

Digital Aerial Baseline Survey of Marine Wildlife in Support of Offshore Wind Energy

Health and Safety Plan Summer 2016



NYSERDA



Digital Aerial Baseline Survey of Marine Wildlife in Support of Offshore Wind Energy

Health and Safety Plan Summer 2016

Prepared for

New York State Energy
Research and Development
Authority
17 Columbia Circle
Albany, NY 12203-6399



Prepared by

Normandeau Associates Inc.
4581 NW 6th Street, Suite A
Gainesville, FL 32609
352-372-4747
www.normandeau.com



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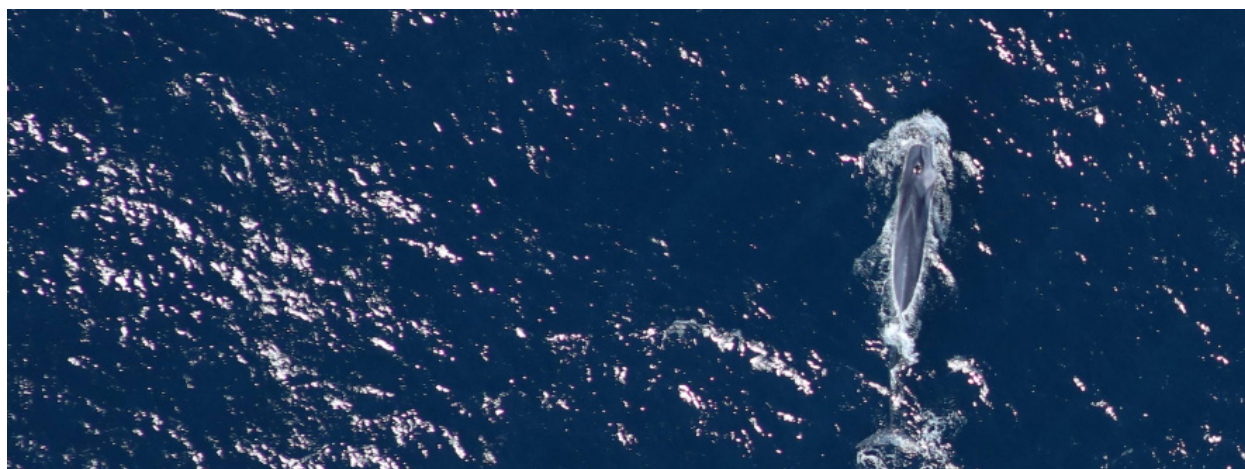
APEM Ltd
Riverview
A17 Embankment Business Park
Heaton Mersey
Stockport SK4 3GN



July 2016

Revision and Amendment Register

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
V2	15 Jul 2016	ALL	34	Updated following review	CN
V3	20 Jul 2016	Appendix 1	35	Risk assessment updated to latest version	SM
V4	12 Sep 2016	All	32	Edited and formatted	JRW



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1 Methodology

1.1 Scope of Work

APEM Ltd. will undertake the provision of wildlife data capture in the New York State Department of State's Offshore Planning Area (OPA).

1.1.1 Proposed Dates of Survey

Summer Survey: 25 July to 22 August 2016

1.1.2 Contact Information for Key Project Personnel

- Christian Newman, APEM Project Manager: c.newman@apem-inc.com, (352) 559-9155 ext. 1350, Mobile (352) 672-2479
- Stephanie McGovern, APEM Operations Manager, S.McGovern@apemltd.co.uk, Tel +44 (0)1244 520 460, Mobile +44 (0) 7717421040
- Ben Chapman, APEM Aviation Task Manager: b.chapman@apemltd.co.uk, Tel +44 (0)1244 520 460, Mobile +44 (0) 7436 269324
- John McCarthy, APEM Camera Task Manager: J.Mccarthy@apemltd.co.uk, Tel +44 (0) 1244 520 460, Mobile +44 (0) 7918 088596
- Stuart Clough, APEM Director: s.clough@apemltd.co.uk, Tel: +44 (0) 161 442 8938, Mobile 07738 219340
- Gemma McLean, Health and Safety Coordinator: g.mclean@apemltd.co.uk, Tel: +44 (0) 1443 239 205

