APPLICATION ONE

SOUTH YORKSHIRE TURNING UP THE HEAT ON NOx

DECLARATIONS

The Department for Transport (DfT) is inviting local authorities in England[1] to apply for Clean Vehicle Technology grants of a maximum of £500,000[2] towards reducing oxides of nitrogen (NO_X) emissions from local vehicles. The total fund available for this scheme is £5m.

Applicants should use this form to submit their proposals to DfT by 17:00, Friday 25 July 2014. Applicants can propose to upgrade vehicles with more than one type of technology but should use one application form per technology. Guidance notes have been published to assist you with completing the application form.

All applicants must confirm that they have secured appropriate interest from at least one operator that will engage in the proposed project. Please check the box below to show that you have completed this requirement.

I have secured commitment as stated above: ☑

In addition, all applicants must confirm that they have received legal advice on EU state aid rules and that the proposed project is compatible with the relevant restrictions. Please check the box below to show that you have completed this requirement and provide a short summary of the legal advice you have received which explains why the proposed project would either not be classed as state aid or would be classed as compatible aid which is exempt from the requirement to notify the European Commission in advance of proceeding.

I confirm that I have received legal advice on EU state aid rules which will allow the proposed project to proceed if successful: ☑

Summary of legal advice received:

"It is considered that the grant to the grant recipient would not be classed as "state aid" given the nature of the project. It is understood that the proposed works will not give any financial benefit to the grant recipient e.g. improved fuel efficiency, and in fact may slightly increase on-going operating costs (more Adblue). It is therefore the case that the grant would not constitute an economic advantage and would therefore not fall within the definition of state aid in Article 87(1) of the Treaty. The beneficiaries of the grant are the public sector in terms of meeting emissions targets and the public at large through improved air quality.

In the unlikely event that the grant was deemed by the DfT as being state aid, a grant of up to 200,000 euros would be de minimis aid under Regulation no.1407/2013 (on the application of Articles 107 and 108 of the Treaty on the functioning of the European Union to de minimis aid), and as such would have no potential effect on competition. The proposed grant recipient has confirmed that, inclusive of a grant of 200,000 euros, the total amount of de minimis aid granted to them will not exceed 200,000 euros over the relevant three fiscal years (2 previous years and present year). This lower level of grant would still allow much of the project to be implemented (30 buses out of 41 on the two routes).

It is intended that the grant agreement with the grant recipient will specify that the parties agree that the grant is not state aid. The grant will be delivered to First who have selected the technology supplier HJS."

From time to time, we receive Freedom of Information (FOI) and Environmental Information Regulations (EIR) requests about DfT grant awards.

Information provided in this application may be subject to publication or disclosure in accordance with the Freedom of Information Act 2000 (FOIA) or the Environmental Information Regulations 2004.

If you want information that you provide to be treated as confidential, please be aware that, under the FOIA, there is a Statutory Code of Practice with which public authorities must comply and which deals, amongst other things, with obligations of confidence. In view of this it would be helpful if you could explain to us why you regard the information you have provided as confidential. If we receive a request for disclosure of the information, we will take full account of your explanation, but we cannot give an assurance that confidentiality can be maintained in all circumstances.

Please also let us know if you would be content for us to share your contact details with a third party, e.g. technology supplier.

I am content for my contact details to be forwarded to an enquirer. ☑

This page has been completed by the Senior Responsible Owner (SRO) of the proposed project[3] : ☑

SECTION A

APPLICANT INFORMATION

SECTION A1
LEAD AUTHORITY AND PARTNERS

South Yorkshire Passenger Transport Executive (SYPTE) – Lead Applicant

On behalf of:
Sheffield City Council
Rotherham Metropolitan Borough Council
Doncaster Metropolitan Borough Council
Barnsley Metropolitan Borough Council

In partnership with:
First South Yorkshire
HJS Emission Technology
Sheffield Bus Partnership
Rotherham Bus Partnership

SECTION A2
PROJECT MANAGEMENT

Senior Responsible Owner name and position:
Ben Still – Interim Director General, SYPTE

Bid Manager name and position
(first point of contact):
Chloe Shepherd - Strategy and Policy Officer

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Email address:
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SECTION B

PROJECT PROPOSAL

SECTION B1
DESCRIPTION OF PROJECT PROPOSAL

Local Challenge

The CVTF will enable us to tackle local air quality issues across South Yorkshire, by encouraging bus operators to establish and implement innovative technologies on their existing vehicles. Our bid will help to improve air quality and offset the negative impact economic growth can have on our environment. South Yorkshire is undergoing an economic transformation that will lead to more jobs, more people travelling and without our collective action, worsening air quality.

We face a significant challenge, having a total of 20 Air Quality Management Areas (AQMAs) declared for NO_2 exceedance across South Yorkshire (see Figure 1). Pollution from the M1 presents a difficult problem for the South Yorkshire Authorities, as it is an area largely outside of our direct influence and a major contributor to emissions. In South Yorkshire the number of deaths from respiratory disease in the under 75's is higher than the national average, with Doncaster and Rotherham reporting amongst the highest figures in the Yorkshire and Humber area[4].

Up to 500 premature deaths a year are attributed to poor air quality in Sheffield alone, with health costs of £160million[5] . Overall, the adverse effects of poor air quality are likely to be having a bigger negative impact on Sheffield's residents' life expectancy than road traffic accidents or passive smoking[6].

Tackling the emissions from the X78 and 75 bus services will deliver significant public health benefits in the areas along the route, which are amongst those with the greatest need of assistance. Our proposal has two elements to demonstrate scalability, all using the same innovative technology.

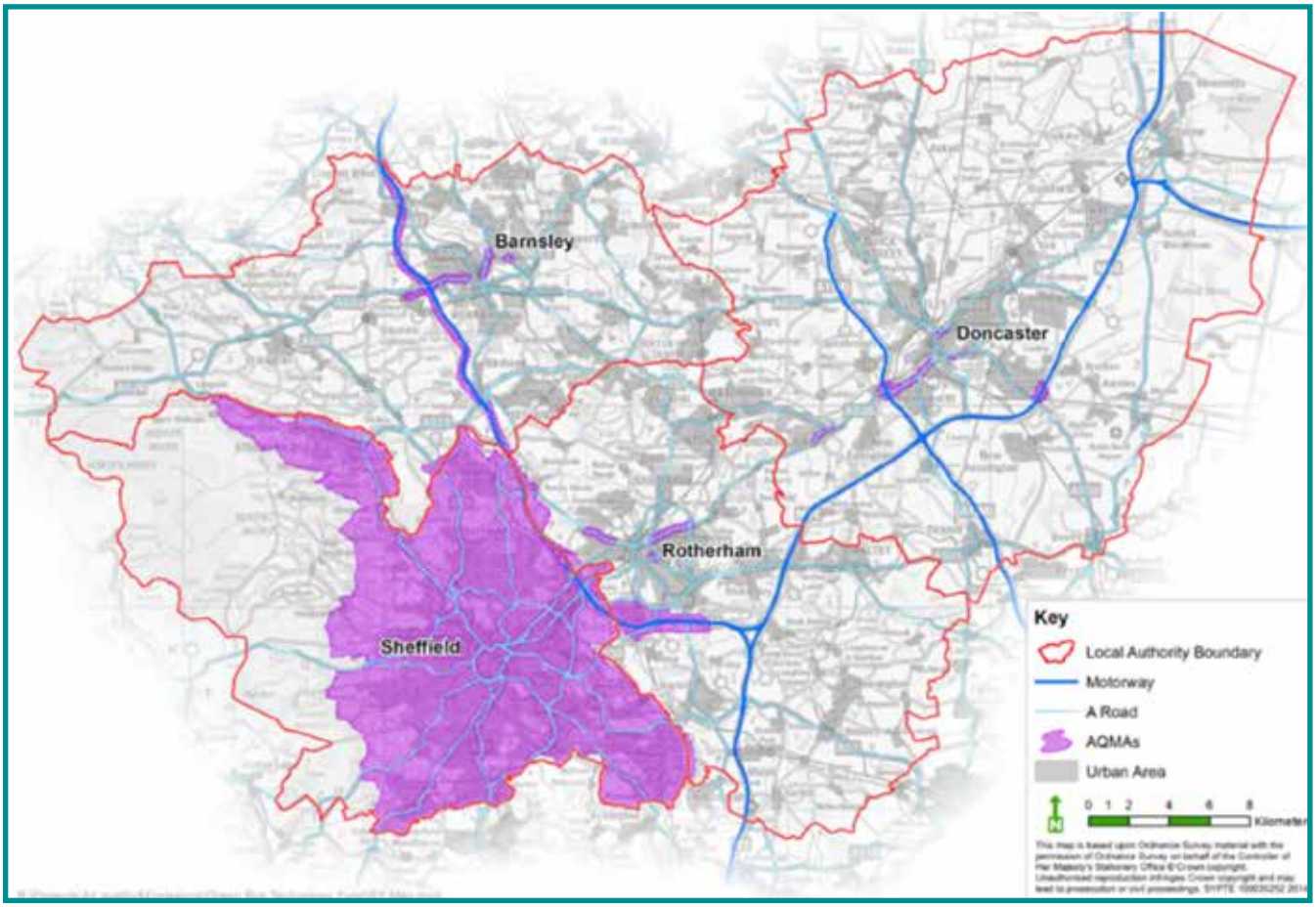


Figure 1

Project Proposal

Element 1

Buses on the longest, single operator route in South Yorkshire, will be fitted with an innovative form of Selective Catalytic Reduction (SCR) called Thermo Management Technology (TMT), that reduces existing NO_X emissions by raising exhaust-gas temperatures (see Figure 5). The X78 bus route traverses 7 of the 20 Air Quality Management Areas (AQMAs) in South Yorkshire and connects 3 of the 4 South Yorkshire Authorities, all of which are declared for an exceedance of NO_X (see Figure 2). A total of 21 Volvo B9TL buses are required to operate this route, all of which will be fitted with this technology.

