ENVISA

AVIATION & ENVIRONMENTAL SOLUTIONS

Brussels National Airport

Study of the impacts on the environment with regard to noise pollution – **Chapter One Report**

Prepared for: Federal Public Service Mobility and Transport By ENVISA (Paris) www.env-isa.com	Version 1.0 28/12/2018 Ted Elliff – Coordinator Tel: +33 1 71 19 45 80 Email: ted.elliff@env-isa.com

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Executive Summary

This study is independent, and Envisa treated the recorded statements and opinions of stakeholders in accordance with our scientific expertise and experience.

The perceived significance of aircraft noise impact and the effectiveness of its management effectiveness of aircraft noise depends not only on the noise impact itself but also on a complex blend of non-acoustic factors such as, inter alia, regulation, governance, perceived ownership and benefits, community engagement and communications and the rate and number of changes to overflight patterns etc. In discussions with BRU stakeholders, it has become clear that the study, in addition to its core work of delivering an independent assessment of noise impact for BRU, should also consider certain key areas of the governance framework for BRU noise management and the causes of related litigations

It is clear from a detailed review of complaints and discussions with stakeholders that the perception of significant noise extends far beyond the average modelled noise contours at which aircraft noise might normally be considered to be significant for major decision-making purposes. It is also clear that there has been a greater number than normal of significant changes to aircraft procedures and overflight patterns during the last two decades, that have raised the profile and perceived significance of aircraft noise around BRU for many of the local communities. The effect of these numerous changes, whilst they can be assumed to have been well-meaning, have reduced community tolerance and acceptance of aircraft noise and have set one community against another. It is also apparent that historical noise management and associated decision making has been at least in part, driven by weight of complaints rather than scientific evaluation. It has been reported to Envisa that BRU aircraft noise may have been used for political purposes. It is also apparent that the policy and regulatory framework for BRU aircraft noise has been fragmented and inconsistent partly as a result of what would have otherwise been logical dissemination of powers on key topics such a land-use planning and environmental regulation. It is also apparent that in common with many other airports, land-use planning restrictions inappropriate development in the vicinity of BRU has not been sufficient to prevent encroachment of residential and sensitive receptors into areas significantly affected by aircraft noise. The presently applied judgement to operate a fair and equitable dispersal plan based on runway selection, is based on crude geographical distribution and does not accurately control the number of residents being overflown at differing heights and hence noise levels. There are no agreed parameters on what constitutes acceptable dispersion or acceptable accuracy for the operating procedures.

It is also apparent that any increasing traffic throughout and the potential for climate change may further change BRU noise distribution patterns. These observations for the natural evolution of the existing situation at BRU have also been considered in this study.

The importance of aircraft noise around BRU is also heightened by the airfield orientation and proximity to the Brussels conurbation. This was decided decades ago when aircraft were far less frequent and had totally different flight characteristics and operating procedures than the present aircraft fleet and airspace. This will be considered in Chapter 2 of this study, but it can be stated now that decisions for significant changes to BRU runway infrastructure, airport relocation, or demand re-distribution depend on far more significant factors than aircraft noise and will not be solved with this study. Nor can detailed noise analysis for such options be undertaken without detailed design, which does not presently exist – some general very high-level observations on this political topic will however be offered in the completed Envisa report.

Understanding the noise pollution impact of existing BRU activities and operations, however, remains the key area of focus for this Chapter of the study. Because of the history of aircraft noise at BRU, the study scope includes noise from aircraft operating at some distance from the airport and outside of the noise contours that would normally be considered to describe significant noise. These key areas of focus are further described herein.

Examples of key operational practice findings for the present BRU situation:

- Aircraft operating into and out of BRU are being operated correctly in accordance with approved and published procedures
- Runways are being selected in accordance with what can be described as a genuine attempt to comply with the runway use judgement
- Aircraft noise performance and height keeping is appropriate to good practice – but as at other airports, further improvement may still be possible
- Collaboration between operational stakeholders is rudimentary at present, but very recent developments in Collaborative Environmental Management at BRU may see this improve
- Noise microphone penalties are being levied against modern aircraft that are being operated in accordance with their operating procedures. It is not clear what purpose this serves, but it will distort the stated legal policy of fair and equitable distribution of aircraft overflight since pilots will seek to avoid overflight of these microphones.

In conclusion, for this chapter of the report, it is noted that there are a number of systematic problems which need to be addressed, including:

- Fragmented and inconsistent governance
- Poor collaboration between stakeholders
- Poor communication and outreach to all community stakeholders
- Failure to assess impact prior to implementing decisions
- Past history of frequent changes to airspace organisation based on dubious criteria

These will be studied further, and solutions proposed in Chapter 2 of this report.

A Cautionary Note
"You can please some of the people all of the time, you can please all of the people some of the time, but you can't please all of the people all of the time"

This study is aimed at helping to facilitate discussion and propose a framework for everyone to join the debate in a fair and equitable way. We see no miracle cure for the problems that people have spoken to us about. But there are clearly many ideas that need further debate and evaluation, which when taken individually or as a package, will inevitably lead to an improvement upon the current situation.

Agreeing that improvement is possible and indeed, agreeing that progress is being made in the right direction, depends on reaching a consensus on what the criteria are to be used to assess this "improvement". This in turn requires effective regulatory, political and community engagement infrastructure and processes to be in place.

Only through observing an improvement of measurable facts, can we be satisfied that progress is being made.

1 Introduction

1.1 *The Terms of Reference for this Study*

Envisa have been commissioned by the Belgian Federal Public Service (FPS) Mobility and Transport to conduct a fully independent scientific study into noise impact and practice arising from activities and operations at Brussels Airport (BRU). The study will meet the requirements of the tender specifications (ref. BB/PUR-16/11/2017-48 BIS) of this noise impact study which were drafted to fulfil the decision of the Brussels Court of First Instance proceedings, of 19 July 2017, R.G. 16/4222/A and specifically the requirement as follows:

It is pronounced taking into account the litigation proceedings, which in recent years, have become repetitive, carried by the administrative authorities responsible for the environment protection and various associations (as in the present case) but also the people living nearby the airport and those living under the air routes. The inventory of documents drawn up by the Belgian State refers to 18 decisions of courts (judicial courts) delivered between 2004 and 2016, taking into account that this list does not mention all the proceedings of which the Dutch courts have been seized, nor the judgement of the Brussels Court of Appeal of 31 March 2017, nor the present proceedings.

The whole situation requires that an impact study is carried out to scientifically, independently and transparently outline the current activity of Brussels National Airport (from an overall perspective) in light of the application of all the laws and regulations and the aeronautic rules and procedures applicable (safety measures, measures restricting operation, aviation routes and their conditions of use, wind standards, etc.) with regard to the noise generated.

The impact assessment will include the consideration of alternative solutions allowing noise abatement, taking into account the essential safety requirement, with an assessment of the impact on operating capacity.

There is no reason to condemn the Belgian State to carry out the impact study as organised by the Act of 13 February 2006, or otherwise to a public consultation. It will be for the State to take the necessary procedural steps in the light of decisions it will make.

The study is intended to provide independent, scientific and transparent assessment of the present noise impact arising from operational activities connected with Brussels Airport in order to address the numerous and continuing noise related litigation actions taken against the Belgian State. The consideration of alternative solutions to noise abatement is another key point that will be covered. It is implied that the Flemish side of the Belgian judiciary are also faced with a large number of litigations—and that this study whilst triggered by the decision of a francophone court will have relevance for the Flemish side.

In discussions with stakeholders, it has become clear that the study, in addition to its core work of delivering an independent assessment of noise impact for BRU, should also consider certain key areas of the governance framework for BRU noise management and the judgements and rules that have been and are being applied. The study will also seek to understand the causes of related litigations. Understanding the noise pollution impact of BRU activities and operations however, remains the key area of focus for this study.

Based on the Call for Tender and the proposal made by Envisa, the study is divided into 3 stages. These are summarised as follows:

- **Preliminary Chapter:** This stage of the study was designed to gather sufficient information to allow preparation of a study plan to the satisfaction of the Client. This chapter is an internal document for planning and project management.

- **Chapter 1:** (This Report) This stage of the study is designed to:
    - identify range of roles, powers, opinions, concerns and perceptions of the key stakeholders engaged in the study topic;
    - understand and set out the present airport practice and the context in which it operates;
    - gather and synthesise the rules that govern noise management at BRU and offer commentary on the pertinence of this
    - analyse and report compliance against these and at high level against known good practice to identify areas for investigation in the next phase of the study; and,
    - assess and report the current noise impact for BRU operations;

- **Chapter 2:** This stage of the study is designed to:
    - identify comparator airports and governance processes against which to compare BRU noise management practice and processes;
    - identify candidate improvements in noise management practice and/or governance;
    - identify the required enablers and likely impacts and interdependencies for these candidates; and,
    - propose a road map to achieve one or more future noise management scenarios

It should be borne in mind that the study stages may be iterative. When new information is uncovered, a review of previous information may be triggered. Thus, the Chapter reports should only be considered final at study conclusion. The Chapter reports (1 &2) will be made public and will be presented to stakeholders.

1.2 *Discussion of Project Task*

The scope of this project is focussed on the overall management of noise generated by aircraft operating on or around the existing BRU airport. This project is not an end-point or blueprint for solving such noise issues arising since such solutions has required political, legislative, social economic, financial and environmental impact assessments and decision making, which lie outside of the scope of this study.

This project is however an independent analysis of the historical and present framework and operational issues and practice surrounding these difficult issues. It identifies problems and barriers and enablers to achieving the required solutions to these issues. It also offers advice and options to be considered in any future process to solve these issues. The powers and process to take this advice forward lie within the Belgian political, legal and operational frameworks and to some extent in the international frameworks where local decisions may have transboundary implications. It must also be borne in mind that there is not obvious single 'magic bullet' to eliminate these issues in all such decisions there are costs and benefits, winners and losers. Implementing such changes requires difficult decisions to be taken. These decisions may see social, environmental or economic imperatives being brought to a different balance or being given more weight than others.

The study encompasses the total present legal and operational noise mitigation framework covering the control, mitigation and operational practices concerned with noise generated from BRU activities and operations on the ground within the main airport perimeter and from aircraft operations in the air extending to an attitude of 10,000 ft above ground level. A particular focus is on runway use and related aircraft routeings, which are of particular public interest.

The study considers:

The wider international noise related regulatory and guidance framework.

- Belgian national, regional and local noise related obligations, rules and supporting structures (e.g. land-use planning).
- The noise related practice of BRU aviation stakeholders both in terms of individual stakeholders and in terms of any collaborative arrangements that may be relevant to noise management.
- The noise related practice on and around a selection of comparable airports with a known international reputation for good practice.
- Potential future noise management practice arising from developments associated with, but not limited to EU SES, SESAR, NextGen and ICAO.

The study considers the **interdependencies and trade-offs** that can arise from noise management including but not limited to impacts on safety, cost, capacity, flight efficiency, noise, air quality and climate change.

It is also important that the study remains transparent and that stakeholders are allowed to offer their opinions. Envisa reserve the right however, not to take these opinions into account in developing their findings, where these opinions are considered to be erroneous. This is a highly sensitive topic of much political and public interest and concern. It is therefore crucial that a full understanding of the background and core issues is reached, but that any undue influence on the outcomes of the study by any stakeholder community is avoided.

1.3 *About Envisa*

Envisa is an international consultancy based in Paris, specialising uniquely in environmental and sustainability aspects of aviation. It has been trusted over a period of more than 15 years to support major European institutions, such as EUROCONTROL, EASA and the European Commission, through

European and International projects, helping to understand and report aviation's impact at both global and local levels. Envisa offers a wide range of individual expertise and corporate knowledge to deliver sustainable solutions for all stakeholders.

1.4 *Chapter One Scope*

The purpose of this report is to provide a draft Chapter 1 for the BRU noise study as described above.

The Scope for the Chapter One stage is summarised as:

- Individual meetings with key stakeholders. These are planned throughout the duration of the study, but for the purposes of characterising the current situation at BRU sufficient information has been gathered to make informed assessment and suggestions
- Review and collation of pertinent policies, rules and regulations at national, international and sub-national levels. To consider these in terms of fitness for purpose, strengths, weaknesses etc
- To collate high-level and aggregated historical data such as weather, complaints, gestation of previous rules, changes in demand, changes in fleet etc. Where appropriate conclusions have been drawn to explain and offer context for the current situation. Lessons Learnt are offered
- Description of airport, management structures and processes and procedures. Analysis and collation of existing BRU noise management practice—and initial identification of potential benchmarks—commencement of gathering of comparator examples
- Review of existing noise performance against published obligations—characterisation of delivery, gaps, weaknesses and barriers, etc.
- Data collection, definition of scenarios and preparation of input data for noise models, simulations and analysis of results.
- The framework that enables the present noise regime and BRU operations has been reviewed to understand the governance, policy, regulations and decision-making processes concerning noise from BRU operations and activities. The direct influence of the wider framework on BRU noise impact, public perception and concerns were also considered.
- During the study gaps, weakness, non-compliances etc were found, together with examples of good practice and things that work well. These were used to formulate a section of the Chapter 1 report on key findings – which will include a description of their implications. It is essential that whilst retaining independence, any assumptions underpinning these findings were checked and validated.

1.5 *Structure of this "Chapter 1" report*

We have tried to make clear in this document, three different types of text. The can be summarised as follows:

1. The main text, unless otherwise stated, tries to capture the facts as best as we understand them at this time. It is totally possible, due to a complex historical and legal context, compounded by dealing with documents in three different languages, that errors or misunderstandings may have occurred. Feedback and review is encouraged.
2. Text within section 3 Stakeholder Discussions, is a summary of comments and opinions from stakeholders interviewed. They reflect issues that are considered relevant to this stage of the report, representing key issues that were raised. We have tried not to attribute remarks to individuals at this point. It should be emphasized here, that full discussion of stakeholder interviews will be covered in Chapter 2.
3. At the end of each main section (4, 5 & 6), our own independent observations and conclusions

2 The Airport Context

2.1 *Historical and current context*

The Brussels airport (BRU) would not have been sited where it is in the modern era – but when it was developed back in the 1950s (from a war time airfield), aircraft numbers were much lower, people had a different attitude to aircraft and flight, aircraft performance and procedures were totally different.

Relocating the airport would have major international, airspace political, economic and sustainability implications including funding and return on investment viability, for ownership, for compensation, for translocated impacts and newly affected populations, for service partners, for transition.

Artificially forcing relocation of supply and demand to regional airport would effectively be market interference and some relocation is already taking place already by market forces to some degree. Such a policy would raise many complex issues including economic blight on Brussels, compensation for investors in BRU, loss of economies of scale for airports and airlines, longer and more frequent ground transport links with attendant infrastructure and sustainability implications.

These complex and extensive impacts and issues are out of the scope of this noise focussed study and cannot be answered here. Thus, the scope focus of this study is to consider noise impact at the existing BRU airport and how this may be managed and minimised most effectively. Inevitably this will result in options and choices some of which will lie outside of purely technical aspects of noise control and will derive from political and community choices.

Today, the Airport is run by Brussels Airport Company (BAC), a private, limited company to which the Belgian State has granted the licence to operate. 75% of the company's shares are held by a consortium of private investors. The Belgian State has an interest of 25% of the shares. The Board of Directors is composed of eleven members. Apart from the Chairman and the CEO, the Board consists of six members designated by the consortium of private investors and three members designated by the Belgian State.

2.2 *Future context (Forum 2040)*

In November 2016, Brussels Airport Company chief executive Arnaud Feist has laid out the gateway's long-term strategy in the form of a programme called Strategic Vision 2040.

According to him, the airport has an ambitious plan to prepare itself for what it envisages will be significant growth in air traffic over the next 25 years.

"The plan connects our country to the rest of the world and to the future," a statement describing Mr Feist's presentation noted.

"The presence of an international airport which is connected to all corners of the globe is a key factor in the development of any country," it continued. "Given the rising world population and the ongoing globalisation of the economy, people and goods will increasingly be travelling by air."

"Over the next 20 years, passenger traffic is to increase by 3.8% per year and cargo traffic by 4.7% per year at (the) global level."

"Numerous foreign airports, including (some) in Belgium's neighbouring countries, have announced major strategic investments to meet this expected market increase."

"Our country cannot afford to lag behind and owes it to itself to seize on the huge opportunities that aviation will offer in terms of economic, social and cultural benefits."

"Strategic Vision 2040… details the developments Brussels Airport has in mind to meet the expectations of its customers, passengers and air carriers, and to strengthen its competitive position in Europe and the rest of the world," the statement stressed.

With respect to development of Infrastructure development, plans include:

· Turning the Brucargo freight area into a "top-tier logistics centre" in order to support areas of national economic growth, such as the pharmaceutical and the biotechnology industries. The success of these industries relies on a supply chain of efficient and high-performance transport infrastructure and storage facilities, the airport pointed out.

· Upgrading runway infrastructure in order to meet capacity during peak hours and to ensure operating capacity is available under all weather conditions. To do so, the airport is looking at two options: either an extension of the taxiway alongside runway 07R/25L, or an extension of the runway itself.

· The construction of two additional piers: Pier A West by 2023 and Pier C by 2030.

Other proposed improvements include upgrades to the public transport system linking the airport to the capital and the region.

2.3 *The Litigation Context*

An overview of the current and previous litigations has also been undertaken (non-exhaustive).

A timeline providing an overview of the evolution of laws and regulations and related litigation is presented here:

Table 1: Timeline of the evolution of rules and regulations

2000	Environmental permit: max 25,000 night movements
2001	Quota count for night flights Bankruptcy of Sabena leading to decrease in traffic
2002	Further night noise quota count restrictions Creation of Brussels Airport Mediation service
2003	Further night noise quota count restrictions
2004	Environmental permit: max 10,000 night-time (23:00–5:59) take-offs
2005	
2006	Federal law of 13 February on the environmental assessment of plans and programmes (directive 2001/42 SEA)
2007	
2008	Departure of DHL leading to reduction in night traffic Decision of the Cabinet from 19 December 2008
2009	Ministerial degree of 3 May 2004 Art 7. comes into effect: max 16,000 night-time (23:00–5:59) slots and max 5,000 night-time departures Also no night-time take-offs over weekends (nights from Fri–Sat 1:00–5:59, Sat–Sun 0:00–5:59, Sun–Mon 0:00–5:59) and further night noise quota count restrictions and their extension to the period 6:00–6:59
2010	Decision of the Cabinet from 26 February 2010
2011	
2012	Ministerial instructions for Wathelet Plan following Decisions of the Cabinet from 19 December 2008 and 26 February 2010
2013	
2014	Wathelet Plan comes into effect
2015	Return to situation before 6 February 2014 of Wathelet Plan (freeze of Phase 6) following judgement of 31 July 2014
2016	Hulderberg case: use of waypoint "HUL" can continue according to judgement of 6 June 2016
2017	Wathelet plan confirmed by Conseil of State Judgement of 19 July 2017: state must produce an environmental impact study for noise

	and end violations of "Arrêté bruit" on Canal route, and on Ring route and landings on 01 during night-time period 23:00–7:00 (Brussels Capital Region)
2018	Judgement of 30 May 2018: stop of Phases 6 and 7 of Wathelet Plan and establishment of "General Estates" (communes of Noordrand) Ongoing judgement on the use of Leuvenrechtdoor route Hardy case: ongoing judgement relative to the adoption of plan Anciaux (prior to 2011) (Noordrand) Servais case: Ongoing judgement on landings on runway 01 and wind conditions for the use of 25L/R (Woluwe-Saint-Pierre commune) (new) second Brussels Region case (RBCII) – a series of proposed fines on the Belgian State in case of insufficient action on noise mitigation at BRU (including fine for late delivery of this report!)

3 Stakeholder Discussions

The observations and limited discussion which follows, is based on extensive interviews with almost all concerned stakeholders. At the time of writing (December 2018) there remain some outstanding stakeholders to be contacted and interviewed. The process of stakeholder consultation will continue during the Chapter 2 phase. Only limited comments are documented at this stage of the project, with the objective of highlighting stakeholders' concerns and comments about the current situation, ie: the operational framework and practices relating to noise impact management at Brussels Airport. Suggestions discussed for solutions to any of these, will be documented and developed in the final chapter (Chapter 2) of the final report.

3.1 *Summary of Organisations contacted to date*

For the sake of organisational simplicity, a basic stakeholder framework was created, classifying organisations into 3 main groups: Institutional, Operational and Community.

Organisations that have been met to date, are listed below, (in no particular order).

At the time of writing (end Nov 2018), there are still some organisations where it has not yet been possible to arrange meetings. A complete list will be included in the Final version of this report as well as any update to the commentary, taking into account statements made.

Table 2 Organisations Contacted

Institutional	Ministry of Mobility & Transport	Federal Government
Institutional	Office of Minister-President	Walloon Region Government
Institutional	Office of Minister for Mobility and Public Works	Flemish Region Government
Institutional	Office of Minister for Environment	Brussels-Capital Region Government
Institutional	Belgian Civil Aviation Authority (BCAA)	Federal Regulator
Operational	Brussels Airport Company	Private Operator of the Airport
Operational	skeyes	Air Navigation Service Provider
Operational	Airport Mediation Service	Ombudsman
Operational	SOWAER	Walloon Airports Infrastructure
Operational	Brussels Environment	Environment and energy administration for Brussels-Capital Region
Operational	IATA	Airspace Users Organisation
Operational	Ryan Air	BRU based airline
Operational	DHL	BRU based airline
Operational	TUI	BRU based airline

Operational	Belgian Cockpit Association (BeCA)	Pilots Organisation
Community	Actie Noordrand/ Daedalus	
Community	Actiegroep Grimbergen	
Community	Actiegroep Leuven Rechtdoor	
Community	AWACSS	
Community	vzw Boreas	
Community	Bruxelles Air Libre	
Community	Comité Tervueren-Montgomery	
Community	Coeur Europe	
Community	Hart voor Huldenberg	
Community	Pas Question	
Community	Piste 01 ça suffit	
Community	UBCNA - BUTV	
Community	Werkgroep Leuven (WGL)	
Community	Burgerforum Luchthavenregio	
Community	Sterrebeek 2000	

3.2 *Key Focus Areas arising from discussion*

There is much for Belgium to be proud of in the noise management practice for Brussels National Airport. There are several examples of good and best noise management practice. These will be covered in the final report. The following key areas are highlighted for further consideration in the BRU Noise Study. As further stakeholder discussion progresses further key areas for focus may arise.

The core aim of the study remains to conduct an INDEPENDENT scientific assessment of the noise impact and management practice of BRU. In addition, the judgement also cites the significant ongoing litigation as one reason for the study – and therefore the study must understand the causes for the litigations, so it can address these. This requires that the context for the present noise impact and public perceptions of this and noise management practice, should also be considered in the study.

The following paragraphs highlight some of the issues that have been raised during discussions with stakeholders to date. It is by no means, an exhaustive list, nor is it a record of all matters discussed during the interviews. The various text that follows in this section should be heard in the "voice" of one or a number of stakeholders interviewed.

It should be restated here as well, that much of the discussions with stakeholders covered opinions and perspectives on events and operating practices from the past and present as well as ideas and proposals for how to improve the situation in future. These discussions will be covered in much more detail in the Chapter 2 of this report.

3.2.1 Safety aspects and incidents

Some comments have been passed that runway 020 (019) is less safe than others due to an accident on May 25, 2008, when a Kalitta Air B747-200 overran runway 020 (now 019).

The accident was caused by the decision to Reject the Take-Off 12 knots after passing V1 speed.

3.2.2 Decision support assessment processes

Lack of explicit requirement to undertake impact assessments prior to airspace changes.

The European SEA Directive 2001/42/EC is applicable (not aviation specific) but is not invoked.

3.2.3 Airspace User Perspective

Use of vectoring rather than holding creates additional "unpredictable" dispersion

Because of "lack of predictability" – no advance information on track miles (anecdotal "tour of Belgium" to lose fuel before landing)

Frustration when strictly respecting the statutorily flight paths and precisely following-up instructions of air traffic control, airlines are still being fined by a regional government, even when operating the quietest aircraft available.

3.2.4 Overall airport governance

Where is the independent regulator?

Airport governance is fragmented

Where is the strategic vision for the development of the country's national airport?

3.2.5 Application of international rules

Balanced approach (ICAO) is not applied

3.2.6 Land Use Planning

There is no evidence of effective Land Use Planning – due to the instability of the situation. In fact, a fund was created (FANVA) some time ago (2000), with the objective of funding insulation grants, but this has never been resourced.

3.2.7 Trust in key actors

Noise Impact reports published by the airport are generally accepted but many have issues with the way the results are interpreted.

Are BAC and skeyes to be trusted? Data and circumstances used to make key decisions is challenged.

More transparency is demanded.

3.2.8 Airport as an Economic Asset

Very polarised views about the Airport being a National economic asset.

Debate is very political, both at Regional level (Brussels Capital Region and Flanders) and at political party levels within Regions.

There is a lack of vision and debate at a national level about the strategic development of ALL Belgium's airports and how they may complement each other.

3.2.9 Public information and awareness

Despite the existence of the Airport Mediation service, some associations/community representatives complained that clear and timely information was not provided concerning planned changes to aircraft routings (for example for maintenance reasons).

Communities are complaining in some cases based on data from websites such as Flight24. Comments that this can be misleading as it can display significant errors at low altitudes.

3.2.10 Night operations

According to the federal and international regulations, night time ends at 6 am. However, for Brussels Capital Region, they consider 7 am is the end of the night period. This can cause more fines to be levied on flights during the sensitive 6-7am period (as the thresholds are lower).

There is some pressure to make full night curfew from 10pm -7am. There is widespread support from nearly all community associations for a ban on night flights.

Low cost and charter flights form the majority of flights departing between 6-7am and in the opinion of many, these could be better located at other airports (eg: Charleroi)? There is some social survey data (Brussels-Capital Region) that suggests that people are ready to travel up to 50 kms to go to the airport.

DHL are developing cargo operations at an airport that has some inherent disadvantages for night time operations (being close to main city and other densely populated areas).

Lack of clarity and reporting on night time operations and the QC system.

3.2.11 Frustrations about decision making

BCAA/Minister making decisions or not making? (Requests from skeyes)

Decisions are being taken without consultation (Communities) and without impact assessments

Multiple changes made over relative short period of time, driven by politics and judges. Is safety considered?

Why aren't PBN procedures used more widely applied?

3.2.12 Dispersion and concentration of noise

Many differences of opinion about the Environmental burden and how to distribute it.

The dispersion policy is already causing capacity constraint and delay. This may have transboundary effects which goes against SEA and EIA and this is likely to become worse in the future if increasing demand is accommodated – and if not lifted then demand will not be served and transboundary ATFM delay will worsen.

3.2.13 Dose-response numbers

If one is to follow the VLAREM guidance, the population "highly annoyed" can be calculated as a proportion of the population exposed to the L_{den} 55 db(A) contour. This is possibly underestimating the population affected by aircraft noise. It is suggested that, for health purposes, exposed population is much more relevant than annoyed population.

3.2.14 Airport Infrastructure

Due to different levels of technology installations on the different runways, this could create an unnatural bias in runways actually used. (No ILS on 07L & 07R)

The lack of parallel taxiway departing 25L means that aircraft would have to backtrack to use full length and hence reach optimum height before being over Brussels.

3.2.15 Consideration of Health Effects

Health impacts are considered to be driven more by frequency of events and the frequency (hz) of the noise, particularly at night time (sleep disturbance).

Publication of new WHO guidance on health impact of aircraft noise in Oct 2018 adds more complication to an already complex situation for BRU.

All airports (and ACI) are reviewing the implications of the WHO recommendations.

4 Existing Governance Framework

4.1 *Political and Judicial framework*

Historical changes to airspace and procedures were made by political interference and without impact assessments or consultation – not compliant with SEA – government have not applied SEA – this is their prerogative but could be challenged. The changes are not based on generally accepted norms of noise significance – no internationally agree metrics or methodologies for far out noise.

Too many changes without real respite – and most were based on community feedback - this reduces tolerance and community feedback to pressurise politicians to act. Sometimes it is better to let things settle down.

Judges can impose a decision on the airport effectively changing procedures and flight patterns based on a locally 'reported' impact, without reference to the overall effect on noise impact or other affected communities.

Judges can impose changes to overall operations based on their judgment of noise impact, without reference to the effect on community tolerance, newly affected populations, flight efficiency and CO_2 emissions, present or future airport capacity or other related impacts.

There is no single federal level multi-party entity to oversee the airport's operation, performance, development and regulation. This is one cause of the present, political, regulatory and community fragmentation. This fragmentation is making noise control less effective and is providing a barrier to the airport reaching its economic potential.

4.2 *Regulatory framework*

4.2.1 Applicable rules and Regulations

The following rules are noted to apply (non-exhaustive):

- Regulation (EU) No 598/2014 of the European Parliament and of the Council of 16 April 2014 on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Union airports within a Balanced Approach and repealing Directive 2002/30/EC:

  https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014R0598

- Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment and subsequent amendments – as these are incorporated into Belgian law.

- Arrêté Royal du 25 septembre 2003 établissant des règles et procédures concernant l'introduction de restrictions d'exploitation à l'aéroport de Bruxelles-National (federal regulation): http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=fr&la=F&cn=2003092531&table_name=loi
- Arrêté Ministériel du 3 mai 2004 relatif à la gestion des nuisances sonores à l'aéroport de Bruxelles-National (federal regulation – as modified by the AM of 27 July 2009) http://www.ejustice.just.fgov.be/cgi/article_body.pl?language=fr&caller=summary&pub_date=09-08-21&numac=2009014208

http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=fr&la=F&cn=2004050334&table_name=loi

- Arrêté du Gouvernement de la Région de Bruxelles-Capitale du 27 mai 1999 relatif à la lutte contre le bruit généré par le trafic aérien (Regional Government of Brussels): http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=fr&la=F&cn=1999052751&table_name=loi

- Flemish environmental permit or "milieuvergunning" as defined in VLAREM along with its operational restrictions; also Appendix 2.2.4.1 of VLAREM II on noise indicators: https://navigator.emis.vito.be/

- The federal law of 13 February 2006 transposing the 2001/42 directive (SEA): http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=fr&la=F&cn=2006021341&table_name=loi

- The Environmental Noise Action Plan "omgevingslawaai" for Brussels Airport of the Flemish Government according to directive 2002/49 (END), adopted on 10 June 2016: https://www.lne.be/geluidsactieplannen

- The flight routes (and PRS) are imposed by the minister (in the form of an "instruction", which is the "decision" as described in art. 2, § 2, of the royal decree of 19 December 2014

- The federal Ministerial decision of 3 May 2004 concerning the management of the noise nuisance at Brussels National Airport, introduced various operating restrictions to limit noise emissions from air traffic.

4.2.2 Federal & Regional considerations

No federal regulation or guidance on how airspace and flight procedure changes should be designed, consulted or assessed before implementation. No federal application of the balanced approach. No federal application of SEA.

Unlike many other States, the state CAA does not have specific powers to regulate aircraft noise since environmental regulations are vested in the regions. Some coordination on such regulations takes place but there are significant inconsistencies. There is no specific overarching airport regulation which means de-facto constraints can accompany policies supporting airport growth. Other general environmental regulations are not being employed by the federal government, which means that arbitrary changes to aircraft operations are mandated without adequate assessment.

There is no multi-party oversight body to ensure consistent development of the policies and rules within which BRU develops and operates. Most other capital city airports have specific rules and mechanisms to underpin their sustainable development and to avoid incoherence and waste.

Regulation infrastructure seems weak, poorly defined and resourced (skeyes formally request permission to BCAA and Minister. Anecdotal evidence of new procedures (eg: RNP19) being refused. Frustration (in skeyes) that cannot publish changes to procedures, even though they are being flown. ATC decisions are having to be justified in front of a judge! Are they really the competent authority?

Environment regulations are set by regions and these have resulted in multiple and differing noise control limits for BRU. This can result in the airport having to comply with conflicting noise regulations.

Split regulatory framework: Federal, Regions (and Provinces). Environmental impact "managed" by Regions – which in the case of BRU, often (Brussels & Walloon Regions) are expected to manage an impact over which they have no direct influence

Penalties do not seem to relate to noise certification values. If these are catching a significant proportion of flights, the noise fining regime becomes a de-facto noise related airport restriction. These would not be compliant if implemented today, because of new airport regulation.

There is little evidence of the systematic and coordinated application of the ICAO Balanced Approach to Aircraft Noise Management at BRU. Nor does there appear to be a mechanism in place to achieve this. It is believed by the consultant that the use of restrictions as the first recourse, in combination with the failure to consult effectively, the failure to apply SEA and failures in the application and enforcement of land-use planning around the airport by federal and regional government has contributed to the politicisation and less that optimal performance of noise management at BRU.

There is anecdotal evidence of a failure in local land-use planning failing to prevent inappropriate development (e.g. residential in noise effected areas).

4.2.3 Airspace change

Stimulus for airspace change may come from different sources:

- Judgement (following litigation)
- Operational needs (eg: infrastructure maintenance)
- Politicians (in the past), responding to popular pressure (complaints)

Proposals are submitted by skeyes to Minister/BCAA

Decisions are made (or rejected) by the Minister.

4.2.4 Noise Penalties

Brussels Capital Region is using its own network of NMTs to issue penalties. These NMTs are not located at, or close to, the locations used by ICAO for noise certification measurements. This limitation on placement of NMTs is less than ideal but is also found at some other airports. Best endeavours have generally been used however, to place NMTs as close to certification points as is practicable at other airports. The adoption by local authorities of NMTs at a long distance from the airport and using these to raise penalties, is however, far less common. It is not clear how the noise limit levels set for penalties were chosen. The NMTs are located in a variety of location types – some are on rooftops and it is not known what method is used to account for this elevation when computing penalties. It is also not known how effectively ambient of reflective surfaces have been avoided or accounted for, which is important where NMTs are used for legal purposes such as sanctions. Details of NMT locations and results are offered on a public web-site by the Brussels Capital Region. The NMTs are correctly calibrated and maintained.

4.3 *Governance Framework Independent Observations*

The following observations are Envisa's independent expert opinions based on extensive experience and knowledge of the governance and framework of airports around the world. There is much to commend in the approach to aircraft noise governance in Belgium. There are however, significant areas of concern in historic decision making and in the present situation. Solutions for these will be considered in the future Chapter 2 of this report.

