

[3] Trees & Design Action Group (2019). Tree Species Selection for Green Infrastructure. Available at: http://www.tdag.org.uk/uploads/4/2/8/0/4280686/tdag_treespeciesguidev1.3.pdf

[4] British Standards Institution (2014). BS 8545:2014 Trees: from nursery to independence in the landscape - Recommendations. Available at: https://shop.bsigroup.com/ProductDetail/?pid=000000000030219672

[5] British Standards Institution (1991). BS 5837:1991 Guide for trees in relation to construction. Available at: https://shop.bsigroup.com/ProductDetail/?pid=000000000000258384

Figure 39: Trees along main and secondary roads help to reduce any traffic noise and enhance the natural environment.

Car parking solutions

At the time of writing, the demand for private cars remains high and therefore car parking has to be carefully integrated into neighbourhoods. There is no single best approach to domestic car parking. A good mix of parking typologies should be deployed, depending on, and influenced by. location, topography and market demand. The main types to be considered are shown on this page and the next one.

- For family homes, cars should be placed at the front or side of the property. For small pockets of housing a front or rear court is acceptable. Multiple garage parking is encouraged.
- Car parking design should be combined with landscaping to minimise the presence of vehicles.
- Parking areas and driveways should be designed to minimise impervious surfaces, for example through the use of permeable paving.
- When placing parking at the front, the area should be designed to minimise visual impact and to blend with the existing streetscape and materials. The aim is to keep a sense of enclosure and to break the potential of a continuous area of car parking in front of the dwellings by means of walls, hedging, planting, and use of differentiated quality paving materials.
- Cycle parking must be integrated into all new housing.
- A very useful website that helps define appropriate car parking solutions depending on the type of development is http://www.spacetopark.org/. This resource should be used as a design tool in new developments.

On plot side or on front parking

- On-plot parking can be visually attractive when it is combined with high quality and well designed soft landscaping. Front garden depth from pavement back must be sufficient for a large family car.
- Boundary treatment is the key element to help avoid a car-dominated character. This can be achieved by using elements such as hedges, trees, flower beds, low walls, and high quality paving materials between the private and public space.
- Hard standing and driveways must be constructed from porous materials to minimise surface water run-off.

Figure 40: Example of on-plot side parking in Rectory Park. The use of planting and trees helps screen the parking spaces and creates a good visual result.

1. Front parking with part of the surface reserved for soft landscaping. Permeable pavement to be used whenever possible.
2. Side parking set back from the main building line. Permeable pavement to be used whenever possible.
3. Boundary hedges to screen vehicles and parking spaces.

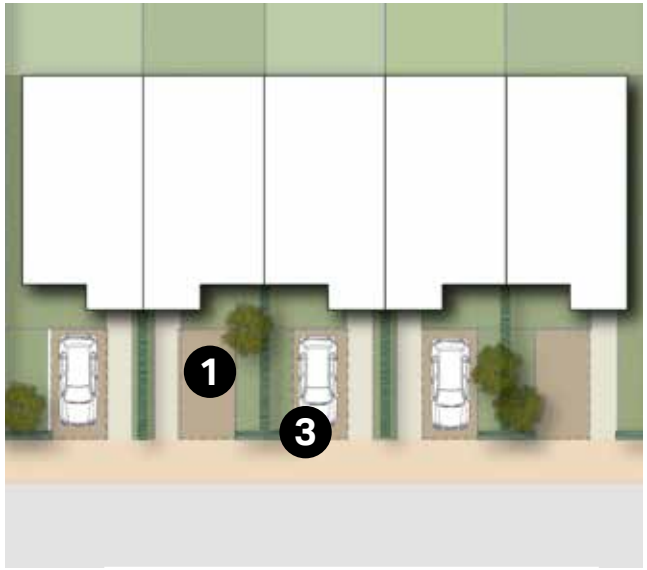


Figure 41: Illustrative diagram showing an indicative layout of on-plot front parking.

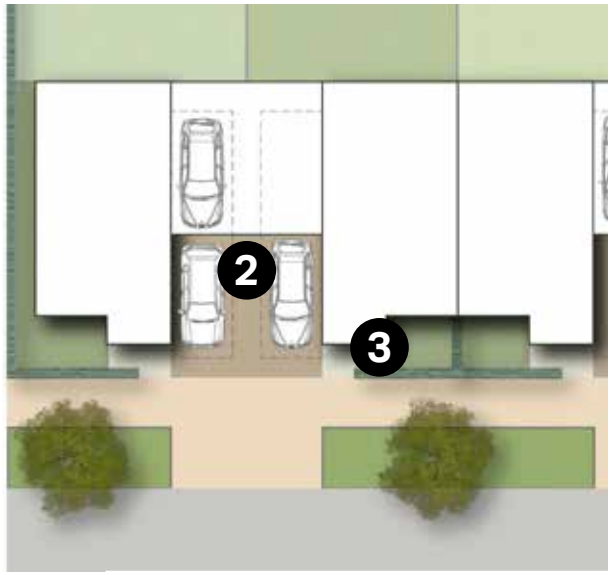
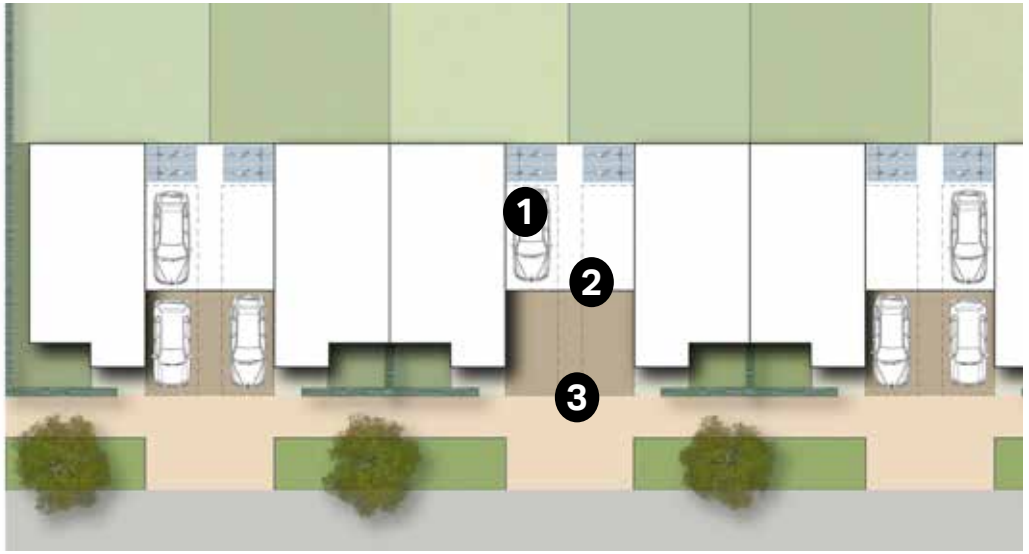


Figure 42: Illustrative diagram showing an indicative layout of on-plot side parking.

On plot garages

- Where provided, garages must be designed either as free standing structures or as additive form to the main building. In both situations, it must complement and harmonise with the architectural style of the main building rather than forming a mismatched unit.
- Often, garages can be used as a design element to create a link between buildings, ensuring continuity of the building line. However, it should be considered that garages are not prominent elements and they must be designed accordingly.
- It should be noted that many garages are not used for storing vehicles, and so may not be the best use of space.
- Consideration must be given to the integration of bicycle parking and/or waste storage into garages.

Figure 43: Example of on-plot garages along Marsh Road. The height of the garages is no higher than the main roofline of the buildings, whilst planting and vegetation in the front gardens help improve the visual result and give the impression of a less car dominated place.



1. Side parking set back from the main building line. Permeable pavement to be used whenever possible.
2. Garage structure set back from main building line. Height to be no higher than the main roofline.
3. Boundary hedges to screen vehicles and parking spaces.

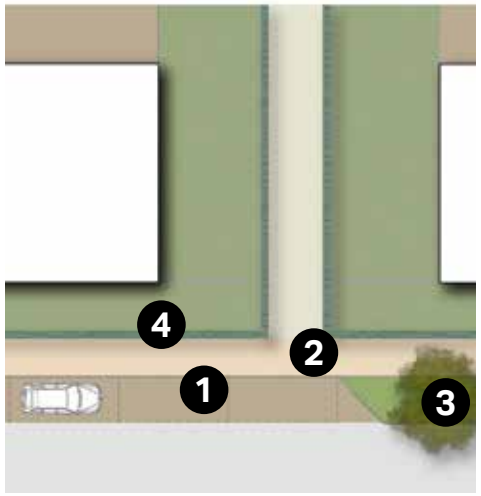
Figure 44: Illustrative diagram showing an indicative layout of on-plot parking with garages.