Element 2

To demonstrate scalability within our bid, we have identified an additional, single operator route, which also uses Volvo B9TL bus engines. The entirety of the 75 bus corridor is located within the Sheffield AQMA (see Figure 3), operating a high frequency service, 7 days a week, under urban driving conditions. It connects the Northern General Hospital and the Moor markets, which are popular destinations located in congested urban environments. A total of 20 buses will be fitted with the innovative TMT system, which would result in the entire fleet used on the key commuter service, benefitting from the improvement.

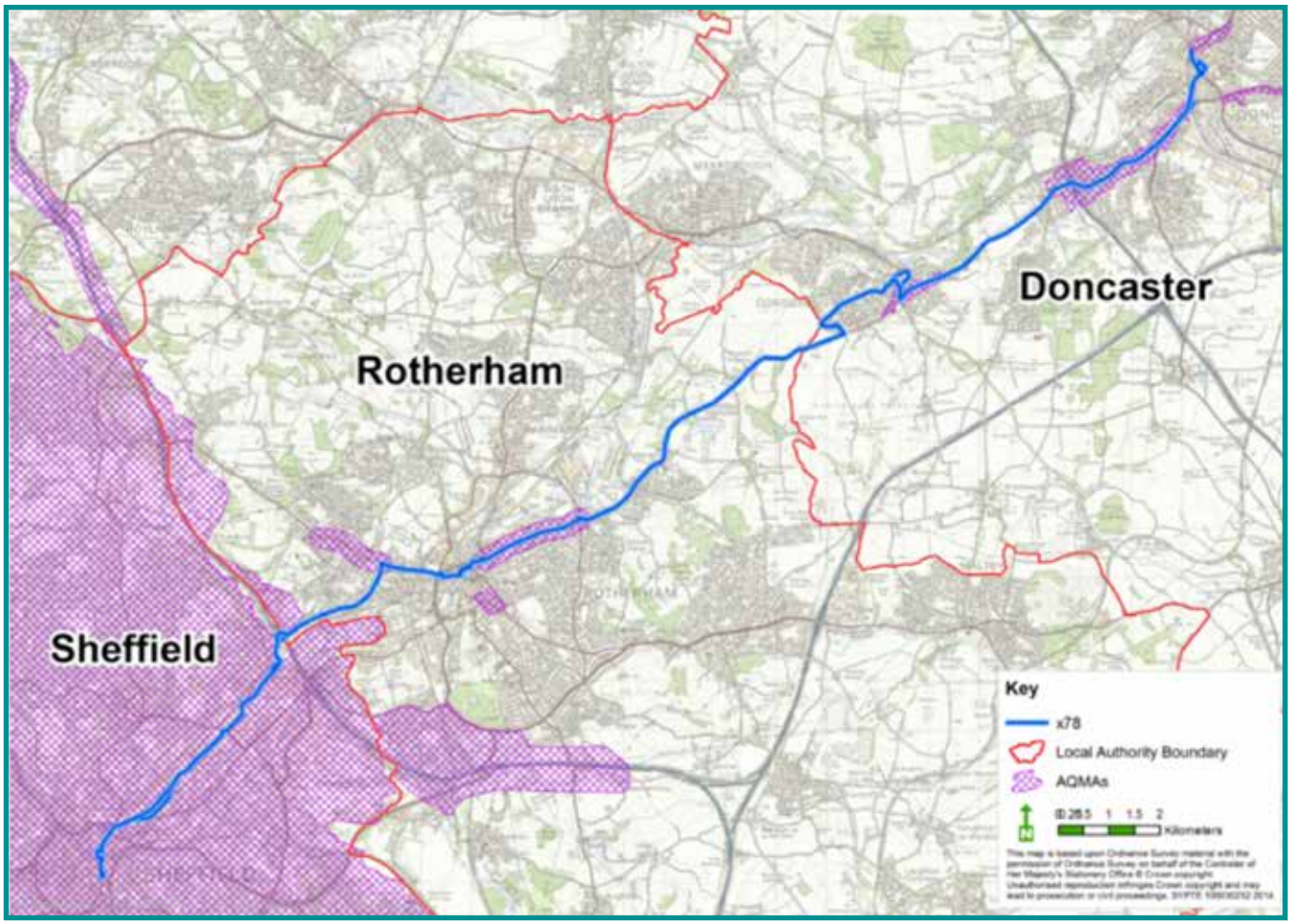


Figure 2

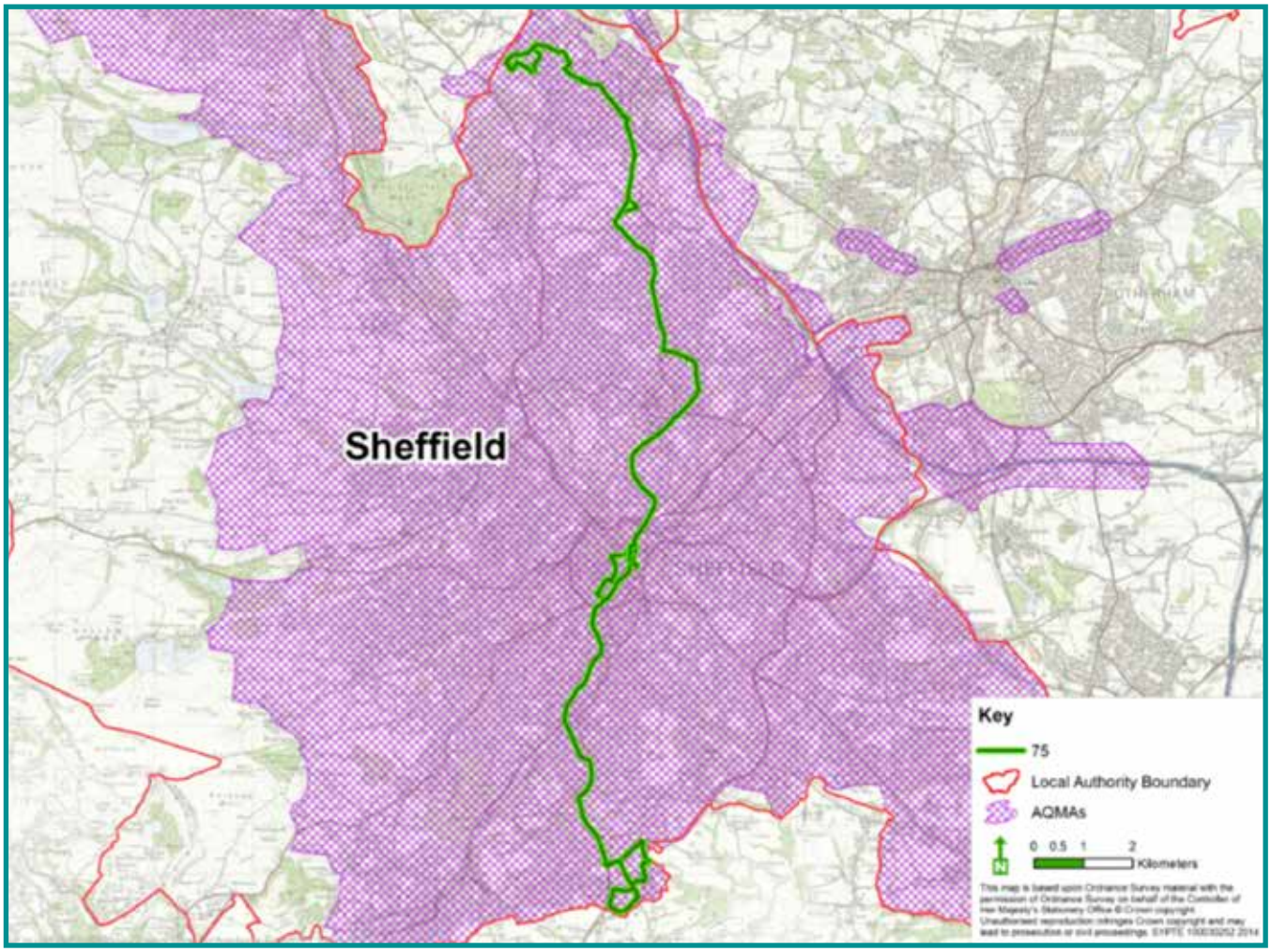


Figure 3

Expected Impact

CVTF funding would enable South Yorkshire partners to deliver a marked improvement in the NO_2 emissions from bus services. The X78 route contains almost 16kms of road within AQMAs and the entirety of the 75 route operates within an AQMA, all declared for exceedance of NO_2.

