

A Case Study of Bristol Airport Expansion, Environmental Impact Assessment

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List of Abbreviations

EIA	Environment Impact Assessment
BIA	Bristol International Airport
BRL	Carboniferous Black Rock Limestone
SuDS	Sustainable Drainage System
HGV	Heavy Goods Vehicles ³⁶
IEA	Environmental Assessment's

CHAPTER 1 INTRODUCTION

1.1 Environment Impact Assessment (EIA)

Environmental Impact Assessment (EIA) is a procedure/method or a tool which is used to evaluate the critical impacts to the environment of a development project proposal (“Environmental Impact Assessment (EIA)”). If project needs a EIA, developer can be requested to the council for a formal screening. Moreover, if project is needed EIA report then can be requested for a scoping as well.

The EIA contains five general phases as follow:

I. Screening

It is necessary to identify whether a proposed project is under the rules and regulations within the EIA and have to determine the whether EIA is needed or not, in this stage developer should be clearly identify the EIA necessity and need to proceed further (GOV.UK).

II. Scoping

In this phase, it will be determined the issues with EIA and assessed with that finally environment statement will be issued. The developer might be asked the local planning authority for scoping opinions which states the authority's point on the data that must be given (GOV.UK).

III. Preparing an Environmental Statement

If it is decided Environment assessment is compulsory for the development the applicant should be submitted an environment statement which included with minimum data required to evaluate the adverse effects of the development going to cause as regulation 18(3) and regulation 18(4) (GOV.UK).

The developer must ensure that the Environmental Statement is produced by the qualified consultants in order to guarantee its accuracy and quality. A declaration statement from the developer explaining the relevant experience or qualifications of such specialists must be included with the Environmental Statement (GOV.UK).

IV. Making a planning application and consultation

The Environmental Statement must be made available online and through public notice. It is required to give the public and the relevant consultants to express their opinions regards the development and the Environment Statement (GOV.UK).

V. Decision making

First, the local planning authority and / or the secretary should be evaluate the decisions, comments from relevant authorities/consultants taken from the planning application process and the environment statement and then they should decide the proposed development granted or not. The important point is that the decision made in this phase should be transparent to the public by electronically or public notice (GOV.UK).

A SWOT analysis for the EIA in the UK as below;

Strengthens

- i. Present UK government give their immense effort to continuation of EIA within the UK and further they are ensuring further protection on EIA tool.
- ii. The environment management assessment institute with collaborate with the environment agency enhance the capacity building programs, training programs, and EIA guidance document within the UK

(Jha-Thakur and Fischer, 2016; 6-8).

Weaknesses

- i. It is stated that, EIA easily draw anything but there is no relevant fit, as an example it should be wider in concentration with topics as carbon emissions.
- ii. Insufficient attention on changes made in decision making process of EIA
- iii. Monitoring is identified as an important phase and it should be improve further to manage adverse environment effect and the and to deliver the mitigation

(Jha-Thakur and Fischer, 2016; 10-11).

Opportunities

- i. According to the Liverpool workshop 2013 it is identified the new EIA directive (2014/52/EU) as a good opportunity
- ii. Practical usages of Information Technology for EIA

(Jha-Thakur and Fischer, 2016; 12).

Threats

- i. EIA legal conditions are not clearly understand

(Jha-Thakur and Fischer, 2016; 13).

CHAPTER 2

A Case Study of Bristol Airport Expansion, Environmental Impact Assessment

2.1 Introduction

The Government's Aviation White paper illustrates the necessity of airport development with rational reasons in the United Kingdom; furthermore it provides the information on Bristol airport (BIA) development to meet air travel demand rising within 10 – 12 million passengers by 2030. The forecasts regarding BIA stated that passengers usage will be grow around 8 million by 2015. With comparisons to other airports BIA expansion development is more important because of existence proper infrastructure facilities, catering for passengers at the incensement of 9 million passengers per annum.