On street parking

- The streetscape should not to be dominated by continuous on-street parking spaces. Where possible, tree planting and other gaps between parking bays should be incorporated.
- On-street parking can be in parallel, perpendicular or echelon in relation with the traffic speed and the traffic volume.
- On-street parking must be designed to avoid impeding the flow of pedestrians, cyclists, and other vehicles, and can serve a useful informal traffic calming function.
- Parking bays can be inset between kerb build outs or street trees. Kerb build outs between parking bays can shorten pedestrian crossing distances and can host street furniture or green infrastructure. They must be sufficiently wide to shelter the entire parking bay in order to avoid impeding traffic.
- On low-traffic residential streets or lanes that are shared between vehicles and pedestrians, parking bays can be clearly marked using changes in paving materials instead of markings but must be of a different level to the pedestrian way e.g. with a kerb. This will provide drivers with an indication of where to park. The street must be sufficiently wide so that parked vehicles do not impede motor vehicles or pedestrians.
- Opportunities must be created for new public car parking spaces to include electric vehicle charging points. Such provision must be located conveniently throughout the town and designed to minimise street clutter.

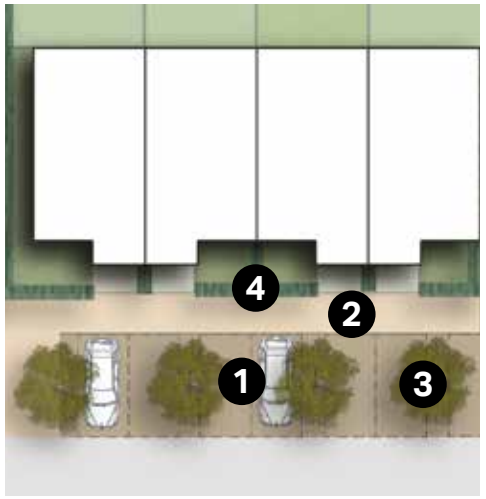
Figure 45: A good practice example, on-street inset parking where a warm colour palette is used for the landscape to create a less car dominated environment, Goldsmith Street, Norwich.

Figure 46: A good practice example - on-street perpendicular parking where hedges and tress are used to mitigate any unpleasant visual impact, Horstead Park, Kent.



1. On-street parking bay inset between kerb extensions.
2. Footway - additional green verge if street width permits.
3. Planted kerb extensions - width to be sufficient to fully shelter parking bay. Trees are optional but would be positive additions.
4. Boundary hedges.

Figure 47: Illustrative diagram showing an indicative layout of on-street inset parking.



1. On-street perpendicular parking bay.
2. Footway.
3. Tree planting used to define car parking spaces.
4. Boundary hedges.

Figure 48: Illustrative diagram showing an indicative layout of on-street perpendicular parking.

Cycle parking

A straightforward way to encourage cycling is to provide secured covered cycle parking within all new residential developments and publicly available cycle parking in the public realm.

Houses without garages

- For residential units, where there is no on-plot garage, covered and secured cycle parking should be provided within the domestic curtilage.
- Cycle storage must be provided at a convenient location with an easy access.
- When provided within the footprint of the dwelling or as a free standing shed, cycle parking should be accessed by means of a door at least 900mm and the structure should be at least 2m deep.
- Parking should be secure, covered and it should be well integrated into the streetscape if it is allocated at the front of the house.
- The use of planting and smaller trees alongside cycle parking can be used to mitigate any visual impact on adjacent spaces or buildings.

Houses with garages

- The minimum garage size should be 7mx3m to allow space for cycle storage.
- Where possible, cycle parking should be accessed form the front of the building either in a specially constructed enclosure or easily accessible garage.
- The design of any enclosure should integrate well with the surroundings.
- The bicycle must be removed easily without having to move the vehicle.

Public realm

New development should promote cycling by providing more cycle routes and monitor the condition of the existing ones.

- Bicycle stands in the public realm should be sited in locations that are convenient and that benefit from adequate natural surveillance. They should be placed in locations that do not impede pedestrian mobility or kerbside activities.
- The chosen materials must be appropriate to its surroundings and follow the dimensions as illustrated below.

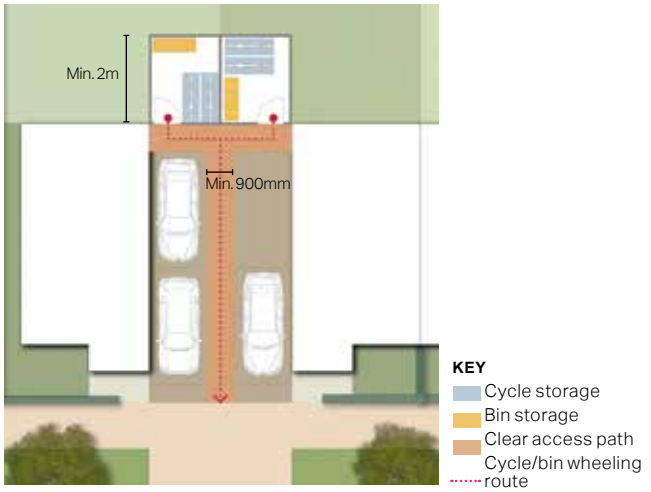


Figure 49: Indicative layout of a bicycle and bin storage area at the back of semi-detached properties.

Figure 52: Example of cycle parking along a high street, UK

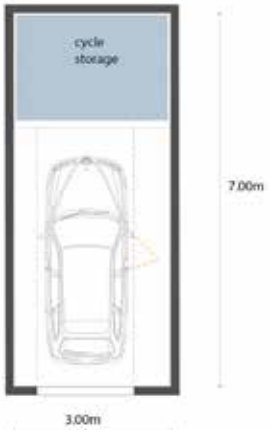


Figure 50: Indicative layout of a garage with a cycle storage area.

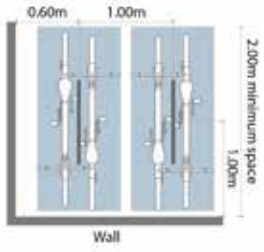


Figure 51: Sheffield cycle stands for visitors and cycle parking illustration.

Servicing

With modern requirements for waste separation and recycling, the number and size of household bins has increased. This poses a problem with the aesthetics of the property. Therefore, we recommend the following:

- When dealing with waste storage, servicing arrangements and site conditions should be taken into account; in some cases waste management should be from the front of the building and in others, from the rear. It is recommended that bins are located away from areas used as amenity space.
- Create a specific enclosure of sufficient size for all the necessary bins.
- Bins should be placed as close to the dwelling's boundary and the public highway, such as against a wall, fence, hedge but not in a way as to obstruct the shared surface for pedestrian and vehicle movements.
- Place it within easy access from the street and, where possible, with the ability to open on the pavement side to ease retrieval.
- Refer to the materials palette to analyse what would be a complementary material.
- Add to the environmentally sustainable design by incorporating a green roof element to it.
- It could be combined with cycle storage.

Figure 53: Bin storage design solution.

Figure 54: Example showing an option for hiding oil tanks used for heating.

3.2.3. Built form

Building line and boundary treatments

- Any new development should front onto, and have access from, the street or public space. Dead frontages should be avoided.
- Buildings should be designed to ensure that streets and/or public spaces have good levels of natural surveillance from buildings. This can be ensured by placing ground floor habitable rooms and upper floor windows facing the street.
- Any new developments should have setbacks that can provide front gardens, or alternatively small areas that offer buffer zones between private and public spaces. Building setbacks should be varied by street level, local character, and type of structure.
- The transition between private and public spaces can vary from a well - defined to a looser boundary. A buffer zone could be defined by the use of railings, fences, plants, walls, etc.
- If placed on the property boundary, waste storage should be integrated as part of the overall design of the property. Landscaping could also be used to minimise the visual impact of bins and recycling containers.

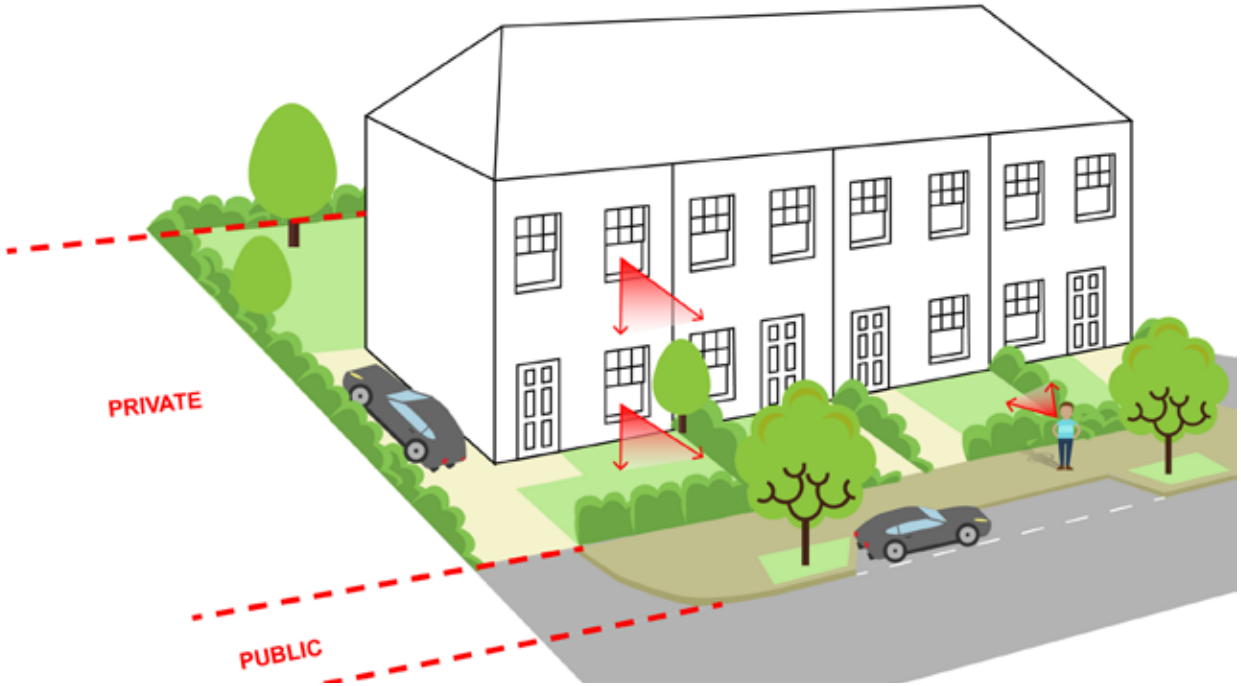


Figure 55: Distinction between public, semi-private and private spaces.

