

Precast concrete paving for inspired hard landscape and urban design

# PLANNING WITH PAVING



# Introduction

This document is targeted at all those involved with the development process – particularly designers, developers and planners. It explores the latest approaches to planning, urban design and 'place shaping' encouraged by government and other organisations, and fleshed out in adopted guidance such as *Manual for Streets* and *Manual for Streets 2*. Focusing on external surfaces, it makes the case for precast concrete paving as a modern, flexible and sustainable material capable of meeting the latest planning policy demands. It then goes on to demonstrate techniques and best practice for using precast concrete paving to create vibrant and accessible external spaces for sustainable communities.

## The Changing Face of Precast Concrete

The use of segmental paving laid to create a hard surface for roads can be traced back over 6,000 years and precast concrete paving continues this tradition today.

Concrete paving flags have been used as an alternative to stone for at least 100 years and concrete kerbs in place of granite for 70 years. Use of concrete blocks for paving started at the end of the nineteenth century, but cost-effective mass production in Holland after the Second World War led to a rapid growth in popularity, which spread to Germany in the 1950s, then the UK and other countries in the 1970s.

Unlike other paving materials, precast concrete products are engineered and produced under automated factory conditions to give precise dimensional control and consistent performance characteristics, making them safe, durable and problem-free. However, this engineered approach also impacted on their visual characteristics during the 1970s and 1980s with repetitive shapes, simple patterns and single pigmented colours – often inappropriate for the urban environment. More recently, Interpave manufacturers have completely transformed precast concrete paving and kerb products with a palette



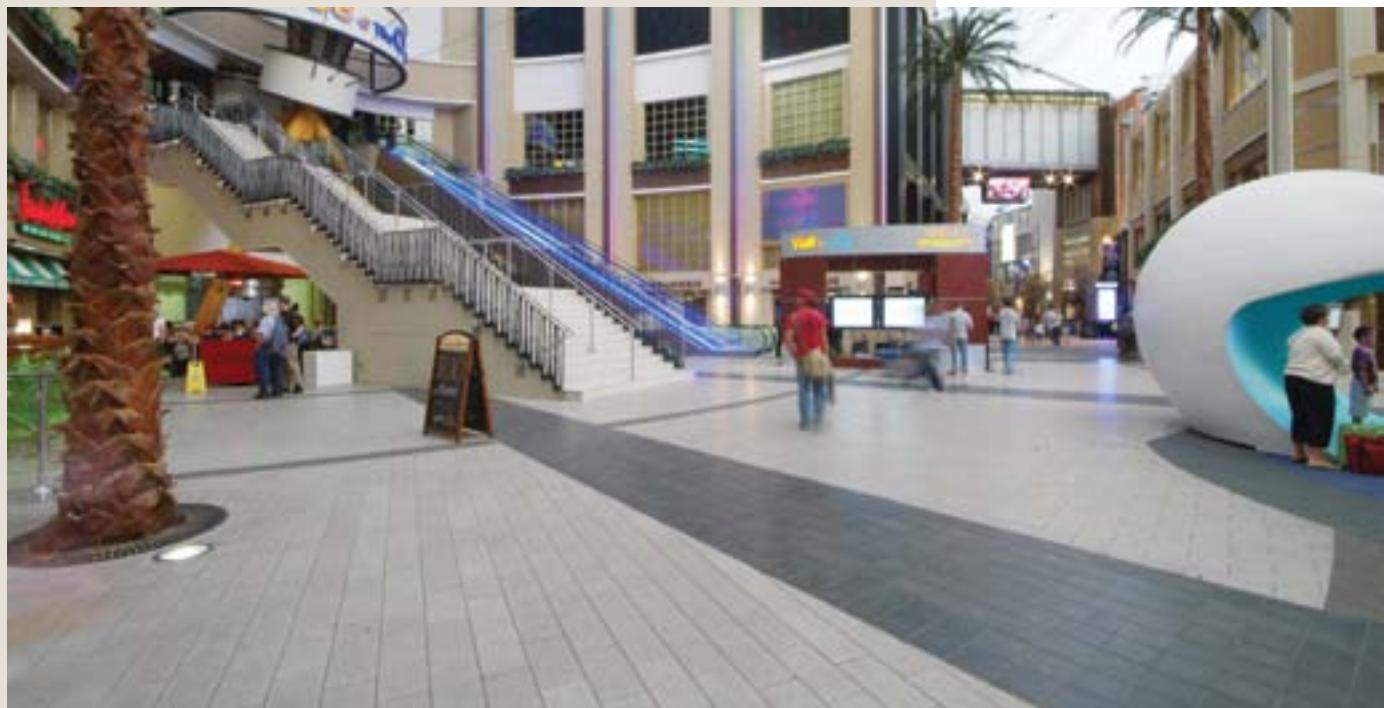
of designs, colours and textures offering a visual richness and huge design choice atypical of mass production – and with a quality suitable for the very best in current urban design, whether traditional or modern.

