



East Anglia THREE

Appendix 15.1

Annex 3

Navigational Risk Assessment MGN Checklist Document Reference – 6.3.15 (1d)

Author – Anatec Limited East Anglia THREE Limited Date – November 2015 Revision History – Revision A



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MCA MGN 371 Checklist East Anglia THREE Offshore Windfarm Appendix 15.1 Annex 3 MGN Checklist

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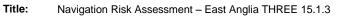




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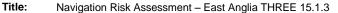


1. Introduction

1. This Appendix presents the Marine Coastguard Agency (MCA) checklist based on the requirements set out in Marine Guidance Note (MGN) 371 which was the guidance set by the MCA during the NRA preparation.

2. Reference notes/remarks are made within the table based on which sections of the Navigational Risk Assessment (NRA), or other documents, address the issue noted in the MGN 371 checklist.

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2. MGN 371 Compliance Checklist

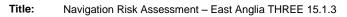
Table 1 MGN 371 Compliance Checklist for the Proposed East Anglia THREE Windfarm

Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks	
Annex 1 : Considerations on Site Position, Structures and Safety Zones				

1. Site and Installation Co-ordinates: Developers are responsible for ensuring that formally agreed variations in the co-ordinates of site perimeters and individual OREI structures are made available, on request, to interested parties at all project stages, including application for consent, development, array variation, operation and decommissioning. This should be supplied as authoritative Geographical Information System (GIS) data, preferably in Environmental Systems Research Institute (ESRI) format. Metadata should facilitate the identification of the data creator, its date and purpose, and the geodetic datum used. For mariners' use, appropriate data should also be provided in latitude/ longitude formats.

2. Traffic Survey	2. Traffic Survey				
All vessel types	✓	Section 10: Maritime Traffic Surveys – 10.2: Survey Details & Section 13: Validation Survey 2014. Tracking of all vessel types was achieved by recording AIS and Radar data.			
Four weeks duration, within 12 months prior to submission of the Environmental Statement	V	Section 10: Maritime Traffic Surveys – 10.2: Survey Details & Section 13: Validation Survey 2014. Baseline Survey period comprised 30 days AIS/Radar survey from September 2012 to May 2013, as detailed in Section 10.2. Validation Survey period comprised 10 days AIS/Radar survey from January/February 2014.			
Seasonal variations	✓	Section 10: Maritime Traffic Surveys – 10.2: Survey Details & Section 13: Validation Survey 2014. Surveys have been carried out in Autumn (September 2012), spring (May 2013), summer			

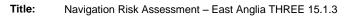
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Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
			(July/August 2013) and winter
			(January/February 2014), to
			take account seasonal
			variations in traffic patterns.
Recreational and fishing vessel	✓		Section 10: Maritime Traffic
organisations			Surveys & Section 13:
			Validation Survey 2014.
			Periods and seasonal
			variations of data used in the
			Maritime Traffic Surveys were
			chosen following consultation
			with representative recreational
			and fishing vessel
			organisations, as well as
			analysis of fishing data.
Port and navigation authorities	✓		Section 10: Maritime Traffic
			Surveys & Section 13:
			Validation Survey 2014.
			Periods and seasonal
			variations of data used in the
			Maritime Traffic Surveys were
			chosen following consultation
			with port and navigation authorities.
Δς	sessm	ent	authornies.
a. Proposed OREI site relative to	<u>√</u>		Section 11: Survey Analysis
areas used by any type of marine			& Section 13: Validation
craft.			Survey 2014.
			Summarises the results of the
			Maritime Traffic Surveys.
			Section 15: Recreational
			Craft Activity.
			Examines recreational vessel
			activity in the area based on the
			Maritime Traffic Survey and
			available desktop information.
			Section 16: Commercial
			Fishing Vessel Activity.
			Reviews fishing vessel activity
			in the area based on the
			Maritime Traffic Surveys.
			Section 18: Future Case
			Commercial Vessel Routeing.
			Considers the impact on

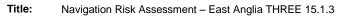
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Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
			commercial shipping navigation
			based on the Maritime Traffic
			Surveys.
b. Numbers, types and sizes of	✓		Section 10: Maritime Traffic
vessels presently using such areas			Surveys.
			Summarises the results of the
			Maritime Traffic Surveys,
			including the numbers (Section
			11: Survey Analysis), types
			(11.2: Survey Data by Vessel
			Type) and sizes (11.3: Vessel
			Size) of vessels.
			Section 15: Recreational
			Craft Activity.
			Examines recreational vessel
			activity in the area based on the
			Maritime Traffic Survey and
			available desktop information.
			Section 16: Commercial
			Fishing Vessel Activity.
			Reviews fishing vessel activity
			in the area based on the
			Maritime Traffic Surveys.
c. Non-transit uses of the areas, e.g.	✓		Section 15: Recreational
fishing, day cruising of leisure craft,			Vessel Activity.
racing, aggregate dredging, etc.			Examines recreational vessel
			activity in the area based on the
			Maritime Traffic Survey and
			available desktop information.
			Section 16: Commercial
			Fishing Vessel Activity.
			Reviews fishing vessel activity
			in the area based on the
			Maritime Traffic Surveys.
			Section 7: Existing
			Environment – 7.8:
			Aggregates Dredging Areas.
			Investigates the proximity of the
			site to marine aggregate
			dredging areas.
			Section 11: Survey Analysis –
			11.2: Survey Data by Vessel
			Type.
			Examines other operational
			vessel activity, including

