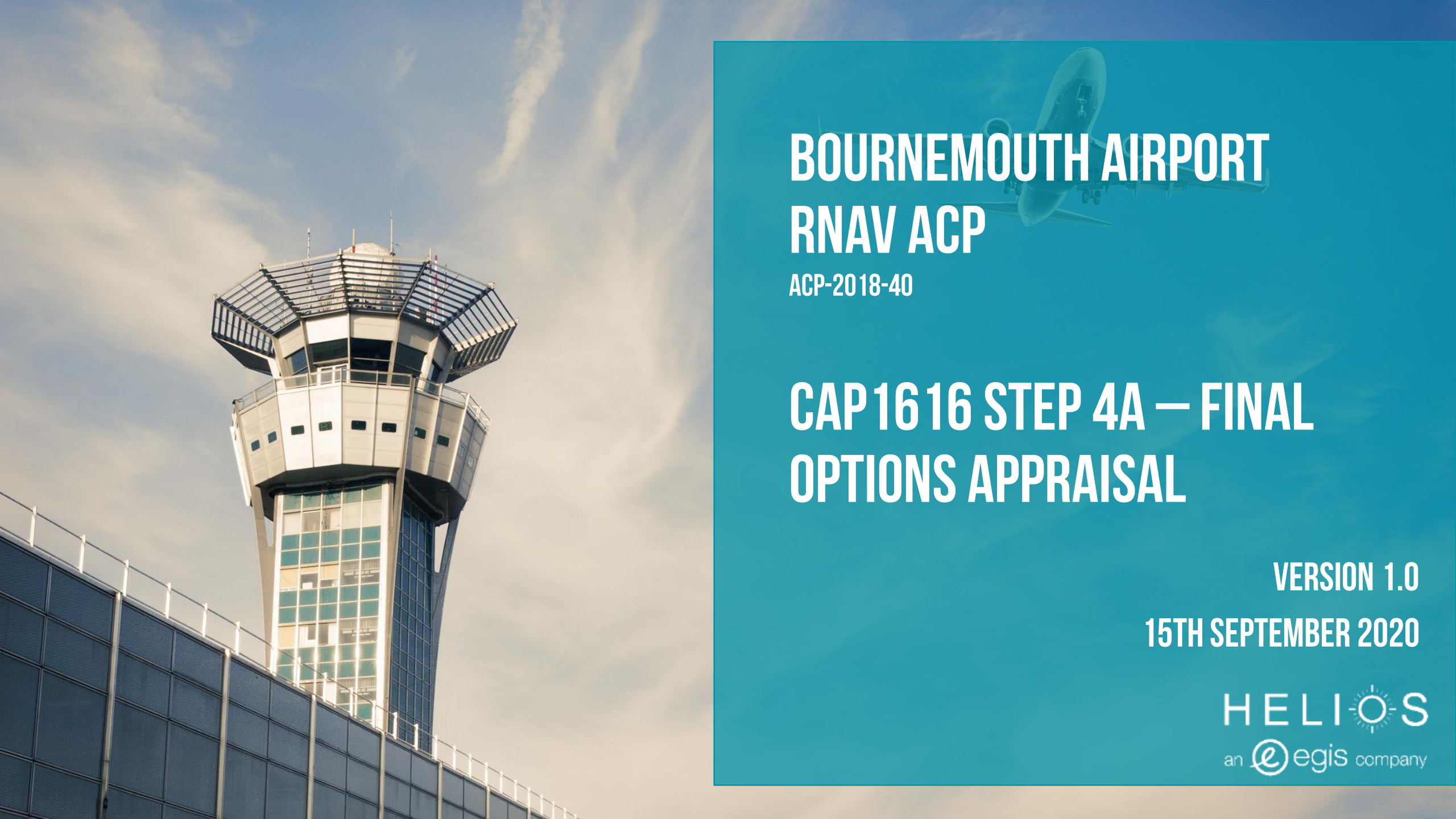


BOURNEMOUTH AIRPORT RNAV ACP

ACP-2018-40

CAP1616 STEP 4A – FINAL OPTIONS APPRAISAL

VERSION 1.0

15TH SEPTEMBER 2020

HELIOS

an egis company

INTRODUCTION

- Bournemouth Airport initiated a CAA CAP1616 Airspace Change Process (ACP) in 2018.
- The Bournemouth Airspace Change Proposal successfully passed the ACP Stage 2 Develop and Assess Gateway on Friday 28 June 2019 and concluded Stage 3 on 22 June 2020.
- During Stage 3, Bournemouth Airport completed a 22-week consultation, lasting from 13th December 2019 until 15th May 2020. During the consultation 34 responses were received. Following the analysis, the admissible responses were consolidated to a total of 33, with one duplicate response received.
- These slides form our submission for CAP1616 Stage 4A – Final Options Appraisal.

CONTEXT FOR THE CHANGE

1. Bournemouth Airport currently has ILS on both RWY ends
   - 08 (Cat I) ~ 30% of landings
   - 26 (Cat III) ~ 70% of landings
2. RWY 08 ILS is obsolete
   - Installed second hand in 1984/5
   - Maintenance support at end of life
   - Irrecoverable failure will have serious operational consequences
3. There is a legal requirement to implement RNP approaches by 2024
   - Could provide 3-Dimensional capability to both RWYs,
   - Could improve resilience to Runway 26 operations.

THE AIRSPACE CHANGE PROCESS – STEP 4A

These slides present BIA's submission as per the CAP1616 Step 4A of the ACP process and provide evidence for compliance with its requirements, which are:

1. Review the consultation responses (Step 3D);
2. Identified responses requiring further consideration, consider the merits and practical possibilities of amending the airspace change design, if possible, to address the issues raised in those responses;
3. Updates the options appraisal to the Final version, using the same approach as in the earlier phases, if this is needed in order to take account of the revised impacts of any new design features; and
4. Discuss with the CAA whether a second consultation is required, if the options appraisal reveals that the impact of the design has changed fundamentally.

SUMMARY OF PREVIOUS CAP1616 STAGES

STAGES 1A TO 3C

STATEMENT OF NEED (STEP 1A)

Bournemouth Airport has RWY 08 and RWY 26, both providing precision approach capabilities via ILS. The preferential runway is RWY 26 handling 75% of all arrivals with the remainder utilising RWY 08. The ILS on RWY 26 is CAT III.

The ILS (CAT I) serving RWY 08 is obsolete and needs to be replaced. The ILS was installed second hand in 1984/85 and the equipment and maintenance support is at end of life. Unrecoverable failure of the ILS on RWY 08 will have serious operational consequences denying easterly Precision Approaches and increasing dependence on RWY 26. In addition, the publication of EU Implementing Rule (IR) 2018/1048 stipulates the implementation of PBN approach procedures to both RWY 08 and RWY 26 by 2024. By 2030 the IR emphasises the preference for PBN over conventional ILS CAT I.

DESIGN PRINCIPLES (STEP 1B)

1. The new procedures should not increase the number of people overflown by aircraft participating in the approach. **(Community/Environmental)**
2. The new procedures should not increase the noise footprint of the existing airport operation, for similar aircraft types and traffic levels, as detailed in the LAeq 16 Hr map in the current Noise Action Plan. **(Community/Environmental)**
3. Implementation should minimise disturbance to the Moors River System SSSI. **(Community/Environmental)**
4. The new approaches shall be standardised by ICAO and acceptable to EASA and CAA and the implementation shall be in compliance with all applicable legislation and regulations, **(Technical)**
5. The design shall be fully compliant with the design criteria stated in ICAO Doc 8168 (PANS OPS) and be flyable by all aircraft types in approach Speed Categories A through D. **(Technical)**
6. The approach procedures shall be of a type for which the majority of Bournemouth aircraft operators are equipped and authorised to fly. **(Technical)**
7. The designs shall seamlessly integrate with extant instrument approach procedures at Bournemouth International Airport **(Technical)**
8. The procedures should address the needs of flight training operators at Bournemouth. **(Operational)**
9. The design shall support continued use of existing radar vectored arrival procedures provided by Solent Radar. **(Operational)**
10. The new procedures shall be implemented in a cost-effective manner. **(Financial)**

IDENTIFIED OPTIONS (STEP 2A)

The following table contains all identified Options at Stage 2A:

Options	
Option 1	Do Nothing
Option 2	Install new CAT I ILS on RWY 08
Option 3	RNP IAP Missed Approach conventional or RNAV to be confirmed during ACP Stage 3
a)	Full T-bar comprising Initial, Intermediate and Final Approach Fixes
b)	Limited T-bar with 1 Initial, Intermediate and Final Approach Fixes
c)	Straight-in with combined Initial/Intermediate and Final Approach Fixes

ALIGNMENT OF OPTIONS WITH DESIGN PRINCIPLES (STEP 2A)

The table below presents an initial assessment of how each option addresses the design principles requirements.

Design Principles	Options		
	Do Nothing	Replace ILS	RNP IAPs
1. The new procedures should not increase the number of people overflown by aircraft participating in the approach	NOK	OK	OK
2. The new procedures should not increase the noise footprint of the existing airport operation, for similar aircraft types and traffic levels, as detailed in the LAeq 16 Hr map in the current Noise Action Plan.	NOK	OK	OK
3. Implementation should minimise disturbance to the Moors River System SSSI.	OK	NOK	OK
4. The new approaches shall be standardised by ICAO and acceptable to EASA and CAA and the implementation shall be in compliance with all applicable legislation and regulations	NOK	NOK	OK
5. The design shall be fully compliant with the design criteria stated in ICAO Doc 8168 (PANS OPS) and be flyable by all aircraft types in approach Speed Categories A through D.	OK	OK	OK
6. The approach procedures shall be of a type for which the majority of Bournemouth aircraft operators are equipped and authorised to fly.	OK	OK	OK
7. The designs shall seamlessly integrate with extant instrument approach procedures at Bournemouth International Airport	OK	OK	OK
8. The procedures should address the needs of flight training operators at Bournemouth	Partial	Partial	OK
9. The design shall support continued use of existing radar vectored arrival procedures provided by Solent Radar.	OK	OK	OK
10. The new procedures shall be implemented in a cost-effective manner.	OK	NOK	OK

ALIGNMENT OF OPTIONS WITH DESIGN PRINCIPLES (STEP 2A)

Option 1: Do Nothing

Design Principles	Alignment	Description
1. The new procedures should not increase the number of people overflown by aircraft participating in the approach	**NOK**	The conventional non-precision 2D NDB and SRA procedures provide less precise guidance spreading flights over a greater area and affecting more people than 3D precision approaches.
2. The new procedures should not increase the noise footprint of the existing airport operation, for similar aircraft types and traffic levels, as detailed in the LAeq 16 Hr map in the current Noise Action Plan.	**NOK**	Non-precision 2D NDB and SRA procedures do not provide vertical guidance requiring aircraft to operate with higher levels of engine thrust and increased engine noise on approach. The increased operating minima of the Non-Precision approaches are likely to result in a higher number of missed approaches, resulting in increased aircraft noise from high thrust settings on the missed approach climb-out
4. The new approaches shall be standardised by ICAO and acceptable to EASA and CAA and the implementation shall be in compliance with all applicable legislation and regulations	**NOK**	This option does not meet the requirements of PBN Implementing Rule (IR) 2018/1048 for PBN Approaches with Vertical Guidance with 3 lines of minima by January 2024. If ILS on RWY 08 becomes unsupportable before 2020, the PBN IR compliance date will become Dec 2020.
8. The procedures should address the needs of flight training operators at Bournemouth	**Partial**	Flight training operators will be able to perform conventional training at BIA but PBN Training will not be supported, noting that BIA is one of the few airports with the infrastructure and capacity to support training operations.

ALIGNMENT OF OPTIONS WITH DESIGN PRINCIPLES (STEP 2A)

Option 2: Install new CAT I ILS on RWY 08

Design Principles	Alignment	Description
3. Implementation should minimise disturbance to the Moors River System SSSI.	**NOK**	The RWY 08 ILS localiser is located in a Site of Special Scientific Interest (SSSI) and replacement construction works would involve significant disruption of flora and fauna and create planning difficulties.
4. The new approaches shall be standardised by ICAO and acceptable to EASA and CAA and the implementation shall be in compliance with all applicable legislation and regulations	**NOK**	This option does not meet the requirements of PBN Implementing Rule (IR) 2018/1048 for PBN Approaches with Vertical Guidance with 3 lines of minima by January 2024.
8. The procedures should address the needs of flight training operators at Bournemouth	**Partial**	Flight training operators will be able to perform conventional training at BIA. In case of PBN training they will have to carry out the training at surrounding airport with PBN IAPs.
10. The new procedures shall be implemented in a cost-effective manner.	**NOK**	PBN Implementing Rule (IR) 2018/1048 foresees RNP approaches in preference to CAT I operations after 2030, thereby negating a positive business case for replacement of RWY 08 ILS.

ALIGNMENT OF OPTIONS WITH DESIGN PRINCIPLES (STEP 2A) – SUMMARY

- It was agreed during stakeholder engagement that Option 1 and Option 2 do not deliver against the Statement of Need and they are not align with the Design Principles. This claim was also confirmed by evaluation against design principles. On the previous slides.
- The following table presents the retained Option 3 following stakeholder engagement and evaluation against design principles. This Option remains equally valid for RWY 08 and RWY 26.

Options	
Option 3	RNP IAP Missed Approach conventional or RNAV to be confirmed during ACP Stage 3
a)	Full T-bar comprising Initial, Intermediate and Final Approach Fixes
b)	Limited T-bar with 1 Initial, Intermediate and Final Approach Fixes
c)	Straight-in with combined Initial/Intermediate and Final Approach Fixes

INITIAL APPRAISAL OF REMAINING OPTION 3: SUMMARY (STEP 2B)

- The Initial Options Appraisal for Option 3 and all its sub-options resulted in Option 3a being discounted for RWY 26 since the IAF aligned with the final approach track was close to the Southampton CTR. Aircraft using this IAF could adversely impact ATC workload and create safety issues due to this proximity. In addition, few arriving aircraft during 2017/2018, would utilise this IAF and it would not provide significant benefit.
- The Initial Options Appraisal also proposed a fourth option (**Option 3d:** RNP IAP – Limited T-bar with 2 Initial Approach Fixes) for further assessment following a safety review. Option 3d was evaluated against the Design Principles, tested with stakeholders and assessed in the Initial Options Appraisal.

RWY	Option 3: RNP IAP			
	OPTION 3a Full T-bar	OPTION 3b Limited T-bar: 1 IAF	OPTION 3c 'Straight-in'	OPTION 3d Limited T-bar: 2 IAFs
RWY 26	**Excluded after Initial Options Appraisal**	✓	✓	✓
RWY 08	✓	✓	✓	✓

INITIAL APPRAISAL OF REMAINING OPTION 3: COMPARISON OF SUB-OPTIONS (STEP 2B)

GROUP	IMPACT	OPTION 3a Full T-bar	OPTION 3b Limited T-bar: 1 IAF	OPTION 3c 'Straight-in'	OPTION 3d Limited T-bar: 2 IAFs	Benefit or Dis-Benefit
Community	**Noise impact on health and quality of life**	=	—	—	=	IAF for arrivals provide a predictable initial approach
Community	**Air Quality**	=	=	=	=	
Wider Society	**Air Quality and Greenhouse gas impact**	=	=	=	=	
Wider Society	**Capacity /resilience**	=	=	=	=	
General Aviation	**Access**	+	+	—	+	Initial approach segment increases training scenarios
General Aviation/ commercial airlines	**Economic impact from increased effective capacity**	+	+	—	+	
General Aviation/ commercial airlines	**Fuel Burn**	+	+	—	+	Non-Radar, lower miles compared to Prom ILS approach Fewer transit flights if local RNP approach available.
Commercial airlines	**Training costs**	=	=	=	=	
Commercial airlines	**Other costs**	=	=	=	=	
Airport/ANSP	**Infrastructure costs**	=	=	=	=	
Airport/ANSP	**Operational costs**	=	=	=	=	
Airport/ANSP	**Deployment costs**	=	=	=	=	
	Safety	—	—	=	=	Proximity of RWY 26 'central IAF' to Southampton CTR and single IAF for both GA and CAT

= No difference between Options + Positive benefit — Dis-benefit

FULL APPRAISAL OF REMAINING OPTION 3: SUMMARY (STEP 3A)

- BIA completed the Full Options Appraisal for Option 3 and its remaining sub-options. Following the Full Options Appraisal, BIA discounted Option 3a for RWY 08 and Option 3b for both RWY ends.
- Options 3c and 3d were retained for public consultation. The evaluation showed a better noise and fuel performance for Option 3d which were nominated the preferred option for the Consultation.
- The following table summarises the results of the Full Options Appraisal.

RWY	Option 3: RNP IAP			
	OPTION 3a Full T-bar	OPTION 3b Limited T-bar: 1 IAF	OPTION 3c 'Straight-in'	OPTION 3d Limited T-bar: 2 IAFs
RWY 26	*Excluded after Initial Options Appraisal*	**Excluded due to limited benefits and potential for noise shift**	**Retained for consultation**	**Retained for consultation**
RWY 08	**Excluded due to IAF outside of controlled airspace**	**Excluded due to limited benefits and potential for noise shift**	**Retained for consultation**	**Retained for consultation**

FULL APPRAISAL SUMMARY FOR REMAINING OPTION 3 : COMPARISON OF SUB-OPTIONS 3C AND 3D (STEP 3A)

GROUP	IMPACT	OPTION 3c 'Straight-in'	OPTION 3d Limited T-bar: 2 IAFs	Benefit or Dis-Benefit
Community	**Noise impact on health and quality of life**	—	+	IAF for arrivals provide a predictable initial approach
Community	**Air Quality**	=	=	
Wider Society	**Air Quality and Greenhouse gas impact**	=	=	
Wider Society	**Capacity /resilience**	=	=	
General Aviation	**Access**	—	+	Initial approach segment increases training scenarios
General Aviation/ commercial airlines	**Economic impact from increased effective capacity**	—	+	
General Aviation/ commercial airlines	**Fuel Burn**	—	+	Non-Radar, lower miles compared to Prom ILS approach Fewer transit flights if local RNP approach available.
Commercial airlines	**Training costs**	=	=	
Commercial airlines	**Other costs**	=	=	
Airport/ANSP	**Infrastructure costs**	=	=	
Airport/ANSP	**Operational costs**	=	=	
Airport/ANSP	**Deployment costs**	=	=	
	Safety (Initial Options Appraisal)	=	=	

Due to the increased flexibility of sub-option 3d to support all of Bournemouth's aviation stakeholders' needs, this sub-option is the preferred solution.

= No difference between Options + Positive benefit — Dis-benefit

STEP 3D – SUMMARY OF CONSULTATION

CONSULTATION FEEDBACK SUMMARY

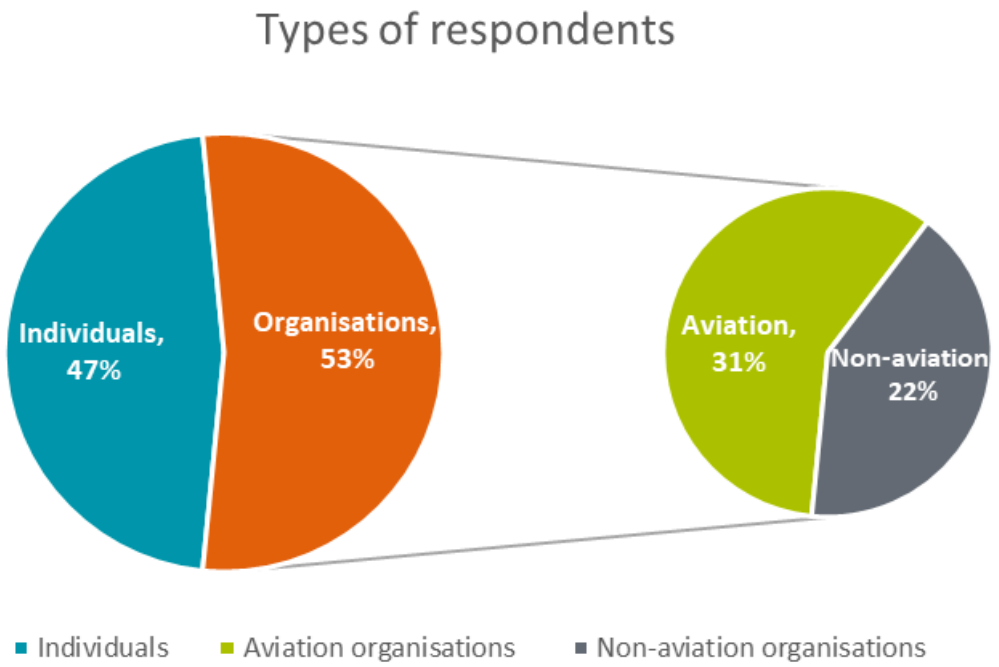
- Bournemouth RNAV Approaches Consultation was started 13th December 2019 and was closed 15th May 2020 – in total 22 weeks.
- During the consultation **34 responses** were received. Following the analysis, the admissible responses were consolidated to **a total of 33**, as there was one case of duplicate response received from the same person.
- The total number of 91 Consultation invitations were sent out to aviation and non-aviation stakeholders.

CONSULTATION VALIDATION

- We believe that the consultation remains valid due to the following reasons:
  - There has been a relatively long period (22 weeks) during which stakeholders had the opportunity to express their opinions;
  - No critical or major issues have been received from any stakeholders in relation to the proposed change;
  - We recognize that there was one consultation response, which suggested modifications to the proposed airspace change. However, we believe that this response was sufficiently addressed by the consultation team (see Categorisation of Responses document). Some of the suggestions can be considered in future airspace changes.
  - Currently, there is still a legal requirement to implement RNP approaches at all instrument UK airports by 2024.

