Appendix 2 – Proposed Belfast City Council detailed responses to the Department of Agriculture, Environment and Rural Affairs Clean Air Strategy for Northern Ireland. A Public Discussion Document. November 2020

Chapter 1 - The Background: Sources and Effects of Air Pollution.
Q1: Should there be legally binding targets for particulate matter, which are based on WHO guidelines?
The Clean Air Strategy public discussion document highlights the WHO '*Health Risks of Air Pollution in Europe*', HRAPIE project, advising that the project concluded that the main findings of the survey were that the majority of respondents identified the general categories of 'road traffic', 'space heating and air conditioning' and 'shipping' as the top three emission source categories of concern associated with emerging issues for public health. In addition, respondents stated that fine and ultra-fine particles and their metal content were of greatest concern in relation to health effects.

The UK Air Quality Strategy has already established objectives for particulate matter (PM_{10}) of a 40 μgm^{-3} annual mean and a 24 hour mean of 50 μgm^{-3}, not to be exceeded more than 35 times per annum. In addition, Directive 2008/50/EC of the European Parliament and of the Council of 21st May 2008 on ambient air quality and cleaner air for Europe has established a national exposure reduction target, an exposure concentration obligation, a target value and limit values for fine particulate matter ($PM_{2.5}$). Whilst these various standards for fine particulate matter are not in legislation for the purposes of local air quality management, they nevertheless apply at country level and the Air Quality Standards Regulations (Northern Ireland) 2010 place a duty on Northern Ireland departments to ensure that concentrations of particulate matter, including for $PM_{2.5}$, do not exceed the relevant limit values and that all necessary measures, not entailing disproportionate costs, are taken to ensure that concentrations of $PM_{2.5}$ do not exceed the target values. Moreover, Northern Ireland Departments are to ensure that all necessary measures, not entailing disproportionate costs are taken with a view to ensuring that the average exposure indicator for 2015 does not exceed 20 μgm^{-3} and that the national exposure reduction target is achieved by 2020. No detailed discussion of, or reflections on the various actions being taken by government Departments in pursuit of these air quality standards for $PM_{2.5}$ have been included within the Clean Air Strategy discussion document and similarly, no detailed discussion of current concentrations of particulate matter (PM_{10} and $PM_{2.5}$) across Northern Ireland has been presented. It is however noted on page 7 of the discussion document that the Department has advised that no exceedances of the standards for PM_{10} and $PM_{2.5}$ have been observed in Northern Ireland since 2011.

The Department has asked whether legally binding targets for particulate matter, based on WHO guidelines should be introduced for Northern Ireland. As previously noted, no recent spatial ambient particulate matter concentration data, for either PM_{10} or $PM_{2.5}$, have been provided by the Department to assist in developing and informing a response to this question. Nevertheless, the 2005 WHO '*Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide Global update*' publication provided an assessment of the health effects of air pollution and thresholds for health harmful pollution levels including for $PM_{2.5}$. The WHO report highlighted that the evidence on airborne particulate matter and its public health impact was consistent in showing adverse health effects at exposures currently experienced by urban populations in both developed and developing countries. Furthermore,

WHO advised that the range of health effects was broad, but impact was predominantly to the respiratory and cardiovascular systems, with all of the population affected and with susceptibility to air pollution varying with health or age. WHO added that the risk for various outcomes had been shown to increase with exposure and there was little evidence to suggest a threshold below which no adverse health effects would be anticipated.

In proposing guideline values for PM_{10} and $PM_{2.5}$, WHO acknowledged that as thresholds have not been identified, and given that there is substantial inter-individual variability in exposure and in the response in a given exposure, it is unlikely that any standard or guideline value would lead to complete protection for every individual against all possible adverse health effects of particulate matter. On that basis, WHO advised that the standard-setting process needed to aim at achieving the lowest concentrations possible in the context of local constraints, capabilities and public health priorities. WHO further advised that in developing their guideline values, they had assumed that $PM_{2.5}$ guideline values would be converted to the corresponding PM_{10} guideline values by the application of a ratio of 0.5; 0.5 being typical of developing country urban areas and at the bottom of the range for developed country urban areas (0.5 - 0.8).

Accordingly, the 2005 WHO global update document put forward annual mean guideline values of 20 μgm^{-3} and 10 μgm^{-3} and 24 hour mean guideline values of 50 μgm^{-3} and 25 μgm^{-3} for PM_{10} and $PM_{2.5}$ respectively. Both 24 hour mean guideline values are to be assessed as the 99th percentile. The European Commission and UK have already established a 24 hour mean for PM_{10} of 50 μgm^{-3}, assessed as the 90.4th percentile, allowing for 35 exceedances of the 24 hour mean per annum. It is noted however that the Department has referred only to the WHO annual mean guideline values within its discussion document (Table 1.3). It is unclear therefore why the WHO 24 hour mean guideline values have been omitted from consideration in the Department's discussion document. For clarity, WHO advised that when evaluating guideline values and interim targets, it was generally recommended that the annual average take precedence over the 24-hour average since, at low levels, there was less concern about episodic excursions. WHO added however, that meeting the guideline values for the 24-hour mean would protect against peaks of pollution that would otherwise lead to substantial excess morbidity or mortality. Accordingly, WHO recommended that countries, with areas not meeting the 24-hour guideline values, should undertake immediate action to achieve these levels in the shortest possible time.

It is noted in Fig 1-1 Particulate matter ($PM_{2.5}$), that the Department has specifically identified emission sources for primary particulate matter, highlighting principal sources of concern to be domestic coal and wood burning, industrial combustion, road transport and solvents and industrial processes. However, the 2012 Air Quality Expert Group (AQEG) '*Fine Particulate Matter ($PM_{2.5}$) in the United Kingdom*' report advised that evidence from urban sites and the limited number of rural background measurement sites indicated that regional (rural) background concentrations make a considerable contribution to the overall mass of $PM_{2.5}$ in urban areas, accounting for around 60-80% of the background concentrations in the major urban areas of southern England. AQEG also advised that the regional background concentrations are dominated by secondary $PM_{2.5}$, primarily as ammonium nitrate and ammonium sulphate, but also as organic particles, adding that in the central and southern UK, around 60% of the urban background mass $PM_{2.5}$ is made up of secondary particles, with

sulphate particles remaining important, despite the large reductions in sulphur dioxide emissions since the 1980s. When these data and considerations are resolved into urban and rural background annual mean $PM_{2.5}$ data for the UK, AQEG noted that around 16% was estimated to be as a result of sea salt and residual natural sources, 38% from secondary inorganic aerosols, 8% from secondary organic aerosols, 11% from regional primary sources, 11% from rural and urban dusts, 10% from non-traffic local sources and 7% from traffic local sources (primary exhaust emissions and brake and tyre wear) (*Population-weighted mean contributions to urban and rural background annual mean $PM_{2.5}$ in the UK in 2009 from the PCM model*). It is therefore considered that equivalent information should have been provided by the Department as part of the public discussion process in order to provide a comprehensive description of the mechanism of $PM_{2.5}$ formation (both primary and secondary) for Northern Ireland and the likely abatement measures that will need to be prioritised locally, nationally and further afield in order to address Northern Ireland $PM_{2.5}$ concentrations.

It should be noted that the 2019 UK Clean Air Strategy contains a commitment to progressively cut public exposure to particulate matter pollution as suggested by WHO by setting a new, ambitious, long-term target to reduce peoples' exposure to $PM_{2.5}$. In order to help inform this commitment, the UK government committed to the publication of evidence early in 2019 to examine what actions would be needed to meet the WHO annual mean guideline limit of 10 μgm^{-3}. Analysis undertaken for the July 2019 Department for Environment, Food and Rural Affairs (Defra) publication entitled, '*Assessing progress towards WHO guideline levels of PM2.5 in the UK*' demonstrates that measures in the UK Clean Air Strategy, alongside complementary actions by EU Member States, are likely to take the UK a substantial way towards achieving the WHO guideline level for annual mean $PM_{2.5}$, including an anticipated 95% reduction in the population exceedance of WHO guideline levels of $PM_{2.5}$ by 2030, when compared to a 2016 baseline. Accordingly, the authors of the publication have advised that on the basis of scientific modelling, which has not considered full economic viability and practical deliverability, it would be technically feasible to meet the WHO annual mean guideline level for $PM_{2.5}$ across the UK in the future. The authors have added however, that substantive further analysis is needed to understand what would be an appropriate timescale and means of achievement.

It is again considered that the Department should have referred to this information or included equivalent information specifically for Northern Ireland within the public discussion document in order to help better inform the considerations on reducing exposure to particulate matter. Moreover, it is noted that Defra has recently initiated a 'call for evidence' on future $PM_{2.5}$ concentrations for England, advising that the government has indicated its intention to set two air quality targets relating to fine particulate matter ($PM_{2.5}$). The government has proposed that one target will be based on the annual mean concentration of $PM_{2.5}$, as stated in Clause 2 of the Environment Bill, and the other will be on the basis of population exposure reduction. The development of these targets is to be informed by evidence and analysis, including input from independent experts. It is noted that the Air Quality Expert Group (AQEG), together with the Committee on the Medical Effects of Air Pollutants (COMEAP), are providing independent technical advice to Defra throughout the development of the air quality targets. It is considered that a similar informed advisory approach should have been applied for Northern Ireland by the Department in advance of consulting on whether legally binding targets for particulate matter, based on WHO guidelines, should be applied to Northern Ireland. Moreover, whilst the Department has asked about introducing legally binding targets for particulate matter, based

on WHO guidelines, it is has not provided any information as to when such targets might be expected to be achieved across Northern Ireland.

Notwithstanding these issues, the Council would wish to emphasise the health benefits of reducing population exposure to particulate matter generally and with an emphasis on addressing fine particulate matter ($PM_{2.5}$). From a health perspective, the British Lung Foundation (BLF) have advised that exposure to $PM_{2.5}$ can cause illnesses like asthma, COPD, coronary heart disease, stroke, and lung cancer. The BLF have also advised of evidence linking $PM_{2.5}$ to low birth weight, diabetes and diseases such as Alzheimer's and Parkinson's.

From a financial perspective, the 2018 Public Health England (PHE) report entitled, '*Estimation of costs to the NHS and social care due to the health impacts of air pollution: summary report*' advises that between 2017 and 2025, the total cost to the NHS and social care of air pollution, where there is more robust evidence for an association, is estimated to be £1.60 billion for $PM_{2.5}$ and NO_2 combined increasing to £5.56 billion where other diseases for which there is currently less robust evidence for an association are included. The Department has advised that for Northern Ireland, comparable annual estimates for Health and Social Care costs in Northern Ireland associated with diseases related to ambient air pollution ($PM_{2.5}$ and NO_2) are in the range of £1.5m - £5.4m.

Given the above-mentioned acknowledged adverse health and financial impacts associated with exposure to fine particulate matter, the Council is content that a compelling case exists of the reduction of anthropogenic sources of particulate matter (PM_{10} and $PM_{2.5}$) in order to reduce public exposure as far as practically possible, thereby reducing mortality and morbidity effects of air pollution and safeguarding public health and the environment. Accordingly, the Council would welcome further research and discussion by the Department into the introduction of legally binding targets for particulate matter for Northern Ireland, based on WHO guidelines, informed by an appropriate timescale, and prioritised actions for achievement of the targets.

Q2: Should all automatic monitoring sites measure at least NOx and PM?

The Department will be aware that the various European air quality directives have primarily established the basis for ambient monitoring and for the number of sampling points required throughout member states, through the designation of zones and agglomerations. These national monitoring requirements have been augmented through the years by local authorities as part of their local air quality management functions and duties. To that end, LAQM.TG(16) now advises that local monitoring and / or assessment should provide a detailed picture of the local pollution problem. LAQM.TG(16) further advises that in order to achieve this, detailed dispersion modelling may be required, and appropriate monitoring should also be considered. The monitoring and modelling evidence should be sufficient to enable key sources to be identified and to allow source apportionment to be carried out; the nature and extent of the exceedance to be fully understood; the number and location of relevant receptors to be clearly identified; and the degree of population exposure to be considered.

However, with specific regard to monitoring networks, LAQM.TG(16) states that most local authorities have progressively adapted their monitoring strategies in accordance to the air quality issues specific to their administrative area. Over the years, many local authorities have

relocated kerbside monitoring sites to roadside or other sites relevant of public exposure. Monitoring networks have also been progressively extended to identify all potential hot spots, whilst a number of sites have been moved elsewhere or closed in areas where data showed continued compliance. LAQM.TG(16) therefore advises that it is likely that the existing monitoring network for most local authorities is now adapted to respond to the requirements of their LAQM system. As a result, it is not expected that local authorities need extensive guidance in relation to air quality monitoring strategies, such as how to determine the best location, the number of monitoring sites required, etc.

Accordingly, screening assessments, such as the use of the DMRB for transport sources or other pollution sources, either detailed or referenced within LAQM.TG(16), should provide useful initial information on the likely locations where the air quality objective for a pollutant of concern may be exceeded. This information can be used to select a monitoring site for a detailed study using an automatic or passive monitor. Screening tools for the various pollutants currently of concern are detailed within Chapter 7 of LAQM.TG(16) and criteria have been provided for nitrogen dioxide (from transport, non-transport sources, airports, industrial sources, ports, railways and commercial and domestic combustion sources), sulphur dioxide (from industrial sources, railways, ports and commercial and domestic combustion sources), particulate matter (from roads, ports, non-road mobile machinery, poultry farms, industrial sources and commercial and domestic combustion sources) and benzene (from petrol storage depots and petrol stations). On this basis, it is considered that ambient monitoring should continue to be located and undertaken in order to characterise ambient concentrations for specific pollutants of concern as per the pollutants and objectives of concern and the relevant exposure and other qualifying criteria as detailed in Chapter 7 of LAQM.TG(16). Where a monitoring site is to be located, for example, to specifically measure particulate matter emissions associated with a poultry farm, it is unclear why that site should also monitor for nitrogen dioxide. Similarly, LAQM.TG(16) suggests that nitrogen dioxide is the pollutant of concern for bus and coach stations and for narrow congested streets with residential properties close to the kerb and for busy streets where people may spend 1 hour or more close to traffic but that particulate matter is a pollutant of concern for commercial and domestic biomass combustion combined installations, domestic solid fuel use and for fugitive or uncontrolled particulate matter sources.

