# BLOCK PAVING APPLICATIONS FOR TRAFFIC CONTROL IN HISTORIC ENVIRONMENTS

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## ABSTRACT

The paper sets out to examine recent case studies in the historic town of St. George, Bermuda which is currently undergoing an extensive urban regeneration programme. Concrete block paving is playing a major role in this, replacing asphalt for ancient alleyways, squares and thoroughfares throughout the town. Rumbled pavers of varying sizes and colour mixes are being used to give a natural texture and informal visual 'grain' to paved areas in keeping with the historic urban environment. Of particular interest, carefully considered detailed design makes use of different combinations of colour, pattern and layout to delineate specific areas, such as pedestrian routes, thoroughfares and parking bays, without the need for road markings or intrusive signage. Consistent application of these treatments has ensured a full understanding by the public and high levels of compliance, reducing congestion and accidents. The needs of disabled people are also catered for without detriment to visual quality.

## 1. BACKGROUND AND CONTEXT

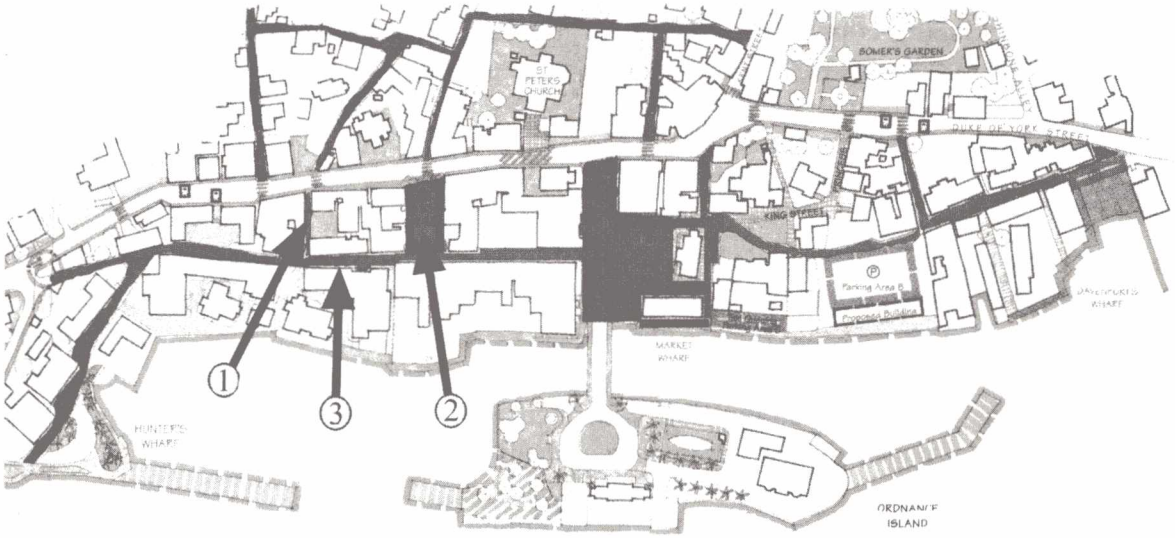
Bermuda is a group of volcanic islands in the Western Atlantic some 800 kilometres from the North American coast. It was first colonised by the British in 1612 and the town of St. George was established at that time. Although the capital was moved from St. George's to Hamilton in 1815, the town's rich heritage continues as a living reminder of Bermuda's past. It remains the oldest continuously inhabited town of English origin in the western hemisphere and of major historic importance globally.

The urban structure of St. George's is one of public squares linked by historic streets, interlaced with narrow lanes or alleys. Place names such as 'Aunt Peggy's Lane' and 'Pilot Darrell's Square' (where the original family still lives) reinforce the unique, personal character of the town. These ancient routes run through to waterfront promenades - often the first point of contact for tourists, who provide a major contribution to the local economy, with Bermuda. The historic importance of St. George's lies not in individual monuments and palaces but in this unique urban fabric of public spaces contained by often modest, original buildings where paving is of primary importance.

