

Quantifying Noise Impact of Dublin Airport's North Runway Departure Routes: An EIA-Conformance Gap Analysis

Report

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Dublin Airport's North Runway operates on departure routes that differ materially from those assessed in the 2004/2005 Environmental Impact Statement (EIS) underlying the 2007 planning consent, a point not disputed in the public record. This report quantifies the spatial distribution of population exposure associated with that divergence. It does not assess legal compliance with the EIA Directive or planning permission; rather, it provides a reproducible geospatial comparison of assessed and operational routings. SID-compliance corridors are constructed around the published SID ("Routes Flown") and two EIS-consistent alternatives: Strict 5NM (a 5 NM straight segment before any turn, the legacy 28L convention) and Designed (Strict plus a 1.5 NM extension to avoid direct overflight of Dunboyne). Buildings are counted from OpenStreetMap, population estimated from 2022 CSO Small Area data; 28L operations are the existing exposure baseline.

Under the Routes Flown, an estimated 13,923 residents (4,008 buildings) are newly directly overflowed that were not overflowed by three decades of 28L operations, against 998 (330) under Strict 5NM and 1,008 (333) under Designed: 13× more residents and 12× more buildings than either EIS-consistent alternative, within a regulator-anchored 1.5 km corridor (UK DfT track-keeping swathe). At the canonical 1.5 km half-width, the Routes Flown corridor has zero overlap with the 28L Actual corridor. Against the 28L baseline, the Routes Flown reduce the overflowed population by 31%; the Designed alternative would reduce it by 86%, a difference of ~11,000 people.

Each EIS-consistent alternative is realisable at standard 15-degree bank and 250 knots; no geometric or procedure-design constraint was identified that would preclude these alternatives under standard departure design assumptions. Full operational validation (ATC, separation, airspace integration, procedure redesign) is outside the scope of this study, nor is regulatory compliance adjudicated. The report establishes the numerical scale of the departure of the Routes Flown from any feasible EIS-consistent alternative.

The analysis adopts a single-event (L_{Amax}-based) spatial framework to bound the lateral extent of overflight exposure and does not model cumulative noise metrics (L_{den}, L_{night}).

A corridor-width sensitivity sweep ([Annex §9]) finds the point estimates move 10 to 25% across defensible half-widths. At the ICAO RNAV-1 XTT of 1.852 km the newly-overflowed count is 17,137, 22.7% above the 1.5 km canonical: the canonical is the narrower of the two named regulator anchors and is conservative against interest. The order-of-magnitude disparity between the Routes Flown and any EIS-consistent alternative holds across the full 4×3 matrix.

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1 Front matter

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Data availability: All analysis inputs (GeoPackages for route centrelines, selection zones, building footprints, and Small Area census data; georeferenced reference rasters; ADS-B tracks) and the QGIS project that produces every figure are deposited in the same Zenodo record as this report (DOI: 10.5281/zenodo.19567671). A reader with QGIS 3.34 or later can reproduce any number in this report by opening the .qgs project from EIDW-EIA-Conformance-Gap-Analysis-Reproducibility-v1.0.zip. See §6 Reproducibility.

2 Introduction

2.1 A note on terminology (EIA, EIS, EIAR)

The Environmental Impact Assessment (EIA) is the statutory procedure by which the environmental consequences of a proposed development are assessed before consent. The 2004/2005 EIS for the North Runway was prepared under the EIA Directive then in force: Council Directive 85/337/EEC, as amended (notably by Directive 2003/35/EC, which transposed parts of the Aarhus Convention). Directive 85/337/EEC was codified as Directive 2011/92/EU; that codification was itself amended by Directive 2014/52/EU, transposed in Ireland by SI 296/2018, which renamed the output document from “Environmental Impact Statement” (EIS) to “Environmental Impact Assessment Report” (EIAR). The Irish transposition of the EIA procedure has been continuous across the 85/337/EEC → 2011/92/EU → 2014/52/EU progression. “EIS” is preserved throughout this report as the historically correct name for the 2004/2005 report on

which the 2007 An Bord Pleanála grant for the North Runway was based, and for the straight-ahead departure routing assessed in that report (the “EIS Route”). “EIA-Conformance” in the title refers to conformance with the EIA: the statutory procedure (as continuously in force across the directive progression above) and the 2004/2005 assessment produced under it for the North Runway. The gap this report quantifies is between the operating departure routes and the routes assessed and consented under the EIA; no subsequent assessment has closed it.

2.2 Purpose

This study takes as given that the operational routes differ materially from those assessed in the EIS, a point not disputed in the public record. It does not address whether that difference constitutes a breach of planning or environmental law. Its purpose is to quantify the spatial distribution of population exposure associated with that divergence.

This report quantifies numerically the community impact of departing from the routings assessed in the 2007 EIS for Dublin Airport’s North Runway and operating instead on the Standard Instrument Departure (SID) routings published and flown since August 2022.

It does not address whether that decision was a material change requiring re-assessment under the EIA Directive, whether it complied with the conditions of the 2007 Planning Board grant, whether subsequent operations complied with Regulation 598/2014 (the Balanced Approach)¹, or whether the absence of consultation breached the Aarhus Convention. Those questions are before the European Commission (complaint CPLT(2026)00881), the Aarhus Convention Compliance Committee, and the European Parliament Petitions Committee (petition 0553/2026).

This report addresses only the factual question: given that the Routes Flown deviate from the EIS, how many people live under the deviation?

What this report does not model. Cumulative noise dosage metrics (Leq, Lden, Lnight, N70), nighttime-specific exposure, fleet-mix evolution, and operational schedule are out of scope. The affected-corridor construction uses a single-event L_{Amax} footprint: appropriate for bounding the lateral extent of a departure event but not for time-weighted annoyance or sleep-disturbance metrics, which require a fleet-wide operational-schedule model (see [Annex §4]).

¹Regulation (EU) 598/2014, Articles 5, 6, and 8. Article 5 (“General rules on aircraft noise management”) requires Member States to apply the Balanced Approach where a noise problem is identified; Article 6 (“Rules on noise assessment”) sets the methodology and consultation requirements for noise-situation assessment; Article 8 (“Rules on the introduction of operating restrictions”) sets notice and reporting requirements. Commission Decision C(2026) 919 of 10 February 2026 found Ireland’s Regulation 598/2014 process at Dublin Airport non-compliant, having assessed only Pillar 4 (operating restrictions) without assessing the other three pillars (reduction of noise at source, land-use planning and management, and noise abatement operational procedures).

2.3 Structure of this report

This report is the principal artefact of the GIS impact study. It presents the population-exposure numbers and their interpretation in a form intended for direct citation. A companion Technical Annex, deposited with this report in the same Zenodo record, contains the full methodology detail, the corridor-construction and noise-modelling derivations, the ADS-B validation, and the secondary analyses (design choice within the EIS-consistent envelope, the redistribution objection with worked best-case). The annex is cross-referenced throughout this document as [Annex §N]. Anyone wishing to cite, verify, or re-derive a methodological claim in this report should consult the corresponding annex section.

The analysis proceeds in three steps.

Step 1 (§2, §3.1-3.3): establish the marginal population exposed. The Routes Flown are compared to a set of EIS-consistent alternative routings (Strict 5NM, being the 5 NM straight segment convention carried over from the legacy 28L SID; a Designed variant with a 1.5 NM extension past Dunboyne; and the historic 28L south runway baseline) using corridors of standard track-keeping width (1.5 km each side, per UK DfT practice) and a wider 3 km each side “affected” zone. Residential buildings within each corridor are counted from OpenStreetMap; population is estimated from CSO Small Area data. The difference between the Routes Flown corridor and the baseline corridor defines the “newly overflowed” and “newly affected” populations: those exposed specifically as a consequence of the deviation from the EIS.

Step 2 (§3.2): establish that the result is not an artefact of comparing the Routes Flown against unrealistic alternatives. Two EIS-consistent alternatives are modelled at different levels of design care. Strict 5NM applies the same 5 NM straight-segment convention used on the legacy 28L SID. Designed adds 1.5 NM of straight flight before the southbound turn, a deliberate population-avoidance choice based on examination of the terrain, of the kind already applied at Dublin where politically necessary (the 10R departure forces a 7 NM fly-over at 4,000 ft MSL with a 9.1% climb gradient to avoid traffic above Dublin city and Howth). The two alternatives produce nearly identical “newly overflowed” counts but differ by 38% in total overflowed population: even within the set of EIS-consistent options, modest design care measurably reduces operational noise burden. Design-choice-within-the-EIS-envelope analysis, showing the 38% reduction from a single 1.5 NM design decision, is at [Annex §9].