It may however, be desirable to monitor for both nitrogen dioxide and particulate matter for those sources that are known to emit both significant quantities of nitrogen dioxide and particulate matter. Referring to table 7.1 Screening Assessment of Road Traffic Sources, the technical guidance, for example, suggests that nitrogen dioxide and particulate matter may be a concern for those junctions or new roads with a vehicle flow of 10,000 vehicles/day and exposure within 10m from kerb (20m in conurbations > 2m in habitants) and for roads with a high flow of HDVs, i.e. 2,500 HDVs/day - exposure within 10m from kerb (20m in conurbations > 2m inhabitants). It should be noted however, that following this guidance from LAQM.TG(16), Belfast City Council operates a roadside automatic monitoring site for nitrogen dioxide and particulate matter at Stockmans Lane, close to the M1 Motorway, in the vicinity of two major road junctions. The site was originally established to confirm modelled exceedances of short and longer term nitrogen dioxide and particulate matter objectives. Although the site has since been affiliated into the AURN network, and continues to monitor both nitrogen dioxide (NO_2) and particulate matter (PM_{10}), principally from road transport, whilst there have been recent continuing exceedances of the nitrogen dioxide annual mean objective, there

have been no recent exceedances of the particulate matter 24-hour or annual mean objectives. For clarity, the ratified 2019 annual mean for particulate matter (PM_{10}) was 18 μgm^{-3} or less than ½ of the current 40 μgm^{-3} annual mean objective. Accordingly, if this site were not part of the AURN network, it might be possible to conclude the particulate matter monitoring at this location, due to the consistently low reported annual and 24 hour mean concentrations and as a result, it would not be necessary to measure at least nitrogen oxides and particulate matter at this location.

It is acknowledged however, that if legally binding targets for particulate matter, based on WHO guideline values, were to be introduced for Northern Ireland, significant additional ambient monitoring for particulate matter (PM_{10} and $PM_{2.5}$) would likely be required across Northern Ireland to better understand particulate matter concentrations and relevant public exposure in terms of those guideline values. This matter would need to be considered by all competent authorities. It should be noted however, that in 2019, the Stockman's Lane roadside site would have achieved the WHO annual mean guideline value of 20μgm^{-3} for PM_{10}.

DAERA will be aware that additional monitoring for nitrogen dioxide across Northern Ireland could assist government in better assessing progress with its Programme for Government Indicator 37: Improve air quality, where the lead measure is nitrogen dioxide concentrations, measured at both urban background and urban roadside monitoring sites. It is considered that this indicator should be more widely supported across government, down to a regional level and that competent authorities such as the Department for Infrastructure could better contribute towards its achievement through the Department's management and monitoring of the road infrastructure network. Moreover, it is considered that DfI could choose to introduce its own performance metrics, relating to nitrogen dioxide concentrations and directly measure the ambient air quality impacts of its actions relating to traffic management and encouraging a modal shift towards more sustainable forms of transport at regional, local and neighbourhood levels.

Q3: Should the current urban air quality monitoring network be expanded?

The governments' LAQM.TG(16) technical guidance document advises that screening assessments should provide useful initial information on the likely locations where the air quality objective for a pollutant of concern may be exceeded. This information can then be used to in turn select a monitoring site for detailed studies using automatic or other monitoring equipment.

The Department has however advised that the current approach for air quality monitoring was not set up to provide information to inform air quality alerts and thus, only specific pollutants are monitored at specific locations, where, according to predefined criteria, they are deemed to present a problem.

The Department has therefore stated that during a widespread air pollution episode, it is likely that sites measuring PM_{10} could register 'high' levels, whilst sites measuring only NOx could measure 'moderate' or even 'low' levels. The Department has stated that this presents a misleading picture to the public, since, looking at the DAQI map would suggest that air pollution levels are only a problem in particular locations and not others, while the overall extent of the problem is merely limited by available monitoring.

Moreover, the Department has advised that pollution episodes tend to occur in the colder months of the year, when cold, settled weather leads to the formation of temperature inversion layers in which pollutants are trapped near ground level and a lack of wind means that they are not dispersed. Coincidental with these cold weather conditions is an increased level of household heating, and where solid fuel is used as the heating source, emissions of particulate matter and PAHs then increase.

It is considered however, that in making this statement, the Department should acknowledge that ambient air quality monitoring, by its nature, is retrospective in nature in the sense that monitoring can only establish recent ambient air quality conditions and as advised, only at locations where monitoring is being undertaken. It is noted for example, that for PM_{10} and indeed $PM_{2.5}$ particles, the Daily Air Quality (1-10) Index is based on the daily mean concentration for historical data, i.e. the latest 24 hour running mean for the current day, whereas for nitrogen dioxide, the Daily Air Quality Index value is based on the most recent hourly mean concentrations. Comparisons between these two pollutants in a pollution episode are therefore never going to be readily achieved due to the differences in averaging periods of the objectives, pollution sources and monitoring locations. Moreover, it is noted that the majority of automatic nitrogen dioxide monitoring sites across Northern Ireland are situated at roadside locations, in order to characterise road transport emissions, with some urban background sites, whereas particulate matter monitoring sites tend to be located mostly at urban background locations and closer to residential accommodation in order to characterise emissions from solid and other fuel use within these premises. Moreover, fine particulate matter is well-known to function as a long-range transboundary pollutant, meaning that the UK can sometimes be affected by particulate matter emissions originating from without its shores, whereas transboundary nitrogen dioxide and nitrogen oxides typically have a lower air quality impact within Northern Ireland.

LAQM.TG(16) additionally advises that a monitoring programme should be designed to assist the authority in defining the geographical extent of any exceedance and that locations should be selected bearing in mind that results are likely to be used to help demonstrate the performance of dispersion modelling. Dispersion modelling can therefore be used to provide both spatial and temporal information on ambient pollutant levels at up to a country level. For this reason, the Department and indeed Defra also provide dispersion modelling based air pollution forecasting for all of Northern Ireland, in addition to ambient monitoring data, via their respective air quality websites. Defra's air quality forecasts are produced by the Met Office early in the morning for the current day as well as for the next 4 days. Accordingly, the Met Office weather forecast and climate prediction model have been developed to include air quality forecasting in a new model configuration called AQUM. This new Met Office model uses UK and European maps of annual average pollutant emissions to simulate the release of chemical species into the atmosphere. These emissions are then allowed to chemically react according to prescribed reaction rates, which depend on factors including the concentration of the species, the temperature and the amount of sunlight. Species are then transported and dispersed within the model boundary according to the winds and the concentrations are then re-evaluated. Using these concentrations, calculated in this way throughout the forecast period, the Daily Air Quality Index is calculated as an average over the prescribed time periods. It is noted that the forecast is improved by incorporating recent observations of air quality from across the UK from Automatic Urban and Rural Network (AURN) monitoring sites.

It is considered therefore that whilst the most recent Daily Air Quality Index values displayed on the various monitoring sites on the front page of the DAERA Northern Ireland Air website and accompanying mobile application are useful and informative to the public, the provision of accurate forward projections or forecasts is of significant benefit as they enable members of the public to take informed decisions in advance about their daily activities over the next four days, where predicted air pollution in the low (1-3) band means enjoy your usual outdoor activities; medium (4-6) means adults and children with lung problems, and adults with heart problems, who experience symptoms, should consider reducing strenuous physical activity, particularly outdoors; high (7-9) means adults and children with lung problems, and adults with heart problems, should reduce strenuous physical exertion, particularly outdoors, and particularly if they experience symptoms; people with asthma may find they need to use their reliever inhaler more often and older people should also reduce physical exertion and very high (10) means adults and children with lung problems, adults with heart problems, and older people, should avoid strenuous physical activity; people with asthma may find they need to use their reliever inhaler more often.

The Department will be aware that members of the public can also subscribe to a text message service '*Air Aware SMS*' via their mobile phone that informs them of moderate, high or very high pollution episodes across Northern Ireland. The text message also refers them to the NI Direct website for more detailed information. Further detailed air quality information, along with air pollution forecasts, are also now available via the Northern Ireland Air mobile phone application.

By way of conclusion, the Council considers it vital that the Department continues to review and where necessary augment the ambient air quality monitoring network for Northern Ireland, recognising the value that such monitoring brings to understanding and measuring progress towards achieving the Programme for Government Indicator 37: Improve air quality, the strategic agenda to be established within the Clean Air Quality Strategy for Northern Ireland and the objectives of the UK Environment Bill.

Q4: Should a targeted approach to exposure, based on population, be used to expand the current monitoring network?
&
Q5: What are your views on using a population figure of 10,000 as a threshold that triggers the requirement to monitor air quality?
The Department has suggested a targeted monitoring approach based on human exposure could set a population threshold, for example, 10,000 people and require that air quality monitoring is carried out in any settlement with a greater population than this. The Department has advised that if this approach were adopted, then the following towns and villages would become part of Northern Ireland's air quality monitoring network: Cookstown, Dungannon, Limavady, Enniskillen, Banbridge, Larne, Omagh, Antrim, Coleraine, Carrickfergus and Newtownards.

Belfast City Council considers that a response to this question should be a matter for these towns in the first instance but it is noted that the proposed additional monitoring approach would provide greater ambient air quality monitoring data across Northern Ireland and within the additional population centres that have been identified by DAERA.

It is however unclear from the public discussion document where monitoring would be undertaken within these towns, i.e. urban centre, urban background, suburban, kerbside, roadside, rural or other monitoring location and for which pollutants. Moreover, it is unclear from the discussion document whether the Department's proposal to expand the monitoring network is related principally to capturing more localised data during relatively infrequent and meteorologically dependent high pollution episodes, to assess local background concentrations or if it is to be used for the purposes of local air quality management, meaning that the monitoring equipment would therefore be cited at relevant receptor locations.

It is noted, however, from the LAQM section of the Northern Ireland Air website that Northern Ireland Councils, including those encompassing the towns mentioned above, have provided numerous Progress, Updating and Screening Assessment and Detailed Assessment reports over the years that would have been expected to identify on an ongoing basis any locations where any ambient air quality objectives were, or were predicted to be exceeded. Following these reports and where appropriate, Councils would likely have undertaken ambient monitoring and dispersion modelling to confirm the presence and extent of any exceedances and they would, where necessary, have then declared Air Quality Management Areas and developed Action Plans in pursuit of the objectives. In identifying the presence of exceedances of the objectives, the Councils would have considered both short and longer term objectives, ranging from 15 minutes for sulphur dioxide to 1 hour for nitrogen dioxide, to 24 hours for particulate matter and to annual means for nitrogen dioxide and particulate matter. These are the equivalent time periods on which the Daily Air Quality Index values are calculated and assessed.

In addition, it is noted that within Chapter 7 of the discussion document, the Department has made reference to revised options for the allocation of local air quality management grant funding. Accordingly, DAERA have proposed that the grant application process will change to allow Local Authorities and also non-governmental organisations or other similar bodies to bid for money to develop projects, which demonstrate outcomes where the activities, supported by the grant money, will have a direct impact on the improvement of air quality in the region or location. DAERA have added that in Northern Ireland, Automatic Urban and Rural Network (AURN) sites, which are part of the official UK-wide monitoring network will continue to be supported by central government, along with those district council monitoring sites that are used to inform the NICS Outcomes Delivery Plan air quality indicator. Aside from these, more emphasis may be given to allocation of grant monies to support measures that improve ambient air quality. It is therefore unclear how the additional monitoring sites that DAERA have proposed establishing across Northern Ireland are to be installed, operated and maintained.

Q6: Should biomass heating be discouraged in urban areas or in areas with poor air quality?

The Department has advised that the UK Committee on Climate Change (UKCCC) produced a report in February 2019, entitled *'Reducing Emissions in Northern Ireland'*, which sets out how Northern Ireland can reduce its greenhouse gas emissions between now and 2030 in order to meet UK-wide climate change targets. Overall, Northern Ireland's contribution to the UK's fifth carbon budget requires emissions reductions of at least 35% against 1990 levels by 2030. The report examines carbon emissions from a range of sectors in Northern Ireland and identifies gaps and deficiencies in current policy, which are considered to be barriers to achieving sustained carbon reductions. The report does however recognise that there are

‘*wider benefits to climate action through reduced air pollution and other health benefits*’. Specifically in relation to biomass, the report recommends that, ‘*biomass for heating in urban areas should not be supported due to air quality concerns*’. On this basis, it would appear that biomass heating should be discouraged in urban areas or in areas with poor air quality.

However, the report also states, in advance of the commentary on biomass, that the objective should be to provide support for *'low-regret'* heat technology in the early 2020s, meaning that Northern Ireland can support moves away from oil boilers and resistive electric heating through financial support for low-carbon alternatives in both residential and non-residential properties; i.e. heat pumps, including hybrid heat pumps, low-carbon district heating and biomethane gas-to-grid where technically feasible and anaerobic digestion (AD), where it can replace fossil-fuel space or process heating. The report adds that there is potential for a large expansion of '*low-regret*' low-carbon heating due to the high proportion of households off the gas grid that are currently fitted with oil boilers. Applying the average carbon savings per household of retrofits from our fifth carbon budget advice, the authors of the report calculated that retrofitting 25% of Northern Ireland's oil-heated homes to heat pumps by 2030 could bring additional savings of 0.5 $MtCO_2$. From a climate change perspective, it would seem therefore that biomass is not a preferred technology for addressing future greenhouse gas carbon dioxide emissions, with a recommended emphasis being placed on retrofitting heat pumps, installing district heating or developing biomethane gas-to-grid or anaerobic digestion.

The Air Quality Expert Group (AQEG) in its 2017 report entitled, *‘The Potential Air Quality Impacts from Biomass Combustion Prepared for: Department for Environment, Food and Rural Affairs; Scottish Government; Welsh Government; and Department of the Environment in Northern Ireland’* advised that emissions from the combustion of wood within both power generation processes and residential heating appliances will comprise both gases and particles. These include particulate matter and gases such as carbon monoxide (CO), carbon dioxide (CO_2), oxides of nitrogen (NOx), volatile organic compounds (VOCs), sulphur oxides (SOx) and a range of trace species including polyaromatic hydrocarbons (PAHs). AQEG further advised that particulate matter emissions are perhaps of the greatest concern since, particularly for domestic appliances, wood may have replaced gas as a heating fuel leading to a net dis-benefit to air quality in terms of particulate matter. Of the particulate matter produced during wood combustion in an enclosed residential wood burner, 96% was suggested to be in the PM_{10} size fraction and 93% in the $PM_{2.5}$ fraction, thereby putting the majority of emissions into the respirable fraction and also of significance in terms of meeting air quality standards.

Accordingly, AQEG concluded that domestic emissions of wood smoke have an especially high impact on ground-level concentrations relative to those from elevated sources. If current trends in domestic biomass burning continue upwards, it is inevitable that there will be an increase in airborne concentrations of wood smoke, which will consequently lead to increased population exposures. Wood smoke is already a significant contributor to population weighted $PM_{2.5}$ exposures and is liable to make an increasingly important contribution in the future for this reason, and as emissions from some other sources decline. In terms of the strength of measurement evidence in relationship to air pollution from biomass burning, AQEG advised that the current measurement evidence is insufficient to suggest any long term trends but that short term measurements suggest a significant contribution of biomass burning to particulate matter levels during the winter months in urban areas.