1.1.3 Aircraft Suppliers

- Andrew J. Williams, Williams Aerial & Mapping, Inc., Director: Office (574) 287-2104, Mobile (574) 315-9139, Fax (574) 287-2113
- Bradley Aselage, Williams Aerial & Mapping, Inc. Flight Ops Director of Special Missions: Office (574) 287-2104, Mobile (937)726-7368, Fax (574) 287-2113
- Rick Kosinski, C.P., Williams Aerial & Mapping, Inc. President: Office (574)287-2104, Mobile (574) 220-4434, Fax (574)287-2113

1.2 Survey Schedule

Starting in July 2016, twelve aerial digital still surveys of the OPA and Wind Energy Area will be carried out over 3 years with one survey delivered per season (spring, summer, fall, winter) per year. Surveys will coincide with peak biological activity and associated weather patterns affecting seasonal movements of birds to maximize hot spot identification. The survey schedule was developed to capture peak times of abundance for as many taxa based on historic data collected within the area and region. This provided a broad overview of the likely species and abundances that could be expected. A month prior to the start of the seasonal survey window, long-term weather forecast and local weather trends will be monitored to determine a suitable time to mobilize for the start of the survey.

The targeted periods and the abundant taxa that will likely be recorded based on the historical data are as follows:

- Winter: End Feb/Mar—Ducks, Loons, Grebes, Puffin, Jaeger, Skua, Pilot Whale
- Spring: End Apr/May—Ducks, Loons, Grebes, Puffin, Jaeger, Skua, Cormorant, Pilot Whale
- Summer: End July/Aug—Fin Whale, Minke Whale, Humpback Whale, Pilot Whale Turtles, Loon, Grebe, Jaeger, Skua
- Fall: End Oct/Nov—Ducks, Loons, Grebes, Puffin, Jaeger, Skua, Cormorant, Turtles, Pilot Whale

The endangered Northern Right Whale could be recorded during all periods but will most likely be recorded during the Spring target period. The greatest chance to find a threatened Roseate Tern will also be in the Spring and possibly during the Summer.

Each seasonal survey will require an estimated 50 hours of combined aerial survey time spread over 10 to 15 days. For planning purposes, there will be about 5 hours per day on average of actual data collection in addition to daily transit to/from the airport and refueling. However, the number of hours of actual data collection will vary depending on season and weather.

1.3 Survey Team

The survey will be carried out by John McCarthy and David Mullock, a member of APEM's Remote Sensing team under the supervision of John McCarthy. They will carry out the installation, operation, and extraction of the camera equipment throughout the duration of the survey. A pilot employed by the aircraft operator, William Aerial & Mapping, will be in command of the aircraft throughout the duration of the survey and any ground or additional air crew support will be arranged by the operator.

In the event of sickness, vacation, or extended leave, other suitably qualified members from APEM's survey team will be appointed to cover those roles. It will be ensured that they have the relevant skills and qualifications necessary for the safe undertaking of the work.

1.4 Risk Assessments

A specific aerial survey risk assessment will be prepared and then authorized by either the Project Manager or Health and Safety Coordinator before the commencement of the New York State Energy Research and Development Authority's (NYSERDA's) aerial digital baseline survey. The risk assessment to be used for this survey is provided in Appendix 1.

1.5 Presurvey Arrangements

APEM, in collaboration with the air charter company, will work together to ensure that all flights and logistics are thoroughly prepared for. Where necessary, appropriate permissions will be sought from local air traffic control (ATC). Contact will be established at least 24 hours prior to survey with the relevant bodies to obtain permission to survey in any restricted areas.

Survey flight plans are created using a special software suite that allows APEM to preplan specific flight lines, ensuring that images will be captured at precisely the intended location during the surveys.

As part of the survey preparation, a site-specific risk assessment will be created following consultation with our Chief Pilot, Operations Manager, and Health and Safety Coordinator. This will be completed and signed off by the Health and Safety Coordinator or Project Manager before any work begins.

1.6 Arrival on Site

In planning and preparation for the survey, adequate personnel will be available to assist with carrying heavy loads. After long-haul flights, sufficient rest breaks will be allowed between tasks especially for a long, continuous journey.

Prior to survey APEM will mobilize the aircrew and a Shearwater II camera system to a suitable location to be used as a base for the survey. The camera system will then be installed into a local survey aircraft chartered specifically for the purposes of this project.

