

**UPDATED
FOR 2025**
NEW INFORMATION
AND STATISTICS

POTHOLES - MORE THAN A SURFACE ISSUE

HELPING LOCAL AUTHORITIES FIND SOLUTIONS
TO THE UK'S POTHOLE PROBLEM

THE URGENCY TO TACKLE THE UK'S ONGOING POTHOLE PROBLEM

As the first edition of this industry report stated when we launched it last year, billions of pounds are spent each year on tackling the UK's pothole crisis - and 2 years on, a fresh approach is still clearly needed.

Now, will a new Labour government - **whose election pledge was to fix a million more potholes a year during the next parliament** - make a difference?

The latest figures on the cost of repairing the country's roads are stark - **and becoming worse**. According to this year's annual ALARM report by the Asphalt Industry Alliance (AIA) ^[1], roads in England and Wales are at 'breaking point' - literally and figuratively.

It will cost a record high of £16.81 billion to fix the backlog of carriageway repairs, a further rise from last year's total, underlining the growing scale of the crisis. **Only 48% of local roads are now considered to be in good condition** with more than 15 years of life remaining, while 17% are classified as poor, expected to fail within five years.

1.89 million potholes were filled in the past year - a slight drop from 2 million, but still **the second-highest figure in recent years**. That's one every 17 seconds, which is adding to the existing 'patchwork' of previous repairs. Whilst pothole repairs are welcome, it's also an environmental concern - our research shows that will create 42,000 tonnes of CO₂ emissions.

Although the report says that local authorities have 'a bit more money to spend this year', rising costs due to inflation and the effects of the extreme weather are having an impact on the rate at which local roads are suffering.

Motorists are fed up with the damage that potholes cause to their vehicles, from punctures and wheel damage to broken suspension springs. A report by the RAC last summer revealed that pothole-related damage was the leading concern for **UK drivers, costing them an average of £460 per year in repairs**.

Potholes form when weaknesses exist in the road surface, exacerbated by harsh weather, heavier road usage and the quality of road surface materials. **Other underlying causes include road ironwork failures** - with the use of poor-quality materials and workmanship - an important issue that we have consistently highlighted.

We are seeing a growing number of local authorities unhappy with the approach of patch repairing already subpar pothole repair works, but this is happening far too often.

On average, local roads are now resurfaced once every 93 years, highlighting how stretched budgets are falling far short of the needs of the network.



We have been at the forefront of highlighting the need to address the root causes of surface failures and failing ironwork. We are delighted by the ongoing success of our report in raising awareness and the positive feedback we have received.

We have held numerous rewarding conversations with key stakeholders from local authorities and utility companies on whole life cost, whole life carbon, and increasing sustainability of ironwork installations.

This has led to speaking opportunities at the **LCRIG Innovation and Learning Festival and RSTA Decarbonisation of Road Surfacing Asset Management Technical Training Day 2024**. And we're thrilled to be spreading the message further with an appearance on the Public Sector Executive Podcast.

As you'll read in the report, our collaboration with highways technology experts Gaist shed light on the role of failing ironwork in contributing to the deterioration of road surfaces. We are now working with road surfacing and repair solutions experts IKO Plc.

Here at Wrekin, **we still strongly believe that the UK's pothole problem isn't a lost cause**. Our report has helped to lift the lid on this complex issue - and to encourage conversations about the issues. But we can't stop here.

Read on to discover how, with the help of industry and local authority experts, gully grates, manhole covers, and pothole formations are often interlinked and seek out the solutions to tackle this long-lasting and expensive national issue.

Thank you for reading.

Paul Thompson
Technical Specification Manager
Wrekin Products



^[1]Annual Local Authority Road Maintenance Survey Report 2025.
Asphalt Industry Alliance. March 18, 2025

CONTENTS

INTRODUCTION THE UK HAS A POTHOLE PROBLEM	Page 6
SECTION ONE THE PROBLEM	Page 8
What causes potholes?	Page 9
How do ironworks contribute to potholes?	Page 10
Is it surface failure - or ironwork installation failings?	Page 11
The environmental impact	Page 12
LOCAL AUTHORITY VOICES WHAT ARE LOCAL AUTHORITIES DOING ABOUT IT?	Page 14
Brighton & Hove City Council	Page 15
Derby City Council	Page 16
View from industry expert - LCRIG	Page 17
View from industry expert - Gaist	Page 18
SECTION TWO FINDING THE SOLUTIONS	Page 22
Choose your access cover designs carefully	Page 23
What is the ideal ironwork?	Page 23
Three key solutions to focus on	Page 24
How important is the role of the bedding material used?	Page 25
Case Study - Unite gully gratings trial	Page 26
How does quality ironwork support the safety of all road users?	Page 28
Looking to the future	Page 29
CONCLUSION ALL JOURNEYS BY CAR BEGIN AND END ON LOCAL ROADS.	Page 30

In collaboration with:



THE UK HAS A POTHOLE PROBLEM.

For local authorities up and down the country, this is one claim that can be agreed upon. With billions of pounds each year being spent on tackling potholes in the UK, it is clear that a fresh approach is needed.

A large amount of budget has been committed to the issue, including **£1.6 billion for pothole and road surface repairs** across England for the 2025–2026 financial year.

According to this year's Annual Local Authority Road Maintenance (ALARM) report, highway teams in England and Wales are facing a growing shortfall – **with a total annual funding gap of £1.25 billion**. On average, each local authority now needs **an extra £7.4 million per year just to maintain roads to a satisfactory standard**.

Fixing the backlog of carriageway repairs would cost £16.81 billion. **In the last decade this backlog figure has increased by 42% from £11.8 billion** reported in ALARM 2016^[1]. The report estimates it would take an average of 12 years to complete.

Despite a small increase in overall highway maintenance budgets, less is being spent on the carriageway itself. And rising costs due to inflationary pressures mean engineers have reported being forced to postpone or cancel road schemes to make savings, says the AIA.

The pothole problem is showing no signs of abating. The AA Pothole Tracker^[2] revealed that **pothole incidents in June 2023 were at their worst for five years**. This is all happening for a variety of reasons, but the sheer volume of repairs is no doubt impacting how quickly repairs can take place and when.

The pothole problem is far-reaching, and this includes the different ways they are being formed. While harsh weather, heavier road usage and the quality of road surface materials used to make repairs has long been attributed to the reasons behind potholes forming, ironwork is another topic we need to be highlighting.

While failing ironworks have commonly been treated as a separate issue to potholes, **there is growing concern over the potential link between them**. It is in the interests of everyone involved in the road industry, whether in creating new roads or carrying out repairs, that ironwork issues are included and addressed.

In this report, **we aim to raise awareness of the issues surrounding potholes and failing ironwork**. Importantly, delving into how - against a backdrop of continued demands on the public purse - it is essential that the sector sits up and finds new ways to tackle the problems.