Whilst AQEG did not recommend that biomass should be discouraged, AQEG did acknowledge that emissions from newer biomass appliances are likely to be lower than for legacy devices (e.g. domestic stoves, boilers) due to developing and strengthening legislation. AQEG stated therefore that capturing information on device replacement and fuel switching would be critical to assessing net changes in emissions, and it recommended that data be sourced on this, through either surveys or collecting data via processes associated with the purchase or installation of newer appliances. AQEG stated however that the turnover of domestic combustion devices is likely to be much slower than for emissions sources in the domestic road transport sector, adding that incentives to encourage the replacement of older biomass devices with newer ones, which meet required regulatory constraints, would be beneficial, as would improving guidance on solid fuel stove operation. AQEG therefore recommended that consideration be given to the feasibility of supporting these actions.

It is noted that within the 2019 UK Clean Air Strategy document, government has committed to ensuring only the very cleanest stoves can be bought and installed, adding that in 2022, new EU Ecodesign regulations will come into force, which will mean that all new stoves will need to meet agreed emissions standards, regardless of where they are used, thereby raising the standard of appliances across the whole country. Defra have advised that these new emission limit requirements for solid fuel appliances will need to be coupled with an effective approach to testing and that measuring emissions of particulate matter from wood stoves is a recognised challenge. Defra have further advised however, that it is working with industry sectors and test houses to review different methods for testing stove emissions to determine what test methods are the most reliable. Accordingly, it would appear that the current government policy direction is not to ban biomass heating but to ensure that only the cleanest appliances can be placed in the marketplace.

The Department has asked if biomass heating should be discouraged in urban areas or in areas with poor air quality. It is unclear as to what the Department means by the terms ‘discouraged’ or ‘poor air quality’ and it is considered that further clarity is required on both of these terms before a fully informed response can be provided. It is also unclear whether the Department has given consideration to the need to address emissions from existing biomass installations. However, on the basis of the comments and conclusions within the UKCCC and AQEG reports about the disbenefits of biomass in terms of general ambient air pollution and specifically in terms of particulate matter emissions, the Council is content that biomass heating should be discouraged in what DAERA have described as urban areas or in areas with poor air quality.

It should however be noted that Belfast City has been substantially declared as a series of Smoke Control Areas, with the exception of the port area, some areas of north Belfast and those areas of neighbouring Councils that were amalgamated into the revised Belfast City Council boundary as part of the 2015 local government reform and were not designated as smoke control areas by their previous Councils.

Accordingly, the Clean Air (Northern Ireland) Order 1981 provides for the prohibition of dark smoke from chimneys and from industrial or trade premises, as well as providing for the designation of smoke control areas and the provision that subject to any exemptions and limitations for the time being in force if, on any day, smoke is emitted from a chimney of any building within a smoke control area, the occupier of that building shall be guilty of an offence.

In proceedings for an offence under this legislation, it shall be a defence to prove that the emission of smoke was not caused by the use of any fuel other than an authorised fuel.

A list of authorised fuels for use within Northern Ireland Smoke Control Areas is maintained by Defra via the below weblink and it should be noted that wood is not an authorised fuel, although some charcoals have been authorised. Moreover, only inherently smokeless fuels such as anthracite, semi-anthracite, electricity, gas, and low volatile steam coals are subject to generic authorisations. https://smokecontrol.defra.gov.uk/fuels.php?country=northern-ireland

In addition, the Clean Air (Northern Ireland) Order 1981 provides that where the Department is satisfied that any class of fireplace can be used for burning fuel other than authorised fuels, without producing any smoke or a substantial quantity of smoke, the Department may prescribe that fireplaces of that class shall, upon such conditions as may be prescribed, be exempted from the provisions of Article 17 in relation of the Order in relation to smoke emissions.

Defra maintains a list of exempted appliances for use within Northern Ireland Smoke Control Areas via the following weblink:
https://smokecontrol.defra.gov.uk/appliances.php?country=northern-ireland

It should be noted that the exempted appliances list includes numerous household and other appliances that are approved for use within Smoke Control Areas for burning biomass or wood fuels, including for example, wood logs, wood pellets, small untreated pieces of wood and wood chips, etc. From the requirements of the Clean Air (Northern Ireland) Order 1981, it is assumed that these appliances have been tested and confirmed to be able to operate without producing any smoke or a substantial quantity of smoke. It is therefore unclear whether the Department's initial comments on discouraging the use of biomass in urban areas or in areas with poor air quality extend to the use of exempted appliances using biomass fuels within smoke control areas.

It is additionally noted that in the 2017 AQEG report, '*The Potential Air Quality Impacts from Biomass Combustion',* the authors have advised that a straight comparison of the particulate matter limits for local space heaters within the proposed Ecodesign Directive with those specified by the current exemption criteria for smoke control areas within the UK Clean Air Act is not possible since they are based on different units. The report does advise however, that for domestic scale boilers the Ecodesign Directive will lead to quite a large reduction in emissions limits of approximately a factor of six in comparison to the Clean Air Act, and in fact, the Ecodesign Directive is slightly more stringent for small boilers than the limits imposed via the Renewable Heating Incentive.

Q7: Should the connectivity between air quality and noise issues be improved through requiring consideration of each in Noise and Air Quality Action Plans?
The Department has highlighted that some sources of air pollution have little to no association with noise, for example smoke from chimneys, whilst others have much more of a distinct relationship, including for example industrial or vehicle noise. Where air and noise pollution share some of the same sources, the Department has stated that improving the quality of air can have a subsequent impact on improving the quality of noise. The Department has cited

air and noise pollution synergies between industry, aircraft, railways and road vehicles by way of example.

The Department will be aware that Directive 2002/49/EC relating to assessment and management of environmental noise, more commonly referred to as the Environmental Noise Directive or 'END', was published in July 2002. The aim of the Directive was to avoid, prevent or reduce on a prioritised basis the harmful effects, including annoyance, due to exposure to environmental noise.

The three main actions that END requires Member States to undertake are to determine the noise exposure of the population through noise mapping; to make information on environmental noise and its effects available to the public; and to establish Action Plans based on the mapping results.

Within Northern Ireland, the competent authorities for END for noise sources located within the Belfast City Council boundary are the Department for Infrastructure for road transport noise, George Best Belfast City Airport for aircraft noise, Translink NI Railways for railway noise and the Department of Agriculture, Environment and Rural Affairs for industrial noise. To date, three Quiet Areas have been designated within the Belfast agglomeration, with the Lagan Meadows under consideration for designation as a further Quiet Area.

It should be noted that noise action plans have been published by each of the abovementioned competent authorities; i.e. round two action plans for roads, rail, George Best Belfast City Airport and industry, covering the period 2013-2018 and round 3 action plans for industry, roads, aircraft and rail covering the period up until 2024.

For the Department for Infrastructure Roads Environmental Noise Directive Round Three - Noise Action Plan 2018-2023, it should be noted that the action plan has considered major roads across Northern Ireland (major roads to be included in Round 3 noise mapping were trunk roads, motorways and classified roads with more than 3 million vehicle passages per year), as well as roads located within the Belfast agglomeration. The action planning process has led to the identification of 25 candidate noise management areas within the Belfast agglomeration and in terms of mitigation measures to reduce noise exposure, the plan in many instances proposes measures including the introduction of specific transport initiatives such as the creation of car pools, cycling to work schemes and encouraging the use of public transport. Where the candidate noise management areas are also situated close to Belfast Rapid Transport (BRT) network, the Department for Infrastructure has advised that such candidate noise management areas could potentially benefit from the BRT scheme, i.e. encourage a transition away from reliance on the private car to a more sustainable form, such as public transport. These actions are therefore consistent with those proposed as part of the various Air Quality Action Plans for Belfast City, as they have also been designed to encourage a modal shift away from private car usage, thereby reducing transport related ambient air pollution (nitrogen dioxide). For complementary actions such as these, it would be beneficial to encourage cross linkages between noise and air quality action plans. However, in some instances the Department has proposed noise specific engineering solutions such as the construction of acoustic barriers and the introduction of low noise surfacing, both of which are unlikely to deliver appreciable improvements in local ambient air quality.

Accordingly, it is considered that for road transport sources, there may be benefit in linking noise and air quality action plans but this may be on a site by site basis only. In addition, it should be noted that the majority of the Department for Infrastructure's proposed candidate noise management areas are not located within the Council's air quality management areas, with the exception of candidate noise management area number 4, located at Little George's Street, adjacent to the junction of the A12 Westlink with York Street. Moreover, in accordance with the government's intention that new cars and vans, powered wholly by petrol or diesel, will not be sold in the UK from 2030, it is anticipated that a fully electrified road vehicle fleet will be some 3 - 4 dB quieter as compared to the present internal combustion engine based road fleet, thereby further reducing the number of people severely annoyed by road traffic noise.

It should be noted that Belfast City Council has not declared any air quality management areas associated with industrial, airport or railway air emissions and so our Air Quality Action Plans have not needed to include mitigation measures designed to address these sources of ambient air pollution at relevant receptor locations.

Q8: Given that air pollution, carbon emissions, and noise often share the same sources, what are your views on including noise and carbon emissions as considerations in Low Emissions Zones?

It should be noted that within the Department's public discussion document, low emission zones are considered in detail within '*Chapter 2, Section 2.9 Clean Air Zones'* and *'Chapter 6 - Local Air Quality Management',* but are not mentioned or discussed in detail within *'Chapter 1 Background: Sources and Effects of Air Pollution'.* It is considered therefore that this question should have been posed as a component of either Chapter 2 or 6.

Nevertheless, the Department has advised that low emission zones are more suited to addressing transport related NO_2 exceedances in city centre streets and are therefore not an obvious solution to exceedances along major trunk roads such as the A12 Westlink or A2 Sydenham Bypass. It is anticipated therefore that low emission zones would be applied predominantly in city centres and address air pollution, noise and carbon emissions associated with road transport in those locations.

Belfast City Council would highlight that detailed comments have been provided concerning the anticipated applicability of Low Emission Zones / Clean Air Zones to the Belfast City Council area within our responses for Chapters 2 and 6. Moreover, the Department is encouraged to refer to the Council's preceding response to question 7, concerning connectivity between ambient air quality and noise action plans.

In specific relation to climate change and carbon emissions, the Department is advised that Belfast City Council declared a climate emergency for the city in October 2019 and in doing so, the Council has committed to becoming a carbon-neutral organisation as urgently as possible, producing an action plan setting out how we will become a carbon-neutral organisation and working with partners across Belfast and with central and devolved government to seek to ensure that Belfast district's net carbon emissions are reduced by 80% compared to 2005 levels as quickly as possible. The Council is therefore working towards publishing a climate adaptation and mitigation plan, which will aim to deliver the vision set out in the draft Belfast Resilience Strategy - to transition to a low-carbon economy in a generation.

https://www.belfastcity.gov.uk/belfastresilience. The Plan is being developed in consultation with a number of cities as part of Belfast's membership of the Resilient Cities Network and it will focus on actions that the Council can take in relation to climate adaptation and climate mitigation. It is considered therefore that whilst low emissions zones could contribute to addressing carbon emissions within the city centre, the Council's forthcoming climate mitigation and adaptation plan will develop and present authoritative, encompassing and prioritised mitigation and adaptation measures for the city.

Chapter 2 - Transport Emissions.

Q9: Are there any potential measures not included here that you believe could help encourage a shift away from private car use to walking, cycling, and public transport?

The Department has highlighted that an assessment of technology options to reduce road transport emissions (both greenhouse gases and air pollutants) by Policy Exchange shows modal shift to be an option with both high air quality potential and low consumer cost. The report contains a number of recommendations for government including the introduction of Clean Air Zones, vehicle scrappage schemes, and recommendations on other vehicle fuel technologies such as biodiesel, gas and electric vehicles. The recommendations on modal shift include investment in improved public transport and increasing the proportion of the overall transport budget that is spent on cycling and walking.

The Department has also highlighted that in 2018, just under one quarter (24%) of all journeys were taken by walking, cycling or public transport and that there has been no statistically significant change comparing the figure for 2018 to that for the baseline year (25% in 2015). Indeed, there has been no significant change in modal choice when comparing to the earliest available Travel Survey for Northern Ireland data.

The Department has stated that increasing the proportion of journeys undertaken by walking, cycling and public transport has the potential to reduce the number of private cars on our roads, and to decrease associated emissions of nitrogen oxides. It is also clear that a focus on short journeys - which are more suitable for walking or cycling - could deliver benefits. The *Belfast Active Travel Action Plan 2014-2020* stated that approximately 33% of all journeys within Northern Ireland are less than 2 miles long and a further 17.5% of all journeys are between 2-5 miles long. Currently, approximately 35% of trips less than 1 mile long; 69% of trips between 1-2 miles long; and 84% of trips between 2-5 miles are taken by private car. With this in mind, by increasing the proportion of short journeys undertaken by walking, cycling and/or public transport, this is likely to considerably reduce emissions.

In terms of the Belfast City Council area, the most recent Belfast Air Quality Action Plan 2015-2020 contained a range of measures proposed by the Department for Infrastructure to encourage modal shift including introduction of the Belfast Rapid Transit (BRT) system and developing the new the Belfast Transport Hub at Weavers' Cross. The Department also committed towards improving and extending the cycle network in Belfast City Centre with the introduction of a network of parallel routes including contra-flow cycle lanes, shared use bus and cycle lanes. The Department stated that it would provide secure cycle parking and promote cycle to work and public bike hire schemes. Finally, the Department committed to extending its bus and rail based park and ride schemes in order to reduce traffic travelling and

parking within the city centre by establishing an out of town car park and using buses (or trains) to travel into the city.

Within the Action Plan, Translink indicated that it would upgrade its current bus fleet by replacement and renewal to bring in a greater proportion of newer, lower polluting vehicles, thereby reducing the average age of its fleet. Translink also committed to an annual programme of publicity campaigns and events to encourage commuters to use public transport instead of private cars.

Belfast City Council Green and Blue Infrastructure Plan.
https://www.belfastcity.gov.uk/gbip
In terms of additional potential measures not included, that could help encourage a shift away from private car use to walking, cycling, and public transport, the Council would highlight that its Green and Blue Infrastructure Plan recognises that as the city grows, there is a risk that busy roads will become increasingly congested. Over half of commuters move through the city by private vehicle and, without an alternative, planned growth could add 100,000 vehicle trips in peak hours. In addition to the pressure that this would add to the road network capacity, the additional emissions would have climate change and air pollution impacts. As such, finding alternative routes through the city that accommodate more sustainable and healthy cycling and walking is imperative. The benefits of more active modes of movement extend beyond physical health such as reduced risk of cardiovascular or respiratory diseases, it also improves overall wellbeing, with those walking or cycling recognised as being some of the happiest commuters when compared with those driving or taking the bus.