Upon arrival at the airport from which the survey will be conducted, manual handling techniques will be observed when taking equipment in or out of vehicles and aircraft. The camera system will be installed into the aircraft according to APEM's in-house installation procedure to ensure the system is safely secured and that no part obstructs a route of egress from the aircraft should an emergency situation arise.

1.7 Survey Methodology

APEM will charter a dedicated survey aircraft to collect high resolution imagery across the New York State Department of State's OPA using the Shearwater II camera system. APEM regularly conducts a wide variety of survey flights, providing scientific services to a range of sectors and clients. Although all flight activity carries risks, the offshore survey work carries additional ones. This is the exemplar area addressed through the following mitigation measures.

The aircraft chartered for use as the offshore survey platform will be fitted with a first aid kit, fire extinguisher, Emergency Locator Transponder, secondary VHF radio, and life raft. The flight crew will wear appropriate personal protective equipment, including high visibility clothing, marine immersion suits (see Appendix 2 for immersion suit risk assessment), personal locator beacon, and lifejackets at all times during the survey.

Avoidance of fatigue is of paramount importance to the safe operation of survey equipment, and APEM survey personnel are advised and encouraged to take plenty of rest prior to conducting a survey. Operators shall operate within the operational constraints of their operator's certificate as outlined by Federal Aviation Authority (FAA) regulations to ensure air crew fatigue is kept to a minimum. If transit time is expected to be considerably greater, or long periods on the survey task are required, a second crew can be employed to extend the operating period on a given day.

Pilots are encouraged to follow the IMSAFE checklist (Illness, Medication, Stress, Alcohol, Fatigue, Eating) and encouraged to discontinue the flight at any point that they feel the safety of the flight could be in jeopardy due to aeromedical factors.

Flight Fitness: The "I'm Safe" Checklist		
I	Illness	Do I have an illness or any symptoms of an illness?
M	Medication	Have I been taking prescription or over-the-counter drugs?
S	Stress	Am I under psychological pressure from the job? Worried about financial matters, health problems or family discord?
A	Alcohol	Have I been drinking within 8 hours? Within 24 hours?
F	Fatigue	Am I tired and not adequately rested?
E	Eating	Am I adequately nourished?

Survey personnel are recommended to carry plenty of fluid while on board the aircraft to prevent dehydration (especially during warmer temperatures). During colder weather crew are advised to wear extra layers.

1.8 Survey Area

The survey will comprise an area of 12,650 square nautical miles with this area extending up to 130 nautical miles off shore. The center of the survey area is located at 40°1'24.88"N, 72°20'48.85"W.

2 First Aid and Incident Reporting

The survey technician will have access to a first aid kit at all times when on duty.

In the event of an injury or near miss, the verbal incident chain will be followed as detailed below:

1. First contact will be made with the director (Dr. Stuart Clough).
2. If the technical director is not available then follow this order of notification:
 - Christian Newman, APEM Project Manager: c.newman@apem-inc.com, (352) 559-9155 ext. 1350, Mobile (352) 672-2479
 - Stephanie McGovern, APEM Operations Manager, S.McGovern@apemltd.co.uk, Tel +44 (0)1244 520 460, Mobile +44 (0) 7717421040
 - Ben Chapman, APEM Aviation Task Manager: b.chapman@apemltd.co.uk, Tel +44 (0)1244 520 460, Mobile +44 (0) 7436 269324
 - John McCarthy, APEM Camera Task Manager: J.Mccarthy@apemltd.co.uk, Tel +44 (0) 1244 520 460, Mobile +44 (0) 7918 088596
 - Stuart Clough, APEM Director: s.clough@apemltd.co.uk, Tel: +44 (0) 161 442 8938, Mobile 07738 219340
 - Gemma McLean, Health and Safety Coordinator: g.mclean@apemltd.co.uk, Tel: +44 (0) 1443 239 205

3. APEM Inc. Board of Directors and the Health and Safety Coordinator will then be informed of the incident and necessary protocol will be followed.
4. Upon return to the airport, the injured staff member (or fellow team member in their absence) will provide a written record of the incident to the technical director.
5. The APEM Health and Safety Coordinator will then investigate and formulate an Accident Investigation Report, which will be kept confidential and filed in accordance with Health and Safety Executive (HSE) and employee legislation.

