



# A Second Runway for Gatwick

Appendix

# A27

## Public Safety Zones



# THIRD PARTY RISK CONTOURS AND PUBLIC SAFETY ZONES FOR THE TWO-RUNWAY FUTURE OPTION 3 WITH AND WITHOUT EATS FOR 2040 FORECAST MOVEMENTS AT GATWICK AIRPORT

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# 1. Summary

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- 1.1 This report describes the results of Third Party Risk calculations for Gatwick Airport Ltd.
- 1.2 In this piece of work NATS was tasked with calculating the risk to third parties in the vicinity of Gatwick Airport for 2040 forecast movements in the following two-runway scenarios:
  - Option 3 - Wide spaced independent mixed mode, 505,602 total forecast movements (496,214 Air transport Movements (ATMs)):
    - Option 3 with EATs (End-around taxiway)
    - Option 3 without EATs
- 1.3 In addition, for each of the above scenarios, an assessment was made of the size and shape of the Public Safety Zones (PSZ) that would be applied to each runway, note that the PSZ is the region behind its landing threshold (i.e. PSZ for 08R is located at the end of the runway closest to the 08R threshold). The results from these assessments have been compared with the current DfT  $10^{-4}$  contour and PSZ which is based on 2025 forecast movements for the current single runway operation.
- 1.4 In the above scenarios, only the locations in which third parties would be subject to individual risk greater than  $10^{-4}$  (1 in 10,000 per annum) and  $10^{-5}$  (1 in 100,000 per annum) were calculated. The  $10^{-5}$  contour is used to determine the size and shape of PSZs in the UK. The risks were assessed by estimating the risk of death per year from aircraft crashes to a nominal individual residing permanently at a particular location. The risks to airline passengers and people whilst working at the airport have not been considered.
- 1.5 Gatwick Airport Ltd provided detailed forecast movements for the above options. Gatwick Airport Ltd also provided the co-ordinates of the existing runway (08R/26L) and proposed runway (08S/26S) thresholds for each of the options.
- 1.6 The risk contours and PSZ areas were created for each of the options above and each has been compared with the current DfT risk contours and PSZ for the existing runway 08R/26L.
- 1.7 Option 3 with EATs:
  - uses a shortened existing runway and the proposed new runway.
  - has  $10^{-4}$  risk contours for the existing runway that are smaller than those for the 2025 DfT assessment.
  - has  $10^{-4}$  risk contours for the proposed runway that are also of a similar magnitude to those calculated for the existing runway.
  - PSZs for runway 26L and the new proposed runway are smaller than the current DfT PSZs.

- PSZ for runway 08R is 288m longer, however due to the shortened existing runway the PSZ does not extend beyond the current DfT PSZ.
- 1.8 Option 3 without EATs:
- uses the same runway splits and forecast traffic as for Option 3 with EATs.
  - uses the existing runway and the same proposed new runway as in Option 3 with EATs.
  - has  $10^{-4}$  risk contours for the existing runway that are very similar in magnitude to the with EATs contours. The differences in the location are a result of the shortened runway in Option 3 with EATs.
  - has  $10^{-4}$  risk contours for the proposed runway that are identical to those in Option 3 with EATs.
  - PSZs are smaller than the current DfT PSZs.
- 1.9 The variations in the contours and PSZs for Option 3 with and without EATs, and the 2025 DfT assessment, are primarily caused by the split of traffic between each runway and the difference in length of the existing runway.

## 2. Methodology for Individual Risk Calculation

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- 2.1 NATS uses HM DfT approved Third Party Risk methodology and UK PSZ policy (Reference 1). This methodology is in use at 35 UK airports as part of national PSZ policy.
- 2.2 The current PSZ contour data is used in this assessment with the permission of the DfT.
- 2.3 It should be noted that whilst every effort has been made to ensure that the modelled scenarios are as representative of real life as is possible, risk modelling can never predict future ATM operations with 100% certainty. Any business decisions made based on the outputs of such modelling need to take these uncertainties into account as well as any assumptions made during the modelling process.
- 2.4 DfT policy for the control of development in Airport Public Safety Zones is given in Reference 2.