In addition, precast concrete paving from Interpave manufacturers is demonstrably **sustainable** paving – in every sense. As well as having a low environmental impact, products are locally manufactured, making a vital contribution to local employment, economy and community. Also concrete block permeable paving – an important sustainable drainage systems (SuDS) technique – helps in the fight against flooding and pollution, providing a controlled source of clean water for amenity. At the same time it offers a similar diversity of styles as other precast concrete paving.

These and other factors justify taking a fresh look at precast concrete paving.

### Interpave's Role

Interpave represents all the major precast concrete paving manufacturers in the UK. Its block paving manufacturer members maintain the highest standards of quality control, product innovation and sustainability and are signatories to the British Precast Concrete Federation *Sustainability Charter*. Interpave has the expertise and resources to provide the definitive guidance on all aspects of precast concrete paving and works alongside other organisations, such as the British Standards Institution and Health and Safety Executive, in taking the industry forward. Its manufacturing members continue to develop innovative products and systems, and to work in partnership with designers and local authorities in meeting their specific demands.





# Planning and Place Shaping

## The National Planning Policy Framework

Taking effect in March 2012, the National Planning Policy Framework (NPPF) replaced extensive Planning Policy Statements and other policies. It must be taken into account in the preparation of local and neighbourhood plans, and is a material consideration in planning decisions. One of its core planning principles is to: “*always seek to secure high quality design and a good standard of amenity*.”

In terms of hard landscape and urban design, the NPPF seeks:

- A strong sense of place, using streetscapes and buildings to create attractive and comfortable places to live, work and visit
- Safe and accessible developments, containing clear and legible pedestrian routes, and high quality public space

- Use of design codes where they could help deliver high quality outcomes - including landscape, layout, materials and access.

Intended to augment national policy such as NPPF, *Manual for Streets* and *Manual for Streets 2* should continue to inform the development of local policy and design codes for external spaces, and assessment of individual designs at the planning stage.

## Manual for Streets

Intended as guidelines for all those involved in any aspect of designing streets, the original *Manual for Streets* (MfS - Department for Transport, 2007) replaced the 30-year old *Design Bulletin 32* and focused on residential and other lightly trafficked streets. Its central aim was to create attractive, safe and well-designed residential environments. It set out a “*manifesto for better design, streets and communities*” – not detailed design guidance





– and local authorities were strongly recommended to review their standards and guidance to embrace its principles. A similar policy statement for Scotland – *Designing Streets* – is also now in place.

The guidelines are still valid today and prioritise pedestrians over cars, with more emphasis on urban design than engineering. There is a clear move away from the previous vehicle based hierarchy of roads. There is also a trend towards using narrower roads to slow traffic, although speed is certainly not the only determining factor on road width in MfS. Streets are now regarded as places for people and the heart of neighbourhoods, not just arteries for the flow of vehicles. MfS promotes a traditional grid of streets defined by buildings to give a 'permeable' network, particularly for pedestrians and cyclists. There is also a general assumption that neighbourhoods will be made up of 'public fronts and private backs' to homes.