Accordingly, the Green and Blue Infrastructure Plan proposes creating a strategic framework for green and blue infrastructure, i.e. a green space network and a blue infrastructure network interconnected by strategic connections. For example, Belfast has a growing number of greenways and community paths linking across the city. Greenways are dedicated movement corridors free of motor vehicles, which provide a safe environment for walkers, runners and cyclists to move around the city. Where segregation from other road users is impossible, the Council has developed community paths with a strong identity to help users navigate efficiently across the city. These links help connect our green spaces and often run parallel to our blue infrastructure. As well as helping develop a new sustainable approach to travel, they provide an excellent opportunity for urban greening to enhance the green space network.

Local Development Plan.
https://www.belfastcity.gov.uk/ldp
Moreover, the Council's Local Development Plan contains a range of policies to deliver sustainable patterns of development, which reduce the need for motorised transport and prioritise active travel and travel by public transport, to protect routes and land required for enhancing the existing transport network and delivering future transport schemes; and to facilitate active travel and a modal change to more sustainable modes of travel throughout the city.

In terms of facilitating active travel - walking and cycling, for example, Policy TRAN 1 commits that planning permission will be granted for development proposals providing major residential, jobs, shopping, leisure and services, including educational and community uses,

which takes account of the needs of walkers and cyclists. In such cases, provision of the following will be required:

- Safe and convenient walking and cycle access;
- Safe, convenient and secure cycle parking having regard to the DfI's published standards; and
- Safe, accessible and convenient walking and cycle links to existing or programmed networks and public transport services where they adjoin the development site.

In addition, major employment generating development will be required to make appropriate provision for shower and changing facilities.

Furthermore, Policy Tran 5, relating to new transport schemes, advises that the Council will safeguard land required to implement new transport proposals or planned improvements to the transportation network as identified in the DfI's extant transport plan. This includes new and improved walking and cycling routes, enhanced or new public transport services, park and ride proposals and road schemes. Policy Tran 5 advises that planning permission will not be granted for development that would prejudice the implementation of a transport scheme. The Council will also protect disused transport routes such as disused railway lines and canals. Planning permission will not be granted for development that would prejudice the future re-use of a disused transport route for transport or recreational purposes.

A Bolder Vision for Belfast - Reimagining the Centre.

https://www.belfastcity.gov.uk/documents/a-bolder-vision-for-belfast

The joint Belfast City Council, Department for Communities and Department for Infrastructure December 2019 publication entitled, '*A Bolder Vision for Belfast - Reimagining the Centre*' advises in its introductory section that, '*Like many coastal cities Belfast faces unprecedented challenges to build resilience and overcome the risks posed by climate change. At the same time, it must also tackle a range of other challenges including how to improve its air quality and adjust to the needs of an aging population*'. To that end, the document highlights that the dominance of the car in the centre of Belfast must end and that far too much space is devoted to an inefficient and unsustainable means of transporting people to and across the City, which we know significantly contributes to the problems of air quality, severance and inequality of access faced by those living, working and visiting the centre of Belfast.

The Bolder Vision for Belfast document therefore sets out how a green, walkable, cyclable network of streets and places will improve health for all, revitalise the City's economy and restore a sense of collective pride in the centre of the City by the communities within and around it, highlighting that too many journeys are made by car often with only one person in the car, even with significant investment in public transport, car journeys are forecast to grow by 2030 and as a consequence that bold change is required to make space for prioritising walking, cycling and public transport to halt significant congestion and improve air quality.

Belfast Bikes Scheme.

https://www.belfastbikes.co.uk

With regard to encouraging greater levels of cycling, Belfast City Council continues to operate its Belfast Bikes public bike hire scheme. At present, there are 47 docking stations and over 300 bikes located across Belfast, providing a low cost, convenient and sustainable way to

travel about the city. In terms of scheme patronage, there were 3,274 rentals in October and 3,462 rentals during November 2020.

However, in order to encourage greater levels of cycling across the city, the Council's City Regeneration and Development team have recommended the introduction of bike purchase schemes should be proactively encouraged amongst employers, including focused engagement with the public sector and larger private employers. They have recommended also that the uptake of such schemes amongst employees should be supported through the provision of quality showering and changing facilities at workplaces, secured cycle parking across the city centre and at key employment locations and segregated cycle lanes. In addition, the Team have highlighted the forthcoming implementation of the Belfast Bicycle Network Strategy (due to be launched in January 2021)

The City Regeneration and Development team have also highlighted the need for frequent and clear public awareness campaigns similar to the, '*Take 5 Steps to Wellbeing*' health and social wellbeing initiative, adding that initiatives of this type should be informed by behavioural change approaches and supported by practical schemes such as cycle to work incentives, etc.

Q10: What would encourage you to consider buying an electric vehicle as your next car?

The Department has advised that ultra-low emissions vehicles (ULEVs) are those vehicles powered purely by electricity, as well as 'plug-in hybrids' that run both on electricity as well as a conventional combustion engine; hydrogen and biogas low and zero emission vehicles are also being developed and demonstrated across the UK.

The Department has also advised that the Continuous Household Survey for 2015/16, based on a random sample of 4,500 domestic addresses, contained questions about e-cars and their uptake. The dataset from the survey contains responses for 3,340 survey respondents aged 16 and over, who answered the e-car question set. The survey found that of those questioned, 94% said that they were 'not at all likely' to buy an electric vehicle as their next car, with 6% saying that they would be 'quite likely' and 1% 'very likely' to buy an electric vehicle as their next car (percentages have been rounded to whole numbers and so do not sum to 100). Key factors that would encourage electric vehicle purchase were found to include no vehicle duty, grant towards purchase and low running costs and no vehicle duty.

The UKCCC Report chapter on Emissions from Transport noted that tax and vehicle standards are reserved matters, and therefore outside the competence of the NI government. However, the Committee proposed a number of actions that would further encourage the uptake of ULEVs:

- operating and promoting UK government-funded schemes, such as e-car NI;
- pursuing opportunities to secure UK government funding for ULEV infrastructure in Northern Ireland;
- providing leadership via public sector and bus fleets;
- using the infrastructure budget on electric vehicle charging infrastructure;
- setting targets for ULEV sales that go beyond those in the Road to Zero Strategy and;

- addressing non-financial barriers for ULEVs: parking, and access to priority lanes and bus lanes.

The Department has therefore asked what would encourage consideration of buying an electric vehicle as your next car. It is considered that there are a number of perceived issues with electric cars including the limited driving range and associated charging / recharging time, lack of charging infrastructure including residential, workplace and public charging, grid capacity for EV charging, limited current vehicle choices, vehicle purchase costs and residual vehicle values, maintenance and longevity concerns, issues around the recycling of vehicles and their components and concerns around the supply chain for certain constituent components used in electric vehicle manufacture including, for example, the supply of lithium and cobalt used within the vehicle's batteries. It is noted that during 2020, cobalt was added to the EU's 4th list of, *'Critical Raw Materials Resilience: Charting a Path towards greater Security and Sustainability'*. https://ec.europa.eu/growth/sectors/raw-materials/specific-interest/critical_en.

Moreover, if the source of the energy to power the electric vehicles does not come from sustainable sources then carbon dioxide and ambient air pollution emissions will be higher and may also be displaced if the electricity used to charge the vehicles comes from the burning of fossil fuels in a remote power station.

In addition, it should be noted that concerns have also recently been raised about some plugin type hybrids, with reports suggesting that they are rarely plugged in, meaning that these cars are routinely operated using their internal combustion engines, with associated tailpipe emissions dictated primarily by the owner's driving and operating behaviour, as opposed to the vehicle technology, and closer therefore to those of normal internal combustion engined vehicles.

These concerns about tailpipe emissions have been further exacerbated by recently highlighted differences between real-world and laboratory based emissions tests, where some manufacturers have been able to generate favourable tailpipe emissions data, as laboratory test cycles have not been required to take account of terrain, junctions and congestion, typically encountered in the real-world environment.

Furthermore, AQEG voiced concerns in its 2019 ,'*Non-Exhaust Emissions from Road Traffic*' report that data from the UK National Atmospheric Emissions Inventory indicates that particles from brake wear, tyre wear and road surface wear currently constitute 60% and 73% (by mass), respectively, of primary $PM_{2.5}$ and PM_{10} emissions from road transport, and will become more dominant in the future. They currently contribute around 7.4% and 8.5% of all UK primary $PM_{2.5}$ and PM_{10} emissions. Therefore, to achieve further gains in $PM_{2.5}$ and PM_{10} air quality in relation to road transport sources AQEG has stated that attention should also be focused on reducing non-exhaust emissions, not solely a focus on lowering exhaust emissions.

Accordingly, whilst a shift away from petrol and diesel fuelled vehicles is desirable in order to address greenhouse gas emissions and tailpipe emissions of the nitrogen oxides, nitrogen dioxide and particulate matter, etc. the preferred direction of transition should also take full account of and seek to mitigate other sources of air pollution including particulate matter associated with non-exhaust emissions. This may mean simply that the Department's focus

should not immediately be on encouraging people to consider transitioning to an electric vehicle but to encourage people to consider firstly whether their transport needs might be better served using more sustainable modes of transport including walking and cycling, as well as better utilisation of public transport. It is considered that all of these matters will have to be overcome for Northern Ireland in order for electric vehicles to become more acceptable and more prevalent within the local vehicle fleet.

Q11: Do you think that DAERA should develop a Low Emission Zone Framework for dealing specifically with transport emissions in Northern Ireland?

In May 2017, Defra published a document entitled, '*Clean Air Zone Framework - Principles for setting up Clean Air Zones in England*', setting forth principles, which local authorities had to follow when setting up Clean Air Zones in England. For clarity, a Clean Air Zone or Low Emission Zone is defined as an area where targeted action is taken to improve ambient air quality and resources are prioritised and coordinated in order to shape the urban environment in a way that delivers improved health benefits and supports economic growth.

Initially, government mandated the cities of Birmingham, Leeds, Derby, Nottingham and Southampton to introduce Clean Air Zones to combat concentrations of nitrogen dioxide. As part of the earlier 2015 Defra, '*Improving air quality in the UK. Tackling nitrogen dioxide in our towns and cities*' publication, government had already published detailed modelling for these cities for the class of clean air zone that would likely be required, together with various vehicle and Euro emission classes that the clean air zone would seek to control. London has separately introduced a congestion charge, Ultra Low Emission Zone and Low Emission Zone. Government also named 23 other local authorities where it expected pollution levels still to be reaching illegal levels by 2021. These local authorities were required to carry out feasibility studies to determine whether a clean air zone was required for their area. Therefore, the initial deployment of clean air zones in England was not a discretionary measure for those cities and local authorities involved.

It should be noted however, that not all of the cities mandated to introduce clean air zones by government have since done so; for example, Nottingham and Leeds City Councils have both indicated that measures underway have improved air quality to the extent that Clean Air Zones are not necessary.

The Department did not at the time extend clean air zone / low emission zone provisions and requirements to Northern Ireland but have asked whether the Department should now develop a Low Emissions Zone framework for dealing specifically with transport emissions in Northern Ireland.

The Department has clarified however that LEZs / CAZs are more suited to NO_2 exceedances in city centre streets and are therefore not an obvious solution to exceedances along major trunk roads such as the A12 Westlink corridor or the A2 Sydenham Bypass. In addition, DfI have advised that the A12 Westlink and A2 Sydenham Bypass are key transport corridors, forming part of the wider Regional Strategic Transport Network for Northern Ireland. It is assumed that the Department is referring principally to exceedances of the nitrogen dioxide annual mean objective or limit value and that the Department is aware that exceedances of the annual mean objective for nitrogen dioxide within Belfast have been limited to the existing air quality management areas and predominantly, the M1 Motorway / A12 Westlink corridor

and at Stockmans Lane. Belfast City Council has not declared Belfast City Centre area as an air quality management area, as ambient monitoring data confirms that the annual mean and hourly objectives for nitrogen dioxide are presently being achieved at relevant human health receptor locations.

In addition, Translink has recently advised that it has established a contract for 145 zero and low emission buses, as part of its commitment to net zero emissions transport. 100 of these zero emission buses, comprising 80 battery electric vehicles and 20 hydrogen fuel cell electric vehicles, are to be deployed through the Metro services in Belfast and Derry, thereby significantly reducing bus based tailpipe emissions across both of these locations, to include in Belfast City Centre, where a number of the Belfast Metro routes originate and terminate. Moreover, the UK government has recently indicated its intention to end the sale of new petrol and diesel cars by 2030, i.e. the phase-out date for the sale of new petrol and diesel cars and vans will be brought forward to 2030, and all new cars and vans will have to be fully zero emission at the tailpipe from 2035.

Nevertheless, it should be noted that the designation of a low emission zone for transport emissions within the city centre area of Belfast would likely be a matter principally for the Department for Infrastructure Roads. The Department has already implemented the 'Belfast on the Move' traffic masterplan for Belfast City centre and has indicated future plans for further deployment of the Belfast Rapid Transit system and for phase 2 of Belfast Streets Ahead, which will pedestrianise Donegall Place and link it to the City Hall. Accordingly, the Council would recommend that the need for a low emission framework for dealing specifically with transport emissions and the need for low emission zones for Belfast City centre, or indeed elsewhere within the city, should be determined through research by the Department for Infrastructure, in collaboration with Belfast City Council, and be based upon ambient monitoring data, traffic management requirements and any necessary transition from highly emitting vehicles towards newer and more sustainable modes of transport.

Q11: Would you be in favour of Low Emissions Zones for urban areas also covering other sources of pollution, for example, those from household heating?

The Department will be aware that the majority of Belfast City has already been declared as a series of smoke control areas and that financial support was provided to households across the city for the adaptation of fireplaces within private dwellings.

Accordingly, the initial detailed review and assessment of ambient air quality for the city, completed in 2004, concluded that no air quality management areas were required to be declared for exceedances of any of the sulphur dioxide (SO_2) objectives, associated with the use of solid fuel for household heating. Similarly, the detailed review and assessment also concluded that no air quality management areas were required to be declared for exceedances of any of the objectives for particulate matter (PM_{10}) associated with household, commercial or industrial heating and combustion. These conclusions were accepted by the government's technical assessors who appraised in detail the Council's various review and assessment documents at that time. This situation has continued since this first detailed review and assessment of ambient air quality was completed for the city, with the various subsequent progress, updating and screening and detailed assessment reports, together with ambient monitoring data, confirming that there have not been any exceedances of sulphur

dioxide or particulate matter air quality objectives associated with household heating emissions within Belfast.

On this basis, it is considered that low emissions zones for urban areas covering other sources of pollution, including for example, those from household heating, would not presently be necessary for the Belfast City Council area. The Council would acknowledge however, that this matter may have to be revisited in the event that WHO guideline values are adopted as standards for particulate matter (PM_{10} and $PM_{2.5}$) across Northern Ireland.