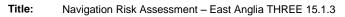
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Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
			aggregates dredgers, based on the Maritime Traffic Surveys. Section 7: Existing Environment – 7.11: Ship to Ship Transfers and Section 20: Offshore Cable Corridor Maritime Traffic Survey– 20.4: Offshore Cable Corridor Anchored Vessels. Investigates ship to ship oil transfers in the area.
d. Whether these areas contain	√		Section 11: Survey Analysis.
transit routes used by coastal or deep-draught vessels on passage.			Determines whether these areas contain transit routes used by coastal or deepdraught vessels on passage, by examination of draught details in Maritime Traffic Survey data.
e. Alignment and proximity of the site relative to adjacent shipping lanes	V		Section 11: Survey Analysis, and Section 18: Future Case Commercial Vessel Routeing. Studies alignment and proximity of the site relative to adjacent shipping lanes, by analysis of Maritime Traffic Survey data.
f. Whether the nearby area contains prescribed routeing schemes or precautionary areas	✓		Section 7: Existing Environment – 7.2: IMO Routeing Measures. States whether the area contains prescribed routeing schemes or precautionary areas, from analysis of Hydrographic Charts.
g. Whether the site lies on or near a prescribed or conventionally accepted separation zone between two opposing routes	✓		Section 7: Existing Environment – 7.2: IMO Routeing Measures. States whether the site lies on or near a prescribed or conventionally accepted separation zone between two opposing routes, from analysis of Hydrographic Charts.

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Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
h. Proximity of the site to areas used for anchorage, safe haven, port approaches and pilot boarding or landing areas.	V		Section 7: Existing Environment – 7.4: Charted Anchorage Areas and Section 20: Offshore Cable Corridor Maritime Traffic Survey–20.4: Offshore Cable Corridor Anchored Vessels. Examines the proximity of the site to areas used for anchorage, from analysis of Hydrographic Charts and AIS data Section 7.3: Navigational Aids. Examines the proximity to pilot boarding or landing areas, from analysis of Hydrographic Charts.
i. Whether the site lies within port limits, etc. jurisdiction of a port and/or navigation authority.	√		Section 7: Existing Environment – 7.5: Ports. Examines whether the site lies within the limits of jurisdiction of a port and/or navigation authority, by information from Hydrographic Charts.
j. Proximity of the site to existing fishing grounds, or to routes used by fishing vessels to such grounds.	✓		Section 16: Commercial Fishing Vessel Activity. Reviews the fishing vessel activity at the site based on the maritime traffic surveys.
k. Proximity of the site to offshore firing/bombing ranges and areas used for any marine military purposes.	✓		Section 7: Existing Environment – 7.7: Ministry of Defence (MOD) Exercise Areas and Explosives Dumping Grounds – Water Based. Analysis of SeaZone Hydrographic GIS files and Hydrographic Charts to determine proximity to military areas.

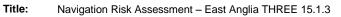
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Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
I. Proximity of the site to existing or proposed offshore oil / gas platform, marine aggregate dredging, marine archaeological sites or wrecks, or other exploration/exploitation sites	✓		Section 7: Existing Environment – 7.6: Oil and Gas Infrastructure. Uses GIS files from Oil & Gas UK Deal to assess proximity to oil / gas platforms, wells, license blocks and fields. Section 7: Existing Environment – 7.8: Marine Aggregates Dredging Areas. Analyses GIS files from the Crown Estate to determine proximity to marine aggregate dredging sites.
m. Proximity of the site relative to any designated areas for the disposal of dredging spoil	V		Not applicable.
n. Proximity of the site to aids to navigation and/or Vessel Traffic Services (VTS) in or adjacent to the area and any impact thereon.	V		Section 7: Existing Environment – 7.3: Navigational Aids. Examined Hydrographic Charts and Admiralty Sailing Directions NP28 for positions of navigational aids and to determine proximity to VTS.
o. Researched opinion using computer simulation techniques with respect to the displacement of traffic and, in particular, the creation of 'choke points' in areas of high traffic density.	•		Section 23: Allision and Collision Risk Modelling Overview, Section 24: Base No Windfarm Model Results, Section 25: Future Case No Windfarm and Section 26: Future Case with Windfarm. Used computer simulation techniques to assess present-day vessel activity and future-case with windfarm activity, with vessels being displaced following construction. Examined encounters, vessel-to-vessel collisions, vessel allision with structure, fishing vessel allision.

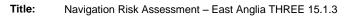
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Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
p. Type(s) of simulation used in	√		Section 23: Allision and
analysis Limitation of system(s)			Collision Risk Modelling
			Overview and Appendix D:
			Risk Models Overview.
			Discusses simulations used in
			the analysis. All the quantified
			risk assessments were carried
			out using Anatec's COLLRISK
			software which conforms to the
			DECC methodology as outlined
			in Annex D3 in the Guidance. In
			line with this, Anatec makes the
			declaration that the models
			used within this work have
			been validated and are
			appropriate for the intended
			use.
	REI St	ructui	
a. Whether any features of the OREI,	✓		Section 3: Project Details -
including auxiliary platforms outside			3.3: Structure Details.
the main generator site and cabling to			Outlines the Rochdale
the shore, could pose any type of			Envelope, including the number
difficulty or danger to vessels			of OREI structures and auxiliary
underway, performing normal			platforms. 3.4: Offshore Cable
operations, or anchoring.			Corridor. Examines options for
			cabling to shore. Section 18: Future Case
			Commercial Vessel Routeing.
			Considers the impact of the
			OREI on vessels steaming on
			passage.
			Section 15: Recreational
			Vessel Activity:
			Assesses the impact of the
			OREI on vessels engaged in
			recreational activities.
			Section 16: Commercial
			Fishing Vessel Activity:
			Assesses the impact of the
			OREI on vessels engaged in
			fishing or transiting to fishing
			grounds.
			Section 26: Future Case With
			Wind Farm Risk (Base Case).
			Assesses the impact that the