### 3. Results and Summary

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- 3.1 The 2040 traffic forecast and operational assumptions provided by Gatwick Airport Ltd were used to derive the mix of traffic using a particular runway for Option 3. The movement numbers modelled and aircraft types for Option 3 are given in Table 1a.
- 3.2 An estimation of the directional splits for the projected movement data for Runway 08R/26L and the proposed runway 08S/26S was provided by Gatwick Airport Ltd for each of the options modelled. The splits for Option 3 are given in Table 1b. The split of traffic between the existing and new runway was 50%/50%. The directional splits are 70% westerly, 30% easterly.
- 3.3 The lengths of the risk contours differ for each end of the runways. These differences are caused by the interaction between the various input parameters to the risk model, the crash frequency, average destroyed area and the numbers and direction of the landing/take-off operations on a given runway.
- 3.4 Options 3 with and without EATs use mixed mode operations between the existing and proposed new runways. This will result in a 50%/50% arrival/departure split between the two runways. The 2040 forecast traffic for Option 3 has increased by 60% compared to that used in the 2025 DfT assessment.
- 3.5 Option 3 with EATs:
- uses a shortened existing runway and the proposed new runway.
  - has  $10^{-4}$  risk contours for the existing runway that are smaller than those for the 2025 DfT assessment.
  - has  $10^{-4}$  risk contours for the proposed runway that are also of a similar magnitude to those calculated for the existing runway in this assessment. This is a result of the forecast traffic being split evenly between the proposed 2 runways.
  - PSZs extend between 2002m and 2643m (Table 2a).
  - PSZs for runway 26L and the new proposed runway are smaller than the current DfT PSZs. The dimensions of the current DfT PSZs are given in Table 2.
  - the PSZ for runway 08R is 288m longer, however due to the shortened existing runway the PSZ does not extend beyond the current DfT PSZ.

- 3.6 Option 3 without EATs:

- uses the same runway splits and forecast traffic as for Option 3 with EATs.
  - uses the existing runway and the same proposed new runway as in Option 3 with EATs.
  - has  $10^{-4}$  risk contours for the existing runway that are very similar in magnitude to the with EATs contours due to the same runway splits and forecast traffic being used. The differences in the location are a result of the shortened runway in Option 3 with EATs.
  - has  $10^{-4}$  risk contours for the proposed runway that are identical to those in Option 3 with EATs.
  - PSZs extend between 2003m and 2262m (Table 2b). These are smaller than the current DfT PSZs.
- 3.7 The variations in the contours and PSZs for Option 3 with and without EATs, and the 2025 DfT assessment, are primarily caused by the split of traffic between each runway and the difference in length of the existing runway.

## 4. References

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1. Department for Transport: Third Party Risk Near Airports and Public Safety Zone Policy: October 1997
2. Control of Development in Airport Public Safety Zones: Department for Transport Circular 1/2010: March 2010.



## 5. Tables

**Table 1a: Options 3 With and Without EATs – 2040 Total Annual Aircraft Movements**

Type	Passenger	Cargo	Positioning	Test & Training	GA/ Other	Total
<b>A319</b>	123,616	0	1,593	18	0	125,227
<b>A320</b>	112,851	0	1,455	16	0	114,322
<b>A321</b>	37,365	0	482	5	0	37,852
<b>B738</b>	2,206	0	29	0	0	2,235
<b>B739</b>	41,356	0	533	6	0	41,895
<b>E175</b>	17,762	0	228	3	0	17,993
<b>E195</b>	26,132	0	337	4	0	26,473
<b>ATR72</b>	12,064	0	155	2	0	12,221
<b>Dash 8 Q400</b>	896	0	12	0	0	908
<b>A350</b>	39,362	45	507	6	0	39,920
<b>B777</b>	25,333	0	326	4	0	25,663
<b>B787</b>	50,410	45	650	7	0	51,112
<b>A380</b>	6,860	0	88	1	0	6,949
<b>Heli</b>	0	0	0	0	91	91
<b>C525</b>	2,048	0	0	0	0	2,048
<b>BE20</b>	683	0	0	0	0	683
<b>Hawk</b>	0	0	0	0	3	3
<b>Typhoon</b>	0	0	0	0	2	2
<b>A400M</b>	0	0	0	0	3	3
<b>A330 MRTT</b>	0	0	0	0	2	2
<b>Total</b>	498,944	90	6,396	71	101	505,602

**Note:** Movement numbers have been rounded

**Table 1b: Options 3 With and Without EATs – Runway Splits**

Runway	Landing	Take Off	Total
<b>08R</b>	7.5%	7.5%	15%
<b>26L</b>	17.5%	17.5%	35%
<b>08S</b>	7.5%	7.5%	15%
<b>26S</b>	17.5%	17.5%	35%
<b>Total</b>	50%	50%	100%

**Table 2: Dimensions of Established Public Safety Zones – 2025 Traffic Forecast**

Runway	Overall Length (L1) of modified triangle (metres)	Length (L2) from Base to 'flared' point (metres)	Width (W1) at base of triangle (metres)	Width (W2) at 'flared' point (metres)	Total Area of modified triangle (Hectares)
08R	2355.39	620.94	289.53	161.21	28.25
26L	2738.97	994.42	268.39	123.87	30.31