### Manual for Streets 2

*Manual for Streets 2 – Wider Application of the Principles* (MfS2 – Chartered Institution of Highways & Transportation, 2010) takes these principles forward as a companion guide to the original MfS. It explores how and where the principles of MfS can be applied

to busier streets and other non-trunk roads wherever these form part of urban areas or, indeed, rural settlements. MfS2 examines various street types in terms of 'movement' and 'place' functions and argues for a re-balancing of these functions to improve the street environment.

Research into 'Mixed Priority Route' (i.e. busy high street) demonstration schemes, carried out under a DfT project, also informs MfS2 guidance. Here, streets with a high level of traffic, fronted with a mix of different building types and accessed by different users were enhanced and monitored. These schemes achieved a substantial rate of casualty reduction, noise and air quality improvements, increased pedestrian and cyclist activity, and more vibrant local economies, after enhancement.

MfS2 recommends that, for any scheme affecting non-trunk roads, designers should start with MfS rather than other guidance such as the *Design Manual for Roads and Bridges*. It confirms that most MfS advice can be applied regardless of speed limit and that key MfS principles can be applied widely to highways: they are not limited to low speed, lightly trafficked or residential roads.





### Manual for Streets and Materials

Although it does not prescribe materials and detailing, MfS does expect local authorities to be “encouraging innovation with a flexible approach to... the use of locally distinctive, durable and maintainable materials...”. It encourages use of ‘local’ materials for both aesthetic and sustainability reasons and highlights the importance of predictable long-term performance for problem-free adoption. It acknowledges that the choice of surface materials has a large part to play in achieving a real sense of place, encouraging planning and highway authorities to develop a limited palette of materials within design codes or other local design guidance to simplify maintenance and adoption issues, as well as give local character.

Another important MfS approach is generally to clear away the visual ‘clutter’ of excessive signage, using instead other design features to encourage better road user behaviour, such as variation in surface materials, colour or texture. This approach helps make the environment legible to all users. MfS2 highlights that “street designs should be as self-explanatory as possible” and encourages use of appropriate paving styles and removal of some road markings and signs, with consequent long-term savings.

### Manual for Streets Applied

Sustainable Drainage Systems (SuDS) are also encouraged by MfS for use wherever practicable and seen as one of the key features to be addressed in master-planning, as well as in local design codes: Interpave’s *SuDS & Permeable Paving Today* document discusses this in detail. Sustainability generally is also considered important for choice of materials, including consideration of manufacturing processes and energy use: this issue is discussed in Interpave’s *Sustainable Paving* document.



Precast concrete paving meets all these requirements and MfS highlights its own research demonstrating that block paving significantly reduces traffic speed compared with asphalt, particularly on shared surfaces. MfS2 also identifies a number of key characteristics, identified in ongoing research of shared spaces, where precast concrete paving can play an essential role, including:

- Drainage of level surfaces where there are no cross-falls and kerbs, including 'shared surfaces' – ideally suited to concrete block permeable paving
- Contrasting colours and tones to help partially-sighted pedestrians to orientate themselves and to highlight crossings or traffic-free areas
- Differentiation of specific areas such as parking
- Design of transition zones and 'gateways'
- Tactile features for blind and partially-sighted pedestrians
- Bus stops with specially designed raised kerbs for access.

These issues are explored later and are also featured in Interpave Case Studies.

## Home Zones

Home Zones are residential streets or groups of streets where people and vehicles share the whole road space safely and on equal terms, although the motorist should feel like a 'guest' in the area. They are designed so that quality of life takes precedence over ease of traffic movement and they aim to promote neighbourliness and a sense of security. Although based on the same principles as *Manual for Streets*, Home Zones are distinct and specifically defined in law.

**Essential requirements for paving materials, from Manual for Streets and other guidelines, can be summarised as follows:**

- visually attractive and able to deliver distinctive local character
- capability for visual or tactile differentiation between distinct areas
- durable and maintainable with reliable product supply
- accessible to all with consistent slip and skid resistance
- well drained to avoid standing water and compatible with SuDS
- sustainable – in the widest sense

**Precast concrete paving is uniquely placed to satisfy all these requirements.**



# Precast Paving Principles

In the previous section, we have seen how adopted guidelines such as *Manual for Streets* and *Manual for Streets 2* are linked to planning policies, and the positive place shaping role of planners via design codes. This section aims to demonstrate how modern precast concrete paving and kerb products from Interpave manufacturers meet all the requirements of these guidelines, opening the door for their addition to design codes and specification on a wide range of projects.