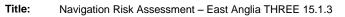
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Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
			OREI will have upon vessel-to-
			vessel collisions, vessel allision
			with structure (powered and
			drifting) fishing vessel allisions
			and recreational vessel
			allisions.
			26.5: Risk Results Summary
			and 26.6 Consequences.
			Present a summary of results
			from modelling used to assess
			whether any features of the
			OREI could pose any type of
			difficulty or danger to vessels
			underway, performing normal
			operations, or anchoring.
Clearances of wind turbine blades	✓		Section 3: Project Details -
above the sea surface not less than			3.3: Structure Details.
22 metres			Minimum clearances between
			sea level conditions at MHWS
			and wind turbine rotors will be
			not less than 22m and will meet
			MCA guidance.
Least depth of current turbine blades	✓		Not applicable.
The burial depth of cabling	✓		Section 20: Offshore Cable
			Corridor Maritime Traffic
			Survey – 20.5 Effects for
			Offshore Cable Corridor.
			Assessment of cable route.
			Cables will be buried /
			protected appropriately taking
			into account fishing and
			anchoring practices.
b. Whether any feature of the	✓		Section 21: Emergency
installation could create problems for			Response.
emergency rescue services, including			Determines whether any
the use of lifeboats, helicopters and			feature of the installation could
emergency towing vessels (ETVs)			create problems for emergency
			rescue services.
			21.1 Search and rescue.
			Assesses SAR helicopter
			assets and RNLI lifeboat
			stations in the vicinity, and
			response times to the site.
			Determines whether the

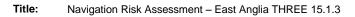
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Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
			installation could create problems for SAR helicopters and lifeboats. 21.2: Salvage and Towing. Examines options for salvage in the vicinity of the site. 21.3: Emergency Response Co-operation Plan (ERCoP) Examines features to be incorporated to ERCoP. 21.4:Marine Pollution and Counter Pollution Examines options for pollution response in vicinity of the site.
c. With respect to specific OREI devices, how rotor blade rotation, other exposed moving mechanical parts and/or power transmission, etc., will be controlled by the designated services when this is required in an emergency.	✓		Response in vicinity of the site. Section 21: Emergency Response – 21.3: Emergency Response Co-operation Plan (ERCoP). States that EAOW will meet the MCA's requirements in terms of standards and procedures for generator shutdown and other operational requirements in the event of this being required in an emergency.
4. Assessment of Access to and Na determine the extent to which navigation by asset	on wou	ıld be f	thin, or Close to , an OREI: To easible within the OREI site itself
a. Navigation within or close to the site would be safe:	20119		
 i. by all vessels, or ii. by specified vessel types, operations and/or sizes. iii. in all directions or areas, or iv. in specified directions or areas. v. in specified tidal, weather or other conditions 	✓ ✓ ✓ ✓ ✓ ✓		Section 18: Future Case Commercial Vessel Routeing. Assesses whether navigation within or close to the site would be safe for commercial vessels. Section 15: Recreational Craft Activity. Assesses whether navigation within or close to the site would be safe for recreational vessels, including passing between turbines. Section 16: Commercial Fishing Vessel Activity.

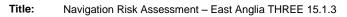
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Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
			Assesses whether navigation within or close to the site would be safe for fishing vessels, including passing between turbines and allision risk modelling. Section 25: Future Case No Windfarm & Section 26: Future Case with Windfarm. Uses a variety of models to assess whether navigation within or close to the site would be safe for all vessels. The models take into account tidal and weather conditions.
b. Navigation in and/or near the site should be:			
i. prohibited by specified vessels types, operations and/or sizes. ii. prohibited in respect of specific activities, iii. prohibited in all areas or directions, or iv. prohibited in specified areas or directions, or v. prohibited in specified tidal or weather conditions, or simply vi. Recommended to be avoided.	> > > > > > >		Section 18: Future Case Commercial Vessel Routeing. Assesses whether navigation within or close to the site should be prohibited or recommended to be avoided by commercial vessels. Section 15: Recreational Craft Activity Assesses whether navigation within or close to the site should be prohibited or recommended to be avoided by recreational vessels. Section 16: Commercial Fishing Vessel Activity. Assesses whether navigation within or close to the site should be prohibited or recommended to be avoided by fishing vessels. Section 24: Base Case No Windfarm, Section 25: Future Case No Windfarm and Section 26: future Case with Windfarm. Uses a variety of models to assess whether navigation

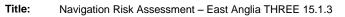
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Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
			within or close to the site
			should be prohibited or
			recommended to be avoided by
			all vessels. The models take
			into account tidal and weather
			conditions.
c. Exclusion from the site could cause	✓		Section 18: Future Case
navigational, safety or routeing			Commercial Vessel Routeing.
problems for vessels operating in the			Assesses whether exclusion
area. eg by causing a vessel or			from the site could cause
vessels to follow a less than optimum			navigation, safety or routeing
route			problems for commercial
			vessels operating in the area.
			Section 15: Recreational
			Craft Activity.
			Assesses whether exclusion
			from the site could cause
			navigation, safety or routeing
			problems for recreational
			vessels operating in the area.
			Section 16: Fishing Vessel
			Activity.
			Assesses whether exclusion from the site could cause
			navigation, safety or routeing
			problems for fishing vessels
Relevant information concerning a	√		operating in the area. Section 4: Embedded
decision to seek a "safety zone" for a			Mitigations.
particular site during any point in its			Presents relevant information
construction, operation or			concerning a decision to seek a
decommissioning should be specified			'safety zone' for the Project
in the Environmental Statement			during any point in its
accompanying the development			construction, operation or
application			decommissioning.
Annex 2 : Navigation, collisi			
	l Strea	ms : It	should be determined whether:
i. Current maritime traffic flows and	✓		Section 3: Project
operations in the general area are			Description – 3.2: East Anglia
affected by the depth of water in			THREE Boundary.
which the proposed installation is			States the depth of water in
situated at various states of the tide			which the proposed installation
i.e. whether the installation could			is situated.
pose problems at high water which			Section 8: Metocean Data -