Figure 56: Boundary planting and a distance of 22m between habitable rooms helps to provide a good level of privacy.

Turn the corner

Together with the creation of potential local landmarks, one of the crucial aspects of a successful townscape and urban form is the issue of corners. Because these buildings have at least two public facing façades, they have double the potential to influence the street's appearance. Therefore, the following guidelines apply to corner buildings.

- If placed at important intersections the building could be treated as a landmark and thus be slightly taller or display another built element, signalling its importance as a way - finding cue.
- The form of corner buildings should respect the local architecture characters that improves the street scene and generates local pride.
- All the façades overlooking the street or public space should be treated as primary façades.
- They should have some form of street contact in the form of windows, balconies, or outdoor private space.
- In the case of fencing for back gardens or perimeter walls, the quality of the materials should be high. Panel fencing should be avoided. Instead, different treatments should be used such as: dry wall or masonry walls which create patterns similar to the main building windows; patterns created with bricks; a green wall; hedges and planting; a combination of timber and brick; country fencing, etc.
- Perimeter walls should be made in high quality materials.

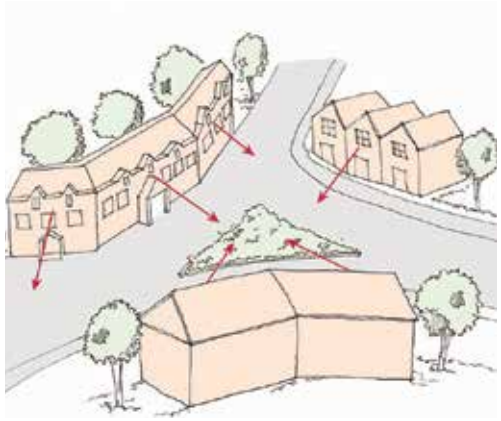


Figure 57: Natural surveillance should be fully achieved at the corners by addressing them with active frontages.

Figure 58: Example of a corner addressed by a detached house with windows on both streets to enhance natural surveillance and physical boundary treatment to add a level of privacy as well.

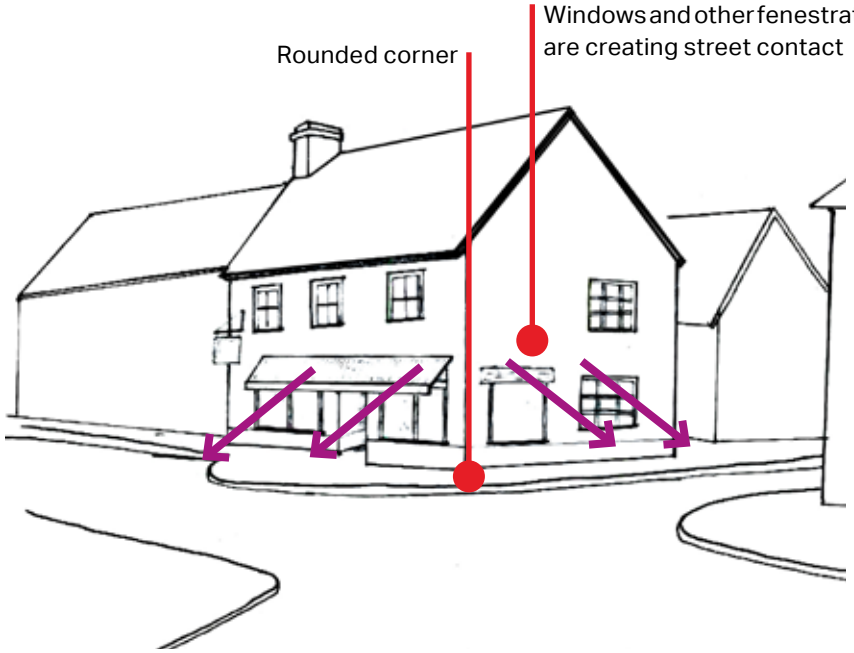


Figure 59: Windows on both streets facing façades provide enhanced natural surveillance.

Enclosure

Focal points and public spaces in new developments should be designed in good proportions and delineated with clarity. Clearly defined spaces help achieve cohesive and attractive village forms. They also create an appropriate sense of enclosure - the relationship between a given space (lane, street, square) and the vertical boundary elements at its edges (buildings, walls, trees).

The enclosure level of new developments must reflect an intelligent understanding of their surrounding historic environment. The historic core of Boxford has a higher level of enclosure, with fewer front gardens and buildings that directly front the main street. The surrounding neighbourhoods have a greater variety of enclosure levels, but are in general more open than in the centre of the village with a higher prevalence of front gardens and more distinctive building setbacks.

The following principles serve as general guidelines that should be considered for achieving a satisfactory sense of enclosure:

- When designing building setbacks, there must be an appropriate ratio between the width of the street and the height of the buildings (see diagram opposite).
- Buildings should be designed to turn corners and create attractive start and end points of a new street or frontage.
- Generally, building façades should front onto streets. Variation to the building line can be introduced to create an informal character.
- In the case of terraced and adjoining buildings, it is recommended that a variety of plot widths, land use, building heights, and façade depth should be considered during the design process to create an attractive streetscape and break the monotony of the street wall.
- Trees, hedges, and other landscaping features can help create a more enclosed streetscape in addition to providing shading and protection from heat, wind, and rain.

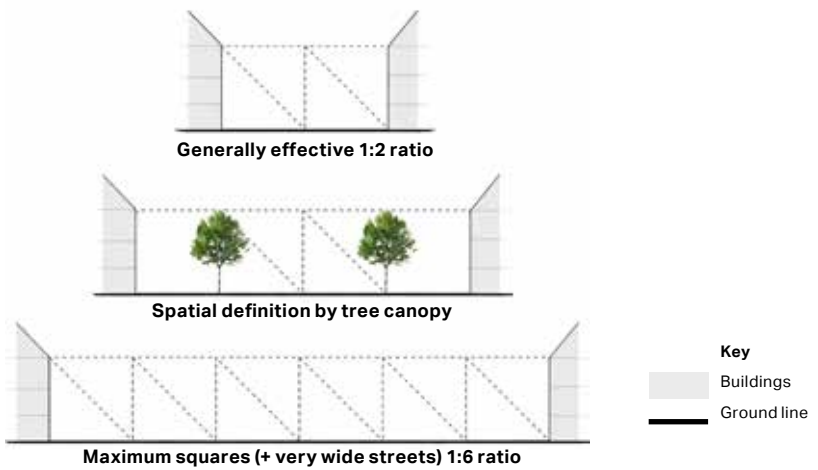


Figure 60: 'Enclosure' is the relationship between the height of the buildings and the distance across the street or space between facing ones. A ratio of 1:2 (top) or 1:3 is generally appropriate for residential streets, with 1:6 (bottom) a general maximum for squares and very wide streets. Enclosure can be defined by trees instead of buildings (centre).

Figure 61: Green open spaces surrounded by buildings can create an enclosed environment reflecting the character of Boxford village.

Building heights and roofline

Boxford village already has two prevailing rooflines defined by the types of building groupings that are found in the area. The two photos/diagrams shown on this page illustrate those rooflines that both contribute to the character of the village in a different way. The continuous roofline is characteristic of the historic core of the village while the interrupted one reinforces the existing rich green infrastructure allowing for views to the countryside.

Creating variety in the roofline is a significant element of designing attractive places. There are certain elements that serve as guidelines in achieving a good variety of roofs:

- The scale and pitch of the roof should always be in proportion with the dimensions of the building itself.
- Monotonous building elevations should be avoided, therefore subtle changes in roofline should be ensured during the design process. Roof shapes and pitches must however employ a restrained palette on a given building; overly complex roofs must be avoided.
- Locally traditional roof detailing elements such as roofing materials, edge treatments, and dormer styles should be considered and implemented where possible in new developments.
- Dormers can be used as a design element to add variety and interest to roofs. They must be proportional to the mass of the building roof, be vertically aligned to the windows, and be of consistent style across an elevation.
- Future developments should follow the existing styles in rooflines and avoid long stretches of similar roof heights and monotonous rooflines.
- Higher buildings should be placed on important roads and junctions to be used as landmarks and improve legibility.

