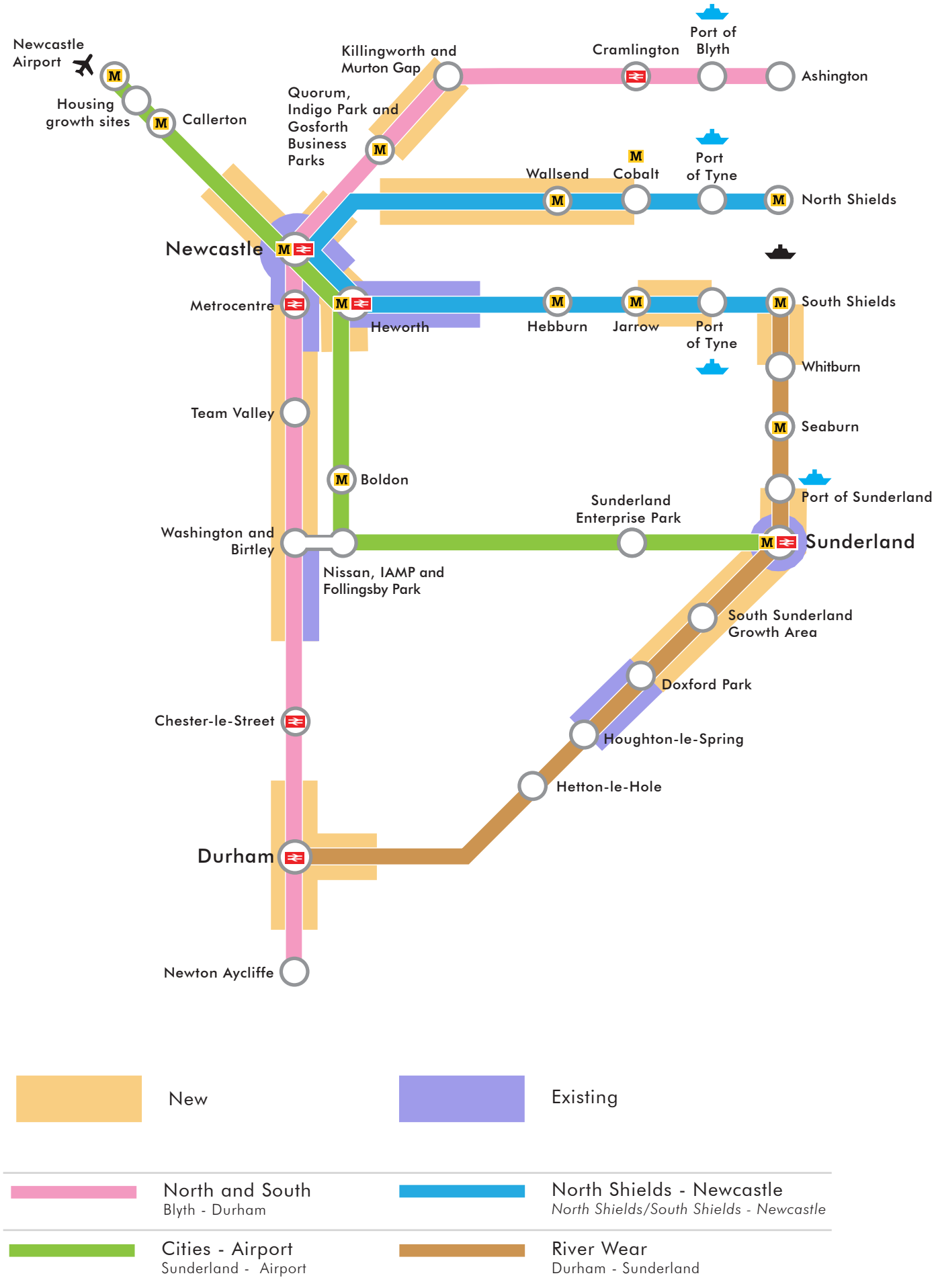
Annex A: Map of scheme

Public Transport Reliability



Annex B

The Geographic, Economic and Social Context Background Evidence

1. Geographical scope

1.1 The North East

We are a region that is culturally rich, steeped in history, with beautiful landscapes and coastlines together with an ambitious drive to improve our economy in the future for our residents and businesses. Our population in 2017 is 1.97m[1] across the area.

The North East area is made up of:

- 7 Local Authorities County Durham, Northumberland and the Metropolitan County of Tyne and Wear (Gateshead, Newcastle, North Tyneside, Sunderland and South Tyneside).
- 2 Combined Authorities
- 1 Local Enterprise Partnership
- 1 Passenger Transport Executive.
- 3 diverse and globally recognised cities

In addition, the North East area is home to:

- 21 Enterprise Zones (which are the focus for developing new employment in our specialist areas and priority sectors)
- Over 10 major employment sites (Quorum/Indigo Park/Gosforth Business Park, Cobalt/Silverlink, Longbenton, Team Valley, Metrocentre, Washington, Sunderland Enterprise Park, Nissan, Doxford Park)
- 2 World Heritage Sites (Durham Cathedral and Hadrian's Wall)
- 4 areas identified for significant housing growth

Our three great cities are rich in history and have bright and bold aspirations for the future. Newcastle has vibrant science, education, culture, digital and service sectors. Historic Durham has a leading university, science and tourism sites. Sunderland is renowned for its manufacturing capability, being the home of Nissan's world-leading car manufacturing base and the focus of one the Europe's leading automotive clusters.

Our cities are connected into a strong and diverse urban hinterland. Strategic digital and transport links, available land and labour supply provide a compelling combination to attract investment.

We are strategically located between Scotland and the wider northern economy. The North East is well connected to markets in the rest of the UK, Europe and the rest of the world by:

- air (Newcastle International Airport);
- sea (five ports and North Shields Ferry Terminal);
- rail (East Coast Mainline, Trans Pennine routes); and

[1] ONS, 2017 estimate http://www.nomisweb.co.uk/reports/lmp/lep/1925185556/report.aspx#tabrespop

- road (A1(M), A19, A66 and A69).

Our locational diagrams are located at appendix G, together with our transport connections.

The North East's Strategic Economic Plan – More and Better jobs sets the strategic context for this bid.

- The Productivity gap
- More and Better Jobs

1.2 Overview

- 2 million people
- An economy generating £40 billion[2] each year,
- Our ambition is that by 2024 there will be 100,000 more jobs.

2. The Economy

Traditionally, the North East economy was dominated by mining and manufacturing. Whilst manufacturing remains an important part of the regional economy. It is growing with clusters in automotive and medicines, and is increasingly advanced in profile. The wider regional economy has grown, developed and diversified over the last 40 years.

In addition to the manufacturing base, the North East has:

- Key assets in the energy sector, in particular in offshore energy and in other energy technologies and utilities
- A strong life sciences sector including medicines' manufacturing, science and research and a strong and innovation-focused health service
- A rapidly growing digital and creative sector with a number of specialisms
- Strengths in a number of services sectors including financial professional and business services, education and transport and logistics
- A higher proportion of employment in the public sector than other areas. Over and above the services of our local authorities, we have strong education and health services, and a concentration of shared service and back office functions for government and other agencies
- The North East also has a strong tourism and cultural sector and food and rural sectors reflecting the extensive rural area.

Figure 1 below, provides a headline overview of the North East economy, as set out in the 'Performance of our Economy – 2018', published by the NELEP.

Figure 1 - North East Economy Overview[3]

[2] ONS, Regional Accounts, 2017 (Provisional)
[3] https://www.nelep.co.uk/wp-content/uploads/2018/03/performance-of-our-economy.pdf

Overall performance of North East LEP area economy

Indicator	Most recent data	Change since 2014W	NE as % of England excl. London	Gap closing with England excl. London
GVA per head	£19,658 (2016)	Increased by 5.2% (nominal)	83	No change
Population	1.97 million (2016)	Increased by 0.7%	-	-
Working age population as % of total population	63.3% (2016)	Decreased by 0.5 percentage points	102	No change
Economically active as % of working age population	76.1% (Oct 2016 to Sep 2017)	Increased by 1.6 percentage points	97	Yes
Employment as % of working age population	71.2% (Oct 2016 to Sep 2017)	Increased by 3.1 percentage points	95	Yes
Productivity (GVA per hour worked)	£28.70 (2016)	Increased by 4.5% (nominal)	88 (UK)	No change (UK)

Key finding – We are making good progress in providing more and better jobs by 2024. To continue with progress, we will introduce measures that support access to employment centres and development sites which will create extra jobs, reduce congestion and improving the reliability of journey times.

2.1The GVA productivity gap

Gross Value Added (GVA) measures the value of the goods and services produced in an area, industry or sector - and is used to estimate the size of their economies.

In 2016:

- the GVA of North East LEP area was £38.7 billion, which is 2.6% of English GVA.
- the GVA per head of the North East LEP area was £19,658, below the GVA per head of England (£27,060).
- GVA per head increased by 5.2% between 2014 and 2016 in the North East LEP area, slightly below the England excluding London rate of increase (5.4%).

Figure 2 below shows the GVA per head for the North East area compared with the English average excluding London, and the English average.

Figure 2 - GVA per head[4]

[4] https://www.nelep.co.uk/wp-content/uploads/2018/03/performance-of-our-economy.pdf

Key finding – the North East economy lags behind the English average in productivity. To reduce this gap, we will introduce measures that support access to employment centres and development sites which will create extra jobs, reduce congestion and improving the reliability of journey times.

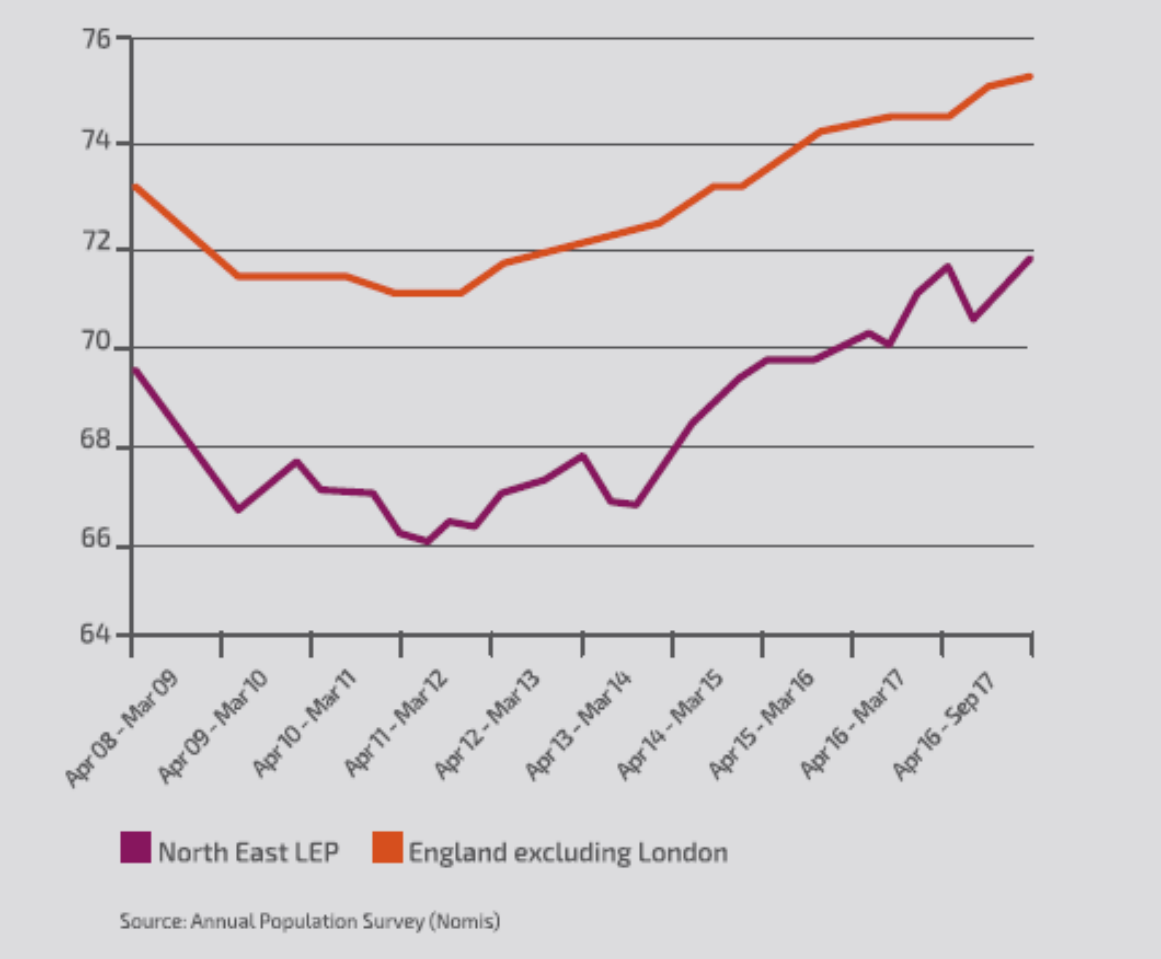
2.2 Employment Rate

We want to Increase the proportion of residents in employment, to enhance opportunities for individuals and help underpin economic growth of the region.

We want to close the gap between the North East's employment rate for 16-64 year olds with England (excluding London) by 100% by 2024.

Figure 3 - Employment Rate[5]

[5] https://www.nelep.co.uk/wp-content/uploads/2018/03/performance-of-our-economy.pdf



Key finding – Despite good progress in reducing the gap in the employment rate between the North East and London, we recognise that we need to continue to increase the number of jobs, and employability of residents. We will introduce measures that support access to employment centres and development sites which will create extra jobs, reduce congestion and improving the reliability of journey times to employment centres.

Our Strategic Economic Plan sets out how we will provide 'more and better jobs' in our region by 2024. We want to reduce the economic gap between ourselves and the English average, and assist in meeting the Government's objective of rebalancing the economy.

In 2014, there were 811,600 jobs in the North East LEP area. We have a target to provide an additional 100,000 jobs by 2024[6].

In 2017, the total number of jobs in the North East LEP area had increased by 55,200, so we remain on track to meet our target.

[6] https://www.nelep.co.uk/wp-content/uploads/2017/08/north-east-sep-final-march-2017.pdf

We want 70% of the additional 100,000 jobs to be 'better jobs'[7] .Of the 55,200 additional jobs since 2014, 73% 40,300 are 'better jobs'[8].

2.3 Employment sectors

Our largest employing sectors in the North East LEP area are[9]:

- Health (15.7%)
- Manufacturing (11.0%)
- Retail (10.0%)
- Education (9.4%)

The SEP is focused on growing the following sectors to accommodate the aim of more and better jobs:

- Technology and digital – The NELEP area is the fastest growing tech economy in the UK[10]
- Advanced manufacturing – automotive and medicines – 62,500 people are employed in this sector in the North East, making it in the top 5 in the UK. 120,000 people are employed in wider manufacturing
- Energy sector – the North East is world leading in offshore and sub-sea technology.
- Enabling services – for a growing and productive service economy

[7] defined as managers, directors and senior officials; professional occupations (such as civil engineers and doctors); and associate professional and technical occupations (such as laboratory technicians and graphic designers).
[8] https://www.nelep.co.uk/wp-content/uploads/2018/03/performance-of-our-economy.pdf
[9] https://www.nelep.co.uk/wp-content/uploads/2017/08/north-east-sep-final-march-2017.pdf
[10] ibid

Figure 4 - Employability Summary Table[11]

Employability and inclusion in the North East LEP economy

Indicator	Most recent data	Change since 2014	NE as % of England excl. London	Gap closing with England excl. London
% of 16-64 population that are economically inactive	23.9 (Oct 2016 to Sep 2017)	Decreased by 1.6 percentage points	111	Yes
% of 16-64 economically active population that are unemployed	6.4 (Oct 2016 to Sep 2017)	Decreased by 2.2 percentage points	146	No - widened
% of 16-24 economically active population that are unemployed	15.6 (Oct 2016 to Sep 2017)	Decreased by 5.1 percentage points	130	No - widened
% of 50-64 economically active population that are unemployed	4.7 (Oct 2016 to Sep 2017)	Decreased by 1.4 percentage points	162	No - widened
Median gross weekly wages of full-time workers (£)	£506.2 (2017)	Increased by £27.50 (2014)	91 (England)	No change (England)

Sources: Annual Population Survey (Nomis) and Annual Survey of Hours and Earnings (Nomis)
Notes: 1. To ensure that seasonal factors are not affecting comparison, the same time periods are used for both the most recent year and the 2014 benchmark year for each indicator. For example, the most recent Annual Population Survey data is for the period July 2016 to June 2017 – so July 2013 to June 2014 is used as the comparator. 2. Unemployment rates use the ILO measure

2.4 The income gap

The gap in income between the North East and England (excluding London) remains, and over one in five households in the North East are living in poverty.

Between 2013/14 – 2015/16:
22% of households in the North East region were living below 60% median household income after housing costs. This is equivalent to 600,000 individuals in the region living in households in poverty

The average wage for a full-time worker in the NELEP area (£506.20 per week) are below the English level (£555.80 per week)[12]. This is shown in figure 5. This is the second lowest amongst the core city LEPs.

[11] https://www.nelep.co.uk/wp-content/uploads/2018/03/employability-and-inclusion.pdf
[12] Annual Survey of Hours and Earnings and the Family Resources Survey

Figure 5 - Median gross weekly wage of full time workers by location[13]

Median gross weekly wages of full-time workers (£), North East LEP, core city LEPs and England, 2014 and 2017

	2014	2017	% Change 2014 to 2017
Greater Birmingham and Solihull	494.2	536.6	8.6
Greater Manchester	481.6	515.4	7.0
England	523.5	555.8	6.2
Leeds City Region	479.5	508.3	6.0
North East	478.7	506.2	5.7
Sheffield City Region	474.2	499.8	5.3
West of England	522.6	550.0	5.2
Derby, Derbyshire, Nottingham and Nottinghamshire	488.3	510.3	4.5
Liverpool City Region	492.6	513.8	4.3

Key finding – the gap in income between the North East and the rest of England remains, and when IMD data is added, it highlights that there are significant disparities between areas in the North East and the rest of the country. Our proposals will aim to reduce these gaps, by providing better access to employment centres and development sites.

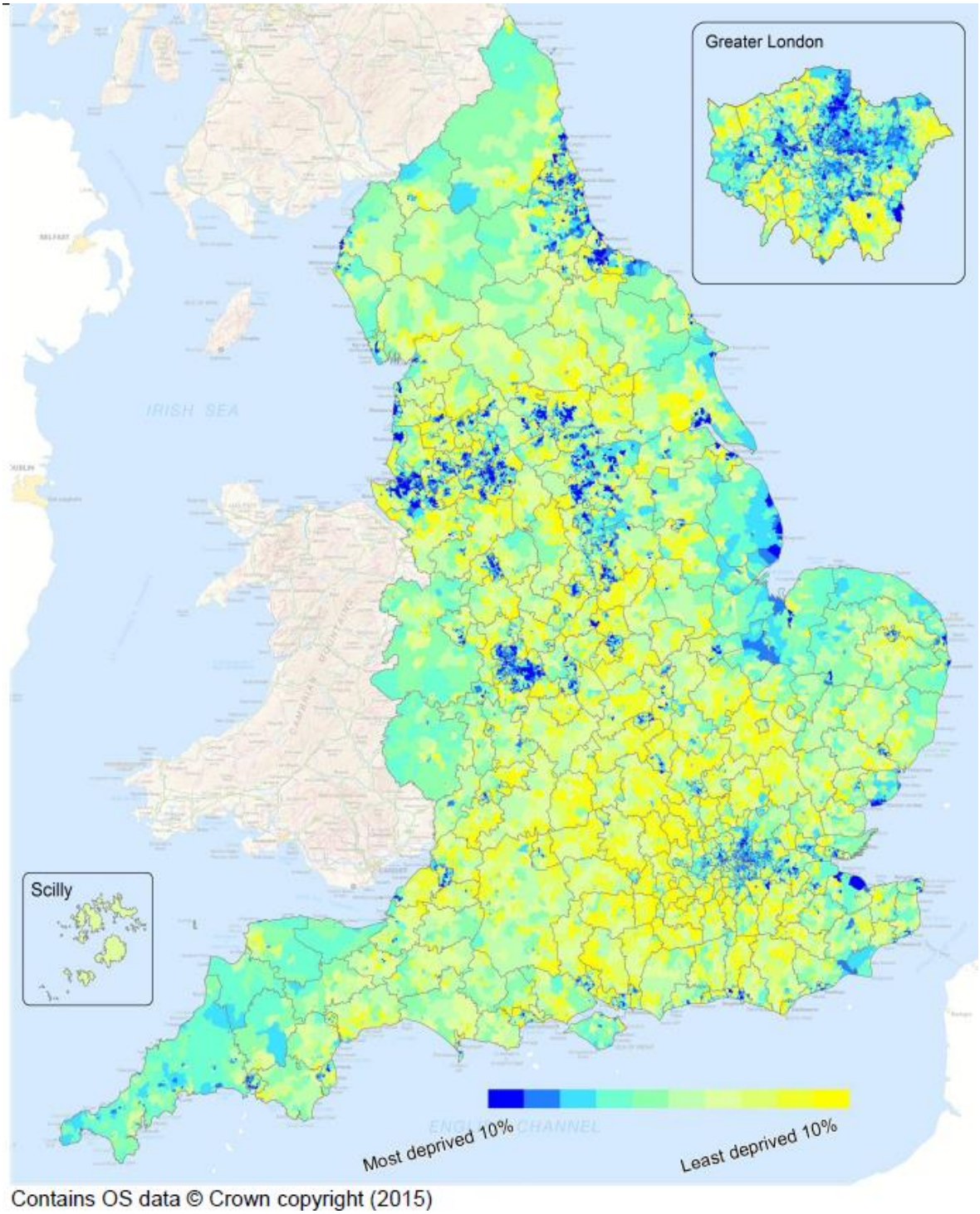
2.5 Indices of Multiple deprivation

The North East LEP area remains significantly deprived and is the 10th most deprived partnership area in the country with all seven local authorities being in the most deprived 50% and four within the most deprived 25% of local authorities

Figure 6 shows the distribution of IMD across England in 2015, it can be seen that within the NELEP area, there are a significant number of areas that rated in the highest 10% of deprivation in England.

[13] https://www.nelep.co.uk/wp-content/uploads/2018/03/employability-and-inclusion.pdf

Figure 6 - IMD 2015, England[14]



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https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/465791/English_Indices_of_Deprivation_2015_-_Statistical_Release.pdf

2.6 Summary

Despite numerous sectoral strengths and a positive balance of trade from the region the area continues to lag behind the rest of the UK on key performance indicators around productivity, employment rates and income. This leads to a lower employment rates, standard of living and impacts negatively on health and life expectancy.

We aim to close the gap on these indicators, growing the economy, improving productivity and creating more and better jobs. And our KPI's, will ensure that we will increase the number of jobs, reduce the GVA gap and improve the employment rate.

The KPI's are:

- Increase the number jobs in the North East economy by 100,000 by 2024 (60% of all jobs created from 2014 will be will be better jobs)
- Improvement of productivity measured by the Gross Value Added (GVA) per full-time equivalent job – 50% reduction in the gap by 2024
- Close the gap in employment rate. Target - 100% reduction in gap by 2024

2.7 Our Transforming Cities Programme

Our vision is: 'more sustainable connectivity, more mobility', making sustainable transport the natural choice for people moving around our city region, banishing congestion and its polluting effects, and improving air quality and public health.

Our ambition through this bid is to help close our area's productivity gap, creating more and better jobs.

Our bid focuses on improving connectivity to Key Economic and Employment Centres, these include:

Key City Centre Employment sites of:

- Newcastle City Centre
- Sunderland City Centre
- Durham City Centre

Between them these sites employ 98,000[15] people. [16]

Key Enterprise zones including:

- Newcastle Airport
- Port of Blyth
- Port of Tyne
- North Banks of the Tyne
- Holborn Riverside, South Shields
- International Advanced Manufacturing Park/Nissan/Follingsby

[15] ONS, Business Register and Employment Survey, 2017 [from NOMIS]
[16] Source: Business Register and Employment Survey, 2017

- Port of Sunderland

Between them, these sites employ 38,000[17] people [18], however these are the sites which will see significant growth in employment in coming years.

The bid also supports established employment sites, as identified earlier located on our key corridors. Between them, approximately 549,000[19] people [20] are employed.

The map of these can be found in annex H.

These important economic sites are linked by four key corridors:

- North and South
- Cities – Airport
- Banks of the Tyne
- River Wear

The map of these can be found in annex I.

These corridors are critical to the economic success of the important regional employment sites, allowing the movement of people, good and services between sites, from strategic housing sites and for the onwards distribution of good via our ports and airport.

These corridors however suffer congestion and do not offer reliable connectivity and the out of town cities are often poorly connected by sustainable transport thus negatively impacting on the productivity of the region.

Improving journey time reliability on these corridors gives great access to employment and ensure that new and established businesses have access to a large pool of talented workers.

The corridors also link our key residential suburbs, housing growth sites and areas of deprivation to our key employment sites. Our major housing growth sites are:

- Murton Gap, North Tyneside (approx. 3000 dwellings)
- Killingworth Moor, North Tyneside (approx. 2000 dwellings)
- Upper, Middle and Lower Callerton, Newcastle (approx. 3000 dwellings)
- Sunderland South Development (approx. 3000 dwellings)

Improving reliability and journey times on our corridors will assist in linking these new sites to employment by sustainable means, helping to reduce reliance on private car.

The map can be seen in annex A.

[17] Ibid
[18] Ibid
[19] Ibid
[20] Ibid

3. Local Challenges – transport

3.1 Journey Time reliability

Add journey time reliability

When making a journey, having a reliable estimate of the time it may take is likely to be as great a consideration as the total time taken. There is evidence at national level of the concern that both freight and bus operators have about the negative impacts of unreliable journey times due to congestion, both in terms of increased costs for operators and lower bus passenger volumes, due to the perception of bus travel as increasingly unreliable and protracted.[21] [22]

Within the North East there are particular congestion hot spots on key routes into urban centres and at river crossings, and this is likely to lead to greater journey time unreliability. This is of particular concern relating to the four key corridors quoted in section 2.7. As a result, bus journey times are particularly lengthy in the peak making this form of sustainable transport less attractive.

3.2 Transport Costs (rail, tube, bus, coach)

Following on from the income gap statistics, the people in the North East spend a greater proportion of income on transport services than most other parts of the UK[23].

Figure 7 Percentage of Household income spend on transport services

[21] Written evidence submitted by the Confederation of Passenger Transport UK to the Transport Select Committee, health of the bus market 2018 http://www.cpt-uk.org//_uploads/attachment/4677.pdf

[22] Congestion on UK roads worst for over 10 years, FTA survey reveals, Freight Transport Association 2015 https://fta.co.uk/press-releases/20150316-congestion-on-uk-roads-worst-for-over-ten-years-fta-survey-reveals

[23] https://www.ons.gov.uk/peoplepopulationandcommunity/personalandhouseholdfinances/expenditure/datasets/detailedhouseholdexpenditurebycountriesandregionsuktablea35

4. The Environment and Public Health

We know that 66% of trips were under 5 miles in England, of which 56% were by car[24], these are journeys that could be made by sustainable modes, with the right infrastructure and plans in place.

4.1 Carbon

Carbon dioxide (CO_2) is the main greenhouse gas, accounting for about 81 percent of the UK greenhouse gas emissions in 2015[1]. The Department for Business, Energy and Industrial Strategy publishes statistics on carbon dioxide (CO_2) emissions.

Key points from our data show:

- In 2015, road transport in the North East area was estimated to account for just under a third of CO_2 emissions.
- Since 2005, North East total emissions per capita have fallen by 42% while transport emissions per capita have fallen by 15%.
- There are forecasts for a 16% increase in trips made by car drivers between 2018 and 2038 in our area[25]

[24] National Travel Survey, DfT, 2015
[1] Local Authority Carbon Dioxide Emissions Estimates 2015, Department for Business, Energy and Industrial Strategy, 29 June 2017.
[25] NTEM Version 7.2

- a 24% increase forecasted for the number of cars in our area[26]

The Census, 2011 presented details on the mode of transport for people travelling to work. In our area:

- 60% as a car/van driver
- 7% as car passenger
- 14% public transport users
- 10% walking
- 2% cycling

.

Key finding – despite road transport's contribution to falling CO2 levels, there remains significant challenges, through forecasts showing the number of cars will increase in the future, which could mean more CO2 emissions. Our proposals will aim to continue the downward trajectory of CO2 emissions by encouraging mode shift away from the car to public transport, cycling and walking for journeys to work.

4.2 Public health

Physical activity through travel

Public Health England produce data that measures the level of physical activity attained through travel, by walking 3 days a week or more, and by cycling 3 days a week or more. These are broken down by area and are measured in percentage terms, benchmarked against the English rate.

For our area, in terms of the percentage of adults walking more than 3 days per week:

- Newcastle performs better than the benchmark
- Northumberland and Sunderland are under the benchmark rate.

Figure 8 – Percentage of adults walking for travel at least three days per week 2016/17[27]

[26] ibid

[27] https://fingertips.phe.org.uk/profile/physical-activity/data#page/3/gid/1938132899/pat/126/par/E47000005/ati/102/are/E08000037/iid/93439/age/164/sex/4

Area	Value	Lower CI	Upper CI
England	22.9	22.6	23.1
CA-North East	-	-	-
County Durham	20.6	16.8	24.4
Gateshead	22.5	17.3	27.7
Newcastle upon Tyne	29.7	26.8	32.6
North Tyneside	24.2	19.4	28.9
Northumberland	15.7	12.6	18.8
South Tyneside	18.5	13.7	23.4
Sunderland	16.3	13.3	19.3

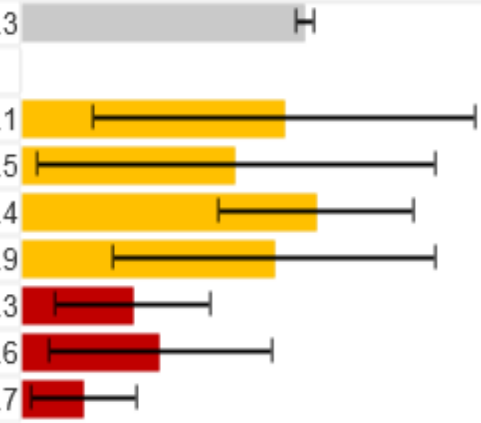
Source: Department for Transport (based on Active Lives, Sport England)

For our area in terms of the percentage of adults cycling more than 3 days per week: Newcastle, although rated similar to levels across England, is actually 0.1% higher. Northumberland, South Tyneside and Sunderland have levels that are under the benchmarked rate.

Figure 9 - Percentage of adults cycling for travel at least three days per week 2016/17[28]

[28] https://fingertips.phe.org.uk/profile/physical-activity/data#page/3/gid/1938132899/pat/126/par/E47000005/ati/102/are/E08000037/iid/93440/age/164/sex/4

Area	Value	Lower CI	Upper CI
England	3.3	3.2	3.4
CA-North East	-	-	-
County Durham	3.1	0.8	5.3
Gateshead	2.5	0.2	4.8
Newcastle upon Tyne	3.4	2.3	4.6
North Tyneside	2.9	1.1	4.8
Northumberland	1.3	0.4	2.2
South Tyneside	1.6	0.3	2.9
Sunderland	0.7	0.1	1.3



Source: Department for Transport (based on Active Lives, Sport England)

Key finding – there is significant potential to improve on the number of adults cycling and walking at least 3 times a week. Through our proposals to encourage more people to cycle and walk to work, we can increase the rates of cycling and walking trips

4.3 Air quality

The main contributor to local air pollution in our area is road traffic (petrol cars 36%, diesel cars 29%, diesel LGV 16% and HGV 13%)[29].

Defra have identified that a number of road links in the area which are the subject of air quality exceedances.

- the Tyne Bridge
- parts of Newcastle city centre,
- A1 western Bypass
- A1058 Coast Road
- It is estimated that poor air quality is responsible for around 360 deaths each year in Central Newcastle/Gateshead alone.

The map, figure 10, below identifies these routes.

Figure 10 Air Quality exceedance points

South Tyneside and Sunderland also have routes that are currently in exceedance, these being the A194 corridor in South Tyneside and the link into the Galleries Shopping Centre in Washington.

[29] DfBIS 2015

To complete the picture, four authorities also have designated Air Quality Management Areas (AQMAs).

Authority	**Location(s)**
Durham	Durham City Chester Le Street
Gateshead	Town Centre
Newcastle City Council	City Centre Gosforth
South Tyneside Council	Boldon Lane / Stanhope Road Leam Lane / Lindisfarne Roundabout

Key findings – we have pockets of poor air quality in our area, and in some areas are forecast to be in exceedance of legal limits. Our proposals will help improve air quality in certain locations, and eliminate AQMA's through better public and sustainable transport.

Annex C

The Transport Barriers and our key corridors

1. The North East

The transport barriers which are limiting growth in the region are:

- Restricted sustainable connectivity
- Restricted Mobility

1.1 Sustainable Connectivity

Sustainable connectivity across the region is impaired by the following issues:

- Not all key housing, employment and enterprise zones are well connected by sustainable means;
- Where connections do exist, there are often capacity, reliability and resilience concerns;
- Current connectivity may place reliance on the car, increasing congestion, impacting on air quality and discouraging active travel, and;
- "Last mile" links which connect the sustainable network to key sites can be lacking or may need improvement, especially for active travel.

1.2 Mobility – Use of Sustainable Transport

In instances where the current network is already well established, perceptions of the service offered can be a barrier to its use:

- Perception of price is a barrier to use;
- Perception of convenience is a barrier to use, including:
    - Access to the network and ease of interchange between modes;
    - End to end journey time and frequency;
    - Reliability of the service and the practicalities of using active travel.
- Perception of security on the sustainable network.