Our bid offers a cost effective, high-impact solution, due to the combination of high frequency, long routes and the affordability of the chosen technology. HJS state that their TMT system could facilitate a 40% reduction in NO_x emissions, which would assist our Local Authority partners with meeting air quality targets and improve public health.

SECTION B2
PREVIOUS EXPERIENCE

In South Yorkshire, we have a strong track record of working in partnership with both the Local Authorities and the bus operators. Our innovative Sheffield Bus Partnership (and emerging Rotherham Bus Partnership) are testament to our commitment to improve the quality of bus services and the environment in which they operate.

Our strong governance allows us to set out a clear message that sustainable economic growth is at the centre of our plans. The recent LSTF II revenue bid and the Growth Deal announcements build on our long-term commitment to protect SCR's high quality natural environment, reducing carbon and harmful emissions, whilst facilitating economic growth. This bid will further that commitment by contributing to a reduction in air pollution and increasing the attractiveness of key commuter services.

Within South Yorkshire, Stagecoach has already successfully secured Green Bus funding for 40 electric hybrid buses. These buses use 30% less fuel than a standard diesel bus and have been deployed along some of the most polluted routes in Sheffield, to help improve air quality. The Green Bus Fund has already enabled the early introduction of hybrid buses to the South Yorkshire fleet, overcoming concerns of commercial viability.

SYPTE in partnership with the operators and SCC, were also successful in becoming one of the UKs first Better Bus Areas. The Better Bus Area Fund, designed to promote economic growth and reduce emissions, has enabled a number of projects to be delivered to improve patronage and reduce operational costs for the bus operators.

SECTION C

PROPOSED TECHNOLOGY

SECTION C1
NO_X ABATEMENT TECHNOLOGY DESCRIPTION

Method

Our proposed method of NO_X abatement is the retrofitment of an innovative form of SCR technology called Thermo Management Technology (TMT). This would be installed on 41 of First South Yorkshire's Euro IV, Volvo B9TLs.

Rationale

This technology has been selected for three main reasons;

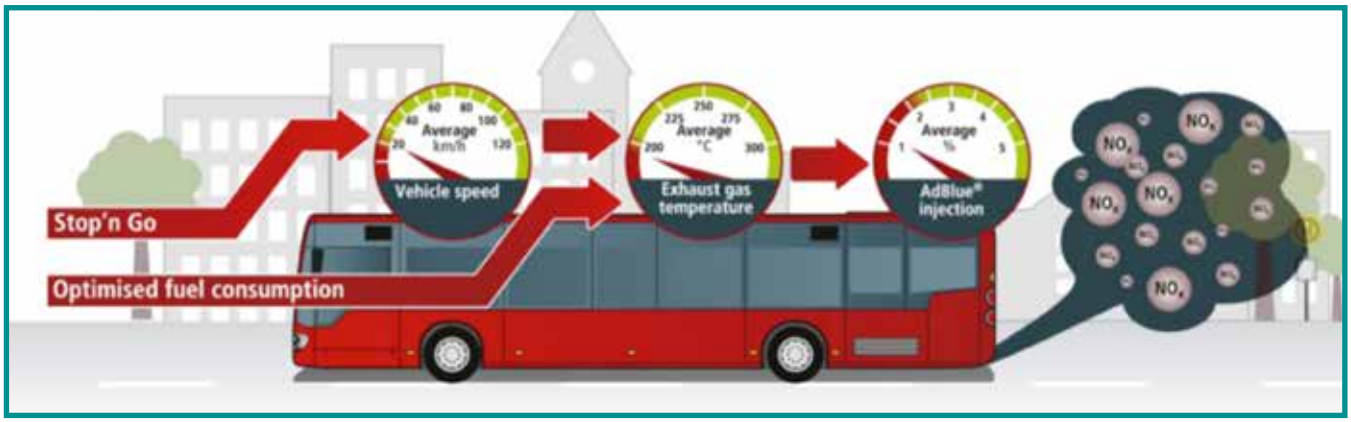
1 – Locally appropriate solution

2 – Cost effective

3 – Commercially attractive to the operators

Evidence shows that NO_X emissions from buses are proportionally high compared to those from other road vehicles[7]. This is due to the driving conditions of the urban environment, limiting the efficiency of the buses Original Equipment Manufacturer (OEM) SCR system. Driving at slow speeds due to congestion and the stop-start driving patterns, results in a lower exhaust temperature (Figure 4). These lower exhaust temperatures reduce the rate at which AdBlue is injected by the buses OEM SCR system, leading to high NO_X emissions.

Figure 4



The TMT works with the buses OEM SCR system, to raise the exhaust gas temperature by increasing the backpressure on the engine (Figure 5). This increased exhaust gas temperature triggers the injection of AdBlue and corresponding reduction of NO_X emissions.

This technology offers a cost effective way of reducing NO_X emissions. The technology is attractive to the operators as it has low maintenance requirements and as it works with the buses OEM, it requires limited changes to the structure of the bus. There is also the potential for the operator to install and repair the technology in the future (see section E5).

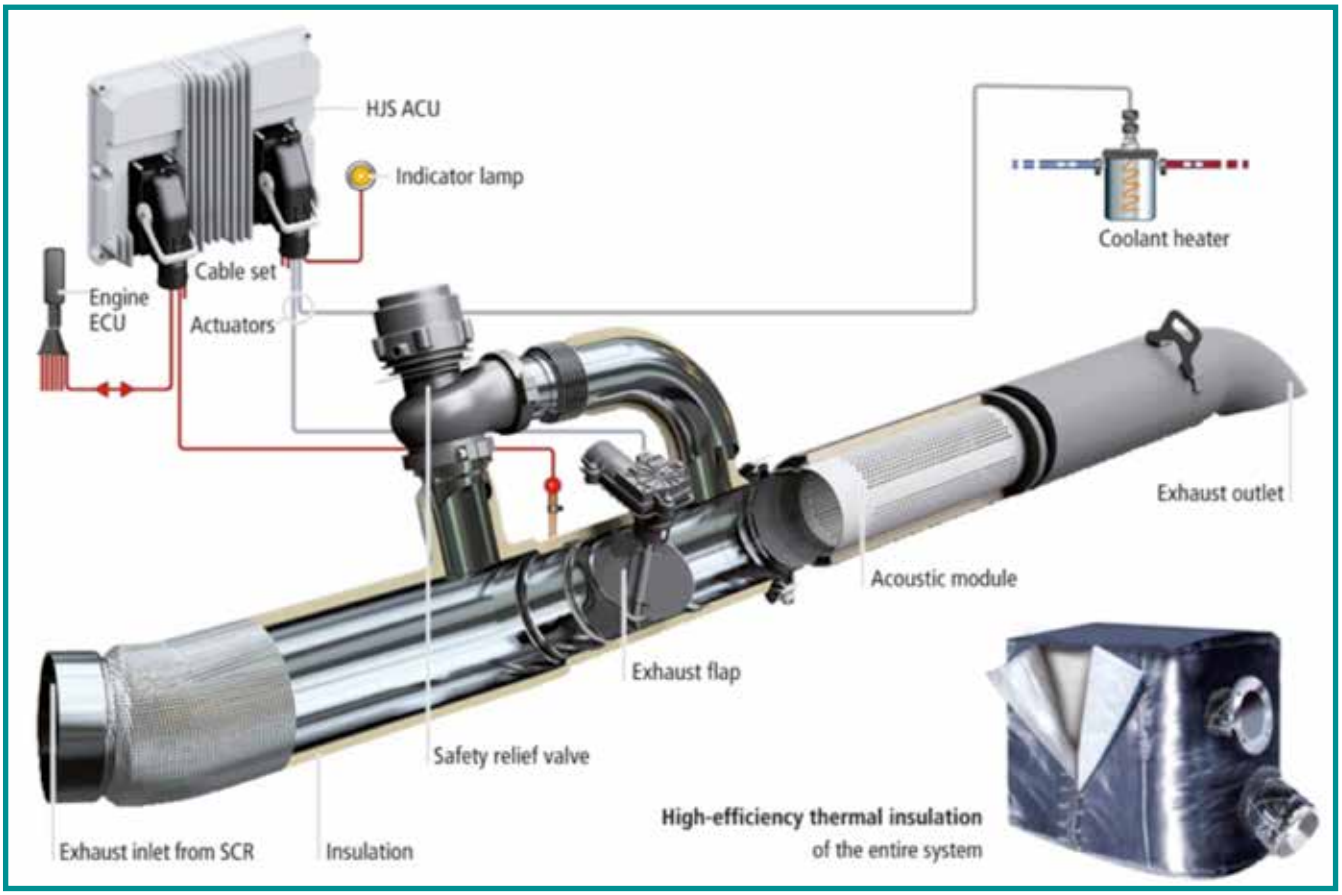


Figure 5

Risk

The technology is considered low risk by the operators and the manufacturers indicate that there is no increase in secondary emissions. As the TMT works with the buses OEM SCR, the operator does not anticipate any significant increase in fuel consumption as a result of this installation, which was a compelling reason for selecting this technology.

