	d Meets objectives, in	Reason for Categor ignificant impact, and is the Preferred Option for this procedure has an insignificant impact but is less attractive	<ul> <li>Negectero - bores not mere consumins (e.g. anspace modernisation) or technical criteria of CAP1616; Existing GNSS approaches do not meet the technical criteria:ground-based aids required for missed approach. Carried forward to Full Options Appraisal</li> </ul>			Shorter than Option 3 but overflies a school at								
Carry Forward		nas an insignificant impact but is less attractive more objectives or has a significant impact that cannot be	to enable environmental comparison of proposal against the baseline.		stakeholders had their input. Fewer track miles	2000ft and a hospital at 4000ft. Longer than Post Engagement Option (SID 27 AGGER	5NM longer than the Post Engagement option (SID 27 AGGER Option 1b) but affects fewer	(replicates current WAL departure) but track	ks shortest possible route over the residential	Only one practical option for direct routing to	expose more communities and sensitive area	<ul> <li>Shortest practical route and avoids residential as areas and follows the route of the motorway</li> </ul>	versus SID 09 CAVEN Option 4 as more people	<ul> <li>more track miles, and does not minim</li> </ul>
Group Impact	effectively mitigated	High-level Appraisal for the introduction of PBN/RNAV	-	Compliance SID 27 AGGER Option 1	and fewer overflown than other options. PE SID 27 AGGER Option 1b	Option 1b) SID 27 AGGER Option 2	sensitive areas than Option 2.	over more populated areas for longer	areas SID 27 WAL Option 2	TEMP2	to noise than SID 09 AGGER Option 2. SID 09 AGGER Option 1	initially SID 09 AGGER Option 2		or people overflown versus other o
Communities Noise impact o	on Initial Options	In general RNAV procedures are predicted to reduce noise	The tracks flown by aircraft using conventional	Option rejected at DPE stage due to non-	Flown at optimum aircraft performance and	Flown at optimum aircraft performance but	Flown at optimum aircraft performance;	Flown at optimum aircraft performance;	Flown at optimum aircraft performance;	Flown at optimum aircraft performance;	Flown at optimum aircraft performance;	Flown at optimum aircraft performance;	Flown at optimum aircraft performance;	Flown at optimum aircraft performan
health and quality of life	Appraisal: Qualitativ	e exposure versus extant conventional procedures due to the facilitation of continuous climb/descent profiles and	taken relies on the pilot interpreting ground-based	compliance with PANS OPS 8168 (turns/waypoint spacing).	with continuous climb profile to minimise noise.	overflies a school at 2000ft and a hospital at 4000ft within built up areas. Incorporates	minimises noise. The procedure overflies Eastham Country Park	minimises noise. The procedure overfiles Eastham Country Park and over or in the	minimises noise. The procedure overflies Eastham Country Park after departure, 3.2 nr	minimises noise. The procedure overflies Eastham Country Park after departure, 3.2 nm	minimises noise. The procedure overflies Hall Primary School after departure, 1.5 nm on th	routing of Option 1 to avoid sensitive areas in	minimises noise. The procedure overflies Hale Primary School after departure, 1.5 nm on the	minimises noise. The procedure over Primary School after departure, 1.5 n
		optimum aircraft performance. However it is not always possible to deliver these characteristics and each Option has	beacon information and therefore the procedures as published often don't represent actual tracks flown		The procedure takes a more direct route to AGGER; aircraft remain over the River Mersey	continuous climb to minimise noise and overflies fewer (but more densely populated)	after departure, 3.2 nm on the extended centreline. The route flies over school	vicinity of a number of schools in residential areas of Bebington and Birkenhead.	on the extended centreline and also flies in the vicinity of schools in Bebington. The routing	e on the extended centreline. The procedure is also files in the vicinity of schools in	extended centreline. The procedure also overflies schools in Runcorn and Frodsham.	Runcorn and Frodsham. The procedure overflies village of Hale and Hale Primary	extended centreline and also overflies schools in Widnes. Incorporates continuous climb but	extended centreline. The procedure overfiles schools in Runcorn, Frodsha
		been assessed to determine whether noise is minimised through these measures. The assessment also assessed the	and instead, aircraft are spread out over a wider area. Height restrictions (4000ft or below) to		during the initial right hand turn after take-off. Routing takes the aircraft over populated	residential areas compared to SID 27 AGGER Option 3. The procedure overflies Liverpool	grounds in Ellesmere Port, at an altitude of approximately 4,500 ft. Incorporates	Incorporates continuous climb to minimise noise.	close to two major hospitals (Clatterbridge and Arrowe Park) in the Wirral. Incorporates	Bebington. Incorporates continuous climb profile to minimise the impact of noise. Flies	Incorporates continuous climb but flies over the village of Hale and populated areas of	as the school is at 1.5 nm on the extended	has been restricted to a maximum altitude of 5,000 ft prior to CAVEN to meet en-route	Ellesmere Port. Incorporates a conti climb to minimise noise, but is restri
		exposure of communities to noise i.e. whether the option minimises overflight of sensitive areas, public spaces and	deconflict traffic from Manchester Airport means that aircraft can spend extended time in level flight;				continuous climb to minimise noise and crosses the residential areas of Bebington and		continuous climb profile to minimise the impact of noise. Follows the shortest possible	over populated areas of Bebington and Raby Mere but follows the most direct route across	Runcorn, Frodsham and Helsby.	centreline. Incorporates continuous climb to minimise noise. This option is assessed to	requirements (FASI-N). Routing represents the most direct route to CAVEN but takes the	5,000 ft maximum altitude for en-rou requirements. Routing takes the airc
		parks, built up environments and residential areas. Consideration of the altitude and flight profile (below 7000ft	are unable to fly with optimum power settings		approximately 4,000 fb before flying over this area. The procedure avoids direct overflight of sensitive areas although a school and a	altitudes than Option 3.	Ellesmere Port. The procedure also overflies Capenhurst		route over populated areas of Bebington and	the populated area to minimise exposure. The route also avoids most of the populated areas		minimise noise for SID 09 via AGGER in so far	aircraft over populated areas of Widnes,	the village of Hale and populated are Runcorn, Frodsham, Helsby and Elles
		has also been included.	The existing GNSS approaches offer more		hospital are close to the planned flightpath;		Nuclear Processing plant, a Restricted area up to 2,200 ft, at an altitude of approximately		Wirral.	in the southern part of the Wirral.		as is reasonably practicable.	noyon and charpool.	Port. Other options have a lower not
			predictable routes minimising people overflown, however the missed approach element of the		aircraft will be above approximately 4,000 ft at these points.		4,000 ft.							
			procedure references ground based beacon information and hold location and would be less		Incorporates a continuous climb profile to minimise noise and minimises residential									
			predictable. Also ATC vectoring is required between the airways and the approach (no transition) which		areas overflown.									
			does not offer minimal track miles or optimum engine performance (more people exposed to											
			noise).											
Communities Air Quality	Initial Options	Most of the area around LJLA is within an Air Quality	No change to air quality predicted in maintaining		No change to baseline	No change to baseline	No change to baseline	No change to baseline	No change to baseline	No change to baseline	No change to baseline			
	Appraisan Quantach	<ul> <li>Management Area (AQMA) and the airport has partnered with Liverpool City Council (LCC) to measure AQ for over 10 years. Engagement to date with the environmental health</li> </ul>	basenne conditions											
		authorities at Halton Borough Council and LCC suggests that												
		no changes are expected as no changes to the baseline are expected below 1000ft for any of the options; therefore no												
		change in air quality is predicted. Aircraft currently descend below 1000ft on final approach commensurate with runway	,											
		orientation; and Aircraft depart up to 1000ft on the same track as they do currently.												
		One of the stated benefits of the introduction of RNAV procedures is reduced environmental impact due in part to												
		continuous climb/descent. It is predicted that the initial climb/ final approach segments of flight will be the same as												
		extant procedures but this will be tested during the full options appraisal in order to quantify any change in air												
		quality.												
Wider Society Greenhouse G	as Initial Options	Reduced environmental impact is one of the benefits listed			Minimises track miles - this option offers the	Minimises track miles compared to Option 3;	Continuous climb enables optimum aircraft	Minimises track miles - this option offers the	Continuous climb enables optimum aircraft	Continuous climb enables optimum aircraft		This procedure has been designed to be flower	Procedure unavoidably restricted to 5,000 ft	Procedure unavoidably restricted to !
impact	Appraisal: Qualitativ	<ul> <li>by ICAO of introducing PBN, and RNAV flight procedures. The Options have been assessed individually to determine</li> </ul>	have a greater environmental impact compared to		climb enables optimum aircraft performance	Although this is not the most direct route to AGGER, it is a viable route that allows the	initially after take-off increases the track miles	shortest practical route to WAL. Continuous climb enables optimum aircraft performance	0.8NM longer than SID 27 WAL Option 1 and		aircraft to obtain the correct height prior to	ie in a clockwise direction around LILA to enable aircraft to obtain the correct height prior to	maximum altitude to comply with FASI (N) but represents a short practical route to CAVEN.	<ul> <li>maximum altitude to comply with FA represents increased track miles over options to CAVEN. Aircraft will remain the complete the second second</li></ul>
		whether they have the potential to minimise emissions through optimum aircraft configuration (engine power	proposed options; routes unpredictable in length; continuous climb/descent not supported, extended		and fuel burn (lower emissions predicted versus SID 27 AGGER Option 2.)	aircraft to fly at optimum performance levels to be PANS-OPS compliant. It is longer than	flown to AGGER.	and fuel burn.	which will require more fuel and therefore increase aircraft emissions.	TEMP2.	to wider initial turn but remains a viable and	e AGGER. Is the shortest practical route to enable continuous climb to correct height.	Aircraft will remain at this altitude for a number of track miles thus potentially not	altitude for a greater number of track
		settings), use of continuous climb/descent profiles, utilisatio of shortest practical routes etc. In general, the introduction	<ul> <li>periods of level flight; radar vectoring to join airways; height restrictions and clearance delays -</li> </ul>			Option 1b.					practical route to enable continuous climb to correct height.	Offers a tighter initial turn than Option 1 which may require slightly increased engine	minimising emissions.	thus not minimising emissions.
		of RNAV flight procedures is predicted to reduce environmental impact over extant ground/equipment based	all contributing to higher engine settings/more track									power setting.		
		navigation procedures.												