**Table 2a: Dimensions of Public Safety Zones – Option 3 With EATs**

Runway	Overall Length (L1) of modified triangle (metres)	Length (L2) from Base to 'flared' point (metres)	Width (W1) at base of triangle (metres)	Width (W2) at 'flared' point (metres)	Total Area of modified triangle (Hectares)
08R	2643.49	738.38	296.35	170.22	33.44
26L	2589.62	966.98	261.18	131.16	29.61
08S	2002.03	745.49	263.10	120.00	21.82
26S	2260.45	757.07	232.82	120.00	22.38

**Table 2b: Dimensions of Public Safety Zones – Option 3 Without EATs**

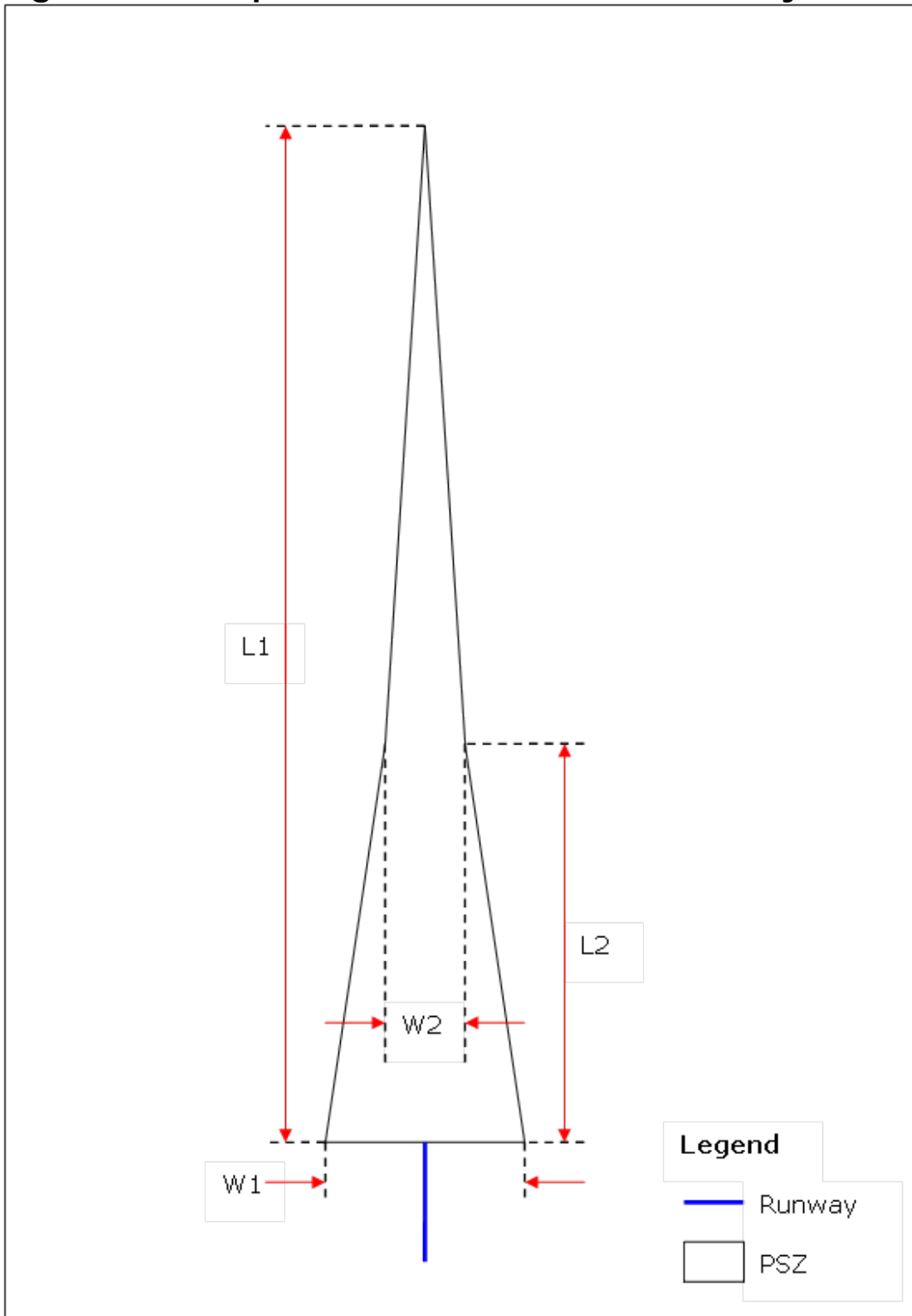
Runway	Overall Length (L1) of modified triangle (metres)	Length (L2) from Base to 'flared' point (metres)	Width (W1) at base of triangle (metres)	Width (W2) at 'flared' point (metres)	Total Area of modified triangle (Hectares)
08R	2047.83	676.21	267.01	132.61	22.61
26L	2252.47	704.26	233.71	129.07	22.77
08S	2003.09	745.51	262.53	120.00	21.80
26S	2262.41	754.11	231.16	120.00	22.29

**Note:** The Public Safety Zone for a runway is defined as the region behind its landing threshold. I.e. The PSZ for runway 08R is located at the end of the runway closest to the 08R threshold.