Step 3 (§4): interpret the result. The magnitude of the difference between the Routes Flown and any EIS-consistent alternative, the absence of any geometric constraint that would have forced the actual routing under standard departure design assumptions, the statutory planning

history that configured two counties around the EIS-assessed footprint, and the absence of any re-assessment or consultation accompanying the change.

2.4 Background

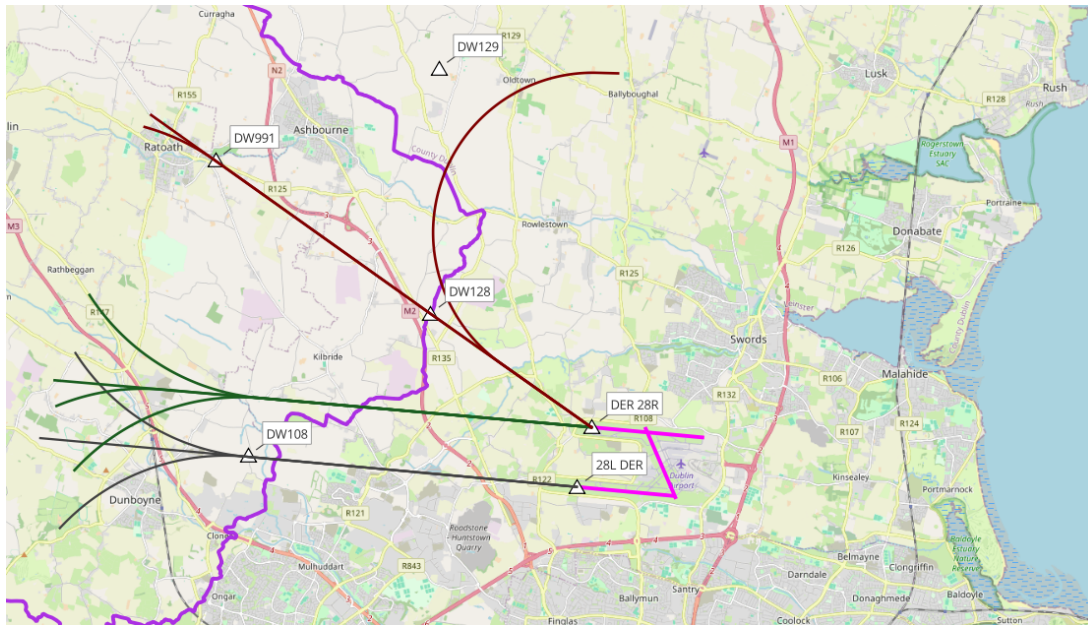


Figure 1: Study area: Dublin Airport with the parallel 28R/28L runways, the surrounding communities of Swords, Ashbourne, Ratoath, Dunshaughlin, Dunboyne, and the three modelled route families: EIS-consistent alternatives (green), Routes Flown (red), 28L Actual baseline (grey).

Dublin Airport operates two parallel runways, 10/28 aligned 1,666m apart. The South Runway (10R/28L) has been in service for decades; the North Runway (10L/28R) opened on 24 August 2022. The 2007 An Bord Pleanála grant (PL06F.217429) that authorised construction of the North Runway was based on the 2004/2005 EIS, which assumed a straight-ahead departure track from 28R broadly parallel to the 28L departure track.² The statutory noise zones shown in the EIS and subsequently promulgated into the Fingal and Meath County Development Plans followed the same assumption.

In October 2016 daa (the Aerodrome Operator under EASA Regulation 139/2014)³ conducted a public consultation on revised departure routings proposing aircraft would turn either 15 or 75

²EIS §16.1.3.4 (p.295): “For the proposed runway, it was assumed that the aircraft would join up with the tracks used for the existing 10/28 runway which was agreed with the Irish Aviation Authority to be a reasonable assumption at this stage.” The public safety zones and noise contours derived on that assumption are shown at Figures 13 and 14 of the EIS Figure set (pp.16-17).

³Regulation (EU) 139/2014, Annex III, ADR.OR.D.005 (“Management system”), assigning the aerodrome operator responsibility for an integrated safety management system, hazard identification, risk assessment, and safety performance monitoring.

degrees at the end of 28R. The consultation was confined to Fingal County; 3 of 261 respondents were from County Meath. No planning application followed, and none of the presented routes was implemented. The consultation is referenced in this report only as contextual history; see §2.1 on why no quantitative comparison to these routes is drawn.

On opening (24 August 2022), departures from 28R flew a 30 or 75 degree turn sequence at the Departure End of Runway (DER, the term used in the GIS data files and route definitions referenced throughout this report). In February 2023 the sequence was revised to the configuration in use at the date of this report: a 30-degree right turn at DER, followed for more than 50% of departures by a further 56-degree right turn at waypoint DW128 (total 86 degrees from runway heading).⁴ No Environmental Impact Assessment was conducted for either configuration, and no consultation was held with the communities overflown.

On ICAO 9643 and departure divergence. A potential framing of this analysis is that departure divergence from the runway heading is a safety requirement for independent parallel operations and that any alternative routing would breach that requirement.

ICAO 9643 (“Manual on Simultaneous Operations on Parallel or Near-Parallel Instrument Runways”) requires divergence between the departure track of one runway and the missed approach track of the parallel runway when independent operations are in use. It specifies divergence “immediately after take-off” without defining the phrase in altitude or distance terms, and does not prescribe the direction or magnitude of the deviation for either track so long as 30-degree divergence is achieved. PANS-OPS (ICAO Doc 8168, Vol II, Part I, §3.3.1) sets the absolute minimum turn altitude for departure procedure design at 394 ft AGL. The Routes Flown at Dublin initiate the 30-degree turn at approximately that minimum.

Divergence can be achieved, as at Dublin, by turning the departure runway’s traffic. It can equally be achieved by deviating the *missed approach* of the parallel runway, or by a combination of both. Deviating the missed approach is the norm at several comparable airports, including London Heathrow and Berlin Brandenburg. 9643 does not mandate Dublin’s choice of method; it is one option among several.

The present configuration at Dublin (deviating 28R departures at DER at the regulatory minimum altitude) is one of several ICAO 9643-compliant options. In responses to An Bord Pleanála and in public statements made after the procedure was implemented, the configuration has been characterised as the only viable option and as required for safety, with responsibility further at-

⁴The >50% figure is derived from the 25 March 2026 ADS-B sample (n=218 Cat C+D departures: 124 right turn at DW128, 94 straight to DW991); see [Annex §3.4]. Cat A+B aircraft use different non-EIA-conforming SIDs and are not counted here.

tributed to the Irish Aviation Authority. Statements from the Aerodrome Operator have asserted that planning permission does not apply to procedure design at all. The configuration was not, on the public record, presented to An Bord Pleanála as one alternative among several at any prior decision point. NRTG has proposed an alternative using deviated 28L missed approach accounting for Baldonnell military airfield and Weston Aerodrome airspace. That proposal has never been examined by a qualified party.

The present report does not attempt to qualify the EIS Route or any alternative under ICAO 9643. Doing so is the job of appropriately qualified professionals briefed to minimise community impact subject to the 9643 and PANS-OPS constraints: the work that has never been done for Dublin. The NRTG proposal delivered to the Aerodrome Operator in 2023, is a starting point for such an exercise, not a substitute for it. This report's numerical analysis proceeds by comparing the geometry of the EIS Route against the geometry of the Routes Flown, under the assumption that a properly briefed design exercise would produce something at least as close to the EIS Route as the alternatives modelled here. What the report quantifies is the community-impact consequence of the decision to forgo that exercise.

3 Methodology

3.1 Defined terms

Terminology in this area is contested. The unqualified phrase “flight path” has been used at Dublin Airport to refer to various distinct concepts depending on respondent, and was used without systematic discrimination in NRTG's own earlier correspondence. The following defined terms were introduced in the NRTG communication to the Aarhus Convention Compliance Committee (Supplementary #2, 8 April 2026) after the pattern of terminological substitution became apparent in the Oireachtas Committee on Transport sessions of March 2026. They are the terms this report uses and the terms adopted going forward in NRTG submissions to the European Commission, the Aarhus Convention Compliance Committee, and the European Parliament:

- **“EIS Route”**: the departure route assessed in the 2004/2005 Environmental Impact Statement and assumed in the 2007 planning permission (An Bord Pleanála Ref. PL06F.217429), being a straight-ahead departure from Runway 28R. This is the route for which the statutory noise zones promulgated into the Fingal and Meath County Development Plans were computed.