Wider Society Capacity and	Initial Options	Generally, the introduction of PBN is based on delivering	Maintaining extant procedures would maintain		The procedure has been designed to integrate	The procedure has been designed to integrate	The procedure has been designed to integrate	The procedure has been designed to integrat	te The procedure has been designed to integrat	The procedure has been designed to integrate	The procedure has been designed to integrate	The procedure has been designed to integrate	The procedure has been designed to integrate	The procedure has been designed to
resilience	Appraisal: Qualitativ	<ul> <li>benefits in terms of increasing airspace capacity leading to more predictable routes, fewer on-ground and in-air delays</li> </ul>	significantly affected. LILA would fail to meet		with the en-route structure.	with the en-route structure.	with the en-route structure.	with the en-route structure.	with the en-route structure.	with the en-route structure.	with the en-route structure.			
		experienced by airlines. The completion of the entire route from airport to destination via PBN leads to a more effective	airspace modernisation priorities including											
		route structure. The implementation of PBN is currently the highest priority for the global aviation community.	coordination with FASI-N											
General Aviation Access	Initial Options	No change to existing airspace arrangements. Procedure	No change to existing airspace arrangements. GA			No change to existing airspace arrangements.	No change to existing airspace arrangements.	No change to existing airspace arrangements	No change to existing airspace arrangements	No change to existing airspace arrangements.	No change to existing airspace arrangements	No change to existing airspace arrangements.	No change to existing airspace arrangements.	No change to existing airspace arran
	Appraisal: Qualitativ	<ul> <li>wholly contained within extant CAS; no change to GA access to airspace. GA users of LILA will continue to arrive and</li> </ul>	under extant operational arrangements.		Procedure wholly contained within extant CAS no change to GA access to airspace. GA users	no change to GA access to airspace. GA users	Procedure wholly contained within extant CAS no change to GA access to airspace. GA users	Procedure wholly contained within extant CA no change to GA access to airspace. GA users of LILA will continue to arrive and depart	<li>Frocedure wholly contained within extant CA no change to GA access to airspace. GA users</li>	<ol> <li>Procedure wholly contained within extant CAS no change to GA access to airspace. GA users</li> </ol>	Procedure wholly contained within extant CA no change to GA access to airspace. GA users	IS: Procedure wholly contained within extant CA no change to GA access to airspace. GA users of LILA will continue to arrive and depart	Procedure wholly contained within extant CAS no change to GA access to airspace. GA users	Procedure wholly contained within ex no change to GA access to airspace. (
		depart under extant operational arrangements. Access to the runway may be slightly improved via a reduction in on-	e		of LILA will continue to arrive and depart under extant operational arrangements.	of LILA will continue to arrive and depart under extant operational arrangements.	of LILA will continue to arrive and depart under extant operational arrangements.	of LILA will continue to arrive and depart under extant operational arrangements.	of LILA will continue to arrive and depart under extant operational arrangements.	of LILA will continue to arrive and depart under extant operational arrangements.	of LILA will continue to arrive and depart under extant operational arrangements.	of LILA will continue to arrive and depart under extant operational arrangements.	of LILA will continue to arrive and depart under extant operational arrangements.	of LILA will continue to arrive and de under extant operational arrangement
		ground and in-air delays brought about by the introduction of PBN.	of											
General Aviation / Economic Impa	act Initial Options	Generally, the introduction of PBN is based on delivering	No increase to effective capacity anticipated for		This is a PBN/RNAV procedure and contributes	This is a PBN/RNAV procedure and contributes	s This is a PBN/RNAV procedure and contributes	This is a PBN/RNAV procedure and contribute	es This is a PBN/RNAV procedure and contribute	s This is a PBN/RNAV procedure and contribute	This is a PBN/RNAV procedure and contribute	This is a PBN/RNAV procedure and contribute	This is a PBN/RNAV procedure and contributes	This is a PBN/RNAV procedure and co
commercial airlines from increased effective	d Appraisal: Qualitativ	<ul> <li>benefits in terms of increasing airspace capacity leading to more predictable routes, fewer on-ground and in-air delays</li> </ul>	economic benefit for GA/airlines.		increased effective capacity which is predicted	increased effective capacity which is predicted		to the delivery of associated benefits includin increased effective capacity which is predicte	ed increased effective capacity which is predicte	d increased effective capacity which is predicted	increased effective capacity which is predicte	to the delivery of associated benefits includin increased effective capacity which is predicte	Increased effective capacity which is predicted	to the delivery of associated benefits increased effective capacity which is
capacity		experienced by airlines. This may have an economic benefit to airlines in the context of being an enabler for increased ai	ir .		to have direct and indirect economic benefits for airlines and general aviation.	to have direct and indirect economic benefits for airlines and general aviation.	to have direct and indirect economic benefits for airlines and general aviation.	to have direct and indirect economic benefits for airlines and general aviation.	s to have direct and indirect economic benefits for airlines and general aviation.	to have direct and indirect economic benefits for airlines and general aviation.	to have direct and indirect economic benefits for airlines and general aviation.	to have direct and indirect economic benefits for airlines and general aviation.	to have direct and indirect economic benefits for airlines and general aviation.	to have direct and indirect economic for airlines and general aviation.
		transport movements, passenger numbers and cargo tonnag carried. It is not proportionate for LILA to predict the precise	2											
		economic benefit to commercial airlines using the new procedures as any increase in individual airline capacity will												
		depend on private commercial business characteristics. It is not proportionate for LILA to assess the economic												
		benefit to the GA community however they are expected to benefit from increased predictability of commercial airline												
		movements which is predicted to lead to reduced on-ground and in-air delays for all users which may have a positive	1											
		Impact on GA costs.												
General Aviation / Fuel burn	Initial Options	Each option has been assessed against other options based	Fuel burn predicted to be greater (and less		Track Length 20.8NM	Track Length 22.4NM	Track Length 25NM	Track Length 10.4NM	Track Length 11.2NM	Track Length 14.7NM	Track Length 31.7NM	Track length 29.1NM	Track Length 15.4NM	Track Length 20.4NM
commercial airlines	Appraisal: Qualitativ	e on whether any factors of the design might contribute to increased fuel burn. In general the introduction of RNAV			route with a continuous climb profile enabling		This option increases the track miles due to the initial left turn after take off. The route	This Option is 0.8NM shorter than SID 27 WA Option 2 and therefore may require negligible	Inis Option is 0.8NM longer than SID 27 WAL     Option 1 and therefore may require negligible	Only one practical option; track length will inform the Full Options Appraisal stage to	This Option is 1.6NM longer than Option 2 ar may result in negligible additional fuel burn.	nd Shortest practical route; track length will inform the Full Options Appraisal stage to	Shortest practical route predicted to result in lowest fuel burn. Necessary height restrictions	Longest route; predicted to result in j fuel burn. Necessary height restriction practical routes to CAVEN may result
		procedures and associated predictability of tracks, continuous climb/descent, reduction in tactical intervention	extended track miles in level flight; tactical ATC intervention; continuous climb/descent		aircraft into the airways structure; predicted	integrates aircraft into the airways structure;	integrates aircraft into the airways structure; due to increased track miles compared to SID	less tuel.	more fuel.	determine Fuel Burn.		determine Fuel Burn.	for all practical routes to CAVEN may result in comparatively greater fuel burn versus other	comparatively greater fuel burn versi
		is predicted to result in reduced fuel burn versus the baseline.	unsupported; exact route depends on pilot/on- board system interpretation of navigation		to minimise fuel burn.	due to slightly increased track miles compared to SID 27 AGGER Option 1b, is less attractive.							procedures.	procedures.
			equipment.											
Commercial airlines Training costs	Initial Options	It is expected that Pilot/Crew Training will be required to	No additional training predicted.		It is expected that Pilot/Crew Training will be	It is expected that Pilot/Crew Training will be	It is expected that Biot/Crew Technics	It is expected that Pilot/Crew Training will be	It is expected that Direct/Communication	It is expected that Diat if we Technics of	It is expected that Dilet/Com-Technica	It is expected that Pilot/Crew Training will be	It is expected that Bilet Crew Technics will	It is expected that Dilation and
Commercial arring costs	Appraisal: Qualitativ	It is expected that Pilot/Crew Training will be required to e enable pilots to flight the new RNAV procedures. It is not proportionate for LILA to assess training costs for individual	the sources are saying predicted.		It is expected that Pilot/Crew Training will be required to enable pilots to flight the new RNAV procedures. It is not proportionate for	It is expected that Pilot/Crew Training will be required to enable pilots to flight the new RNAV procedures. It is not proportionate for	It is expected that Pilot/Crew Training will be required to enable pilots to flight the new RNAV procedures. It is not proportionate for	It is expected that Pilot/Crew Training will be required to enable pilots to flight the new RNAV procedures. It is not proportionate for	required to enable pilots to flight the new RNAV oppedition. It is not	It is expected that Pilot/Crew Training will be required to enable pilots to flight the new RNAV procedures. It is not proportionate for	It is expected that Pilot/Crew Training will be required to enable pilots to flight the new BNAV procedures. It is not proportionate for	<ul> <li>It is expected that Pilot/Crew Training will be required to enable pilots to flight the new RNAV procedures. It is not proportionate for</li> </ul>	It is expected that Pilot/Crew Training will be required to enable pilots to flight the new RNAV procedures. It is not proportionate for	It is expected that Pilot/Crew Training required to enable pilots to flight the RNAV procedures. It is not proportion
		commercial airlines due to the significant variables involved e.g. number of pilots requiring training (some may already b			LILA to assess training costs for individual commercial airlines due to the significant	LILA to assess training costs for individual commercial airlines due to the significant	LILA to assess training costs for individual commercial airlines due to the significant	LILA to assess training costs for individual commercial airlines due to the significant	LILA to assess training costs for individual	LILA to assess training costs for individual commercial airlines due to the significant	LILA to assess training costs for individual commercial airlines due to the significant	LILA to assess training costs for individual commercial airlines due to the significant	LILA to assess training costs for individual commercial airlines due to the significant	LILA to assess training costs for indiv commercial airlines due to the signifi
		competent), variables in pilot competence (i.e. how much training the individual will require), airline policies on			variables involved (see General Appraisal of PBN/RNAV)	variables involved (see General Appraisal of PBN/RNAV)	variables involved (see General Appraisal of PRN/RNAV)	variables involved (see General Appraisal of PRN/RNAV)		variables involved (see General Appraisal of PRN/RNAV)	variables involved (see General Appraisal of PBN/RNAV)	variables involved (see General Appraisal of PRN/RNAV)	variables involved (see General Appraisal of PRN/RNAV)	variables involved (see General Appra PRN/RNAV)
		training the individual will require), airline policies on training in simulator versus live flight training, variables in aircraft performance, variables in on-board equipment and							- stymetry					
		aircraft controls etc.												
