



PIPELINE & DRAINAGE SYSTEMS PLC  
DEVELOPING PIPELINE & DRAINAGE SOLUTIONS



Envirokerb

# Envirokerb

The new and improved range of recycled composite kerb drain solutions.



[www.pds-plc.com](http://www.pds-plc.com)



## PIPELINE & DRAINAGE SYSTEMS PLC

DEVELOPING PIPELINE & DRAINAGE SOLUTIONS

# Welcome to Pipeline Drainage Systems Plc

Founded in 2000 we have successfully established ourselves as market leaders working on major projects throughout the UK, Europe and Worldwide.

PDS continue to be at the forefront of innovative design, solving both traditional problems and devising radical solutions to the challenges we face in the future.

We are very proud of our reputation for excellence.



The Lightweight Envirokerb Range of products conform to Manual Handling Regulations, cutting out the cost of any mechanical handling equipment. Installation time is exceptionally quick on the whole Envirokerb System, as well as reducing the RISK of personal injury.

### Reputation built through innovation

Whilst the Envirokerb drainage product range has proven to be a great success as the lightest, yet strongest unit on the market, it has always been the policy of Pipeline and Drainage Systems to continually improve our product ranges.

We have now been able to develop a method of manufacturing the Envirokerb that improves strength to an even greater level, reduces weight over the existing units, but also has the added benefit of dramatically improving the aesthetic finish of the product. Our production time has also improved leading to greater material output as we look to increase our market share.

The full range of units include both Bridge drainage and 305, 385 and 480 depths in Half battered and Splay profile and is complemented by our ENVIROCHANNEL.

## Lightweight

Each Envirokerb component has been designed to be installed manually. The Bridge drainage weighs as little as 9kg. The standard 305mm depth weighs only 15kg, the 385mm weighs 18.5kg and the 480mm weighs 24kg.

## Strong and Robust

The material used in manufacture is exceptionally strong and complies with BSEN1433 Group 3 kerb side installations load class D400KN. The product also conforms to the HIGHWAY AGENCY IAN117/08 for combined kerb drainage

## Impact Resistant - PRODUCT GUARANTEED!

The product has the added advantage over traditional materials in being virtually unbreakable, offering exceptional strength, provided it is installed correctly and to our specification. In fact, PDS PLC Guarantee the product against breakage - please call for details.

## Chemical Resistance

The product is resistant to all forms of effluents found in highway situations such as road-salts, petrol, diesel etc.

## Aesthetics

Envirokerb, through a policy of material and process development, has a finish almost identical to a standard concrete kerb. Further large investment in new tooling and production techniques has allowed for improved aesthetics over the original product. We are confident that we now produce a product that cannot be differentiated from concrete- unless you pick it up!!

## System components

The Envirokerb system is complemented by a full range of additional components including drop kerbs, centre stones, lightweight gully chamber, rodding access units, radius units and numerous outlet possibilities.



Available in 165mm, 190mm, 210mm (Structures) and 305, 385, 480, depths in both HB2 and 45° splay. The Envirokerb Range has been used on motorways, car parks, traffic calming, urban areas, train stations and now on structures and bridges.

## Contents

“ The product has proven to be very strong, and to date we have experienced no breakages. Once in-situ the product has the appearance of concrete and blends exactly with existing kerb-lines. We would have no hesitation in recommending the product. ”

Nottinghamshire County Council

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# Quality Assurance /Accreditation

When launching our new product range in 2003 it became apparent that designers and clients require confirmation of the longevity and quality of the Envirokerb range. It was therefore imperative that PDS PLC made large investments in all required standards, Quality Assurance and Accreditation.

Due to success in Ireland where we are the market leader in the supply of Combined Kerb Drainage, and with a clear objective to supply markets in mainland Europe it was essential that any Accreditation we obtained was recognised in Europe and not just the UK. We therefore chose to CE mark all our product ranges.



“ Further Benefits - On the A1073 Spalding to Eye contract, the complete range of Envirokerb Units was delivered to site on 20 Artic loads - it was estimated that Traditional Concrete products would have required 80 Artic loads to deliver the same meterage. ”

This calculation can be carried out for your project.

This was done with the guidance of the Highways Agency and in partnership with Lloyds Register Quality Assurance. We are now very proud to hold the following certification:

- **EN1433 CERTIFICATION TO D400KN - EN1433** is a European Harmonised standard with an attestation level of 3. This defines how to test products and where to source NOTIFIED BODIES to oversee all tests.
- Tests covered in EN1433 include **LOAD TEST (D400KN)**, **WEATHERING TEST (R+)** and also watertight test (an essential requirement of EN1433).
- **ISO9001 Quality Assurance** for the Design, Manufacture and Distribution of Combined Kerb and Line drainage.
- The above allow us to issue a “Declaration of Conformity” and to **CE Mark** our product range- Under European legislation this is the only Mark relevant under a **Harmonised Standard** - No other Mark SHOULD BE SPECIFIED as this can undermine the CE mark and lead to confusion.
- **ENVIROKERB** is fully compliant with all revisions of the **HIGHWAYS AGENCY Interim Advice Note IAN117/08** and clause **516 of the Specification for Highways Works**.
- **PRODUCT ACCEPTANCE** - PDS have supplied and are supplying the largest contracts in the UK and Ireland. This includes Highway Agency, National Roads Authority and Department of Environment contracts. Contracts in Germany, Italy, Slovakia, Spain, Switzerland and more recently South Africa. A comprehensive list is available to download on our website.
- Envirokerb is type tested in accordance with 89/106/EEC attestation systems 3. Management system of production location(s) are assessed to the requirements of ISO 9001:2000 and additional product focused audit trails and samples are carried out, to the intent of 89/106/EEC attestation system 1.



# Environmental Benefits

We are often asked about our GREEN CREDENTIALS. Initially we felt that any research or figures produced would be very subjective dependant on which organisation was chosen to carry out the tests. Then we were approached by ENVIROLINK NORTHWEST (A public sector organisation) who suggested that a new standard PAS2050 (Publicly Available Standard) would offer clarity to any research.

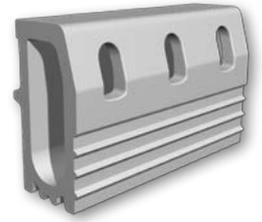
PDS use recycled materials that would otherwise be destined for landfill within the UK & China. If sent to landfill the material we use, for example, to manufacture our Envirokerb range, would take between 750-1000 years to degrade. PDS can help your company decrease its carbon footprint. In the UK it is estimated that we have only 7 years of landfill left! Existing Combined Kerb Drainage systems manufactured in traditional materials rely heavily on natural resources.

There are additional logistical concerns on the transportation of these materials through the smaller countryside communities in the UK. These products are heavy, brittle, difficult to recycle, and carry a number of on-site safety issues associated with their handling and installation. We are happy to supply clients with carbon calculations and carbon costs for haulage on projects using our materials.