2. Our Transforming Cities Programme

The transport barriers in relation to the key employment sites, corridors and strategic housing sites identified in our Expression of Interest and set out above are:

- Poor sustainable Connectivity
- Mobility – use of sustainable transport

The transport barriers outlined in Rebalancing the Economy can equally apply to parts of our region

- Congestion
- Connectivity
- Capacity
- Reliability

2.1 Sustainable Connectivity

North – South Corridor - Key challenges

- There are areas of high deprivation along this corridor (Parts of South East Northumberland, Newcastle and Gateshead have wards ranked within England's most deprived areas).
- There are significant gaps in life expectancy between areas of most deprivation and least deprivation, for example life expectancy is 9.5 years lower for men and 7.1 years[1] lower for women in the most deprived areas of Northumberland than in the least deprived areas.
- Congestion on key routes into urban centre (A1/A1(M), A189, A167, A184) and overcrowding on peak Metro and some local train services.
- There are areas of poor air quality within the urban core.
- There are no direct train services to SE Northumberland or Washington
- Public transport journey times from SE Northumberland to Newcastle are lengthy at peak times (average of 64 minutes for 17 mile journey)
- Ensuring that major developments do not add further strain to transport network through extra trips generated

Banks of Tyne Corridor – Key challenges

- There are areas of high deprivation along this corridor (Parts of North Tyneside, East End of Newcastle, Gateshead and parts of South Tyneside have wards ranked within England's most deprived areas).
- There are significant gaps in life expectancy between areas of most deprivation and least deprivation, for example life expectancy is 8.4 years lower for men and 8.1 years[2] lower for women in the most deprived areas of South Tyneside than in the least deprived areas.
- Congestion on key routes into urban centre, particularly at river crossings (A19, A1058 Coast Road, A167, A184, A194, A195) and overcrowding on peak Metro services.
- There are areas of poor air quality within the urban core.
- Journey times by bus are lengthy, for example the bus journey South Shields to Newcastle, via Heworth in the AM peak is 1 hour 23 minutes for a 14 mile journey. An AM peak bus from North Shields to Newcastle is 52 minutes for a 10 mile journey.
- Limited capacity and lack of resilience on parts of Metro network in South Tyneside

Cities and Airport Corridor – Key Challenges

[1] http://fingertipsreports.phe.org.uk/health-profiles/2017/e06000057.pdf

[2] https://fingertipsws.phe.org.uk/static-reports?profile_key=health-profiles&file_name=e08000023.pdf&time_period=2018

- There are areas of high deprivation along this corridor (Parts of Sunderland, South Tyneside Gateshead and West Newcastle have wards ranked within England's most deprived areas).
- Congestion on key routes into urban centres, particularly at river crossings (A19, A1, A194/A184, A167, A186 and A696, A194, A195) and overcrowding on peak Metro services and peak heavy rail services between the city centres
- There are areas of poor air quality within the urban core, with limited opportunity for integration with Park and Ride.
- Journey times by bus are lengthy, for example the bus journey Sunderland to Newcastle, via Washington in the AM peak is 1 hour 25 minutes for a 17 mile journey. An AM peak bus from Newcastle Airport to Newcastle is 25 minutes for a 6.5 mile journey.
- Providing access to unlock housing and employment development via sustainable modes
- Increasing issues with reliability of existing Metro fleet
- Poor quality and appearance of stations and interchanges not conducive to new customers

River Wear Corridor – Key challenges

- There are areas of high deprivation along this corridor (Parts of Sunderland Coalfields area and Central Sunderland have wards ranked within England's most deprived areas).
- There are significant gaps in life expectancy between areas of most deprivation and least deprivation, for example life expectancy is 7.7 years lower for men and 7.1 years[3] lower for women in the most deprived areas of Durham than in the least deprived areas.
- Congestion on key routes into urban centres, particularly A690 to Sunderland and Durham, A177 into Durham and A183 into Sunderland
- Congestion at pinch points A19/A690 junction at Doxford Park and A1018.
- There are areas of poor air quality within urban centres
- Journey times by bus are lengthy, for example the bus journey from Durham to Sunderland, in the AM peak is 1 hour 06 minutes for a 17 mile journey. An AM peak bus from Sunderland to South Shields is 35 minutes for a 6 mile journey.
- Providing access to unlock housing and employment development via sustainable modes
- Ensuring network in city centres allows traffic to flow more efficiently

[3] https://fingertipsws.phe.org.uk/static-reports?profile_key=health-profiles&file_name=e06000047.pdf&time_period=2018

2.2 Mobility – Use of Sustainable Transport

[Provide an commentary for each corridor on future demand and capacity constraints in the context of Mobility – use of sustainable transport[

North – South Corridor - future demand and capacity constraints in the context of mobility and use of sustainable transport

- Present and future demand, particularly using sustainable forms of transport such as public transport and cycling, is constrained or deterred by
    - The current lack of train services to Ashington, Team Valley and to Washington
    - The limited train service at both Cramlington and Chester-le-Street stations, and the location of Cramlington station
    - Long peak time bus journey times from SE Northumberland to Newcastle (average of 64 minutes for a 17-mile journey)
    - Some of the business parks are not well served by public transport particularly for shift workers
    - Lack of cycling facilities at key points
- Capacity constraints consist of congestion on key routes into urban centres (A1/A1(M), A189, A167, A184) and overcrowding on peak Metro and some local train services.

Banks of Tyne Corridor – future demand and capacity constraints in the context of mobility and use of sustainable transport

- Present and future demand, particularly using sustainable forms of transport such as public transport and cycling, is constrained or deterred by
    - Long peak time bus journey times for example South Shields to Newcastle via Heworth is 1 hour 23 minutes for a 14-mile journey and North Shields to Newcastle is 52 minutes for a 10-mile journey.
    - Lack of cycling facilities at key points
    - Lack of reliability of the existing Metro system and fleet, particularly in South Tyneside
- Capacity constraints consist of congestion on key routes into urban centres, particularly at river crossings (A19, A1058 Coast Road, A167, A184, A194, A195) and overcrowding on peak Metro services.
- There is particularly limited capacity on parts of Metro network in South Tyneside

Cities and Airport Corridor – future demand and capacity constraints in the context of mobility and use of sustainable transport

- Present and future demand, particularly using sustainable forms of transport such as public transport and cycling, is constrained or deterred by
    - Long peak time bus journey times for example Sunderland to Newcastle via Washington is 1 hour 25 minutes for a 17- mile journey and Newcastle Airport to Newcastle is 25 minutes for a 6.5-mile journey.

- Newcastle Airport, Nissan and Follingsby Park are not well served by public transport at shift work times
- Lack of cycling facilities at key points
- Lack of reliability of the existing Metro fleet
- Poor quality and appearance of stations and interchanges not conducive to new customers

- Capacity constraints consist of congestion on key routes into urban centres, particularly at river crossings (A19, A1, A194/A184, A167, A186 and A696, A194, A195) and overcrowding on peak Metro and heavy rail services centres

River Wear Corridor – future demand and capacity constraints in the context of mobility and use of sustainable transport

- Present and future demand, particularly using sustainable forms of transport such as public transport and cycling, is constrained or deterred by
  - Long peak time bus journey times for example Durham to Sunderland is 1 hour 06 minutes for a 17-mile journey and Sunderland to South Shields is 35 minutes for a 6-mile journey.
  - Doxford business park is not well served by public transport particularly for shift workers
  - Lack of cycling facilities at key points

- Capacity constraints consist of congestion on key routes into urban centres, particularly A690 to Sunderland and Durham, A177 into Durham and A183 into Sunderland and also at pinch points A19/A690 junction at Doxford Park and A1018.

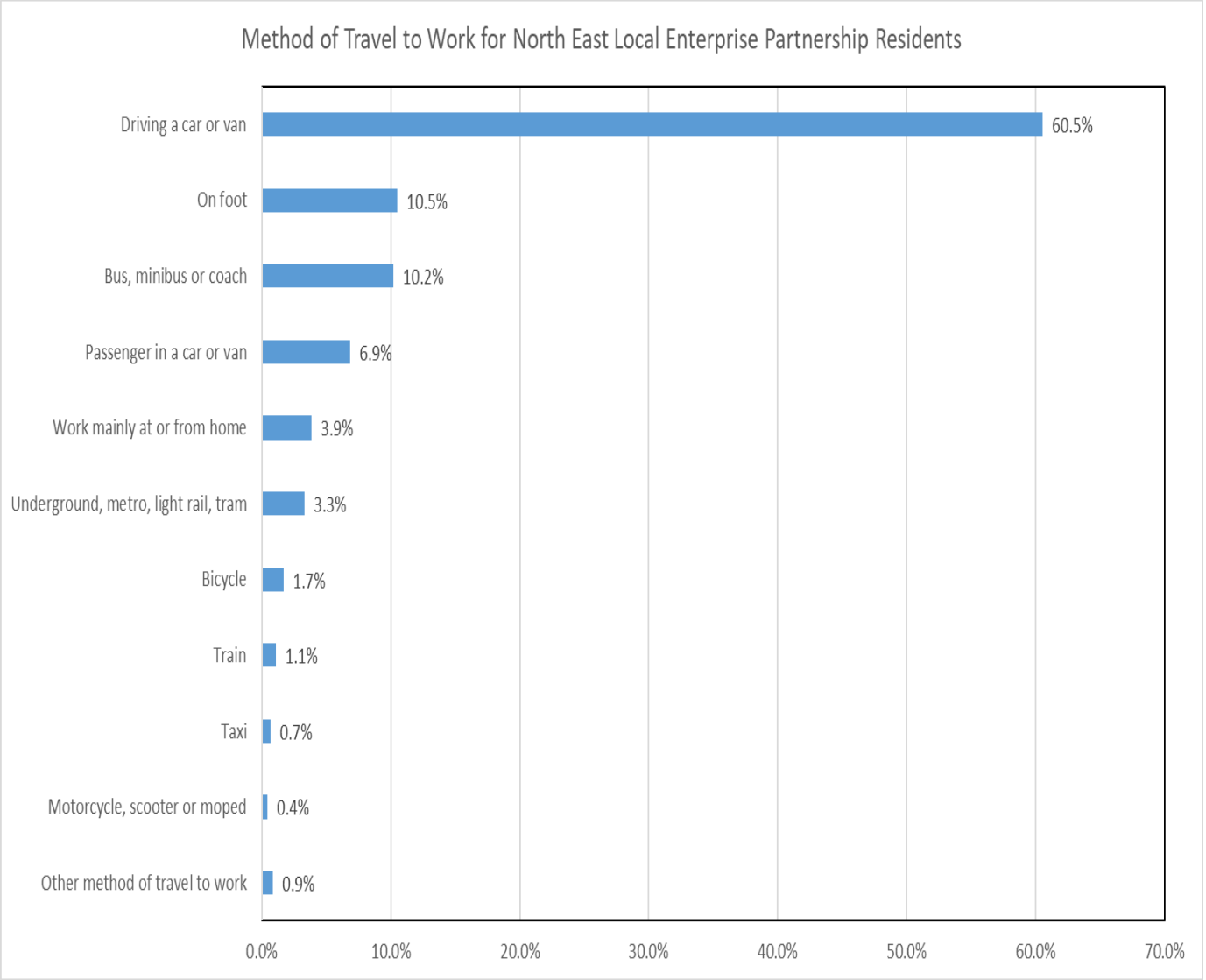
2.3 Congestion, connectivity, capacity and reliability

2.3.1 Congestion

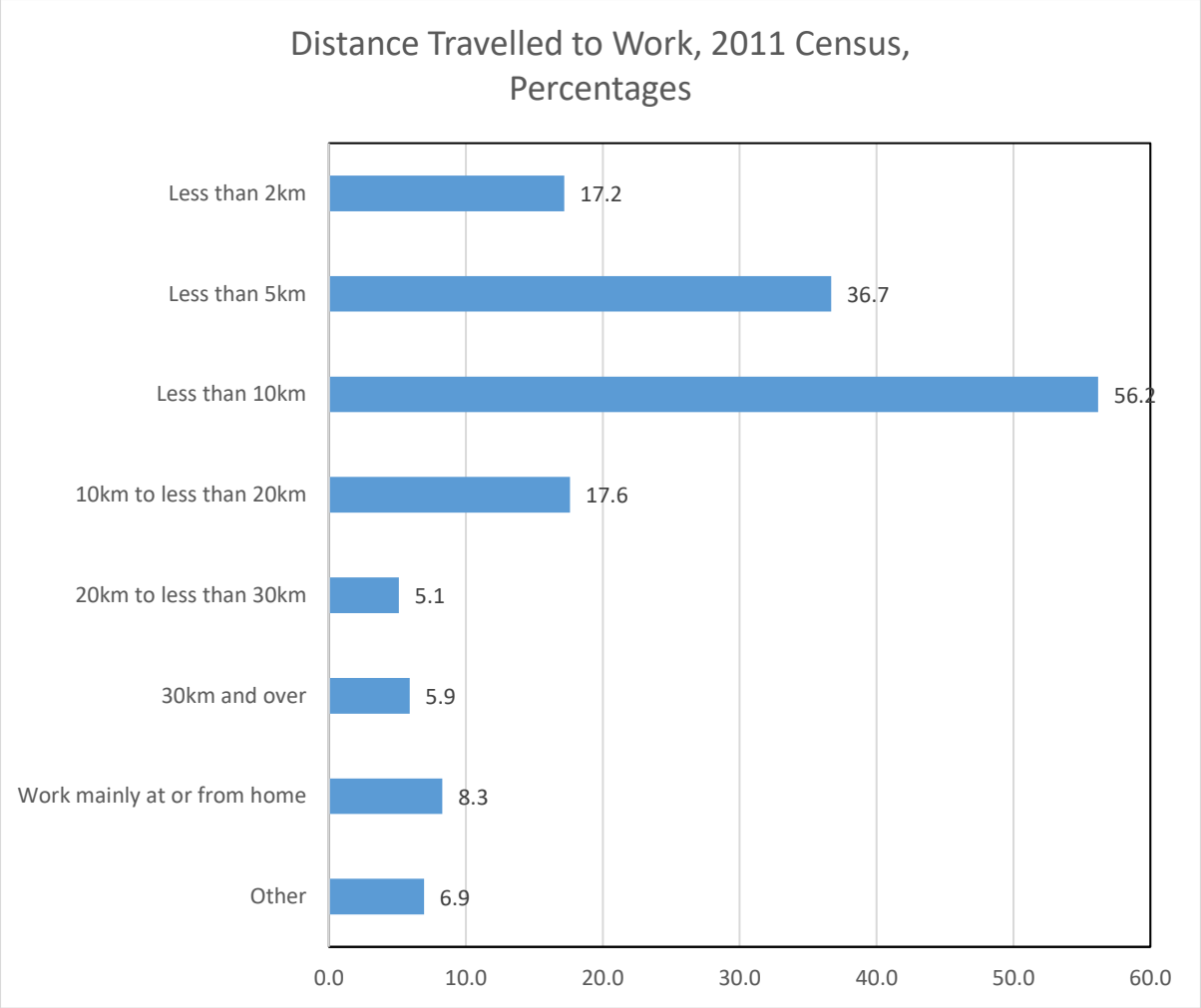
Although car ownership remains lower than in other parts of the UK, it has increased from 763,000 to 822,000 over an 8 year period,[4] and congestion is a growing problem.

- 67% of commutes are by car (either as passenger or driver)[5]
- majority of commutes under 10km in distance.[6]
- 20% extra travel time needed on the busiest routes in the North East.

[4] Department for Transport, Table VEH0105, 2009 to 2017.
[5] 2011 Census, ONS Crown Copyright Reserved [from Nomis]
[6] Ibid



Source: 2011 Census, Office for National Statistics (Nomis).
All usual residents aged 16 to 74 and in employment.



Source: Office for National Statistics (Nomis).
All usual residents aged 16 to 74 and in employment within the North East Local Enterprise Partnership.

The region's spectacular river valleys form natural physical barriers, leading to bottlenecks across, and on the approaches to, important river crossings whilst journeys into and out of city centres and other major employment sites are also subject to delays.

2.3.2 Connectivity

The region has higher than average levels of public transport use and a major locally-owned transport asset in the Metro system, supported by national rail provision. However, the Metro and rail networks are not extensive enough to reach all areas of housing and employment opportunity, while bus patronage has declined substantially.

Peripheral areas, for example South-East Northumberland, are isolated from the urban core by slow public transport links, whilst major out-of-town employment sites such as Doxford Park and Team Valley have limited public transport provision. Car use thus becomes the natural choice for such journeys, which adds to congestion and results in economic isolation for those without access to a car.

There are a number of deterrents to multi-modal journeys.

- Park and Ride sites are not in optimal locations to intercept traffic before it reaches the urban core.
- Interchanges are of variable quality and are not always perceived as attractive or secure locations to change modes, especially at night.
- The overall standard of cycling and walking routes are variable
- major road links can cause problems of severance

In general, people are switching away from public transport because of:

- poor perceptions of reliability, value for money and convenience and personal security,[7]

Whilst pedestrian and cycle networks are not yet sufficiently comprehensive or attractive to generate the levels of sustainable trips that we see elsewhere in Europe.[8]

2.3.3 Capacity

Major new housing sites such as Killingworth Moor and Murton Gap, and new employment sites such as IAMP, risk adding pressure to the existing transport network by building in high levels of car dependence and need new sustainable links to unlock their potential.

Peak-hour overcrowding affects key rail links into Newcastle whilst overcrowding on the Metro system is a growing challenge at busy periods, compounded by poor availability of the ageing train fleet.

2.3.4 Reliability

For commuters and businesses, being able to reliably estimate the time a journey may take is an important consideration alongside the total time taken. Both freight and bus operators have highlighted the negative impacts of unreliable journey times due to congestion, both in terms of increased costs for operators and lower bus passenger volumes, due to the perception of bus travel as increasingly unreliable and protracted.[9] [10]

Customer satisfaction with the Metro service is becoming worse, we have just recorded our worst average score, as set out in the chart below. Increasing levels of

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[7] Public attitudes to bus services 2013, Department for Transport, 2013 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/253219/buses-report-2013.pdf

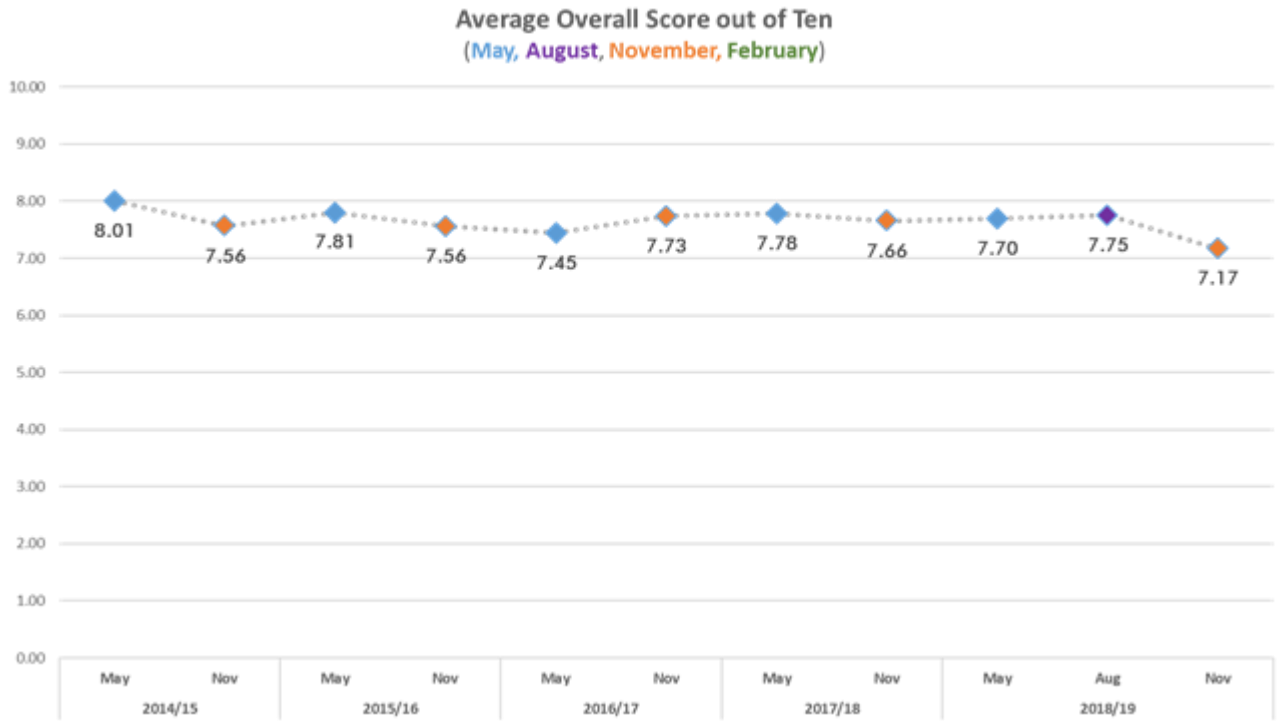
[8] Cycling UK's Cycling Statistics, CTC 2018 https://www.cyclinguk.org/statistics

[9] Written evidence submitted by the Confederation of Passenger Transport UK to the Transport Select Committee, health of the bus market 2018 http://www.cpt-uk.org//_uploads/attachment/4677.pdf

[10] Congestion on UK roads worst for over 10 years, FTA survey reveals, Freight Transport Association 2015 https://fta.co.uk/press-releases/20150316-congestion-on-uk-roads-worst-for-over-ten-years-fta-survey-reveals

dissatisfaction mean a deterioration in people's perception of reliability of Metro, which affects patronage.

Figure 1 - Trend of Metro satisfaction scores



Annex D
National and Regional Objectives

1. The National Objectives

1.1 The Industrial Strategy

The Government's Industrial Strategy (2017) sets out the plan to develop the economy of the UK, boosting productivity and earning power, through the vision for:

- The world's most innovative economy
- Good jobs and greater earning power for al
- A major upgrade to the UK's infrastructure
- The best place to start and grow a business
- Prosperous communities across the UK

The strategy focuses on four 'Grand Challenges'. The Grand Challenge pertinent to Transforming Cities is the one called 'Future of Mobility'.

1.2 Transport Investment plan

The Transport Investment Strategy sets out targeted packages of investment which will drive economic development as part of a wider programme of interventions focusing on the specific circumstances of each area.
Through this investment the government will seek to:

- Create a more reliable, less congested, and better connected transport network that works for the users who rely on it;
- Build a stronger, more balanced economy by enhancing productivity and responding to local growth priorities
- Enhance our global competitiveness by making Britain a more attractive place to trade and invest;
- Support the creation of new housing

1.3 Transforming Cities

Set out the Overarching Transforming Cities objectives
The Transforming Cities Fund was created with the aim of driving up productivity to spread prosperity through investment in public and sustainable transport in some of the largest city regions. The fund is focused on intra-city connectivity, making it quicker and easier to get around and access jobs. The overarching objectives of the Transforming Cities fund are to:

- Invest in new local transport infrastructure, to boost productivity and to support and facilitate local economic development
- Improve public and sustainable transport connectivity
- Improve access to employment sites, Enterprise Zones, development sites, or an urban centre that offers particular growth/employment opportunities
- Reduce incidences of poor air quality, reducing carbon emissions and increasing the health benefits of active modes
- Reduce regional economic disparities

- Support the Industrial Strategy 'Future of Mobility' Grand Challenge

1.4 Cross Cutting Priorities

- Improving access to work and connectivity within and between city regions
- Delivering a boost to productivity
- Encouraging the use of new mobility systems and technology as part of the 'Future of Mobility' Grand Challenge
- Tackling air pollution and reducing carbon emissions
- Delivering more homes
- Delivering apprenticeships and improving skills

1.5 Draft Clean Air Strategy

The draft Clean Air Strategy recognises the role that modal shift to lower emission modes of travel can play in reducing transport emissions. The Government is committed to encouraging more sustainable modes of transport like cycling, walking and public transport.

Encouraging an increase in cycling and walking for short journeys delivers a reduction in traffic congestion and emissions from road transport, as well as health benefits from more active lifestyles.

The draft Clean Air Strategy also highlights the importance of public transport in reducing emissions, "modal shift to rail, particularly on electrified lines, can help to reduce road traffic congestion and emissions" (p48)[1].

2. Supporting National Objectives

Our Transforming cities programme objectives link to:

2.1 The Industrial Strategy

Our Transforming Cities objectives seek to support the goals of the Industrial Strategy, to build on local strengths and deliver economic opportunities through:

- Reducing the productivity gap
- Providing better access to jobs and education
- Improving sustainable connectivity in our city region
- Reducing congestion through mode switch and improved public transport reliability and journey times.

2.2 The Transport Investment Plan

[1] https://consult.defra.gov.uk/environmental-quality/clean-air-strategy-consultation/user_uploads/clean-air-strategy-2018-consultation.pdf

Our Transforming Cities objectives align with those of the Transport Investment Strategy by:

- Targeting traffic congestion hotspots on our strategic corridors
- Making journey times more reliable
- Providing opportunities for easy interchange between modes
- Ensuring our transport system helps to boost local growth priorities in our employment centres.

Our objectives to make sustainable journey times quicker and more reliable and to develop innovative transport solutions will enhance the investment opportunities within our city region, and will help to meet the challenge of increasing demand on the transport system generated by the creation of new housing, supporting future developments.

2.3 The Transforming Cities objectives

Our specific bid objectives are designed to align closely with and build upon the national objectives of the Transforming Cities fund.

- Our objective to create 100,000 more and better jobs aligns with the national objective to support and facilitate local economic development, and to reduce regional economic disparities.

- Our bid objectives around increasing patronage of Metro and buses, and increasing walking and cycling, reflects the government objectives of improving sustainable and public transport, reducing instances of poor air quality, and increasing the health benefits of active modes.

- Our emphasis on innovation and sustainability ensures that our Transforming Cities objectives support the Industrial Strategy's 'Future of Mobility' Grand Challenge, in line with the national objectives of the fund.

2.4 Cross Cutting priorities

Our bid objectives have a particular emphasis on the priorities that are shared by the above national strategies.

- Our objectives seek to create more and better jobs, improve access to jobs and education, and reduce the productivity gap, all of which tie in with the cross-cutting themes of improving connectivity, boosting productivity, and delivering apprenticeships and improving skills.

- Our objectives of servicing major developments in an innovative and sustainable way, and of showcasing 5G connectivity and innovative solutions, link to the theme of encouraging the use of new mobility systems and technology.

- The objectives aiming to reduce congestion and encourage use of public transport and active modes reflect the cross-cutting priority of tackling air pollution and reducing carbon emissions.

- The creation of more homes will be enabled by the improvements to sustainable transport set out across our bid objectives, which will help to meet the additional demand generated by such developments.

3. Supporting Regional objectives

Our Transforming Cities programme objectives help deliver:

3.1 The regional objectives for Transport

Our regional transport goals are to deliver a North-East transport network that is easy to use, reliable, affordable and accessible, and which also contributes to the region's challenging air quality targets. The measures set out in this bid will assist in all these objectives.

Better cycling provision will make the network more **easy to use**. Our various ITS and junction improvements, by optimising vehicle flow and cutting delays at key bottlenecks on bus corridors, will make the bus network more **reliable** and attractive to passengers. A more efficient bus network enables better utilisation of vehicles, potential passenger growth and making fares more **affordable**.

The high-quality decarbonised transport provision that we aim to deliver with assistance from the Transforming Cites programme will contribute to a more **accessible** and inclusive network, linking people to jobs, and ensuring areas of economic exclusion are sustainably connected to growth hubs. **Air quality** will benefit through the wider availability of excellent cycling and public transport options that provide an attractive alternative to car use and that complement ongoing work to deliver a greener bus and taxi fleet.

3.2 The Strategic Economic Plan Objectives

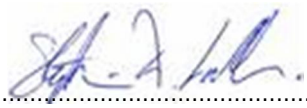
The schemes proposed in Tranche 1 of the TCF will help to deliver the objectives set out in the SEP. By reducing congestion through encouraging mode shift, we will reduce journey times, meaning people and goods can reach markets more quickly, thereby increasing productivity.

By investing in ITS systems to improve traffic flow, and give public transport priority we are removing barriers that prevent some residents from accessing employment opportunities.

Improving active travel provision that links people to employment sites will help to meet the SEP's goal of decarbonising our transport network and fostering sustainable economic growth.

NECA UTMC Review

March 2016

Prepared by:  .....
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NECA UTMC Review

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Executive Summary

This report demonstrates that current and future proposed UTMC interventions demonstrate strong alignment with transport policies and objectives. UTMC can also support the delivery of the developing objectives within the draft North East Combined Authority Transport Manifesto "Our Journey".

The draft Network Management Statement identifies technology as a key driver in managing the future demand on the regional network; this is demonstrated within a range of new infrastructure commissions, which comprise a technology component as an integral part of the network solution.

There is also strong evidence for support of the existing system from key stakeholders relating to the benefits of UTMC services; however there is also an acknowledgement that more could be achieved from the expansion of the existing system and enhancing co-ordination between the local authorities within the NECA region. This report presents the justification and subsequent business case for maintaining and extending the existing UTMC services.

There has already been significant investment to date on UTMC / ITS across the region, with a number of in-flight commissions ready to deliver enhanced and expanded services in 2016. This report estimates that the current systems are delivering approximately £50m over ten years in network benefits.

The proposed expansion of the current UTMC services are focused on infilling gaps in the current provision and expanding the range and means of delivering real-time traffic and travel information provision. The business case has also investigated and established new staffing levels sufficient to accommodate the above expansion over the next ten years.

The assessment process adopted a conservative/pessimistic approach to estimate the potential network benefits, yet still delivered a high value for money assessment using Department for Transport appraisal criteria.

The table below provides the summary assessment of the Cost Benefit Analysis

Option	BCR	DfT Assessment of Value for Money
Low Return Test	2.17	High
Average Return Test	2.46	High
High Return Test	3.18	High

The proposed future provision of ITS interventions returns high value for money for all test scenarios, based on the guidance presented in the DfT Value for Money Assessment: Advice Note for Local Transport Decision Makers (2013). These values are returned against pessimistic estimation of network benefits. As such, it is highly likely that the BCR would tend to be at the higher end of the forecast range.

This study concludes there are sufficient network benefits to be gained with the expansion of the existing service provision to justify the long term future of ITS UTMC provision. The recommendation is that this would be best achieved from a single NECA UTMC centre for the whole region. The report identifies there is a significant cost of decommissioning the UTMC facility in addition to the loss of network benefits, which further strengthens the case for UTMC retention.

Glossary & Abbreviations

This report uses terms that may be open to interpretation. For clarity, the following list defines the meanings applied to those terms within this report.

Active Traffic Management	Covers a range of SMART interventions to provide enhance traffic / network management; an example of an Active Traffic Management intervention would Variable Mandatory Speed Limits (VMSL). VSML are driven by complex algorithms, speed limits displayed on an MSU reduce as traffic increases to maximise capacity and avoid flow breakdown.
Adaptive Traffic Signal Control	Generic terms for all forms of Urban Traffic Control systems, including SCOOT, MOVA, SCATS, etc.
ANPR	Automatic Number Plate Recognition – reference covers the enable ANPR cameras which capture and process vehicles number plates.
BCR	Benefit Cost Ratio is an indicator to summarize the overall value for money of a proposed scheme.
CCTV	Closed Circuit Television is the use of video cameras to transmit a signal to a specific place, such as a control centre
CDB	Common Database refers to the UTMC CDB which amalgamates various equipment, systems and data into a central system or database.
Control Centre	A dedicated communications hub from which operators control network operations, see Traffic Management Centre.
CPMS	Car Park Management System covers all system developing to provide parking information and guidance (can also be known as PGI- Parking Guidance and Information System).
Demand Management	In the context of this report Demand Management refer to all technology interventions that are design to suppress or effluence traffic demand; an example in this context would be Road User Charging (RUC).
Electronic Transit Fare Payment	Electronic Transit Fare Payment cover the system requirements for the automation of the public transport ticketing system, an example would be integrated ticketing.
Elgin	National roadwork portal for England and Wales displaying information on all current and future roadworks (roadwroks.org)
Gap Analysis	Identification of current gaps in road incident management practices compared to international best practice.
GIS	Geographic Information Systems is a system designed to capture, store, manipulate, analyse, manage, and present all types of geographically referenced data
GPS	Global Positioning System is a space-based global navigation satellite system that provides location and time information
Incident Management	Covers all technology interventions relating to the enhance management of incidents; an example would Automatic Incident Detection (AID) to enhance identification of incidents on the network.
Internal Rates of Return	Internal rate of return (IRR) is the interest rate at which the net present value of all the cash flows (both positive and negative) from a project or investment equal zero. Internal rate of return is used to evaluate the attractiveness of a project or investment.

ITS	Intelligent Transport Systems refers to information and communication technology applied to transport infrastructure and vehicles; such systems improve transport outcomes such as transport safety, transport productivity, travel reliability, informed travel choices, social equity, environmental performance and network operation resilience
NECA	North East Combined Authority
Net Present Value (NPV)	Indicator that compares the amount invested today to the present value of the future benefits from the intervention.
NEXUS	NEXUS is the Passenger Transport Executive for the Tyne and Wear region of North East England. Nexus is an executive body of the North East Combined Authority.
Parking Management	See under CPMS
Public Transport Management	Term refers to all technology interventions that are designed to enhance the performance of public transport services; an example would be Selective Vehicle Detection (SVD) in order to allow traffic signals to selectively favour buses' movement through intersection by changing traffic light sequences and timings as buses approach.
SMART Applications	Generic terms used for all technologies that are more personal / mobile, such as information that can be provided on SMART phones, Apps, etc.
SCOOT	SCOOT (Split Cycle Offset Optimisation Technique) is a tool for managing and controlling traffic signals in urban areas. It is an adaptive system that responds automatically to fluctuations in traffic flow through the use of on-street detectors.
TMC	Traffic Management Centre is a control centre which collects traffic data and disseminates information to travellers to improve journey selection and enhance the performance of the network. Centres aim to improve transport safety, transport productivity, travel reliability, informed travel choices, social equity, environmental performance and network operation resilience
Traveller Information (Driver)	Term refers to all system / information that covers all travel information; an example would be Variable Message Signs.
Traveller Information (Public Transport)	Term refers to all system / information that relates to public transport; an example would be Real Time Passenger Information (RTPI) system.
UTMC	UTMC systems are designed to allow the different ITS applications used within modern traffic management systems to communicate and share information with each other.
VfM	Term used to assess whether or not an organisation has obtained the maximum benefit from the services it provides.
Virtual NECA UTMC System	Concept assessment on the performance of a virtual combined NECA UTMC (Tyne & Wear and Durham UTMCs).
VMS	Variable Message Sign: Dynamic roadside traffic sign with the capability to display a range of messages.
Weather & Environmental Monitoring	Term covers all system / equipment relating to the collection and provision of data / information on weather or environmental monitoring; an example would be Vaisala weather stations.
Willingness to Pay	Willingness to pay is the maximum amount an individual is willing to sacrifice to procure a service / good

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Introduction

01

1 Introduction

1.1 Background

The North East Combined Authority (NECA) has commissioned AECOM to develop a business case and the justification for the future provision of UTMC and ITS services. This report comprises an 'ITS and Network Management Statement' and constitutes the business case for continued and increasing use of UTMC / ITS across the region.

The NECA is a new legal body that brings together the seven North East councils: Durham, Gateshead, Newcastle, North Tyneside, Northumberland, South Tyneside and Sunderland.

The NECA aims to create the best possible conditions for growth in jobs, investment and living standards, to make the North East an excellent location for business, to prioritise and deliver high quality infrastructure and to enable residents to raise their skill levels and to benefit from economic growth long into the future.

The NECA has taken ownership of the regional Intelligent Transportation Systems (ITS) for Tyne and Wear and is reviewing the long term future of ITS provision across the Combined Authority area. Currently, Durham County Council operates its own UTMC system, but there may be benefits of bringing both systems together.

Transport issues such as mobility, accessibility and congestion are acknowledged problems in many regions including in the NECA area. Historically, the answer has been to build increased road capacity, but this is no longer acceptable. Regionally, where space is at a premium and land is expensive, it is not really possible to build new road links. ITS systems offer significant opportunities to optimise existing road space by managing travel demand, improving and regulating traffic flows, and can help reduce the need for extensive new infrastructure. This report therefore considers whether ITS provides a value for money solution to deliver agreed objectives of the NECA in the future.

1.2 Review Elements and Report Structure

One of the first tasks AECOM were asked to deliver, was the development of a Network Management Statement. Following this introductory section, a review of policy documents has been undertaken, as follows:

- **Section 2** - Policy Review: this section provides a critical review of all the documents detailed below, in accordance with the study brief:
    - NELEP Strategic Economic Plan;
    - NECA Transport Plan;
    - Draft Transport Manifesto for the North East;
    - Local Transport Plans (LTP) for Tyne and Wear, County Durham and Northumberland;
    - Tyne and Wear's Congestion Reduction Plan; and
    - Network Management Plans.

The above policy and strategy documents have been reviewed to develop a high level Network Management Statement for NECA to inform its strategic road network policy. The overall objective for the Network Management Statement is to set out at the highest level the requirements for the management of transport networks for the NECA area. This is presented in Appendix A

- **Section 3** – UTMC Best Practice Review: This section sets out the best use of ITS required to deliver the Network Management Statement and draws on examples of best practice from other regions across the UK.
- **Section 4** – Review of Existing UTMC Provision: This section identifies the assets already in place and any shortfall in the current ITS equipment and infrastructure that is required to deliver the NECA objectives. This section includes budgetary estimates for the procurement of capital assets. This review provides the "baseline" case to be considered in the requirements of the gap analysis.
- **Section 5** – Resources / Business Case for Future UTMC Provision: This section identifies the resources and revenue costs associated with the proposed implementation and equipment over the next 10 years. It includes cost estimates for:
    - Any required technical refresh of back office equipment;
    - Staff;
    - Accommodation;
    - Maintenance of all back office and deployed ITS assets;
    - Telecommunications; and
    - Power consumption.
- **Section 6** – Conclusion: This section provides a summary of the above assessment.

1.3 Study Area

The remit of the NECA 'ITS and Network Management Statement' encompasses the strategic transport network within the county councils of Durham and Northumberland, along with the five Tyne and Wear Councils of Gateshead, Newcastle, North Tyneside, South Tyneside and Sunderland.

Policy Review

02

2 Policy Review

2.1 Review of Existing Policy

As outlined in the brief and discussed at project inception, AECOM has reviewed the following policy documents that are directly relevant to the provision of UTMC and ITS systems and services in the NECA area:

- NELEP Strategic Economic Plan;
- NECA Transport Plan;
- Local Transport Plans (LTP) for Tyne and Wear, County Durham and Northumberland;
- Tyne and Wear Congestion Reduction Plan;
- Network Management Plans (where available); and,
- Draft Transport Manifesto for the North East, “Our Journey”.