- **“2016 Consulted Routes”**: the routes presented at three public information sessions in Fingal County in 2016, involving a 15-degree or 75-degree turn. The consultation was confined to Fingal; three of 261 respondents were from County Meath. No planning application was filed on the basis of this consultation. The routes presented were never implemented. They are named here for terminological completeness only; the consultation was geographically exclusionary, was not adopted in any form, and was not implemented, and does not function as a legitimate baseline for any subsequent routing decision. No quantitative comparisons to the 2016 Consulted Routes are presented in this report.
- **“Routes Flown”** (February 2023 to present; the 28R runway opened August 2022 with an earlier 30 + 75 degree configuration that was revised to the present routing in February 2023): the current operational routes, involving a 30-degree turn at approximately 400 ft AGL from the departure end of the runway, with more than 50% of departures making a further 56-degree right turn at waypoint DW128 (total 86 degrees from runway heading). Never consulted, never assessed. The Routes Flown differ from the EIS Route by up to 86 degrees.
- **“Instrument Flight Procedure” (“IFP”) / “Standard Instrument Departure” (“SID”)**: the coded procedure published in the Aeronautical Information Publication (AIP), designed by AirNav Ireland, approved by the Irish Aviation Authority on safety grounds only. The IFP implements whichever route is chosen; it does not determine the route. IFP approval does not constitute or substitute for environmental assessment.
- **“Noise Preferential Route” (“NPR”)**: internationally, a route designed to minimise noise impact on affected populations, set *before* the IFP is designed (UK DfT 2017). At Dublin Airport, “NPR” is used by the Aerodrome Operator (daa) for a corridor whose boundary is drawn around the existing SID, reversing the order of international convention: the NPR is set first, and the SID is designed to comply with it. Where this report uses “NPR” without qualification, the international meaning is intended.

This report uses “route” in preference to “flight path”. The unqualified phrase “flight path” has been used at Dublin Airport to refer variously to the IFP (a coded procedure), the NPR (a corridor), an individual aircraft’s actual track, the “indicative” track assumed in the EIS, and the Routes Flown; it is avoided except in direct quotations.

Mapping to the scenarios modelled in this report. Section 2.5 defines four operational scenarios. Their relationship to the canonical terms:

- **“Routes Flown”** is the canonical term used throughout this report. Data-file layer

names use the compound form **28R Routes Flown** (e.g. **28R Routes Flown overflown**, **28R Routes Flown affected**, **28R Routes Flown newly overflown**). The centreline geometry is constructed from the published waypoints (DW128 fly-by, DW129 fly-by, DW991 fly-over) and validated against ADS-B tracks captured on 25 March 2026.

- **“EIS Route”** is the straight-ahead departure assessed in the 2004/2005 EIS. The report compares the Routes Flown against two NRTG-constructed EIS-consistent alternatives derived from the EIS Route: **28R Strict 5NM** (a 5 NM straight segment before any turn, mirroring the legacy 28L SID convention) and **28R Designed** (the same with a 1.5 NM extension past Dunboyne, by analogy with the 10R departure’s existing population-avoidance design; see §2.2). Neither is a defined term in the canonical table; both are EIS-consistent in the sense that they retain the straight-ahead initial departure that the EIS assessed.
- **“28L Actual”** refers to operations from the legacy south runway, used as the existing exposure baseline against which “newly overflown” and “newly affected” are measured.

3.2 Modelled scenarios and corridor construction

Four operational scenarios are compared: **28L Actual** (three-decade south-runway baseline), **28R Strict 5NM** (the legacy 5 NM straight-segment convention carried from the 28L SID, applied unmodified to 28R), **28R Designed** (Strict 5NM plus a 1.5 NM extension on the south-bound routing, a population-avoidance choice analogous to the 10R departure’s existing 4,000 ft / 9.1% / DW553 design), and **28R Routes Flown** (the current published and flown SID: 30-degree turn at DER to DW128, further 57-degree through DW128, 90-degree through DW129, or straight / 89-degree left at DW991).

Corridors are constructed around each route centreline at two widths: an **overflown** corridor of 1.5 km half-width and an **affected** corridor of 3 km half-width. The half-width transitions from a narrower value at DER to the steady-state width over the first 2.5 km of downrange. Routes are trimmed at 15 km from DER. Full derivations of centreline construction, turn-geometry assumptions, the daa-vs-NRTG corridor comparison, and the ADS-B validation against four reference flights on 25 March 2026 are set out in [Annex §§3.1-3.4]. The daa-published-NPR vs NRTG-corridor comparison is at [Annex §3.2]. Single-event L_{Amax} noise-footprint modelling supporting the 3 km affected-corridor width is at [Annex §4].

The two half-widths are working definitions adopted for this study, reported alongside each other so a reader using a different threshold can recompute. The 1.5 km overflown half-width is the UK track-keeping swathe used by the Department for Transport at the three UK designated

airports (Heathrow, Gatwick, Stansted; DfT00393, 2017); it is adopted here as the most directly comparable benchmark from a regulator that publishes one. The 3 km affected half-width is the approximate lateral extent of the 55 dBA single-event L_{Amax} contour produced for the common Dublin departure fleet by the NRTG single-event noise model (see [Annex §4]). Neither is a regulatory threshold. Buildings and populations are reported for both corridors and also as absolute and “newly” counts, so the results can be re-expressed at a different corridor width by re-running the selection in QGIS against the deposited data.

3.3 Building counts

Residential building footprints were extracted from OpenStreetMap on 12 April 2026 for the bounding box (53.41, -6.55, 53.53, -6.25), using the Overpass API with the following tag filter:

```
way["building"="house"]
way["building"="apartments"]
way["building"="residential"]
way["building"="terrace"]
way["building"="semidetached_house"]
way["building"="bungalow"]
way["building"="detached"]
```

Within this bbox, 20,831 residential building polygons were returned. Tag distribution: house 20,263; apartments 215; residential 192; terrace 155; semidetached_house 6; bungalow 0; detached 0. The Irish convention in this area is to tag detached houses as house rather than the more specific detached.

Buildings are counted as one per polygon (one way). This understates dwelling counts for terraces (one way typically represents 4-10 dwellings) and for apartment blocks (one way represents all units in the block, often 20-100 dwellings). The building count is therefore a conservative proxy for dwelling count.

3.4 Population estimation

Population estimates use CSO Small Areas 2022 with the variable T1_1AGETT_Norm (total population, all ages, both sexes).

For each selection zone, population is the sum over all Small Areas that intersect the zone of:

$(\text{SA population}) \times (\text{intersection area} / \text{total SA area})$

Area-weighted proportional allocation is standard practice in census-based exposure analysis. It assumes uniform population distribution within each Small Area. In Irish suburbs and towns (Ashbourne, Ratoath, Dunboyne, Swords), Small Areas average ~80-120 households, so the assumption is reasonable at the resolution of interest.

3.5 Data and reproducibility

All GIS layers, census extracts, OpenStreetMap extracts, and the QGIS project are distributed in EIDW-EIA-Conformance-Gap-Analysis-Reproducibility-v1.0.zip in the same Zenodo record as this report. All figures are distributed as georeferenced PNGs with .pgw world files in EIDW-EIA-Conformance-Gap-Analysis-Figures-v1.0.zip. Any independent party with QGIS 3.34 or later can reproduce every number in this document. See §6 Reproducibility.

4 Results

4.1 Corridor areas

The starting result, independent of any external data source, is the area of each corridor. Areas are a pure geometric measurement of the corridor polygons and do not depend on building-footprint completeness, census allocation assumptions, or any other ancillary data.

Scenario	Overflown		Newly	
	(km²)	Affected (km²)	overflown (km²)	Newly affected (km²)
28L Actual	50.59	91.63	(baseline)	(baseline)
28R Strict 5NM	50.59	91.63	24.82	27.20
28R Designed	46.98	89.45	25.04	27.90
28R Routes Flown	66.77	124.04	66.77	113.30

Three findings from this table alone.

First, the 28R Routes Flown overflown zone (66.77 km²) and its newly-overflown area (66.77 km²) are identical. Zero overlap under the defined 1.5 km corridor specification, confirmed geometrically.

Second, the Routes Flown newly-affected area (113.30 km²) is 4.2 times the newly-affected area under Strict 5NM (27.20 km²) and 4.1 times that under Designed (27.90 km²). The affected-zone disparity is driven by the same geometric fact that drives the building and population disparity in §3.3: the Routes Flown corridor sweeps through an entirely different region of north County Dublin and south County Meath than any EIS-consistent alternative.

Third, the Designed variant has lower total overflown and affected areas than Strict 5NM despite covering an additional 1.5 NM of straight flight. This is the geometric mechanism underlying the 38% reduction in total overflown buildings documented in [Annex §9]: the Designed south-bound extension keeps the corridor within the existing 28L envelope, so the additional 1.5 NM reuses ground already in the baseline rather than creating new exposure.