With the help of industry and local authority experts, we explore how gully grates, manhole covers and pothole formation are often interlinked and seek out the solutions to tackle this long-lasting and expensive national issue.



^[1] Annual Local Authority Road Maintenance Survey Report 2025.
Asphalt Industry Alliance. March 18, 2025

^[2] Pothole plague remains at worst for five years
The AA. July 14, 2023

THE PROBLEM

The total depth of all the UK's potholes added together would be 1.5 million metres deep (or almost four times the distance from London to Edinburgh), research has found.^[1]

Burst tyres, buckled wheels and damaged suspension. We all know the risks that road users face daily when navigating potholes on our roads. In turn, this puts huge pressure on local authorities to try and rectify road surface problems with limited resources.

And while huge amounts of work are carried out on pothole repairs and resurfacing - one pothole is filled in the equivalent of every 17 seconds^[1] - it's an unsustainable and seemingly never-ending task for local authorities to keep up with.

Potholes are a longstanding issue, despite the funds thrown at tackling them. The apparent problem with our road surface issues appears to **stem from taking a reactive approach, rather than addressing the real root causes.**

Prevention pays. According to the latest ALARM survey, **the average cost of a planned pothole repair in England is £57.87, compared to £81.62 for a reactive fix. That's a 41% saving** when councils can take a proactive approach.

The new UK Labour Government has stated^[3] that it wants additional pothole funding to be used proactively - specifically to resurface roads and prevent potholes from forming, rather than just reacting to existing damage.

At Wrekin, we agree that stopping the formation of potholes in the first place is intrinsically linked to protecting and preserving our roads. This includes the associated ironwork.

“ IN THE LAST YEAR, ONE POTHOLE WAS FILLED EVERY 17 SECONDS, WITH COUNCILS IN ENGLAND AND WALES SPENDING £121.6 MILLION ON REPAIRS.^[1] ”

^[1]Annual Local Authority Road Maintenance Survey Report 2025.
Asphalt Industry Alliance. March 18, 2025

^[3]Seven million more potholes to be filled next year as public urged to report roads in need of repair
DfT. December 20, 2024

WHAT CAUSES POTHOLES?

Potholes are formed from weaknesses in the road surface, potentially from surfacing joints, remedial works, or the use of poor-quality materials.

These small weaknesses are then exacerbated through a combination of weather conditions and wear and tear. This can be seen particularly in colder months when water that has entered cracks in the road surface freezes and expands - the 'freeze thaw' effect.

The effects of climate change must also be considered. The 2025 ALARM report directly links extreme weather patterns to increased stress on local road networks.^[1]



“ The impact of increasingly extreme weather events—particularly rainfall and freeze-thaw conditions—is evident across the network and is a growing concern among highway authorities. ”



It says these climate-related stresses are worsening the effect of underfunding and delayed resurfacing, meaning the roads are less resilient when weather events occur.

Once the basis for a pothole is formed, it will only deteriorate until it is repaired.



IN SIMPLE TERMS...



STAGE 1 MOISTURE INFILTRATION

Water enters small cracks in the road surface due to rain, snow, or irrigation.



STAGE 2 FREEZE-THAW CYCLE

Temperatures drop, causing the trapped water to freeze and expand, widening the cracks.



STAGE 3 SURFACE WEAKENING

Vehicle loads and traffic stress the pavement, exacerbating cracks and weakening the road's structural integrity.



STAGE 4 POTHOLE FORMATION

The combination of weakened pavement and ongoing traffic pressure leads to the collapse of the road surface, creating a pothole.

HOW DO IRONWORKS CONTRIBUTE TO POTHOLES?

“Understanding the relationship between ironwork specification and installation, and the formation of potholes will be crucial in helping local authorities take action and form longer-term approaches to maintaining roads.”

Paul Thompson

Technical Specification Manager at Wrekin

“There is always potential for a weakness to be created in a road surface wherever a piece of ironwork exists. **Opening a road to create a trench can reduce its structural life by up to 30%.** It is therefore critical to form longer-term approaches to road maintenance.”

The issue doesn't only affect service trenches - cuts in the road to remove, replace or repair ironwork also causes problems. **As soon as there is a cut, there's an increased chance of a pothole forming.**

Poor reinstatement or repeated openings of the same sections of road can result in uneven surfaces and reduced durability, making roads more vulnerable to damage and pothole formation.^[1]

“**Specifying suitable, sympathetic ironwork to begin with is the best solution in the long run,**” he said. “In remedial work, any ironwork that minimises vibrations in the frame or flange will help. This is because any movement, no matter how small, can cause cracks, allowing potholes to form.

Access covers and gully gratings with poorly conceived characteristics, that lack structural rigidity, have the potential to work against their surrounding materials.

This can cause vibrations below the road surface, leading to fractures in the road's layers and the break-up of the top surface.

The rising number of cars on Britain's roads^[4] is also putting pressure on the pothole situation. **Some ironwork designed to take a certain traffic load may now be outdated** and struggle to cope with increased traffic levels. It's surely then only a matter of time before failures occur.

With these traffic concerns, carbon targets to meet, and continued adverse weather conditions to consider, **engineers should no longer be choosing a reactive maintenance approach.** That simply addresses the symptom and not the root cause.

Forming a cut and patching up creates a weak point. The goal must be to protect roads before issues arise to delay the need for short-term deep repairs.

Only through using the correct, appropriate materials can the potential for surface weakness be reduced. **Durable ironwork that is sympathetic to its bedding materials and surrounding environment will have a greatly reduced impact on the creation of potholes.**





“ THE AVERAGE
FREQUENCY OF
RESURFACING FOR ALL
CLASSES OF ROADS NOW
STANDS AT **ONCE EVERY
93 YEARS.**”^[1]

IS IT SURFACE FAILURE - OR IRONWORK INSTALLATION FAILINGS?

Potholes can be caused by either of those factors or a combination of both. Quite often the road surface failure can be caused by poor ironwork installation. The ironwork could be unsympathetic to its environment, and/or the surrounding bedding material could prematurely fail.

Not every pothole is close to an access cover but a significant number are. Our team sees countless examples of ironwork at the centre of or close to the pothole itself. This can either be from the original installation of the ironwork, or from a servicing repair around a replacement cover.

Bus lanes can also be an issue. **Heavier vehicles and their wider wheelbase have a huge impact on the gully gratings found in kerbside (group 3) locations.** Narrower roads are increasingly being built to accommodate more housing plots in developments or as a material cost saving. Gully grates fitted on these roads are therefore **pushed further into the line of vehicles, making them more vulnerable to trafficking.**



Surface failures and failing ironwork go hand in hand, which is why fixing the surface level problem, the pothole, without addressing the underlying causes is a futile exercise.

Councils need to consider the durability and whole life cost of ironwork systems, rather than just surface level repairs.

^[1]Annual Local Authority Road Maintenance Survey Report 2025.
Asphalt Industry Alliance. March 18, 2025

^[4]New car market grows for ninth month running.
The Society of Motor Manufacturers and Traders. May 4, 2023.