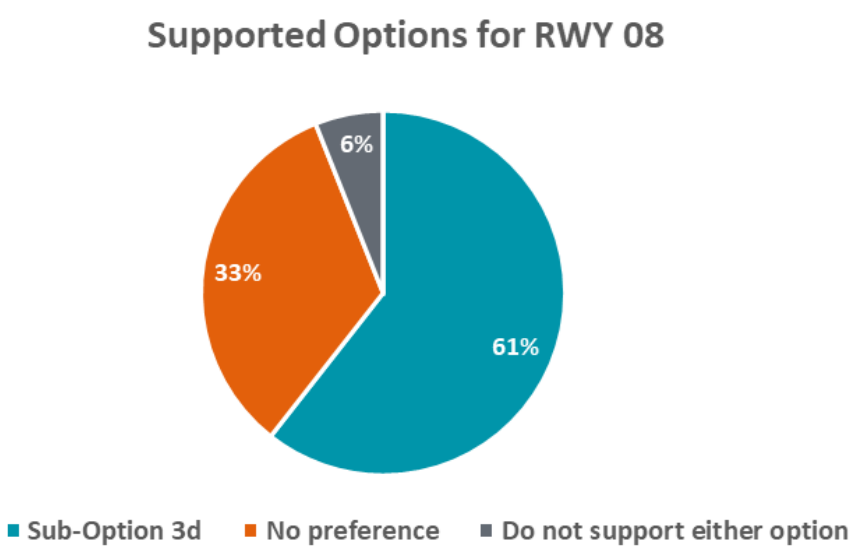
PERCENTAGE OF RESPONSES BY TYPE OF RESPONDENT

Organisations submitted more responses (18) than individuals, representing 55% of the total amount. Aviation organisations submitted 11 responses representing 33% of the total amount and other organisations submitted 7 responses, representing 21% of the total. On the other hand, individuals submitted 15 responses, representing 47% of the total value.

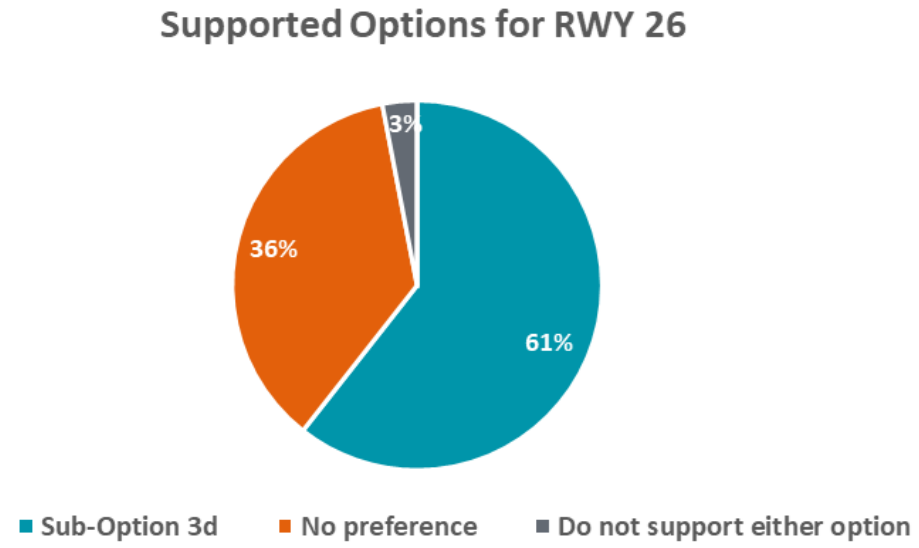


ANALYSIS OF RESPONSES BY PREFERRED OPTION

Of the 33 received responses, 61% (20) gave their support to “Sub-Option 3d”, 33% (11) had no preferred option (“No preference”) and 6% (2) of respondents selected “Do not support either proposal”. No respondents expressed their support for “Sub-Option 3c” for RWY 08.



Of the 33 received responses, 61% (20) gave their support to “Sub-Option 3d”, 36% (12) had no preferred option (“No preference”), whilst 3% (1) of respondents selected “Do not support either proposal”. Similarly, as for RWY 08, there were no responses that supported “Sub-Option 3c” for RWY 26.



STEP 4A – FINAL OPTIONS APPRAISAL

SUMMARY FROM STAGE 2B

- The Comprehensive List of Options were:
    1. Do Nothing;
    2. Install new CAT I ILS on RWY 08;
    3. RNP IAP (missed Approach conventional or RNAV to be confirmed during ACP Stage 3):
        - **Option 3a:** Full T-bar comprising Initial, Intermediate and Final Approach Fixes;
        - **Option 3b:** Limited T-bar with 1 Initial, Intermediate and Final Approach Fixes
        - **Option 3c:** Straight-in with combined Initial/Intermediate and Final Approach Fixes
- Options 1 and 2 were discounted in Step 2A as they do not deliver against the Statement of Need nor are aligned with the Design Principles and therefore are not viable. This was accepted by all engaged stakeholders.
- The Initial Options Appraisal for Option 3 and all its sub-options resulted in Option 3a being discounted for RWY 26 since the IAF aligned with the final approach track was close to the Southampton CTR. Aircraft using this IAF could adversely impact ATC workload and create safety issues due to this proximity. In addition, few arriving aircraft during 2017/2018, would utilise this IAF and it would not provide significant benefit.
- The Initial Options Appraisal also proposed a fourth option (**Option 3d:** RNP IAP – Limited T-bar with 2 Initial Approach Fixes) for further assessment following a safety review. Option 3d was evaluated against the Design Principles, tested with stakeholders and assessed in the Initial Options Appraisal.

SUB-OPTIONS FOR ASSESSMENT

The following table presents the remaining Option 3 sub-options for both RWY ends after the Initial Options Appraisal at Step 2B of the CAP1616 process.

RWY	Option 3: RNP IAP			
	OPTION 3a Full T-bar	OPTION 3b Limited T-bar: 1 IAF	OPTION 3c 'Straight-in'	OPTION 3d Limited T-bar: 2 IAFs
RWY 26	Excluded after Initial Options Appraisal	✓	✓	✓
RWY 08	✓	✓	✓	✓

COMPARISON OF SUB-OPTIONS

GROUP	IMPACT	OPTION 3a Full T-bar	OPTION 3b Limited T-bar: 1 IAF	OPTION 3c 'Straight-in'	OPTION 3d Limited T-bar: 2 IAFs	Benefit or Dis-Benefit
Community	**Noise impact on health and quality of life**	=	—	—	=	IAF for arrivals provide a predictable initial approach
Community	**Air Quality**	=	=	=	=	
Wider Society	**Air Quality and Greenhouse gas impact**	=	=	=	=	
Wider Society	**Capacity /resilience**	=	=	=	=	
General Aviation	**Access**	+	+	—	+	Initial approach segment increases training scenarios
General Aviation/ commercial airlines	**Economic impact from increased effective capacity**	+	+	—	+	
General Aviation/ commercial airlines	**Fuel Burn**	+	+	—	+	Non-Radar, lower miles compared to Prom ILS approach Fewer transit flights if local RNP approach available.
Commercial airlines	**Training costs**	=	=	=	=	
Commercial airlines	**Other costs**	=	=	=	=	
Airport/ANSP	**Infrastructure costs**	=	=	=	=	
Airport/ANSP	**Operational costs**	=	=	=	=	
Airport/ANSP	**Deployment costs**	=	=	=	=	
	Safety	—	—	=	=	Proximity of RWY 26 'central IAF' to Southampton CTR and single IAF for both GA and CAT

= No difference between Options + Positive benefit — Dis-benefit

FINAL OPTIONS APPRAISAL

- The following slides contain a qualitative and quantitative overview of Option 3 and its remaining sub-options including a summary of the concept of operation, with a full appraisal highlighting the benefits and/or dis-benefits between the sub-options.
- From the environmental perspective, the assessment required for the Level 1 change must contains the following:
  - Noise;
  - Overflight;
  - CO2 emissions;
  - Local Air Quality;
  - AONBs and National Parks – impact on tranquility; and
  - Biodiversity.
- A quantitative analysis has been performed for Noise and Greenhouse Gasses in WebTAG, for CO2 emission and fuel savings in the project CBA.
- The Bournemouth Webtrack arrivals data (derived from radar) for 2018 was used as an inputs to the CBA. The CBA was conducted to quantify benefits for a small proportion of night arrivals of commercial aircraft benefiting from the change thanks to distance reduction. The figures presenting an assumptions for the distance saved from each direction are presented on Slides 76 and 77.
- A qualitative analysis has been performed to cover local air quality, impacts on tranquility within Areas of Outstanding Natural Beauty and National Parks, Biodiversity and other groups as required by CAP1616.
- Over the previous 11 years, the movements at Bournemouth Airport have decreased at a rate of -7% CAGR. Bournemouth Airport has ambitions to return, over the course of the next 10 years, to traffic volume of the year 2008, which represents 78,527 movements per year. This figure was used in the CBA and noise contours analysis to derive average annual traffic growth until 2029.

FINAL APPRAISAL: CONCEPT OF OPERATION

To meet Design Principle 9 (*The design shall support continued use of existing radar vectored arrival procedures provided by Solent Radar*), arriving aircraft participating in the RNP Approaches will be vectored by Solent Radar to establish on the ILS before the Final Approach Fix (approximately 8NM).

- Commercial aircraft conducting a missed approach will normally be provided with vectors by Bournemouth radar to re-join the arrival traffic sequence.

Outside of the hours of Solent or Bournemouth Radar services, the published procedure requires aircraft to join overhead BIA NDB and from there to fly an outbound leg and procedural turn to intercept the ILS. Under the proposed RNP approach, aircraft will self position to commence the approach at any Initial Approach Fix without overhead joins.

It is envisaged that aircraft engaged in training activities who wish to commence an RNP Approach will be required, through local instructions, to join via a northerly Initial Approach Fix.

- Note the aircraft outbound tracks from the Hold to each northern IAF will be close to, but not replicate, the existing tracks of the ILS, NDB or SRA missed approaches.

Note: RWY 08 arrivals are expected to prefer the proposed RNP Approach as it will be the only 3-Dimensional IAP to the RWY. For RWY 26, the ILS approach is expected to remain the preferred approach option.

FINAL APPRAISAL: CONCEPT OF OPERATION

- The operational concept for the change to Bournemouth airport, as proposed in each variant of Option 3, results in the aircraft following the same final approach segment as is the case today when the aircraft follow the ILS guidance. The changes that are therefore anticipated and are presented in the following analysis are based on the assessment that the proposed changes will have no impact on:
  - the operational practices at the airport;
  - the number of aircraft utilising the airport;
  - the rest of the airspace (which is beyond Bournemouth Airport's control);
  - how aircraft arrive to Bournemouth Airport's airspace;
  - the vertical path of aircraft landing at the airport;
  - the mix of aircraft.
- Variations in each of the options will result in some concentration of noise around the initial and intermediate segments if the aircraft fly the RNP approach as opposed to the existing ILS. This change is more explicit for RWY 08 than for RWY 26 which will maintain ILS capabilities and therefore the same operational concept of today in the future.
- Unlike today's operation, where aircraft self position to join the ILS naturally leading to some dispersion of tracks, the publication of the RNP approach to either runway end will have some impact on noise – albeit expected to be small. The variability of this impact on the local community is dependent on the final option selected due to the concentration of arrivals around the Initial Approach Fix when joining the RNP approach out of hours.

FINAL APPRAISAL: CBA METHODOLOGY USED

The CBA for Bournemouth was undertaken with a focus on Commercial Air Transport and Business Jet aircraft operations as being the operations most likely to benefit (track miles, fuel and CO_2) from the implementation of the proposed options. In order to determine the level of benefit delivered, the following steps were undertaken:

1. **Gate analysis:** A gate anaylysis was undertaken to determine the plit of arriving traffic by direction to the two runways. Bournemouth WebTrak 2018 arrival data was used. Custom Python code, Excel and QGIS analysis were used to split arrivals for each runway into North, South, East and West arrivals This was used to determine the number and proportion of arrivals using each gate split by flight rules (VFR vs. IFR), day and night flights, and by flight category (commercial, regional, business, GA, helicopter and military).

2. **Base year arrivals:** The number of arrivals at Bournemouth in 2018[1] within scope was 2,893. Only a small proportion of these would be applicable to benefit directly from out of hours operation and included in the analysis. This proportion also varied by each sub-option. The arrivals were estimated based on:
   - Commercial Air Transport: 4,081 movements
   - Business Aviation: 1,704 movements

3. **Forecast traffic growth:** To determine the traffic growth through the CBA period, traffic levels from 2008 were used to baseline the growth rate. This year traffic movements were much higher than 2018 and Bournemouth Airport has ambitions to return to these traffic levels over the next 10 years. In the CBA therefore, it was assumed that 2029 traffic will have the same number of movements as 2008 (8,175 arrivals) and that the traffic growth would be linear between 2019 and 2029. The traffic levels assumed for 2008[1] were 16,350 total movements with half (8,175) assumed for arrivals based on:
   - Commercial Air Transport: 11,936 movements
   - Business Aviation: 4,414 movements

4. **Track miles saved:** With the new proposed IAP procedures, during normal operational hours, arrivals will continue to be radar vectored by ATC as today. This will not change the flight profiles hence there will be no change in distance flown or fuel burn. During out of the hours operations, arriving operations using each sub-option will benefit with the distance flown being reduced by 5 – 10 NM resulting in fuel burn and CO_2 emissions savings.

5. **Affected flights:** The gate analysis showed that night arrivals represent approximately 12% of arriving traffic. On the basis of the percentage split from the Gate analysis, the number of commercial air transport and business arrivals from 2018 and this assessment of night benefiting arrivals, the overall number of flights benefiting was then calculated as the basis of the CBA.

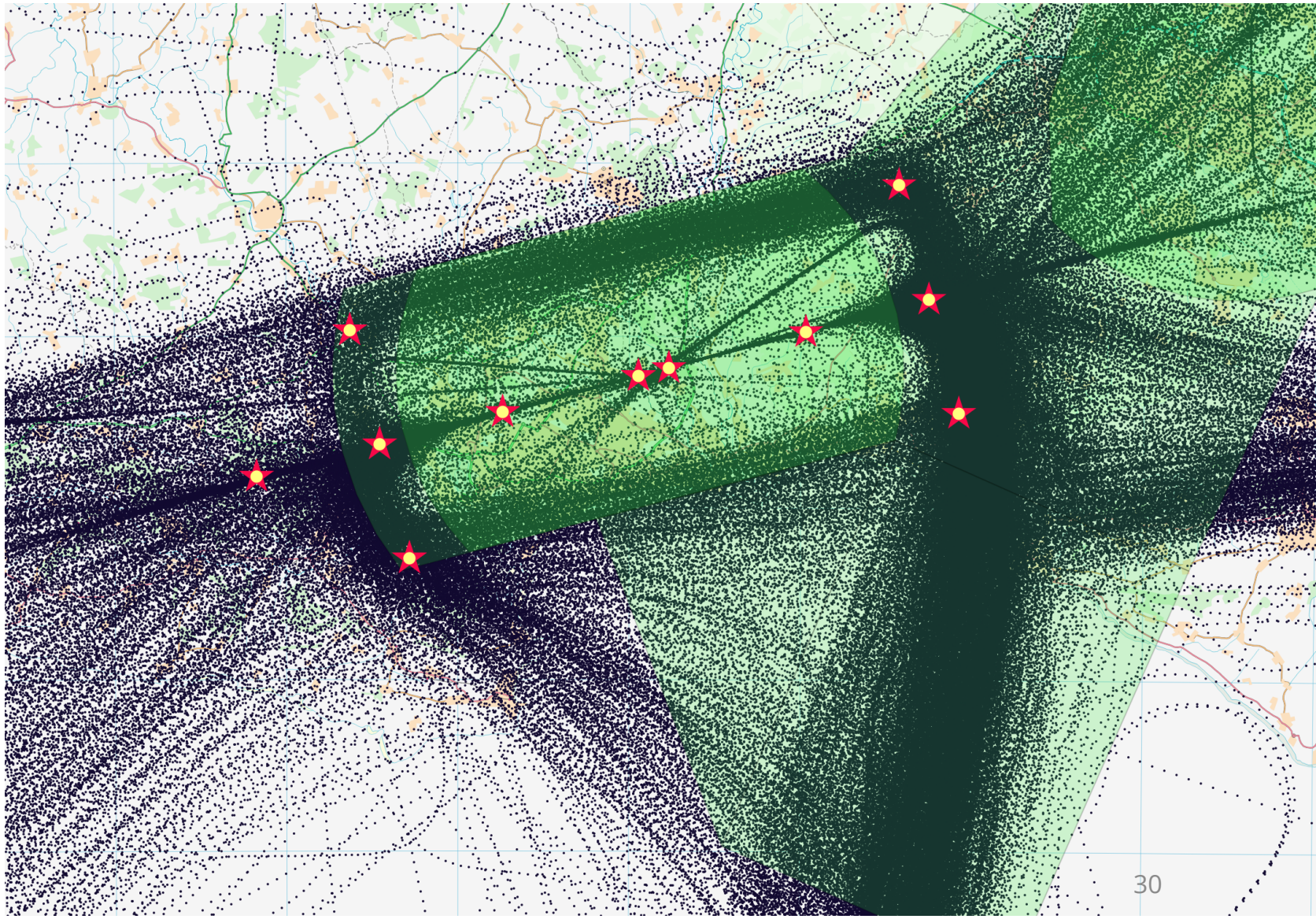
[1] https://www.caa.co.uk/Data-and-analysis/UK-aviation-market/Airports/Datasets/UK-airport-data/

OPTIONS APPRAISAL: INDICATIVE FIXES ON RADAR TRACKS

Waypoint positions for the proposed options are presented and are **Indicative**. They are, informed by the 2017/2018 traffic data (shown here filtered for Commercial Air Transport Operations), the existing conventional IAPs and PAN-OPS segment lengths.

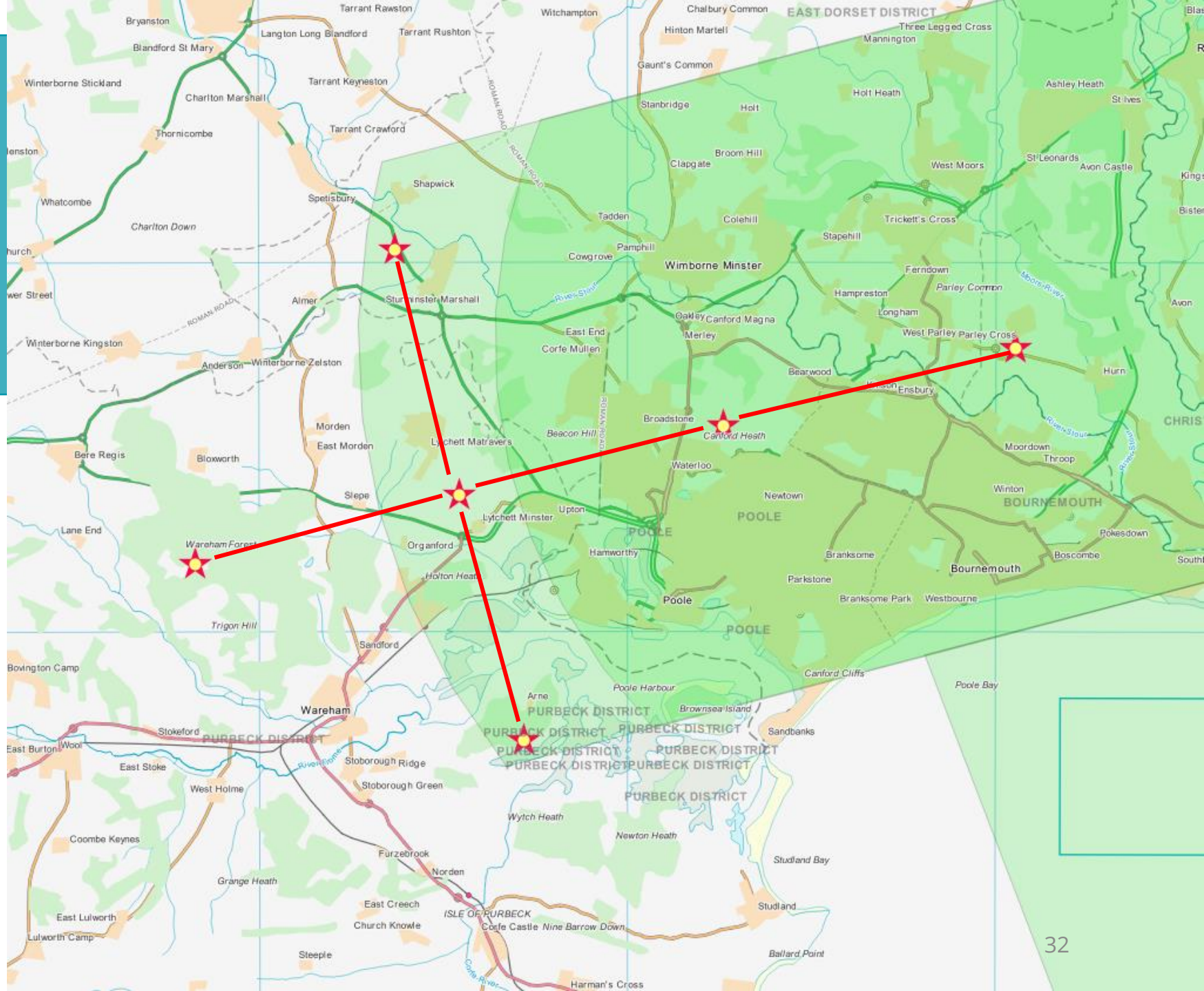
These have been confirmed during the formal IFPD process and have not tangibly moved.

Waypoint positions are common to all Options, although Options 3b and 3c may not include all waypoints.