4.2 Building and Population counts

4.2.1 28L Actual baseline (three decades of 28L operations)

Scenario	Zone	House	Apt	Trce	Other	Total	Est. Pop.
28L Actual	overflown	5,430	64	136	108	5,738	20,048
28L Actual	affected	6,391	64	136	114	6,705	38,613

4.2.2 28R scenarios: absolute counts (total buildings / population within each corridor)

Scenario	Zone	House	Apt	Trce	Other	Total	Est. Pop.
28R Strict 5NM	overflown	1,610	0	15	5	1,630	4,772
28R Strict 5NM	affected	5,892	55	136	109	6,192	20,854
28R Designed	overflown	997	0	15	5	1,017	2,888
28R Designed	affected	4,971	44	136	106	5,257	17,481
28R Routes Flown	overflown	3,910	31	9	58	4,008	13,923

Scenario	Zone	House	Apt	Trce	Other	Total	Est. Pop.
28R Routes Flown	affected	8,680	119	17	65	8,881	30,540

4.2.3 Newly counts (geometric difference vs 28L Actual baseline)

Scenario	Zone	House	Apt	Trce	Other	Total	Est. Pop.
28R Strict 5NM	newly overflown	329	0	0	1	330	998
28R Strict 5NM	newly affected	447	0	0	0	447	1,164
28R Designed	newly overflown	332	0	0	1	333	1,008
28R Designed	newly affected	450	0	0	0	450	1,202
28R Routes Flown	newly overflown	3,910	31	9	58	4,008	13,923
28R Routes Flown	newly affected	8,561	119	17	64	8,761	30,186

Canonical widths are 1.5 km overflown and 3.0 km affected. Across the sensitivity sweep ([An-nex §9]), Routes Flown newly-overflown moves 13,966 → 17,137 → 19,000 at 1.5, 1.852 and 2.0 km; newly-affected moves 26,092 → 30,186 → 31,499 at 2.5, 3.0 and 3.5 km. The 1.5 km canonical is the narrower of two named regulator anchors (UK DfT 1.5 km, ICAO RNAV-1 XTT 1.852 km); adopting the ICAO value raises the newly-overflown headline by 22.7%. Scenario ratios stay at order-of-magnitude disparity across the full matrix.

4.3 Key comparisons

The move of westerly departures from 28L to 28R, occasioned by the opening of the North Run-way in August 2022, changed both the absolute number of people overflown and affected by Dublin Airport's primary departure operation and the set of communities exposed. The 28L corridor had accumulated three decades of exposure over a population that had grown up un-der it. Replacing it with a new corridor, on a runway 1.6 km to the north, could relocate that total or reduce it. This section quantifies the difference between the three 28R scenarios against that baseline.

Total overflown (direct overflight, absolute count):

Scenario	Buildings	Est. Pop	vs 28L Actual
28L Actual (baseline)	5,738	20,048	–
28R Strict 5NM	1,630	4,772	–4,108 (–72%) / –15,276 (–76%)
28R Designed	1,017	2,888	–4,721 (–82%) / –17,160 (–86%)
28R Routes Flown	4,008	13,923	–1,730 (–30%) / –6,125 (–31%)

Total affected (within 3 km, absolute count):

Scenario	Buildings	Est. Pop	vs 28L Actual
28L Actual (baseline)	6,705	38,613	–
28R Strict 5NM	6,192	20,854	–513 (–8%) / –17,759 (–46%)
28R Designed	5,257	17,481	–1,448 (–22%) / –21,132 (–55%)
28R Routes Flown	8,881	30,540	+2,176 (+32%) / –8,073 (–21%)

In absolute terms, every EIS-consistent alternative produces substantially fewer overflown and affected people than the 28L baseline. The Designed variant reduces direct overflight by 86% of population (82% of buildings) and reduces the affected-corridor count by 55% of population (22% of buildings) compared with three decades of 28L operations. The Routes Flown reduce direct overflight by 31% of population (30% of buildings); the affected population falls by 21%, though the affected-building count rises by 32% because the 28L affected corridor included denser urban areas of north Dublin.

In absolute terms: had the 28R departure been designed as Strict 5NM, 15,276 fewer people would be under direct overflight than were under three decades of 28L. Under Designed, 17,160 fewer. Under the Routes Flown, 6,125 fewer. The difference between 17,160 and 6,125 (11,035 people) is the absolute-count gap between population-avoidance design and the Routes Flown.

Newly overflown (direct overflight not present under 28L baseline):

Scenario	Buildings	Est. Pop	vs Strict 5NM
28R Strict 5NM	330	998	–
28R Designed	333	1,008	+0.9% / +1%
28R Routes Flown	4,008	13,923	+1,114% / +1,296%
of which overlap with EIS-consistent (newly overflowed either way)	50	190	
spared if EIS-consistent alternative adopted	3,959	13,733	

Newly affected (within 3km, not present under 28L baseline):

Scenario	Buildings	Est. Pop	vs Strict 5NM
28R Strict 5NM	447	1,164	–
28R Designed	450	1,202	+0.7% / +3%
28R Routes Flown	8,761	30,186	+1,860% / +2,494%
of which overlap with EIS-consistent (newly affected either way)	300	734	
spared if EIS-consistent alternative adopted	8,465	29,452	

The geometric set-difference rows isolate the population that would not be added to either exposure category by any EIS-consistent alternative modelled here. These residents are newly exposed under the Routes Flown and only under the Routes Flown: the exposure is attributable to the route choice itself, not to the decision to operate the North Runway.

4.4 Zero overlap finding

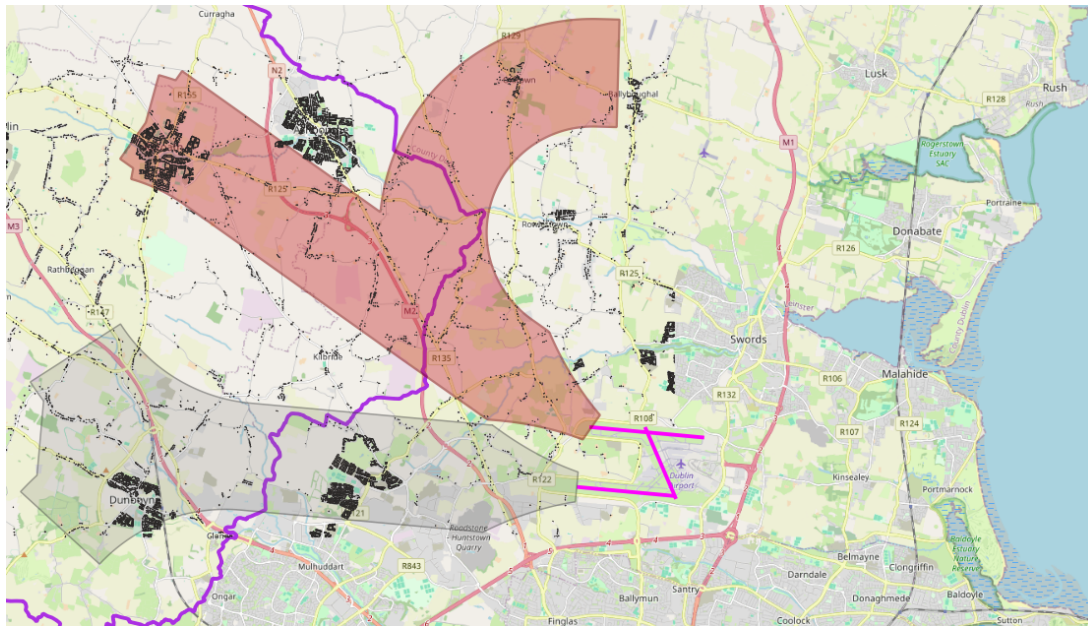


Figure 2: 28R Routes Flown newly overflowed zone (red) overlaid on 28L Actual overflowed zone (grey) and the residential building footprints. 13,923 residents (4,008 buildings) newly exposed. Every square metre is ground not previously overflowed.

At the canonical 1.5 km half-width, the Routes Flown overflowed zone has zero overlap with the 28L Actual overflowed zone. Every square metre of the Routes Flown overflowed corridor lies outside the 28L baseline. For the 3km affected zone, overlap is minimal: ~350 people (120 buildings) are within both the Routes Flown affected zone and the 28L Actual affected zone.

The EIS-consistent alternatives share approximately half their corridor area with the 28L baseline, because both runways depart on the same heading and a straight-ahead 28R departure passes over much of the same ground as a straight-ahead 28L departure. The EIS Route was designed to be broadly compatible with the existing south runway exposure. The Routes Flown are not.