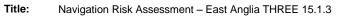
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Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
do not exist at low water conditions,			8.4: Tide.
and vice versa.			Examines various states of the
			tide in the area.
			Section 11: Survey Analysis
			and Section 13: Validation
			Survey 2014:
			Assesses current maritime
			traffic flows and operations in
			the general area. Surveys
			accounted for a range of tidal
			conditions.
			Section 24: Base Case No
			Windfarm, Section 25: Future
			Case No Windfarm and
			Section 26: future Case with
			Windfarm.
			Models take into account tides
			in the vicinity.
ii. The set and rate of the tidal	√		Section 8: Metocean Data -
stream, at any state of the tide, has a	,		8.4: Tide.
significant effect on vessels in the			Examines various states of the
area of the OREI site.			tide in the area.
area or the Orter site.			Section 24: Base Case No
			Windfarm, Section 25: Future
			Case No Windfarm and
			Section 26: future Case with
			Windfarm.
			Models take into account tides
			in the vicinity.
iii. The maximum rate tidal stream	√		Section 8: Metocean Data –
runs parallel to the major axis of the			8.4: Tide.
proposed site layout, and, if so, its			Assesses tidal streams in the
effect.			area.
iv. The set is across the major axis of	✓		Section 8: Metocean Data -
the layout at any time, and, if so, at			8.4: Tide.
what rate.			Assesses tidal streams in the
			area.
v. In general, whether engine failure	✓		Section 8: Metocean Data -
or other circumstance could cause			8.4: Tide.
vessels to be set into danger by the			Assesses tidal streams in the
tidal stream.			area.
			Section 24: Base Case No
			Windfarm, Section 25: Future
			Case No Windfarm and

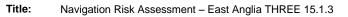
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Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
			Section 26: future Case with
			Windfarm.
			Drifting vessel allision models
			take into account tides in the
			area.
			Section 15: Recreational
			Craft Activity – 15.6:
			Recreational Vessel Blade
			and Mast Allision.
			Assesses whether machinery
			failure could cause recreational
			vessels to be set into danger.
vi. The structures themselves could	✓		Section 8: Metocean Data -
cause changes in the set and rate of			8.5:Potential Effects on
the tidal stream.			Waves and Tidal Streams.
			Summarises study to assess
			changes in the set and rate of
			the tidal stream.
vii. The structures in the tidal stream	✓		Section 8: Metocean Data -
could be such as to produce siltation,			8.6: Sedimentation/Scouring
deposition of sediment or scouring,			Impacting Navigable Water
affecting navigable water depths in			Depths in the Area.
the wind farm area or adjacent to the			Summarises study to assess
area			potential for siltation, deposition
			of sediment or scouring,
			affecting navigable water
			depths in the wind farm area or
			adjacent to the area.
2. Weather: It show	uld be	determ	
i. The site, in normal, bad weather, or	✓		Section 8: Metocean Data
restricted visibility conditions, could			Presents Metocean statistics in
present difficulties or dangers to craft,			the area.
including sailing vessels, which might			Section 11: Survey Analysis
pass in close proximity to it.			and Section 13: Validation
			Survey 2014:
			Assesses routeing of vessels
			which might pass in close
			proximity to the site.
			Section 18: Future Case
			Commercial Vessel Routeing.
			Assesses whether the site in
			normal, bad weather or
			restricted visibility conditions
			could present difficulties or

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Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
			dangers to commercial vessels
			which might pass in close
			proximity to it.
			Section 15: Recreational
			Craft Activity
			Assesses whether the site in
			normal, bad weather or
			restricted visibility conditions
			could present difficulties or
			dangers to sailing vessels
			which might pass in close
			proximity to it.
			Section 16: Commercial
			Fishing Vessel Activity.
			Assesses whether the site in
			normal, bad weather or
			restricted visibility conditions
			could present difficulties or
			dangers to fishing vessels
			which might pass in close
			proximity to it.
			Section 24: Base Case No
			Windfarm, Section 25: Future
			Case No Windfarm and
			Section 26: future Case with
			Windfarm.
			Models take into account
			weather in the vicinity.
ii. The structures could create	✓		Section 15: Recreational
problems in the area for vessels			Vessel Activity– 15.5:
under sail, such as wind masking,			Impacts of Structures on
turbulence or sheer.			Wind Masking/Turbulence or
			Sheer.
			Assesses whether wind
			masking, turbulence or sheer
			could create problems in the
	<u> </u>		area for vessels under sail.
iii. In general, taking into account the	✓		Section 24: Base Case No
prevailing winds for the area, whether			Windfarm, Section 25: Future
engine failure or other circumstances			Case No Windfarm and
could cause vessels to drift into			Section 26: future Case with
danger, particularly if in conjunction			Windfarm.
with a tidal set such as referred to in			Drifting Vessel Allision. Model
2.1 (v) above			assesses whether vessels
. ,			could drift into danger.

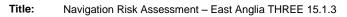
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Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
3. Visual Navigation and Collision	Avoida	nce: It	should be determined whether:
i. The structures could block or hinder	✓		Section 27: Communication
the view of other vessels under way			and Position Fixing – 27.11:
on any route.			Effects on Visual
			Collision/Allision Avoidance.
			Assesses whether the
			structures could block or hinder
			other vessels' view.
ii. The structures could block or	✓		Section 27: Communication
hinder the view of the coastline or of			and Position Fixing – 27.11:
any other navigational feature such			Effects on Visual
as aids to navigation, landmarks,			Collision/Allision Avoidance.
promontories, etc			Assesses whether the
			structures could block or hinder
			the view of navigational aids or
			landmarks.
4. Communications, Radar and Po	sitioni	ing Sys	stems: To provide researched
opinion of a generic and, where approp			
i. The structures could produce radio	√		Section27: Communication
interference such as shadowing,			and Position Fixing - 27.1
reflections or phase changes, with			Impact of Marine Radar, 27.2:
respect to any frequencies used for			VHF Communications
marine positioning, navigation or			(including DSC), 27.3: VHF
communications, including Automatic			Direction Finding, 27.4:
Identification Systems (AIS), whether			Navtex Systems, 27.4: AIS,
ship borne, ashore or fitted to any of			27.6: GPS, 27.7:Structures
the proposed structures.			and Generators affecting
			Sonar Systems in Area and
			27.8: Electromagnetic
			interference on Navigation
			Equipment:
			Assesses impact of structures
			upon VHF communications,
			Navtex, VHF direction finding,
			AIS, GPS, Sonar Systems and
			electromagnetic interference on
			Navigation Equipment.
ii. The structures could produce radar			Section27: Communication
reflections, blind spots, shadow areas			and Position Fixing – 27.1
or other adverse effects:			Impact of Marine Radar
a. Vessel to vessel;	✓		Determines whether the
b. Vessel to shore;	✓		structures could produce Radar
c. VTS radar to vessel;	✓		reflections, blind spots, shadow
d. Racon to/from vessel.	✓		areas or other adverse effects,