It is noted that the Department appears to have posed a similar question to question 11 in Chapter 6 Local Air Quality Management, i.e. *Question 22 Should AQMAs should be discontinued and replaced instead with Low Emissions Zones, which cover all aspects of air quality, including Smoke Control?* It is considered that the Department should consider undertaking further research and development of this proposal and provide additional information to Councils, other government Departments and Housing Associations, etc. for their consideration as to the anticipated administrative, human health and environmental advantages of this proposed overall Low Emissions Zone approach.

Q12: What are your views on vehicle charging cordons for entry to the most polluted parts of urban areas in Northern Ireland?

As highlighted in previous comments, it remains unclear as to what the Department means by the term '*most polluted parts of urban areas in Northern Ireland*'. Are they for example, areas where levels of nitrogen dioxide associated with road transport are exceeding the relevant air quality objectives? It is considered that the Department should have more clearly defined what it is considers to be the criteria for determining the most polluted parts of urban areas in Northern Ireland in order to assist consultees in meaningfully responding to this particular question.

It should however be noted that vehicle charging cordons are more typically applied as part of a low emission or clean air zone framework. For example, the Defra, '*Clean Air Zone Framework - Principles for setting up Clean Air Zones in England*' advises that clean air zones typically fall into two categories;

- Non-charging Clean Air Zones – defined as geographic areas used as a focus for action to improve air quality. Actions can take a range of forms but they do not include the use of charge-based access restrictions and;
- Charging Clean Air Zones – zones where, in addition to the above, vehicle owners are required to pay a charge to enter, or move within, a zone if they are driving a vehicle that does not meet a particular standard for their vehicle type in that zone.

The Department has already stated in section 2.9 that Low Emission Zones LEZs / CAZs can incorporate many measures, such as might already be found in AQMA Action Plans, but at their most stringent they entail the restriction of certain vehicle types, or introduce monetary charging for vehicles to enter. The Department has added that LEZs are more suited to NO_2 exceedances in city centre streets and are therefore not an obvious solution to exceedances along major trunk roads such as the A12 Westlink corridor or the A2 Sydenham Bypass.

The Council has already explained in its response to question 11 that the designation of a low emission zone for transport emissions within the city centre area of Belfast would likely be a

matter principally for the Department for Infrastructure Roads. The Council would therefore consider that the introduction of a vehicle charging cordon for the city would similarly be a matter principally for the Department for Infrastructure Roads. To that end, the Council would recommend that the Department for Infrastructure should undertake research, in collaboration with Belfast City Council, into the need for a vehicle charging cordon for the city, based upon ambient monitoring data, traffic management requirements and any necessary transition towards more sustainable modes of transport.

Moreover, one of the additional requirements for a low emission zone or clean air zone is that it should also take action, as necessary, to support growth and protect the economy of local high streets and town centres, whilst ensuring that clean air zone proposals do not simply result in the displacement of the most polluting vehicles away from the town centre to the surrounding areas, thereby causing a deterioration in ambient air quality at those locations. These additional obligations would have to be carefully considered and addressed in the event that a low emission zone or vehicle charging cordon was to be introduced for the Belfast City Council area.

Chapter 3 Household Emissions.

Q13: Should urban areas, in their entirety, be designated as Smoke Control Areas?

As highlighted in the Council's response to question 11, the Department will be aware that the majority of Belfast City has already been declared as a series of smoke control areas and that financial support was provided to households across the city for the adaptation of fireplaces within private dwellings. The only areas of the city that have not been declared as smoke control areas are some areas of north Belfast adjacent to the Cavehill where there are no residential dwellings, the port area and areas of other Councils that were subsumed into the Belfast City Council area as part of the local government reform process and were not declared as smoke control areas by their former Councils. The Department will be aware that the Belfast City Council boundary was recast in 2015. The Department will also be aware that appliances installed in dwellings built after the 1st March 1969 should be capable of operating smokelessly and do not therefore require conversion.

Accordingly, it is considered that given the majority of Belfast City has already been declared as a series of smoke control areas and given also that financial support has been provided to households across the city for the adaptation of fireplaces within private dwellings, the Council has completed the designation of significant proportion of its area. The continuing effectiveness of the smoke control areas is confirmed by the various detailed review and assessments, updating and screening assessments and progress reports that have been submitted to the Department since the first detailed review and assessment was completed by the Council in 2004. Ambient monitoring data also confirms that there have been no exceedances of the various objectives for sulphur dioxide and particulate matter and indeed previously for polycyclic aromatic hydrocarbons across the city, associated with domestic emissions. An extension of the existing smoke control areas to the city urban area, in entirety, would therefore serve to incorporate those areas that were not previously declared as smoke control areas by Belfast City Council and those areas that were subsumed into the Belfast City Council area during the local government reform process and were not declared as smoke control areas by their former Councils.

The Department will be aware that designation of the Council's smoke control areas was facilitated by grant support from the former Department of the Environment (DoENI). It is therefore envisaged that similar grant support would be necessary from DAERA at a regional level if Council areas were, in their entirety, be designated as Smoke Control Areas. It is anticipated however, that costs associated with conversion works would not be extensive as only a small portion of dwellings would likely be eligible for grant support as those built after the 1st March 1969 or those with a primary smokeless means of heating would not attract grant support.

Q14: Should the law should be changed so that non-smokeless fuels may not under any circumstances be sold in Smoke Control Areas?

The Department will be aware that the Smoke Control Areas (Sale or Delivery of Unauthorised Fuel) Regulations (Northern Ireland) 1998 provide for the possession of an unauthorised fuel within a smoke control area for the purpose of its sale or delivery to any premises that are not located within a smoke control area. Moreover, the Regulations also provide for the delivery of any such fuel for use in a class of fireplace exempted from the provisions of Article 17 of the Clean Air (Northern Ireland) Order 1981 by regulations made under that Article. This exemption includes the use of wood and other unauthorised fuels in exempted fireplaces and appliances, subject to the specific details provided for by the exemption.

It is noted that in July 2020, Ireland banned the sale of 'smoky' coal in towns over 10,000 population and from the 1st September 2020, the burning, sale and marketing of smoky coal was prohibited in thirteen additional areas across the country. Powers underpinning the new ban include local authority staff undertaking inspections of premises and vehicles being used for the sale and distribution of solid fuel, bringing a prosecution under the Air Pollution Act for breaches of the Regulations and issuing a fixed payment notices for offences relating to the marketing, sale and distribution of prohibited fuels in low smoke zones with a penalty in the range €250 to €1000.

It is considered therefore that as the Belfast City Council area has substantially been designated as a series of smoke control areas, a ban on the sale of non-smokeless fuels within the smoke control areas would further assist in their operation and with compliance matters. It would not however, preclude householders from purchasing non-smokeless fuels in areas located outside of smoke control areas and inadvertently using them within the smoke control areas. In addition, the Department would have to consider the matter of the provision of unauthorised fuels for use in exempted appliances.

Q15: Should government ban the sale to the general public of smoky / bituminous / household coal in Northern Ireland?

As has been highlighted in previous responses, the Department will be aware that the Belfast City Council area has been substantially declared as a series of smoke control areas and as a consequence, the Smoke Control Areas (Sale or Delivery of Unauthorised Fuel) Regulations (Northern Ireland) 1998 already preclude the sale or delivery of unauthorised fuels such as smoky / bituminous / household coals for use within these smoke control areas.

However, the Department's public discussion document highlights that the strongest evidence for air pollution from household heating comes from levels of polycyclic aromatic hydrocarbons (PAHs) monitored at sites here in Northern Ireland, citing data from the three Northern Ireland

monitoring sites, Derry Brandywell, Ballymena Ballykeel and Kilmakee Leisure Centre. DAERA have advised that these sites have recorded the first, fifth and sixth highest annual mean concentrations of benzo (α) pyrene (BαP) in the UK in 2017 with the levels associated principally with domestic solid fuel use.

It should be noted that a further PAH monitoring site was previously located in east Belfast in order to characterise domestic solid fuel use emissions for Belfast. This site operated from 1/1/2001 but was discontinued in early 2007 as concentrations of PAHs for the city were substantially below the 0.25 ngm^{-3} UK Air quality Strategy objective for PAHs (using Benzo (α) Pyrene as an indicator), assessed as a calendar mean and to be achieved by 31st December 2010. By way of example, the monitored 2006 calendar mean for benzo (α) pyrene at the Clara Street monitoring site was 0.14 ngm^{-3}.

Notwithstanding these issues, it should be noted that in July 2020, Ireland banned the sale of 'smoky' coal in towns over 10,000 population and from the 1st September 2020, the burning, sale and marketing of smoky coal was prohibited in thirteen additional areas across the country.

Accordingly, and from an air quality perspective, a ban on the sale to the general public of smoky / bituminous / household coal in Northern Ireland would lead to further improvements in ambient air quality, particularly within residential settings. It would also assist with compliance within the Council's smoke control areas and by reducing household emissions within the wider city boundary by preventing the use of smoky / bituminous / household coal fuels. Moreover, a ban on the sale to the general public of smoky / bituminous / household coal across Northern Ireland could reduce the need for designation of further smoke control areas.

Q16: Should government ban the import, into Northern Ireland, of high-sulphur coal?
It should be noted that the Sulphur Content of Solid Fuel Regulations (Northern Ireland) 1998 preclude the sale by retail or delivery of any solid fuel having a total sulphur content greater than 2% determined on a dry basis in accordance with British Standard BS 1016: Part 100: 1994 Methods for analysis and testing of coal and coke.

However, the Department will be aware that the Regulations do not prohibit the delivery of any such fuels to premises other than a private dwelling; or the possession of any such fuel for the purposes of its use in the manufacture of solid fuel; or its export from Northern Ireland.

Accordingly, it is considered that a ban on importation of high-sulphur coals may not have an appreciably additional beneficial impact on local ambient air quality as long as the solid fuels being placed in the marketplace are in compliance with the 2% sulphur content requirement of the above-mentioned Regulations. The Department may wish however to introduce a ban on the importation of high sulphur coal as a general means of improving ambient air quality across Northern Ireland.

It should be noted that no air quality management areas have been declared within Belfast for exceedances of any local air quality management objectives for sulphur dioxide and that over the past few years, annual mean sulphur dioxide concentrations measured at the Belfast

Centre AURN site have consistently been around 2 μgm^{-3}, with the maximum 24 hour mean typically less than 10 μgm^{-3} and maximum hourly mean typically less than 40 μgm^{-3}. By way of comparator, the 24 hour mean objective for sulphur dioxide has been established at 125 μgm^{-3} and the hourly mean objective has been set at 350 μgm^{-3}.

Referring again to the Sulphur Content of Solid Fuel Regulations (Northern Ireland) 1998, it is noted that the Regulations advise that analysis of sulphur content has to be undertaken in accordance with the provisions of British Standard BS 1016: Part 100: 1994 Methods for analysis and testing of coal and coke. Whilst the British Standards website indicates that this Standard is confirmed as current, recent engagement with accredited analytical laboratories has revealed that the majority are unable to undertake this analysis to a recognised accredited analytical standard such ISO 17025:2017, '*General requirements for the competence of testing and calibration laboratories*', which is likely to be necessary in the event of any formal enforcement action under the Regulations. For this reason, the Department is encouraged to review the provisions of these Regulations in a similar manner to that recommended for the Clean Air Order (Northern Ireland) 1981 (see the response to question 18), in order, where necessary, to bring the Regulations up to date and to ensure that they are reflective of commercially available laboratory analytical techniques and accreditations.

Q17: Should government ban the sale to the general public of unseasoned wood in Northern Ireland at retail outlets?

The Department is again reminded that the Belfast City Council area has substantially been declared as a series of smoke control areas and as a consequence, the Smoke Control Areas (Sale or Delivery of Unauthorised Fuel) Regulations (Northern Ireland) 1998 already preclude the sale or delivery of unauthorised fuels such as smoky / bituminous / household coals and wood within these smoke control areas.

However, the Department will be aware that Article 17 of the Clean Air (Northern Ireland) Order 1981 provides that where the Department is satisfied that any class of fireplace can be used for burning fuel other than authorised fuels without producing any smoke or a substantial quantity of smoke, the Department may prescribe that fireplaces of that class shall, upon such conditions as may be prescribed, be exempted from the provisions of this Article.

To this end, Defra maintains a list of exempted appliances and fireplaces via the following weblink: https://smokecontrol.defra.gov.uk/appliances.php?country=northern-ireland

Many of these exempted appliances or fireplaces are able to burn wood or biomass smokelessly or nearly smokelessly within smoke control areas as a consequence of the engineering of the appliance and due to the manner in which the exemption is specified, i.e. many will require that the appliance has to be operated and maintained in accordance with the manufacturer's instructions and operating manual. Manufacturer's operating instructions typically advise that although any type of wood is suitable, hardwood is preferred. The manual will also typically advise that the wood must be well-seasoned and have a moisture content below 20%. In many instances, the manufacturer will supply an electronic moisture meter in order to allow the householder to determine the moisture content of the wood. These seasoning and moisture requirements usually necessitate that wood has been suitably stored to allow the moisture to evaporate for at least 9 months in the case of soft wood, and at least

24 months in the case of hard wood. Manufacturers also typically recommend that for general household burning, wood should be cut into logs of a diameter of less than 10-15 cm.

Therefore, for those exempted appliances being correctly operating within smoke control areas, it would be anticipated that the wood fuel used should predominantly be correctly seasoned in order to comply with the exemption and to ensure that smoke or excess air pollution are not emitted. It would therefore be helpful in this regard, if the sale of unseasoned wood to the general public in Northern Ireland at retail outlets could be restricted in order to reduce the potential for unseasoned wood to be used and excessive smoke and other air pollutants to be emitted. It is acknowledged however that not all wood burned within Northern Ireland is obtained through retail outlets. Indeed, wood used in household settings may have been obtained from directly cutting trees, from fallen wood or from waste woods, the overwhelming majority of which will not have subject to any specific seasoning processes.

It should be noted that Defra met with fuel industry representatives in January 2017 in order to discuss and identify ways to reduce air pollution emissions from wood fuel. This led to the wood fuel industry launching the '*Ready to Burn*' scheme in September 2017 which aims to raise consumer awareness and educate wood-burning stove owners about the importance of burning clean, dry, quality logs to help reduce air pollution.

The scheme sets a benchmark for logs and other wood fuels in the UK to help consumers to identify wood that has been carefully chosen and is 'Ready to Burn' for the benefit of their appliance and the environment. The initiative is being led by Woodsure, at present the UK's only wood fuel quality assurance scheme, and supported by Defra with suppliers signing up to the scheme providing a guarantee that the fuel they will sell as '*Ready to Burn*' has a moisture content of 20% or less, meaning that it can be burned without the need for further drying out. In addition, and from the 21st February 2021, Defra also plans to introduce a requirement that all wood sold in single units under $2m^3$ (loose stacked) must have a moisture content of 20% or less.