4.5 Figures

The figure set (reproduced in Appendix A; the most important two are embedded inline at §§1.4 and 3.4):

- **fig01:** Study area overview with all route centrelines
- **fig05-08:** Per-scenario corridor maps (28L Actual, 28R Strict 5NM, 28R Designed, 28R Routes Flown) at matched extent and scale for direct visual comparison

- **fig11:** 28R Routes Flown newly overflowed zone with building footprints
- **fig12:** 28R Routes Flown newly affected zone with building footprints

Full methodology figures (corridor construction, daa-vs-NRTG comparison, ADS-B validation, single-event noise model, worked best-case design, zoom-ins) are in the Technical Annex.

5 Discussion

5.1 A net reduction against the 28L baseline

The opening of 28R in August 2022 changed the number of people affected by Dublin Airport's westerly departures and the set of communities exposed. The Routes Flown deliver a partial reduction against the 28L baseline; an EIS-consistent routing would deliver a substantially larger one.

The Routes Flown already deliver an absolute reduction against three decades of 28L operations: 31% fewer people overflowed (13,923 vs 20,048) and 21% fewer within the 3 km affected corridor (30,540 vs 38,613). That reduction is real. The question is how much more was available at no operational cost.

Reinstating an EIS-consistent routing, particularly with the 1.5 NM Designed extension past Dunboyne, converts:

- a 31% reduction in people overflowed into an 86% reduction (2,888 vs 20,048);
- a 21% reduction in people affected into a 55% reduction (17,481 vs 38,613).

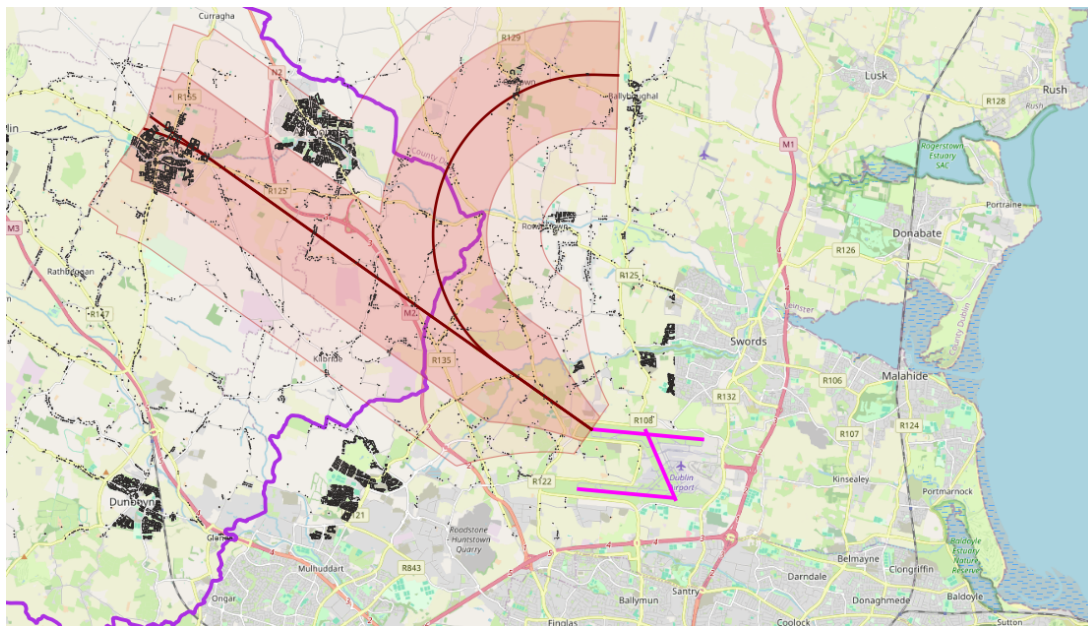
The additional communities spared by the Designed scenario are spared without new overflight anywhere. The Designed corridor lies substantially inside the existing 28L envelope: the 1.5 NM extension concentrates overflight onto less populated ground already overflowed for three decades, not onto new population. The "newly overflowed" count under Designed is 1,008 residents (333 buildings): indistinguishable from Strict 5NM (998 / 330) and an order of magnitude below the Routes Flown (13,923 / 4,008).

A small population close to the departure end of the runway sits inside every 28R corridor (Routes Flown, Strict, and Designed alike) because any westerly departure from the North Runway must pass over it. Moving from the Routes Flown to an EIS-consistent alternative does not spare this population; it reshuffles some residents between "directly overflowed" and "affected within 3 km" (some shift each way). This is the only population to which a redistribution

objection has any purchase, and the shift is small. The near-runway exposure intensity this population experiences is a question for dB-based noise modelling and is outside the scope of this report.

The absolute-reduction count and the newly-overflowed count answer different questions. The absolute count measures the total exposure footprint: which configuration places the fewest residents under direct overflight. The newly count identifies residents under direct overflight from the Routes Flown who were not under direct overflight from the 28L baseline: 4,008 buildings and 13,923 residents newly overflowed, and 8,761 buildings and 30,186 residents newly affected within 3 km. Both counts are derived from the same geometry and both are reported here; which is load-bearing for any specific regulatory or policy question is outside the scope of this report.

5.2 The Routes Flown occupy entirely new airspace



Set-difference of the newly-affected zones isolates the population spared by an EIS-consistent alternative. Of the 30,186 residents (8,761 buildings) newly affected under Routes Flown ~29,452 residents (8,465 buildings) lie outside both the Strict and Designed newly-affected zones: they would not be newly affected under the EIS Routes. The remaining ~734 residents (300 buildings) overlap with the Strict 5NM newly-affected zone and would be newly affected either way.

The 28R operation introduces direct overflight of south County Meath, Ashbourne, Ratoath, and Dunshaughlin: communities not within the 28L corridor and not addressed by any EIS, noise action plan, statutory noise zone, or Planning Board decision. The 2007 EIS assessed a straight-ahead departure covering substantially the same ground as 28L (the two runways are parallel, 1,666 m apart, on the same heading); the published and flown SID does not.

5.3 The statutory framework was configured around the EIS, which has never been superseded

The 2007 EIS assessed a straight-ahead departure and remains the only environmental impact assessment ever conducted for 28R departures. Figures 5 and 8 illustrate the geometric basis: the 28L Actual corridor approximates the EIS straight-ahead footprint; at the canonical 1.5 km half-width, the Routes Flown corridor has zero overlap with it in the overflowed zone. The Routes Flown are therefore unassessed, not partially or indirectly but entirely, under the regulatory framework that governs such procedures. No EIA, statutory noise assessment, Strategic Environmental Assessment, targeted public consultation, or Habitats Directive Appropriate Assessment has been performed.

The EIS was not only the consent basis for construction; it was the technical basis for the statutory noise zones subsequently promulgated into the Fingal and Meath County Development Plans. Those zones carried direct planning consequences: restrictions on development, noise-insulation requirements where development was permitted, and inclusion in Noise Action Plans, planning decisions, and Section 5 declarations for roughly two decades.

Land *outside* the EIS zones (on the straight-ahead track, a substantial area of south Meath north of the runway heading) was treated by the planning system as available for development. Ashbourne, Ratoath, Dunshaughlin and the smaller settlements of south Meath expanded substantially between 2007 and 2022 under planning permissions granted in good-faith reliance on those zones. The ~30,000 residents now newly affected by the Routes Flown are, in substantial part, that two-decade expansion.

The opening of 28R in August 2022 was accompanied by no update to the statutory noise zones,

no consultation with newly-affected communities, no re-assessment under the EIA Directive, and no change to the planning treatment of the areas now directly overflowed. The Routes Flown cross communities that:

1. Were told by the statutory framework, correctly as of that time, that they lay outside the assessed noise footprint;
2. Made planning, investment, and life decisions on that basis;
3. Received no notice when the operational routing changed to place them directly under the unassessed Routes Flown;
4. Have, as of this report, still received no formal re-assessment or updated statutory designation.

The 2007 EIS and derived noise zones remain the only valid assessment on the statutory record; the Routes Flown have superseded them in operational terms.

5.4 Operational and regulatory constraints on alternative routings

Each EIS-consistent alternative modelled here is realisable:

- **Strict 5NM** applies the 5 NM straight-segment convention from the legacy 28L SID. It exceeds the PANS-OPS minimum turn altitude (394 ft AGL) by a wide margin and is flyable at 15° bank and 250 knots.
- **Designed** adds 1.5 NM of straight flight before the southbound turn: no special procedure, equipment, or ATC coordination required.
- **Turn Right to ENDEQ** achieves the Routes Flown's DW128-right outbound routing but begins from a 5 NM-straight point.