The purpose of the policy review has been to examine the main policies described within each document and to assess the potential for ITS and UTMC measures to be used to support a positive outcome. Likewise, each main policy has been assessed to determine whether the policy itself acts as a potential constraint on ITS/UTMC, therefore limiting its use or effectiveness.

2.1.1 Strategic Economic Plan

The Strategic Economic Plan (SEP) is central to the North East agenda for growth, setting out a clear vision and investment programme for the area, identifying key priorities and actions. The overlying theme is the desire to create more, and higher skilled, jobs in the area, with transport playing a vital role in this goal.

The key aims of the report are outlined in **Table 1** overleaf, alongside the potential role that ITS/UTMC can play in the application of the policy. Additionally, possible ITS constraints of the objective have been identified.

Table 1: Strategic Economic Plan Review

SEP Policy Outline	Possible ITS Application	Possible UTMC Contribution/Constraints
Aim to create jobs and growth for the North East – have over 1 million people in employment by 2024		This would very likely lead to higher traffic levels, making the road network harder to manage and monitor. Implementing effective ITS features would need to be increasingly extensive therefore would prove more costly in order to have a higher level of influence. May also contain the need to expand the UTMC coverage area due to growth, and expansion of urban spaces.
Generate good quality and connected housing in order to attract skilled workers and retain economic investment	Strong transport connections between housing and occupational/social hubs are therefore important. Relieving congestion through Variable Messaging Signs (VMS), real time information surrounding delays or modification of signal timings may be necessary and helpful.	Similar to the previous point, increased traffic numbers are likely, particularly in these housing areas where the density is likely to increase further. This would put more strain on traffic signals in these areas and this issue would need to be addressed. Further traffic signals may have to be included for new developments, and then integrated into the UTMC network, as would any changes to current signal positions, layouts or timings.
Improved wages and high levels of employment are targeted by 2024	This requires good transport connections, nationally and internationally for all modes. More influence may therefore be placed on public transport, therefore smart ticketing and integrated transport systems can be implemented. There may also be more influence on highways as more people would be able to afford a personal vehicle, therefore traffic management takes on greater importance.	
Increase the uptake in low carbon technology. This is inclusive of the transport sector	Recognised low carbon vehicle zones could be managed effectively using ANPR to identify `rogue' vehicles. The UTMC also has the capability to monitor air quality at certain sites; therefore emissions can be tracked from vehicles to assess	The UTMC coverage area for air quality measurement may have to be extended to monitor emissions more thoroughly (Unsure of the current extent of this capability).

SEP Policy Outline	Possible ITS Application	Possible UTMC Contribution/Constraints
	whether progress is being made.	
'Transport and digital connectivity' is to be one of six key strategic themes. It serves to connect people and businesses; letting more people move around for work and leisure, and connecting the North East to the national and international economy	A key aspect is improving national and international connectivity, as well as reinforcing strong local links across the region. VMS signs can aid with route choices from around the North East, with parking guidance available within the city centres, enabling more efficient vehicle movement.	Make greater use of the Newcastle City Dashboard and social media to inform members of the public of current traffic conditions, or public transport delays.
Ensure public transport is sufficient for connectivity to priority areas	Ease of use is important to encourage use. Therefore smart ticketing and integrated ticketing, for use across modes, such as Pop cards are important steps. Safety is also important when on public transport, and in the surrounding areas, so the use of CCTV can remove some of the fear of public transport use. Real time information (RTI) can also be useful as it gives an indication of wait times and journey times, which in turn aid passenger decision making.	
More effective use of technology and high speed broadband is to be encouraged, and could add £1.2bn to NE GVA by 2017. This will be used to support businesses and aid digital inclusion	To increase the effective use of technology would also mean effective use of the UTMC. RTI for public transport drivers and users is a vital tool, particularly if it can continually improve and offer wider coverage. The increased presence of smartphones and internet use aids in informing passenger options, whether for route decisions, parking or public transport timings.	UMTC currently uses technology very effectively through integrated analysis of a number of parameters.

2.1.2 NECA Transport Manifesto

This high level commitment and the associated transport plan which will be developed to deliver it, will replace the Local Transport Plans currently adopted in Tyne and Wear, County Durham and Northumberland. The NECA Transport Manifesto is currently under development for NECA, and will set out the vision for transport in the region over the next 20 years. Although LTP3s are the current policy driver, the NECA transport manifesto is in the stages of refinement and internal consultation, and therefore is at a stage of readiness to consider for the Network Management Statement and how ITS solutions can support its' aims. As such, Table 2 below highlights the significant points from the draft NECA Transport Manifesto alongside the potential support that the UTMC system(s) can provide.

Table 2: NECA Transport Plan Review

Transport Manifesto	Possible ITS Application	Possible UTMC Contribution / Constraints
The future North East transport system must be easy to use	Integrated ticketing, such as Pop cards, is vital in this advancement. Wider ownership of pop cards is a realistic target to make public transport easier to use. RTI is also important.	Providing the RTI of bus and rail services is important. Likewise, reports of accidents and congestion would aid in ease of travel by providing guidance towards the best mode of transport for the individual to use.
The future North East transport system must be reliable	Again, RTI is important, as up to date and reliable information allows informed decision making and more reliable journey times for passengers/road users overall.	The UTMC is able to provide real time information surrounding various aspects of transport and should make the networks more resilient.
The future North East transport system must be affordable	Pop cards, as an integrated ticketing service, could provide cheaper rates than paying for individual services by mode.	
The future North East transport system must be accessible	Information about all modes of transport could be made easily available in a number of ways by ITS solutions.	
Oversee a growth in economic activity	Accessibility through all modes of transport will support this initiative. This is inclusive of some of the factors outlined above.	UTMC contributions outlined for the above scenarios all apply here. However, generally the direct contribution of the UTMC to this overall goal is limited.
More sustainable travel	Encouraging public transport use through ease of access and cost delivers more sustainable outcomes, if people are being converted from owning personal vehicles.	ITS can provide valuable real time information to promote sustainable modes of transport.

Transport Manifesto	Possible ITS Application	Possible UTMC Contribution / Constraints
Less road congestion	Providing RTI, through the internet, directly to smartphones or by VMS, would allow route options to be considered if congestion was present along one corridor. Better coordination of traffic signals and improved signal plans could significantly improve traffic conditions within the area.	Queue lengths can be monitored, in addition to individual vehicle journey times, to give an accurate impression of congestion. RTI can be used to inform road users of this and encourage different route options in an attempt to relieve the congestion in this area. Adjusting signal timings can also allow priority to any corridor showing signs of congestion in an attempt to relieve queues.
Good access to workplaces, shops, services and leisure	Similar applications to those previously mentioned under the accessible transport systems heading, mostly surrounding information about public transport and the extent of this to reach out to wider communities.	
Encourage healthy, active lifestyles	Offering information for walking and cycling routes through city and town centres encourages this. Likewise, reducing the number of city and town centre vehicles on the roads will reduce emissions therefore Pop cards, or similar methods for the region as a whole, and further methods encouraging public transport use are important.	Air quality can be measured in some areas around the region therefore the impacts can be monitored to determine if any measures are making a clear difference to emissions.
Better air quality and lower carbon emissions	There are ITS applications to monitor air quality which can be utilised by the UTMC.	The UTMC can monitor air quality to observe any changes in level. Additionally, network management to reduce congestion and traffic queues will also have an effect on emissions and air quality. Encouraging public transport may also reduce emissions through mode changes by passengers.
Well maintained, climate-resilient and safe transport networks	ITS technology allows monitoring of the transport network through CCTV cameras to aid in identifying unsafe areas or areas that are in need of improvements.	UTMC has wide CCTV coverage over the region so can monitor safety and functionality of transport networks. Ice detection services can also be employed to aid in this.

Transport Manifesto	Possible ITS Application	Possible UTMC Contribution / Constraints
Efficient use of transport assets	Network management and RTI for public transport would enable all modes to be used efficiently.	This is possible through the UTMC, as congestion would need to be reduced and public transport use may need to increase in order for all modes to be deemed efficient.

2.1.3 NECA Authorities' LTP3s

LTP3 for Tyne and Wear 2011-21 was prepared by the Tyne and Wear Integrated Transport Authority, prior to its abolition. The LTP3 partners are Newcastle, Sunderland, Gateshead, North Tyneside and South Tyneside, and Nexus. County Durham and Northumberland currently have separate Local Transport Plans.

Similar to the previous tables, the key policies from the Tyne and Wear LTP3 are outlined alongside possible ITS applications and constraints that are within the scope of the UTMC below in **Table 3**. The themes of the Durham and Northumberland LTP3s are consistent with those outlined below.

Table 3: Tyne and Wear LTP3 Review

LTP3 Policy Outline	Possible ITS Application	Possible UTMC Contribution / Constraints
Aim for a fully integrated and sustainable transport network	Integration of tickets between public transport modes is a key aspect. Pop cards are therefore of high importance. In particular, moving to pay as you go on the Pop card will add to ease of travel, and hopefully and the integration of modes will be more seamless.	
Support efficient movement of goods within and beyond Tyne and Wear	Through network management, VMS, transmission of delay information of certain roads and improved communication and use of technology to share RTI movement of all vehicles through the region should become more efficient. Improved use of traffic signals, or adapted timings should also increase efficiency. Real time mapping could also be used for efficient visual updates.	Transport for the North are aiming for more freight to enter the UK through northern ports, therefore it is key that there are adequate facilities for this increase so that it can be managed effectively, and available 'freight friendly' maps are available and up to date.
A comprehensive network of pedestrian, cycle and passenger transport links - access for all to employment, training, community services and facilities	Good public transport is again necessary and therefore smart ticketing and integrated ticketing could offer improvements. RTI is also again important.	

LTP3 Policy Outline	Possible ITS Application	Possible UTMC Contribution / Constraints
Help people make more informed travel choices	RTI is the key to the success of this policy aim. The increased use of smartphones with internet access allows for up to date information. Electronic timetables and displays which update to reflect the current environment aid in decision making surrounding public transport. Parking guidance is also available, allowing public decision making on whether to take a personal vehicle, walk/cycle or choose public transport for a more efficient trip. Real time mapping could also provide a visual source of information which is easy to interpret for members of the public.	The UTMC can help the public make informed travel decisions through the application of RTI that it currently monitors.
Improve road safety	Speed cameras in places through the region can help maintain and enforce safe vehicle speeds. ANPR can also be used to identify any vehicles perceived to be driving in an unsafe manner, alongside CCTV.	
Improve personal safety	Again, speed cameras enforcing safe speed limits will have an effect on the safety of drivers, passengers, cyclists and pedestrians. For public transport users, CCTV can also make lone travellers feel more protected, although this is currently generally only available within Metro stations, and not in the surrounding areas or in all major transport interchanges.	May lead to an increase in CCTV coverage for the UTMC to monitor.
Keep the transport network in a good condition	Asset management analysis is available through the UTMC to continually assess the road environment and ensure the network is in good condition, while being able to recognise any deteriorating aspects of the network.	

LTP3 Policy Outline	Possible ITS Application	Possible UTMC Contribution / Constraints
Ensure good connectivity to major services	Efficient traffic signals, effective speed limits and VMS information can all contribute to congestion on particular roads, but used effectively they can manage the traffic system well and alleviate congestion, particularly if VMS information is communicated effectively.	
Provide safe and efficient travel flow for all modes	RTI given to passengers and drivers can make travel more efficient for all users. Traffic signal timings could also be optimised. Road user charging could also be implemented in an attempt to control network conditions and influence driver movement.	
Improve air quality, and support low carbon initiatives	In order to completely monitor air quality in transportation terms, the current air quality monitoring network may need to be expanded, but can be monitored by the UTMC.	
Invest in walking/cycling	CCTV for personal safety, particularly at night, on pavements and cycle routes may be needed.	New cycle routes may need an extension in the current coverage of CCTV.
Invest in public transport	Again, RTI is of high importance. Electronic displays with up to date timetable data could also be implemented and extended, although these are currently in place throughout the Metro system already.	UTMC cannot contribute to investment, but can influence the running and ensure investment in the right areas is optimised.
Improve transport networks and improve links to airports, ports, rail and motorway	An extension of network coverage to region-wide may be necessary in order to include all relevant transport hubs within the UTMC system.	

2.1.4 Tyne and Wear Congestion Reduction Plan

The 2007 Congestion Reduction Plan, updated in 2008, was a Tyne and Wear plan aiming to reduce congestion on a selection of the most heavily trafficked routes in the area. Many of these routes remain vitally important routes around the region. Clearly, with further development, greater traffic demands will be placed on these important routes, increasing the importance of ITS/UTMC measures contributing to more effective management of traffic. During the seven years since the most recent version of the Congestion Reduction Plan was published, technological advances have been made, and the UTMC is now much more capable of observing and managing traffic across this network of key routes. identifies the main priorities of the Tyne and Wear Congestion Reduction Plan, alongside selected highlighted improvements that were targeted at the time of the Congestion Reduction Plan's publication. Again, the possible ITS applications and UTMC contribution are outlined, alongside potential constraints on UTMC operation.

Table 4 identifies the main priorities of the Tyne and Wear Congestion Reduction Plan, alongside selected highlighted improvements that were targeted at the time of the Congestion Reduction Plan's publication. Again, the possible ITS applications and UTMC contribution are outlined, alongside potential constraints on UTMC operation.

Table 4: Congestion Reduction Plan Review

Congestion Reduction Plan Proposal	Possible ITS Application	Possible UTMC Contribution/Constraints
Oversee a reduction in congestion (along specified routes)	Parking guidance (faster parking, therefore reduced queues). CCTV/Strategic Network Management - real time queueing information available, then enabled to be passed on and communicated through internet/radio. RTI, VMS, internet. Reduce illegal parking i.e. in bus lanes. Specific congestion management signal plans could also be implemented.	Ensuring information is readily available and accessible, and that people know where to find it, is key. Also, analysis of whether any ITS measures applied are having the desired effect can be done by the UTMC.
Oversee a reduction in social exclusion	Ensure public transport is running effectively, again through reduction in congestion measures. Feeling of safety is also important, as fear is sometimes an influence on social exclusion, so CCTV, speed limits/cameras are important too.	As mentioned previously, if an expansion of the CCTV network is implemented this will also need to be connected into the UTMC network.
Improve the quality of life for people in the local area	Encourage value for money fares, ease of travel, possibly through Pop cards (or similar). Transport asset management is important, good quality roads, streets, bridges, and services encourage use, as well as walking and cycling, which in turn reduces congestion.	

Congestion Reduction Plan Proposal	Possible ITS Application	Possible UTMC Contribution/Constraints
Promote economic regeneration of the North East	Importance of highlighting recommended freight routes, to allow national and international links. Transport asset management maintains high quality services and roads etc. and can be monitored by UTMC.	Increased freight in the North is planned by TfN therefore this will have to be considered in traffic management, and in accessible RTI.
Improve highways	Similar to previously mentioned congestion reduction measures. CCTV coverage and asset management can also assist.	In addition to reductions in congestion, UTMC has asset management applications and can assess the suitability of highways for their purpose.
Improve rail services	Improve accessibility, personal safety through CCTV, ease of travel through integrated transport systems and potentially easier methods of payment such as direct contactless card payments.	
Improve bus services	Similar to above for rail services – RTI key to inform decision making.	
Improve freight partnership	RTI can help drivers make informed decisions surrounding routes, in addition to up to date freight maps. VMS signs can also offer indications of 'best' routes for freight vehicles.	UTMC can monitor traffic systems for build ups, and allow greater priority for those with delays. RTI given can also inform route choices.
Monitor and improve air quality	There are ITS applications that allow air quality monitoring.	UTMC can monitor air quality in some locations. This may need to be extended if required, or begin to integrate with other data sources that do monitor air quality over greater areas not covered by the UTMC currently.

2.1.5 *Network Management Plans*

Prior to the formation of NECA, each of the seven local authorities had developed a Network Management Plan as a legal requirement, in an attempt to evaluate traffic congestion in each area. Generally these documents considered the key routes within each authority boundary and also cross-boundary movements. ITS / UTMC influence would aid in better solutions for these routes. General issues from the Network Management Plans of the NECA authorities are outlined in **Table 5** below (where those NMPs were available), rather than issues on specific routes as found in the reports. ITS and UTMC applications that would support the aims of these plans are also identified.

Table 5: Review of Network Management Plans

Network Management Plan Proposals	Possible ITS Application	Possible UTMC Contribution/Constraints
To consider the needs of all road users	RTI and real time mapping could offer balanced options for routes, with VMS signs indicating the best routes for differing vehicle types e.g. cars, freight. Enforcement of bus priority could also be achieved through CCTV and ANPR technology.	UTMC is capable of these applications, but in reality some are more important than others. To fully enforce bus priority lanes and follow `rogue' users would be time consuming with greater network issues occurring.
To co-ordinate and plan works and known events	Traffic signals can be manipulated through ITS to allow priority to certain directions of travel, which could be useful for certain events in the region when the vast majority of travel is travelling to/from one area.	The UTMC is capable of managing the network in this way if required to, and if approached by the correct authorities for help and permission to carry this help out.
To gather information and provide information needs	Vehicle counts and class can be determined through ITS measures, in addition to CCTV and ANPR measures being used for other services. This can be output as information to road/public transport users to notify of journey times, congestion, PT arrival times and parking availability, to inform travel decisions. RTI and real time mapping can also support this.	Again, all methods mentioned are within the capability of the UTMC in its current state.

Network Management Plan Proposals	Possible ITS Application	Possible UTMC Contribution/Constraints
To develop contingency plans for managing incidents	Priority traffic signals towards hospital departments could have majorly beneficial effects if implemented. The European eCall system could also be implemented if present in new vehicles, to automatically ring the emergency services if an incident is detected.	The eCall system is far from being ready to implement in the UK, however the UTMC can aid in traffic signal control and allow priority to emergency vehicles.
To effectively monitor and manage traffic growth	Vehicle counts enable traffic growth to be monitored and calculated. ANPR and vehicle counts in car parks can also help to gauge the level of occupancy of city centre spacing by vehicles. Road user charging could also be implemented to manage traffic growth if needed.	Traffic counts and parking occupancy can be monitored by the UTMC.
To consult and involve stakeholders and other interested parties	No real ITS involvement.	No UTMC involvement.
To ensure parity between the local highway authority and others	No real ITS involvement.	No UTMC involvement.

2.1.6 New Developments/Schemes

There is a need to consider new schemes included in the Local Growth Fund which could benefit from the inclusion of ITS technology. ITS support may be referred to in the business cases for these projects, promoted recently by individual authorities. Therefore, the possible expansion of the UTMC will be necessary, and may require new road systems or traffic signals to be included in the UTMC database, without which, the full benefits of individual schemes may not be realised. Additionally, further CCTV may need to be linked into expanding/new transport hubs and stations. **Table 6** highlights the possible UTMC components that could supplement these new schemes (Phase 1 Growth Fund Schemes). A list of future longer term schemes seeking potential Growth Fund finances is given as Appendix A. Some of these could also benefit from ITS UTMC interventions.

Table 6: Regional Growth Fund Schemes Review

Scheme	Possible UTMC Components
1 – Horden (Peterlee) Station	In-station CCTV may be necessary, and be connected to UTMC network. Public transport information also needed, e.g. timings - to inform RTI for passengers.
2 - A167 Park and Ride Corridor	Route needs to be monitored through RTI alongside public transport for journey times to give people a good idea of which option is the most efficient for them. This could be provided through the UTMC. VMS signs could also be used. Parking occupancy at the park and ride centre could additionally be monitored, and information released to the public.
3 – Low Carbon Zone Infrastructure	Air quality monitoring is possible through the UTMC, therefore this area could be included in the range the UTMC covers and may require an extension of UTMC monitors. ANPR could be used to identify high carbon emitting vehicles, with CCTV to enforce the low carbon zone. Any new or changed signals will need to be added / modified in the UTMC base. UTC could be included around the area to best manage traffic demands.
4 – A19 / A194 / A1300 Lindisfarne Roundabout	Key route, therefore congestion can be monitored and journey times derived. Signal timings will also need to be modified in the UTMC database to update them, and allow access to modify these at peak times in case of congestion.
5 – Direct link from Newcastle Central Station to Stephenson Quarter	UTMC will need to be notified of new signal timings and have influence on these in case of emergency situations, as access to the RVI is nearby and for busy events (e.g. at the Metro Radio Arena or St James' Park) emergency vehicles may need priority.
6 – A1 Corridor local network works – Scotswood Bridgehead Improvements	UTMC will need to be notified of any signal changes. Journey times could also be derived for this route into the city.

Scheme	Possible UTMC Components
7 – Central Metro Station Refurbishment	For a major interchange such as this, CCTV may need to be in operation and connected to the UTMC. Also may present greater opportunities for the display of RTI after the refurbishment, across modes.
8 – A194 / A185 (The Arches) Junction	UTMC could produce journey time advice with access to queues and traffic movement (with regards to Tyne Tunnel use). Improved/modified signals would also have to have UTMC inclusion. Real time information to inform public behaviour could be given, in the form of VMS.
9 – Northern Access Corridor, Cowgate to Osborne Road	Possibility of monitoring bus lanes to ensure public transport runs on time. The UTMC will need to be notified of new signal locations and timings.
10 – South Shields Transport Hub	Allows for integration of ticketing, and of information between modes. CCTV for Metro and Bus centres within the hub is necessary and would need UTMC links. RTI is important in an area such as this therefore monitoring of PT could be beneficial.
11 – Northern Access Corridor, Osborne Road to Haddrick's Mill	Congestion can again be monitored through assessment of vehicle numbers. Signal locations and timings also need to be linked to the UTMC.
12 – A19 Employment Corridor Access Improvements	VMS could inform access options for journey times, and for road users. Again, signal timings need to be linked to the UTMC.
13 – A191Jjunctions including Coach Lane and Tyne View Park	UTMC needs to be updated with all signal aspects of the scheme.
14 – A1058 Coast Road Major Scheme (Billy Mill – Norham Road improvements)	All signals will need to be linked into the UTMC. VMS can also be used to display travel time information for routes into Newcastle/navigation of the Tyne Tunnel.
15 – A1056-A189 Wearside Roundabout Improvements and A1 - A19 Link (A1056)	UTMC needs to be updated with all signal aspects of the scheme.

2.1.7 *Transportation Objectives*

Following this review of policy relevant to the NECA area and the use and deployment of UTMC and ITS interventions, the main themes arising from the documents, in respect of transport, can be summarised as follows:

***NECA Priorities*:**

- Support economic development and regeneration
- Connectivity to all locations for all travel purposes
- Congestion reduction
- Investment in all modes – to improve highways, public transport, walking and cycling

Supporting/Secondary Priorities:

- Informed travel choices
- Improved safety
- Improved air quality
- Low carbon technologies

Monitoring and Management

- Network monitoring
- Incident/event planning and management

2.2 Draft Network Management Statement

Through the policies and strategies reviewed, the North East Combined Authority (NECA) sets out how the transport network within the area can be managed to best meet regional objectives. Comprising the areas of Tyne and Wear, Northumberland and Durham, the efficient movement of people, goods and services is a key priority. ITS is already used as a tool for managing travel in the region; however there is scope to develop this further through enhanced and increased provision.

NECA recognises the importance of connectivity between diverse areas of the region, with transport acting as an enabler for access to employment, education, shops, health, leisure and other key destinations; as well as facilitating freight and business traffic.

The first step in effectively managing the network is the agreement between partners to the extent and scale of the network to be managed. NECA will support the agreement in relation to network coverage.

With the network outlined, the focus will turn to ensuring the network management is aligned to the regional priorities.

The main regional priority is the commitment to achieving economic growth and regeneration through the attraction of increased employment opportunities and the upskilling of the workforce. This is to be supported by the development of quality housing stock and the other supporting services, such as an enhanced retail and leisure offer. Growth invariably brings new

challenges to any network; more people and changing travel behaviour. Therefore, managing the network is essential in order not to stifle prospective growth.

The region's roads can be congested in particular locations and at certain times of the day. Making the best use of the current infrastructure is a priority, supported by localised investment in instances with serious congestion problems. Design solutions, with ITS, should become mainstream, therefore improving the operation of the network across the region without the need to fulfil extensive and costly capacity improvements. This includes the provision of routing decisions, information dissemination and advanced warnings, resulting in congestion reduction which brings economic benefits for the region and minimising travel time for the individual.

With the environmental impacts of travel becoming increasingly prominent, methods to achieve carbon reduction and air quality improvement are becoming more important. Enhancements in the use of ITS can be used to capture data associated with low emission zones and as an enforcement mechanism to ensure compliance.

Beyond the use of the private car, there is a requirement for investment in public transport, comprising bus, Metro and rail services. A quality public transport network should be attractive to users, both for those travelling on a regular basis and those who use it on an occasional or infrequent basis. Solutions to improve public transport travel within the region are already being seen by passengers, including integrated ticketing and passenger display information. Further improvements through the use of technology across a wider area and beyond key hubs and interchanges can only improve passenger experience.

Crucially, the use of ITS and UTMC will support the regional priority for improved and facilitated connectivity between the key regional centres and the region's ports and airports, cementing the North East's status as an outward facing locality and to supporting the attractiveness of the region for economic investment. Indeed, the maintenance and enhancement of the freight network within the North East is vital; supporting existing jobs and businesses while facilitating future planned development.

Understanding when and how to travel; which time of day and which mode to use; should be a simple decision. Enabling informed travel choices, allows more efficient movements and expanded travel horizons. Journey planning, mobile data and real time information are mechanisms for making information accessible to the widest audience, preventing the exclusion that can be a a barrier to travel.

Irrespective of mode choice, the ability to travel safely is paramount. Observing movement through the use of CCTV and other mechanisms and providing information to those travelling enables people to travel through the region with confidence.

Understanding the operation of the network improves the ability to effectively manage it. The use of technology as a mechanism for monitoring the network assists with day to day operations, in addition to event planning/incident management. Resilience planning over the longer term is also a fundamental requirement of any sensible transport strategy.

The effective management of the transport system enables an operational system that works to the advantage of the region.

UTMC Best Practice Review

03

3 UTMC Best Practice Review

3.1 Introduction

Intelligent Transport Systems (ITS) provide tools for achieving transport policies on local, regional and national transportation networks. ITS provide services using Information and Communications Technology (ICT). ITS collect information about the current state of the transport network, process that information, and either directly manage the network (e.g. traffic signals), or allow people to decide how best to use the network (e.g. incident detection, travel news).

The organisational framework in which ITS operate are of equal importance to the technology. ITS are an ICT tool to support delivery of transport policy and like all such tools, needs to reflect the organisations' requirements, structures, staffing and locations. ITS services should therefore be considered to be both the technology system and the organisation that uses it.

In recent years there has been a significant shift on dissemination of traveller information to personal devices, such as Smart Phone, Tablets, etc. These services are general provided by a third party via Apps, which source open data from the central management systems (UTMC). The importance of this shift in the method of disseminating information needs to be addressed in any review of future service provision.

NECA, like many regions around the world, has significant transport challenges, many of which relate to rapidly increasing levels of private car ownership, combined with a number of other factors which contribute to congestion on the urban transport network. These challenges are set against a backdrop of reduced funding and limited operational budgets.

3.2 Selection of Long List of Interventions

Best practice in the application of ITS and UTMC demonstrates the importance of ITS services. This reflects the policy objectives for the transport network and demonstrates the synergy of ITS with other transport interventions (e.g. infrastructure, public transport operations). ITS offers the opportunity to integrate some or all elements of transport network management and operations, thereby providing benefits that are greater than those achieved through standalone systems.

The development of effective ITS therefore, requires a development and implementation strategy that reflects policy objectives and identifies the steps required to develop ITS assets over time to implement an integrated system.

The policy review set out in **Section 2** clearly sets out the relevance of UTMC and ITS to the priorities of NECA and the NECA authorities. ITS is required in the NECA area to address the transport challenges facing the region, which include the impacts of traffic congestion and network resilience. ITS should always complement other transport interventions in helping to manage network demand and optimise operations.

The following services provide a long list of possible UTMC and ITS interventions which could be applied across all or parts of the NECA region:

- Adaptive Traffic Signal Control
- Electronic Transit Fare Payment
- Public Transport Management
- Active Traffic Management
- Parking Management
- Incident Management
- Traveller Information (public transport)
- Traveller Information (driver)
- Freight Transport
- SMART Applications (Mobile Phone, Tablets, etc.)
- Weather and environmental conditions monitoring
- Demand Management

3.3 Review of Best Practice

The following table provides an overview of the best practice application and deployment of the ITS and UTMC services identified in Section 3.2.

Table 7 provides a description for each of these interventions, an indication of the possible level of benefits from each of these interventions and real world examples where these interventions have been deployed and have delivered identifiable and discernible benefits.

Table 7: ITS / UTMC Interventions

Services	Description	Benefits	Example
Adaptive Traffic Signal Control	Traffic technology solutions are used in nearly every major city throughout the world. Technology improvements have allowed the development of sophisticated methods to operate networks to resolve the conflicting demands of road users. A key benefit of Urban Traffic Control (UTC) solutions is that they are low cost and quick to implement requiring negligible construction work or additional land. UTC solutions are flexible and can be used to manage congestion, prioritise buses and provide safe crossings for pedestrians and cyclists. UTC is also used strategically to manage access and priority over the wider highway network to support strategic transport objectives.	Reductions in junction delay (5-20%) Reduced traffic accidents (10-20%) Improved bus journey times (20-30%) Increased capacity (10-15%)	**UTMC in Cities UK Wide:** UTMC is employed in town and cities across the UK. Local authority control centres can actively manage their networks using the integrated traffic controls that are part of the system. **MOVA:** Real time optimisation of traffic signals, that maximises capacity, whilst minimising delay, providing benefits over conventional vehicle actuation, reduction in casualties and a reduction in red light violations.
Active Traffic Management	In many locations it is often not physically possible, or sustainable to increase road capacity through traditional road construction. Active Traffic Management (ATM) is a best practice solution that can maximise the use of existing capacity on major highways and strategic roads, whilst minimising construction requirements and timescales. In addition, ATM has a role to play in the management and operation of the wider network.	Reduction in accidents (50%) Increase in journey time reliability (20%) Reduction in emissions (10%) Increased access control (5-10%)	**M42 ATM, Birmingham UK**: This scheme maximised the capacity of the existing network with minimal construction requirements. ITS technology is used to control the flow of traffic, opening the hard-shoulder for additional capacity at peak times. Active Traffic Management is now in place across the most congested parts of the Highways England network. **A38(M) Aston Expressway, Birmingham**: Tidal flow management

Services	Description	Benefits	Example
			with lanes allocated via electronic overhead signs in the morning and evening peaks making best use of existing capacity managing demand and smoothing flow within the available corridor width. There is a fixed 50mph speed limit.
Public Transport Management	Highway and transit authorities across the world recognise buses as being a key element of the public transport system with proven potential for reducing traffic congestion and supporting a sustainable approach to transport. Bus lanes, traffic management and other infrastructure measures increase the attractiveness of buses by improving both journey time and reliability. However, for buses to compete as a real alternative to the car it is important that bus passengers have a quality experience from making their decision to travel to arriving at their destination. This user-focused approach is called the whole journey concept.	Peak hour mode shift (15%) Journey time improvement (30%) Reduction in accidents (80%) Increase in ridership (70%+) Reduction in emissions (40%) The whole route concept includes: Decision to travel — travel planning and passenger information systems. Journey to and from bus stop — maintained footways, safe pedestrian crossings, street lighting, way finding to key destinations. Bus stop/interchange — sheltered, comfortable, passenger information, safety and security, local map and information, way finding to key destinations. Boarding and alighting bus — level access, smart ticketing. Bus journey — clean, comfortable, safe, secure vehicle, on board travel information, customer focused staff. Bus lanes, priority systems, traffic management and other bus infrastructure measures. Supporting measures — activities to define and market a brand image for the quality bus services. Staff development	**TransMilenio, Bogata, Colombia** – This BRT system carries 90,000 passengers per hour and includes features such as passing places and stations with multiple stops. This customer focused approach has led to a very high passenger approval rating and a large reduction in accidents **Quality Bus Partnership, Dublin, Ireland** – A complete overhaul of bus services along several key routes, with extensive priority, high frequency service, new high quality vehicles and improved infrastructure, providing an increase in trips and users, with a decrease in bus journey times. Advanced Vehicle Location – Detection of priority vehicles running behind the scheduled timetable, using satellite location technology and wireless communications to relay location back to a central automated control system that is able to initiate traffic signal priority plans designed to get the vehicle back on timetable.

Services	Description	Benefits	Example
		and training to improve customer service.	
Traveller Information (Public Transport)	Passenger expectations have risen greatly over the past five years. Whether it is for increased services, cleaner vehicles or more accurate information, passengers rightly demand the highest in quality services to enhance their journey experience. Key to this information are real time passenger information (RTPI) systems, which provide accurate departure and arrival times, enabling travellers to plan their journeys and thus make better use of their time.	User satisfaction (90%) Increase in ridership (5%) 2:1 benefit to cost ratio	**Centro RTPI West Midlands, UK**: This RTPI system tracks 2,000 buses and uses 1,900 real time information displays. Key benefits include: high passenger approval rating; patronage increase; and journey time improvements.
Traveller Information (Driver)	Technology systems helping all users of the road network to make informed travel choices.	Better informed travellers & travel choice Journey time improvement (5-10%) Modal shift to public transport (5-15%)	**Traffic Scotland, UK**: Distribution of live traffic and travel information through message signs on the highway, CCTV & incident updates via smartphones and internet based forms and online travel planning. Live Traffic New South Wales, Australia – Dissemination of live traffic information online, via mobile devices and roadside variable message signs
Parking Management	Unregulated parking creates a significant burden on the efficiency of the urban road network, impeding through and priority traffic, unnecessary congestion due to space searching and atmospheric / noise pollution. Whilst gaining control of city centre parking is a primary tool for demand management,	Better balance of car park usage. Parking restrictions encourage modal shift to public transport Accompanying reduction in traffic volume Reduction in traffic congestion and circuitous parking space searching Improved local environment including air quality Reduction in illegal and inappropriate	**Perth Parking Management, Australia:** New parking policy created a balanced transport system. A parking levy/tax on non-residential bays was introduced along with maximum parking limits imposed on new developments. No additional parking is now permitted in certain zones **City Wide Parking Management, Abu**

Services	Description	Benefits	Example
	it can also be used as a tool in encouraging parking turnover for the benefit of the economy or influencing other goals, such as prioritising parking for particular groups such as residents, visitors or employees.	parking Support for local businesses Potential for reliable revenue streams	**Dhabi, UAE:** Rapid development growth had placed significant demands and problems on the city, similar to any modern western city, creating a unique opportunity to adopt a completely modern solution.
	As traffic increases in cities and metropolitan areas the regulation and enforcement of both stationary and moving traffic has become an increasingly important tool in tackling congestion and managing driver behaviour. High and increasing car ownership results in large volumes of illegally and indiscriminately parked cars on city streets and arterial routes. This contributes to rising traffic congestion, road safety issues and limited availability of kerbside space for legitimate loading, servicing and access activities. Over the past 10 years many countries and states across the world have challenged their established practices for implementing and enforcing traffic regulations and have developed a regime that better meet the needs of today's traffic and travel demands. In many locations these improvements have been developed alongside other measures such as bus priority schemes and traffic control systems to create an integrated solution that maximise benefits.	Reduction in travel time (11%) Increase in bus use (10%) Improvement in general reliability (20%) Reduction in road accidents (20%) Reduction in bus travel time (25%) Improvement in bus reliability (35%) Increase in general traffic flows (1flows (10%)	**Decriminalised Parking Enforcement, UK Wide:** Historically, parking violations have been a criminal offence in the UK. Local highway authorities now have the power to decriminalise these offences and take on board the enforcement Red Routes, London, UK – High impact regulation across 500km of key routes, maximising road space and improvements to junctions and crossings. Provided 25% improvement in journey times, 33% improvement in journey time reliability, improved traffic flow and reduced accidents.