## Visual Characteristics and Design Flexibility

With precast concrete paving and kerbs, distinct, modular units and designed variations in colour, texture and shape break up areas giving visual interest and a human scale not possible with monotonous,

formless materials such as asphalt. In recent years, Interpave manufacturers have transformed this concept, moving away from the simple, regular patterns and colours of the 1970s and 1980s. They continue to expand an extensive palette of styles, shapes, colours and textures to meet current demands in urban design, matching – and often exceeding – the visual qualities of materials such as stone.

In particular, they work in partnership with major developers and planning authorities to develop specific products and finishes to provide distinctive local character for particular areas, which can then form part of local design codes. This is a valid and sustainable interpretation of adopted guidelines. It is generally unrealistic on cost, availability and accessibility grounds to



specify locally extracted stone which may have been used in the past, while imported stone fails to meet sustainability criteria.

### Predictability and Long-Term Performance

In addition, and unlike extracted materials such as stone and clay, precast concrete products are fully engineered and manufactured under modern, controlled conditions – consistently providing accurate product and joint size, colour and texture, slip/skid resistance and other performance characteristics. So, precast concrete paving offers a unique combination of predictability to ensure safety and accessibility for all, with scope for endless variety in shape, scale, colour and texture to enrich the urban environment.

Specifiers and adoption authorities cannot afford to take risks and should demand consistent, predictable, trouble-free performance of paving and kerbs over the longer term.

Unlike similar products which have been imported, such as sandstone or granite, or other materials, such as plastics, precast concrete paving and kerbs from Interpave manufacturers comply with all aspects of test procedures stipulated in the latest British Standards, designed to replicate performance in use over time. For example, BS EN 1338, 1339 and 1340 introduced a more rigorous approach to previous British Standards to provide specifiers with full confidence in the use of precast concrete paving blocks, flags and kerbs respectively.

It stipulates that the manufactured concrete must conform to a wider range of performance characteristics, determined on actual manufactured products, including weathering, abrasion and slip/skid resistance, and strength.



25-year old concrete block paving throughout the high street of West Malling (Kent), for many years a busy trunk road



20-year old concrete block paving in Hadlow (Kent) on the A26, today with a constant stream of over 20,000 HGVs, buses and cars passing through daily.



### Long-Term Availability

Continuing availability of a complete range of products and accessories in a single, predictable material is essential for successful urban design over the long-term. This is simply not achievable with imported stone or plastic products, generating potential user-safety issues and product maintenance or replacement problems for the future, which should raise doubts about their adoption.

In contrast, as substantial organisations Interpave manufacturers working within the local framework of established standards and regulation easily achieve this aim. Precast concrete paving can be easily reinstated following excavation works, for example to access services, leaving minimal evidence – with any replacement product readily available. It is also worth remembering that all these benefits of precast concrete paving from Interpave manufacturers are available at an economic cost – in both initial and whole life terms.



## Sustainable Paving

The BRE *Green Guide to Specification* provides independent endorsement of the low environmental impact of precast concrete paving, particularly in comparison with imported materials. It rates a wide range of elements from 'A+' for best environmental performance to 'E' for the worst. Three different paving scenarios are considered covering: Pedestrian Areas, including communal spaces, walkways and garden paving; Lightly Trafficked Areas, such as car parking; Heavily Trafficked Areas, for heavier vehicles or repetitive car traffic.

The same three scenarios – with identical results – are applied across the six different building types considered by the Green Guide. But the ratings also provide essential guidance for local authorities to exercise their responsibilities for sustainable materials on roads and public spaces unrelated to particular buildings.





The summary environmental ratings for the various precast concrete paving specifications considered are shown in the chart on page 13.