No geometric constraint was identified that would preclude these alternatives under standard departure design assumptions. The apparent direct costs of the alternatives modelled here are small: 2-4 km of additional track miles, no change in aerodrome capacity, and the 210-knot speed limit on the Routes Flown's tight DW128-DW129 turns would relax to the standard 250-knot climb speed, with a small fuel-burn advantage. Full operational validation (ATC, separation, airspace integration, procedure redesign, safety case) is outside the scope of this study and remains the responsibility of qualified procedure designers. (Worked best-case 8 NM design example at [Annex §7].)

5.5 A note on noise metrics

This study measures *where* the departure footprint has moved, not *how loud* it is on average. Standard environmental noise assessments under Directive 2002/49/EC and Regulation 598/2014 use cumulative indicators (Lden, Lnight) that aggregate noise energy across all operations over a 24-hour (Lden) or 8-hour night (Lnight) window, further averaged across the year. Use of Lden and Lnight values in general discussion can obscure the noise experienced when an aircraft flies directly overhead: an Lden band shown as 55 dB in a noise model can coexist with routine single-event levels of 80 dB, because the peaks are absorbed into the averaging window the indicator is designed to summarise. Single-event spatial geometry is the direct answer to the spatial-redistribution question, which cumulative contours are not designed to answer. This study complements cumulative noise mapping rather than competing with it; no Lden or Lnight modelling is undertaken or claimed.

5.6 A note on the 28L baseline

28L is no longer Dublin Airport's primary departure runway. Since 28R opened in August 2022, essentially all commercial departures are assigned to 28R, with 28L used only when 28R is unavailable. The 28L Actual corridor reflects three decades of historic exposure, not current daily operations; in current-operations terms, the Routes Flown corridor *is* Dublin Airport's westerly departure footprint.

The 28L corridor itself reflects the absence of population-avoidance design on the legacy south runway; the "newly overflowed" counts are therefore conservative, since against a population-avoidance-designed 28L baseline they would be larger.

6 Limitations

- **Building count undercounts dwellings:** terraces and apartment blocks are counted as single buildings. A more accurate dwelling count would require ancillary data (GeoDirectory, Eircode, or similar). The population estimate partly corrects for this at the Small Area level.
- **Small Area uniformity assumption:** population is allocated uniformly within each Small Area. This overestimates impact for zones that catch the edges of SAs where built-up density is lower.

- **OSM completeness:** OpenStreetMap building coverage is high in urban areas but variable in rural. Ashbourne, Ratoath, Dunshaughlin and Swords appear well mapped. Rural Meath may be under-represented.
- **15km cutoff:** routes beyond 15km from DER are not assessed. At 15km aircraft are typically at 5,000-6,000 ft AAL with continuing noise impact. A future version of this study could extend the analysis to an altitude-based cutoff.
- **Turn radius assumption:** single 15-degree bank used throughout. Real aircraft vary bank angle and speed through a turn. The assumption is standard for flight procedure design and is the design basis for ICAO PANS-OPS.
- **Conservative against interest:** methodology choices consistently favour the EIS-consistent alternatives being made to look as large as plausible (wider turn radius = wider corridor = more homes counted). This is deliberate: findings are defensible against critique that alternatives are unrealistically compact.
- **28L baseline is historical, not current:** the 28L Actual corridor reflects three decades of pre-2022 exposure, not current operations. Since 28R opened in August 2022, essentially all departures have been assigned to 28R. The “newly overflowed” figures isolate the marginal geometric novelty of the 28R corridor relative to the historic 28L footprint, not the operational burden the 28R corridor now carries as the primary exposure footprint of the airport. See §4.1.

7 Reproducibility

Two companion archives are deposited in the same Zenodo record as this PDF:

- `EIDW-EIA-Conformance-Gap-Analysis-Figures-v1.0.zip` (~19 MB): every figure as a georeferenced PNG with companion `.pgw` world file. Any figure can be loaded directly into QGIS as a raster layer and will register in its correct geographic location over any base map.
- `EIDW-EIA-Conformance-Gap-Analysis-Reproducibility-v1.0.zip` (~39 MB): the full QGIS project and all referenced source data, for readers who want to inspect, query, or re-derive any result.

Contents of the reproducibility archive (internal filenames retain the EIDW-QNI-study tag from the working-title stage of the project; they carry no additional meaning):

- `EIDW-QNI-study.qgs`: QGIS project (styling embedded, paths relative)

- README.md: provenance, CRS, and opening instructions
- data/: 11 GeoPackages (airport_infra, boundaries, buildings_residential, census, EIDW_fli_2026-03-25T0508Z_2026-03-25T2330Z_north, noise, npr_analysis, sid-study, sid_actual_zones, sid_compliance_zones, sid_selection_zones)
- rasters/: 3 georeferenced reference scans: noise_zones.tif (EIS noise zones), northrunwaynpr.tif (daa-published NPR), safety_zones.tif (Public Safety Zones)

A reader with QGIS 3.34 or later can extract the archive, open the .qgs, and inspect, query, or re-export every figure in this report directly. OpenStreetMap tiles are loaded at runtime from tile.openstreetmap.org and require internet access; they are cosmetic and can be removed if unavailable.

OSM building query: see §2.3. CSO Small Areas 2022: sourced from tab.cso.ie CensusHub, table T2_4_SA.

All GeoPackages are in EPSG:2157 (Irish Transverse Mercator). Buildings in EPSG:4326 (WGS84). The QGIS project uses EPSG:3857 (Web Mercator) as the display CRS for compatibility with OpenStreetMap tiling.

All figure PNGs exported from the QGIS project carry a companion .pgw world file, making each figure a georeferenced raster that loads directly into another QGIS project and sits in the correct location over any base map. Any reviewer can open a figure alongside their own data and confirm that the corridors cover the communities shown.

8 Use of this report

This report is evidence, not advocacy. It does not adjudicate regulatory compliance and does not recommend a specific replacement SID. Its purpose is to establish a single, narrow factual record: the numerical scale of the community-impact departure between the Routes Flown at Dublin Airport's North Runway and any feasible EIS-consistent alternative, measured against the historic 28L baseline.

The report is intended for use by:

- **The European Commission** (CPLT(2026)00881 and supplementary communications), as a quantitative evidence base for the EIA Directive, Environmental Noise Directive, and Regulation 598/2014 considerations raised in the complaint;

- **The Aarhus Convention Compliance Committee**, as a quantitative evidence base for the Article 6 and Article 7 public-participation considerations raised in the NRTG communication;
- **The European Parliament Petitions Committee**, as context for the petition requesting investigation;
- **Irish parliamentary procedure** (Oireachtas Committees, Parliamentary Questions, written submissions), as a citable source for the “how many people” questions that arise in those settings;
- **Academic work**, including the parallel NRTG paper on structural secrecy in Irish aviation oversight (r116-structural-secrecy), as the citable source of impact figures;
- **Journalists and the general public**, under the Creative Commons BY 4.0 licence, subject to the attribution and terminology conventions documented in this report.

The figures, underlying GeoPackages, census data, and OpenStreetMap extracts are all available in the Zenodo deposit of this report. Any independent party with access to QGIS can reproduce every number in this document.

9 References

UK Department for Transport (2017). *Noise controls and noise preferential routes (NPRs) at designated airports: Impact Assessment*. Reference DfT00393, 20 October 2017. Available via gov.uk.

NRTG (2026). Communication to the Aarhus Convention Compliance Committee, Supplementary #2 (“Parliamentary Record”), 8 April 2026. Available at www.dublin-north-runway.com.

ICAO (2020). *Doc 8168: Procedures for Air Navigation Services: Aircraft Operations, Volume II (Construction of Visual and Instrument Flight Procedures), 7th Edition*. International Civil Aviation Organization, Montreal.

Central Statistics Office (2023). *Census of Population 2022: Small Area Population Statistics*. Dublin: CSO. Available via tab.cso.ie CensusHub, table T2_4_SA.

OpenStreetMap contributors (2026). Building footprint data for Dublin Airport environs, extracted via Overpass API on 12 April 2026, bbox (53.41, -6.55, 53.53, -6.25). © OpenStreetMap contributors, data available under the Open Database License.

European Commission (2026). Decision C(2026) 919 of 10 February 2026 concerning Ireland’s notification of an operating restriction at Dublin Airport under Regulation (EU) No 598/2014.