OPTION 3A: FINAL APPRAISAL

OPTION 3A FOR RWY 08



OPTION 3A FOR RWY 08

Group	Impact	Level of Analysis	Description
Communities	Noise impact on health and quality of life	Qualitative / Quantitative	Under normal operations, where arrivals will continue to be radar vectored by ATC at Solent Radar to the approach, there is likely to be a concentration of flight tracks around the initial approach fixes, compared to the ILS of today. • For direct arrivals from the west, there will be no change compared to today. • For arrivals from the North, East and South vectored via the IAF, there is likely to be a merge of tracks concentrated over the Dorset AONB, Cranborne Chase AONB and the county parishes of Sturminster Marshall, Shapwick, Pamphill in the North and Arne, Corfe Castle, Wareham St. Martin, Lytchett Minster and Upton in the South. This traffic pattern will continue out of hours with aircraft routing direct to the IAF as opposed to self positioning today. The precise guidance of the RNP approach will enable improved track keeping compared to an NDB or SRA approach, and therefore will maintain the noise footprint within the existing bounds. The RNP approach will have lower minima than the NDB or SRA approaches and so it would be expected that the RNP approach would also result in a net decrease in missed approaches or diversions, thus, lower levels of climb out noise following a missed approach. Use of the southerly IAF by training aircraft would result in a change in overflights for neighbourhoods south of the runway. Because of that, the using of IAF will be excluded for training flights, as it would result in a change in airport operations. The LAeq 16hr and 8hr contours have also been calculated, as well as longer-term noise impact, and they are no different to the other sub-options . These are presented at the end of this document – see slides 86-89. In accordance with CAP 1616, we assessed the number of households that are currently experiencing noise from arrivals to Bournemouth airport using the WebTAG Noise Assessment Workbook using the Laeq contours as input. We quantified noise impact of Bournemouth arrivals for four cases (see Slides 86-89): • Opening year (proposed year of change – 2020) – 16 hour day – 8 hour night • Forecast year (last year of the forecast – 2030) – 16 hour day – 8 hour night The noise contour maps confirm that even with the 10-year growth forecast, proposed Initial Approach Fix (IAF) points are outside the noise contours, therefore areas around IAFs will experience noise lower than 51 dB Leq during the day and lower than 45 dB Leq during the night. Given that this ACP only concerns location of the IAFs, any changes will not affect noise contours. 'With' and 'without scheme' scenarios are therefore identical from a noise point of view and result in £0 monetisation of the change. The WebTAg Noise workbook results are presented on Slide 78 as are the other sub-options.

OPTION 3A FOR RWY 08

Group	Impact	Level of Analysis	Description
Communities	Air Quality	Qualitative	DfT's TAG UNIT A5.2 Aviation Appraisal states the following with respect to Air Quality impacts: *"Any appraisal of aviation schemes ought to take into account the impacts on local and regional air quality where these impacts are likely to be significant, such as for a major airport development"*. In addition, CAP1616, Appendix B (Environmental metrics and assessment requirements), paragraph B74 states: *"Due to the effects of mixing and dispersion, emissions from aircraft above 1,000 feet (amsl) are unlikely to have a significant impact on local air quality. Therefore the impact of airspace design on local air quality is generally negligible compared with other factors such as changes in the volume of air traffic, and local transport infrastructures feeding the airport."* In our view this airspace change will not generate 'significant' change in Air Quality as it does not impact emissions from aircraft below 1,000 feet, and therefore we have decided to provide high-level and qualitative assessment only. RNP Full T-bar approach will have significantly lower minima than the NDB or SRA approaches on RWY 08. Under normal operations, when arrivals are vectored by ATC at Solent Radar to the final approach, it is expected there will be no change to air quality due to trajectories and heights being identical. During out of hours operations, the RNP full T-bar approach will result in fewer track miles, compared to the ILS or NDB approaches today, which will result in reduced fuel burn, lower emissions and improved air quality. Following the implementation of the RNP full T-bar approach at Bournemouth there may be reduced transit flying by training organisations based at Bournemouth to conduct RNP approach training elsewhere - currently Exeter, Cardiff, Bristol and the Channel Islands have RNP approaches. This will result in minor reductions in fuel burn, CO_2 emissions.

OPTION 3A FOR RWY 08

Group	Impact	Level of Analysis	Description
Wider Society	Greenhouse gas impact	Qualitative	As an input to the WebTAG Greenhouse Gasses workbook we used outputs from the CBA undertaken for this airspace change. During operational hours, arrivals will continue to be radar vectored by ATC as today. This will not change the flight profiles hence there will be no change in relation to fuel burn and CO2 emissions. During out of the hours operations, there will be a small proportion of arriving commercial aircraft benefiting from the change thanks to distance reduction. The CBA was conducted to quantify these benefits for each sub-option. The savings in terms of reduced emissions for the proposed year of change of 2020 from our CBA are: CO2 emissions savings (kg) 52,417 CO2 emissions savings (t) 52 Tonnes of CO2e emissions (savings) 52 The savings in terms of reduced emissions for 10-year forecast scenario from our CBA are: CO2 emissions savings (kg) 818,043 CO2 emissions savings (t) 818 Tonnes of CO2e emissions (savings) 818 In accordance with CAP 1616, we assessed the impact of Option 3A on Greenhouse Gas emissions using the WebTAG Greenhouse Gases workbook for the assessments. The results are presented on Slide 79.

OPTION 3A FOR RWY 08

Group	Impact	Level of Analysis	Description
Wider Society	Capacity /Resilience	Qualitative	The provision of RNP Approaches will provide capacity and resilience benefits and will have higher operational availability than can be provided by today's ILS, with minimal ongoing operational costs. The RNP approach will provide a 3 Dimensional approach with minima being at worst lower than the existing 2D NDB or SRA approaches or at best being comparable to the CAT I ILS that it will replace. This will reduce the need to utilise a 2D approach procedure (not preferred) or diverting to an alternate aerodrome. No quantitative assessment of the cost of diversions as a result of lack of availability of the ILS is undertaken as the objective is to replace the ILS with the RNP approach. Not quantitative assessment is made of the increase in capacity as a result of the RNP approach compared to the ILS. Although the airport has a stated aim of returning the airport to 2008 movement levels, this was achieved without the RNP approach implying that the existing infrastructure is capable of delivering this capacity. An assessment of the approach to deliver this capacity was deemed not needed, given the availability from GNSS to support the ILS is higher.
General Aviation	Access	Qualitative	The provision of RNP approaches at Bournemouth is of particular interest to General Aviation operators, specifically the instrument training. GA currently account for 84% of movements at Bournemouth which is expected to remain unchanged. The AOPA Response to the Stage 1 engagement included: *"The proposal is supported by AOPA because there is a growing need for GA pilots to train for RNP/PBN procedures and Bournemouth has been and we hope will continue to be a regional airport that continues to welcome General Aviation operations."* The inclusion of an Initial Approach Segment would increase the range of training scenarios that could be provided at Bournemouth. A straight-In Initial Approach Segment from the West would be outside of the controlled airspace as depicted on slides 12 and 14, with potential interaction between IFR arrivals and VFR traffic transitioning around the CTR not under the control of Bournemouth airport or Solent radar. It could also, depending on the training scenario lead to situations where student pilots are transitioning from controlled to uncontrolled and back to controlled airspace increasing operational risk without need. No quantitative assessment has been made as the vast majority of GA movements at Bournemouth operating under visual flight rules and would continue to use Bournemouth airport without the procedure in place.

OPTION 3A FOR RWY 08

Group	Impact	Level of Analysis	Description
General Aviation/ Commercial Air Transport	Economic impact from increased effective capacity	Qualitative	There are benefits to the GA and commercial training organisations through the inclusion of a full RNP approach and associated missed approach as this increases the range of training scenarios available at Bournemouth. Without the option to undertake training on PBN approach procedures, training will have to be undertaken away from Bournemouth increasing flight costs for ferrying to and from aerodromes with suitable procedures. There are benefits to CAT operations from the availability of this approach to RWY 08 increases the resilience of the operation in the event of the ultimate failure of the ILS, and given the roughly 30% utilisation of RWY 08. Without the availability of a precision approach, the incidence of landings with higher tail wind components (RWY 26) or diversions could be a consequence. The net result in all cases is increased costs for training and commercial operations at Bournemouth without the RNP approach.

OPTION 3A FOR RWY 08

Group	Impact	Level of Analysis	Description
General Aviation/ Commercial Air Transport	Fuel burn	Qualitative / Quantitative	During operational hours arrivals will continue to be radar vectored by ATC as today, this will not change the flight profiles hence there will be no change in relation to fuel burn. During out of the hours operations, there will be a small proportion of arriving CAT operations benefiting from the change thanks to distance reduction. The benefits for proposed year of change 2020 assessed from our CBA are summarised below. Fuel saved (kg) 16,640 Fuel savings (£) £11,648 Fuel savings (£) – discounted £11,254 The total benefits estimated over 10 years assessed from 2020 from our CBA are summarised below. Fuel saved (kg) 259,696 Fuel savings (£) £181,787 Fuel savings (£) – discounted £147,766 The available full T-bar approach at Bournemouth for a local training will result in fuels savings ands reduced engine run times for GA training operators thorough a reduction in the flight time and distance to an airport with RNP approach capability and the capacity to accept training aircraft. There are known instances of UK training operators travelling to the Channel Islands, France and Belgium to conduct RNP approach training and tests flights. The inclusion of Initial Approach Fixes would increase the range of GA training and test exercises that could be provided at Bournemouth leading to fuel burn and operating cost savings from reduced transit flights. Due to the variability in GA training operations these have not been assessed quantitatively.

OPTION 3A FOR RWY 08

Group	Impact	Level of Analysis	Description
Commercial airlines	Training costs	Qualitative	There are no training costs required for commercial operators to participate in the RNP Approach as Regulation (EU) No. 539/2016 Performance Based Navigation (PBN) requires all Pilots who fly PBN routes or procedures to have PBN Endorsement on their licences by 25 August 2018. Engagement with the operators at Bournemouth has confirmed that their aircraft and crew are capable of LNAV and LNAV/VNAV operations. Given the recent publication of Regulation (EU) No. 1048/2018 it is to be expected that commercial operators will introduce LPV capabilities into their fleets. It is noted that EasyJet are the initial customer for LPV capability on the A320 NEO from circa. 2022. Given these assumptions, no quantitative assessment is made.
Commercial airlines	Other costs	Qualitative	The availability of a 3 Dimensional approach to RWY 08 at Bournemouth will lead to fewer minima related diversions and will provide contingency for RWY 26 during periods when the ILS is unavailable (e.g. equipment unserviceability or aerodrome works). The availability of a 3 Dimensional approach to only one runway end may discourage some aircraft operators from implementing new services which would be mitigated by the presence of the RNP approach. No quantitative assessment is made as the estimate would be subject to too many assumptions, including the effectiveness of operational mitigations, and given the current low utilisation of the airport are time dependent on when any outage would occur.

OPTION 3A FOR RWY

Group	Impact	Level of Analysis	Description
Airport/Air Navigation Service Provider	Infrastructure costs	Qualitative	There are no infrastructure (equipment) costs associated with the full T-bar RNP approach. The only costs associated with the full T-bar RNP approach implementation are: • IAP design, • Validation (flight and ground), • Safety assessment, • Airspace change and consultation, • Certification and • Training • Publication in AIP. No quantitative estimate is provided as these are commercially sensitive.
Airport/Air Navigation Service Provider	Operational costs	Qualitative	The costs of ownership of the full T-bar RNP approach supported by GNSS is very low compared to a conventional approach which requires the provision of ground navigation aid infrastructure. The full T-bar RNP approach requires maintenance of the approach procedure on a five yearly basis although there are no ongoing flight inspection activities as would be required for an approach based on conventional navigation infrastructure. No quantitative estimate is provided as these are commercially sensitive but are less than the costs associated with the ongoing maintenance of the ILS.

OPTION 3A FOR RWY

Group	Impact	Level of Analysis	Description
Airport/Air Navigation Service Provider	Deployment costs	Qualitative	There are no deployment costs associated with the full T-bar RNP approach. The only costs associated with RNP implementation are • IAP design, • Validation (flight and ground), • Safety assessment, • Airspace change and consultation, • Certification and • Training • Publication in AIP. No quantitative estimate is provided as these are commercially sensitive.
Wider Society	Biodiversity	Qualitative	The implementation of the full T-bar RBP is not expected to result in any changes to biodiversity given that the implementation will not require any ground works to support implementation. However, the ILS localiser for RWY 08 is located in a SSSI. The impact of decommissioning the localiser is to be discussed in detail with Hampshire County Council, Natural England and the New Forest National Park during decommissioning to minimise any disturbance to local flora and fauna. This would have to happen regardless of any option given the end of life status of the RWY 08 ILS. An option might be to leave the antenna concrete plinth and sub surface cables and ducting in situ depending on the recommendation of the above organisations. Since the introduction of the proposed change does not change the existing operations or number of movements to the airport, no quantitative assessment has been made.

OPTION 3A FOR RWY 08

Group	Impact	Level of Analysis	Description
Wider Society	Tranquillity	Qualitative / Quantitative	The existing arrivals to RWY 08 overfly the AONBs of Dorset and Cranborne Chase and West Wiltshire Downs. The implementation of options 3A will not change the proposed vectoring operation but is likely to lead to a concentration of flight tracks around the initial approach fix in Arne County Parish within the Dorset AONB and within the limits of Tarrant Crawford, Shapwick, Pamphill and Hinton County Parishes within Cranborne Chase AONB. It is noted that the change of this option will be the rerouting of aircraft arriving from the east that would have flown the published procedure overhead the aerodrome, to joining via the initial approach fix. Analysis of the traffic arriving over 2017 and 2018 showed that approximately 3% of instrument flight operations (including training) flew the published instrument approach procedure. This means that 97% of traffic continues to overfly the county parishes indicated above under today's operations. The RNP approach also provides the opportunity to improve the vertical profiles for arriving aircraft, keeping them higher for longer. Given that the proposed routings will therefore not change the existing fleet of aircraft, frequency and altitudes at which aircraft are arriving to RWY 08, it is estimated that there will be no change in the levels of tranquillity and no quantitative assessment is made.

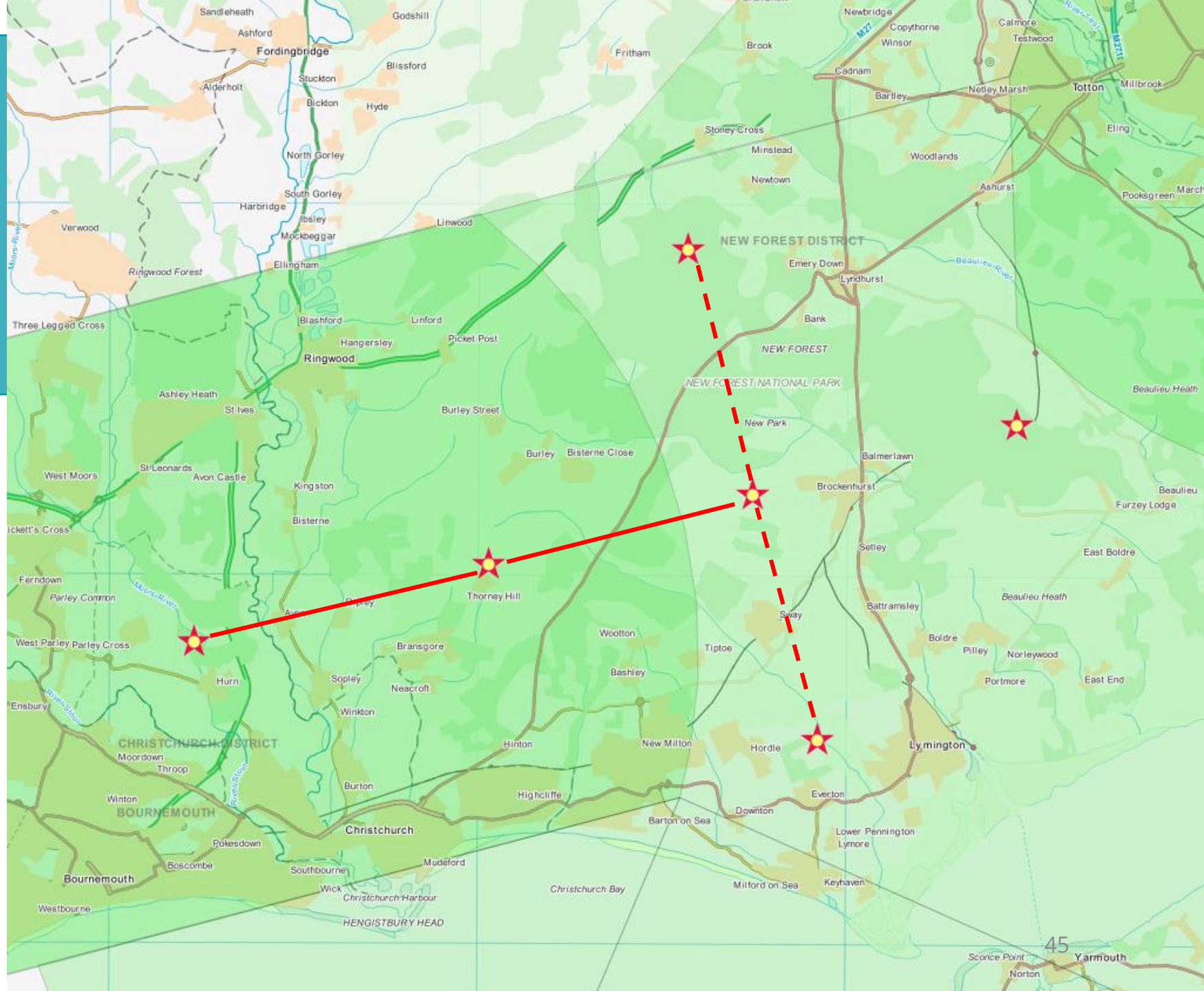
OPTION 3A FINAL APPRAISAL FOR RWY 08: SUMMARY

The implementation of a straight-in IAF with separate IF under Option 3a requires the implementation of an IAF outside of controlled airspace whilst the rest of the procedure remains in controlled airspace. This could lead to interactions between IFR and VFR flights that are beyond the control of Bournemouth ATC.

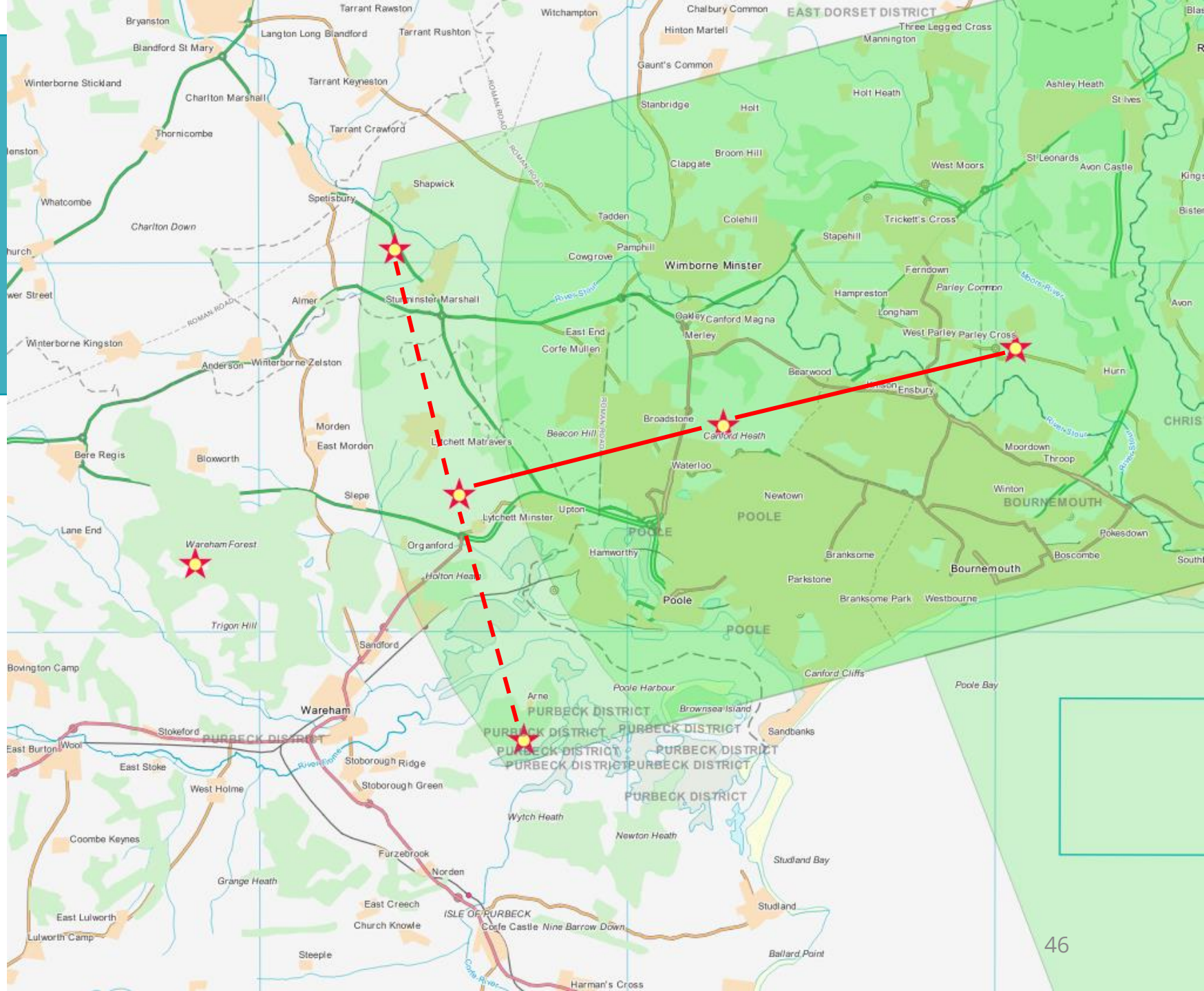
Given this, **Option 3a for RWY 08 has been discounted**.