THE ENVIRONMENTAL IMPACT

The pothole problem isn't just impacting road users and straining the public purse. The environmental impact of this issue is often more far-reaching than first thought.

Consider the fuel needed as highways teams identify which potholes need to be repaired – and the workers who travel to fix the issues. Then there are the materials needed for the repairs, the tools and generators. The temporary traffic lights needed add to the road's congestion, increasing emissions. And the pothole-damaged tyres and cars that need replacing are sent to landfill.

In the first quarter of 2025, the RAC reported^[5] it had attended 9,439 pothole-related breakdowns, marking a 19% increase compared to the same period in 2024.

This number equates to 1.5% of all RAC breakdowns – a significant jump on the fourth quarter of 2024 (0.8%) and the first three months of 2024 (1.1%).

Councils and road authorities across Britain are paying out record levels of compensation to drivers, with £25.6 million awarded in 2023/24 for pothole damage alone – an increase of 57% compared with the previous year.^[6]



“ 1.89 MILLION
POTHOLE WERE
REPAIRED IN 2025,
EQUATING TO **56,960**
TONNES OF CO₂ ”^[9]

The average pothole in an asphalt surface repair using traditional methods emits approximately 30kg of CO₂ per repair, according to outdoor estate compliance experts Outco.^[7] In addition, the ALARM Survey 2025 reports that 1.89 million potholes were repaired in 2024. If you consider these stats on a larger scale, combining the two statistics, this equates to 56,960 tonnes of CO₂ emissions produced.^[8]

At the same time, the cost of not repairing asphalt damage greatly reduces the lifespan and exponentially increases the capital cost, it says.

With the UK striving to reduce emissions and achieve net zero targets, the spotlight is firmly on local authorities to deliver. There has never been a more crucial time to be changing the status quo when it comes to potholes and ironwork.



THE QUANTITY OF CO₂
EMISSIONS **FROM JUST**
ONE YEAR OF POTHOLE
REPAIRS WOULD TAKE OVER
2,589,091 TREES
ONE YEAR TO OFFSET^[8]

^[5] Pothole breakdowns up a fifth in 12 months, RAC reports
Fleet News. April 23, 2025.

^[6] Pothole damage claim: how to get compensated and report a pothole.
What Car? October 25, 2024.

^[7] Environmental road polymer technology - environmentally friendly road / car park repairs.
Outco.

^[8] (30kg x 1.89 million = 56,960 tonnes of CO₂.) Based on 1 tree absorbing 22kg of CO₂ per year (this figure is only achieved when the tree is fully grown).



WHAT ARE LOCAL AUTHORITIES DOING ABOUT IT?

According to the AIA's annual **ALARM** survey^[1], councils would have needed on average an extra **£7.4m** each last year to reach their own target road conditions. It is hardly surprising, therefore, that many local authorities are struggling.

In a bid to tackle the problem, many are opting for treatments that can be completed within certain timescales to meet budget and time constraints.

Encouragingly, the appetite for changing the situation is high and councils are working hard to make a difference.

Nottinghamshire County Council revealed to us how its move to a 'right first-time'^[9] approach to repair works had decreased short-term pothole repairs by 61%. And Derbyshire County Council has previously said that it had fixed 42,000 potholes in 2023^[10], as it continues to put extra resources into highways maintenance.

“ ON AVERAGE COUNCILS WOULD HAVE NEEDED **AN EXTRA £7.4M EACH** LAST YEAR TO REACH THEIR OWN TARGET ROAD CONDITIONS.”^[1]

^[1]Annual Local Authority Road Maintenance Survey Report 2025.
Asphalt Industry Alliance. March 18, 2025

^[9]The impact of winter potholes.
Nottinghamshire County Council. January 17, 2023

^[10]We've fixed more than 42,000 potholes so far this year.
Derbyshire County Council. May 3, 2023

LOCAL AUTHORITY VOICES



Joe Westwood
Highway Engineer,
Brighton & Hove City Council



Local authorities across the country are facing huge budgetary demands to maintain their road networks. That's why future innovation is so important, says Joe Westwood, highway engineer at Brighton & Hove City Council.

We've experienced potholes next to both gully grates and manhole covers in our roads, so we can see how the two are often linked. And with Brighton & Hove having the highest bus usage outside London, any broken covers can suffer further damage, leading to potholes, through the weight of the buses.

Part of the problem is that we are dealing with quite an old utilities infrastructure. Some ironwork has been in-situ for decades, but road usage is so much higher now.

When a pothole forms in proximity to manholes or gully grates, the materials used might not have been compacted properly or reached the right depth. In some cases, this can even lead to the road sinking.

The UK's weather is also becoming increasingly unstable and having an impact. Flash floods in summer and more surface water in the winter which then freezes can lead to more potholes.

This all puts a strain on our roads and makes costly ironwork failures more likely.

We need to consider the quality of the work being done to fix potholes and the type of ironwork being used.

We have budgets to maintain gully grates but often the manhole covers are the responsibility of the utilities company. Depending on the problem, we have a quick 'make safe' repair using a cold mix Tarmac or asphalt and ask the utilities to go and fix it.

We are very keen to raise awareness and trial new cost-effective ways to tackle the issues, in collaboration with all those responsible for our roads.

As a council, we're looking at more surface improvement programmes, using treatments to seal the roads and prevent the water from getting in. We can also respray surfaces that are two or three years old to rejuvenate them.

Surface treatments don't just help with potholes, they can be carbon-saving as they won't need repairing as often.

A project I started work on in August '23 will use innovative new low-carbon techniques to treat several concrete roads in the city and significantly reduce their chance of developing potholes.

The project involves removing the existing asphalt surface and repairing the concrete joints underneath using a specialised flexible jointing material to create a textured surface on the exposed concrete.

This puts skid resistance into the concrete and ensures noise levels and ride quality are not negatively impacted. It will improve the long-term durability of the roads, extending their life and lowering the need for future maintenance.

**“ SOME
IRONWORK HAS
BEEN IN-SITU
FOR DECADES,
BUT ROAD USAGE
IS SO MUCH
HIGHER NOW. ”**

In the future, we want to include ironwork in our asset team's overarching map of where all our assets are and to keep a log of all the issues. We're trying to work with the utilities so that repairs and reinstatements are done right first time.



Derby City Council

Amy Durrant

Senior Asset Management
Technician, Derby City
Council

LOCAL AUTHORITY VOICES

Former highway inspector Amy Durrant, the current senior asset management technician with Derby City Council, has wide-ranging experience in dealing with road maintenance issues, as she explains:

A large part of my career has been dedicated to carrying out routine inspections of the highway network, looking for defects. One of the main things that I would identify was the occurrence of potholes next to ironwork.

It's quite common to see and needs tackling urgently as it can end up being quite a sharp-edged defect which creates a big risk.