SECTION C2
EXPECTED ENVIRONMENTAL IMPACT

It is estimated that the TMT can deliver a 40% reduction on real world NO_X emissions. A defining feature of our CVTF bid, is the built-in emissions test to serve as a baseline for this 40% reduction. Using on bus NO_X sensors, HJS will conduct this test at no additional cost and we will share the results to assist DfT and others, in calculating the real world emissions.

A real world test is critical as estimated emission levels vary, depending upon the information source. The manufacturer's specification in g/kwh (Table 1) is similar to the g/km figure[8] from the operator (Table 2). Both of these figures are considerably lower than SCC's observed data (Table 3). The SCC LEZ Study shows that in real world driving conditions, Euro IV buses are operating in some cases, at Euro II emission levels[9].

The data in Tables 2 and 3, highlights the significant difference between annual emission levels from the X78 and 75 bus routes[10], depending upon the information source. A definitive baseline is therefore important to quantify the scale of the problem and quantify the improvement delivered by the technology.

The manufacturers of the technology state that the TMT system will not increase secondary emissions and the operator is content with this assertion. Other emissions are not affected, as the system is purely designed to ensure that the OEM SCR system is functioning as originally intended.

TABLE 1

Pre-TMT Installation (Manufacturers Specification)				
Euro Standard	CO	HC	NOx	PM10
IV	1.5g/kwh	0.46g/kwh	**3.5g/kwh**	0.02g/kwh
Post TMT Installation				
Euro Standard	CO	HC	NOx	PM10
IV	1.5g/kwh	0.46g/kwh	**2.1g/kwh**	0.02g/kwh

TABLE 2

Pre-TMT Installation (First Calculations)				
Euro Standard	CO	HC	NOx	PM10
IV	1.36g/km	0.42g/km	**3.16g/km**	0.02g/km
X78 Annual NOx			**6,117,198g**	
X75 Annual NOx			**4,048,425g**	
Post TMT Installation				
Euro Standard	CO	HC	NOx	PM10
IV	1.36g/km	0.42g/km	**1.74g/km**	0.02g/km
X78 Annual NOx			**3,368,330g**	
X75 Annual NOx			**2,229,196g**	
Total Annual Reduction			**4,568,097g**	

TABLE 3

Pre-TMT Installation (SCC LEZ Observed Data)				
Euro Standard	CO	HC	NOx	PM10
IV	1.675g/km	0.277g/km	**8.683g/km**	n/a
X78 Annual NOx			**16,808,742g**	
X75 Annual NOx			**11,124,199g**	
Post TMT Installation				
Euro Standard	CO	HC	NOx	PM10
IV	1.005g/km	0.166g/km	**5.210g/km**	n/a
X78 Annual NOx			**10,085,632g**	
X75 Annual NOx			**6,674,776g**	
Total Annual Reduction			**11,172,533g**	

SECTION D

ABOUT THE LOCAL VEHICLES

SECTION D1
VEHICLE MAKES AND MODELS

In total how many vehicles do you expect to modify?	41
Vehicle type (eg bus, taxi, van)	Bus
Make and model	Volvo B9TL
Number of single-deckers (if upgrading buses)	0
Number of double-deckers (if upgrading buses)	41
Euro Standard	Currently Euro IV
Name of engine manufacturer (of each type if known)	Volvo
Estimated average mileage	**X78** - 23,123 miles per week 1,202,864 miles per year **75** - 15,309 Miles per week 796,068 miles per year **Total - 38,441 miles per week** **Total - 1,998,932 miles per year**
Expected change in annual milage as a result of vehicle modification*	0
Will modification extend the lifetime of the vehicle? If so for how long for?*	No
Estimated cost of purchasing and fitting technology per vehicle	£5,250K
Estimated additional opperating costs/savings (including fuel) per vehicle over five years	£200 - AdBlue per year £1000 Total over five years
Estimated additional maintenance costs/ savings per vehicle over five years*	£0
Total cost of warranty for one year (if not included in cost saving technology)*	A two year warranty is included in the package
If infrastructure included in bid please specify the type of infrastructure	n/a
Estimated cost of purchasing and fitting infrasturcture*	n/a
If monitoring systems included in bid, please specify type of monitoring system*	**NOx sensors -** two buses will be fitted with two sensors for in-service monitoring, provided at **no extra cost to CVTF (see below)** **Millbrook Test -** First have offered to undertake a single Millbrook test at **no extra cost to CVTF**
Estimated cost of purchasing and fitting monitoring equipment*	£3,000 - HJS undertaking in kind
Number of monitoring equipment required*	2 NOx sensors
DFT funding sought per vehicle (ie including one year warranty, but excluding other contributions and operational costs)*	£5,250K

SECTION D2
GEOGRAPHICAL AREA

The bus routes chosen for this bid operate within South Yorkshire and cover three major urban conurbations, including one Core City (Sheffield). Both routes involve areas of congestion, urban driving conditions and some steep topography, all of which contribute to elevated engine emissions.

The X78 travels from Sheffield, into Rotherham and Doncaster. Due to this route connecting three urban centres, congestion is faced at a number of points along the route. The X78 is a high frequency, daily service[11], operating 1,210 trips a week and around 62,920 trips a year. As the service passes through 7 AQMAs, all declared for the exceedance of the NO_2 annual mean air quality objective, the X78 will operate in a polluted hotspot' 440,440 times during the course of a year.

The 75 operates the entirety of its route within Sheffield, travelling north to south across the city. Congestion is experienced along sections of the route including the journey across the city centre. The 75 is also a high frequency service[12], operating 994 trips a week and around 51,688 trips a year. The entirety of this route is within the Sheffield AQMA, which is declared for the exceedance of the NO_2 annual mean air quality objective.

Table 4 contains all of the AQMAs which would benefit from our CVTF bid.

TABLE 4

District	AQMA NAME
Rotherham	Area 1 pt 2 - West of M1 between Meadowbank Road and New Droppingwell Road and extending to West Hill, Kimberworth
Rotherham	Fitzwilliam Rd No2 - Encompassing properties along Fitzwilliam Rd between St Ann's and Mushroom roundabouts
Rotherham	Wortley Rd No2 - Encompassing Wortley Rd and surrounding properties between the Junction with Old Wortley Rd and Wilton Gardens roundabout
Sheffield	Sheffield Air Quality Management Area
Doncaster	AQMA 1 - Market Place Area
Doncaster	AQMA 2 - Area surrounding J36 of A1(M)/Warmsworth Road Junction, Balby Road Area
Doncaster	AQMA 5 - Conisbrough Doncaster Road Corridor

SECTION D3
LEVEL OF NO_2 EMISSIONS AND AMBIENT CONCENTRATION

Trends and Current State of NO_X

In describing the trends and current state of NO_X, we have kept the information supplied to a minimum. We wanted to provide all of the evidence to support our bid and to outline the challenges faced. We have 7 AQMAs that are affected by the bid, split across 3 Local Authority areas.

The following maps display the bus routes in relation to the AQMAs, the locations of the air quality monitoring stations. The supporting information contained in the tables includes a description of the local air quality issues, the proportion of NO_2 contributed by buses and estimated NO_2 saving. Although the EU set the limit for the NO_2 annual mean of 40ug/m3, there is no limit value for total NO_X.