Commercial airlines Other costs	Initial Options Appraisal: Qualitativ	Other costs to commercial airlines may include updates to Flight Management Systems (FMS), navigation databases and	other costs for commercial airlines - there may be		Other costs to commercial airlines may include updates to Flight Management	Other costs to commercial airlines may include updates to Flight Management	Other costs to commercial airlines may include updates to Flight Management	Other costs to commercial airlines may include updates to Flight Management	Other costs to commercial airlines may include updates to Flight Management	Other costs to commercial airlines may include updates to Flight Management	Other costs to commercial airlines may include updates to Flight Management	Other costs to commercial airlines may include updates to Flight Management	Other costs to commercial airlines may include updates to Flight Management	Other costs to commercial airlines m include updates to Flight Management
		operating procedures, increased pilot hire costs versus training etc. It is not proportionate for LILA to assess the	costs associated with maintaining legacy systems to continue flying conventional navigation but there		Systems (FMS), navigation databases and operating procedures, increased pilot hire	Systems (FMS), navigation databases and operating procedures, increased pilot hire	Systems (FMS), navigation databases and operating procedures, increased pilot hire	Systems (FMS), navigation databases and operating procedures, increased pilot hire	Systems (FMS), navigation databases and operating procedures, increased pilot hire	Systems (FMS), navigation databases and operating procedures, increased pilot hire	Systems (FMS), navigation databases and operating procedures, increased pilot hire	Systems (FMS), navigation databases and operating procedures, increased pilot hire	Systems (FMS), navigation databases and operating procedures, increased pilot hire	Systems (FMS), navigation databases operating procedures, increased pilot
		other costs' to commercial airlines of flying RNAV procedures due to significant variables; some airlines may	are too many variables (e.g. aircraft types, on-board system capability etc.) to consider these effectively.		costs versus training etc. It is not proportionate for LILA to assess the 'other	costs versus training etc. It is not proportionate for LILA to assess the 'other	costs versus training etc. It is not proportionate for LILA to assess the 'other	costs versus training etc. It is not proportionate for LILA to assess the 'other	costs versus training etc. It is not proportionate for LILA to assess the 'other	costs versus training etc. It is not proportionate for LILA to assess the 'other	costs versus training etc. It is not proportionate for LILA to assess the 'other	costs versus training etc. It is not proportionate for LJLA to assess the 'other	costs versus training etc. It is not proportionate for LILA to assess the 'other	costs versus training etc. It is not proportionate for LILA to assess the '
		already be 'PBN ready' whereas others may not.	, and a second a se		proportionate for LILA to assess the other costs' to commercial airlines of flying RNAV procedures due to significant variables; some	proportionate for LILA to assess the other costs' to commercial airlines of flying RNAV procedures due to significant variables; some	proportionate for LILA to assess the other costs' to commercial airlines of flying RNAV procedures due to significant variables; some	proportionate for LLA to assess the other costs' to commercial airlines of flying RNAV procedures due to significant variables; some	costs' to commercial airlines of flying RNAV	costs' to commercial airlines of flying RNAV procedures due to significant variables; some	costs' to commercial airlines of flying RNAV	costs' to commercial airlines of flying RNAV	costs' to commercial airlines of flying RNAV procedures due to significant variables: some	costs' to commercial airlines of flying procedures due to significant variable
					airlines may already be 'PBN ready' whereas others may not.	airlines may already be 'PBN ready' whereas	airlines may already be 'PBN ready' whereas others may not.	airlines may already be 'PBN ready' whereas others may not.	<ul> <li>procedures due to significant variables; some airlines may already be 'PBN ready' whereas others may not.</li> </ul>	<ul> <li>procedures due to significant variables; some airlines may already be 'PBN ready' whereas others may not.</li> </ul>	airlines may already be 'PBN ready' whereas	airlines may already be 'PBN ready' whereas others may not.	airlines may already be 'PBN ready' whereas others may not.	airlines may already be 'PBN ready' v
Airport / Air Infrastructure navigation service costs	Initial Options Appraisal: Qualitativ	All options relate to the implementation of PBN and no additional infrastructure is required. The introduction of PBN	Existing infrastructure is subject to rationalisation programme - no additional infrastructure is required		No additional infrastructure required (see High Level Appraisal of PBN/RNAV.	others may not. No additional infrastructure required (see High Level Appraisal of PBN/RNAV.	No additional infrastructure required (see High Level Appraisal of PBN/RNAV.	No additional infrastructure required (see High Level Appraisal of PBN/RNAV.	No additional infrastructure required (see High Level Appraisal of PBN/RNAV.	No additional infrastructure required (see High Level Appraisal of PBN/RNAV.	others may not. No additional infrastructure required (see High Level Appraisal of PBN/RNAV.	No additional infrastructure required (see High Level Appraisal of PBN/RNAV.	No additional infrastructure required (see High Level Appraisal of PBN/RNAV.	others may not. No additional infrastructure required High Level Appraisal of PBN/RNAV.
provider		reduces the reliance on infrastructure, in particular ground based navigation aids are no longer needed. The foundation	to maintain extant conventional procedures											
		for PBN is 'area navigation' or RNAV; aircraft arriving and departing LJLA using the proposed RNAV procedures will do	equipment may be prohibitively expensive. Note that the GNSS approaches would also be unavailable as											
		so based on their performance based navigation capability.	the missed approach references the ground-based infrastructure.											
Airport / Air Operational	Initial Options	ICAO list Improved Operational Efficiency as a benefit	No change to operational costs are attributable to		Operational Costs are not predicted to vary by	Operational Costs are not predicted to vary by	Operational Costs are not predicted to vary by	Operational Costs are not predicted to vary b	Operational Costs are not predicted to vary b	y Operational Costs are not predicted to vary by		Operational Costs are not predicted to vary by	Operational Costs are not predicted to vary by	Operational Costs are not predicted t
navigation service costs provider	Appraisal: Qualitativ	<ul> <li>delivered by the introduction of PBN. In general LILA predicts that operational efficiency will improve and that there may</li> </ul>	s maintaining the extant procedures except possibly in the case of infrastructure (see above).		Individual option.	individual option.	Individual option.	individual option.	Individual option.	Individual option.	individual option.	Individual option.	Individual option.	Individual option.
		be potential for a net reduction in operational costs. It is expected that any change in operational costs will be the												
		same regardless of which option is chosen. This will be considered further at Full Options Appraisal stage.												
Airport / Air Deployment	Initial Options	Deployment costs are attributable to the introduction of RBN/RNAV procedures rather than the individual IER options			Deployment costs are not predicted to vary by	Deployment costs are not predicted to vary by	Peployment costs are not predicted to vary by individual option.	Deployment costs are not predicted to vary b individual option.	Deployment costs are not predicted to vary b	y Deployment costs are not predicted to vary by		Deployment costs are not predicted to vary by     Individual potion	Deployment costs are not predicted to vary by	Deployment costs are not predicted t
navigation service costs provider	Appraisai: Qualitativ	<ul> <li>PBN/RNAV procedures rather than the individual IFP options themselves. Costs will include ATCO training and competency (based on understanding aircraft performance and ATC)</li> </ul>	y		полиция орной.	individual option.			amoust opción.		Individual option.	annous opudit.	ныницы орной.	individual option.
		(based on understanding aircraft performance and ATC procedures relating to RNAV), Aerodrome documentation												
		and procedures updates (e.g. MATS Pt2 updates, chart updates, payment to CAA, Procedure Validation and Simulator Costs).												
Safety Arrows Color-	Initial Ontines	Simulator Costs). One benefit of the introduction of PBN is the improvement in	The baceline arrumption is that arrupt and it	Not screened related DPL	Not Cimificant	Not Canificant	Mat Confirmat	Net Casificant	Not Configurat	Not Canificant	Not Canificant	Not Simificant	Not Capificant	Met Canificant
Safety Assessment Safety Assessment	Initial Options Appraisal: Qualitativ	safety and in fact ICOA declare it as is one of the primary	at LILA are safe including use of the extant	Not assessed, rejected at DPE stage	Not Significant Conflict with transition procedures managed	Not Significant Conflict with transition procedures managed	Not Significant Conflict with transition procedures managed	Not Significant Conflict with 09 Approach MAP managed by		Not Significant Conflict with Manchester IFPs to be managed	Not Significant Conflict with 09 Approach MAP mana			
		reasons for a state to implement PBN. An individual safety assessment has been carried out for each option but in	conventional and GNSS/RNAV procedures.		by vertical separation. Conflict with Hawarden traffic to be managed	by vertical separation. Some conflict with Manchester current	by vertical separation. Conflict with Hawarden traffic managed by	by vertical separation.	ey verucal separation.	by vertical separation. Conflict with Hawarden traffic managed by	vertical separation. Conflict with Manchester MIRSI hold to be	vertical separation. Conflict with Manchester MIRSI hold to be	by coordination with Manchester ACP development.	vertical separation. Conflict with Manchester IFPs to be in
		general, LILA's intention to introduce RNAV approaches delivers a safety benefit to the airport and its users.			by climb gradient and minimum altitude waypoint.	procedures; managed through coordination with Manchester ACP development.	climb gradient requirement and minimum altitude waypoint.			climb gradient requirement and minimum altitude waypoint.	managed through coordination with Manchester ACP development.	managed through coordination with Manchester ACP development. Conflict with Hawarden traffic managed by		through coordination with Mancheste development. Conflict with Hawarden traffic manag
											Conflict with Hawarden traffic managed by climb gradient requirement and minimum altitude wavenint	Conflict with Hawarden traffic managed by climb gradient requirement and minimum altitude waysoint		climb gradient requirement and minir
											altitude waypoint.	aundoe waypoint.		altitude waypoint.
					•									•

practical route - tot minimise noise	Fewer people overflown versus option 1 and follows the motorway (higher ambient noise) but less attractive than Option 4 due to	This option is longer than option 1 but it minimises overflight of sensitive areas and people on the ground and is therfore most	Does not minimise people overflown versus
s other options.	proximity to sensitive areas.	attractive.	Option 3 but is shorter than Option 2
erformance;	SID 09 CAVEN Option 3 Flown at optimum aircraft performance;	Flown at optimum aircraft performance:	SID 09 CORKA Option 1 Flown at optimum aircraft performance;
ure overflies Hale ire, 1.5 nm on the ocedure also	minimises noise. Overfiles Hale Primary School after departure, which is unavoidable as it is	minimises noise. The procedure unavoidably overflies Hale Primary School after departure,	minimises noise. Unavoidably overflies Hale Primary School after departure, 1.5 nm on the
cedure also Frodsham and	1.5 nm on the extended centreline. The procedure also overflies schools in Ellesmere	1.5 nm on the extended centreline. Flies over populated areas of Huyton and Liverpool.	extended centreline. The procedure also overflies schools in Runcorn and Frodsham.
a continuous is restricted to	Port. Flies over the village of Hale and populated areas of Ellesmere Port. Assessed	Assessed to affect fewer residential areas than SID CAVEN Options 1 and 2. Incorporates	Overflies the village of Hale and populated areas of Runcorn and Frodsham. Incorporates
or en-route the aircraft over	to affect fewer residential areas than Option 1 and 2.	continuous climb but with altitude restrictions at 5000ft.	continuous climb but other options have a lower noise impact on sensitive and residential
ocedure also , Frodsham and s a continuous ls restricted to or en-route : the aircraft over lated areas of and Ellesmere swer noise impact.			areas.
wer noise impact.			