When a pothole is adjacent to the ironwork, we'll do an emergency temporary repair where we pack Tarmac around it to stop any further movement to make it safe. Then we report it to the relevant utility company to say it needs dealing with urgently.

If there is damage to the ironwork itself, if it's on the verge of collapse and needing immediate repair, we will guard it off

with barriers and use traffic management if the location allows until it is replaced.

It can be difficult to establish whose responsibility it is because quite often movement of the ironwork has caused the pothole. Not all manhole covers are owned by us, so there are different organisations involved, along with varying qualities of work.

Finding a long-term solution comes down to investing in the infrastructure so that we're not just maintaining a failing structure. To achieve longer-lasting results, a full audit of the road is needed, considering its uses and vehicle load, such as if there will be a bus route.

Roads change and develop over time and failures can happen. You need much more solid ironwork and the bedding needs to be very strong and structured to withstand the movement and the pounding from the vehicles.

Longevity is also key. Repairs have a huge carbon footprint, so getting it right first time is important. A temporary repair, depending on the traffic sensitivity of the road, could fail within a day or last for weeks. A permanent repair, done properly, generally lasts for quite some time.

Looking to the future, it would be good for local authorities to work together to see a set standard across the board that everyone can work with, benefiting us all if it means having to do less reactive work.

“ FINDING A
LONG-TERM
SOLUTION
COMES DOWN TO
**INVESTING IN THE
INFRASTRUCTURE**
SO THAT WE'RE
NOT JUST
MAINTAINING
A FAILING
STRUCTURE. ”



VIEW FROM INDUSTRY EXPERT

INNOVATIONS PLAY A CRUCIAL ROLE IN THE INDUSTRY'S FUTURE

The **Local Council Roads Innovation Group (LCRIG)** is a community interest not-for-profit, membership organisation, for councils and supply chain working in the highways sector. LCRIG works with over 90% of all Highways Authorities across the country, over 150 supply chain members and Government.

LCRIG supports the highway sector through a range of activities particularly around the themes of collaboration, innovation, skills and net zero. Its Chief Executive, Paula Claytonsmith, describes innovation's crucial role in the industry's future:

At LCRIG, our research clearly show that our local road infrastructure needs much more investment. Particularly if it is to continue to be the asset that connects our communities, businesses to customers and encourages a healthier lifestyle in our population through active travel.

Our local infrastructure of roads, footways and structures is the biggest and most expensive asset we own as nations. Whatever way we interact in our local roads infrastructure, we are impacted by how it functions and the way it is looked after impacts motorists (or other wheeled users) and pedestrians.

Potholes or defects affect much more than motorists, they affect cyclists and motorcyclists, with sometimes fatal effect. We are not going to remove the problem of potholes immediately, however we can look to tackle them through innovation in repairs, new materials, technologies and of course using quality ironwork and drainage that doesn't create an environment for new unfettered potholes or defects to develop.

The Asphalt Industry Alliance (AIA), with whom LCRIG works closely with, releases its annual well-respected ALARM survey. Each year the results are a good barometer of where the industry is in terms of the costs involved in getting local roads back into a reasonable condition. Combined with annual DfT Road condition statistics, both pictures paint a seemingly depressing view of local roads infrastructure. Although a depressing picture, I think it is remarkable just how much councils are doing when faced with less-than-ideal budgets.



Paula Claytonsmith
Chief Executive, LCRIG



The fact that Wrekin understands the complexity that councils are faced with and how poor ironwork can impact on the road environment is demonstrated in this report. It is really important that suppliers do understand the constraints faced and help work with councils pro-actively by highlighting the importance of initial works, maintenance or replaced ironwork. We have all seen how dangerous defects around ironwork can be or can look and some users of our roads are disproportionately affected too. Cyclists for example are hugely vulnerable to defects around ironwork. Weather exacerbates the longevity of any repair, temporary or long term, as can a 'patch and mend' approach.

Effect Asset Management and innovation adoption is key for councils, especially if they are to embrace new technologies that are emerging faster than ever before.

There is a strong appetite for innovation across the highways sector and LCRIG will continue to push the sector into opportunities where they can see what new products supply chain have developed, new ways of thinking and also how innovation must be part of our thinking in a complex world.





VIEW FROM INDUSTRY EXPERT

IRONWORK IS ‘A KEY RISK FACTOR IN HIGHWAY DETERIORATION’

Highways technology experts Gaist use advanced data capture techniques to provide highly detailed images and analysis on the condition of hundreds of thousands of miles of the UK’s roads.

The company captures data for over a third of all local authorities and works with national bodies such as the Department for Transport to produce groundbreaking image-based intelligence to tackle the issues facing our transport infrastructure.

Its data-gathering activities and subsequent analysis highlights a wide range of road deterioration related to the formation of potholes - including where they are located near or around ironworks. Here Christina Liassides, Gaist’s head of professional services, explains.

HOW DOES FAILING IRONWORK CONTRIBUTE TO THE DETERIORATION OF ROAD SURFACES?

Gaist routinely identifies ironwork such as gullies and covers within its condition survey because these are a key risk factor, particularly for deterioration in the carriageway.

“Manhole covers, utility access covers, drainage grates and other ironwork can contribute to localised road deterioration that can significantly impact over the longer term,” said Christina.

“This has been borne out by and tested through us routinely performing accurate and detailed surveys and developing identification and lifecycle models over many years.

“As our technology surveys the whole carriageway and can identify any emerging defects, we are able to see a correlation between ironwork and the localised deterioration of road surfaces.”



Christina Liassides

Head of Professional Services, Gaist (FCIHT, MIHE)

Formerly head of highway asset and network management for Brighton & Hove City Council, Christina has more than 20 years of local authority management experience across a range of services at senior level.

Christina heads up Gaist’s professional services, combining highway and data expertise to support local authority and private sector clients in delivering and improving their services.

HOW DOES ROADSIDE INTELLIGENCE IDENTIFY THE TYPE OF DAMAGE YOU SEE?

“Our condition analysis has been established over many years of working with highways authorities in the UK and uses a combination of high-quality data capture and cloud-based advanced image analysis.

“This data, from rural and urban locations, usually forms an annual survey for local authorities and looks at kerb-to-kerb conditions for each section of the road. Some urban local authorities also use our imagery to identify issues monthly, where potholes can be picked up much more quickly.

“It means we can supply real-time intelligence about the whole roadscape environment - and our in-house analysis of the results helps us to drive a deeper understanding and a more multi-faceted approach to highways safety and maintenance.

“The types of damage we typically see around ironwork includes arc cracking - often caused by water ingress - and crazing or potholing, where the movement of the ironwork breaks up the surrounding material, weakening its structural integrity and increasing permeability.”

“Despite the information around ironwork and the connection to pothole formations being just one part of our overall data collection concerning the UK’s road network, we recognise the importance of this issue to the industry. We hope that through closer collaboration and sharing of information we can help the sector devise the solutions needed to tackle this very serious and costly issue.”