Moreover White paper mentioned the possible development expansions within BIA as below;

- South west air is the most suitable for the expansion; many passengers from south west (around 70%) fly into neighboring airport due to the traffic.
- BIA will be a one of major airport in the UK so it is suggested to have new terminal and runway extension as well.
- There is no support to build an airport within the north side of the Bristol

It is very important to evaluate BIA environment effects since this is laid within a green belt.

(Bristol International Airport, 2005)

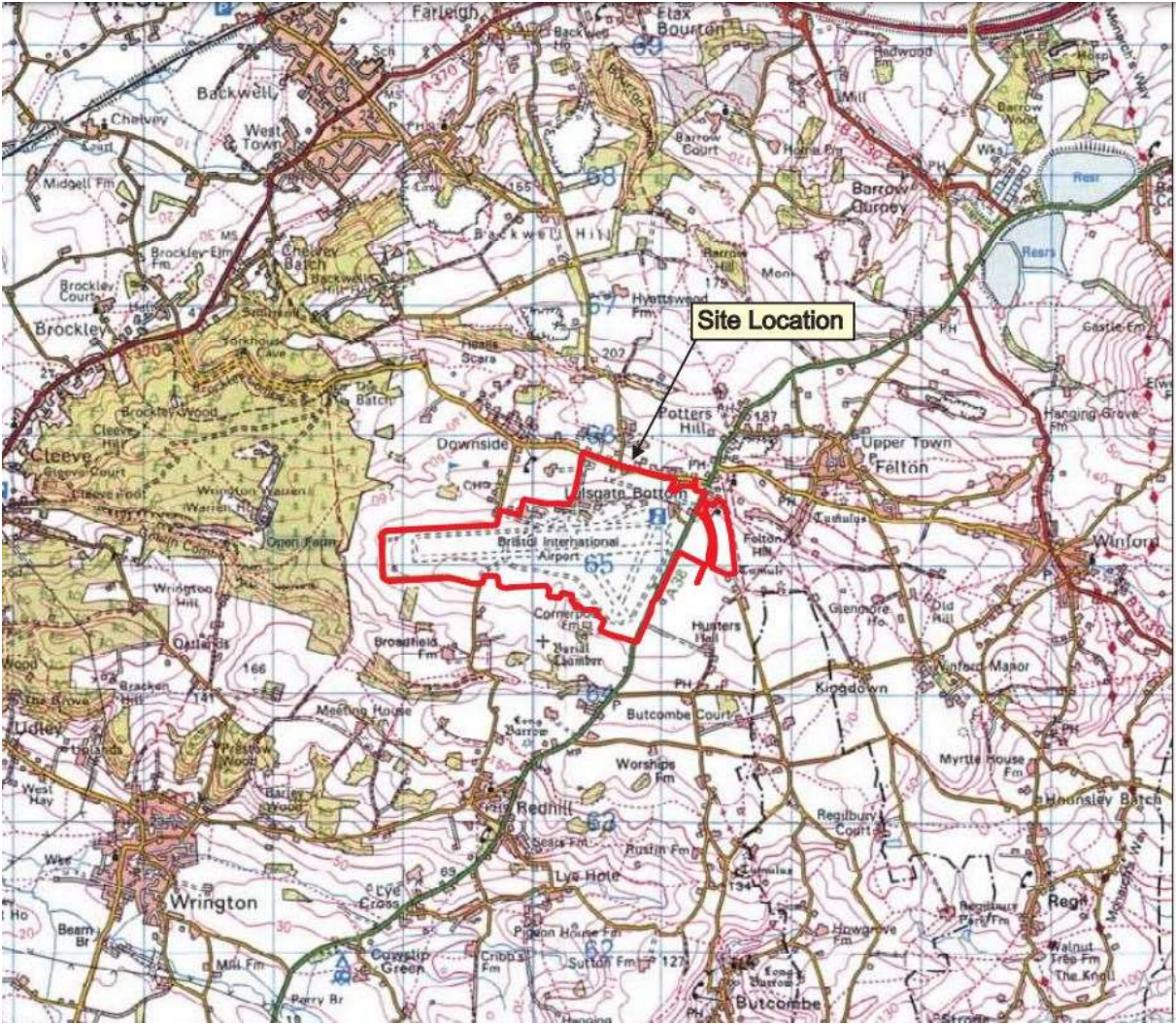


Figure 2.1 – Bristol International Airport Location (Bristol International Airport, 2005)

