



Module 11: Quality of Life

Health and Equalities Assessment Review

Prepared for the
Airports Commission

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Contents

1	Introduction	1
1.1	Overview	1
1.2	Purpose	2
1.3	Approach	2
1.4	Structure of Report	3
2	Health Impact Assessment	4
2.1	What is Health Impact Assessment?	4
2.2	Legislation and guidance	5
2.3	Health Impact Assessment process	5
2.4	Other Relevant HIAs	6
2.5	Appraisal Framework Level of Assessment	7
2.6	Key Potential Health Impacts Relevant to Airport Expansion	7
2.7	Conclusion	9
3	Equality Impact Assessment	11
3.1	What is Equality Impact Assessment?	11
3.2	Legislation and guidance	12
3.3	Equalities Impact Assessment Process	12
3.4	Appraisal Framework Level of Assessment	13
3.5	Key Potential Equality Impacts Relevant to Airport Expansion	14
3.6	Conclusion	15
4	Appraisal Framework Health and Equality Literature Review	16
4.1	Methodology	16
4.2	Appraisal Framework Literature Review Findings	16
5	Conclusion	33
6	Implications for Future Assessment Work	37
6.1	Future HIA work	37
6.2	Future EqIA work	39
7	References	41

Executive Summary

The Airports Commission is considering the case for, and best means of, providing additional airport capacity within the UK.

In 2013, the Airports Commission received submissions on potential options for airport expansion for the UK. Following an assessment of these options, three airport schemes were shortlisted to be taken and considered in more detail. These were:

- *Gatwick Airport Second Runway (Gatwick 2R) promoted by Gatwick Airport Ltd (GAL);*
- *Heathrow Airport Northwest Runway (NWR) promoted by Heathrow Airport Ltd (HAL); and,*
- *Heathrow Airport Extended Northern Runway (ENR) promoted by Heathrow Hub Limited (HH).*

The Appraisal Framework, published in 2014, defined the methodology for assessing the shortlisted schemes. This did not contain specific assessments for health or equalities. However, the topics and issues within the Appraisal Framework did consider health and equalities matters including an equalities screening and consideration of health impacts within the noise and air quality assessments. In response to the consultation on the environmental assessment of the options, consultees have raised the need for health impact assessment and equalities impact assessment to have been undertaken on the shortlisted schemes.

Therefore, this report has been prepared to consider the relevance of the work completed to health impact assessment and equalities impact assessment.

It is considered that a full Health Impact Assessment (HIA) / Equalities Impact Assessment (EqIA) would neither be appropriate or achievable at this stage of the assessment of future airport expansion options due to current information limitations. However, based on the Appraisal Framework assessment both HIA and EqIA would require further consideration at the project level assessment.

The review of the existing assessment information has identified a large amount of high level information to indicate potential community impacts on health and some information that indicates potential distribution of these effects to understand equality impacts. This information forms the initial 'screening' and 'scoping' of potential health and equalities impacts and should be seen as the starting point for an ongoing process of assessment. For example, current air quality and noise findings indicate that significant health impacts are likely and should be further studied at a project level. Findings on both positive and negative impacts to the community, local economy, and other influences on wellbeing identified at the Appraisal Framework level including impacts to services and other resources, also indicate the need for further consideration of health impacts at the project level.

The high level equalities screening work undertaken to date for the Commission has identified potential disproportionate effects, with no explicit acknowledgement of potential differential impacts on groups or individuals with particular protected characteristics. This high level screening has been based on the potential effects of the proposals on known or assumed user groups of the community resources likely to be impacted either directly (e.g. demolition or noise) or indirectly (e.g. through severance or isolation) during construction and/or operation.

The work completed to date provides the basis for more detailed HIA and EQIA once a single airport expansion option is identified and project level design and EIA commences on that scheme.

Potential Scope of full HIA

All three proposals for expansion include considerable future air quality related damage costs and some predicted increases in noise. Other potential effects of the proposals include employment, visual, quality of life, and impacts to services, which are relevant under each proposal. The studies completed to date illustrate where future effects could be concentrated. The health and equality findings of these studies will serve as a part of the scoping process to help focus the health impact equalities impact assessment process that will support the next phase of work.

The finding of this process indicate that at the project level further study will need to be conducted to understand the services, water bodies, and physical resources that could be affected and the implications that this could have for health impacts on the community. Given that significant changes are predicted in terms of noise effects on sleep disturbance and given that the NOx and PM10 damage costs are predicted to be substantial, further health impact analysis should be conducted at the project level, consistent with the methodologies described below. Beneficial employment impacts should also be studied in further detail to understand impacts on wellbeing.

Potential Scope of EqIA

The distribution of environmental and health effects from airport expansion are likely to have clear spatial patterns and could disproportionately affect groups with protected characteristics or other vulnerable members of society (for example socially deprived communities in close proximity to an airport). There will also be a high probability of differential effects on groups or individuals with heightened sensitivity to the environmental impacts associated with construction and/or operation of an airport (such as the potentially differential impacts of noise and air quality disabled, the elderly and the young).

The purpose of an EqIA is to identify where these impacts are likely to occur and whom they are likely to affect and how they can be mitigated. This assessment can only be undertaken once the details of project design and operation are known.

However, the range of assessments undertaken on the three shortlisted options for expansion does provide useful information for the purposes of identifying key equalities issues that will need to be explored in greater detail in a full EqIA, and therefore help inform subsequent analysis and engagement.

In terms of impacts on equalities groups, the work undertaken to date suggests that these could potentially arise from:

- reduced or impaired access to community services (children, elderly, ethnic minorities; disabled people; faith communities);
- loss of homes (where this impacts disproportionately on deprived communities; and/or particular the community cohesion of ethnic minority communities);
- air quality (on disabled people and deprived communities); and
- noise (on children's learning environments).

Table A summarises the review of the existing information, the likely scope for the HIA and EqIA and what additional information is likely to be required for a full HIA/EqIA.

Table A: HIA and EqIA: summary of relevant Appraisal Framework analysis undertaken to date and future requirements for full HIA / EqIA in the future

Assessment area		Considered in Appraisal Framework Level Assessment	Additional Information Required for full EqIA and HIA
Health Impact Assessment	Noise	Y	Scheme design and established flight paths. All sensitive locations (incl. schools, hospitals etc) to be clearly defined and monitoring / measuring of potential impact undertaken. Note: some consideration of open spaces / non built environment is advisable.
	Air pollution	Y	Include assessment of forecast changes to demography/ at lower super output level.
	Employment	Y	Include assessment of direct and indirect employment effects at the local authority level.
	Well-being	Y	Identification of communities that may be segregated once introduction of a runway occurs.
	Social inclusion	Y	Assurance that cultural groups are accounted for in expansion plans. Identification of Lower Super Output Areas experiencing Multiple Deprivation (IMD).
	Construction effects (dust)	Y	Consideration of residents in proximity that may be affected during construction processes should be covered within the air quality assessment.
	Soil and water pollution	N	Not required.
	Infectious diseases	N	Not required.
	Safety	Y	Likely usage levels of planned airport expansion and ensuring appropriate mitigation is in place in case of incident should be included.
	Occupational health	Not required	Current health and safety practices are in place to prevent such effects.
	Visual environment	Y	A landscape / visual impact assessment would be a requirement of any environmental statement associated with applications.
Equality Impact Assessment	Race	Y	LSOA level profile of communities.
	Gender	Y	Data on lone parent families and community engagement to understand differential nature of impacts.
	Gender reassignment	Not required	Not required.
	Disability	Partial (facilities identified but not population)	Baseline data on disabled population and disabled users of airports. Evidence that disability / access has been taken into account within construction plans and design proposals.
	Sexual orientation	Not required	Not required.
	Age	Yes	Noise impacts should be separately identified for sensitive receptors (e.g. schools, care homes).
	Religion or belief	Yes	Impact on access to religious buildings (e.g. due to demolition or severance).

Assessment area		Considered in Appraisal Framework Level Assessment	Additional Information Required for full EqIA and HIA
	Deprivation	Partial (at high level in Phase 1 Initial Screening of Long Term Capacity)	Baseline analysis of IMD should be completed at super-output area level. (Update to IMD due summer 2015).

1 Introduction

In November 2014 the Airports Commission published a series of reports detailing the assessment of the three shortlisted schemes for future airport expansion. In response to consultee feedback on the assessment this report details the extent to which the existing work considers potential health and equalities impacts.

1.1 Overview

The Airports Commission is considering the case for, and best means of, providing additional airport capacity within the UK.

In 2013, the Airports Commission received submissions on potential options for airport expansion for the UK. Following an assessment of these options, three airport schemes were shortlisted to be taken and considered in more detail. These were:

- Gatwick Airport Second Runway (Gatwick 2R) promoted by Gatwick Airport Ltd (GAL);
- Heathrow Airport Northwest Runway (NWR) promoted by Heathrow Airport Ltd (HAL); and,
- Heathrow Airport Extended Northern Runway (ENR) promoted by Heathrow Hub Limited (HH).

In April 2014, the Airports Commission published an Appraisal Framework which identified the methodology to further assess the three shortlisted schemes. The framework included an assessment of the potential air quality, noise, community and quality of life impacts. The relevant assessments were undertaken and published for consultation by the Commission in November 2014.

The Appraisal Framework, published in 2014, defined the methodology for assessing the shortlisted schemes. This did not contain specific assessments for health or equalities. However, the topics and issues within the Appraisal Framework did consider health and equalities matters including an equalities screening and consideration of health impacts within the noise and air quality assessments. In response to the consultation on the environmental assessment of the options, consultees have raised the need for health impact assessment and equalities impact assessment to have been undertaken on the shortlisted schemes.

Therefore, this report has been prepared to consider the relevance of the work completed to health impact assessment and equalities impact assessment.

Overall, it is considered that completion of a full Health Impact Assessment (HIA) / Equalities Impact Assessment (EqIA) would neither be appropriate or achievable at this stage of the assessment of the airport options. This is because health based statistics have such a wide and complex range of contributory factors that site specific details and project level environmental impacts are essential to undertake a meaningful and detailed health and equalities assessment. At this Appraisal Framework stage there is a substantial level of uncertainty over the precise detail of the schemes themselves and their impacts. Therefore, full HIA and EQIA would be more appropriate alongside a future Environmental Impact Assessment (EIA).

However, equalities assessment and health assessment are both iterative processes that involve various stages to determine the focus of potential impacts. Therefore, it is

appropriate to consider health and equalities issues at the Appraisal Framework stage in advance of detailed HIA and EQIA at project level. In particular, findings during the early stages of analysis help shape future phases and will allow the lead agency to identify the health and inequality issues of potential significance, which can then be continually monitored and addressed through to the project EIA and then the construction and operation of the scheme. For example, preliminary findings of exceedance in particulate emissions would indicate the need to look further into the details of health related respiratory effects and the need to study populations that are sensitive to respiratory effects (such as elderly or asthmatic member of the population). In this sense, health and equalities analysis conducted at the Appraisal Framework level serves as part of the screening and scoping process to determine where impacts are likely to occur and where further research should be conducted, but at this stage will not provide a lot of actual conclusions on potential impacts. In addition, it is noted that as part of the iterative process the screening and scoping will need to be reviewed as project specific details become available at a later stage.

The Airports Commission have identified relevant health and equalities issues associated with the shortlisted airport expansion options and this will inform the work that will need to be undertaken at the project level following selection of the preferred option.