Christina Liassides

Head of professional services, Gaist (FCIHT, MIHE)

WHAT ARE THE MAJOR CAUSES OF THIS ROAD DAMAGE?

TRAFFIC



With a substantial increase in the weight and volume of vehicles over the years, and the amount of delivery and other vehicular movements, ironwork must perform under greater traffic load. Localised movement can begin a process of vibration and eventually fracturing.

IRONWORK QUALITY



Covers and frames and gully gratings need to be of sufficient quality to cope with traffic volume and weight, especially where gullies are partly or wholly in the wheel tracks.

CONSTRUCTION



Joints and excavation create weaker points in the road structure, which is designed to operate as a whole. While providing maximum strength - and with a beneficial level of flexibility - it is vital that construction reduces the opportunity for unwanted movement either on the surface or in the sub-structure. Even if the grating material is strong, shock loading can break off the seating lugs, causing vibration which leads to fracturing of the surrounding material.

DIFFERING HEIGHTS



Even if minimal, setting a different height to the surrounding road surface can create an uneven stress distribution when vehicles pass over. This can cause ‘differential settling’ where the ironwork sinks more than the surrounding road surface, creating potholes and cracks - and accelerating road deterioration.

WATER DAMAGE



The gaps and joints between the ironwork cover and surrounding road surface, or those created by minor deterioration, can allow water to seep in and penetrate the road’s deeper layers. Moisture weakens the structural integrity, frequently causing the layers to separate and deform, again accelerating road deterioration.



INTELLIGENTLY TRACKING HIGHWAY DETERIORATION

Gaist SafetyView detects areas of investigation or ‘AOIs’ in line with highway authorities’ inspection schedules, surveying their network with high definition, 360-degree imagery.

With imagery being captured as often as once per month on highly trafficked routes, this builds up a longer-term view of how the network deteriorates.

It enables tracking of issues that may need repair and monitoring of locations that may develop into defects, including those localised around ironwork.

The information for this case study focused on a single gully over a period of nearly three years, to provide additional intelligence on the susceptibility to deterioration in a busy location.

Gaist then uses this intelligence when reviewing key risk factors for the highway network, enabling highway authorities to better manage risk and maintenance across their network.

THE CYCLE OF DETERIORATION

“In the example to the right, the photographs speak for themselves and show three cycles of deterioration and repair from October 2020 to May 2023.

“You can see the tracking of the gully using our SafetyView feature which captures imagery to assist a local authority’s highway safety inspection regime.

“The increased damage is localised around the ironwork over a period of months, which is not uncommon in our experience of surveying local roads.

“The gully grating itself remains in good condition throughout the two and a half years of monitoring. But the material surrounding it is susceptible initially to water ingress - note the arc cracking - and eventually to potholing where the outer surrounding material is in line with the nearside wheel track.

“This occurs even after repair, where the material is gradually pushed up and eroded around the grating, once again leading to a cycle of pothole and repair.”

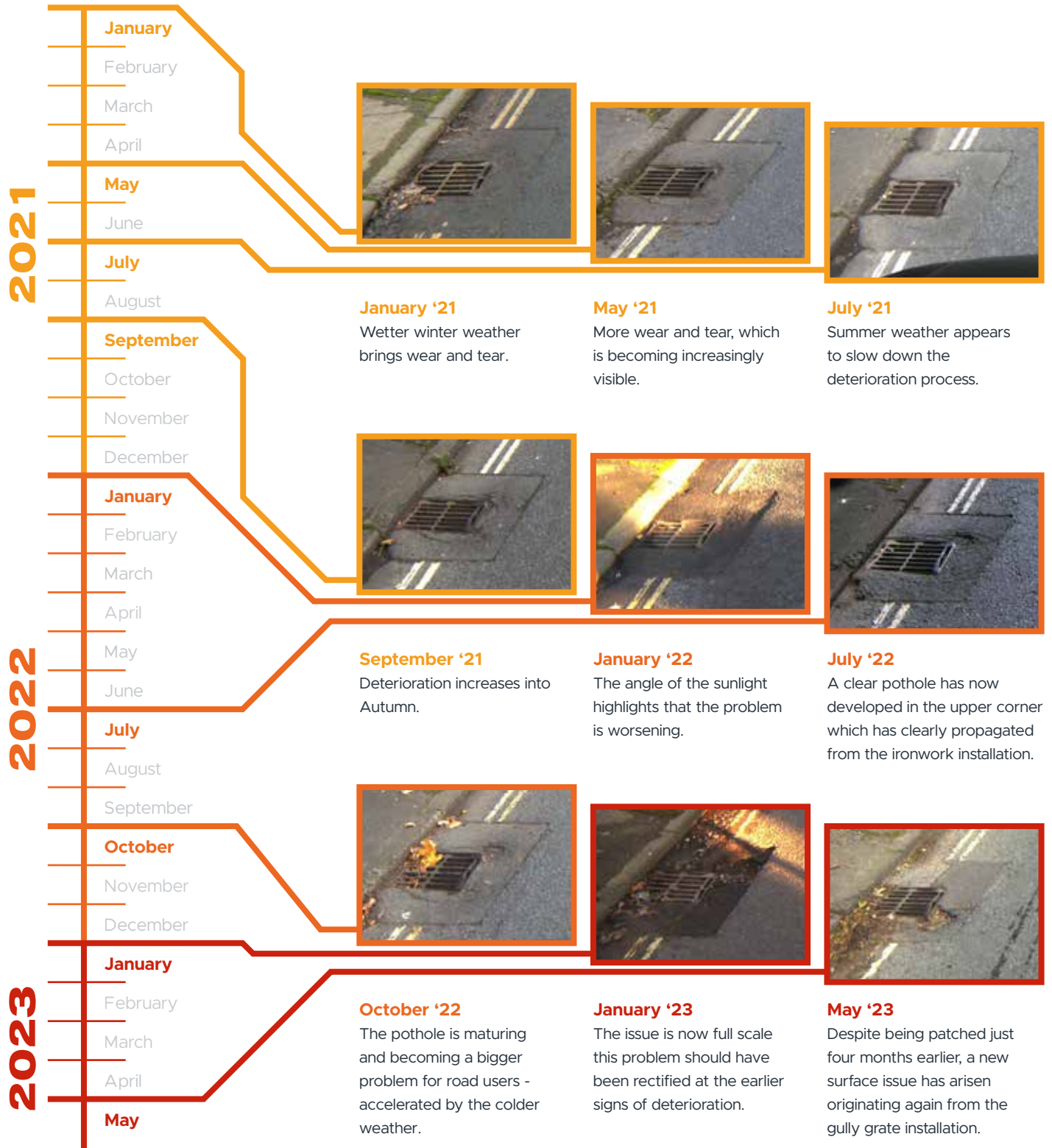
IRONWORK INSIGHT

"It's clear from the photographs that this issue has originated from inadequacies in either the ironwork used, the bedding mortar or overall structure of the system installation. In colder months this issue has accelerated to the point where there is a clear risk to road users. If we consider the remedial work that was done to patch around this grating (which subsequently failed), there has been unnecessary cost to the local authority."