10.2 Per-scenario corridor maps (§3.2, §4.2)

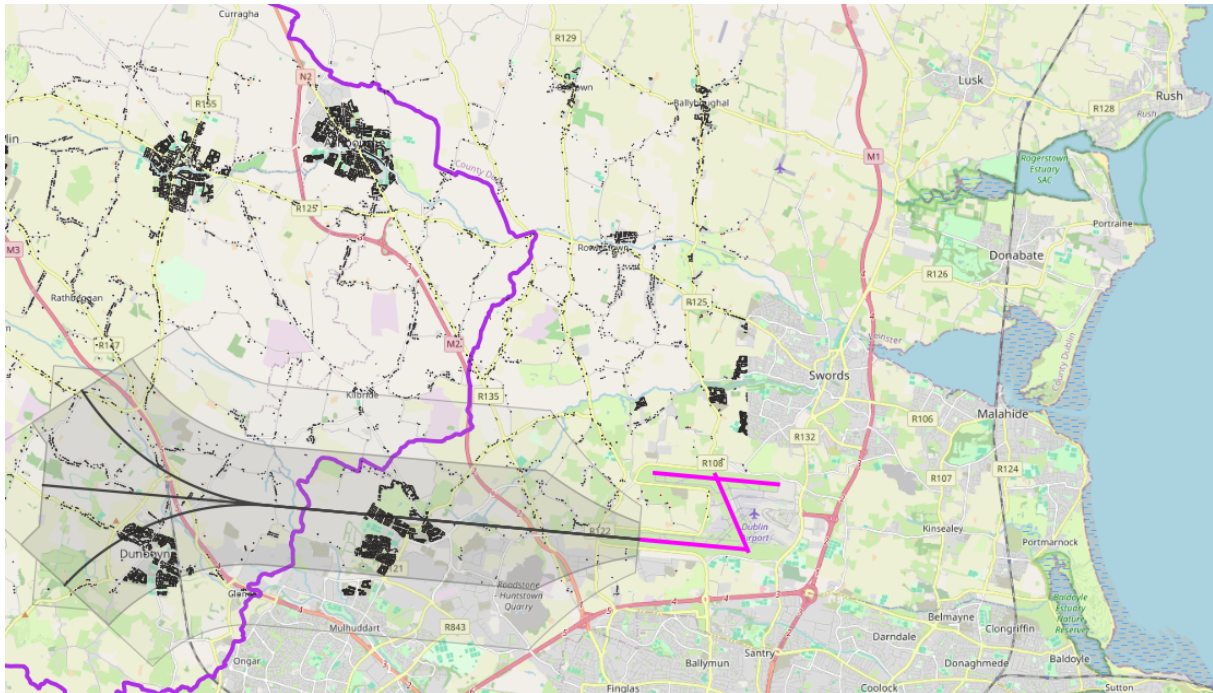


Figure 5: 28L Actual corridor (grey). The existing exposure baseline from three decades of south runway operations.

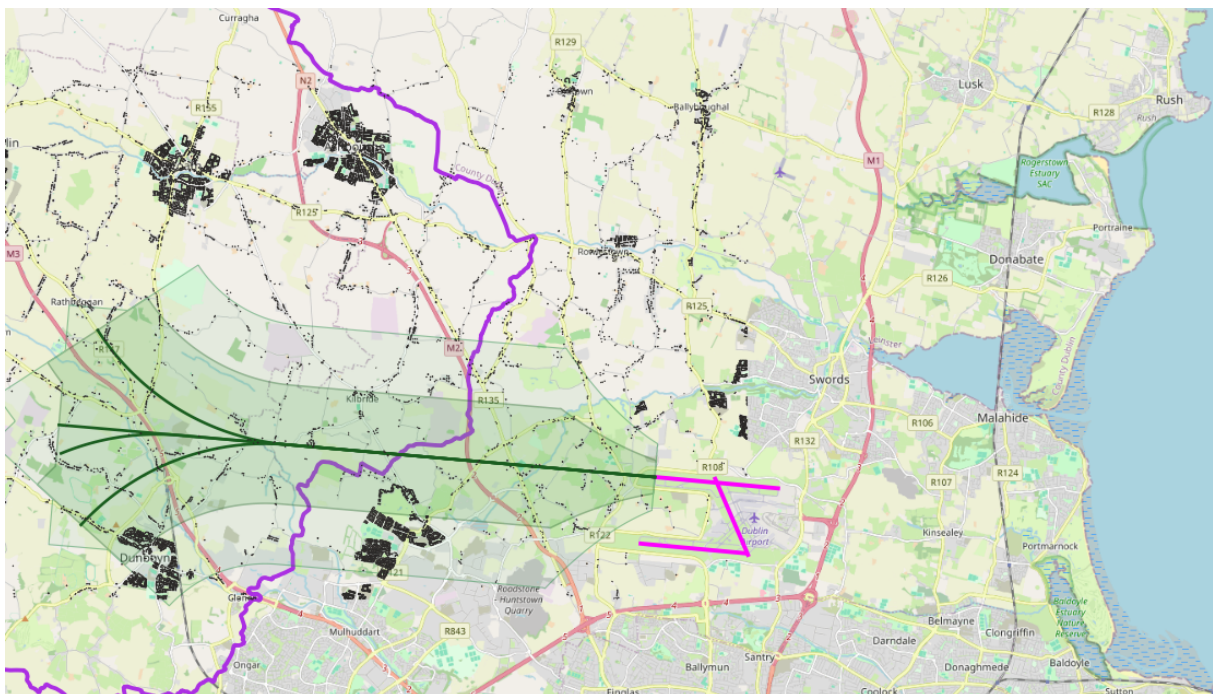


Figure 6: 28R Strict 5NM corridor (green). The 5 NM straight-segment convention applied without modification from the legacy 28L SID.

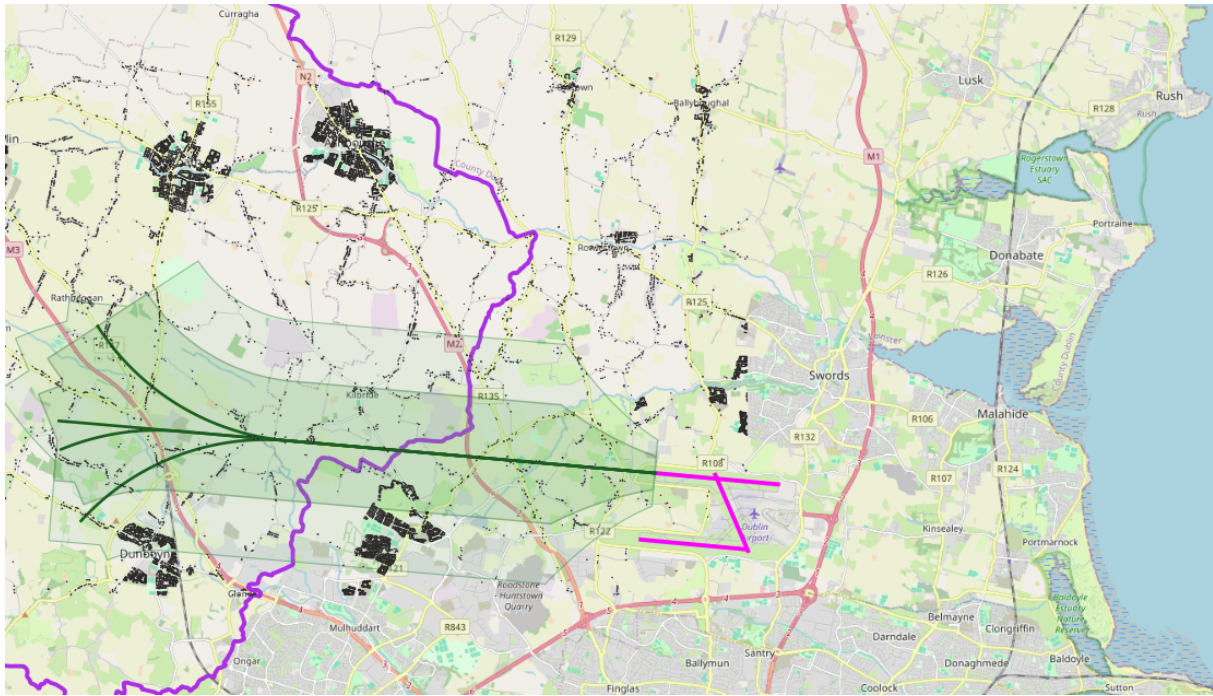


Figure 7: 28R Designed corridor (green). Strict 5NM plus 1.5NM extension to avoid direct overflight of Dunboyne.