	No change to baseline	No change to baseline	No change to baseline
icted to 5,000 ft with FASI (N) and	Procedure unavoidably restricted to 5,000 ft maximum altitude to comply with FASI (N) and	Procedure unavoidably restricted to 5,000 ft maximum altitude to comply with FASI (N) but	Represents the shortest practical route to CORKA thus minimising emissions
tiles over other will remain at this	represents increased track miles over options 1 due to right hand turn after take-off.	represents a short practical route to CAVEN. Aircraft will remain at this altitude for a	and an
r of track miles ns.	Aircraft will remain at this altitude for a greater number of track miles thus not	number of track miles thus potentially not minimising emissions. This option is longer	
	minimising emissions.	than Option 1.	
igned to integrate	The procedure has been designed to integrate	The procedure has been designed to integrate	The procedure has been designed to integrate with the encrute structure
	with the en-route structure.	with the en-route structure.	with the en-route structure.
ce arrangements. within extant CAS;	No change to existing airspace arrangements. Procedure wholly contained within extant CAS;	No change to existing airspace arrangements. Procedure wholly contained within extant CAS;	No change to existing airspace arrangements. Procedure wholly contained within extant CAS;
within extant CAS; inspace. GA users we and depart	no change to GA access to airspace. GA users of LILA will continue to arrive and depart	no change to GA access to airspace. GA users of LILA will continue to arrive and depart	no change to GA access to airspace. GA users of LILA will continue to arrive and depart
angements.	under extant operational arrangements.	under extant operational arrangements.	under extant operational arrangements.
re and contributes	This is a PBN/RNAV procedure and contributes	This is a PBN/RNAV procedure and contributes	This is a PBN/RNAV procedure and contributes
benefits including which is predicted conomic benefits ion.	to the delivery of associated benefits including increased effective capacity which is predicted	to the delivery of associated benefits including increased effective capacity which is predicted	to the delivery of associated benefits including increased effective capacity which is predicted
conomic benefits ion.	to have direct and indirect economic benefits for airlines and general aviation.	to have direct and indirect economic benefits for airlines and general aviation.	to have direct and indirect economic benefits for airlines and general aviation.
	Track Length 17.9NM	Track Length 17.9NM	Track Length 13.5NM
result in greatest restrictions for all ay result in urn versus other	2.5NM Longer than Option 1 representing Increased fuel burn.	2.5NM Longer than Option 1 representing Increased fuel burn.	2.4NM longer than Option 3 but continuous climb enables optimum aircraft performance
ay result in urn versus other	Necessary height restrictions for all practical routes to CAVEN may result in comparatively greater fuel burn versus other procedures.	Necessary height restrictions for all practical routes to CAVEN may result in comparatively greater fuel burn versus other procedures.	minimising fuel burn.
	greater fuel burn versus other procedures.	greater fuel burn versus other procedures.	
r Training will be	It is expected that Pilot/Crew Training will be required to enable pilots to flight the new	It is expected that Pilot/Crew Training will be	It is expected that Pilot/Crew Training will be
light the new roportionate for	RNAV procedures. It is not proportionate for	required to enable pilots to flight the new RNAV procedures. It is not proportionate for	required to enable pilots to flight the new RNAV procedures. It is not proportionate for
for individual he significant ral Appraisal of	LILA to assess training costs for individual commercial airlines due to the significant	LJLA to assess training costs for individual commercial airlines due to the significant	LILA to assess training costs for individual commercial airlines due to the significant
rai Appraisal of	variables involved (see General Appraisal of PBN/RNAV)	variables involved (see General Appraisal of PBN/RNAV)	variables involved (see General Appraisal of PBN/RNAV)
irlines may	Other costs to commercial airlines may	Other costs to commercial airlines may	Other costs to commercial airlines may
nagement stabases and ised pilot hire	include updates to Flight Management Systems (FMS), navigation databases and operating procedures, increased pilot hire	include updates to Flight Management Systems (FMS), navigation databases and	Include updates to Flight Management Systems (FMS), navigation databases and
not	operating procedures, increased pilot hire costs versus training etc. It is not proportionate for LILA to assess the 'other	operating procedures, increased pilot hire costs versus training etc. It is not proportionate for LILA to assess the 'other	operating procedures, increased pilot hire costs versus training etc. It is not proportionate for LILA to assess the 'other
ess the 'other of flying RNAV t variables; some	proportionate for LILA to assess the 'other costs' to commercial airlines of flying RNAV procedures due to significant variables; some	proportionate for LILA to assess the 'other costs' to commercial airlines of flying RNAV procedures due to significant variables; some	proportionate for LJLA to assess the 'other costs' to commercial airlines of flying RNAV procedures due to significant variables; some
ready' whereas	airlines may already be 'PBN ready' whereas others may not.	airlines may already be 'PBN ready' whereas others may not	airlines may already be 'PBN ready' whereas others may not.
required (see 'RNAV.	No additional infrastructure required (see High Level Appraisal of PBN/RNAV.	No additional infrastructure required (see High Level Appraisal of PBN/RNAV.	No additional infrastructure required (see High Level Appraisal of PBN/RNAV.
	Constituted Cost	Operational Cost	Department Cost
edicted to vary by	Operational Costs are not predicted to vary by individual option.	Operational Costs are not predicted to vary by individual option.	Operational Costs are not predicted to vary by individual option.
edicted to vary by	Deployment costs are not predicted to vary by	Deployment costs are not predicted to vary by	Deployment costs are not predicted to vary by
	Individual option.	individual option.	individual option.
AP marrow i	Not Significant	Not Significant Conflict with Manchester IFPs to be managed	Not Significant Conflict with Manchester IFPs to be managed
IAP managed by	Conflict with 09 Approach MAP managed by vertical separation. Conflict with Manchester IFPs to be managed	Conflict with Manchester IFPs to be managed through coordination with Manchester ACP development.	Conflict with Manchester IFPs to be managed through coordination with Manchester ACP development.
s to be managed tanchester ACP	through coordination with Manchester ACP development.		development. Conflict with Hawarden traffic managed by climb gradient requirement and minimum
ic managed by and minimum	Conflict with Hawarden traffic managed by climb gradient requirement and minimum		altitude waypoint.
	altitude waypoint.		

INITIAL C KEY	Carry Forward	Meets objectives, insig Meets objectives or h	nificant impact, and is the Preferred Option for this procedure as an insignificant impact but is less attractive	Less attractive to stakeholders; increased noise exposure versus SID 09 CORKA Option as more people are overflown and significar difference in track miler flown. Taken foreau	nt rd This option is the chartest south to CORVA and			Track miles and noise are as low as reasonably	Less attractive, greater track miles and more				Replaced by Post Engagement	Offers fewest practical track miles, the minimal exposure to noise and people over	This Option was released at the DBE stress due	Does not minimise noise or overflight of		Does not minimise noise or overflight of
	Reject	effectively mitigated	ore objectives or has a significant impact that cannot be	to provide alternative to other options which	h minimises overflight of people on the ground It follows the motorway and avoids Runcorn	Only one practical option for most direct	Only one practical option for most direct transition.	practicable within the constraints. Preferred Option.	required as an alternative when MAN using Runway 05.	Only one practical option for most direct transition.	Only one practical option for most direct transition.	Only one practical option for most direct transition.	preferred by stakeholders and met more objectives	the ground - amended original Option 1 with stakeholder input.	to unacceptable safety impact on Hawarden Aerodrome.	burn due to continuous descent not always being possible	Rejected in favour of Approach 09 Option 3b which improved environental	residential areas (MAP and hold) versus Option 3b.