These ratings provide independent endorsement of the low environmental impact of precast concrete paving, particularly in comparison with imported materials, helping specifiers and local authorities to make responsible material choices. They also reflect the on-going environmental investments and improvements made by Interpave manufacturer members, as well as by the cement industry generally.

Although not considered in the Green Guide, precast concrete kerbs will have similar environmental characteristics to concrete flags, whereas alternative kerbing materials such as plastic remain an unknown quantity.

Although many of the on-going environmental investments and improvements made by Interpave manufacturer members are reflected in the

Green Guide ratings, they also affect other sustainability issues. All Interpave block paving manufacturers have committed to the *British Precast Concrete Federation Sustainability Charter*, with wide ranging key performance indicators. They have senior managers and directors specifically tasked with executing sustainability policies and continue to explore ways of improving performance in all areas and demonstrating that performance to stakeholders. Recycling, reducing waste and responsible use of resources all form part of this ethos.

It is also worth remembering that their precast concrete paving products are manufactured locally on modern, automated manufacturing plant. Interpave manufacturers form an essential part of the local economy – generating sustainable employment – and community. Localisation also minimises transportation impacts of both manufacturing materials and supplied products, and provides effective national coverage. More information on sustainability issues can be found in Interpave's *Sustainable Paving* document.



Local material sourcing and product supply is also a key element of sustainable construction, and equivalent paving products shipped into the country bear a substantial CO<sub>2</sub> emission load over those locally supplied. Some imported stone paving products are also included in the Green Guide – generally with much poorer ratings than their precast concrete equivalents and half with the worst 'E' rating.

### Green Guide Ratings for Precast Concrete Paving

#### Pedestrian Areas

Rating	Specification	
A	50mm thick concrete blocks with no sub-base	
A+	35mm thick concrete paving flags with no sub-base	
[B]	[100mm thick concrete cellular units for grass with no sub-base. In fact, this specification is unlikely to be used here, as these products are specifically designed for trafficking]	

#### Lightly Trafficked Areas

A+	60mm thick concrete blocks over prepared recycled sub-base	
A	60mm thick concrete blocks over prepared sub-base	
A+	60mm thick concrete paving flags over prepared recycled sub-base	
A	60mm thick concrete paving flags over prepared sub-base	
A	120mm thick concrete cellular units for grass over prepared sub-base (using on-site available material)	

#### Heavily Trafficked Areas

A	80mm thick concrete blocks over prepared recycled sub-base	
B	80mm thick concrete blocks over prepared sub-base	
A+	120mm thick concrete cellular units for grass over prepared sub-base (using on-site available material)	





### Concrete Block Permeable Paving

Concrete block permeable paving (CBPP) is an essential SuDS source control and collection technique. It generally has the same visual characteristics as other precast concrete paving and is available in a growing range of styles, colours and textures – in some cases matching impermeable products. It deals with surface water close to where rainfall hits the ground and offers two fundamental benefits: completely level, well-drained, firm and slip-resistance surfaces and an absence of channels, gulleys and other interruptions.

As a result, concrete block permeable paving meets current accessibility requirements for the whole community – unlike loose materials such as gravel, suggested in some SuDS guidance but

specifically excluded by accessibility rules, such as Building Regulation Part M. It also eliminates 'ponding', reducing the risk of ice forming on the surface and avoiding rain splashing from standing water.

CBPP attenuates rainwater runoff and reduces runoff to green-field rates or less from developed sites. CBPP is very effective at removing pollution from runoff, unlike conventional drainage systems – which effectively concentrate pollutants and flush them directly into drains, watercourses and groundwater.



It can also supply a controlled flow of clean water to other landscape features for amenity. It is one of the most space-efficient SuDS components available and does not require any additional land-take, making it an ideal solution for urban areas. In fact, it can handle runoff from roof drainage and adjacent impermeable surfaces around double its own area as well.

Definitive guidance for designers, developers and planners is available from [www.paving.org.uk/water](http://www.paving.org.uk/water).