Figure 62: Within the historic core, the roofline is continuous, due to the building groupings, creating an interesting visual result.

Figure 63: Outside the historic core, the surrounding neighbourhoods are characterised by different building groupings with repetitive gaps creating a different roofline pattern, interrupted by those gaps that allow long distance views to the countryside.

Façades and fenestration

Windows, in Boxford village, are varied in type and arrangement. There are examples of the 'cottage' type common and the Georgian style sash with glazing bars popular on re-fronted houses. Moving to the surrounding neighbourhoods, outside the historic core, the prevailing style is casement windows. Some important guidelines that new development should consider in design are:

- Fenestration on public/private spaces increase the natural surveillance and enhances the attractiveness of the place. Long stretches of blank (windowless) walls should be avoided, including on side elevations. Overall, considerations for natural surveillance, interaction, and privacy must all be addressed carefully.
- The number and size of the windows should be proportionate to each elevation. Because sunlight has an important effect on the circadian rhythm, windows must be of sufficient size and number for abundant natural light.
- Site layout and building massing should ensure access to sunshine and avoid overshadowing neighbouring buildings and gardens. New developments should also maximise opportunities for long-distance views.
- A restrained palette of window styles and shapes must be used across a given façade to avoid visual clutter and dissonance. Within a cluster of buildings, however, diversity in fenestration can add visual interest and avoid monotonous repetitions.
- Necessary window repair or replacement must be sympathetic to the host building and local vernacular, especially within or in proximity to conservation areas. Fenestration must reflect an understanding of locally distinctive features such as window rhythm, scale, proportions, materials, ornamentation, and articulation. This should however not result in low-quality pastiche replica.

Figure 64: Houses within the historic core display consistent window alignment while allowing for sufficient variety in their placement.

Figure 65: New development in Goodlands uses a modern version of casement windows that are sympathetic to the local vernacular of the village.

Figure 66: A variety of styles can be accommodated on a building facade, always maintaining the alignment to create a good visual result.

Figure 67: Modern versions of window styles should be in line with the local vernacular and any proposal that is not sensitive to the existing architecture should be avoided.

Local vernacular

The local vernacular of Boxford village is rich and composed by a variety of materials and architectural styles and techniques.

Starting from the core of the village, the Grade I listed 15th century Church of St Mary stands prominently at the centre. It is built largely of flint with stone dressing and a red clay flat tile roof and has an exceptional Caen limestone south porch. The wooden north porch is very rare and of an earlier origin. Opposite of Broad Street, the Grade II* listed Fleece Hotel is located which has an 18th Century stucco facade covering an older, probably 16th Century, timber-framed building, with a carriage entrance through to the rear yard with a fine range of red brick outbuildings. The rest of the listed buildings, Grade II, are houses and cottages, mainly domestic in style and function. They offer a variety of different styles, frontages and heights that all together compose a positive image for Boxford village. Most are timber-framed but over the centuries they have in many cases been re-fronted with a variety of materials, usually render or brick, hiding the frame completely.

A variety of subdued colour palettes have been used for the walls, especially within the historic core, emphasising the individuality of each house without detracting from the unity of the whole village.

Most houses in the village have steep clay red flat tiled roofs with red brick chimneys and overhanging eaves. Some have façades in Sudbury white brick, often combined with slate roofs. Also a feature of the village are the many red brick boundary walls to properties, dating from the 19th century.

Figure 68: The Grade I listed 15th century Church of St Mary stands prominently at the centre of the historic core.

Figure 69: Variety in colour palettes, chimneys and eaves are architectural details that define the local vernacular and should be preserved.

Figure 70: The brickwork in this building, including red and black brick, makes it a focal point along Swan Street enhancing the architecture of the village but also improving legibility.

Figure 71: The variety in styles and colour palettes for the porches found within the conservation area of Boxford village enhance the local vernacular.

Materials

The materials and architectural detailing used throughout the Parish contribute to the historic character of the area and the local vernacular. It is therefore important that the materials used in proposed developments are of a high quality and reinforce local distinctiveness. Any future development proposals should demonstrate that the palette of materials has been selected based on a solid knowledge of the local vernacular style and traditions. They must also reflect an intelligent understanding of the building details of the historic settlement cores without resulting in low-quality imitations of past styles.

In new developments and renovations, locally sourced bricks or bricks that match the buildings in the surrounding area would be the most appropriate. Particular attention should be given to the bonding pattern, size, colour, and texture of bricks. While red bricks are extensively used in the Parish, stocks bricks are not characteristic of the area and should be avoided. Engineering bricks do not contribute to the historic character of the Parish, however, due to their durability they can be appropriate in some occasions. Generally, for inspiration and appropriate examples, the developers should look at the historic cores of the settlements and the surrounding area. Each development should be designed with the specific location in mind and its immediate surroundings.

The next page includes examples of building materials that contribute to the local vernacular of the Parish and that could be used to inform future development.

Colour palettes

Any future development proposals should demonstrate that the palette of rendering colours (building materials or paint) has been selected based on an understanding of the surrounding built environment.

New developments should be able to demonstrate a sympathetic response to the more historic developments in Boxford.

COLOUR PALETTES

Warm beige tones for rendering and as colour choice for building material.

Undertones: ochre , grey and brown.

Earthy tones for rendering and as colour choice for building material.

Undertones: yellow, orange, brick and taupe.

FLINT WALLING

YELLOW BRICK

RED BRICK

WALL PARGETTING

PORCH DETAILING

TIMBER-FRAMING WITH WHITE RENDER INFILLS

RENDERING

CLAY RED FLAT TILED ROOF WITH RED BRICK CHIMNEYS

HIP ROOF

GABLE ROOF

LOW BRICK WALL

LANDSCAPE BOUNDARY HEDGE

3.2.4. Environmental and energy efficiency

Sustainable building

The following section elaborates on energy efficient technologies that could be incorporated in buildings and at broader Parish design scale as principles.

Use of such principles and design tools should be encouraged in order to contribute towards a more sustainable environment

Energy efficient or eco design combines all around energy efficient appliances and lighting with commercially available renewable energy systems, such as solar electricity and/or solar/ water heating.

Starting from the design stage there are strategies that can be incorporated to incorporate technologies such as passive solar heating, cooling and energy efficient landscaping which are determined by local climate and site conditions.