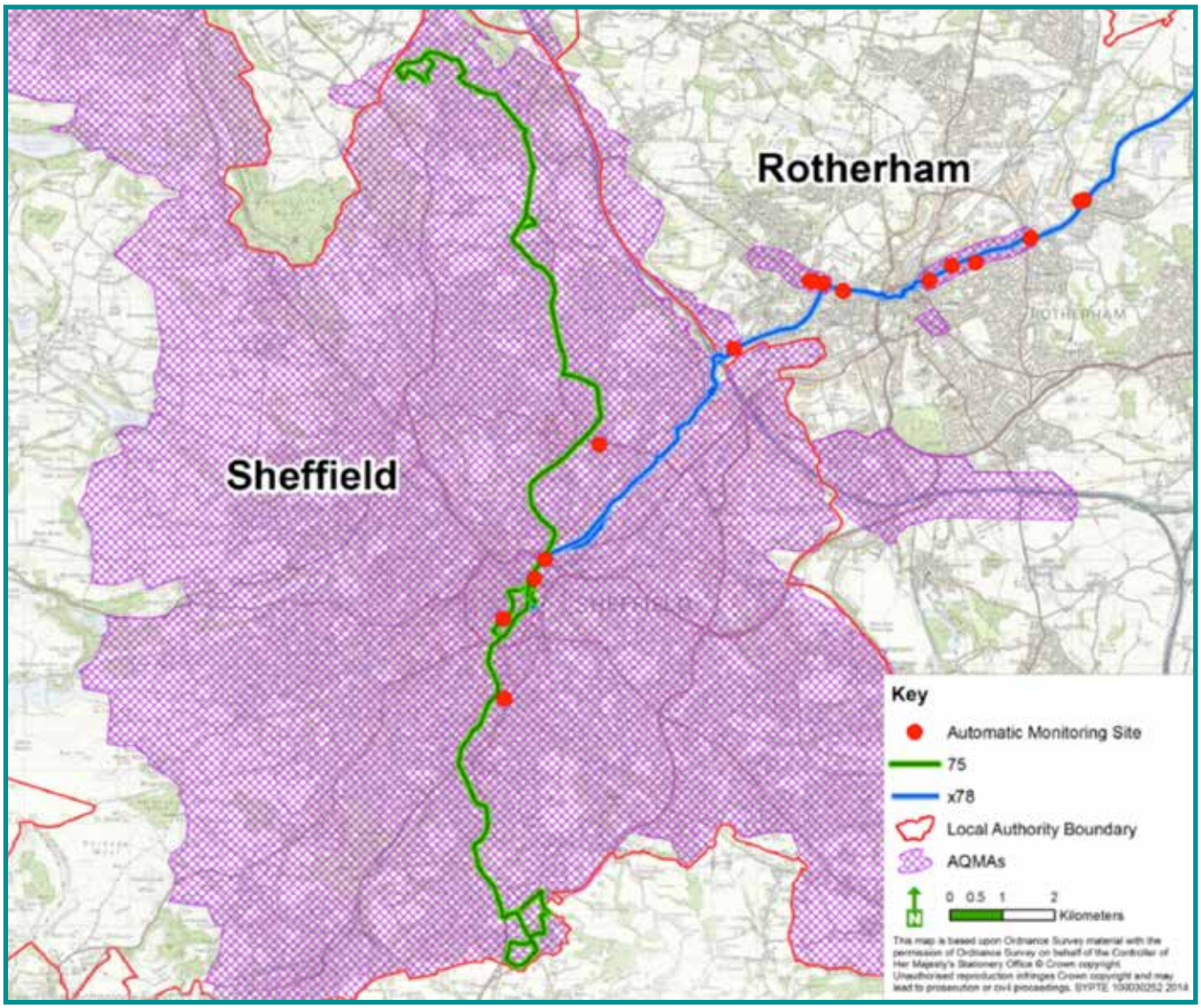


Figure 6

TABLE 5

Sheffield AQMA - (2010)	
Trends and Current State of NOx	Trends in ambient concentrations of NO_2 show both an increase and a decrease in concentration during 2003 to 2013 but have largely remained 'flat'. Concentrations appear to have been stable during this period, which may also reflect the influence of the weather.
Ambient Roadside concentration levels (EU limit for NO2 - 40ug/m3)	Monitored levels at a number of sites currently exceed the annual mean EU Limit Value for NO_2 (40ug/m3) and are likely to exceed the hourly mean value. The 2013 bias adjusted monitored results at the following locations are; Pond St. Sheffield Interchange – 63µg/m^3 Fitzalan Square – 67µg/m3 Castle Street/Waingate – 70µg/m^3 Ladys Bridge – 52µg/m^3 The Wicker – 45µg/m^3 Savile Street/Attercliffe Jnc – 49µg/m^3 Savile Street East (Gripple) – 39.9µg/m^3 Brightside Ln (Stevenson Road) – 52.2µg/m^3 Brightside Ln (Forgemasters) – 56.7µg/m^3 Brightside Ln (Jenkin Road) – 68.1µg/m^3 Meadowhall Road (Interchange) – 65.4µg/m^3
Additional Statistics such as road lengths assessed that exceed the EU concentration limit values, further details on AQMAs, observed and forecast impact on health and local environment	NO_x annual mean measured at Castle Street/Waingate in 2012 was 478ug/m3 (241.5ppb) It is estimated from national statistics that up to 500 deaths per year and up to £160m in health and social costs, are attributable to air pollution in Sheffield For a 'do nothing' scenario, it would take until 2020 at the earliest to achieve compliance with EU limit value - Sheffield City Council's LEZ Feasibility Study The X78 service runs above the A1 and below the M1, which is an area of high pollution. The Highways Agency recently consulted on proposals to limit speeds to 60mph between 7am - 7pm, seven days a week because of the potential effect of the new 'Smart Motorway' scheme on local air quality. The Highways Agency are "rigorously investigating alternatives while work progresses on the scheme in the next 12-18 months" 5.8km of the X78 route exceeds EU limit values 25.6km of the 75 route exceeds EU limit values The measured average NO_2 concentration on the X78 route corridor is 57.04µg/m^3. Buses contribute an estimated 5.7µg/m^3 (10%) of NO_2. Therefore, retrofitting TMT should deliver up to 2.28µg/m^3 average NO_2 reduction[13] . The measured average NO_2 concentration on the 75 bus route is 44.47µg/m^3. Buses contribute an estimated 4.45µg/m^3 (10%) of NO_2. Therefore, retrofitting TMT should deliver up to 1.78µg/m^3 average NO_2 reduction. This would represent an important contribution towards bringing our AQMA into compliance