- The location and orientation of the airport and runways in relation to the major conurbation of Brussels is less than ideal. Addressing this would go far beyond the scope of pure aircraft noise and include major social, financial and economic considerations. Addressing this issue would also generate significant changes to environmental impacts (not just aircraft impacts) and depending on the chosen solution, could impact new communities and could even have trans-border international implications. This topic will be covered at high-level in Chapter 2 of this report, which considers potential improvements, but detailed consideration falls outside of the scope of this focussed study into BRU aircraft noise.
- Complaint numbers are disproportionately high at BRU compared to movement number when compared to many other airports – there are a few exceptions however.
- There is an apparent loss of trust between the public and those framework decision makers.
- There is no clear national airport policy or integrated governance of what is effectively one of Belgium's key strategic economic assets – BRU airport. This is doubly concerning when BRU is also one of Belgium's major local, transboundary and trans-border sources of adverse impacts.
- The judiciary can apparently decide changes to airspace in an arbitrary way without comprehensive overall Impact Assessment or consultation – legal challenges can (and are) be mounted based on local concerns.
- The Federal Government has not applied its powers under the SEA Directive (2001/42/EC), to enforce a detailed assessment and consultation prior to airspace changes.
- Envisa has concerns that previous decisions did not adequately follow the ICAO Balanced Approach A33/7 on the 'Balanced Approach to Aircraft Noise Management' and subsequent superseding resolutions the degree of risk arising from this is a matter for Belgian Authorities. The new EU Better Airport Regulation on noise restrictions post-dates these decisions and does not therefore apply. Future new airspace, procedural and noise policies that could constitute a restriction under this regulation would have to comply with it.
- There has been an historic failure to effectively oversee and control land-use planning and development in the vicinity of the airport, leading to encroachment of inappropriate development towards the airport – thus increase the population exposed to adverse impacts from BRU operations.
- There is no specific formally constituted multi-stakeholder governance oversight body to provide a harmonised framework for the sustainable development of BRU.
- There has been a historic over-reliance on public complaints as a key indicator to influence decisions on BRU noise impact management. This policy has widely-known weaknesses including, but not limited to:
    - Disproportionate number of complaints as demonstrated when complaints increase significantly even when aircraft noise impact decreases. As can be seen by statistical analysis for BRU.
    - Widespread adoption of aircraft noise as a simulacrum for other life-concerns and problems, thereby disproportionately amplifying the aircraft noise issue beyond its true impact of quality of life.
    - Manipulation of complaints to achieve purely political objectives
    - Growing NIMBYism and mounting public opposition, when it becomes clear that he who shouts loudest get the best protection.

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- The vociferous minority having a disproportionate influence on decision making, when the content-but-silent majority may not be concerned.
- The setting of one community against another leading to competition on which can exert most political pressure to achieve local aims.
- People outside of areas scientifically considered not to be subject to significant adverse impacts having a significant influence on airport policy.

  NOTE: This does not mean that complaints are not a key indicator for noise impacts, but rather that they need more careful and expert assessment when used to inform major decisions.

- There are no specific published rules for how new environmental rules, airspace or procedural changes at BRU should be implemented.
- The Belgium Civil Aviation Authority has not invested in the necessary resources and skills to oversee and enforce the application of environmental rules for BRU. It neither has the delegated authority from the Minister. In many other countries it is the CAA, with support from the national Environmental Protection Agency, that are the competent authority to oversee and enforce the environmental and operational rules framework for airports. These powers are often advised by a multi-party steering/advisory group or panel.
- It is unusual to see a political appointment, as is the Minister for Transport, being responsible operationally for decisions relating to air traffic management. The usual "model" of regulator and service provider relationship seems distorted.
- Environmental regulation of airport noise is devolved to Regional Governments with no mechanism for coordination. This has resulted in differing noise restrictions and standards being unilaterally applied with no clear national policy aims or reference to internationally agreed certification standards. This could potentially have several weaknesses including, but not limited to:
  - Failure to provide a nationally agreed degree of protection to local people
  - One region could disproportionately constrain airport demand and development with adverse effects on the national economy and those of other regions. There is some evidence that flight services have been withdrawn or not started at BRU because of this. This is a transboundary economic impact since the destination airports are also affected by noise decisions at BRU.
  - Similarly, the policy for noise dispersion which requires the use of runway configurations with adverse capacity generating ATFM is also a transboundary economic impact and operational constraint. This exported impact may grow if increasing demand is served.
  - Penalising aircraft that meet modern standards and are being operated correctly. This is a de-facto operational restriction on aircraft that are officially permitted to operate at BRU and other airports. Thus, this does not constitute a sanction on poor operational practice, which is the normal use for noise fines. It becomes a de-facto noise related charge.
  - The policy to implement de-facto noise related charges, based on microphone readings means that the charges could affect differing aircraft or the same aircraft on differing days according to the variance in weather, which lies beyond the control of

airlines. For this reason, International policy, including that of ICAO and the EU, is that noise related charges should be based on internationally agreed noise certification.

- The misuse of noise 'fines' to supplement the public purse
- Influencing where aircraft fly to avoid triggering fines, which would result in de-facto concentration of overflight away from noise microphones – this runs counter to the stated BRU policy of noise dispersion.

- Normally changes to airspace and procedures around airports are few and far between. This is in part because such changes are highly contentious and stimulate public unrest, and in part because it can take considerable time for things to 'settle-down' once a change has been made. Airspace changes around airports are normally only undertaken when there is a clear overall advantage that significantly outweighs the disadvantages and the potential for public unrest. For BRU however, there have been a series of changes; and for some changes it could be argued that they were arbitrary, that were implemented in a relatively short time period (broadly 2 decades). It is believed by Envisa that:
    - The significance to the public, of changes to flight patterns – and especially to those communities newly overflown, and the potential for public unrest and mobilisation against the airport was not adequately considered in historic decision making.
    - The number and frequency of changes has understandably and disproportionately raised public and media interest and concern on aircraft noise generally – this is now ongoing (reference complaints trend).
    - The perception that political influence by the public can drive local noise protection and hence airspace and procedure changes has been established.
    - The overall location, significance and severity of noise impact, whilst having been considered, has not necessarily been given sufficient weight in previous decisions
    - Public trust has been significantly degraded between the public and airport governance bodies and between communities themselves.
    - The recovery towards a more objective and balanced perception of aircraft noise may take a considerable time, total transparency to be established and tough decisions to be taken and upheld.
    - The uncertainty of future developments at BRU has not been good for route development interest or investment.
- It is not clear to what extent the future influences of climate change and growing demand have been taken into account in historical decision making for example:
    - commitments to runway use for noise dispersion may be perceived as being compromised, given the potential for changes to prevailing wind patterns and increasing frequency of storms etc arising from climate change
    - If the airport is successful in growing its aircraft throughput and given that certain configurations chosen for noise dispersion have limited capacity, there may be difficult future decisions of international significance. For example, regarding:
        - the willingness to accept increasing ATFM delay;
        - as opposed to increasing concentration of noise patterns because certain configuration become less useable;

    - as opposed to voluntary noise-based restrictions – that must meet the tests of the ICAO Balanced Approach and underpinning EU Regulations.

- It is not certain to what extent procedural changes to aircraft noise outside of the 'significant contours' was weighed against trade-offs, such as the CO_2 impact generated by less than efficient flight on noise routeings were taken in historical decision making.
    - The decision to impose a policy of noise dispersion and respite regime using runway selection will at best provide a partial dispersion since SIDS and STARS must also ensure safe and expeditious arrivals and departures. No formally published definitions as to what constitutes effective or acceptable dispersion around the centrelines of SIDs exists – and some (rare) complaints are received when aircraft deviate widely form SIDs even though this could be considered to be effective dispersion.
    - It is not known if any comparison of noise impact in terms of people affected by differing levels of noise for concentration versus dispersion was used to inform the decision to opt for concentration.
- Similarly, no definition of acceptable concentration is published, even though such concentration is required on the SID known as the canal SID. There is no way to measure dispersion or concentration performance other than by the level of achievement of specified runway selection. This is largely dependent on wind speed and direction and hence not in control of operational stakeholders. Provisions for a degree of flexibility however, is provided in recognition of the role of wind in runway availability/safety.
- With respect to the noise penalties levied by Brussels Capital Region, it is not clear what the purpose of the noise penalties is. According to good practice:
    - If used to penalise poor-practice by operational stakeholders (principally pilots), which is by far the usual purpose for NMT based penalties, then it would be expected to see only a small number of overflights penalised where abnormal operations have taken place. It is pointless to set a limit to sanction poor performance if most operations are caught. At some airports, such penalties can also be used to encourage the adoption for quieter aircraft by catching the noisiest few aircraft that don't achieve best possible performance. This is more difficult to defend against claims that aircraft standard operating procedures are being changed for one airport's policies and that safety is therefore being compromised. This kind of fleet-change-by penalty policy is also only effective where a quieter alternative direct replacement aircraft exists – otherwise it achieves nothing except revenue raising. It would certainly be pointless to set punitive penalties to catch quieter aircraft being operated normally along approved flight routes. Such a policy would also work against any dispersion policy since if aircraft are prevented from flying over one area – then they naturally concentrate over another area.
    - If used to sanction unacceptable noise levels in sensitive zones as a pseudo 'no-fly-zone' for noisier aircraft, then these should be clearly defined and incorporated into flight procedures so that unauthorised operations do not normally overfly these zones. Thus again, penalties would only be applied to abnormal operations and hence to only a small proportion of flights. If any overflight of the zones by certain aircraft or at certain times is permitted, then the noise penalty limits should be set so as not to penalise correct operation of these. This no-fly option would make no sense for BRU aircraft given the judgment to disperse aircraft since such a restricted zone policy would be a de-facto concentration mechanism – i.e. designed to ensure all noisier

aircraft fly over specifically allowed areas only. It would be poor policy to penalise quiet aircraft for following published procedures as explained above.

- If the penalties are being used as a pseudo noise related mechanism of some sort, to encourage the uptake of quieter aircraft, then this should be done by the airport operator. These would be formulated trough the normal 'regulated' airport charges setting processes, taking account of aircraft size etc; and, not by arbitrary punitive penalties (as described above) based on overflight of a few NMTs. Such noise related charging mechanism should ideally be fiscally neutral across the entire airport fleet to encourage the adoption of less noise modern aircraft by discounted fees for these. The charges should be based on internationally set noise certification values for each aircraft. Some of the noise charges raised by penalties or noise charges are often hypothecated for use in noise mitigation or community schemes such as sound insulation protection for residences and sensitive receptors.
- In addition, it is general good practice to operate a feedback loop with operational stakeholders to investigate abnormal events and to facilitate more sustainable operations. This feedback has to be very rapid since the pilot may have forgotten the circumstances of a particular flight in a few days. Ideally the report should be sent immediately via the pilot's airline. Alternatively, follow-up using historical track monitoring and radio transmission data would be required. This would allow investigation to check penalty validity, to improve flight practice and to allow mitigation of penalties in extenuating circumstances such as a safety imperative.
- The present Brussels Capital Region noise limit regime penalises aircraft that meet modern standards that are correctly flying published procedures, including Chapter 4 certified aircraft. These aircraft operate unhindered into other airports without such penalties. This regime could be considered to be a de-facto noise related operational restriction on the airport, since airlines have no choice other than to operate and face fines – or to withdraw their service. Anecdotally the withdrawal of service caused by the noise regime has happened already. This penalty regime pre-dates the recent EU Noise Restriction related regulation, otherwise it may have faced a legal challenge for this reason. The regime does not follow the spirit of this recent regulation nor does it support the legal requirement for dispersion of aircraft around BRU and equal sharing of the noise burden. The regime does not follow the ICAO balanced Approach to Noise management which has been an obligation on EU member states for over 15 years. There is little historical evidence of feedback or dialogue between Brussels Capital Region and operational stakeholders to discuss individual events.
- The airport operator does not use NMTs for penalty purposes. It is understood that whilst the Flanders and Wallonia regions have NMTs, no penalties are levied using these.

5 Existing Operational Practice

5.1 *Roles and Responsibilities*

5.1.1 The Airport (BAC)

Brussels Airport Company (BAC), a private, limited company to which the Belgian State has granted the licence to operate. 75% of the company's shares are held by a consortium of private investors. The Belgian State has an interest of 25% of the shares.

Under current arrangements and obligations, the airport responsible for the management of ground noise.

5.1.2 skeyes

skeyes is the new branding for Belgocontrol, an autonomous public company in charge of delivering air navigation services (ANS) in the civil airspace for which the Belgian State is responsible.

Its zone of activities extends from ground level - the control of movements at Brussels Airport and the airports of Liege, Ostend and Kortrijk - to flight level 245 (7,500 metres) for Belgium and between the flight levels 145/165 and 245 (4,500 - 7,500 metres) for the Grand Duchy of Luxembourg. The sectors above flight level 245 fall within the competence of the EUROCONTROL centre in Maastricht (the Netherlands), to which Belgium has delegated air traffic control for its upper airspace.

Under current arrangements and obligations, skeyes is held responsible for the management of airborne aircraft noise.

5.1.3 Airport Mediation Service

The terms of reference of the Mediation Service for Brussels Airport are based on the Royal Decree of 15 March 2002, noting particularly:

Article 1: The mission of the Mediation Service is to collect and disseminate information relating to the trajectories followed and the nuisances caused by aircraft using Brussels Airport based on complaints received, and to collect and process complaints and suggestions from residents about the exploitation of the airport.

Article 2: The Mediation Service is functionally independent

Article 3: The Mediation Service shall carry out its tasks in complete independence

Article 5: The mission of the Mediation Service shall include the collection, recording and analysing all relevant information, in order to understand the causes of complaints from airport residents. The Director shall provide an annual report of activities to the Minister responsible for aeronautics

Article 9: The Mediation Service shall maintain the documentation relating to noise pollution and aircraft trajectories at Brussels Airport -

5.2 *Operations Management and Processes*

5.2.1 Preferential Runway System (PRS)

The details of the PRS in operation at BRU are set out in the following text which is extracted from the AIP (Nov 2018):

4.1 Selection of Runway-in-use

The direction in which aircraft take off and land is determined by the speed and direction of the surface wind or by the preferential runway system.

The term “runway-in-use” is used to indicate the runway that - at a particular time - is considered by ATC to be the most suitable for use by the types of aircraft expected to land or take off according to the preferential runway system.

Normally, an aircraft will take off and land into the wind, unless safety, runway configuration or traffic conditions determine that a different direction is preferable. However, in selecting the runway-in-use, ATC shall also take into consideration other relevant factors such as the aerodrome traffic circuits, the length of the runway, the approach and landing aids available, meteorological conditions, aircraft performance, the existence of a preferential runway system and noise abatement.

Accepting a runway is a pilot’s decision. If the pilot-in-command considers the runway-in-use not usable for reasons of safety or performance, he shall request permission to use another runway. ATC will accept such request, provided that traffic and air safety conditions permit.

4.2 Preferential Runway System

4.2.1 Runway Configuration Scheme

		0500 to 1459 (0400 to 1359)	1500 to 2159 (1400 to 2059)	2200 to 0459 (2100 to 0359)
MON 0500 (0400) till TUE 0459 (0359)	TKOF	25R		25R / 19(1)
	LDG	25L / 25R		25R / 25L(2)

TUE 0500 (0400) till WED 0459 (0359)	TKOF	25R		25R / 19(1)
	LDG	25L / 25R		25R / 25L(2)
WED 0500 (0400) till THU 0459 (0359)	TKOF	25R		25R / 19(1)
	LDG	25L / 25R		25R / 25L(2)
THU 0500 (0400) till FRI 0459 (0359)	TKOF	25R		25R / 19(1)
	LDG	25L / 25R		25R / 25L(2)
FRI 0500 (0400) till SAT 0459 (0359)	TKOF	25R		25R(3)
	LDG	25L / 25R		25R
SAT 0500 (0400) till SUN 0459 (0359)	TKOF	25R	25R / 19(1)	25L(4)
	LDG	25L / 25R	25R / 25L(2)	25L

SUN 0500 (0400) till MON 0459 (0359)	TKOF	25R / 19(1)	25R	19(4)
	LDG	25R / 25L(2)	25L / 25R	19

(1) RWY 25R only for traffic via ELSIK, NIK, HELEN, DENUT, KOK and CIV / RWY 19 only for traffic via LNO, SPI, SOPOK, PITES and ROUSY; aircraft with MTOW between 80 and 200T can use RWY 25R or 19 (at pilot discretion); aircraft with MTOW > 200T shall use RWY 25R regardless the destination.

(2) Arrival on RWY 25L at ATC discretion only.

(3) No airport slot will be allocated for take-off between 0000 (2300) and 0500 (0400) (EBBR AD 2.20, § 1).

(4) No airport slot will be allocated for take-off between 2300 (2200) and 0500 (0400) (EBBR AD 2.20, § 1).

Times of runway changeover are subject to flexibility in order to ensure transition in safe conditions. ATC will operate the changeover as close as possible from the indicated time, taking into account the traffic conditions.

4.2.2 Wind Criteria

In selecting the runway combination to be used, the following wind components shall be applied:

Runway-in-use: wind components are exceeded at:

	RWY 25L/R	RWY 19 (TKOF only)
Tailwind MAX	7KT	7KT
Crosswind MAX	20KT	20KT

	RWY 01	RWY 07L/R	RWY 19 (TKOF and ARR)
Tailwind MAX	0KT - 3KT (incl)	0KT - 3KT (incl)	0KT - 3KT (incl)
Crosswind MAX	20KT	20KT	20KT

Note: (incl) means that the wind component threshold is exceeded when the component exceeds 3 KT.

4.2.3 Exceptions

The preferential runway system is not the determining factor in runway selection under the following circumstances:

a. when the crosswind component exceeds 20KT or more (gusts included);
b. when the tailwind component exceeds 7KT or more (gusts included);
c. when the runways are contaminated or when estimated surface friction is less than good;
d. when alternative runways are successively requested by pilots for safety reasons;
e. when pilots report excessive wind at higher altitudes resulting in go-arounds;
f. when wind shear has been reported or forecast, or when thunderstorms are expected to affect arriving or departing traffic;
g. when works are in progress on one of the runways included in the preferential runway system;
h. for landing, when the ceiling is lower than 500FT or the visibility is less than 1900M;
i. for departure, when the visibility is less than 1900M.

Gust components are derived from the maximum 3 second average wind speed which occurred during the last 10 minutes (or a shorter period in case of a marked discontinuity).

In 2017 Belgocontrol assured 85% of movements at the airport being performed at the three preferential runways (25R, 25L and 19). In 15% of cases, the air traffic controllers had to use alternative runway configurations in order to guarantee the safety of air traffic. It was the first time in fifteen years the number of landings on runway 01 has been so low.

Two main reasons contributed to this fact:

1) the 2 main runways were much more available than in previous year due to less maintenance

2) winds from the north-east were much less frequent. Depending on their intensity, these winds can result in the alternative runway configuration 01/07R for aviation safety reasons.

5.2.2 Noise Monitoring and Track Keeping (NTK)

Until very recently, BRU operated a B&K integrated noise and track monitoring system (NTK) with some 21, purpose designed Noise Monitoring Terminals (NMT) and 4D radar coverage to monitor and record aircraft flight paths extending well beyond the furthest noise monitor. The radar information is the output form the airport surveillance radar used to control aircraft by Belgocontrol (now skeyes). The NTK system links this positional data with operational information on each flight including airlines, aircraft type and time of events. The data can have intermittent tracks for a very small number of flights and these are moved to storage for manual treatment if required. Coverage has generally been well above 90% of flights. The noise events and radar tracks are stored in the NTK system. skeyes have a terminal with which to interrogate track data to follow up complaints and respond to requests for information from the Mediator's office. The regional governments are supplied with NTK track-data to allow them to correlated noise events from their own NMTs for follow up or to impose penalties on aircraft that breach noise limits. The airport NMTs are located close to local communities. Overall the NTK system meets good practice, but commentary on its use is made later in this report. The calibration and maintenance of the NTK also meets good practice. No regular independent audit of the NTK system, information or reporting is presently undertaken. The Mediator however has oversight of its use. The B&K system has recently been replaced by a Topsonic NTK system. Both B&K and Topsonic can be considered 'state-of-the-art' and fit for purpose.

NMTs are used by the airport to validate noise modelling studies with real measurement, to enrich noise level reporting and to support the response to complaints and enquiries. NMTs locations have in part been selected 'politically' and do not correspond to ICAO noise certification microphone positions. Mobile NMTs can be used for one-off studies and to verify locations for permanent NMTs before these are selected. Close-in NMTs have been used to help local studies into noise from aircraft operations on the ground.

The Mediator has access to the NTK system and can make use of monitored values.

The NTK track monitoring accurately records the 4D tracks for the vast majority of BRU flights including aircraft registration and type, vertical and lateral and radar point times. Meteo data is also logged and used to correct altitudes for barometric pressure. skeyes also record the radio transmission between the pilots and the Air Traffic Officers to understand what flight instructions and information were exchanged.

The NTK track monitoring data is used by all with access to correlate NMT events to particular flights. BRU airport operator are not responsible for aircraft in the air but use the flight track data to prepare their inputs in noise modelling skeyes use their NTK terminal to interrogate track data to investigate complaints and to support the Mediator's reporting where necessary. It is also used to assess and report CDO performance. The system is not used to monitor or assess the effectiveness of the dispersion policy nor is it used to monitor or assess the accuracy by which aircraft follow the one concentration 'canal' SID over the Brussels canal and associated industrial zones.

The main 'dispersion' policy performance requirement is the required schedule of runway selection. Since runway use is predicated on wind speed and direction at different altitudes some flexibility is allowed where safety requirements override the runway selection to comply with the dispersion policy. The tail-wind component (the speed and gust vector of wind along the centreline of the runway) is used as a guide for runway selection.

It is also understood that safety can be compromised by too-rapid changes to operational runway configurations. Decisions to follow or not the dispersion requirements are taken tactically and often as a result of pilot concerns. Performance is transparently reported. The practice at Brussels matches standard 'noise preferred runway' procedures as operated at numerous airports where noise preferred runways are employed.

The SIDs are designed to specify turning points based on altitude. This supports the dispersion policy because since different aircraft types have differing climb performance and this performance depends on ambient conditions, different flights reach the turn point at different distances from take-off and hence spread out from the SID centreline. This is common practice to alleviate noise for communities at some distance from the airport by sharing flights geographically. However, it is less common to find procedures that generate so much dispersion relatively close in to the airport.

There are no definitions of what constitutes acceptable dispersion or concentration levels – nor are there any defined 'tolerance-of-acceptability' swathes around the SID and STAR centrelines. Some complaints were generated because aircraft were flying were not expected for a given configuration, but with the lack of definition on accuracy tolerances there is no way to measure if this is supporting or counter to the dispersion policy.

Some of the prescribed runway configurations do not allow adequate operational runway capacity to serve demand without introducing ATFM delay. As demand increases in the future, this ATFM delay is likely to increase. This will affect both origin and destination airports serving BRU with 'knock-on' delay thus in effect exporting operational and environmental problems abroad. This could conceivably therefore start to raise a difficult situation in the future, where international pressure is brought to bear to resolve an increasing problem. In such circumstances the Network Manager may intervene. This could result in an imperative to increase capacity for the prescribed configuration with associated costs; or, to relinquish some degree of dispersion. This in turn could present economic, legal or political difficulties. Such changes would also not follow the generally employed guidance that changes to aircraft noise distribution and aircraft overflight should generally be avoided unless a clear, meaningful and long-lived improvement can be gained. This policy to avoid changes to noise climate and overflight also allows robust supporting land-use planning to be implemented and enforced over the long term; and, allows populations to naturally migrate over the long term according to personal noise tolerance (which varies significantly between individuals).

5.2.3 Community Engagement

It seems not to be clear which organisation is accountable and responsible for management of noise impact. The airport itself (BAC) says it is only responsible for ground noise.

Matters relating to noise from aircraft airborne operations is directed to skeyes and the Airport Mediation service.

The Airport Mediation Service is not viewed as independent by some community associations. This could be a barrier to direct engagement with community – the community have lost trust that their concerns are being treated seriously at the airport itself.

Until very recently (late 2018), BRU did not have any formal Collaborative mechanism to allow operational stakeholders to work together to jointly improve noise performance, rules and procedures and to share good practice. This is common practice at most major airports with serious noise issues and EUROCONTROL provides guidance on this under the Collaborative Environmental management (CEM) initiative.

Having now started, this allows airport stakeholders to formally collaborate to address the shared and interrelated issue of noise from operations in the air and on the ground. This means that up until now there has been no formal mechanism that allows the key stakeholders involved in assessing reporting and managing aircraft noise to work together on this topic.

Still, there is no formal consultative committee involving all stakeholder and community representatives to address noise and other sustainability issues. A subset of stakeholders are invited, but a significant number of stakeholders are absent. Whatever the reasons for this, it is difficult to see how trust can be built if there is not all-embracing framework for dialogue and consultation.

The notion of "Permission to grow" does not seem evident as airport strategy at this time.

5.3 *Operational Practice Independent Observations*

The following Observations are Envisa's independent expert opinions based on extensive experience and knowledge of the management of aircraft noise at airports around the world. There is much to commend in the approach to aircraft noise management at BRU. There are however, significant gaps and weaknesses, the solution to which will be considered in the future Chapter 2 of this report.

- Ownership of the "noise management" problem – seems to be between the airport and skeyes – there should be one clear focal point to manage community outreach.
- Day-to-day noise management practice for aircraft in the air, is largely in the responsibility of skeyes (formerly Belgocontrol). Noise from aircraft on the ground is largely the province of BAC. Complaints handling is largely the responsibility of the aircraft noise Mediation Service. The Mediation Service can request information from the operational stakeholders to inform responses to complainants and general reporting. This splitting of a shared issue into compartments is understandable but not common practice. Aircraft noise management is generally managed collaboratively with all stakeholders contributing their support and expertise including (indirectly) the community.
- Such committees form an advisory resource for operational and regulatory stakeholders at an airport not just on noise but on other topics of public interest. The Airport Operator usually provides the venue and secretarial services for such a committee.
- Until recently (late 2018) there was no formal collaborative forum to allow the airport operator, airlines, pilots and air traffic representatives to meet and discuss noise performance, to share good practice and to implement improvements. This lack of collaboration may have historically resulted in less than fully optimal noise management operations and a less than effective interface with external parties and external decision-making processes.
- It is understood that as of September 2018 a new Collaborative Environmental Management (CEM) process has been established at BRU in accordance with EUROCONTROL guidance. It is believed that the first priority will be Continuous Descent Operations at BRU. It is Envisa's experience that such CEM processes take a few months to establish full effectiveness. Once established however, CEM should go a long way to improve noise management at BRU along with aircraft fuel efficiency and atmospheric emissions reduction.
- Aircraft are operated in accordance with good practice and Standard Operating Procedures which is in accordance with ICAO policy to avoid proliferation of local rules. Noise Abatement Departure Procedures are published in the Belgian Aeronautical Information Publication (AIP). In general, all noise related operational procedure requirements are adequately covered in the AIP. There is however no real follow-up to check if noise requirements are effectively covered in Pilot procedure publications such as Jeppersen. It may be that on a day-to-day basis pilots

are not fully briefed on noise management requirements for operating aircraft in the vicinity of BRU. This could be addressed through CEM.

- There is an apparent loss of trust between a significant part of the general public and operational stakeholders and to some extent in the Mediation Service, which is not universally viewed as being truly independent.
- Until recently, the airlines have been largely reactive to these differing noise rules and requirements and simply follow published procedures. Now processes are being put in place to improve engagement of the airlines and pilots in operational practice.
- Night flying is an issue at BRU as it is at many airports. Changes in strategy and operations in the past, together with poor communication and lack of public consultation have led to a situation where all night time operations are robustly challenged by the community associations.
- The responsibility for noise penalties lies with the Regions as described earlier, and Brussels Capital Region in particular. However, there does not seem to be a verification or operational checking process to look at why some operations are penalised, and others are not. The reason for each infraction is not understood, so it is difficult to see how such a system can be effective in modifying the behaviour of overflights and lead to an improved system performance over time.
- The operational requirements for runway selection have been determined by externally imposed judgements as described earlier in this document. It is skeyes' responsibility to implement these requirements. The present operational provision to achieve this has been independently studied by EUROCONTROL as to its suitability, on more than one occasion and has been found to be fit for purpose. Investigation by Envisa supports this finding albeit with a caveat that unless effective collaboration, consultation and feedback loops are established between all operational stakeholders, the effective management of the operational structures and procedures will not be fully realised.
- The SIDs used for dispersion are designed with turns based on height. Given the differing climb capabilities of different aircraft this provide a degree of inherent dispersion since different aircraft will commence turns at different distance from the runway. The exception is the noise 'concentration' canal SID which uses DME for turns.
- The airfield has infrastructure capacity limitations that prevent a fully optimised noise distribution system from presently being implemented at BRU airport, for example the short crossing runway and the parallel taxiway provisions, particularly on runway 25L for departures. Solving these shortfalls could offer opportunities for greater flexibility of configurations and opportunities to reduce the number of people overflown.
- It is not clear to Envisa how the decision to impose operational dispersion has been justified, when a common noise management principle adopted at other airports is to overfly the least number of people where noise impact is most significant (close in).
- There is no published national guidance on relative importance of differing environment impacts at different altitudes or given different noise levels. In practice however, we were told that below 5000', noise is prioritised whereas above 5000', carbon emissions are given more weight.
- The choice of runway configuration is a complex and relatively subjective matter and it seems to generate a lot of debate within the Communities and results in direct challenges to the professional organisation and individuals responsible for ATC. There is clearly some public distrust arising from the fact that the runway configuration selected seems sometimes to be counter intuitive given the visible wind on the ground. Some distrust could arise when members

of the public attempt to check wind conditions using online data sources, perhaps not realising that wind may be different at different altitudes. This is also a common situation in communities at other airports using noise-preferred-runways. There was no evidence uncovered in the course of this study that non-compliant runway configurations were being selected unnecessarily. There was also little evidence that the rules on configuration selection were being effectively explained to the community, but it was reported that a new web-site would address this in the near future. Update: new site now on-line: https://www.batc.be/en/

6 Independent Noise Impact Assessment

6.1 *Noise Modelling Methodology*

The purpose of this section is to describe the process of aircraft noise modelling with the Federal Aviation Administration (FAA) Aviation Environmental Design Tool (AEDT) using actual radar data for performing an independent assessment of the annual noise.

6.1.1 Choice of Noise Model

AEDT Version 2b released in May 2015 replaced the latest version FAA Integrated Noise Model (INM). The most recent version of AEDT is version 2d. AEDT contains the most up-to-date Aircraft Noise Performance (ANP) database. The future update of the AEDT ANP database is expected to contain noise and performance data for new aircraft such as the Airbus A350 and A320neo aircraft family.

AEDT stores the study information into a Microsoft SQL Server 2012 database. Therefore, facilitating noise contour generation based on actual flight tracks rather than spine tracks. Using actual radar tracks to represent the group track of the aircraft movements eliminates the need of making assumptions regarding the

6.1.2 Radar Data Processing

Radar data for the year 2017 sourced from the noise and track keeping system was provided by skeyes in 12 comma separate values (CSV) files. The data was converted from the CSV file format into a database format (SQlite). The data was then further adapted and transferred to the AEDT study database.

The radar data may contain missing data. For example, aircraft ICAO/IATA code may be missing for an ATM. The database clean-up process identifies missing data and attempts to fill-in the missing data or completely delete the record. The radar data provide by BAC was complete with only a few records with missing data. Therefore, the application of an adjustment factor was not required to match the official total number of ATMs for the year.

6.1.3 Input Data Report

Using the data from the processed radar database, a draft input data report was prepared to summarize the noise model input data. The input data report contains 12 tables that summarize the parameters required for noise contour calculation with AEDT. The tables are reproduced in Appendix A. The report allows the stakeholders to review the input data and determine if the input data is representative of the typical operation of the airport during the selected year. Preliminary reviews of the input data tables indicated that the data represents the operational characteristics of the airport during year the year 2017.

The input data report allows stakeholders to provide comments. Comments from the stakeholders are reviewed, and depending on the comments, the radar data database may be updated.

Table 11 of the Input Data Report (Appendix A) shows the runway end coordinates, elevations, and displaced thresholds. In addition, the table shows the coordinates of the airport reference point (ARP). The ARP is used as the centre of the calculation receptor grid in AEDT. The elevation of the receptor grid was set to the airport elevation. The runway layout data in AEDT was updated based on EBBR AD 2.1, 2.12, and 2.13. The information presented in Table 11 is used in AEDT to represent the runway configuration. For runway 25R and 19, a departure displaced threshold was added to model departures from B1 and E7 (See EBBR AD Section 2.3.3). Aircraft requiring the full-length runway would cross RWY 01/19 to make use of the full length of RWY 19 or RWY 25R. However, from the radar data it is not possible to determine which aircraft departed from B1 or E7. Therefore, it was assumed that all aircraft movements departing from RWY 25R and RWY 19 begin the take-off roll at the intersection with connector taxiways B1 and E7 respectively. The location of the arrival (or departure) threshold influences the size and shape of the noise contour. The conditions modelled for departures from RWY 25R and RWY 19 are considered a worst-case scenario.

Table 12 shows the weather parameters used by AEDT for noise contour calculation. The weather parameters are used by AEDT to estimate aircraft performance along the flight profile, as well as estimate atmospheric absorption. SAE-ARP-5534 was used as the atmospheric absorption calculation methodology. SAE-ARP-5534 considers temperature, pressure, and relative humidity in the estimation of noise atmospheric absorption an it is the most up-to-date standard.

Table 13 shows the fleet mix of aircraft that operated at EBBR during calendar year 2017. This table also shows the relationship between the ICAO aircraft ID and the AEDT aircraft ID used to represent the aircraft in the noise contour calculation. It can be observed that most of the ATMs are represented by the Airbus A320 and Boeing 737 aircraft family, and therefore, these will have the most significant effect on the shape and size of the contours.

Table 14 shows the distribution of the departure profile number. The profile number, sometimes known as stage length group, is used in noise modelling as a proxy for the weight of an aircraft. From the city pair information (departure-arrival airports), the distance of the trip can be calculated. Based on this trip or stage length, the modelled weight of the aircraft will be attributed. Higher profile numbers represent larger distances. The longer the distance, the heavier the weight of the aircraft, due mostly to the extra fuel. From an intuitive perspective, as the profile number increases, the modelled profile becomes shallower and the distance between the aircraft and the receptor decreases, hence increasing the noise level at the receptor grid point. It can be observed that most of the ATMs have a profile of three or less. The typical aircraft for long haul flights are the Boeing B747 and B777 aircraft family, and the Airbus A330 family. These aircraft have larger profile numbers and tend to have a significant influence on the size and shape of the noise contours particularly for arrival operations.

Table 15 (Arrivals) and Table 16 (Departures) show the distribution of the aircraft fleet mix over the three time periods (day, evening, night). The day period is defined from 07:00 to 19:00. The evening period is defined from 19:00 to 23:00. The L_{den} noise metric imposes a 5 dB(A) penalty on ATMs during the evening period, and a 10 dB(A) penalty to the night period. The night period is defined from 23:00 to 7:00. From these tables it can be observed that most of the ATMs occur during the day period. However, night arrivals of aircraft such as the Airbus A330 and Boeing B777 and B747 tend to have a significant influence on the size and shape of the noise contours.

Table 17 (Arrivals) and Table 18 (Departures) show the aircraft fleet mix and associated runway utilization. The tables show that west flow conditions prevail and that the north runway is primarily used for departures. For arrivals the distribution between the north and south runway is more even.

Table 19 through Table 22 provide an aggregated summary of the runway utilization. These tables can be used in conjunction with flight track figures to better understand the shape of the different noise contours.

6.1.4 Configure and Run AEDT

AEDT was configured to generate the necessary noise contours and data. This includes contours for the following noise metrics: L_{day}, $L_{evening}$, L_{night}, L_{den}. Frequency count contours for levels above 70 and 60 are also included. The L_{day}, $L_{evening}$, L_{night}, L_{den} are not preconfigured in AEDT, therefore, user-defined metrics were created.