3 Emergency Procedures

3.1 Standard Emergency Actions

The survey technician is qualified in first aid. If an injury requires immediate medical assistance, emergency services will be contacted by dialing 911 asking for ambulance service. They will require as much detail as possible, which will include the nature of the incident and location (latitude and longitude). If emergency services are not needed but medical assistance is required, the member of staff in need of assistance will be driven to the nearest Emergency Room department, which will be located and a route will be determined prior to conducting a survey.

3.2 Nonstandard Conditions/Emergency Actions

3.2.1 Weather Deterioration

If the weather drops below the minimum as described in the survey briefing documentation or the pilot deems it unsafe to continue, then the survey will be abandoned.

If conditions at the designated airfield are unsuitable, then two alternative airfields, which were identified during the flight planning phase, will be evaluated for safe-landing suitability.

3.2.2 Radio Failure

In the event that both onboard radios fail, the transponder will be set to the communication failure code 7600, to alert ATC of the radio failure. The survey will be abandoned and the pilot will follow their company operating procedure, along with adhering to the FAA VFR rules.

3.2.3 Single Engine Failure

In the event of a single engine failure, the pilot will shut down the engine, inform ATC, abandon the survey, and land at the nearest suitable airfield.

3.2.4 Ditching

In the event of having to ditch, a mayday call will be transmitted to ATC, and the Emergency Location Transmitter (ELT) will be activated. In the event of ditching at sea, APEM aerial survey personnel will have immersion suits and will wear lifejackets at all times when in the aircraft. Furthermore, the aircraft has a life raft that can be deployed outside the aircraft when on the water to provide refuge in the event of ditching over water. All survey personnel have received training in sea survival.

3.2.5 Personnel Emergency Procedures

In the event of a medical emergency occurring while in flight, the pilot will contact ATC making a medical PAN call (nonemergency call requiring assistance from the ground), giving the aircraft priority to land at the nearest airfield. In the event of a complete communications (radio) failure, the transponder will be set to the general emergency code 7700. Ground emergency services will be notified so that the casualty can be tended to immediately when on the ground.

If a medical emergency occurs while on the ground (e.g., while working around the aircraft), the pilot will notify emergency services by calling 911, requesting ambulance service. In the event that emergency services are not required but medical attention is required, then a member of staff will drive the casualty to the nearest Emergency Room.

4 APEM Staff Insurance Details

All employees of APEM Ltd are covered by Chubb Insurance while travelling. When contacting Chubb for assistance, please have the following information available:

- The name of the Insured
- Your policy number
- Contact telephone number
- Location of the insured abroad
- Nature of the emergency or the assistance required
- Name of the employer of the insured

Use this helpline number and contact information to access Chubb Travel Cover pretravel advice and emergency medical assistance.

Helpline: +44 (0) 207 895 3364

Email: medicalassistance@chubb.com

www.chubbassistance.com

Your Policy Number: **64813944**

When calling please have these available: a contact number, your Policy Number, your precise location, and the name of any attending doctor.

When accessing the website, your policy number is the password.

5 Emergency Responders

5.1 U.S. Coast Guard (USCG)

Look in the front of your telephone directory for an emergency number listing for the U.S. Coast Guard, or do one or more of the following:

- Dial 911
- Call the nearest U.S. Coast Guard Rescue Coordination: RCC Boston Commander 1st Coast Guard District, Boston, Massachusetts (617) 223-8555
- Use the Global Maritime Distress and Safety System, which provides a number of additional means for contacting or alerting Search and Rescue (SAR) authorities. These include INMARSAT, SARSAT (EPIRBs, ELTs, and PLBs), MF-DSC, HF-DSC, etc.

Local station phone numbers for obtaining general information only:

- Fire Island.....(631) 661-9101
- Shinnecock.....(631) 728-1171
- Montauk.....(631) 668-2716

5.2 Airport and Nearest Hospitals

5.2.1 Farmingdale (KFRG)

- St. Joseph Hospital, 4295 Hempstead Turnpike, Bethpage, NY 11714 (516-579-6000), 3.9 miles
- Plainview Hospital, 888 Old Country Road Plainview, NY 11803 (516-719-3000), 7.1 miles
- Nassau University Medical Center, 2201 Hempstead Turnpike, East Meadow, NY 1155 (516-572-0123), 11.3 miles

5.2.2 Islip (KISP)

- Southside Hospital, 301 E Main St, Bay Shore, NY 11706 (631-968-3000), 11.4 miles
- Brookhaven Memorial Hospital, 109 W Main St, Patchogue, NY 11772 (631-687-2828), 5.7 miles
- Good Samaritan Hospital Medical Center, 1000 Montauk Hwy, West Islip, NY 11795 (631-376-3000), 15.3 miles