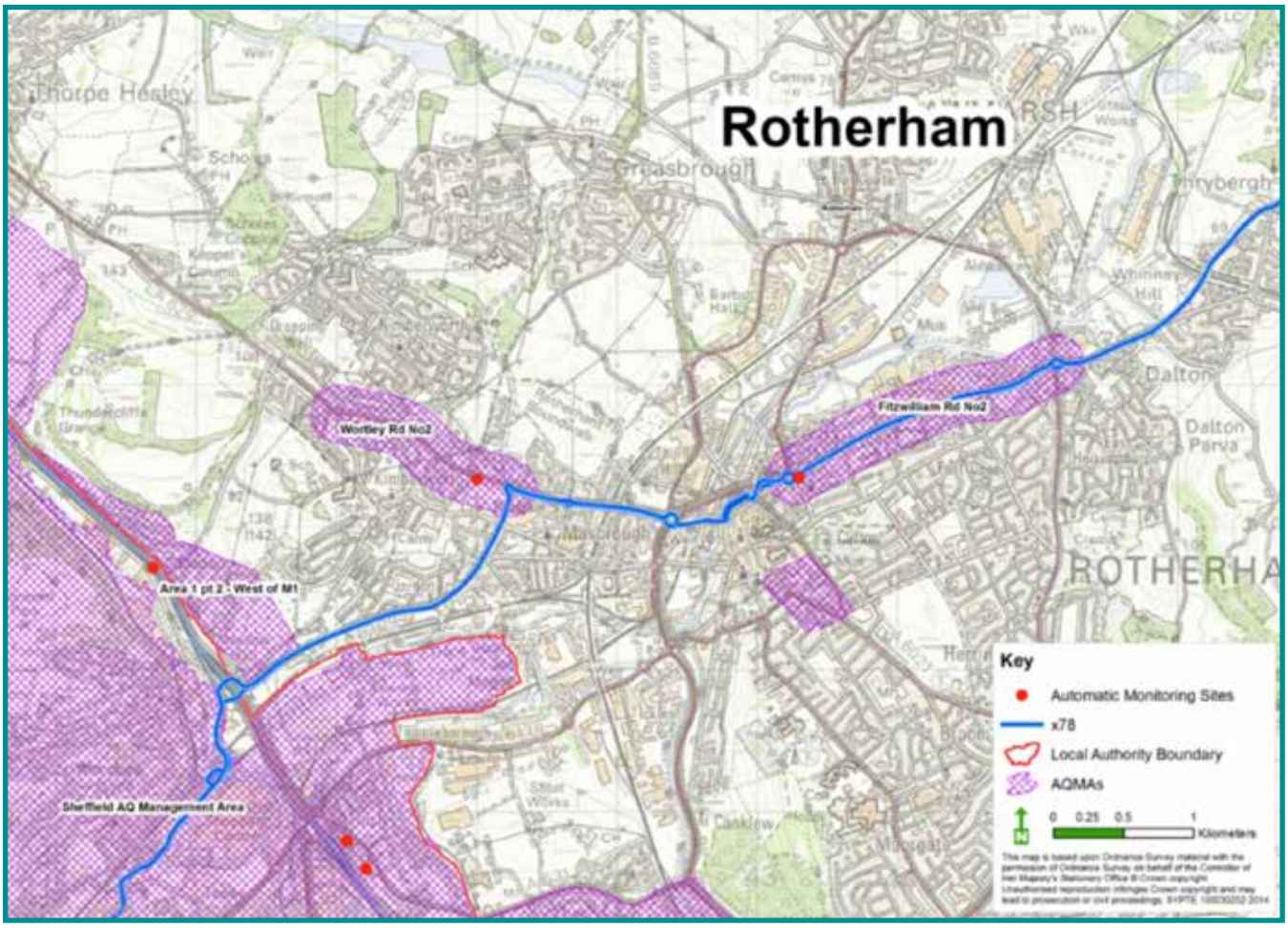


Figure 8

TABLE 5

Rotherham– Wortley Road AQMA (2004), Fitzwilliam Road AQMA (2004), Area 1 AQMA (2001)	
Trends and Current State of NOx	NO_X annual mean for; Wortley Road - 91 ug/m^3 (2013) Fitzwilliam Road (St Ann's) - 78ug/m^3 (2013) Blackburn School (in Area 1) - 58ug/m^3 (2012) During the past 5 years the annual mean nitrogen dioxide has fallen by 12%
Ambient Roadside concentration levels (EU limit for NO2 - 40ug/m3)	Current levels of roadside NO_2 readings at relevant monitoring sites (in 2013): Wilton Gardens - 42 ug/m^3 Fenton Road - 44 ug/m^3 Wortley Road - 45 ug/m^3 St Ann's (automatic) – 40ug/m^3 Fitzwilliam Road (non-automatic) annual mean - 42ug/m^3

Rotherham– Wortley Road AQMA (2004), Fitzwilliam Road AQMA (2004), Area 1 AQMA (2001)	
Additional Statistics such as road lengths assessed that exceed the EU concentration limit values, further details on AQMAs, observed and forecast impact on health and local environment	A Health Impact Assessment of Rotherham (2014) found these AQMAs to have some of the worst health outcomes and lowest average life expectancy (by 10 years) in the borough of Rotherham (reference - An Air Quality Health Inequalities Impact Assessment for Rotherham MBC 2014) The reduction in bus emissions as a result of this proposal could contribute to reaching a level of nitrogen dioxide annual mean compliant with EU limits within 2 years Road lengths exceeding the EU limit for NO_2; 300m in Wortley Rd AQMA 2km in Fitzwilliam Rd AQMA 575m in Area 1 AQMA Estimated annual reduction of 2ug/m^3 in NO_2 from the TMT in each AQMA

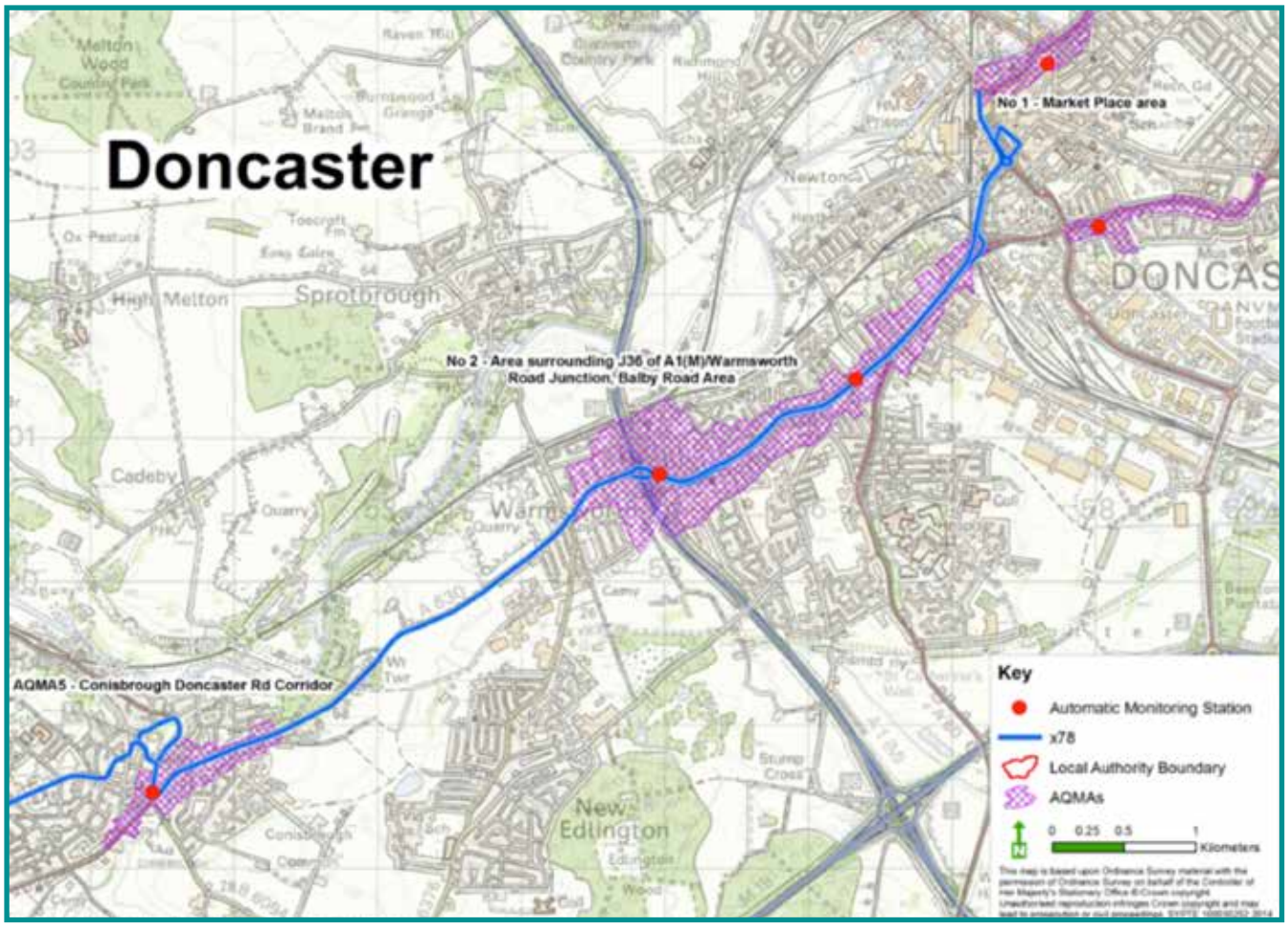


Figure 8

TABLE 7

Doncaster – Market Place AQMA1 (2001), Warmsworth Road AQMA2 (2001), Conisbrough/Doncaster Road AQMA5 (2012)	
Trends and Current State of NO_X	AQMA1– NO_X annual mean 2013 – 55.2µg/m^3 - shows a slight decline AQMA2 – NO_X annual mean 2013 - 89.5µg/m^3 shows a general decline, increasing levels closer to A1(M) AQMA5 - NO_X annual mean 2013 – 83.9µg/m^3
Ambient Roadside concentration levels (EU limit for NO_2 - 40ug/m^3)	NO2 readings in 2013 – AQMA1 – (Non-automatic) annual mean – 39µg/m^3 AQMA2 – (Automatic) annual mean – 50.2µg/m^3 AQMA5 – (Non-automatic) annual mean – 47µg/m^3
Additional Statistics such as road lengths assessed that exceed the EU concentration limit values, further details on AQMAs, observed and forecast impact on health and local environment	The A630 is a mainly flat dual carriageway which skirts the town centre of Doncaster. It is the main corridor into the shopping district of the town. The traffic is controlled by a number of signals and roundabouts with a (one-way) bus only lane across the River Don. The bus and rail interchange is located within AQMA1. Road lengths exceeding the EU limit for NO_2; 1km in AQMA1 3.6km in AQMA2 1.5km in AQMA5 The approximate population within AQMA; AQMA1 – 200ppl AQMA2 - 4,500ppl AQMA5 – 980ppl In Doncaster as a whole, 160 deaths or 1,706 years of life lost have been attributed to air pollution Source apportionment results; A630 from Frenchgate to Market Place contributed 41.2% to the exceedance in AQMA1, in terms of vehicle contribution 2.4% of the exceedance was modelled to be from the bus fleet. A630 Balby Road contributes almost 100% to the exceedance in AQMA2, with buses contributing an estimated 20.9% to the exceedance Low Road in AQMA5 contributes 45% to the exceedance in that area, with a 14% contribution from the bus fleet Estimated annual NO_2 reduction from TMT by AQMA - AQMA1 – 0.05ug/m^3 (0.56) AQMA2 – 0.61ug/m^3 (6.1) AQMA5 – 0.4ug/m^3 (4.0)

Overall the trends and current state of NO_x emissions varies in each Local Authority area. In some areas, the implementation of the TMT system could be enough to bring some AQMAs into compliance. Due to the scale of the challenge, this bid needs to form part of a package of measures, targeted at improving air quality. The investment from this project is only part of the solution and further investment will be needed.