Tumbled blocks combined with a considered range of sizes and muted colours provide an appropriate setting for historic environments such as conservation areas and listed buildings

# Precast Paving Products

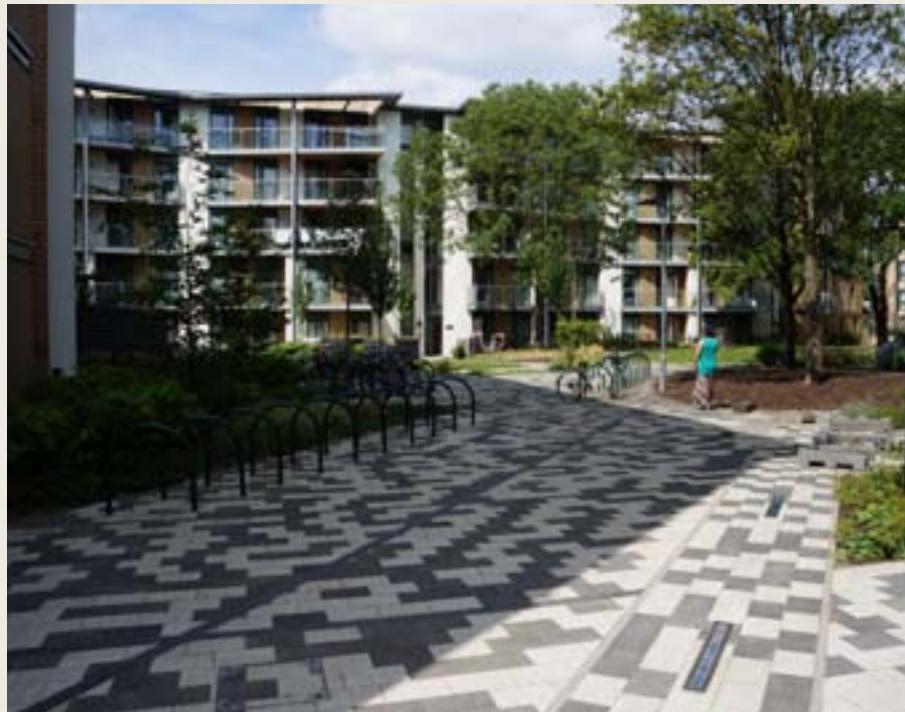
Generally, precast concrete paving products can be divided into three categories - paving blocks, flags and kerbs – each subject to a separate set of standards. However, they all exhibit the same slip resistance and many other characteristics, ensuring consistency, safety and accessibility for all users across the whole surface whichever combinations of products are used. However, it is the Interpave manufacturers' impressive diversity of enhanced surface finishes, which can be applied to all products, that singles out precast concrete as the most flexible material for the paved environment.

## Enhanced Finishes

In terms of design opportunities, pigment technology allows a much wider choice of colours today – ranging from vibrant to muted tones – as well as varied mixes of colours that can emulate other materials such as stone or clay.

Surface treatments can also be applied to paving blocks, flags and kerbs to give different textures, some exposing the inherent aggregates. Surfaces can be honed for a flat finish or polished, or products shot blasted to look weathered or tumbled for a more rugged, natural appearance.

Combining these attributes with the range of shapes and sizes available enables designers to select paving styles ranging from traditional to contemporary, enhancing any environments from historic conservation areas to brand new urban spaces. For more information about the range of products and finishes offered by each Interpave manufacturer, visit [www.paving.org.uk/manufacturer\\_members.php](http://www.paving.org.uk/manufacturer_members.php) for links to each member's website.





### Block Paving

Paving blocks are manufactured in a controlled, factory environment to close tolerances using a relatively dry mix concrete. High density and strength are achieved using vibration combined with substantial pressure applied by 'heads' descending into the mould, which also define the top surface. A wide choice of colours and blends can be achieved with high quality pigments. In some cases, a second less-dry mix – perhaps with pigments or other decorative material, provides the top surface. High material strength linked with limited size give each individual block considerable loadbearing capabilities while the flexible joints between blocks allow tiny movements, avoiding the cracking which can occur with rigid surfaces.