The Department may therefore wish to consider promoting such a 'Ready to Burn' scheme more widely within Northern Ireland in order to foster engagement with Northern Ireland wood fuel suppliers and to ensure that only appropriately certified and seasoned wood fuels are placed on the market. The certification scheme could be supported by an appropriate public advertising campaign, delivered in partnership with stove manufacturers and retailers, explaining the disbenefits of burning unseasoned wood in terms of the efficiency and maintenance of their appliance and in relation to reducing the emission of excessive ambient air pollution.

Q18: Are there any further things you think that central and local government could be doing to address air pollution from burning solid fuels?

The Council would highlight to the Department that the Clean Air (Northern Ireland) Order was commenced from 1981, some 40 years ago, and substantially predates the recent English Clean Air Act of 1993. It is considered that the Clean Air (Northern Ireland) Order 1981 is in need of urgent and rigorous update to take formal account of the various advances in terms of fuels, combustion and energy technologies, and circumstances of ambient air pollution that have taken place across Northern Ireland since 1981. For example, the Act refers to the prohibition of dark smoke from chimneys or from trade or industrial premises, where such dark

smoke is defined and has to be measured as smoke which, if compared in the appropriate manner with a chart of the type known on the 9th June 1964 as the Ringelmann Chart, would appear to be as dark as or darker than shade 2 on that chart. The Act also refers to the need for assessment of the height of chimneys; i.e. the district council shall not approve plans submitted to that council pursuant to this Article unless it is satisfied that the height of the chimney as shown on the plans will be sufficient to prevent, so far as practicable, the smoke or grit and dust or gases from becoming a nuisance or prejudicial to health having regard to the purpose of the chimney; the position and description of buildings near to it; the levels of the neighbouring ground; and any other matters requiring consideration in the circumstances.

It is noted that the forthcoming UK Environment Bill will create a new framework for the government to set environmental targets for protection of the environment, including specifically for ambient air quality. It is however also noted from that an air quality perspective, the Bill presently focuses on fine particulate matter ($PM_{2.5}$) and further that only certain aspects of the Bill are given to apply within Northern Ireland. For example, Part II of the Bill provides for environmental governance arrangements in relation to improving the natural environment and for the role of the Office for Environmental Protection within Northern Ireland. Moreover, Part IV of the Bill addresses Air Quality and Environmental Recall but in specific relation to ambient air quality, it serves only to amend the Environment Act 1995 and the Clean Air Act 1993, neither of which apply to Northern Ireland. It is therefore considered, as a consequence, that the Department should prioritise an update to the Clean Air (Northern Ireland) Order 1981 to include, where necessary, subordinate or supporting legislation.

The Council would reiterate comments provided as part of its answer to question 13 that in the event that urban areas, in their entirety, are to be designated as smoke control areas, that the Department would have to provide grant support to facilitate appliance conversion works.

It is noted that within Chapter 3 Section 3.1 Legislation and Controls, DAERA have highlighted that smoke arising from bonfires in gardens of domestic properties, has the potential to cause pollution and become a statutory nuisance. DAERA have added that the provision of doorstep recycling where householders are encouraged to deposit their garden waste in their designated bin, the collection of larger items from householders by the Council and the provision of civic amenity sites should mitigate against the need for the burning of any waste in the garden of domestic properties. DAERA have noted however that garden waste bins are not provided to householders in all areas.

The Council's Waste Management Service have advised that where waste is referenced within this public discussion document, 'prevention' and 'reduction' should be promoted as more favourable applications of the waste hierarchy followed by increased 'reuse' and 'recycling', in preference to Energy from Waste, landfilling or bonfires, etc. Accordingly, the Service have stated that a Clean Air Strategy for Northern Ireland should be developed with regard to the provisions of the DAERA Waste Strategy to help drive the transition towards a resource efficient Circular Economy.

Chapter 4 - Agricultural Emissions.

Q19 Do you think that the process in place to address ammonia emissions in Northern Ireland is appropriate?

It should be noted that ammonia is not monitored or managed as a component of the UK local air quality management process. As a consequence, no air quality strategy objectives have been established for human health or for protection of vegetation and ecosystems. However, it should be noted that the protection of vegetation and ecosystems from new ammonia sources is regulated and monitored through the assessment of Site Relevant Critical Loads under the Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 via the planning process. The Critical Load of a protected habitat is set at either 1µgm^{-3} or 3 µgm^{-3}, depending on site and species sensitivity.

In addition, it is well evidenced that both ammonia and its contribution to ambient particulate matter emissions can have significant negative impacts on human health. However, the proportion of ambient emissions from agriculture varies considerably over time and space. Whilst ammonia is not classed as a local air quality management pollutant, its contribution to ambient particulate matter emissions cannot be denied. Therefore, given the large scale and economic value of Northern Ireland's agriculture sector, it is vital that both ammonia and particulate matter are appropriately monitored and managed whilst the industry continues to grow, to ensure that measures can be put in place when required, in order to reduce human health risks, as well as provide environmental safeguards.

Reports have highlighted that reductions in agricultural emissions can have significant beneficial impacts on $PM_{2.5}$, which can in turn prevent mortality attributable to air pollution by 19% in Europe. Therefore, whilst the Department's discussion document focusses on the massive ecological implications of the agriculture industry, it is also essential that measures and actions put in place to mitigate impacts on the environment also provide protection to human health.

Some of the comments provided below have been briefly highlighted in the 2017 NIEA report entitled '*Making Ammonia Visible'*, however, as shown in Figure 4.7 of the Department's discussion document, ammonia emissions are continuing to rise in NI and so it is considered that more focussed actions need to be implemented in order to remain in compliance with the Habitats Directive, as well as preventing degradation of human health within Northern Ireland.

Gaps in knowledge of emissions from non-PPC regulated farms:

It has been discussed that whilst large poultry and pig installations are regulated under the Pollution Prevention and Control Regulations (PPC), when they reach specific thresholds, smaller facilities including cattle, which account for 69% of ammonia emissions in NI, are not regulated at all for ambient air quality. It is therefore imperative to fill this knowledge gap and create a comprehensive database of all agricultural installations, both existing and proposed, including those that are non-IPPC regulated. This will ensure that every installation is taken account of and it will allow the database to aid Competent Authorities and Consultants in their obligations for fully assessing the operational impacts from any new proposed developments to ensure that there are no unacceptable adverse effects on human health and the environment.

Further research into cross-boundary effects:
Northern Ireland is in a unique position where individuals from the farming industry regularly own and use land that traverses the border. For example, slurry from agricultural activities in the north may be spread on land within Ireland. This is further exacerbated by the fact that ammonia is a long-range pollutant. Therefore, agricultural activities in Ireland may have adverse impacts on habitats and human health in Northern Ireland and vice-versa. Therefore, it will be necessary to collaborate with authorities in Ireland to address data and information gaps, thus ensuring that any databases that are to be created will be accurate for authorities operating on both sides of the border.

Research into mitigation and pollutant reduction technologies:
As previously mentioned, the cattle sector of the industry contributes to the majority of ammonia emissions within Northern Ireland. However, when comparing research into abatement technologies, cattle housing lags behind that in other sectors including poultry and pig. An abundance of research can be found on crude protein diets in pigs, whilst air 'scrubber' ventilation systems can potentially drastically reduce ammonia emissions from poultry units. Such new technologies and novel approaches will help to achieve a reduction in emissions from future activities and potentially help to reduce current impacts if retrofitting is applied or incentivised. Thus, it would help to make room for further development in order to reach goals within the DAERA '*Going for Growth Strategy',* (a strategic action plan in support of the Northern Ireland Agri-Food Industry), whilst adhering to air quality objectives.

Further to this, specific emission factors should be identified for such novel technologies in order to allow competent authorities to make appropriate calculations and assumptions during the planning process, thus ensuring that the Habitats Regulations are adhered to, which will in turn will ensure no further increases to existing background ammonia emissions that could have detrimental impacts on human health. Recent applications on the Northern Ireland Planning Portal suggest that farmers are willing to invest in novel technologies in order to reduce ambient air pollution impacts from operational activities and allow for the opportunity of future expansion and development on their lands. The development of specific guidance for planning authorities would remove any uncertainty about new technologies and would alleviate decision pressures from within the planning process, thus aiding in reducing the time it takes to make a decision on planning proposals.

Improvement of Proposed Development Assessment:
The National Atmospheric Emissions Inventory (NAEI) map (https://naei.beis.gov.uk/emissionsapp/) illustrates Northern Ireland's relatively high levels of ammonia emissions when compared to the rest of the United Kingdom. It is considered that information of this type serves to emphasise the need for Northern Ireland to lead the way in addressing ammonia emissions. However, it should be noted that at present, the rest of the United Kingdom is far ahead of Northern Ireland in providing a comprehensive approach in addressing ammonia impacts from development.

Natural Resource Wales has recently released its discussion document regarding updated guidance for the assessment of future agricultural development, to be published 2021. The document highlights, for example, a more specialised approach to appropriate screening distances to sensitive receptors, which is dependent on the size of the proposed installation in question. Such measures may allow scope for some growth in the sector, as smaller

proposals could be screened out, as they are unlikely to contribute significantly to background ammonia emissions, whilst larger proposed installations are subject to an appropriate assessment and critique. This case-by-case approach may alleviate planning pressures; whilst at the same time prevent increase in ammonia and particulate matter emissions from agriculture.

Another potential approach could be that where background levels are already exceeded, then no further development can take place, unless the applicant is able to provide evidence that any new proposed abatement technologies will reduce existing levels, thus allowing room for further development, provided that there is either a decrease, or no net increase in emissions from the facility. This recommendation accords with the above comments, whereby research into mitigation technologies may be able to provide room regarding emissions from the sector to enable further additional growth.

Public Awareness:
An overarching approach, which has been encompassed within the 2017 NIEA publication, '*Making Ammonia Visible'* is to educate and inform the agriculture sector and industry through every step of the way. It is considered that this educational approach should be applied with each of the above comments. Whilst it is understandable that confusion exists within the industry concerning the apparent contradictions between the requirements of the Habitats Directive and objectives of DAERA's, '*Going for Growth* Strategy', these issues further highlight the need for a sustainable approach to ensure both can be achieved, and key to this is free and open information regarding approaches to tackling ambient air quality issues.

Chapter 5 - Industrial Emissions.
Q20: Are there any industrial sectors or air pollutants that require new or further investigation?
Under the Pollution Prevention Control (Industrial Emissions) Regulations (NI) 2013 regime, Belfast City Council is responsible for Part C permitted industrial processes that emit solely to air. The types and sizes of industrial processes are diverse, ranging from small dry cleaning processes to much larger metal coating processes. In our experience, there have been a number of larger activities primarily in the Port of Belfast area, which have given rise to legitimate air quality complaints and which are not directly controlled under the PPC regime. These activities include the discharging of animal feed and stone aggregates from large bulk shipping vessels. There can also be issues with the storage of these products, and whilst action could be taken using the Clean Neighbourhoods and Environment Act (Northern Ireland) 2011, Pollution Prevention Control legislation may be more suitable.

In January 2019, the Department for Transport published, '*Maritime 2050: Navigating the Future*', a strategy setting out the Government's vision and ambitions for the future of the British maritime sector. The environment is a key theme of this strategy, which introduces the Clean Maritime Plan as the environmental route map.
https://www.gov.uk/government/publications/clean-maritime-plan-maritime-2050-environment-route-map.

This Plan sets out a number of domestic policies to reduce greenhouse gases and emissions from shipping, but it also focuses on opportunities to reduce emissions from domestic shipping

and from port activities. It is considered that port activities can be considered as an area where industrial activities that can cause air pollution, by way of fugitive dust emissions, may need to be better controlled using relevant legislation.

Medium Combustion Plant.

The Pollution Prevention and Control (Industrial Emissions) Regulations (Northern Ireland) 2013 were amended in February 2018 to transpose the requirements of the Medium Combustion Plant Directive ("MCPD" – Directive (EU) 2015/2193 of 25 November 2015 on the limitation of emissions of certain pollutants into the air from medium combustion plants).

Medium Combustion Plant (MCP) are used to generate heat and for power generation. All combustion plant between 1 and 50 MW (net rated thermal input) are required to obtain a permit or be registered. Since its introduction, Northern Ireland local authorities have experienced difficulties in applying the legislation due to a lack of guidance from the Department in relation to the regulation of MCPs under the PPC regime. A lack of Northern Ireland specific guidance notes means that it is difficult for local authorities to explain to operators why their generators now fall under the PPC permitting regime and concerning the permitting process. It is the Council's view that Northern Ireland specific guidance, developed and endorsed by the Department is necessary for supporting better implementation and operation of MCP permitting across Northern Ireland, particularly where the guidance applies to those operators that have never fallen under local authority regulation or the PPC regime before.

Chapter 6 - Local Air Quality Management.

Q21: Should councils more widely adopt low-cost air quality monitoring systems, for screening purposes?

The Department will be aware that the various European air quality Directives such as Directive 2008/50/EC of the European Parliament and of the Council of 21st May 2008 on ambient air quality and cleaner air for Europe contain detailed information on the various reference methods that are to be applied to monitor ambient air quality within member states. For example, the reference method of the measurement of nitrogen dioxide is described in EN 14211:2005 '*Ambient air quality — standard method for the measurement of the concentration of nitrogen dioxide and nitrogen monoxide by chemiluminescence*'. Accordingly, the overwhelming majority of historical monitors in operation across the UK for measuring nitrogen dioxide will have employed this methodology. Similar reference methods have been established for all other ambient air pollutants. As these are automated reference methods, the monitoring equipment is able to provide real time measurement of ambient pollution levels. They are therefore suitable for assessing exceedances over all of the objective averaging periods, including for short term objectives such as the 15 minute mean objective for sulphur dioxide, to the hourly mean objective for nitrogen dioxide, to the 24 hour mean objective for particulate matter and to the annual mean objectives for nitrogen dioxide and particulate matter. These types of equipment are routinely present in the various AURN sites located across the UK as well as in local authority monitoring sites. The monitoring equipment does however need regular calibration and maintenance, as well as regular data quality assurance and quality control processes in order to provide accurate and ratified results. The Department will be aware that data from AURN and local authority automatic monitoring sites is typically fully ratified by government on a six monthly basis in arrears. Moreover, the cost of purchasing

an analyser for an individual pollutant may be in excess of £10,000 with additional costs required to facilitate installation of an enclosure and further ongoing additional running costs required for calibration gases, servicing, maintenance, calibration and data quality assurance and quality control. In addition, due to the size of the monitoring enclosures and the need for sites to be powered from main electricity, sites cannot always be installed in locations where they are required to assess relevant human health exposure.

