STONEmaster™

Sustainable In-Situ Filter Drain Refurbishment

Carnell™

Improving value through innovation

StoneMaster returns roadside filter drains to their optimum condition by removing the sediment that accumulates between the filter media. The in-situ recycling process improves road safety and pavement integrity by reducing flooding events and occasions of standing water on the carriageway.

STONEmaster™

INTRODUCTION

The StoneMaster units are custom built, self contained vehicles that enable us to meet all site safety requirements. They can be operated during the day or night in virtually all weather conditions and in most carriageway locations without the need for full road closures.

The process is sustainable in that it recycles existing material and minimises the volume of additional material that has to be quarried and transported to site, thus significantly reducing the number of vehicle movements to and from site. Multiple units can work in the same TM closure for even greater savings and efficiencies.

By adopting the StoneMaster process to refurbish your filter drains, greenhouse carbon emissions are reduced by more than 7.1 tonnes per 1,000 metres in comparison with traditional replacement techniques – the equivalent emissions of a car journey of 36,000 miles.

Since being developed, Carnell's 6 StoneMaster machines have operated in all the Highways England Areas and Scottish Operating Units, Welsh TRAs and most DBFO contracts. A number of Local Authorities have also utilised the innovative process.

The United Nations Sustainable Development Goals (SDGs) are the blueprint to achieving a better and more sustainable future for all. StoneMaster makes a significant contribution to these, directly contributing to delivering 8 of the 17 goals.

FEATURES

6X STONEMASTERS
Multiple units can work in tandem in a single closure.

250M PER SHIFT
Linear metres covered by each unit.

VARIABLE EXCAVATION DIMENSIONS
Filter drains can be recycled to required width and depth.

DOUBLE SIDED LOADING
Recycles drains in verge or central reserve.

SMARTSCAN SURVEYS
Advanced GPR surveys identify filter drain condition and porosity.

STABLEDRAIN REINFORCEMENT
Stabilisation applied to drain during the recycling process.

Improving value through innovation

THE BENEFITS

- Efficiency Savings
- Reduced Congestion
- People-Plant Interface
- CO_2 Savings
- Customers Feel Safer
- Air Quality Improvements
- Verge Stabilisation
- Reduced Flood Risk

265,477m³

of roadside filter drain recycled by StoneMaster, in the last 5 years, on the strategic road network.
That's the same volume as 106 Olympic sized swimming pools.

£25.1m savings

generated in the last 5 years by StoneMaster. The recycling process reduces the volume of new filter stone required and reduces haulage costs.
(When compared to a traditional excavate and replace solution)

53,095

lorry movements removed from site, in the last 5 years.
Reducing the number of roadworkers killed and seriously injured from the people-plant risk.

1.4 million

miles of HGV movements removed from our roads in the last 5 years.
That's the same as travelling 56 times around the World...
saving over 300,000 litres of diesel!

79% Reduction

in lorry journeys to and from site.
Minimising congestion for customers by recycling filter media in-situ.

7.1 tonnes

of CO_2 saved
for every kilometre of filter drain recycled
By reducing aggregate production and transportation to site.

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BENEFITS

The advantages of StoneMaster align with the three Highways England imperatives:

SAFETY

- People-plant interfaces on site reduced by a factor of 4.75 due to fewer lorry movements.
- Reduced vehicle movements Improves air quality, contributing to improved health.
- Stabilised verges minimises the risks of stone scatter and vehicle embedment.
- Smarter surveying using GPR technology reducing the need for trial excavations and risk of service strikes.