A fixed grid was used, 11 nautical miles northwards and southwards and 17 eastwards and westwards. The offset in relation to the airport reference point was set seven nautical miles westwards, and six nautical miles southwards. The offset was defined to better accommodate the shape of the contours due to west flow arrivals. The grid spacing was set to 1/8 of a nautical mile. For the $L_{evening}$ noise contour the grid size was increased to 12 nautical miles northwards and southwards and 18 eastwards and westwards.

6.1.5 Export and Process Results

After running AEDT of each metric, the results were exported in SHP file format. The above 70 and 60 Lmax values were exported in tabular format for further processing into contour lines. The generated contours are then overlaid over a base map.

The current version of AEDT (Version 2d) does not include the functionality to generate frequency count contours. Therefore, the frequency contours were calculated by exporting the noise report from AEDT to a CSV file. The AEDT noise report contains, for each location point in the calculation grid, the number times the calculated L_{max} at the location point exceeded the defined levels (60 dB or 70dB). A custom software script was used to convert the AEDT noise report into the NMGF file format. The NMGF is a standard file format used to store sets of georeferenced data points. The grid files were then imported into NMPlot (Version 4.970). The contour plots were then generated using the plot functionality of NMPlot. NMPlot is an application for viewing and editing sets of georeferenced data points. NMPlot was designed to support noise models and was included in INM. AEDT has the capability to read, create and display files in the NMGF format.

6.2 *Results and Analysis*

The results and analysis that are presented in this section, should be considered, for the moment as draft. Stakeholders are welcome to review the information provided. Any comments or suggestions will be considered, and if appropriate, integrated into the final version of this report.

Noise is a subjective impact, the significance of which depends on many factors, for example (and this is a limited, non-exhaustive list) proximity, loudness, duration, frequency, altitude, number of events, personal sensitivity, other personal stresses at the time, weather, temperature, moisture content, pressure, wind, time-of-day, activity or leisure, windows open/closed, other fixed or transient noise sources, reflections, attenuation, etc. There are studies that show that an individual's sensitivity to noise varies during the week, with different life events and according to wealth or culture. Everyone's perception of noise is different. Noise impact modelling and calculations therefore reflect typical or average noise climate are essential decision support tools, but it is normal for real-life perceptions to vary from the expected impact assessment.

State-of-the-art noise models (such as INM, AEDT and IMPACT), that comply with all relevant standards, cannot account for every tiny nuance of aircraft operations. Noise modelling is less accurate for assessing noise at lower intensities, for example noise from aircraft operations at some distance from an airport. These 'further-out' aircraft operations may, however, still account for significant community concern. On its own, noise modelling cannot answer the question of whether an airport's noise mitigation regime is complete or meets good practice.

The noise modelling methodology used in this study is wholly independent, based on best practices, and does not refer or consider previous BRU noise impact studies.

6.2.1 L_{den}

The Lden unit is a combination of Lday, Levening and Lnight. The evening movements are penalised with 5 dB(A), the night movements with 10 dB(A). The shape files for Lden and its components are output directly from AEDT and are plotted in the following sections.

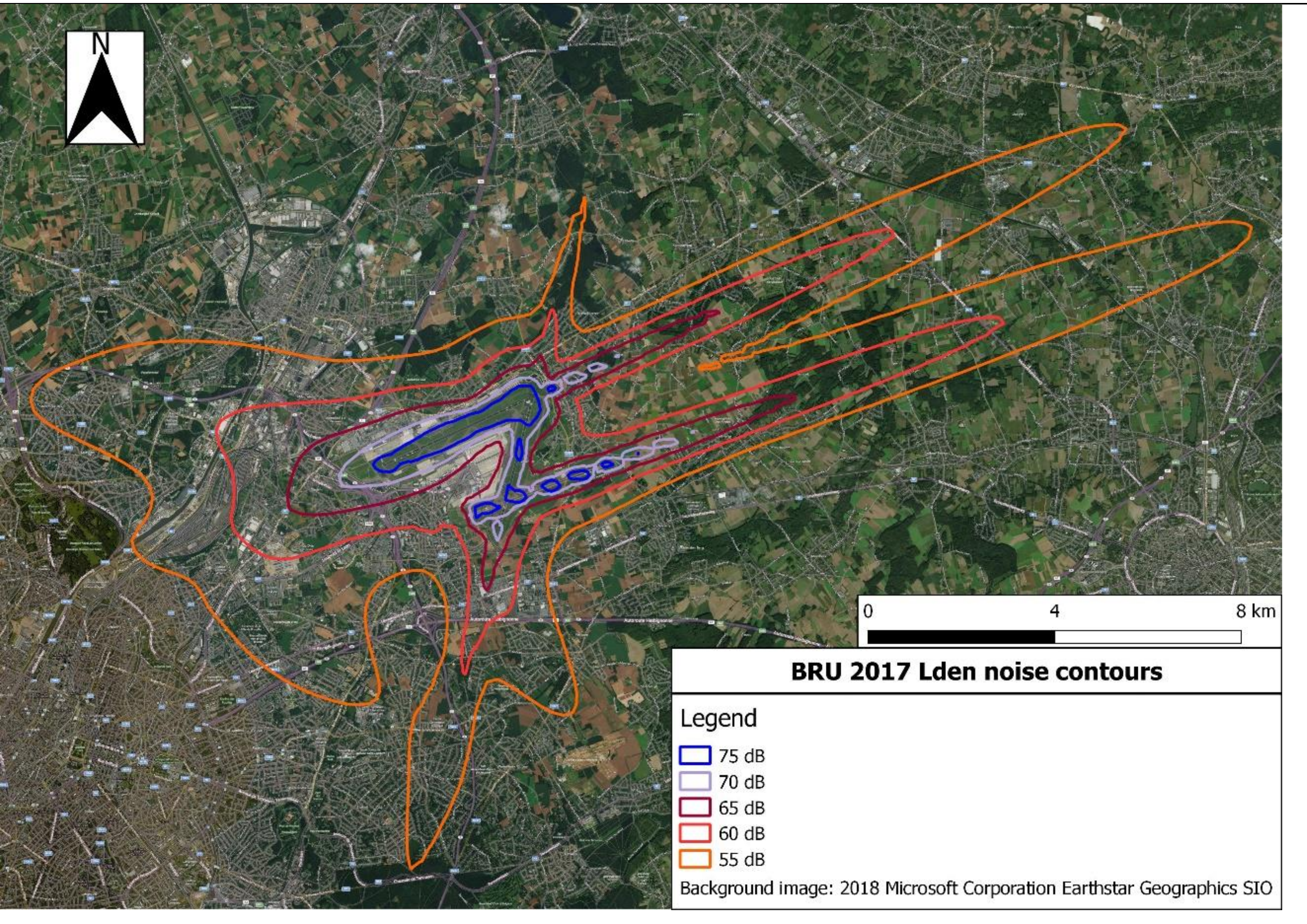


Figure 1: BRU 2017 Lden noise contours

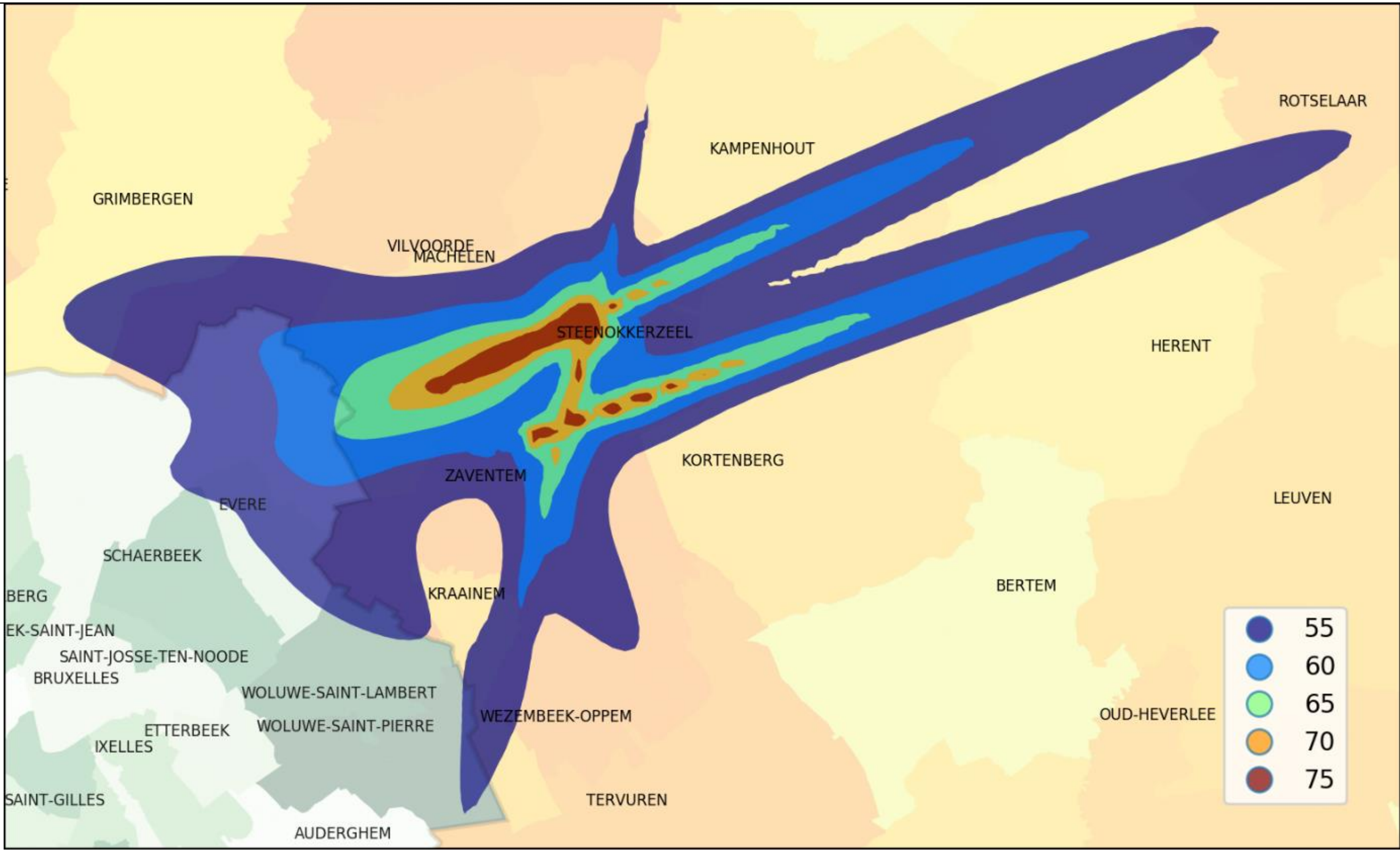


Figure 2: BRU 2017 Lden noise contours by municipality

6.2.2 L_{day}

The Lday contours represent the A-weighted equivalent sound pressure level for the period 07:00 to 19:00

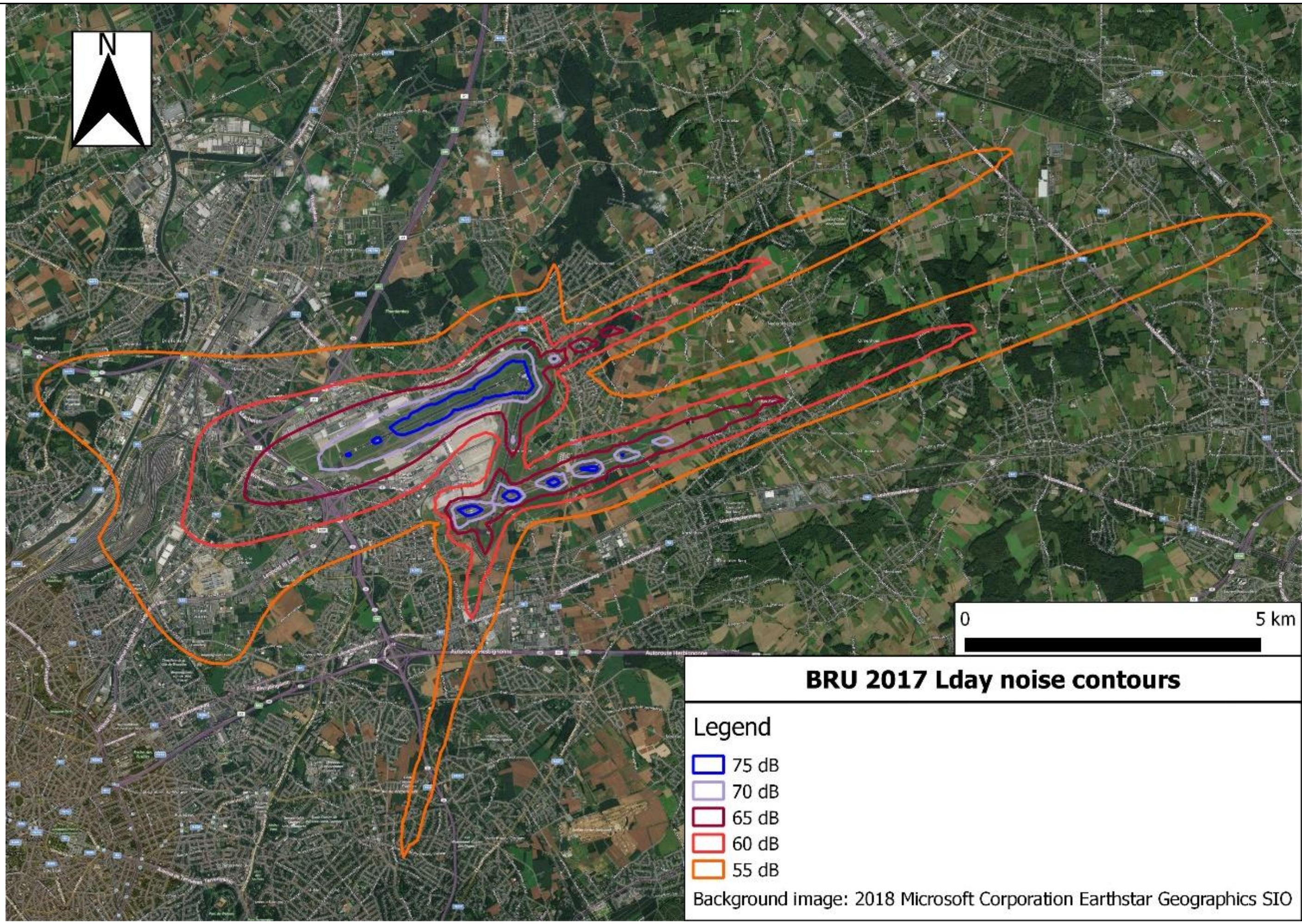


Figure 3: BRU 2017 Lday noise contours

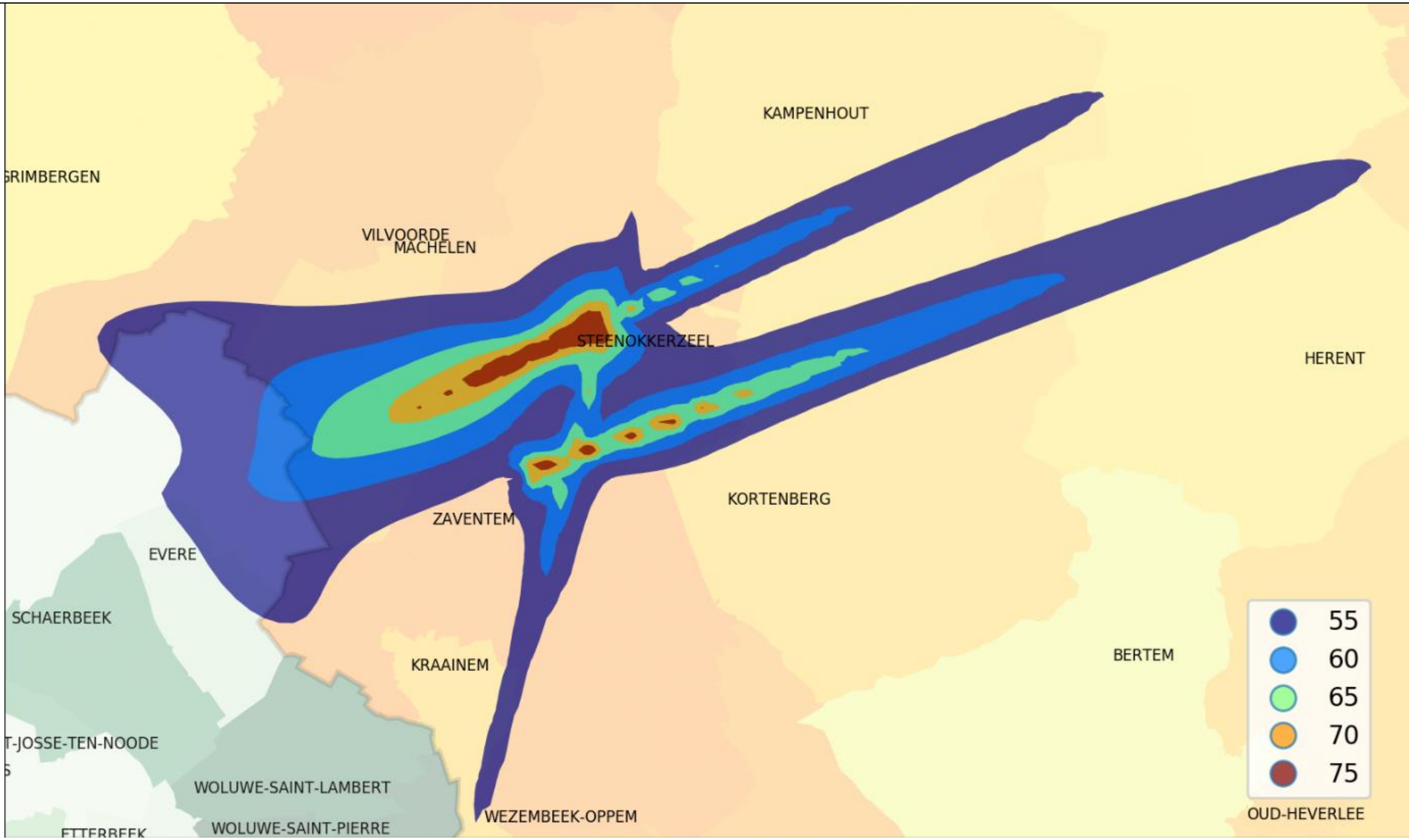


Figure 4: BRU 2017 Lday noise contours by municipality

6.2.3 $L_{evening}$

The Levening contours represent the A-weighted equivalent sound pressure level for the period 19:00 to 23:00

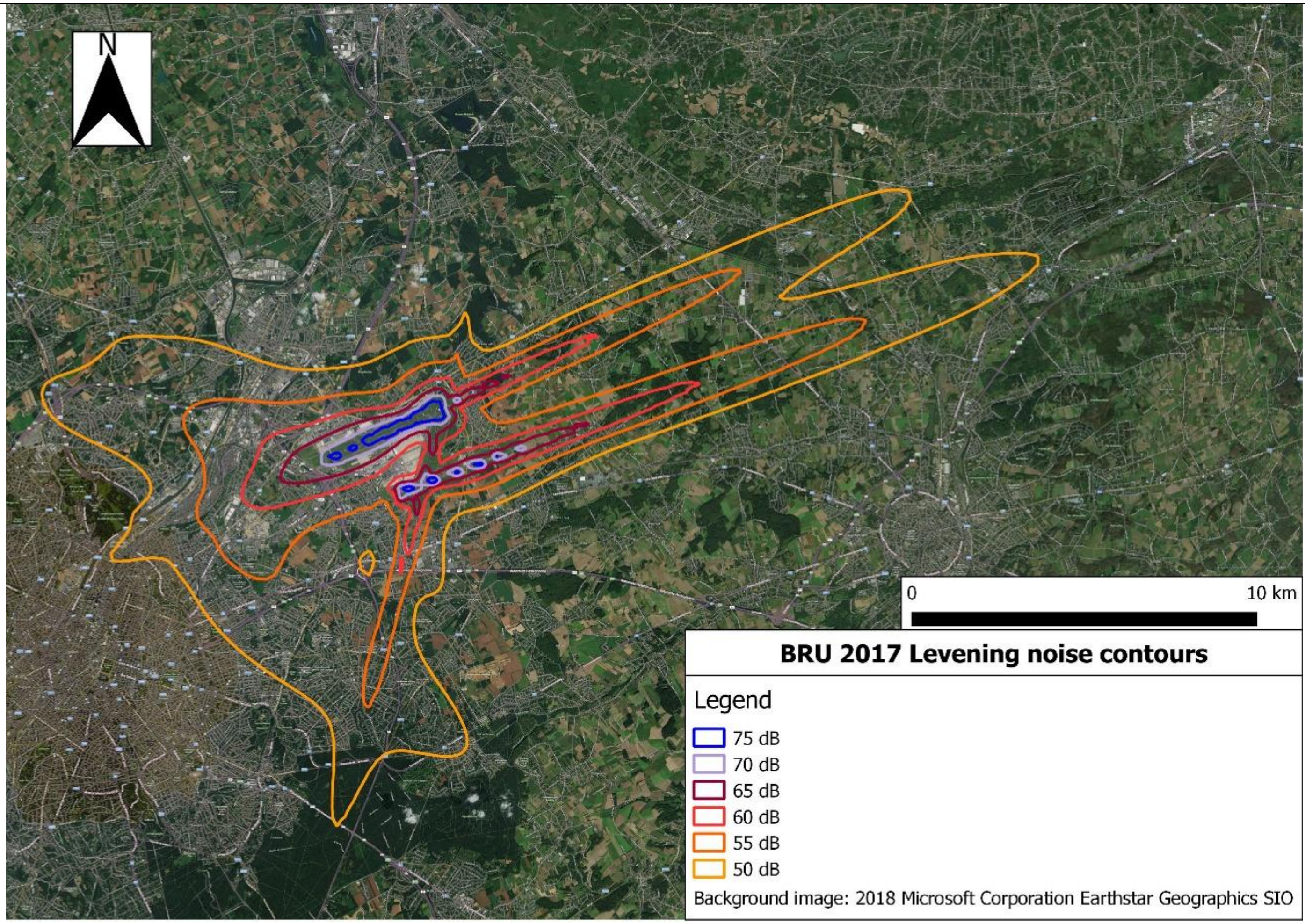


Figure 5: BRU 2017 Levening noise contours

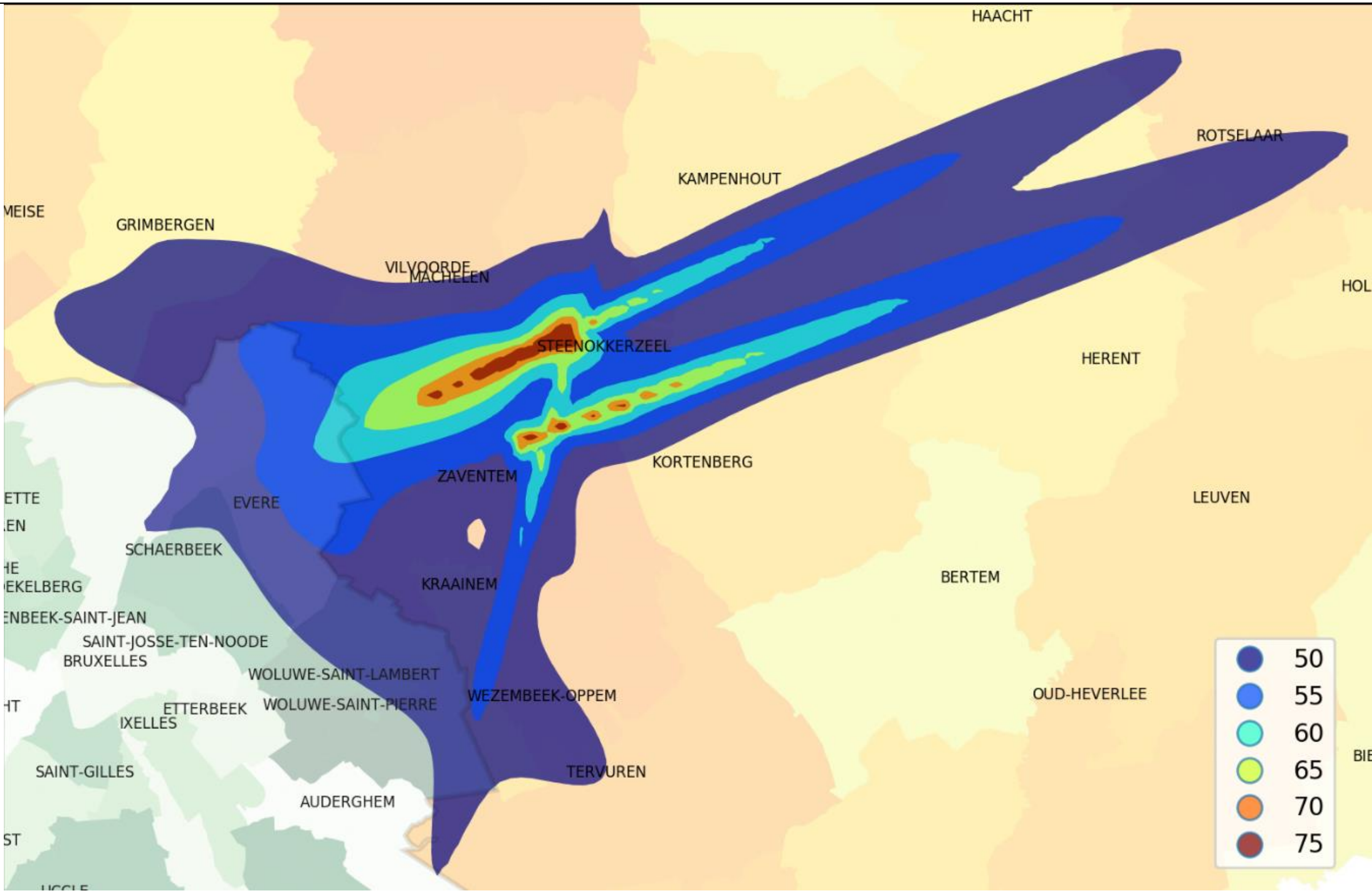


Figure 6: BRU 2017 Levening noise contours by municipality

6.2.4 Lnight

The Lnight contours represent the A-weighted equivalent sound pressure level for the period 23:00 to 07:00

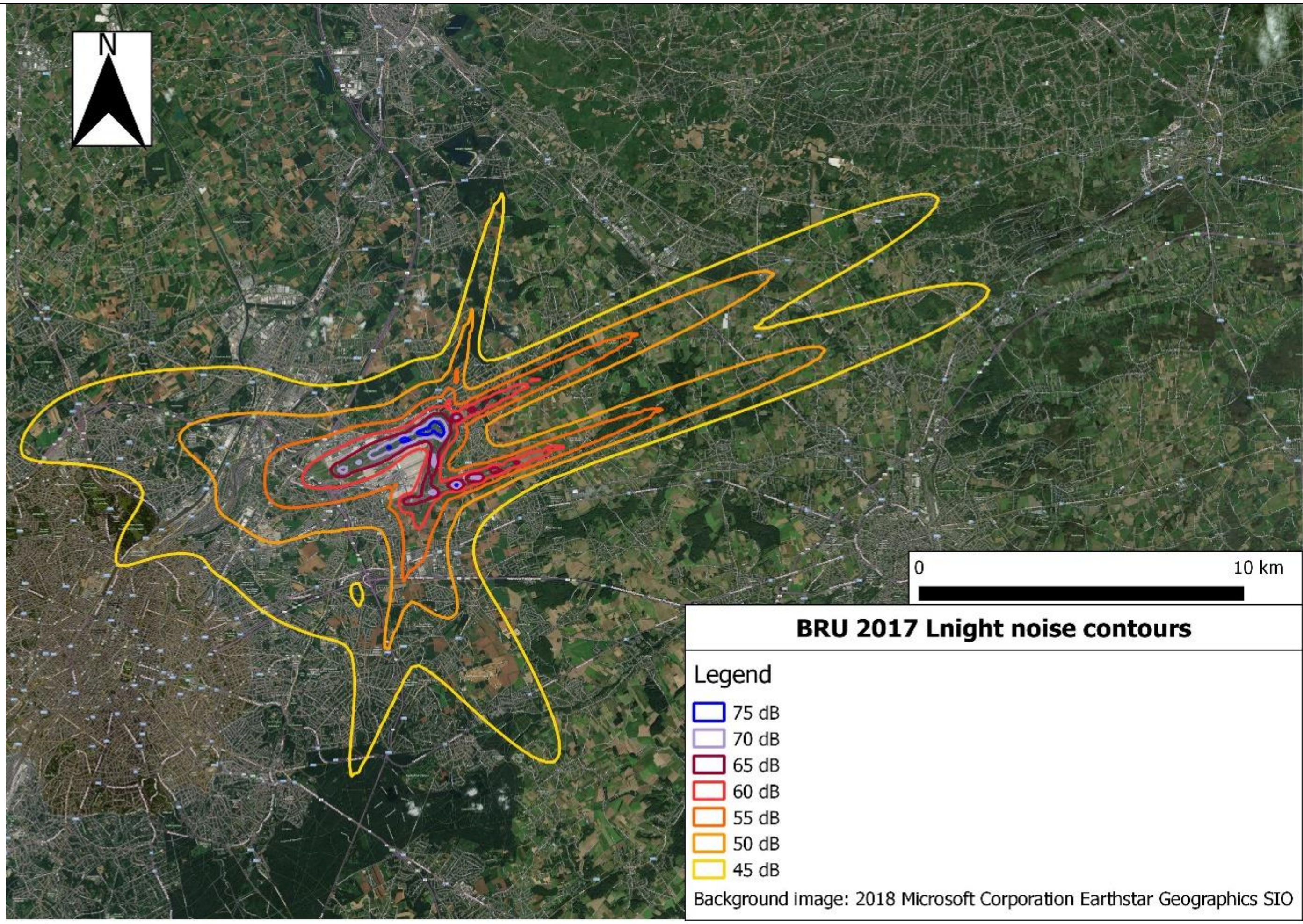



Figure 7: BRU 2017 Lnight noise contours

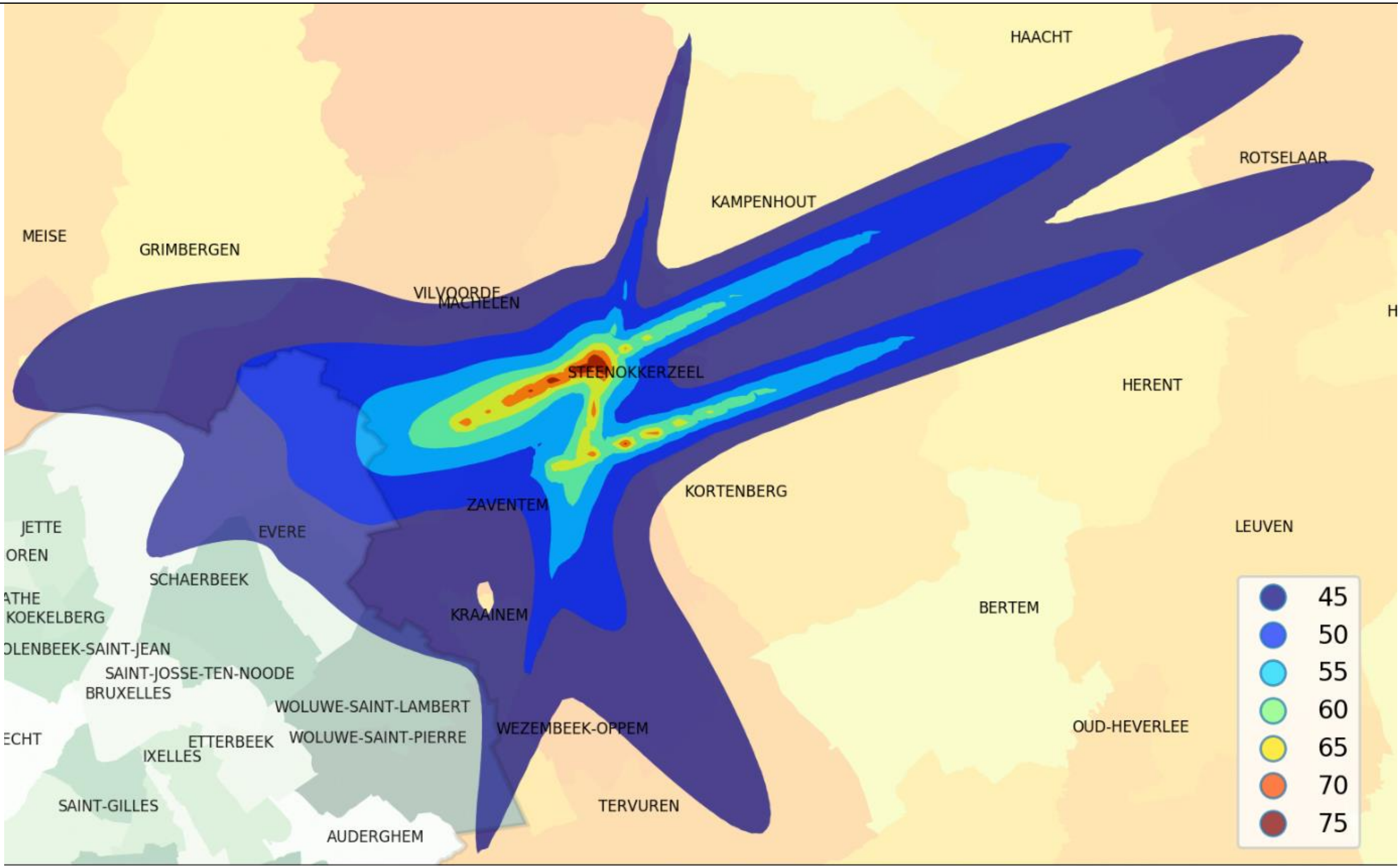


Figure 8: BRU 2017 Lnight noise contours by municipality

6.2.5 Freq.70, day

Frequency of events above 70db during the day (07:00 - 23:00)