It should also be noted that for the purposes of undertaking screening exercises for nitrogen dioxide, local authorities are also able to utilise passive diffusion tubes. These are small plastic tubes containing a chemical that reacts with nitrogen dioxide in the air and that can be installed on lampposts, on house facades or at other locations where it is necessary to monitor human health exposure for nitrogen dioxide. The tubes are exposed for typical successive periods of 28 days and are then sent to an accredited laboratory for chemical analysis in order to determine the concentration of nitrogen dioxide present in local air over the 28 day period. Due to the 28 day exposure period, the resultant data is not suitable to assess compliance with the 1-hour mean objective for nitrogen dioxide; rather, the tubes are normally maintained at a monitoring location for a period of up to 1 year to enable comparison with the nitrogen dioxide annual mean objective. Belfast City Council currently operates 55 nitrogen dioxide diffusion tube sites across the city (7 kerbside, 45 roadside and 3 background). Diffusion tubes typically cost around £10 per month per tube to operate and analyse, and so provide a relatively cheap and effective alternative to reference grade analysers for the purposes of screening assessments.

Government has however indicated that nitrogen dioxide diffusion tubes are not as accurate (diffusion tubes are typically quoted as ± 25%) as the data from reference grade analysers and so government guidance is that diffusion tubes should be triplicate co-located with a reference grade analyser in order to derive a site-specific correction or bias adjustment factor. National bias adjustment factors are also published by Defra for the various diffusion tube analytical laboratories.

More recently, a number of what are referred to as small sensor air quality monitoring systems have started to appear on the market. These small sensor air quality monitoring systems are automatic mains or solar powered analysers, typically utilising optical, solid state and electrochemical analytical techniques. The analysers are small enough to be located on a lamppost or on a property and are virtually silent in operation, thereby enabling monitoring to be undertaken where it is required. In addition, a single unit is capable of measuring a range of ambient pollutants, including gases and particulate matter. Some are also able to measure other environmental parameters such as ambient noise and meteorological conditions. In addition to the siting benefits, the instruments do not typically require regular calibration, as is required for AURN equipment. These type of instruments do however generate real time data and so they can be used to screen for all objective averaging periods and for all air pollutants. Examples include AQMesh, Zephyr, Aeroqual and Purple Air type small sensor air quality monitoring systems.

The instruments also ideally need to have some form of colocation exercise with a local reference grade analyser in order to derive local specific correction factors for the scaling and ratification of the monitoring data. It should be noted that many manufacturers have already

undertaken such detailed colocation studies with reference grade analysers, with the data from these studies available via their websites.

It is therefore Belfast City Council's view that Northern Ireland Councils should more widely adopt low-cost air quality monitoring systems, for screening purposes but that the screening methodology to be employed should be appropriate and cost effective to the pollutant and averaging period of the air quality objective under consideration.

Q22: Should AQMAs be discontinued and replaced instead with Low Emissions Zones, which cover all aspects of air quality, including Smoke Control?

The Department has stated in its public discussion document that Low Emission Zones (LEZs / CAZs) can incorporate many measures, such as might already be found in AQMA Action Plans, but at their most stringent, they entail the restriction of certain vehicle types, or introduce monetary charging for vehicles to enter an area. The Department has therefore also stated that LEZs are more suited to NO_2 exceedances in city centre streets and are therefore not an obvious solution to exceedances along major trunk roads such as the A12 and A2 in Northern Ireland.

The Department has now asked whether AQMAs should be discontinued and replaced instead with Low Emissions Zones, which cover all aspects of ambient air quality, including smoke control. Since commencement of Part III of the Environment (Northern Ireland) Order 2002, local authorities have been carrying out periodic review and assessments of air quality within their areas. This has involved measuring air pollution and trying to predict how it will change over the coming next few years. The aim of the various review and assessments has been to ensure that the national air quality objectives are achieved within council areas by the relevant deadlines. Where a local authority has found any location within its area where the objectives are unlikely to be achieved, then it has declared an Air Quality Management Area. AQMAs normally encompass the geographic extent of the exceedence of the objective but there is discretion for local authorities to designate a much larger area or indeed their entire district where they deem it necessary.

Specifically, Article 12 of the Environment (Norther Ireland) Order 2002 states that, '*Where, as a result of an air quality review, it appears that any air quality standards or objectives are not being achieved, or are not likely within the relevant period to be achieved, within the district of a district council, the council shall by Order designate as an Air Quality Management Area all, or any part of its district in which it appears that those standards or objectives are not being achieved, or are not likely to be achieved within the relevant period'*.

It should be noted that Belfast City Council has declared four Air Quality Management Areas across the city that presently relate to exceedances of annual and hourly mean objectives for nitrogen dioxide, associated principally with road transport emissions. Exceedences of the hourly objective have been restricted to the M1 Motorway and A12 Westlink corridor AQMA. The AQMAs were declared as a consequence of conclusions and recommendations arising from the first detailed review and assessment of ambient air quality for the Belfast City Council area, completed in 2004. The extent and shape of the AQMAs were determined from the results of atmospheric dispersion modelling and ambient monitoring that was undertaken as part of the detailed assessment and their ribbon shape reflect the geographic extent of the

modelled exceedances of the annual mean objective for nitrogen dioxide at the time of the detailed assessment.

As a consequence of the declaration of the four air quality management areas, the Council has been required to develop a series of Air Quality Action Plans, with input from competent authority partners. As source apportionment studies have determined that the nitrogen dioxide exceedances within the AQMAs are related principally to road transport, the mitigation measures detailed within our various Action Plans have focused mostly on road transport and so have been provided predominantly by the Department for Infrastructure, Translink and Northern Ireland Railways.

No AQMAs have been declared within the city for exceedances of any air pollution objectives for particulate matter or sulphur dioxide, associated with domestic emissions.

The Department will however be aware that the Belfast City Council area has been already substantially declared as a series of smoke control areas. Exceptions include an area of north Belfast, the port area and areas of other Councils that were incorporated into the Belfast City Council area during the local government reform process but were not declared as smoke control areas by their former Councils.

Given the differing nature and focus of the Air Quality Management Areas and Smoke Control Areas that have been declared for Belfast and the variations between the Clean Air (Northern Ireland) Order 1981 and Part III of the Environment (Northern Ireland) Order 2002, it is considered that the administrative, human health and wider environmental benefits of discontinuing Air Quality Management Areas at this stage and amalgamating them with all other aspects of ambient air quality, including smoke control, under an overall Low Emissions Zone approach are not immediately apparent at this time.

It is considered therefore that the Department should undertake further research and development of this recommendation and provide additional information to Councils, competent authorities and other bodies involved in local air quality management for their consideration as to the anticipated administrative, human health and environmental advantages of this proposed overall Low Emissions Zone approach.

Q23: Where applicable, should the entirety of urban districts should be declared as AQMAs (or Low Emissions Zones)?

The Department will be aware from Part III of the Environment (Northern Ireland) Order 2002 and the Council's response to question 22 that legislation already provides for district councils to designate as an air quality management area all, or any part of their districts in which it appears that ambient air quality standards or objectives are not being achieved, or are not likely to be achieved within the relevant period.

As indicated previously, Belfast City Council chose to designate ribbon type AQMAs encompassing the arterial routes where exceedances of the nitrogen dioxide annual mean objective were occurring. The extent and shape of the AQMAs were therefore determined from the results of atmospheric dispersion modelling and ambient monitoring that were undertaken as part of the detailed assessment process and the ribbon style reflects the geographic extent

of the modelled exceedances of the annual mean objective for nitrogen dioxide at the time of the detailed assessment.

Source apportionment studies have since indicated that the principal source of the nitrogen dioxide annual mean objective exceedances within the AQMAs is road transport emissions. Accordingly, in developing our various Air Quality Action Plans, we have referred principally to the transport providers for the city including NI Railways, Translink and the Department for Infrastructure Roads.

In terms of the various mitigation measures that have been provided, there have been location specific proposals such as the proposed York Street Interchange upgrade to address traffic congestion and excessive nitrogen dioxide concentrations along the A12 Westlink corridor but there have also been a range of complementary measures designed to improve ambient air quality generally across the city, such as the new Belfast Transport Hub to be located at Great Victoria Street, promotion of public transport, improvements to the bus fleet, a new Bicycle Strategy for Northern Ireland, eCarNI – electric vehicle charging infrastructure, and further development of park and ride sites at distance from the city. These measures would be expected to deliver air quality improvements within the AQMAs and also across the city generally.

Accordingly, it is the Council's view that there may be benefits in declaring the entirety of urban districts as an AQMA or Low Emissions Zone as such an approach could encourage the development of mitigation measures across a wider urban area and population as opposed to focusing only within the AQMA, which may have been declared to address relatively minor or individual human health exposure. This approach would also ensure that any control measures applied within, for example, a transport related AQMA, do not simply encourage road vehicles to '*rat run*' into adjacent areas with an associated disbenefit to ambient air quality in those locations. A district wide AQMA may also enable other ambient pollutants to be concomitantly proactively addressed. The Council would consider however, that DAERA and other government Departments and competent authorities should, where necessary, be part of this decision making process as in many instances, it will fall to them to introduce the required strategies and actions, together with funding support, to create the necessary regional and local improvements in ambient air quality.

In practice however, Belfast City Council has found that in developing its various Air Quality Action Plans to address transport related emissions, competent authority partners have proactively brought forward welcome actions to improve ambient air quality both within the AQMAs and generally across the city without the entire Belfast City Council district needing to have been declared as an AQMA or low emission zone.

In addition, it should be noted that a significant portion of daily road traffic within Belfast is associated with commuters from neighbouring conurbations travelling into and out of the city in order to get to and from work. Accordingly, whilst it may be desirable to declare the entirety of an urban council district as an AQMA or low emissions zone, it is recommended that the Department should also give consideration, from an ambient air quality perspective, as to how road transport and road transport emissions can be more coherently and effectively managed across the wider Belfast Metropolitan Urban Area.

Q24: What are your views on having a traffic-light system for councils to report on?
The Department will be aware that a review of the local air quality management regime in England was conducted by Defra during 2013, 2014 and 2015. No such equivalent review or consultation has been undertaken for Northern Ireland. Accordingly, when referring to the government's LAQM.TG(16), readers will note that the document includes two approaches to local air quality management, i.e. an Annual Status Report, to be completed by local authorities in England, an Annual Progress Report to be completed by local authorities in Wales and Scotland and the various progress reports, updating and screening assessment reports and detailed assessment reports to be completed by local authorities in Northern Ireland.

It is now noted in the public discussion document that the Department has advised that where each Northern Ireland council previously participated in a three year cycle of Updating and Screening Assessment reports, followed by two progress reports, the system will change to reflect that of the other Devolved Administrations with an Annual Status Report being provided. It is further noted that there has been no consultation between the Department and Northern Ireland local councils concerning this revised approach or on the content and format of Northern Ireland Annual Status Reports, and despite the current consultation process functioning only as a public discussion document, the Department has indicated that the new reporting date will be moved to 30th September. The Department has further advised that once agreed, this new system could commence from September 2021.

It is further noted that the proposed new Annual Status Report requires an assessment of local air quality according to monitoring results and against Air Quality Standards and EU objectives. It is unclear if this terminology is referring to EU limit values but if so, it should be noted that there are significant differences between the local air quality management system and that applied to government Departments in respect of compliance with EU limit values. For example, the Air Quality Standards Regulations (Northern Ireland) 2010 place a duty on Northern Ireland Departments to ensure that levels of sulphur dioxide, nitrogen dioxide, benzene, carbon monoxide, lead and particulate matter do not exceed the various limit values set out in Schedule 2 of the Regulations.

Moreover, the Regulations require that in relation to EU target values, Northern Ireland departments shall ensure that all necessary measures not entailing disproportionate costs are taken to ensure that concentrations of $PM_{2.5}$, ozone, arsenic, cadmium, nickel and benzo(a)pyrene do not exceed the target values detailed in Schedule 3 of the Regulations.

In relation to the duty of Northern Ireland departments to limit exposure to $PM_{2.5}$, it is noted that the Regulations require that Northern Ireland departments shall ensure that all necessary measures not entailing disproportionate costs are taken in relation to Northern Ireland with a view to attaining the national exposure reduction target by 2020. In addition, Northern Ireland departments shall ensure that all appropriate measures are taken in Northern Ireland with a view to ensuring that the average exposure indicator for 2015 does not exceed 20 μgm^{-3}.

It is recommended therefore that with the United Kingdom having formally left the European Union on 31st January 2020, and the requirements on government Departments to achieve and report on achieving limit values to the European Union having been rescinded or amended, the Department should give consideration to aligning and streamlining central and

local government local air quality management obligations and associated reporting requirements in order to create a more coherent and optimum ambient air quality outcome from both processes.

The Council would additionally highlight that for some ambient air pollutants, such as those related to road transport, Councils are functioning principally as co-ordinators of the various Air Quality Action Plans. Whilst Councils do bring forward actions to contribute to these Action Plans and to city and local agenda, Belfast City Council considers it essential that Action Plans should include strategic and local actions from competent authorities that are proven to contribute towards achieving the air quality objectives / limit values, as well as contributing towards PfG Indicator 37 for improving air quality and to community plans, i.e. the Belfast Agenda. The Council is therefore of the view that relevant authorities should also be required to monitor and report on their own performance against government guidance and in that way, effectively contribute to the various Air Quality Action Plans and to the achievement of the air quality objectives / limit values.

In relation to the proposed traffic light system, it is noted that the Department has proposed that Councils will be encouraged to attach a traffic light rating (green – red) to low emission zones. It is unclear however, at this stage whether low emission zones, encompassing smoke control areas, will ultimately be implemented. The Department is encouraged to refer again to the Council's responses to questions 11, 22 and 23 concerning low emission zones and the extent of LEZs / AQMAs. Moreover, it is considered that the Department should provide greater explanation and clarity as to some of the descriptors that are proposed to be applied within the traffic light system. For example, it is unclear how '*good*', '*adequate*' or '*poor*' handling of smoke control could be administratively measured and demonstrated. Moreover, it may be difficult, on an annual basis, to adequately demonstrate that ambient air pollution is improving, not improving or deteriorating. Conclusions of this nature may need to be determined on the basis of longer term ambient monitoring and longer term air pollution trends. It is considered therefore that significant further engagement is required between DAERA, Northern Ireland departments and local Councils concerning the proposed traffic light system and descriptors for Northern Ireland local air quality management reporting, where they are to apply to low emission zones.

Q25: What are your views on the proposals to change the LAQM process, in particular to grant funding for outcome-based measures as opposed to monitoring?

It is noted in the public discussion document that monitoring locations will need to be kept under review and should be addressed as part of the proposed Annual Status Report. It is further noted that the Department has proposed that the LAQM grant application process will be changed to allow Local Authorities and also non-governmental organisations or other similar bodies to bid for money to develop projects which demonstrate outcomes where the activities, supported by the grant money, will have a direct impact on the improvement of air quality in the region or location. These projects could be designed to focus on tackling one or two sources of pollution or they may focus specifically on areas with exceedances.