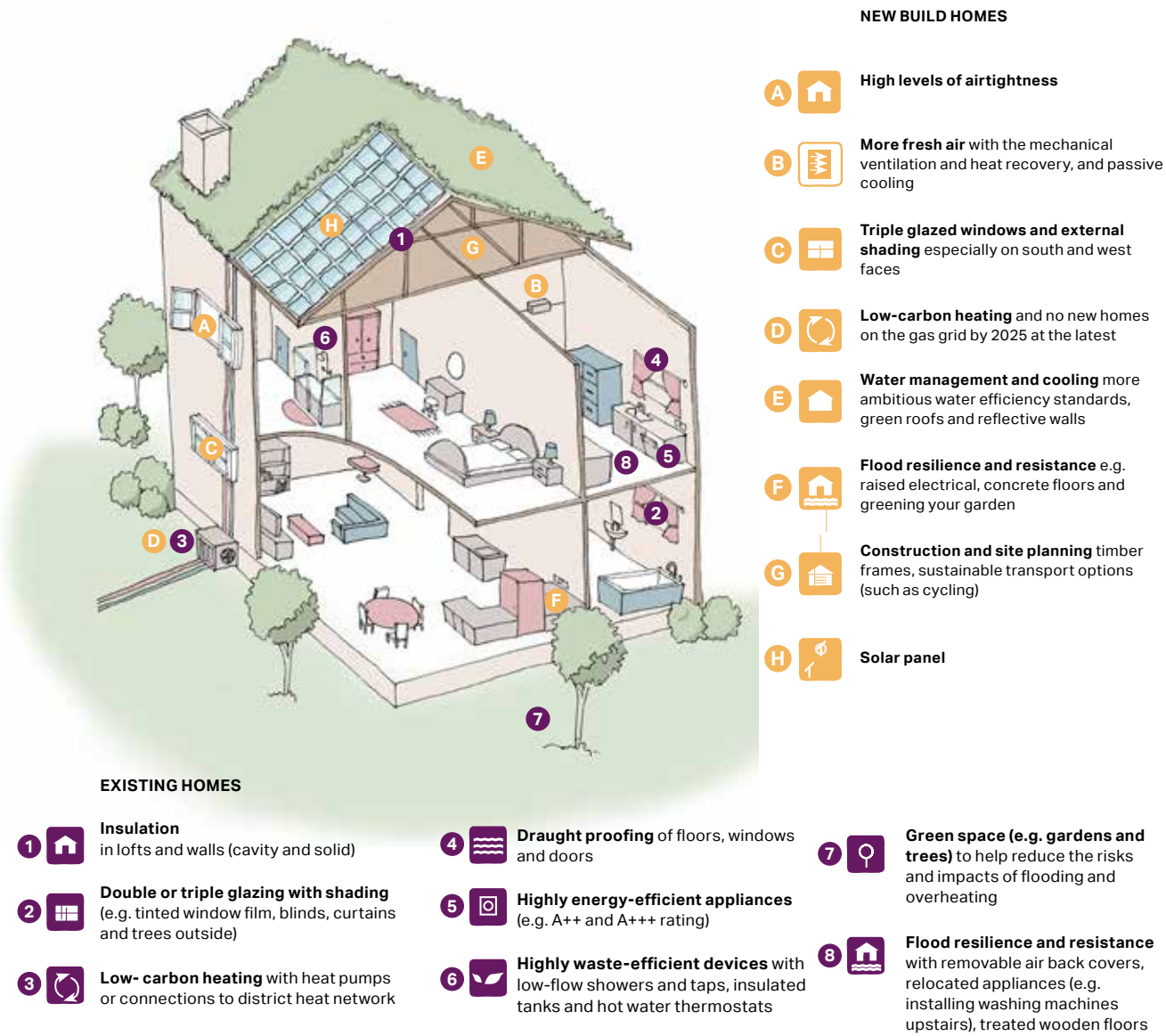


Figure 72: Diagram showing low-carbon homes in both existing and new build conditions.

SuDs

The term SuDS stands for Sustainable Drainage Systems. It covers a range of approaches to managing surface water in a more sustainable way to reduce flood risk and improve water quality whilst improving amenity benefits.

SuDS work by reducing the amount and rate at which surface water reaches a waterway or combined sewer system. Usually, the most sustainable option is collecting this water for reuse, for example in a water butt or rainwater harvesting system, as this has the added benefit of reducing pressure on important water sources.

Where reuse is not possible there are two alternative approaches using SuDS:

- Infiltration, which allows water to percolate into the ground and eventually restore groundwater.
- Attenuation and controlled release, which holds back the water and slowly releases it into the sewer network. Although the overall volume entering the sewer system is the same, the peak flow is reduced. This reduces the risk of sewers overflowing. Attenuation and controlled release options are suitable when either infiltration is not possible (for example where the water table is high or soils are clay) or where infiltration could be polluting (such as on contaminated sites).

The most effective type or design of SuDS would depend on site-specific conditions such as underlying ground conditions, infiltration rate, slope, or presence of ground contamination. A number of overarching principles can however be applied:

- Manage surface water as close to where it originates as possible.
- Reduce runoff rates by facilitating infiltration into the ground or by providing attenuation that stores water to help slow its flow down so that it does not overwhelm water courses or the sewer network.
- Improve water quality by filtering pollutants to help avoid environmental contamination.
- Form a 'SuDS train' of two or three different surface water management approaches.
- Integrate into development and improve amenity through early consideration in the development process and good design practices.
- SuDS are often as important in areas that are not directly in an area of flood risk themselves, as they can help reduce downstream flood risk by storing water upstream.
- Some of the most effective SuDS are vegetated, using natural processes to slow and clean the water whilst increasing the biodiversity value of the area.
- Best practice SuDS schemes link the water cycle to make the most efficient use of water resources by reusing surface water.
- SuDS must be designed sensitively to augment the landscape and provide biodiversity and amenity benefits.

Figure 73: Example of SuDS designed as a public amenity and fully integrated into the design of the public realm in Stockholm, Sweden.

Figure 74: Example of SuDS designed as a public amenity and fully integrated into the design of the public realm, UK.

Roof solar panels

Solar panels over a rooftop can have a positive environmental impact, however their design and installation should be done carefully considering potential implications within conservations areas. Preserving the character of the village should be a priority.

Some solutions of sensitive implementation of solar roof panels are suggested as follows:

On new builds

- Design solar panel features from the start, forming part of the design concept. Some attractive options are solar shingles and photovoltaic slates.
- Use the solar panels as a material in their own right.

On retrofits

- Analyse the proportions of the building and roof surface in order to identify the best location and sizing of panels.
- Consider introducing other tile or slate colours to create a composition with the solar panel materials.
- Conversely, aim to introduce contrast and boldness with proportion. There has been increased interest in black panels due to their more attractive appearance. Black solar panels with black mounting systems and frames can be an appealing alternative to blue panels.
- Carefully consider the location of solar panels on buildings within the Great Dalby Conservation Area. It might be appropriate to introduce solar panels to areas of the building that are more concealed in order to preserve the character and appearance of the conservation area.
- Solar panels can be added to listed buildings, but they need to be carefully sited and consent will be required.

Figure 75: Integration of solar panels on the south-facing pane of the roof of a new house in Lingfield, Surrey.

Figure 76: Use of shingle-like solar panels on a slate roof, with the design and colour of the solar panels matching those of the adjacent slate tiles in Lingfield, Surrey.

Permeable pavements

Most built-up areas, including roads and driveways, increase impervious surfaces and reduce the capacity of the ground to absorb runoff water. This in turn increases the risks of surface water flooding. Permeable pavements offer a solution to maintain soil permeability while performing the function of conventional paving. The choice of permeable paving units must be made depending on the local context; the units may take the form of unbound gravel, clay pavers, or stone setts.

Permeable paving can be used where appropriate on footpaths, public squares, private access roads, driveways, and private areas within the individual development boundaries. In addition, permeable pavement must also:

- Flood and Water Management Act 2010, Schedule 3.[1]
- The Building Regulations Part H – Drainage and Waste Disposal.[2]
- Town and Country Planning (General Permitted Development) (England) Order 2015.[3]

Regulations, standards, and guidelines relevant to permeable paving and sustainable drainage are listed below:

- Sustainable Drainage Systems - non-statutory technical standards for sustainable drainage systems.[4]
- The SuDS Manual (C753).[5]
- BS 8582:2013 Code of practice for surface water management for development sites.[6]
- BS 7533-13:2009 Pavements constructed with clay, natural stone or concrete pavers.[7]
- Guidance on the Permeable Surfacing of Front Gardens.[8]

Figure 77: Example of a permeable paving option.

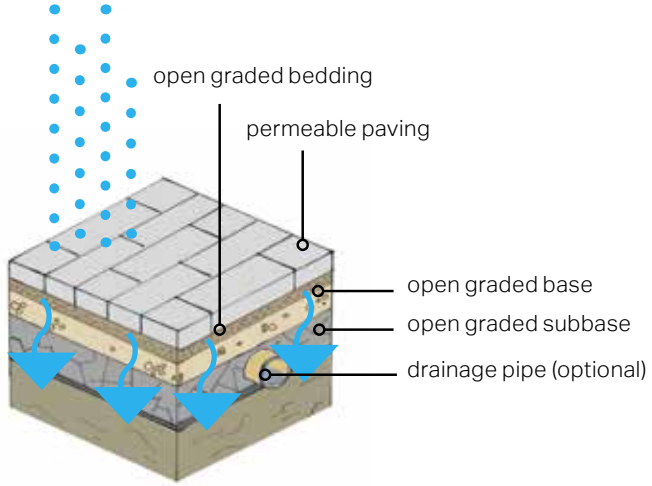


Figure 78: Diagram illustrating the functioning of a soak away.

[1] Great Britain (2010). *Flood and Water Management Act, Schedule 3*. Available at: http://www.legislation.gov.uk/ukpga/2010/29/schedule/3

[2] Great Britain (2010). *The Building Regulations Part H – Drainage and Waste Disposal*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/442889/BR_PDF_AD_H_2015.pdf

[3] Great Britain (2015). *Town and Country Planning (General Permitted Development) (England) Order 2015*. Available at: http://www.legislation.gov.uk/uksi/2015/596/pdfs/uksi_20150596_en.pdf

[4] Great Britain. Department for Environment, Food and Rural Affairs (2015). *Sustainable drainage systems – non-statutory technical standards for sustainable drainage systems*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/415773/sustainable-drainage-technical-standards.pdf

[5] CIRIA (2015). *The SuDS Manual (C753)*.

[6] British Standards Institution (2013). *BS 8582:2013 Code of practice for surface water management for development sites*. Available at: https://shop.bsigroup.com/ProductDetail/?pid=000000000030253266

[7] British Standards Institution (2009). *BS 7533-13:2009 Pavements constructed with clay, natural stone or concrete pavers*. Available at: https://shop.bsigroup.com/ProductDetail/?pid=000000000030159352

[8] Great Britain. Ministry of Housing, Communities & Local Government (2008). *Guidance on the Permeable Surfacing of Front Gardens*. Available at:https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/7728/pavingfrontgardens.pdf

Wildfriendly environment

- Biodiversity and woodlands should be protected and enhanced where possible. Hedges, trees, road verges along roads as well as natural tree buffers should be protected when planning for new developments.
- Abrupt edges to development with little vegetation or landscape on the edge of the settlement should be avoided and, instead, a comprehensive landscape buffering should be encouraged.
- New developments and building extensions should aim to strengthen biodiversity and the natural environment.
- Ensure habitats are buffered. Widths of buffer zones should be wide enough and based on specific ecological function.
- New development proposals should include the creation of new habitats and wildlife corridors. This could be by aligning back and front gardens or installing bird boxes or bricks in walls. Wildlife corridors should be included to enable wildlife to travel to and from foraging areas and their dwelling areas.