“ PAS2050 - *the assessment of the lifecycle greenhouse gas emissions of goods and services*” was developed in response to an industry desire for a consistent method of quantifying CARBON FOOTPRINT cost. PDS PLC successfully completed a lifecycle study as defined by PAS2050 and are proud to be able to claim that our products really are GREEN! ”

## Environmental Considerations

<p><b>Concrete / Polymer concrete products</b> All raw materials are newly quarried using large machinery.</p>	<p><b>Envirokerb</b> The UK sourced raw material was originally manufactured for other products. There is therefore no extra carbon cost for our products.</p>
<p>Products include cement or resins which are all manufactured for the process.</p>	<p>Kerbs are manufactured using heat and moulding. This would be our biggest carbon factor.</p>
<p>Products are moved around production facility, and around site using forklifts - less on a pallet than Envirokerb.</p>	<p>Products are moved around production facility and around site using forklifts - but due to light weight we have more units per pallet.</p>
<p>HAULAGE - this is one of the major considerations - There is 26 tonnes of raw material, or finished product on an articulated lorry. The meterage of product is much less than our lightweight product. We would be happy to carry out haulage calculations for your client.</p>	<p>HAULAGE - we can now carry 1320 units per load (660mts), compared to 320 (160mts of Concrete kerb drains). This is the largest factor for consideration.</p>
<p>Most concrete products will be installed by machinery due to excessive weight - this is a high carbon cost.</p>	<p>The full Envirokerb range is installed manually. Therefore the carbon cost is greatly reduced over concrete type products.</p>
	<p>Other considerations when using the Envirokerb may include the carbon cost of dumping the waste on landfill sites and its degradation over a 1000 year period. The other consideration would be the incineration of this plastic waste if it was not recycled into a new product.</p>



## Combined kerb drainage

Envirokerb is available in a range of depths and kerb profiles to suit all types of contracts including Motorways, Trunk Roads, Car Parks and other urban areas. (for Envirokerb for Bridges and shallow depths see page 18). With the advantage of full accreditation to EN1433 and Clause 516 (SHW) and the added advantage of a 'CE' mark, you can be confident in the 100% recycled combined Envirokerb drainage for your scheme.



“The Envirokerb offers the perfect solution. At 15kg it is lightweight enough for manual installation. Of all the projects we have carried out so far we have not had a single breakage or chipping to kerbs and the product has proven to be stronger in all aspects than the traditional concrete kerbs.”

Birmingham City Council Highways Dept

- Lightweight - the lightest product on the market by up to 70% allowing easy installation.
- Durable - high impact resistant greater than traditional materials.
- Manufactured from recycled materials.
- Available in both 305mm, 385mm and 480mm depths in 45° SPLAY and HB2 profile.
- For use on motorways, trunk roads, car parks and most other urban areas.
- Conforms to EN1433 linear drainage systems D400KN loading.
- Full Quality Assurance.

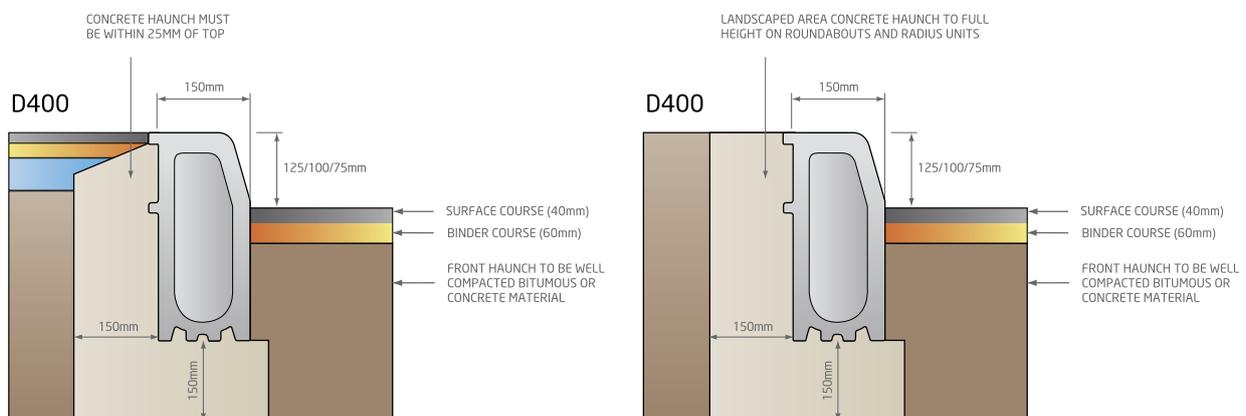
# Installation Guide

Envirokerb is manufactured to comply with the D400kn loading requirement of EN1433, an integral part of this standard is the installation detail used and the concrete surround/haunch.

- 1) Risk assessment should be carried out.
- 2) Excavate through to line and level.
- 3) Lay out units prior to installation to ensure all rodding access units and outlets are positioned correctly.
- 4) Start at outfall and work away, finished line and level should be pre-determined.
- 5) Sealant is to be applied to unit not yet laid then butt together - keep joints clean of concrete bedding material.
- 6) Rear haunch - concrete should be a minimum st4 concrete with a 50mm slump to ensure the correct density.
- 7) PDS PLC suggest a very simple shutter system will reduce the amount of concrete used and will enable concrete density.
- 8) Asphalt can be laid to the bottom of outlets for a 125mm kerb-face, or to the watermark for 75mm/100mm kerb face.
- 9) Units should be cleaned prior to hand over.
- 10) Please use our inspection and test plan I.T.P. To ensure installation is correct as specified by the manufacturer. This can be included in your quality assurance manual.
- 11) Designers - to ensure your installation is correct please contact our technical department to request installation video/i.T.P.

It is imperative that the rear haunch is at the correct height, using a concrete with the correct strength and slump. Standard concrete kerb laying material should NOT be used. If you are in any doubt please call the technical Dept. of PDS PLC. PDS PLC have launched an interactive installation guide- this can be viewed on the web, or on a smartphone. Please contact sales or visit [www.pds-plc.com](http://www.pds-plc.com).

If asphalt pavement is present at rear of units the concrete can be adjusted accordingly, the concrete haunch can be lower. Any block paving adjacent to the kerbs should be restrained from movement on an epoxy or polymer modified mortar.



Please note: EN1433 is clear and concise. ALL combined kerb products must be tested for Watertightness - therefore units must be sealed to ensure conformity.

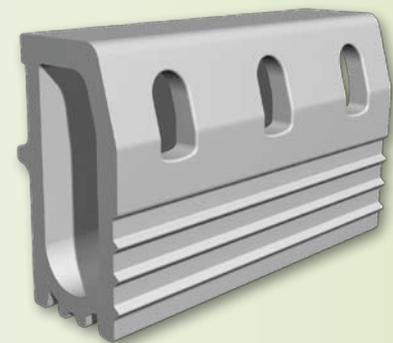
# Combined kerb drainage

## Standard Unit

305mm standard unit. Available half battered or splayed profile.

### Design Features

A 500mm long one-piece unit designed for ease of installation. At least 34% lighter in weight than conventional combined kerb drainage systems, and yet fully meets the EN1433 load requirements, and has exceptional impact resistance. Applications include trunk roads, car parks, access roads, traffic calming areas and industrial areas. The product is also 100% recycled.