1.2 Purpose

The purpose of this study is to identify:

- *What was an appropriate level of assessment for the Appraisal Framework for health and equalities;*
- *To review technical work undertaken to date to determine how the findings could be used to inform future health and equality assessments;*
- *To inform the Airports Commission at an Appraisal Framework level of any conclusions that can be drawn at this stage; and*
- *To identify work that would be needed for a full HIA / EQIA and any key areas to be considered.*

This will be done by considering the stages involved in HIA and EQIA and how a proposal for future airport expansion relates to the scope of each, (Chapter 2 and 3). Chapter 4 considers the information within the existing Appraisal Framework assessment and the relevant health and equalities issues that have been identified. This will inform the scope of the future HIA and EQIA and the work that will be required in the future. A summary of this potential future work, once a preferred option has been selected, is described in Chapter 6.

1.3 Approach

To understand the extent of work that has been completed to date, relevant to human health and equalities, a review of the Appraisal Framework assessments published November 2014 has been undertaken.

This report identifies the links between the effects that have been assessed in the published Appraisal Framework assessment reports, (November 2014) and the consequent health and equalities impacts that would be anticipated. Health and equality are addressed as distinct topics (although there are synergies between both, such as levels of deprivation and associations this may have with ethnic minority groups) as they are typically subject to separate analysis.

The approach will distinguish between:

- Appraisal Framework level of assessment: This is considered to be a high level, strategic consideration of options with relatively high level of project detail available;
- Project level assessment: This is considered to be the detailed assessment stage with full project detail available, (including commitments on mitigation) and the stage at which the EIA would be undertaken.

1.3.1 Reports Reviewed

Work undertaken by or on behalf of the Airports Commission to date has included:

- *Airports Commission, (2014a). Airports Commission: Appraisal Framework, April 2014.*
- *Airports Commission, (2014b). Airports Commission: Community: Impact Assessment.*
- *Airports Commission, (2014c). Airports Commission: Local Economy Impacts Assessment.*
- *Jacobs, (2014a). Module 5: Noise: Baseline.*
- *Jacobs, (2014b). Module 5: Noise: Local Assessment.*
- *Jacobs, (2014c). Module 5: Noise: National Assessment.*
- *Jacobs, (2014d). Module 6: Air Quality: Baseline.*
- *Jacobs, (2014e). Module 6: Air Quality: National and Local Assessment.*
- *Jacobs, (2014f). Module 9: Water and Flood Risk: Flood Risk Assessment.*
- *Jacobs, (2014g). Module 9: Water and Flood Risk: Water Quantity and Water Quality Assessment.*
- *Jacobs, (2014h). Module 10: Place: Baseline.*
- *Jacobs, (2014i). Module 10: Place: Assessment of Place Impacts.*
- *Jacobs, (2015a). Module 5: Noise / Local Assessment: Addendum.*
- *Jacobs, (2015b). Module 6: Air Quality / Local Assessment: Detailed Emissions Inventory & Dispersion Modelling.*
- *PricewaterhouseCoopers, (2014). Module 11: Quality of Life: Assessment.*

1.4 Structure of Report

The following sections of the report include;

- **Section 2 – Health Impact Assessment**
- **Section 3 – Equalities Impact Assessment**
- **Section 4 – Appraisal Framework Health and Equalities Literature Review**
- **Section 5 – Conclusion**
- **Section 6 – Implications for Future Work**

2 Health Impact Assessment

This section provides an overview of the HIA process and how it relates to the Appraisal Framework assessment. It also considers the issues that will be relevant to scoping a health assessment for future airport expansion.

2.1 What is Health Impact Assessment?

HIA is a process by which the impacts of a programme, project or policy on the population's health and wellbeing are assessed.

The World Health Organisation (1946) defines health as,

"...a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity".

Well-being is defined by the Department of Health (2010) as,

"...a positive state of mind and body, feeling safe and able to cope, with a sense of connection with people, communities and the wider environment".

Figure 2-A shows the determinants of health in a community context. This is commonly used during HIA to identify potential health and wellbeing impacts.

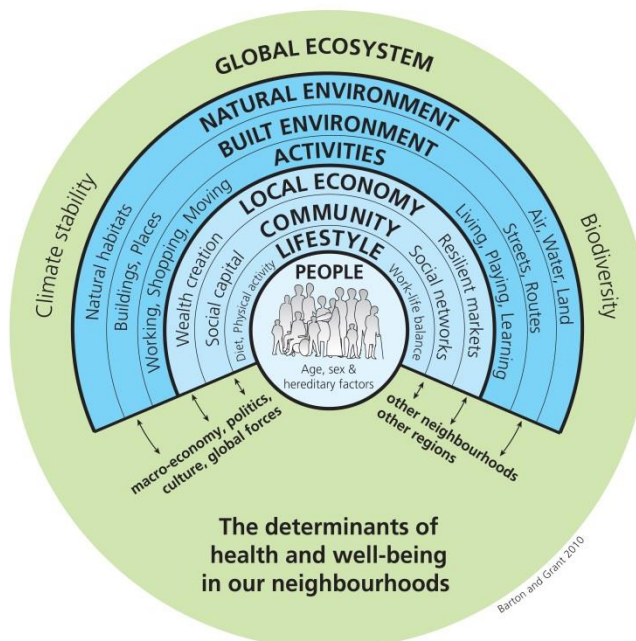


Figure 2-A Determinants of Health (Barton and Grant, 2010)

As Figure 2-A illustrates, the determinants of health include social, economic, environmental and cultural factors that indirectly influence health and wellbeing.

HIA is a way to find and improve the health consequences of any defined policy or activity. It usually assesses a policy or activity that does not have health improvement as a primary objective. Any action will, it is hoped, reach its intended objectives, but may have other consequences that are unintended or unanticipated. These unintended effects may be good or bad for people's health. HIA aims to assess all these potential effects on health to

enhance the benefits for health and minimise any risks to health. It includes explicit consideration of the differential impacts on different groups in the population. HIA is usually forward looking (prospective), done at a time when it is possible to change the proposal if necessary.

2.2 Legislation and guidance

In the UK, HIA has been integrated into the legislative framework, with the government assigned the task of conducting all HIAs for purposes of evidence-based policy-making. Any impacts of possible consequence to the population's health must be taken into account.

No statutory guidance exists for HIA and so they tend to employ different methods, to meet individual project requirements.

2.3 Health Impact Assessment process

The HIA process typically entails a systematic review of potential construction and operational consequences to health (unintended or otherwise) that could result from the project and an analysis of whether these consequences would affect the population within the spatial scope under consideration, or just certain groups within that population. The process can entail a qualitative or quantitative analysis depending upon the level of detail available on project effects, (e.g. monetisation of noise effects - quantitative, versus a general increase in noise nuisance - qualitative).

The assessment employs both quantitative and qualitative information including data from population needs assessments, literature reviews of the evidence base, and stakeholders and local stakeholder experience and knowledge.

The different stages involved in doing a HIA are as follows:

Screening	The first stage is to identify whether the development should be subjected to HIA.
Getting the HIA team together	HIA needs input from a team of different specialists to provide different perspectives and areas of expertise.
Scoping	This stage refers to setting the boundaries of the HIA: the geographical scope, the population groups whose health is considered, and the timescale over which to predict impacts.
Identifying impacts	This stage relates to identifying possible health consequences of the proposal.
Assessing impacts	During this stage the identified impacts are assessed, to inform recommendations to improve the health consequences.
Making recommendations	The HIA should include recommendations to adjust the proposal to maximise positive and minimise negative health impacts.
Monitoring impacts	Once the proposal is implemented, the health impacts that arise in practice should be monitored.

A preliminary screening and very high level scoping exercise would comprise the first two stages of the process outlined above. This is the level of analysis which would be appropriate at the 'options' appraisal stage of project development given the many uncertainties which will remain about the detailed delivery of the projects and the associated impacts. Therefore, these are the two stages most applicable to the Appraisal Framework stage of assessment.

HIA Screening Questions recommended by the DoH (2010) include:

1. Will the proposal have a direct impact on health, mental health and wellbeing?
2. Will the policy have an impact on social, economic and environmental living conditions that would indirectly affect health?
3. Will the proposal affect an individual's ability to improve their own health and wellbeing?
4. Will there be a change in demand for or access to health and social care services?
5. Will the proposal have an impact on global health?

In practice, an assessment will often have to revisit earlier assessment stages when there is more information and as such the process is iterative. For example, once the assessment has identified the impacts it may be decided that these could affect a larger population than originally thought, so the assessment will have to re-define the population scope of the HIA.

2.4 Other Relevant HIAs

To determine the level of detail appropriate for the Appraisal Framework level of assessment and to further understand aviation related health issues of national and regional issues of importance, the following HIAs were reviewed:

- A Rapid Health Impact Assessment of Birmingham International Airport's Proposed Runway Extension (University of Liverpool, 2008);
- Health and Equalities Impact Assessment: Enabling works to allow implementation of full runway alteration during easterly operations at Heathrow Airport 2013 (Mott MacDonald, 2013);
- Finningley Airport HIA, (Doncaster Health Authority and DMBC, 2000)
- Luton Airport HIA, (Arup, 2012); and
- London City Airport HIA, (RPS, 2007).

As expected, these reports vary in approach and fluctuate between qualitative and quantitative information. These HIA were generally undertaken at the project level and for the strategic level, less detail is available about potential impacts on any particular community. Therefore, conclusions at this level, within the HIA case studies reviewed tend to be more qualitative. The more that is known about detail of design and the community that will be directly impacted, the more quantitative health impact analysis tends to be. Of the assessments that were reviewed, the Heathrow Airport Report, (Mott Macdonald, 2013) most closely aligns with the approach for scoping the HIA at an early level.

The HIAs reviewed would typically be followed by the development of a community profile for the potentially impacted community, stakeholder engagement to understand community concerns and interests, and then completion of the assessment including detailing and ranking the potential health impacts. This would typically be followed by recommendations to improve health outcomes and a plan for monitoring and management. This would all form part of the project level HIA.

2.5 Appraisal Framework Level of Assessment

It is considered that for the Appraisal Framework, it would be appropriate to undertake initial identification of key health issues and identify matters that would form part of the scope of the full HIA.

It was identified at Appraisal Framework stage that health issues were of relevance to the selection of a preferred airport expansion option, particularly in relation to air quality and this report consolidates that information and identifies likely key issues. Chapter 4 provides a detailed review of the Appraisal Framework assessments that have been completed. Section 2.6 summarises the likely relevant health issues that were used to inform this review.

It is likely that both screening criteria and scoping issues would need to be revisited and reviewed as part of the iterative process at project level alongside the EIA.

2.6 Key Potential Health Impacts Relevant to Airport Expansion

The pathways by which health impacts can occur involves complex interactions between various aspects of transport and how this impacts on the health of the population. This section outlines the number of ways that transport can impact on health (or health pathways) both positively and negatively and provides an indication of the issues that are relevant to the scope of the assessment of health impacts.

2.6.1 Transport and Noise

Transportation is the main source of noise pollution in Europe; road traffic is the main noise source for communities, with the exception of those that live by airports and rail lines. According to the World Health Organisation (WHO, 2000b) the following health effects are associated with transportation noise:

- Impaired communication;
- Disturbed sleep;
- Annoyance;
- Increased aggression;
- Cognitive performance, (Dft, 2003);
- Heart disease and hypertension; and
- Hearing impairment.

The shortlisted options for airport expansion will be likely to result in changes in aircraft and road traffic. They also have the potential for increased rail noise impacts. At the Appraisal Framework stage, noise impacts have been identified and therefore, noise would need to be considered within the project level HIA.

2.6.2 Transport and Air Pollution

According to the World Health Organisation (WHO, 2000a), the key or 'classical' air pollutants consist of the following:

- Sulphur dioxide;
- Nitrogen dioxide;
- Carbon monoxide;
- Ozone;

- Suspended particulate matter; and
- Lead.