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Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
			including an assessment of the
			impacts on vessels using the
			DWRs.
iii. The OREI, in general, would	✓		Section27: Communication
comply with current			and Position Fixing – 27.8:
recommendations concerning			Electromagnetic interference
electromagnetic interference.			on Navigation Equipment:
			Noted that the OREI would
			comply with current
			recommendations concerning
			electromagnetic interference.
iv. The structures and generators	✓		Section27: Communication
might produce sonar interference			and Position Fixing -
affecting fishing, industrial or military			27.7:Structures and
systems used in the area.			Generators affecting Sonar
			Systems in Area
			Indicates no evidence has been
			found regarding sonar
			interference.
v. The site might produce acoustic	✓		Section27: Communication
noise which could mask prescribed			and Position Fixing – 27.9:
sound signals.			Noise Impact.
			Determines acoustic noise
			masking sound signals from the
vi. Generators and the seabed	√		site. Section27: Communication
cabling within the site and onshore	•		and Position Fixing – 27.8:
might produce electro-magnetic fields			Electromagnetic Interference
affecting compasses and other			on Navigation Equipment.
navigation systems.			States no impact is anticipated.
5. Marine Navigational M	l Iarkind	u · It ch	
i. How the overall site would be	√	, 1031	Section 5: Marine
marked by day and by night taking			Navigational Markings.
into account that there may be an			Outlines how the overall site
ongoing requirement for marking on			will be marked.
completion of decommissioning,			
depending on individual			
circumstances.			
ii. How individual structures on the	√		Section 5: Marine
perimeter of and within the site, both			Navigational Markings – 5.3:
above and below the sea surface,			Marking of Individual
would be marked by day and by			Structures and 5.4: Proposed
night.			Markings.
			Describes how individual

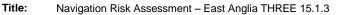
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Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
			structures will be marked.
iii. If the specific OREI structure would be inherently radar conspicuous from all seaward directions (and for SAR and maritime surveillance aviation purposes) or would require passive enhancers	✓		Large surface structures, therefore not applicable.
iv. If the site would be marked by one or more radar beacons (Racons)	V		Section 5: Marine Navigational Markings. Describes marking of site. Any additional Aids to Navigation, such as Racons, will be agreed in consultation with Trinity House once the final wind turbine layout has been selected.
v. If the site would be marked by an Automatic Identification System (AIS) transceiver, and if so, the data it would transmit.	V		Section 5: Marine Navigational Markings. Describes marking of site. Any additional Aids to Navigation will be agreed in consultation with Trinity House once the final wind turbine layout has been selected.
vi. If the site would be fitted with a sound signal, and where the signal or signals would be sited	✓		Section 5: Marine Navigational Markings. Describes marking of site. Any additional Aids to Navigation will be agreed in consultation with Trinity House once the final wind turbine layout has been selected.
vii. If the structure(s) would be fitted with aviation marks, and if so, how these would be screened from mariners or potential confusion with other navigational marks and lights resolved	√		Section 5: Marine Navigational Markings – 5.4: Proposed Markings. Considers aviation marks.
viii. Whether the proposed site and/or its individual generators would comply in general with markings for such structures, as required by the relevant General Lighthouse Authority (GLA) or recommended by	√		Section 5: Marine Navigational Markings. Considers compliance with markings as required by GLA / MCA.

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Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
the Maritime and Coastguard			
Agency, respectively.			
ix. The aids to navigation specified by	✓		Section 5: Marine
the GLAs are being maintained such			Navigational Markings – 5.5:
that the 'availability criteria', as laid			Superintendence and
down and applied by the GLAs, is			Management.
met at all times. Separate detailed			Considers markings as required
guidance is available from the GLAs			by GLA.
on this matter.			
x. The procedures that need to be put	✓		Section 5: Marine
in place to respond to casualties to			Navigational Markings – 5.5:
the aids to navigation specified by the			Superintendence and
GLAs, within the timescales laid			Management.
down and specified by the GLAs.			Considers markings as required
			by GLA.

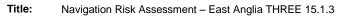
6. Hydrography: In order to establish a baseline, detailed and accurate hydrographic surveys are required to IHO Order 1a standard multibeam bathymetry with final data being supplied as a digital full density data set, and erroneous soundings flagged as deleted but include in the data set. A full report detailing survey methodology and equipment should accompany the surveys.

Annex 3: MCA template for assessing distances between wind farm boundaries and shipping routes

Annex 4: Safety and mitigation measures recommended for OREI during construction, operation and decommissioning.