As this is a dual carriageway the gully grating is at more risk than a single carriageway road. This highlights the importance of getting the specification of the ironwork installation right first time."

Paul Thompson

Technical Specification Manager, Wrekin Products



FINDING THE SOLUTIONS

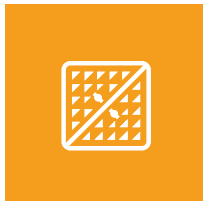
The UK's pothole problem isn't a lost cause. There are solutions available to prevent access covers from contributing to potholes. We know that the challenge can often lie in a patch repair approach, rather than focusing on the root cause.

Prevention pays. According to the latest ALARM survey, the average cost of a planned pothole repair in England is £57.87, compared to £81.62 for a reactive fix. That's a 41% saving when councils can take a proactive approach.^[1]

The new UK Labour Government has stated^[3] that it wants additional pothole funding to be used proactively - specifically to resurface roads and prevent potholes from forming, rather than just reacting to existing damage.

Investing in solving the problem is a clear priority. Local authorities need help in creating longer-term plans to keep roads in better condition for longer.

When searching for the solution, there are key questions to consider:



How do we ensure the correct specification of ironwork and materials?



How can we break the habit of resurfacing and filling potholes cheaply and quickly?



Can we better plan for our ever-changing road landscape, as we see the introduction of more eco-friendly cycle and bus lanes?

41%
SAVING
POSSIBLE WHEN TAKING A
PROACTIVE APPROACH TO
POTHOLE REPAIRS.

CHOOSE YOUR ACCESS COVER DESIGNS CAREFULLY

A major issue contributing to potholes is the quality of the access covers chosen and how they are fitted. The Water Research Centre found that 89% of access cover failures relate to a single mode of failure, not specifically foundation failure, while 44% suffer failure of the paved surround.

This is where national standards have a crucial role to play, especially the National Highways CD 534, part of the Standards for Highways' Design Manual for Roads and Bridges (DMRB). Typically, local authorities adopt CD 534, and Sewers for Adoption (The Code).

Supplementary to the BS EN 124 British standard, for all gully tops and chamber tops on National Highways managed roads, CD 534 was updated in May 2022 to help improve the quality of the ironwork going into the market.

VO.1.0 of CD 534 recognises that load transfer from trafficking, from the frame to the underlying bedding material, is a key factor in determining the lifetime of an installation. This is where another key standard comes into play – BS 7903, which recommends the inclusion of frame gussets to be positioned adjacent to cover seating locations. This offers key additional support and rigidity to the frame under loading. Failing ironwork has been shown to contribute to pothole formation long before it is visible on the surface, bringing further focus on solutions that are proven and reliable.

It is therefore imperative that specifiers, on behalf of transport planners, work with manufacturers to ensure that gully and chamber top products meet these new requirements, for the benefit of road users, taxpayers and the environment.



National Highways updated a significant set of its requirements for manhole covers and gully grates installed on the road network, for which it is responsible. The document in question is CD 534, which was first released in February 2020 and has been updated to version 0.1.0 in May 2022. The updated guidance affects bedding pressures, frame weights, depths and skid resistance, amongst other criteria.

WHAT IS THE IDEAL IRONWORK?

The bearing pressure exerted on an access cover is one of the biggest factors when choosing the best solution.

CD 534 VO.1.0 – which should be considered the minimal base level of product – sets a minimum flange area and frame weight for all 600 x 600mm and 675 x 675mm manhole cover frames to ensure that products can take the dynamic loads they are specified for.

Ironwork that doesn't meet these criteria isn't suitable for the National Highways network.

We must also consider the regulations criteria for frame weights. As well as having a surface area that is designed for high-intensity traffic loads, the frames need to have the rigidity to resist the loads transferred to them. A heavier frame weight will offer the best possible rigidity, even under the most extreme loads.

Although gully gratings are not as large a focus in the standards as access covers, the creation of narrower roads means they are becoming a higher risk and are frequently in the line of traffic. BS EN 124 and CD 534 should be addressing this higher risk to gully gratings to aid specifiers in their product selection.

By going above and beyond the standard, local authorities are better positioned to combat the most common causes of failure.

We must ensure that all these bases are covered, using the optimum type of ironwork in the right environment, to prevent problems caused by vibrations, road surface failures and water ingress.

^[1]Annual Local Authority Road Maintenance Survey Report 2025.
Asphalt Industry Alliance. March 18, 2025

^[3]Seven million more potholes to be filled next year as public urged to report roads in need of repair
DfT. December 20, 2024

THREE KEY SOLUTIONS TO FOCUS ON:

1

BEDDING MATERIALS

Bedding materials must be selected based on their suitability for the job. Adjustment units which are made from the same material as the bedding material make for a homogeneous installation.

2

LONGEVITY

Manufacturers must be able to demonstrate that ironwork products are designed to significantly reduce the replacement cycles throughout their service life - improving the whole life cost and reducing carbon emissions.

3

OPTIMISED DESIGNS

Ironworks should be designed to carefully balance strength and performance and be engineered to exceed standards - achieved through optimised designs - while emitting as little CO₂ across their whole life.

The ideal ironwork should include features that combat the typical modes of failure that we see on UK roads, such as a rigid I-beam for high performance load transfer, BS 7903 frame gussets for overall frame rigidity, surface texturing above and below the flange for maximum mortar engagement and an optimal seating position within the frame to minimise friction wear and frame flex.

This is why we have been refining and perfecting the Unite product for over 20 years. The demands on UK roads are ever-increasing and this is reflected in the need for ultra-efficient and long lasting highway ironwork.

Learn more about Unite, our highest quality range of access covers and gully grates with over 500,000 installations and zero reported failures at wrek.in/unite





Unite Range

Gully Grates & Manhole Covers

wrek.in/unite

FEATURES	BENEFITS	UNITE
Rigid I-beam	High performance load transfer	✓
Frame gussets (BS 7903)	Increased frame rigidity, reducing vibration transfer	✓
Low wear seating	Increased installation life from reduced wear	✓
Mortar sympathetic frame features	The frame bonds with its surrounding better, reducing movement	✓
CD 534 compliant & BSI Kitemarked to BS EN 124:2015	Meets and exceeds the standards to give assurance of performance	✓
Market leading 10-year warranty	Peace of mind, reduced whole life cost	✓

HOW IMPORTANT IS THE ROLE OF THE BEDDING MATERIAL USED?

“ MCHW SERIES
500... EFFECTIVELY
OUTLAWS THE
USE OF PACKING
MATERIALS FOR
GULLY AND CHAMBER
TOPS. ”

GLOSSARY OF TERMS

Sympathetic ironwork

Ironwork that manages load transfer extremely efficiently, having minimal impact on its immediate surrounding bedding and surface materials, and chamber top.