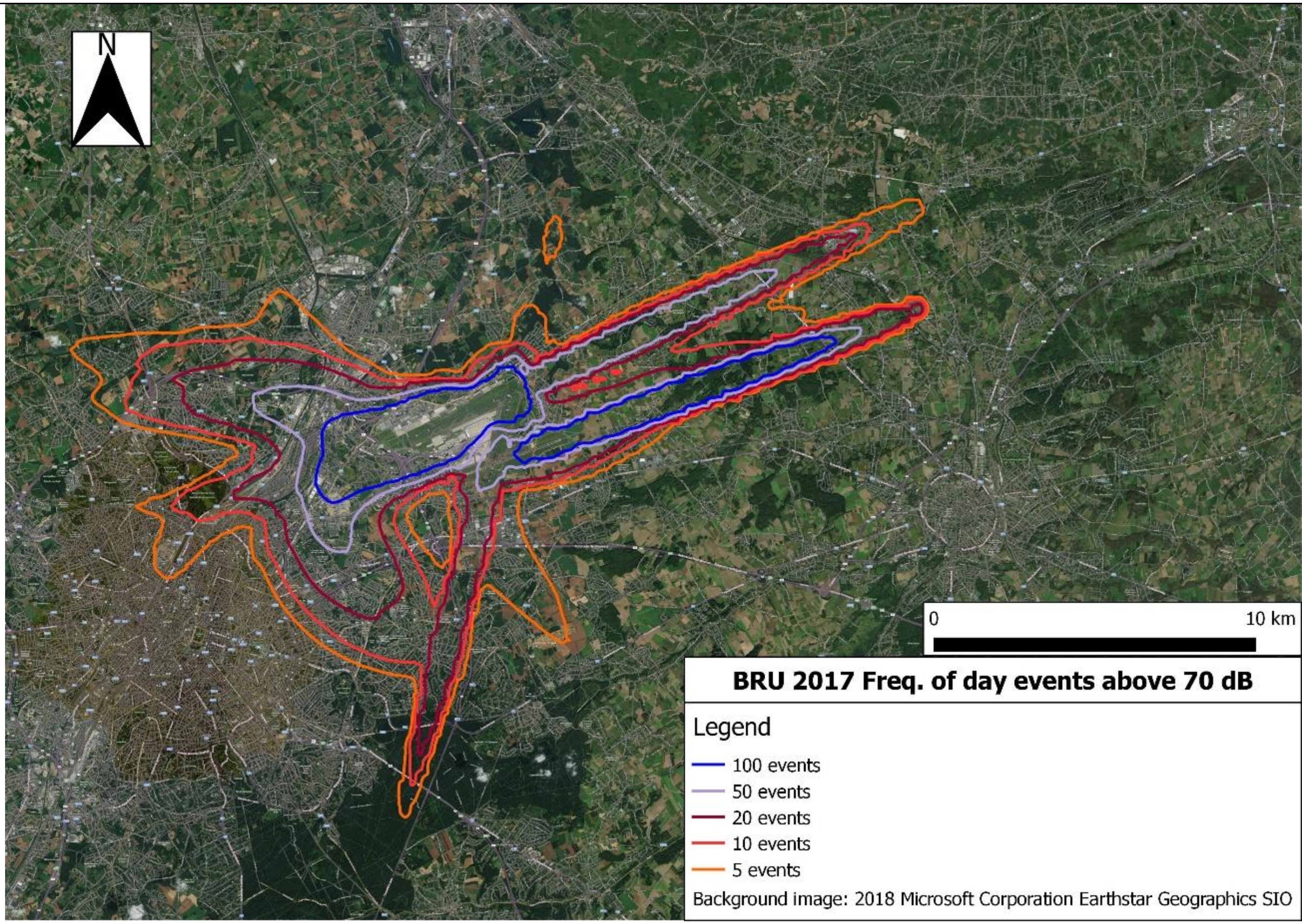


Figure 9: BRU 2017 Freq. of day events above 70 dB

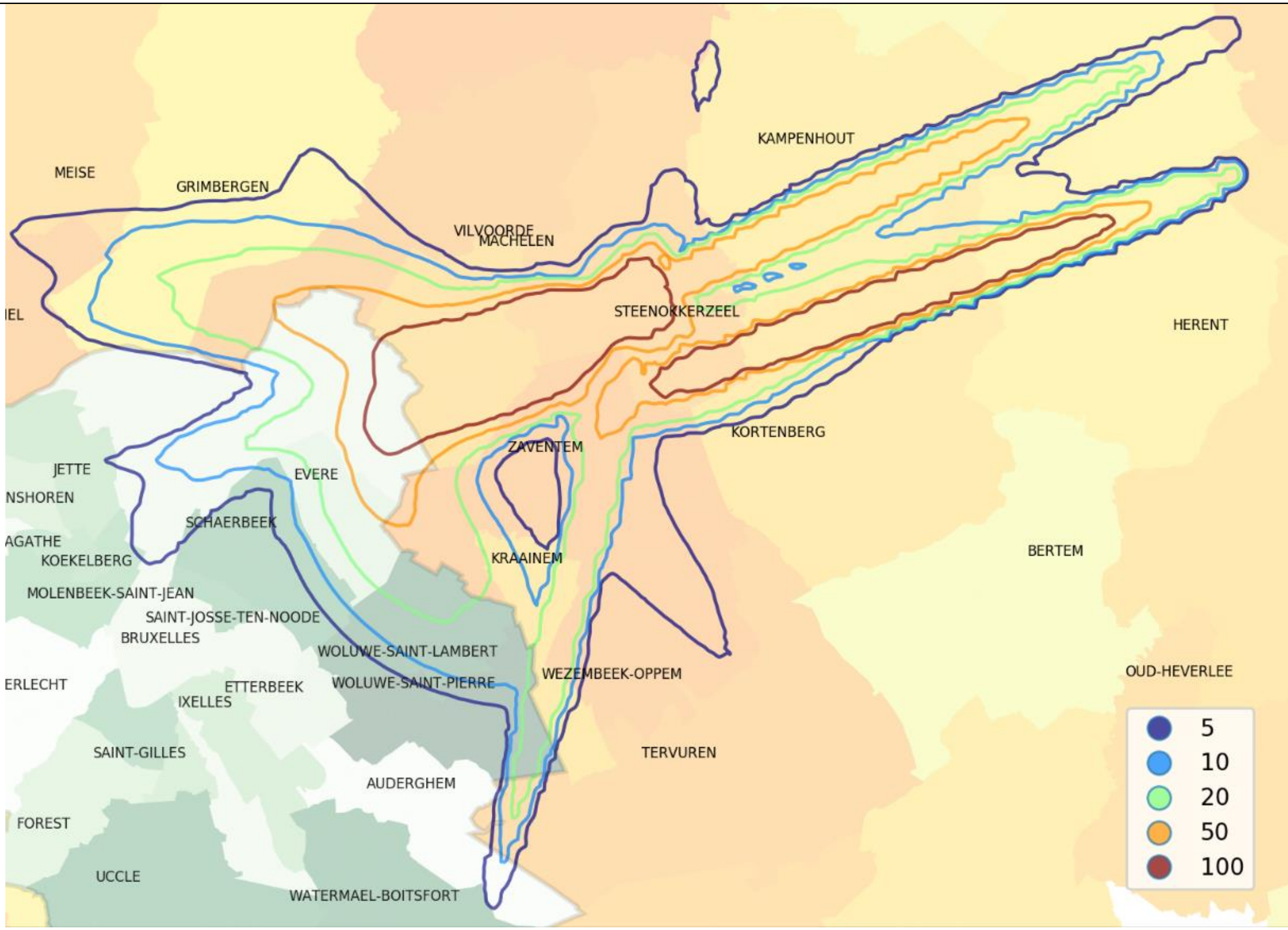


Figure 10: BRU 2017 Freq. of day events above 70 dB by municipality

6.2.6 Freq.70, night

Frequency of events above 70db during the night (23:00-07:00)

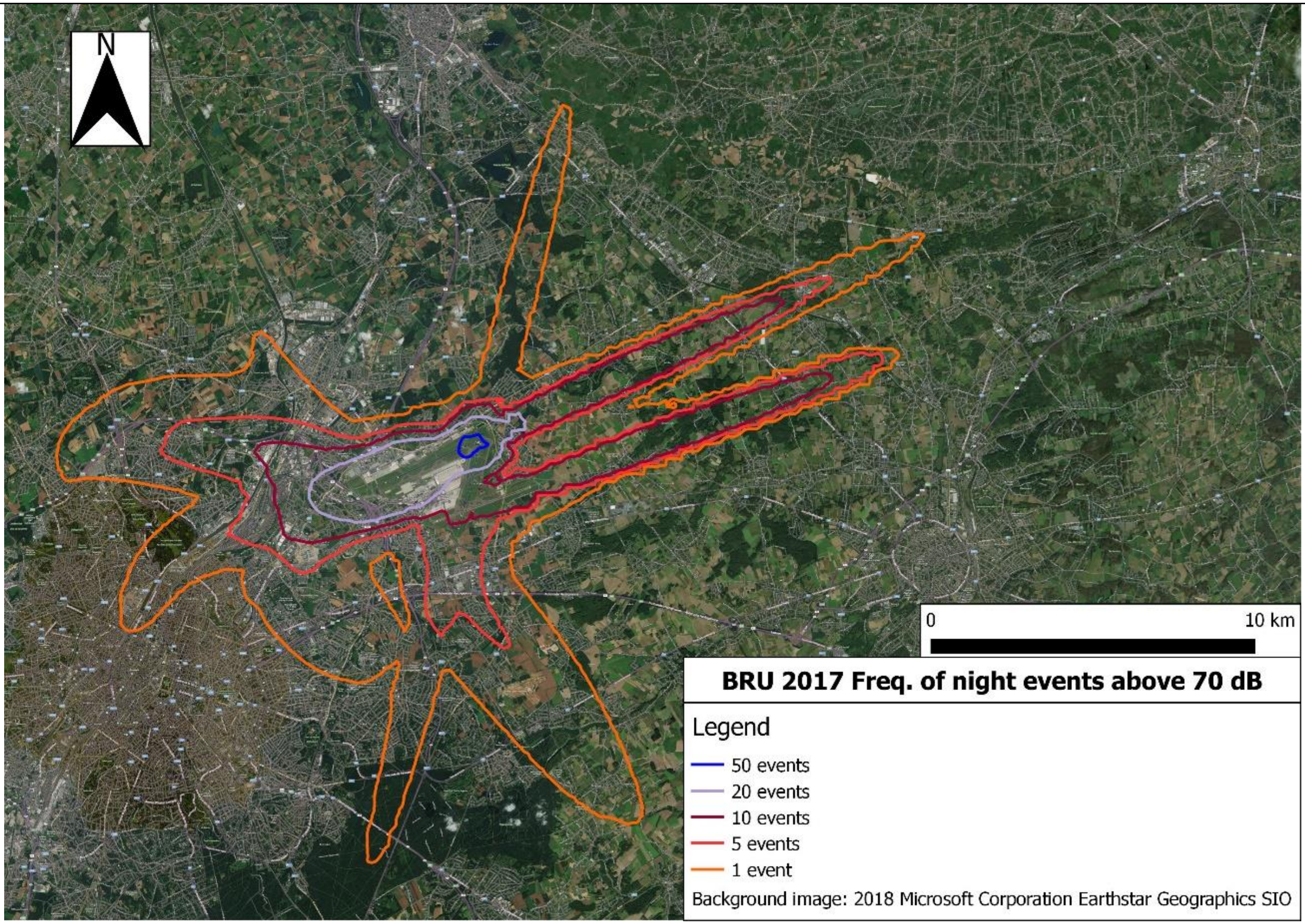



Figure 11: BRU 2017 Freq. of night events above 70 dB

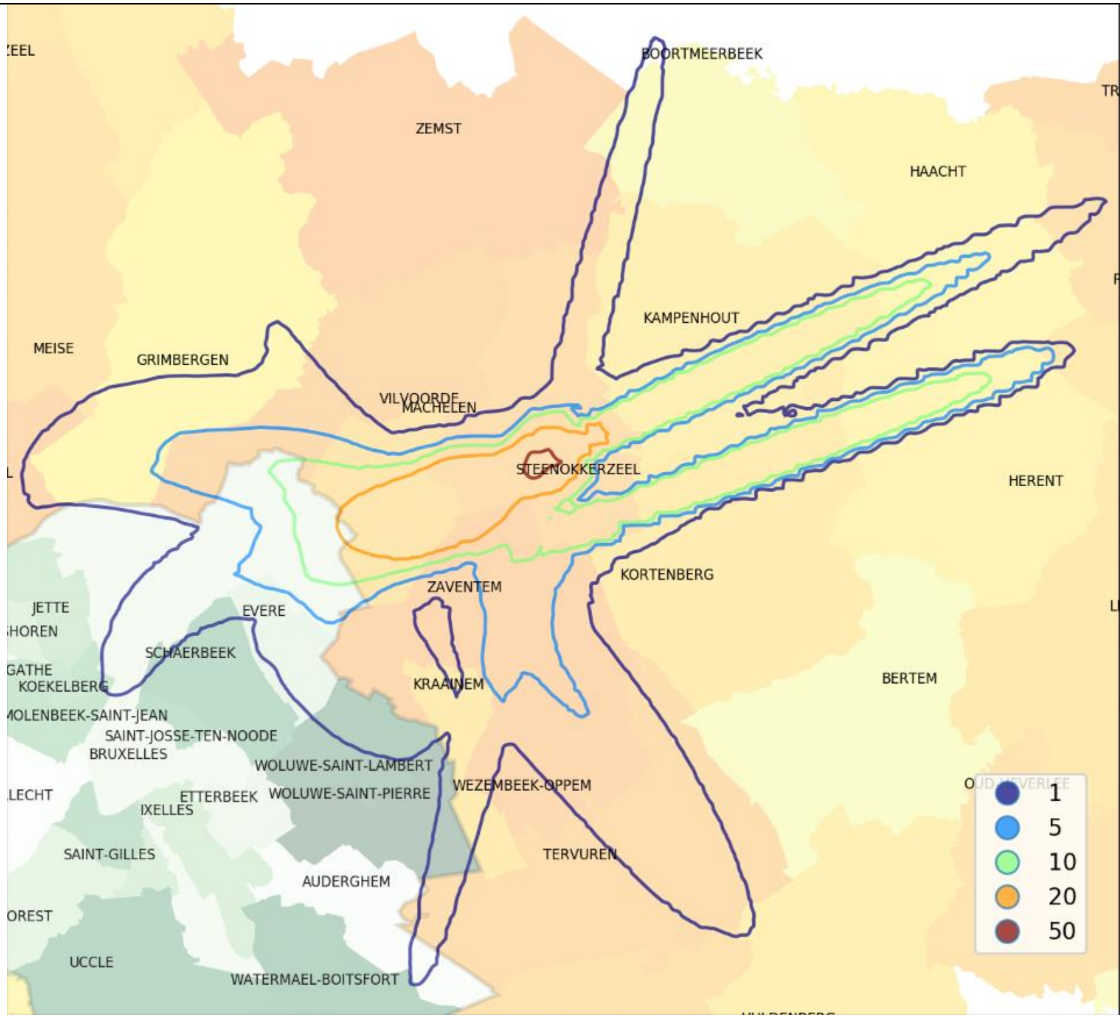


Figure 12: BRU 2017 Freq. of night events above 70 dB by municipality

6.2.7 Freq.60, day

Frequency of events above 60db during the day (07:00 - 23:00)

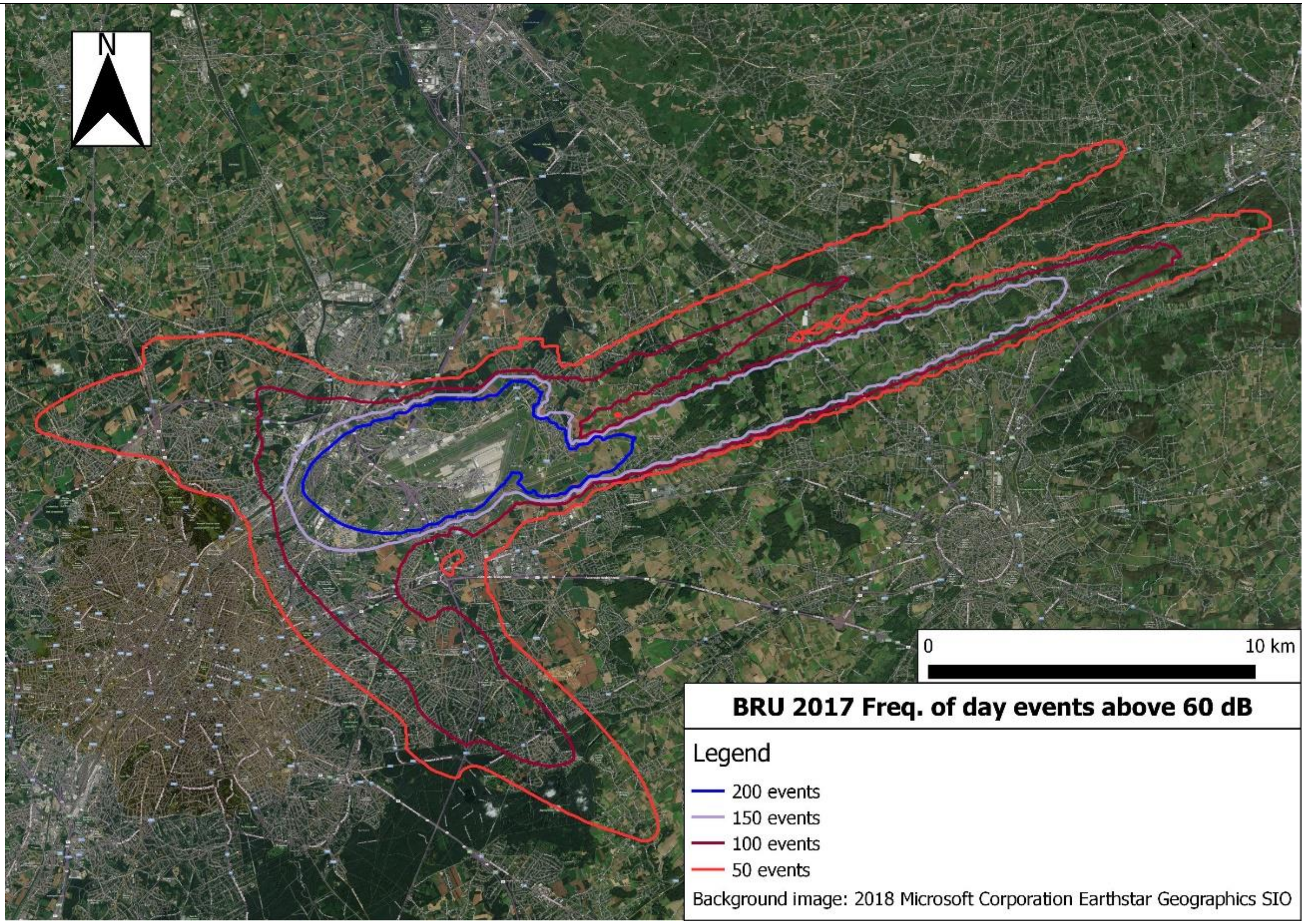


Figure 13: BRU 2017 Freq. of day events above 60 dB

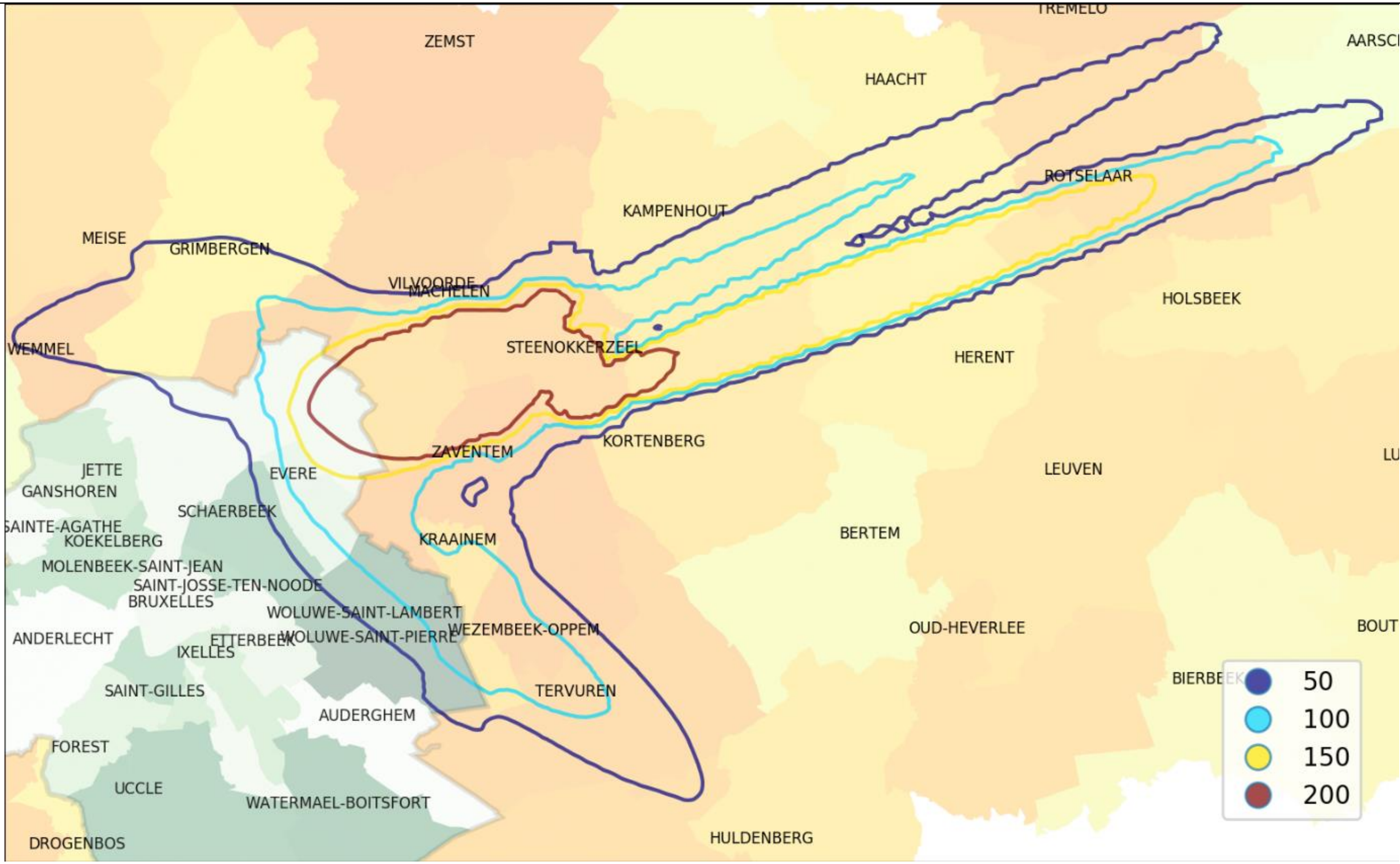


Figure 14: BRU 2017 Freq. of day events above 60 dB by municipality

6.2.8 Freq.60, night

Frequency of events above 60db during the night (23:00-07:00)

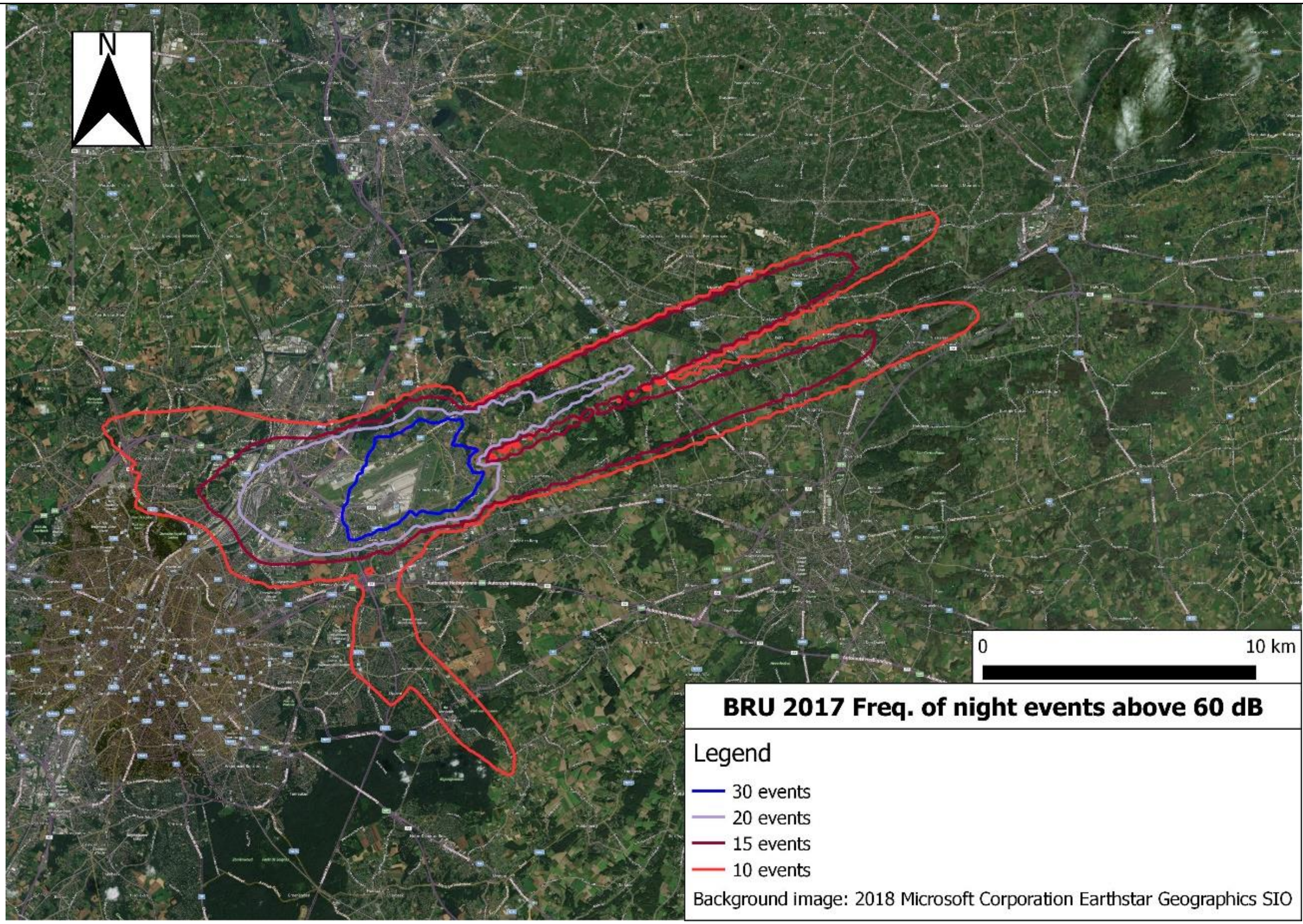



Figure 15: BRU 2017 Freq. of night events above 60 dB

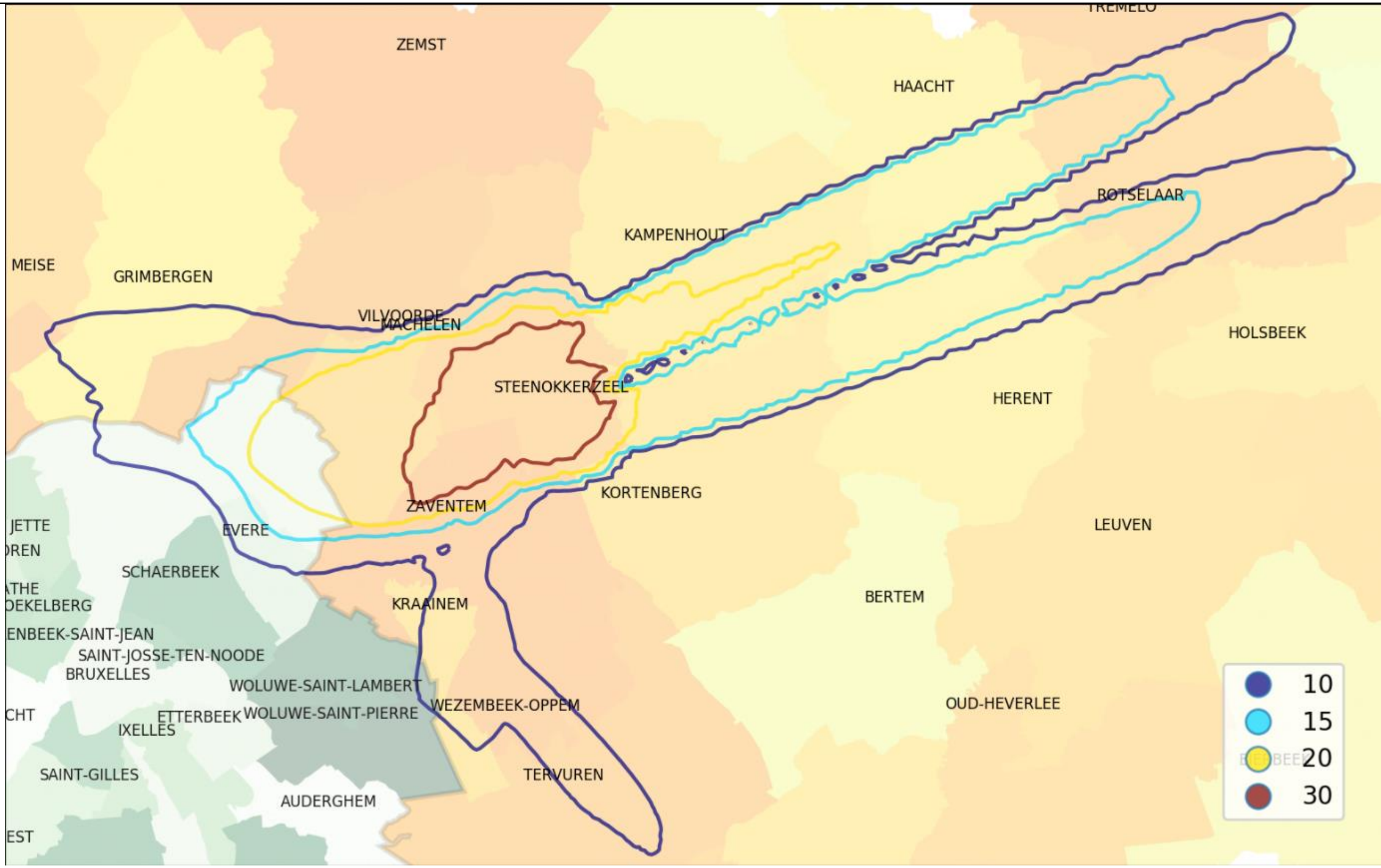


Figure 16: BRU 2017 Freq. of night events above 60 dB by municipality

6.2.9 Population affected

An estimation of the population living within the contours of the different metrics was made. These derived figures should be considered as "potential population impacted". No attempt has been made at this stage to apply a dose-response relationship.

The Global Human Settlement (GHS) population dataset, developed in the context of the European Copernicus Program, was used to derive the number of people likely to be affected by aircraft noise. This spatial raster dataset, generated using not just the resident population from censuses for year 2011 provided by Eurostat/GEOSTAT but also the best available sources by country, depicts the distribution and density of residential population, expressed as the number of people per cell. The initial 1 km resolution has been further disaggregated to 100 m based on information on land cover and land use from Corine Land Cover Refined 2006 and on built-up distribution and density as mapped in the European Settlement Map 2016 layer[1].

The population count for each noise contour was performed individually for each of the affected municipalities. Information on the geographical extent of each municipality was collected from STATBEL (Statistics Belgium).

The population on the borderlines of each area code was recalculated based on the intersection surface between each population grid cell and the geographical boundary. The population distribution in each 100x100m grid cell is considered homogeneous. Similarly, the intersection area between each noise contour and the intersecting population grid cells was calculated. The total population count is calculated based on ratio of the intersection area and the total surface of the population grid cell.

Results are summarized in the tables that follow.

All numbers are cumulative. For example, figures shown for population affected in Table 3, in the column "55 dB(A)", is the estimation of the population impacted by 55 dB(A) or above.