Figure 79: Example of a bughouse located in an outdoor playground facility.

Figure 80: Example of a structure used as a frog habitat corridor located in an outdoor green space.

Green Roofs

Green roofs improve drainage and add to biodiversity. Whether the roof is partially or completely covered with vegetation, their design should follow some design principles such as:

- Planned from the start.
- Easy to reach and maintain.
- To complement (where applicable) the surrounding landscape.
- To help integrate the building with the countryside.
- Design comprehensively with other eco designs such as water harvesting and porous pavements.

Figure 81: Modern building with green roof and facade.

Figure 82: Green roof integrating the building with the countryside.

Storage and slow release

Rainwater harvesting refers to the systems allowing the capture and storage of rainwater as well as those enabling the reuse in-site of grey water. Simple storage solutions, such as water butts, can help provide significant attenuation. To be able to continue to provide benefits, there has to be some headroom within the storage solution. If water is not reused, a slow release valve allows water from the storage to trickle out, recreating capacity for future rainfall events. New digital technologies that predict rainfall events can enable stored water to be released when the sewer has greatest capacity to accept it.

These systems involve pipes and storage devices that could be unsightly if added without an integral vision for design. Therefore, some design recommendation would be to:

- Conceal tanks by cladding them in complementary materials.
- Use attractive materials or finishing for pipes.
- Combine landscape/planters with water capture systems.
- Underground tanks.
- Utilise water bodies for storage.

Figure 83: Examples of water butts used for rainwater harvesting in Reach, Cambridgeshire.

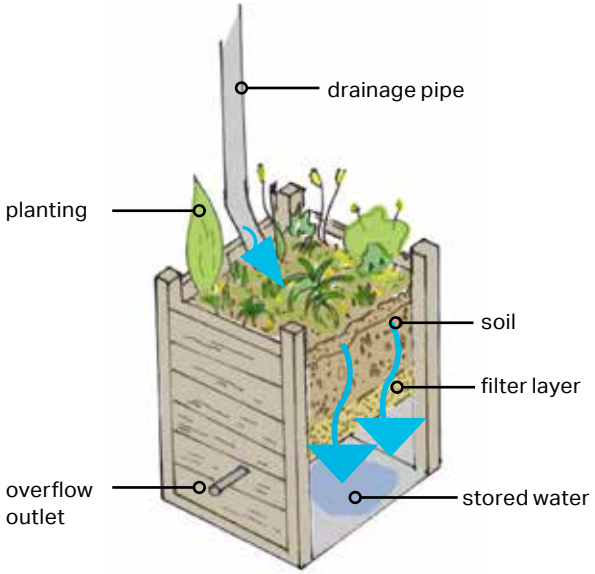


Figure 84: Diagram illustrating the functioning of a stormwater planter.

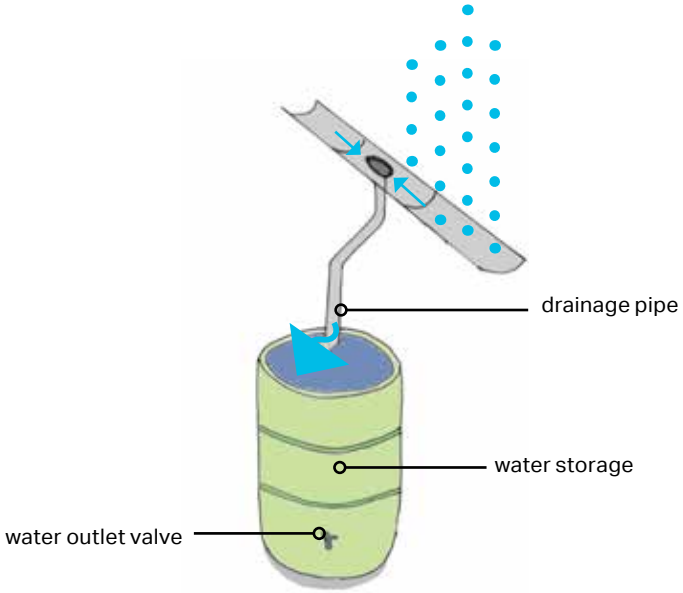


Figure 85: Diagram illustrating the functioning of a water butt.

Bioretention systems

Bioretention systems, including soak away and rain gardens, can be used within each development, along verges, and in semi-natural green spaces. They must be designed to sit cohesively with the surrounding landscape, reflecting the natural character of the Parish. Vegetation must reflect that of the surrounding environment.

They can be used at varying scales, from small-scale rain gardens serving individual properties, to long green-blue corridors incorporating bioretention swales, tree pits and mini-wetlands, serving roads or extensive built-up areas.

These planted spaces are designed to enable water to infiltrate into the ground. Cutting of downpipes and enabling roof water to flow into rain gardens can significantly reduce the runoff into the sewer system. The UK Rain Garden Design Guidelines provides more detailed guidance on their feasibility and suggests planting to help improve water quality as well as attract biodiversity.[1]

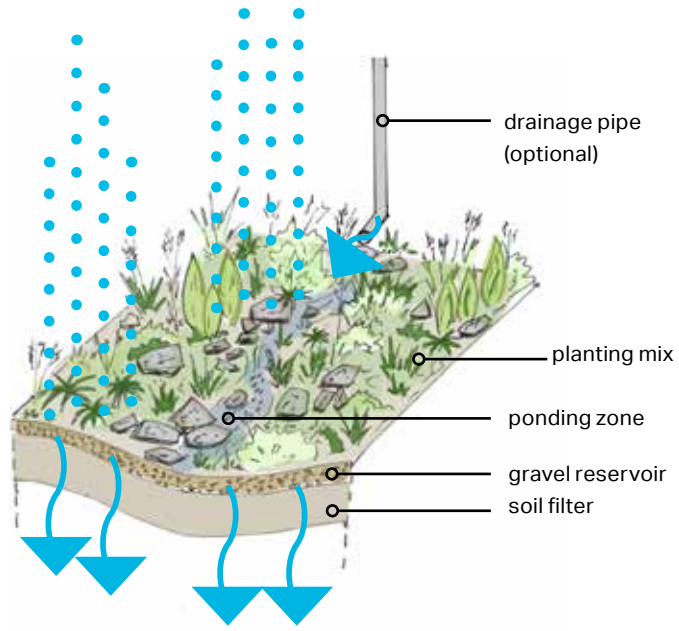


Figure 86: Diagram illustrating the functioning of a rain garden.

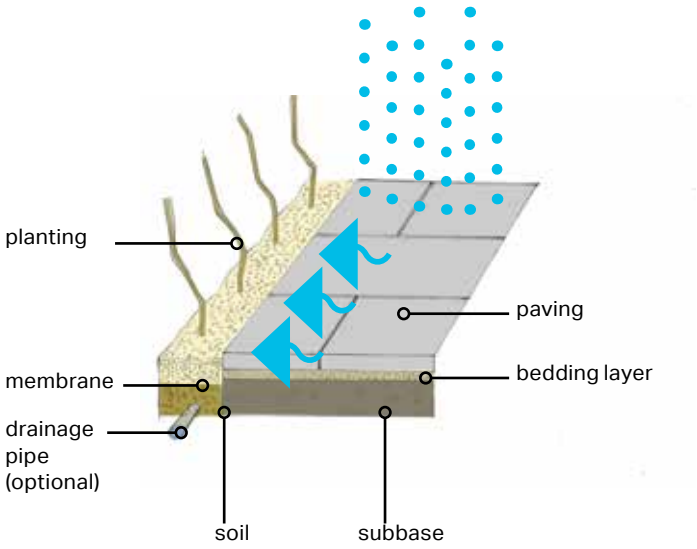


Figure 87: Diagram illustrating the functioning of a soak away garden.

[1] UK Rain Gardens Guide. Available at: https://raingardens.info/wp-content/uploads/2012/07/UKRainGarden-Guide.pdf

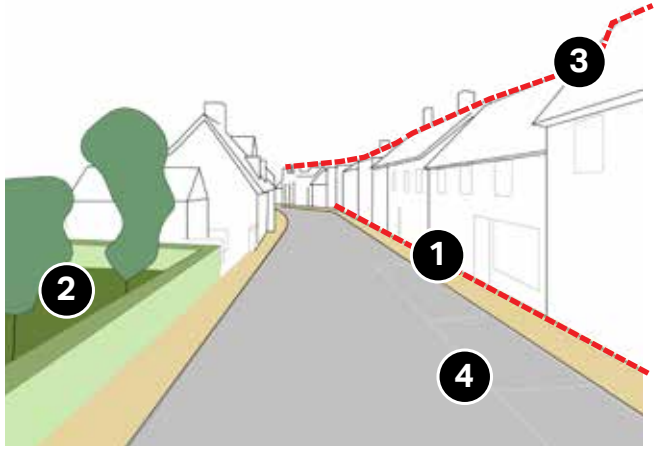
3.3. Design codes for each character area

CH.A 1 - Village core

The priority for this character area is to maintain the continuity on the building façades and preserve the local vernacular.