Mitigation and safety measures will	✓	Section 4: Embedded
be applied to the OREI development		Mitigations.
appropriate to the level and type of		Discusses promulgation of
risk determined during the		safety zone information, safety
Environmental Impact Assessment		zones for the Project, and
(EIA).The specific measures to be		infringement of safety zones
employed will be selected in		and presents a list of mitigation
consultation with the Maritime and		measures and monitoring.
Coastguard Agency and will be listed		Section 21: Emergency
in the developer's Environmental		Response.
Statement (ES). These will be		Discuss emergency response
consistent with international		related safety and mitigation
standards contained in, for example,		measures, and ERCoP (21.3:
the Safety of Life at Sea (SOLAS)		Emergency Response Co-
Convention - Chapter V, IMO		operation Plan (ERCoP))
Resolution A.572 (14)3 and		Discusses EAOW's proposals
Resolution A.671(16)4 and could		for its own resources to aid in
include any or all of the following:		SAR.
		Section 20: Risk Mitigation
		Measures and Monitoring.

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Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
i. Promulgation of information and	✓		Section 4: Embedded
warnings through notices to mariners			Mitigations.
and other appropriate media.			Mitigation measure adopted by
			Project.
ii. Continuous watch by multi-channel	✓		Section 30: Future
VHF, including Digital Selective			Monitoring
Calling (DSC).			Discusses future monitoring under consideration.
iii. Safety zones of appropriate	√		Section 4: Embedded
configuration, extent and application	*		Mitigations.
to specified vessels			Discusses safety zones for the
to opening vectors			Project.
iv. Designation of the site as an area	√		Not applicable.
to be avoided (ATBA).			
v. Implementation of routeing	√		Not applicable.
measures within or near to the			''
development.			
vi. Monitoring by radar, AIS and/or	✓		Section 30: Future
closed circuit television (CCTV).			Monitoring
			Discusses future monitoring
			under consideration.
vii. Appropriate means to notify and	✓		Section 4: Embedded
provide evidence of the infringement			Mitigations.
of safety zones or ATBA's.			Discusses infringement of
			safety zones.
viii. Any other measures and	✓		Section 21: Emergency
procedures considered appropriate in			Response – 21.1: Search and
consultation with other stakeholders.			Rescue
			Discusses SAR related safety
			and mitigation measures.
			Section 4: Embedded
			Mitigation and Section 30:
			Future Monitoring.
			Details mitigation measures
			adopted and under
in Creation of an European	./		consideration.
ix. Creation of an Emergency	*		Section 21: Emergency
Response Cooperation Plan with the relevant Maritime Rescue			Response – 21.3: Emergency Response Co-operation Plan
Coordination Centre (from			(ERCoP).
construction phase onwards)			ERCoP will be in place pre-
contained prideo onwards)			construction.
Annex 5: Standards and procedure	es for v	wind to	1

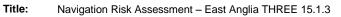
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Issue: OREI RESPONSE	Yes	No R	Reference notes/Remarks	
the event of a search and rescue, counter pollution or salvage incident				
in or around a wind farm.				
1. Design Requirements: The OREI state of the following design requirements for search and rescue (SAR), counter poll farm or or the following design requirements.	emerg	ency roto	or shut-down in the event of a e operation in or around a wind	
i. All wind turbine generators (WTGs) and other OREI individual structures will each be marked with clearly visible unique identification characters which can be seen by both vessels at sea level and aircraft (helicopters and fixed wing) from above.	✓	S N D a s S S R R (I	Section 5: Marine Navigational Markings. Describes marking of WTGs and other OREI individual etructures. Section 21: Emergency Response – 21.3: Emergency Response Co-operation Plan ERCoP). List of design features to be incorporated.	
ii. The identification characters shall each be illuminated by a low-intensity light visible from a vessel thus enabling the structure to be detected at a suitable distance to avoid a collision with it. The size of the identification characters in combination with the lighting should be such that, under normal conditions of visibility and all known tidal conditions, they are clearly readable by an observer, stationed 3 metres above sea levels, and at a distance of at least 150 metres from the turbine. It is recommended that lighting for this purpose be hooded or baffled so as to avoid unnecessary light pollution or confusion with navigation marks. (Precise dimensions to be determined by the height of lights and necessary range of visibility of the identification numbers)	√	S N D C S R R (I	Section 5: Marine Navigational Markings. Describes identification Characters and lighting. Section 21: Emergency Response – 21.3: Emergency Response Co-operation Plan ERCoP). List of design features to be incorporated.	
iii. For aviation purposes, OREI structures should be marked with hazard warning lighting in accordance with CAA guidance and also with unique identification	√	N C	Section 5: Marine Navigational Markings. Considers aviation marks. CAA guidance will be followed.	

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Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
numbers (with illumination controlled from the site control centre and activated as required) on the upper works of the OREI structure so that aircraft can identify each installation from a height of 500ft (150 metres) above the highest part of the OREI structure.			
iv. Wind Turbine Generators (WTG) shall have high contrast markings (dots or stripes) placed at 10 metre intervals on both sides of the blades to provide SAR helicopter pilots with a hover reference point.	✓		Section 21: Emergency Response. Design will meet MCA requirements.
v. All OREI generators and transmission systems should be equipped with control mechanisms that can be operated from the OREI Central Control Room or through a single contact point.	√		Section 21: Emergency Response – 21.3: Emergency Response Co-operation Plan (ERCoP). Discusses OREI Central Control Room.
vi. Throughout the design process for an OREI, appropriate assessments and methods for safe shutdown should be established and agreed, through consultation with MCA Navigation safety Branch, Search and rescue Branch and other emergency support services.	*		Section 21: Emergency Response. Discusses shutdown methods. Section 4: Embedded Mitigation and Section 30: Future Monitoring Details mitigation measures adopted and under consideration.
vii. The OREI control mechanisms should allow the Control Room Operator to fix and maintain the position of the WTG blades, nacelles and other appropriate OREI moving parts to configurations determined by the Maritime Rescue Co-ordination Centre (MRCC). This same operator must be able to immediately effect the control of offshore substations and export cables.	~		Section 21: Emergency Response. Discusses shutdown methods.
viii. Nacelle hatches and other OREI enclosed spaces in which personnel are working should be capable of being opened from the outside. This	√		Section 21: Emergency Response. Design will meet MCA