[1] Freire, Sergio; Halkia, Matina; Pesaresi, Martino (2016): GHS population grid, derived from EUROSTAT census data (2011) and ESM 2016. European Commission, Joint Research Centre (JRC) [Dataset] PID: http://data.europa.eu/89h/jrc-ghsl-ghs_pop_eurostat_europe_r2016a

Table 3: Population affected by L_{den} contours

Municipality	Population					Area (ha)				
	55 dB(A)	60 dB(A)	65 dB(A)	70 dB(A)	75 dB(A)	55 dB(A)	60 dB(A)	65 dB(A)	70 dB(A)	75 dB(A)
BRUXELLES	10898	3603	38			1058	350	13		
EVERE	14569					305				
GRIMBERGEN	7494					245				
HAACHT	1656	425				659	173			
KAMPENHOUT	4112	1355	279	1		1340	450	73	0	
KORTENBERG	3074	1268	239	10	0	882	481	148	16	0
KRAAINEM	5449	3				233	1			
LEUVEN	808					231				
HERENT	1602	425				693	173			
MACHELEN	12854	9047	3815	149	2	1097	799	422	149	38
ROTSELAAR	155					105				
SCHAERBEEK	172					5				
STEENOKKERZEEL	7944	5096	1418	190	17	1596	1100	673	369	158
VILVOORDE	11120	89				568	14			
WEZEMBEEK-OPPEM	2854	10				2854	149			
WOLUWE-SAINT-LAMBERT	5054					88				
WOLUWE-SAINT-PIERRE	2551					80				
ZAVENTEM	21839	5604	273	18	4	1815	637	209	66	16
TOTALS	**114205**	**26923**	**6061**	**369**	**23**	**13854**	**4327**	**1537**	**599**	**212**

Table 4: Population affected by L_{day} contours

Municipality	Population					Area (ha)				
	55 dB(A)	60 dB(A)	65 dB(A)	70 dB(A)	75 dB(A)	55 dB(A)	60 dB(A)	65 dB(A)	70 dB(A)	75 dB(A)
KRAAINEM	399					44				
LEUVEN	28					11				
BRUXELLES	4994	1812				785	109			
EVERE	3449					84				
KAMPENHOUT	1492	291	1			530	78	0		
MACHELEN	11062	5858	1964	25	0	951	588	278	72	1
STEENOKKERZEEL	5907	2099	209	21	4	1230	770	423	196	85
VILVOORDE	788					110				
ZAVENTEM	5677	1118	26	9	2	715	245	81	29	6
WEZEMBEEK-OPPEM	744					38				
HAACHT	197					128				
HERENT	989	3				371	5			
KORTENBERG	2219	43	688	2		695	63	324	3	
TOTALS	**37946**	**11225**	**2888**	**57**	**5**	**5690**	**1857**	**1106**	**300**	**92**

Table 5: Population affected by $L_{evening}$ contours

Municipality	Population						Area (ha)					
	50 dB(A)	55 dB(A)	60 dB(A)	65 dB(A)	70 dB(A)	75 dB(A)	50 dB(A)	55 dB(A)	60 dB(A)	65 dB(A)	70 dB(A)	75 dB(A)
KRAAINEM	12576	1422					552	82				
LEUVEN	1386	4					304	1				
AUDERGHEM	2						1					
BRUXELLES	14643	4749	1334				1195	696	80			
EVERE	35780	3554					513	86				
SCHAERBEEK	21700						133					
WOLUWE-SAINT-LAMBERT	24372						505					
WOLUWE-SAINT-PIERRE	11508						354					
GRIMBERGEN	15111						710					
KAMPENHOUT	4942	1724	350	10			1499	586	101	1		
MACHELEN	13202	10489	5153	1403	19	0	1134	925	545	245	66	7
STEENOKKERZEEL	8432	5944	2114	290	23	3	1634	1230	766	422	189	82
VILVOORDE	15452	233					727	45				
ZAVENTEM	21065	6108	880	24	8	1	1775	725	229	73	26	4
WEZEMBEEK-OPPEM	9443	1175					469	58				
HAACHT	3291	199					983	132				
HERENT	2379	912	1				1045	345	2			
KORTENBERG	4444	2091	618	35	1		1118	672	302	55	2	
ROTSELAAR	2218						519					
TERVUREN	2427						247					
TOTALS	**224371**	**38602**	**10450**	**1761**	**52**	**5**	**15417**	**5583**	**2025**	**795**	**283**	**93**

Table 6: Population affected by L_{night} contours

Municipality	Population						
	45 dB(A)	**50 dB(A)**	**55 dB(A)**	**60 dB(A)**	**65 dB(A)**	**70 dB(A)**	**75 dB(A)**
KRAAINEM	10981	74					
LEUVEN	1229						
BRUXELLES	26243	4315	182				
EVERE	17803						
SCHAERBEEK	6971						
WOLUWE-SAINT-LAMBERT	4877						
WOLUWE-SAINT-PIERRE	4036						
GRIMBERGEN	16379						
KAMPENHOUT	5694	2358	760	125			
MACHELEN	13259	11034	5052	367	12	0	
MEISE	1						
STEENOKKERZEEL	8912	6743	2597	568	77	5	0
VILVOORDE	16593	396					
ZAVENTEM	28804	11615	1449	35	7	0	
ZEMST	64						
WEMMEL	916						
WEZEMBEEK-OPPEM	8050	145					
BOORTMEERBEEK	0						
HAACHT	3818	296					
HERENT	2291	765					
KORTENBERG	3492	1613	407	20	0		
ROTSELAAR	3012						
TERVUREN	3432						
TOTALS	**186857**	**39354**	**10448**	**1115**	**96**	**5**	**0**

Municipality	Area (ha)						
	45 dB(A)	50 dB(A)	55 dB(A)	60 dB(A)	65 dB(A)	70 dB(A)	75 dB(A)
KRAAINEM	429	28					
LEUVEN	286						
BRUXELLES	1444	646	39				
EVERE	320						
SCHAERBEEK	40						
WOLUWE-SAINT-LAMBERT	87						
WOLUWE-SAINT-PIERRE	139						
GRIMBERGEN	890						
KAMPENHOUT	1752	764	223	20			
MACHELEN	1143	933	522	196	56	4	
MEISE	0						
STEENOKKERZEEL	1778	1327	818	503	239	93	21
VILVOORDE	775	78					
ZAVENTEM	2633	1044	426	117	33	1	
ZEMST	41						
WEMMEL	49						
WEZEMBEEK-OPPEM	411	12					
BOORTMEERBEEK	10						
HAACHT	1093	207					
HERENT	1011	303					
KORTENBERG	1027	553	219	33	1		
ROTSELAAR	684						
TERVUREN	466						
TOTALS	**16509**	**5896**	**2246**	**870**	**329**	**98**	**21**

Table 7: Population affected by L_{max} Day 60 dB frequency contours

Municipality	Population				Area (ha)			
	50	**100**	**150**	**200**	**50**	**100**	**150**	**200**
EVERE	35801	15616	165		513	300	1	
WOLUWE-SAINT-LAMBERT	31246	11898			571	276		
BRUXELLES	27963	7498	4396	3247	1279	909	568	266
GRIMBERGEN	21035	539			1288	15		
ZAVENTEM	20204	12357	5956	4572	1661	966	438	333
SCHAERBEEK	17118				159			
VILVOORDE	15364	1565	62		730	231	10	
WOLUWE-SAINT-PIERRE	14843	6369			432	172		
MACHELEN	13241	12360	11163	9486	1143	1063	969	849
KRAAINEM	12824	10165			587	405		
WEZEMBEEK-OPPEM	12269	8355			649	421		
TERVUREN	10202	5825			1234	269		
ROTSELAAR	9430	4752	1369		1870	781	279	
STEENOKKERZEEL	8942	7140	6054	4752	1684	1426	1207	1027
WEMMEL	5862				395			
KAMPENHOUT	5296	1698	46		1596	736	76	
HAACHT	4043	736	466		1179	360	254	
KORTENBERG	3880	3385	2965	186	1116	923	812	124
HERENT	2623	1956	1666		1124	815	670	
LEUVEN	1959	1440	1084		359	311	266	
AARSCHOT	1245	22			361	12		
MEISE	1078				78			
OVERIJSE	341				83			
TREMELO	141				78			
BEGIJNENDIJK	70				26			
HOLSBEEK	6				6			
TOTALS	**277026**	**113674**	**35392**	**22244**	**20201**	**10391**	**5550**	**2599**

Table 8: Population affected by L_{max} Day 70 dB frequency contours

Municipality	Population					Area (ha)				
	5	10	20	50	100	5	10	20	50	100
KRAAINEM	11449	8971	3525			450	353	173		
LEUVEN	136	102	45			53	40	17		
AUDERGHEM	16	1				55	2			
BRUXELLES	43759	12184	5650	4566	2525	1688	1245	923	630	187
EVERE	35801	35793	17404	593		513	513	333	45	
JETTE	393					3				
MOLENBEEK-SAINT-JEAN	1674					4				
SCHAERBEEK	32528	5148				279	65			
WATERMAEL-BOITSFORT	0					1				
WOLUWE-SAINT-LAMBERT	38864	27016	9013			631	529	175		
WOLUWE-SAINT-PIERRE	12541	7879	2061			349	245	92		
GRIMBERGEN	19411	14522	4204			1233	736	154		
KAMPENHOUT	4450	3697	2444	1527	2	1471	1242	851	524	4
MACHELEN	12603	12000	10916	8551	5988	1065	1022	946	795	614
MEISE	624	59				88	5			
STEENOKKERZEEL	7768	6459	5591	3743	1490	1515	1321	1200	944	612
VILVOORDE	17657	13199	8968	308		742	615	476	60	
ZAVENTEM	22525	12999	9563	2772	1353	1965	1256	1010	298	105
ZEMST	11					7				
WEMMEL	1383	11				177	1			
WEZEMBEEK-OPPEM	3546	2687	1954			177	136	101		
HAACHT	1448	760	387	59	2	575	377	254	39	1
HERENT	1618	1185	1000	682	460	722	489	395	256	180
KORTENBERG	4884	3502	2637	1824	1247	1087	895	777	570	459
ROTSELAAR	35					37				
TERVUREN	5	3	1			138	88	22		
TOTALS	**275130**	**168178**	**85360**	**24625**	**13068**	**15026**	**11175**	**7900**	**4162**	**2162**

Table 9: Population affected by L_{max} Night 60 dB frequency contours

Municipality	Population				Area (ha)			
	10	**15**	**20**	**30**	**10**	**15**	**20**	**30**
KRAAINEM	8603				316			
LEUVEN	1927	992			356	257		
BRUXELLES	28247	8968	3557		1268	875	386	
EVERE	13762	1893			226	24		
WOLUWE-SAINT-LAMBERT	9				0			
WOLUWE-SAINT-PIERRE	1913				39			
GRIMBERGEN	13991				659			
KAMPENHOUT	5654	4794	1969	0	1666	1425	499	1
MACHELEN	13242	12403	11278	88	1144	1067	974	85
MEISE	137				12			
STEENOKKERZEEL	9075	8304	7301	5578	1704	1594	1428	965
VILVOORDE	13694	377	21		703	75	3	
ZAVENTEM	15179	9265	7670	4742	1309	707	536	330
WEMMEL	112				14			
WEZEMBEEK-OPPEM	10953				565			
AARSCHOT	36				14			
BEGIJNENDIJK	111				41			
HAACHT	4349	3305			1268	1021		
HERENT	2617	1710			1115	768		
KORTENBERG	3647	3007	32		1071	890	50	
ROTSELAAR	9263	2997			1954	722		
TERVUREN	3800				451			
TREMELO	398				135			
TOTALS	**160718**	**58014**	**31828**	**10408**	**16030**	**9427**	**3877**	**1380**

Table 10: Population affected by L_{max} Night 70 dB frequency contours

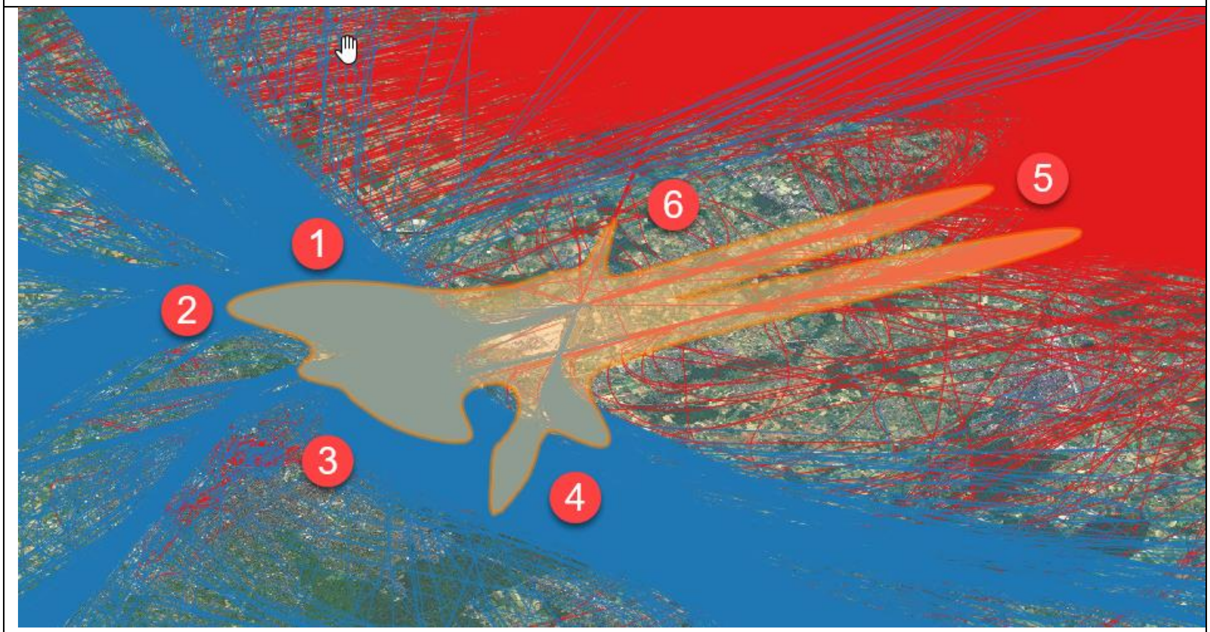
Municipality	Population					Area (ha)				
	1	5	10	20	50	1	5	10	20	50
KRAAINEM	10310	2				415	1			
LEUVEN	96	19				38	8			
AUDERGHEM	17					58				
BRUXELLES	41485	5144	3190	35		1701	821	305	14	
EVERE	29135	542				444	15			
MOLENBEEK-SAINT-JEAN	4187					10				
SCHAERBEEK	15184					84				
WATERMAEL-BOITSFORT	1					1				
WOLUWE-SAINT-LAMBERT	15503					329				
WOLUWE-SAINT-PIERRE	4933					176				
GRIMBERGEN	18871	984				1188	23			
KAMPENHOUT	5380	2568	1959			1667	824	645		
MACHELEN	12526	10409	7941	4001		1074	892	728	457	
MEISE	218					18				
OVERIJSE	20					9				
STEENOKKERZEEL	8337	5416	3927	1628	1	1703	1143	972	504	38
VILVOORDE	19027	7347	114			768	398	18		
ZAVENTEM	27778	9393	2479	841		2555	969	269	87	
ZEMST	157					101				
WEMMEL	1850					117				
WEZEMBEEK-OPPEM	7445	162				410	11			
BOORTMEERBEEK	1941					249				
HAACHT	1661	437	121			623	290	86		
HERENT	1331	1016	642			555	400	243		
HULDENBERG	16					21				
KORTENBERG	3007	2070	1404			863	611	493		
ROTSELAAR	100					89				
TERVUREN	7544					1245				
TOTALS	**238061**	**45508**	**21776**	**6504**	**1**	**16512**	**6405**	**3761**	**1062**	**38**

6.2.10 Track data plots

For the analysis of the results, the L_{den} 55 db(A) noise contour was overlaid over the flight tracks in west and east flow condition. July 2017 was selected because it had the largest amount of aircraft movements when compared to the other months.

Figure 17 shows the flight tracks for July 2017 in the west-flow condition. Note the how the departure flight tracks shape the noise contours. Note how the concentration of the departure flight tracks define the contour near Location 2. Departures to the southeast from RWY 19 clearly define the shape of the contour near Location 4. The arrivals to RWY 25R and RWY 25L clearly define the shape of the contour to east side of the airport. When compared to departures, noise contours caused by arrivals tend to be longer and narrower. This can be clearly seen near Location 5 and Location 6.

Figure 17: West Flow Conditions - Lden 55



Notes: Flight track colours: red represent arrivals, blue represents departures. Flight tracks for July 2017.

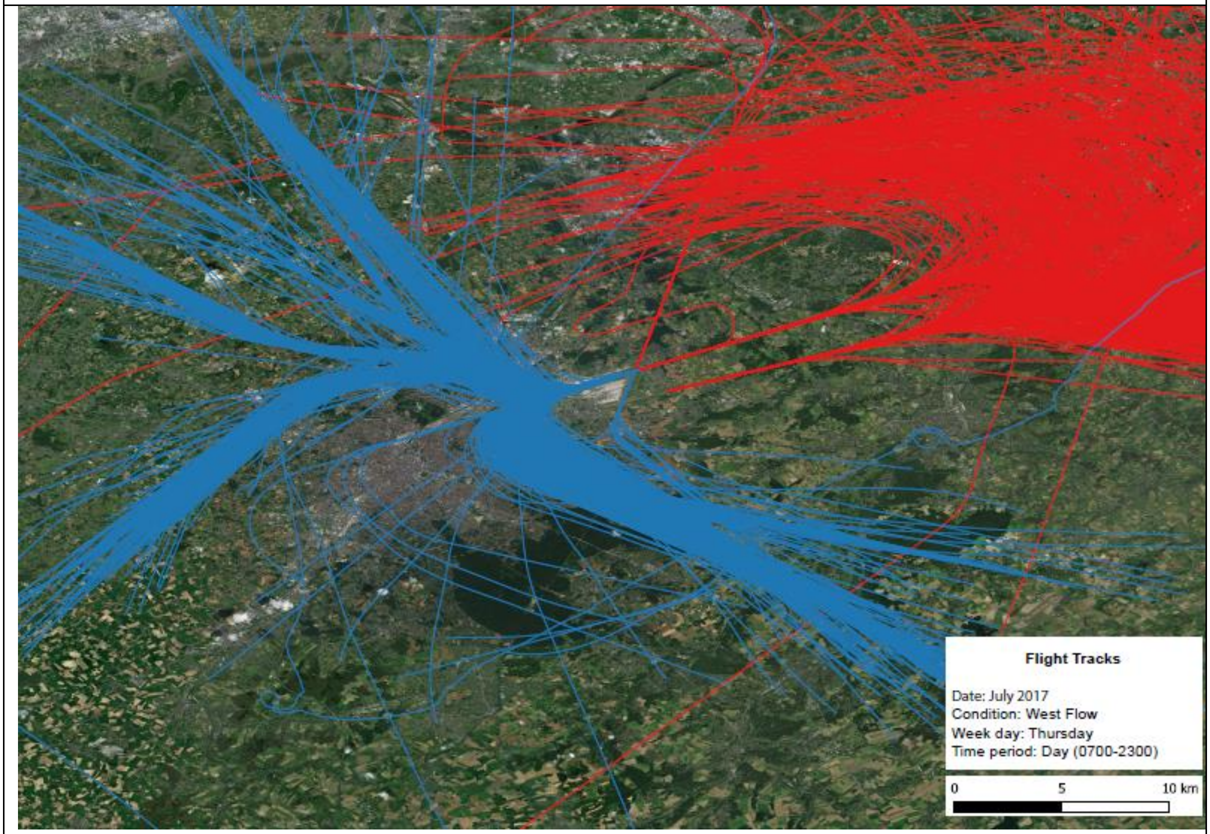
Figure 18 shows the flight tracks for July 2017 in east-flow condition. Note that the departures to the east do not have a significant impact on the shape of the noise contour. At Location 1 and Location 2 it can be clearly observed that the shape of the contour in influenced by the arrival operations to RWY 07L and RWY 01.

Figure 18: East Flow Conditions - Lden 55

Notes: Flight track colours: red represent arrivals, blue represents departures. Flight tracks for July 2017.

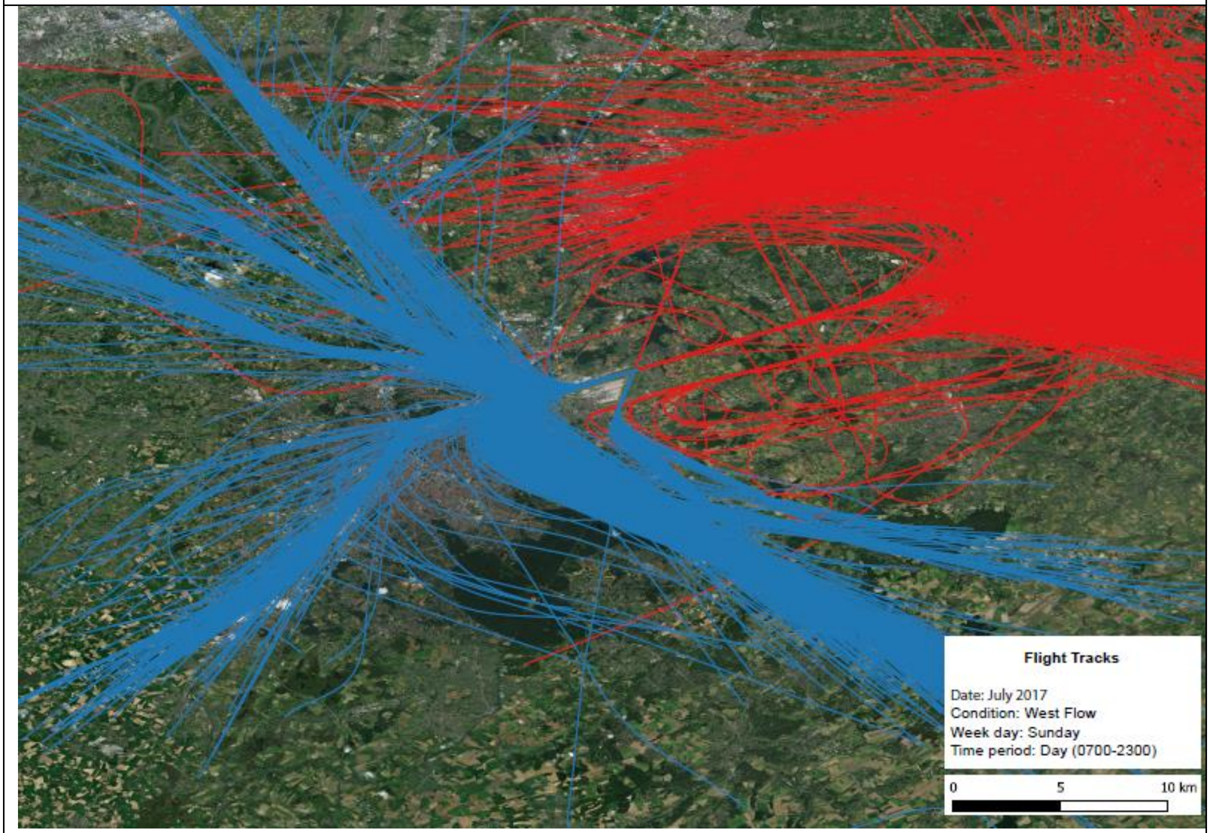
The following figures are included to give some impression of the variation of areas that are overflown based on how flows change depending on the day and time of the week. They are presented for illustrative purposes only at this stage and are not intended to be either "representative" or "exhaustive" in terms of all possible permutations of flight operations.

Figure 19: Flight tracks July 2017, West Flow, Day period



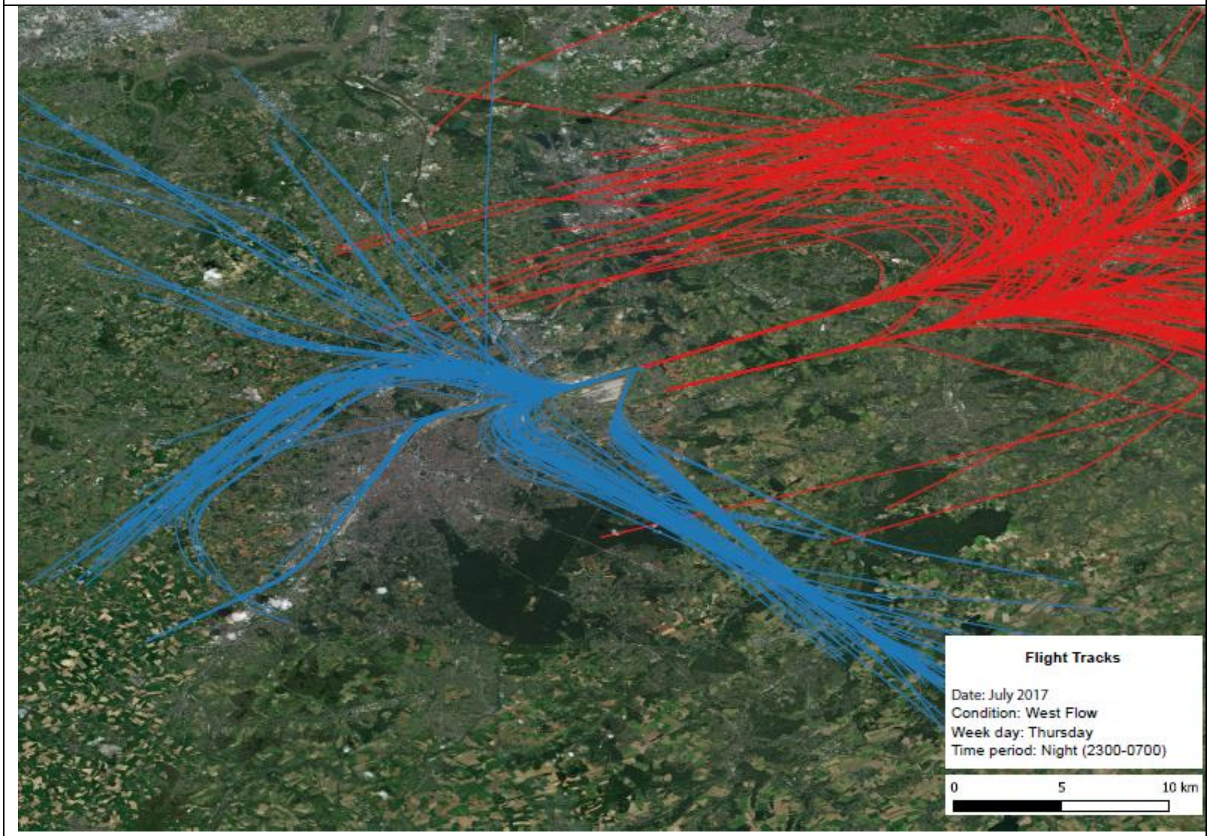
Notes:

Figure 20: Flight Tracks July 2017, West Flow, Weekend, Day period



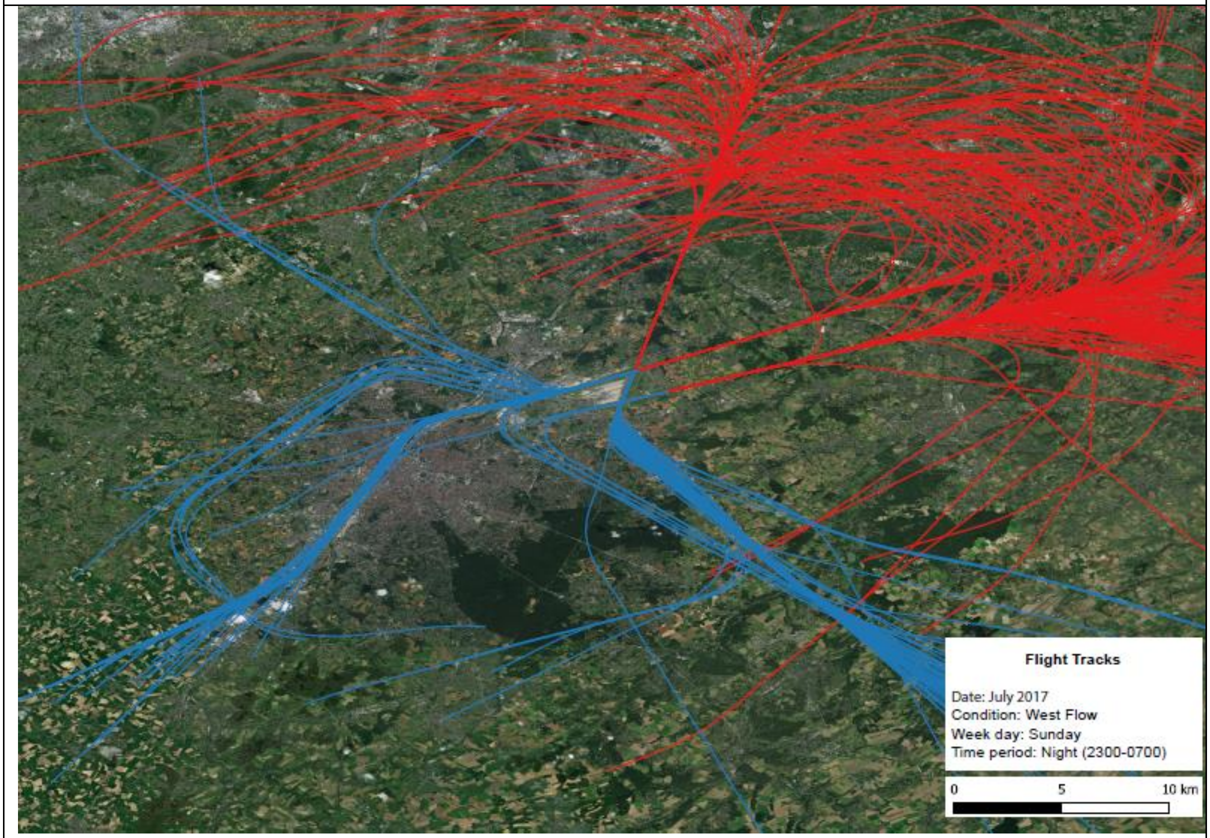
Notes:

Figure 21: Flight Tracks July 2017, West Flow, Weekday, Night period



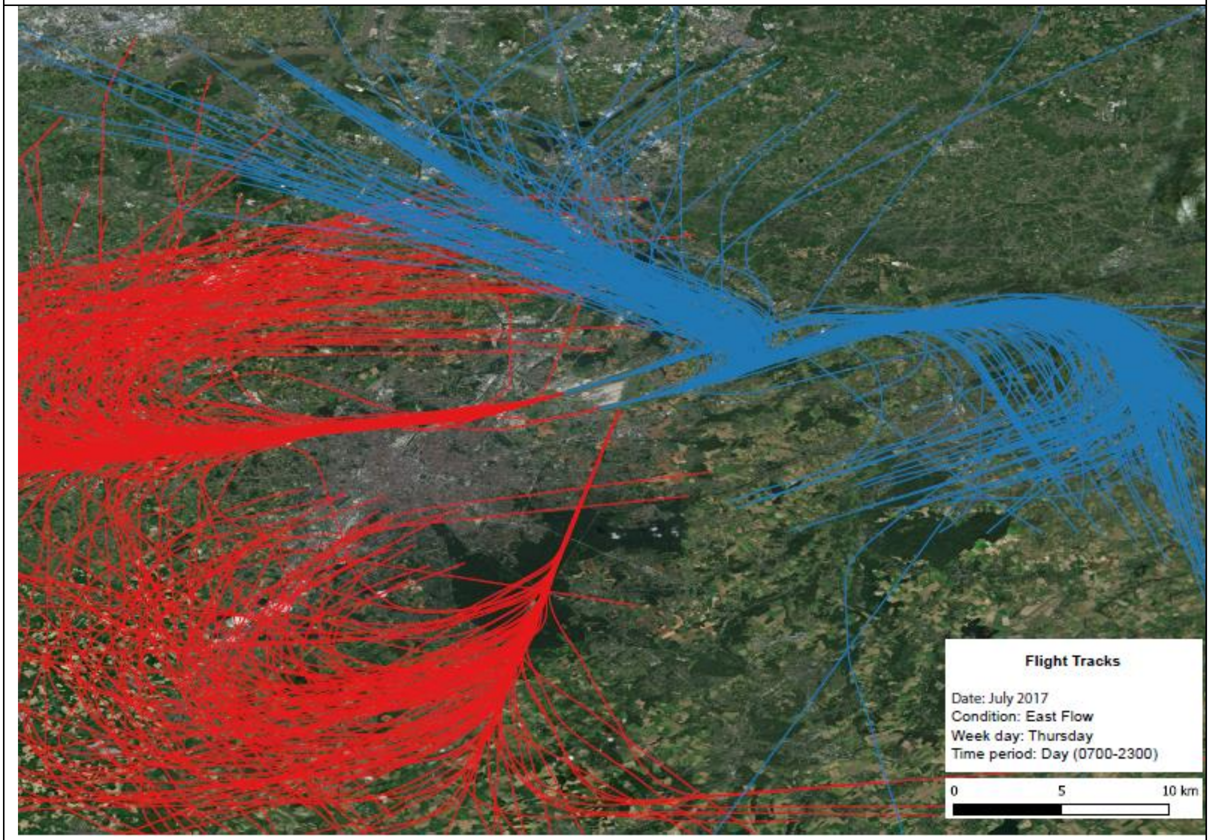
Notes:

Figure 22: Flight Tracks, July 2017, West Flow, Weekend, Night period



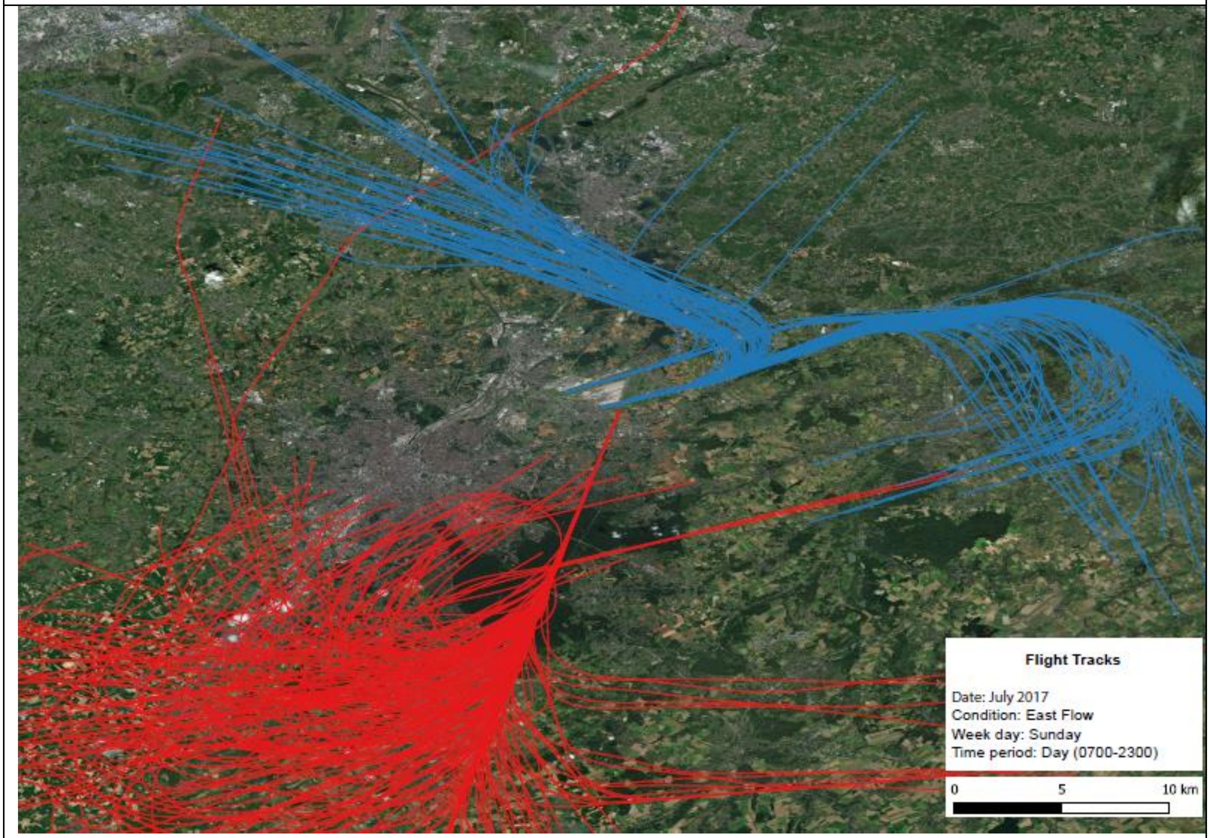
Notes:

Figure 23: Flight Tracks, July 2017, East Flow, Weekday, Day Period



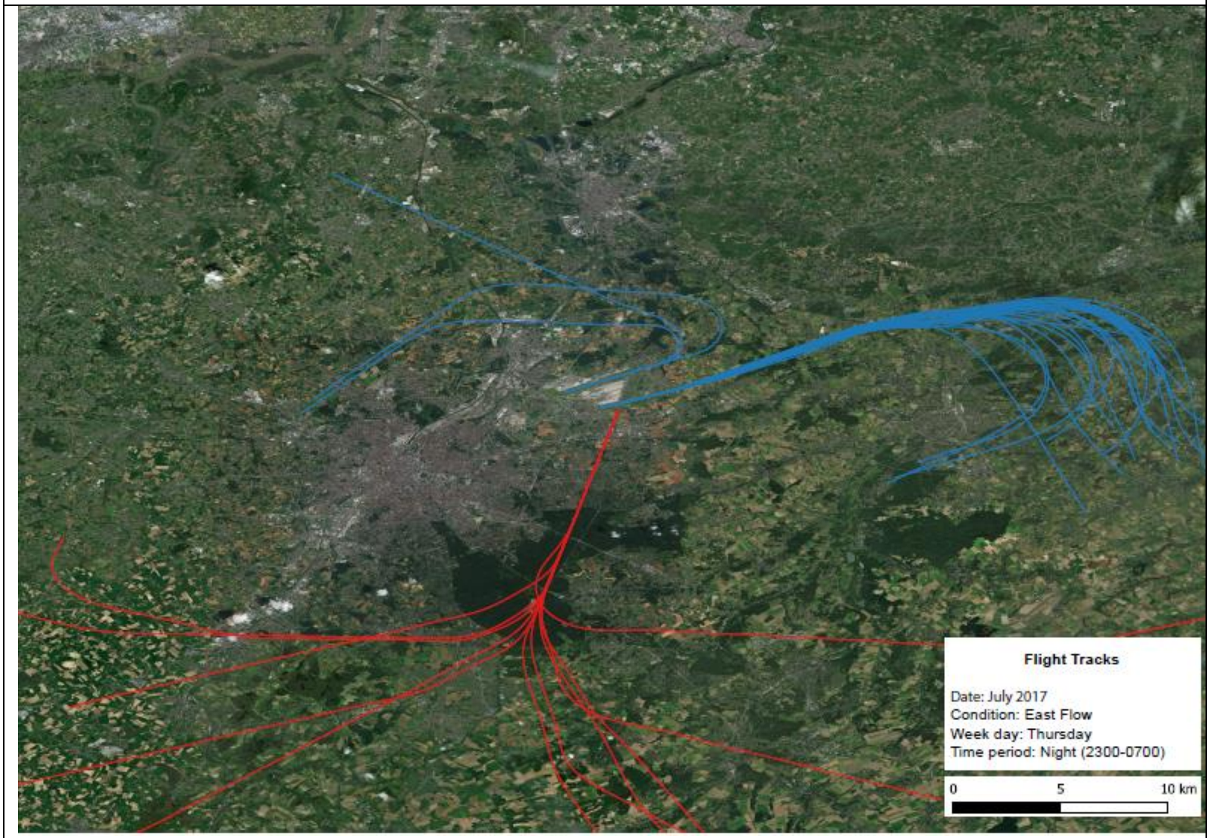
Notes:

Figure 24: Flight Tracks, July 2017, East Flow, Weekend, Day Period



Notes:

Figure 25: Flight Tracks, East Flow, Weekday, Night Period



Notes:

6.3 *Noise Impact Independent Observations*

It can be observed that most of the ATMs are represented by the Airbus A320 and Boeing 737 aircraft family, and therefore, these will have the most significant effect on the shape and size of the contours.