Services	Description	Benefits	Example
Transport Related Incident Management	As transport networks approach capacity minor incidents or events can have a significant impact on transport disruption. Gridlock and secondary incidents are commonplace in many cities causing extensive disruption for several hours. Possible diversion routes can also be congested so traffic cannot avoid the incident and as the traffic queues build up, driver frustration will increase. The development and application of proactive incident and event management is therefore a critical component of an effective network operations strategy in congested areas. Many measures to achieve this can be implemented quickly and at relatively low cost compared to large scale infrastructure investment programs.	Early identification of incidents leads to faster response Traffic control (gating, ATM and ramp metering) can reduce incident created congestion	**Managed Motorways, UK:** Dynamic traffic control of traffic on major motorways, using a tool box of measures including, hard shoulder running, variable speed limits, queue protection, lane specific signalling, ramp metering and integrated traffic management. Reducing incidents, up to 26% reduction in journey time, 50% reduction in accidents, 98% compliance with speed limits. **Road Rangers, Florida, USA:** Dedicated 24/7 incident response, able to rapidly manage incidents, clearing incapacitated vehicles and getting the network back to full capacity as quickly as possible.
Policing/ Enforcing Traffic Regulations	Automated road safety systems, covering speed management, warning systems and driver information have successfully contributed towards a significant reduction in casualty rates and severities. Experience in the UK has demonstrated that a considered approached to deployment increases the success of each installation, focuses installations where the results can be objectively measured and avoided over proliferation of equipment that would reduce the impact of installations and become a larger than	Reduction in the proportion of vehicles exceeding the speed limit (72% at fixed urban sites) Reduction in the proportion of vehicles exceeding the speed limit by 15mph or more (94% at fixed urban sites) Reduction in people killed or seriously injured (47-62%)	**Knoxville, Tennessee, USA**: red light enforcement using cameras to capture rear licence plates of offenders, backed up with video coverage. Resulted in 18% reduction in collisions at junctions, cost neutral through fines collected. **Vehicle Activated Signs, Queensland Australia:** Various signs were tested including speed limit and junction or curve warnings. Speed and accident reductions were immediate and sustained at test sites on the highway network.

Services	Description	Benefits	Example
	necessary maintenance burden.		
Freight Transport	Sustainable and efficient freight strategies in urban areas aim to promote best practice in freight operations through practical planning and application. The strategies help to maximise available resource and increase cost-effectiveness of freight operations, whilst reducing the impact on society and environment. The Freight Best Practice programme in the UK has alone produced yearly savings of £50,957,833 to the freight industry and reduced the level of CO2 by 148,883 tonnes. Sustainable and efficient freight strategies rely on research to explore and understand the issues and to help make the most appropriate decisions for the specific locality. They then rely on partnership and buy-in which is achieved by engaging with the relevant national and local stakeholders. Once these foundations are set and a framework or plan of action is in place, then the strategy can be successfully delivered bringing about practical change. Through monitoring the strategies the improvements and successes can be captured enabling further improvements to be made.	Fuel saving (5-15%) Fuel saving (5-15%) Reduction in trips (10-20%) Increased load utilisation (10-20%) Reduced congestion Reduction in atmospheric pollution and carbon emissions.	**London Consolidation Centre, UK:** Central distribution of materials for numerous construction companies, providing efficient, effective, timely and safe management of deliveries, reducing congestion, fuel costs, carbon emissions and accidents. **Masterplanning, , Abu Dhabi, UAE:** Investigation of freight use through surveys, the creation of regulation and policy through a well-informed knowledge base to create safer and more efficient movement of freight with consideration of future development and growth in road, airport and port infrastructure.

Services	Description	Benefits	Example
Road Transport-Related Personal Safety	Walking and cycling interventions are proven as quick to implement and cost-effective solutions to reducing car dependency and promote mobility in urban areas. Furthermore, they also tend to be quicker and lower cost alternatives to the car for many short trips. Pedestrians are the most vulnerable group of road users, particularly the young and the elderly. It is essential to consider their needs within the transport system to give them equal and sometimes greater consideration than other road users. As all road users are pedestrians for at least part of the journey, routes to transport access points should be made safe and attractive	Quick to implement Cost-effective solutions Reduction in car dependency Promote mobility in urban areas Quicker/lower cost alternatives for many short trips	**Cycle Superhighways, London, UK:** Whole route approach, providing 15km of priority route across 12 corridors, increasing peak cycle flow and rider confidence, whilst reducing congestion, overcrowding on public transport and emissions. **Aarhus, Denmark:** Cycling in Denmark could now be more efficient than ever pending a trial where bikes are fitted with RFID tags that allow cyclists to breeze through red lights without even slowing down as they approach by turning them green. The tags, fitted to around 200 bicycles so far, turn red lights green when cyclists approach one intersection in Aarhus, Denmark.
Demand Management	Transport Demand Management techniques are the collective term for measures which aim to reduce or remove the need to travel, alter the time of travel, encourage changes towards travel via more sustainable modes, or arrangements that make more efficient use of the existing infrastructure. The approach applies equally to personal transport as freight transport. It is important that Demand Management measures do not reduce accessibility or impinge negatively on the economy, as most often journeys result from a need to travel.	More efficient use of a limited network or travel resource	**Electronic Road Pricing System, Singapore:** On-board units with cash communicate with roadside beacons to deduct charges. The system has resulted in 25,000 less vehicles during peak periods; 13% less traffic in CBD; car parking increased; and trips shifted from peak to non-peak. **SFpark, San Francisco:** uses demand-responsive pricing to open up parking spaces on each block and reduce circling and double-parking. SFpark charges the lowest possible hourly rate to achieve the right level of parking availability. In areas and at times where it is difficult to find a

Services	Description	Benefits	Example
			parking space, rates will increase incrementally until at least one space is available on each block most of the time. In areas where open parking spaces are plentiful, rates will decrease until some of the empty spaces fill.
Weather and Environmental Conditions Monitoring	As traffic and congestion increases, there is a direct impact on local air quality and longer term impacts on energy and carbon use. Freight vehicles have a disproportionate effect. Effective demand management, enforcement and provision of alternatives can minimise and reduce the impacts.	Net reduction of exhaust particulate and NOx emissions (10-20%) Reduction in SO2-concentrations A decrease in traffic (5%) Reduction in the oldest and most polluting vehicles from the controlled area	**Low Emission Zone, Berlin, Germany**: This example covers an area of 88 km2, and one third of the city's inhabitants live within the zone. Both a monetary and traffic registry penalty are enforced within the zone with local authorities able to retain the income from the penalties. **Alberta Road Weather Information System, Canad**a: network of 76 road weather stations monitoring conditions at and above the road surface allowing real time planning of winter maintenance activities.

3.4 Selection of ITS / UTMC Short List

A five point scorecard has been developed to indicate the importance of individual UTMC services in delivering network and operational benefits across the whole of the NECA region.

It is important to note that this assessment is focussed on the ability of the UTMC to influence these network improvements, rather than relating to the overall importance of these activities for NECA.

Score	Category
A	CAT A: Essential – Interventions that are consider essential to the management of the network and are fully within the control of the UTMC.
B	CAT B: Desirable - Interventions that are consider desirable to the management of the network and are fully within the control of the UTMC.
C	CAT C: Aspirational - Interventions that are consider aspirational to the management of the network and are fully within the control of the UTMC.
D	CAT D: Interventions that are consider beneficial to the management of the network, but are mainly out with the control of the UTMC.
E	CAT E: Intervention that are not supported by UTMC or are best served as standalone systems.

This scoring system has been applied to the application of UTMC service across the NECA region; this is based on a “blank canvas” approach, disregarding at this stage what existing services are already in place and how these services are performing, (the performance of existing system will be assessed prior to the Gap Analysis).

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Table 8 below provides summary of the assessment of the proposed long list.

Table 8: Summary of Long List

ITS Service	Score	Criteria	Justification
Adaptive Traffic Signal Control	**A**	Interventions that are considered essential to the management of the network and are fully within the control of the UTMC.	Expansion / upgrading of traffic signals to Adaptive Traffic Control (e.g. SCOOT) will deliver significant benefit in the NECA urban cores; although there will be no significant advantage or benefit in the rural areas.
Active Traffic Management (e.g. Variable Speed Limits)	**D**	Interventions that are considered beneficial to the management of the network, but are mainly out with the control of the UTMC.	The responsibility for this activity falls mainly within the remit of Highways England; the key aspect for NECA would be the enhancement of the information exchange between the UTMC and NTIS. Ongoing work on the CHARM commission may provide significant opportunities to improve linkages between the two systems.
Public Transport Management	**A**	Interventions that are considered essential to the management of the network and are fully within the control of the UTMC.	The provision of enhanced bus services (e.g. reliability of services) will be a shared collaborative activity with NEXUS and Bus Operators. The provision of a high quality public transport network has strong alignment with NECA's core objectives.
Public Transport Real Time Information Systems	**D**	Interventions that are considered beneficial to the management of the network, but are out with the control of the UTMC.	The responsibility for this activity falls mainly within the remit of NEXUS; the key aspect for NECA would be the provision of high quality, reliable bus network across the region.
Traveller Information (on-route: VMS / Journey Time)	**A**	Interventions that are considered essential to the management of the network and are fully within the control of the UTMC.	Ongoing expansion of VMS provision across the region; identification of additional strategic locations established. Combined with social media feeds, will continue to be main dissemination methods in the short-medium term.
Freight Transport	**C**	Interventions that are considered aspirational to the management of the network and are fully within the control of the UTMC.	Significant freight movement across the whole region; including logging activity in the rural areas. Provision of specific ITS interventions responsibility of freight operators – network condition would disseminate as part of wider information provision (e.g. VMS, Internet services).

ITS Service	Score	Criteria	Justification
Demand Management	E	Interventions that are not supported by UTMC or are best served as standalone systems.	Durham Congestion Charging scheme provides measureable benefits in reduction of congestion along a key route; however it is unlikely that any additional provision would be considered in the short – medium term.
Parking Management	B	Interventions that are considered desirable to the management of the network and are fully within the control of the UTMC.	The development of Car Parking Management System will deliver benefits in the core urban areas; however, will have no impact on the wider region – there is ongoing development in this area.
Transport Related Incident Management	D	Interventions that are considered beneficial to the management of the network, but are out with the control of the UTMC.	Incident management relates mainly to major inter-urban routes; there may be some routes under NECA control that would benefit from this deployment; the key aspect for NECA would be the enhancement of the information exchange between the UTMC and NTIS on major incidents on the Highways England network.
Policing / Enforcing Traffic Regulations	D	Interventions that are considered beneficial to the management of the network, but are out with the control of the UTMC.	UTMC can support the policing and enforcement of traffic regulations, but is not considered a core function – activities should reside with other departments (e.g. parking enforcement resides with parking operation teams).
Road Transport-Related Personal Safety (Pedestrians & Bicycles)	E	Intervention that are not supported by UTMC or are best served as standalone systems.	Active traffic is a key objective for the NECA; however there are limited UTMC services that would support these interventions. Available technologies to support this service are typically standalone and should be consider outside the remit of the UTMC service.
Weather and Environmental Conditions Monitoring	B	Interventions that are considered desirable to the management of the network and are fully within the control of the UTMC.	Enhanced weather information would significantly benefit the network operations during the winter months; remote image capture on web sites would provide additional customer service. Air quality information would enhance the management of core urban areas – potential linkages to the adaptive traffic signal provision,
Internet Services (Social media / pre-trip information)	A	Interventions that are considered essential to the management of the network and are fully within the control of the UTMC.	Key means of disseminating traffic and network information across the whole region and covering various transportation networks and modes – very cost effective service provision.

ITS Service	Score	Criteria	Justification
SMART Application	**B**	Interventions that are considered desirable to the management of the network and are fully within the control of the UTMC.	Services are typically provided by third party agencies; the key aspect for NECA would be the provision of access to open source data on traffic / network conditions via the UTMC service.

Based on the above assessment the following services are rank in ascending order of importance for NECA.

Table 9: Intervention Rankings

Ranking	Interventions	Comments
A Interventions that are considered essential to the management of the network and are fully within the control of the UTMC.	• Adaptive Traffic Signal Control • Public Transport Management • Traveller Information (VMS / Journey Time) • Internet Services	Core services that will deliver significant benefit across the NECA region. They will assist in the delivery of the Network Management Statement and support individual major scheme proposals.
B Interventions that are considered desirable to the management of the network and are fully within the control of the UTMC.	• Parking Management • Weather / Environmental Systems • SMART Application	Services that will contribute to enhanced network operating conditions.
C Interventions that are considered aspirational to the management of the network and are fully within the control of the UTMC.	• Freight Information	Freight interventions would mainly be delivered by the freight operators, with UTMC support.
D Interventions that are considered beneficial to the management of the network, but are mainly out with the control of the UTMC system.	• Active Traffic Management (VSL) • Public Transport Information • Incident Management • Enforcement	Services provided by others, with possible system links with UTMC.
E Intervention that are not supported by UTMC or are best served as standalone systems.	• Demand Management • Personnel Safety (pedestrian / cyclists)	Standalone systems / services, with no intervention from UTMC required.

Interventions classified as CAT A / B will be considered as the short list of key ITS and UTMC service requirements for the NECA region.

3.5 Assessment of Interventions Against Objectives

The following UTMC services have been assessed as key for supporting the delivery of enhanced network performance within the NECA region.

- Adaptive Traffic Signal Control
- Traveller Information
- Parking Management
- SMART Application
- Public Transport Management
- Internet Services
- Weather / Environmental Systems

3.5.1 Draft North East Combined Authority (NECA) Statement

The North East Combined Authority (NECA) statement "Our Journey" set out a twenty year manifesto for the North East, with the objectives to provide attractive, reliable, safe, healthy transport choices for businesses, residents and visitors while enhancing the environment. This statement provides a framework for investment in intelligent transport systems over the next 20 years. NECA's intent is to fully maximise the development of technologies and exploit the existing investment in Urban Traffic Management and Control Systems to support the delivery of the four key themes identified within "Our Journey":

- Easy to Use: It should be easy to plan safe journeys, find out the best way to travel, pay for tickets and get all the essential information for your journey;
- Reliable: The transport network should be one that we can rely on to work, with buses and trains running on time and congestion at a minimum;
- Affordable: The cost of travelling will not be a barrier to commuting, learning or exploring; and
- Accessible: Transport should run as near as possible to where people live and want to travel to, and where businesses are (or want to be) located. It should be usable by everyone including people with disabilities.

This statement sets out NECA's response to the opportunities presented by ITS to support the delivery of these four key themes. New technologies offer exciting developments that can transform the way the transport network is planned, invested in and managed.

Score	Criteria
5	The service will provide a major and added value contribution in delivering the key themes.
4	The service will provide a major contribution across most of the areas within the key themes.
3	The service will contribute to delivering in core areas of the key themes.
2	The service provides some benefits in delivering the key themes.
1	The service has a negligible contribution in delivering the key themes (contribution could not be measured)

Table 10 assesses how well each these interventions score against the key themes.

3.6 - Assessment Against Objectives

Table 10: Assessment Against Objectives

Key Themes	Adaptive Traffic Signal Control	Public Transport Management	Traveller Information (VMS / Journey Time)	Internet Services	Parking Management	Weather / Environmental Systems	SMART Application
Easy of Use							
Integrated Transport Systems	2	5	4	5	2	1	5
Enhanced Traveller Information	2	1	5	5	1	3	5
Improved Parking Information	1	1	5	5	5	1	5
Reliable							
Improving Conditions for All Road Users	5	4	1	1	2	2	1
Improving Traffic Management	5	3	4	3	3	2	3
Improving Efficiency of all Transport Networks	5	4	3	3	3	2	3
Improve Traffic Safety	3	4	4	3	2	3	3
Affordable							
Improve Conditions for Non-Motorised Traffic	2	4	1	1	1	1	1
Improve Conditions for Pedestrians	2	1	1	1	1	1	1
Accessible							
Encourage Public Transport Usage	5	5	3	3	1	2	3
Scoring	32	32	31	30	21	18	30
Ranking	1st	1st	2nd	3rd	4th	5th	3rd

3.7 Ranking

The short list of interventions is ranked in **Table 11** below in terms of their ability to support and deliver the key themes of the Network Management Statement:

Table 11: Short List of Interventions

Ranking	UTMC Interventions	Score	Category
1st	Adaptive Traffic Signal Control	32 pts	A
	Public Transport Management	32 pts	A
2nd	Traveller Information (VMS / Journey Time / etc.)	31 pts	A
3rd	Internet Services	30 pts	A
	SMART Applications	30 pts	B
4th	Parking Management	21 pts	B
5th	Weather / Environmental Monitoring	18 pts	B

The assessment indicates that Adaptive Traffic Signal Control and Public Transport Management scores best when measured against the NECA objectives, closely followed by Traveller Information Services (VMS, internet, etc.). These interventions are part of a cluster of five interventions that have good alignment with the current objectives.

Those interventions that score less well are Parking Management and Weather / Environmental monitoring. This does not mean that these interventions do not produce network benefits; it simply means that there is less of an alignment with the current NECA objectives.

In the following section, the report considers the effectiveness of the existing system against these core services.

Review of Existing UTMC Provision

04

4 Review of Existing UTMC Provision

4.1 Introduction

Long-term system operations is fast becoming a priority focus area for many transportation authorities, leveraging and protecting the investment authorities have made in Intelligent Transport Systems. The North East has already made significant investments in ITS. The region currently has two UTMC systems providing network management and control interventions across six of the seven local authorities within the region.

4.2 Stakeholder Engagement

Previous engagement with the key stakeholders across the region, undertaken by White Young Green[1] in 2015, identified that whilst the existing UTMC systems were already being used to deliver a number of significant network benefits, there was opportunity to make more effective use of the existing systems and targeted key enhancements. Common themes from the previous engagement covered:

- Enhance the geographical coverage of the existing systems (Traffic Signals, CCTV, VMS, etc.);
- SMART Apps for mobile phones;
- Improvement / enhancement to website;
- Support public transport (real time information / priority); and
- Improved coordination between neighbouring authorities / agencies (i.e. Highways England).

A general feeling from this engagement was that the UTMC is a valuable resource that has not been utilised to its full potential.

As part of this review, in addition to those carried out by White Young Green[2], a limited number of further consultations have been carried out with a number of stakeholders. These included Tyne & Wear, Durham, Northumberland and NEXUS.

4.2.1 Tyne & Wear UTMC

Engagement with Tyne & Wear UTMC was undertaken in November 2015; a meeting was held with the UTMC Manager Ray King. The purpose of this engagement was to establish the current and planned service provision and operational requirements of the current system. The meeting also established key dates that might impact on the future provision of the current service and subsequent business case.

The system currently operates a Mott MacDonald Osprey system and covers five of the local authority areas within NECA (Gateshead, Newcastle upon Tyne, North Tyneside, South Tyneside and Sunderland). The system currently provides a range of service (see Task Section 4.3.1) and has standard hours of operations between 07:00 and 19:00 during the working week. Additional coverage out with these hours can be provided for special events, etc.

The system currently operates with four operators and an UTMC manager, with the current staff also performing on-site maintenance and validation tasks. The current staff numbers are about right for normal network operations, although it was suggested that additional support staff would be useful to cover periods of significant stress on the network, such as the Christmas period.

[1] White Young Green, UTMC Real Time Data Collection, Modelling and Dissemination Study
[2] White Young Green, UTMC Real Time Data Collection, Modelling and Dissemination Study

A significant date for the current system is March 2017, where the current funding and support contract with Mott MacDonald ends. Going forward, there is also a need to establish a new agreement for the centre location; it was suggested that this could be shared facilities.

A number of significant in-flight developments are well advanced and would be available to enhance current operations in 2016; these include expansion of the VMS coverage, expansion of ANPR cameras and real-time monitoring of the key car parks.

A key concern for the future UTMC provision is the ongoing operational and annual costs; issues such as the increasing telecommunication costs is something that needs to be addressed for any future provision.

4.2.2 Durham UTMC

Engagement with Durham UTMC was undertaken in November 2015, a meeting was held with Dave Wafer, Strategic Traffic Manager and Malcolm Sinclair, Team Leader Traffic Signals and UTMC. The purpose of this engagement was the same as that of the Tyne & Wear meeting; to establish the current and planning service provision and operational requirements of the current UTMC services in Durham.

The Durham system is also a Mott MacDonald Osprey system, providing a similar range of services as Tyne & Wear UTMC (see **Section 4.3.2**) and has standard office hours of operation during the working week; although operational procedures are in place to deal with incidents and special events (e.g. Lumiere Light Festival).

The system currently operates with no dedicated staff allocation to the operation of the UTMC; rather staff use the system as a network management tool as and when it is required. The system also does not have a dedicated control room.

Durham also has a number of significant in-flight developments, which will be available to enhance current operations in 2016; these include provision of strategic VMS, development of a car parking management and guidance system and enhancement to the CCTV coverage.

The above approach works well for Durham, covering their network needs and minimises concerns regarding ongoing operational costs.

4.2.3 NEXUS

Engagement with NEXUS was undertake in December 2015, a teleconference was held with Colin Urquhart. The main purpose of the engagement was to establish the current and possible future level of integration with the existing UTMC services.

NEXUS has existing agreements with the three main bus operating companies within the NECA region; Arriva, Stagecoach and Go North East. The agreements cover the exchange of data between NEXUS and these operators.

NEXUS indicated that there had been some previous engagement with the Tyne & Wear UTMC to investigate the benefits of sharing / exchanging data; at this stage it was still unclear what could be done and what value this data exchange would have to the management of the network.

NEXUS are also currently developing channels to make the data available to the travelling public; they have developed the Application Programming Interface (API) to allow software to software interface to allow this public access. However, they need to enhance the bandwidth to enable this access to occur.

NEXUS are aware of the ongoing Tyne & Wear UTMC work to provide monitoring at ten Park & Ride sites (ANPR monitoring); however, NEXUS are unaware of any existing route to present this data.

NEXUS indicated that they see benefits in having a single linked and integrated system for all transportation needs across the region; the key question is can a central control centre for NECA operate more effectively than the existing arrangements? NEXUS also had some concerns

regarding the current hours of operation and that the requirement for public transport services would need the current hours extended beyond 07:00 to 19:00.

4.2.4 Northumberland County Council

Engagement with Northumberland County Council was undertaken in November 2015; a meeting was held with Ruth Bendell and Lynne Ryan. The main purpose of the engagement was to establish any current or future interventions or support that Northumberland may require from a region wide UTMC system.

Due to the rural nature of their authority, Northumberland considered that there would be limited benefit for their network from UTMC interventions.

However, it was established that a number of systems had been deployed or were in the process of being deployed, including:

- Variable Message Signs – a new strategic sign being installed as part of the NEPO framework, which will be controlled from Tyne & Wear UTMC;
- Mobile VMS – signs hired for special events, such as concerts at Alnwick Castle;
- Weather stations currently deployed across the authority area; and
- Roadwork information provided on internet site – linked to Elgin (Roadwork.org), which provides a map layer of all roadworks.

The council will also be hosting some significant special events in 2016/17:

- Tall Ships 2016; and
- Tour of Britain 2017.

At the time of engagement meeting the Council did not consider there was a significant need for UTMC involvement. However, it was highlighted that there were a wide range of possible interventions that could provide network benefits either at define hotspots (Blyth Traffic Signals) or supporting the management of special events (Tall Ships 2016). As such it is recommended that the need for UTMC involvement should be revisited on a regular basis, especially for the management of any major events which has an impact on the wider NECA networks.

4.2.5 Highway England

No engagement has been established with Highway England at the time of writing this report.

4.3 Review of Existing Systems

As recognised elsewhere in this report, the North East has already made significant investment in ITS. The region currently has two UTMC systems providing network management and control interventions across six of the seven local authorities within the region. Between them, the two systems are providing the following interventions:

- Adaptive Traffic Signal Control (SCOOT) at key junctions within Tyne & Wear and remote signal monitoring of junctions across the whole region;
- Provision of journey time and event information on strategically located Variable Message Signs on a number of key corridors;
- Collection of data to support future development, including traffic counts and journey time information;
- Network monitoring via CCTV at key locations / junctions;
- Weather and Environment monitoring across the whole region;
- Development of car parking monitoring and guidance system in both Durham and Newcastle;

- Both systems are fully exploiting social media to inform travellers of up to the minute information about conditions on the public transport and road networks.

UTMC intervention has also been identified as having an important part to play in the significant programme of planned infrastructure improvement across the region; with technology supporting these improvements both during the construction and operational phases of these network improvements.

4.3.1 Tyne & Wear UTMC System

The Tyne & Wear UTMC currently monitors the busiest and strategically important parts of the road transport network, accounting for over 750,000 vehicle movements per day. The system currently deals with over 3,000 incidents, collision and events per year, based on the 2015 annual report[3].

The system is currently staffed five days a week between 07:00 and 19:00, with additional coverage of special events at the weekend or at night.

The current core system is a Mott MacDonald Osprey system, which provides the following key functions:

- Real-time network management and control;
- Off-line data analysis; and
- Data dissemination.

Tyne & Wear UTMC fully utilises both internet and social media channels to disseminate real time traffic and network conditions to the travelling public, and broadcasting and media outlets.

There has already been a significant investment in ITS provision and there are a number of in-flight commissions for 2015/16; these include expansion of VMS provision and provision of real time monitoring of three multi-storey car parks within Newcastle city centre.

Tyne & Wear UTMC also has a number of call-off contracts in place to support the development and enhancement of the current service provision; these include a 3 year commission for the provision of ANPR cameras to enhance journey time monitoring on strategic corridors and car parking monitoring.

As noted previously in relation to the stakeholder engagement with Nexus, at present the service does not provide any bus priority or shared data with NEXUS or bus operators. This is due to the institutional split of responsibility for public transport in the North East, and the provision of civil infrastructure (e.g. bus lanes) to provide bus priority measures in the key urban areas.

[3] Reference needed

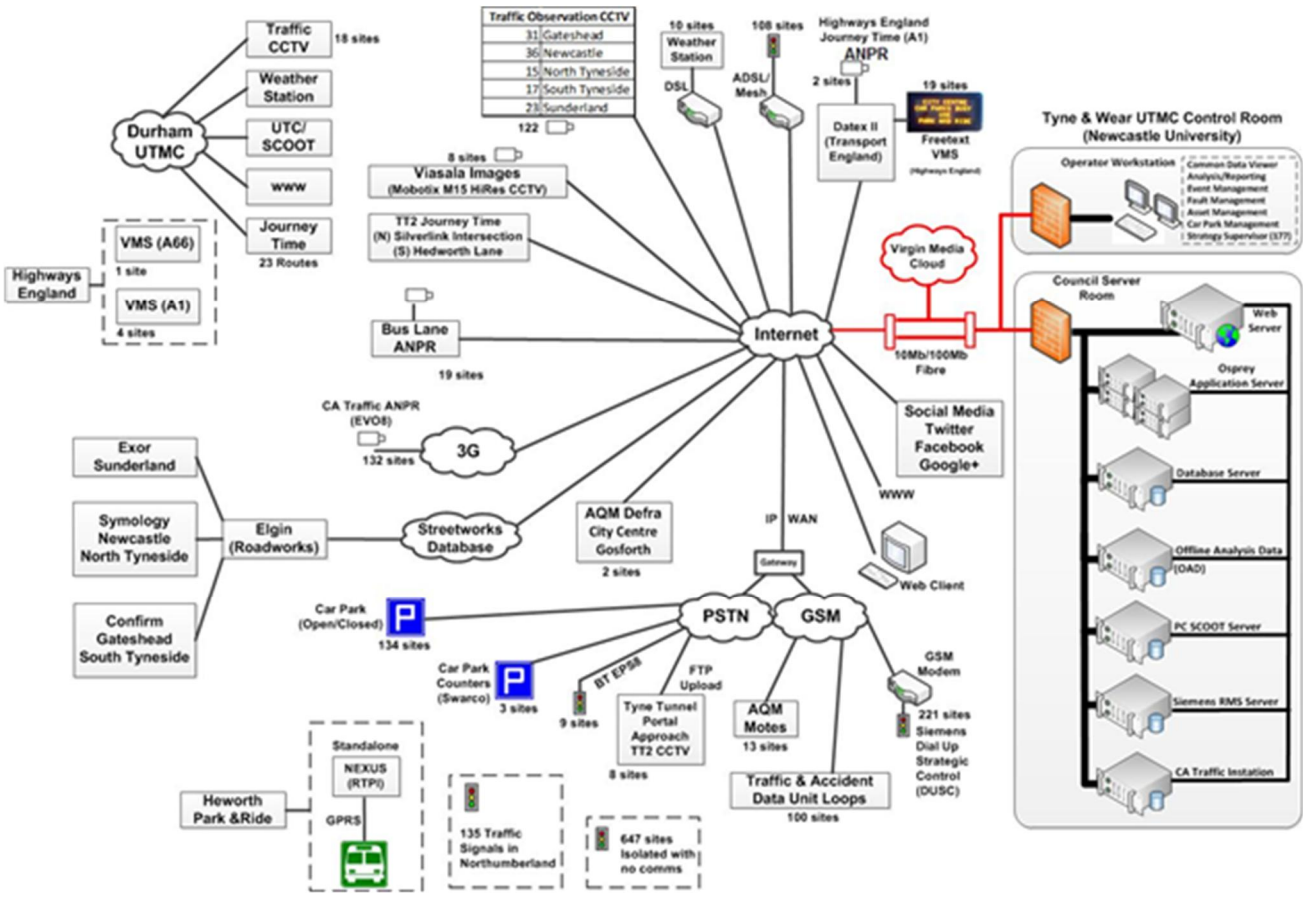
The following table provides an overview of the current and in-flight developments:

Table 12: Tyne & Wear UTMC current and in flight developments

Equipment	Existing	In-Flight
Traffic Signal Installation (Remote Access)	221	0
Traffic Signal Installation (SCOOT)	117	0
CCTV	145	60
ANPR Cameras (Journey Time)	115	100
ANPR Cameras (Parking Monitoring)	3	3
VMS (Strategic)	0	27
VMS (Parking)	None	0
Weather Stations	10	12
Air Quality Monitoring	15	15
Cabinets	635	34

The above provision is illustrated in the system architecture below:

Figure 1: Tyne & Wear System Architecture



4.3.2 *Durham UTMC System*

Durham currently operates the same Osprey system as Tyne & Wear UTMC; the system provides the following core modules:

- Strategy Manager
- Fault Manager
- Alert Manager
- Journey Time Manager
- Strategic VMS Manager
- Datex 2 PublisherCdmf
- Event manager
- Car Park & VMs Manager
- Count Manager
- Asset Manager
- CCTV Manager
- Cdmf Web Client viewer

Information from Durham's UTMC can be accessed from the Durham County Council website and includes the following data:

- Car Parking: All car parks within the county are displayed on an interactive map layer; information is also presented in tabular format providing opening times, tariffs, etc.
- Journey Times: Data is presented in both tabular format and colour co-ordinated map format; at present the following corridors are covered: A1, A19, A167, A688 and the main radial routes into Durham City;
- Roadworks: Information on roadworks is provided for various locations throughout the County in a tabular format
- CCTV: Camera images are available for a number of sites throughout the County – pictures are updated every 10 minutes.

The system currently operates within standard council working hours and has no dedicated staff allocated to the day to day operation of the system. Operational procedures are in place to deal with special events in the County.

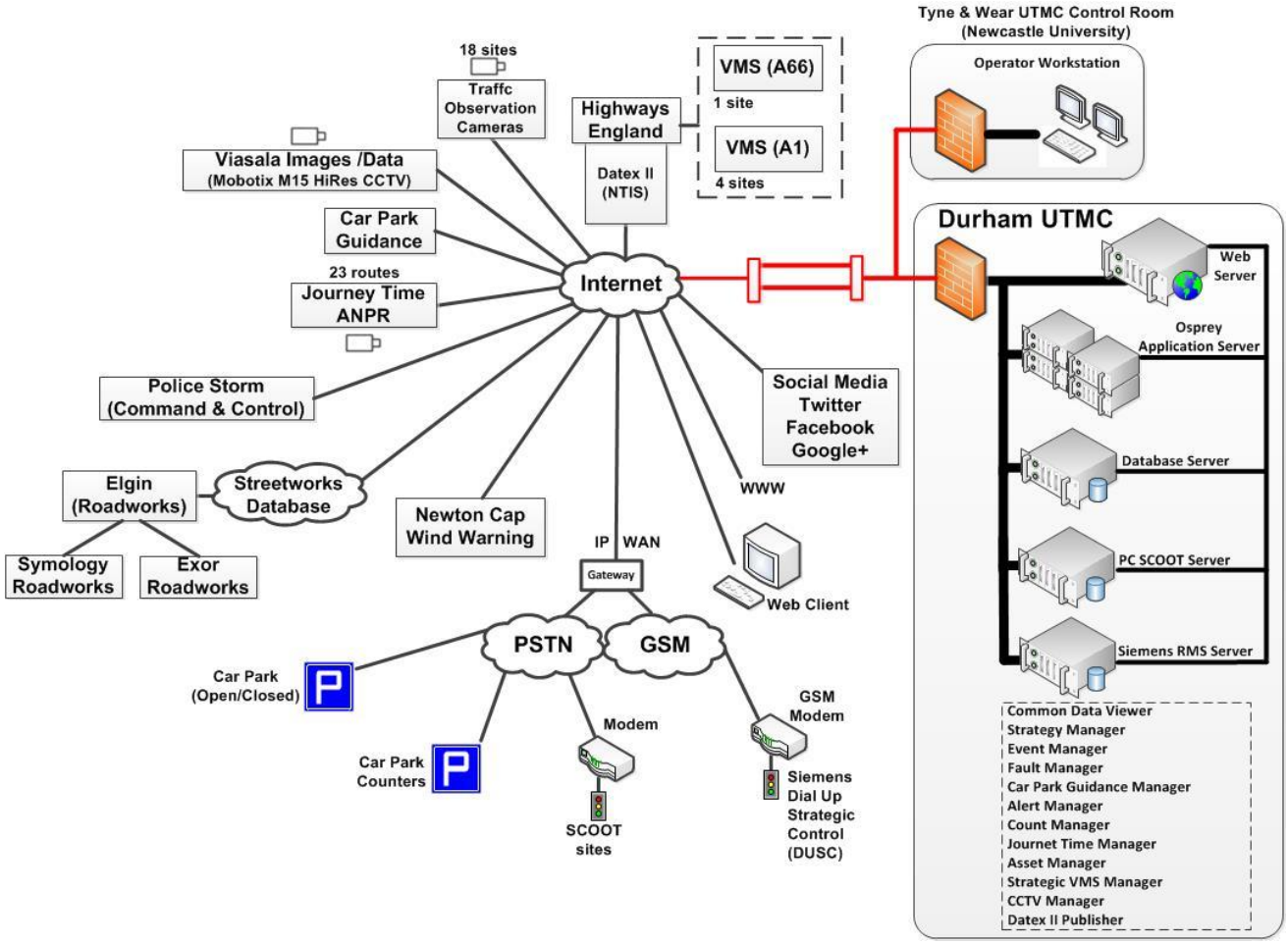
The following table provides an overview of the current and in-flight developments:

Table 13: Durham UTMC current and in flight developments

Equipment	Existing	In-Flight
Traffic Signal Installation (Remote Access)	63	tbc
Traffic Signal Installation (SCOOT)	0	tbc
CCTV	18	tbc
ANPR Cameras (Journey Time)	23	tbc
Car Parking Monitoring (Loops)	6	tbc
VMS (Strategic)	9	tbc
Weather Stations	9	tbc
Cabinets	122	tbc

The above provision is illustrated in the system architecture below:

Figure 2: Durham UTMC system architecture



4.4 Gap Analysis

The services required to deliver the key themes of the Network Management Strategy and their relative contribution were identified in Section 3 as:

- Adaptive Traffic Signal Control
- Traveller Information (VMS / Journey Time / etc.)
- Internet Services
- SMART Applications
- Public Transport Management
- Parking Management
- Weather / Environmental Monitoring

In order for these services to work as Intelligent Transport Systems that support the key themes of the Network Management Statement and deliver the types of benefits achieved in the identified best practice deployments; then the services need to operate and perform with the following attributes:

- ***Strategic*:** The system(s) needs to be able to support the way the transport network is managed on a cross regional basis allowing the operator to make and understand the impact of decisions across all areas of responsibility and modes. The system needs to be supported by robust governance to lead on planning in terms of both business planning and pre-planning of operations, and to draw together the wider stakeholder and suppliers to work together collaboratively;
- ***Tactical*:** Supports day to day network management allowing the operator to make decisions based on an understanding of the impact those decisions will have on the transport network;

- ***Integrated:*** The system needs exchange of information between its component parts in a seamless and efficient manner and on a multi-agency and stakeholder basis. Importantly, the need to be integrated applies to the technical, organisational and governance aspects of the traffic management system;
- ***Flexible:*** NECA has a wide range of transport users and needs that differ across the region. The transport system is constantly evolving and priorities and objectives are likely to change over time. There is therefore a need for the traffic management system to contain tools that can be applied flexibly to meet changing requirements and policy.
- ***Scalable:*** The capacity of the system can be increased in terms of users, geographic coverage and functional scope without significant commercial penalty or risk.
- ***Resilient:*** The system can be adequately supported and maintained without significant commercial penalty or risk.