Groups that are particularly vulnerable to exposure from air pollution include fetuses, young children, the elderly, those with cardio-respiratory disease and the socio-economically deprived. Emissions from aircraft and road vehicles, as a result of increased road journeys will be a likely consequence of future airport expansion. At the Appraisal Framework stage air quality impacts have been identified and air quality would need to be considered within the project level HIA.

2.6.3 Transport and Social Inclusion

Development of new transport systems and associated infrastructure can disrupt social networks through the creation of barriers preventing or reducing community interaction. This can occur where airport runways are built which alter community interaction by placing a physical barrier to communities. Community severance is the separation of different areas within a community and can lead to changes in support networks affecting social capital. The risk and severity of health effects from community severance is relative, dependent upon a number of additional factors and can only be appraised qualitatively and will a project level of information. This would need to be considered in the project level HIA.

On the other hand, improved access to transportation as a result of airport expansion and associated public transport improvements could increase social inclusion. However, if people are unable to access transport due to a lack of public transport, cost or difficulties in access then there could be increased social exclusion. This would also need to be considered in the project level HIA.

2.6.4 Transport Projects and Wellbeing

Large infrastructure projects such as airports are likely to generate construction and operational jobs. Levels of employment can affect happiness/ self-confidence, sense of control and stress levels, whilst levels of income can create severance within a community, inhibiting or enhancing development of social support networks and altering risk behaviours such as smoking, excessive alcohol consumption and drug abuse. Good diet and the treatment of health problems are also linked to levels of income, as healthier food can be more expensive, and better treatment for health problems may be available privately. At the Appraisal Framework stage changes in employment have been identified and therefore, future project level assessment of these effects on the communities that would be directly impacted would need to be conducted.

2.6.5 Transportation Construction Effects (Dust)

A major construction project such as that required for airport expansion has the potential for dust emission. The potential for dust to be emitted during construction is strongly dependent on the type of activities taking place, on wind speed and on whether winds carry emitted particles towards sensitive receptors, such as hospitals, schools and residential property. At this Appraisal Framework stage the assessment of dust impacts is not viable given the information available but it would need to be considered at a project level. It is noted that management measures can be highly effective in mitigating potential impacts and this would need to be considered as part of the assessment at project level.

2.6.6 Soil and Water Pollution

For major airport expansion pollution risks relevant to health related to the soil and the water environment include leaking underground storage tanks and pipes, fuel spillage or leakage during ground handling of aircraft, washing of aircraft and vehicles and fire-training for which flame-retardant chemicals are used. If policies to prevent pollution are in force and effective, the public health impact would be minor and effects on humans due to exposure to all these compounds appear to be unlikely. Therefore, it is recommended that this issue does not need to be considered further.

2.6.7 Importation of Infectious Diseases

World-wide air traffic increases the potential for transmission of infectious diseases from one country to another. The number of documented cases at present is small, but given the growth of air transport it is important that the risk of this is noted within plans for airports.

2.6.8 Occupational Health Risk

There are potential health effects from working at an airport. However, current health and safety practices are in place to prevent such effects and there does not seem to be strong evidence of increased incidence of disorders associated with airport workers. Therefore, it is recommended that this issue does not need to be considered further.

2.6.9 Visual Environment and Health

Adverse effects to landscape character and views affect an individual's sense of connection with their natural environment and ultimately impact peoples well-being.

The presence of a visual disturbance increases the perceived risk to health, as it is a constant reminder and provides a focus for concerns that can lead to stress and anxiety. Evidence also suggests that people are becoming more sensitive to the stray light that is being directed towards their property and windows (Shaflik, 1995) (which may also become an issue from a new runway introduction). Probably the most annoying aspect of light pollution is glare. Glare, which can be described as unwanted source of luminance can cause annoyance, discomfort, or loss of visual performance and visibility. For some people any amount of obtrusive lighting is considered an annoyance. This is subjective, however, and depends on the individual, (Shaflik, 1995). At the Appraisal Framework stage, airport expansion would likely involve significant changes to the visual environment, therefore future project level assessment of these effects on the communities that would be directly impacted should be conducted.

2.7 Conclusion

At a level of analysis equivalent with the Airports Commission Appraisal Framework consideration of health impacts would consider the potential pathways by which airport expansion and associated infrastructure could impact the health of the local population. A high level review of relevant screening and scoping topics has identified a number of potential health issues that would need to be considered in the full HIA.

For certain topics such as air quality and noise, there is a specific next tier quantitative analysis that would be conducted at the project level based on the current findings at the strategic level (i.e. damage costs above a certain amount trigger the need for further analysis). Trends identified through the Appraisal Framework level assessment will also help highlight the potential future health benefits of the project, such as anticipated

employment levels and any access related improvements that could positively influence health (such as better access to healthcare facilities or other services). Chapter 4 provides an overview of the existing Appraisal Framework assessment and how this relates to the scope of the future HIA to be conducted at the project level.

3 Equality Impact Assessment

This section provides an overview of the EQIA process and how it relates to the Appraisal Framework assessment. It also considers the issues that will be relevant to scoping a health assessment for future airport expansion.

3.1 What is Equality Impact Assessment?

An EqlA is a systematic process that identifies the impact or likely impact, a project or proposal will have on the different groups of people defined as having Protected Characteristics in the Equality Act 2010¹.

Protected Characteristics as defined in the Act are:

- **Age**, which refers to a person of a particular age group;
- **Disability**, including persons with a physical or mental impairment and the impairment has a substantial long-term adverse effect on that person's ability to carry out day-to-day activities;
- **Gender**;
- **Gender reassignment**, which refers to a person proposing to or has undergone a process to physiological or other attributes of sex;
- **Pregnancy and maternity**;
- **Race**, including ethnic or national origins, colour or nationality;
- **Religion or belief**, including lack of belief;
- **Sexual orientation**, including a person's sexual orientation toward persons of the same sex, opposite sex or of either sex; and
- **Marriage and civil partnership**.

In addition to those groups protected by law, EqlA may also consider impacts on social inclusion issues; such as, effects on single parents and people living in areas affected by multiple facets of socio-economic deprivation.

Impacts on equalities groups can either be differential or disproportionate:

- A disproportionate impact is one which has a proportionately greater effect on groups with a particular protected characteristic than the population in general (within an a geographical area of impact); and
- A differential impact is one which affects member of protected characteristic group differently from the general population due to their recognised vulnerability or sensitivity.

¹ The Equality Act 2010, see: <http://www.legislation.gov.uk/ukpga/2010/15/contents>

3.2 Legislation and guidance

The *Equality Act 2010* is the main piece of legislation that requires public bodies to take a proactive approach to promoting equality and diversity. EqlA (sometimes referred to as Equality Analysis) is not a legal requirement in England, but aims to provide an evidence base against which public bodies and other organisations can assess the extent to which policies or programmes meet the public sector equality duty (PSED), which is required by law. The Act places great importance on organisations and the public sector using public funds and those delivering on behalf of the public sector that they should work towards the following:

- Remove unlawful discrimination, harassment and victimisation;
- Progress equality of opportunity between different groups; and
- Nurture good relations between different groups.

EqlA does not have to follow a specified process, and so different approaches can be developed for different areas, or types of policy or practice. The following provides guidance on the methodology of EqlAs:

- Cabinet Office Equality Impact Assessments: Guidance to the Process (Cabinet Office, undated), which details what an EqlA is and how to undertake one within the Cabinet Office;
- Equality impact assessment quick-start guide (Equality and Human Rights Commission, undated), which provides guidance on integrating equality impact assessment into policymaking and review; and
- Equality Impact Assessment Guidance and Forms 2007-13 (Revised 2012) (European Regional Development Fund, 2007). This document provides guidance on conducting EqlA for project leads to carry out effective EqlAs.

3.3 Equalities Impact Assessment Process

Guidance on EqlA suggests two key stages are undertaken to allow for a reasonable, practical and manageable approach to the process:

- Initial screening and scoping; and
- Full Impact Assessment.

The equality analysis undertaken as part of the Appraisal of Sustainability for HS2 Phase 2: Birmingham to Manchester and Leeds provides the most recent example from a nationally significant infrastructure project in its early stages of development. This breaks these two stages down further and can be summarised as follows:

Stage 1	Establish Aims and Objectives of the scheme and their relevance to statutory equality duties;
Stage 2	Identify equalities groups and gather information on those groups on how they might be affected by construction and operation;
Stage 3	Identify potential 'equality' impacts of the scheme within the area in which significant environmental effects are predicted to occur;
Stage 4	Identify any disproportionate or differential impacts on people with protected characteristics; and
Stage 5	Document findings and provide details of mitigation.

A preliminary screening (and very high level scoping) exercise would comprise stages 1 and 2 of the process outlined above. This is the level of analysis which would be

appropriate at the 'options' appraisal stage of project development, given the many uncertainties which will remain about the detailed delivery of the projects and the associated impacts. Therefore, these are the two stages most applicable to the Appraisal Framework stage of assessment.

A high level equality analysis addressing stages 1 and 2 would reasonably provide a brief summary of the way the proposed schemes may be relevant to equality and indicate the immediate equality concerns that the policy or proposals may present. Relevant questions to answer at this early stage of project or policy development include:

- How do the aims and objectives of the activity relate to equality?
- What aspects of the activity are relevant to equality?
- Which protected groups and parts of the duty is the activity relevant to?
- What equality information is available (including information from any stakeholder and community engagement)?
- Are there any information gaps?
- Which groups could usefully be engaged in future?

The Cabinet Office guides states that at this stage of the assessment existing information should be used to consider whether there are concerns that the policy / project / process could have a differential impact on a particular community or group, e.g. racial group, disabled people, people of a particular age group etc.

Answering these questions will not only identify whether a full equality impact assessment will be required, but also provide a sound basis for identifying the scope of such an assessment (i.e. in terms of the activities, or particular aspects of the proposal, that may impact differentially on particular groups). At this early stage of policy, programme or project development this 'equality analysis' will be necessarily be high level.

The full EqIA is a natural progression from the screening / scoping stage if:

- there remain significant uncertainties about the levels of impact on one or more of the identified diversity groups; or
- there is no agreement about the balance of differential impact between different groups; and/or
- there is no identified or acceptable way to mitigate potential adverse impacts or to identify ways of advancing equality of opportunity.

The process of full EqIA (Steps 3 – 5 above) includes a more in-depth analysis supported by involvement and consultation of diversity groups, and fully evidenced research.

3.4 Appraisal Framework Level of Assessment

It is considered that for the Appraisal Framework, stages 1 and 2 (screening and scoping) would provide an appropriate level of detail and assessment. The issues identified at Appraisal Framework level will then form part of the scope of the full EQIA.

It was identified at Appraisal Framework stage that equalities issues were of relevance to the selection of a preferred airport expansion option, particularly in the Community Impact Assessment. Chapter 4 provides a detailed review of the Appraisal Framework assessments that have been completed. Section 3.5 summarises likely relevant equalities screening questions that were used to inform this review.

It is likely that both screening criteria and scoping issues would need to be revisited and reviewed as part of the iterative process at project level alongside the EIA. Stages 3-5 would be progressed in parallel to the preparation of detailed scheme design and the undertaking of a full EIA (the findings of which will be required to inform a full EqlA).

3.5 Key Potential Equality Impacts Relevant to Airport Expansion

Typical screening questions to be addressed during the screening process for an EqlA are set out in the sections below. The questions are designed to focus on the proposal's ability to address the needs of each equality groups (and are designed to be specific to airport expansion plans). They provide an indication of the issues that are relevant to the scope of the assessment of equalities impacts.