The typical aircraft for long haul flights are the Boeing B747 and B777 aircraft family, and the Airbus A330 family. These aircraft have larger profile numbers and tend to have a significant influence on the size and shape of the noise contours particularly for arrival operations.

Most of the ATMs occur during the day period. However, night arrivals of aircraft such as the Airbus A330 and Boeing B777 and B747 tend to have a significant influence on the size and shape of the noise contours.

When compared to departures, noise contours caused by arrivals tend to be longer and narrower.

7 "Chapter 1" Overall Conclusions

In conclusion, for this chapter of the report, it is noted that there are a number of systematic problems which need to be addressed, including:

Fragmented and inconsistent governance

Partly due to the unique Belgian political situation of regional and federal governance, powers for different aspects of regulation are distributed in a way that is not always conducive to joined up governance. The operating licence of the airport is granted at Federal level, but responsibility for environmental regulation (for example) is with the Regions.

Poor collaboration between stakeholders

This conclusion can be attributed at many levels:

(1) Because of the fragmented regulatory context, it would be desirable to see cooperative collaboration between the Regions and Federal governments in order to ensure efficient regulation of all issues. This does not appear to be the case. In fact, the situation seems to be politically driven, causing impasse.

(2) On an operational level, collaboration between key operational stakeholders has been poor in the past. This shows signs of improvement now with the introduction of Collaborative Environmental Management at the Airport.

(3) Between the different associations and pressure groups representing the communities around the airport. There seems to be no over-arching organisation that represents all people impacted by the noise nuisance of the airport operations.

Poor communication and outreach to all community stakeholders

The Airport has some structures in place for conducting a dialogue with community stakeholders, but this seems to be limited for the moment to a selected subgroup of the community impacted. More extensive outreach is needed, clearly demonstrating that the views of all are being taken into consideration.

Failure to assess impact prior to implementing decisions

There have been too many examples in the past where airspace changes have been directed by judicial or Ministerial decisions, often as a result of political pressures, without appropriate impact assessment being carried out **prior** to the introduction of the changes.

History of frequent changes to airspace organisation based on dubious criteria

The perception of significant noise seems to extend far beyond the average modelled noise contours at which aircraft noise might normally be considered significant for major decision-making purposes. It is also clear that there has been a greater number than normal of significant changes to aircraft procedures and overflight patterns during the last two decades, that have raised the profile and perceived significance of aircraft noise around BRU for many of the local communities. The effect of these numerous changes, whilst they can be assumed to have been well-meaning, have reduced community tolerance and acceptance of aircraft noise and have set one community against another.

8 Issues and key principles to consider in Chapter 2 work

In addition to addressing the systematic problems summarised in the conclusions to Chapter 1, work in Chapter 2 will review and consider the merits of different principles that could be applied in the search for improvement to current airspace procedures.

The following list is non-exhaustive and not mutually exclusive. It has been developed through the discussions with stakeholders to date.

- Least people impacted
- Avoid densely populated areas
- Ignore political and regional boundaries (impartial)
- Should be no quotas by region
- No "new noise" (avoid new populations being impacted)
- Noise sharing
- Respite
- People choosing to live in rural and less populated areas are usually also the people who are naturally more sensitive to noise
- Try not to set communities against each other
- Transparency
- ICAO Balanced Approach to be applied
- One Citizen=One Citizen

Considered "best practice" examples from other airports will also reviewed.

Appendix A Input data

A-1 Runway Data

Table 11: Runway Data

Runway End	Latitude	Longitude	Elevation (Feet)	Approach Displaced Threshold (Feet)	Departure Displaced Threshold (Feet)
01	50.886928	4.491414	184	151	0
19	50.912928	4.502019	107	722	722
07R	50.889039	4.480425	174	401	1050
25L	50.898942	4.523300	159	0	0
07L	50.899067	4.456219	138	847	0
25R	50.912664	4.503267	108	985	985
ARP	50.901389	4.484444	184[1]	--	--

Source: Adapted from Aeronautical Information Publication (AIP) Belgium & Luxembourg

A-2 Weather Data

Table 12: Weather Details

Temperature (°F)	51.5
Pressure (millibars)	1,009.29
Sea Level Pressure (millibars)	1,016.33
Relative Humidity (%)	79.33
Dew Point (°F)	44.98
Wind Speed (Knots)	7.28

Source: AEDT default weather

A-3 Fleet Mix

Table 13: Fleet Mix

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Arrivals	Departures
560	CNA560XL	Cessna Citation Excel 560 / PW545A		1
A124	74720B	Boeing 747-200/JT9D-7Q	1	1
A148	737700	Boeing 737-700/CFM56-7B24	1	1
A20N	A320-232	Airbus A320-211/CFM56-5A1	171	171
A21N	A321-232	Airbus A321-232/IAE V2530-A5	7	7
A306	A300-622R	Airbus A300-622R/PW4158	1,352	1,353
A310	A310-304	Airbus A310-304/GE CF6-80C2A2	37	37
A318	A319-131	Airbus A319-131/V2522-A5	71	71
A319	A319-131	Airbus A319-131/V2522-A5	29,530	29,554
A320	A320-211	Airbus A320-211/CFM56-5A1	21,965	21,994
A321	A321-232	Airbus A321-232/IAE V2530-A5	2,598	2,596
A332	A330-343	Airbus A330-343/RR Trent 772B	2,176	2,171
A333	A330-343	Airbus A330-343/RR Trent 772B	2,545	2,534
A342	A340-211	Airbus A340-211/CFM56-5C2	3	3
A343	A340-211	Airbus A340-211/CFM56-5C2	35	34
A345	A340-642	Airbus A340-642/RR Trent 556	9	9
A346	A340-642	Airbus A340-642/RR Trent 556	5	5
A359	777200	Boeing 777-200/GE90-76B	278	278
A400	C130	C-130H/T56-A-15	14	14
AC90	CNA441	Cessna CONQUEST II /TPE331-8	1	1
AEST	BEC58P	Raytheon BARON 58P/TS10-520-L	1	1
AN12	C130E	C-130E/T56-A-7	6	6
AN26	DHC8	Bombardier de Havilland DASH 8-100/PW121	4	4
AN30	DHC8	Bombardier de Havilland DASH 8-100/PW121	4	5
ASTR	IA1125	IAI-1125 ASTRA/TFE731-3A	17	18
AT43	DHC8	Bombardier de Havilland DASH 8-100/PW121	1	1

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Arrivals	Departures
AT45	DHC8	Bombardier de Havilland DASH 8-100/PW121	6	6
AT72	HS748A	Hawker Siddeley HS-748/DART MK532-2	48	48
AT73	HS748A	Hawker Siddeley HS-748/DART MK532-2	7	7
AT75	HS748A	Hawker Siddeley HS-748/DART MK532-2	28	28
ATP	HS748A	Hawker Siddeley HS-748/DART MK532-2	159	158
B190	1900D	Beech 1900D/PT6A67	4	4
B350	DHC6	De Havilland DASH 6/PT6A-27	58	58
B461	BAE146	BAe 146-200/ALF502R-5	21	21
B462	BAE146	BAe 146-200/ALF502R-5	19	17
B463	BAE300	BAe 146-300/ALF502R-5	4	4
B733	737300	Boeing 737-300/CFM56-3B-1	733	737
B734	737400	Boeing 737-400/CFM56-3C-1	2,168	2,169
B735	737500	Boeing 737-500/CFM56-3C-1	589	588
B736	737700	Boeing 737-700/CFM56-7B24	343	343
B737	737700	Boeing 737-700/CFM56-7B24	2,066	2,064
B738	737800	Boeing 737-800/CFM56-7B26	14,562	14,607
B739	737800	Boeing 737-800/CFM56-7B26	70	69
B742	74720B	Boeing 747-200/JT9D-7Q	4	4
B744	747400	Boeing 747-400/PW4056	1,106	1,102
B748	7478	Boeing 747-8F / Genx-2B67	4	4
B752	757RR	Boeing 757-200/RB211-535E4	1,645	1,643
B753	757300	Boeing 757-300/RB211-535E4B	29	29
B763	767300	Boeing 767-300/PW4060	1,735	1,734
B764	767400	Boeing 767-400ER/CF6-80C2B(F)	258	258
B772	777200	Boeing 777-200/GE90-76B	789	784
B773	777300	Boeing 777-300/Trent 892	35	35
B77L	7773ER	Boeing 777-300ER / GE 90-115B-EIS	868	866
B77W	7773ER	Boeing 777-300ER / GE 90-115B-EIS	537	535

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Arrivals	Departures
B788	7878R	Boeing 787-8/T1000-C/01 Family Plan Cert	1,218	1,215
B789	7878R	Boeing 787-8/T1000-C/01 Family Plan Cert	49	50
BCS1	737500	Boeing 737-500/CFM56-3C-1	498	501
BCS3	737500	Boeing 737-500/CFM56-3C-1	32	32
BE20	DHC6	De Havilland DASH 6/PT6A-27	56	57
BE40	MU3001	Mitsubishi MU300-10 Diamond II/JT15D-5	23	23
BE9L	CNA441	Cessna CONQUEST II /TPE331-8	17	17
C130	C130E	C-130E/T56-A-7	540	485
C160	HS748A	Hawker Siddeley HS-748/DART MK532-2	18	18
C17	C17	F117-PW-100	33	34
C182	CNA182	Cessna 182H / Continental O-470-R	56	62
C25A	CNA500	Cessna Citation II/JT15D-4	274	273
C25B	CNA500	Cessna Citation II/JT15D-4	291	290
C25C	CIT3	Cessna Citation III/TFE731-3-100S	29	29
C25M	CNA525C	Cessna Citation CJ4 525C /FJ44-4A	10	10
C27J	SF340	Saab SF340B/CT7-9B	11	12
C295	DHC8	Bombardier de Havilland DASH 8-100/PW121	20	20
C30J	C130AD	Lockheed Hercules T56-A15	7	7
C421	BEC58P	Raytheon BARON 58P/TS10-520-L	1	1
C425	CNA441	Cessna CONQUEST II /TPE331-8	21	21
C441	CNA441	Cessna CONQUEST II /TPE331-8	1	1
C500	CNA500	Cessna Citation II/JT15D-4	2	2
C501	CNA500	Cessna Citation II/JT15D-4	6	6
C510	ECLIPSE500	Eclipse 500 / PW610F	261	265
C525	CNA500	Cessna Citation II/JT15D-4	87	88
C550	CNA500	Cessna Citation II/JT15D-4	51	51
C551	CNA55B	Cessna 550 Citation Bravo/PW530A	3	3
C55B	CNA55B	Cessna 550 Citation Bravo/PW530A	1	1

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Arrivals	Departures
C560	CNA55B	Cessna 550 Citation Bravo/PW530A	18	18
C56X	CNA55B	Cessna 550 Citation Bravo/PW530A	713	710
C650	CIT3	Cessna Citation III/TFE731-3-100S	42	42
C680	CNA680	Cessna Citation Sovereign 680 / PW306C	65	67
C68A	CNA680	Cessna Citation Sovereign 680 / PW306C	35	34
C750	CNA750	Cessna Citation X/Rolls Royce Allison AE3007C	20	20
CL30	CL600	Canadair CL-600/ALF502L	30	31
CL35	CL600	Canadair CL-600/ALF502L	42	42
CL60	CL601	Canadair CL-601/CF34-3A	121	120
CN35	SF340	Saab SF340B/CT7-9B	6	5
CRJ2	CL601	Canadair CL-601/CF34-3A	49	49
CRJ7	CRJ9-ER	Bombardier CL-600-2D15/CL-600-2D24/CF34-8C5	255	256
CRJ9	CRJ9-ER	Bombardier CL-600-2D15/CL-600-2D24/CF34-8C5	2,305	2,303
CRJX	CRJ9-LR	Bombardier CL-600-2D15/CL-600-2D24/CF34-8C5	137	137
D328	DO328	Dornier 328-100 / PW119C	8	8
DA42	BEC58P	Raytheon BARON 58P/TS10-520-L	2	2
DC10	DC1010	McDonnell Douglas DC10-10/CF6-6D	3	3
DH8D	DHC830	Bombardier de Havilland DASH 8-300/PW123	2,605	2,608
DHC6	DHC6	De Havilland DASH 6/PT6A-27	1	1
DHC8	DHC830	Bombardier de Havilland DASH 8-300/PW123	11	10
E120	EMB120	Embraer 120 ER / Pratt & Whitney PW118	34	34
E121	EMB120	Embraer 120 ER / Pratt & Whitney PW118	3	3
E135	EMB145	Embraer 145 ER / Allison AE3007	743	741
E145	EMB145	Embraer 145 ER / Allison AE3007	3,751	3,747
E170	EMB170	ERJ170-100	1,877	1,881
E190	EMB190	ERJ190-100	4,809	4,815

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Arrivals	Departures
E195	EMB195	ERJ190-200	292	292
E35L	EMB145	Embraer 145 ER / Allison AE3007	36	37
E3TF	707320	Boeing 707-320B/JT3D-7	1	1
E500	CNA208	Cessna 208 / PT6A-114	2	2
E50P	CNA510	Cessna Mustang Model 510 / PW615F	56	56
E530	CNA208	Cessna 208 / PT6A-114	2	2
E545	EMB145	Embraer 145 ER / Allison AE3007	66	66
E550	CL600	Canadair CL-600/ALF502L	7	6
E55P	CL600	Canadair CL-600/ALF502L	151	150
E75L	EMB175	ERJ170-200	53	53
EA50	ECLIPSE500	Eclipse 500 / PW610F	1	1
F10	GASEPV	1985 1-ENG VP PROP	2	2
F100	F10062	Fokker 100/TAY 620-15	262	262
F260	GASEPV	1985 1-ENG VP PROP	3	4
F2TH	CL600	Canadair CL-600/ALF502L	380	375
F406	DHC6	De Havilland DASH 6/PT6A-27	1	1
F50	F10062	Fokker 100/TAY 620-15	11	10
F70	F10062	Fokker 100/TAY 620-15	412	413
F900	F10062	Fokker 100/TAY 620-15	285	287
FA10	LEAR35	Learjet 36/TFE731-2	3	3
FA50	F10062	Fokker 100/TAY 620-15	48	48
FA7X	GIV	Gulfstream GIV-SP/TAY 611-8	156	157
FA8X	GIV	Gulfstream GIV-SP/TAY 611-8	5	5
G150	IA1125	IAI-1125 ASTRA/TFE731-3A	10	10
G280	CL600	Canadair CL-600/ALF502L	7	7
GALX	CL600	Canadair CL-600/ALF502L	13	13
GL5T	BD-700-1A10	BD-700-1A10\BR700-710A2-20 Bombardier Global Express	69	69

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Arrivals	Departures
GLEX	BD-700-1A11	BD-700-1A11\BR700-710A2-20 Bombardier Global 5000 Business	96	97
GLF3	GIIB	Gulfstream GIIB/GIII - SPEY 511-8	1	1
GLF4	GIV	Gulfstream GIV-SP/TAY 611-8	73	73
GLF5	GV	Gulfstream GV/BR 710	140	140
GLF6	GV	Gulfstream GV/BR 710	42	42
H25B	LEAR35	Learjet 36/TFE731-2	82	83
HA4T	CL600	Canadair CL-600/ALF502L	10	10
HDJT	CNA55B	Cessna 550 Citation Bravo/PW530A	5	5
HS25	LEAR35	Learjet 36/TFE731-2	1	1
J328	CNA750	Cessna Citation X/Rolls Royce Allison AE3007C	2	2
L410	DHC6	De Havilland DASH 6/PT6A-27	4	4
LJ31	LEAR35	Learjet 36/TFE731-2	10	10
LJ35	LEAR35	Learjet 36/TFE731-2	55	55
LJ40	LEAR35	Learjet 36/TFE731-2	3	3
LJ45	LEAR35	Learjet 36/TFE731-2	101	102
LJ55	LEAR35	Learjet 36/TFE731-2	12	12
LJ60	CNA55B	Cessna 550 Citation Bravo/PW530A	26	26
LJ75	CIT3	Cessna Citation III/TFE731-3-100S	3	2
M20P	GASEPV	1985 1-ENG VP PROP	1	1
MD82	MD82	McDonnell Douglas MD-82/JT8D-217A	2	2
MD83	MD83	McDonnell Douglas MD-83/JT8D-219	3	3
MD87	MD81	McDonnell Douglas MD-81/JT8D-209	1	1
P180	SD330	Short SD3-30/PT6A-45AR	37	38
P210	CNA206	Cessna 206H/Lycoming IO-540-AC	3	5
P46T	CNA208	Cessna 208 / PT6A-114	1	1
PA27	BEC58P	Raytheon BARON 58P/TS10-520-L	1	1
PA34	BEC58P	Raytheon BARON 58P/TS10-520-L	1	1

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Arrivals	Departures
PA44	BEC58P	Raytheon BARON 58P/TS10-520-L	1	1
PA46	CNA208	Cessna 208 / PT6A-114	4	4
PAY1	CNA441	Cessna CONQUEST II /TPE331-8	6	6
PAY2	CNA441	Cessna CONQUEST II /TPE331-8	1	1
PAY3	PA42	Piper PA-42 / PT6A-41	12	12
PAY4	PA42	Piper PA-42 / PT6A-41	4	4
PC12	CNA208	Cessna 208 / PT6A-114	175	175
PRM1	LEAR35	Learjet 36/TFE731-2	20	20
RJ1H	BAE146	BAe 146-200/ALF502R-5	2,496	2,506
RJ85	BAE146	BAe 146-200/ALF502R-5	24	24
SB20	HS748A	Hawker Siddeley HS-748/DART MK532-2	3	3
SC7	DHC6	De Havilland DASH 6/PT6A-27	21	12
SF34	SF340	Saab SF340B/CT7-9B	18	18
SR22	GASEPV	1985 1-ENG VP PROP	3	3
SU95	EMB190	ERJ190-100	2,411	2,406
SW3	DHC6	De Havilland DASH 6/PT6A-27	1	1
SW4	DHC6	De Havilland DASH 6/PT6A-27	7	7
T154	727D17	Boeing 727-200/JT8D-17	1	1
T204	757RR	Boeing 757-200/RB211-535E4	1	1
TBM7	CNA208	Cessna 208 / PT6A-114	13	12
TBM8	CNA208	Cessna 208 / PT6A-114	7	7
TBM9	CNA208	Cessna 208 / PT6A-114	1	1
YK40	SABR80	NA Sabreliner 80	20	20
		Sub-Total	118,328	118,351
		Total	236,679	

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A-4 Departure Profile Distribution

Table 14: Departure Profile Distribution

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Max Profile Stage	Departure Profile								
				1	2	3	4	5	6	7	8	9
560	CNA560XL	Cessna Citation Excel 560 / PW545A	1	1								
A124	74720B	Boeing 747-200/JT9D-7Q	7				1					
A148	737700	Boeing 737-700/CFM56-7B24	6			1						
A20N	A320-211	Airbus A320-211/CFM56-5A1	5	96	74	1						
A21N	A321-232	Airbus A321-232/IAE V2530-A5	5			7						
A306	A300-622R	Airbus A300-622R/PW4158	6	935	361	6	49	2				
A310	A310-304	Airbus A310-304/GE CF6-80C2A2	6	2	2	1		32				
A318	A319-131	Airbus A319-131/V2522-A5	5		69		2					
A319	A319-131	Airbus A319-131/V2522-A5	5	19,130	9,451	854	118	1				
A320	A320-211	Airbus A320-211/CFM56-5A1	5	8,696	7,002	4,155	2,139	2				
A321	A321-232	Airbus A321-232/IAE V2530-A5	5	579	486	1,483	47	1				
A332	A330-343	Airbus A330-343/RR Trent 772B	7	25	23	14	21	1,875	211	2		
A333	A330-343	Airbus A330-343/RR Trent 772B	7	34	3	18	213	1,987	279			
A342	A340-211	Airbus A340-211/CFM56-5C2	7	1		1		1				
A343	A340-211	Airbus A340-211/CFM56-5C2	7	14	13	4	2	1				

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Max Profile Stage	Departure Profile								
				1	2	3	4	5	6	7	8	9
A345	A340-642	Airbus A340-642/RR Trent 556	7		4	3	1	1				
A346	A340-642	Airbus A340-642/RR Trent 556	7		3		1	1				
A359	777200	Boeing 777-200/GE90-76B	9	1				186		91		
A400	C130	C-130H/T56-A-15	2	10	4							
AC90	CNA441	Cessna CONQUEST II /TPE331-8	1	1								
AEST	BEC58P	Raytheon BARON 58P/TS10-520-L	1	1								
AN12	C130E	C-130E/T56-A-7	2	2	4							
AN26	DHC8	Bombardier de Havilland DASH 8-100/PW121	1	4								
AN30	DHC8	Bombardier de Havilland DASH 8-100/PW121	1	5								
ASTR	IA1125	IAI-1125 ASTRA/TFE731-3A	1	18								
AT43	DHC8	Bombardier de Havilland DASH 8-100/PW121	1	1								
AT45	DHC8	Bombardier de Havilland DASH 8-100/PW121	1	6								
AT72	HS748A	Hawker Siddeley HS-748/DART MK532-2	1	48								
AT73	HS748A	Hawker Siddeley HS-748/DART MK532-2	1	7								
AT75	HS748A	Hawker Siddeley HS-748/DART MK532-2	1	28								
ATP	HS748A	Hawker Siddeley HS-748/DART MK532-2	1	158								

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Max Profile Stage	Departure Profile								
				1	2	3	4	5	6	7	8	9
B190	1900D	Beech 1900D/PT6A67	2	4								
B350	DHC6	De Havilland DASH 6/PT6A-27	1	58								
B461	BAE146	BAe 146-200/ALF502R-5	3	20	1							
B462	BAE146	BAe 146-200/ALF502R-5	3	16	1							
B463	BAE300	BAe 146-300/ALF502R-5	3	4								
B733	737300	Boeing 737-300/CFM56-3B-1	4	272	291	172	2					
B734	737400	Boeing 737-400/CFM56-3C-1	4	847	842	480						
B735	737500	Boeing 737-500/CFM56-3C-1	5	6	350	160	72					
B736	737700	Boeing 737-700/CFM56-7B24	6	4	315	24						
B737	737700	Boeing 737-700/CFM56-7B24	6	292	1,249	308	206	9				
B738	737800	Boeing 737-800/CFM56-7B26	6	3,390	6,541	3,171	1,490	3	12			
B739	737800	Boeing 737-800/CFM56-7B26	6	7	2	20	39	1				
B742	74720B	Boeing 747-200/JT9D-7Q	7	2	2							
B744	747400	Boeing 747-400/PW4056	9	105	35		85	129	278	247	223	
B748	7478	Boeing 747-8F / Genx-2B67	9	4								
B752	757RR	Boeing 757-200/RB211-535E4	7	1,035	360	217	27	3	1			
B753	757300	Boeing 757-300/RB211-535E4B	6	2		27						
B763	767300	Boeing 767-300/PW4060	7	491	25	21	70	595	531	1		
B764	767400	Boeing 767-400ER/CF6-80C2B(F)	7	1				233	24			

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Max Profile Stage	Departure Profile								
				1	2	3	4	5	6	7	8	9
B772	777200	Boeing 777-200/GE90-76B	9	7	1	1		521	254			
B773	777300	Boeing 777-300/Trent 892	7			1		31	3			
B77L	7773ER	Boeing 777-300ER / GE 90-115B-EIS	9	150			1	418	3	294		
B77W	7773ER	Boeing 777-300ER / GE 90-115B-EIS	9	5		2		411		117		
B788	7878R	Boeing 787-8/T1000-C/01 Family Plan Cert	9	12	2			546	305	350		
B789	7878R	Boeing 787-8/T1000-C/01 Family Plan Cert	9	3				5		42		
BCS1	737500	Boeing 737-500/CFM56-3C-1	5	501								
BCS3	737500	Boeing 737-500/CFM56-3C-1	5	9	23							
BE20	DHC6	De Havilland DASH 6/PT6A-27	1	57								
BE40	MU3001	Mitsubishi MU300-10 Diamond II/JT15D-5	1	23								
BE9L	CNA441	Cessna CONQUEST II /TPE331-8	1	17								
C130	C130E	C-130E/T56-A-7	2	357	128							
C160	HS748A	Hawker Siddeley HS-748/DART MK532-2	1	18								
C17	C17	F117-PW-100	1	34								
C182	CNA182	Cessna 182H / Continental O-470-R	1	62								
C25A	CNA500	Cessna Citation II/JT15D-4	1	273								
C25B	CNA500	Cessna Citation II/JT15D-4	1	290								

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Max Profile Stage	Departure Profile								
				1	2	3	4	5	6	7	8	9
C25C	CIT3	Cessna Citation III/TFE731-3-100S	1	29								
C25M	CNA525C	Cessna Citation CJ4 525C /FJ44-4A	1	10								
C27J	SF340	Saab SF340B/CT7-9B	2		12							
C295	DHC8	Bombardier de Havilland DASH 8-100/PW121	1	20								
C30J	C130AD	Lockheed Hercules T56-A15	1	7								
C421	BEC58P	Raytheon BARON 58P/TS10-520-L	1	1								
C425	CNA441	Cessna CONQUEST II /TPE331-8	1	21								
C441	CNA441	Cessna CONQUEST II /TPE331-8	1	1								
C500	CNA500	Cessna Citation II/JT15D-4	1	2								
C501	CNA500	Cessna Citation II/JT15D-4	1	6								
C510	ECLIPSE500	Eclipse 500 / PW610F	3	252	13							
C525	CNA500	Cessna Citation II/JT15D-4	1	88								
C550	CNA500	Cessna Citation II/JT15D-4	1	51								
C551	CNA55B	Cessna 550 Citation Bravo/PW530A	1	3								
C55B	CNA55B	Cessna 550 Citation Bravo/PW530A	1	1								
C560	CNA55B	Cessna 550 Citation Bravo/PW530A	1	18								
C56X	CNA55B	Cessna 550 Citation Bravo/PW530A	1	710								
C650	CIT3	Cessna Citation III/TFE731-3-100S	1	42								

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Max Profile Stage	Departure Profile								
				1	2	3	4	5	6	7	8	9
C680	CNA680	Cessna Citation Sovereign 680 / PW306C	1	67								
C68A	CNA680	Cessna Citation Sovereign 680 / PW306C	1	34								
C750	CNA750	Cessna Citation X/Rolls Royce Allison AE3007C	1	20								
CL30	CL600	Canadair CL-600/ALF502L	1	31								
CL35	CL600	Canadair CL-600/ALF502L	1	42								
CL60	CL601	Canadair CL-601/CF34-3A	1	120								
CN35	SF340	Saab SF340B/CT7-9B	2	4	1							
CRJ2	CL601	Canadair CL-601/CF34-3A	1	49								
CRJ7	CRJ9-ER	Bombardier CL-600-2D15/CL-600-2D24/CF34-8C5	5	204	52							
CRJ9	CRJ9-ER	Bombardier CL-600-2D15/CL-600-2D24/CF34-8C5	5	1,857	445	1						
CRJX	CRJ9-LR	Bombardier CL-600-2D15/CL-600-2D24/CF34-8C5	5	2	135							
D328	DO328	Dornier 328-100 / PW119C	1	8								
DA42	BEC58P	Raytheon BARON 58P/TS10-520-L	1	2								
DC10	DC1010	McDonnell Douglas DC10-10/CF6-6D	6	2				1				
DH8D	DHC830	Bombardier de Havilland DASH 8-300/PW123	1	2,608								
DHC6	DHC6	De Havilland DASH 6/PT6A-27	1	1								

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Max Profile Stage	Departure Profile								
				1	2	3	4	5	6	7	8	9
DHC8	DHC830	Bombardier de Havilland DASH 8-300/PW123	1	10								
E120	EMB120	Embraer 120 ER / Pratt & Whitney PW118	1	34								
E121	EMB120	Embraer 120 ER / Pratt & Whitney PW118	1	3								
E135	EMB145	Embraer 145 ER / Allison AE3007	4	662	48	31						
E145	EMB145	Embraer 145 ER / Allison AE3007	4	3,659	59	29						
E170	EMB170	ERJ170-100	3	1,369	511	1						
E190	EMB190	ERJ190-100	4	1,686	2,894	231	4					
E195	EMB195	ERJ190-200	4	136	156							
E35L	EMB145	Embraer 145 ER / Allison AE3007	4	21	7	6	3					
E3TF	707320	Boeing 707-320B/JT3D-7	7			1						
E500	CNA208	Cessna 208 / PT6A-114	1	2								
E50P	CNA510	Cessna Mustang Model 510 / PW615F	1	56								
E530	CNA208	Cessna 208 / PT6A-114	1	2								
E545	EMB145	Embraer 145 ER / Allison AE3007	4	53	8	2	3					
E550	CL600	Canadair CL-600/ALF502L	1	6								
E55P	CL600	Canadair CL-600/ALF502L	1	150								
E75L	EMB175	ERJ170-200	3	53								
EA50	ECLIPSE500	Eclipse 500 / PW610F	3	1								

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Max Profile Stage	Departure Profile								
				1	2	3	4	5	6	7	8	9
F10	GASEPV	1985 1-ENG VP PROP	1	2								
F100	F10062	Fokker 100/TAY 620-15	3	170	90	2						
F260	GASEPV	1985 1-ENG VP PROP	1	4								
F2TH	CL600	Canadair CL-600/ALF502L	1	375								
F406	DHC6	De Havilland DASH 6/PT6A-27	1	1								
F50	F10062	Fokker 100/TAY 620-15	3	10								
F70	F10062	Fokker 100/TAY 620-15	3	413								
F900	F10062	Fokker 100/TAY 620-15	3	143	93	51						
FA10	LEAR35	Learjet 36/TFE731-2	1	3								
FA50	F10062	Fokker 100/TAY 620-15	3	25	18	5						
FA7X	GIV	Gulfstream GIV-SP/TAY 611-8	1	157								
FA8X	GIV	Gulfstream GIV-SP/TAY 611-8	1	5								
G150	IA1125	IAI-1125 ASTRA/TFE731-3A	1	10								
G280	CL600	Canadair CL-600/ALF502L	1	7								
GALX	CL600	Canadair CL-600/ALF502L	1	13								
GL5T	BD-700-1A10	BD-700-1A10\BR700-710A2-20 Bombardier Global Express	8	51	3	4	3	7	1			
GLEX	BD-700-1A11	BD-700-1A11\BR700-710A2-20 Bombardier Global 5000 Business	7	60	8	6		15	5	3		

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Max Profile Stage	Departure Profile								
				1	2	3	4	5	6	7	8	9
GLF3	GIIB	Gulfstream GIIB/GIII - SPEY 511-8	1	1								
GLF4	GIV	Gulfstream GIV-SP/TAY 611-8	1	73								
GLF5	GV	Gulfstream GV/BR 710	1	140								
GLF6	GV	Gulfstream GV/BR 710	1	42								
H25B	LEAR35	Learjet 36/TFE731-2	1	83								
HA4T	CL600	Canadair CL-600/ALF502L	1	10								
HDJT	CNA55B	Cessna 550 Citation Bravo/PW530A	1	5								
HS25	LEAR35	Learjet 36/TFE731-2	1	1								
J328	CNA750	Cessna Citation X/Rolls Royce Allison AE3007C	1	2								
L410	DHC6	De Havilland DASH 6/PT6A-27	1	4								
LJ31	LEAR35	Learjet 36/TFE731-2	1	10								
LJ35	LEAR35	Learjet 36/TFE731-2	1	55								
LJ40	LEAR35	Learjet 36/TFE731-2	1	3								
LJ45	LEAR35	Learjet 36/TFE731-2	1	102								
LJ55	LEAR35	Learjet 36/TFE731-2	1	12								
LJ60	CNA55B	Cessna 550 Citation Bravo/PW530A	1	26								
LJ75	CIT3	Cessna Citation III/TFE731-3-100S	1	2								
M20P	GASEPV	1985 1-ENG VP PROP	1	1								

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Max Profile Stage	Departure Profile								
				1	2	3	4	5	6	7	8	9
MD82	MD82	McDonnell Douglas MD-82/JT8D-217A	5		2							
MD83	MD83	McDonnell Douglas MD-83/JT8D-219	5		1	2						
MD87	MD81	McDonnell Douglas MD-81/JT8D-209	4	1								
P180	SD330	Short SD3-30/PT6A-45AR	1	38								
P210	CNA206	Cessna 206H/Lycoming IO-540-AC	1	5								
P46T	CNA208	Cessna 208 / PT6A-114	1	1								
PA27	BEC58P	Raytheon BARON 58P/TS10-520-L	1	1								
PA34	BEC58P	Raytheon BARON 58P/TS10-520-L	1	1								
PA44	BEC58P	Raytheon BARON 58P/TS10-520-L	1	1								
PA46	CNA208	Cessna 208 / PT6A-114	1	4								
PAY1	CNA441	Cessna CONQUEST II /TPE331-8	1	6								
PAY2	CNA441	Cessna CONQUEST II /TPE331-8	1	1								
PAY3	PA42	Piper PA-42 / PT6A-41	1	12								
PAY4	PA42	Piper PA-42 / PT6A-41	1	4								
PC12	CNA208	Cessna 208 / PT6A-114	1	175								
PRM1	LEAR35	Learjet 36/TFE731-2	1	20								
RJ1H	BAE146	BAe 146-200/ALF502R-5	3	1,704	802							
RJ85	BAE146	BAe 146-200/ALF502R-5	3	14	10							
SB20	HS748A	Hawker Siddeley HS-748/DART MK532-2	1	3								

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Max Profile Stage	Departure Profile								
				1	2	3	4	5	6	7	8	9
SC7	DHC6	De Havilland DASH 6/PT6A-27	1	12								
SF34	SF340	Saab SF340B/CT7-9B	2	14	4							
SR22	GASEPV	1985 1-ENG VP PROP	1	3								
SU95	EMB190	ERJ190-100	4	1,906	499	1						
SW3	DHC6	De Havilland DASH 6/PT6A-27	1	1								
SW4	DHC6	De Havilland DASH 6/PT6A-27	1	7								
T154	727D17	Boeing 727-200/JT8D-17	4	1								
T204	757RR	Boeing 757-200/RB211-535E4	7	1								
TBM7	CNA208	Cessna 208 / PT6A-114	1	12								
TBM8	CNA208	Cessna 208 / PT6A-114	1	7								
TBM9	CNA208	Cessna 208 / PT6A-114	1	1								
YK40	SABR80	NA Sabreliner 80	1	20								
			Sub-Total	58,394	33,538	11,525	4,599	7,018	1,907	1,147	223	0
				49%	28%	10%	4%	6%	2%	1%	0%	0%
			Total	118,351								