## 2. A POLICY FOR ENVIRONMENTAL IMPROVEMENT

In 1995 the Corporation of St. George's recognised that environmental improvements were needed to the central public areas to allow full enjoyment by local residents and visitors alike. A strategic process was embarked upon for economic and environmental regeneration by the Corporation and its consultants, STANLEY G.KENNEDY/ URBAN DESIGN ASSOCIATES of Bermuda and LDR International of Baltimore, Maryland, USA, following local public consultation. Issues such as removal of unsightly overhead cables and excessive signage, and introduction of shade tree planting were incorporated but the major feature of this initiative was the extensive re-evaluation and resurfacing of paved areas. This was needed to reduce pedestrian/vehicular conflicts, encourage more flexible usage of public areas and allow unimpeded access to disabled people including wheelchair users, as well as to visually enhance public areas.

Existing pavements generally consisted of asphalt carriageways with raised, kerb-edged concrete footways where space allowed in squares and wider roads. Narrower lanes and alleys were either asphalt or not made up at all. Disfiguring road paint had been used extensively for parking demarcation, travel direction, restrictions and other information, supported by large, standard highway signage. A plan was developed to gradually replace these with block paved areas and other enhancements in the key public areas identified in Figure 1.




Key:

- Areas designated for resurfacing with pavers.
- ① Barber's Alley.
- ② Customs House Square.
- ③ Water Street.

Figure 1.

## 3. HISTORICAL RESEARCH AND PAVER SELECTION

When selecting paving materials for St George's, few clues were available in Bermuda itself on an appropriate local paving tradition. Consequently, the project consultants looked to the United Kingdom with which Bermuda shares strong historic links. Unpublished research on the history of paving in the UK carried out by planning and conservation specialist Nigel Green proved an invaluable resource and had already been utilised by a UK paver manufacturer in the development of a concrete paving block range for conservation and urban areas. This research can be summarised as follows.

In the UK, the pattern of street design derived from the earliest planned towns of ancient Egypt endured almost up until the nineteenth century. This consisted of local stones laid across the street in courses with a central drainage channel and was adopted by the Romans, who established our first real towns and cities. Although there was sometimes a distinction between footway and carriageway, streets frequently ran from building to building and medieval streets, where they were paved at all, continued this tradition. There are close similarities between these medieval streets and the narrow, winding alleys of Bermuda.

Historically, where stone was used on carriageways different types were often mixed and, as a natural material containing minerals, interesting colour variations avoided dull uniformity. Stones selected for paving setts were the most durable locally available, and, therefore, the hardest and more difficult to work. Consequently, sizes varied considerably - from about 250 x 200mm to around 100 x 100mm, with granite setts even smaller. They were therefore generally laid in straight courses of varying sett length with the smallest or the largest units used for channels, edges or carriage tracks. The width of each course often varied substantially from that of its neighbour, giving traditional pavements a unique combination of structure and variety.

Perhaps the most important event to influence the development of urban paving was the passing of the Westminster Paving Act which set up a Paving Commission to improve the city's streets. This was widely copied throughout the country and established the use of distinct footways, usually constructed with stone or concrete slabs, separated from the carriageway by kerbs. A much wider variety of materials was then used on the carriageway itself including stone setts and, from the 19th century, asphalt, as well as more unusual choices such as wood blocks, rubber and cork attempting to provide a better surface for wheeled vehicles. With the rapidly increasing demands of wheeled traffic, the use of asphalt for carriageways became almost universal. This uniform, lifeless material has eroded the character of many British towns and cities, exacerbated by a proliferation of road marking and signage attempting to control the invasion of vehicular traffic. On a smaller scale, similar problems have occurred in St George's.

As an alternative, stone sett pavements provide a richness and diversity which remain very appealing today - but they cannot provide acceptable levels of technical performance in terms of vehicle passenger comfort, noise, skid resistance and surface uniformity. For new projects and upgrading, the cost and availability of stone is also often prohibitive. Concrete block paving can provide a cost effective, technically superior alternative, bringing texture

back to the urban environment, although the use of uniform sized pavers in single colours may not be the best answer.