5.2.3 Shirley (KHWV)

- Brookhaven Memorial Hospital, 550 Montauk Hwy, Shirley, NY 11967 (631-852-1070), 2.8 miles
- Brookhaven Memorial Hospital, 101 Hospital Rd, Patchogue, NY 11772 (631-654-7100), 8.4 miles
- Stony Brook Emergency Room, 101 Nicolls Rd, Stony Brook, NY 11790, N/A, 15 miles
- Westhampton (KFOK) Southampton Hospital, 240 Meeting House Ln, Southampton, NY 11968 (631-726-8200), 17.3 miles

- Peconic Bay Medical Center, 1300 Roanoke Ave, Riverhead, NY 11901 (631-548-6000), 7.3 miles
- Eastern Long Island Hospital, 201 Manor Pl, Greenport, NY 11944 (631-477-1000), 29 miles

5.2.4 East Hampton (KHTO)

- Southampton Hospital, 240 Meeting House Ln, Southampton, NY 11968 (631-726-8200), 11 miles
- Eastern Long Island Hospital, 201 Manor Pl, Greenport, NY 11944 (631-477-1000), 14.4 miles
- Peconic Bay Medical Center, 1300 Roanoke Ave, Riverhead, NY 11901 (631-548-6000), 28.9 miles

5.3 Known Aerial Surveys

5.3.1 New York State Department of Environmental Conservation Marine Mammal Survey

These surveys will not begin until September 2016. Contacts for future surveys are:

- Lisa Bonacci, NYSDEC: lisa.bonacci@dec.ny.gov
- Meghan Rickard, NYSDEC: meghan.rickard@dec.ny.gov

5.3.2 Atlantic Marine Assessment Program for Protected Species (AMAPPS) Surveys

These surveys are scheduled to begin around 15 August and be completed by 28 September 2016. If the NYSERDA surveys are not completed by 15 August, APEM will notify the following contacts to coordinate:

- Debra Palka, U.S. Bureau of Ocean Energy Management: Debra.Palka@noaa.gov

Appendices

Appendix 1. APEM Site Risk Assessment

APEM Aerial Surveys Site Risk Assessment Receipt (SRAR) Form, Version 4

- This form must be completed prior to survey commencement and left in Operations Manager's inbox for filing.
- Upon completion of survey work this form must be filed along with the accompanying Site Risk Assessment (SRA) form (see next page).
- A copy of this SRAR form must be retained in the flight envelope.

Survey Information			
Project No.:	P00000274	Location:	New York Bight, New York
Project Name:	NYSERDA Wildlife Survey	Date(s) of survey:	25 July –22 August 2016
Project Manager:	Stephanie McGovern	Expected hours of work:	06:00–19:00

Team Leader			
Name:	John McCarthy		
Contact No.:	+44 (0)7918 088596		
Survey Team Members		Office Contact	
John McCarthy		Name:	Tracy Shaw / Stephanie McGovern
David Mullock		Office:	+ 44 (0)124 4520 460 / +44 (0)1244 520 460
		Contact number:	+ 44 (0)7436 269 325 / +44 (0) 7717 421 040

Any other additional information (e.g., site security contacts, night work involved etc.)
Emergency Services – 911

APEM Aerial Surveys Site Risk Assessment (SRA) Form, Version 2

- This form must be completed (by an appropriate combination of Health and Safety Coordinator, Project Manager, and Aviation Management) and approved (by the Director or Associate Director of Remote Sensing) prior to survey work commencing.
- Once approved all other survey team members must be briefed regarding the survey and the hazards involved. All survey team members must familiarize themselves with the contents of this SRA form prior to commencing survey work and sign accordingly.
- Upon completion of survey, this SRA form must be passed for filing in line with instruction on the accompanying SRAR form (see above).