Group	Impact		High-level Appraisal for the introduction of PBN/RNAV	SID 09 CORKA Option 2	SID 09 CORKA Option 3	Trans 27 DIOUF	Trans 27 NOMSU	Trans 27 VEGUN	Trans 27 VEGUN (CCD5)	Trans 09 DIDUF	Trans 09 NDMSU	Trans 09 VEGUN	Approach 27 Option 1	Post Engagement Approach 27 Option 1b	Approach 27 Option 2	Approach 27 Option 3	Approach 09 Option 1	Approach 09 Option 2
Communities	Noise impact on health and	Initial Options Appraisal: Qualitative	In general RNAV procedures are predicted to reduce noise exposure versus extant conventional procedures due to the	Flown at optimum aircraft performance; minimises noise. Overflies Hale Primary Scho	ol minimises noise. The procedure overflies Hale	minimises noise. The procedure passes over	Procedure has been designed to be flown at optimum aircraft performance and includes a	n Broughton and Chester, but at heights in	Overflies two schools and the periphery of Clatterbridge Hospital in the Wirral, although	The routing of this procedure is in the vicinity of several schools, in particular in the Crosby	times therefore noise impact is negligible.	sensitive areas but routes in the vicinity of a	with continuous descent profile to minimise	Flown at optimum aircraft performance and with continuous descent profile to minimise	Rejected at DPE/Safety Assessment Stage	Potential for aircraft to spend extended periods in level flight at 2,000 ft on the	Flown at optimum aircraft performance and with continuous descent profile to minimise	with continuous descent profile to minimise
	quality of life		optimum aircraft performance. However it is not always	after departure, 1.5 nm on the extended centreline, and schools in Widnes.	Primary School after departure, but this is unavoidable as the school is at 1.5 nm on the	two small country parks, above 2,000 ft. Overflies residential areas of Crosby and	improved descent profile, although height restrictions at NEW3 due to Manchester	excess of 3,000 ft. The procedure overfiles Delamere Forest Park. The procedure routes over mainly rural locations, with the exception	aircraft will be above 5,000 ft at this point. Overflies residential areas of Liverpool,	or above, 7,000 ft. Aircraft will descend below		number of schools in rural villages. Incorporates a continuous descent profile to	noise. The procedure flies over, or close to, a number of schools in the built-up areas of	noise. The procedure flies over, or close to, a numbe of schools in the built-up areas of Warrington	r .	approach with increased engine power setting Continuous descent profile not always possible	g. noise. The procedure files over, or close to, a number of schools in residential areas of Heswall and Bebington on final approach. The	noise. The procedure flies over, or close to, a number of schools in residential areas of
			possible to deliver these characteristics and each Option has been assessed to determine whether noise is minimised		files over the village of Hale but the option	and close to hospitals, but aircraft will be at	descent profile which prevents minimising of	of residential areas in Broughton and Chester,	Birkenhead, and Huyton, in the vicinity of schools and hospitals, but at altitudes greater	7,000 ft in the vicinity of Crosby, just prior to coasting out. Aircraft will be a continuous		represents the minimum practicable route to	This is unavoidable as aircraft must line up to	and Runcorn on final approach. The missed		due to sequencing with other traffic and so does not minimise noise. The procedure	Heswall and Bebington on final approach. The missed approach procedure routes in the vicinity of a number of schools in Runcorn and	<ul> <li>Heswall and Bebington on final approach. The missed approach procedure routes in the</li> </ul>
			through these measures. The assessment also assessed the exposure of communities to noise i.e. whether the option	Liverpool.	overflown versus options 1 and 2	above 5,000 ft and in the descent, so will have reduced noise commensurate with lower	small country parks above 2 000 ft. The	where aircraft will be at, or above, 3,000 ft. The procedure does not incorporate a	than 4,000 ft. Passes over two small country parks, above 2,000 ft. Height restriction of	descent so will have a minimum engine powe setting. The aircraft will remain over the sea	r	reduce track miles flown although passes over several small village locations at approximate	the runway. The missed approach procedure routes in the vicinity of a number of schools,	approach procedure routes over Eastham Country Park and in the vicinity of a number o schools in Bebington and Birkenhead at or	4	overflies residential areas of Warrington and Runcorn, potentially in level flight at 2,000 ft.	vicinity of a number of schools in Runcorn and Frodsham, not below 2,500 ft. The MAP is an emergency procedure rarely used so low	i vicinity of a number of schools and residential areas in Runcorn, Warrington and Widnes, not
			minimises overflight of sensitive areas, public spaces and parks, built up environments and residential areas.			power settings. Routing is planned over industrial areas and close to the motorways, with higher ambient noise. The procedure has	procedure overflies residential areas of Liverpool in the vicinity of a number of schoo	continuous descent profile due to a height is restriction of 3,000 ft at NEW7 to deconflict	4,000 ft at NEW3 due to Manchester arrival traffic restricts the use of a continuous	for the remainder of the Transition to the IAP. The design of this option minimises noise in so		altitudes of 3,000 ft and above. Only one practical option is available to meet enroute	2,000 ft; The MAP is an emergency procedur	above 2,500 ft.		residential areas of Liverpool, also at 2,000 ft.	probability of noise impact for this element of	descent profile and represents the most direct
			Consideration of the altitude and flight profile (below 7000ft) has also been included.			been designed to enable a more continuous	than 4.000 ft. Overfiles residential areas of	increased engine power setting. This	descent profile, requiring an increased engine power setting. Increased track miles versus	far as reasonably practicable. Only one option is available to meet enroute requirements.	1	requirements.	rarely used so low probability of noise impact for this element of the procedure.	overflies a residential area of Bebington and		The MAP is an emergency procedure rarely used so low probability of noise impact for	the procedure. This option is the shortest possible route for approach to runway 09 so	routing to minimise people overflown. Position of the hold does not minimise noise
						descent but height restrictions at NEW3 to deconflict from Manchester arrival traffic	Wallasey, Liverpool and Huyton during the descent, so will have lower power settings.	restriction is to comply with enroute requirements (FASI (N)). Two options for	other option; increases the time below 7,000 ft. Although the other option has a lower					Birkenhead. The majority of the missed approach procedure is flown over rural parts		this element of the procedure.	minimises noise versus the other options.	for sensitive areas.
						means the descent profile flown is not	Routing is planned over industrial areas and close to the motorways, with higher ambient	transition via VEGUN are available with this	noise impact that this one, this alternative routing is required for use when Manchester					of the Wirral and the hold is positioned over the sea.				
						provide most direct route and to comply with en-route structure - FASI(N).	noise.	however both are required – Trans 27 VEGUN (crns)	Airport is operating on Runway 05 to decoeffict with Macchester arrivals					The MAP is an emergency procedure rarely used so low probability of noise impact for				
								()						this element of the procedure.				
Communities	Air Quality	Initial Options	Most of the area around LILA is within an Air Quality	No change to baseline	No change to baseline	No change to baseline	No change to baseline	No change to baseline	No change to baseline	No change to baseline	No change to baseline	No change to baseline	No change to baseline	No change to baseline.		No change to baseline	No change to baseline	No change to baseline
		Appraisal: Qualitative	Management Area (AQMA) and the airport has partnered with Liverpool City Council (LCC) to measure AQ for over 10															
			years. Engagement to date with the environmental health authorities at Halton Borough Council and LCC suggests that															
			no changes are expected as no changes to the baseline are expected below 1000ft for any of the options; therefore no															
			change in air quality is predicted. Aircraft currently descend below 1000ft on final approach commensurate with runway															
			orientation; and Aircraft depart up to 1000ft on the same															
			track as they do currently. One of the stated benefits of the introduction of RNAV															
			procedures is reduced environmental impact due in part to continuous climb/descent. It is predicted that the initial															
			climb/ final approach segments of flight will be the same as extant procedures but this will be tested during the full															
			options appraisal in order to quantify any change in air quality.															
Wider Society	Greenhouse Gas	Initial Ontionr	Reduced environmental impact is one of the benefits listed	DPE states that this procedure goes to TEMP.	2 Most direct route to TEMP3 incomparation	The procedure has been designed to be firmer	This procedure represents the most direct	The procedure represents the most direct	This procedure routes to the north of the	Represents shortest safe route from DIOUF; A	The procedure incorporater a continue of	The procedure incorporater a continue of	The procedure has been deviated to be for	The procedure has been designed to be flown		This procedure uses the existing waypoint	The procedure incorporates a continuous	The procedure incorporates a continuous
white society	impact	Appraisal: Qualitative	by ICAO of introducing PBN, and RNAV flight procedures. The Options have been assessed individually to determine	rather than CORKA. TEMP2 has been used as an alternate position for this SID and is locate	2 Most direct route to TEMP2 incorporating continuous climb profile therefore minimises en emissions.	at optimum aircraft performance and includes	route from NOMSU to the IAP. The procedure	e routing from VEGUN, minimising the track	airport, increasing the track miles flown. A height restriction of 4,000 ft at NEW3 due to	more direct track could reduce the number of	descent profile at optimum aircraft performance and minimises the track miles	descent profile at optimum aircraft	at optimum aircraft performance and with the minimum practicable track miles flown.	at optimum aircraft performance. Extended track miles are flown due to positionine the		INVEB as an Intermediate Fix, thus increasing	descent profile, to be flown at optimum	descent profile, to be flown at optimum
			whether they have the potential to minimise emissions	an alternate position for this SID and is locate within 1NM of CORKA but not over a	ed emissions.	a continuous descent profile. The extended 'S' profile increases track miles flown but this is	has been designed to be flown at optimum aircraft performance and includes an	miles flown. The height restriction of 3,000 ft at NEW7 is required to separate from	height restriction of 4,000 ft at NEW3 due to Manchester arrival traffic restricts the use of a	would require more turns by the aircraft	flown; Minimises emissions.	flown; Minimises emissions.	minimum practicable track miles flown.	hold over the sea to the west of the Airport.		the potential for aircraft to spend extended	<ul> <li>aircraft performance and represents the most direct flight path.</li> </ul>	direct flight path.
			through optimum aircraft configuration (engine power settings), use of continuous climb/descent profiles, utilisation	populated area. The precise location of the waypoint will be rationalised during the		required to allow the improved descent profile given the aircraft's altitude at the beginning of	Improved descent profile, although height restrictions at NEW3 due to Manchester	Manchester departures and hence the descent profile is not continuous, requiring an	t continuous descent profile. This routing is required when Manchester Airport is	during a busy period of the flight, so could have an adverse effect on Safety.				However, the MAP is an emergency procedure, seldom used, but will allow the			Minimises track miles and emissions. The MAP is an emergency 'go-around'	The final and missed approach procedure represents the minimum number of track
			of shortest practical routes etc. In general, the introduction of RNAV flight procedures is predicted to reduce	detailed technical design. Increased track miles over Option 1 due to initial left turn. No	ot		descent profile. This restriction is to comply	increased engine power setting. This restriction is to comply with FASI (North)	operating on Runway 05 to deconflict with Manchester arrivals. The height restriction is	Therefore minimises emissions through the use of continuous descent and incorporating				crew a period of stable flight in order to deal with any issues.		to increased power settings and greater emissions. The missed approach procedure	procedure seldom used, but by its nature may require maximum engine power setting.	miles flown and minimises emissions; The MAP is an emergency 'go-around' procedure
			environmental impact over extant ground/equipment based navigation procedures.	a direct route thus not minimising emissions.	-	means the descent profile flown is not optimum. This restriction is to comply with	with FASI (North) requirements. Aircraft in descent with lower power settings	requirements. Aircraft in descent with lower power settings.	to comply with FASI (North) requirements.	fewer turns to reduce impact on safety.						represents the minimum practicable track miles flown; ; The MAP is an emergency 'go-		seldom used, but by its nature may require maximum engine power setting.
						FASI (North) requirements. Aircraft in descent with lower power settings.	Minimise emissions so far as is practicable	Minimise emissions so far as is practicable based on FASI (N) constraints								around' procedure seldom used, but by its nature may require maximum engine power		
						Minimise emissions so far as is practicable based on FASI (N) constraints.										setting.		
Wider Society	Capacity and resilience	Initial Options Appraisal: Qualitative	Generally, the introduction of PBN is based on delivering benefits in terms of increasing airspace capacity leading to	The procedure has been designed to integrat with the en-route structure.	The procedure has been designed to integrate with the en-route structure.	The procedure has been designed to integrate with the en-route structure.	The procedure has been designed to integrate with the en-route structure.	The procedure has been designed to integrate with the en-route structure.	The procedure has been designed to integrate with the en-route structure.	The procedure has been designed to integrate with the en-route structure.	<ul> <li>The procedure has been designed to integrate with the en-route structure.</li> </ul>	The procedure has been designed to integrate with the en-route structure.	The procedure has been designed to integrat with the en-route structure.	The procedure has been designed to integrate with the en-route structure.	2	The procedure has been designed to integrate with the en-route structure.	The procedure has been designed to integrate with the en-route structure.	The procedure has been designed to integrate with the en-route structure.
			more predictable routes, fewer on-ground and in-air delays experienced by airlines. The completion of the entire route															
			from airport to destination via PBN leads to a more effective route structure. The implementation of PBN is currently the															
			highest priority for the global aviation community.															