## 4. CHARACTERISTICS OF THE BLOCK PAVING SYSTEM SELECTED

Following research of the UK market, the Corporation of St George's and its consultants selected an existing product range, 'Priory', manufactured by RMC Concrete Products (UK) Limited. This had been designed in conjunction with planning and conservation specialist Nigel Green to provide similar visual characteristics to historic stone setts. In common with some other systems, individual pavers were treated in a 'rumbler' device after manufacture to provide naturally textured surfaces and edges. Unlike other systems, pavers were supplied as standard in a combination of eight sizes, as shown in Figure 2, derived from common sizes found in older stone sett pavements. This combination allowed creation of traditional laying patterns, including varying row widths, with minimal cutting or wastage. A larger Channel Unit was also separately available for particular details. The range was organised into four distinct, alternative colourways to give lighter and darker versions of warm and cool colours mixes. Each colourway was achieved by combining pavers of different colours, as found in natural stone setts, and these colours were derived

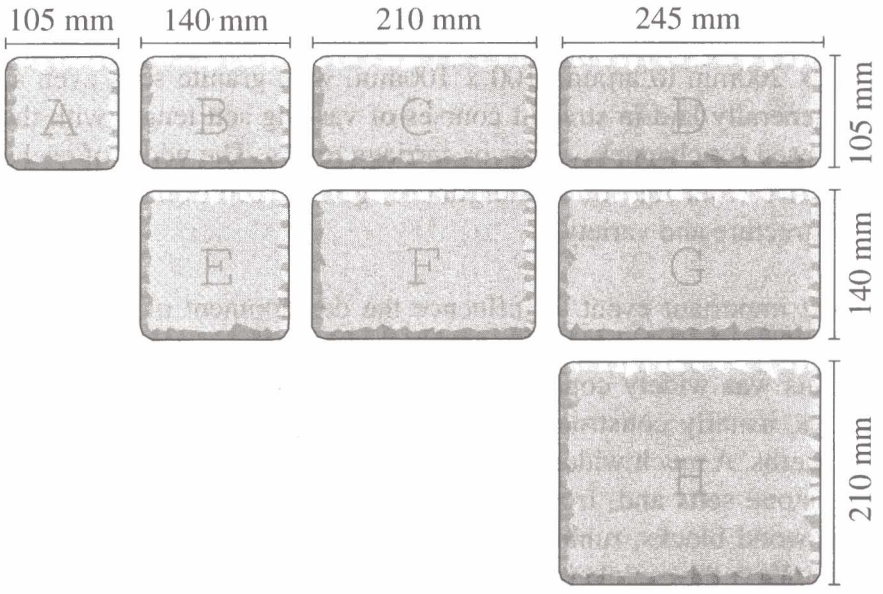



Figure 2.

## 5. ESTABLISHING A COHERENT DESIGN LANGUAGE

As part of their research of the UK paving block market, Consultants for the St. George's project inspected and assessed block paved streets in the historic centre of Bury St Edmunds, Suffolk. Here they observed how careful layouts and a sensitive use of materials could result in the proper use of public areas by both vehicles and pedestrians through cooperation, without the need for strict enforcement and consequent extensive signage and road markings. In addition to these techniques, they have developed a clear language for the

use of block paving to communicate the designations for specific areas without detrimentally affecting overall visual appeal. This is based on the use of different colourways, combinations of colours, demarcations and laying patterns to communicate pavement usage to the public. This language makes use of two contrasting colourways from the standard Priory paving block range with an added, special cream coloured Channel Unit in un-rumbled form for contrast. It was considered essential that the basic 'vocabulary' of colour linked to application, shown in Table 1, be used consistently throughout the town. Differences in laying pattern have been used with more flexibility to highlight particular local situations. It is expected that the local population will quickly become accustomed to this 'language', at least at a subliminal level, leading to cooperative compliance.

Table 1. Vocabulary of Pavement Colours and Applications

| Application: | Pavement Colourway: |
|---|---|
| Carriageways | Grey |
| Parking | Red |
| Sidewalks | Grey/Red mix |
| Pedestrian Areas | Grey/Red mix |
| Pedestrian Crossings | Grey/Red mix alternating with Cream bands |
| Delineation of Areas | Cream |

## 6. IMPLEMENTATION AND PROGRESS

In 1995 the first Priory pavers were delivered and work commenced on Barber's Alley as a trial project. This narrow pedestrian way was paved with Grey and Red colourways mixed (indicating pedestrians only). It incorporated rows of varying widths running across the direction of travel and a central flat channel using larger units, reflecting traditional British paving techniques. The pavers were installed by hand on a sand laying course using standard block paving construction. The trial demonstrated that local labour could make use of the different block sizes supplied to create the required traditional laying patterns with minimal cutting or wastage. In addition, favourable local reaction confirmed this as an attractive form of paving entirely appropriate for Bermuda.