These attributes represent a set of technical performance measures for existing ITS services across the NECA region that provide a mechanism to identify where the key gaps in existing service provision in relation to providing best practice solutions to meet the key themes stated in the Network Management Statement.

The assessment of performance against these areas has been quantified using a ten point scale as shown below.

1	Does not exist
2	Exists but does not perform in area of measurement.
3	Negligible performance in meeting current requirements in area of measurement.
4	Some performance in meeting current requirements in area of measurement but improvement to meet all current requirements would likely be not cost effective.
5	Some performance in meeting current requirements in area of measurement where improvement to meet all current requirements would likely be cost effective.
6	Meets current requirements in area of measurement but improvement to meet future requirements would likely be not cost effective
7	Meets current requirements in area of measurement where improvement to meet future requirements would likely be cost effective
8	Meets current and future requirements in area of measurement
9	Meets current and future requirements and has added functionality in area of measurement.
10	A recognised, exemplar world best practice solution

The scores have been qualified with comments relating to service performance. The scoring is intended to illustrate where opportunities exist for improvement rather than to reflect deficiency in the current operations. The technical assessments for the ITS services are summarised in the gap analysis below.

The assessments also consider a virtual NECA UTMC service and this virtual service is developed further in both defining additional interventions and within the business case assessment.

Table 14: Tyne & Wear UTMC

UTMC Intervention	Rank Against Network Management Strategy	Existing System / Service								Comments
Adaptive Traffic Signal Control	1st	221 Traffic Signals (fixed-time plans); and 117 SCOOT sites.	7	7	5	8	8	7	**42**	108 Sites being transfer 2014-15 647 not connected to the UTMC
Traveller Information (VMS / Journey Time / etc.)	2nd	New VMS installation currently being installed across Tyne & Wear (2015/2016); and Journey Time information on 19 corridors (65km) via 115 ANPR cameras	7	7	5	8	8	7	**42**	Significant expansion in this service area plan to be operational in 2016.
Internet Services	3rd	Real-time information; CCTV Website; Link to social media	7	7	5	8	8	7	**42**	Proactive use of internet and social media to disseminate travel information.
SMART Applications	3rd	No current provision	1	1	1	1	1	1	**6**	No applications at present,
Public Transport Management	4th	No current provision	1	1	1	1	1	1	**6**	Services are provided via NEXUS or from civil infrastructure.
Parking Management	5th	System has capacity details and current opening status for 138 car parks; and ANPR monitoring being installed in three car parks (2015/2016).	5	3	3	8	8	7	**34**	Limited coverage at present – specification being prepared for 2016/17 for significant expansion of the parking coverage.
Weather / Environmental Monitoring	6th	Ten weather stations; and Fifteen air quality monitoring stations	5	3	3	8	8	7	**34**	Data is not used in strategies at the moment

Table 15: Durham UTMC

UTMC Intervention	Rank Against Network Management Strategy	Existing System / Service								Comments
Adaptive Traffic Signal Control	1st	UTC co-ordinate traffic signals across the city and remote monitoring of signal via Siemen system	5	5	5	5	8	7	**42**	UTC element co-ordinate traffic signals across the county, remote monitoring of some sites - future deployment of SCOOT
Traveller Information (VMS / Journey Time / etc.)	2nd	Strategic VMS; Journey time information along key corridors	7	7	5	8	8	7	**42**	Signage providing real time information, options to use in a strategic manner is constrained by network configuration (Millburngate Bridge).
Internet Services	3rd	Car parking information; Journey time information; Updates on road works; and CCTV	7	7	5	8	8	7	**42**	Proactive use of internet to disseminate journey time, parking, roadworks and CCTV images.
SMART Applications	3rd	No current provision	1	1	1	1	1	1	**6**	No applications at present
Public Transport Management	4th	No current provision	1	1	1	1	1	1	**6**	Services are provided via NEXUS or from civil infrastructure.
Parking Management	5th	New car parking management system being installed (2015-16)	8	8	3	8	8	7	**52**	Existing system currently being renewed, with new on-street sign displaying availability.
Weather / Environmental Monitoring	6th	Weather stations	5	3	3	8	8	7	**34**	Data is not used in strategies at the moment

Table 16: Combined Virtual NECA UTMC

UTMC Intervention	Rank Against Network Management Strategy	Existing System / Service								Comments
Adaptive Traffic Signal Control	1st	Existing SCOOT control in Tyne & Wear UTMC and pending £2.5m scheme in Durham.	7	7	5	8	8	7	**42**	Significant number of traffic signals out with the control of both UTMCs.
Traveller Information (VMS / Journey Time / etc.)	2nd	Strategic VMS installed around Durham and ongoing work to install 27 strategic VMS across Tyne & Wear.	7	7	5	8	8	7	**42**	Previous stakeholder engagement cited lack of integrated management strategies between neighbouring Councils. Situation should improve with the new VMS provision.
Internet Services	3rd	Proactive use of internet and social media to disseminate travel information.	7	7	5	8	8	7	**42**	Lack of integration / sharing of information between existing web sites.
SMART Applications	3rd	No current provision	1	1	1	1	1	1	**6**	No applications at present,
Public Transport Management	4th	No current provision	1	1	1	1	1	1	**6**	Services are provided via NEXUS.
Parking Management	5th	Durham system currently being upgraded / Tyne & Wear improving monitoring of car parks.	5	5	3	8	8	7	**36**	Limited dissemination of parking information at present – requirement for more signage and development of SMART applications.
Weather / Environmental Monitoring	6th	Additional weather and air monitoring site being deployed in 2016.	5	5	5	8	8	7	**38**	Weather data is not used in strategies at the moment – air quality monitoring strategies being developed in conjunction with Newcastle University.

4.5 Gap Assessment Scores

The assessment provides an overview of how well a virtual NECA system would perform against best practice, the score for the core services indicated that these services are tracking in the right direction and reflect the investment already made in these areas. However, all services indicate scope for improvement, either in the geographical coverage to improve the strategic management of the network, or for additional services such as SMART applications and public transport management.

Table 17: Virtual NECA UMTC Assessment Score

Ranking	UTMC Interventions	Score
Joint 1st	Adaptive Traffic Signal Control	42
Joint 1st	Traveller Information (VMS / Journey Time / etc.)	42
Joint 1st	Internet Services	42
2nd	Weather / Environmental Monitoring	38
3rd	Parking Management	36
Joint 4th	SMART Applications	6
Joint 4th	Public Transport Management	6

The scores for the virtual NECA UTMC indicate that there is a good correlation between the interventions that align well with the NECA objectives and the investment made to date in those areas. However, the scores indicate a possible under investment in both SMART applications and public transport management interventions.

At present, public transport management is provided via hard civil infrastructure provision and although there has been some discussion between Tyne & Wear & Durham UTMCs and NEXUS, there is also a lack of co-ordination between the two networks under their respective remits. It is clear from the evidence collected under best practice that the deployment of public transport management systems within core urban areas is something that could provide significant improvement to the network and have very strong alignment with the key themes of the Transport Manifesto.

Currently the development of SMART applications has been left open to the marketplace to develop and market travel applications. The UTMC will provide access to the open data on their systems for any developers.

4.6 Proposed Interventions

Based on the findings above, the following programme of interventions has been identified for the NECA region, these interventions build upon the recommendations in the White Young Green report[4].

[4] White Young Green, UTMC Real Time Data Collection, Modelling and Dissemination Study

Table 18: Proposed Interventions

UTMC Intervention	Option	Discussion	Approx. Cost	Recommendations
Adaptive Traffic Signal Control	SCOOT Loop Count Sites	Utilise up to 400 existing 1 and 2 lane SCOOT loops to gather automatic traffic counts within UTMC database. Equivalent value of approx £1m if implemented through traditional automatic count sites	£50k	Seek capital support to configure sites.
Adaptive Traffic Signal Control	Increase number of UTMC Connected Signal Installations	At present there are approximately 640 signals (66%) operating in complete isolation with no facility to amend signal timings etc. Increasing the number of connected signals will improve control and strategy options. Seek to convert 110 sites as part of targeted upgrade of hot-spots and strategic routes to deliver a 33% increase in connected sites.	£770k – for approx 110 target sites.	Seek capital funding for upgrade of targeted sites within a bundled UTMC strategy and information initiative. Upgrade remainder over prolonged period through capital schemes and maintenance renewals.
Public Transport Management	Nexus Data Broker Integration	Connecting Nexus databroker and UTMC systems will allow bus operations to be assessed independently of general network conditions along with the impact of specific measures / strategies on bus operations. It will also enable strategic bus priority to benefit public transport on specific corridors.	£100k	Seek funding to fund system integration, developing monitoring and reporting strategies and testing strategic priority.
Traveller Information	Expand journey time monitoring (via ANPR)	Comprehensive coverage of the main congested routes throughout the region will be beneficial to local authorities, allowing better identification of issues. In combination with introduction of remote monitoring and dial-up control it will allow authorities to react to issue and target problem routes/locations. It is possible however that this information will be readily available through crowd sourced data – using companies such as INRIX.	£140k capital cost for 30 camera locations	Coverage to include all major radial routes and other major roads, including river crossings – it is understood that an extension to the ANPR coverage is planned in the current financial year

UTMC Intervention	Option	Discussion	Approx. Cost	Recommendations
Internet Services	Improve data presentation on existing website	Although the website (and any subsequent app) is unlikely to be able to compete with Google/Apple etc. The NECA journey planning will contain information that is not readily available elsewhere. The existing software would form a good starting point to improve data presentation. Training for all local authority users should be provided. The site should be promoted on local authority websites.	£35,000 for initial improvements and review of potential improvements.	Further develop the existing site and investigate the potential for increased user interface facilities. Make this facility available to the public via local authority websites. The site should ultimately present all available transport data on a user friendly map based system.
All (Operational Agreement / Procedure)	Provide Tyne & Wear UTMC, data and signals centre with greater powers to implement strategies	This would concentrate resources and expertise. It could draw on consultancy expertise as required and lead to standardisation of software and strategies across the NECA area. It would concentrate the signals capability replacing the current situation where the Tyne & Wear signals team are responsible for setting up sites and the UTMC team is responsible for managing sites. It would however take responsibility from Network Managers who have the responsibility for network performance and the greatest knowledge of their local authority network.	Dependent upon organisational details, but likely to be cost neutral	Maintain the current system with UTMC as the enabler, responding to Network Manager decisions/requests. Individual authorities would retain control over policy decisions.

UTMC Intervention	Option	Discussion	Approx. Cost	Recommendations
Traveller Information	Off-Network Information Screens	Off-network information screens offer an alternative means of disseminating transport information and mixed client content to both stakeholders and the general public. There is the potential for a partnership with Nexus to implement a trial delivering bus and network information alongside bespoke client data where required.	£100k	Investigate potential partners and seek capital funding to deploy a 20-30 screen trial involving NECA partners and public premises.
Traveller Information	VMS Expansion	Ongoing provision of strategic VMS across the NECA region. Signs will be available from March 2016 and will enhance the dissemination of real time information, including journey time, road works, incidents and special events.	£1,200k	Site works expected to commence in January 2016.
Parking Management	Newcastle Parking System	Work has been completed to provide ANPR cameras at three multi-storey car parks in Newcastle city centre. Further development of an enhanced car parking guidance and information system is being promoted to support the long term vibrancy of the city centre.	£1,100k	Contract specifications are being prepared at present for both a car parking management system (CPMS) and enhancement to the parking payment provision at all car park operated by the Council. The proposed payment system should be in place for Christmas 2016. The timeline for the CPMS is undefined at present.
Parking Management	Gateshead Parking System	Proposal has been developed to provide a car parking management system (CPMS) for the major shopping development in Gateshead.	£650k	Development of the CPMS will be via planning application, as such no capital costs have been carried forward into the economic assessment.
Parking Management	ANPR Deployment	Tyne & Wear current have a 3 year contract for the provision of ANPR across the network; it is anticipated that over 100 additional cameras will be installed in 2016.	£600k	ANPR monitoring will be deployed at car parking monitoring at council operated car parks and monitoring of park and ride sites.

UTMC Intervention	Option	Discussion	Approx. Cost	Recommendations
Weather / Environmental Monitoring	Weather / Environmental Monitoring	Proposed geographical expansion of weather and environmental monitoring across the whole of the NECA region.	£855k	Allowance has been made for 30 new air quality monitoring to be installed in 2016. Future provision has been for 20 more weather stations across the region, linked to CCTV image capture.
All (supports wide range of interventions)	CCTV	Provision has been made to extend the current CCTV coverage in 2016.	£250k	Allowance has been made to install 50 additional CCTV across the Tyne & Wear region.

4.7 Capital Cost Estimate

The development of the capital cost estimates have been split into three sections:

- Existing equipment;
- In-flight developments (2016); and
- Proposed enhancement (short term 2016-2020).

Although the monies have already been allocated to cover both installed and in-flight developments, it is important to capture the full capital cost of the existing UTMC assets across the whole of NECA.

Based on work we have undertaken for the development of a business case for a new control centre in Ireland, we have taken the residual value of the existing / installed equipment forward into the business case.

The following tables provide the current cost estimates for the above three phases. All costs have also been taken back to a common cost base of 2010, in accordance with the guidance in Web TAG Data book (November 2014).

The cost estimates below have been carried forward into the Cost Benefit Analysis.

Existing Infrastructure

Table 19: Tyne & Wear UTMC Equipment

Item	Quantity	Unit Costs (2010 Prices)	Total Costs (2010 Prices)	Installation Date (Est)	Ave Design Life	Est Residual Life	Residual Costs (2010)	Total Residual Costs (2010)	Comments
Traffic Signal Installation (Remote Access)	221	£10,000	£2,210,000	2010	10	5	£5,000	£1,105,000	
Traffic Signal Installation (SCOOT)	117	£35,000	£4,095,000	2010	10	5	£17,500	£2,047,500	
CCTV	145	£5,000	£725,000	2010	10	5	£2,500	£362,500	
ANPR Cameras (Journey Time)	115	£5,000	£575,000	2010	10	5	£2,500	£287,500	
VMS (Highways England Signs)	15	£0	£0	2010	15	10	£0	£0	No direct cost to NECA
Weather Stations	10	£15,000	£150,000	2010	10	5	£7,500	£75,000	
Air Quality Monitoring	15	£20,000	£300,000	2010	10	5	£10,000	£150,000	
Cabinets	635	£1,000	£635,000	2010	10	5	£500	£317,500	
Total Costs			**£8,690,000**					**£4,345,000**	

Table 20: Durham UTMC Equipment

Item	Quantity	Unit Costs (2010 Prices)	Total Costs (2010 Prices)	Installation Date (Est)	Ave Design Life	Est Residual Life	Residual Costs (2010)	Total Residual Costs (2010)	Comments
Traffic Signal Installation (Remote Access)	63	£10,000	£630,000	2010	10	5	£5,000	£315,000	
CCTV	18	£5,000	£90,000	2010	10	5	£2,500	£45,000	
ANPR Cameras (Journey Time)	23	£5,000	£115,000	2010	10	5	£2,500	£57,500	
VMS (Highways England Signs)	15	£0	£0	2010	15	5	£0	£0	No direct cost to NECA
VMS (Strategic)	9	£40,000	£360,000	2010	15	5	£13,333	£120,000	
Weather Stations	9	£15,000	£135,000	2010	10	5	£7,500	£67,500	
Cabinets	122	£1,000	£122,000	2010	10	5	£500	£61,000	
			£1,452,000					**£666,000**	

Table 21: In-Flight Development NECA

Item	Quantity	Costs (2015 prices)	Total Costs (2010 prices)	Installation Date (Est)	Comments
CCTV	50	£5,000	£285,009	-	
Traffic Signal Installation (SCOOT)	Item	£2,500,000	£2,375,071		Scheme Costs
ANPR Cameras (Journey Time)	100	£5,000	£475,014	-	
ANPR Cameras (Parking Monitoring)	3	£5,000	£14,250	2015/16	In-flight development
VMS (Strategic)	26	£1,200,000	£1,140,034	2015/16	In-flight development
Air Quality Monitoring	15	£20,000	£285,009	-	
Cabinets	215	£1,000	£204,256	-	Estimate allowance for each site.
			£4,778,643		

Table 22: Short Term Proposed Interventions

Item	Quantity	Unit Costs (2015)	Total Costs (2015 Prices)	Total Costs (2010 Prices)	Installation	Comments
Traffic Signal Installation (Remote Access)	55	£10,000	£550,000	£522,516	-	Upgrade to Remote Access
Traffic Signal Installation (SCOOT)	55	£35,000	£1,925,000	£1,828,805	-	Upgrade to SCOOT
ANPR Cameras (Parking Monitoring)	74	£5,000	£370,000	£351,511	2015/16	In-flight development
ANPR Cameras (Park & Ride)	20	£5,000	£100,000	£95,022		
VMS (Highways England Signs)	0	£0	£0	£0	-	No direct cost to NECA
VMS (Strategic)	14		£800,000	£760,023		Additional VMS
VMS (Parking)	28	£25,000	£700,000	£665,020		Proposed future development
Weather Stations	20	£15,000	£300,000	£285,009	-	Allowance for some expansion
Air Quality Monitoring	0	£20,000	£0	£0	-	Allowance for some expansion
NEXUS Database Integration	1	£100,000	£1000,000	£95,003		
Improve Website	1	£35,000	£35,000	£33,251		
Network Information Screens	1	£100,000	£100,000	£95,003		
Cabinets	250	£1,000	£250,000	£237,507	-	
			£4,895,000	**£4,968,668**		

Business Case for Future UTMC Provision

05

5 Business Case for Future UTMC Provision

5.1 Introduction

This section provides details on the development of the business case for the future provision of UTMC services across the NECA region. The business case has been developed to consider a number of variables to the future provision and also sensitive in the estimation of the possible benefits derived from both the current and future interventions.

In all cases a conservative approach has been adopted to the possible level of benefits that could be realised from both the current and future interventions to avoid over estimation.

5.2 Development of Business Case

The development of the business case considered the following possible options:

- End Provision: End the current provision of UTMC service across the NECA region;
- Do-Nothing: Maintain the current status quo with two UTMC operating across the NECA region; and
- Do-Something: Combine the two systems into a central control system.

It has been assumed that ending the current provision of UTMC would have a negative impact on the existing network and would result in a loss of network performance leading to a net dis-benefit to the NECA region.

5.3 Capital Cost Estimates

As indicated in Section 4, the development of the capital cost estimates has been split into three sections:

- Existing equipment;
- In-flight developments (2016); and
- Proposed enhancement (short term 2016-2020).

These costs are based on the supply and installation cost of the existing equipment, including the current residual value of the Common Database (CDB).

An allowance has also been made within the capital cost model for the replacement cost of all the current field and CDB provision.

The tables containing the full cost estimates are provided in Section 4 and the cost tables carried into the business case are contained within Appendix C.

5.4 Operational Costs

An assessment period of ten years has been used, which broadly reflects the service life of the necessary equipment that is deployed as part of ITS measures. The following operational costs have been included within the assessment of the business case for each of the assessment years:

- System Support: Annual support cost for CDB;
- Building Costs: Annual Rate & Rents costs for control centre;
- Field Equipment: Annual maintenance cost to maintain all field equipment, annual cost for power consumption and annual cost for telecommunications;
- Staffing: Annual staff cost for core UTMC provision and annual staff costs for remote access from all seven local authorities across NECA.

The above annual costs are based on 2010 prices and discounted back to 2010 over the ten year period. The table containing the full annual operating costs estimates are provided within Appendix C.

Building Option

At this stage a consideration of building options was assessed on the possible future option for UTMC provision and has been based on the following:

- Do-Nothing: Both centres remain on their current provision;
- Do-Something: Combine into a single control centre:
- Remains at Newcastle University;
- New rental accommodation;
- Combined with other centres (such as Tyne Tunnel);
- New building.

Due to the fact that Durham UTMC does not have any dedicated control facility, as such there is no cost difference between the current provision and combining into a single control room facility, as such and solely in terms of annual costs, these options can be consider as a single option.

In terms of new rental accommodation, the following rates were obtained for new rental accommodation, and are based on actual costs quoted in 2015:

- Higher End: £190 per m^2; and
- Lower End: £90 per m^2.

Based on work undertaken for Irish National Road Authority in 2015, the typical space requirement for a control centre (control room, management offices, meeting rooms, welfare facilities) was between 200-300m^2.

Based on this size allocation annual rental costs would be in the range of £18,000 to £57,000 per year, significantly more expensive than the current rental charge of £10,000; as such this option was not carried forward into the business case.

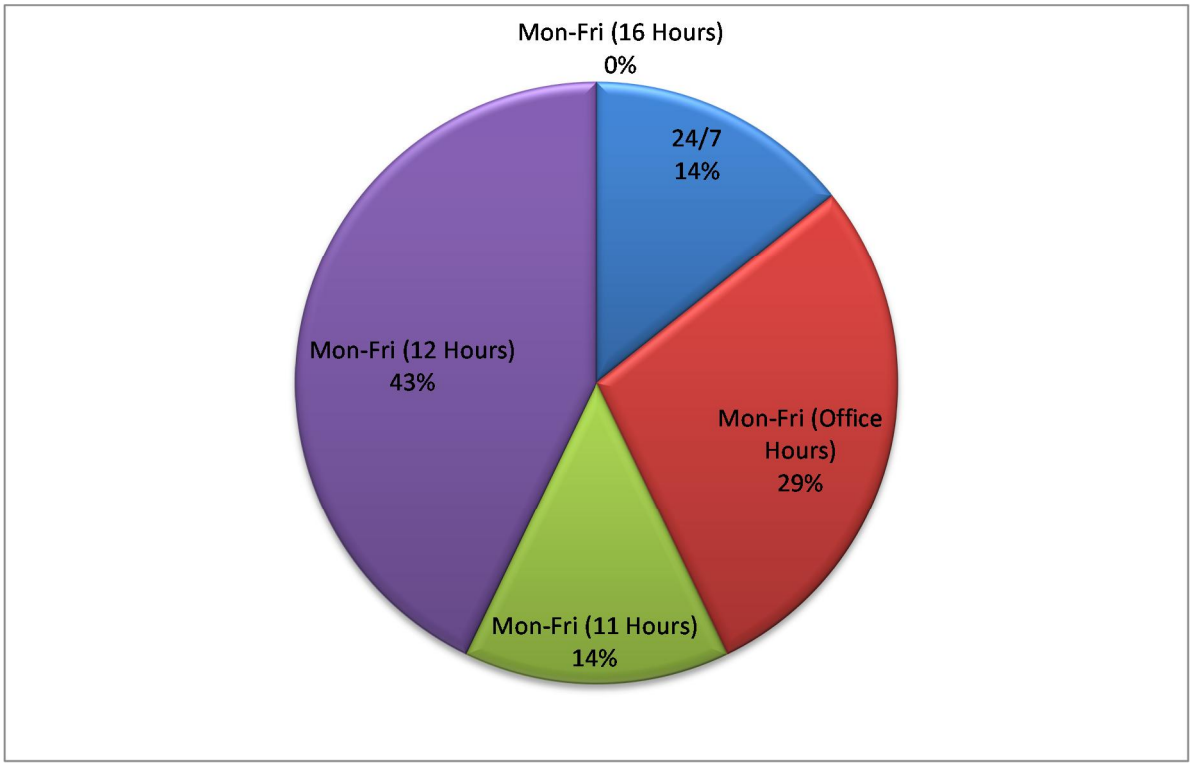
Similarly the construction cost for a new control centre has been estimated at £3,500 per m^2 (again based on our work for a new control centre for Ireland). This cost is significantly higher than normal office requirements due to the increased requirements for accommodating IT. Based on the same space allocation we would be looking at a cost range of £700,000 to £1,050,000 for a new control centre; as such this option was not carried forward into the business case.

Any provision of a new central control facility would be subject to an open tender procurement and as such is unknown at this stage. As such it is proposed only to consider the current control room option, as this is currently clearly the most economic option.

Hours Operations / Staffing Options

As part of the benchmarking on the types of services provided by local authorities, AECOM also obtained information on the standard hours of operations for a selection of those authorities. The information is illustrated in the pie-chart below:

Figure 3: Standard Operational Hours



The above survey indicated that the vast majority of local authorities operate a five day a week service, over an 8-12 hour period. There is likely to be a wide range of reasons why local authorities consider this level of provision to be the most appropriate for their network. However, it is expected the budget constraints for the provision of 24/7 will be a key factor. Staffing numbers required to provide such a service would increase current levels by a factor of between 2 and 3 times, with the associated increase in operating costs. The above assessment concluded that any future NECA system would be based around the current Tyne & Wear UTMC staff provision, with additional cover over weekend / nights to cover special events.

AECOM undertook a review of the resource requirements to cover the current level of UTMC incidents across the whole of the NECA region. Using the data contain in the Tyne & Wear 2014 annual report, an assessment was undertaken to determine the possible future staffing levels across the region.

Based on data analysis from AECOM control centres in the US, it was possible to make an assessment of the equivalent full time employee (FTE) to manage and monitor various events recorded in 2014. The development of that assessment is contained in Appendix C and is summarised below, along with the proposed hours of operations:

- Six full time members of staff:
  - One UTMC Manager
  - One UTMC Supervisor
  - Four UTMC Operators
- Remote Access:
  - Allowance of 2 FTE to cover remote access to the system;
- Hours of Operation:
  - Working Week
  - 07:00 – 19:00

- Additional special event coverage

The above staff levels are based on delivering all of the in-flight and proposed interventions and have been carried forward into the business case.

5.5 UTMC Benefits

The provision of an UTMC system is considered an essential component of many major cities / regions in the effective management of their network. The current UTMC system supports a range of operations across Tyne & Wear and Durham to enhance network condition and provide real time travel information.

A major study conducted by the French Government in 2004[5], investigated a wide range of technology interventions and conducted Cost-Benefit studies of several Traffic Management Centres. The results published in the National Traffic Accounts found that most interventions, especially in larger urban areas, consistently brought about greater benefits than their costs. These measures were also found to be greatest when different measures where combined together.

Expected benefits from a well-established UTMC system, include:

- Improved integration between different ITS interventions, through the use of an Urban Traffic Management and Control common database, ensuring that NECA transport networks operate at optimal efficiency;
- Enhanced network efficiency (safer, informed travel choices, improved air quality information, network reliance during incidents, reduce travel costs);
- Reduce the impact of incidents on the network via proactive management of incidents response plans and co-ordination with emergency service;
- Assist the travelling public during network incidents to find the best route and mode of transport during any major incidents;
- Improved safety by providing road users with real time information on the network conditions (weather, accidents, etc.);
- Improved public transport networks by providing passengers with accurate real time information about network services;
- Improvement of freight operations through the provision of real time network information;
- Reduce the effect of air pollution from vehicles by more adaptive traffic management strategies;
- Improved network security by the provision of CCTV at strategic locations and car parks;
- Attract inward investment by reducing network journey time / improve journey time reliability, to increase economic viability and vitality of rural and urban areas;
- Improve health and wellbeing by enabling local communities to plan journeys better via providing real time public information on travel options, parking, costs and journey times;
- Offering more attractive travel experience to visitors to the region, accommodating flexible responses for seasonal needs of tourism across the network;
- Enhancing customer satisfaction with the level of service provided across all of NECA transport networks; and
- Establishing a focal point for all NECA traffic management and assist in the establishment of the NECA brand across the North East.

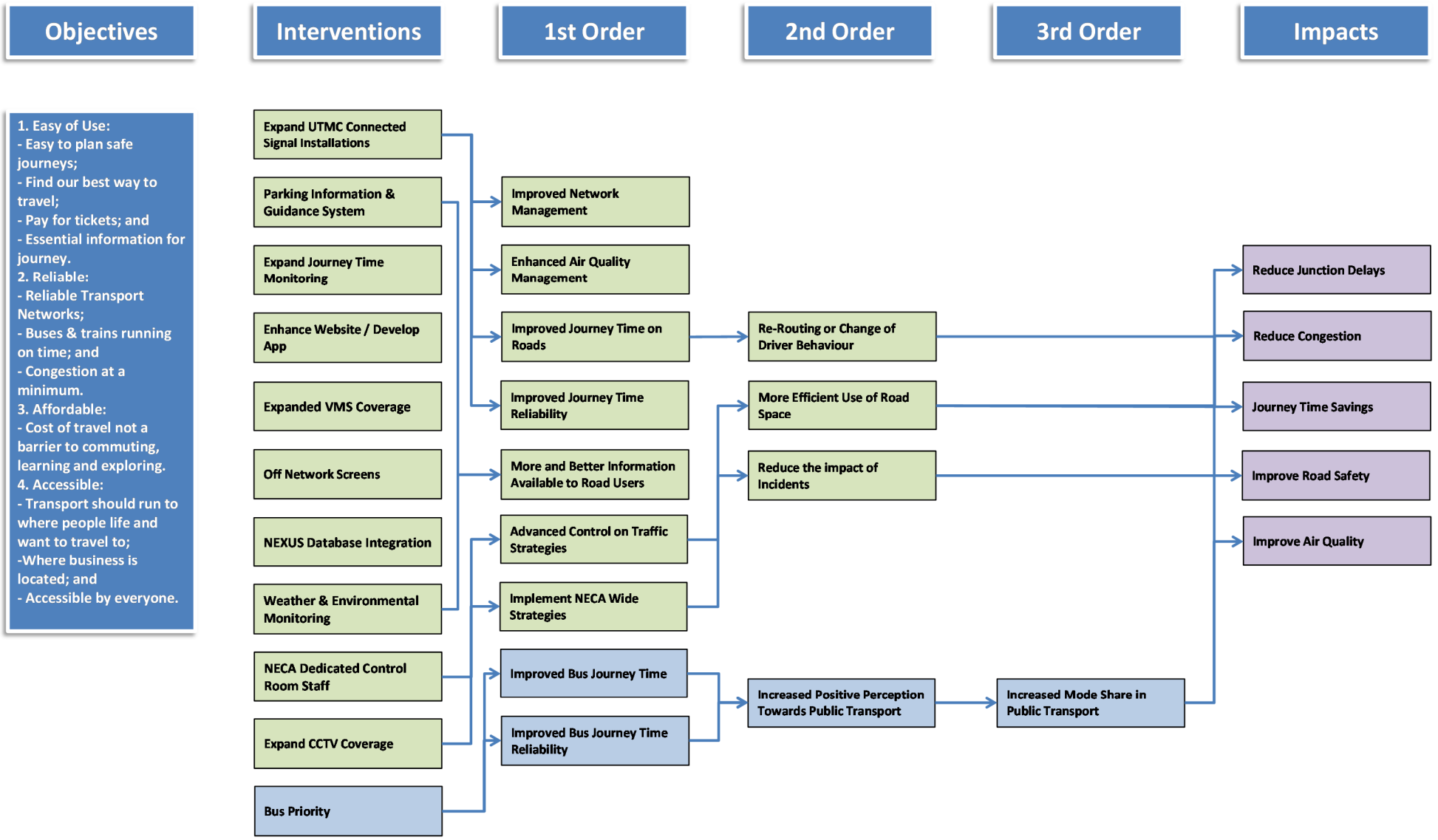
[5] Managing Urban Traffic Congestion by OECD, European Conference of Ministers of Transport.

However, it is recognised that it is difficult to isolate and evaluate the impacts of UTMC using standard assessment tools (i.e. those applied to highways scheme); the general expert opinion is that without the enhanced operational coordination that control centre offers, the result would be increased congestion and reduced traffic safety on urban networks.

The above benefits and their alignment with objective and expected outcomes is illustrated in logic flow model in Figure 4.

Only the above interventions that have clear and tangible monetary benefits will be considered in the Cost-Benefit Analysis.

Figure 4: Tyne & Wear System Architecture



5.6 Scale of NECA Benefits

The proposed benefits from the current and future interventions have been based on the following benefits:

- Provision of real time information; and
- Benefits from deployment of Adaptive Traffic Signal Control / Remote Access.

As with the assessment of costs, benefits associated with the ITS measures are considered over a shorter time period of 10 years, which broadly reflects the service life of the necessary equipment that is deployed as part of such measures.

Work undertaken in the USA[6] to provide agencies that currently have traffic management systems, but do not have a robust evaluation methodology with a framework for estimating the monetary benefits from ITS interventions.

Table 23: Typical % of ITS Monetary Benefits

Benefit	Percentage
Private Vehicle Occupant Delay	66.1%
Commercial Vehicle Occupant Delay	4.3%
Cost of Crashes	13.1%
Value of Delay for Goods	8.0%
Fuel cost of Delays	8.6%
Total	100%

Based on the above split, it is estimated that only 70% of the possible UTMC benefits are being captured by the proposed benefit methodology for NECA assessment; significant additional data collection and modelling would be required to accurately measure the full potential benefits.

5.6.1 Real Time Information (Internet / Variable Message Signing / Apps)

The appraisal of web information and VMS is somewhat different to the provision of other infrastructure measures such as new road provision. Research in appraisal of such information provision has focused on the assessment of the value to road users of the certainty that accurate and relevant information will be provided in the cases of network disruption.

A number of key references are relevant in this regard; Bekiaris and Nakanishi[7] have published research on willingness to pay for travel information across a range of systems associated with traffic control centres. The research found that the population that would be willing to pay for information was high, at between 3.0 and 2.5 on a 4-point scale.

The willingness to pay by commuters was only marginally lower than that for tourists/visitors. The analysis concluded that the mean willingness to pay was £0.44, with a minimum value of £0.04 per journey.

[6] Methodologies to Measure and Quantify Transportation Management Centre Benefits, Final Synthesis Report (FHWA), December 2012

[7] *Economic Impacts of Intelligent Transport Systems – Innovations and Case Studies: Bekiaris & Nakanishi. Elsevier (2004)*

Applying this to a conservative value of 60% (based on 2.5 on the 4 point scale) of users who responded a willingness to pay, suggests a value of £0.25 per user.

Whilst not related to traffic information, comparable research is also available from studies on real time passenger information at public transport stops. Whilst such information does not make journeys faster or more reliable, public transport users nevertheless place a value on them in the sense that they can provide adequate warning of any disruption of the network.

A study from the University of California concluded that the willingness to pay for such information was $0.25, or just over £0.16 per user.

It is noted that the above values relate to the full range of information resources that are available through traffic control centres, including websites, social network feeds and variable message signs.

The Bekiaris and Nakanishi study ranked these different methods in terms of popularity.

This found that apart from radio broadcasts which were valued very highly, other forms presented relatively similar responses in terms of reduction in workload.

Table 24: Users Subjective Ratings of Impact on Workload regarding different service typologies after pilot test

System Mode	Target Groups			
	Typical	Elderly	Disabled	Tourists
Variable Message Signs	3.3	3.7	5.0	3.2
Short Message Sending	3.5	3.2	3.3	3.3
Radio Broadcasts	5.0	3.5	5.0	3.6
Radio Data System	3.3	3.2	2.3	3.4
Internet	3.8	2.8	4.0	4.0
All of the above	3.2	3.4	3.8	3.8

For the this appraisal, we have applied a value of between 10p to 20p per user for the provision of information via VMS, web based travel information, and SMS/social network feeds for commuters only (public transport information has been excluded at this stage, due to the lack of available information at present across NECA).

Benefits would cover the costs of the following elements:

- VMS
- Internet
- Any future SMART Application
- ANPR – Journey time provision
- Car Park Management System
- Weather Monitoring Systems

The calculation of the possible benefits from these applications are defined in Section 5.5.4.

5.6.2 Remote Access / Adaptive Traffic Signal Control

The possible benefits to be derived from the geographical expansion of both Adaptive Traffic Signal Control and Remote Access has been developed from various research sources and from previous economic assessment undertaken by White Young Green report.