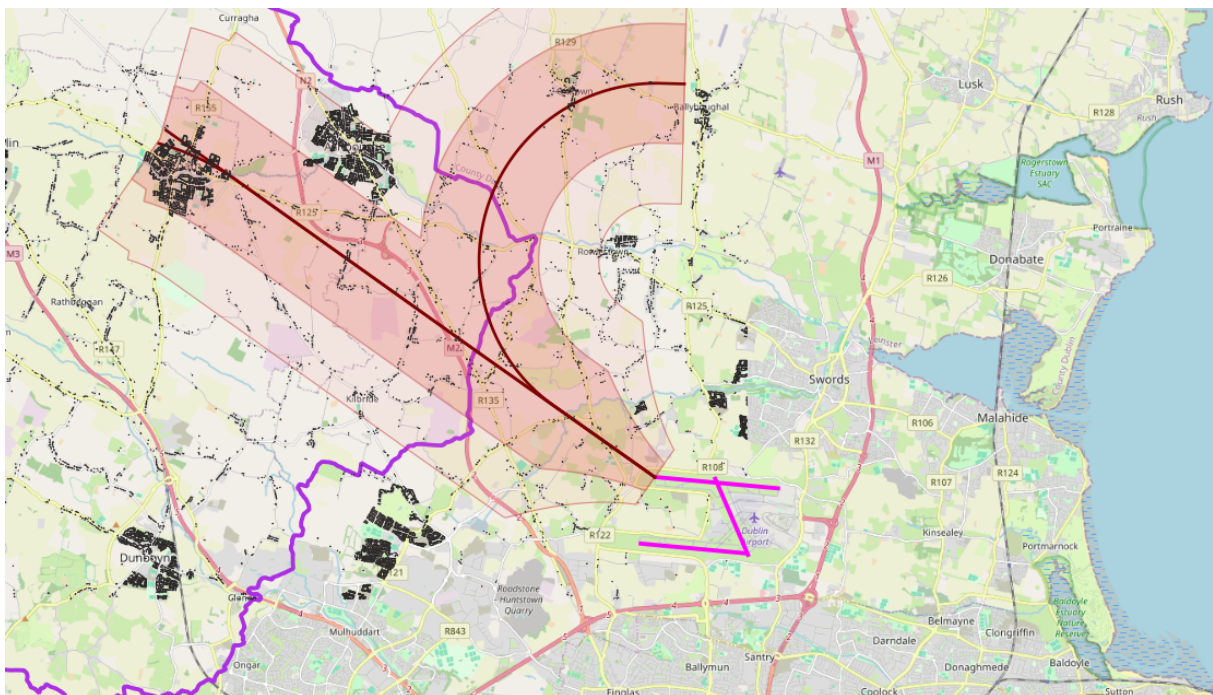


Figure 8: 28R Routes Flown corridor (red). The actual published and flown SID. Compare directly with figures 5-7 at the same scale.

10.3 Newly-exposed zones (§3.3, §4.2)

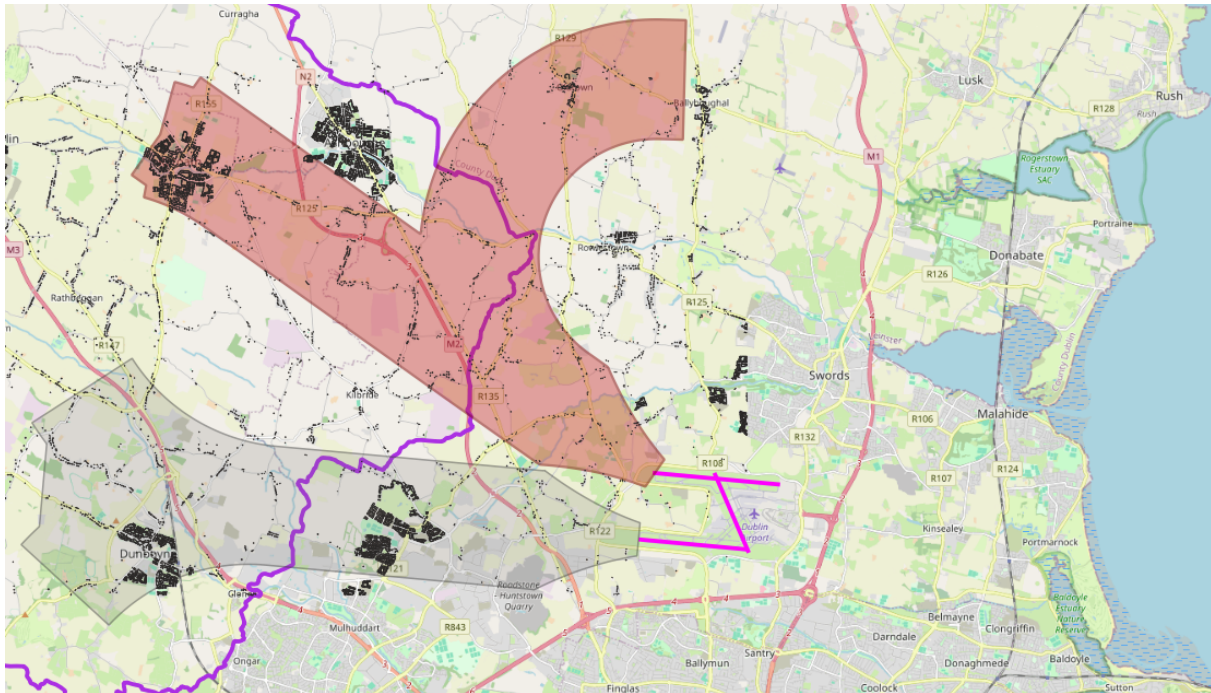


Figure 9: 28R Routes Flown newly overflowed zone (red). 13,923 residents (4,008 buildings). Zero overlap with the 28L baseline at the 1.5 km half-width: every square metre is ground not previously overflowed. Compare the size and location to the per-scenario corridors above.

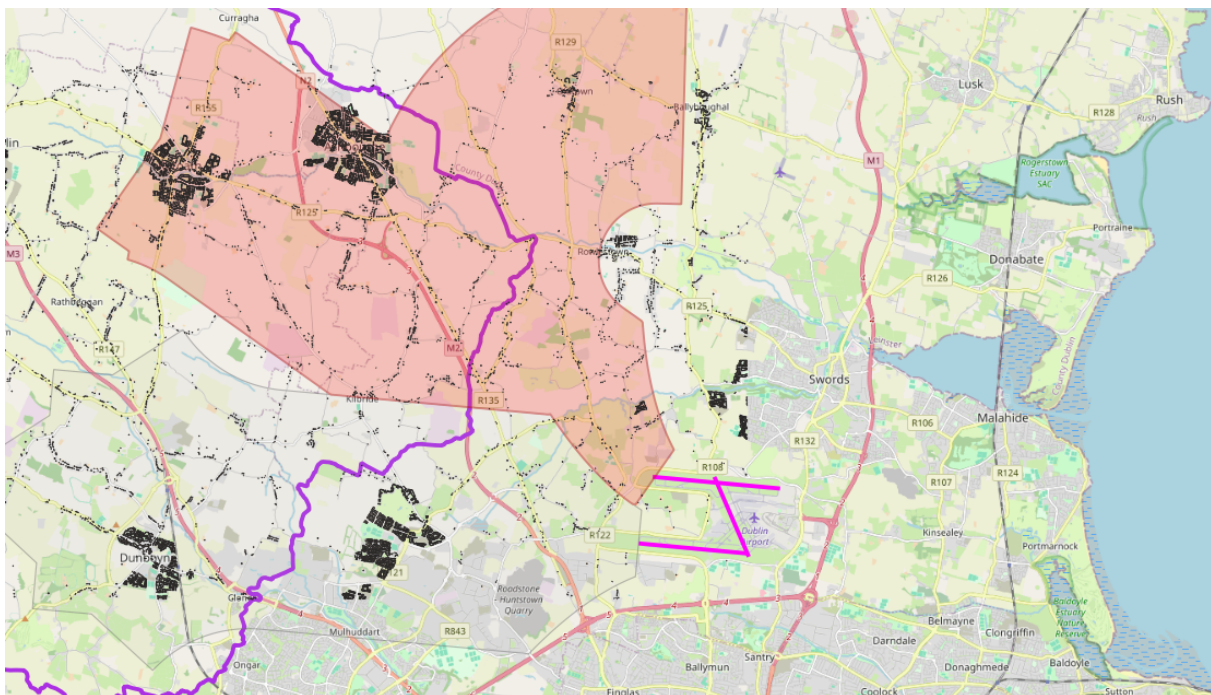


Figure 10: 28R Routes Flown newly affected zone (red). 30,186 residents (8,761 buildings) within 3km of the centreline that were not within 3km of any 28L centreline.

Preprint v1.0 · 15 April 2026. North Runway Technical Group. Submitted for methodological review; revisions will be issued as new versions on the same Zenodo record (10.5281/zenodo.19567671).