In recent years, new designs have been added to the standard 200mm x 100mm block with chamfered edges to give a less regular appearance. These designs can have an irregular or 'weathered' appearance, matching the look of stone setts, cobbles, clay bricks and other traditional surfaces – while costing significantly less and providing better slip resistance and a more accessible surface for all pedestrians. Concrete block permeable paving is growing rapidly in popularity as a SuDS technique, which incorporates widened joints to allow water flow while maintaining a similar appearance to impermeable equivalents.

Standard concrete block paving can provide a crisp, regular appearance to suit contemporary buildings





### Flag Paving

Precast concrete flags are produced in a wide range of square or rectangular sizes, offering extensive opportunities for different laying patterns. Sizes range from 300 x 300 to 900 x 600 mm, offering designers the potential to use elements of a larger scale than block paving. Flags can be divided into three main categories: standard, small element and decorative. All but decorative are manufactured to BS 7263: part 1 or BS EN 1339 in standard sizes.

It is of fundamental importance to design flag paving either for trafficking or for pedestrians only, bearing in mind the potential for service vehicles to override pedestrian areas in some cases. Interpave manufacturers have developed special flags reinforced with

fibres to withstand trafficking. Flags can also be manufactured to reproduce the colour and surface texture of natural stone paving in various finishes including riven, split, sawn and tooled, while easy-clean surface finishes can also be supplied. Interpave manufacturers also supply a full range of tactile surface paving to inform blind and partially sighted people of hazards and routes to facilitate full accessibility, as discussed later. It is important that these are exactly as prescribed in standards to ensure clear, universal communication.

Precast concrete flag paving at the Wales Millennium Centre in the regenerated Cardiff Bay area



### Kerbs

Precast concrete kerbs are best known for an extensive range of well-used 'BS' profiles given in the latest British Standards. Unlike other kerb materials, the full, extensive range of components and accessories is available in precast concrete, covering all the highway and urban design features needed today. These are easily sourced and present no problems of compatibility between different manufacturers. Other, non-standard products are also available, such as small element block kerbs and accessories for more informal layouts.

New versions of the kerb solution continue to be developed to meet specific demands. For example, high kerbs with special profiles offer a simple, cost-effective system for containing vehicles on the road, contributing

towards better road safety and protecting pedestrians. Other precast concrete kerb products have been developed to facilitate access by wheelchair users, people with prams, the ambulant disabled and others onto buses. Here, special kerbs overcome the problems associated with height variance between footway and the various entrance levels of public transport vehicles, while also minimising the gap by facilitating easier, accurate vehicle positioning. The extensive, established precast concrete kerb industry has the resources to continue meeting new demands. Unlike other materials, developments in precast concrete kerbs are simplified by manufacturing techniques that enable bespoke products to be produced without expensive tooling.



Precast concrete kerbs systems are available with integral drainage facilities

# Designing with Precast Paving

## Design Techniques

While the *Manual for Streets* and other guidance documents encourage innovation, they also demand consideration of various other criteria when designing external paving. Selection of paving materials to provide 'local character' is considered essential – and may well define the palette of materials set by planning authorities in master plans and local design codes, as discussed earlier.

However, communication is also important so that the design is self-explanatory in terms of both navigation and use of different areas, perhaps involving combinations of different colours, styles, patterns and textures. The traffic speed reduction effects of block paving have been clearly demonstrated, while kerbs are well recognised by all as a vehicle/pedestrian delineator – and still effective when set flush with the paving. However, design restraint may also be needed to avoid a confusing, overpowering design and a balance struck between this and a 'wall-to-wall' appearance of a single paving style without relief.

Precast concrete paving is uniquely placed to satisfy these demands consistently with a huge palette of patterns, product designs, colours and finishes.