2.1.1 Legislation

The procedure of Environment Impact Assessment included in the town and country planning, England. The process of Environmental Impact Assessment in the context of town and country planning in England is ruled by the Town and Country Planning (the ‘2017 Regulations’). These rules apply to construction projects that have Part III of the Town and Country Planning Act 1990 planning permission (GOV.UK).

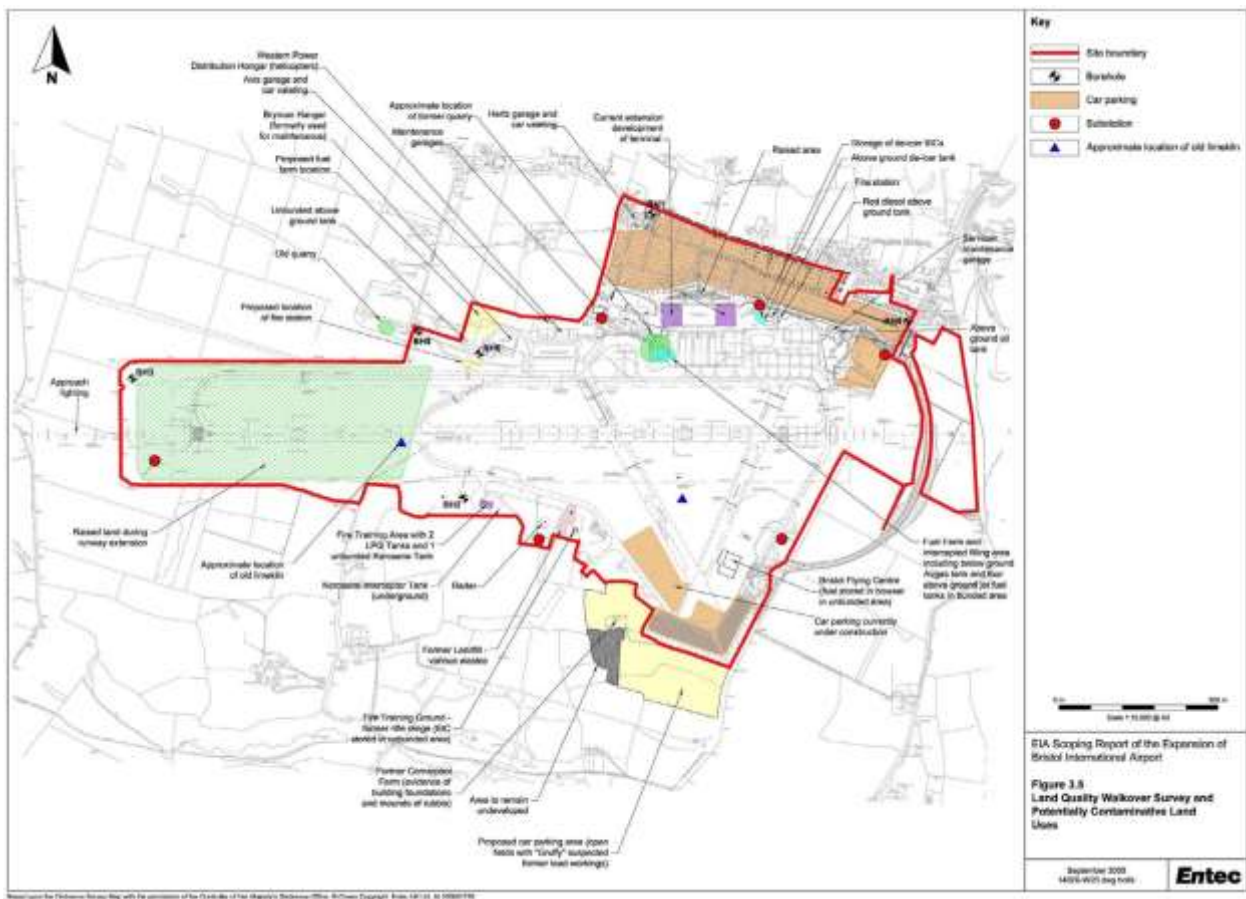
According to The Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 - SI No. 293, the BIA scoping report has made as a part of the EIA report. Prior to granting planning permission for some types of development covered by The Town and Country Planning Act 1990, an EIA is required by the EIA Regulations. As