Remote Access

The White Young Green report for the UTMC Real Time Data Collection, Modelling and Dissemination Study, developed three scenarios to illustrate the opportunities to remotely connect numerous traffic signal installations on key routes to the UTMC system to deliver pro-active traffic management and control strategies during incidents on the network. The report considered the following scenarios in the table below.

Table 25: White Young Green Scenarios Assessment

Scenarios	Provision	Estimated Cost (£,000)	Estimated Benefits (£,000)	B/C Ratio No.
Scotswood Rd	Connect 12 sites & 8 ANPR cameras	124	569[8]	4.6
Stadium of Light, Sunderland	Connect 28 sites & 4 ANPR cameras	245	481	2.0
A1 Incidents	UTMC upgrades across multiple city routes; connecting 41 sites & 20 ANPR cameras.	442	4091	9.3
	Total	811	5141	6

This scenario modelling indicates a strong business case for upgrading to effective UTMC control but it is important to stress that the analysis is based on the more basic "fixed time" UTMC upgrade implemented by Tyne & Wear UTMC on some corridors during incidents. Due to the limitation of the above scenario modelling it was recommended that only 50% of the modelled benefits to be carried forward into the economic assessment for the report.

Those same recommendations to reduce the achieved modelled benefit have been carried forward into the economic assessment of this report.

Adaptive Traffic Signal Control: A wide range of research reference material was gathered to establish typical expected benefits (and installation costs) from the installation of SCOOT control to traffic signals junctions. All the reference material was collected from respected UK and European data sources. The following provides a summary of the review:

- **COMPASS web site (optimised Co-Modal Passenger Transport for Reducing Carbon Emissions)**: Financial issues: Installing SCOOT costs € 20,000 - 30,000 per junction. Overall user benefits are predicted to amount to around € 90,000 per junction (considering the value of time at 2009) and excluding vehicle operating costs (wear and tear, fuel, etc) and social cost of carbon reductions. Upgrading costs in both cases (SCATS and SCOOT) were reported to be about $20,000 per intersection – assuming existing infrastructure – based on current exchange rates this equates to around £13,000 per intersection.
- **ITS Leeds web site (Urban Traffic Control Systems)**: Installing SCOOT £20,000 - £25,000 per junction.

[8] Note: These benefits have been derived from the Value of Time at the time of the White Young Green Report; this value is subject to a consultation process at the time of this report (consultation closed 29th January 2016) – any resultant change in the Value of Time will have an impact on the level of benefits quoted in Table 24.

- **Transport for London, Finance and Policy Committee (Date: 18 July 2013), paper on Item 10: Road Space Management SCOOT**: The 12 per cent reduction in delay provides a benefit cost ratio of 16:1. This modelled benefit has now been supported by actual measured benefits over a large sample size.

- **TfL expands SCOOT adaptive traffic management (First published in ITS International November December 2012)**: The models predicted annual user benefits, per junction, of between £89,200 and £107,100, with an overall user benefit in the first year, per node, of £90,000 (2009 value of time) excluding vehicle operating costs and the social cost of carbon reductions. The modelling results have been validated and show that overall, across the 600 junctions, SCOOT is delivering an average 12.84% reduction in delays and 4.6% reduction in the number of times that vehicles have to stop as they travel through the network.

Due to the sheer size of the modelling exercise, the anticipated benefit from the introduction of SCOOT has been based on the modelling work for TfL. However, it was considered prudent to only consider 50% of that anticipated benefit with the business case. This dampening factor covers both factors for the transfer of benefits to NECA and also the unknown variations in junction performance.

5.6.3 Public Transport Measures

At present there seems to a significant opportunity to expand both the Tyne & Wear UTMC and Durham UTMC to include bus priority. This intervention coupled with a greater degree of intervention with NEXUS to provide real-time passenger information could yield significant network benefits and would strongly align with the developing objectives of the NECA Transport Manifesto. The measured / recorded benefits from the introduction of public transport measures are quoted in Section 3.3 and are summarised below:

- Peak hour mode shift (15%)
- Journey time improvement (30%)
- Reduction in accidents (80%)
- Increase in ridership (70%+)
- Reduction in emissions (40%)

At this stage it is impossible to determine the transferable benefits to the NECA region, without undertaking a more detail assessment of the current performance of the public transport network. Although it is strongly expected to yield significant benefits this intervention has been taken as neutral for the current NECA business case. In the 2014 report for Greener Journeys, KPMG estimate that bus priority schemes can typically generate £3.32 of benefit for every £1 invested. The report also indicated that bus priority schemes are also cheaper to build and maintain and quicker to implement than traditional infrastructure schemes.[9]

5.6.4 Combined Benefits

The proposed benefits carried forward into the NECA assessment are based on the following interventions:

- Real Time Travel / Road Information:

- Bundles together all the data collection systems (ANPR, weather stations, etc.);
- Bundles together all dissemination system (VMS, Internet, etc.); and
- Benefits from "Willingness to Pay" – various studies average value of 25p (values of between 5p-20p have been assumed for the NECA for various test scenarios)

[9] Bus 2020, The Case for the Bus, Greener Journeys

- Adaptive Traffic Signal Control:

- Remote Access Sites (average of £60k per junction over 10 years, benefits only taken 50% for the business case); and

- SCOOT Sites (average value of £90k per junction p.a., benefits only taken 50% for the business case).

- Public Transport Priority:

- Anticipated time saving per bus per junction; and

- Benefits are unqualifiable at this stage for the NECA region.

The following table provides an overview of the allocation of future benefits from the proposed interventions for both provision of real time information and provision of Adaptive Traffic Signal Control / Remote Access.

Table 26: Overview of ITS Benefits

Option	Discussion	Approx. Cost	Benefits
Increase number of UTMC Connected Signal Installations	At present there are approximately 640 signals (66%) operating in complete isolation with no facility to amend signal timings etc. Increasing the number of connected signals will improve control and strategy options. Seek to convert 110 sites as part of targeted upgrade of hot-spots and strategic routes to deliver a 33% increase in connected sites.	WYG Report suggesting connecting 110 sites to UTMC at a cost of £770k (£7k per site) It has been assumed, that the same sites would benefit from the installation of SCOOT system.	Benefits have been assumed at £90,000 per junction based on previous reports.
Nexus Data Broker Integration	Connecting Nexus data broker and UTMC systems will allow bus operations to be assessed independently of general network conditions along with the impact of specific measures / strategies on bus operations. It will also enable strategic bus priority to benefit public transport on specific corridors.	Recommendation / Costs taken from WYG report as £100k.	Included within the overall benefit for the provision of real time travel information.
Expand journey time monitoring (via ANPR) coverage to include all major radial routes and other major roads, including river crossings – it is understood that an extension to the ANPR coverage is planned in the current financial year.	Comprehensive coverage of the main congested routes throughout the region will be beneficial to local authorities, allowing better identification of issues. In combination with introduction of remote monitoring and dial-up control it will allow authorities to react to issue and target problem routes/locations.	WYG proposed an additional 30 ANPR locations to cover additional journey time information. Additional capital cost = £140,000 (approx. £5k per location)	Included within the overall benefit for the provision of real time travel information.

Option	Discussion	Approx. Cost	Benefits
Expand coverage of car park occupancy monitoring	Car park occupancy monitoring is useful both to members of the public in planning journeys, and also to local authorities, allowing more efficient signing of traffic. Ongoing commissions in Newcastle, Durham and Gateshead.	Newcastle – £1,430k Durham – Gateshead - £650k Cost includes extended maintenance agreements.	Included within the overall benefit for the provision of real time travel information.
Improve data presentation on existing website	Although the website (and any subsequent app) is unlikely to be able to compete with Google/Apple etc for journey planning it does contain information that is not readily available elsewhere. The existing software developed by both Tyne & Wear & Durham UTMC would form a good starting point to improve data presentation. Training for all local authority users should be provided. The sire should be promoted on local authority websites.	£50,000 for initial improvements and review of potential improvements.	Included within the overall benefit for the provision of real time travel information.

Table 27: Application of Benefit (Low Value)

Intervention	Researched Benefits	Benefits (2010)	Quantity	2016	Benefit pa	2017	Benefit pa	>2018	Benefit pa
SCOOT / RMS Interventions									
Current: Remote Sites	£6,000 p.a. per junction	£5,700	284	50%	£809,400	50%	£809,400	50%	£809,400
Current: SCOOT Sites	£90,000 p.a. per junction	£85,500	117	50%	£5,001,750	50%	£5,001,750	50%	£5,001,750
In-Flight: Remote Sites	£6,000 per junction	£5,700	0	50%	£0	50%	£0	50%	£0
In-Flight: SCOOT Sites	£90,000 per junction	£85,500	0	50%	£0	50%	£0	50%	£0
Future: Remote Sites	£6,000 per junction	£5,700	110	50%	£0	50%	£0	50%	£313,500
Future: SCOOT Sites	£90,000 per junction	£85,500	0	50%	£0	50%	£0	50%	£0
Real Time Information									
VMS / Web / App / etc.	Ave WTP £0.25	£0.25	16,625,000	0.10	£1,581,000				
			16,625,000			0.10	£1,581,000		
			33,250,000					0.10	£3,161,695

Table 28: Application of Benefit (Med Value)

Intervention	Researched Benefits	Benefits (2010)	Quantity	2016	Benefit pa	2017	Benefit pa	>2018	Benefit pa
SCOOT / RMS Interventions									
Current: Remote Sites	£6,000 p.a. per junction	£5,700	284	50%	£809,400	50%	£809,400	50%	£809,400
Current: SCOOT Sites	£90,000 p.a. per junction	£85,500	117	50%	£5,001,750	50%	£5,001,750	50%	£5,001,750
In-Flight: Remote Sites	£6,000 per junction	£5,700	0	50%	£0	50%	£0	50%	£0
In-Flight: SCOOT Sites	£90,000 per junction	£85,500	0	50%	£0	50%	£0	50%	£0
Future: Remote Sites	£6,000 per junction	£5,700	110	50%	£0	50%	£0	50%	£313,500
Future: SCOOT Sites	£90,000 per junction	£85,500	0	50%	£0	50%	£0	50%	£0
Real Time Information									
VMS / Web / App / etc.	Ave WTP £0.25	£0.25	16,625,000	0.10	£1,581,000				
			33,250,000			0.10	£1,581,000		
			33,250,000					0.15	£4,742,542

Table 29: Application of Benefit (High Value)

Intervention	Researched Benefits	Benefits (2010)	Quantity	2016	Benefit pa	2017	Benefit pa	>2018	Benefit pa
SCOOT / RMS Interventions									
Current: Remote Sites	£6,000 p.a. per junction	£5,700	284	50%	£809,400	50%	£809,400	50%	£809,400
Current: SCOOT Sites	£90,000 p.a. per junction	£85,500	117	50%	£5,001,750	50%	£5,001,750	50%	£5,001,750
In-Flight: Remote Sites	£6,000 per junction	£5,700	0	50%	£0	50%	£0	50%	£0
In-Flight: SCOOT Sites	£90,000 per junction	£85,500	0	50%	£0	50%	£0	50%	£0
Future: Remote Sites	£6,000 per junction	£5,700	55	50%	£0	50%	£0	50%	£156,750
Future: SCOOT Sites	£90,000 per junction	£85,500	55	50%	£0	50%	£0	50%	£2,351,250
Real Time Information									
VMS / Web / App / etc.	Ave WTP £0.25	£0.25	16,625,000	0.10	£1,581,000				
			33,250,000			0.10	£1,581,000		
			33,250,000					0.20	£6,323,390

5.7 Discontinuation of UTMC Provision

This option considers the option for ending the current provision of UTMC services within the NECA region. This option would consider the cost savings from operating the centres (building / staffing costs) against the loss of network benefits from discontinuing the current services.

Similar to the business case developed for the continuity and expansion of the existing services, the discontinuing of the current UTMC provision will be assessed over a ten year period; as such current inflight enhancements have been included in the assessment.

The following aspect will be considered in the assessment.

Cost Savings:

- Annual staffing costs;
- Annual rental costs;
- Annual power;
- Annual communication costs; and
- Annual maintenance costs.

Benefit Reduction:

- Annual benefits from junction delays;
- Annual benefits from UTMC interventions;
- Rewrite off cost of existing equipment;
- Decommissioning cost of existing equipment (removal).

Applying the current annual cost estimates to the above items, would yield a savings of approximately £16m (2010 prices discounted to 2010) over the ten years assessment period.

However, using the same benefit assessment methodology for the existing system, it was estimated that the current system is yielding around £60 million of network benefits (2010 prices discounted to 2010) and would require write off / decommission costs of the existing systems and infrastructure in the region of £9 million (2010 prices discounted to 2010).

Combining these two estimates together, would indicate that the discontinuation of the existing UTMC services would net a total dis-benefit to the network of approximately £53m over the next ten years.

Based on the above analysis there is strong evidence to suggest that the discontinuation of the existing UTMC services would have a significant negative impact on the current network performance of the existing and future transport network and the clear recommendation is to only consider the options relating to the continuity of the existing UTMC services.

5.8 UTMC Business Case for Continuing UTMC Services

The standard range of economic indicators has been produced for the NECA business case options, which are as follows:

- Internal Rates of Return (IRR);
- Benefit-Cost Ratios (BCR); and
- Net Present Values (NPV).

The above indicators were also subject to a range of their sensitivity test to account for external factors; such as failure to mitigate the risks outlined in Section 5.7.

Based on the information presented in the DfT Value for Money Assessment: Advice Note for Local Transport Decision Makers (2013):

- Poor VfM if BCR is below 1.0;

- Low VfM if BCR is between 1.0 and 1.5;
- Medium VfM if BCR is between 1.5 and 2.0;
- High VfM if BCR is between 2.0 and 4.0; and
- Very High VfM if BCR is greater than 4.0

The range of current, in-flight and proposed interventions / system can be considered as a package of measures that contribute towards improving both the effectiveness of the NECA transportation networks and informed travel choices by the travelling public. Under this Business Case these interventions have been clustered together into two packages:

- Real Time Information; and
- Adaptive Traffic Signal Control / Remote Control.

Evidence collected under practice review, clearly indicates significantly greater potential for network benefits from the current, in-flight and proposed interventions. However, a conservative approach has been used when assessing all financial benefits and the above approach can be consider pessimistic in the value of benefits quoted.

The full economic assessment tables are contained within Appendix C, providing details on both the costs and benefits estimates for the NECA region and are summarised in the tables below.

Table 30: Value of Costs (2010 prices, at 2010)

Item	Operating Costs	Capital Costs	Total Costs
NECA UTMC	£10,070,592	£19,557,922	**£29,628,514**

The proposed economic assessment planned to investigate the options between running the current twin UTMC systems or combining into a single centre. However, due to the fact that Durham UTMC does not have any dedicated staff or allocated control room, the cost differential between both options is insignificant in terms of the business case outcome. The only cost savings would be allocated to the reduction in the replacement costs of one of the UTMC system (estimated at £300,000 at 210 prices).

However, there is evidence to strongly suggest that a single centralised control system will enhance network co-ordination, improved consistency in the management of incidents / special events and would also become a strong focus point for the whole region.

There are counter arguments that suggest that due to improved communication links between systems, and if clear and concise operational agreement are in place, then there is now no need for a centralised system.

As indicated there is very little cost difference between both options and effective co-ordination between the two centres could yield the same level of benefit from a central system; therefore, the main reason for one system would be to become a focal point for the provision of traffic and travel information for the whole of the NECA region and as such this is the recommended and assessed option. The following table provides the cost benefit analysis based on this option.

Table 31: Value of Benefit & Net Present Value (2010 prices, at 2010)

Option	Benefits	BCR	NPV
Low	£64,331,855	2.17	£34,703,341
Average	£72,872,961	2.46	£43,244,447
High	£94,117,563	3.18	£64,489,049

5.9 Risk Assessment

The following table provides details of the possible risk to delivery / continuation / expansion of the UTMC services across the region and the proposed mitigation actions to reduce these risks.

Table 32: NECA Risk Assessment

Risk	Details	Impact	Likelihood	Mitigating Action	Residual Risk
Facilities	Current facilities insufficient to accommodate the current and future needs of the NECA.	High	High	Pending building works may impact on the option to remain at the current location; mitigating action would be to investigate an alternative location prior to end of 2016.	High
	Any restriction on space usage, functions or other users to the facilities.	Moderate	Moderate	Proposed options include continued location at Newcastle University or new facility. Any proposed new building works will have minimum impact on existing operations.	Low
	Facilities to be fit into an existing building / space	Moderate	High	Building feasibility design studies would be required for any new locations.	Low
Technologies	Poor or no maintenance agreements in place for the existing / proposed systems.	High	Moderate	Number of maintenance plans in place for both UTMCs and field equipment support. Need to consider future options.	Low
	Lack of support for external stakeholder's needs from current / proposed technologies.	Moderate	Low	Extensive stakeholder engagement with wide range of parties to address all external needs. Strong support for UTMC services across the region.	Low
Stakeholders	Lack of active participation of external stakeholders to support functions and roles for the new UTMC.	High	Low	Identification of stakeholder participation and engagement for current and planned operations.	Low
Leadership / Organisational Structure	Institutional issues or challenges that could impact the overall performance of the new UTMC.	High	Moderate	Identification of stakeholder participation and engagement for current and planned operations.	Low
	Internal / external management practices or processes that impact the working of the proposed UTMC.	High	Moderate	Identification of stakeholder participation and engagement for current and planned operations.	Moderate

Risk	Details	Impact	Likelihood	Mitigating Action	Residual Risk
Funding	Adequate funding available to address recommended technical, operational and maintenance needs.	High	Moderate	Strong business case for the justification of the provision of recommended technical, operational and maintenance needs	Moderate
Resources	Insufficient resources to adequately staff the functional and operational requirements of the UTMC Gaps in current staffing training needs for new technical capabilities.	High High	Low Moderate	Ensure appropriate levels of staffing are included in the ongoing operations of the UTMC. High quality staff currently in place at both UTMC centres.	Low Low
Timeframe	Sufficient timeframe for new UTMC to be in place.	High	Moderate	Adherence to programme for the justification of business case for UTMC.	Moderate

Conclusions

06

6 Conclusion

The North East Combined Authority (NECA), like many regions around the world, has significant transport challenges, many of which relate to rapidly increasing levels of private car ownership, combined with a number of other factors which contribute to congestion on the urban transport network. These challenges are set against a backdrop of reduced funding and limited operational budgets. To address these challenges, the NECA has set out its objectives on how to best manage the transport networks and deliver enhancements in the efficient movement of people, goods and services across the region.

The applications of Intelligent Transport Systems (ITS) have been proven to deliver real network benefits across the world. The review of best practice in the application of ITS and UTMC demonstrates the importance of ITS services in delivering policy objectives for transport networks and subsequently, allowing synergy with other transport interventions (e.g. infrastructure and public transport operations).

Across the NECA region, there is a range of ITS services that have already been deployed to manage the network. However, it has been generally recognised that there is scope to develop this further through enhanced and increased provision.

This report reviewed both the justification for maintaining the existing services and investigates the economic benefits of extending those services.

The investigation identified the following UTMC services as key interventions for supporting the delivery of the Network Management Statement and other high level objectives, whilst also enhancing network performance within the region.

- Adaptive Traffic Signal Control
- Traveller Information
- Parking Management
- SMART Application
- Public Transport Management
- Internet Services
- Weather / Environmental Systems

The assessment of these key interventions against the objectives indicate that Adaptive Traffic Signal Control scores best when measured against objectives, closely followed by Traveller Information Services (VMS, internet, etc.). Parking Management and Weather / Environmental monitoring score less well against the objectives, although they do provide an extremely valuable source of information.

The assessment undertaken provides an overview of how well a virtual NECA system would perform against best practice. The score for the core services indicated that these services are tracking in the right direction and reflect the investment already made in these areas. However, all services indicate scope for improvement, either in the geographical coverage to improve the strategic management of the network, or for additional services such as SMART applications and public transport management.

Ranking	UTMC Interventions	Score
Joint 1st	Adaptive Traffic Signal Control	42
	Traveller Information (VMS / Journey Time / etc.)	42
	Internet Services	42

2nd	Weather / Environmental Monitoring	38
3rd	Parking Management	36
Joint 4th	SMART Applications	6
	Public Transport Management	6

The scores for the virtual NECA UTMC indicate that there is a good correlation between those interventions that align well with the objectives and the investment made to date in those areas. However, the scores indicate a possible under investment in both SMART applications and public transport management interventions.

Based on the findings above, a programme of interventions has been identified to enhance the existing services, this includes:

- Geographical expansion of SCOOT installation;
- Increase the number of connected traffic signals;
- Create linkages with the NEXUS database;
- Expand ANPR coverage (journey time monitoring);
- Installation of additional strategic VMS;
- Enhancement / creation of a NECA web site;
- Provision of parking management and guidance systems; and
- Enhanced provision and usage of weather and air quality monitoring.

A number of the above interventions are already committed and are currently being installed, with a scheduled delivery date of 2016.

At present, the development of a NECA SMART application (App), would reside with the private sector, with future UTMC providing access to open data to support any development. As such, SMART Applications have not been included within the proposed interventions/improvements.

The above interventions have been carried forward into the development of a business case for the justification of both the existing services and future provision.

The costs have been allocated between capital and operating (revenue) costs and have been applied over a ten year assessment period.

Capital costs include the following item coverage:

- Existing equipment: These costs are based on the supply and installation costs of the existing equipment, including the current residual value of the Common Database;
- In-flight developments (2016): Current developments expected to be delivered in 2016;
- Proposed enhancement (short term 2016-2020): Proposed future interventions, an allowance has also been made under this provision for the replacement cost of all the current field and CDB provision.

Operational costs have been included within the assessment of the business case for each of the assessment years:

- System Support: Annual support cost for CDB;

- Building Costs: Annual Rate & Rents costs for control centre;
- Field Equipment: Annual maintenance cost to maintain all field equipment, annual cost for power consumption and annual cost for telecommunications;
- Staffing: Annual staff cost for core UTMC provision and annual staff costs for remote access from all seven local authorities across NECA.

The current UTMC system supports a range of operations across Tyne & Wear and Durham to enhance network conditions and provide real time travel information. A combined NECA UTMC is expected to deliver the following benefits:

- Improved integration between different ITS interventions, through the use of an Urban Traffic Management and Control common database, ensuring that NECA transport networks operate at optimal efficiency;
- Enhanced network efficiency (safer, informed travel choices, improved air quality information, network reliance during incidents, reduced travel costs);
- Reduce the impact of incidents on the network via proactive management of incident response plans and co-ordination with emergency services;
- Assist the travelling public during network incidents to find the best route and mode of transport during any major incidents;
- Improved safety by providing road users with real time information on the network conditions (weather, accidents, etc.);
- Improved public transport networks by providing passengers with accurate real time information about network services;
- Improvement of freight operations through the provision of real time network information;
- Reduce the effect of air pollution from vehicles by more adaptive traffic management strategies;
- Improved network security by the provision of CCTV at strategic locations and car parks;
- Attract inward investment by reducing network journey time / improve journey time reliability to increase economic viability and vitality of rural and urban areas;
- Improve health and wellbeing be enabling local communities to plan journeys better via providing real time public information on travel options, parking, costs and journey times;
- Offering more attractive travel experience for visitors to the region, accommodating flexible responses for sessional needs of tourism across the network;
- Enhancing customer satisfaction with the level of service provided across all of NECA transport networks; and
- Establishing a focal point for all NECA traffic management; and
- Assist in the establishment of the NECA brand across the North East.

Based on the above, the following financial benefits have been carried forward into the NECA assessment, based on the following interventions:

- Provision of Real Time Travel / Road Information;
- Remote Access to Traffic Signals; and

- Expansion of SCOOT Provision

Evidence collected under practice review, clearly indicates a significantly greater potential for network benefits from the current, in-flight and proposed interventions. However, a conservative approach has been used when assessing all financial benefits and the above approach can be considered pessimistic in the value of benefits quoted.

The first stage of the business case development considers the option for ending the current provision of UTMC services within the NECA region. This option would consider the cost savings from operating the centres (building / staffing costs) against the loss of network benefits from discontinuing the current services. Combining these two estimates together, would indicate that the discontinuation of the existing UTMC services would net a total disbenefit to the network of approximately £53m over the next ten years. Based on the above analysis, there is strong evidence to suggest that the discontinuation of the existing UTMC services would have a significant negative impact on the current network performance. **A clear recommendation is to only consider options relating to the continuity of the existing UTMC services**.

The proposed expansion of the current UTMC services are focused on infilling gaps in the current provision and expanding the range and means of delivering real-time traffic and travel information. The business case also investigated and established new staffing levels sufficient to accommodate the above expansion over the next ten years.

The assessment also deployed a conservative approach to estimate the potential network benefits, leading to a pessimistic approach to the justification of the UTMC services over the next ten years.

The table below provides the summary assessment of the analysis.

Option	BCR	DfT Value for Money Assessment
Low Option	2.17	High
Average Option	2.46	High
High Option	3.18	High

The proposed future provision returns high value for money for all test scenarios, based on the guidance presented in the DfT Value for Money Assessment: Advice Note for Local Transport Decision Makers (2013). These values are returned against pessimistic estimation of network benefits. As such, it is highly likely that the BCR would tend to be the higher end of the forecast range.

Based on the above assessment, there is strong justification for the continuity of existing services and also, strong evidence to suggest that in-flight and future interventions would enhance current network performance and return a high value for money Benefit Cost Ratio.

Appendices

Appendix A: Draft Network Management Statement

NECA Network Management Statement

The North East Combined Authority (NECA) statement "Our Journey" set out a twenty year manifesto for the North East, with the objectives to provide attractive, reliable, safe, healthy transport choices for businesses, residents and visitors while enhancing the environment.

This Network Management Statement provides a framework for our investment in intelligent transport systems over the next 20 years. Our intent is to fully maximise the development of technologies and exploit the already considerable investment in our Urban Traffic Management and Control Systems to support the delivery of the four key themes identified within "Our Journey":

- ***Easy to Use:*** *It should be easy to plan safe journeys, find out the best way to travel, pay for tickets and get all the essential information for your journey;*
- ***Reliable:*** *The transport network should be one that we can rely on to work, with buses and trains running on time and congestion at a minimum;*
- *Affordable: The cost of travelling will not be a barrier to commuting, learning or exploring; and*
- *Accessible: Transport should run as near as possible to where people live and want to travel to, and where businesses are (or want to be) located. It should be usable by everyone including people with disabilities.*

This statement sets out NECA's response to the opportunities presented by Intelligent Transport Systems (ITS) to support the delivery of these four key themes. New technologies offer exciting developments that can transform the way we plan, invest in and manage parts of our transport network.

Across the world ITS interventions have an increasingly important role as key enablers of a transport system that is able to shape smart choices for all travellers across our network, support safer and more reliable journeys, deliver more efficient movement of people and goods and supporting sustainable travel.

Our commitment for the North East is to realise the full potential of intelligent transport systems and will require us to continue to invest in a range of ITS initiatives. Where ITS will support NECA's four key themes, we will:

- Invest in and support intelligent transport systems solutions that demonstrably contribute to our strategic objectives, enabling us to focus our available resources where they'll add most value for the whole region;
- We promote a traveller-centric approach across all interventions, with users of our networks at the core of everything we do;
- We consider intelligent transport systems from a multi-modal perspective, integrating information and the customer experience across all modes;

- We encourage sector-led intelligent transport systems development and investment, looking to enable Small Medium Enterprises (SMEs) and our Universities to play their role in our journey; and
- We value sustainable travel over all other modes and will exploit ITS to encourage and enable sustainable travel choices.

Current Status of Intelligent Transport Systems in the North East

There have already been significant investments in intelligent transport systems across the North East; the region currently has two Urban Traffic Management & Control (UTMC) systems providing network management and control interventions across six of the seven local authorities within the region.

Between them the systems are providing network benefits:

- Control over signalised junctions, with xxx on traffic signal control and another xxx utilising adaptive traffic signal control (SCOOT);
- Journey time and event information on strategic located Variable Message Signs on a number of the key corridors;
- Weather and environmental monitoring….
- Monitoring of car parking information….
- Collection of data to support future development, including traffic counts and journey time information on strategic corridors; and
- Fully exploiting social media to inform our customers of up to the minute information about conditions on the public transport and road networks.

We are constantly investigating and developing new services to improve the end-to-end journey experience of our customers across all modes of transport. At present we are installing a number of latest generation Variable Message Signs (VMS) at strategic locations across the region; these signs add flexibility and will be able to provide more detailed information including journey times, incident reports, parking and event information on the approaches to our major centres.

Within Newcastle we are also currently investigating the development of a new Car Parking Management System (CPMS), which will enable increased flexibility in the way we all pay for our parking and will provide smart applications for the dissemination of real time parking space availability.

Intelligent Transport Systems has also been identified as having an important part to play in the significant programme of planned infrastructure improvement across the North East and will support these improvements during both the construction and operational phases of any new infrastructure.

How will future intelligent transport systems benefit the North East?

NECA continually monitor the global transport sector to ensure that our intelligent transport systems efforts and investment practices are maximising returns for the North East.

We are also engaging with key stakeholders to undertake a strategic review into the way we provide ITS services across the whole North East; establishing how best we can drive efficiency and improve services both into our highly populated urban areas and our significant rural hinterland.

While technology is already used to deliver a number of significant transport sector benefits, making more effective use of existing intelligent transport systems and targeted enhancement could take it to the next level, enabling dramatic improvements in:

- Improving the amount and quality of the data we gather; development SMART applications to disseminate real-time and informed information on the status of all our transport networks;
- Enhance our ability to respond to operational issues across all our transport networks, both in terms of the geographical coverage and the benefits we can deliver to the users of those networks;
- Enhance the safety of all our customers across all transport network; providing systems to react quickly to any incidents on our networks;
- Provide more reliable networks, linking to third party system to enhance end-to-end journey experience;
- Enhance all travellers' access to the real-time information that they need to plan and complete their journeys; and
- Provide more systems that support sustainable forms of transport; providing priority to those modes and better information on available of sustainable alternatives.

Intelligent Transport Systems have been widely demonstrated to provide benefits many different customer groups and networks, is has been identified as a priority area.

In the next five years we plan to work with our key stakeholder to develop a shared approach to intelligent transport systems and their implementation in the North East.

Our work will focus on supporting the four key themes of the Transport Manifesto for the North East, supporting the delivery of attractive, reliable, healthy transport choices for all.

Key Themes			
Easy to Use:	*Reliable:*	*Affordable:*	*Accessible:*
Systems			
NECA – Urban Traffic Management Control (UTMC) NEXUS – Public Transport Systems Highways England - Regional Control System	NECA – Urban Traffic Management Control (UTMC) Highways England - Regional Control System	NECA – Urban Traffic Management Control (UTMC)	NECA – Urban Traffic Management Control (UTMC)
ITS Interventions			
• *Integrated ticketing (SMART cards, etc.);* • *Real-time travel information (public transport (RTPI), SMART Apps, Variable Message Signs (VMS), etc.);* • *Journey planner for all modes of travel; and* • *Linkages with external systems, such as the Highways England travel web site.*	• *Adaptive traffic signal plans implemented via Urban Traffic Management Control (UTMC) system;* • *Network priority to sustainable journeys – public transport, cycling, taxi, etc;* • *Technology interventions to reduce the impact of congestion, including Journey Time information and adaptive traffic signals;* • *Incident management system to reduce the impact of accidents on the network; and* • *Data share on events impacting on cross boundary journeys.*	• *Technology interventions to promote more cycling (priority at junctions, innovation low energy lighting of cyclic paths, cycling Apps (spaces on trains, location of cycling facilities, etc.) and monitoring).*	• *Information hub support information on mobility (include dial-a-bus, taxi, accessible public transport, etc).*

Appendix B: Survey Sheets

Benchmarking of Current UTMC Systems

Highway Authority:	Bristol CC	
Respondent:	*Name:*	J Davies, UTMC Engineer
	Contact Details:	01173 525 814/ Jackie.davies@bristol.gov.uk
Interviewer:	George Lunt (by e-mail)	
Date of interview:	24/11/15	
UTMC System:	SCOOT Cloud Amber Common database – VMS/ CPGVMS/ JTMS/ Strategy Manager CCTV & ANPR network	
Installation Date:	2008	
Approx. Network Coverage:	100% UTC on key sites, 80% for VMS on key routes. 100% for CPGVMS 90% for JTMS	

System Interventions:		
	✓ Adaptive Traffic Signal Control	✓ Traveller Information (public transport)
	✓ Roadside Traveler Information (VMS)	✓ Public Transport Management
	☐ Air Quality Monitoring	☐ Weather Monitoring
	☐ Electronic Public Transport fare payment	✓ Car Parking Management System (CPMS)
	☐ Automatic Incident Detection / Management	✓ Responsive Demand Management – if by this you mean SCOOT, yes.
	☐ Freight services	✓ Enforcement Services – bus lane enforcement
	✓ CCTV	✓ Social Media / Internet Service – traffic twitter
	✓External Links to other systems (please indicate)	
Others:	☐	☐

Interfaces with Other Systems:	Car parks and ANPR system to receive data

Maintenance Arrangements:	Software:	Annual maintenance paid
	Field Equipment:	Under contract

Hours of Operations:	Traffic control centre open 7 – 7 mon to fri and weekends when needed.

Staffing:	Staff numbers:	Meant to be 6, currently 2. – Currently interviewing for 4 replacement staff.

Control:	Specific control room?	Y
	Size of control room?	8 work stations

Overall Control Centre Dimensions:	20m x 25m?

Other Comments:	none

Benchmarking of Current UTMC Systems

Highway Authority:	Cardiff Council	
Respondent:	*Name:*	David Kinnaird / Peter Azzopardi
	Contact Details:	Electrical Team, Room 301,
Interviewer:	City Operations, Cardiff Council, Atlantic Wharf, County Hall	
Date of interview:	Cardiff, CF10 4UW	

UTMC System:	Siemens Comet / UTC Cloud Amber Argonaut
Installation Date:	
Approx. Network Coverage:	City of Cardiff Council

System Interventions:		
	√ Adaptive Traffic Signal Control	☐ Traveller Information (public transport)
	√ Roadside Traveler Information (VMS)	☐ Public Transport Management
	☐ Air Quality Monitoring	☐ Weather Monitoring
	☐ Electronic Public Transport fare payment	√ Car Parking Management System (CPMS)
	☐ Automatic Incident Detection / Management	☐ Responsive Demand Management
	☐ Freight services	☐ Enforcement Services
	☐ CCTV	√ Social Media / Internet Service
	☐ External Links to other systems (please indicate)	Bute Town Tunnel
Others:	☐	☐

Interfaces with Other Systems:	VMSS

Maintenance Arrangements:

Software:	Siemens & Cloud Amber
Field Equipment:	

Hours of Operations:

24hrs, 7 days

Staffing:

Staff numbers:	11 Operators working 2 per shift

Control:

Specific control room?	Yes
Size of control room?	Cardiff Traffic & Tunnel Control Room, shared with South Wales Police

Overall Control Centre Dimensions:

Other Comments:

The control room in Cardiff monitors and controls • Traffic signals & pedestrian crossings • Automatic rising bollards • LED Variable Message signs • Carpark management signs • Rotating plank signs • CCTV camera • Bute Town Tunnel The control room also carries out community safety CCTV monitoring along with liaising with the Councils civil parking enforcement team.

Benchmarking of Current UTMC Systems

Highway Authority:	Durham County Council	
Respondent:	*Name:*	Malcolm Sinclair
	Contact Details:	03000 267088
Interviewer:	Stephen D Lavelle	
Date of interview:	4th November 2015	

UTMC System:	Motts MacDonald Osprey System
Installation Date:	-
Approx. Network Coverage:	County wide coverage.

System Interventions:

✓ Adaptive Traffic Signal Control	☐ Traveller Information (public transport)
✓ Roadside Traveler Information (VMS)	☐ Public Transport Management
☐ Air Quality Monitoring	✓ Weather Monitoring
☐ Electronic Public Transport fare payment	✓ Car Parking Management System (CPMS)
☐ Automatic Incident Detection / Management	✓Responsive Demand Management
☐ Freight services	✓ Enforcement Services
✓ CCTV	✓ Social Media / Internet Service
✓ External Links to other systems (please indicate)	See below
☐	☐

Others:

Interfaces with Other Systems:

- Newton Cap Wind Warning system;
- Siemens Traffic Signal RMS;
- Symology ;
- 3M ANPR Journey time system;
- Highways England
- Police – STORM system

Maintenance Arrangements:

Software:	Motts MacDonald
Field Equipment:	Various agreements

Hours of Operations:

Standard office hours

Staffing:

Staff numbers:	*No Dedicated staff* - Signals & UTMC team manage & operate the system via the cdv viewer & webclient viewer but no-one is solely UTMC duties.