OPTION 3B: FINAL APPRAISAL

OPTION 3B FOR RWY 26



OPTION 3B FOR RWY 08



OPTION 3B

Group	Impact	Level of Analysis	Description
Communities	Noise impact on health and quality of life	Qualitative / Quantitative	Under normal operations where arrivals continue to be radar vectored to the approach, there is likely to be some concentration of flight tracks around the initial approach fixes compared to the ILS of today for both runways. **RWY 08** For direct arrivals from the west, there will be no change compared to today. For arrivals from the North, East and South vectored via the IAF, there is likely to be a merge of tracks concentrated over the Dorset AONB, Cranborne Chase AONB and the county parishes of Sturminster Marshall, Shapwick, Pamphill in the North and Arne, Corfe Castle, Wareham St. Martin, Lytchett Minster and Upton in the South. This traffic pattern will continue out of hours with aircraft routing direct to the IAF as opposed to self positioning today. **RWY 26** The majority of arrivals are from the South and East. Arrivals from the West are predominantly vectored to join either from the North or South. This places all arrival traffic passing over the New Forrest National Park. Arrivals from the East would be expected to be unaffected by the change. North bound joins would be expected to lead to some concentration over the county parishes of Ellingham, Harbridge and Ibsley and Minstead. Southern joins would be expected to lead to some concentration over Milford-on-Sea, Hordle, Lymington and Pennington and Sway. There is potentially some change over Brockenhurst The precise guidance of the RNP approach will enable improved track keeping compared to an NDB or SRA approach, and therefore will maintain the noise footprint within the existing bounds. The RNP approach will have lower minima than the NDB or SRA approaches and so it would be expected that the RNP approach would also result in a net decrease in missed approaches or diversions, thus, lower levels of climb out noise following a missed approach. Use of the southerly IAF by training aircraft would result in a change in overflights for neighbourhoods south of the runway. To avoid this change, the use of IAF will be excluded for training flights. The LAeq 16hr and 8hr contours have been calculated, as well as longer-term noise impact, and they are no different to the other sub-options . These are presented at the end of this document in the section Attachments (slide 86-89).

OPTION 3B

Group	Impact	Level of Analysis	Description
Communities	Noise impact on health and quality of life	Qualitative / Quantitative	In accordance with CAP 1616, we have assessed the number of households that are currently experiencing noise from arrivals to Bournemouth airport using the WebTAG Noise Assessment Workbook. We used general WebTAG methodology with noise contours sequenced by 3 dB as the data from our noise modelling tool (AEDT) was produced in 3 dB steps. In line with the WebTAG template, we quantified the noise impact of Bournemouth arrivals for four cases (see attachments on Slides 86-89): • Opening year (proposed year of change – 2020) – 16 hour day – 8 hour night • Forecast year (last year of the forecast – 2030) – 16 hour day – 8 hour night The noise contour maps confirm that even with the 10-year growth forecast, proposed Initial Approach Fix (IAF) points are outside the noise contours, therefore areas around IAFs will experience noise lower than 51 dB Leq during the day and lower than 45 dB Leq during the night. Given that this ACP only concerns location of the IAFs, any changes will not affect noise contours. 'With' and 'without scheme' scenarios are therefore identical from noise point of view and result in £0 monetisation of the change. The WebTAg Noise workbook results are presented on Slides 78.

OPTION 3B

Group	Impact	Level of Analysis	Description
Communities	Air Quality	Qualitative / Quantitative	DfT's TAG UNIT A5.2 Aviation Appraisal states the following with respect to Air Quality impacts: *"Any appraisal of aviation schemes ought to take into account the impacts on local and regional air quality where these impacts are likely to be significant, such as for a major airport development"*. In addition, CAP1616, Appendix B (Environmental metrics and assessment requirements), paragraph B74 states: *"Due to the effects of mixing and dispersion, emissions from aircraft above 1,000 feet (amsl) are unlikely to have a significant impact on local air quality. Therefore the impact of airspace design on local air quality is generally negligible compared with other factors such as changes in the volume of air traffic, and local transport infrastructures feeding the airport."* In our view this airspace change will not generate 'significant' change in Air Quality as it does not impact emissions from aircraft below 1,000 feet, and therefore we have decided to provide high-level and qualitative assessment only. RNP Limited T-bar (1 IAF) approach will have significantly lower minima than the NDB or SRA approaches on RWY 08. Under normal operations, when arrivals are vectored by ATC at Solent Radar to the final approach, it is expected that there will be no change to air quality due to trajectories and heights being identical. During out of hours operations, the RNP Limited T-bar (1 IAF) approach will result in fewer track miles, compared to the ILS or NDB approaches today, which will result in reduced fuel burn, lower emissions and improved air quality. Following the implementation of the RNP Limited T-bar (1 IAF) approach at Bournemouth there may be reduced transit flying by training organisations based at Bournemouth to conduct RNP approach training elsewhere - currently Exeter, Cardiff, Bristol and the Channel Islands have RNP approaches. This will result in minor reductions in fuel burn, CO2 emissions.

OPTION 3B

Group	Impact	Level of Analysis	Description
Wider society	Greenhouse gas impact	Qualitative / Quantitative	As an input to the WebTAG Greenhouse Gasses workbook we used outputs from the CBA undertaken for this airspace change. Under the normal operations, where arrivals will be radar vectored by ATC at Solent Radar, there will be no change in relation to fuel burn and CO2 emissions. During out of the hours operations, there will be a small proportion of arriving commercial aircraft benefiting from the change thanks to distance reduction. The CBA was conducted to quantify these benefits for each sub-option. **Option 3b:Limited T-bar 1 IAF (South) RWY 26** The savings in terms of reduced emissions for proposed year of change 2020 assessed from our CBA are: CO2 emissions savings (kg) 103,662 CO2 emissions savings (t) 104 Tonnes of CO2e emissions (savings) 104 The savings in terms of reduced emissions for 10-year forecast scenario assessed from our CBA are: CO2 emissions savings (kg) 1,617,806 CO2 emissions savings (t) 1,618 Tonnes of CO2e emissions (savings) 1,618 **Option 3b:Limited T-bar 1 IAF (South) RWY 08** The savings in terms of reduced emissions for proposed year of change 2020 assessed from our CBA are: CO2 emissions savings (kg) 44,510 CO2 emissions savings (t) 45 Tonnes of CO2e emissions (savings) 45 The savings in terms of reduced emissions for 10-year forecast scenario assessed from our CBA are: CO2 emissions savings (kg) 694,651 CO2 emissions savings (t) 695 Tonnes of CO2e emissions (savings) 695

OPTION 3B

Group	Impact	Level of Analysis	Description
Wider society	Greenhouse gas impact	Qualitative / Quantitative	**Option 3b: Limited T-bar 1 IAF (North) RWY 26** The savings in terms of reduced emissions for proposed year of change 2020 from our CBA are: CO2 emissions savings (kg) 73,793 CO2 emissions savings (t) 74 Tonnes of CO2e emissions (savings) 74 The savings in terms of reduced emissions for 10-year forecast scenario from our CBA are: CO2 emissions savings (kg) 1,151,659 CO2 emissions savings (t) 1,152 Tonnes of CO2e emissions (savings) 1,152 **Option 3b: Limited T-bar 1 IAF (North) RWY 08** The savings in terms of reduced emissions for proposed year of change 2020 from our CBA are: CO2 emissions savings (kg) 29,576 CO2 emissions savings (t) 30 Tonnes of CO2e emissions (savings) 8.1 The savings in terms of reduced emissions for 10-year forecast scenario from our CBA are: CO2 emissions savings (kg) 461,577 CO2 emissions savings (t) 462 Tonnes of CO2e emissions (savings) 462 In accordance with CAP 1616, we assessed the impact of Option 3B on Greenhouse Gas emissions. We used WebTAG Greenhouse Gases workbook for the assessments and the results are presented on the Slides 80-83.

OPTION 3B

Group	Impact	Level of Analysis	Description
Wider Society	Capacity /Resilience	Qualitative	The provision of RNP Approaches will provide capacity and resilience benefits and will have higher operational availability than can be provided by today's ILS, with minimal ongoing operational costs. The RNP approach will provide a 3 Dimensional approach with minima being at worst lower than the existing 2D NDB or SRA approaches or at best being comparable to the CAT I ILS that it will replace. This will reduce the need to utilise a 2D approach procedure (not preferred) or diverting to an alternate aerodrome. No quantitative assessment of the cost of diversions as a result of lack of availability of the ILS is undertaken as the objective is to replace the ILS with the RNP approach. Not quantitative assessment is made of the increase in capacity as a result of the RNP approach compared to the ILS. Although the airport has a stated aim of returning the airport to 2008 movement levels, this was achieved without the RNP approach implying that the existing infrastructure is capable of delivering this capacity. An assessment of the approach to deliver this capacity was deemed not needed, given the availability from GNSS to support the ILS is higher.
General Aviation	Access	Qualitative	Business and General aviation fleets have a high level of equipage for RNP approaches with LPV lines of minima. The provision of RNP approaches at Bournemouth is of particular interest to General Aviation operators with respect to instrument training. The AOPA Response to the Stage 1 engagement included: *"The proposal is supported by AOPA because there is a growing need for GA pilots to train for RNP/PBN procedures and Bournemouth has been and we hope will continue to be a regional airport that continues to welcome General Aviation operations."* The inclusion of an Initial Approach Segment and an RNP Missed approach would increase the range of training scenarios that could be provided at Bournemouth. Given the variability in training sorties and the above statement, this benefit has not been quantified.

OPTION 3B

Group	Impact	Level of Analysis	Description
General Aviation/ Commercial Air Transport	Economic impact from increased effective capacity	Qualitative	There are benefits to the GA and commercial training organisations through the inclusion of a full RNP approach and associated missed approach as this increases the range of training scenarios available at Bournemouth. Without the option to undertake training on PBN approach procedures, training will have to be undertaken away from Bournemouth increasing flight costs for ferrying to and from aerodromes with suitable procedures. There are benefits to CAT operations from the availability of this approach to RWY 08 increases the resilience of the operation in the event of the ultimate failure of the ILS, and given the roughly 30% utilisation of RWY 08. Without the availability of a precision approach, the incidence of landings with higher tail wind components (RWY 26) or diversions could be a consequence. The net result in all cases is increased costs for training and commercial operations at Bournemouth without the RNP approach.

OPTION 3B

Group	Impact	Level of Analysis	Description
General Aviation/ Commercial Air Transport	Fuel burn	Qualitative /Quantitative	During operational hours arrivals will continue to be radar vectored by ATC as today, this will not change the flight profiles hence there will be no change in relation to fuel burn. During out of the hours operations, there will be a small proportion of arriving commercial aircraft benefiting from the change thanks to distance reduction. **Option 3b: Limited T-bar 1 IAF (South) RWY 26** The benefits for proposed year of change 2020 assessed from our CBA are summarised below. Fuel saved (kg) 32,909 Fuel savings (£) £23,036 Fuel savings (£) – discounted £22,257 The total benefits estimated over 10 years from 2020 assessed from our CBA are summarised below. Fuel saved (kg) 513,589 Fuel savings (£) £359,512 Fuel savings (£) – discounted £292,231 **Option 3b: Limited T-bar 1 IAF (South) RWY 08** The benefits for proposed year of change 2020 assessed from our CBA are summarised below. Fuel saved (kg) 14,130 Fuel savings (£) £9,891 Fuel savings (£) – discounted £9,557 The total benefits estimated over 10 years from 2020 assessed from our CBA are summarised below. Fuel saved (kg) 220,524 Fuel savings (£) £154,367 Fuel savings (£) – discounted £125,478

OPTION 3B

Group	Impact	Level of Analysis	Description
General Aviation/ Commercial Air Transport	Fuel burn (continued)	Qualitative /Quantitative	**Option 3b: Limited T-bar 1 IAF (North) RWY 26** The benefits for proposed year of change 2020 assessed from our CBA are summarised below. Fuel saved (kg) 23,426 Fuel savings (£) £16,399 Fuel savings (£) – discounted £15,844 The total benefits estimated over 10 years from 2020 assessed from our CBA are summarised below. Fuel saved (kg) 365,606 Fuel savings (£) £255,924 Fuel savings (£) – discounted £208,029 **Option 3b: Limited T-bar 1 IAF (North) RWY 08** The benefits for proposed year of change 2020 assessed from our CBA are summarised below. Fuel saved (kg) 9,389 Fuel savings (£) £6,572 Fuel savings (£) – discounted £6,350 The total benefits estimated over 10 years from 2020 assessed from our CBA are summarised below. Fuel saved (kg) 146,533 Fuel savings (£) £102,573 Fuel savings (£) – discounted £83,377

OPTION 3B

Group	Impact	Level of Analysis	Description
General Aviation/ Commercial Air Transport	Fuel burn (continued)	Qualitative /Quantitative	The available limited T-bar approach at Bournemouth for a local training will result in fuels savings ands reduced engine run times for GA training operators thorough a reduction in the flight time and distance to an airport with RNP approach capability and the capacity to accept training aircraft. There are known instances of UK training operators travelling to the Channel Islands, France and Belgium to conduct RNP approach training and tests flights. The inclusion of Initial Approach Fixes would increase the range of GA training and test exercises that could be provided at Bournemouth leading to fuel burn and operating cost savings from reduced transit flights
Commercial airlines	Training costs	Qualitative	There are no training costs required for commercial operators to participate in the RNP Approach as Regulation (EU) No. 539/2016 Performance Based Navigation (PBN) requires all Pilots who fly PBN routes or procedures to have PBN Endorsement on their licences by 25 August 2018. Engagement with the operators at Bournemouth has confirmed that their aircraft and crew are capable of LNAV and LNAV/VNAV operations. Given the recent publication of Regulation (EU) No. 1048/2018 it is to be expected that commercial operators will introduce LPV capabilities into their fleets. It is noted that EasyJet are the initial customer for LPV capability on the A320 NEO from circa. 2022. There will be no impact on training costs from any of the options for RNP approaches at Bournemouth.

OPTION 3B

Group	Impact	Level of Analysis	Description
Commercial airlines	Other costs	Qualitative	The availability of a 3 Dimensional approach to RWY 08 at Bournemouth will lead to fewer minima related diversions and will provide contingency for RWY 26 during periods when the ILS is unavailable (e.g. equipment unserviceability or aerodrome works). The availability of a 3 Dimensional approach to only one runway end may discourage some aircraft operators from implementing new services which would be mitigated by the presence of the RNP approach. No quantitative assessment is made as the estimate would be subject to too many assumptions, including the effectiveness of operational mitigations, and given the current low utilisation of the airport are time dependent on when any outage would occur.
Airport/Air Navigation Service Provider	Infrastructure costs	Qualitative	There are no infrastructure (equipment) costs associated with the limited T-bar RNP approach. The only costs associated with the limited T-bar RNP approach implementation are: • IAP design, • Validation (flight and ground), • Safety assessment, • Airspace change and consultation, • Certification and • Training • Publication in AIP. No quantitative estimate is provided as these are commercially sensitive.

OPTION 3B

Group	Impact	Level of Analysis	Description
Airport/Air Navigation Service Provider	Operational costs	Qualitative	The costs of ownership of the limited T-bar RNP approach supported by GNSS is very low compared to a conventional approach which requires the provision of ground navigation aid infrastructure. The limited T-bar RNP approach requires maintenance of the approach procedure on a five yearly basis although there are no ongoing flight inspection activities as would be required for an approach based on conventional navigation infrastructure. No quantitative estimate is provided as these are commercially sensitive although are less than the ongoing operational cost for the ILS for RWY 08.
Airport/Air Navigation Service Provider	Deployment costs	Qualitative	There are no deployment costs associated with the limited T-bar RNP approach. The only costs associated with RNP implementation are • IAP design, • Validation (flight and ground), • Safety assessment, • Airspace change and consultation, • Certification and • Training • Publication in AIP. No quantitative estimate is provided as these are commercially sensitive.

OPTION 3B

Group	Impact	Level of Analysis	Description
Wider Society	Tranquillity	Qualitative	The proposed implementation of Option 3b at BIA will not change the operational concept for air traffic operations or control at the airport. The vast majority of operations will be vectored by ATC in accordance with existing practice, and at similar altitudes. Analysis of the traffic arriving at BIA in 2017 showed that approximately 3% of instrument flight operations (including training) flew the published instrument approach procedure. The utilisation of the Option 3b approach will facilitate a more direct approach for aircraft flying the procedure from either the north or south (depending on IAF orientation) – especially out of hours – with reduced track miles compared to the existing procedures if optimised for southerly approaches. Of the other traffic at BIA approximately 50% of movements are visual flight rules (VFR) traffic which would not be flying the procedure and are typically lower than other traffic. Thus it is estimated that the introduction of Option 3 will result in a slight improvement or no change in the levels of tranquillity. It is noted that the change of this option will be the rerouting of aircraft arriving from the east that would have flown the published procedure overhead the aerodrome, to joining via the initial approach fix. Analysis of the traffic arriving over 2017 and 2018 showed that approximately 3% of instrument flight operations (including training) flew the published instrument approach procedure. This means that 97% of traffic continues to overfly the county parishes indicated above under today's operations. Given that the proposed routings will therefore not change the existing fleet of aircraft, frequency and altitudes at which aircraft are arriving to RWY 08 or 26, it is estimated that there will be no change in the levels of tranquillity. Details of the population affected by the noise are calculated and presented with the noise contours presented at the end of this document.

OPTION 3B

Group	Impact	Level of Analysis	Description
Wider Society	Biodiversity	Qualitative	The implementation of the Option 3b is not expected to result in any changes to biodiversity given that the implementation will not require any ground works to support implementation. However, the ILS localiser for RWY 08 is located in a SSI. The impact of decommissioning the localiser is to be discussed in detail with Hampshire County Council, Natural England and the New Forrest National Park during decommissioning to minimise any disturbance to local flora and fauna. This would have to happen regardless of any option given the end of life status of the RWY 08 ILS. An option might be to leave the antenna concrete plinth and sub surface cables and ducting in situ depending on the recommendation of the above organisations.

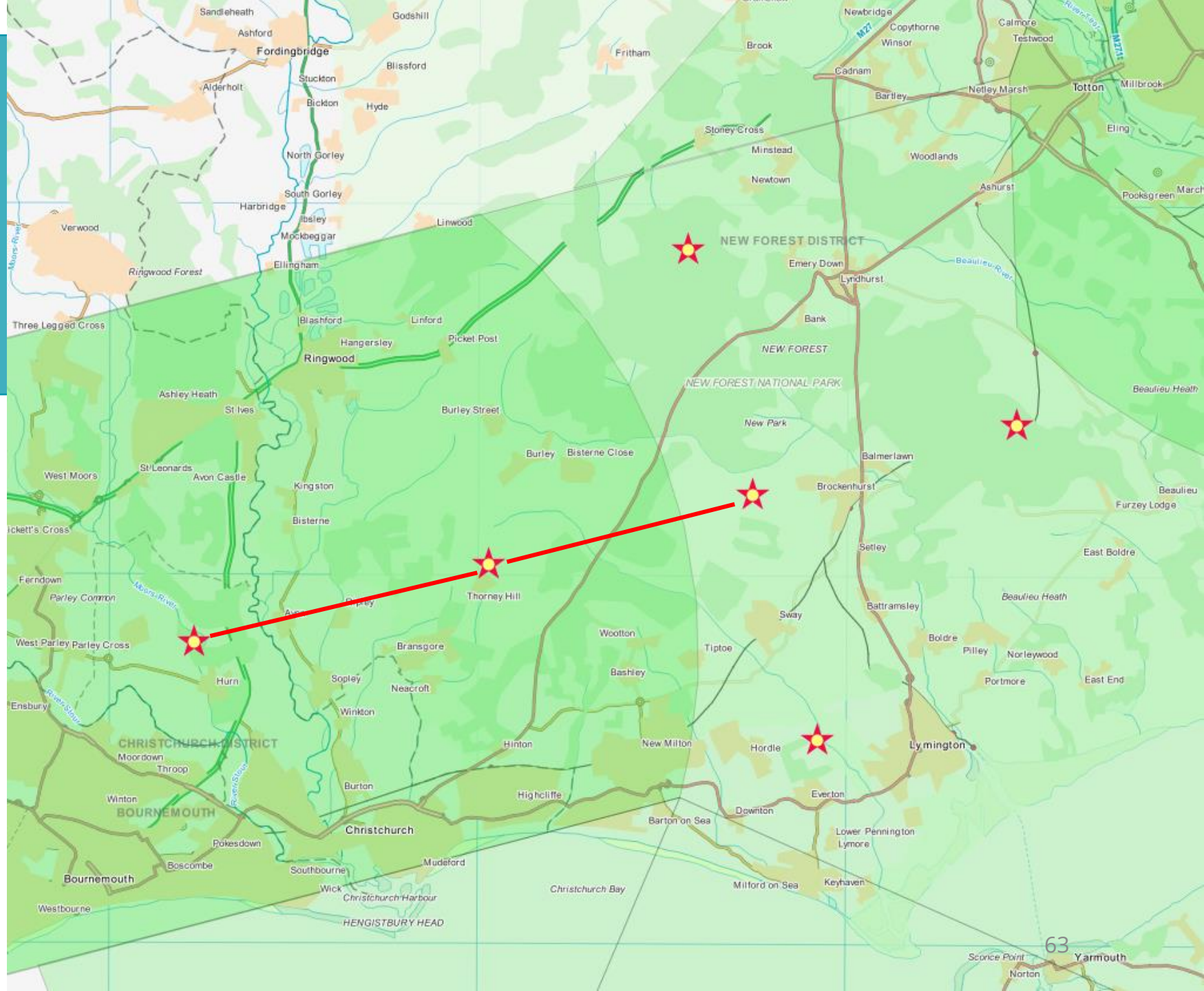
OPTION 3B FINAL APPRAISAL: SUMMARY

1. If the RNP procedure is implemented with a northern IAF for both RWY ends, this will mimic the existing ILS and NDB procedures with an outbound joining leg. However, given that the majority of CAT operations approach from the south, the fuel, emissions and noise benefits from this procedure would be limited.
2. If the RNP procedure is implemented with a southern IAF on both RWY ends, there will be a positive benefit in terms of distance and fuel saved for CAT night operations arriving from southern, eastern and western directions. However, for GA and commercial training traffic the availability of a single southern IAFs for both RWY ends could lead to the change in traffic patterns with an associated impact on the noise footprint.