SECTION D4
FUTURE USE OF MODIFIED VEHICLES

We have established Sheffield and Rotherham Bus Partnerships to deliver improvements to the bus network. These partnerships are underpinned by legal agreements, to bring stability to the partnership. Decisions will be made within this partnership forum to guide the operation of the retrofitted buses. This flexibility will also allow us to make decisions with the operators to direct the retrofitted vehicles to routes with the highest levels of NO_2.

We have operator agreement to retain the TMT technology on the buses retrofitted using the CVTF funding (see Letters of Support). In addition to this agreement, it has been highlighted that once installed, the TMT system will be integral to the operation of the vehicle systems and cannot be removed without incurring significant cost. Therefore the removal of the technology post-installation would be unattractive to the operator.

First Groups average life cycle of a bus is 15-17 years before replacement. The buses selected for participation in this project are Euro IV and are currently 7 years old, so they will remain in the fleet for a minimum of 8 years. The fitting of these systems will mean that as the vehicles operate for the remainder of those 8 years, they will have an improved emissions profile.

SECTION E

PROJECT AND FINANCIAL MANAGEMENT

SECTION E1
PROJECT AND RISK MANAGEMENT

Project Name

South Yorkshire: Raising the Heat on NOx

Timeline

Assuming notification of success in mid-September, all retrofitted vehicles will be on street by March 2015

Milestones and Project Management

A timetable has been created using information from our partners (Table 8), which will develop as the project progresses. Project Management will be provided by SYPTE at no extra cost to CVTF and First South Yorkshire will maintain the technology.

TABLE 8

Activity	Timescale	Milestone
Conduct a baseline test using NOx sensors following notification of success	1 week	Baseline set
From order receipt, HJS will engineer, design and procure system parts to construct a prototype	6 - 8 weeks	Prototype installed
NOx sensor test post prototype installation on 2 buses	1 – 2 weeks	Real world NOx saving established
Serial system production will commence in week 8 and be finished by week twelve	4 weeks	29 TMT units
Installations commence in 13 weeks from order receipt **Fitment will take between 6 - 10 hours and will be done on site at Olive Grove** **This can be done overnight at Olive Grove at a rate of 1 vehicle per night in the space of one month. Using this turnover rate, there will be no impact on the operation of the route or the end user**	1 month	Buses fitted and enter service
NOx sensor test post system fitment	1 - 2 weeks	Real world NOx savings reported

Risks and Mitigation Measures

Risk management will be carried out in line with the PRINCE2 Principles. We have a procedure for monitoring and managing risk which will be led by the Project Manager and controlled by the Project Board and to date we have:

i) An established risk register
ii) Populated with the risks identified to date
iii) Assessed their impact and planned mitigations where appropriate
iv) All risks have allocated owners

The main risks are:

a) **Accuracy of estimated costs**

Although costs have been agreed, there is a risk that the estimates could under or over run. This risk will reduce as the procurement process progresses.

b) **Procurement**

TMT system production could be delayed. To mitigate this, regular communication between the project manager and HJS will be maintained to anticipate delays and reorder the project delivery profile where possible.

c) **Loss of Staff**

There is a risk that staff could change before the project is completed. Partners have staff resourcing plans in place to mitigate the impact of any staff changes.

d) **Outcomes**

Prolonged vehicle down time. The impact of this will be managed through installing TMT on one vehicle at a time, to prevent a large number of vehicles being removed from service.

The TMT may not perform as anticipated. To mitigate this, a test will be conducted to assess the baseline emission levels against which future outputs will be monitored. On vehicle tests will also be used to measure the outputs to identify how the technology is performing in real world conditions.

The technology may have a significant impact on secondary emissions. As the technology works with the vehicles OEM SCR system, there will be no adverse impact on emissions. The operator and technology provider are confident that no increase in secondary emissions will occur as a consequence of this installation.

SECTION E2
PROGRESS REPORT

Within SYPTE's project management structure, we will provide regular update reports to the DfT as required, highlighting any new risk, mitigation measures and project progress (see F1 for project management structure).

To ensure that we will hit the timescales set out in E1, we will implement strict tolerances for time and cost. This will ensure that we can meet the project spend deadline of March 2015 and deliver all 41 buses within the required funding amount.

We have already engaged with the technology supplier (see Letters of Support) to identify the cost of the technology and the installation. As a project team we have also outlined how the installation will take place, the timescales involved and the anticipated impact on the fleet. We will continue to proactively work together to ensure delivery on time and within budget.

SECTION E3
MONITORING AND SHARING BEST PRACTICE

We would be pleased to co-operate with DfT in evaluating the benefits of TMT. If successful, we will propose a joint evaluation approach which will combine resources from our on-going performance monitoring programme with DfT's contribution. This will ensure that we undertake efficient monitoring and cost-benefit assessment while making the best use of all available resources.

As outlined in section E1, the additional outputs we will report on include real world, on bus emissions. This data is required to satisfy all parties that the technology is delivering a 40% reduction in NO_X emissions as anticipated. Real world emissions testing using NO_X sensors will be conducted at several stages within the project;

- Pre installation
- Post-prototype installation
- Post TMT installation
- Access to Millbrook has also been offered by First post installation, should this prove a useful way of assessing the NO_X emission savings

The data from these tests will be shared with DfT, First, HJS, SYPTE and the South Yorkshire Local Authorities. This will ensure that all parties have access to the data and can build upon the information received, maximising the cross-cutting benefits of the project.

The long term strategic view is that the TMT system can be linked to the live bus telematics system. This would provide a live data feed linking NOx emissions to driving conditions and engine temperatures. This data could be used to inform future fleet operation and assist in improving air quality.

SECTION E5
CONTRIBUTING TO GOVERNMENT GROWTH AGENDA

Locally our bid will contribute to economic growth as the introduction of this innovative SCR technology will require expertise to maintain and install it. The technology suppliers HJS, have a certification scheme that First South Yorkshire will participate in. Once certified, First staff will be qualified to maintain, install and offer technical support to other users of the TMT technology.

Our CVTF bid would support national growth, in the supply chain for emissions reduction technology. HJS have a UK base in Bracknell which employs a small team of sales and engineering staff. HJS also work with Intechnic Ltd who are based in Oxford and provide specialist technical expertise. Arriva Coach and Bus based in West Yorkshire will also offer support with the installation process as part of this project. This investment will therefore help to grow the UK employment and skill base across these organisations.

First South Yorkshire will share data with SYPTE and the South Yorkshire Local Authorities, which can be used to inform future emissions interventions. The real world emissions test results will be available to other authorities and the DfT, for use in other projects where appropriate. There are also discussions regarding future linkages between the TMT system and the on bus telematics. This would provide enhanced emissions data wirelessly whilst the bus is in service, to give in service NO_x readings, which could be shared with other Local Authorities and fleet operators.

SECTION E6
OUTSOURCING

There are no plans to outsource any element of the project. Legal advice and support will be provided by SYPTE's Legal Team at no additional cost. Project management will also be provided at no additional cost by SYPTE. Engineering and maintenance support will be managed by First South Yorkshire with support from HJS. The air quality data monitoring will be conducted by the South Yorkshire Authorities at no additional cost to the project.

Table of anticipated costs

E7	Total DfT funding contribution sought (up to £500,000)*	£215,250
E8	Total estimated cost of outsourcing and operational costs (not covered by CVTF)*	ALL IN KIND; £3,900 – SYPTE Project Management £1,200 - SYPTE Legal Support £3,000 – HJS NOx Sensor Tests £8,832 – First Engineering Costs and Data Collection
E9	If applicable, local or transport authority contribution to capital cost	£0
E10	If applicable, other contribution (e.g. bus operator or public body)	£0
E11	**Total estimated cost of project***	**£215,250**

SECTION F

SUPPORTING EVIDENCE

SECTION F1
ADDITIONAL EVIDENCE

We are making good progress in tackling air quality issues through a series of targeted investments and a commitment to a longer-term vision. We need the economic growth we plan to achieve to be matched by investment in technology that will help to remove the unwanted negative environment impact of this growth. It makes good sense that we continue our journey so that we can build on the benefits of our investment so far and create a centre of excellence for vehicle operators to remove barriers to further investment.

Our bid is presented as a scalable opportunity, in two elements. Both elements are highly deliverable, focused upon opportunities that fully comply with State Aid and will see investment in innovative technology, on two of our key commuter services. Both elements of our bid have been specifically selected to make a significant contribution to improving the air quality in the areas where the services run and all strongly aligned to the objectives of the fund.

We have set out clearly our capacity and ability to deliver our project. Within our project management structure (Figure 9) and partnership groups, we have the capacity to effectively monitor, manage and report on the outcomes of our project. The Bus Partnership provides a forum to discuss the future use of the vehicles to ensure they continue to benefit the routes require the greatest emissions reduction.

The letters of support from our partners appended to our bid, demonstrate the firm expression of interest from the vehicle operator and technology provider. We have secured resources to manage the project and on-going maintenance of the technology. We have also secured commitment to test the performance of the technology from both the operator and the technology provider. This will serve as evidence of best practise for ourselves and others to learn from.