3.5.1 Race

The locations of the shortlisted airport expansion options are in different geographical locations. Therefore relevant considerations for the equality assessment will include whether particular racial or ethnic groups are disproportionately represented in the areas adjacent to the airport? Will the construction of the airport impact on the cohesion of these communities?

3.5.2 Gender

A major transport project could affect access to services and employment. Therefore relevant considerations include whether the construction and/or operational impact of the airport will have a disproportion impact on availability of or access to services used by women or men? Will the construction and/or operation of the airport impact have a disproportion impact on access to employment for women and/or men? It is not clear that there would be differences in gender impacts between different airport expansion options.

3.5.3 Gender Reassignment

It is relevant at the screening stage to consider whether there would be any reason why somebody experiencing gender reassignment would feel segregated, or as if their health and social needs were not met? It is not considered that there would be any likely disproportionate or differential impacts on this group as a result of the proposals for airport expansion.

3.5.4 Disability

In the assessment of the impacts associated with the proposed locations for future airport expansion it will be necessary to consider the representation of mentally and physically disabled people in residential areas in close proximity to the airport who may be impacted differentially as a result to the construction or operation. Will provision be made for fully inclusive design in terms of both airport users and employees? These issues will require detailed consideration not only in the full EqlA but on an ongoing basis through detailed design and delivery to establish whether 'reasonable' adjustments may be required².

² Section 20 of the Equality Act 2010 requires decision makers to make reasonable adjustments where a disabled person is at a substantial disadvantage in comparison with people who are not disabled. In these circumstances there is a duty to take reasonable steps to remove that disadvantage.

3.5.5 Sexual Orientation

It would be relevant at screening stage to consider whether this group could experience a differential impact. It is not considered that there would be any likely disproportionate or differential impacts on this group as a result of the proposals for airport expansion.

3.5.6 Age

Relevant issues related to age would include whether the construction of the airport predicted to have adverse impacts on children's learning environment, access to school or places of recreation, and if the young or elderly are disproportionately represented in the communities adjacent to the airport? The level of detail available at Appraisal Framework stage would make it unlikely that such impacts could be predicted with a high degree of certainty.

3.5.7 Religion or Belief

Given the two locations being considered for future airport expansion, the equality assessment should consider the religious profile of surrounding communities and whether any places of worship are likely to be significantly affected.

3.5.8 Deprivation

Multiple deprivation is a measure of the relative level of income, employment, health, education, barriers to housing, crime and living environment within a community. A relevant question is if the proposals disproportionately affect any communities identified as socially deprived / in an area of multiple deprivation?

3.6 Conclusion

At the Appraisal Framework stage initial high level screening and scoping work for equalities assessment is appropriate. For the initial screening and scoping stage the response to these questions will necessarily be informed by a high level analysis of secondary data sources, such as the Census and the Index of Multiple Deprivation to identify the demographic profile of the local population (in terms of protected characteristics) benchmarked against local, regional and national data to identify any local over-representation in anticipated areas of environmental impacts (as identified in initial assessments). The review of the Appraisal Framework assessments completed to date as detailed in Section 4 will help formulate the scope of future equalities impact analysis work to be conducted at the project level.

4 Appraisal Framework Health and Equality Literature Review

This section summarises the existing health and equality information that is available within the existing assessment reports completed within the Appraisal Framework. Each report reviewed is listed and information of relevance to health and equality is discussed.

4.1 Methodology

The literature review considered the documents listed below to ascertain the existing information available and relevant to Appraisal Framework health and equalities assessment. These primarily consist of the technical studies published in November 2014 as part of the Airport Commission's consultation on the shortlisted runway schemes including:

- *Airports Commission, (2014a). Airports Commission: Appraisal Framework, April 2014.*
- *Airports Commission, (2014b). Airports Commission: Community: Impact Assessment.*
- *Airports Commission, (2014c). Airports Commission: Local Economy Impacts Assessment.*
- *Jacobs, (2014a). Module 5: Noise: Baseline.*
- *Jacobs, (2014b). Module 5: Noise: Local Assessment.*
- *Jacobs, (2014c). Module 5: Noise: National Assessment.*
- *Jacobs, (2014d). Module 6: Air Quality: Baseline.*
- *Jacobs, (2014e). Module 6: Air Quality: National and Local Assessment.*
- *Jacobs, (2014f). Module 9: Water and Flood Risk: Flood Risk Assessment.*
- *Jacobs, (2014g). Module 9: Water and Flood Risk: Water Quantity and Water Quality Assessment.*
- *Jacobs, (2014h). Module 10: Place: Baseline.*
- *Jacobs, (2014i). Module 10: Place: Assessment of Place Impacts.*
- *Jacobs, (2015a). Module 5: Noise / Local Assessment: Addendum.*
- *Jacobs, (2015b). Module 6: Air Quality / Local Assessment: Detailed Emissions Inventory & Dispersion Modelling.*
- *PricewaterhouseCoopers, (2014). Module 11: Quality of Life: Assessment.*

The review of these documents is presented in section 4.2 to identify any key health or equality impacts related to the technical assessments undertaken to date. The review also helps to scope and inform the next stage of assessment as discussed Sections 5 and 6.

4.2 Appraisal Framework Literature Review Findings

4.2.1 Air Quality

The Air Quality Assessment (Jacobs, 2014e and 2015b) includes an assessment of 2030, 2040 and 2050 baseline conditions. The geographical scope of the impact assessment is defined as the proposed airport boundaries and environs, including potentially high risk zones along the routes of any existing surface access. The analysis focusses on sensitive receptors including residential properties, care homes, hospitals and schools.

The assessment also considers the financial cost of air quality impacts; part of which is the cost related to health impacts in terms of morbidity through predicted hospital admissions.

The total cost of NO_x and PM₁₀ over the 60 year appraisal period is based on the unmitigated change in mass air pollution emissions with the airport expansion scheme in place, and this is substantial under each scenario. Therefore, it is expected that there would be impacts under all of the shortlisted expansion options and so health impacts will be relevant to the full HIA at the project level.

(a) Air Quality and related Health Effects

Changes in emissions associated with airport expansion could have health effects related to respiratory and cardiovascular functions. Air quality related health effects associated with airport expansion would result from emissions from road traffic, goods vehicles, aircraft, biomass boilers and incinerators. According to the air quality assessment work reviewed for this phase of expansion, the most common source of emissions of concern with regards to air quality at sensitive receptors near the airport is road traffic. Community concerns, perceptions and beliefs about aircraft air pollution; change in demand for local health and social care services as a result of air pollution are also relevant considerations for airport expansion of this scale. Table 4.1 provides a summary of the findings of the air quality assessment, (Jacobs, 2015b). These will be relevant to a full project level HIA although more detailed air quality modelling and analysis would be needed at this stage. It is also noted that these are 'unmitigated' air quality results and a number of measures have been identified by the scheme promoters for reducing potential impacts. The mitigation measures would be developed more fully following a decision on the preferred option and this would be part of the detailed scheme information which would need to inform future modelling work and the full HIA.

(b) Air Quality and Wellbeing

The Quality of Life Assessment, (PwC, 2014) identifies that there is some evidence to suggest that higher concentrations of air pollutants in areas reduce residents' subjective wellbeing. This general impact may be linked to health effects but also other aspects such as the amenity value of clean air. Based on the air quality report (Jacobs, 2015b), it can be concluded that air pollution from airport development, operation and access, including traffic, may affect health and quality of life.

The Quality of Life report, (PwC, 2014) also states that an individual's self-reported and objective health are both linked to subjective wellbeing. In addition, specific conditions, including strokes and heart attacks, are known to affect subjective wellbeing. PwC stress that some care is needed in interpreting this result as the strength of the link is also partly due to the fact that both measures are self-reported and, hence, use the same cognitive processes. Self-reported measures tend to correlate quite strongly. Similarly, psychological health has a very strong relationship with subjective wellbeing.

Table 4.1 Air Quality impact assessment (Jacobs, 2015b)

Analysis	Gatwick 2R	Heathrow NWR	Heathrow ENR
Air Quality	<p>Changes in local air quality have been modelled for the assessment year, 2030. The maximum predicted annual mean NO₂ concentration with the Gatwick 2R Scheme is 38.6 µg/m³ and occurs to the south east of the airport; the incremental change above Do-Minimum is 4.6 µg/m³. The maximum predicted incremental change (13.1 µg/m³) occurs at the south-eastern boundary of the new southern runway, where the predicted concentration for the Gatwick 2R Scheme is 30.7 µg/m³. There are no predicted exceedences of the air quality objective at any receptor location with Gatwick 2R.</p> <p>There are 20,985 properties where annual mean NO₂ concentrations within the Principal Study Area are predicted to be higher (on average by 2.1 µg/m³), with 51,328 people affected. There are 62 “at risk” properties (>32 µg/m³) that would experience an increase in NO₂ concentrations. (Jacobs, 2015b).</p>	<p>Changes in local air quality have been modelled for the assessment year, 2030. The maximum predicted annual mean NO₂ concentration with the Heathrow NWR Scheme is 34.7 µg/m³ and occurs to the north-east of the airport, at Bath Road (A4); the incremental change above Do-Minimum is 0.4 µg/m³. The maximum predicted incremental change (10.8 µg/m³) occurs to the north-west, adjacent to the new third runway, where the predicted concentration for the Heathrow NWR Scheme is 32.9 µg/m³. There are no predicted exceedences of the air quality objective at any receptor location, in either the Do-Minimum or Heathrow NWR scenarios.</p> <p>There are 47,063 properties where annual mean NO₂ concentrations within the Principal Study Area are predicted to be higher (on average by 0.9 µg/m³), with 121,377 people affected. There are 14 “at risk” properties (>32 µg/m³) that would experience an increase in annual mean NO₂ concentrations. (Jacobs, 2015b).</p>	<p>The maximum predicted annual mean NO₂ concentration with the Heathrow ENR Scheme is 37.2 µg/m³ and occurs to the north of the new extended runway, close to the A3044; the incremental change above Do-Minimum is 9.8 µg/m³. The maximum predicted incremental change (14.0 µg/m³) occurs to the north of the new extended runway, close to the realigned M25, where the predicted concentration for the Heathrow ENR Scheme is 37.1 µg/m³. There are no predicted exceedences of the air quality objective at any receptor location, in either the Do-Minimum or Heathrow ENR scenarios.</p> <p>There are 38,656 properties where annual mean NO₂ concentrations within the Principal Study Area are predicted to be higher (on average by 0.7 µg/m³), with 100,389 people affected. There are 113 “at risk” properties (>32 µg/m³) that would experience an increase in annual mean NO₂ concentrations. (Jacobs, 2015b).</p>
Exceedence	<p>The Scheme would not cause any exceedences of the annual mean NO₂ concentration at which the EU Limit Value is set, and would not delay Defra in achieving compliance in the relevant zone. The proposals for the A23 in the Gatwick 2R Scheme are to realign the road to the east. The predicted incremental change to annual mean NO₂ concentrations from airport sources alone at this new link are in the region of 8-10 µg/m³, but it is not possible to replicate Defra’s Pollution Climate Mapping</p>	<p>The Scheme would not cause any new exceedences of the annual mean NO₂ concentration at which the EU Limit Value is set. However, the incremental change associated with the unmitigated Heathrow NWR Scheme would cause the retained Bath Road (A4) sector PCM road link to have a marginally higher concentration in 2030 (48.7 µg/m³) than the Maximum PCM Predicted Concentration in the Greater London Agglomeration (which is 48.6 µg/m³ and occurs at Marylebone Road). The</p>	<p>The Scheme would not cause any new exceedences of the annual mean NO₂ concentration at which the EU Limit Value is set. However, the incremental change associated with the unmitigated Heathrow ENR Scheme would cause one of the Bath Road (A4) sector PCM road links to have a higher concentration in 2030 (55.8 µg/m³) than the Maximum PCM Predicted Concentration in the Greater London Agglomeration (which is 48.6 µg/m³). The unmitigated Heathrow ENR Scheme would</p>