Product Code	Total Depth	Invert	Width Bore (nominal)	Length	Weight
305SU	305mm	275mm	100mm	500mm	15kg

## Standard Unit

385mm standard unit. Available half battered or splayed profile.

### Design Features

A 500mm long one-piece unit designed for ease of installation. Fills the large Hydraulic gap between the 305 and the 480. This provides much greater flexibility to any designer. The product is also 100% recycled.



Product Code	Total Depth	Invert	Width Bore (nominal)	Length	Weight
385SU	385mm	355mm	100mm	500mm	18kg

## Standard Unit

480mm standard unit. Available half battered or splayed profile.

### Design Features

A 500mm long one-piece unit designed for ease of installation. At least 25% lighter in weight than conventional combined kerb drainage systems, and yet fully meets the EN1433 load requirements, and has exceptional impact resistance. Designed for areas requiring greater hydraulic capacity.



Product Code	Total Depth	Invert	Width Bore (nominal)	Length	Weight
480SU	480mm	450mm	100mm	500mm	24kg



Splay to HB transitions available.

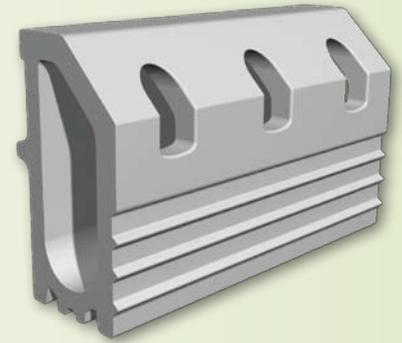
## Splayed Unit

305mm splayed unit available offering 75mm, 100mm or 125mm kerb height.

### Design Features

A 500mm long one-piece unit, designed for ease of installation. The splay profile has been introduced for requirements on fast moving roads with no pedestrian access. This includes motorways, trunk roads, and many rural roads. We are pleased to be able to offer all three depths (305, 385 and 480) with the splayed profile from stock.

Product Code	Total Depth	Invert	Width Bore (nominal)	Length	Weight
305SP	305mm	275mm	100mm	500mm	15kg



## Splayed Unit

385mm splayed unit available offering 75mm, 100mm or 125mm kerb height.

### Design Features

The 385mm deep unit fills the 'Hydraulic gap' found on other systems but still offers a lightweight installation.

Product Code	Total Depth	Invert	Width Bore (nominal)	Length	Weight
385SP	385mm	355mm	100mm	500mm	18kg



## Splayed Unit

480mm splayed unit available offering 75mm, 100mm or 125mm kerb height.

### Design Features

The 480mm splay is designed for areas requiring greater Hydraulic flows - we suggest using all three depths on a scheme - increase depth as required.

Product Code	Total Depth	Invert	Width Bore (nominal)	Length	Weight
480SU	480mm	450mm	100mm	500mm	24kg



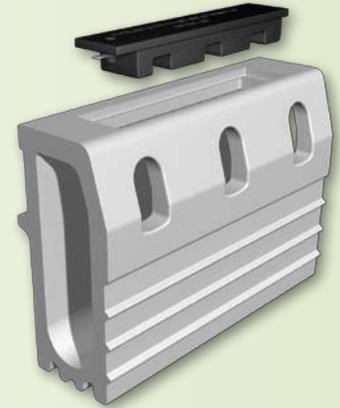
# Combined kerb drainage

## Rodding Access Unit

305mm, 385mm and 480mm splayed and HB rodding access unit.

### Design Features

Rodding units are installed to allow access for cleaning purposes - PDS PLC suggest placing these at high points and every 40mts.



Product Code	Total Depth	Invert	Width Bore (nominal)	Length	Weight
305RA	305mm	275mm	100mm	500mm	15kg
385RA	385mm	355mm	100mm	500mm	17.5kg
480RA	480mm	450mm	100mm	500mm	24kg

## Rodding Access and Outlet Unit Splayed and HB

305mm, 385mm and 480mm outlet unit complete with rodding access. One outlet of both 110mm dia and 160mm dia are supplied as standard.

### Design Features

Pipeline and Drainage Systems PLC have introduced a combined outlet unit with rodding access. The site installation process is significantly faster using the pre-formed outlets and closing caps (110mm and 160mm rear outlets offered). Other outlet configurations are available upon request. Outlets suit standard BS4660 pipe, but a number of outlet connections are offered to suit site pipework.



Product Code	Total Depth	Invert	Width Bore (nominal)	Length	Weight
305RA/O	305mm	275mm	100mm	500mm	15kg
385RA/O	385mm	355mm	100mm	500mm	17.5kg
480RA/O	480mm	450mm	100mm	500mm	24kg

*Due to the nature of material the envirokerb is manufactured from, we can quite easily supply outlets in the front face or base of the unit. Please contact the sales office to discuss your requirements.*

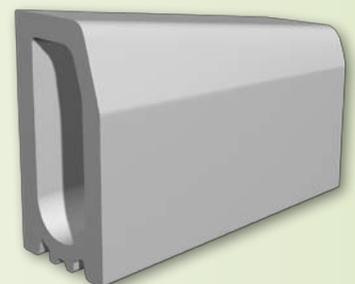
## Drop Kerb Outer Unit

305mm and 480mm deep Drop kerb outer unit.

### Design Features

A 457.5mm long outer drop unit is installed alongside a 457.5mm inner drop kerb. These will form a 915mm total length to suit existing openings in footpaths within maintenance contracts. The units have been developed at half the length of existing systems to reduce the weight, and ease general handling to speed the installation process.

Product Code	Total Depth	Width Bore (nominal)	Length	Weight
305DO	305-255mm	100mm	457.5mm	15kg
385DO	385-335mm	100mm	457.5mm	16.5kg
480DO	480-430mm	100mm	457.5mm	22kg





Various Outlets,  
End Plates and Cable  
Loop Units available.

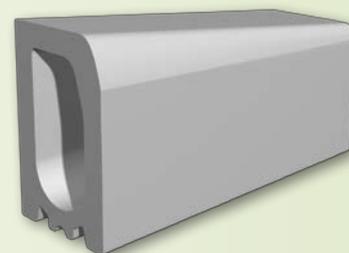
## Drop Kerb Inner Unit

305mm and 480mm deep drop kerb inner unit.

### Design Features

A 457.5mm long inner drop unit is installed alongside a 457.5mm outer drop kerb. These will form a 915mm total length to suit existing openings in footpaths within maintenance contracts. The units have been developed at half the length of existing systems to reduce the weight, and ease general handling to speed the installation process.

Product Code	Total Depth	Width Bore (nominal)	Length	Weight
305DI	305-255mm	100mm	457.5mm	15kg
385DI	385-335mm	100mm	457.5mm	16.5kg
480DI	480-430mm	100mm	457.5mm	22kg



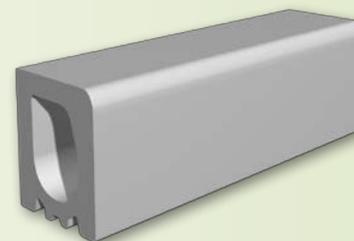
## Centre Stone

305mm, 385mm and 480mm centre stones.