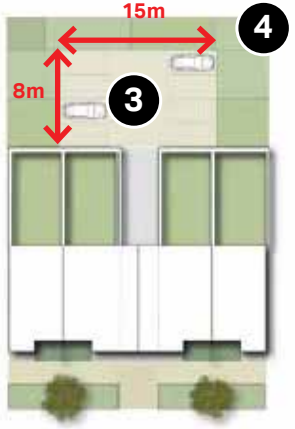
LAYOUT AND BUILDING APPEARANCE

- Buildings should be organised on a linear format along main roads.
- Building façades should accommodate planting and vegetation to improve public realm without obstructing movement along the narrow footways.
- New development should maintain the rich vernacular of the area in terms of architectural details and textures. More details can be found in Section 3.2.3 in the report.
- Buildings façades should use a variety of the Suffolk colour palette, presented in Section 3.2.3, as well as local red, white or yellow brick to give emphasis on the individuality of each without detracting from the unity of the whole.
- New buildings should match the height of surrounding properties in order to maintain the existing roofline; buildings should not generally exceed 2 to 2.5 storeys.
- New development should integrate rear parking courtyards in the design in order to address the parking needs, while also preserving the characteristic continuity on the building façades. On-street parallel car parking could also be proposed along roads that are wide enough to avoid creating any obstruction in vehicle movement, whilst designated areas for service and emergency parking can be proposed along narrow streets, like Swan Street.



1. Continuous façades that follow a linear format with consistent building setbacks.
2. Small green buffers can improve the visual result and break the continuity.
3. Building heights should not exceed 2 to 2.5 storeys.
4. On-street parallel parking should be integrated into design, where possible, without obstructing vehicle movement.

Figure 88: Illustration to highlight design elements, related to the pattern and layout of buildings and streets.



1. Access to the parking courts through archways to ensure the continuity of the building façades.
2. Continuity on the building façades is preserved.
3. Car parking courtyards should be kept small in scale, limited to maximum 8 cars (where possible) and they should be easy in access.
4. Parking courtyards overlooked by other properties.

Figure 89: Illustration to show a rear parking courtyard layout.

CH.A 2 - Meandering neighbourhoods

The priority for this character area is to create a permeable street network and enhance boundary treatments promoting a clear separation between private and public spaces.

LAYOUT AND BUILDING APPEARANCE

- Buildings setbacks should be generally consistent to create clear and unobstructed views within the neighbourhood and the countryside.
- New development should support a well-connected footpath and cycle network that will link those places with the village centre, the local facilities and the surrounding countryside. In addition, appropriate signage should be incorporated into design to improve legibility.
- Physical boundary treatments should be enhanced in order to improve the environment, secure a level of privacy and clearly separate public from private spaces.
- Building groupings should allow for occasional gaps between properties to offer views to the surrounding countryside. In addition, corner treatment should include windows on both façades facing the streets to enhance natural surveillance and maximise the sunlight entering the house.
- Variety in building typologies and roof types should be encouraged in order to enhance the architectural character of the place and create interesting visual outcomes.
- Parking provision should include on-plot parking as well as on-street. Green verges and street trees should decorate the roads to minimise the impression of car dominance. More details on parking layouts can be found in Section 3.2.2.

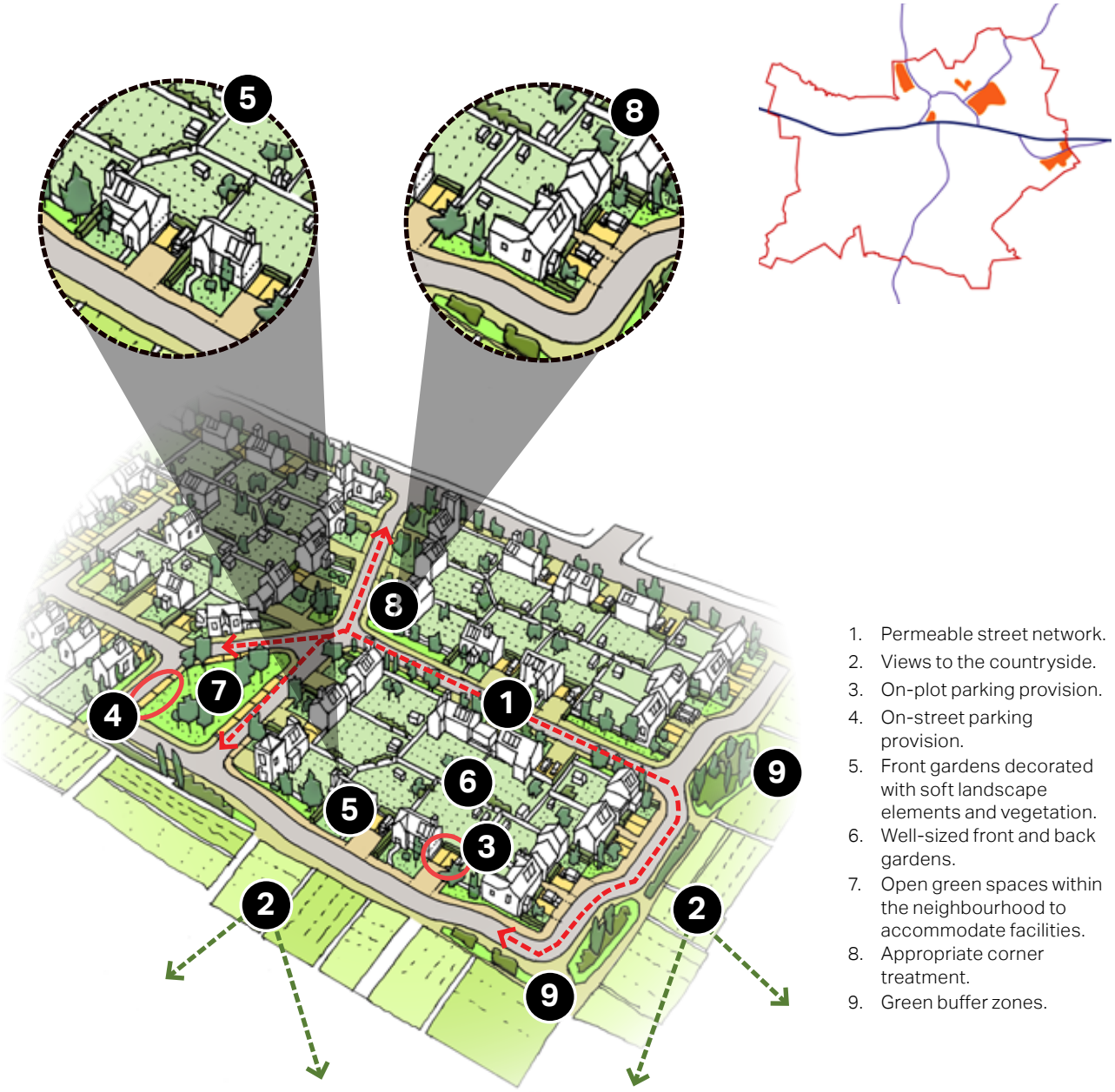


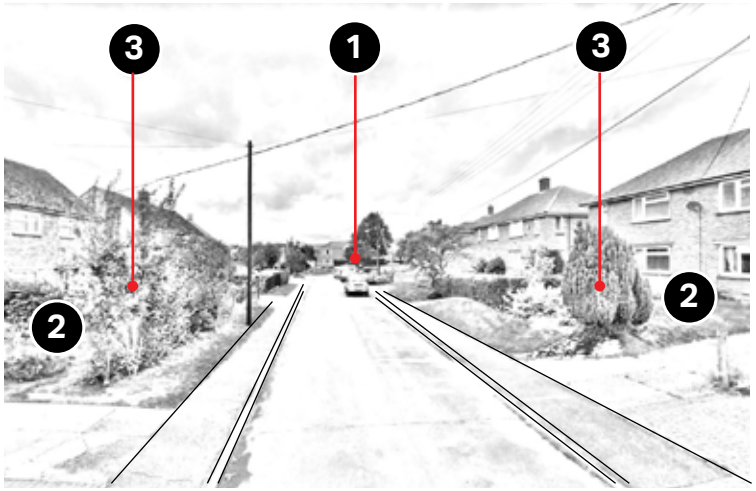
Figure 90: Illustration to show a neighbourhood block highlighting design elements, related to the pattern and layout of buildings and streets.