General Aviation	on Access		No change to existing airspace arrangements. Procedure wholly contained within extant CAS; no change to GA access	No change to existing airspace arrangements Procedure wholy contained within extant CA				No change to existing airspace arrangements. Procedure wholly contained within extant CAS	No change to existing airspace arrangements. Procedure wholly contained within extant CAS	No change to existing airspace arrangements. Procedure wholly contained within extant CA	No change to existing airspace arrangements.	No change to existing airspace arrangements.	No change to existing airspace arrangements Procedure wholly contained within extant CA	No change to existing airspace arrangements.		No change to existing airspace arrangements. Procedure wholly contained within extant CA	No change to existing airspace arrangements. Procedure wholly contained within extant CAS	No change to existing airspace arrangements. Procedure wholly contained within extant CAS:
			to airspace. GA users of LILA will continue to arrive and depart under extant operational arrangements. Access to the	no change to GA access to airspace. GA users	no change to GA access to airspace. GA users	no change to GA access to airspace. GA users of LILA will continue to arrive and depart	no change to GA access to airspace. GA users	no change to GA access to airspace. GA users	no change to GA access to airspace. GA users	no change to GA access to airspace. GA users	no change to GA access to airspace. GA users	no change to GA access to airspace. GA users of LILA will continue to arrive and depart	no change to GA access to airspace. GA user	S: Procedure wholly contained within extant CAS no change to GA access to airspace. GA users of LILA will continue to arrive and depart		no change to GA access to airspace. GA users	no change to GA access to airspace. GA users of LLA will continue to arrive and depart	no change to GA access to airspace. GA users
			runway may be slightly improved via a reduction in on-	under extant operational arrangements.	under extant operational arrangements.	under extant operational arrangements.	under extant operational arrangements.	under extant operational arrangements.	under extant operational arrangements.	under extant operational arrangements.	under extant operational arrangements.	under extant operational arrangements.	under extant operational arrangements.	under extant operational arrangements.		under extant operational arrangements.	under extant operational arrangements.	under extant operational arrangements.
			ground and in-air delays brought about by the introduction of PBN.															
	on / Economic impact	Initial Options	Generally, the introduction of PBN is based on delivering	This is a PBN/RNAV procedure and contribut	This is a PBN/RNAV procedure and contribute	This is a PBN/RNAV procedure and contributes	This is a PBN/RNAV procedure and contribute	This is a PBN/RNAV procedure and contributes to the delivery of associated benefits including	This is a PBN/RNAV procedure and contributes	This is a PBN/RNAV procedure and contribute	s This is a PBN/RNAV procedure and contribute	This is a PBN/RNAV procedure and contribute	This is a PBN/RNAV procedure and contribut	This is a PBN/RNAV procedure and contribute to the delivery of associated benefits including	s	This is a PBN/RNAV procedure and contribute	s This is a PBN/RNAV procedure and contributes	This is a PBN/RNAV procedure and contributes
commercial airl	effective	Appraisal: Qualitative	benefits in terms of increasing airspace capacity leading to more predictable routes, fewer on-ground and in-air delays	to the delivery of associated benefits includir increased effective capacity which is predicto	ed increased effective capacity which is predicted	Increased effective capacity which is predicted	increased effective capacity which is predicte	d increased effective capacity which is predicted	increased effective capacity which is predicted	increased effective capacity which is predicted	d increased effective capacity which is predicted	d increased effective capacity which is predicted	increased effective capacity which is predict	d increased effective capacity which is predicted	6 d	to the delivery of associated benefits including increased effective capacity which is predicte	s This is a PBN/RNAV procedure and contributes to the delivery of associated benefits including d increased effective capacity which is predicted	to the delivery of associated benefits including increased effective capacity which is predicted
	capacity		experienced by airlines. This may have an economic benefit to airlines in the context of being an enabler for increased air		for airlines and general aviation.	for airlines and general aviation.	to have direct and indirect economic benefits for airlines and general aviation.	to have direct and indirect economic benefits for airlines and general aviation.	to have direct and indirect economic benefits for airlines and general aviation.	for airlines and general aviation.	for airlines and general aviation.	to have direct and indirect economic benefits for airlines and general aviation.	for airlines and general aviation.	for airlines and general aviation.		to have direct and indirect economic benefits for airlines and general aviation.	to have direct and indirect economic benefits for airlines and general aviation.	to have direct and indirect economic benefits for airlines and general aviation.
			transport movements, passenger numbers and cargo tonnage carried. It is not proportionate for LILA to predict the precise															
			economic benefit to commercial airlines using the new procedures as any increase in individual airline capacity will															
			depend on private commercial business characteristics. It is not proportionate for LILA to assess the economic															
			benefit to the GA community however they are expected to benefit from increased oredictability of commercial airline															
			movements which is predicted to lead to reduced on-ground and in-air delays for all users which may have a positive															
			impact on GA costs.															
	on / Fuel burn		Each option has been assessed against other options based	Track Length 23.9NM	Track Length 11.1NM	Most practical and expeditious route,	Only one practical and expeditious route;	Most practical and expeditious route; however	Longer route required to coordinate with	Most practical and expeditious route,	Most practical and expeditious route,	Most practical and expeditious route,	Flown at optimum aircraft performance and	Flown at optimum aircraft performance and		Continuous descent profile not always possible	e Flown at optimum aircraft performance and	Flown at optimum aircraft performance and
commercial airl	lines	Appraisal: Qualitative	on whether any factors of the design might contribute to increased fuel burn. In general the introduction of RNAV	This option is double the length of Option 3 due to initial left hand turn routing aircraft to	Shortest Track length due to right hand turn south direct to TEMP2, continuous climb	performance minimises fuel burn for this	necessary height restrictions to coordinate	continuous descent is limited by necessary height restrictions to coordinate with	Manchester arrivals when Manchester are using runway 05; continuous descent is	continuous descent, optimum aircraft performance minimises fuel burn for this	continuous descent, optimum aircraft performance minimises fuel burn for this	continuous descent, optimum aircraft performance minimises fuel burn for this	with continuous descent profile to minimise fuel burn.	with continuous descent profile to minimise fuel burn. Offers fewest possible track miles		due to coordination with other airspace users leading to increased fuel burn over other	, with continuous descent profile to minimise fuel burn.	with continuous descent profile to minimise fuel burn.
			procedures and associated predictability of tracks, continuous climb/descent, reduction in tactical intervention	the north before tracking south for TEMP2.	enables optimum aircraft performance minimising fuel burn. Note that TEMP2 is a	procedure.	with Manchester arrivals and comply with FA (N) constraints, optimum aircraft performance	e constraints, optimum aircraft performance	limited by necessary height restrictions to coordinate with Manchester and comply with	procedure.	procedure.	procedure.		for 27 Approach.		options.		
			is predicted to result in reduced fuel burn versus the baseline.		slightly displaced waypoint alternative to CORKA to place the end of the procedure		may not be possible and increased fuel burn versus other transitions.	may not be possible and increased fuel burn versus other transitions is predicted.	FASI (N) constraints, optimum aircraft performance may not be possible and									
					inside LILA airspace (CORKA is the fixed enroute entry point just outside LILA airspace				increased fuel burn versus other transitions is predicted.									
Communication	liner Train're rest	Initial Ontines	It is expected that Pilot/Crew Training will be required to	It is apported that Diret/Press Testelan	buildary.	It is expected that Pilot/Crew Training will be	It is avaarted that Bilat from Testains	It is apparted that Dist Press Testates	It is associated that Directions Technics	It is superial that Bilat Prov. Technics (11)	It is separated that Dist from Testalog	It is apparted that Digt from Technics	It is accorded that Dilet Prov. Testate	It is expected that Dilet from Testates		It is expected that Bilet from Testalan 111	It is apparted that Bilat Cours Technics	It is apparted that Biot/Com-Technics will i
cominercial airl	rlines Training costs	Appraisal: Qualitative	It is expected that Pilot/Crew Training will be required to enable pilots to flight the new RNAV procedures. It is not proportionate for LILA to assess training costs for individual	required to enable pilots to flight the new	required to enable pilots to flight the new	It is expected that Pilot/Crew Training will be required to enable pilots to flight the new RNAV procedures. It is not proportionate for	required to enable pilots to flight the new	It is expected that Pilot/Crew Training will be required to enable pilots to flight the new RNAV procedures. It is not proportionate for	required to enable pilots to flight the new RMM encoders. Pilots to flight the new	It is expected that Pilot/Crew Training will be required to enable pilots to flight the new RNAV procedures. It is not proportionate for	required to enable pilots to flight the new	It is expected that Pilot/Crew Training will be required to enable pilots to flight the new RNAV procedures. It is not proportionate for	required to enable pilots to flight the new	It is expected that Pilot/Crew Training will be required to enable pilots to flight the new RNAV procedures. It is not proportionate for		It is expected that Pilot/Crew Training will be required to enable pilots to flight the new RNAV procedures. It is not proportionate for	It is expected that Pilot/Crew Training will be required to enable pilots to flight the new RNAV procedures. It is not proportionate for	It is expected that Pilot/Crew Training will be required to enable pilots to flight the new RNAV procedures. It is not proportionate for
			commercial airlines due to the significant variables involved	ULA to assess training costs for individual	LILA to assess training costs for individual	LILA to assess training costs for individual	LILA to assess training costs for individual	RNAV procedures. It is not proportionate for LILA to assess training costs for individual commercial airlines due to the significant	LILA to assess training costs for individual	LILA to assess training costs for individual	LILA to assess training costs for individual	RNAV procedures. It is not proportionate for LILA to assess training costs for individual commercial airlines due to the significant	LILA to assess training costs for individual	RNAV procedures. It is not proportionate for LILA to assess training costs for individual commercial aidlose due to the simplicant		LILA to assess training costs for individual	LILA to assess training costs for individual	RNAV procedures. It is not proportionate for LJLA to assess training costs for individual commercial airlines due to the significant
			e.g. number of pilots requiring training (some may already be competent), variables in pilot competence (i.e. how much	variables involved (see General Appraisal of		commercial airlines due to the significant variables involved (see General Appraisal of	variables involved (see General Appraisal of	variables involved (see General Appraisal of	variables involved (see General Appraisal of	variables involved (see General Appraisal of	variables involved (see General Appraisal of	variables involved (see General Appraisal of	variables involved (see General Appraisal of	variables involved (see General Appraisal of		commercial airlines due to the significant variables involved (see General Appraisal of	commercial airlines due to the significant variables involved (see General Appraisal of	variables involved (see General Appraisal of
			training the individual will require), airline policies on training in simulator versus live flight training, variables in	PBN/KNAV)	PBN/RNAV)	PBN/RNAV)	PBN/RNAV)	PBN/RNAV)	PBN/RNAV)	PBN/RNAV)	PBN/RNAV)	PBN/RNAV)	PBN/RNAV)	PBN/RNAV)		PBN/RNAV)	PBN/RNAV)	PBN/RNAV)
			aircraft performance, variables in on-board equipment and aircraft controls etc.															