### Design Features

Centre stones - 305, 385, 480 centre stones with either 25mm upstand or flush/6mm as required dependant on the installation detail. (If the flush/6mm upstand is to be used, a third drop is required.)

Product Code	Total Depth	Width Bore (nominal)	Length	Weight
305CS	205-180mm	100mm	457.5mm	11.5kg
385CS	285-260mm	100mm	457.5mm	15kg
480CS	380-355mm	100mm	457.5mm	18.5kg



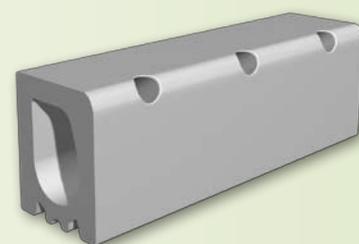
## Centre Stones with various inlets

305mm, 385mm and 480mm centre stones.

### Design Features

Due to the adaptable nature of the raw material used in the manufacture of Envirokerb we are able to create numerous types of drainage facilities within our centre stones. These have included in the past Holes in the upstand, holes in the centre top, or more popular recently is a number of slots which also offer the "Heel-safe" facility.

Product Code	Total Depth	Width Bore (nominal)	Length	Weight
305CS	205-180mm	100mm	457.5mm	11.5kg
385CS	285-260mm	100mm	457.5mm	15kg
480CS	380-355mm	100mm	457.5mm	18.5kg



# Combined kerb drainage

## Gully Top Cover and Base

305mm, 385mm and 480mm Gully cover and frame with top section.

### Design Features

The Gully top section is manufactured in Ductile Iron to comply with the EN1433 loading of D400KN for kerb side covers and frames. The cover is hinged and locking to ease maintenance, and gully cleaning. The base section has been redesigned to offer greater compressive loads and side wall strength, yet it is still a 100% recycled product. The gully accepts drainage units on both sides.

Product Code	Total Depth	Invert	Width Bore (nominal)	Length	Weight
305GMT	505mm	275mm	390mm	500mm	47kg
385GMT	505mm	355mm	390mm	500mm	47kg
480GMT	505mm	450mm	390mm	500mm	47kg



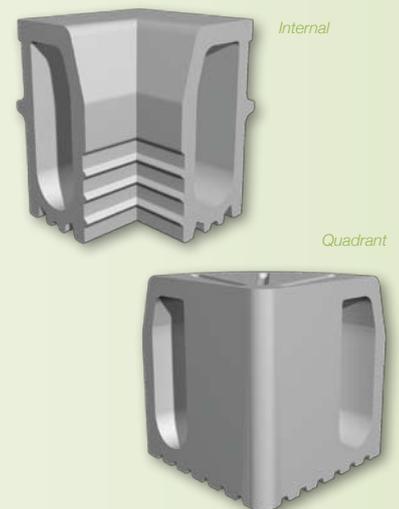
## 305 90° Quadrant Internal and External angles for all sizes

305mm Internal angle. 305mm Quadrant - for external angles rounded for safety reasons.

### Design Features

PDS are able to offer internal and external angles to suit site requirements. We have supplied 90° and 45° on numerous schemes. Enables continuation of hydraulic flow around 90° external angles - we suggest that a rodding access unit (305RA) is installed alongside this product. The top surface has been designed to be slip resistant, and the base has an in-built 'key' for the concrete bed.

Product Code	Total Depth	Invert	Width Bore (nominal)	Length	Weight
305QUAD	305mm	275mm	100mm	500mm	16.5kg (approx.)
305ANG	305mm	275mm	100mm	305mm	19kg (approx.)



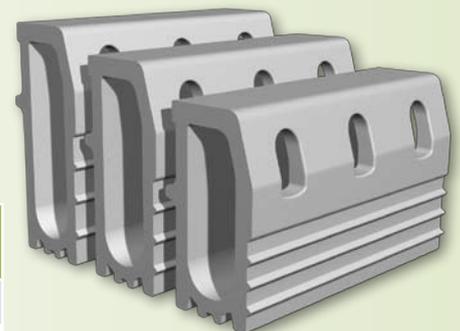
## Internal & External Radius Units

305, 385 and 480 internal and external radius.

### Design Features

PDS are the only manufacturer that supply radius units to suit your site requirements. A wide range of radius from 4Mtr to 14Mtr. Straight units can be used to form a radius in excess of 14mtrs by manipulating the joints as the units are only 500mm long. PDS PLC offer a number of outlets and end caps - please call for full details.

Product Code	Total Depth	Invert	Width Bore (nominal)	Length	Weight
305IR/305ER	305mm	275mm	100mm	*500mm	16.5kg
385IR/385ER	385mm	355mm	100mm	*500mm	15kg
480IR/480ER	480mm	450mm	100mm	*500mm	24kg



\*effective length along centre line.



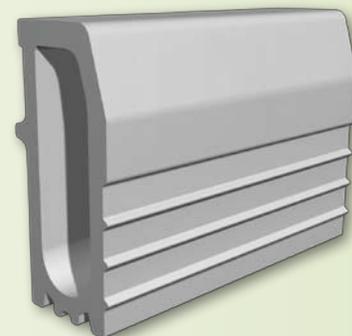
## Solid Head Unit

305mm, 385mm and 480mm solid head units.

### Design Features

We are often asked for SOLID HEAD units for raised platforms, Traffic calming humps, Super elevated roads, and even for use as Cable Troughs. We are happy to supply SOLID HEAD units in 305mm, 385mm and 480mm depth.

Product Code	Total Depth	Invert	Width Bore (nominal)	Length	Weight
305SOLID	305mm	275mm	100mm	500mm	15kg
385SOLID	385mm	355mm	100mm	500mm	18kg
480SOLID	480mm	450mm	100mm	500mm	24kg



## IT Kerb

Drainage kerbs with cable through.

### Design Features

A recent addition to the range, the IT-KERB is available in different configurations to allow either Drainage and cables, two cable "ducts" or even a single duct - please call office for details.

Product Code	Total Depth	Invert	Width Bore (nominal)	Length	Weight
ITKERB	480mm	Various	100mm	500mm	24kg



## Envirochannel

A D400kN one-piece channel drainage - also for crossing.

### Design Features

ENVIROCHANNEL was introduced as a cross-over channel for road crossing and access points - it is fully compatible with ENVIROKERB and the drop units and we are happy to supply bespoke designs in all depths - Alternatively ENVIROCHANNEL is a stand alone product - please see further literature or call office.

Product Code	Total Depth	Invert	Width Bore (nominal)	Length	Weight
CHANNEL	180-385mm	Various	100mm	500mm	Various



# Design and Hydraulics

The designs carried by PDS PLC include the option of schematic schedules and CAD drawings incorporating the preferred product. This can be from a simple layout diagram up to a very complicated computer generated layout.