Homogeneous installation

An installation consisting of parts all of the same kind. In this case, bedding mortar made with the same materials used to create packing plates or chamber adjustment units.

The key to enhancing the lifespan of ironwork is to ensure that it engages as sympathetically as possible with its bedding materials and surrounding environment.

You will have seen many examples where parts of the bedding material around a gully grate or manhole cover have completely fallen away from the ironwork and the road, creating a pothole.

Products that are not sympathetic to their environment will accelerate this failure mode, by acting as a catalyst in the break-up of bedding materials, affecting the road surface.

A separate standard, the MCHW Series 500, relates to drainage and service ducts - and effectively outlaws the use of packing materials for gully and chamber tops. It offers guidance on the most suitable materials and stipulates the methodology for installation best practice.

Ideally, materials that form a solid homogeneous base with the mortar should be used – and preferably from the same material. This can reduce the expansion and contraction of materials at different rates that occurs in changing conditions and can cause cracking, leading to water ingress, freeze thaw and failure.

Any products used alongside bedding mortar in the installation process – such as chamber adjustment accessories – that are made from the same material as the mortar offers a fully homogeneous installation. It avoids the risk of delaminating materials in the bedding and surrounding road surface.

THE BENEFITS OF USING A HIGH-PERFORMANCE RESIN-BASED AND FLOWABLE MORTAR

FLOWABLE

A CD 534 compliant high-performance flowable mortar offers a quick and easy installation, while offering an all-encompassing approach to ironwork flange envelopment.

RESIN

Polyester resin bedding mortar offers the best mechanical properties for best practice ironwork installation, as it should have high tensile and flexural strength. This is because ductile iron will flex under loading (well-designed iron products will flex less) therefore the bedding material must be able to absorb these dynamics.

CITY COUNCIL'S SEARCH FOR **SOLUTIONS WITH GULLY GRATES TRIAL**



While drivers face a daily swerve of potholes on the UK's roads, residents and road users alike are also putting up with noisy ironwork that has become loose in heavily trafficked areas. Paul Thompson, Wrekin's Technical Specification Manager, describes how a trial project is helping one council.



Unite Gully Grates



Unipak Bedding Mortar

THE ISSUE

The council had been having an issue with a line of gully gratings on a local A road for several years.

It's a standard-sized two-lane carriageway on a bridge next to a tunnel that experiences heavy bus traffic. The seven or eight gratings, set against the kerb, were in a vulnerable position as wider vehicles and buses drove over them - cars would normally miss them.

The traffic pressure was causing damage, loosening the gratings which started to break out of the ground and rattle. Because drivers came out of the tunnel and straight on to the bridge, there wasn't as much depth to play with regarding the road's construction.

The council was always replacing the gully gratings and couldn't seem to find a solution. There were some potholes being created around a couple of the gratings, with the road surface breaking up around the edge.

THE EFFECTS

The council was either replacing the damaged gratings or patching them up. If they could see one starting to rattle, it would be dug out and re-bedded.

It was proving to be massively costly in terms of the work involved, the carbon effect of continual repairs, the traffic management and resulting congestion as it's a busy route. It can take half a day just to replace a gully grating, especially if the chamber is damaged.

THE SOLUTION

The council told Wrekin about the issue when we met them at the Local Council Roads Innovation Group's (LCRIG) Strictly Highways show in October '22.

The team knew straight away what the solution was. In these cases, it's almost always the same thing – poor performance is down to the ironwork design and the grade of bedding material. Both need to work together to provide the stability needed.

We suggested a trial of Wrekin's Unite gully grate, which we delivered to their depot with Unipak bedding mortar. We then attended on-site to supervise the installation in the first space outside the tunnel. This approach made sure the installation was spot on. Without the right installation technique, this is another contributing factor to ironwork failures and resulting potholes.

The Unite gully grates and access covers have been installed more than 500,000 times in the last 20 years, with zero reported failures. They're extremely well-designed, engineered for a long life and provide substantial savings in installation costs and road disruptions.

The council's team really liked the gully grate's aesthetics and its robustness - it's very much a 'belt and braces' product that looks very strong.

It's also vital that the product is sympathetic to its surroundings by using a high-performance bedding mortar - polyester resin is the best you can get.

THE RESULTS

At the time of writing, the gully grating has been in place for several years, and it has been doing a great job. I've been to see it in action, watching it being trafficked by buses and lorries - there were no issues from sound or any visible movement. It looks like it's solidly anchored into the ground - it couldn't have performed any better.

And although it might be a slightly more expensive product to buy - an extra £50 to £70 - that's balanced with a reduced number of replacements and the many thousands of pounds spent on them over the years. Every council across the country will be facing similar issues.

It's about looking beyond the initial cost and thinking about the impact it will have for the next few months and years.





HOW DOES QUALITY IRONWORK SUPPORT THE SAFETY OF ALL ROAD USERS?

Good quality ironwork can not only prevent potholes forming, but with the right specification they can contribute to the safety of other road users too.

Gully grates that include a lower secondary grid maximise the hydraulic drainage performance through turbulence increasing the volume of surface water evacuated from the road. This promotes vehicle, cycle and pedestrian safety by reducing the formation of surface water.

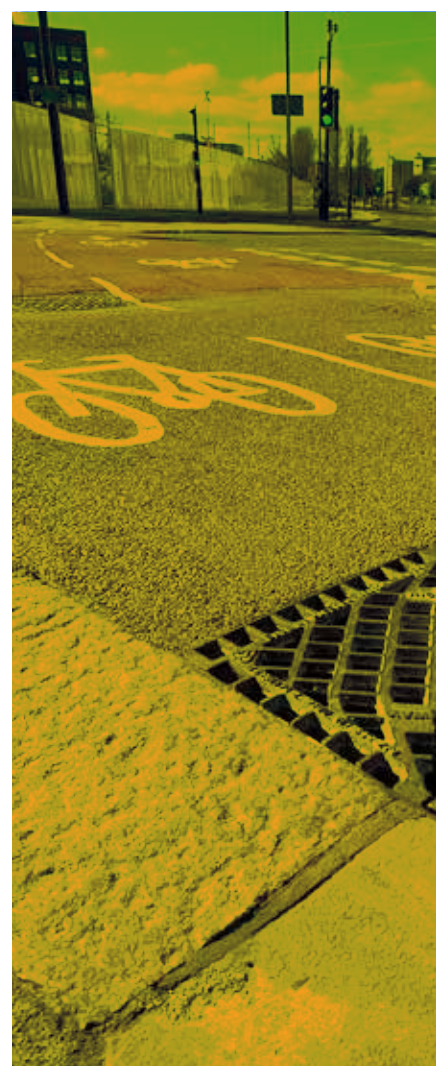
Other methods have previously been adopted to increase cycle safety, such as narrower gully gratings, so less ironwork protrudes into the roadway. But this only worsens the hydraulic performance of road gullies evacuating surface water - potentially creating a greater risk, such as vehicle hydroplaning and surface water pooling which could affect cyclists and pedestrians.