It is unclear however, from the public discussion document proposals, whether projects to be delivered by non-governmental organisations or other similar bodies will have to be reflected in, and be in accordance with the respective local authority Air Quality Action Plan, and their progress and contributions to improving local air quality managed and monitored through the

Action Planning process or the new Annual Status Reports. It is noted that DAERA have proposed that they will take their lead from the Defra LAQM grant scheme operated in England. It should be noted however that governance arrangements for English Councils are in some instances markedly different to those within Northern Ireland. By way of example, the Department will be aware that responsibility for transport planning, the roads network and associated road infrastructure lies with the Department for Infrastructure as opposed to Northern Ireland Councils. It is also noted that projects will be expected to be completed within 12 months, which may be an insufficient time period to deliver meaningful longer term air quality improvement projects.

DAERA have proposed that Air Quality Action Plans should be fully revised by 30th April 2020 and every 5 years thereafter. The Department will appreciate that Belfast City Council has generally developed and renewed its Action Plans on a 5 year cycle, the most recent 2015 having concluded in 2020 and a new 5 years air quality action plan currently in development.

With further regard to the LAQM grant process and ambient monitoring, the Department has advised that in Northern Ireland, Automatic Urban and Rural Network (AURN) sites, which form part of the official UK-wide monitoring network, will continue to be supported by central government, along with those district council monitoring sites that are used to inform the NICS Outcomes Delivery Plan nitrogen dioxide air quality indicator. Aside from this, more emphasis may be given to the allocation of grant monies to support measures that improve air quality.

This position therefore seems to suggest that the operation of those monitoring sites that are not part of the AURN network, or whose data are not used to calculate the NICS Outcomes Delivery Plan air quality indicator, may no longer be supported through the LAQM process. It is however unclear how this position accords with the Department's proposal, within Chapter 1 of the discussion document, of requiring ambient air quality monitoring to be carried out in any settlement with a population greater than 10,000 persons.

Notwithstanding these matters, Belfast City Council would agree that LAQM grant funding should focus more on projects that deliver tangible improvements in ambient air quality, as opposed to just monitoring. The Council would consider however, that existing or additional monitoring may be necessary as a component of a specific project in order to ensure that it is delivering the anticipated ambient air quality benefits and in that regard, the monitoring should be supported through the LAQM grant process. The types of monitoring equipment that may be needed for future LAQM projects and that should be funded could include, for example, diffusion tubes, small sensor air quality monitoring systems or additional reference grade analysers for characterising particulate matter (PM_{10} and $PM_{2.5}$) concentrations, should WHO guideline values be adopted as standards for Northern Ireland.

Q26: Are there any further measures you would suggest to help achieve a significant reduction or revocation of all AQMAs by 2021?

The Department will be aware of the impact of the Covid 19 pandemic and the associated lock-downs on ambient air quality across Belfast and further afield during 2020. Although monitoring data for 2020 has not yet been fully ratified, a review of the provisional annual summary statistics would suggest that concentrations of nitrogen dioxide measured at roadside and background sites across the city were appreciably reduced during 2020, when compared to preceding years. For example, the nitrogen dioxide annual mean, measured at

the Stockmans Lane roadside site in 2019, was 45 μgm^{-3} whereas during 2020, it reduced to a provisional annual mean of 33 μgm^{-3}. Similarly, the nitrogen dioxide annual mean measured at the Westlink roadside site in 2019 was 34 μgm^{-3} whereas for 2020, the provisional annual mean was reduced to 24 μgm^{-3}. For 2019, the nitrogen dioxide annual mean measured at the Belfast Centre urban background site, located at Lombard Street in the city centre, was 24 μgm^{-3} whereas during 2020, the provisional annual mean was reduced to 18 μgm^{-3} (68% data capture).

It should be noted that if nitrogen dioxide annual mean concentrations across the Council's various automatic monitoring sites and air quality management areas were to remain at these 2020 levels, there would likely be no exceedances of the national objectives for nitrogen dioxide within the city and as a consequence, all of the AQMAs might be able to be revoked.

It should be noted however, that not all ambient pollutants have been affected in the same manner as nitrogen dioxide. In 2019, for example, the annual mean concentration of particulate matter (PM_{10}), measured at the Stockmans Lane roadside monitoring site was 18 μgm^{-3}, whereas the provisional annual mean for 2020 was 17 μgm^{-3}. In 2019, the annual mean concentration of particulate matter (PM_{10}), measured at the Belfast Centre urban background site was 15 μgm^{-3}, whereas the provisional annual mean for 2020 was 12 μgm^{-3}. Similarly, the 2019 annual mean concentration for fine particulate matter ($PM_{2.5}$) measured at the Belfast Centre site was 11 μgm^{-3}, whereas the provisional annual mean for 2020 was 7 μgm^{-3}.

At present, it is unclear how the continuing Covid-19 pandemic and economic recovery by the city will impact upon road transport and associated concentrations of nitrogen dioxide but the Council will continue to operate its various ambient air quality monitoring stations and sites across the city in order to understand how ambient concentrations of nitrogen dioxide and other ambient pollutants are affected throughout the recovery process.

Chapter 7 – Communication.

Q27. Do you have any suggestions for the membership of the Air Quality Forum?

Whilst the intention of an Air Quality Forum, specific to Northern Ireland, is a welcome idea, it is worth noting that there is already an air quality information sharing platform in existence for the UK. The Air Quality Hub (https://www.airqualityhub.co.uk/) was launched in November 2020 and is Defra funded via multiple councils within England, in collaboration with the Low Emissions Partnership (LEP). The project seeks to '*deliver air quality benefits to Local Authorities throughout the country, by establishing an air quality knowledge sharing platform where experience and knowledge on air quality related issues can be readily shared, where a comprehensive library of air quality publications from a number of organisations can be collated and details of events or programmes can be disseminated'*.

The Air Quality Hub aims to support local authority officers and Defra with delivery of the national Clean Air Strategy, thereby ensuring the full range of helpful air quality improvement information is captured and shared from a single access point for the first time. In essence, this appears to be what DAERA's proposal for an Air Quality Forum also seeks to achieve. It may therefore be appropriate for DAERA to work alongside Defra within the framework of the

existing Hub, in order to focus on developing a solid database of best practice information, whilst encouraging further discussion around a NI Air Quality Forum.

However, as the Department will be aware, when it evaluates options for the creation of a NI Forum, consideration should be given to addressing the various differences between Great Britain governance arrangements and those within Northern Ireland. For example, responsibility for transport planning, the roads network and associated road infrastructure lies with the Department for Infrastructure as opposed to Northern Ireland Councils. Establishing clear communication links between relevant organisations and government Departments is considered therefore to be of the utmost importance when further developing this proposal.
Regarding membership of the Air Quality Forum, the Council would advise that current regulations and Local Air Quality Management Policy Guidance require that Councils seek actions from 'competent authorities' in relation to AQMAs and subsequent Air Quality Action Plans. Competent Authorities were originally defined in the Air Quality Regulations (Northern Ireland) 2003 and broadly include all Northern Ireland government Departments and the Northern Ireland Housing Executive. Accordingly, it is recommended that Forum membership should consist of representatives from relevant 'competent authority' partners, to include Translink / Northern Ireland Railways, together with representation from other organisations that can contribute views and actions to further reduce ambient air pollution, including for example, planners, industry and industry bodies, housing associations, airport and port operators, freight and road haulage associations, taxi and other transport providers, Sustrans, Shared Environmental Services and the Public Health Agency, etc.

Furthermore, the Department will be aware that a joint unit was formed between the Department for Environment, Food and Rural Affairs (Defra) and the Department for Transport (DfT) in 2016, mainly to deliver the UK's national air quality plans to reduce levels of nitrogen dioxide, including proposals to establish Clean Air Zones.

As prescribed within UK Clean Air Strategy 2019, the Joint Air Quality Unit (JAQU) provides those local authorities taking action on NO_2 exceedances with comprehensive technical support and guidance specifically for the development and implementation of local plans and measures to improve ambient air quality. Each local authority has a dedicated account manager who supports co-ordination and communication with the relevant local authorities, keeps track of progress and provides guidance and workshop style support, with signposting to funding streams across government.

It is this Council's view that a similar approach to cross-departmental collaboration within Northern Ireland would help to tackle air pollution more effectively, especially as NO_2 exceedences for roads remain a pressing challenge for many Northern Ireland local authorities. Moreover, although collaboration with other local authorities, Departments and relevant organisations is already recommended as part of LAQM process (LAQM.TG(16), it would be desirable that any new Air Quality Forum would not only oversee measures associated with improving air quality, and have appropriate vires to do so, but also serve to foster and co-ordinate better inter-disciplinary collaboration to ensure that ambient air quality matters are adequately considered throughout all relevant policies and initiatives. Moreover, the Forum should ensure that government Departments consider ambient air quality in policy development and throughout their various delivery programmes and projects.

Should DAERA choose to proceed with an individual Northern Ireland Air Quality Forum, separate and distinct from the Air Quality Hub, it may also be worthwhile maintaining existing connections with Defra and the UK Environment Agency in order to ensure that their inputs regarding AURN monitoring sites located within Northern Ireland continue to the be taken into account, whilst also providing for links between the UK Clean Air Strategy and Northern Ireland's forthcoming Clean Air Strategy.

Furthermore, given Northern Ireland's unique status within the UK of having a land border with Ireland, DAERA should also give consideration to including air quality practitioners and competent authorities from Ireland. These linkages will ensure that cross-border issues of air quality are not over-looked and are coherently addressed.

Q28: Is increasing awareness of air quality impacts at a local level the best way of promoting behaviour change by individuals to reduce air pollution?
Whilst increasing awareness of air quality impacts at a local level is a major contributing factor to behavioural change, it cannot be relied upon alone to produce the required over-arching positive behavioural change within NI. A more comprehensive multi-faceted approach to this issue is likely to be necessary.

Northern Ireland, as with the rest of the UK, has been built on a foundation of inequalities, which are far from being rectified. For example, NIVCA have advised that the incomes of the bottom 30% of households in Northern Ireland account for just 14% of total income, whilst the top 30% account for 51%. The top 10% of Northern Ireland households alone receive 24% of all income. This economic disparity flows across other areas where inequality is prevalent, including health, and is highlighted in the Department of Health's *2020 Annual Report on Health Inequalities*, which has identified that '*for respiratory mortality among under 75s, the rate in the most deprived areas was almost three and a half times that seen in the least deprived*'. Although air quality issues are not solely to blame for this statistic, it remains a stark reminder that poor ambient air quality issues disproportionately affect those from lower income households, within deprived areas. In the case of fuel poverty, individuals living in more socially deprived areas may not have the resources available to adequately fund centralised home heating that is less damaging to the environment and themselves. Furthermore, whilst economic incentives may be the contributing factor for one individual, the same incentive may not engender an equivalent change for another individual. It is necessary therefore, to use communication and education on ambient air quality issues alongside economic, health and environmental incentives, in order to encourage behavioural change from all socio-economic levels and provide a helping hand to those who are most affected by ambient air quality issues.

It is also worthwhile noting that behavioural changes, especially those required to improve air quality throughout Northern Ireland, are likely to take a considerable amount of time to imprint in society, and the process should therefore be classed as a longer term goal. However, the Department chooses to promote this change, the project should be managed over years, in order to engender the kind of deep and meaningful behaviour change that is needed.

Belfast Health Development Unit colleagues have additionally advised that in relation to road transport, it is important to give the public information on how road-traffic-related air pollution affects their health and on how their transport choices (such as driving during episodes of high pollution) contribute to this, adding that it is reasonable to make businesses aware of the need

to reduce air pollution, by encouraging active travel and more energy-efficient driving, scheduling deliveries to avoid times when streets are congested might also reduce the contribution businesses make to congestion and the resulting pollution.

The Belfast Health Development Unit have further added that information provided by healthcare professionals is also likely to be important in highlighting the effects of ambient air pollution on health and so it is important to ensure that health professionals are aware of the issues about air pollution and communicate them to vulnerable groups. If healthcare professionals routinely raise air pollution as an issue affecting health, this could help to prevent health conditions escalating, particularly amongst the most vulnerable groups. If local authorities raise awareness about air pollution with businesses and the public, this could help reduce air pollution and resulting ill health, so meeting their duty to protect people's health and wellbeing. In both cases, this would also reduce the need for potentially more expensive and less effective remedial interventions at a later time. It is considered that changes in knowledge and behaviour that may to lead to reduced exposure to air pollution, either for the person or for the wider community, are essential. Raising awareness of air pollution will therefore help people, particularly those who are most vulnerable, to reduce their exposure, especially when levels of pollution are high, help people to understand how to change their behaviour to reduce emissions, thereby further reducing population-level exposure and support the development of social networks (social capital) that can be built on for benefits in other areas.

Q29: Do you have any further comments or suggestions on how the impacts of policy interventions can be tracked in Northern Ireland?

Based on the most recent '*Review of interventions to improve outdoor air quality and public health*' 2019, produced by Public Health England, the original approach to quantifying impact was through the analysis of cost and health benefits arising from reductions in negative air quality impacts. Whilst this quantification process is not yet completed, it is still an idealistic solution to the track ambient air quality policy intervention impacts over the longer term.
https://www.gov.uk/government/publications/improving-outdoor-air-quality-and-health-review-of-interventions

The initial steps should set out a framework to aid in tracking the impact of policy interventions and include a baseline from which to work. Once this has been established, it may be possible to evaluate policies based on their short and long term impacts, with priority on policies that aim to reduce the impacts to air quality at source, rather than the mitigation of consequences, as noted in the Department's discussion document.

The related point of tracking short and long term air quality trends, rather than just impacts of policy interventions is an equally important consideration when moving forward. Northern Ireland provides all ambient air quality data openly via the Northern Ireland Air website, as well as through numerous annual reports and the various Council Air Quality Action Plans. It is considered that this repository is significant as it is the most comprehensive database for Northern Ireland ambient air quality data, research and reports. The Department should therefore seek to utilise the website to its fullest potential in relation to tracking and publicising air quality trends as well as the impacts of policy interventions. However, in order to further improve the usage and functionality of the website, it is considered that the Department should develop and include further Northern Ireland specific policy guidance for local authorities and other air quality actors to utilise, based upon Northern Ireland local air quality management

needs and priorities. This would ensure that all Northern Ireland Councils and their partners are able to tackle all air quality issues within their areas and to track impacts and interventions in a coherent and consistent manner, thus ensuring that ambient air quality data collected throughout Northern Ireland can be collated to provide a much more comprehensive and accurate overview of Northern Ireland's air quality issues and improvements over time.