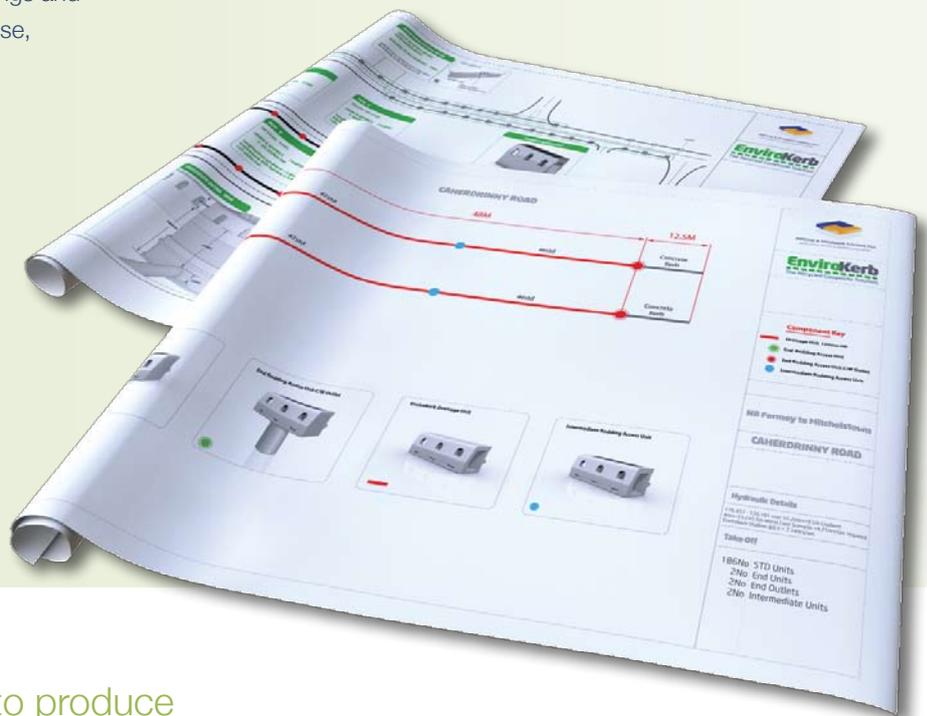
## Online Drawing tool

PDS have invested in a state of the art online drawing tool. This can be found at [www.pds-plc.com](http://www.pds-plc.com) and allows users to access designs for a particular project or a number of projects allocated to one company or individual. All drawings and relevant paperwork can be stored on this database, allowing instant access anytime day or night. *This is a free of charge service!*

## CPD Seminars

PDS are pleased to offer presentations to all Engineering/Civil Contractors and also to end clients/Authorities. This philosophy of working closely with the design engineers ensures that all our new developments and benefits are understood. It also enables PDS to obtain valuable feed-back on your requirements, and assists us in our policy of Continuous Product Development (CPD).

“ We design bespoke solutions to contract-specific problems. ”



PDS PLC also has the facility to produce Interactive dvd Presentations.

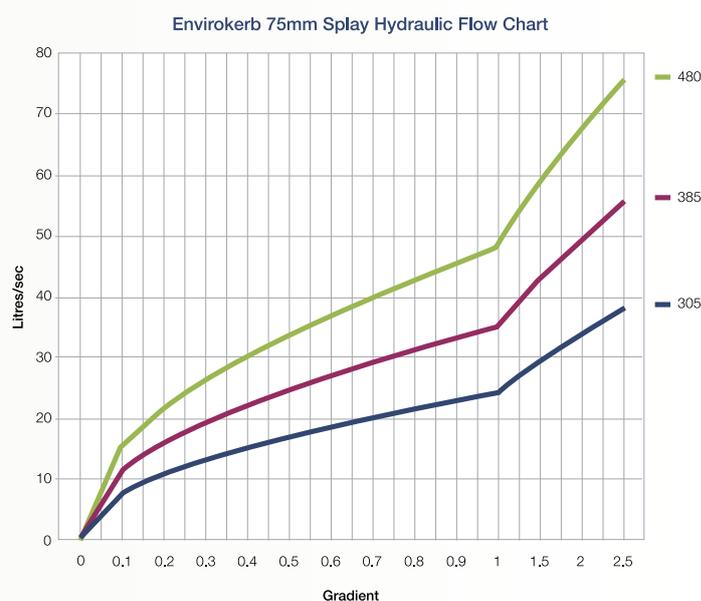
## Other products

PDS PLC are now a major manufacturer and supplier of a number of products for the Civil Engineering Industry. These include ENVIROCHANNEL Surface water drainage channels, ENVIRODECK Combined kerb drainage for Bridges and areas of shallow depth, ITKERB a Combined kerb drainage and cable duct system. Please see our website [www.pds-plc.com](http://www.pds-plc.com) for further information.



# Improved hydraulic performance

Due to the composite material used in the manufacture of Envirokerb giving excellent co-efficiency values, the hydraulic performance is improved over traditional materials. We have also incorporated three surface water inlet points offering a higher waterway area, designed to restrict the ingress of large debris.



## PDS PLC has always offered a full design service for both bridges and roads.

PDS PLC are pleased (and in fact prefer) to carry out all Hydraulic designs on behalf of both the Designer and the Contractor.

This service is free of charge on the Envirokerb road and bridge drainage range Systems. We feel that this ensures the contract incorporates the most cost-effective and hydraulically efficient depth/width drainage unit.

It is a mistake to incorporate units that are 'over sized' in your design as they may be ineffective at obtaining a self-cleansing velocity. Establishing the correct size of unit enables products that offer cost savings over large, heavy drainage units to be installed. In our experience, a large number of contracts are designed using ineffective sizes that struggle to drain the required areas, due to the velocity of run-off being too low.

A quick reference chart is shown for both Splay and Half Battered units.

## Intermediate size

PDS have a unique 385mm deep unit within the Envirokerb range. It was noted that there was a large 'Hydraulic gap' between the 305mm and 480mm sizes. The 385mm offers a wider range and yet still weighs in at only 18kg - alternative products have no other option than to offer larger/heavier sizes.

## Technical help

PDS PLC have great experience in designing Kerb Drainage Systems, especially ascertaining the most effective sizes required to efficiently drain your scheme. We therefore request your details/drawings are forwarded to our design department for a full Hydraulic review - *This is a free of charge service!*

## Method for Calculations

PDS PLC carry out all calculations utilising the Mannings Equation - This has been proven to be the most effective for shallow gradients.

# Case Studies

PDS have successfully supplied some of the largest highway contracts in the UK and Ireland in the last 5 years. This includes Highway Agency, National Road Authority and Department of Environment contracts. A comprehensive list is available to download on our website.

We initially contacted the contractor HMCJV on the largest road project in Northern Ireland to discuss Bridge Drainage. At a meeting with Martin O'Neill (Project Manager) we also took the opportunity to offer our Envirokerb Recycled Kerb Drainage for Roads.

Due to the nature of the contract and the very close spacing of the Gully Gratings we found that in certain areas the Lightweight Kerb Drainage offered a cost benefit over the traditional kerb and gully method of construction.

PDS were invited to meet with the designers, Arup to investigate the potential across the whole scheme. Eventually over 6500 mts of Envirokerb and Hydrodeck Bridge Drainage were supplied to HMCJV.

*“...the installation rates on this job compared to other products is far superior; it's a one part system instead of the usual two part system. It's also a lot less weight being plastic, the rate you could lay at is twice as much if not more than traditional concrete systems....”*

Birse Civils - Video Case Study.