## Accessible Design

The *Manual for Streets* and other guidance stress the importance of inclusivity and accessibility for all. Whilst there is on-going debate about accessibility and shared external spaces, firm guidelines are provided for other paved areas in BS 8300:2009 *Design of buildings and their approaches to meet the needs of disabled people – Code of practice*. BS 8300 forms the basis of Building Regulation requirements which apply to those features outside the building needed to provide pedestrian and wheelchair access to the building entrance from the edge of the site, car parking, setting down points and (for non-housing) from other buildings on a site. Of course, the design principles involved can also be applied to other external areas to ensure accessibility for all.





Specific guidelines are provided in BS 8300 for on-street parking, off-street parking, 'level' approaches, ramps and steps. It is important that these elements are accurately designed in detail as an integral part of the overall scheme, not left until the construction phase with ad hoc solutions.

Tactile surfaces, reinforced with the use of colour, have been developed to provide blind or partially-sighted people with specific information. It is essential that the rationalised range of surfaces, summarised here, is used properly and consistently, in accordance with the DETR *Guidance on the use of Tactile Paving Surfaces and BS 7997 Products for tactile paving surface indicators*. With precast concrete flags and paving blocks, the detailed profiles, sizes and colours specified can be produced easily and consistently.

All the guidance documents agree that paving surfaces must be:

- Firm, stable and even (not loose materials such as gravel)
- Durable
- Slip resistant
- Non-reflective

Precast concrete flags and paving blocks, used in conjunction with concrete kerbs, easily meet all these criteria. As fully engineered products manufactured under controlled conditions, they consistently provide:

- Accurate sizing with controlled joints to ensure an even surface
- Non-slip characteristics in dry or wet conditions (recognised in BS 8300)
- Proven long-term performance and durability
- Reinstatement without evidence to give an even surface after below-ground work
- Wide variety of colours and textures – particularly for ramps and tactile surfaces – with uniform frictional characteristics.

This impressive choice can also satisfy specific requirements for colour and surface texture, resulting from current initiatives to resolve accessibility issues with shared surfaces.





Delineation of car spaces using inset kerb units flush within a single style of block paving at the new Upton development, Northampton.

### Design Features

The extensive variety of different precast concrete paving products enables designers to use them in combinations, and perhaps with planters, seating and other street furniture, to form specific features within paving projects. Many of these features are discussed in the *Manual for Streets* and other guidance, notably in relation to Home Zones, although they can also be used for other applications. They include:

- Gateways (entrance and exit) to Home Zones
- Different areas of relevance to visually impaired people
- Dedicated car parking spaces
- Traffic junctions without road markings
- Pedestrian routes differentiated from vehicle tracks
- Pedestrian crossing points
- Traffic calming features.

Examples of design techniques, features and layouts can be found in Interpave case studies

### Layout Design

The key to effective layout design with precast concrete paving products is to optimise their modular nature, by dimensioning areas to minimise cutting and combining compatible products to avoid cutting. With precast concrete kerbs, Interpave manufacturers work closely with designers to make the most of the extensive range of standardised units available and factory-produced specials to minimise on-site cutting. With considered layout design, modular use of various precast concrete paving products can strengthen the visual character of rectilinear schemes, although, of course, they are also ideal for curvilinear or circular patterns.





An important consideration is to anticipate which paved areas will be trafficked by light or heavier vehicles, including overrun areas on corners and service access routes in pedestrian areas. Where occasional trafficking by vehicles occurs, new product developments such as fibre reinforcement ensure that concrete paving flags provide an attractive and safe surface over the long-term while concrete block paving can be used for any areas whether trafficked or not.

#### Detailed Design and Execution

As with any construction operation, detailing of edges, insertions, level changes and junctions within paving should not be left to site operatives but resolved by designers. With precast concrete paving, well-established solutions are readily available from Interpave technical guidance or members' websites via [www.paving.org.uk](http://www.paving.org.uk).

These solutions include use of string courses to contain inspection chambers, define edges to paving or separate different curvilinear patterns. Quality ironwork and installation is also important for long-term performance and inspection chamber covers are available to inset precast concrete paving to match surrounding areas. The *Manual for Streets* recommends that services are segregated within corridors where possible, a technique which is particularly important to keep them away from permeable paving: for more information, visit: [www.paving.org.uk/water](http://www.paving.org.uk/water).





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