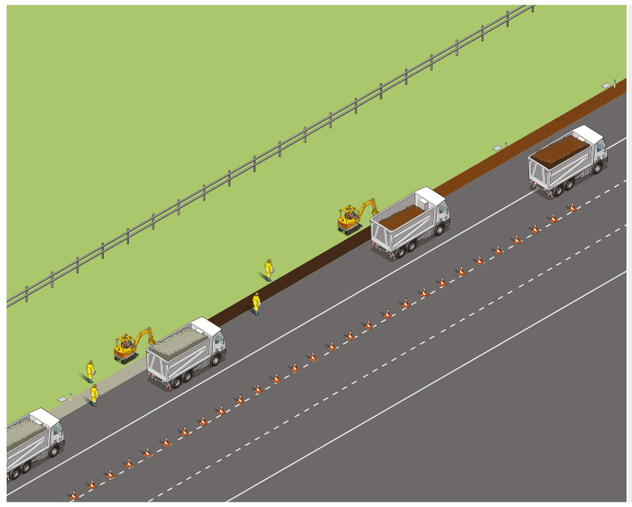
CUSTOMER

- Less congestion through reducing lorry journeys by 79%.
- Fewer movements in and out of TM means road users feel safer, and have a better overall customer experience through roadworks.
- Reduced flood risk helps customers feel safer on the network, supporting Transport Focus research into customer satisfaction.
- The faster process reduces programme duration, increasing lane availability free of roadworks for customers.
- Reduced reliance on imported material deliveries increases confidence around carriageway re-opening.

DELIVERY

- StoneMaster generates £1million cost savings per 10,500m3 recycled through reduced volume of new material and haulage costs.
- CO2 emissions reduced by 7.1 tonnes for every km recycled.
- Multiple units operating in tandem increases productivity and efficiency savings.
- Maintaining drainage prolongs pavement life demonstrating effective asset management.
- SmartScan enables accurate scoping increasing certainty around budget and programme.

home safe and well



TRADITIONAL METHOD

WASTED RESOURCES

> Higher use of virgin aggregate
> Higher disposal/transport costs
> Higher landfill costs
> 4x the volume of HGV movement

SAFETY RISKS

> More HGVs exiting closure
> Increased stone scatter hazard

OTHER ISSUES

> Invasive trial hole excavations

100 METRES PER SHIFT

STONEmaster™

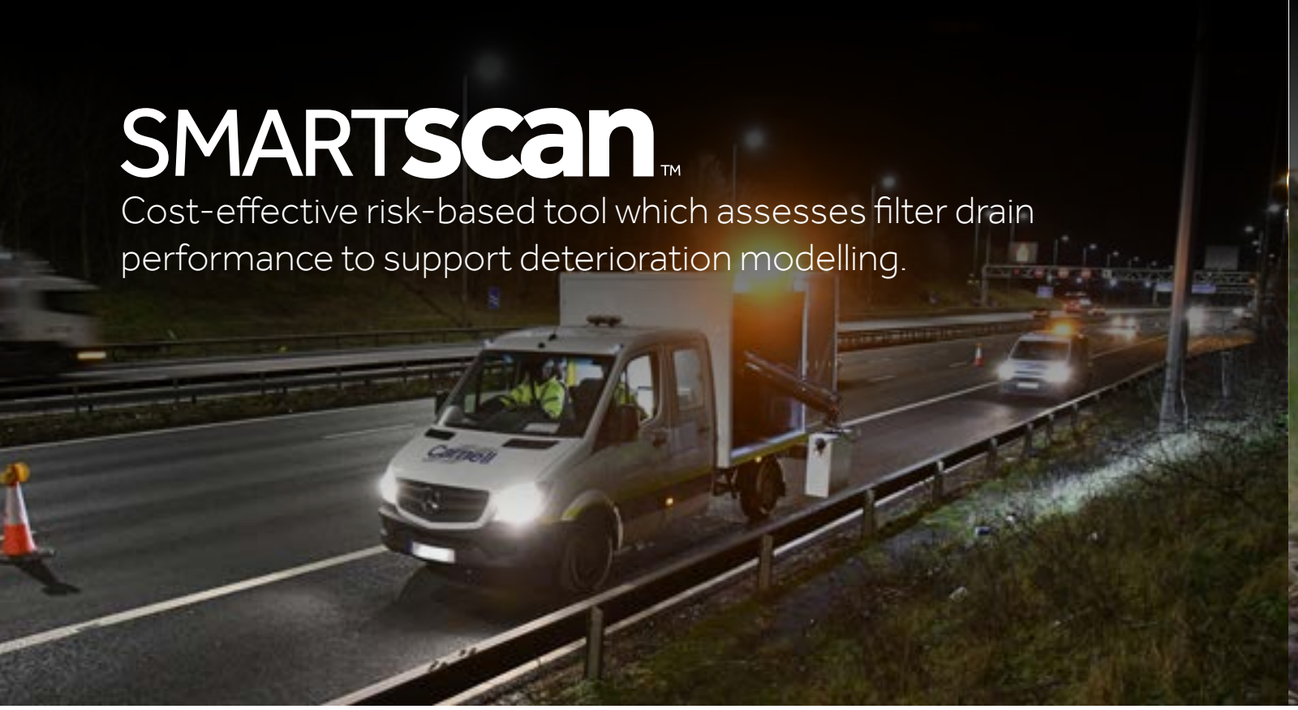
> In-situ recycling
> Safer
> Environmentally friendly
> Cost effective
> Quality restored