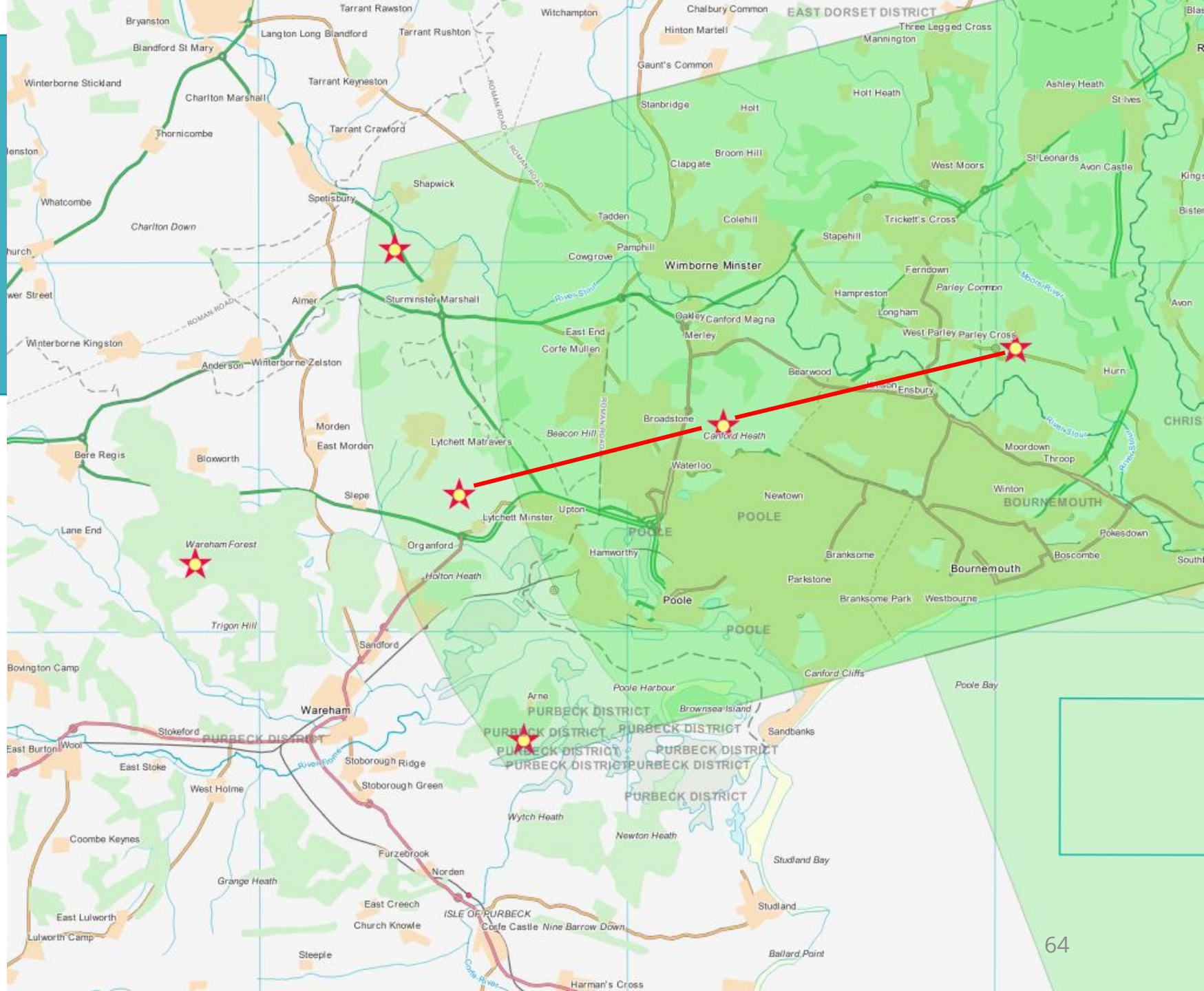
Given the assessments above, **Option 3b for RWY 08 and RWY 26 have been discounted**.

OPTION 3C: FINAL APPRAISAL

OPTION 3C FOR RWY 26



OPTION 3C FOR RWY 08



OPTION 3C

Group	Impact	Level of Analysis	Description
Communities	Noise impact on health and quality of life	Qualitative/ Quantitative	In accordance with CAP 1616, we assessed the number of households that are currently experiencing noise from arrivals to Bournemouth airport using the WebTAG Noise Assessment Workbook. We used general WebTAG methodology with noise contours sequenced by 3 dB as the data from our noise modelling tool (AEDT) was produced in 3 dB steps. In line with WebTAG template we quantified noise impact of Bournemouth arrivals for four cases (see attachments on Slides 86-89): • Opening year (proposed year of change – 2020) – 16 hour day – 8 hour night • Forecast year (last year of the forecast – 2030) – 16 hour day – 8 hour night The noise contour maps confirm that even with the 10-year growth forecast, proposed Initial Approach Fix (IAF) points are outside the noise contours, therefore areas around IAFs will experience noise lower than 51 dB Leq during the day and lower than 45 dB Leq during the night. Given that this ACP only concerns location of the IAFs, any changes will not affect noise contours. 'With' and 'without scheme' scenarios are therefore identical from noise point of view and result in £0 monetisation of the change. The WebTAg Noise workbook results are presented on Slide 78 relative to the other sub-options.

OPTION 3C

Group	Impact	Level of Analysis	Description
Communities	Air Quality	Qualitative	DfT's TAG UNIT A5.2 Aviation Appraisal states the following with respect to Air Quality impacts: *"Any appraisal of aviation schemes ought to take into account the impacts on local and regional air quality where these impacts are likely to be significant, such as for a major airport development"*. In addition, CAP1616, Appendix B (Environmental metrics and assessment requirements), paragraph B74 states: *"Due to the effects of mixing and dispersion, emissions from aircraft above 1,000 feet (amsl) are unlikely to have a significant impact on local air quality. Therefore the impact of airspace design on local air quality is generally negligible compared with other factors such as changes in the volume of air traffic, and local transport infrastructures feeding the airport."* In our view this airspace change will not generate 'significant' change in Air Quality as it does not impact emissions from aircraft below 1,000 feet, and therefore we have decided to provide high-level and qualitative assessment only. RNP straight-in approach will have significantly lower minima than the NDB or SRA approaches on RWY 08. Under normal operations, when arrivals are vectored by ATC at Solent Radar to the final approach, it is expected there will be no change to air quality due to trajectories and heights being identical. During out of hours operations, the straight-in RNP approach will result in fewer track miles, compared to the ILS or NDB approaches today, which will result in reduced fuel burn, lower emissions and improved air quality. Following the implementation of the straight-in RNP approach at Bournemouth there may be reduced transit flying by training organisations based at Bournemouth to conduct RNP approach training elsewhere - currently Exeter, Cardiff, Bristol and the Channel Islands have RNP approaches. This will result in minor reductions in fuel burn, CO2 emissions.

OPTION 3C

Group	Impact	Level of Analysis	Description
Wider society	Greenhouse gas impact	Qualitative	Under the normal operations, where arrivals will be radar vectored by ATC at Solent Radar, there will be no change in relation to fuel burn and CO2 emissions. During out of the hours operations, with the straight-in RNP approach, without the initial approach segment, the aircraft would join the procedure by self-positioning, with less predictable route and therefore there will not be a benefit of distance reduction as it is with the initial approach segment. The CBA was not conducted for this straight-in RNP approach and therefore there were no inputs to the WebTAG Greenhouse Gasses workbook for this sub-option. This option provides an approach mimicking an ILS approach and without any changes to the routings by which aircraft connect to the approach. It is not therefore possible to draw any meaningful assessment to compare this option against todays option than so say it is equivalent.
Wider Society	Capacity /Resilience	Qualitative	The provision of RNP Approaches will provide capacity and resilience benefits and will have higher operational availability than can be provided by today's ILS, with minimal ongoing operational costs. The RNP approach will provide a 3 Dimensional approach with minima being at worst lower than the existing 2D NDB or SRA approaches or at best being comparable to the CAT I ILS that it will replace. This will reduce the need to utilise a 2D approach procedure (not preferred) or diverting to an alternate aerodrome. No quantitative assessment of the cost of diversions as a result of lack of availability of the ILS is undertaken as the objective is to replace the ILS with the RNP approach. Not quantitative assessment is made of the increase in capacity as a result of the RNP approach compared to the ILS. Although the airport has a stated aim of returning the airport to 2008 movement levels, this was achieved without the RNP approach implying that the existing infrastructure is capable of delivering this capacity. An assessment of the approach to deliver this capacity was deemed not needed, given the availability from GNSS to support the ILS is higher.

OPTION 3C

Group	Impact	Level of Analysis	Description
General Aviation	Access	Qualitative	Business and General aviation fleets have a high level of equipage for RNP approaches with LPV lines of minima. The provision of RNP approaches at Bournemouth is of particular interest to General Aviation operators with respect to instrument training. The AOPA Response to the Stage 1 engagement included: *"The proposal is supported by AOPA because there is a growing need for GA pilots to train for RNP/PBN procedures and Bournemouth has been and we hope will continue to be a regional airport that continues to welcome General Aviation operations."* However, for training flights, this procedure provides least benefit since the approach consists only of an intermediate and final approach segment. Without the initial approach segment, this configuration limits the training options that are available to the training organisations resident at Bournemouth, and those that utilise the published approach procedures from other airfields. In effect, this option would still require GA aircraft to transit to another airfield for full RNP approach training and requires a mix of conventional and RNAV avionics in order to connect to the procedure. Given the variability of GA operations and the constraints highlighted above, no quantitative assessment is made for this impact.

OPTION 3C

Group	Impact	Level of Analysis	Description
General Aviation/ Commercial Air Transport	Economic impact from increased effective capacity	Qualitative	The major economic dis-benefit would be the absence of a 3 Dimensional approach to RWY 08. There are benefits to the GA and commercial training organisations through the inclusion of an initial approach segments that would increase the range of training scenarios that could be provided at Bournemouth. However, with the straight-in RNP approach, the benefit would not be realised as the means to connect to the IF for the direct approach would need to combine conventional navigation capabilities – the suitability of which would depend on aircraft avionics. Given the variability of GA operations and the constraints highlighted above, no quantitative assessment is made for this impact.
General Aviation/ Commercial Air Transport	Fuel burn	Qualitative	During operational hours arrivals will continue to be radar vectored by ATC as today, this will not change the flight profiles hence there will be no change in relation to fuel burn and hence no quantitative assessment has been made. During out of the hours operations, with the straight-in RNP approach, without the initial approach segment, the aircraft would join the procedure by self-positioning, with less predictable route and therefore there will not be a benefit of fuel saving as it is with the initial approach segment.

OPTION 3C

Group	Impact	Level of Analysis	Description
Commercial airlines	Training costs	Qualitative	There are no training costs required for commercial operators to participate in the RNP Approach as Regulation (EU) No. 539/2016 Performance Based Navigation (PBN) requires all Pilots who fly PBN routes or procedures to have PBN Endorsement on their licences by 25 August 2018. Engagement with the operators at Bournemouth has confirmed that their aircraft and crew are capable of LNAV and LNAV/VNAV operations. Given the recent publication of Regulation (EU) No. 1048/2018 it is to be expected that commercial operators will introduce LPV capabilities into their fleets. It is noted that EasyJet are the initial customer for LPV capability on the A320 NEO from circa. 2022. There will be no impact on training costs from any of the options for RNP approaches at Bournemouth.
Commercial airlines	Other costs	Qualitative	The availability of a 3 Dimensional approach to RWY 08 at Bournemouth will lead to fewer minima related diversions and will provide contingency for RWY 26 during periods when the ILS is unavailable (e.g. equipment unserviceability or aerodrome works). The availability of a 3 Dimensional approach to only one runway end may discourage some aircraft operators from implementing new services which would be mitigated by the presence of the RNP approach. No quantitative assessment is made as the estimate would be subject to too many assumptions, including the effectiveness of operational mitigations, and given the current low utilisation of the airport are time dependent on when any outage would occur.

OPTION 3C

Group	Impact	Level of Analysis	Description
Airport/Air Navigation Service Provider	Infrastructure costs	Qualitative	There are no infrastructure (equipment) costs associated with the straight-in RNP approach. The only costs associated with the limited T-bar RNP approach implementation are: • IAP design, • Validation (flight and ground), • Safety assessment, • Airspace change and consultation, • Certification and • Training • Publication in AIP. No quantitative estimate is provided as these are commercially sensitive.
Airport/Air Navigation Service Provider	Operational costs	Qualitative	The costs of ownership of the straight-in RNP approach supported by GNSS is very low compared to a conventional approach which requires the provision of ground navigation aid infrastructure. The straight-in RNP approach requires maintenance of the approach procedure on a five yearly basis although there are no ongoing flight inspection activities as would be required for an approach based on conventional navigation infrastructure. No quantitative estimate is provided as these are commercially sensitive.

OPTION 3C

Group	Impact	Level of Analysis	Description
Airport/Air Navigation Service Provider	Deployment costs	Qualitative	There are no deployment costs associated with the straight-in RNP approach. The only costs associated with straight-in RNP implementation are: • IAP design, • Validation (flight and ground), • Safety assessment, • Airspace change and consultation, • Certification and • Training • Publication in AIP. No quantitative estimate is provided as these are commercially sensitive.

OPTION 3C

Group	Impact	Level of Analysis	Description
Wider Society	Biodiversity	Qualitative	The implementation of the straight-in RNP approach is not expected to result in any changes to biodiversity given that the implementation will not require any ground works to support implementation. However, the ILS localiser for RWY 08 is located in a SSI. The impact of decommissioning the localiser is to be discussed in detail with Hampshire County Council, Natural England and the New Forrest National Park during decommissioning to minimise any disturbance to local flora and fauna. This would have to happen regardless of any option given the end of life status of the RWY 08 ILS. An option might be to leave the antenna concrete plinth and sub surface cables and ducting in situ depending on the recommendation of the above organisations. Given the above statements, no further quantitative assessment was deemed necessary.
Wider Society	Tranquillity	Qualitative	The proposed implementation of straight-in RNP approach at BIA will not change the operational concept for air traffic operations or control at the airport. The vast majority of operations will be vectored by ATC for in accordance with existing practice, and at similar altitudes. Analysis of the traffic arriving at BIA in 2018 showed that approximately 3% of instrument flight operations (including training) flew the published instrument approach procedure. The utilisation of the Option 3c approach will facilitate a more direct approach for aircraft flying the procedure – especially out of hours – with reduced track miles compared to the existing procedures. However, given that there would be no change to the general routings as identified on the radar plots under Option 3c, no quantitative assessment was deemed necessary.

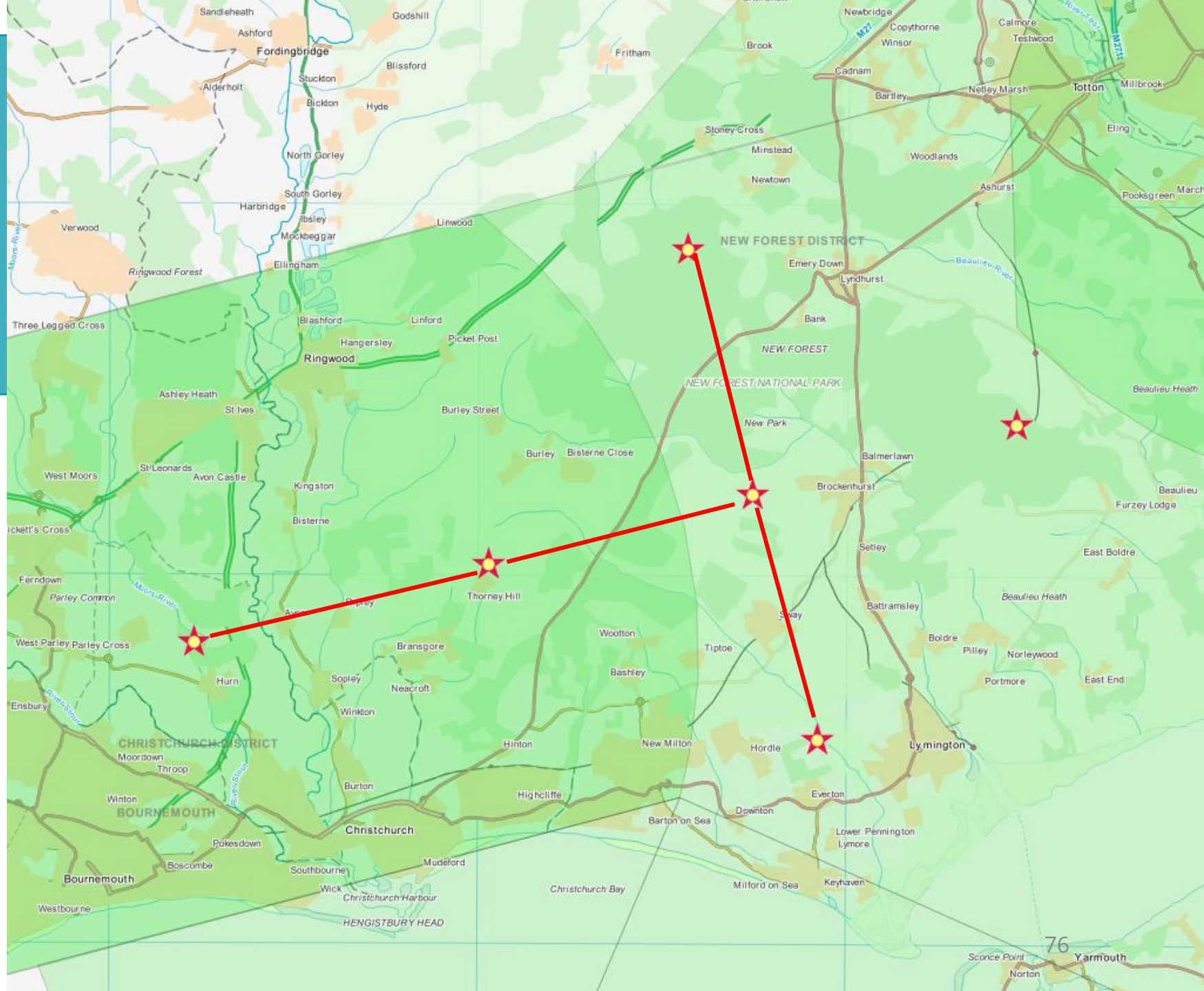
OPTION 3C FINAL APPRAISAL: SUMMARY

This appraisal notes that the existing GA training traffic utilises the published IAPs with outbound legs north of the runway before procedural turns to intercept with the ILS. Under Option 3c, this would not be possible but positioning for the IAP could be either through self positioning or ATC vectoring.

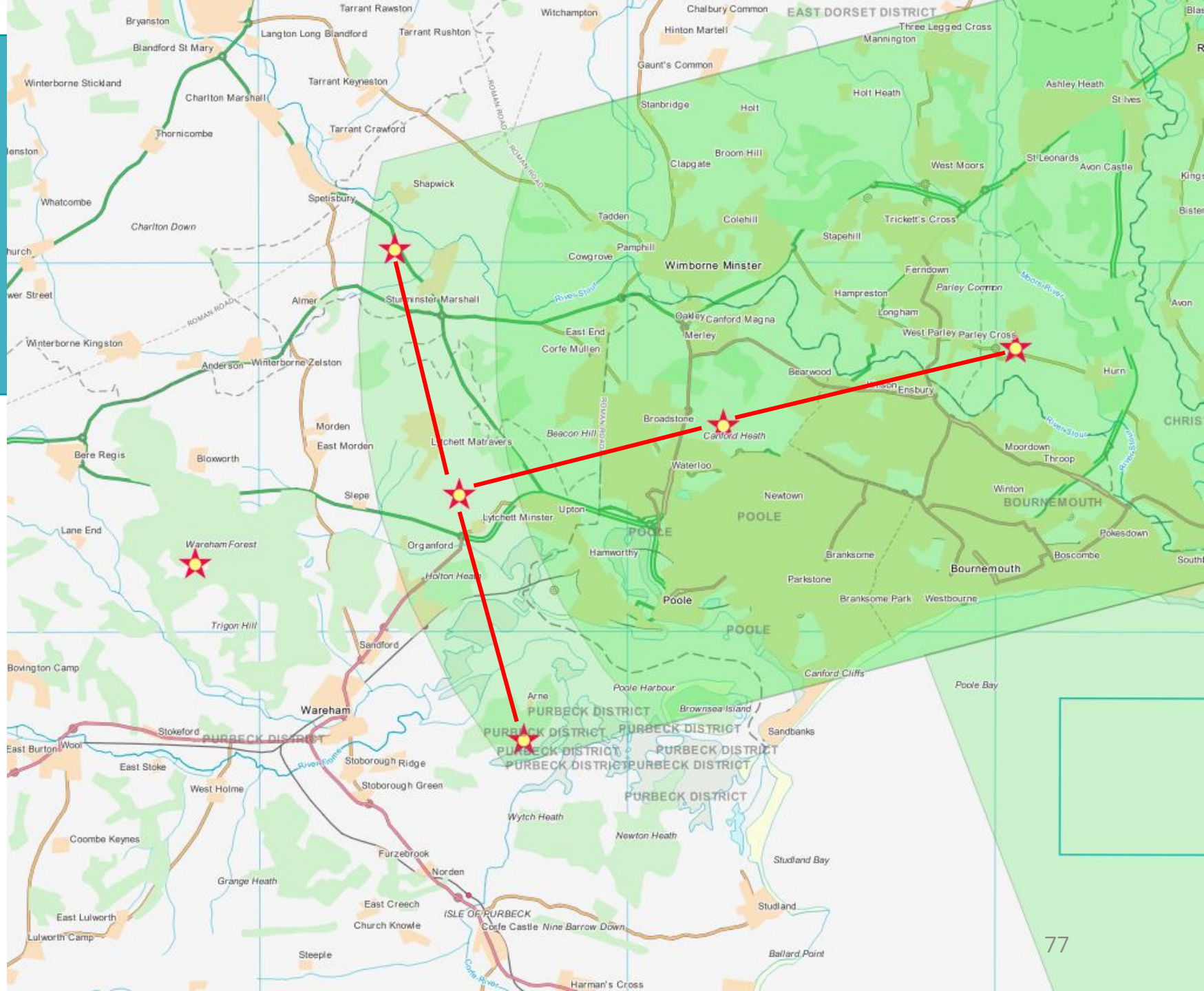
Given the assessment above, **Option 3c for RWY 08 and RWY 26 was retained** and included in the public consultation.