stated in the aviation white paper, there is a need for EIA on BIA expansion project (Bristol International Airport, 2005).

2.2 Scoping of Bristol International Airport expansion project

The main goal of this scoping report is to recognize the proposed development's adverse effects which should be taken into account as serious. Potential environmental effects and fundamental stages of development such as permanent land use changes and new infrastructures in the scheme need to be consider within the scoping (Bristol International Airport, 2005).

One of the main objectives of this EIA is to collect all necessary environmental data to support the development and minimizing the adverse effect on environment. The EIA team must collaborate closely with the project design team to accomplish this.



The proposed scope of the EIA is brief as below. Environmental factors which need to be considered described as below;

2.2.1 Air

The air quality strategy in the UK was circulated in January 2000, in this air pollutions at national and local levels are illustrated broadly (Bristol International Airport, 2005). Air pollution will lead to changes in the atmosphere it may cause badly on environment and human health too (Zanetta, 1994; 5). UK Government has implemented a three – stage approach to evaluate the air quality. Air quality should be evaluated by local authorities regards to the regulations. At the initial stage ozone got short term objectives but with the European strategy for limiting ozone concentration and with the transboundry nature of the ozone, ozone not evaluated within the air quality.

Possible air pollution sources within the Bristol International airport as follow;

- Airplane operations
- vehicle emissions
- energy consumption
- fuel storage of the airplane
- Airplane storage tanks and refilling tanks
- Maintenance, building operations

Nitrogen Oxide, Carbon Monoxide, Carbon Dioxide, Sulphure Dioxide, Volatile organic compounds, Particulates are recognized as main air pollutants within the BIA. Recent studies from Aberdeen University illustrated that BIA air pollution will lead to stunt babies and causal factors have identified as exposure of mother to polluted air within the pregnancy period furthermore smaller gestational births, coronary artery disease, diabetes and asthma has recognized as major diseases can be caused with this air pollution (Greenwood, 2019).

Emissions from the aircraft, emissions caused by the road traffic, dust nuisance, Deposition of airborne pollutants on designated sites are recognized as major potential effects need to be consider further with expansion of BIA(Bristol International Airport, 2005).

Mitigation actions need to be taken within BIA as follow;

- a) airfield layout should be modify to minimize idling and taxiing time

- b) there should be a proper traffic management strategy to avoid the emission
- c) encourage people to have public transport , it will be minimize the congestion

(Bristol International Airport, 2005).

2.2.2 Geology and land quality

A qualitative risk assessment based on the "source-pathway-receptor" approach is used to identify the likely important consequences that relate to geology and land quality. This methodology can be defined as follows (Bristol International Airport, 2005).

- Source- a pollutant that might be harmful to environmental and human receptors. In a broader sense, this could refer to specific ground conditions, like the existence of abandoned footings, which could have an effect on redevelopment plans. People, other living things, physical systems, and manufactured objects may all be affected by the "source."
- Receptor- The "receptor" can only be affected if a functional pathway connects the "source" and the "receptor." It is possible to consider groundwater and surface water systems to be receptors in and of themselves due to the fact that their quality is regulated by statutory agencies and that they act as pathways for pollutant migration to other receptors.
 - buildings and buried services – current and proposed;
 - land quality – current and future;
 - surface water;
 - groundwater; and
 - flora and fauna.