Analysis	Gatwick 2R	Heathrow NWR	Heathrow ENR
	(PCM) ³ model predictions at this realigned link, nor is it possible to confirm whether this new link would be included in the PCM model (due to lack of public exposure) and no further assessment can be provided. (Jacobs, 2015b).	<p>unmitigated Heathrow NWR Scheme would thus delay Defra in achieving compliance with the Limit Value. Potential mitigation measures to offset this impact have been investigated (including those proposed by the Promoter). If some of these mitigation measures were incorporated, a reduction in NO₂ concentrations at the Bath Road PCM receptor could be achieved, which might be sufficient to avoid delaying compliance.</p> <p>The proposals for the A4 Bath Road in the Heathrow NWR scenario are to realign the road northwards to run around the northern boundary of the airport. The predicted incremental changes to annual mean NO₂ concentrations from airport sources alone at these new links exceed 10 µg/m³, but it is not possible to replicate Defra's PCM predictions at these realigned links, nor is it possible to confirm whether these new links would be included in the PCM model (due to lack of public exposure) and no further assessment can be provided. (Jacobs, 2015b).</p>	thus delay Defra in achieving compliance with the Limit Value. Potential mitigation measures to offset this impact have been investigated (including those proposed by the Promoter). If all of these mitigation measures were incorporated, a reduction in NO ₂ concentrations at the Bath Road PCM receptor could be achieved, but may not be sufficient to avoid delaying compliance. (Jacobs, 2015b).
Costs	The total costs of the increases in NOx and PM ₁₀ emissions over the 60 year appraisal period, based on the unmitigated change in mass emissions with the Gatwick 2R Scheme are £73.6m and £247m respectively, based on Defra's Green Book central estimate (a total damage cost of £320.5m). The total damage costs range between £250.7m (Green Book low estimate) to £962.7m (European Environment Agency (EEA) High, Value of a Statistical Life).	The total costs of the increases in NOx and PM ₁₀ emissions over the 60 year appraisal period, based on the unmitigated change in mass emissions with the Heathrow NWR Scheme are £94.2m and £863.5m respectively, based on Defra's Green Book central estimate (a total of £957.8m). The total damage costs range between £470.7m (EEA Low, Value of Life Year) and £1,299.5m (EEA High, Value of a Statistical Life). (Jacobs, 2015b).	The total costs of NOx and PM ₁₀ over the 60 year appraisal period, based on the unmitigated change in mass emissions with the unmitigated Heathrow ENR Scheme in place, are £69.6m and £618.7m respectively, based on Defra's Green Book central estimate (a total damage cost of £688.3m). The total damage costs range between £351.6m (EEA Low, Value of Life Year) and £971.3m (EEA High, Value of a Statistical Life).

³ PCM is the national model used by Defra to determine exceedences of the EU Limit Value.

(c) Air Quality and Equality Effects

The Air Quality assessment (Jacobs, 2014e and 2015b) demonstrates that the greatest effects are predicted to be from road movements associated with the schemes, with mitigation proposals listed for a number of major routes appropriate to each scheme. Emission sources generally include airport related road transport, airport activities, non-airport related road transport, and other emissions. Information on community sensitive locations or information specific to equality is limited. However, the air quality assessment and potential impacts will be relevant to the full project level EqIA.

Air quality impacts from increased traffic and emissions could affect sensitive populations located near the proposal as well as further afield. From an equality perspective affected groups could include children (aged under 16), older people (aged 65+), and people with long term respiratory illnesses.

Assessment of air quality impacts could further consider impacts of transport routes on sensitive populations. It must be noted that numbers of individuals with pre-existing conditions would not be identifiable at a strategic scale. Local road routes would need to be finalised before equality impacts could be determined in a project level assessment.

4.2.2 Noise

In general, the noise assessment (Jacobs, 2014b and 2015a) includes assessment for a base date of 2030, an interim date of 2040 and an end date of 2050 (these dates do not coincide with the wider appraisal start and end dates, which are derived from an available scheme completion date (2025 / 2026) and a 60 year appraisal period). Table 4.2 provides a summary of the findings of the noise assessment, (Jacobs, 2014b and 2015a). This would be relevant to a full project HIA although more detailed noise modelling and analysis would be required.

(a) Noise Related Health Effects

Noise associated with airport expansion could result in the following health effects: annoyance, sleep deprivation, hearing damage, morbidity, coronary health, changes in wellbeing, changes in educational attainment, and changes in hospital recovery rates. Consistent with the World Health Organisation's 'Methodical Guidance for Estimating the burden of Disease from Environmental Noise' and the Environmental Research and Consultancy Department's Proposed methodology for estimating the cost of sleep disturbance from aircraft noise, the noise report includes monetisation of annoyance, sleep disturbance, Health-AMI and Health-Hypertension (strokes and dementia) associated with each of the schemes. The costs are stated in £millions/assessment year, or when considering totals, £billions/60-years.

For all of the shortlisted airport expansion options a range of scenarios have been considered in order to assess likely noise impacts and how these may vary over time. This includes but is not limited to the results reproduced in Table 4.2.

Table 4.2 Noise impact assessment (Jacobs, 2014b)

Scenario	Gatwick 2R (AoN)	Heathrow-NWR-T	Heathrow ENR - O
2030	>55 dB Lden 22,100	>55 dB Lden 556,200	>55 dB Lden 558,600
2040	>55 dB Lden 21,300	>55 dB Lden 618,100	>55 dB Lden 600,900
2050	>55 dB Lden 24,600	>55 dB Lden 637,700	>55 dB Lden 570,100

The noise assessment has also identified sensitive buildings that could be affected by noise impacts including schools, hospitals and places of worship.

It is clear from all of the reports reviewed that noise could have significant effects on the local population and further modelling would need to be conducted at the project level. This would inform the full HIA.

(b) Equality and Noise Effects

The noise assessment includes assessment of a base date of 2030, an interim date of 2040 and an end date of 2050 to be used. The noise assessment includes population density data based on settlements in proximity to the schemes, which includes some calculations from a forecast perspective. Monetised assessment of disturbance to residents has been included (such as annoyance, sleep disturbance, dementia). However, the Noise: Local Assessment, (Jacobs, 2014b and 2015a) provides limited information specific to equality impacts.

Noise issues or impacts for affected groups could include construction noise and noise during operation of the schemes.

There will be a change in demography over time and different assessments will need to focus on various timeframes for base data. Therefore, some accounting for changing equality information may be required, through forecasting within the full EQIA because of the potential in change to receptors over the period analysed. For example, there may be an increase in older population (aged 65+ years) who are more susceptible to noise changes.

The noise assessment is based on settlements that are potentially impacted. In addition, there has also been consideration of schools, hospitals and places of worship and these have been included in the base line scenarios. Potential users of these sensitive sites are not included. Data included in the noise assessment, such as identification of sensitive locations, could be used to inform any potential future EqlAs.

4.2.3 Employment

(a) Employment Related Health Effects

Levels of employment and income have proven to be linked closely with people's mental and physical health and well-being, including through their living environment and their ability to access the services, facilities and products they need to live healthily. Forecasts have been estimated for the number of additional jobs that each of the proposals would create in the local community, (Airports Commission, 2014c). The estimates vary significantly depending on which scenario for each scheme has been considered and also the assessment technique that has been used.

The forecast for Gatwick 2R estimates that under the low-cost is king scenario an additional 23,600 direct, indirect and induced jobs could be created in 2030 and 32,500 by 2050. Under the global fragmentation scenario, the jobs created would be significantly lower with an additional 200 jobs in 2030 and 7,900 by 2050, (Airports Commission, 2014c).

The forecast for Heathrow NWR, depending on the scenario, estimates that additional job numbers would range between 47,400 – 112,400 jobs in 2030 and 64,100 – 108,300 jobs in 2050. The upper end of the figure represents the global growth scenario, while global fragmentation represents the lower end of the range, (Airports Commission, 2014c).

The forecast for Heathrow ENR, depending on the scenario, estimates that additional job numbers would range between 47,400 – 96,200 jobs in 2030, and 54,800 – 92,900 jobs in 2050. The upper end of the figure represents the global growth scenario, while global fragmentation represents the lower end of the range, (Airports Commission, 2014c).

The number of additional jobs forecasted depends upon whether “catalytic impacts” of the proposals are considered. These impacts arise as a result of the wider benefits that air travel reportedly encourages such as, improving connectivity and reducing costs through reduced travel times, providing greater choice of destinations and more regular flights, and reduced country to country trade costs.

There is evidence to suggest that people who experience insecure employment are among those most likely to suffer poor health outcomes and earlier death, compared with the rest of the population. Therefore, given that assessments have found that all proposals would generate additional jobs for the local community, it is reasonable to conclude that airport expansion would create a positive health outcome by providing secure employment.

Growth of jobs and businesses associated with the airport schemes, however, has the potential to put pressure on housing in the local area. Forecasts for the numbers of additional housing vary significantly and depend on assumptions made about population growth, net migration, unemployment and out-commuting. Increased housing densities and renovation of brownfield land could be considered in meeting this need for all airport proposals. This additional housing will need to be supported by additional social infrastructure such as schools and GP practices.

Increasing housing densities could potentially result in negative health effects if new houses are constructed at the expense of green space, which has been proven to improve mental and physical health and have been shown to reduce health inequalities.

The extent of the potential for job creation identified at the Appraisal Framework stage and the consequential impacts on human health mean that this would need to be considered at the project level HIA.

(b) Employment Related Equality Effects

The Local Economy: Assessment report (Airports Commission, 2014c) presents information relevant to equality effects, referring to Heathrow’s five focus local authorities (Spelthorne District, Slough, Hounslow, Hillingdown, and Ealing) as well as the ‘Gatwick Diamond’ local authorities (Tandridge, Raigate and Bandstead District, Mole Valley District, Mid Sussex District, Horsham District, Epsom and Ewell District, and Crawley District). Information presented with regards to equality focuses on future potential employees and includes social deprivation, travel to work, and demographics with reference to the age structure of workers.

With regard to social deprivation, the Lower layer Super Output Areas (LSOAs) is referred to. LSOAs are small areas in England which are used to calculate deprivation in each area. The index of deprivation ranks small areas on a number of weighted criteria, mainly income and employment. Health, education, barriers to housing, crime and living environment are also considered.

The report (Airports Commission, 2014c) states that Crawley, Epsom and Ewell and Reigate and Bandstead District have the highest proportion of deprivation (Decile 1). This suggests that Crawley in particular would benefit from additional jobs generated by Gatwick

Airport, which could reduce overall deprivation levels. This would however depend on the skill levels of the unemployed and their ability to engage in new employment opportunities. In comparison, Heathrow's five focus local authorities have a spread of LSOAs in each decile. Slough is the most deprived of the local authorities, followed by Ealing.

Travel to work, including distance and form of transport can be an indicator of equality. Indirect and induced employees travel to work areas (TTWA) and form of transport is referred to in the report. In 2012, approximately 60% of workers working at Gatwick Airport travel by car and 11% by train. Many workers living in the Gatwick Diamond authorities commute long distances to work, up to 60km. This suggests that workers at Gatwick Airport would be reliant on private vehicles to reach work and may need to travel long distances. This excludes those living in Crawley District.