## M1 West Link, Belfast

**Client** Roads Service

**Contractor** HMCJV

**Consultant** ARUP

This will be the second largest project carried out by this Birse CL site team following on from the Sunderland Radial route.

The site agent, Andy Moore has reported that due to the speed of lay, but mainly due to the lack of breakage the Envirokerb was his chosen product on the Darlington Eastern Transport corridor.

The 100% guarantee against breakage has saved Birse up to 15% in new purchases but also the saving over 're-laying' when units are broken by site traffic.

*BIRSE CL HAVE INSTALLED 10.000MT OF ENVIROKERB FOR CARLISLE NORTHERN DEVELOPMENT ROUTE.*



## Eastern Transport Corridor Darlington

**Client** Darlington MBC

**Contractor** Birse Civils

**Consultant** Darlington MBC

Increasingly PDS PLC are supplying contracts with various products from our range. The Leeds Inner Ring Road is another project that shows why this benefits both the contractor, client and of course the supplier.

This project has removed traditional concrete kerb drains and replaced them with our Envirokerb lightweight Road Drainage and was also one of the first schemes to utilise the Envirodeck Bridge Drainage System.

The contractor, Alfred McAlpine saw the benefit of using lightweight, non-metallic and strong drainage systems rather than using heavy, brittle and large concrete drainage products. Envirokerb gave them the added benefit of increasing the amount of 100% recycled products used on the scheme.

The savings by 'value engineering' the design has proven to be very worthwhile for Alfred McAlpine who have now purchased these products on numerous other schemes.



#### Leeds Inner Ring Road

**Client** Leeds City Council

**Contractor** McAlpine (Carillion 2008)

**Consultant** Mouchel

“ Alfred McAlpine take the Health & Safety and their environmental responsibilities very seriously. ”

PDS PLC have built up a number of close relationships with large contractors who use our Design department to 'Value Engineer' schemes to obtain the most cost effective and beneficial solution to their surface water problems.

One of these contractors is CARILLION (Formerly known as Alfred McAlpine) who have recently incorporated our products on some Award Winning schemes. The Envirokerb Recycled Kerb Drainage has been re-designed into Leeds Inner Ring Road, M60 Manchester Widening, A30 Bodmin Scheme, the A1 Scotch Corner contract, the A12 Witham Bypass and the on-going M4 Widening at Cardiff. The Leeds Inner Ring Road also incorporates the Envirodeck Bridge Drainage system.

Both parties have benefitted greatly from these arrangements by improving on design, saving on installation time, improving Environmental impact and of course a cost saving has to be made to make it a worthwhile partnership.



*We enjoy a "partnership" arrangement with these contractors and they allow us to offer our Unique products to their clients.*



## Bridge and shallow depth drainage

Due to the huge success of the Envirokerb Road Drainage product, PDS have developed the NEW Envirokerb BRIDGE Shallow System for Structures and restricted depth construction.

The product has all the advantages of the existing Envirokerb range, including superb impact resistance, Lightweight for

manual handling, aesthetics very similar to concrete and of course the benefit of a product manufactured in 100% Recycled material.



The product is available as 150mm, 220mm and 310mm wide with various depths depending on the Kerb Profile required (75mm, 100mm or 125mm splay or HB).

PDS PLC are the World leaders in Bridge Drainage, supplying over 90% of Structures in the UK and Ireland. Our reputation for quality of product and service has led to orders in Spain, Switzerland, Italy, Abu Dhabi, Singapore, Germany and recently the Czech Republic.

It was always our ambition to increase our range of lightweight, Environmentally friendly products and as our International business grows this becomes much more important.

- Three additions to Envirokerb Range.
- Manufactured as a high strength one-piece monolithic unit.
- Ideal for areas where construction depths are limited i.e concrete slabs, Bridges, roads built as a slab or structure, underpasses and above culverts.
- 3 widths dependant on Hydraulic run-off.
- Allows continuity of Envirokerb drainage from carriageways to structures.
- Sub-surface drainage facility to help drain asphalt matrix.
- Fully compliant to EN1433 D400KN for Kerb Drainage Systems.
- Lightweight for installation advantages (19kg for heaviest product).
- Non-Metallic and therefore non-oxidising.

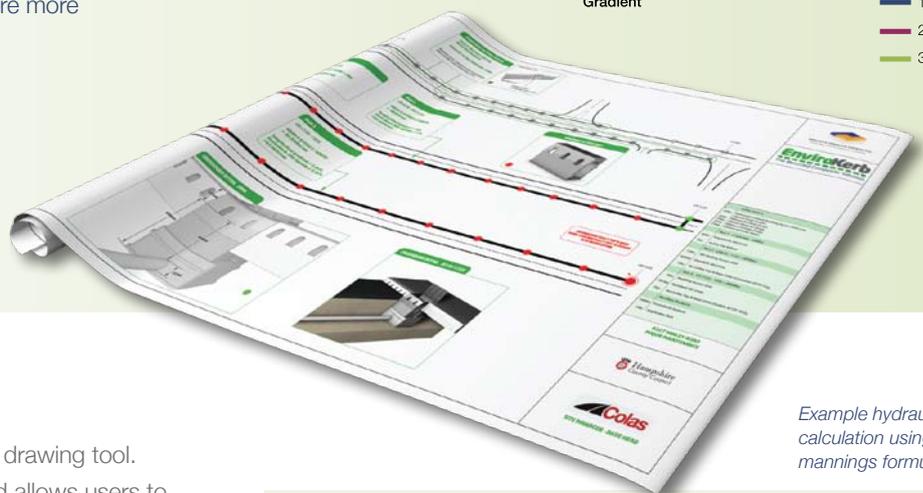
# Bridge Design and Hydraulics

The NEW Envirokerb Bridge Drainage unit has been manufactured to supersede Heavy Ductile Units. There are a number of factors we need to establish to very quickly ascertain the width and depth required.

Depth is dependent on the kerb profile and upstand - this will either be 75mm, 100mm or 125mm with the road construction depth determining the final full depth (see installation page 24).

Width is based solely on the Hydraulic flows anticipated in conjunction with the longitudinal gradient on the deck. This is very easy for PDS to determine from a plan layout drawing showing road levels and a cross-section, then using our in house flow calculator we can size the units (chart alongside for quick reference) allowing us to offer the most Hydraulically (and cost) effective width.

Please call our Technical department as we are more than happy to carry out calculations as part of our free of charge design service.



Example hydraulic calculation using mannings formula

## Online Drawing Tool

PDS have invested in a state of the art online drawing tool. This can be found at [www.pds-plc.com](http://www.pds-plc.com) and allows users to access designs for a particular project or a number of projects allocated to one company or individual. All drawings and relevant paperwork can be stored on this database, allowing instant access any time day or night. (A free of charge service.)

## Design Service

### Our free design service offers huge benefits!

The designs carried by PDS PLC include the option of schematic schedules and CAD drawings incorporating the preferred product. This can be from a simple layout diagram up to a very complicated computer generated layout. PDS PLC also has the facility to produce INTERACTIVE DVD PRESENTATIONS. We design bespoke solutions to contract-specific problems.

All calculations are based on the Mannings Equation which offers the most effective formula for low gradients.