The move to choosing greener and healthier travel options means this is now a vital consideration. The government announced in 2023 that it was setting aside £200m to improve walking and cycling routes following extensive consultation with local authorities and communities across England.

Overseen by the Active Travel England agency, it is hoped that the investment in hundreds of upgraded routes and paths will help to ease congestion, reduce emissions, boost local economies, make it safer for children to walk to school and improve people's health.

Ironworks - and in particular gully grates - play an important role as our street scenes evolve, with efficiently functioning drainage an important consideration as roads narrow to encompass more bus and cycle lanes.

Products which maximise the drainage waterway while offering increased longevity will offer the best value for a local authority and its residents.



LOOKING TO THE FUTURE

The industry must focus on using specialist, robust and long-lasting ironwork installation systems that increase whole-life performance in a ‘right first time’ approach, reducing waste and emissions.

Using materials provided by companies with good distribution networks, which can ensure local storage, can also cut down on haulage-related CO₂.

Clearly, transport planners’ budgets need to be allocated wisely but we urge local authorities to consider the longer-term benefits of investing in a whole-life cost and not seeking a quick fix.

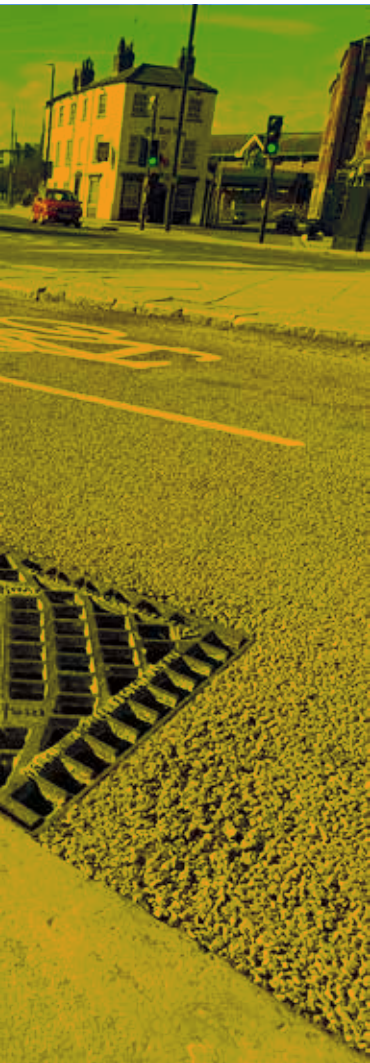
Paul Thompson, Technical Specification Manager at Wrekin, said: “Local authorities invest millions in surfacing the highway network and making significant changes to future uses, especially on busy and economically important routes.

“They don’t need to be spending further time and money over the years by digging up roads for repairs and replacements due to failing ironwork. A ‘copy and paste’ approach to specifications must stop to protect local authority investments and protect roads and road users for many years to come.”

Councils and planners need to consider the overwhelming costs of traffic management and the environmental and social impact through traffic jams and CO₂ emissions against the cost of the quality of ironwork chosen.

The replacement costs involved with a typical access cover installation can be thousands of pounds. When compared with the initial cost for a ‘right first time’ installation, the outlay for the ironwork becomes insignificant.

There is also a significant cost value to road users. Ironwork replacement typically takes around 3 hours^[11]. Studies show the 2,000 users per hour of A-roads are delayed by an average of 4 minutes in roadworks^[12]. This loss of earnings and productivity equates to over £3,000 per hour. The saving to society of not having a three-hour long unnecessary manhole replacement is at least £9,000 and cuts the associated noise, dust and waste.



	Typical Manhole Cover	Unite
Approximate cost	£110	£225
Installation frequency	2+	1
Installation cost	£1,200+	£600
Total cost	£1,440+	£825
Total savings with Unite	£615+	
Sustainable saving	Social Cost £9,000	

[11] Based on independent analysis commissioned by a major water utility.

[12] Statistics collated from Department for Transport & The National Traffic Survey 2014



ALL JOURNEYS BY CAR BEGIN AND END ON LOCAL ROADS.

It's a well-known phrase and one that speaks volumes about the vital importance of local roads to the well-being and future success of our communities and economy.

As we conclude this report, we hope this is not the end but only the beginning of many important conversations to come. Engaging with local authorities and the highways sector about the next steps to securing a better future for our road network is paramount.

We know first-hand the difficulties facing local authorities when it comes to potholes. The knock-on effects are stark. For example, councils and road authorities across Britain are paying out record levels of compensation to drivers, with £25.6 million awarded in 2023/24 for pothole damage alone – an increase of 57% compared with the previous year.^[6]

Failing ironwork is only contributing to road issues. We need to do all we can to prevent the disruption and spiralling costs associated with repeated ironwork and pothole repairs. Not to mention the fact we must also reduce the environmental impact of increased CO₂ emissions produced when travelling to and undertaking works.

The problems stem all too often from pothole and ironwork repairs being completed in silos, leaving local authorities and utility companies to play catch-up with one another as the repair works aren't linked. Surface failures and failing ironwork go hand in hand, which is why we need to address the underlying causes.

At Wrekin, we believe in looking at the root causes and the long-term solutions so we can all have a road network to be proud of.

Do share your thoughts on the report and for more information about the solutions discussed, get in touch today.



Paul Thompson

Technical Specification Manager
Wrekin Products

^[6]Pothole damage claim: how to get compensated and report a pothole.
What Car? October 25, 2024.



SHARE

We hope you found our white paper insightful and informative. Sharing knowledge is essential in driving progress and fostering informed discussions. If you believe our research can benefit your colleagues, peers, or industry stakeholders, we encourage you to share this white paper with them. Together, we can work towards a better understanding of the subject matter and collectively strive for meaningful solutions.

Thank you for your engagement and for being a part of the ongoing conversation.

wrek.in/potholeshare



THANKS FOR READING

Thank you for taking the time to read our White Paper, we welcome your input and feedback.

To get in touch with us, please visit wrek.in/contact or scan the QR code below.

Wrekin Products Limited.

Unit 1a, Europa Way
Britannia Enterprise Park
Lichfield, Staffordshire
WS14 9TZ

wrekinproducts.com





All information in this brochure is subject to change without notice. While efforts have been made to make this brochure helpful and accurate, Wrekin Products Ltd. does not warrant the accuracy of information obtained from this brochure. Where errors or omission are brought to the attention of Wrekin, amendments will be made as quickly as possible.



Tel. 01543 440 440
Fax. 01543 440 444
Email. info@wrekinproducts.com

wrekinproducts.com

Wrekin Products Limited.
Unit 1a, Europa Way
Britannia Enterprise Park
Lichfield, Staffordshire
WS14 9TZ