Possible impacts of the proposed development on biodiversity, surface water, groundwater, and/or the presence of toxins

- Pathway: - the potential path by which the "source" and "receptor" might interact. This can involve the physical transfer of contamination, groundwater, wind-blown dust, vapour migration, excavation and deposition, among other methods.

The existence of "gruffy" patches, which have been linked to historical lead and calamine mining, could point to the possibility of elevated metal concentrations close to the proposed auto parking lot to the south. The site that Cornerpool Farm once inhabited, which could potentially be contaminated by waste or rubble and where there are signs of building foundations, is suggested to be used for the car parking space(Bristol International Airport, 2005).

Improvements to drainage, including an update to the site's interceptors, are among the environmental enhancement measures connected to the proposed construction. This will lessen the possibility that hazardous contaminants will affect the condition of the land.

It's possible that historical activities in the intended development zones have contaminated the land. During the development and rebuilding processes, such contaminants that may otherwise go undetected and continue to endanger sensitive receptors may be characterized (Bristol International Airport, 2005).

2.2.3 Noise

Noise can be divided in to four as construction noise, airborne noise, ground operations noise, and road traffic noise. Sound pollution in the BIA is in the critical level as Dr.Vaughn measured the sound pollution around the airport and it concluded as it is doubled as recommended by the World Health Organisation (WHO) (Greenwood, 2019).

2.2.4 Water resources and quality

A strategy based on the "source-pathway-receptor" concept is used to identify impacts that are expected to have a major impact on surface and groundwater features. Anyone who causes or intentionally permits the entry into surface or groundwater polluting substances, particularly those on Lists 1 and 2 of the 1998 Regulations, is guilty of an offence under the Water Resources Act of 1991 and the Groundwater Regulations. The BIA is situated on Broadfield Down, a dome-shaped periclinal formation, the core of which is made up of Carboniferous Black Rock Limestone (BRL). The surrounding soil has a high potential for leaching, according to the Environment Agency's Groundwater Vulnerability . As a result, the lack of a large physical barrier and the poor chemical attenuating qualities of the soil would imply that there may not be much standing in the way of potentially tainted recharge waters making their way to the water table beneath the ground. BIA will keep growing till it reaches its current capacity. An increase in the use of potentially polluting products is predicted, but any consequences should be mitigated by following the present environmental management and pollution prevention/response methods. According to the Environment Agency, BIA is not at risk from severe river or sea flooding. Climate change is anticipated to cause changes to climatic factors. The main effects of this could be drier summers and more variable and intense rains during the winter. An increase in surface runoff and the possibility of localized flooding may be caused by the shift in rainfall pattern. It has been expected that there will be a general drop in groundwater recharge, which will lower groundwater levels and have corresponding consequences in groundwater supported watercourses (Bristol International Airport, 2005, 2006).

To accommodate the expected short-term increase in passenger volume, a new parking space is now being built. This location will use a Sustainable Drainage System (SuDS) that is connected to the current drainage system and consists of a permeable surface covered in a layer of sand and geotextile (Bristol International Airport, 2005, 2006).

Mitigation practices as follow;

- There should be a proper management plan during the building period
- Modification of current drainage system
- There should be a system to contain pollutants at fire station and fuel farm
- Use of SuDS to increase the amount of runoff

2.2.5 Transport

The EIA's methodology will follow the guidelines outlined in the Institute of Environmental Assessment's (IEA) "Guidelines for the Environmental Assessment of Road Traffic," which were issued in 1993. Therefore, the evaluation will concentrate on possible effects on:

- Local roads and the people who utilize them
- Along with the relevant occupants and users, the land uses and environmental resources fronting those highways are all important

The movements of commercial Heavy Goods Vehicles³⁶ (HGV) travelling to and from the site during the construction period of the development are expected to have an influence on transportation during construction. Once the plant is operating, private vehicle travel to and from the site will have the greatest impact on transportation (Bristol International Airport, 2005, 2006). The general operation of the highway network, including traffic speeds and capacity of highway linkages and junctions, may be impacted by changes in the baseline traffic as a result of construction activity, particularly HGVs.