A-5 Time Period Distribution - Arrivals

Table 15: Time Period Distribution - Arrivals

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Day	Evening	Night
A124	74720B	Boeing 747-200/JT9D-7Q	1		
A148	737700	Boeing 737-700/CFM56-7B24	1		
A20N	A320-211	Airbus A320-211/CFM56-5A1	122	45	4
A21N	A321-232	Airbus A321-232/IAE V2530-A5	7		
A306	A300-622R	Airbus A300-622R/PW4158	274	142	936
A310	A310-304	Airbus A310-304/GE CF6-80C2A2	36	1	
A318	A319-131	Airbus A319-131/V2522-A5	56	15	
A319	A319-131	Airbus A319-131/V2522-A5	20,302	7,649	1,579
A320	A320-211	Airbus A320-211/CFM56-5A1	14,288	5,342	2,335
A321	A321-232	Airbus A321-232/IAE V2530-A5	1,912	568	118
A332	A330-343	Airbus A330-343/RR Trent 772B	1,006	222	948
A333	A330-343	Airbus A330-343/RR Trent 772B	950	26	1,569
A342	A340-211	Airbus A340-211/CFM56-5C2	3		
A343	A340-211	Airbus A340-211/CFM56-5C2	28	6	1
A345	A340-642	Airbus A340-642/RR Trent 556	4	4	1
A346	A340-642	Airbus A340-642/RR Trent 556	3	1	1
A359	777200	Boeing 777-200/GE90-76B	199	1	78
A400	C130	C-130H/T56-A-15	12	1	1
AC90	CNA441	Cessna CONQUEST II /TPE331-8			1
AEST	BEC58P	Raytheon BARON 58P/TS10-520-L	1		
AN12	C130E	C-130E/T56-A-7	4	1	1
AN26	DHC8	Bombardier de Havilland DASH 8-100/PW121	4		
AN30	DHC8	Bombardier de Havilland DASH 8-100/PW121	4		

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Day	Evening	Night
ASTR	IA1125	IAI-1125 ASTRA/TFE731-3A	13	3	1
AT43	DHC8	Bombardier de Havilland DASH 8-100/PW121	1		
AT45	DHC8	Bombardier de Havilland DASH 8-100/PW121	5	1	
AT72	HS748A	Hawker Siddeley HS-748/DART MK532-2	3	36	9
AT73	HS748A	Hawker Siddeley HS-748/DART MK532-2	1	2	4
AT75	HS748A	Hawker Siddeley HS-748/DART MK532-2	22	6	
ATP	HS748A	Hawker Siddeley HS-748/DART MK532-2	6	108	45
B190	1900D	Beech 1900D/PT6A67	3		1
B350	DHC6	De Havilland DASH 6/PT6A-27	39	19	
B461	BAE146	BAe 146-200/ALF502R-5	15	5	1
B462	BAE146	BAe 146-200/ALF502R-5	10	7	2
B463	BAE300	BAe 146-300/ALF502R-5			4
B733	737300	Boeing 737-300/CFM56-3B-1	590	127	16
B734	737400	Boeing 737-400/CFM56-3C-1	588	329	1,251
B735	737500	Boeing 737-500/CFM56-3C-1	392	81	116
B736	737700	Boeing 737-700/CFM56-7B24	277	66	
B737	737700	Boeing 737-700/CFM56-7B24	1,469	400	197
B738	737800	Boeing 737-800/CFM56-7B26	9,440	3,868	1,254
B739	737800	Boeing 737-800/CFM56-7B26	59	11	
B742	74720B	Boeing 747-200/JT9D-7Q	3	1	
B744	747400	Boeing 747-400/PW4056	841	170	95
B748	7478	Boeing 747-8F / Genx-2B67	4		
B752	757RR	Boeing 757-200/RB211-535E4	275	44	1,326
B753	757300	Boeing 757-300/RB211-535E4B	28		1

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Day	Evening	Night
B763	767300	Boeing 767-300/PW4060	847	355	533
B764	767400	Boeing 767-400ER/CF6-80C2B(F)	227		31
B772	777200	Boeing 777-200/GE90-76B	641	1	147
B773	777300	Boeing 777-300/Trent 892	33		2
B77L	7773ER	Boeing 777-300ER / GE 90-115B-EIS	586	227	55
B77W	7773ER	Boeing 777-300ER / GE 90-115B-EIS	480	7	50
B788	7878R	Boeing 787-8/T1000-C/01 Family Plan Cert	1,046	8	164
B789	7878R	Boeing 787-8/T1000-C/01 Family Plan Cert	22		27
BCS1	737500	Boeing 737-500/CFM56-3C-1	258	221	19
BCS3	737500	Boeing 737-500/CFM56-3C-1	31	1	
BE20	DHC6	De Havilland DASH 6/PT6A-27	53	1	2
BE40	MU3001	Mitsubishi MU300-10 Diamond II/JT15D-5	15	5	3
BE9L	CNA441	Cessna CONQUEST II /TPE331-8	14	1	2
C130	C130E	C-130E/T56-A-7	443	89	8
C160	HS748A	Hawker Siddeley HS-748/DART MK532-2	17	1	
C17	C17	F117-PW-100	17	7	9
C182	CNA182	Cessna 182H / Continental O-470-R	55	1	
C25A	CNA500	Cessna Citation II/JT15D-4	196	65	13
C25B	CNA500	Cessna Citation II/JT15D-4	193	88	10
C25C	CIT3	Cessna Citation III/TFE731-3-100S	24	5	
C25M	CNA525C	Cessna Citation CJ4 525C /FJ44-4A	9	1	
C27J	SF340	Saab SF340B/CT7-9B	10	1	
C295	DHC8	Bombardier de Havilland DASH 8-100/PW121	19	1	
C30J	C130AD	Lockheed Hercules T56-A15	7		
C421	BEC58P	Raytheon BARON 58P/TS10-520-L	1		

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Day	Evening	Night
C425	CNA441	Cessna CONQUEST II /TPE331-8	10	4	7
C441	CNA441	Cessna CONQUEST II /TPE331-8	1		
C500	CNA500	Cessna Citation II/JT15D-4	1	1	
C501	CNA500	Cessna Citation II/JT15D-4	4	1	1
C510	ECLIPSE500	Eclipse 500 / PW610F	204	45	12
C525	CNA500	Cessna Citation II/JT15D-4	62	12	13
C550	CNA500	Cessna Citation II/JT15D-4	38	10	3
C551	CNA55B	Cessna 550 Citation Bravo/PW530A	3		
C55B	CNA55B	Cessna 550 Citation Bravo/PW530A	1		
C560	CNA55B	Cessna 550 Citation Bravo/PW530A	13	4	1
C56X	CNA55B	Cessna 550 Citation Bravo/PW530A	480	202	31
C650	CIT3	Cessna Citation III/TFE731-3-100S	28	13	1
C680	CNA680	Cessna Citation Sovereign 680 / PW306C	50	10	5
C68A	CNA680	Cessna Citation Sovereign 680 / PW306C	29	6	
C750	CNA750	Cessna Citation X/Rolls Royce Allison AE3007C	13	4	3
CL30	CL600	Canadair CL-600/ALF502L	20	7	3
CL35	CL600	Canadair CL-600/ALF502L	37	5	
CL60	CL601	Canadair CL-601/CF34-3A	105	8	8
CN35	SF340	Saab SF340B/CT7-9B	3	2	1
CRJ2	CL601	Canadair CL-601/CF34-3A	31	14	4
CRJ7	CRJ9-ER	Bombardier CL-600-2D15/CL-600-2D24/CF34-8C5	214	40	1
CRJ9	CRJ9-ER	Bombardier CL-600-2D15/CL-600-2D24/CF34-8C5	1,821	483	1
CRJX	CRJ9-LR	Bombardier CL-600-2D15/CL-600-2D24/CF34-8C5	86	51	
D328	DO328	Dornier 328-100 / PW119C	6	2	

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Day	Evening	Night
DA42	BEC58P	Raytheon BARON 58P/TS10-520-L	2		
DC10	DC1010	McDonnell Douglas DC10-10/CF6-6D	1	1	1
DH8D	DHC830	Bombardier de Havilland DASH 8-300/PW123	2,111	493	1
DHC6	DHC6	De Havilland DASH 6/PT6A-27	1		
DHC8	DHC830	Bombardier de Havilland DASH 8-300/PW123	8	3	
E120	EMB120	Embraer 120 ER / Pratt & Whitney PW118	1	3	30
E121	EMB120	Embraer 120 ER / Pratt & Whitney PW118	3		
E135	EMB145	Embraer 145 ER / Allison AE3007	410	328	5
E145	EMB145	Embraer 145 ER / Allison AE3007	2,401	1,328	22
E170	EMB170	ERJ170-100	1,235	627	15
E190	EMB190	ERJ190-100	3,424	1,183	202
E195	EMB195	ERJ190-200	222	69	1
E35L	EMB145	Embraer 145 ER / Allison AE3007	26	7	3
E3TF	707320	Boeing 707-320B/JT3D-7			1
E500	CNA208	Cessna 208 / PT6A-114	2		
E50P	CNA510	Cessna Mustang Model 510 / PW615F	44	10	2
E530	CNA208	Cessna 208 / PT6A-114	2		
E545	EMB145	Embraer 145 ER / Allison AE3007	45	18	3
E550	CL600	Canadair CL-600/ALF502L	6		1
E55P	CL600	Canadair CL-600/ALF502L	130	21	
E75L	EMB175	ERJ170-200	50	3	
EA50	ECLIPSE500	Eclipse 500 / PW610F	1		
F10	GASEPV	1985 1-ENG VP PROP	2		
F100	F10062	Fokker 100/TAY 620-15	180	80	2
F260	GASEPV	1985 1-ENG VP PROP	2	1	

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Day	Evening	Night
F2TH	CL600	Canadair CL-600/ALF502L	260	98	22
F406	DHC6	De Havilland DASH 6/PT6A-27	1		
F50	F10062	Fokker 100/TAY 620-15		10	1
F70	F10062	Fokker 100/TAY 620-15	344	67	1
F900	F10062	Fokker 100/TAY 620-15	206	65	14
FA10	LEAR35	Learjet 36/TFE731-2	3		
FA50	F10062	Fokker 100/TAY 620-15	39	7	2
FA7X	GIV	Gulfstream GIV-SP/TAY 611-8	110	23	23
FA8X	GIV	Gulfstream GIV-SP/TAY 611-8	5		
G150	IA1125	IAI-1125 ASTRA/TFE731-3A	7	2	1
G280	CL600	Canadair CL-600/ALF502L	6	1	
GALX	CL600	Canadair CL-600/ALF502L	11	1	1
GL5T	BD-700-1A10	BD-700-1A10\BR700-710A2-20 Bombardier Global Express	50	14	5
GLEX	BD-700-1A11	BD-700-1A11\BR700-710A2-20 Bombardier Global 5000 Business	70	20	6
GLF3	GIIB	Gulfstream GIIB/GIII - SPEY 511-8		1	
GLF4	GIV	Gulfstream GIV-SP/TAY 611-8	56	8	9
GLF5	GV	Gulfstream GV/BR 710	83	41	16
GLF6	GV	Gulfstream GV/BR 710	32	5	5
H25B	LEAR35	Learjet 36/TFE731-2	67	13	2
HA4T	CL600	Canadair CL-600/ALF502L	8	1	1
HDJT	CNA55B	Cessna 550 Citation Bravo/PW530A	4	1	
HS25	LEAR35	Learjet 36/TFE731-2	1		
J328	CNA750	Cessna Citation X/Rolls Royce Allison AE3007C	1	1	
L410	DHC6	De Havilland DASH 6/PT6A-27	4		
LJ31	LEAR35	Learjet 36/TFE731-2	7	2	1
LJ35	LEAR35	Learjet 36/TFE731-2	39	12	4

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Day	Evening	Night
LJ40	LEAR35	Learjet 36/TFE731-2	3		
LJ45	LEAR35	Learjet 36/TFE731-2	66	23	12
LJ55	LEAR35	Learjet 36/TFE731-2	9	2	1
LJ60	CNA55B	Cessna 550 Citation Bravo/PW530A	18	7	1
LJ75	CIT3	Cessna Citation III/TFE731-3-100S	2	1	
M20P	GASEPV	1985 1-ENG VP PROP	1		
MD82	MD82	McDonnell Douglas MD-82/JT8D-217A	2		
MD83	MD83	McDonnell Douglas MD-83/JT8D-219	2		1
MD87	MD81	McDonnell Douglas MD-81/JT8D-209		1	
P180	SD330	Short SD3-30/PT6A-45AR	25	8	4
P210	CNA206	Cessna 206H/Lycoming IO-540-AC	3		
P46T	CNA208	Cessna 208 / PT6A-114	1		
PA27	BEC58P	Raytheon BARON 58P/TS10-520-L			1
PA34	BEC58P	Raytheon BARON 58P/TS10-520-L		1	
PA44	BEC58P	Raytheon BARON 58P/TS10-520-L	1		
PA46	CNA208	Cessna 208 / PT6A-114	4		
PAY1	CNA441	Cessna CONQUEST II /TPE331-8	4		2
PAY2	CNA441	Cessna CONQUEST II /TPE331-8	1		
PAY3	PA42	Piper PA-42 / PT6A-41	8	1	3
PAY4	PA42	Piper PA-42 / PT6A-41	4		
PC12	CNA208	Cessna 208 / PT6A-114	145	30	
PRM1	LEAR35	Learjet 36/TFE731-2	17	1	2
RJ1H	BAE146	BAe 146-200/ALF502R-5	1,812	613	71
RJ85	BAE146	BAe 146-200/ALF502R-5	18	4	2
SB20	HS748A	Hawker Siddeley HS-748/DART MK532-2	3		
SC7	DHC6	De Havilland DASH 6/PT6A-27	8	7	6
SF34	SF340	Saab SF340B/CT7-9B	10	6	2

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Day	Evening	Night
SR22	GASEPV	1985 1-ENG VP PROP	3		
SU95	EMB190	ERJ190-100	1,728	536	147
SW3	DHC6	De Havilland DASH 6/PT6A-27		1	
SW4	DHC6	De Havilland DASH 6/PT6A-27	4	3	
T154	727D17	Boeing 727-200/JT8D-17	1		
T204	757RR	Boeing 757-200/RB211-535E4	1		
TBM7	CNA208	Cessna 208 / PT6A-114	13		
TBM8	CNA208	Cessna 208 / PT6A-114	6		1
TBM9	CNA208	Cessna 208 / PT6A-114	1		
YK40	SABR80	NA Sabreliner 80	16	4	
Sub-Total			77,468	27,135	13,725
Percentage of Total			65 %	23%	12%
Total			118,328		

A-6 Time Period Distribution - Departures

Table 16: Time Period Distribution - Departures

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Day	Evening	Night
560	CNA560XL	Cessna Citation Excel 560 / PW545A	1		
A124	74720B	Boeing 747-200/JT9D-7Q	1		
A148	737700	Boeing 737-700/CFM56-7B24		1	
A20N	A320-211	Airbus A320-211/CFM56-5A1	118	46	7
A21N	A321-232	Airbus A321-232/IAE V2530-A5	7		
A306	A300-622R	Airbus A300-622R/PW4158	269	172	912
A310	A310-304	Airbus A310-304/GE CF6-80C2A2	34	3	
A318	A319-131	Airbus A319-131/V2522-A5	51	18	2
A319	A319-131	Airbus A319-131/V2522-A5	20,032	7,897	1,625
A320	A320-211	Airbus A320-211/CFM56-5A1	14,397	5,253	2,344
A321	A321-232	Airbus A321-232/IAE V2530-A5	1,925	541	130
A332	A330-343	Airbus A330-343/RR Trent 772B	1,769	349	53
A333	A330-343	Airbus A330-343/RR Trent 772B	2,479	53	2
A342	A340-211	Airbus A340-211/CFM56-5C2	2	1	
A343	A340-211	Airbus A340-211/CFM56-5C2	26	6	2
A345	A340-642	Airbus A340-642/RR Trent 556	4	5	
A346	A340-642	Airbus A340-642/RR Trent 556	3	1	1
A359	777200	Boeing 777-200/GE90-76B	276	2	
A400	C130	C-130H/T56-A-15	10	4	
AC90	CNA441	Cessna CONQUEST II /TPE331-8	1		
AEST	BEC58P	Raytheon BARON 58P/TS10-520-L	1		
AN12	C130E	C-130E/T56-A-7	5	1	
AN26	DHC8	Bombardier de Havilland DASH 8-100/PW121	4		
AN30	DHC8	Bombardier de Havilland DASH 8-100/PW121	5		

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Day	Evening	Night
ASTR	IA1125	IAI-1125 ASTRA/TFE731-3A	17	1	
AT43	DHC8	Bombardier de Havilland DASH 8-100/PW121	1		
AT45	DHC8	Bombardier de Havilland DASH 8-100/PW121	4	2	
AT72	HS748A	Hawker Siddeley HS-748/DART MK532-2	11	4	33
AT73	HS748A	Hawker Siddeley HS-748/DART MK532-2			7
AT75	HS748A	Hawker Siddeley HS-748/DART MK532-2	24	3	1
ATP	HS748A	Hawker Siddeley HS-748/DART MK532-2	4	1	153
B190	1900D	Beech 1900D/PT6A67	4		
B350	DHC6	De Havilland DASH 6/PT6A-27	43	13	2
B461	BAE146	BAe 146-200/ALF502R-5	16	3	2
B462	BAE146	BAe 146-200/ALF502R-5	8	7	2
B463	BAE300	BAe 146-300/ALF502R-5		4	
B733	737300	Boeing 737-300/CFM56-3B-1	564	156	17
B734	737400	Boeing 737-400/CFM56-3C-1	623	461	1,085
B735	737500	Boeing 737-500/CFM56-3C-1	394	48	146
B736	737700	Boeing 737-700/CFM56-7B24	255	88	
B737	737700	Boeing 737-700/CFM56-7B24	1,111	625	328
B738	737800	Boeing 737-800/CFM56-7B26	10,433	2,452	1,722
B739	737800	Boeing 737-800/CFM56-7B26	52	17	
B742	74720B	Boeing 747-200/JT9D-7Q	2	2	
B744	747400	Boeing 747-400/PW4056	576	508	18
B748	7478	Boeing 747-8F / Genx-2B67	2	2	
B752	757RR	Boeing 757-200/RB211-535E4	271	51	1,321
B753	757300	Boeing 757-300/RB211-535E4B	29		

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Day	Evening	Night
B763	767300	Boeing 767-300/PW4060	911	29	794
B764	767400	Boeing 767-400ER/CF6-80C2B(F)	258		
B772	777200	Boeing 777-200/GE90-76B	783	1	
B773	777300	Boeing 777-300/Trent 892	30	5	
B77L	7773ER	Boeing 777-300ER / GE 90-115B-EIS	294	398	174
B77W	7773ER	Boeing 777-300ER / GE 90-115B-EIS	471	62	2
B788	7878R	Boeing 787-8/T1000-C/01 Family Plan Cert	588	619	8
B789	7878R	Boeing 787-8/T1000-C/01 Family Plan Cert	36	14	
BCS1	737500	Boeing 737-500/CFM56-3C-1	410	91	
BCS3	737500	Boeing 737-500/CFM56-3C-1	23	9	
BE20	DHC6	De Havilland DASH 6/PT6A-27	53	3	1
BE40	MU3001	Mitsubishi MU300-10 Diamond II/JT15D-5	22		1
BE9L	CNA441	Cessna CONQUEST II /TPE331-8	12		5
C130	C130E	C-130E/T56-A-7	459	22	4
C160	HS748A	Hawker Siddeley HS-748/DART MK532-2	17	1	
C17	C17	F117-PW-100	21	5	8
C182	CNA182	Cessna 182H / Continental O-470-R	62		
C25A	CNA500	Cessna Citation II/JT15D-4	226	33	14
C25B	CNA500	Cessna Citation II/JT15D-4	249	29	12
C25C	CIT3	Cessna Citation III/TFE731-3-100S	23	6	
C25M	CNA525C	Cessna Citation CJ4 525C /FJ44-4A	8	1	1
C27J	SF340	Saab SF340B/CT7-9B	12		
C295	DHC8	Bombardier de Havilland DASH 8-100/PW121	19	1	
C30J	C130AD	Lockheed Hercules T56-A15	7		
C421	BEC58P	Raytheon BARON 58P/TS10-520-L	1		

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Day	Evening	Night
C425	CNA441	Cessna CONQUEST II /TPE331-8	10	3	8
C441	CNA441	Cessna CONQUEST II /TPE331-8	1		
C500	CNA500	Cessna Citation II/JT15D-4	1	1	
C501	CNA500	Cessna Citation II/JT15D-4	4	2	
C510	ECLIPSE500	Eclipse 500 / PW610F	230	24	11
C525	CNA500	Cessna Citation II/JT15D-4	70	12	6
C550	CNA500	Cessna Citation II/JT15D-4	41	7	3
C551	CNA55B	Cessna 550 Citation Bravo/PW530A	3		
C55B	CNA55B	Cessna 550 Citation Bravo/PW530A	1		
C560	CNA55B	Cessna 550 Citation Bravo/PW530A	14	3	1
C56X	CNA55B	Cessna 550 Citation Bravo/PW530A	621	57	32
C650	CIT3	Cessna Citation III/TFE731-3-100S	31	8	3
C680	CNA680	Cessna Citation Sovereign 680 / PW306C	56	6	5
C68A	CNA680	Cessna Citation Sovereign 680 / PW306C	29	5	
C750	CNA750	Cessna Citation X/Rolls Royce Allison AE3007C	15	5	
CL30	CL600	Canadair CL-600/ALF502L	27	3	1
CL35	CL600	Canadair CL-600/ALF502L	39	3	
CL60	CL601	Canadair CL-601/CF34-3A	105	12	3
CN35	SF340	Saab SF340B/CT7-9B	3	1	1
CRJ2	CL601	Canadair CL-601/CF34-3A	41	7	1
CRJ7	CRJ9-ER	Bombardier CL-600-2D15/CL-600-2D24/CF34-8C5	161	92	3
CRJ9	CRJ9-ER	Bombardier CL-600-2D15/CL-600-2D24/CF34-8C5	1,625	668	10
CRJX	CRJ9-LR	Bombardier CL-600-2D15/CL-600-2D24/CF34-8C5	75	62	
D328	DO328	Dornier 328-100 / PW119C	5	2	1

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Day	Evening	Night
DA42	BEC58P	Raytheon BARON 58P/TS10-520-L	2		
DC10	DC1010	McDonnell Douglas DC10-10/CF6-6D	3		
DH8D	DHC830	Bombardier de Havilland DASH 8-300/PW123	1,856	743	9
DHC6	DHC6	De Havilland DASH 6/PT6A-27	1		
DHC8	DHC830	Bombardier de Havilland DASH 8-300/PW123	8	2	
E120	EMB120	Embraer 120 ER / Pratt & Whitney PW118	30	4	
E121	EMB120	Embraer 120 ER / Pratt & Whitney PW118	3		
E135	EMB145	Embraer 145 ER / Allison AE3007	433	299	9
E145	EMB145	Embraer 145 ER / Allison AE3007	2,456	1,102	189
E170	EMB170	ERJ170-100	1,387	358	136
E190	EMB190	ERJ190-100	3,194	1,075	546
E195	EMB195	ERJ190-200	199	91	2
E35L	EMB145	Embraer 145 ER / Allison AE3007	26	7	4
E3TF	707320	Boeing 707-320B/JT3D-7	1		
E500	CNA208	Cessna 208 / PT6A-114	2		
E50P	CNA510	Cessna Mustang Model 510 / PW615F	48	7	1
E530	CNA208	Cessna 208 / PT6A-114	2		
E545	EMB145	Embraer 145 ER / Allison AE3007	60	3	3
E550	CL600	Canadair CL-600/ALF502L	4	1	1
E55P	CL600	Canadair CL-600/ALF502L	129	15	6
E75L	EMB175	ERJ170-200	50		3
EA50	ECLIPSE500	Eclipse 500 / PW610F	1		
F10	GASEPV	1985 1-ENG VP PROP		2	
F100	F10062	Fokker 100/TAY 620-15	131	128	3
F260	GASEPV	1985 1-ENG VP PROP	4		

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Day	Evening	Night
F2TH	CL600	Canadair CL-600/ALF502L	321	44	10
F406	DHC6	De Havilland DASH 6/PT6A-27	1		
F50	F10062	Fokker 100/TAY 620-15		10	
F70	F10062	Fokker 100/TAY 620-15	351		62
F900	F10062	Fokker 100/TAY 620-15	234	35	18
FA10	LEAR35	Learjet 36/TFE731-2	3		
FA50	F10062	Fokker 100/TAY 620-15	39	7	2
FA7X	GIV	Gulfstream GIV-SP/TAY 611-8	126	19	12
FA8X	GIV	Gulfstream GIV-SP/TAY 611-8	3	1	1
G150	IA1125	IAI-1125 ASTRA/TFE731-3A	9	1	
G280	CL600	Canadair CL-600/ALF502L	7		
GALX	CL600	Canadair CL-600/ALF502L	12	1	
GL5T	BD-700-1A10	BD-700-1A10\BR700-710A2-20 Bombardier Global Express	49	16	4
GLEX	BD-700-1A11	BD-700-1A11\BR700-710A2-20 Bombardier Global 5000 Business	76	16	5
GLF3	GIIB	Gulfstream GIIB/GIII - SPEY 511-8	1		
GLF4	GIV	Gulfstream GIV-SP/TAY 611-8	58	14	1
GLF5	GV	Gulfstream GV/BR 710	114	22	4
GLF6	GV	Gulfstream GV/BR 710	27	11	4
H25B	LEAR35	Learjet 36/TFE731-2	77	5	1
HA4T	CL600	Canadair CL-600/ALF502L	9	1	
HDJT	CNA55B	Cessna 550 Citation Bravo/PW530A	4	1	
HS25	LEAR35	Learjet 36/TFE731-2	1		
J328	CNA750	Cessna Citation X/Rolls Royce Allison AE3007C	1	1	
L410	DHC6	De Havilland DASH 6/PT6A-27	4		
LJ31	LEAR35	Learjet 36/TFE731-2	5	3	2
LJ35	LEAR35	Learjet 36/TFE731-2	34	18	3

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Day	Evening	Night
LJ40	LEAR35	Learjet 36/TFE731-2	3		
LJ45	LEAR35	Learjet 36/TFE731-2	75	13	14
LJ55	LEAR35	Learjet 36/TFE731-2	10	2	
LJ60	CNA55B	Cessna 550 Citation Bravo/PW530A	21	3	2
LJ75	CIT3	Cessna Citation III/TFE731-3-100S	1	1	
M20P	GASEPV	1985 1-ENG VP PROP	1		
MD82	MD82	McDonnell Douglas MD-82/JT8D-217A	1	1	
MD83	MD83	McDonnell Douglas MD-83/JT8D-219	2		1
MD87	MD81	McDonnell Douglas MD-81/JT8D-209	1		
P180	SD330	Short SD3-30/PT6A-45AR	21	11	6
P210	CNA206	Cessna 206H/Lycoming IO-540-AC	5		
P46T	CNA208	Cessna 208 / PT6A-114	1		
PA27	BEC58P	Raytheon BARON 58P/TS10-520-L			1
PA34	BEC58P	Raytheon BARON 58P/TS10-520-L	1		
PA44	BEC58P	Raytheon BARON 58P/TS10-520-L		1	
PA46	CNA208	Cessna 208 / PT6A-114	4		
PAY1	CNA441	Cessna CONQUEST II /TPE331-8	4	1	1
PAY2	CNA441	Cessna CONQUEST II /TPE331-8		1	
PAY3	PA42	Piper PA-42 / PT6A-41	8	1	3
PAY4	PA42	Piper PA-42 / PT6A-41	2	1	1
PC12	CNA208	Cessna 208 / PT6A-114	156	16	3
PRM1	LEAR35	Learjet 36/TFE731-2	14	4	2
RJ1H	BAE146	BAe 146-200/ALF502R-5	1,704	629	173
RJ85	BAE146	BAe 146-200/ALF502R-5	20	2	2
SB20	HS748A	Hawker Siddeley HS-748/DART MK532-2	3		
SC7	DHC6	De Havilland DASH 6/PT6A-27	8	3	1
SF34	SF340	Saab SF340B/CT7-9B	15	2	1

ICAO Aircraft ID	ANP Aircraft ID	ANP Aircraft Description	Day	Evening	Night
SR22	GASEPV	1985 1-ENG VP PROP	3		
SU95	EMB190	ERJ190-100	1,590	652	164
SW3	DHC6	De Havilland DASH 6/PT6A-27		1	
SW4	DHC6	De Havilland DASH 6/PT6A-27	5	2	
T154	727D17	Boeing 727-200/JT8D-17	1		
T204	757RR	Boeing 757-200/RB211-535E4	1		
TBM7	CNA208	Cessna 208 / PT6A-114	11	1	
TBM8	CNA208	Cessna 208 / PT6A-114	7		
TBM9	CNA208	Cessna 208 / PT6A-114	1		
YK40	SABR80	NA Sabreliner 80	17	3	
		Sub-Totals	79,380	26,527	12,444
		Percentage of Total	67%	22%	11%
		Total	118,351		

A-7 Runway Utilization - Arrivals

Table 17: Runway Utilisation - Arrivals

Time Period	ICAO Aircraft ID	ANP Aircraft	ANP Aircraft Description	North Runway		South Runway		Crosswind Runway	
				07L	25R	07R	25L	01	19
Day	A124	74720B	Boeing 747-200/JT9D-7Q		1				
Day	A148	737700	Boeing 737-700/CFM56-7B24		1				
Day	A20N	A320-211	Airbus A320-211/CFM56-5A1		8		155	5	3
Day	A21N	A321-232	Airbus A321-232/IAE V2530-A5	1			6		
Day	A310	A310-304	Airbus A310-304/GE CF6-80C2A2	3	4		27	3	
Day	A318	A319-131	Airbus A319-131/V2522-A5	2	3		57	8	1
Day	A321	A321-232	Airbus A321-232/IAE V2530-A5	54	218	7	2,058	225	36
Day	A332	A330-343	Airbus A330-343/RR Trent 772B	27	487	5	1,451	141	65
Day	A333	A330-343	Airbus A330-343/RR Trent 772B	11	215	11	2,057	155	96
Day	A342	A340-211	Airbus A340-211/CFM56-5C2		3				
Day	A346	A340-642	Airbus A340-642/RR Trent 556	1			4		
Day	A359	777200	Boeing 777-200/GE90-76B	3	10		252	8	5
Day	A400	C130	C-130H/T56-A-15	1	9		2	2	
Day	AEST	BEC58P	Raytheon BARON 58P/TS10-520-L		1				

Time Period	ICAO Aircraft ID	ANP Aircraft	ANP Aircraft Description	North Runway		South Runway		Crosswind Runway	
				07L	25R	07R	25L	01	19
Day	AN12	C130E	C-130E/T56-A-7		5		1		
Day	AN26	DHC8	Bombardier de Havilland DASH 8-100/PW121		3		1		
Day	AN30	DHC8	Bombardier de Havilland DASH 8-100/PW121		4				
Day	ASTR	IA1125	IAI-1125 ASTRA/TFE731-3A	3	13		1		
Day	AT43	DHC8	Bombardier de Havilland DASH 8-100/PW121		1				
Day	AT45	DHC8	Bombardier de Havilland DASH 8-100/PW121				6		
Day	AT72	HS748A	Hawker Siddeley HS-748/DART MK532-2	1	33		10	4	
Day	AT73	HS748A	Hawker Siddeley HS-748/DART MK532-2		7				
Day	AT75	HS748A	Hawker Siddeley HS-748/DART MK532-2		1		24	3	
Day	ATP	HS748A	Hawker Siddeley HS-748/DART MK532-2		125	2	2	27	3
Day	B190	1900D	Beech 1900D/PT6A67				3	1	
Day	B461	BAE146	BAe 146-200/ALF502R-5		14		4	3	
Day	B733	737300	Boeing 737-300/CFM56-3B-1	14	371	1	278	57	12
Day	B734	737400	Boeing 737-400/CFM56-3C-1	28	1,209	10	681	182	58
Day	B735	737500	Boeing 737-500/CFM56-3C-1	9	127	3	386	43	21
Day	B736	737700	Boeing 737-700/CFM56-7B24	8	11		273	41	10
Day	B739	737800	Boeing 737-800/CFM56-7B26	3	4		58	3	2

Time Period	ICAO Aircraft ID	ANP Aircraft	ANP Aircraft Description	North Runway		South Runway		Crosswind Runway	
				07L	25R	07R	25L	01	19
Day	B742	74720B	Boeing 747-200/JT9D-7Q		4				
Day	B748	7478	Boeing 747-8F / Genx-2B67		4				
Day	B752	757RR	Boeing 757-200/RB211-535E4	16	1,183	8	285	130	23
Day	B763	767300	Boeing 767-300/PW4060	16	722	7	807	130	53
Day	B764	767400	Boeing 767-400ER/CF6-80C2B(F)	2	4		219	28	5
Day	B772	777200	Boeing 777-200/GE90-76B	7	22		715	41	4
Day	B773	777300	Boeing 777-300/Trent 892		1		30	2	2
Day	B77L	7773ER	Boeing 777-300ER / GE 90-115B-EIS	24	673	2	78	80	11
Day	B788	7878R	Boeing 787-8/T1000-C/01 Family Plan Cert	27	58	1	1,005	100	27
Day	BCS1	737500	Boeing 737-500/CFM56-3C-1	10	33	3	408	38	6
Day	BCS3	737500	Boeing 737-500/CFM56-3C-1	1	3		28		
Day	BE20	DHC6	De Havilland DASH 6/PT6A-27	1	38		9	7	1
Day	BE40	MU3001	Mitsubishi MU300-10 Diamond II/JT15D-5		13		8	2	
Day	BE9L	CNA441	Cessna CONQUEST II /TPE331-8		11		2	3	1
Day	C130	C130E	C-130E/T56-A-7	15	378	2	65	35	45
Day	C160	HS748A	Hawker Siddeley HS-748/DART MK532-2	1	12		4	1	
Day	C182	CNA182	Cessna 182H / Continental O-470-R	13	39		3		1

Time Period	ICAO Aircraft ID	ANP Aircraft	ANP Aircraft Description	North Runway		South Runway		Crosswind Runway	
				07L	25R	07R	25L	01	19
Day	C25B	CNA500	Cessna Citation II/JT15D-4	6	174	1	74	30	6
Day	C25C	CIT3	Cessna Citation III/TFE731-3-100S		18		6	3	2
Day	C25M	CNA525C	Cessna Citation CJ4 525C /FJ44-4A		3		5	2	
Day	C27J	SF340	Saab SF340B/CT7-9B		5		5	1	
Day	C295	DHC8	Bombardier de Havilland DASH 8-100/PW121		14		2	3	1
Day	C30J	C130AD	Lockheed Hercules T56-A15	2	5				
Day	C421	BEC58P	Raytheon BARON 58P/TS10-520-L		1				
Day	C425	CNA441	Cessna CONQUEST II /TPE331-8		16	1	1	2	1
Day	C441	CNA441	Cessna CONQUEST II /TPE331-8				1		
Day	C500	CNA500	Cessna Citation II/JT15D-4		1		1		
Day	C501	CNA500	Cessna Citation II/JT15D-4		4		2		
Day	C525	CNA500	Cessna Citation II/JT15D-4	3	60		13	9	2
Day	C550	CNA500	Cessna Citation II/JT15D-4	1	33		9	8	
Day	C551	CNA55B	Cessna 550 Citation Bravo/PW530A		1		2		
Day	C55B	CNA55B	Cessna 550 Citation Bravo/PW530A				1		
Day	C560	CNA55B	Cessna 550 Citation Bravo/PW530A	1	12		3	2	
Day	C650	CIT3	Cessna Citation III/TFE731-3-100S	1	26		9	6	