In contrast, distance travelled for most workers in the Heathrow local authorities is 5-20km which is less than the Gatwick Diamond. This suggests that employment prospects are relatively accessible.

The age structure (2013) of the Gatwick Diamond local authorities shows that there is a high proportion of 'next working generation' workers indicating an ability to draw on local workforce, (Airports Commission, 2014c). Similarly, the age structure in Heathrow's five local authority areas is generally younger than the national average, suggesting higher availability of local workforce. It is unlikely that the spread of workers' age would cause any workforce constraints for the schemes.

The potential for employment to result in equalities impacts mean that this would need to be considered in the project level EQIA.

4.2.4 Water Quality and Quantity

The potential impacts to the water environment focused on the use of de-icer, (Jacobs, 2014g). The Water and Flood Risk: Water Quantity and Water Quality Assessment does however indicate that water would not be discharged before being treated to a standard consistent with the Water Framework Directive (WFD) Good water quality status, (Jacobs, 2014g).

Although all scheme promoters assert that impacts on water quality would be mitigated, the assessment by Jacobs recognises (from other case studies and prior experience) that despite mitigation at airports, contaminants such as de-icers do occasionally reach receiving watercourses (Jacobs, 2014g). This risk would likely be mitigated as part of the continued planning process.

The most common de-icing chemical is Sodium Chloride that can lead to cardiovascular, kidney and liver disease¹. Further information and consideration is required regarding the types of chemicals used at the schemes and the potential pathways for contaminants to enter into drinking water and should be considered alongside the full mitigation plan developed in future.

(a) Health and Water Quality and Quantity

Access to safe drinking water is an essential determinant of health and the Water and Flood Risk: Water Quantity and Water Quality Assessment (Jacobs, 2014g) consider the affect that the increase in passenger numbers will have on demand for water. The incumbent water supplier for Gatwick 2R, Sutton and East Surrey Water, state they currently have a surplus in the water resource zone. Following completion of the scheme, GAL and

Heathrow NWR have forecast a reduction in the water consumption per passenger as a result of water efficiency measures and a rise in total water consumption.

The lack of distinction between the two components, airport extension and hub interchange, of the scheme has led to a level of uncertainty with regard to the calculation of impacts on water resources from the submission for Heathrow ENR, (Jacobs, 2014g). Although, lack of water is unlikely to be a serious future health concern for Londoners, further information and clarification will be required to understand any potential impacts to health at the project level.

(b) Equality and Water Quality and Quantity

Information specific to equality is limited within the Water Quality and Quantity Assessment, (Jacobs, 2014g). All three schemes would result in increased passenger capacity, which would ultimately result in increased water demand. This is of particular concern for the Heathrow proposals, as the area is already water stressed with the water supplier, Affinity Water, already reporting deficits in their supply demand balance.

The location of the different options could alter the nature of any potential impact however it is likely that mitigation and regulation would be effective in managing potential effects.

4.2.5 Flood Risk Assessment

(a) Health and Equality and Flood Risk Assessment

Flooding can cause stress and anxiety as a result of damage to property and belongings, the threat of injury to oneself, friends or family, and isolation as a result of severed transport infrastructure.

The Water and Flood Risk: Flood Risk Assessment (Jacobs, 2014f) found that without effective long-term mitigation Gatwick 2R, Heathrow NWR and Heathrow ENR would cause 'a major increase in flood risk elsewhere'.

Information specific to health or equality is limited within the Water and Flood Risk Assessment due to the early design stages that the schemes are currently at. Additional information regarding flood risk mitigation will be required before an impact assessment of potential flooding on the local communities, and therefore health and equality, can be conducted. Flood modelling would be needed to inform the full project level HIA.

4.2.6 Health Effects related to the Place Assessment

(a) Health Effects related to the Place Assessment

The Place: Assessment of Place Impacts report (Jacobs, 2014i) includes assessment of planning & land take, landscape, townscape & waterscape; heritage and waste.

The availability of secure, accessible, suitable and attractive open/green space can lead to increased physical activity and reduce illnesses that are usually associated with sedentary and stressful lifestyles. Moreover, adverse effects to landscape character and views could affect an individual's sense of connection with their natural environment and ultimately impact peoples well-being.

For all three schemes, there is the potential for some areas to experience a reduction in tranquillity due to the increased area of flight paths associated with the new runway.

(b) Equality Effects related to the Place Assessment

The Place Assessment includes consideration of:

- *Planning and land take, which is a desk based review of the type and quantity of land take for each of the schemes;*
- *Landscape, townscape and waterscape, which considers potential effects on the landscape, townscape, visual amenity,*
- *Heritage, which focusses on designated heritage assets; and*
- *Waste, which considers how waste would be managed during construction and operation.*

The geographic study areas for each of these assessments vary.

The Place Assessment offers limited analysis or discussion on the potential impacts of sense of place on specific equality group users of the three options. Education, places of worship and community services have been identified but not linked to local demography to identify the type of residents within the area, as this analysis is included within the Community: Impact Assessment (Airports Commission, 2014b). However, the Place Assessment provides the following information, which would be relevant to the preparation of a future EqIA:

- *Planning and land take – residential properties would likely need to be demolished for all schemes. In addition, all schemes are located within the green belt.*
- *Landscape, townscape and waterscape – a reduction in tranquillity and amenity may be an outcome from all proposed schemes both during construction and operation.*

The schemes contain public safety zones; an area at the end of the runway where risk of incident on take-off / landing restricts development. These include housing areas. An understanding of specific equality issues in relation to these areas which are likely to be directly impacted would need to be considered in the project level EqIA.

4.2.7 Community Impact Assessment

(a) Health Effects and Community Impact Assessment

Access to good quality services and supportive and cohesive community networks are linked with health and wellbeing as they reduce the likelihood of depression and chronic illnesses. Community severance can result from disruption of communities' social networks as well as reduction in access to local amenities, services and facilities caused by the physical barrier created by transport infrastructure that runs through a community.

For all three schemes, high level analysis of potential impacts on nearby communities has been conducted. Tables 4.3 – 4.5 provide a summary of predicted community impacts, ways of mitigating these impacts, and the extent to which the Airports Commission believes that such mitigation will ensure a neutral outcome.

Table 4.3 – Gatwick 2R Community Impacts (Airports Commission, 2014b)

Community Facility/Service	Proposed mitigation	Likely extent of mitigation
➤ 168 residential properties likely to be demolished for airport expansion.	• financial compensation.	▪ partial, unless planning permits relocation of displaced communities en masse.
➤ up to 37 residential properties could be demolished for surface access, since they fall within buffer zone for construction works.	• financial compensation.	▪ partial, unless planning permits relocation of displaced communities en masse.
➤ potential secondary impacts of relocated households on existing communities.	• provision of community services to meet additional demand.	▪ full if effects are subsumed within wider effects associated with airport-related development.
➤ Trent House care home.	• financial compensation and relocation.	▪ full, assuming alternative facilities large enough.
➤ two places of worship – a church used by 7th Day Adventists, and a Hindu temple.	• financial compensation and relocation.	▪ full – alternative facilities available nearby.
➤ one charity facility - Outreach 3 Way, which helps people with learning difficulties.	• financial compensation and relocation.	▪ full, since charity has alternative facilities nearby.
➤ four pre-schools/nurseries.	• financial compensation and relocation.	▪ partial, unless replacement facilities are similarly close to families new dwellings. Two alternative facilities nearby could be affected by noise.
➤ Crawley Rugby club, with its sporting and social facilities.	• financial compensation and relocation.	▪ full, but dependent on successful planning process which could throw up secondary issues.
➤ The northern part of Rowley Wood.	• financial compensation or provision of alternative community facilities.	▪ full.
➤ public rights of way.	• provision of new links to maintain connectivity.	▪ full once operational, partial during construction.
➤ cycle routes	• provision of new cycle routes once airport operational	▪ full once operational, partial during construction.
➤ Impacts on local journey times, either from severance or increased traffic.	• re-alignment of roads and traffic management measures, and improved public transport access.	▪ Partial, due to uncertainty of journey times for those displaced and/or using re-provided facilities.

Table 4.4 – Heathrow ENR Community Impacts (Airports Commission, 2014b)

Community Facility/Service	Proposed mitigation	Likely extent of mitigation
➤ 242 residential properties likely to demolished for airport expansion.	<ul style="list-style-type: none"> financial compensation and relocation assistance. 	<ul style="list-style-type: none"> partial, unless planning permits relocation of displaced communities en masse.
➤ up to 165 residential properties could be demolished for surface access, since they fall within buffer zone for construction works.	<ul style="list-style-type: none"> financial compensation and relocation assistance. 	<ul style="list-style-type: none"> partial, unless planning permits relocation of displaced communities en masse.
➤ potential secondary impacts of relocated households on existing communities.	<ul style="list-style-type: none"> provision of community services to meet additional demand. 	<ul style="list-style-type: none"> full if effects are subsumed within wider effects associated with airport-related development.
➤ loss of industrial/employment land.	<ul style="list-style-type: none"> financial compensation and relocation assistance. 	<ul style="list-style-type: none"> partial, unless planning permits relocation of businesses to suitable sites close to airport, transport network and other businesses.
➤ loss of Punch Bowl pub during construction.	<ul style="list-style-type: none"> financial compensation and provision of alternative community facility during construction. 	<ul style="list-style-type: none"> full, assuming suitable location available.
➤ noise implications for Pippins Primary school.	<ul style="list-style-type: none"> provision of suitable noise insulation. 	<ul style="list-style-type: none"> partial, unless outdoor provision of similar facilities. Children still exposed to noise to and from school.
➤ severance of section of the Colne Valley Way running from Colnbrook to Horton.	<ul style="list-style-type: none"> diversion. 	<ul style="list-style-type: none"> full.
➤ severance of Poyle Road, which currently links Poyle and Colnbrook with Wraysbury and Horton.	<ul style="list-style-type: none"> traffic diverted via Horton Road instead. 	<ul style="list-style-type: none"> partial – longer local journey times.
➤ severance of route to Poyle from the west along Bath Road.	<ul style="list-style-type: none"> provision of alternative route. 	<ul style="list-style-type: none"> partial, dependent on new journey patterns.

Table 4.5 – Heathrow NWR Community Impacts (Airports Commission, 2014b)

Community Facility/Service	Proposed mitigation	Likely extent of mitigation
➤ 783 residential properties likely to be demolished for airport expansion.	<ul style="list-style-type: none"> financial compensation and relocation assistance. 	<ul style="list-style-type: none"> partial, unless planning permits relocation of displaced communities en masse.
➤ up to 289 residential properties could be demolished for surface access, since they fall within buffer zone for construction works.	<ul style="list-style-type: none"> financial compensation and relocation assistance. 	<ul style="list-style-type: none"> partial, unless planning permits relocation of displaced communities en masse.
➤ potential secondary impacts of relocated households on existing communities.	<ul style="list-style-type: none"> provision of community services to meet additional demand. 	<ul style="list-style-type: none"> full if effects are subsumed within wider effects associated with airport-related development.
➤ Harmondsworth Primary school.	<ul style="list-style-type: none"> Relocation. 	<ul style="list-style-type: none"> partial, dependent on location and accessibility for relocated families.
➤ Harmondsworth Community hall (including the Wonderland day nursery).	<ul style="list-style-type: none"> Relocation. 	<ul style="list-style-type: none"> partial, dependent on location and accessibility for relocated families.
➤ Sipson community centre.	<ul style="list-style-type: none"> Relocation. 	<ul style="list-style-type: none"> partial, dependent on location and accessibility for relocated users.
➤ Heathrow special needs centre in Longford.	<ul style="list-style-type: none"> Relocation. 	<ul style="list-style-type: none"> partial, dependent on location and accessibility for relocated users.
➤ Nursery schools in Longford and Sipson.	<ul style="list-style-type: none"> Relocation. 	<ul style="list-style-type: none"> partial, dependent on location and accessibility for relocated families.
➤ White Horse pub at Longford.	<ul style="list-style-type: none"> financial compensation and relocation assistance. 	<ul style="list-style-type: none"> Full.
➤ Sipson recreation ground and facilities.	<ul style="list-style-type: none"> relocation 	<ul style="list-style-type: none"> partial, dependent on location and accessibility for relocated families
➤ other formal and informal recreation sites.	<ul style="list-style-type: none"> relocation/re-provision. 	<ul style="list-style-type: none"> full.
➤ part of the Colne Valley regional park.	<ul style="list-style-type: none"> relocation 	<ul style="list-style-type: none"> full.
➤ impacts on local journey times and severance from A4/M25/Southern Rail Access works.	<ul style="list-style-type: none"> traffic management measures during construction re-alignment of roads to segregate local from airport and other through traffic, and improved public transport access. 	<ul style="list-style-type: none"> partial, due to uncertainty of journey times for those displaced and/or using re-provided facilities.