250 METRES PER SHIFT APPROX

STABLEdrain™

> Filter drain reinforcement
> Porosity maintained
> Improves safety

(see next page)



SMARTscan™

Cost-effective risk-based tool which assesses filter drain performance to support deterioration modelling.

ASSET MANAGEMENT TOOL (CD535)

SmartScan has been developed by Carnell as a 'risk-based approach' to the condition assessment of roadside filter drains. Using innovative technology combined with multimedia files and sampling techniques, an accurate analysis of the filter drain asset's performance is quickly produced.

Carnell's fleet of custom-built SmartScan vehicles undertake a high speed, non-intrusive investigation of the filter drain's surface and sub-surface condition. GPR, video and mapping data are presented together in an interactive software application to provide robust evidence for the VM process and aid identification of potential flooding hot-spots. The survey data is captured in accordance with CD 535 'Drainage asset data and risk management' and CS 551 'Drainage surveys' standards, and can be uploaded to DDMS.

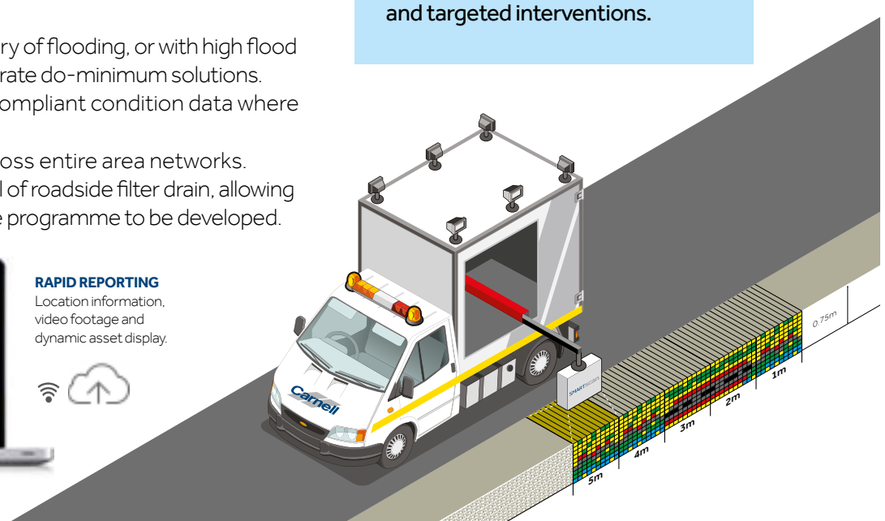
TYPICAL USES

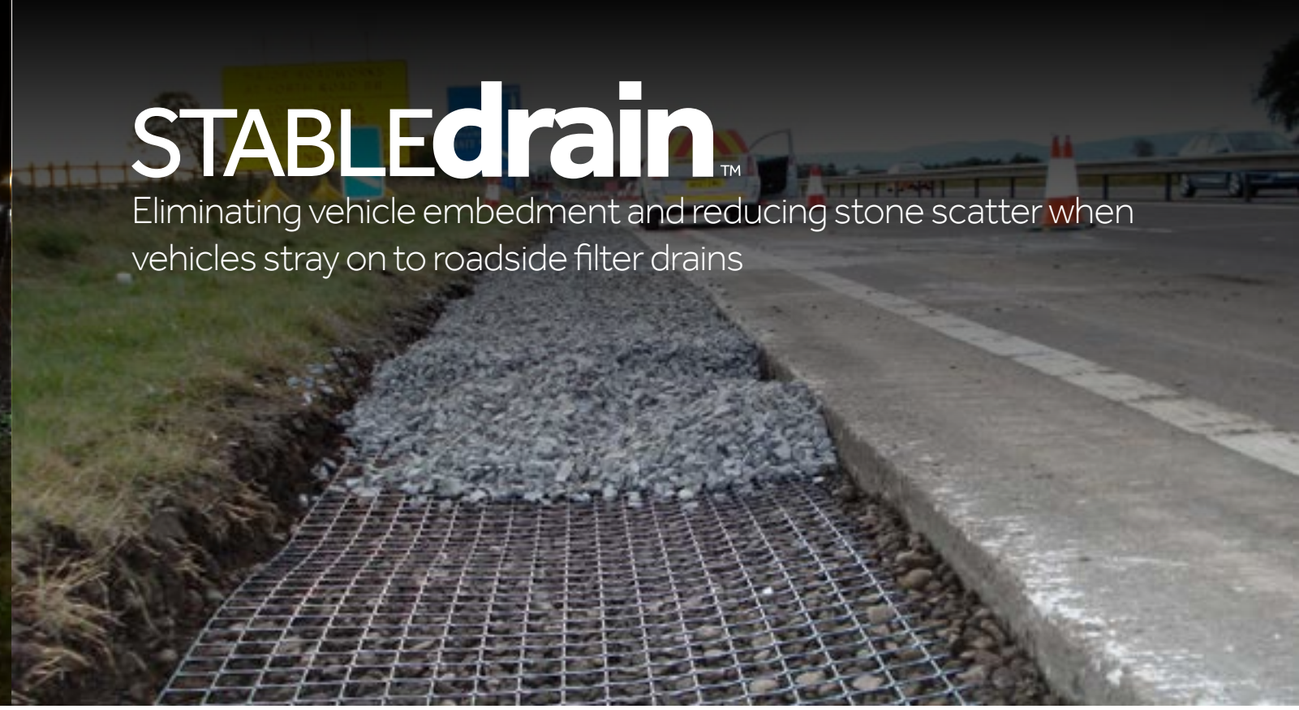
- Survey of networks with history of flooding, or with high flood risk to enable scoping of accurate do-minimum solutions.
- Rapid collection of CS 551 compliant condition data where no information exists.
- Can quickly be rolled out across entire area networks.
- To build a deterioration model of roadside filter drain, allowing a 10 year capital maintenance programme to be developed.

RAPID REPORTING
Location information, video footage and dynamic asset display.

THE BENEFITS

- Improved knowledge of asset condition.
- Achieves distance of approximately 20km per shift.
- SmartScan covers 10 times the distance of a similarly detailed walking survey.
- Reduced network occupancy and roadworker exposure.
- 50% Cheaper than traditional methods.
- Provides robust evidence for VM Process.