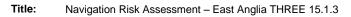
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Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
will allow rescuers (e.g. helicopter winch-man) to gain access to the tower if tower occupants are unable to assist and when sea-borne approach is not possible.			requirements. Section 4: Embedded Mitigation and Section 30: Future Monitoring Details mitigation measures adopted and under consideration.
ix. Access ladders, although designed for entry by trained personnel using specialised equipment and procedures for turbine maintenance in calm weather, could conceivably be used, in an emergency situation, to provide refuge on the turbine structure for distressed mariners. This scenario should therefore be considered when identifying the optimum position of such ladders and take into account the prevailing wind, wave and tidal conditions.			Section 21: Emergency Response. Design will meet MCA requirements. Section 4: Embedded Mitigation and Section 30: Future Monitoring. Details mitigation measures adopted and under consideration.
x. Although it may not be feasible for mariners in emergency situations to be able to use wave or tidal generators as places of refuge, consideration should nevertheless be given to the provision of appropriate facilities	✓		No applicable.
2. Operation	nal Re	quirer	ments
i. The Central Control Room, or mutually agreed single point of contact, should be manned 24 hours a day.	V		Section 21: Emergency Response – 21.3: Emergency Response Co-operation Plan (ERCoP). Operational feature of the project.
ii. The Central Control Room, or mutually agreed single point of contact, should have a chart indicating the Global Positioning System (GPS) position and unique identification numbers of each of the WTGs in the wind farm, or individual devices in other types of OREI.	V		Section 21: Emergency Response. States that the Project will meet the MCA's requirements in terms of standards and procedures for generator shutdown and other operational requirements in the event of a

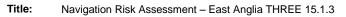
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Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
			search and rescue, counter pollution or salvage incident in or around the site.
iii. All MRCCs will be advised of the contact telephone number of the Central Control Room, or mutually agreed single point of contact.	~		Section 21: Emergency Response States that the Project will meet the MCA's requirements in terms of standards and procedures for generator shutdown and other operational requirements in the event of a search and rescue, counter pollution or salvage incident in or around the site.
iv. All MRCCs will have a chart indicating the GPS position and unique identification number of each of the WTGs in all wind farms or all devices in other types of OREI.	\		Section 21: Emergency Response States that the Project will meet the MCA's requirements in terms of standards and procedures for generator shutdown and other operational requirements in the event of a search and rescue, counter pollution or salvage incident in or around the site.
v. All search and rescue helicopter bases will be supplied with an accurate chart of all the OREI and their GPS positions.	✓		Section 21: Emergency Response States that the Project will meet the MCA's requirements in terms of standards and procedures for generator shutdown and other operational requirements in the event of a search and rescue, counter pollution or salvage incident in or around the site.
vi. The Civil Aviation Authority shall be supplied with accurate GPS positions of all OREI structures for civil aviation navigation charting purposes	√		Section 21: Emergency Response. States that the Project will meet the MCA's requirements in terms of standards and procedures for generator shutdown and other operational

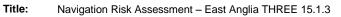
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Lance ODEL DEODONOS	V	N	Defenses mater/Demand
Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
			requirements in the event of a
			search and rescue, counter pollution or salvage incident in
			or around the site.
3. Operati	ional F	Proced	
i. Upon receiving a distress call or	<u>√</u>	10000	Section 21: Emergency
other emergency alert from a vessel			Response
which is concerned about a possible			States that the Project will meet
collision with a WTG or is already			the MCA's requirements in
close to or within the wind farm, or			terms of standards and
when the MRCC receives a report			procedures for generator
that persons are in actual or possible			shutdown and other operational
danger in or near a wind farm and			requirements in the event of a
search and rescue aircraft and/or			search and rescue, counter
rescue boats or craft are required to operate over or within the wind farm,			pollution or salvage incident in
the he MRCC/SC will establish the			or around the site.
position of the vessel and the			
identification numbers of any WTGs			
which are visible to the vessel. This			
information will be passed			
immediately to the Central Control			
Room, or single contact point, by the			
MRCC. A similar procedure will be			
followed when vessels are close to or			
within other types of OREI site.	✓		0.11
ii. The control room operator, or single point of contact, should	*		Section 21: Emergency
immediately initiate the shut-down			Response
procedure for those WTGs as			States that the Project will meet the MCA's requirements in
requested by the MRCC and maintain			the MCA's requirements in terms of standards and
the WTG in the appropriate shut-			procedures for generator
down position, again as requested by			shutdown and other operational
the MRCC, or as agreed with MCA			requirements in the event of a
Navigation Safety Branch or Search			search and rescue, counter
and Rescue Branch for that particular			pollution or salvage incident in
installation, until receiving notification			or around the site.
from the MRCC that it is safe to			
restart the WTG.	√		Ocation Ota Farance
iii. The appropriate procedure to be followed in respect of other OREI	•		Section 21: Emergency
types, designs and configurations will			Response.
be determined by these MCA			States that the Project will meet the MCA's requirements in
branches on a case by case basis, in			· · · · · · · · · · · · · · · · · · ·
2.2			terms of standards and

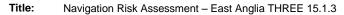
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Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
consultation with appropriate stakeholders, during the Scoping and Environmental Impact Assessment processes			procedures for generator shutdown and other operational requirements in the event of a search and rescue, counter pollution or salvage incident in or around the site.
iv. Communication procedures should be tested satisfactorily at least twice a year. Shutdown and other procedures should be tested as and when mutually agreed with the MCA			Section 21: Emergency Response. States that the Project will meet the MCA's requirements in terms of standards and procedures for generator shutdown and other operational requirements in the event of a search and rescue, counter pollution or salvage incident in or around the site.