The conclusions of the community chapter, (Airports Commission, 2014b) noted that for Gatwick 2R the overall community impacts would be adverse in the absence of any mitigation, and neutral when its proposed mitigation measures are considered. Much if this analysis is based on an availability of alternative community facilities in the local area. The largest community impact is the loss of housing, for which GAL will provide compensation.

For Heathrow NWR it was concluded that at the very local level it is difficult to see any existing community cohesion being maintained, unless entire communities and their facilities could be moved en masse at the same time, (Airports Commission, 2014b).

For Heathrow ENR it was reported that there remained significant uncertainty for the residents of Poyle, some of whom may face the prospect of having both their home and job relocated. This will impact their finances through additional travel costs. Relocating a whole community en masse will present challenges, especially set against a background of increasing housing demand associated with airport expansion, (Airports Commission, 2014b).

For both Heathrow NWR and Heathrow ENR it was also noted that there could be severance issues, (Airports Commission, 2014b).

These community impacts indicate that there will be health impacts arising from the airport options which would need to be considered in the HIA at the project level.

(b) Equality and Community Impact Assessment

The Community: Impact Assessment (Airports Commission, 2014b) was undertaken to:

- *Manage and reduce the effects of housing loss on local communities; and*
- *Reduce or avoid disproportionate impacts on any social group.*

The Community: Impact Assessment (Airports Commission, 2014b) provides the most extensive and explicit coverage of potential equality impacts. It both identifies whether the scheme promoters have undertaken their own equalities screening and presents the findings of a high level equalities screening that was undertaken as part of the Community Assessment to determine the necessity for a full EqlA. The purpose of the screening was to identify any disproportionate effects of the schemes on people with protected characteristics, as defined in Section 3 of this report. The high level screening undertaken concluded that it was not necessary to carry out a full EqlA at this stage. It was however recognised that not all the appropriate data was available for full screening and that the schemes present potential disproportionate impacts on some groups. As such, the Appraisal Framework recommends that a full EqlA may be necessary once detailed scheme plans are provided.

The report (Airports Commission, 2014b) presents baseline data on local communities likely to be affected which includes information on the protected characteristics of age, gender, race and religion. The following provides a summary of the high level equality screening identified for each scheme.

Gatwick 2R

GAL has undertaken its own equalities screening exercise. This concluded that, when account is taken of proposed mitigation measures, the construction and operation of Gatwick 2R does not present any disproportionate impact on any protected group and that a full equalities impact assessment is therefore not required.

However, the high level review presented in the Community Impact Assessment identifies that it is possible that some protected groups may be disproportionately affected, but only a more detailed screening would confirm this. Adverse effects could arise from the following impacts: the relocation of housing and of some community facilities; the additional journey times for members of certain faith groups to places of worship, for young mothers to nurseries, and for elderly people were considered; and the impacts of construction and operational noise on young children. The assessment concludes that a full screening exercise would be more informative at a later stage when detailed plans have been worked up and sufficient data on all protected groups has been collected, (Airports Commission, 2014b).

Heathrow ENR

HHL provided an overview of equalities issues and possible mitigation measures. Potentially adverse impacts on groups with protected characteristics identified by HHL include loss or relocation of employment (young people, BAME, disabled), loss of housing (ethnic minority community), impact on journey times to and learning environment within schools (young people), potential loss of pedestrian access or severance (multiple groups), isolation (multiple groups), community facilities (multiple groups), and noise and air quality (young people, children and disabled). HHL concluded that a full EqIA should be carried out once the scheme design is finalised.

The high level equalities screening undertaken for the Communities Impact Assessment indicates that the loss of community facilities could disproportionality impact some groups, depending on the extent to which alternative and convenient facilities can be provided. It advises that only a more detailed screening would confirm this, or otherwise, and that this would be best undertaken at a later date when sufficient data on all the protected groups have been collected.

Heathrow NWR

The Community: Impact Assessment (Airports Commission, 2014b reports that HAL has not carried out an explicit equalities screening exercise.

The high level equalities analysis presented in the report identifies that some groups might be disproportionately affected, for example as a result of: the relocation of housing and community facilities; additional journey times for members of specific faith groups to access places of worship, for mothers to child nurseries or for elderly people; and noise impacts on young children.

This could only be confirmed by a fuller screening exercise at a project level when detailed plans have been worked up and further information on protected groups has been collected.

4.2.8 Quality of Life Assessment

(a) Health and the Quality of Life Assessment

Many factors contribute to or detract from, quality of life; including personal finance, social relationships, physical health, psychological health, and people's interactions with their natural environment. The Quality of Life assessment, conducted by PWC, analyses the impact of aviation on "subjective" well-being, (PwC, 2014). The assessment considered both people who are affected from living or spending time near to airports and also those

people working and using airports. The Quality of Life assessment concluded that there would also be a positive impact at a national level as a result of the economic impacts from job connectivity and through the ability to take holidays and visit friends and families.

The report is a general assessment of aviation's effect on well-being, considering baseline data from 17 main airports in England. However, the report's appendix does provide specific results of analysis for Gatwick and Heathrow.

The assessment included a review of the available literature to identify evidence of links between the Airports Commission's Appraisal Framework and subjective wellbeing. The review identified links relating to many topics such as noise, air quality and place. The key findings were:-

Airport noise:

- *Living within a daytime aircraft noise contour (over 55dB) is negatively associated with all subjective wellbeing measures: the presence of daytime aircraft noise is associated with lower life satisfaction, lower sense of worthwhile, lower happiness, increased anxiety and lower positive affect balance;*
- *There is a marginal negative effect on all subjective wellbeing measures for every additional decibel from aircraft noise over the 55dB threshold;*
- *Living within a night time aircraft noise contour is not associated with any statistically significant effect on subjective wellbeing; and*
- *Being within a high level aircraft noise contour is negatively associated with happiness and feeling relaxed at a specific time.*

Airport proximity:

- *Living near an airport (within 5km), and controlling for other factors that influence subjective wellbeing does not have any statistically significant effect on subjective wellbeing; and*
- *Being near an airport does not have an effect on happiness at a specific time, but is negatively associated with feeling relaxed: this effect is larger for people who are working or studying at the time.*

Being in airports:

- *There is no statistically significant difference in happiness and relaxation when comparing people who work in airports with similar people who work outside airports; and*
- *Being at an airport is positively associated with happiness and, at the same time, negatively associated with feeling relaxed: airports are associated with happiness and excitement, but are also stressful experiences.*

This Quality of Life report has been used to inform the analysis provided in section 4.2.1 regarding air quality impacts.

(b) Equality Effects and the Quality of Life Assessment

The Quality of Life Assessment, (PwC, 2014) was intended to assess the extent to which and how each scheme is expected to maintain and where possible improve quality of life for local residents and the wider population.

The Measuring National Wellbeing Programme and the corresponding 41 measures (run by the Office for National Statistics) were used in the assessment, with focus on the personal

wellbeing category. The measures are principally related to social cohesion indicators (such as happiness, anxiety, life worthwhile ratings) and all are subjective, based on qualitative measures. The Appraisal Framework includes the following measure:

“Maintain and where possible improve the quality of life for local residents and the wider population and reduce or avoid disproportionate impacts on any social group.” (Airports Commission, 2014a)

From an EqlA perspective, the Quality of Life Assessment includes research undertaken on the likely impact of airports on quality of life but the information included is limited.

5 Conclusion

This section summarises the main findings from the initial screening and scoping of potential health and equalities impacts based on the review of the Appraisal Framework assessments.

Health and equality impact assessment is conducted as part of a continuum. Findings during the early stages of analysis help shape future phases and allow the lead agency to identify issues of importance at the community level, which can then be continually monitored and addressed through construction and operation of the scheme in question. In terms of 'screening' at the Appraisal Framework stage both HIA and EqIA would require further consideration at the project level assessment. The review has identified a large amount of high level information to indicate potential community impacts on health and some information that indicates potential distribution of these effects to understand equality impacts. This information forms the initial 'screening' and 'scoping' of potential health and equalities impacts.

This should be seen as the starting point for an ongoing process of assessment of health and equality impacts which will become more spatially specific as the details of the individual schemes are known and will continue through the planning and delivery of a preferred scheme. At this stage the primary objective should be to establish a high level baseline to identify potential screening and scoping issues. The work undertaken to date provides the basis for compiling an initial baseline for each assessment although there are likely to be some gaps which may need to be filled using national data sets.

It is considered that a full Health Impact Assessment (HIA) / Equalities Impact Assessment (EqIA) would neither be appropriate or achievable at this stage of the assessment of future airport expansion options due to current information limitations. However, analysis conducted at this stage provides a roadmap for further assessment and successfully addresses many of the scoping questions that are relevant to HIA and EqIA to be conducted during future phases. For example, current air quality and noise findings indicate that significant health impacts are likely and should be further studied at a project level. Findings on both positive and negative impacts to the community, local economy, and other influences on wellbeing identified at the Appraisal Framework level including impacts to services and other resources, also indicate the need for further consideration of health impacts at the project level.

The Community Impact Assessment, (Airports Commission, 2014b) acknowledges that a full EqIA may be necessary once detailed plans have been worked up and appropriate data (on protected groups) have been collected. It is evident that the extent of equalities analysis and associated screening of equalities impacts undertaken by the three scheme promoters has been variable.

It should be noted that the high level equalities screening work undertaken to date for the Commission has identified potential disproportionate effects, with no explicit acknowledgement of potential differential impacts on groups or individuals with particular protected characteristics. This high level screening has been based on the potential effects of the proposals on known or assumed user groups of the community resources likely to be impacted – either directly (e.g. demolition or noise) or indirectly (e.g. through severance or isolation) – during construction and/or operation.

The work to date provides the basis for more detailed screening and scoping the HIA and EQIA once a single airport expansion option is identified and project level design and EIA commences on that scheme.

Potential Scope of full HIA

All three proposals for expansion include considerable future air quality related damage costs and some predicted increases in noise. Other potential effects of the proposals include employment, visual, quality of life, and impacts to services, which are relevant under each proposal. The studies completed to date illustrate where future effects could be concentrated. The health and equality findings of these studies will serve as a part of the scoping process to help focus the health impact equalities impact assessment process that will support the next phase of work.