OPTION 3D: FINAL APPRAISAL

OPTION 3D FOR RWY 26



OPTION 3D FOR RWY 08



OPTION 3D

Group	Impact	Level of Analysis	Description
Communities	Noise impact on health and quality of life	Qualitative / Quantitative	Under normal operations where arrivals continue to be radar vectored to the approach, there is likely to be some concentration of flight tracks around the initial approach fixes compared to the ILS of today for both runways. **RWY 08** For direct arrivals from the west, there will be no change compared to today. For arrivals from the North, East and South vectored via the IAF, there is likely to be a merge of tracks concentrated over the Dorset AONB, Cranborne Chase AONB and the county parishes of Sturminster Marshall, Shapwick, Pamphill in the North and Arne, Corfe Castle, Wareham St. Martin, Lytchett Minster and Upton in the South. This traffic pattern will continue out of hours with aircraft routing direct to the IAF as opposed to self positioning today. **RWY 26** The majority of arrivals are from the South and East. Arrivals from the West are predominantly vectored to join either from the North or South. This places all arrival traffic passing over the New Forrest National Park. Arrivals from the East would be expected to be unaffected by the change. North bound joins would be expected to lead to some concentration over the county parishes of Ellingham, Harbridge and Ibsley and Minstead. Southern joins would be expected to lead to some concentration over Milford-on-Sea, Hordle, Lymington and Pennington and Sway. There is potentially some change over Brockenhurst The precise guidance of the RNP approach will enable improved track keeping compared to an NDB or SRA approach, and therefore will maintain the noise footprint within the existing bounds. The RNP approach will have lower minima than the NDB or SRA approaches and so it would be expected that the RNP approach would also result in a net decrease in missed approaches or diversions, thus, lower levels of climb out noise following a missed approach. Use of the southerly IAF by training aircraft would result in a change in overflights for neighbourhoods south of the runway. Because of that, the using of IAF will be excluded for training flights, as it would result in a change in airport operations. The LAeq 16hr and 8hr contours have been calculated, as well as longer-term noise impact, and they are no different to the other sub-options. These are presented at the end of this document in the section Attachments (slides 86-89).

OPTION 3D

Group	Impact	Level of Analysis	Description
Communities	Noise impact on health and quality of life	Qualitative / Quantitative	In accordance with CAP 1616, we assessed the number of households that are currently experiencing noise from arrivals to Bournemouth airport using the WebTAG Noise Assessment Workbook. We used general WebTAG methodology with noise contours sequenced by 3 dB as the data from our noise modelling tool (AEDT) was produced in 3 dB steps. In line with WebTAG template we quantified noise impact of Bournemouth arrivals for four cases (see attachments on Slides 85-88): • Opening year (proposed year of change – 2020) – 16 hour day – 8 hour night • Forecast year (last year of the forecast – 2030) – 16 hour day – 8 hour night The noise contour maps confirm that even with the 10-year growth forecast, proposed Initial Approach Fix (IAF) points are outside the noise contours, therefore areas around IAFs will experience noise lower than 51 dB Leq during the day and lower than 45 dB Leq during the night. Given that this ACP only concerns location of the IAFs, any changes will not affect noise contours. 'With' and 'without scheme' scenarios are therefore identical from noise point of view and result in £0 monetisation of the change. The WebTAg Noise workbook results are presented on Slide 78 relevant also for the other sub-options.

OPTION 3D

Group	Impact	Level of Analysis	Description
Communities	Air Quality	Qualitative / Quantitative	Ft's TAG UNIT A5.2 Aviation Appraisal states the following with respect to Air Quality impacts: *"Any appraisal of aviation schemes ought to take into account the impacts on local and regional air quality where these impacts are likely to be significant, such as for a major airport development"*. In addition, CAP1616, Appendix B (Environmental metrics and assessment requirements), paragraph B74 states: *"Due to the effects of mixing and dispersion, emissions from aircraft above 1,000 feet (amsl) are unlikely to have a significant impact on local air quality. Therefore the impact of airspace design on local air quality is generally negligible compared with other factors such as changes in the volume of air traffic, and local transport infrastructures feeding the airport."* In our view this airspace change will not generate 'significant' change in Air Quality as it does not impact emissions from aircraft below 1,000 feet, and therefore we have decided to provide a high-level and qualitative assessment only. RNP Limited T-bar (2 IAF) approach will have significantly lower minima than the NDB or SRA approaches on RWY 08. Under normal operations, when arrivals are vectored by ATC at Solent Radar to the final approach, it is expected there will be no change to air quality due to trajectories and heights being identical. During out of hours operations, the RNP Limited T-bar (2 IAF) approach will result in fewer track miles, compared to the ILS or NDB approaches today, which will result in reduced fuel burn, lower emissions and improved air quality. Following the implementation of the RNP Limited T-bar (2 IAF) approach at Bournemouth there may be reduced transit flying by training organisations based at Bournemouth to conduct RNP approach training elsewhere - currently Exeter, Cardiff, Bristol and the Channel Islands have RNP approaches. This will result in minor reductions in fuel burn, CO2 emissions.

OPTION 3D

Group	Impact	Level of Analysis	Description
Wider society	Greenhouse gas impact	Qualitative / Quantitative	As an input to the WebTAG Greenhouse Gasses workbook we used outputs from the CBA, which we conducted for this airspace change. Under the normal operations, where arrivals will be radar vectored by ATC at Solent Radar, there will be no change in relation to fuel burn and CO2 emissions. During out of the hours operations, there will be a small proportion of arriving commercial aircraft benefiting from the change thanks to distance reduction. The CBA was conducted to quantify these benefits for each sub-option. **Option 3d: Limited T-bar 2 IAF RWY 26** The savings in terms of reduced emissions for proposed year of change 2020 from our CBA are: CO2 emissions savings (kg) 139,973 CO2 emissions savings (t) 140 Tonnes of CO2e emissions (savings) 140 The savings in terms of reduced emissions for 10-year forecast scenario from our CBA are: CO2 emissions savings (kg) 2,184,495 CO2 emissions savings (t) 2,184 Tonnes of CO2e emissions (savings) 2,184

OPTION 3D

Group	Impact	Level of Analysis	Description
Wider society	Greenhouse gas impact	Qualitative / Quantitative	**Option 3d: Limited T-bar 2 IAF RWY 08** The savings in terms of reduced emissions for proposed year of change 2020 from our CBA are: CO2 emissions savings (kg) 52,417 CO2 emissions savings (t) 52 Tonnes of Carbon emissions (savings) 52 The savings in terms of reduced emissions for 10-year forecast scenario from our CBA are: CO2 emissions savings (kg) 818,043 CO2 emissions savings (t) 818 Tonnes of Carbon emissions (savings) 818 In accordance with CAP 1616, we assessed the impact of Option 3D on Greenhouse Gas emissions. We used WebTAG Greenhouse Gases workbook for the assessments and the results are presented on the Slides 84-85.

OPTION 3D

Group	Impact	Level of Analysis	Description
Wider Society	Capacity /Resilience	Qualitative	The provision of RNP Approaches will provide capacity and resilience benefits and will have higher operational availability than can be provided by today's ILS, with minimal ongoing operational costs. The RNP approach will provide a 3 Dimensional approach with minima being at worst lower than the existing 2D NDB or SRA approaches or at best being comparable to the CAT I ILS that it will replace. This will reduce the need to utilise a 2D approach procedure (not preferred) or diverting to an alternate aerodrome. No quantitative assessment of the cost of diversions as a result of lack of availability of the ILS is undertaken as the objective is to replace the ILS with the RNP approach. Not quantitative assessment is made of the increase in capacity as a result of the RNP approach compared to the ILS. Although the airport has a stated aim of returning the airport to 2008 movement levels, this was achieved without the RNP approach implying that the existing infrastructure is capable of delivering this capacity. An assessment of the approach to deliver this capacity was deemed not needed, given the availability from GNSS to support the ILS is higher.
General Aviation	Access	Qualitative	Business and General aviation fleets have a high level of equipage for RNP approaches with LPV lines of minima. The provision of RNP approaches at Bournemouth is of particular interest to General Aviation operators with respect to instrument training. The AOPA Response to the Stage 1 engagement included: *"The proposal is supported by AOPA because there is a growing need for GA pilots to train for RNP/PBN procedures and Bournemouth has been and we hope will continue to be a regional airport that continues to welcome General Aviation operations."* The inclusion of an Initial Approach Segment and an RNP Missed approach would increase the range of training scenarios that could be provided at Bournemouth. Given the variability of GA training operations and the statement above, not quantitative assessment was deemed necessary.

OPTION 3D

Group	Impact	Level of Analysis	Description
General Aviation/ Commercial Air Transport	Economic impact from increased effective capacity	Qualitative	There are benefits to the GA and commercial training organisations through the inclusion of a full RNP approach and associated missed approach as this increases the range of training scenarios available at Bournemouth. Without the option to undertake training on PBN approach procedures, training will have to be undertaken away from Bournemouth increasing flight costs for ferrying to and from aerodromes with suitable procedures. There are benefits to CAT operations from the availability of this approach to RWY 08 increases the resilience of the operation in the event of the ultimate failure of the ILS, and given the roughly 30% utilisation of RWY 08. Without the availability of a precision approach, the incidence of landings with higher tail wind components (RWY 26) or diversions could be a consequence. The net result in all cases is increased costs for training and commercial operations at Bournemouth without the RNP approach. No quantitative assessment is made here as the value of the above benefits will vary dependent on the time of any interruption to the existing ILS, the aircraft and number of passengers involved.

OPTION 3D

Group	Impact	Level of Analysis	Description
General Aviation/ Commercial Air Transport	Fuel burn	Qualitative /Quantitative	During operational hours, arrivals will continue to be radar vectored by ATC as today, this will not change the flight profiles hence there will be no change in relation to fuel burn. During out of the hours operations, there will be a small proportion of arriving commercial aircraft benefiting from the change thanks to distance reduction. **Option 3d: Limited T-bar 2 IAF RWY 26** The benefits for proposed year of change 2020 assessed from our CBA are summarised below. Fuel saved (kg) 44,436 Fuel savings (£) £31,105 Fuel savings (£) – discounted £30,053 The total benefits estimated over 10 years from 2020 assessed from our CBA are summarised below. Fuel saved (kg) 693,491 Fuel savings (£) £485,443 Fuel savings (£) – discounted £395,594 **Option 3d: Limited T-bar 2 IAF RWY 08** The benefits for proposed year of change 2020 assessed from our CBA are summarised below. Fuel saved (kg) 16,640 Fuel savings (£) £11,648 Fuel savings (£) – discounted £11,254 The total benefits estimated over 10 years from 2020 assessed from our CBA are summarised below. Fuel saved (kg) 259,696 Fuel savings (£) £181,787 Fuel savings (£) – discounted £147,766

OPTION 3D

Group	Impact	Level of Analysis	Description
General Aviation/ Commercial Air Transport	Fuel burn (continued)	Qualitative /Quantitative	The available limited T-bar approach at Bournemouth for a local training will result in fuels savings ands reduced engine run times for GA training operators thorough a reduction in the flight time and distance to an airport with RNP approach capability and the capacity to accept training aircraft. There are known instances of UK training operators travelling to the Channel Islands, France and Belgium to conduct RNP approach training and tests flights. The inclusion of Initial Approach Fixes would increase the range of GA training and test exercises that could be provided at Bournemouth leading to fuel burn and operating cost savings from reduced transit flights
Commercial airlines	Training costs	Qualitative	There are no training costs required for commercial operators to participate in the RNP Approach as Regulation (EU) No. 539/2016 Performance Based Navigation (PBN) requires all Pilots who fly PBN routes or procedures to have PBN Endorsement on their licences by 25 August 2018. Engagement with the operators at Bournemouth has confirmed that their aircraft and crew are capable of LNAV and LNAV/VNAV operations. Given the recent publication of Regulation (EU) No. 1048/2018 it is to be expected that commercial operators will introduce LPV capabilities into their fleets. It is noted that EasyJet are the initial customer for LPV capability on the A320 NEO from circa. 2022. There will be no impact on training costs from any of the options for RNP approaches at Bournemouth.

OPTION 3D

Group	Impact	Level of Analysis	Description
Commercial airlines	Other costs	Qualitative	The availability of a 3 Dimensional approach to RWY 08 at Bournemouth will lead to fewer minima related diversions and will provide contingency for RWY 26 during periods when the ILS is unavailable (e.g. equipment unserviceability or aerodrome works). The availability of a 3 Dimensional approach to only one runway end may discourage some aircraft operators from implementing new services which would be mitigated by the presence of the RNP approach. No quantitative assessment is made as the estimate would be subject to too many assumptions, including the effectiveness of operational mitigations, and given the current low utilisation of the airport are time dependent on when any outage would occur.
Airport/Air Navigation Service Provider	Infrastructure costs	Qualitative	There are no infrastructure (equipment) costs associated with the limited T-bar RNP approach. The only costs associated with the limited T-bar RNP approach implementation are: • IAP design, • Validation (flight and ground), • Safety assessment, • Airspace change and consultation, • Certification and • Training • Publication in AIP. No quantitative estimate is provided as these are commercially sensitive.

OPTION 3D

Group	Impact	Level of Analysis	Description
Airport/Air Navigation Service Provider	Operational costs	Qualitative	The costs of ownership of the limited T-bar RNP approach supported by GNSS is very low compared to a conventional approach which requires the provision of ground navigation aid infrastructure. The limited T-bar RNP approach requires maintenance of the approach procedure on a five yearly basis although there are no ongoing flight inspection activities as would be required for an approach based on conventional navigation infrastructure. No quantitative estimate is provided as these are commercially sensitive.
Airport/Air Navigation Service Provider	Deployment costs	Qualitative	There are no deployment costs associated with the limited T-bar RNP approach. The only costs associated with RNP implementation are • IAP design, • Validation (flight and ground), • Safety assessment, • Airspace change and consultation, • Certification and • Training • Publication in AIP. No quantitative estimate is provided as these are commercially sensitive.

OPTION 3D

Group	Impact	Level of Analysis	Description
Wider Society	Tranquillity	Qualitative	The proposed implementation of Option 3d at BIA will not change the operational concept for air traffic operations or control at the airport. The vast majority of operations will be vectored by ATC in accordance with existing practice, and at similar altitudes. Analysis of the traffic arriving at BIA in 2017 showed that approximately 3% of instrument flight operations (including training) flew the published instrument approach procedure. The utilisation of the Option 3d approach will facilitate a more direct approach for aircraft flying the procedure from either the north or south (depending on IAF orientation) – especially out of hours – with reduced track miles compared to the existing procedures if optimised for southerly approaches. Of the other traffic at BIA approximately 50% of movements are visual flight rules (VFR) traffic which would not be flying the procedure and are typically lower than other traffic. Thus it is estimated that the introduction of Option 3 will result in a slight improvement to no change in the levels of tranquillity. It is noted that the change of this option will be the rerouting of aircraft arriving from the east that would have flown the published procedure overhead the aerodrome, to joining via the initial approach fix. Analysis of the traffic arriving over 2017 and 2018 showed that approximately 3% of instrument flight operations (including training) flew the published instrument approach procedure. This means that 97% of traffic continues to overfly the county parishes indicated above under today's operations. Given that the proposed routings will therefore not change the existing fleet of aircraft, frequency and altitudes at which aircraft are arriving to RWY 08, it is estimated that there will be no change in the levels of tranquillity and no quantitative assessment is needed. Details of the population affected by the noise are calculated and presented with the noise contours presented at the end of this document.

OPTION 3D

Group	Impact	Level of Analysis	Description
Wider Society	Biodiversity	Qualitative	The implementation of the Option 3d is not expected to result in any changes to biodiversity given that the implementation will not require any ground works to support implementation. However, the ILS localiser for RWY 08 is located in a SSI. The impact of decommissioning the localiser is to be discussed in detail with Hampshire County Council, Natural England and the New Forrest National Park during decommissioning to minimise any disturbance to local flora and fauna. This would have to happen regardless of any option given the end of life status of the RWY 08 ILS. An option might be to leave the antenna concrete plinth and sub surface cables and ducting in situ depending on the recommendation of the above organisations.

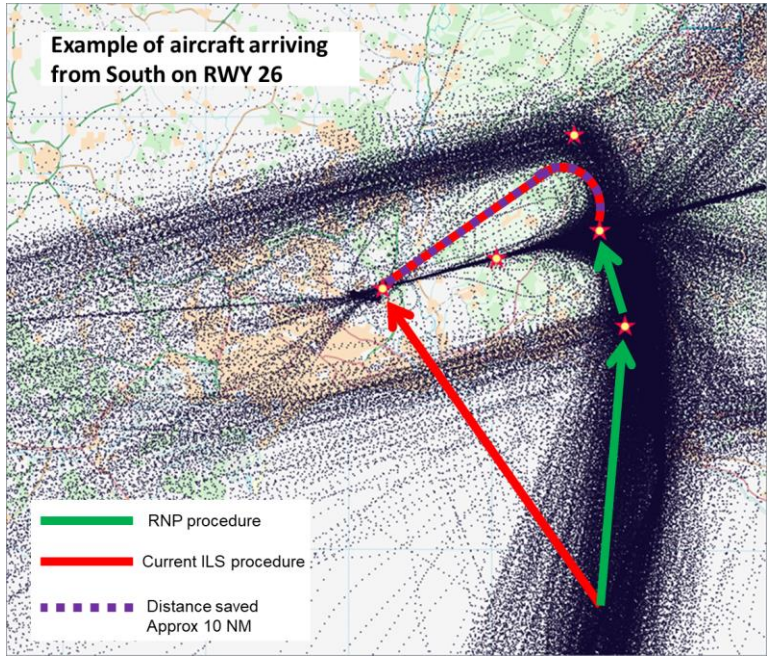
OPTION 3D FINAL APPRAISAL: SUMMARY

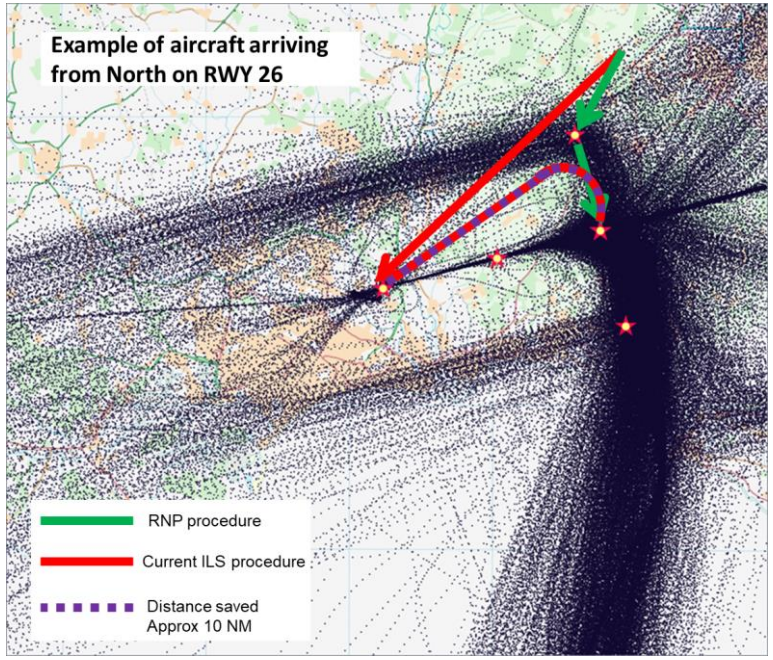
- If the RNP procedure is implemented with Southern and Northern IAFs on both RWY ends, there will be a positive benefit in terms of distance and fuel saved for CAT night operations arriving from Southern, Eastern, Western and Northern direction.
- The appraisal of Option 3d noted that the existing GA training traffic utilises the published IAPs with outbound legs north of the runway before procedural turns to intercept with the ILS. The availability of multiple IAFs could lead to integration issues were this practice to change (i.e. utilisation of the southern IAF by GA training flights) impacting ATC workload. This could be mitigated by limiting GA training activities to commence the approach via the northern IAF of RWY 08 or RWY 26 if available under Options 3d.

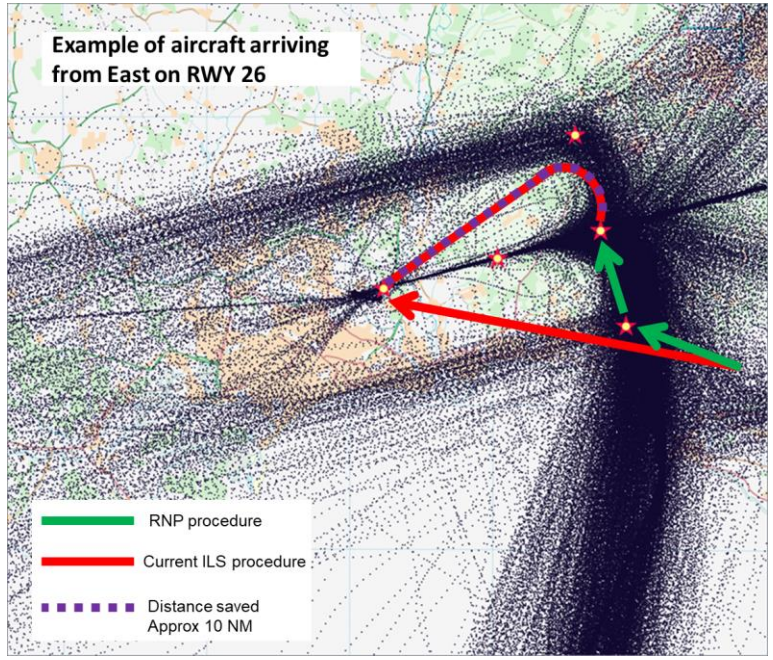
Given the assessments above, **Option 3d for RWY 08 and RWY 26 was retained** and included in the public consultation.