Commercial airl	rlines Other costs	Initial Options	Other costs to commercial airlines may include updates to	Other costs to commercial airlines may	Other costs to commercial airlines may	Other costs to commercial airlines may	Other costs to commercial airlines may	Other costs to commercial airlines may	Other costs to commercial airlines may	Other costs to commercial airlines may	Other costs to commercial airlines may	Other costs to commercial airlines may	Other costs to commercial airlines may	Other costs to commercial airlines may		Other costs to commercial airlines may	Other costs to commercial airlines may	Other costs to commercial airlines may
		Appraisal: Qualitative	Flight Management Systems (FMS), navigation databases and operating procedures, increased pilot hire costs versus	Systems (FMS), navigation databases and	include updates to Flight Management Systems (FMS), navigation databases and		include updates to Flight Management Systems (FMS), navigation databases and	include updates to Flight Management Systems (FMS), navigation databases and	Systems (FMS), navigation databases and	include updates to Flight Management Systems (FMS), navigation databases and	include updates to Flight Management Systems (FMS), navigation databases and		Include updates to Flight Management Systems (FMS), navigation databases and	include updates to Flight Management Systems (FMS), navigation databases and		include updates to Flight Management Systems (FMS), navigation databases and	Include updates to Flight Management Systems (FMS), navigation databases and	include updates to Flight Management Systems (FMS), navigation databases and
			training etc. It is not proportionate for LILA to assess the 'other costs' to commercial airlines of flying RNAV	costs versus training etc. It is not	costs versus training etc. It is not	operating procedures, increased pilot hire costs versus training etc. It is not	costs versus training etc. It is not	operating procedures, increased pilot hire costs versus training etc. It is not	operating procedures, increased pilot hire costs versus training etc. It is not	operating procedures, increased pilot hire costs versus training etc. It is not	operating procedures, increased pilot hire costs versus training etc. It is not	costs versus training etc. It is not	operating procedures, increased pilot hire costs versus training etc. It is not	operating procedures, increased pilot hire costs versus training etc. It is not		operating procedures, increased pilot hire costs versus training etc. It is not	operating procedures, increased pilot hire costs versus training etc. It is not	operating procedures, increased pilot hire costs versus training etc. It is not
			procedures due to significant variables; some airlines may already be 'PBN ready' whereas others may not.	proportionate for LJLA to assess the 'other costs' to commercial airlines of flying RNAV	proportionate for LILA to assess the 'other costs' to commercial airlines of flying RNAV	proportionate for LILA to assess the 'other costs' to commercial airlines of flying RNAV	proportionate for LILA to assess the 'other costs' to commercial airlines of flying RNAV	proportionate for LILA to assess the 'other costs' to commercial airlines of flying RNAV	proportionate for LILA to assess the 'other costs' to commercial airlines of flying RNAV	proportionate for LJLA to assess the 'other costs' to commercial airlines of flying RNAV	proportionate for LILA to assess the 'other costs' to commercial airlines of flying RNAV	proportionate for LILA to assess the 'other costs' to commercial airlines of flying RNAV		proportionate for LJLA to assess the 'other costs' to commercial airlines of flying RNAV		proportionate for LJLA to assess the 'other costs' to commercial airlines of flying RNAV	proportionate for LJLA to assess the 'other costs' to commercial airlines of flying RNAV	
				procedures due to significant variables; some airlines may already be 'PBN ready' whereas	e procedures due to significant variables; some airlines may already be 'PBN ready' whereas	procedures due to significant variables; some airlines may already be 'PBN ready' whereas	procedures due to significant variables; some airlines may already be 'PBN ready' whereas	<ul> <li>procedures due to significant variables; some airlines may already be 'PBN ready' whereas</li> </ul>	procedures due to significant variables; some airlines may already be 'PBN ready' whereas		airlines may already be 'PBN ready' whereas	airlines may already be 'PBN ready' whereas		airlines may already be 'PBN ready' whereas		procedures due to significant variables; some airlines may already be 'PBN ready' whereas	procedures due to significant variables; some airlines may already be 'PBN ready' whereas others may not.	procedures due to significant variables; some airlines may already be 'PBN ready' whereas
Airport / Air		Initial Options	All options relate to the implementation of PBN and no	others may not. No additional infrastructure required (see	No additional infrastructure required (see	No additional infrastructure required (see		others may not. No additional infrastructure required (see	others may not. No additional infrastructure required (see	others may not. No additional infrastructure required (see	others may not. No additional infrastructure required (see	others may not. No additional infrastructure required (see	others may not. No additional infrastructure required (see	others may not. No additional infrastructure required (see		No additional infrastructure required (see	No additional infrastructure required (see	No additional infrastructure required (see
navigation servi provider	nce costs	Appraisal: Qualitative	additional infrastructure is required. The introduction of PBN reduces the reliance on infrastructure, in particular ground	High Level Appraisal of PBN/RNAV.	High Level Appraisal of PBN/RNAV.	High Level Appraisal of PBN/RNAV.	High Level Appraisal of PBN/RNAV.	High Level Appraisal of PBN/RNAV.	High Level Appraisal of PBN/RNAV.	High Level Appraisal of PBN/RNAV.	High Level Appraisal of PBN/RNAV.	High Level Appraisal of PBN/RNAV.	High Level Appraisal of PBN/RNAV.	High Level Appraisal of PBN/RNAV.		High Level Appraisal of PBN/RNAV.	High Level Appraisal of PBN/RNAV.	High Level Appraisal of PBN/RNAV.
			based navigation aids are no longer needed. The foundation for PBN is 'area navigation' or RNAV; aircraft arriving and															
			departing LILA using the proposed RNAV procedures will do so based on their performance based navigation capability.															
	-																	
Airport / Air navigation servi	operational vice costs	Appraisal: Qualitative	ICAO list Improved Operational Efficiency as a benefit delivered by the introduction of PBN. In general LILA predicts	uperational Costs are not predicted to vary b individual option.	Operational Costs are not predicted to vary by individual option.	Operational Costs are not predicted to vary by individual option.	Operational Costs are not predicted to vary b individual option.	y Operational Costs are not predicted to vary by individual option.	uperational Costs are not predicted to vary by individual option.	Operational Costs are not predicted to vary by individual option.	<ul> <li>Operational Costs are not predicted to vary by individual option.</li> </ul>	y Operational Costs are not predicted to vary by individual option.	Operational Costs are not predicted to vary b individual option.	V Operational Costs are not predicted to vary by individual option.		Operational Costs are not predicted to vary by individual option.	<ul> <li>Operational Costs are not predicted to vary by individual option.</li> </ul>	Operational Costs are not predicted to vary by individual option.
provider			that operational efficiency will improve and that there may be potential for a net reduction in operational costs. It is															
			expected that any change in operational costs will be the same regardless of which option is chosen. This will be															
Airport / Air	Destaura	Initial Cation	considered further at Full Options Appraisal stage.	Devicement costs are set a	Performant contract and	Deployment costs are the first	Deployment costs	Parloyment costs are not a	Deployment costs and an and an	Declosment costs are estat	Deployment costs are not a	Deployment costs are not a	Danisument costs and a list	Peolograph contract and a		Deployment costs are set a	Deployment costs	Declarment costs
navigation servi	vice costs	Appraisal: Qualitative	Deployment costs are attributable to the introduction of PBN/RNAV procedures rather than the individual IFP options		Deployment costs are not predicted to vary by individual option.	Deployment costs are not predicted to vary by individual option.	Deployment costs are not predicted to vary b individual option.	y Deployment costs are not predicted to vary by individual option.	individual option.	Deployment costs are not predicted to vary by individual option.	individual option.	y Deployment costs are not predicted to vary by individual option.	Deployment costs are not predicted to vary b individual option.	<ul> <li>Deployment costs are not predicted to vary by individual option.</li> </ul>		Deployment costs are not predicted to vary by individual option.	<ul> <li>Deployment costs are not predicted to vary by individual option.</li> </ul>	Deployment costs are not predicted to vary by individual option.
provider			themselves. Costs will include ATCO training and competency (based on understanding aircraft performance and ATC															
			procedures relating to RNAV), Aerodrome documentation and procedures updates (e.g. MATS Pt2 updates, chart															
			updates, payment to CAA, Procedure Validation and Simulator Costs).															
Safety Assessme	nent Safety		One benefit of the introduction of PBN is the improvement in	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant		Not Significant	Not Significant	Not Significant	Not Significant	Unacceptable impact on Hawarden Airport.	Not Significant	Not Significant MAP conflict with Manchester traffic managed	Not Significant
	Assessment	Appraisan: Qualitative	safety and in fact ICOA declare it as is one of the primary reasons for a state to implement PBN. An individual safety	vertical separation.	Conflict with Manchester IFPs to be managed through coordination with Manchester ACP	Conflict with Manchester MIRSI hold to be managed through coordination with	Conflict with Manchester MIRSI hold to be managed through coordination with	Multiple aircraft at different speeds managed tactically through vectoring, sequencing and	tactically through vectoring, sequencing and	Multiple aircraft at different speeds managed tactically through vectoring, sequencing and	Multiple aircraft at different speeds managed tactically through vectoring, sequencing and	Multiple aircraft at different speeds managed tactically through vectoring, sequencing and	MAP conflict with other aircraft on 27 Approach managed by hold located at WAL.	MAP conflict with other aircraft on 27 Approach managed by hold located at WAL.	MAP exits Controlled Airspace to the south and enters Hawarden ATZ/RMZ.	MAP conflict with other aircraft on 27 Approach managed by hold located at WAL.	through coordination with Manchester ACP	MAP conflict with Manchester traffic managed through coordination with Manchester ACP
			assessment has been carried out for each option but in general, LILA's intention to introduce RNAV approaches	through coordination with Manchester ACP	d development. Conflict with Hawarden traffic managed by	Manchester ACP development. Multiple aircraft at different speeds managed	Manchester ACP development. Multiple aircraft at different speeds managed	hold procedures. Conflict with Manchester 05 traffic maaged by		hold procedures. Conflict with Manchester MIRSI hold to be	nuia procedures.	Hund procedures.	Conflict with GA traffic managed by containment of IFPs in Controlled Airspace	Conflict with GA traffic managed by containment of IFPs in Controlled Airspace	MAP conflict with other aircraft on 27 Approach managed by hold located at WAL.	Conflict with GA traffic managed by containment of IFPs in Controlled Airspace	development.	development.
			delivers a safety benefit to the airport and its users.	development.	climb gradient requirement and minimum altitude waypoint.	tactically through vectoring, sequencing and hold procedures.	hold procedures.	alternative Transition 27 VEGUN (CCD5)	managed through coordination - thei Transition only used when Manchester on 05.	managed through coordination with Manchester ACP development.			(this is a pre-existing hazard, not unique to this option).	(this is a pre-existing hazard, not unique to this option).	Conflict with GA traffic managed by containment of IFPs in Controlled Airspace	(this is a pre-existing hazard, not unique to this option).		