- CD 535 compatible output, uploadable to DDMS.
- Hot-spots identified for risk-based and targeted interventions.





STABLEdrain™

Eliminating vehicle embedment and reducing stone scatter when vehicles stray on to roadside filter drains

FILTER DRAIN REINFORCEMENT

Stone filter drains have no integral source of stabilisation which can cause safety and maintenance issues if vehicles stray onto them. The application of StableDrain provides a reinforced, interlocking layer within the filter stone drain structure which keeps the aggregate in place and distributes the loads imposed by encroaching vehicles.

StableDrain dramatically reduces incidences of stone scatter which puts debris onto the carriageway, vehicle embedment requiring emergency recovery, and damage to the carrier pipe resulting in drainage problems.

The specific geogrid size and structure ensures that the permeability and attenuation performance is unaffected, and the filter drain continues to quickly remove large volumes of surface water from the carriageway.

TRL APPROVED PROCESS

The patented technology was independently tested by TRL and successfully completed 78 individual tests, which involved the trafficking by a range of vehicles at various speeds.

TYPICAL USES

- Implemented behind StoneMaster in the same closure.
- Installed as a standalone operation to act as a form of verge reinforcement and increase network resilience in the event of incidents.
- Useful hardshoulder running where there is an increased risk of vehicle overrun.

THE BENEFITS

- Cost savings due to elimination of clear-up operations and vehicle recovery.
- Road safety improvement by significantly reducing stone scatter.
- Minimises highway disruption through rapid installation times.
- Reduced unplanned road closures due to stone scatter, avoiding disruption to customers planned journeys.
- Fully recyclable.

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All photo's were taken prior to the Coronavirus pandemic