ATTACHMENTS

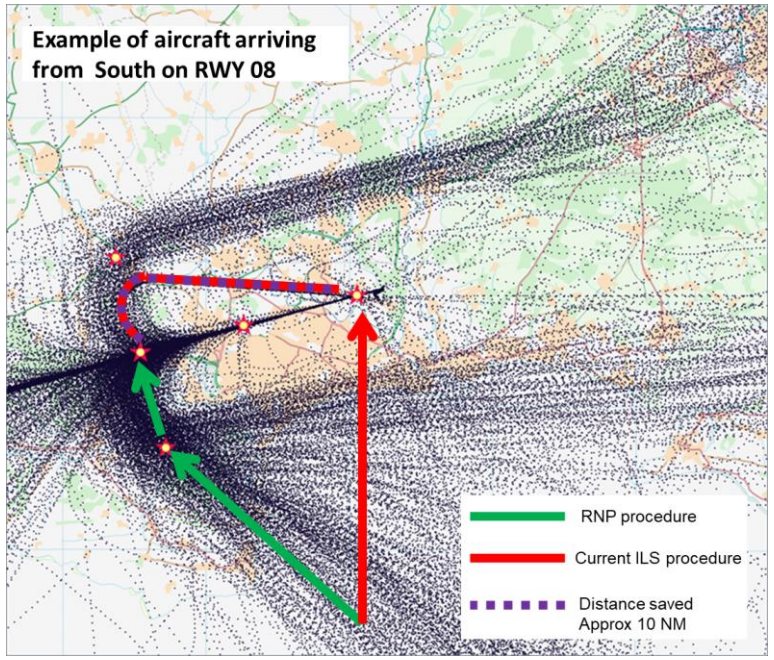
EXAMPLE OF A/C ARRIVING FROM SOUTH, NORTH, AND EAST TO RWY 26

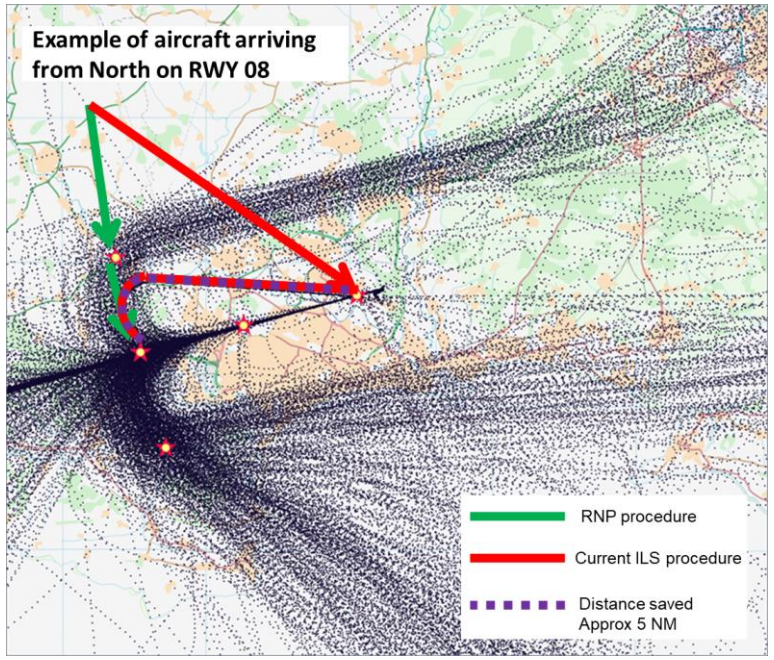


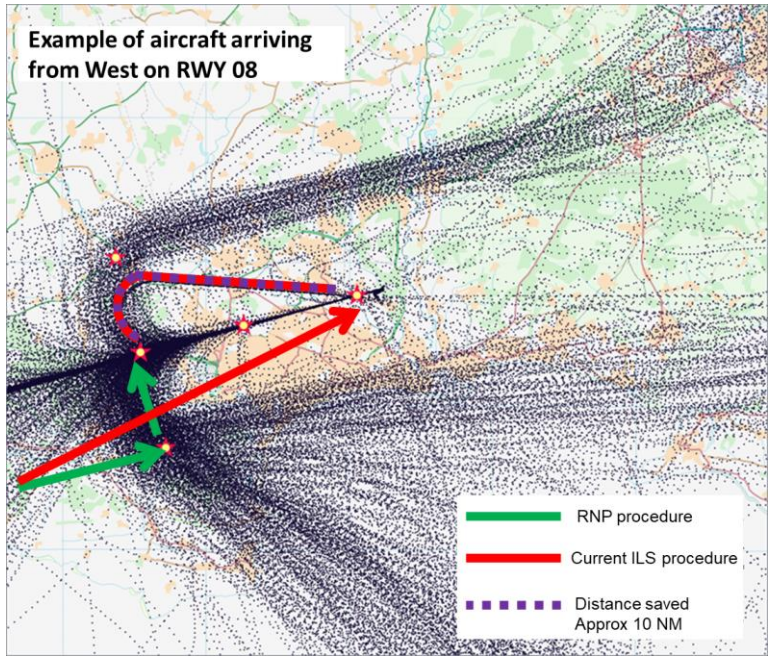




EXAMPLE OF A/C ARRIVING FROM SOUTH, NORTH, AND WEST TO RWY 08







OPTION 3A, 3B, 3C AND 3D WEBTAG NOISE WORKBOOK RESULTS

Noise Workbook - Worksheet 1

Proposal Name: BOH: Instrument Approach Procedure

Present Value Base Year	2010
Current Year	2019
Proposal Opening year:	2020
Project (Road, Rail or Aviation):	aviation

Net present value of change in noise (£):	£0

*positive value reflects a **net benefit** (i.e. a reduction in noise)

Net present value of impact on sleep disturbance (£):	£0
Net present value of impact on amenity (£):	£0
Net present value of impact on AMI (£):	£0
Net present value of impact on stroke (£):	£0
Net present value of impact on dementia (£):	£0

Quantitative results

Households experiencing increased daytime noise in forecast year:	0
Households experiencing reduced daytime noise in forecast year:	0
Households experiencing increased night time noise in forecast year:	0
Households experiencing reduced night time noise in forecast year:	0

Qualitative Comments:

Data Sources:

OPTION 3A
FOR RWY 08
WEBTAG GREENHOUSE GASES WORKBOOK RESULTS

Greenhouse Gases Workbook - Worksheet 1

Scheme Name: Option 3A: Full T-bar

Present Value Base Year	2010
Current Year	2019
Proposal Opening year:	2020
Project (Road/Rail or Road and Ra	road/rail

Overall Assessment Score:

Net Present Value of carbon dioxide equivalent emissions of proposal (£): £19,597

*positive value reflects a **net benefit** (i.e. CO2E emissions reduction)

Quantitative Assessment:

Change in carbon dioxide equivalent emissions over 60 year appraisal period (tonnes): -1,838
(between 'with scheme' and 'without scheme' scenarios)

Of which Traded -1341.524127

Change in carbon dioxide equivalent emissions in opening year (tonnes): -62
(between 'with scheme' and 'without scheme' scenarios)

Net Present Value of traded sector carbon dioxide equivalent emissions of proposal (£): £42,573
(N.B. this is not additional to the appraisal value in cell I17, as the cost of traded sector emissions is assumed to be internalised into market prices. See TAG Unit A3 for further details)

*positive value reflects a **net benefit** (i.e. CO2E emissions reduction)

Change in carbon dioxide equivalent emissions by carbon budget period:

	Carbon Budget 1	Carbon Budget 2	Carbon Budget 3	Carbon Budget 4
Traded sector	0	0	-152.1713179	-366.0001734
Non-traded secto	0	0	-56.28254224	-135.3699272

Qualitative Comments:

OPTION 3B
FOR RWY 26 (IAF SOUTH)
WEBTAG GREENHOUSE GASES WORKBOOK RESULTS

Greenhouse Gases Workbook - Worksheet 1

Scheme Name: 3B Limited T-bar 1 IAF South RWY 26

Present Value Base Year	2010
Current Year	2019
Proposal Opening year:	2020
Project (Road/Rail or Road and Ra	road/rail

Overall Assessment Score:

Net Present Value of carbon dioxide equivalent emissions of proposal (£): £32,878

*positive value reflects a **net benefit** (i.e. CO2E emissions reduction)

Quantitative Assessment:

Change in carbon dioxide equivalent emissions over 60 year appraisal period (tonnes): -3,083
(between 'with scheme' and 'without scheme' scenarios)

Of which Traded -2250.708726

Change in carbon dioxide equivalent emissions in opening year (tonnes): -104
(between 'with scheme' and 'without scheme' scenarios)

Net Present Value of traded sector carbon dioxide equivalent emissions of proposal (£): £71,426
(N.B. this is not additional to the appraisal value in cell I17, as the cost of traded sector emissions is assumed to be internalised into market prices. See TAG Unit A3 for further details)

*positive value reflects a **net benefit** (i.e. CO2E emissions reduction)

Change in carbon dioxide equivalent emissions by carbon budget period:

	Carbon Budget 1	Carbon Budget 2	Carbon Budget 3	Carbon Budget 4
Traded sector	0	0	-255.3016424	-614.0476844
Non-traded secto	0	0	-94.42663485	-227.1135271

Qualitative Comments:

OPTION 3B
FOR RWY 08 (IAF SOUTH)
WEBTAG GREENHOUSE GASES WORKBOOK RESULTS

Greenhouse Gases Workbook - Worksheet 1

Scheme Name: 3B: Limited T-bar 1 IAF South RWY 08

Present Value Base Year	2010
Current Year	2019
Proposal Opening year:	2020
Project (Road/Rail or Road and Ra	road/rail

Overall Assessment Score:

Net Present Value of carbon dioxide equivalent emissions of proposal (£): £14,117

*positive value reflects a **net benefit** (i.e. CO2E emissions reduction)

Quantitative Assessment:

Change in carbon dioxide equivalent emissions over 60 year appraisal period (tonnes): -1,324
(between 'with scheme' and 'without scheme' scenarios)

Of which Traded -966.4060065

Change in carbon dioxide equivalent emissions in opening year (tonnes): -45
(between 'with scheme' and 'without scheme' scenarios)

Net Present Value of traded sector carbon dioxide equivalent emissions of proposal (£): £30,669
(N.B. this is not additional to the appraisal value in cell I17, as the cost of traded sector emissions is assumed to be internalised into market prices. See TAG Unit A3 for further details)

*positive value reflects a **net benefit** (i.e. CO2E emissions reduction)

Change in carbon dioxide equivalent emissions by carbon budget period:

	Carbon Budget 1	Carbon Budget 2	Carbon Budget 3	Carbon Budget 4
Traded sector	0	0	-109.6210442	-263.6588927
Non-traded secto	0	0	-40.54476977	-97.51767265

Qualitative Comments:

OPTION 3B
FOR RWY 26 (IAF NORTH)
WEBTAG GREENHOUSE GASES WORKBOOK RESULTS

Greenhouse Gases Workbook - Worksheet 1

Scheme Name: 3D: Limited T-bar 1 IAF North RWY 26

Present Value Base Year	2010
Current Year	2019
Proposal Opening year:	2020
Project (Road/Rail or Road and Ra	road/rail

Overall Assessment Score:

Net Present Value of carbon dioxide equivalent emissions of proposal (£): £23,404

*positive value reflects a **net benefit** (i.e. CO2E emissions reduction)

Quantitative Assessment:

Change in carbon dioxide equivalent emissions over 60 year appraisal period (tonnes): -2,195
(between 'with scheme' and 'without scheme' scenarios)

Of which Traded -1602.199432

Change in carbon dioxide equivalent emissions in opening year (tonnes): -74
(between 'with scheme' and 'without scheme' scenarios)

Net Present Value of traded sector carbon dioxide equivalent emissions of proposal (£): £50,845
(N.B. this is not additional to the appraisal value in cell I17, as the cost of traded sector emissions is assumed to be internalised into market prices. See TAG Unit A3 for further details)

*positive value reflects a **net benefit** (i.e. CO2E emissions reduction)

Change in carbon dioxide equivalent emissions by carbon budget period:

	Carbon Budget 1	Carbon Budget 2	Carbon Budget 3	Carbon Budget 4
Traded sector	0	0	-181.7401522	-437.1186906
Non-traded secto	0	0	-67.2189604	-161.6740362

Qualitative Comments:

OPTION 3B
FOR RWY 08 (IAF NORTH)
WEBTAG GREENHOUSE GASES WORKBOOK RESULTS

Greenhouse Gases Workbook - Worksheet 1

Scheme Name: 3D: Limited T-bar 1 IAF North RWY 08

Present Value Base Year	2010
Current Year	2019
Proposal Opening year:	2020
Project (Road/Rail or Road and Ra	road/rail

Overall Assessment Score:

Net Present Value of carbon dioxide equivalent emissions of proposal (£): £9,380

*positive value reflects a **net benefit** (i.e. CO2E emissions reduction)

Quantitative Assessment:

Change in carbon dioxide equivalent emissions over 60 year appraisal period (tonnes): -880
(between 'with scheme' and 'without scheme' scenarios)

Of which Traded -642.1513596

Change in carbon dioxide equivalent emissions in opening year (tonnes): -30
(between 'with scheme' and 'without scheme' scenarios)

Net Present Value of traded sector carbon dioxide equivalent emissions of proposal (£): £20,379
(N.B. this is not additional to the appraisal value in cell I17, as the cost of traded sector emissions is assumed to be internalised into market prices. See TAG Unit A3 for further details)

*positive value reflects a **net benefit** (i.e. CO2E emissions reduction)

Change in carbon dioxide equivalent emissions by carbon budget period:

	Carbon Budget 1	Carbon Budget 2	Carbon Budget 3	Carbon Budget 4
Traded sector	0	0	-72.8402991	-175.1943958
Non-traded secto	0	0	-26.94093254	-64.79792722

Qualitative Comments:

OPTION 3D FOR RWY 26 WEBTAG GREENHOUSE GASES WORKBOOK RESULTS

Greenhouse Gases Workbook - Worksheet 1

Scheme Name: 3D: Limited T-bar 2 IAF RWY 26

Present Value Base Year	2010
Current Year	2019
Proposal Opening year:	2020
Project (Road/Rail or Road and Ra	road/rail

Overall Assessment Score:

Net Present Value of carbon dioxide equivalent emissions of proposal (£): £44,394

*positive value reflects a **net benefit** (i.e. CO2E emissions reduction)

Quantitative Assessment:

Change in carbon dioxide equivalent emissions over 60 year appraisal period (tonnes): -4,163
(between 'with scheme' and 'without scheme' scenarios)

Of which Traded -3039.092573

Change in carbon dioxide equivalent emissions in opening year (tonnes): -140
(between 'with scheme' and 'without scheme' scenarios)

Net Present Value of traded sector carbon dioxide equivalent emissions of proposal (£): £96,445
(N.B. this is not additional to the appraisal value in cell I17, as the cost of traded sector emissions is assumed to be internalised into market prices. See TAG Unit A3 for further details)

*positive value reflects a **net benefit** (i.e. CO2E emissions reduction)

Change in carbon dioxide equivalent emissions by carbon budget period:

	Carbon Budget 1	Carbon Budget 2	Carbon Budget 3	Carbon Budget 4
Traded sector	0	0	-344.7293363	-829.1378337
Non-traded secto	0	0	-127.5026312	-306.6674179

Qualitative Comments:

OPTION 3D FOR RWY 08 WEBTAG GREENHOUSE GASES WORKBOOK RESULTS

Greenhouse Gases Workbook - Worksheet 1

Scheme Name: 3D: Limited T-bar 2 IAF RWY 08

Present Value Base Year	2010
Current Year	2019
Proposal Opening year:	2020
Project (Road/Rail or Road and Ra	road/rail

Overall Assessment Score:

Net Present Value of carbon dioxide equivalent emissions of proposal (£): £16,625

*positive value reflects a **net benefit** (i.e. CO2E emissions reduction)

Quantitative Assessment:

Change in carbon dioxide equivalent emissions over 60 year appraisal period (tonnes): -1,559
(between 'with scheme' and 'without scheme' scenarios)

Of which Traded -1138.070231

Change in carbon dioxide equivalent emissions in opening year (tonnes): -52
(between 'with scheme' and 'without scheme' scenarios)

Net Present Value of traded sector carbon dioxide equivalent emissions of proposal (£): £36,116
(N.B. this is not additional to the appraisal value in cell I17, as the cost of traded sector emissions is assumed to be internalised into market prices. See TAG Unit A3 for further details)

*positive value reflects a **net benefit** (i.e. CO2E emissions reduction)

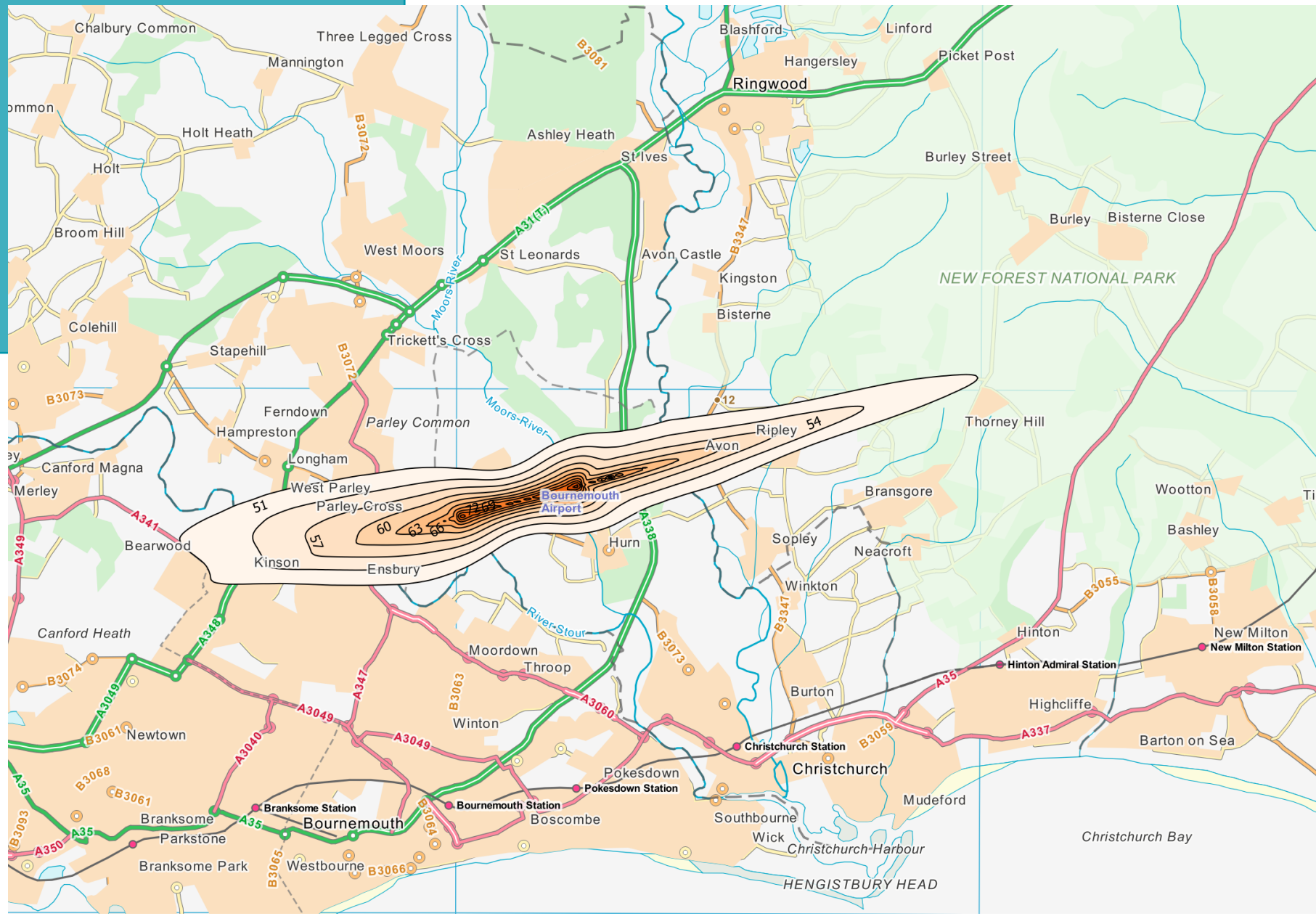
Change in carbon dioxide equivalent emissions by carbon budget period:

	Carbon Budget 1	Carbon Budget 2	Carbon Budget 3	Carbon Budget 4
Traded sector	0	0	-129.0932033	-310.4930381
Non-traded secto	0	0	-47.74680124	-114.8398908

Qualitative Comments:

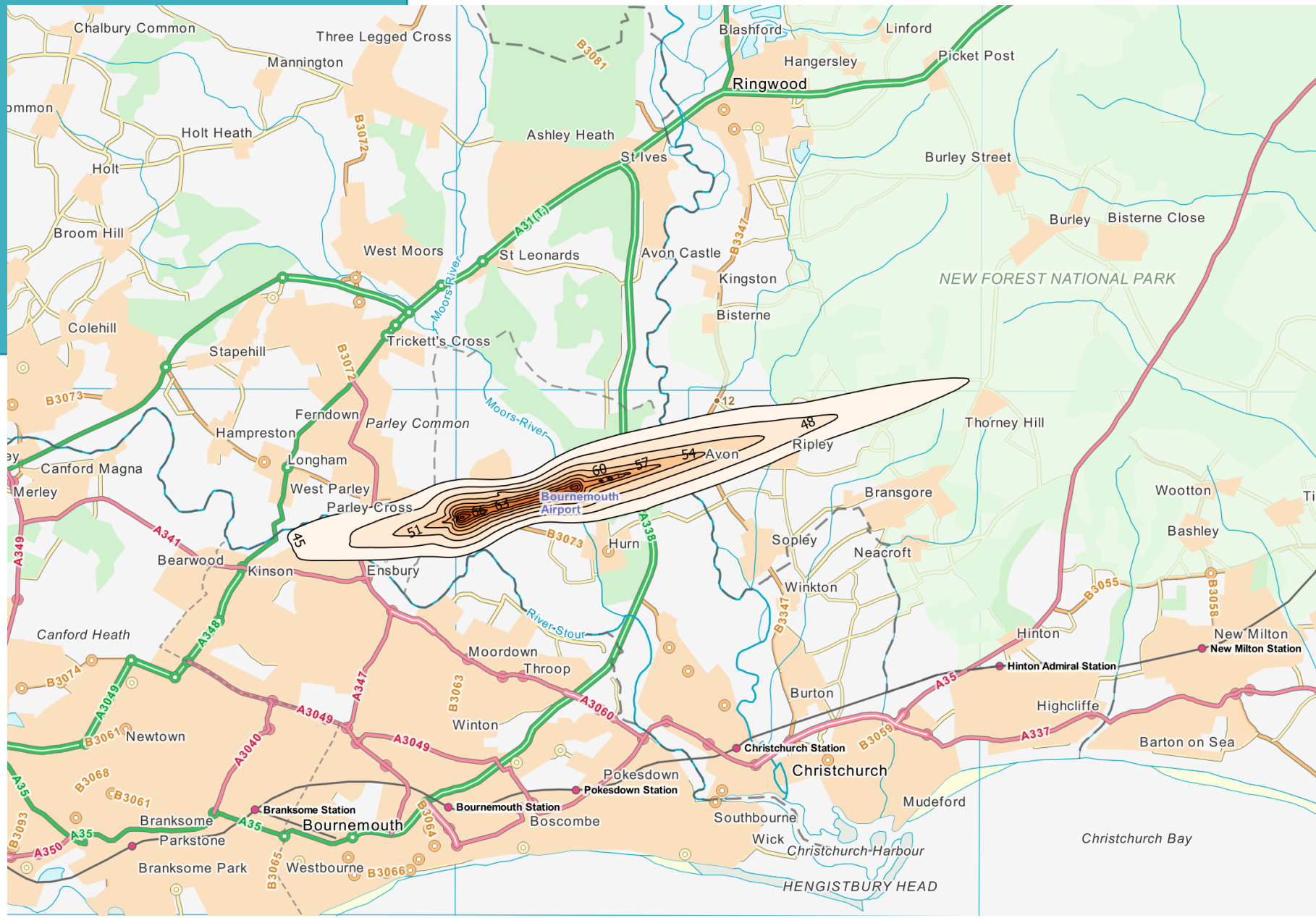
NOISE CONTOURS: DAY

NOMINAL 16HR LAEQ



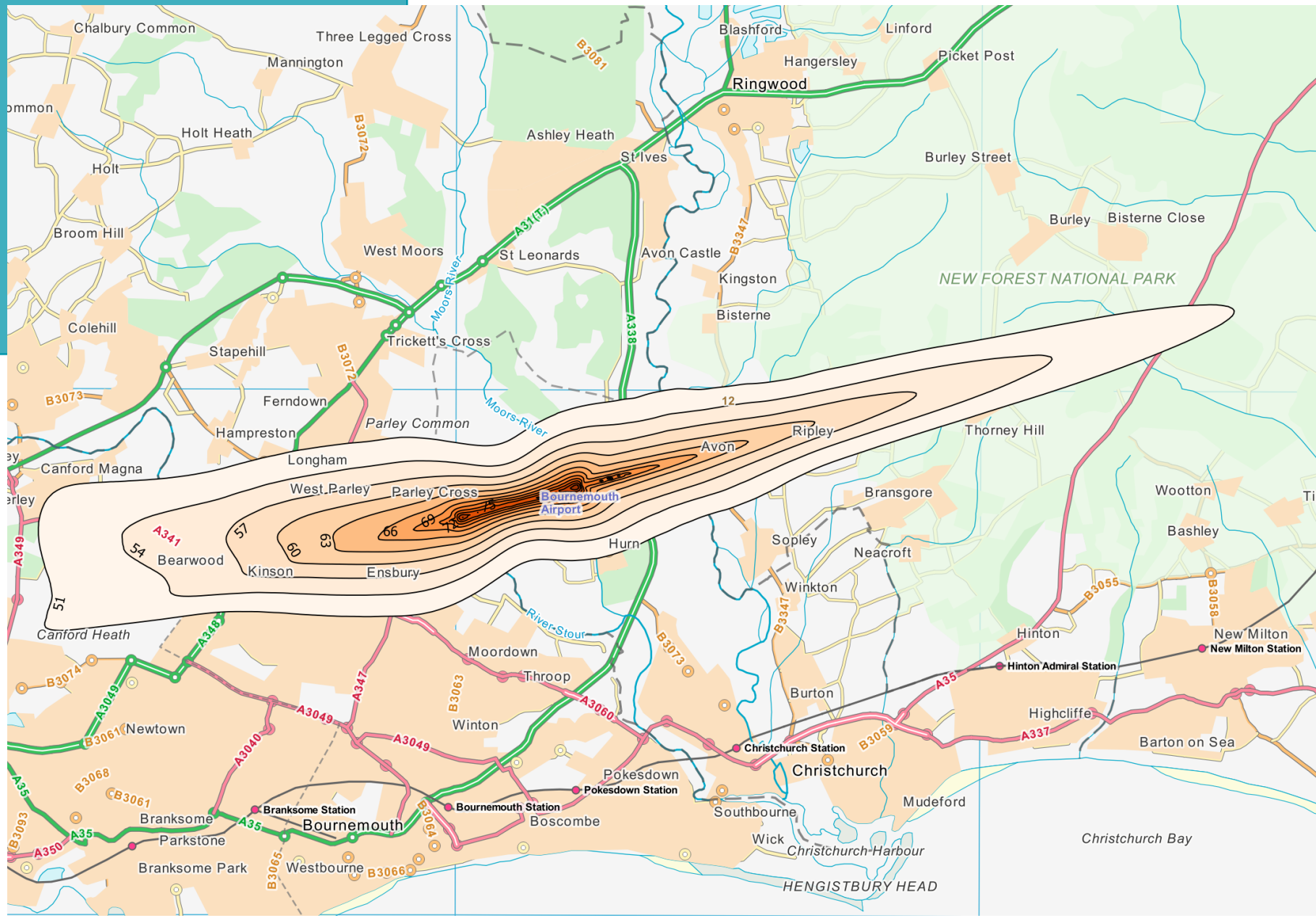
NOISE CONTOURS: NIGHT

NOMINAL 8HR LAEQ



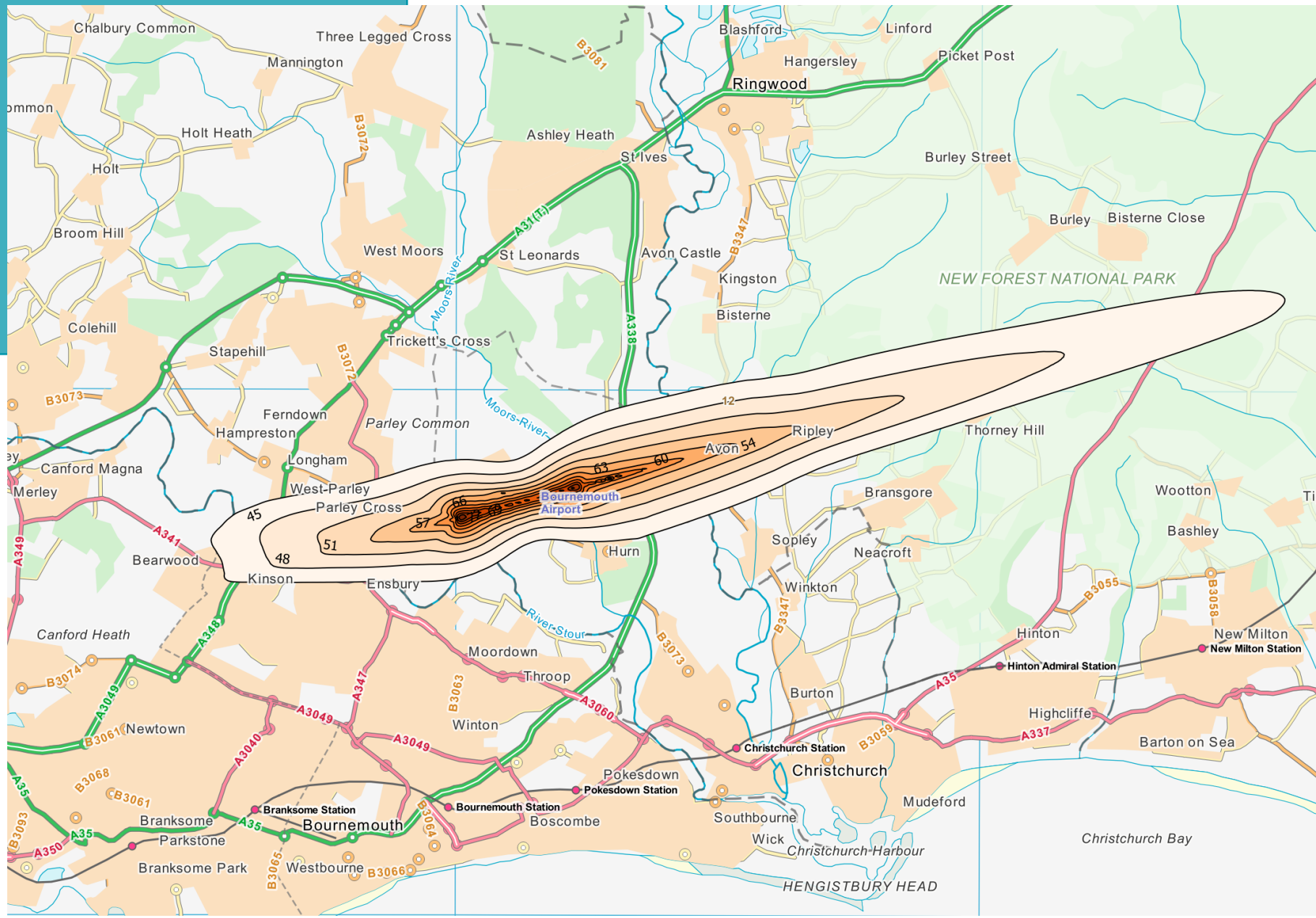
NOISE CONTOURS: DAY FORECAST

10 YEAR GROWTH 16HR LAEQ

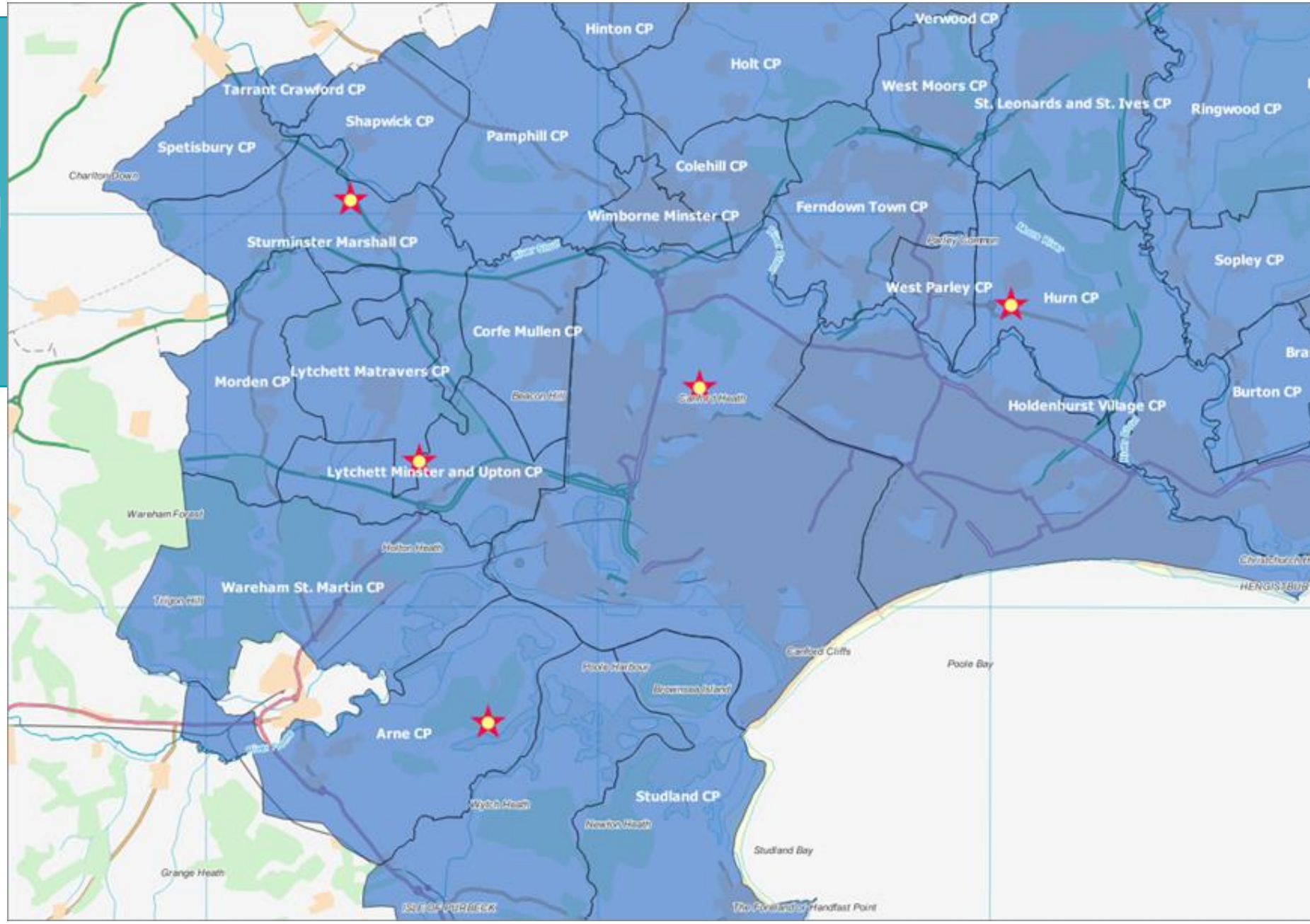


NOISE CONTOURS: NIGHT FORECAST

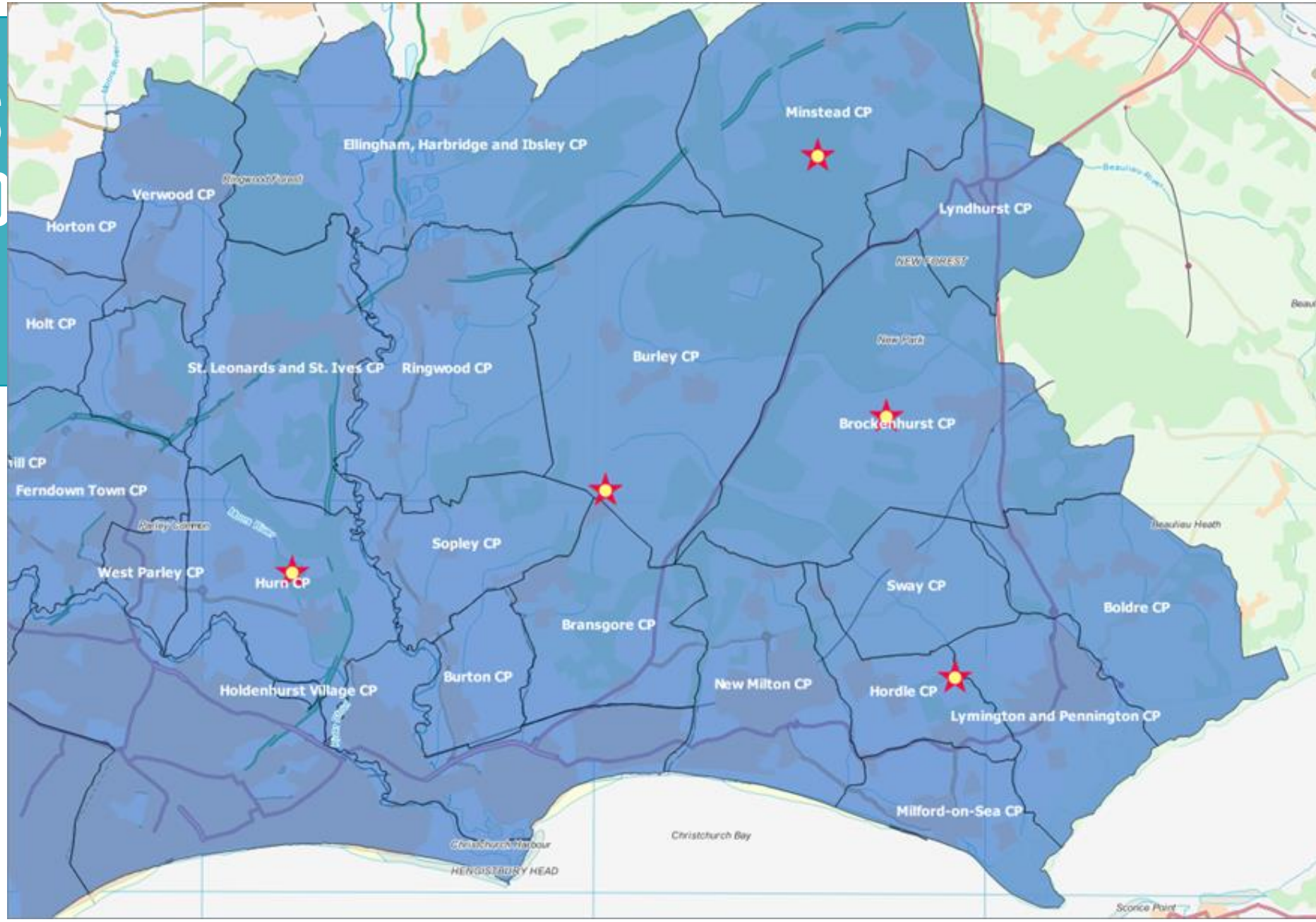
10 YEAR GROWTH 8HR LAEQ



PARISH BOUNDARIES UNDER 3C AND 3D TO RWY 08

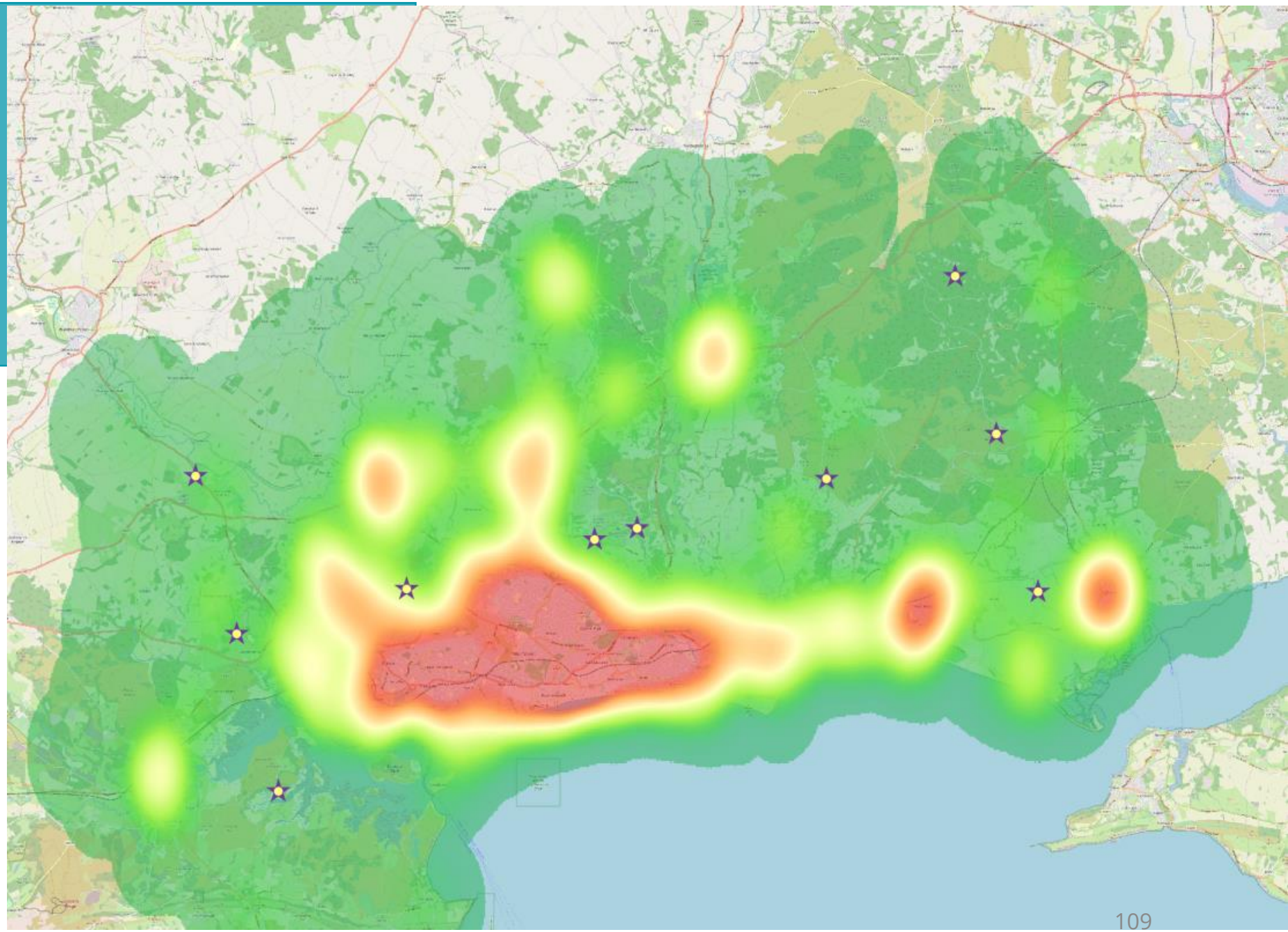


PARISH BOUNDARIES UNDER 3C AND 3D TO RWY 26



POPULATION DENSITY UNDER THE PROPOSED APPROACHES

(2011 CENSUS)



CONCLUSIONS

PROPOSED OPTION AND MODIFICATION TO THE PROPOSAL

- As is presented on slide 21, the majority of consultees supported Sub-Option 3d for both runway ends. No respondents expressed their support for “Sub-Option 3c” for RWY 08.

- The Final Appraisal confirms that Sub-option 3d supports all of Bournemouth’s aviation stakeholders’ needs.

- After careful consideration of the responses to the consultation and this Final Appraisal, Bournemouth Airport is taking forward Sub-Option 3d – “Limited T Bar with two Initial Approach Fixes” via the formal ACP submission at Stage 4B in accordance with the CAP 1616 with no additional modifications to this proposal.

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