Control:

Specific control room?	N
Size of control room?	N/A

Overall Control Centre Dimensions:

N/A

Other Comments:

Durham UTMC system:

- Strategy Manager
- Event manager
- Fault Manager
- Car Park & VMs Manager
- Alert Manager
- Count Manager
- Journey Time Manager
- Asset Manager
- Strategic VMS Manager
- CCTV Manager

Durham uses the Cdmf this as a very effective method of providing access to the system for Network Management colleagues and others. It should be noted that this level of access to UTMC for multiple Durham users would be a requirement for any future options which consider having a single NECA wide UTMC system.

Journey time data is currently exported from UTMC & published on DCC website and there is a programme of development to include data from streetworks, camera images, VMS, car parks etc.

Benchmarking of Current UTMC Systems

Highway Authority:	City of Edinburgh Council	
Respondent:	*Name:*	Robert Mansell
	Contact Details:	Robert.mansell@blueyonder.co.uk
Interviewer:	n/a	
Date of interview:	30/11/15	
UTMC System:	Mott MacDonald Osprey	
Installation Date:	2006	
Approx. Network Coverage:	Edinburgh Council boundary plus some East Lothian & Mid Lothian	

System Interventions:		
	✓ Adaptive Traffic Signal Control	✓ Traveller Information (public transport)
	✓Roadside Traveler Information	✓ Public Transport Management
	✓ Air Quality Monitoring	☐ Weather Monitoring
	☐ Electronic Public Transport fare payment	✓ Car Parking Management System (CPMS)
	☐ Automatic Incident Detection / Management	✓ Responsive Demand Management
	☐ Freight services	✓ Enforcement Services
	✓ CCTV	✓ Social Media / Internet Service
	✓ External Links to other systems (please indicate)	DATEX II Transport Scotland
Others:	☐	☐

Interfaces with Other Systems:	

Maintenance Arrangements:

Software:	Mott MacDonald
Field Equipment:	None

Hours of Operations:

Control room – 7.30-18.30 Mon - Fri

Staffing:

Part time staff numbers:	No part time staff

Control:

Specific control room?	Y
Size of control room?	3 desks – shared with Lothian Buses

Overall Control Centre Dimensions:

Not known

Other Comments:

Benchmarking of Current UTMC Systems

Highway Authority:	Halton Borough Council	
Respondent:	*Name:*	Stephen Rimmer
	Contact Details:	0151 511 7401
Interviewer:	Stephen Lavelle	
Date of interview:	3rd November 2015	

UTMC System:	Currently Comet but we are moving to Stratos in the next few weeks. We also have a Siemens RM system that is being migrated to Stratos to provide a hosted solution. Our traffic signals are generally isolated but some sites are linked MOVA. We do not have SCOOT.
Installation Date:	2007
Approx. Network Coverage:	

System Interventions:	✓ Adaptive Traffic Signal Control	☐ Traveller Information (public transport)
	✓ Roadside Traveler Information (VMS)	☐ Public Transport Management
	☐ Air Quality Monitoring	✓ Weather Monitoring
	☐ Electronic Public Transport fare payment	☐ Car Parking Management System (CPMS)
	✓ Automatic Incident Detection / Management	☐ Responsive Demand Management
	☐ Freight services	☐ Enforcement Services
	✓ CCTV	✓ Social Media / Internet Service
	✓ External Links to other systems (please indicate)	
Others:	☐	☐

Interfaces with Other Systems:	Inrix, Findlay Irvine

Maintenance Arrangements:	Software:	Siemens
	Field Equipment:	Current ITS Contractor except anemometer and ANPR cameras with manufacturer

Hours of Operations:	Office hours, but no control room

Staffing:	Staff:	Going via the service review

Control:	Specific control room?	~~Y/~~N
	Size of control room?	

Overall Control Centre Dimensions:	

Other Comments:	Whilst we have a CCTV Control Room, it does not currently deal with traffic systems.

Benchmarking of Current UTMC Systems

Highway Authority:	Leeds City Council	
Respondent:	*Name:*	Gordon
	Contact Details:	Robertson
Interviewer:	Jeremy Hancox	
Date of interview:	1 Dec 2015	

UTMC System:	Mott MacDonald
Installation Date:	2006
Approx. Network Coverage:	800 signals

System Interventions:

☐ Adaptive Traffic Signal Control	✓ Traveller Information (public transport)
✓ Roadside Traveler Information	☐ Public Transport Management
☐ Air Quality Monitoring	☐ Weather Monitoring
☐ Electronic Public Transport fare payment	✓ Car Parking Management System (CPMS)
☐ Automatic Incident Detection / Management	☐ Responsive Demand Management
☐ Freight services	☐ Enforcement Services
✓CCTV	✓Social Media / Internet Service
☐ External Links to other systems (please indicate)	
Others: ☐	☐

Interfaces with Other Systems:	Bus priority system

Maintenance Arrangements:	Software:	Mott MacDonald
	Field Equipment:	Imtech
Hours of Operations:	7-7	
Staffing:	Part time staff numbers:	2
Control:	Specific control room?	Y
	Size of control room?	4 positions
Overall Control Centre Dimensions:	10m x 8m	
Other Comments:		

Benchmarking of Current UTMC Systems

Highway Authority:	*Tyne & Wear UTMC*	
Respondent:	*Name:*	Ray King
	Contact Details:	0191-277-2590
Interviewer:	Stephen D Lavelle	
Date of interview:	3rd November 2015	

UTMC System:	Mott MacDonald Osprey System
Installation Date:	
Approx. Network Coverage:	Tyne & Wear covering five Council regions (Gateshead / Newcastle upon Tyne / North Tyneside / South Tyneside / Sunderland)

System Interventions:	
✓ Adaptive Traffic Signal Control	☐ Traveller Information (public transport)
✓ Roadside Traveler Information (VMS)	☐ Public Transport Management
✓Air Quality Monitoring	✓ Weather Monitoring
☐ Electronic Public Transport fare payment	✓ Car Parking Management System (CPMS)
✓ ~~Automatic~~ Incident Detection / Management	☐ Responsive Demand Management
☐ Freight services	☐ Enforcement Services
✓ CCTV	✓ Social Media / Internet Service
✓ External Links to other systems (please indicate)	Highways England / Elgin
Others: ☐	☐

Interfaces with Other Systems:	In-flight development to develop a link between Tyne & Wear UTMC and Durham UTMC.

Maintenance Arrangements:

Software:	Current agreement with Motts is reaching end of agreement – funding until 2017.
Field Equipment:	Various agreements for difference systems – Siemens RMS / UTC, CCTV, ANPR and VMS. Traffic signals maintenance is undertaken in-house.

Hours of Operations:

07:00 – 19:00 – 5 Days a Week (additional coverage for special events, with planned overtime paid).

Staffing:

Staff numbers:	Four operating staff plus one UTMC manager. Current staff also performed on-site maintenance tasks – SCOOT loop validation.

Control:

Specific control room?	Y/N
Size of control room?	tbc

Overall Control Centre Dimensions:

tbc

Other Comments:

- Telecommunication increasing ongoing costs – needs to be addressed;
- Bus information such as RTPI reside with NEXUS at present – bus operators (3) have data – but currently no shared information from NEXUS;
- No link / data exchange with the Northumberland Police;
- At present there is no bus priority provided by the Tyne & Wear UTMC – bus priority currently provided by hard infrastructure;
- ANPR commission awarded to CA Traffic - £1.5m over 3 years - contract being used to install ANPR cameras into three car parks – Dean Street / Eldon Garden / Eldon Square to monitoring exit and entry;
- All car parks are on the system – displayed in the Tyne & Wear web site – but no dynamic details;
- At present it is estimated that 50% of the inductive loops are out of order;
- Suggestion that other NECA staff could be trained to provide additional support during periods of stress – such as the Christmas period; and
- New agreement required for the office location – could be shared facilities.

Case Studies[10]

Cambridgeshire, UK

Cambridgeshire is a medium-sized inland county in the east of England. It has an area of 3,389 km2 and a population of approximately 612,000 (2011).

The principal city, Cambridge, has a population of 122,000. Cambridgeshire has a total road network of 4,342km and is well connected by road to London and the south east by the M11 motorway.

Existing Intelligent Transport Systems include adaptive signal control, variable message signs, car parking systems, CCTV, bus priority at signals, and real time passenger information. A UTMC compliant common database receives data from signal control and journey time data acquired from a navigation system supplier. It also contains a strategy manager and provides an export of data for public use, via the web, the mobile web services and, in time, Social Media.

Cambridgeshire has seen significant benefits from adopting UTMC, in two specific areas. Firstly, during procurement allowing for the purchase of, for example, UTMC compliant variable message signs from different suppliers. Secondly, the easy integration provided by UTMC allows operations to be delivered more effectively, more intelligently, and at less cost than would otherwise be the case.

Coventry, UK

Coventry is the 2nd largest city in the county of West Midlands with a population of 316,900 (2011). It has excellent connections with the motorway network bordering the city. The Coventry City network includes over 230 traffic signal installations within the city boundary, which are controlled by a mixture of adaptive signal control and remote monitoring. Bus Priority at signals is provided throughout the network.

Variable Message Signs and car park signs inform motorists of traffic and car park availability status. A number of Automatic Number Plate Recognition cameras are used to monitor journey time along strategic links. A UTMC Common Database links the systems together, and enables integrated fault management. The systems are operated using a combined fibre and wireless communication network.

Coventry's adoption of the UTMC specifications and standards allowed the use of multi-vendor systems, integration of various traffic management tools, and provided a simple structure for the addition of new technology. At the heart of Coventry's UTMC is the Common Database which receives data from individual systems, pools the relevant information, and sends outputs to the appropriate systems or operators.

Hampshire, UK

Hampshire is a coastal county in the south of England. It has an area of 3,679 km2 and a population of 1,320,000 (2011). Hampshire has several urban centres, including Basingstoke, Havant, Fareham, Eastleigh, and Winchester, with substantial rural and agricultural land. In order to manage its 7,200 km long road network, including 200 signalised junctions, Hampshire uses a mix of ITS including adaptive signal control, variable message signs for traffic and car park information, CCTV, automatic number plate recognition and access control.

A UTMC database collates and processes data from various systems for decision making. Hampshire's ROMANSE is a partnership which aims to influence travel behaviour by providing up-to-the-minute traffic and travel information. Hampshire has a long history in ITS and benefits from an

[10] POSSE: Good Practice Guidelines on the Implementation and Development of Open Specifications and Standards for Intelligent Transport Systems

unusually large and stable team of staff, with strong technical skills. This enables it to domore in-house than other authorities of its size.

UTMC has been helpful in the integration of variable message signs and other systems from multiple suppliers.

Reading, UK

Reading is a large town in the south of England. It has a population of 155,000 (2011), and a larger urban area population of 370,000 (2011). Reading is strategically located to offer its businesses and citizens good access to London and the UK's main international airport at Heathrow. It relies heavily on its ITS, which include adaptive traffic signal control, car park guidance, variable message signs, passenger information systems, and CCTV, to manage its road network. The systems are interlinked using UTMC open specifications.

The UTMC facility provides for automatic control of the strategies applied to traffic signal controlled junctions and variable message signage in the absence of an operator, and live traffic and travel information via the Council's website. Reading was one of the four UTMC demonstrators of the UTMC initiative launched by the UK Department for Transport.

UTMC is key to Reading's ambitions for a step change in monitoring the road network situation and informing road users accordingly. In particular, UTMC's openness has helped with easier integration of systems, provided greater flexibility to mix and match solutions as necessary, and given Reading greater insight into understanding how its systems work together and how to resolve problems when they occur.

Greater Manchester, UK

Greater Manchester (GM) is a metropolitan county in North West England. It covers an area of 1276 km2 with a population of nearly 2.7 million (2011). Intelligent Transport Systems (ITS), including adaptive traffic signal control, car park management system, variable message signs and strategy supervisor, play an important part in the management of traffic and travel in GM.

UTMC has been used to integrate ITS for greater efficiency of operations and procurement. In January 2013, GM placed a tender for a £15M contract to procure a UTMC compliant Dynamic Road Network Efficiency and Travel Information System Solution, which will be developed over a period of three years, and designed to facilitate the delivery of initiatives to further improve the management of transport in GM.

The open framework of UTMC provides GM with greater innovation and reduced costs. The solution will offer real-time updates on road conditions, including travel hotspots, and provide management systems and a control platform. Both the static and dynamic data will be offered on an open-source information exchange, and will be accessible through online journey planning tools, internet media and mobile phone platforms.

Liverpool, UK

Liverpool is the 6th most populous city (pop 466, 400 in 2011) in England. It is at the centre of a wider urban area which has a population of around 2 million people. Liverpool has significant road and rail networks and also an international airport and port.

It actively manages its road network and traffic using an adaptive Urban Traffic Control system, supplemented with variable message signs for displaying journey times on key corridors and for showing car parking spaces status and availability.

A UTMC Common Database links a number of systems together to provide real time car park guidance, VMS control, road works information, and interfaces with the national motorway traffic control system. Work has been ongoing to provide real time information throughout the region to bus users.

The UTMC database allows for easier control room operation, improved management of accidents, events, incidents and road works, improved view of the network status, journey time monitoring of key corridors, and car park management. It also allows for enhanced strategic management, providing operators with the ability to implement automatic responses to manage traffic during football matches and concerts.

Appendix C: Spreadsheets

Capital Costs: Summary

Capital Costs (2010 Prices)

	Current	Short Term		Medium Term					Long Term			
		1	2	3	4	5	6	7	8	9	10	
Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Discount Index (4%)	1.19	1.23	1.27	1.32	1.36	1.41	1.46	1.51	1.56	1.62	1.68	
ITS Equipment												
CDB	£100,000		£280,000									
Existing Equipment (Residual)	£5,000,000											
Replacement Equipment						£10,127,000						
In-Flight Developments		£5,000,000										
Proposed Development				£5,000,000								
Building Costs												
New Location												
Communication & Power Provision												
New Sites												
Annual Costs =	**£5,100,000.00**	**£5,000,000.00**	**£280,000.00**	**£5,000,000.00**	**£0.00**	**£10,127,000.00**	**£0.00**	**£0.00**	**£0.00**	**£0.00**	**£0.00**	**£25,507,000**

Capital Costs (Discounted to 2010 in 2010 Prices)

	Current	Short Term		Medium Term					Long Term			
		1	2	3	4	5	6	7	8	9	10	
Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Discount Index (4%)	1.19	1.23	1.27	1.32	1.36	1.41	1.46	1.51	1.56	1.62	1.68	
ITS Equipment												
CDB	£84,197		£220,077									
Existing Equipment (Residual)	£4,209,866											
Replacement Equipment						£7,179,221						
In-Flight Developments		£4,067,503										
Proposed Development				£3,797,058								
Building Costs												
New Location												
Communication & Power Provision												
New Sites												
Annual Costs =	**£4,294,063.15**	**£4,067,503.22**	**£220,077.47**	**£3,797,057.78**	**£0.00**	**£7,179,220.83**	**£0.00**	**£0.00**	**£0.00**	**£0.00**	**£0.00**	**£19,557,922**

Capital Cost: Existing Equipment

Capital Cost: Existing Equipment

Item	Quantity	Unit Costs (2010 prices)	Total Costs (2010 prices)	Installation Date (Est)	Ave Design Life	Residual Life	Residual Costs (2010)	Total Residual Costs (2010)	Comments
Tyne & Wear UMTC (Field Equipment)									
Traffic Signal Installation (Remote Access)	221	£10,000	£2,210,000	2010	10	5	£5,000	£1,105,000	
Traffic Signal Installation (SCOOT)	117	£35,000	£4,095,000	2010	10	5	£17,500	£2,047,500	
CCTV	145	£5,000	£725,000	2010	10	5	£2,500	£362,500	
ANPR Cameras (Journey Time)	115	£5,000	£575,000	2010	10	5	£2,500	£287,500	
ANPR Cameras (Parking Monitoring)	3	-	-	-	-	-	-	-	In-flight development
VMS (Highways England Signs)	15	£0	£0	2010	15	10	£0	£0	No direct cost to NECA
VMS (Strategic)	0	-	-	-	-	-	-	-	In-flight development
VMS (Parking)	0	-	-	-	-	-	-	-	Proposed future development
Weather Stations	10	£15,000	£150,000	2010	10	5	£7,500	£75,000	
Air Quality Monitoring	15	£20,000	£300,000	2010	10	5	£10,000	£150,000	
Cabinets	635	£1,000	£635,000	2010	10	5	£500	£317,500	
			£8,690,000					**£4,345,000**	

	Quantity	Unit Costs (2010 prices)	Total Costs (2010 prices)	Installation Date (Est)	Ave Design Life	Residual Life	Residual Costs (2010)	Total Residual Costs (2010)	Comments
Durham UTMC									
Traffic Signal Installation (Remote Access)	63	£10,000	£630,000	2010	10	5	£5,000	£315,000	
Traffic Signal Installation (SCOOT)	0	-	-	-	-	-	-	-	Proposed future development
CCTV	18	£5,000	£90,000	2010	10	5	£2,500	£45,000	
ANPR Cameras (Journey Time)	23	£5,000	£115,000	2010	10	5	£2,500	£57,500	
Parking Monitoring - Loops	0	-	-	-	-	-	-	-	In-flight development
VMS (Highways England Signs)	15	£0	£0	2010	15	5	£0	£0	No direct cost to NECA
VMS (Strategic)	9	£40,000	£360,000	2010	15	5	£13,333	£120,000	
VMS (Parking)	0	-	-	-	-	-	-	-	In-flight development
Weather Stations	9	£15,000	£135,000	2010	10	5	£7,500	£67,500	
Air Quality Monitoring	0	-	-	-	-	-	-	-	No provision
Cabinets	122	£1,000	£122,000	2010	10	5	£500	£61,000	
			£1,452,000					**£666,000**	
		Total Costs =	**£10,142,000**				Total Costs =	**£5,011,000**	
							Assume =	**£5,000,000**	

Capital Cost Summary: Inflight Developments

Capital Cost: In-Flight Development Equipment

Item	Quantity	Costs (2015 prices)	Total Costs (2010 prices)	Installation Date (Est)	Ave Design Life	Comments
Tyne & Wear UMTC (Field Equipment)						
Traffic Signal Installation (Remote Access)	0	-	-	-	-	
Traffic Signal Installation (SCOOT)	0	-	-	-	-	
CCTV	60	£5,000	£285,009	-	-	
ANPR Cameras (Journey Time)	100	£5,000	£475,014	-	-	
ANPR Cameras (Parking Monitoring)	3	£5,000	£14,250	2015/16	-	In-flight development
ANPR Cameras (Park & Ride Monitoring)	0	£5,000	£0			
VMS (Highways England Signs)	0	-	-	-	-	
VMS (Strategic)	27	£1,200,000	£1,140,034	2015/16	-	In-flight development
VMS (Parking)	0	-	-		-	
Weather Stations	10	-	-	-	-	
Air Quality Monitoring	15	£20,000	£285,009	-	-	
Cabinets	215	£1,000	£204,256	-	-	
		£1,231,000	**£2,403,572**			

	Quantity	Unit Costs (2010 prices)	Total Costs (2010 prices)	Installation Date (Est)	Ave Design Life	Comments
Durham UTMC						
Traffic Signal Installation (Remote Access)	0	£10,000	£0	2010	10	
Traffic Signal Installation (SCOOT)	Item	£2,500,000	£2,375,071	-	-	Proposed future development
CCTV	0	£5,000	£0	2010	10	
ANPR Cameras (Journey Time)	0	£5,000	£0	2010	10	
Parking Monitoring - Loops	0	-	-	-	-	In-flight development
VMS (Highways England Signs)	0	£0	£0	2010	15	No direct cost to NECA
VMS (Strategic)	0	£40,000	£0	2010	15	
VMS (Parking)	0	-	-	-	-	In-flight development
Weather Stations	0	£15,000	£0	2010	10	
Air Quality Monitoring	0	-	-	-	-	No provision
Cabinets	0	£1,000	£0	2010	10	
			£2,375,071			

Total Costs =	**£4,778,643**	
Assume =	**£5,000,000**	

Capital Cost Summary: Proposed Interventions

Capital Cost: Proposed Interventions

Item	Quantity	Unit Costs (2015)	Total Costs (2015 prices)	Total Costs (2010 prices)	Installation Date (Est)	Ave Design Life	Comments
Tyne & Wear UMTC (Field Equipment)							
Traffic Signal Installation (Remote Access)	55	£10,000	£550,000	£522,516	-	-	Upgrade to Remote Access
Traffic Signal Installation (SCOOT)	55	£35,000	£1,925,000	£1,828,805	-	-	Upgrade to SCOOT
CCTV	0	£5,000	£0	£0	-	-	Allowance for some expansion
ANPR Cameras (Journey Time)	0	£5,000	£0	£0	-	-	
ANPR Cameras (Parking Monitoring)	74	£5,000	£370,000	£351,511	2016/17	-	All Council Car Parks
ANPR Cameras (Park & Ride)	20	£5,001	£100,020	£95,022	2016/17		
VMS (Highways England Signs)	0	£0	£0	£0	-	-	No direct cost to NECA
VMS (Strategic)	14	-	£800,000	£760,023	2015/16	-	Additional VMS
VMS (Parking)	28	£25,000	£700,000	£665,020		-	Proposed future development
Weather Stations	20	£15,000	£300,000	£285,009	-	-	Allowance for some expansion
Air Quality Monitoring	0	£20,000	£0	£0	-	-	Allowance for some expansion
NEXUS Data Broker Intergration	1	£100,000	£100,000	£95,003			
Improve Website	1	£35,000	£35,000	£33,251			
Network Information Screen	1	£100,000	£100,000	£95,003			
Cabinets	250	£1,000	£250,000	£237,507	-	-	
			£5,230,020	**£4,968,668**			
			Assume =	**£5,000,000**			

Capital Cost: CDB Replacement

Replacement Costs of CDB Provision

Hardware Cost plus operating System	£15,000
UTMC Common Database Core Element	£10,000
Adaptor Costs (allowance of 20 adaptors)	£100,000
Enhanced Strategy Manager (V2)	£20,000
Interface to Web	£40,000
Portal Access	£30,000
Core CDB	£70,000
Training	£10,000
Total Costs (2015 Prices)	£295,000

GDP (2010) =	100
GDP (2015) =	105.26
Interest Rate =	3.5%

System Support (2010 Prices) =	£280,258
***Assume* =**	**£280,000**

Operational Costs: Summary

Operating Costs (2010 Prices)

	Short Term		Medium Term					Long Term		
	1	2	3	4	5	6	7	8	9	10
Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Discount Index (4%)	1.23	1.27	1.32	1.36	1.41	1.46	1.51	1.56	1.62	1.68
System Support										
Annual Support Costs	£65,000	£65,000	£65,000	£65,000	£65,000	£65,000	£65,000	£65,000	£65,000	£65,000
Building Costs										
Rent & Rates	£20,207	£20,207	£20,207	£20,207	£20,207	£20,207	£20,207	£20,207	£20,207	£20,207
Field Equipment										
Maintenance of Equipment	£475,000	£625,000	£850,000	£850,000	£850,000	£850,000	£850,000	£850,000	£850,000	£850,000
Power & Communication	£350,000	£350,000	£475,000	£475,000	£475,000	£475,000	£475,000	£475,000	£475,000	£475,000
UTMC Staff										
Core Provision	£200,000	£200,000	£200,000	£200,000	£200,000	£200,000	£200,000	£200,000	£200,000	£200,000
Remote Provision	£60,000	£60,000	£60,000	£60,000	£60,000	£60,000	£60,000	£60,000	£60,000	£60,000
Annual Costs =	£1,105,207	£1,255,207	£1,605,207	£1,605,207	£1,605,207	£1,605,207	£1,605,207	£1,605,207	£1,605,207	£1,670,207

Operating Costs (Discounted to 2010 in 2010 Prices)

	Short Term		Medium Term					Long Term		
	1	2	3	4	5	6	7	8	9	10
Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Discount Index (4%)	1.32	1.37	1.42	1.48	1.54	1.60	1.67	1.73	1.80	1.87
System Support										
Annual Support Costs	£49,395	£47,495	£45,668	£43,912	£42,223	£40,599	£39,037	£37,536	£36,092	£34,704
Building Costs										
Rent & Rates	£15,356	£14,765	£14,197	£13,651	£13,126	£12,621	£12,136	£11,669	£11,220	£10,789
Field Equipment										
Maintenance of Equipment	£360,961	£456,681	£597,199	£574,230	£552,144	£530,907	£510,488	£490,854	£471,975	£453,822
Power & Communication	£265,971	£255,742	£333,729	£320,893	£308,551	£296,684	£285,273	£274,301	£263,751	£253,606
UTMC Staff										
Current Provision	£151,984	£146,138	£140,517	£135,113	£129,916	£124,919	£120,115	£115,495	£111,053	£106,782
Future Provision	£45,595	£43,841	£42,155	£40,534	£38,975	£37,476	£36,034	£34,649	£33,316	£32,034
Annual Costs =	£889,261	£964,662	£1,173,465	£1,128,332	£1,084,935	£1,043,206	£1,003,083	£964,503	£927,407	£891,737

Operational Costs: Building

Existing Tyne & Wear UTMC

Rent	£10,635
Service Charge	£10,635
Total Estimate (2015) =	**£21,270**

GDP (2010) =	100
GDP (2015) =	105.26
Interest Rate =	3.5%
Total Estimate (2010) =	**£20,207**

New Office Location

Rent & Service Charge (High) =	£190m²	Earl Grey House
Rent & Service Charge (Low) =	£90m²	Commercial Union House
Estimate Size of Centre =	200-300 m²	

New Construction

Construction Cost =	£3,500 per m²	High level of costs due to IT requirements
Estimate Size of Centre =	200-300 m²	

Operational Costs: System Support

Operating Costs: System Support

Capital Costs =	£280,000
System Support & Licences	
15% of Capital Costs =	£42,000
25% of Capital Costs =	£70,000
Assume Highest Level	**£70,000**
GDP (2010) =	£100
GDP (2015) =	£105
Interest Rate =	£0
System Support (2010 Prices) =	£66,502
***Assume* =**	**£65,000**

Operational Support: Staffing

Proposed NECA UTMC Core Provision

Current Provision	No of Staff	Nominal Annual Cost	Total Cost (£)
MTCC Manager	1	£55,000	£55,000
Supervisors	1	£35,000	£35,000
Control Room Staff	4	£30,000	£120,000
		Total	£210,000

GDP (2010) =	100
GDP (2015) =	105.26
Interest Rate =	3.5%

Proposed NECA UTMC Core Provision (2010 Prices)

Current Provision	*No of Staff*	*Nominal Annual Cost*	*Total Cost (£)*
MTCC Manager	1	*£52,252*	£52,252
Supervisors	1	*£33,251*	£33,251
Control Room Staff	4	*£28,501*	£114,003
		Total	£199,506
		Assume =	**£200,000**

Proposed NECA UTMC Remote Provision

Current Provision	No of Staff	Nominal Annual Cost	Total Cost (£)
Remote Support	2	£30,000	£60,000
		Total	£60,000

GDP (2010) =	100
GDP (2015) =	105.26
Interest Rate =	3.5%

Proposed NECA UTMC Remote Provision (2010 Prices)

Current Provision	*No of Staff*	*Nominal Annual Cost*	*Total Cost (£)*
Remote Support	2	£28,501	£57,002
		Total	£57,002
		Assume =	**£60,000**

Operational Costs: Equipment Maintenance

Operating Costs: Maintenance (Field Equipment)										
Year	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Year of Contract	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Timeframe	**Short**		**Medium**					**Long**		
Annual ITS Maintenance Costs*	£500,000	£650,000	£875,000	£875,000	£875,000	£875,000	£875,000	£875,000	£875,000	£875,000
Annual Maintenance Costs	**£500,000**	**£650,000**	**£875,000**	**£875,000**	**£875,000**	**£875,000**	**£875,000**	**£875,000**	**£875,000**	**£875,000**
*Assumed at 5% pa of installation costs										
Maintenance Cost (Discounted to 2010 prices)										
CPI (2010) =	100									
CPI (2015) =	105.26									
Interest Rate =	3.5%									
Year	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Year of Contract	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Timeframe	**Short**		**Medium**					**Long**		
Maintenance Costs (2010 Prices)=	**£475,014**	**£617,519**	**£831,275**	**£831,275**	**£831,275**	**£831,275**	**£831,275**	**£831,275**	**£831,275**	**£831,275**
Assume	**£475,000**	**£625,000**	**£850,000**	**£850,000**	**£850,000**	**£850,000**	**£850,000**	**£850,000**	**£850,000**	**£850,000**

Operational Support: Power & Communications

Operating Costs: Annual Power & Communication Costs										
Year	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Year of Contract	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Timeframe	**Short**		**Medium**					**Long**		
Annual Power & Comm Costs	£500	£500	£500	£500	£500	£500	£500	£500	£500	£500
Number of Sites	750	790	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Annual Maintenance Costs	**£375,000**	**£395,000**	**£500,000**	**£500,000**	**£500,000**	**£500,000**	**£500,000**	**£500,000**	**£500,000**	**£500,000**
Maintenance Cost (Discounted to 2010 prices)										
CPI (2010) =	100									
CPI (2015) =	105.26									
Interest Rate =	3.5%									
Year	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Year of Contract	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Timeframe	**Short**		**Medium**					**Long**		
Maintenance Costs (2010 Prices)=	**£356,261**	**£375,261**	**£475,014**	**£475,014**	**£475,014**	**£475,014**	**£475,014**	**£475,014**	**£475,014**	**£475,014**
Assumme	**£350,000**	**£350,000**	**£475,000**	**£475,000**	**£475,000**	**£475,000**	**£475,000**	**£475,000**	**£475,000**	**£475,000**

Benefit Summary

Benefit Summary						
					2015	2010 Prices
					Total	Total
UTC Benefits			Sites	Benefits	Benefits	Benefits
				(£,000)	(£,000)	(£,000)
Current	Remote Access Sites	Tyne & Wear UTMC	221	£60	£13,260	£12,597
		Durhan UTMC	63	£60	£3,780	£3,591
	SCOOT	Tyne & Wear	117	£90	£10,530	£10,004
		Durham	0			
In-Flight	Remote Access Sites	Tyne & Wear UTMC	0	£60	£0	£0
		Durhan UTMC	0	£60	£0	£0
	SCOOT	Tyne & Wear	0	£90	£0	£0
		Durham	0			
Proposed Development	Remote Access	NECA	55	£60	£3,300	£3,135
	SCOOT	NECA	55	£90	£4,950	£4,703
						£34,030
Travel Information		Trips		200000		
		By Private Vehcile (64%)		64%	128000	
		Annual Trips (weekdays)		33,280,000		
		Benefit at 10p		£3,328,000	2010 Prices =	£3,161,695
		Benefit 15p		£4,992,000	2010 Prices =	£4,742,542
		Benefit 20p		£6,656,000	2010 Prices =	£6,323,390

Benefits: Existing

Disbenefits (2010 Prices)

	Current	Short Term		Medium Term					Long Term			
		1	2	3	4	5	6	7	8	9	10	
Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Discount Index (4%)	1.19	1.23	1.27	1.32	1.36	1.41	1.46	1.51	1.56	1.62	1.68	
Write-Off Costs												
CDB	£100,000											
Existing Equipment	£5,000,000											
In-Flight Developments		£5,000,000										
Decommissioning Costs												
Existing Equipment (@5%)	£250,000											
In-Flight Developments (@5%)		£250,000										
SCOOT / RMS Interventions												
Current: Remote Sites		£809,400	£809,400	£809,400	£809,400	£809,400	£809,400	£809,400	£809,400	£809,400	£809,400	
Current: SCOOT Sites		£5,001,750	£5,001,750	£5,001,750	£5,001,750	£5,001,750	£5,001,750	£5,001,750	£5,001,750	£5,001,750	£5,001,750	
In-Flight: Remote Sites		£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	
In-Flight: SCOOT Sites		£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	
Real Time Information												
VMS / Web / App / etc.		£1,581,000	£1,581,000	£3,161,695	£3,161,695	£3,161,695	£3,161,695	£3,161,695	£3,161,695	£3,161,695	£3,161,695	
Public Transport Prioirty												
Bus Prioirty		£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	
Annual Costs =	**£5,350,000.00**	**£12,642,150.00**	**£7,392,150.00**	**£8,972,845.00**	**£8,972,845.00**	**£8,972,845.00**	**£8,972,845.00**	**£8,972,845.00**	**£8,972,845.00**	**£8,972,845.00**	**£8,972,845.00**	**£97,167,060**

Capital Costs (Discounted to 2010 in 2010 Prices)

	Current	Short Term		Medium Term					Long Term			
		1	2	3	4	5	6	7	8	9	10	
Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Discount Index (4%)	1.19	1.23	1.27	1.32	1.36	1.41	1.46	1.51	1.56	1.62	1.68	
Write-Off Costs												
CDB	£84,197											
Existing Equipment	£4,209,866											
In-Flight Developments		£4,067,503										
Decommissioning Costs												
Existing Equipment (@5%)	£210,493											
In-Flight Developments (@5%)		£203,375										
SCOOT / RMS Interventions												
Current: Remote Sites		£658,447	£636,181	£614,668	£593,882	£573,799	£554,395	£535,647	£517,534	£500,033	£483,123	£5,667,709
Current: SCOOT Sites		£4,068,927	£3,931,330	£3,798,387	£3,669,939	£3,545,835	£3,425,927	£3,310,075	£3,198,140	£3,089,990	£2,985,498	£35,024,047
In-Flight: Remote Sites		£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
In-Flight: SCOOT Sites		£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
												£0
Real Time Information												£0
VMS / Web / App / etc.		£1,286,145	£1,242,652	£2,401,028	£2,319,834	£2,241,385	£2,165,589	£2,092,357	£2,021,601	£1,953,238	£1,887,186	£19,611,014
												£60,302,769
Public Transport Prioirty												
Bus Prioirty		£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	
Annual Costs =	**£4,504,556.44**	**£10,284,397.17**	**£5,810,163.08**	**£6,814,082.19**	**£6,583,654.29**	**£6,361,018.63**	**£6,145,911.72**	**£5,938,078.96**	**£5,737,274.36**	**£5,543,260.25**	**£5,355,807.00**	**£69,078,204**

Benefits: Low

Low Benefits (2010 Prices)

	Short Term		Medium Term					Long Term			
	1	2	3	4	5	6	7	8	9	10	
Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Discount Index (4%)	1.23	1.27	1.32	1.36	1.41	1.46	1.51	1.56	1.62	1.68	
SCOOT / RMS Interventions											
Current: Remote Sites	£809,400	£809,400	£809,400	£809,400	£809,400	£809,400	£809,400	£809,400	£809,400	£809,400	
Current: SCOOT Sites	£5,001,750	£5,001,750	£5,001,750	£5,001,750	£5,001,750	£5,001,750	£5,001,750	£5,001,750	£5,001,750	£5,001,750	
Additional Remote Access	£333,500	£333,500	£333,500	£333,500	£333,500	£333,500	£333,500	£333,500	£333,500	£333,500	
In-Flight: Remote Sites	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	
In-Flight: SCOOT Sites	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	
Proposed: Remote Sites	£0	£0	£313,500	£313,500	£313,500	£313,500	£313,500	£313,500	£313,500	£313,500	
Proposed: SCOOT Sites	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	
Real Time Information											
VMS / Web / App / etc.	£1,581,000	£1,581,000	£3,161,695	£3,161,695	£3,161,695	£3,161,695	£3,161,695	£3,161,695	£3,161,695	£3,161,695	
Public Transport Prioirty											
Bus Prioirty	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	
Annual Costs =	**£7,725,650.00**	**£7,725,650.00**	**£9,619,845.00**	**£9,619,845.00**	**£9,619,845.00**	**£9,619,845.00**	**£9,619,845.00**	**£9,619,845.00**	**£9,619,845.00**	**£9,619,845.00**	**£92,410,060**

Capital Costs (Discounted to 2010 in 2010 Prices)