						Conflict with SIDs managed by vertical separation.	Conflict with SIDs managed by vertical separation.		Conflict with SIDs managed by vertical separation.	Conflict with new hold for 09 Approach manged through altitude restrictions.				Conflict with transition procedures managed by vertical separation.	(this is a pre-existing hazard, not unique to this option).	Conflict with Manchester procedures manage by coordination with Manchester ACP	d	
																development.		

	Carry Forward		nificant impact, and is the Preferred Option for this procedure		
	Carry Forward		as an insignificant impact but is less attractive ore objectives or has a significant impact that cannot be	Original position of MAP and hold did not minimise track miles or noise for sensitive areas. Replaced by post engagement Approach	Position and orientation of the hold to keep aircraft over the sea reduces noise for this
	Reject	effectively mitigated		09 Option 3b with new hold over the sea.	procedure versus other options. Post Engagement
Group	Impact Noise Impact on health and quality of life	Level of Analysis Hittil Option Appraisal: Qualitative	High-back deparate for the introduction of PBI/IPAAV merror BNAV providences are predicted to reack noise reporter versus extra conventional procedures due to the clicitation of continuous colling/desarg profiles and parallels to deliver these characteristics and sch Option has possible to deliver these characteristics and sch Option has been asseed to detive three characteristics and sch Option has been asseed to detive three characteristics and sch Option has parallels to deliver three characteristics and sch Option has parallels to deliver three characteristics and sch Option has parallels to deliver three characteristics and sch Option parallel and an exact and a sch option three characteristics and parallels and a sch option three sch parallels (sch option parallel). The exact and the sch option three sch options has also been included.	Approach (90 option 3 Hears at optimum aircraft profomance and with contrust, descent profile to minimise routine) (1990) and the second second second second member of schools in residential areas of Hearsail and Belleging and the second second second missel approach procedure routes in the missel in the second to reproduce the second missel in the second to reproduce the second to reproduce the second missel in the second to reproduce the second to reproduce the second missel in the second to reproduce the second to reproduce the second missel in the second to reproduce the second to reproduce the second missel in the second to reproduce the second to reproduce the second missel in the second to reproduce the second to reproduce	Another the Control Table Cont
Communities	Air Quality	inital Optioni Appraisal: Qualitative	Most of the area sensorial LAA within an Air Cashing Management Kee (ALAM) and the airgorth ta partnered with Liverpool Chy Council (LCC) the mesure AC for over 10 with Liverpool Chy Council (LCC) the mesure AC for over 10 mesors are the sensorial of the mesore and the sensorial and no changes are expected as no changes to the baseline are change in an equality is predicted. Alcoratic currently desceed expected below 2000 for any of the optics, therefore no changes are expected as no changes to the baseline are track as they do currently. One of the stated beams of the introduction of RAW procedures in reduced environmental impact date is part to do the stated beams of the introduction of the MM procedures. But have been the taxes are exacts procedures but this will be tested always the full quality.	No change to familier	No change to baseline
Wider Society	Greenhouse Gas Impact	Initial Options Appraisal: Qualitative	Reduced environmental impact is one of the benefits listed by (KAO of tendoscing PRIA and MAN flight procedures. The Options have been associated individually adversarial through optionum alicraft configuration (angine power strong), and of controls clinical strong (angine, plant of shorts practical routes etc. In genral, the introduction of shorts practical routes etc. In genral, the introduction of shorts practical routes etc. In genral, the introduction and NAW flight procession is practical for shorts and environmental impact ower examt ground/equipment based mangation procedures.	The procedure incorporates a continuous descent profiles, to be flown at optimum data of performance and origonational Boother and the procedure and the analysis of the Procedure roads the aircraft stad to the re- join the approach produce which is a grant dataset than the current hold. The MP is an emigrancy ray assumption and the procedure address stade, but by its nature may require maximum approximation.	The procedure incorporates a continuous descent profile, to be flows at optimum about participants and organisms that and the profile of the start of the start represents the minimum number of track minimum. The content is further than the current conventional the particule, the build on the two participants and procedure stable on current conventional the particule, the start conventional the particule and and the start of the start o
Wider Society	Capacity and resilience	Initial Options Appraisal: Qualitative	Cenerally, the introduction of PBN is based on delivering benefits in terms of increasing airspace capacity leading to more predictable routes, fewer one ground and in air delays experienced by airlines. The completion of the entire route from airport to desitantion via PBN iscals to a more effective route structure. The implementation of PBN is currently the highest priority for the global availant community.	The procedure has been designed to integrate with the en-route structure.	No change to baseline
General Aviation	Access	Initial Options	No change to existing airspace arrangements. Procedure	No change to existing airspace arrangements.	No change to existing airspace arrangement
General Aviation /		Appraisal: Qualitative	wholly contained within estant CAS; no charge to GA access to airspace. GA user of LLA will continue to arrive and depart under estant operational arrangements. Access to the runway may be slightly improved us a reduction in on- ground and in air delays brought about by the introduction of PBN. Generality, the introduction of PBN is based on delivering	Procedure wholly contained within extant CAS; no change to GA access to airspace. GA users of LLA. will continue to arrive and depart under extant operational arrangements. This is a PBN/RNAV procedure and contributes	Procedure wholly contained within extant C no change to GA access to airspace. GA user of ULA will conticue to arrive and depart under extant operational arrangements. This is a PBN/RNAV procedure and contribut
General Aviation /	Economic Impact from Increased effective capacity	intal Opioni Appraisal: Qualitative	Leadership, the introduction drawn is called on longering (Leadership), the introduction drawn is called on once predictable routes, here on ground and in all datas experiments of particles. This may have an economic benefit transport moments, passenger numbers and cargo tomoger transport moments, passenger numbers and cargo tomoger accounts banefit is constructed at sites sub- table of the second states of the second states of the procedures as any increase in individual aritime capacity with the net proportionate for LLA to assess the economic banefit to the LA community however they may excited the movement which is predicted to lead to reduced on ground and in all addys for all users shich may have a positive impact on GA-costs.	In the a new year of proceeds where including increased effective cases where the proceeds of the reservent effective cases which is pretected to have direct and indirect economic benefits for airlines and general aviation.	In the dense of the proceeding source of the
General Aviation / commercial airlines	Fuel burn	Initial Options Appraisal: Qualitative	Each option has been assessed against other options based on whether any factors of the disgin partic contribute to increased frue barn. In general the introduction of NMV procedures and associated proficiability of racks, continuous climb/descent, reduction in tactical intervention is predicted to result in reduced fuel burn versus the baseline.	Rown at optimum aircraft performance and with continuous decrent profile noniminise fuel burn. Represents shortest route for this procedure.	Fiom at optimum aircraft performance and with continuous decent profile to minimize field burn. Represents shortest route for this procedure although possible increased fuel burn for the mised approach procedure to reach new hold over the sea. The MAP is an emergency procedure requiring maximum engine power settings but it is typically rare used.
Commercial airlines	Training costs	Initial Options Appraisal: Qualitative	It is expected that Pilo/Crew Yraining will be required to enable pilot to flight the new NRW procedures. It is not enable pilot to flight the new NRW procedures. It is not proportionate for UCA to assess training costs for ideal/dual c.g. number of glicits, requiring training former may already be competent, variables in pilot competence, drawates in national pilot model will require already usables in an acraft performance, variables in on beard equipment and acraft between the training formation and the pilot model of the acraft performance, variables in on beard equipment and acraft performance.	R is expected that Plot/Crew Training will be required to anable pilots to flight the new NetWy procedures. It is not proportionate for LLA to assess training costs for individual commercial alined as the significant writable: Involved (see General Appraisal of PBN/RNAV)	It is expected that Pilot/Crew Training will b required to enable pilots to flight the new RNW procedures. It is not proportionate for LLA to assess training costs for individual commercial alitotics due to the significant variables involved (see General Appraisal of PBN/RNAV)
Commercial airlines		Initial Options Appraisal: Qualitative	Other costs to commercial airlines may include updates to Flight Management (Systems (FMG), metalization databases and operating gacnetiums, increased pilot hare costs versus training dir. It is not proportionate for LIA to assess the "other costs" to commercial airlines of thrug RNW procedures due to aggintizent variables; com airlines may aiready be 'PBN ready' whereas others may not.	Other costs to commercial airlines may include updates to Flight Maragement Systems (FMS), avagetion databases and operating procedures, increased pilot hire costs versus training etc. It is not proportionate for LIA. to assess the 'other production out to significant variables; some airlines may already be 'PBN ready' whereas others may not.	Other costs to commercial airlines may include updates to Flight Management systems (FMS), any adjoint databases and operating procedures, increased pilot hard proportionate for LLIA be assess the 'other costs' to commercial airlines of flying RNAU procedures due to significant variables; son airlines may already be 'BBN ready' wherea others may une.
Airport / Air navigation service provider	Infrastructure	Initial Options Appraisal: Qualitative	Al options relate to the implementation of PBN and no additional infrastructure is required. The introduction of PBN reduces the reliance on infrastructure, in particular ground based navigation dias are no longer needed. The foundation for PBN is area navigation or RNAY, aircraft arriving and departing LLA using the proposed RNAY procedures will do so based on their performance based navigation capability.	No additional infrastructure required (see High Level Appraisal of PBN/RNAV.	No additional infrastructure required (see High Level Appraisal of PBN/RNAV.
navigation service provider	Operational costs	Initial Options Appraisal: Qualitative	ICAO list improved Operational Efficiency as a benefit delivered by the introduction of PBN. In general LILA predicts that operational efficiency will improve and that there may be potential for a net reduction in operational costs. It is waperted that any change in operational costs will be the same regardless of which oppoin a chosen. This will be considered further at Full Options Apprairal stage.	Operational Costs are not predicted to vary by individual option.	individual option.
navigation service provider	Deployment costs	Initial Options Appraisal: Qualitative	Depoyment costs are attributable to the introduction of PMN/NWU procedures: naher than the individual IPP options themselves. Costs will include ATCD training and competency (based on understanding aircraft performance and ATC procedures relations to PMN/). Aerodome documentation and procedures inplastics (e.g. MATS PR2 updates, chart updates, payment to CAP, Procedure Validation and Simulator Costs).	Deployment costs are not predicted to vary by individual option.	individual option.
Safety Assessment	Safety Assessment	Initial Options Appraisal: Qualitative	One benefit of the introduction of PBN is the improvement in safety and in fact ICOA declare it as is one of the primary reasons for a state to implement PBN. An individual safety assessment has been carried out for each option but in general, LLA's intention to introduce RNAV approaches delivers a safety benefit to the airport and its users.	Not Significant MAP conflict with Manchester traffic managed through coordination with Manchester ACP development.	Not Significant New proposed hold conflicts with DIOLIF 09 transition managed by alltitude restrictions o the transition.