#### Mannings Equation:

LENGTH OF RUN = 65MTS  
 DRAINED WIDTH = 7.3MTS  
 ALL FLOWS ONE DIRECTION @ 1% GRADIENT

AREA DRAINED = 487.5m<sup>2</sup>

HYDRAULIC FLOW @ 50mm/hr rainfall  
 = 6.77 ltr per second.

#### Conclusion:

ENVIROKERB BRIDGE 150 DRAINS APPROX  
 10 ltr per second at 1%



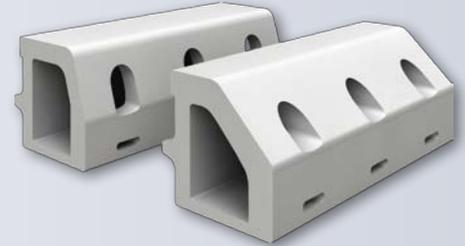
# Envirokerb Bridge Drainage

## 150mm Standard Unit

500mm long with surface and subsurface inlets with either splay or Half Battered kerb face.

### Design Features

A shallow Combined Kerb Drainage for restricted construction depths or for Bridges. Available with either HB or Splay profile and depths to suit. Due to the nature of the material and manufacturing process, we are able to produce numerous depths and kerb profiles not shown below. The 150mm wide unit is typically for low flow areas. Please call Sales for more information.



Product Code	Total Depth	Kerb Profile Height	Width Bore	Length	Weight
150mm x 165mm	165mm	75mm	100mm	500mm	9.2kg
150mm x 190mm	190mm	100mm	100mm	500mm	9.6kg
150mm x 210mm	210mm	125mm	100mm	500mm	10kg

## 220mm Standard Unit

500mm long with surface and subsurface inlets with either splay or Half Battered kerb face.

### Design Features

Again available with either HB or Splay profile and depths to suit. Due to the nature of the material and manufacturing process, we are able to produce numerous depths and kerb profiles not shown below. We also have the advantage of the 235mm deep unit for standard roads, or for installation directly on the deck. Please call Sales for more information.



Product Code	Total Depth	Kerb Profile Height	Width Bore	Length	Weight
220mm x 165mm	165mm	75mm	160mm	500mm	12kg
220mm x 190mm	190mm	100mm	160mm	500mm	12.5kg
220mm x 210mm	210mm	125mm	160mm	500mm	13.5kg
220mm x 235mm	235mm	125mm	160mm	500mm	14.5kg

## 310mm Standard Unit

500mm long with surface and subsurface inlets with either splay or Half Battered kerb face.

### Design Features

Again available with either HB or Splay profile and depths to suit. Due to the nature of the material and manufacturing process, we are able to produce numerous depths and kerb profiles not shown below. We also have the advantage of the 235mm deep unit for standard roads, or for installation directly on the deck. Please call Sales for more information.



Product Code	Total Depth	Kerb Profile Height	Width Bore	Length	Weight
310mm x 165mm	165mm	75mm	255mm	500mm	21kg
310mm x 190mm	190mm	100mm	255mm	500mm	22kg
310mm x 210mm	210mm	125mm	255mm	500mm	23kg
310mm x 235mm	235mm	125mm	255mm	500mm	24kg



Sealant and bedding mortar available on request.

## End or Intermediate Rodding Access Unit

End Rodding & Intermediate Rodding Access units

### Design Features

End Rodding units are either left or right handed to suit the kerb line. Intermediate units are placed approx every 20mts. The access point is sufficient for rodding or jetting.



Product Code	Total Depth	Kerb Profile Height	Width Bore	Length	Weight
EU/IU	165/190/210mm	To suit std unit	100mm	500mm	10kg
EU/IU	165/190/210mm	To suit std unit	160mm	500mm	14kg
EU/IU	165/190/210mm	To suit std unit	255mm	500mm	23kg

## End or Intermediate Outlet Unit Complete With Rodding Access

End OR intermediate outlet units.

### Design Features

Outlets can be placed on base, at end of run (if space allows) or on the rear. The outlet is usually 110mm or 160mm outside diameter but can be size to suit site. All outlets will always be roddable.



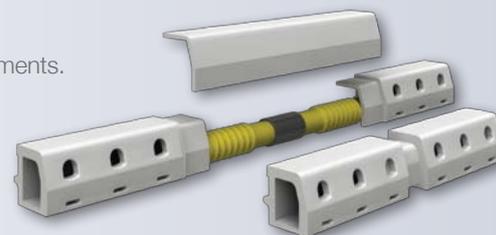
Product Code	Total Depth	Kerb Profile Height	Width Bore	Length	Weight	Outlet size
EUO/IUO	165/190/210mm	To suit std unit	100mm	500mm	10kg	110mm/160mm
EUO/IUO	165/190/210mm	To suit std unit	160mm	500mm	14kg	110mm/160mm
EUO/IUO	165/190/210mm	To suit std unit	255mm	500mm	23kg	110mm/160mm

## Expansion Joint Assembly- Sliding or Standard

Either a 2mt expansion joint assembly or a 1mt sliding expansion assembly for small movements.

### Design Features

Expansion Joint Assemblies are designed to bridge the Expansion joint on bridges. We have a number of standard units, but are always happy to design and manufacture bespoke assemblies for large or difficult joints. The sliding unit is for buried joints or joints that can be elevated to footpath level behind the kerb-line.



Product Code	Total Depth	Kerb Profile Height	Width Bore	Length	Possible movement
EXP	165/190/210mm	To suit std unit	150/220/310mm	1mt	+/- 40mm
EXP	165/190/210mm	To suit std unit	150/220/310mm	2mt	+/-120mm
EXP	165/190/210mm	To suit std unit	150/220/310mm	Special cover plate	Please call

## Case Studies

Initially launched to supply the large infrastructure programme in Ireland, the Envirokerb Bridge drainage very quickly became the first choice for bridge builders and engineers. With 3 widths we can now supply the majority of structures with this product range.

**Build Phase** - Envirokerb is lightweight for installation, impact resistant from on-going site traffic and has long term durability ensuring the product will still look like new 2 years later at the opening ceremony!

**The Games Phase** - Through the games the product will drain the structures as required. The durability will be evident throughout with no rusting, chipping or spalling.

**Legacy Phase** - The 2012 Olympics has to deal with the legacy left for future generations. Therefore roads and bridges are either left for the benefit of the local community, or they are demolished and the material disposed of. Envirokerb Bridge Drainage is manufactured from material that takes up to 1000 years to degrade so longevity is not a problem. And any returned products can be recycled into raw material for other products manufactured by PDS PLC.



### Bridge 13, 14 and 20, Stratford Olympic Bridges (300Mtrs)

**Client** Stratford city developments

**Contractor** Morgan Est

**Consultant** Benaim

A £30 million bypass, delivered by Morgan Est on Transport for Scotland's behalf, involved the design and construction of a 3.5 mile road.

The NEW Shallow Envirokerb range was chosen to be incorporated onto the bridges on the A68 Dalkeith Bypass so that it could link directly with the Envirokerb Road Drainage System already installed on carriageways leading up to the structures. To the motorist the Bridge and Road units are indistinguishable. All are non-rust, lightweight, through-coloured, great impact resistance and with the appearance of Concrete they complement the surrounding area.