	Short Term		Medium Term					Long Term			
	1	2	3	4	5	6	7	8	9	10	
Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Discount Index (4%)	1.23	1.27	1.32	1.36	1.41	1.46	1.51	1.56	1.62	1.68	
ITS Equipment											
Current: Remote Sites	£658,447	£636,181	£614,668	£593,882	£573,799	£554,395	£535,647	£517,534	£500,033	£483,123	£5,667,709
Current: SCOOT Sites	£4,068,927	£3,931,330	£3,798,387	£3,669,939	£3,545,835	£3,425,927	£3,310,075	£3,198,140	£3,089,990	£2,985,498	£35,024,047
Additional Remote Access	£271,302	£262,128	£253,264	£244,699	£236,424	£228,429	£220,705	£213,241	£206,030	£199,063	
In-Flight: Remote Sites	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	
In-Flight: SCOOT Sites	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	
Proposed: Remote Sites	£0	£0	£238,076	£230,025	£222,246	£214,730	£207,469	£200,453	£193,675	£187,125	
Proposed: SCOOT Sites	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	
Real Time Information											
VMS / Web / App / etc.	£1,286,145	£1,242,652	£2,401,028	£2,319,834	£2,241,385	£2,165,589	£2,092,357	£2,021,601	£1,953,238	£1,887,186	£19,611,014
											£60,302,769
Public Transport Prioirty											
New Sites	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	
Annual Costs =	**£6,284,821.25**	**£6,072,291.07**	**£7,305,421.46**	**£7,058,378.22**	**£6,819,689.11**	**£6,589,071.60**	**£6,366,252.75**	**£6,150,968.84**	**£5,942,965.07**	**£5,741,995.23**	**£64,331,855**

Benefits: Average

Ave Benefits (2010 Prices)

	Short Term		Medium Term					Long Term			
	1	2	3	4	5	6	7	8	9	10	
Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Discount Index (4%)	1.23	1.27	1.32	1.36	1.41	1.46	1.51	1.56	1.62	1.68	
SCOOT / RMS Interventions											
Current: Remote Sites	£809,400	£809,400	£809,400	£809,400	£809,400	£809,400	£809,400	£809,400	£809,400	£809,400	
Current: SCOOT Sites	£5,001,750	£5,001,750	£5,001,750	£5,001,750	£5,001,750	£5,001,750	£5,001,750	£5,001,750	£5,001,750	£5,001,750	
Additional Remote Access	£333,500	£333,500	£333,500	£333,500	£333,500	£333,500	£333,500	£333,500	£333,500	£333,500	
In-Flight: Remote Sites	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	
In-Flight: SCOOT Sites	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	
Proposed: Remote Sites	£0	£0	£313,500	£313,500	£313,500	£313,500	£313,500	£313,500	£313,500	£313,500	
Proposed: SCOOT Sites	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	
Real Time Information											
VMS / Web / App / etc.	£1,581,000	£1,581,000	£4,742,542	£4,742,542	£4,742,542	£4,742,542	£4,742,542	£4,742,542	£4,742,542	£4,742,542	
Public Transport Prioirty											
Bus Prioirty	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	
Annual Costs =	**£7,725,650.00**	**£7,725,650.00**	**£11,200,692.00**	**£11,200,692.00**	**£11,200,692.00**	**£11,200,692.00**	**£11,200,692.00**	**£11,200,692.00**	**£11,200,692.00**	**£11,200,692.00**	**£105,056,836**

Capital Costs (Discounted to 2010 in 2010 Prices)

	Short Term		Medium Term					Long Term			
	1	2	3	4	5	6	7	8	9	10	
Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Discount Index (4%)	1.23	1.27	1.32	1.36	1.41	1.46	1.51	1.56	1.62	1.68	
ITS Equipment											
Current: Remote Sites	£658,447	£636,181	£614,668	£593,882	£573,799	£554,395	£535,647	£517,534	£500,033	£483,123	
Current: SCOOT Sites	£4,068,927	£3,931,330	£3,798,387	£3,669,939	£3,545,835	£3,425,927	£3,310,075	£3,198,140	£3,089,990	£2,985,498	
Additional Remote Access	£271,302	£262,128	£253,264	£244,699	£236,424	£228,429	£220,705	£213,241	£206,030	£199,063	
In-Flight: Remote Sites	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	
In-Flight: SCOOT Sites	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	
Proposed: Remote Sites	£0	£0	£238,076	£230,025	£222,246	£214,730	£207,469	£200,453	£193,675	£187,125	
Proposed: SCOOT Sites	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	
Real Time Information											
VMS / Web / App / etc.	£1,286,145	£1,242,652	£3,601,541	£3,479,750	£3,362,077	£3,248,384	£3,138,535	£3,032,401	£2,929,856	£2,830,779	
Public Transport Prioirty											
New Sites	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	
Annual Costs =	**£6,284,821.25**	**£6,072,291.07**	**£8,505,934.94**	**£8,218,294.63**	**£7,940,381.29**	**£7,671,865.98**	**£7,412,430.89**	**£7,161,768.98**	**£6,919,583.56**	**£6,685,587.98**	**£72,872,961**

Benefits: High

High Benefits (2010 Prices)

	Short Term		Medium Term					Long Term			
	1	2	3	4	5	6	7	8	9	10	
Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Discount Index (4%)	1.23	1.27	1.32	1.36	1.41	1.46	1.51	1.56	1.62	1.68	
SCOOT / RMS Interventions											
Current: Remote Sites	£809,400	£809,400	£809,400	£809,400	£809,400	£809,400	£809,400	£809,400	£809,400	£809,400	
Current: SCOOT Sites	£5,001,750	£5,001,750	£5,001,750	£5,001,750	£5,001,750	£5,001,750	£5,001,750	£5,001,750	£5,001,750	£5,001,750	
Additional Remote Access	£333,500	£333,500	£333,500	£333,500	£333,500	£333,500	£333,500	£333,500	£333,500	£333,500	
In-Flight: Remote Sites	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	
In-Flight: SCOOT Sites	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	
Proposed: Remote Sites	£0	£0	£156,750	£156,750	£156,750	£156,750	£156,750	£156,750	£156,750	£156,750	
Proposed: SCOOT Sites	£0	£0	£2,351,250	£2,351,250	£2,351,250	£2,351,250	£2,351,250	£2,351,250	£2,351,250	£2,351,250	
Additional Remote Access			£156,750	£156,750	£156,750	£156,750	£156,750	£156,750	£156,750	£156,750	
Real Time Information											
VMS / Web / App / etc.	£1,581,000	£1,581,000	£6,323,390	£6,323,390	£6,323,390	£6,323,390	£6,323,390	£6,323,390	£6,323,390	£6,323,390	
Public Transport Prioirty											
Bus Prioirty	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	
Annual Costs =	**£7,725,650.00**	**£7,725,650.00**	**£15,132,790.00**	**£15,132,790.00**	**£15,132,790.00**	**£15,132,790.00**	**£15,132,790.00**	**£15,132,790.00**	**£15,132,790.00**	**£15,132,790.00**	**£136,513,620**

Capital Costs (Discounted to 2010 in 2010 Prices)

	Short Term		Medium Term					Long Term			
	1	2	3	4	5	6	7	8	9	10	
Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Discount Index (4%)	1.23	1.27	1.32	1.36	1.41	1.46	1.51	1.56	1.62	1.68	
ITS Equipment											
Current: Remote Sites	£658,447	£636,181	£614,668	£593,882	£573,799	£554,395	£535,647	£517,534	£500,033	£483,123	
Current: SCOOT Sites	£4,068,927	£3,931,330	£3,798,387	£3,669,939	£3,545,835	£3,425,927	£3,310,075	£3,198,140	£3,089,990	£2,985,498	
Additional Remote Access	£271,302	£262,128	£253,264	£244,699	£236,424	£228,429	£220,705	£213,241	£206,030	£199,063	
In-Flight: Remote Sites	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	
In-Flight: SCOOT Sites	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	
Proposed: Remote Sites	£0	£0	£119,038	£115,012	£111,123	£107,365	£103,735	£100,227	£96,837	£93,563	
Proposed: SCOOT Sites	£0	£0	£1,785,566	£1,725,185	£1,666,845	£1,610,479	£1,556,018	£1,503,399	£1,452,559	£1,403,439	
Additional Remote Access			£119,038	£115,012	£111,123	£107,365	£103,735	£100,227	£96,837	£93,563	
Real Time Information											
VMS / Web / App / etc.	£1,286,145	£1,242,652	£4,802,055	£4,639,667	£4,482,770	£4,331,179	£4,184,714	£4,043,202	£3,906,475	£3,774,372	
Public Transport Prioirty											
New Sites	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	
Annual Costs =	**£6,284,821.25**	**£6,072,291.07**	**£11,492,015.60**	**£11,103,396.72**	**£10,727,919.53**	**£10,365,139.65**	**£10,014,627.68**	**£9,675,968.77**	**£9,348,762.10**	**£9,032,620.38**	**£94,117,563**

Cost Benefit Summary

Cost Benefits Analysis							
Cost / Benefits	Operating Costs	Capital Costs	Total Costs	Value of Existing Benefit	Total Future Benefits	BCR	NPV
NECA UTMC	£10,070,592	£19,557,922	**£29,628,514**				
Low Benefit					**£64,331,855**	2.17	**£34,703,341**
Ave Benefit					**£72,872,961**	2.46	**£43,244,447**
High Benefits					**£94,117,563**	3.18	**£64,489,049**

Appendix D: Stakeholder Notes

Summary Notes with Durham UTMC

Topic	Discussion	Actions
UMTC	Durham currently has a Motts MacDonald Osprey system – the same core system as deployed by Tyne & Wear UTMC. The system provides the following core services: • Internet Service (map based showing incidents and journey times) • Strategic VMS; • Car Parking Management System; • ANPTR (Journey time monitoring); • CCTV; • Weather Stations; • Road Works information; and • Traffic signal monitoring.	• DCC to provide maps of the ITS interventions.
Hours of Operations & Staffing	• Standard office hours of operations; • No dedicated staff allocated to the operation of the UTMC – staff use the system as a network management tool as and when it is required; • No dedicated control room for the system; • Operational procedure in place to deal with incidents and special events (e.g. Lumiere Light Festival); • Current structure works well for Durham covering their needs and minimising the ongoing operational costs of the system; and • Above approach was adopted to address ongoing concerns with revenue costs.	
Interface with Other Systems	System is currently contacted to the following systems: • Highways England - NTIS Data – exchange of information – data exchange could be better; • Police – via STORM system; • Elgin Roadwork Database; and • Tyne & Wear UTMC – development of a link with Durham.	
Traffic Data	System is currently hosted by Drakewell Software System – currently no issues with the performance of the system.	
UTC / SCOOT	• UTC co-ordinate traffic signals across the city; • Remote monitoring of signal via Siemen system; • Future deploy of SCCOT	
VMS	• Existing signs displaying Journey Time / Incident information; • Diversion strategies for the city are difficult due to nature of the road network – with the majority of traffic requiring to use Millburngate Bridge to access the city centre.	
In-Flight Developments	Enhancement to the Car Parking Management System: • New Variable Message Signs (VMS) being installed; • Parking space availability using live vehicle data extracted from the Urban Traffic Management Control system (loop monitoring); • Additional VMS on strategic routes into the city; • VMS will be used to display traffic management related messages to drivers. Integration with Tyne & Wear UTMC: • Establish a link with the Tyne & Wear UTMC to share data. CCTV Integration: • Enhancement to current CCTV coverage.	
RTPI	This element falls under the remit of NEXUS.	

Other Applications	• Weight limit monitoring – this is via a ANPR located at the bridge at Barnard Castle – capture of the overloaded vehicles using this bridge – not enforceable – system is not part of the UTMC; • Congestion Charging - using an Automatic Number Plate Recognition (ANPR) system located at the junction of Saddler Street and Claypath - the ANPR system identifies motor vehicles subject to the charge – the system is not part of the UTMC.	1

Northumberland County Council

ITS Interventions	*Current Provision*	*Action / Proposal*
Traffic Signals	- Limited number of junctions under uncoordinated traffic signals, or outdated fixed time plans	***Actions:*** - NCC to provide location of traffic signals where delay is considered an issue ***Proposal:*** - Coordination of traffic signals / plans may have some benefit is supported by NECA UTMC.
Variable Message Signs	- One sign being installed as part of the NEPO VMS commission – sign will be controlled from the Tyne & Wear UTMC system - Unlikely to be any requirement for any additional fixed VMS location - Currently mobile VMS are deployed to manage special events on the network – mobile VMS are hired for the duration of each event. - Forthcoming events cover: o Tall Ships 2016 o Tour of Britain 2017 o Albermarle 2016 & 2017 o Alnwick Castle	***Actions:*** - NCC to provide location of the commonly used mobile VMS sites. ***Proposal:*** - NECA strategy to include the procurement and deployment of mobile VMS across the region; - Signs would be controlled from any future NECA UTMC
Journey Time	- No current provision	***Actions:*** - None ***Proposal:*** - Limited benefit in deploying journey time system, none recommended.

NEXUS

	Colin Urqhart
	Currently at the implementation stage of a real time project - Agreement with arriva, Stagecoach, Go North East to share data - Schedule data in Transxchange, all the interpolation and data issues are sorted, still need to do dynamic stops, panhandles, circular routes that need to be sorted, very long routes which are split...trying to get away from doing any manual work, set up a group with the operators - Server to server from the operators back office - Currently have test data running, but need to get it all up and working - Thetis system, very flexible organisation, good to work o Set it up with a detailed scoping exercise, as a part of the contract - Databroker takes the data in, matches and predicts - Operational data reports - Data link to BI section in Nexus - Archiving is the big challenge, planning to do some aggregation, maybe just keep it at timing point level Have had meetings with Ray, to talk about data sharing, but wasn't clear what would be done with the data Can traffic patterns from buses help the UTMC analysis - No bus priority feed coming through - Information would be on 'every thirty seconds' - - Should be looking at improving headway, rather than just whats late? - How is wait time included in the business case? Waiting for five minutes longer at the stop should be worse than waiting on the bus for five minutes longer Several small operators, who have ticketer, but no transxchange files for them, so cross journey predictions don't work Paid a contribution for all the buses to have updated ticket machines to enable smart ticketing Big operators have public channels to push out data, so bring the operators estimates through, but they are currently clearing down early Have an API built, and currently scoping the cost to make it public, but need to increase the bandwidth to allow it All the data is in the nextbuses api, there is a free allowance per annum, but then there is a cost... Product called myjourney, and live travel map that is going to go live soon, based on regular travellers to provide the updates in real time There is a neca working group on the information portal, journey planning task and finish group Existing ways to deliver information in Northumberland and Durham, but want to bring it together into one format – currently scoping - Does it have to have utmc data? - Looking at electric car parking clubs, - Ray has funding to provide ANPR at 10 p&r, but currently no route to present that information - Use VMS to display that p&r times are shorter than normal traffic times Want to create a personal transport account, to link parking and payment - Link the park cost to the use of the metro, cap the costs...

	Know on and off for metro, but buses are only getting on - For the buses, still need to say where you're going or the price, and then smartcard works as a wallet Bus operators unwilling to share the fare table, as the journey planner only has single price and this looks expensive Pay as you go product on the metro now, Lots of people are currently buying weeklies from the bus driver on a Monday with cash which slows it down. ITSO compliant card Newcastle Uni put the ITSO product onto their card... Disruption - Communicating through SIRI is probably the way forward - Looking at pushing information out to specific users, think it has to be personalised and targeted - Getting feedback loop correct is going to be key - Information is very limited at the moment - 7 to 7 working isn't really going to be long enough, how could it work? No appetite to spend the money on the operation though? - What can be automated No point in having two systems, need one linked and integrated system? Can a central control centre for TfN operate to work more effectively?

Appendix E: List of NECA Major Schemes

Category	Scheme	Description	Timescales	Scheme Value	Promoter
Highway - major investment	Western Relief Road	New single carriageway road between B6302 (Broom Lane) to the A691 close to the existing Sniperley Park and Ride site	2021	High Cost	Durham County Council
	Northern Relief Road	New road connecting the A690 (Carrville Link) to the north east of Durham, with the C12 to the north east of the city centre at Brasside. Significant physical constraints include crossings of the River Wear and the East Coast Main Lien.	2021	High Cost	Durham County Council
	New bridge across the Tyne	Identify suitable location to provide an additional crossing point across the River Tyne to alleviate existing congestion issues	Long term	High Cost	Gateshead Council/South Tyneside Council
	Gateshead Boulevard	Demolition of the Gateshead Highway to provide a central boulevard running through Gateshead	2026	£50 million	Gateshead Council
	Blyth Relief Road	New road into Blyth to reduce congestion and help deliver proposed housing and employment developments	Long term	High Cost	Northumberland County Council
	Moor Farm and Seaton Burn	Major scheme changes to two key A19 junction	Long term	High Cost	Northumberland County Council/North Tyneside/Highways England
	A1 Dualling	Dualling of the A1 north of Newcastle to provide a continuous dual carriageway through to Scotland	Long term	High Cost	Northumberland County Council/Highways England
	Ponteland Bypass	Bypass of Ponteland in Northumberland	Long term	High Cost	Northumberland County Council
	Testos	Grade separation of A19/Testo's junction	Medium term	£60 million	South Tyneside Council/Highways England
	Tilesheds Crossing	Provide a reconfigured junction/flyover at Benton Road/Tilesheds that will allow for the removal of the two level crossings in this location	Medium term	High Cost	South Tyneside Council
	Boldon Southern Relief Road	New road to remove traffic from Boldon	Long term	High Cost	South Tyneside Council
	A183 Coast Road	Realignment of the South Shields to Whitburn (A183) Coast Road	Long term	High Cost	South Tyneside Council
	SSTC3	Development of a strategic transport corridor between the new Wear Bridge and the Port of Sunderland	Medium term	High Cost	Sunderland Council
	Hetton Bypass	Bypass of Hetton	Long term	High Cost	Sunderland Council
	North West Relief Road	Link A1 at North Brunton to the A69	Long term	High Cost	Newcastle City Council

	Paradise Bridge	A bridge between north of Metrocentre and Scotswood Road	Long term	High cost	Newcastle City Council
	Central Route	New corridor linking Sunderland coalfield areas with key urban routes in Sunderland and Durham	Long term	High Cost	Sunderland Council
Highway - localised improvements	Oakwellgate	Realignment of the key Oakwellgate junction in Gateshead to provide improved pedestrian and cycling amenities and a more direct route through the junction for motorised vehicles	2019	£15 million	Gateshead Council
	Localised junction improvements in Blyth	Measures to improve operation of key junctions in Blyth to relieve congestion on the A193 Cowpen Road and the A1061	2016-17	<£5 million per junction	Northumberland County Council
	A696/Newcastle	Scheme to address capacity where Northumberland meets Newcastle	Medium term	Medium cost	Northumberland County Council
	A19/Lindisfarne	Widening of Lindisfarne/John Reid Road to improve traffic congestion	Short term	£6 million	South Tyneside Council
	The Arches Junction Improvement	Development of a scheme to improve traffic congestion at the the A194/A185 junction	Medium term	£5 million	South Tyneside Council
	Southern Portal of Tyne Tunnel	Access improvements to the Southern Portal of the Tyne Tunnel	Medium term	£5 million	South Tyneside Council
	South Tyneside Industrial Corridor	Reinforcement of the link between Nissan, the International Advanced Manufacturing Park and the Port of Tyne	Medium-long term	High cost depending on number of junction improvements	South Tyneside Council
	Downhill Lane	Junction improvement at Downhill Lane	Medium term	£5 million (per junction)	South Tyneside Council
	Whitemare Pool	Junction improvement at Whitemare Pool	Medium term	£5 million (per junction)	South Tyneside Council
	Mill lane	Junction improvement at Mill Lane	Medium term	£5 million (per junction)	South Tyneside Council
	A1290/A19 Junction	Major upgrade of the A1290/A19 junction	Short term	Medium cost	South Tyneside Council
	A19 junction improvements in Sunderland	Improvements to A19 junctions to reduce traffic congestion	Medium term	£5 million (per junction)	Sunderland Council/Highways England
	A690 junction improvements	Improvements to junctions along the A690 corridor to alleviate safety concerns	Medium term	£5 million (per junction)	Sunderland Council
	A19 junction improvements in North Tyneside	Improvements to A19 junctions to reduce traffic congestion	Medium term	£5 million (per junction)	North Tyneside Council/Highways England
	City Centre Improvements	Traffic management improvements, road space realocation	Short term	£18 million	Newcastle City Council
	Urban Core Distributor Road, bridge maintenance	Package of junction improvements and signal upgrades, UTMC support for signal coordination	Short term	£20 million	Newcastle City Council

	Central gateway Phase 3	Highway improvements into Forth Yard Devt site	Short term	£15 million	Newcastle City Council
	Skinnerburn Road corridor improvements	Upgrade of Skinnerburn Road and Quayside junctions	Medium term	£5 million	Newcastle City Council
	Access into Forth Yard	Improved access into the Forth Yard development site	Medium term	£1.7 million	Newcastle City Council
	A1058 Coast Road	Junction improvements along the corridor	Short term	£9.5 million	North Tyenside/Newcastle City Council
	A19/A1 Corridor	Improvements to key junctions along the A19/A1 corridors in Durham	Medium term	£5 million (per junction)	Durham County Council
Bus	Public transport corridor to Stanley	Bus priority measures to improve public transport journey times between Stanley and Gateshead	Unknown	Unknown	Gateshead Council
	Park and ride	Several sites being identified for potential park and ride schemes in Gateshead	Unknown	Unknown	Gateshead Council
	Quality contracts	Implementation of quality contracts for bus travel in Tyne and Wear	Imminent	Unknown	Nexus
	Cross city bus corridor improvements	Upgrade bus routes for services 39, 40, 62, 63	Short term	£12 million	Newcastle City Council
	Shields Road Bus Corridor	Upgrade of the route with better signal coordination	Short term	£5 million	Newcastle City Council
	West Road Transit Corridor	Traffic management and signal improvements on this corridor	Short term	£5 million	Newcastle City Council
	A187 Fossway Hadrian Road Corridor	Bus priority measures and localised improvements for development sites	Medium term	Unknown	Newcastle City Council
	West of City access improvements	Improvements to access to and within LDF development sites	Long term	£10 million	Newcastle City Council
	Bus priority	Bus priority measures across region	Ongoing-long term	Low, medium and high cost	Nexus
Rail	Ashington, Blyth and Tyne	Reopening of the Ashington, Blyth and Tyne line to passenger services. Line will provide improved public transport between Ashington and Newcastle, halving existing journey time in the peak periods when compared to both bus and car.	2020	£65 million	Northumberland County Council
	Fleet refurbishment	Upgrade of the existing Metro fleet of cars	Ongoing	High Cost	Nexus
	Metro extensions	A number of metro extensions are being considered including extensions to Metro Centre, Team Valley, Washington, South of Sunderland and Cobalt	Long term	High Cost	Nexus
	Leamside Line	Reopening of the Leamside Line to remove feight traffic from the East Coast Main Line	Long term	High Cost	South Tyneside Council/LEP
	New stations	New metro stations at Killingworth and Murton to accommodate growth from proposed housing development	Long term	High Cost	North Tyneside Council

	Increase in rail services	Increase Durham Coast line service to every half hour. Look to provide additional services between London and Sunderland	Short-medium term	Medium cost	Sunderland Council
	Horden Peterlee	New station at Horden Peterlee on the Durham Coast Line	Short term	Medium cost	Durham County Council
General	Accessibility	Accessibility improvements to key services and facilities	Ongoing	Low-high cost	Durham County Council/Northumberland County Council/All
	Active modes	Measures to encourage active travel	Ongoing	Low cost	Gateshead Council/South Tyneside Council/all
	Regeneration	Improvements to traffic arrangements in town centres to help facilitate regeneration	Ongoing	Low-medium cost	Northumberland County Council/all
	Safety schemes	Safety improvements along the A697 to reduce number of accidents at known hotspots	Ongoing	Low-medium cost	Northumberland County Council
	Interchanges	Refurbishment of public transport interchanges	Ongoing-long term	Medium-high cost	Nexus
	Integrated/Smart ticketing	Implementation of a smart card for travel across Tyne and Wear and the wider travel to work area	Ongoing	Short term	Nexus
	UTMC	Further rollout of UTMC across both Tyne and Wear and wider travel to work area	Ongoing	Medium-high cost	UTMC Centre
	Port of Tyne	Increase railhead and freight handling infrastructure within the Port	Medium-long term	Medium-high cost	South Tyneside Council
	City Centre Transport Interchanges	Upgrade of Monument Metro and multi storey car parks	Medium term	£23 million	Nexus/Newcastle City Council
	Transport and Public Health Package	Local interventions to promote active travel	Short term	£7 million	Newcastle City Council
	East Newcastle Cycle route	Strategic cycle route in east end of city	Short term	£15 million	Newcastle City Council
	Blaydon pedestrian cycle bridge	New bridge for peds and cyclists at Blaydon	Medium term	£6 million	Newcastle City Council
	Great Nort Cycleway	Strategic cycle route development	Short term	£4 million	Newcastle City Council
	Strategic cycle routes	Develop strategic cycle routes for the city	Short to medium	£11.7 million	Newcastle City Council
	East Pilgrim Street MSCP	Multi storey car park for city centre development site	Short term	£9.4 million	Newcastle City Council
	Manors pedestrian and cycle bridge	A bridge over the CME for peds and cyclists lonking devt sites	Medium	£5.8 million	Newcastle City Council
	Northumberland Street	Public realm improvements	Medium	Unknown	Newcastle City Council
	New Bus Station	New bus station at East Pilgrim Street devt site	Long term	£7 million	Newcastle City Council
	Smarter choices	Measures to encourage smarter travel	Ongoing	Low cost	South Tyneside Council/all

Annex F: AMAT Follingsby Lane Upgrade

Transforming Cities Fund: Tranche 1

Scheme Impact Pro Forma for Small Project Bids - Please fill in the cells highlighted in yellow

Follingsby Lane upgrade (roadworks)

Year of assessment	2019

Scenario	Input Data / Key Performance Indicators	Unit	AM Peak Hr Weekday	PM Peak Hr Weekday	Inter-Peak Hr Weekday
Do-Minimum (with A184/A19 Roadworks)	Number of highway trips affected	vehicles	0	0	0
	Total vehicle travelled time	vehicle-hours	0	0	0
	Total vehicle travelled distance	vehicle-km	0	0	0
	Highway peak period conversion factor	-	0	0	0
	Number of PT passenger trips on affected routes	passenger trips	184	205	184
	Total PT travelled time	passenger-hrs	28.67	31.71	27.80
	PT peak period conversion factor	-	2.00	6.00	2.00
Do-Something	Number of highway trips affected	vehicles	0	0	0
	Total vehicle travelled time	vehicle-hours	0	0	0
	Total vehicle travelled distance	vehicle-km	0	0	0
	Highway peak period conversion factor	-	0	0	0
	Number of PT passenger trips on affected routes	passenger trips	214	239	214
	Total PT travelled time	passenger-hrs	22.32	25.03	22.55
	PT peak period conversion factor	-	2.00	6.00	2.00

Transforming Cities Fund: Tranche 1

Scheme Impact Pro Forma for Small Project Bids - Please fill in the cells highlighted in yellow

Follingsby Lane upgrade (no roadworks)

Year of assessment	2019

Scenario	**Input Data / Key Performance Indicators**	**Unit**	**AM Peak Hr Weekday**	**PM Peak Hr Weekday**	**Inter-Peak Hr Weekday**
Do-Minimum (without A184/A19 Roadworks)	Number of highway trips affected	vehicles	0	0	0
	Total vehicle travelled time	vehicle-hours	0	0	0
	Total vehicle travelled distance	vehicle-km	0	0	0
	Highway peak period conversion factor	-	0	0	0
	Number of PT passenger trips on affected routes	passenger trips	184	205	184
	Total PT travelled time	passenger-hrs	8.60	9.51	8.34
	PT peak period conversion factor	-	2.00	6.00	2.00
Do-Something	Number of highway trips affected	vehicles	0	0	0
	Total vehicle travelled time	vehicle-hours	0	0	0
	Total vehicle travelled distance	vehicle-km	0	0	0
	Highway peak period conversion factor	-	0	0	0
	Number of PT passenger trips on affected routes	passenger trips	214	239	214
	Total PT travelled time	passenger-hrs	22.32	25.03	22.55
	PT peak period conversion factor	-	2.00	6.00	2.00

Annex G: Location Map

Spatial Map


A1
To Berwick,
Edinburgh,
Glasgow,
Aberdeen
Ashington
Morpeth
A696
A68
Port of Blyth
A189
Newcastle
Airport
Cramlington
Whitley Bay
To Carlisle,
Manchester
North Shields
Port of Tyne
South Shields
A1
NEWCASTLE
UPON TYNE
A69
Hexham
Blaydon
Gateshead
SUNDERLAND
Port of
Sunderland
A194(M)
A692
A68
Washington
Consett
A693
South
Airport
ıe Tyne
Chester-le-
Street
A690
Seaham
Harbour
A1(M)
A691
A19
DURHAM
A68
Spennymoor
Bishop
Auckland
Newton
Aycliffe
To Hartlepool
and Middlesbrough
A688
Barnard
Castle
To York, Leeds,
London, Midlands
Principal rail links
Tyne &Wear Metro
Motorway
Key routes
Ports
Airports

Annex H: Enterprise Zone map


North East LEP Enterprise Zone sites
Round one sites
1 Blyth Estuary, Northumberland
East Sleekburn ECA
Bates/Wimbourne Quays ECA
Commissioner's Quay BRD
Dun Cow Quay BRD
2 North Bank of Tyne, Newcastle and North Tyneside
Neptune ECA
Swans BRD
Port of Tyne BRD
3 A19 Corridor, Sunderland
Corridor 1 ECA
Corridor 2 BRD
Corridor 3 ECA
Round two sites
1 Ramparts Business Park, Berwick BRD
2 Fairmoor, Morpeth BRD
3 Follingsby South, Gateshead BRD
4 North Bank of the Tyne Extension, Newcastle ECA
5 Holborn Riverside, South Tyneside
Sites 1 BRD
Sites 2 (Tyne Dock Enterprise Park) ECA
6 Newcastle International Airport Business Park, Newcastle ECA
7 Ashwood Business Park, Ashington ECA
8 Port of Sunderland, Sunderland and South Tyneside ECA
9 International Advanced Manufacturing Park, South Tyneside and Sunderland ECA
10 Jade Business Park, Seaham BRD
Railway
Motorway
Key road
Enterprise Zone
Port
Airport
BRD Business Rate Discount
ECA Enhanced Capital Allowance
Port of Berwick
Berwick-upon-Tweed
A1
Alnwick
Ashington
Morpeth
Port of Blyth
Blyth
A68
Newcastle Airport
North Shields
Port of Tyne
South Shields
NEWCASTLE UPON TYNE
A69
Hexham
GATESHEAD
Sunderland
SUNDERLAND
Consett
Seaham Harbour
A68
DURHAM
BISHOP AUCKLAND
A19
A1 (M)
Durham Tees Valley Airport
Teesport

Annex I: Spatial map of four key corridors

Spatial Map


A1
To Berwick, Edinburgh, Glasgow, Aberdeen
Ashington
Morpeth
A696
A68
Port of Blyth
A189
Newcastle Airport
Cramlington
Whitley Bay
To Carlisle, Manchester
North Shields
Port of Tyne
South Shields
A1
NEWCASTLE
UPON TYNE
A69
Hexham
Blaydon
Gateshead
SUNDERLAND
194M
Port of Sunderland
A692
A68
Washington
Consett
A693
Chester-le-Street
A690
Seaham Harbour
A1(M)
A691
A19
DURHAM
A68
Spennymoor
Bishop Auckland
Newton Aycliffe
To Hartlepool and Middlesbrough
A688
Barnard Castle
To York, Leeds, London, Midlands
North and South
Cities and Airport
Banks of the Tyne
River Wear
Principal rail links
Tyne & Wear Metro
Motorway
Key routes
Ports
Airports

Annex J: Scheme specific letters of support

Trevor Male
Operations Manager – Strategic Transport
Development Services
South Tyneside Council
Town Hall and Civic Officers
Westoe Road
South Shields
Tyne & Wear
NE33 2RL

Your Ref:
Our Ref:
Direct Line: (0191) 203 3664
Email: catherine.massarella@nexus.org.uk

By email (trevor.male@southtyneside.gov.uk) and post December 19, 2018

Dear Trevor,

Follingsby Lane Upgrade

On behalf of Nexus, I wish to express our support for the Follingsby Lane scheme upgrade. The project will improve the condition of the road within the geography and to the standard expressed in the template Transforming Cities Bid and, most importantly, restrict vehicular access to public transport and local traffic only.

With the co-operation of the commercial bus operators and in partnership with IAMP LLP, this scheme will facilitate vital public transport connections between the International Advanced Manufacturing Park, the Follingsby Max development and a number of local and regional conurbations. It will provide access to jobs and training opportunities for local people without increasing road congestion and so will positively impact on local employment, productivity and economic growth.

To demonstrate Nexus' commitment to this scheme, new bus shelters with real time service information will also be provided at Follingsby and IAMP to provide an improved waiting environment for passengers.

Nexus view this scheme as the first step in an ambitious wider development. If delivered to its full potential, the introduction of a local connectivity hub in the Follingsby locality will connect bus services with a local rail link, a substantial Park and Ride facility and sustainable transport options. Looking to the future, it may also become a test-bed for autonomous vehicle services.

For these reasons, Nexus is supportive of this submission.

Yours sincerely,

Cathy Massarella

INTERNATIONAL ADVANCED MANUFACTURING PARK

Jonathan Barlow
Strategic Transport Team
South Tyneside Council
Town Hall and Civic Offices,
Westoe Road
South Shields,
NE33 2RL

12th December 2018

Dear Mr Barlow,

Transforming Cites Bid - International Advanced Manufacturing Park (IAMP)

The IAMP team has established and works closely with the IAMP Public Transport Working Group, to consider and plan for the provision of public transport in and around the IAMP site. This is a 150 hectare nationally significant economic development project to create c4m sqft of floorspace and in excess of 7,000 jobs to the immediate north of Nissan's UK manufacturing facility.

The Working Group includes Nexus and the three local authorities of Sunderland, South Tyneside and Gateshead. The South Tyneside Council Transforming Cities bid to upgrade Follingsby Lane, which runs adjacent to and through the site, and to provide cycling provision from the Tyne Tunnel that will also serve IAMP, is welcomed and fully supported by the IAMP team. This will help strengthen bus and cycling provision to IAMP and will form a key component of the wider public transport strategy for the site.

Delivering schemes such as these, that will improve the resilience and sustainability to the local highways network, are an obvious benefit that will see IAMP and neighbouring sites benefit from lower levels of congestion, improved marked access and improved employee satisfaction.

We view these as positive steps to ensure that our nationally significant development is a positive and sustainable contributor to both the national and local economies over the longer term.

I trust the above is helpful. If you have any questions regarding the contents of this letter, or would like to discuss these matters in further detail, please contact Mark Reynolds, the IAMP Project Coordinator, on 07946 382107 mark.reynolds@sunderland,gov,uk.

Yours sincerely,

Peter McIntyre
Executive Director
Economy and Place
Sunderland City Council

George Mansbridge
Acting Corporate Director Economic Regeneration
South Tyneside Council

On behalf of IAMP LLP

117 Queen Street
Gateshead
Tyne and Wear
NE8 2UA

Tel: 0191 420 50 50
Web: gonortheast.co.uk

Direct Line: 0191 4229216
Email: graham.hill@gonortheast.co.uk

10 December 2018

Jonathan Barlow
Transport Analyst
Enterprise and Regeneration
South Tyneside Council
Town Hall and Civic Offices
Westoe Road
South Shields
NE33 2RL

Dear Jonathan,

A185 - Transforming Cities Fund

I am writing to confirm our support for Transforming Cities Fund Bid to be submitted by South Tyneside Council. I see this as a significant opportunity to invest and save in the resilience of the highway network on this important corridor.

The scheme is designed to deliver improvements to infrastructure and to enable South Tyneside residents and businesses to benefit from economic growth promoted by well maintained and improved local highways assets. The suggested improvements will contribute to improvements in traffic flows on this key highway corridor.

We believe that the proposals set out in this bid will deliver economic, reputational and environmental benefits in our region.

Yours sincerely

Graham Hill
Network Design Manager