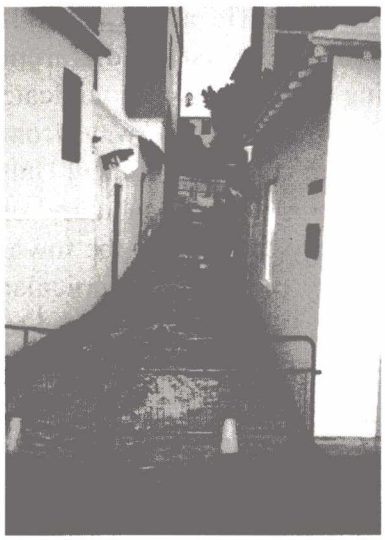


Photo 1. Barber's Alley before resurfacing.



Photo 2. Installation of Priory pavers.



Photo 3. Barber's Alley after resurfacing.

Subsequently, two important parts of the project, as well as other narrow lanes and alleyways have been completed. Water Street is an important commercial street which is now largely pedestrianised: a simple bollard and chain arrangement control occasional access by service vehicles. The complete street has been paved with Priory blocks from building to building, giving a continuity of texture as well as level area for ease of use by disabled people. However, sidewalks have been designated and separated from the occasional carriageway by Cream Channel Units and pedestrian crossings incorporated, all using the standardised 'design language'.



Photo 4. Water Street showing level delineation of sidewalks.

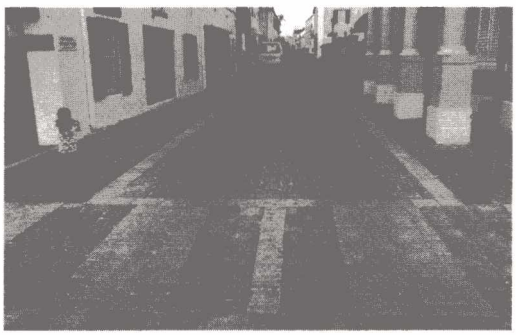


Photo 5. Pedestrian crossing on Water Street.



Photo 6. A typical Alleyway after resurfacing.

Of particular historic importance, Customs House Square has also been completely repaved with Priory blocks as shown in Figure 3. Here, distinct sidewalks remain raised above the carriageway in keeping with the tradition for public squares, although the different colour codings for pedestrians, moving vehicles and parking are used consistently. Short term parking areas for cars and motorbikes have been included without detracting from the overall character of this historic square. Work is expected to begin soon on King's Square, the major focus of St George's. This is a place of assembly, accommodating ceremonial functions and historical re-enactments where the techniques described above will be used to full effect.