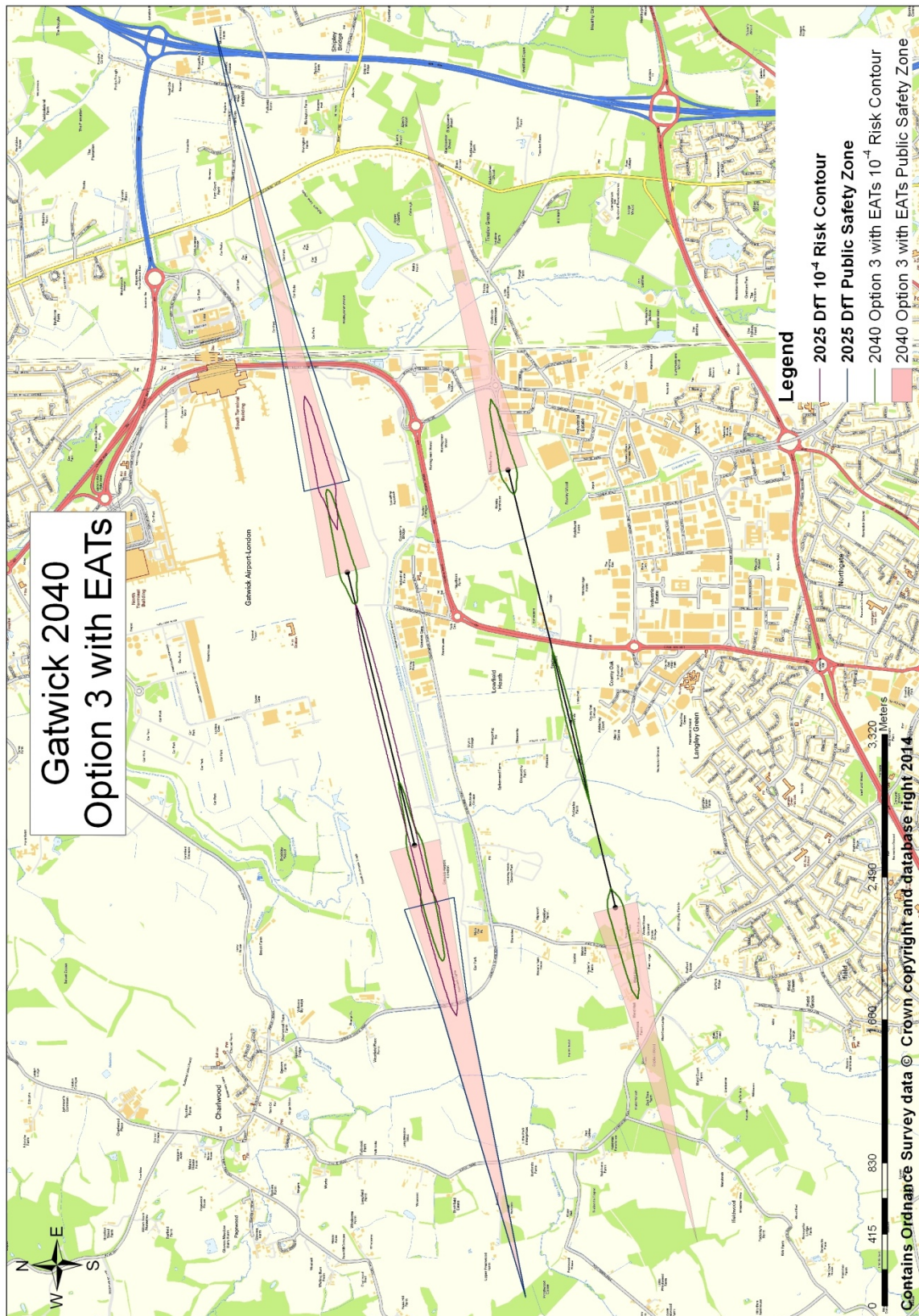
## 6. Figures

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**Figure 1: Example of a Theoretical Public Safety Zone**



**Figure 2: Map of Option 3 with EATs PSZ and Risk Contours**





**Figure 3: Map of Option 3 Without EATs PSZ and Risk Contours**