Time Period	ICAO Aircraft ID	ANP Aircraft	ANP Aircraft Description	North Runway		South Runway		Crosswind Runway	
				07L	25R	07R	25L	01	19
Day	C680	CNA680	Cessna Citation Sovereign 680 / PW306C	2	42		17	4	
Day	C68A	CNA680	Cessna Citation Sovereign 680 / PW306C	1	21		10	3	
Day	C750	CNA750	Cessna Citation X/Rolls Royce Allison AE3007C		16		3	1	
Day	CL30	CL600	Canadair CL-600/ALF502L	1	19		9	1	
Day	CL35	CL600	Canadair CL-600/ALF502L		22		13	6	1
Day	CL60	CL601	Canadair CL-601/CF34-3A	3	73		29	15	1
Day	CRJ7	CRJ9-ER	Bombardier CL-600-2D15/CL-600-2D24/CF34-8C5	4	69		162	17	3
Day	CRJ9	CRJ9-ER	Bombardier CL-600-2D15/CL-600-2D24/CF34-8C5	60	255	1	1,727	229	33
Day	CRJX	CRJ9-LR	Bombardier CL-600-2D15/CL-600-2D24/CF34-8C5	5	2		119	11	
Day	D328	DO328	Dornier 328-100 / PW119C	1	6		1		
Day	DA42	BEC58P	Raytheon BARON 58P/TS10-520-L		2				
Day	DH8D	DHC830	Bombardier de Havilland DASH 8-300/PW123	66	826	2	1,383	284	44
Day	DHC6	DHC6	De Havilland DASH 6/PT6A-27		1				
Day	DHC8	DHC830	Bombardier de Havilland DASH 8-300/PW123		8		3		
Day	E121	EMB120	Embraer 120 ER / Pratt & Whitney PW118		2		1		

Time Period	ICAO Aircraft ID	ANP Aircraft	ANP Aircraft Description	North Runway		South Runway		Crosswind Runway	
				07L	25R	07R	25L	01	19
Day	E145	EMB145	Embraer 145 ER / Allison AE3007	68	644	9	2,578	396	56
Day	E170	EMB170	ERJ170-100	37	496	7	1,119	187	31
Day	E195	EMB195	ERJ190-200	2	41		241	4	4
Day	E500	CNA208	Cessna 208 / PT6A-114		1		1		
Day	E50P	CNA510	Cessna Mustang Model 510 / PW615F	1	25		27	3	
Day	E530	CNA208	Cessna 208 / PT6A-114		1		1		
Day	E545	EMB145	Embraer 145 ER / Allison AE3007	1	41		18	5	1
Day	E550	CL600	Canadair CL-600/ALF502L		6		1		
Day	E55P	CL600	Canadair CL-600/ALF502L	3	93		38	17	
Day	EA50	ECLIPSE500	Eclipse 500 / PW610F		1				
Day	F10	GASEPV	1985 1-ENG VP PROP				2		
Day	F100	F10062	Fokker 100/TAY 620-15	6	48		180	24	4
Day	F260	GASEPV	1985 1-ENG VP PROP		1		2		
Day	F2TH	CL600	Canadair CL-600/ALF502L	12	217	1	97	42	11
Day	F406	DHC6	De Havilland DASH 6/PT6A-27		1				
Day	F70	F10062	Fokker 100/TAY 620-15	11	198		154	41	8
Day	F900	F10062	Fokker 100/TAY 620-15	5	186	2	56	32	4

Time Period	ICAO Aircraft ID	ANP Aircraft	ANP Aircraft Description	North Runway		South Runway		Crosswind Runway	
				07L	25R	07R	25L	01	19
Day	FA10	LEAR35	Learjet 36/TFE731-2		2			1	
Day	FA50	F10062	Fokker 100/TAY 620-15	2	34		11		1
Day	FA7X	GIV	Gulfstream GIV-SP/TAY 611-8	2	97		42	13	2
Day	FA8X	GIV	Gulfstream GIV-SP/TAY 611-8	1	3		1		
Day	G280	CL600	Canadair CL-600/ALF502L		2		3	2	
Day	GALX	CL600	Canadair CL-600/ALF502L		12		1		
Day	GL5T	BD-700-1A10	BD-700-1A10\BR700-710A2-20 Bombardier Global Express	2	47		14	5	1
Day	GLEX	BD-700-1A11	BD-700-1A11\BR700-710A2-20 Bombardier Global 5000 Business	4	55		34	3	
Day	GLF5	GV	Gulfstream GV/BR 710	6	88		34	10	2
Day	GLF6	GV	Gulfstream GV/BR 710		23		13	6	
Day	H25B	LEAR35	Learjet 36/TFE731-2		50		23	7	2
Day	HA4T	CL600	Canadair CL-600/ALF502L		8				2
Day	HDJT	CNA55B	Cessna 550 Citation Bravo/PW530A	1	3			1	
Day	HS25	LEAR35	Learjet 36/TFE731-2				1		
Day	L410	DHC6	De Havilland DASH 6/PT6A-27		2		1	1	

Time Period	ICAO Aircraft ID	ANP Aircraft	ANP Aircraft Description	North Runway		South Runway		Crosswind Runway	
				07L	25R	07R	25L	01	19
Day	LJ31	LEAR35	Learjet 36/TFE731-2		7		3		
Day	LJ35	LEAR35	Learjet 36/TFE731-2	3	45		3	4	
Day	LJ40	LEAR35	Learjet 36/TFE731-2		1		2		
Day	LJ45	LEAR35	Learjet 36/TFE731-2	3	77		15	3	3
Day	LJ55	LEAR35	Learjet 36/TFE731-2		9		1	1	1
Day	M20P	GASEPV	1985 1-ENG VP PROP		1				
Day	MD82	MD82	McDonnell Douglas MD-82/JT8D-217A		1		1		
Day	P180	SD330	Short SD3-30/PT6A-45AR		28		4	5	
Day	P210	CNA206	Cessna 206H/Lycoming IO-540-AC		2			1	
Day	P46T	CNA208	Cessna 208 / PT6A-114				1		
Day	PA44	BEC58P	Raytheon BARON 58P/TS10-520-L		1				
Day	PA46	CNA208	Cessna 208 / PT6A-114		3		1		
Day	PAY1	CNA441	Cessna CONQUEST II /TPE331-8		5			1	
Day	PAY2	CNA441	Cessna CONQUEST II /TPE331-8		1				
Day	PAY4	PA42	Piper PA-42 / PT6A-41		3		1		
Day	PC12	CNA208	Cessna 208 / PT6A-114	3	115	1	43	11	2
Day	PRM1	LEAR35	Learjet 36/TFE731-2	1	12		6		1

Time Period	ICAO Aircraft ID	ANP Aircraft	ANP Aircraft Description	North Runway		South Runway		Crosswind Runway	
				07L	25R	07R	25L	01	19
Day	RJ85	BAE146	BAe 146-200/ALF502R-5		7		15	2	
Day	SB20	HS748A	Hawker Siddeley HS-748/DART MK532-2				2	1	
Day	SC7	DHC6	De Havilland DASH 6/PT6A-27	1	17		2	1	
Day	SR22	GASEPV	1985 1-ENG VP PROP		2		1		
Day	T154	727D17	Boeing 727-200/JT8D-17		1				
Day	T204	757RR	Boeing 757-200/RB211-535E4				1		
Day	TBM7	CNA208	Cessna 208 / PT6A-114		8		3	1	1
Day	TBM8	CNA208	Cessna 208 / PT6A-114		3		2	2	
Day	TBM9	CNA208	Cessna 208 / PT6A-114					1	
Evening	A306	A300-622R	Airbus A300-622R/PW4158	6	1,115	10	100	105	16
Evening	A319	A319-131	Airbus A319-131/V2522-A5	662	10,131	51	15,539	2,604	543
Evening	A343	A340-211	Airbus A340-211/CFM56-5C2		16		15	4	
Evening	B350	DHC6	De Havilland DASH 6/PT6A-27	4	40		5	8	1
Evening	B738	737800	Boeing 737-800/CFM56-7B26	311	5,080	40	7,548	1,244	339
Evening	B744	747400	Boeing 747-400/PW4056	26	927	3	24	101	25
Evening	B77W	7773ER	Boeing 777-300ER / GE 90-115B-EIS	16	20		447	46	8
Evening	C25A	CNA500	Cessna Citation II/JT15D-4	9	172		69	19	5

Time Period	ICAO Aircraft ID	ANP Aircraft	ANP Aircraft Description	North Runway		South Runway		Crosswind Runway	
				07L	25R	07R	25L	01	19
Evening	C510	ECLIPSE500	Eclipse 500 / PW610F	2	169		60	26	4
Evening	CN35	SF340	Saab SF340B/CT7-9B		3		2	1	
Evening	E135	EMB145	Embraer 145 ER / Allison AE3007	16	158	1	480	77	11
Evening	E190	EMB190	ERJ190-100	117	840	9	3,292	452	99
Evening	E35L	EMB145	Embraer 145 ER / Allison AE3007	3	21		10	1	1
Evening	E75L	EMB175	ERJ170-200		34		16	1	2
Evening	G150	IA1125	IAI-1125 ASTRA/TFE731-3A		9		1		
Evening	GLF3	GIIB	Gulfstream GIIB/GIII - SPEY 511-8		1				
Evening	J328	CNA750	Cessna Citation X/Rolls Royce Allison AE3007C				2		
Evening	LJ60	CNA55B	Cessna 550 Citation Bravo/PW530A		17		8	1	
Evening	LJ75	CIT3	Cessna Citation III/TFE731-3-100S		3				
Evening	MD87	MD81	McDonnell Douglas MD-81/JT8D-209		1				
Evening	PA34	BEC58P	Raytheon BARON 58P/TS10-520-L		1				
Evening	RJ1H	BAE146	BAe 146-200/ALF502R-5	59	890	5	1,157	325	60
Evening	SF34	SF340	Saab SF340B/CT7-9B		9		4	5	
Evening	SU95	EMB190	ERJ190-100	51	622	2	1,529	173	34
Evening	SW3	DHC6	De Havilland DASH 6/PT6A-27		1				

Time Period	ICAO Aircraft ID	ANP Aircraft	ANP Aircraft Description	North Runway		South Runway		Crosswind Runway	
				07L	25R	07R	25L	01	19
Evening	SW4	DHC6	De Havilland DASH 6/PT6A-27		6		1		
Evening	YK40	SABR80	NA Sabreliner 80	1	11		6	2	
Night	A320	A320-211	Airbus A320-211/CFM56-5A1	466	5,263	52	13,748	1,905	531
Night	A345	A340-642	Airbus A340-642/RR Trent 556		3		6		
Night	AC90	CNA441	Cessna CONQUEST II /TPE331-8		1				
Night	B462	BAE146	BAe 146-200/ALF502R-5		12		5	2	
Night	B463	BAE300	BAe 146-300/ALF502R-5		2		1	1	
Night	B737	737700	Boeing 737-700/CFM56-7B24	40	265	4	1,506	195	56
Night	B753	757300	Boeing 757-300/RB211-535E4B	1	1		25	1	1
Night	B789	7878R	Boeing 787-8/T1000-C/01 Family Plan Cert	1			44	2	2
Night	C17	C17	F117-PW-100	1	22		3	6	1
Night	C56X	CNA55B	Cessna 550 Citation Bravo/PW530A	12	421		179	77	24
Night	CRJ2	CL601	Canadair CL-601/CF34-3A	2	24		18	3	2
Night	DC10	DC1010	McDonnell Douglas DC10-10/CF6-6D		3				
Night	E120	EMB120	Embraer 120 ER / Pratt & Whitney PW118		4		30		
Night	E3TF	707320	Boeing 707-320B/JT3D-7		1				
Night	F50	F10062	Fokker 100/TAY 620-15				11		

Time Period	ICAO Aircraft ID	ANP Aircraft	ANP Aircraft Description	North Runway		South Runway		Crosswind Runway	
				07L	25R	07R	25L	01	19
Night	GLF4	GIV	Gulfstream GIV-SP/TAY 611-8	1	32		28	9	3
Night	MD83	MD83	McDonnell Douglas MD-83/JT8D-219		1		2		
Night	PA27	BEC58P	Raytheon BARON 58P/TS10-520-L						1
Night	PAY3	PA42	Piper PA-42 / PT6A-41		10		1	1	
			Sub-Total	2,441	36,960	264	65,796	10,376	2,491
			Percentage of Total	2%	31%	0.2%	56%	9%	2%
				33%		56%		11%	
			Total	118,328					

A-8 Runway Utilization - Departures

Table 18: Runway Utilisation - Departures

Time Period	ICAO Aircraft ID	ANP Aircraft	ANP Aircraft Description	North Runway		South Runway		Crosswind Runway	
				07L	25R	07R	25L	01	19
Day	560	CNA560XL	Cessna Citation Excel 560 / PW545A		1				
Day	A124	74720B	Boeing 747-200/JT9D-7Q		1				
Day	A20N	A320-211	Airbus A320-211/CFM56-5A1	1	159	3		2	6
Day	A21N	A321-232	Airbus A321-232/IAE V2530-A5		7				
Day	A318	A319-131	Airbus A319-131/V2522-A5		60	10	1		
Day	A321	A321-232	Airbus A321-232/IAE V2530-A5	11	2,132	272	7		174
Day	A333	A330-343	Airbus A330-343/RR Trent 772B	8	2,260	247		4	15
Day	A343	A340-211	Airbus A340-211/CFM56-5C2	2	30	2			
Day	A345	A340-642	Airbus A340-642/RR Trent 556		9				
Day	A359	777200	Boeing 777-200/GE90-76B		256	15	1		6
Day	A400	C130	C-130H/T56-A-15		11	2			1
Day	AC90	CNA441	Cessna CONQUEST II /TPE331-8		1				
Day	AEST	BEC58P	Raytheon BARON 58P/TS10-520-L		1				
Day	AN12	C130E	C-130E/T56-A-7		6				

Time Period	ICAO Aircraft ID	ANP Aircraft	ANP Aircraft Description	North Runway		South Runway		Crosswind Runway	
				07L	25R	07R	25L	01	19
Day	AN26	DHC8	Bombardier de Havilland DASH 8-100/PW121		2				2
Day	AN30	DHC8	Bombardier de Havilland DASH 8-100/PW121		5				
Day	ASTR	IA1125	IAI-1125 ASTRA/TFE731-3A	1	14	1			2
Day	AT43	DHC8	Bombardier de Havilland DASH 8-100/PW121		1				
Day	AT72	HS748A	Hawker Siddeley HS-748/DART MK532-2		45	3			
Day	AT75	HS748A	Hawker Siddeley HS-748/DART MK532-2		25	3			
Day	ATP	HS748A	Hawker Siddeley HS-748/DART MK532-2	22	136				
Day	B190	1900D	Beech 1900D/PT6A67		4				
Day	B462	BAE146	BAe 146-200/ALF502R-5	2	15				
Day	B733	737300	Boeing 737-300/CFM56-3B-1	20	642	59		1	15
Day	B734	737400	Boeing 737-400/CFM56-3C-1	113	1,511	84			461
Day	B735	737500	Boeing 737-500/CFM56-3C-1	3	496	52			37
Day	B737	737700	Boeing 737-700/CFM56-7B24	9	1,773	224		2	56
Day	B739	737800	Boeing 737-800/CFM56-7B26		63	5			1
Day	B742	74720B	Boeing 747-200/JT9D-7Q	2	2				
Day	B752	757RR	Boeing 757-200/RB211-535E4	107	1,099	35	1	1	400
Day	B753	757300	Boeing 757-300/RB211-535E4B		27	2			

Time Period	ICAO Aircraft ID	ANP Aircraft	ANP Aircraft Description	North Runway		South Runway		Crosswind Runway	
				07L	25R	07R	25L	01	19
Day	B763	767300	Boeing 767-300/PW4060	64	1,202	89	32	4	343
Day	B764	767400	Boeing 767-400ER/CF6-80C2B(F)	1	217	38			2
Day	B772	777200	Boeing 777-200/GE90-76B	1	721	60			2
Day	B773	777300	Boeing 777-300/Trent 892		32	3			
Day	B789	7878R	Boeing 787-8/T1000-C/01 Family Plan Cert		45	3		1	1
Day	BCS1	737500	Boeing 737-500/CFM56-3C-1	1	415	45			40
Day	BCS3	737500	Boeing 737-500/CFM56-3C-1		32				
Day	BE20	DHC6	De Havilland DASH 6/PT6A-27	5	44	4		1	3
Day	BE40	MU3001	Mitsubishi MU300-10 Diamond II/JT15D-5		20				3
Day	BE9L	CNA441	Cessna CONQUEST II /TPE331-8	1	11	2	1		2
Day	C130	C130E	C-130E/T56-A-7	36	417	22		1	9
Day	C160	HS748A	Hawker Siddeley HS-748/DART MK532-2		16	2			
Day	C17	C17	F117-PW-100	5	28	1			
Day	C182	CNA182	Cessna 182H / Continental O-470-R	10	47	1		4	
Day	C25B	CNA500	Cessna Citation II/JT15D-4	15	249	20			6
Day	C25C	CIT3	Cessna Citation III/TFE731-3-100S	1	26	2			
Day	C25M	CNA525C	Cessna Citation CJ4 525C /FJ44-4A	1	7	1			1

Time Period	ICAO Aircraft ID	ANP Aircraft	ANP Aircraft Description	North Runway		South Runway		Crosswind Runway	
				07L	25R	07R	25L	01	19
Day	C27J	SF340	Saab SF340B/CT7-9B	1	9	1			1
Day	C295	DHC8	Bombardier de Havilland DASH 8-100/PW121	1	18				1
Day	C30J	C130AD	Lockheed Hercules T56-A15		6	1			
Day	C421	BEC58P	Raytheon BARON 58P/TS10-520-L		1				
Day	C425	CNA441	Cessna CONQUEST II /TPE331-8	1	15	1			4
Day	C441	CNA441	Cessna CONQUEST II /TPE331-8		1				
Day	C500	CNA500	Cessna Citation II/JT15D-4		2				
Day	C510	ECLIPSE500	Eclipse 500 / PW610F	10	230	18		2	5
Day	C525	CNA500	Cessna Citation II/JT15D-4	4	73	6			5
Day	C550	CNA500	Cessna Citation II/JT15D-4	2	40	8		1	
Day	C551	CNA55B	Cessna 550 Citation Bravo/PW530A		2	1			
Day	C55B	CNA55B	Cessna 550 Citation Bravo/PW530A		1				
Day	C560	CNA55B	Cessna 550 Citation Bravo/PW530A	2	14	2			
Day	C650	CIT3	Cessna Citation III/TFE731-3-100S	5	35	1			1
Day	C680	CNA680	Cessna Citation Sovereign 680 / PW306C	3	54	5			5
Day	C68A	CNA680	Cessna Citation Sovereign 680 / PW306C	2	29	2			1
Day	C750	CNA750	Cessna Citation X/Rolls Royce Allison AE3007C		18	2			

Time Period	ICAO Aircraft ID	ANP Aircraft	ANP Aircraft Description	North Runway		South Runway		Crosswind Runway	
				07L	25R	07R	25L	01	19
Day	CL30	CL600	Canadair CL-600/ALF502L	2	27	1		1	
Day	CL35	CL600	Canadair CL-600/ALF502L	1	37	3			1
Day	CL60	CL601	Canadair CL-601/CF34-3A	11	97	9	1		2
Day	CN35	SF340	Saab SF340B/CT7-9B		4	1			
Day	CRJ7	CRJ9-ER	Bombardier CL-600-2D15/CL-600-2D24/CF34-8C5	1	227	21			7
Day	CRJ9	CRJ9-ER	Bombardier CL-600-2D15/CL-600-2D24/CF34-8C5	6	1,923	285	1	1	87
Day	CRJX	CRJ9-LR	Bombardier CL-600-2D15/CL-600-2D24/CF34-8C5	1	120	16			
Day	D328	DO328	Dornier 328-100 / PW119C	1	7				
Day	DA42	BEC58P	Raytheon BARON 58P/TS10-520-L		2				
Day	DC10	DC1010	McDonnell Douglas DC10-10/CF6-6D		3				
Day	DHC6	DHC6	De Havilland DASH 6/PT6A-27		1				
Day	DHC8	DHC830	Bombardier de Havilland DASH 8-300/PW123		10				
Day	E120	EMB120	Embraer 120 ER / Pratt & Whitney PW118		32	2			
Day	E121	EMB120	Embraer 120 ER / Pratt & Whitney PW118	1	2				
Day	E145	EMB145	Embraer 145 ER / Allison AE3007	27	3,218	452			50

Time Period	ICAO Aircraft ID	ANP Aircraft	ANP Aircraft Description	North Runway		South Runway		Crosswind Runway	
				07L	25R	07R	25L	01	19
Day	E195	EMB195	ERJ190-200		274	9			9
Day	E3TF	707320	Boeing 707-320B/JT3D-7		1				
Day	E500	CNA208	Cessna 208 / PT6A-114		2				
Day	E50P	CNA510	Cessna Mustang Model 510 / PW615F	2	49	4			1
Day	E530	CNA208	Cessna 208 / PT6A-114		2				
Day	E545	EMB145	Embraer 145 ER / Allison AE3007	3	58	1			4
Day	E550	CL600	Canadair CL-600/ALF502L		6				
Day	E55P	CL600	Canadair CL-600/ALF502L	3	123	15	1		8
Day	EA50	ECLIPSE500	Eclipse 500 / PW610F		1				
Day	F260	GASEPV	1985 1-ENG VP PROP		4				
Day	F2TH	CL600	Canadair CL-600/ALF502L	29	314	26			6
Day	F406	DHC6	De Havilland DASH 6/PT6A-27						1
Day	F70	F10062	Fokker 100/TAY 620-15	10	354	45			4
Day	F900	F10062	Fokker 100/TAY 620-15	24	240	15			8
Day	FA10	LEAR35	Learjet 36/TFE731-2	1	2				
Day	FA50	F10062	Fokker 100/TAY 620-15	3	42	2			1
Day	FA7X	GIV	Gulfstream GIV-SP/TAY 611-8	10	132	7			8

Time Period	ICAO Aircraft ID	ANP Aircraft	ANP Aircraft Description	North Runway		South Runway		Crosswind Runway	
				07L	25R	07R	25L	01	19
Day	FA8X	GIV	Gulfstream GIV-SP/TAY 611-8		5				
Day	G150	IA1125	IAI-1125 ASTRA/TFE731-3A		9				1
Day	G280	CL600	Canadair CL-600/ALF502L	1	5	1			
Day	GALX	CL600	Canadair CL-600/ALF502L		12	1			
Day	GL5T	BD-700-1A10	BD-700-1A10\BR700-710A2-20 Bombardier Global Express	5	57	4			3
Day	GLEX	BD-700-1A11	BD-700-1A11\BR700-710A2-20 Bombardier Global 5000 Business	2	89	2			4
Day	GLF3	GIIB	Gulfstream GIIB/GIII - SPEY 511-8		1				
Day	GLF4	GIV	Gulfstream GIV-SP/TAY 611-8	4	63	5			1
Day	GLF6	GV	Gulfstream GV/BR 710	2	34	4			2
Day	H25B	LEAR35	Learjet 36/TFE731-2	6	69	5			3
Day	HA4T	CL600	Canadair CL-600/ALF502L	1	8	1			
Day	HDJT	CNA55B	Cessna 550 Citation Bravo/PW530A	1	3	1			
Day	HS25	LEAR35	Learjet 36/TFE731-2		1				
Day	L410	DHC6	De Havilland DASH 6/PT6A-27	1	3				
Day	LJ35	LEAR35	Learjet 36/TFE731-2	5	42	2			6

Time Period	ICAO Aircraft ID	ANP Aircraft	ANP Aircraft Description	North Runway		South Runway		Crosswind Runway	
				07L	25R	07R	25L	01	19
Day	LJ40	LEAR35	Learjet 36/TFE731-2		3				
Day	LJ45	LEAR35	Learjet 36/TFE731-2	4	85	6			7
Day	LJ55	LEAR35	Learjet 36/TFE731-2		10	1			1
Day	LJ60	CNA55B	Cessna 550 Citation Bravo/PW530A	1	20	1			4
Day	M20P	GASEPV	1985 1-ENG VP PROP		1				
Day	MD83	MD83	McDonnell Douglas MD-83/JT8D-219		3				
Day	MD87	MD81	McDonnell Douglas MD-81/JT8D-209		1				
Day	P180	SD330	Short SD3-30/PT6A-45AR	1	33	2	1	1	
Day	P210	CNA206	Cessna 206H/Lycoming IO-540-AC	1	4				
Day	P46T	CNA208	Cessna 208 / PT6A-114		1				
Day	PA34	BEC58P	Raytheon BARON 58P/TS10-520-L			1			
Day	PA46	CNA208	Cessna 208 / PT6A-114		4				
Day	PAY1	CNA441	Cessna CONQUEST II /TPE331-8	1	4				1
Day	PC12	CNA208	Cessna 208 / PT6A-114	8	151	11			5
Day	RJ1H	BAE146	BAe 146-200/ALF502R-5	33	2,055	358			60
Day	RJ85	BAE146	BAe 146-200/ALF502R-5		23	1			
Day	SB20	HS748A	Hawker Siddeley HS-748/DART MK532-2		2	1			

Time Period	ICAO Aircraft ID	ANP Aircraft	ANP Aircraft Description	North Runway		South Runway		Crosswind Runway	
				07L	25R	07R	25L	01	19
Day	SC7	DHC6	De Havilland DASH 6/PT6A-27	2	9				1
Day	SF34	SF340	Saab SF340B/CT7-9B	2	13	3			
Day	SR22	GASEPV	1985 1-ENG VP PROP		3				
Day	SU95	EMB190	ERJ190-100	4	2,094	218	1		89
Day	T154	727D17	Boeing 727-200/JT8D-17		1				
Day	T204	757RR	Boeing 757-200/RB211-535E4		1				
Day	TBM7	CNA208	Cessna 208 / PT6A-114	1	11				
Day	TBM8	CNA208	Cessna 208 / PT6A-114		7				
Day	TBM9	CNA208	Cessna 208 / PT6A-114	1					
Evening	A148	737700	Boeing 737-700/CFM56-7B24		1				
Evening	A306	A300-622R	Airbus A300-622R/PW4158	117	1,079	14			143
Evening	A310	A310-304	Airbus A310-304/GE CF6-80C2A2	1	30	6			
Evening	A319	A319-131	Airbus A319-131/V2522-A5	261	25,173	3,072	4	1	1,043
Evening	A320	A320-211	Airbus A320-211/CFM56-5A1	141	18,756	2,242	24	8	823
Evening	A332	A330-343	Airbus A330-343/RR Trent 772B	56	1,936	162	1	3	13
Evening	A342	A340-211	Airbus A340-211/CFM56-5C2		3				
Evening	A346	A340-642	Airbus A340-642/RR Trent 556		5				

Time Period	ICAO Aircraft ID	ANP Aircraft	ANP Aircraft Description	North Runway		South Runway		Crosswind Runway	
				07L	25R	07R	25L	01	19
Evening	AT45	DHC8	Bombardier de Havilland DASH 8-100/PW121		6				
Evening	B350	DHC6	De Havilland DASH 6/PT6A-27	2	45	9			2
Evening	B463	BAE300	BAe 146-300/ALF502R-5		4				
Evening	B736	737700	Boeing 737-700/CFM56-7B24	1	293	47			2
Evening	B738	737800	Boeing 737-800/CFM56-7B26	135	12,340	1,432	32	3	665
Evening	B744	747400	Boeing 747-400/PW4056	115	965	13	1		8
Evening	B748	7478	Boeing 747-8F / Genx-2B67		4				
Evening	B77L	7773ER	Boeing 777-300ER / GE 90-115B-EIS	94	747	8	4	1	12
Evening	B77W	7773ER	Boeing 777-300ER / GE 90-115B-EIS	3	453	71			8
Evening	B788	7878R	Boeing 787-8/T1000-C/01 Family Plan Cert	5	1,067	133	1		9
Evening	C25A	CNA500	Cessna Citation II/JT15D-4	7	234	16	1	1	14
Evening	C501	CNA500	Cessna Citation II/JT15D-4		6				
Evening	C56X	CNA55B	Cessna 550 Citation Bravo/PW530A	34	601	49	1	2	23
Evening	DH8D	DHC830	Bombardier de Havilland DASH 8-300/PW123	25	2,217	328	1	1	36
Evening	E135	EMB145	Embraer 145 ER / Allison AE3007	14	646	72		1	8
Evening	E170	EMB170	ERJ170-100	15	1,574	207			85
Evening	E190	EMB190	ERJ190-100	18	4,073	532	5	1	186

Time Period	ICAO Aircraft ID	ANP Aircraft	ANP Aircraft Description	North Runway		South Runway		Crosswind Runway	
				07L	25R	07R	25L	01	19
Evening	E35L	EMB145	Embraer 145 ER / Allison AE3007		32	3			2
Evening	F10	GASEPV	1985 1-ENG VP PROP		2				
Evening	F100	F10062	Fokker 100/TAY 620-15	2	203	31			26
Evening	F50	F10062	Fokker 100/TAY 620-15		10				
Evening	GLF5	GV	Gulfstream GV/BR 710	8	116	13	1		2
Evening	J328	CNA750	Cessna Citation X/Rolls Royce Allison AE3007C		2				
Evening	LJ75	CIT3	Cessna Citation III/TFE731-3-100S		1				1
Evening	MD82	MD82	McDonnell Douglas MD-82/JT8D-217A		2				
Evening	PA44	BEC58P	Raytheon BARON 58P/TS10-520-L		1				
Evening	PAY2	CNA441	Cessna CONQUEST II /TPE331-8		1				
Evening	PAY4	PA42	Piper PA-42 / PT6A-41	2	1				1
Evening	SW3	DHC6	De Havilland DASH 6/PT6A-27		1				
Evening	SW4	DHC6	De Havilland DASH 6/PT6A-27		7				
Evening	YK40	SABR80	NA Sabreliner 80	1	15	4			
Night	AT73	HS748A	Hawker Siddeley HS-748/DART MK532-2		7				
Night	B461	BAE146	BAe 146-200/ALF502R-5	1	18	2			
Night	CRJ2	CL601	Canadair CL-601/CF34-3A	1	39	7			2

Time Period	ICAO Aircraft ID	ANP Aircraft	ANP Aircraft Description	North Runway		South Runway		Crosswind Runway	
				07L	25R	07R	25L	01	19
Night	E75L	EMB175	ERJ170-200		52	1			
Night	LJ31	LEAR35	Learjet 36/TFE731-2	1	8				1
Night	PA27	BEC58P	Raytheon BARON 58P/TS10-520-L		1				
Night	PAY3	PA42	Piper PA-42 / PT6A-41	1	9	1			1
Night	PRM1	LEAR35	Learjet 36/TFE731-2		17	1	1		1
			Sub-Totals	1,757	99,928	11,379	125	49	5,113
			Percentage of Total	1%	84%	10%	0.1%	0.04%	4%
				86%		10%		4%	
			Total	118,351					

A-9 Runway Utilization – Time Period

Table 19: Runway Utilisation Time Period - Arrivals

Time Period	North Runway		South Runway		Crosswind Runway	
	07L	25R	07R	25L	01	19
Day	2,022	22,509	6	45,047	6,514	1,370
Evening	403	7,913	156	15,493	2,926	244
Night	16	6,538	102	5,256	936	877
Sub-Totals	2,441	36,960	264	65,796	10,376	2,491
Totals	118,328					

Table 20: Percentage of Runway Utilisation Time Period- Arrivals

Time Period	North Runway		South Runway		Crosswind Runway	
	07L	25R	07R	25L	01	19
Day	3%	29%	0%	58%	8%	2%
Evening	1%	29%	1%	57%	11%	1%
Night	0.1%	48%	0.7%	38%	7%	6%

Table 21: Runway Utilisation Time Period - Departures

Time Period	North Runway		South Runway		Crosswind Runway	
	07L	25R	07R	25L	01	19
Day	813	68,104	7,921	5	48	2,489
Evening	474	22,400	2,965	21	0	667
Night	470	9,424	493	99	1	1,957
Sub-Totals	1,757	99,928	11,379	125	49	5,113
Totals	118,351					

Table 22: Percentage of Runway Utilisation Time Period - Departures

	North Runway	South Runway	Crosswind Runway

Time Period	07L	25R	07R	25L	01	19
Day	1%	86%	10%	0.01%	0.1%	3%
Evening	2%	84%	11%	0.1%	0%	3%
Night	4%	76%	4%	1%	0%	16%

Appendix B Glossary of Abbreviations and Acronyms

ACI	Airports Council International
AEDT	Aviation Environmental Design Tool
AIP	Aeronautical Information Publication
ANP	Aircraft Noise Performance
ANS	Air Navigation Service
ARP	Airport Reference Point
ATC	Air Traffic Control
ATFM	Air Traffic Flow Management
ATM	Air Traffic Movement
B&K	Brüel & Kjær
BAC	Brussels Airport Company
BCAA	Belgian Civil Aviation Authority
BeCA	Belgian Cockpit Association
BRU	Brussels Airport (IATA code)
CAA	Civil Aviation Authority
CDO	Continuous Descent Operations
CEM	Collaborative Environmental Management
CEO	Chief Operating Officer
CO2	Carbon dioxide
CSV	Comma Separated Values
dB	Decibels
DME	Distance Measuring Equipment
EASA	European Aviation Safety Agency
EBBR	Brussels Airport (ICAO code)
EIA	Environmental Impact Assessment
END	Environmental Noise Directive
EU	European Union

FAA	Federal Aviation Administration
FANVA	Fonds pour l'atténuation des nuissances au voisinage de l'aéroport
FPS	Belgian Federal Public Service
FT	Feet
GHS	Global Human Settlement
ha	Hectares
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
INM	Integrated Noise Model
KT	Knots
LDG	Landing
M	Metres
NIMBY	Not in my back yard
NMGF	Noise Model Grid Format
NMT	Noise Monitoring Terminal
NTK	Noise Monitoring and Track Keeping
PBN	Performance Based Navigation
PRS	Preferential Runway System
QC system	Quota Count System
RBCII	Second Brussels Region Case
RNP	Required Navigation Performance
RWY	Runway
SAE-ARP	Society of Automotive Engineers - Aerospace Recommended Practice
SEA	Strategic Environmental Assessment
SES	Single European Sky
SESAR	Single European Sky ATM Research
SIDS	Standard Instrument Departures
SOWAER	Société Wallonne des Aéroports
STARS	Standard Instrument Arrivals

STATBEL	Statistics Belgium
TKOF	Take-off
UBCNA - BUTV	Union Belge Contre les Nuisances Aériennes - Belgische Unie Tegen Vliegtuighinder
VLAREM	Vlaams Reglement betreffende de Milieuvergunning
WGL	Werkgroep Leuven
WHO	World Health Organisation