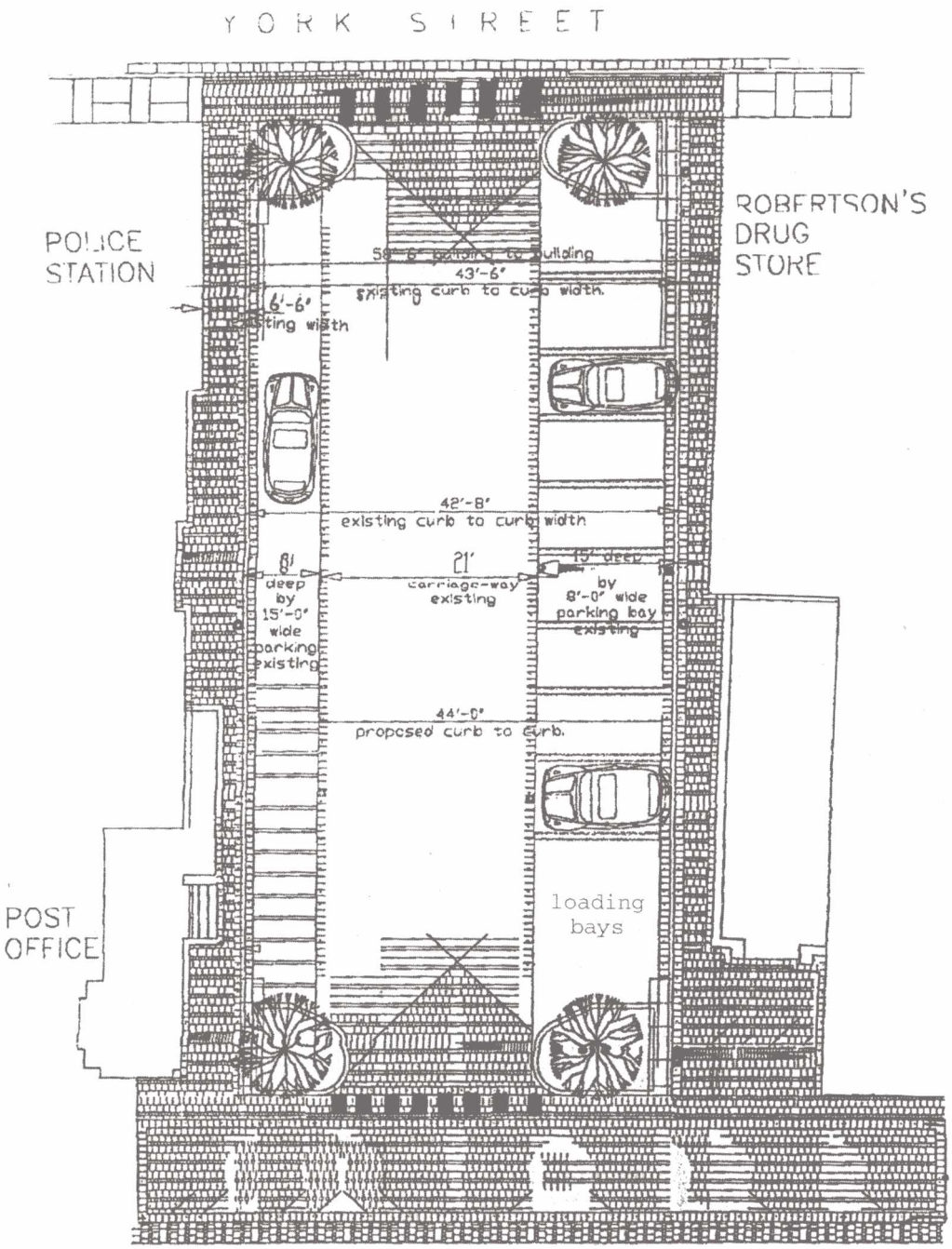
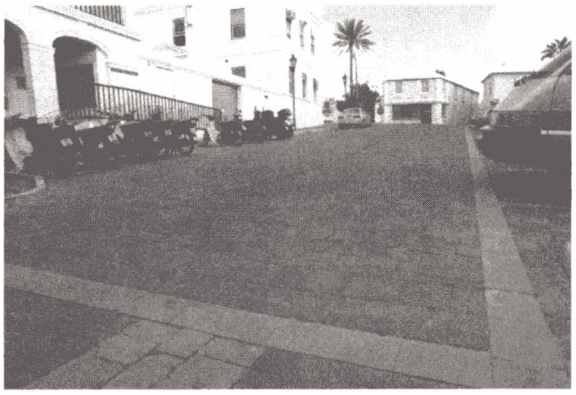



Figure 3. Plan of repaving proposal for Customs House Square




Photos 7 and 8. Customs House Square before resurfacing.

Photos 9 and 10. Customs House Square after resurfacing.

## 7. OBSERVATIONS AND CONCLUSION

Now that several early stages of the St. George's Heritage Strategy have been completed, the following observations have been made following the resurfacing projects:

1. the new paving has been well received by residents and is considered as a substantial improvement over previous areas

2. properties surrounding the areas are being refurbished and an increase in rental levels has been noted: the resurfacing has acted as a catalyst to further regeneration

3. inappropriate parking of vehicles outside designated areas has reduced

4. incidence of accidents between pedestrians and vehicles has reduced

5. accessibility for disabled people has improved significantly

The St. George's projects show the constructive impact that concrete block paving can make on historic environments and urban areas generally, particularly when adopting traditional patterns derived from historical research. In addition, the potential has been demonstrated for use of block paving of different colours, patterns and layouts to inform the public, resulting in cooperative compliance in place of regulated enforcement with intrusive signage and road markings.