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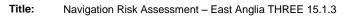
Offshore Renewable Energy Installations

Methodology for Assessing the Marine Navigational Safety Risks of Offshore Wind Farms (Compliance with recommended DTI Methodology)

General Comments:

Section	Yes	No	Reference notes/Remarks
A1: Overview and guidance on navigation safety issues.	√		Section 2: Regulations and Guidance.
A2: Overview of FSA.	√		Section 2: Regulations and Guidance.
A3: Lessons learned.	\		Entire NRA takes into account Lessons Learned within the offshore industry.
B1: Base case traffic densities and types.	✓		Sections 11-16: Survey Analysis, Changes to Routeing Measures within Dutch Waters, Validation Survey 2014, Commercial Ferry Operators and Activity, Recreational Craft Activity, Commercial Fishing Vessel Activity.
B2: Future traffic densities and types.	√		Section 24: Base Case No Windfarm, Section 25: Future Case No Windfarm and Section 26: future Case with Windfarm.
B3: The marine environment :			
B3.1 Technical & operational analysis	√		Section 3: Project Description.
B3.2 Generic TOA	√		Sections 11-16: Survey Analysis, Changes to Routeing Measures within Dutch Waters, Validation Survey 2014, Commercial Ferry Operators and Activity, Recreational Craft Activity, Commercial Fishing Vessel Activity.
B3.3 Potential accidents	√		Sections 18 & 19: Future Case Commercial Vessels Routeing and Future Case 90 th Percentile Route Analysis. Sections 25 & 26: Future Case No Windfarm and Future Case with Windfarm.

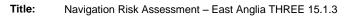
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Section	Yes	No	Reference notes/Remarks
B3.4 Affected navigational activities	√		Section 18 and Section 19: Future Case Commercial Vessel Routeing and Future Case 90 th Percentiles.
B3.5 Effects of wind farm structures	√		Section 24: Base Case No Windfarm, Section 25: Future Case No Windfarm and Section 26: future Case with Windfarm.
B3.6 Development phases	✓		Section 15: Recreational Craft Activity – 15.7: Effects on Recreational Craft, Section 16: Commercial Fishing Vessel Activity – 16.4: Effects on Fishing Vessels (Safe Navigation) and Section 30: Future Monitoring – 30.4: Decommissioning Plan.
B3.7 Other structures & features	√		Sections 7 and 28: Existing Environment, and Cumulative and In-Combination Effects.
B3.8 Vessel types involved	✓		Sections 11 - 16: Survey Analysis, Changes to Routeing Measures within Dutch Waters, Validation Survey 2014, Commercial Ferry Operators and Activity, Recreational Craft Activity, Commercial Fishing Vessel Activity.
B3.9 Conditions affecting navigation	✓		Sections 8 and 27: Metocean Data and Communication and Position Fixing.
B3.10 Human actions	√		Section 18: Future Case Commercial Vessel Routeing
C1: Hazard Identification	√		Section 18: Future Case Commercial Vessel Routeing Annex 15.1.1: Hazard Log Report.
C2: Risk Assessment	√		Section 18: Future Case Commercial Vessel Routeing Annex 15.1.1: Hazard Log Report.
C3: Hazard log	✓		Annex 15.1.1: Hazard Log Report.
C4: Level of risk	√		Section 18: Future Case Commercial Vessel Routeing Annex 15.1.1: Hazard Log Report.
C5: Influences on level of risk	✓		Sections 3, 7.5, 11-16, 18, and 21.

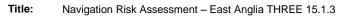
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Section	Yes	No	Reference notes/Remarks
			Project Description, Ports, Survey Analysis, Changes to Routeing Measures in Dutch Waters, Validation Survey 2014, Commercial Ferry Operators and Activity, Recreational Craft Activity, Commercial Fishing Vessel Activity. Emergency Response.
C6: Tolerability of residual risk			Section 18: Future Case Commercial Vessel Routeing Annex 15.1.1: Hazard Log Report.
D1 : Appropriate risk assessment			Sections 8, 9, 11-16, 2, 27.1 and 28: Metocean Data, Maritime Incidents, Survey Analysis, Changes to Routeing Measures within Dutch Waters, Validation Survey 2014, Commercial Ferry Operators and Activity, Recreational Craft Activity, Commercial Fishing Vessel Activity, Search and Rescue, Impact on Marine Radar Systems, Cumulative and In-Combination Effects.
D2 : MCA approval for assessment tools and	√		Section 18: Future Case Commercial Vessel
techniques			Routeing
D3: Demonstration of results	√		Annex 15.1.1: Hazard Log Report.
D4: Area traffic assessment	•		Sections 3, 11, 13, 18, 23, 27.1 and 28: Project Description, Survey Analysis, Validation Survey 2014, Future Case Commercial Vessel Routeing, Allision and Collision Risk Modelling, Impact on Marine Radar Systems, Cumulative and In-Combination Effects, and Additional Navigational Issues. Annex 15.1.1: Hazard Log.
D5: Specific traffic assessment	✓		Sections 3-6, 18 and 21: Project Description, Embedded Mitigations Marine Navigational Markings, Consultation, Future Case Commercial Vessel Routeing,

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Section	Yes	No	Reference notes/Remarks
			Emergency Response.
			Annex 15.1.1: Hazard Log Report.
E1: Risk control log	✓		Annex 15.1.1: Hazard Log Report.
E2: Cost benefit assessment	✓		Cost benefit assessment will be
			carried out if required.
E3: Assessment of equity to	✓		Assessment of equity to stakeholders
stakeholders			will be carried out if required.
F1: Tolerability of risk claim	√		Annex 15.1.1: Hazard Log Report.
G1: Hazard identification	√		Annex 15.1.1: Hazard Log Report.
checklist			
G2: Risk control checklist	✓		Annex 15.1.1: Hazard Log Report.
G3: MCA MGN 371 compliance	√		Annex 15.1.3
checklist			

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