The finding of this process indicate that at the project level further study will need to be conducted to understand the services, water bodies, and physical resources that could be affected and the implications that this could have for health impacts on the community. Given that significant changes are predicted in terms of noise effects on sleep disturbance and given that the NO_x and PM₁₀ damage costs are predicted to be substantial, further health impact analysis should be conducted at the project level, consistent with the methodologies described below. Beneficial employment impacts should also be studied in further detail to understand impacts on wellbeing.

Potential Scope of EqIA

The distribution of environmental and health effects from airport expansion are likely to have clear spatial patterns and could disproportionately affect groups with protected characteristics or other vulnerable members of society (for example socially deprived communities in close proximity to an airport). There will also be a high probability of differential effects on groups or individuals with heightened sensitivity to the environmental impacts associated with construction and/or operation of an airport (such as the potentially differential impacts of noise and air quality disabled, the elderly and the young).

The purpose of an EqIA is to identify where these impacts are likely to occur and whom they are likely to affect and how they can be mitigated. This assessment can only be undertaken once the details of project design and operation are known.

However, the range of assessments undertaken on the three shortlisted options for expansion does provide useful information for the purposes of identifying key equalities issues that will need to be explored in greater detail in a full EqIA, and therefore help inform subsequent analysis and engagement.

In terms of impacts on equalities groups, the work undertaken to date suggests that these could potentially arise from:

- reduced or impaired access to community services (children, elderly, ethnic minorities; disabled people; faith communities);
- loss of homes (where this impacts disproportionately on deprived communities; and/or particular the community cohesion of ethnic minority communities);
- air quality (on disabled people and deprived communities); and
- noise (on children's learning environments).

Based on the findings of the high level strategic assessments reviewed in this report, Table 5.1 identifies the likely scope for the HIA and EqIA and what additional information is likely to be required for a full HIA/EqIA.

Table 5.1: HIA and EqIA: summary of relevant analysis undertaken to date and future requirements

Assessment area		Considered in Appraisal Framework Level Assessment	Additional Information Required for full EqIA and HIA
Health Impact Assessment	Noise	Y	Scheme design and established flight paths. All sensitive locations (incl. schools, hospitals etc) to be clearly defined and monitoring / measuring of potential impact undertaken. Note: some consideration of open spaces / non built environment is advisable.
	Air pollution	Y	Include assessment of forecast changes to demography/ at lower super output level.
	Employment	Y	Include assessment of direct and indirect employment effects at the local authority level.
	Well-being	Y	Identification of communities that may be segregated once introduction of a runway occurs.
	Social inclusion	Y	Assurance that cultural groups are accounted for in expansion plans. Identification of Lower Super Output Areas experiencing Multiple Deprivation (IMD).
	Construction effects (dust)	Y	Consideration of residents in proximity that may be affected during construction processes should be covered within the air quality assessment.
	Soil and water pollution	N	Not required.
	Infectious diseases	N	Not required.
	Safety	Y	Likely usage levels of planned airport expansion and ensuring appropriate mitigation is in place in case of incident should be included.
	Occupational health	Not required	Current health and safety practices are in place to prevent such effects.
	Visual environment	Y	A landscape / visual impact assessment would be a requirement of any environmental statement associated with applications.
Equality Impact Assessment	Race	Y	LSOA level profile of communities.
	Gender	Y	Data on lone parent families and community engagement to understand differential nature of impacts.
	Gender reassignment	Not required	Not required.
	Disability	Partial (facilities identified but not population)	Baseline data on disabled population and disabled users of airports. Evidence that disability / access has been taken into account within construction plans and design proposals.
	Sexual orientation	Not required	Not required.
	Age	Yes	Noise impacts should be separately identified for sensitive receptors (e.g. schools, care homes).

Assessment area		Considered in Appraisal Framework Level Assessment	Additional Information Required for full EqIA and HIA
	Religion or belief	Yes	Impact on access to religious buildings (e.g. due to demolition or severance).
	Deprivation	Partial (at high level in Phase 1 Initial Screening of Long Term Capacity)	Baseline analysis of IMD should be completed at super-output area level. (Update to IMD due summer 2015).

6 Implications for Future Assessment Work

This section describes a suggested approach for undertaking HIA and EqIA in the next phase of work, building upon the information provided and in accordance with best practice methods.

6.1 Future HIA work

This section of the report outlines the scope of what the next stage of Health Impact Assessment analysis would entail for the preferred airport expansion option. The data and assessment completed to date and detailed in section 4 help to inform the topics for consideration at the next phase along with feedback from the stakeholder engagement conducted to date.

Therefore, the future HIA should aim to accomplish the following further steps:

- Develop a complete community profile complementary to what has been included to date in the various analysis;
- Identify community and organisational stakeholders not included or identified to date and gather relevant information on the relevant communities;
- Engage with stakeholders about their priority health issues
- Review the environmental data collected at the project level for each of the relevant topics; and
- Analyse all evidence from the data collected and characterise health impacts according to each stage of the scheme (construction and operation).

6.1.1 Community profile

Information on relevant community profile is important; especially for those that would be affected by the schemes when implemented. It is suggested that a full profile of the communities involved is conducted in order to associate any gaps with those most vulnerable or those who would be susceptible to negative impacts in the community who were not considered previously in the various analysis. Data can be collected from:

- Local Health Authorities,
- A review of the ES,
- Office of National Statistics (ONS), and
- A Desk Based Search.

The data collected includes, but not limited to:

- Health profile;
- Deprivation;
- Biological factors;
- Population demographics;
- Social environment;
- Physical environment; and
- Public services.

In general and depending on health and individual factors, factors identifying health should be looked at and compared on a national, district, ward and community levels (Super Output Area).

6.1.2 Stakeholder engagement

In order to gain an accurate view of potential and perceived health impacts issues, the expertise and experience of a wide range of stakeholders and key informants are needed. As mentioned previously, various stakeholders were consulted in November 2014 on the analysis conducted to date; however, a complete review of those stakeholders and whether those who are most relevant to health were included, will need to be established. Stakeholders and key informants can include representatives of affected communities depending on the depth and issues of the project; relevant professionals and authorities; including directors of public health and social, community and health representatives; and key decision makers; such as, experts in a specific policy field such as noise and air.

6.1.3 Additional HIA work recommended

In order to establish and characterise the potential health effects on the communities in proximity to the airports, additional work will be needed to identify specific health outcomes associated with noise, air quality, access to services and visual/quality of life effects at the project level.

In addition, certain topics such as water supply or recreation that have been discussed in the review of work undertaken to date are not specified as topics for further consideration in Table 5.1. This is based on our review of HIAs for similar schemes and the relative weighting of the importance of issues covered. This would need to be reviewed as the preferred option developed and the determinants of health also revisit to check for any new issues arising from the scheme design.

The issues identified below are considered to be of highest priority from an HIA perspective for the airport expansion schemes being assessed. As this scoping exercise is being conducted prior to having specific project details, it should obviously be revisited once more detail on the proposed schemes becomes available. Information that would be required includes indications of flight paths, defined runway boundaries, likely usage levels and operational policies.

Table 5.1: HIA Scope

Topic	Proposed Methodology
Noise	Based on the DoH guide to quantifying health impacts of government policies (2010), a quantitative assessment of the health effects associated with airport expansion including information on the increase/decrease in the number of incidents of disease associated and mortality associated with project noise effects should be undertaken. For noise, this would include analysis of annoyance, sleep disturbance, cardiovascular and coronary health and heart attack. Information on the distribution of these impacts on various socioeconomics groups and in relation to sensitive receptors should also be included. Estimates of the uncertainty associated with this analysis should also be acknowledged. This option would be consistent with comprehensive HIAs for other similar schemes.
Air quality	Based on the DoH guide to quantifying health impacts of government policies (2010), a quantitative assessment of the health effects associated with airport expansion including information on the increase/decrease in the number of incidents of disease associated and mortality associated with project air quality effects should be undertaken. According to the DoH Guidance, if damage costs (from the analysis completed above) are more than £50 million, then an impact pathway analysis approach should be undertaken for air quality analysis at the next stage.

Topic	Proposed Methodology
	<p>This would require air quality modelling of changes in concentration of pollutants to determine mortality (the loss of life years due to air pollution), and the number of cardiovascular hospital admissions and respiratory hospital admissions as a result of the scheme.</p> <p>Information on the distribution of these impacts on various socioeconomics groups and in relation to sensitive receptors should be included. Estimates of the uncertainty associated with this analysis should also be acknowledged This option would be consistent with comprehensive HIAs for other similar schemes.</p>
Effects on Services	<p>This should include access to services and facilities and access to health care facilities; including emergency and doctor surgeries.</p> <p>The change in demand for services would be identified via the environmental assessment process at the planning application phase of the project. Impacts of this change on the local community should be assessed along with potential impacts on journey times to the new pre-schools and nurseries, to places of worship and other community services</p> <p>Potential congestion and its implications on access to services should be further assessed and discussed.</p> <p>Further consultation would be required to determine the health and quality of life effects associated with these changes.</p>
Visual/Quality of life impacts	<p>Analysis of quality of life effects associated with the change in views due to development of the various schemes should be assessed.</p>

6.2 Future EqlA work

6.2.1 Detailed Screening and Scoping

Further work in terms of more detailed equalities screening and scoping should only be undertaken once a preferred scheme is confirmed. From the work undertaken to date and the nature of the proposed schemes it is considered that a number of equality groups are unlikely to be differentially or disproportionately impacted by airport expansion plans and as such could be scoped out of a project level assessment. However, for other equalities groups, more detailed data will be required in order to understand the nature of the impacts they may experience. To this end, data on the following groups should to be collected within an agreed study area at a smaller spatial scale (i.e. Lower Super Outputs Area where available) than has been presented to date:

- Gender profile – (Census 2011)
- Ethnic mix - Black, Asian and Minority Ethnic (Census 2011); Gypsy and Traveller Caravan Sites (Local Authorities)
- Disability (People receiving Disability Living Allowance and Job seekers Allowance (disability category)
- Children and Young People (Census 2011)
- Religious beliefs (Census 2011)
- Socio-economic deprivation – Index of Multiple Deprivation (CLG)

This should be supplemented by evidence gathered from stakeholder engagement and primary research.

6.2.2 Impact Assessment

This would comprise Steps 3, 4 and 5 of the methodology set out in Section 3 above.

Step 3 (impact assessment) will, to a large extent, be depending upon the findings of the Environmental Impact Assessment. Based on the findings of the assessment work undertaken to date some key outputs of the EIA that will need to inform the equality assessment are likely to include:

- Detailed mapping of noise impacts on sensitive community receptors (e.g. schools, care homes etc);
- Mapping of air quality impacts against sensitive receptors (e.g. schools) and deprivation indices;
- Demolition of residential properties (impact on community cohesion particularly in relation to ethnicity and deprivation);
- Direct (land take, access) and indirect (noise, isolation) impacts on community resources used by groups with protected characteristics will need case by case investigation (e.g. schools, religious buildings, health facilities, care homes, children's play areas); and
- Assessment of severance and / or isolation as a result of stopped up or diverted highways/rights of way/footpaths including impact on journey times to key community facilities (e.g. schools, nurseries etc).

Step 4 (identification of disproportionate and/or differential effects) will need to be informed not only be the baseline population profile, but critically by community engagement processes and outcomes. It will be important to understand, through the engagement process any heightened sensitivity of particular groups to potential adverse impacts, and how potential impacts could be effectively mitigated. A record should be kept of those groups with protected characteristics that are engaged and the issues they raised.

Step 5 is the preparation of an EqIA report. This should summarise all steps in the process, including, importantly the engagement that has taken place with equality groups, and any assumptions which have been made.

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