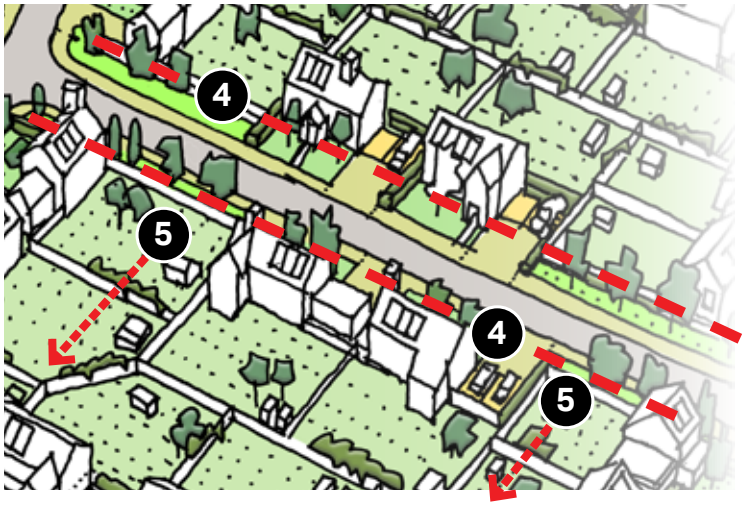
CH.A 3 - Linear neighbourhoods

The priority for this character area is to preserve the linear format of the buildings while also ensuring good connection for pedestrians and cyclists to the centre and the countryside.

LAYOUT AND BUILDING APPEARANCE

- Buildings should be organised on a linear format along main roads.
- New development should support a well-connected footpath and cycle network that will link those places with the village centre, the local facilities and the surrounding countryside. In addition, appropriate signage should be incorporated into design to improve legibility and encourage more people using this network.
- Building groupings should maintain the same layout allowing for occasional gaps between properties to offer views to the surrounding countryside. In addition, corner treatment should include windows on both façades facing the streets to enhance natural surveillance and maximise the sunlight entering the house.
- Parking provision should include on-plot parking as well as on-street. Green verges and street trees should decorate the roads to minimise the impression of car dominance.
- Buildings should not be repetitive, and provide variety of building types and design with coherent scale, massing and elegant simplicity in detailing.





1. On-street parking along one side of the road interrupted from green verges and street trees.
2. Well-sized front gardens with on-plot parking on the side.
3. Physical boundaries and vegetation in front gardens.
4. Linear development with consistent building line.
5. Gaps between building to allow for views to the countryside.

Figure 91: Illustrations to show a residential street of linear format highlighting design elements.

3.4. General questions to ask and issues to consider when presented with a development proposal

Because the design guidelines of this chapter cannot cover all design eventualities, this section provides a number of questions based on established good practice against which the design proposal should be evaluated. The aim is to assess all proposals by objectively answering the questions below. Not all the questions will apply to every development. The relevant ones, however, should provide an assessment as to whether the design proposal has taken into account the context and provided an adequate design solution.

As a first step there are a number of ideas or principles that should be present in the proposals. The proposals or design should:

1. Integrate with existing paths, streets, circulation networks and patterns of activity;
2. Reinforce or enhance the established village or smaller settlement character of streets, greens, and other spaces;
3. Respect the rural character of views and gaps;
4. Harmonise and enhance existing settlement in terms of physical form, architecture and land use;
5. Relate well to local topography and landscape features, including prominent ridge lines and long-distance views;
6. Reflect, respect, and reinforce local architecture and historic distinctiveness;
7. Retain and incorporate important existing features into the development;
8. Respect surrounding buildings in terms of scale, height, form and massing;
9. Adopt contextually appropriate materials and details;
10. Provide adequate open space for the development in terms of both quantity and quality;
11. Incorporate necessary services and drainage infrastructure without causing unacceptable harm to retained features;
12. Ensure all components e.g. buildings, landscapes, access routes, parking and open space are well related to each other;
13. Make sufficient provision for sustainable waste management (including facilities for kerbside collection, waste separation, and minimisation where appropriate) without adverse impact on the street scene, the local landscape or the amenities of neighbours; and
14. Positively integrate energy efficient technologies.

Following these ideas and principles, there are number of questions related to the design guidelines outlined later in the document.

Street grid and layout

- Does it favour accessibility and connectivity over cul-de-sac models? If not, why?
- Do the new points of access and street layout have regard for all users of the development; in particular pedestrians, cyclists, and those with disabilities?
- What are the essential characteristics of the existing street pattern? Are these reflected in the proposal?
- How will the new design or extension integrate with the existing street arrangement?
- Are the new points of access appropriate in terms of patterns of movement?
- Do the points of access conform to the statutory technical requirements?

Green spaces, views and character

- What are the particular characteristics of this area which have been taken into account in the design; i.e. what are the landscape qualities of the area?
- Does the proposal maintain or enhance any identified views or views in general?
- How does the proposal affect the trees on or adjacent to the site?
- Has the proposal been considered within its wider physical context?
- Has the impact on the landscape quality of the area been taken into account?
- In rural locations, has the impact of the development on the tranquillity of the area been fully considered?
- How does the proposal affect the character of a rural location?
- How does the proposal impact on existing views which are important to the area and how are these views incorporated in the design?
- Can any new views be created?
- Is there adequate amenity space for the development?
- Does the new development respect and enhance existing amenity space?
- Have opportunities for enhancing existing amenity spaces been explored?
- Will any communal amenity spaces be created? If so, how will this be used by the new owners and how will it be managed?

Gateway and access features
- What is the arrival point, how is it designed?
- Does the proposal maintain or enhance the existing gaps between settlements?
- Does the proposal affect or change the setting of a listed building or listed landscape?
- Is the landscaping to be hard or soft?

Buildings layout and grouping
- What are the typical groupings of buildings?
- How have the existing groupings been reflected in the proposal?
- Are proposed groups of buildings offering variety and texture to the townscape?
- What effect would the proposal have on the streetscape?
- Does the proposal maintain the character of dwelling clusters stemming from the main road?
- Does the proposal overlook any adjacent properties or gardens? How is this mitigated?

Building line and boundary treatment
- What are the characteristics of the building line?
- How has the building line been respected in the proposals?
- Has the appropriateness of the boundary treatments been considered in the context of the site?

Building heights and roofline
- What are the characteristics of the roofline?
- Have the proposals paid careful attention to height, form, massing, and scale?
- If a higher than average building is proposed, what would be the reason for making the development higher?

Household extensions
- Does the proposed design respect the character of the area and the immediate neighbourhood, or does it have an adverse impact on neighbouring properties in relation to privacy, overbearing, or overshadowing impact?
- Is the roof form of the extension appropriate to the original dwelling (considering angle of pitch)?
- Do the proposed materials match those of the existing dwelling?
- In case of side extension, does it retain important gaps within the street scene and avoid a 'terracing effect'?
- Are there any proposed dormer roof extensions set within the roof slope?
- Does the proposed extension respond to the existing pattern of window and door openings?
- Is the side extension set back from the front of the house?

Building materials and surface treatment
- What is the distinctive material in the area, if any?
- Does the proposed material harmonise with the local materials?
- Does the proposal use high-quality materials?
- Have the details of the windows, doors, eaves, and roof been addressed in the context of the overall design?
- Do the new proposed materials respect or enhance the existing area or adversely change its character?

Car parking solutions
- What parking solutions have been considered?
- Are the car spaces located and arranged in a way that is not dominant or detrimental to the sense of place?
- Has planting been considered to soften the presence of cars?
- Does the proposed car parking compromise the amenity of adjoining properties?
- Have the needs of wheelchair users been considered?

Architectural details and contemporary design
- If the proposal is within a conservation area, how are the characteristics reflected in the design?
- Does the proposal harmonise with the adjacent properties? This means that it follows the height, massing, and general proportions of adjacent buildings and how it takes cues from materials and other physical characteristics.
- Does the proposal maintain or enhance the existing landscape features?
- Has the local architectural character and precedent been demonstrated in the proposals?
- If the proposal is a contemporary design, are the details and materials of a sufficiently high enough quality and does it relate specifically to the architectural characteristics and scale of the site?

Delivery

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4. Delivery

The Design Guidelines and Codes will be a valuable tool in securing context-driven, high quality development within Boxford Parish. They will be used in different ways by different actors in the planning and development process, as summarised in the table.

ACTORS	HOW THEY WILL USE THE DESIGN GUIDELINES
Applicants, developers, and landowners	As a guide to community and Local Planning Authority expectations on design, allowing a degree of certainty – they will be expected to follow the Guidelines as planning consent is sought.
Local Planning Authority	As a reference point, embedded in policy, against which to assess planning applications. The Design Guidelines should be discussed with applicants during any pre-application discussions.
Parish Council	As a guide when commenting on planning applications, ensuring that the Design Guidelines are complied with.
Community organisations	As a tool to promote community-backed development and to inform comments on planning applications.
Statutory consultees	As a reference point when commenting on planning applications.

About AECOM
AECOM is built to deliver a better world. We design, build, finance and operate infrastructure assets for governments, businesses and organizations in more than 150 countries. As a fully integrated firm, we connect knowledge and experience across our global network of experts to help clients solve their most complex challenges. From high-performance buildings and infrastructure, to resilient communities and environments, to stable and secure nations, our work is transformative, differentiated and vital. A Fortune 500 firm, AECOM had revenue of approximately $17.4 billion during fiscal year 2016. See how we deliver what others can only imagine at aecom.com and @AECOM.

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