Even if the development is abandoned, background traffic volumes are expected to increase and it is necessary to quantify these increases in order to conduct a thorough assessment of the effects. Therefore, in order to adjust the data from any previous traffic counts to the anticipated values in the assessment year, a growth factor must be applied starting on the date of the count.

However, it is thought that the effects of the airport expansion on traffic flows could be significant, and mitigation in the form of promoting the use of public transportation as a key method of reducing dependence on private vehicles, along with other measures (such as careful highway and car parking design, and use of traffic control systems), will also be required (Bristol International Airport, 2005, 2006). Road users' increased vehicular activity would have consequences in terms of road safety on vulnerable road users and increase potential risk of accidents.

2.2.6 Biodiversity

It is not feasible for an ecological evaluation to take into account every single species and habitat that could be impacted by a development. Instead, it ought to concentrate on legally protected species and "important ecological sensors."

Within a 2 km radius, records of specific highlights of species that are legally protected include (Bristol International Airport, 2005, 2006);

- crested newt (*Triturus cristatus*) within 500m of the west of the runway
- horseshoe bats found with the North Somerset

- bats being recorded within Cornerpool Farm
- badger (*Meles meles*) found along the existing southern boundary of the airport
- slow worm (*Anguis fragilis*) founded in the southern boundary of the airfield

Before the next steps in the process can be determined, desk studies are still employed as the initial stage of researching a place. Recent scooping reports included desk studies for the Mumbles Lifeboat Station, Heathrow and Gatwick Airports, and other locations (Statement, 2010; Heathrow Airport, 2018; Gatwick Airport, 2019; Glasson, 2019). Desk studies, on the other hand, are carried out from distant office locations and might not take into account local expertise or unrecorded key species in a scooping report, for instance. As a result, new species may have established in a region but may not be noted in secondary data sets (Glasson; 2019).

The desktop analysis found several priority species close enough to the BIA to be taken into account in the scoping report (Bristol International Airport, 2005). The site walkthrough identified four active badger 16 setts, probable bat roosting sites, and bat foraging/commuting habitats, supporting the presence of badgers and bats although no surveys were conducted at the time. The report only specifically addresses surveys for a few particular species and just states that more surveys would be conducted at the proper time of year to offer more reliable data. Potential impacts to the biodiversity as follow;

	Receptor	Potential impact
1.	Vegetation in Felton Common County Wildlife Site	Due to the dust deposition which comes from the construction project will affect for the plant growth and survival
2.	Bats	Disturbances occur to bat's roosting structures Modification of routes
3.	Great crested newt	Death , injury can be caused
4.	Badger	Habitat damages or losses
5.	Slow worm and other reptiles	Habitat damages or losses or disturbances to individuals
6.	Nesting birds	Injury or disturbance to birds or their nests

7.	Semi-improved calcareous grassland	Loss the grasslands by constructions
8.	Groundwater fed watercourses	Ground water pollution

Table 2.1- Potential impacts to the biodiversity (Bristol International Airport, 2005)

Suitable mature trees and hedgerows should preserve as mitigating methods. (Bristol International Airport, 2005).

New habitats will be developed as part of the airport development, and/or existing habitats will be improved. Some of Cornerpool Farm and/or other distinct pieces of land to the east of the A38 may fall under this category. The establishment or improvement of such habitats would be in line with offering more opportunities for locally recognised natural resources , and where practical, would strive to contribute to LBAP targets (Bristol International Airport, 2005,2006)

CHAPTER 3

Conclusion

Bristol International Airport expansion project is a very important as a locally in UK, since future UK aviation passenger demand will increase rapidly. Before the expansion constructions start it is recognized that there should be a EIA, so with this EIA is was identified the adverse environment effects which will be happened after the construction by broad. It was identified some species which will be loss or disturb and some factors which will be disturbances to humans as well. With these factors Environment statement should be build up and then with the qualified consultants planning application should be done. Finally decisions should be made based on these all factors. EIA is basically very important to preserve our environment as and UK is one of the country which was encourage EIA by the government as well.

CHAPTER 4

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