### A68 Dalkeith (4000Mtrs)

**Client** Transport Scotland

**Contractor** Morgan Est

**Consultant** Scott Wilson

The development of ENVIROKERB Bridge Drainage was a direct result of the Irish road building Programme.

Whilst a number of Motorways were built, the existing smaller side roads needed to maintain their course. These roads are usually narrow, and Bridges are short. The Hydraulic Flows were low promoting PDS to produce a smaller, lighter and more cost-effective unit. The M3 project has built 65 new bridges with the majority using ENVIROKERB BRIDGE drainage.

All designs were carried out by PDS PLC who became part of the Design team on the M3. Over 2000mts of bridge drainage has so far been supplied to this contract.



#### M3 Clonee to Kells, Ireland (2500Mtrs)

<b>Client</b>	NRA
<b>Contractor</b>	Roughan & O'Donovan
<b>Consultant</b>	Hyder Consulting

“ We used them on the A64 Hopgrove roundabout in York which is acknowledged internally, by client, consultant and by third parties to be a very successful and well presented project.....In summary I would happily use the product again. ”

Mark Thornton BBCEL

The present Bonar Bridge was designed by Crouch and Hogg, built by William Tawse Ltd, and opened in 1973.

This bowstring girder bridge (built 1973) measures 339ft (103.4m) in overall length, replaces an 1893 bridge built by Sir William Arrol & Co Ltd, Glasgow.

As part of a refurbishment scheme to this graceful structure in Invernesshire PDS PLC supplied over 500mts of Envirokerb Bridge Drainage installed to both kerblines and at only 10Kg each manual handling risks were drastically reduced for the installers.

Being recycled composite and with an appearance almost identical to concrete the grey kerb line is retained and there are no on-going coating maintenance issues. Photographs taken by our Sales Director Greg Parkin during his recent Lands End to John 'O' Groats cycle ride.



#### Bonar Bridge (250Mtrs)

<b>Client</b>	Highland Council
<b>Contractor</b>	Balfour Beatty
<b>Consultant</b>	Highland Council

# Installation Guide

ENVIROKERB BRIDGE drainage will normally be installed on a concrete deck or slab - This acts as your base. If you are to install on soft ground or compacted stone please see installation details for standard ENVIROKERB. The units will be bedded on ENVIROKERB BRIDGE bedding mortar or similar.

- 1) Layout units prior to installation to ensure all rodding units, outlets and expansion joint assemblies are positioned correctly.
- 2) We suggest that expansion joint assemblies are installed first as these cannot be cut to length.
- 3) Mix Envirokerb Bridge Bedding mortar as described on the bag, or on the product details available from the sales office.
- 4) DO NOT mix too much mortar as it is quick setting. Please experiment with the material first. Do not alter the mix ratio.
- 5) Install to line and level. It is advisable to find deck/structure high point and use this to determine the levels. Therefore reducing thickness of bedding mortar.
- 6) Sealant must be applied to unit yet to be laid and then butt together keeping joints clear of concrete bedding material.
- 7) Units can be cut with a power saw with either masonry or carbon blade. A mask, goggles and ear defenders should be worn. Cutting is much quicker than stone or metal units.
- 8) Units must be cleaned prior to handover.

“ The product has proven to be very strong, and to date we have experienced no breakages. Once in-situ the product has the appearance of concrete and blends exactly with existing kerb lines. We would have no hesitation in recommending the product. ”

Nottinghamshire County Council

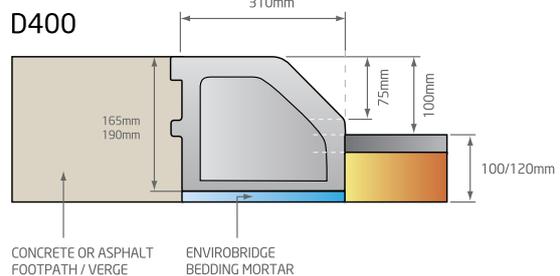
## Dri-Deck

PDS PLC also manufacture a range of sub surface channels and through deck drainage. The Dri-Deck brochure is available online at [www.pds-plc.com](http://www.pds-plc.com) or by contacting our sales department. ENVIRODECK is another Bridge Drainage product where a design requires very large flows or a product with an engineered finish.

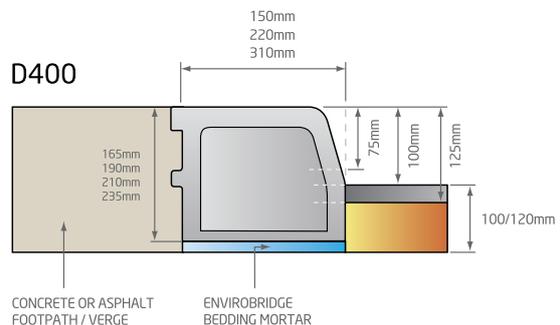


Please note that EN1433 is clear and concise. ALL combined kerb products must be tested for watertightness - therefore units must be sealed to ensure conformity.

## Splay Unit



## HB Unit



## Specification clause (for all products)

**Bridge Drainage** - The Combined Kerb Drainage system shall be as ENVIROKERB 150/220/310mm wide monolithic unit. All system components shall be from the ENVIROKERB range.

Installation details should be followed by utilising the detail within this brochure, the diagrams and the interactive video available from the technical department. The Inspection and Test Plan ITP must be followed, signed and included in the Clients Quality Manual.

Units will be manufactured from Recycled material, and the units should be below the safe one man handling weights of 25kg.

All products should hold PAS 2050 certification to ensure good Carbon Footprint practices.

Kerb profile will be 75/100/125mm splay/HB. All units will be installed on Envirokerb™ Bridge bedding mortar and sealed with Envirokerb Sealant to conform with EN1433.

Product will be CE marked and quality assured as required under IAN117/08.



**Road Drainage** - The Combined Kerb Drainage system shall be as ENVIROKERB 305/385/480mm deep monolithic unit. All system components shall be from the ENVIROKERB range.

Installation details should be followed by utilising the detail within this brochure, the diagrams and the interactive video available from the technical department. The Inspection and Test Plan ITP must be followed, signed and included in the Clients Quality Manual.

Units will be manufactured from Recycled material, and the units should be below the safe one man handling weights of 25kg.

All products should hold PAS 2050 certification to ensure good Carbon Footprint practices.

Kerb profile will be 75/100/125mm splay/HB. All units will be sealed with Envirokerb Sealant to conform with EN1433.

Product will be CE marked and quality assured as required under IAN117/08.

## PIPELINE & DRAINAGE SYSTEMS PLC

Sales and Distribution Centre 12A Flanshaw Way, Flanshaw, Wakefield WF2 9LP  
Tel: +44 (0) 844 848 9400 Fax: +44 (0) 844 848 9401

Accounts and Finance The Maltings, 98 Wilderspool Causeway,  
Warrington, Cheshire WA4 6PU  
Tel: +44 (0) 844 848 9402 Fax: +44 (0) 844 848 9403  
[www.pds-plc.com](http://www.pds-plc.com)

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Specialist Bridge and Kerb Drainage Products.