Corporate	**Transport Committee Project Board**		
Directing	**SU** **Chris Roberts**	**SRO** **Ben Still**	**SS** **Ben Gilligan**
Managing	**Project Manager** **Peter Elliott**		
Delivering	**Bus Partnership**		

Figure 9

LETTERS OF SUPPORT

HJS Emission Technology

HJS Emission Technology GmbH & Co. KG • Dieselweg 12 • D-58706 Menden/Sauerland
UK representation: EEL Ltd • Atrium Court • The Ring • Bracknell • RG12 1BW

Ms Chloe Shepherd
Strategy and Policy Officer
South Yorkshire Passenger Transport Executive
11 Broad Street West
Sheffield
South Yorkshire
SY1 2BQ

17th July 2014

Dear Chloe

Technologies for Air Quality in South Yorkshire

HJS have been working in conjunction with the SYPTE and First South Yorkshire to assist in the identification of technologies that will provide emissions reduction for buses operating in the congested urban areas of Sheffield, Rotherham and Doncaster. Several technologies have been presented in numerous meetings including SCRT technology for Euro 3 buses and Thermo Management Technology (TMT) for later Euro 4 and Euro 5 OE SCR applications.

TMT has been identified as being most suitable for the fleet details provided and the vehicle operating conditions discussed. TMT will address the issues associated with low NOx conversion levels on fuel efficient Euro 4 and Euro 5 SCR equipped vehicles operating on low duty cycle routes. TMT is designed to assist in providing “real world” emissions reduction.

We are talking to various authorities regarding this technology and I believe that the project in South Yorkshire could be regarded as a benchmark for this type of technology in the UK. For many years Euro 4 and Euro 5 has been regarded as part of the solution for air quality issues in towns and cities for many to now realise that they are now contributing to the problem. An opportunity to showcase the effectiveness of this technology in South Yorkshire would demonstrate the solution to the problem to other authorities all over the UK.

HJS will undertake PEMS testing which will provide real world results; we will also equip and monitor two vehicles with two NOx sensors for in service monitoring. Our technicians will support this project throughout and will train the operator as required.

I hope this helps and I hope to be working with you on this project soon.

Yours sincerely

Mark Cooper
Office: 01344 360173
Mobile: 07733 227889

First

Midland Road
Rotherham
S61 1TF
Tel: 01709 566000
Fax: 01709 566063

24 July 2014

To Whomever it may concern,

As part of our commitment to the Sheffield Bus Partnership, we have been actively working with the South Yorkshire Passenger Transport Executive to identify the most effective way to reduce the NOx emissions from our vehicle fleet in First South Yorkshire Ltd. The Clean Vehicle Technology Fund offers a chance to implement innovative technologies that will reduce the emissions from our fleet.

As we developed our bid, a number of proposals were identified and after much consideration and consultation, First selected the Thermo Management Technology (TMT) solution, manufactured by a company called HJS, as it the most appropriate solution to our needs.

Further work was undertaken in partnership with SYPTE, to identify the potential routes that would benefit the most from the scheme. This resulted in us deciding upon a 41 vehicle option for two key routes, which pass through a number of areas with specific air quality issues within the districts of Sheffield, Rotherham and Doncaster.

If successful the bid will result in a significant reduction in the NOx emissions of the 42 Euro IV double deck vehicles and we, as a key member of the Sheffield Bus Partnership, are committed to maintaining the technology throughout its lifetime whilst also ensuring that the vehicles included in the scheme continue to give an air quality benefit to the areas identified by the Partnership for a minimum of 5 years from installation. We will also fully support and facilitate the on-board monitoring and analysis of the system performance through embedded condition monitoring techniques, as well as independent emissions testing, which could include access to testing facilities such as Millbrook Proving Ground.

Recognising the importance of technologies such as this for the future of public transport we, as part of the bid, have also expressed our wish to

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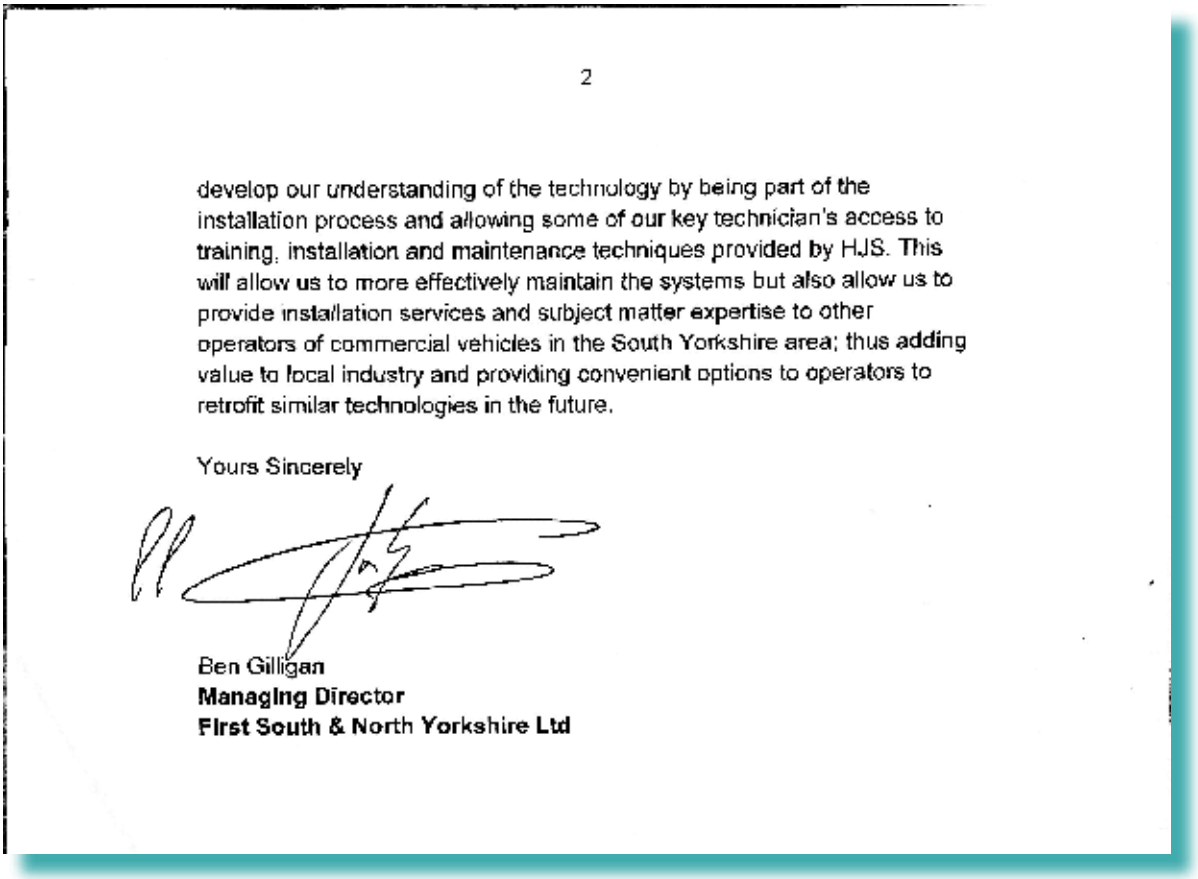

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develop our understanding of the technology by being part of the installation process and allowing some of our key technician's access to training, installation and maintenance techniques provided by HJS. This will allow us to more effectively maintain the systems but also allow us to provide installation services and subject matter expertise to other operators of commercial vehicles in the South Yorkshire area; thus adding value to local industry and providing convenient options to operators to retrofit similar technologies in the future.

Yours Sincerely

Ben Gilligan
Managing Director
First South & North Yorkshire Ltd

REFERENCES

1 In London, the Greater London Authority (GLA) is invited to coordinate and apply on behalf of London boroughs as a single bid for no more than £500,000.

2 Authorities can only bid once for a Clean Vehicle Technology grant of up to £500,000

3 Provide SRO name and contact details in Section A.

4 Public Health England www.phoutcomes.info/public-health-outcomes-framework

5 Sheffield City Council's Air Quality Action Plan https://www.sheffield.gov.uk/environment/air-quality/action-plan.html

6 SCC Low Emission Zone Fesability Study Phase 2 Final Report p15

7 https://www.sheffield.gov.uk/environment/air-quality/LEZ-feasibility.html p29

8 Calculated from fuel consumption data

9 https://www.sheffield.gov.uk/environment/air-quality/LEZ-feasibility.html

10 Calculated using annual km x NOx p/km figure

11 X78 Timetable http://www.travelsouthyorkshire.com/timetablefinder.aspx?searchtext=X78

12 75 Timetable http://www.travelsouthyorkshire.com/timetablefinder.aspx?searchtext=75

13 Average NO2 reduction calculation – (measured NO2 concentration ug) x 40/100