Project No.:	P00000274	Assessors' Names:	Stephanie McGovern	Further assessments required (attach subsequent assessments to this form where applicable):		Persons involved in or affected by the task:																																																	
Project Name:	NYSDERDA Wildlife Survey	Location:	New York Bight, New York																																																				
Risk Assessment Key				COSHH	Employees	X																																																	
				Young Persons (Persons under 18 years of age)	Visitors																																																		
<table border="1"> <thead> <tr> <th colspan="4">Severity of Consequences</th> <th colspan="3">Likelihood of Occurrence</th> </tr> <tr> <th>Definition</th> <th>Risk</th> <th>Environmental Risk</th> <th>Value</th> <th>Definition</th> <th>Meaning</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>Catastrophic</td> <td>Equipment destroyed, fatality</td> <td>Environmental disaster</td> <td>5</td> <td>Frequent</td> <td>Likely to occur many times</td> <td>5</td> </tr> <tr> <td>Hazardous</td> <td>A large reduction in safety margins. Serious injury</td> <td>Serious environmental incident</td> <td>4</td> <td>Occasional</td> <td>Likely to occur sometimes</td> <td>4</td> </tr> <tr> <td>Major</td> <td>A significant reduction in safety margins. Serious incident, injury to persons</td> <td>A significant reduction in environmental standards</td> <td>3</td> <td>Remote</td> <td>Unlikely but possible to occur</td> <td>3</td> </tr> <tr> <td>Minor</td> <td>Nuisance. Operating limitations. Use of emergency procedures. Minor incidents</td> <td>Nuisance. Operating limitations</td> <td>2</td> <td>Improbable</td> <td>Very unlikely to occur</td> <td>2</td> </tr> <tr> <td>Negligible</td> <td>Little consequence</td> <td>Little consequence</td> <td>1</td> <td>Extremely improbable</td> <td>Almost inconceivable that the event will occur</td> <td>1</td> </tr> </tbody> </table> <i>The Severity and Likelihood values are multiplied together to derive a risk value. The risk value must be lower than 6, otherwise the risk is unacceptably high and a further review of the task will be required.</i>				Severity of Consequences				Likelihood of Occurrence			Definition	Risk	Environmental Risk	Value	Definition	Meaning	Value	Catastrophic	Equipment destroyed, fatality	Environmental disaster	5	Frequent	Likely to occur many times	5	Hazardous	A large reduction in safety margins. Serious injury	Serious environmental incident	4	Occasional	Likely to occur sometimes	4	Major	A significant reduction in safety margins. Serious incident, injury to persons	A significant reduction in environmental standards	3	Remote	Unlikely but possible to occur	3	Minor	Nuisance. Operating limitations. Use of emergency procedures. Minor incidents	Nuisance. Operating limitations	2	Improbable	Very unlikely to occur	2	Negligible	Little consequence	Little consequence	1	Extremely improbable	Almost inconceivable that the event will occur	1	Nursing and Expectant Mothers	Contractors	X
				Severity of Consequences				Likelihood of Occurrence																																															
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					Members of the public																																																		
					Others																																																		
				Risk Assessment Date: 20/07/16																																																			
				Risk Assessment Review Date (Only applicable for routine surveys):																																																			

Risk Identification and Control Measures

Risks Identified	Severity (1-5)	Control Measures in Place	Likelihood (1-5)	Risk Value
Double engine failure	5	Engines are subject to regular inspections and servicing in accordance with the Manufacturer's guide lines. Each engine has a finite life, which when reached requires that the unit is removed from the aircraft and undergoes a major overhaul before it is returned to service. Any maintenance carried out is conducted by highly qualified licenced engineers only. Trend monitoring takes place during flight to highlight any potential problems that may be developing so that these can be alerted to our Part 145 M maintenance organization for their action. The fuel used by our aircraft is checked daily by our supplier for contamination. The preflight checks also involve a fuel contamination check conducted by our pilots. Engines are checked routinely prior to flight to ensure correct levels of oil are contained within the unit taking into account the length of the sortie. Prior to flight, the engines are run-up and checked to make sure they are at their optimum level of performance. In the very unlikely event of a double engine failure the Emergency Checklist is actioned and if this does not solve the problem a mayday call is broadcast, the transponder is set to 7700, the aircraft ELT is switched to on, the aircraft is trimmed for the best rate of glide and a suitable landing area identified. In the event of offshore surveys, over the sea, the aircraft will be turned towards any shipping or rigs in the area. The aircraft and its crew will perform their duties in accordance with their latest survival training. The Camera Technician will open the rear door and position the life raft near to the opening ready for deployment. Each crew member is provided with a personal ELT these are worn during each flight together with a dry suit and a life jacket. The pilot will ditch the aircraft, following the predetermined survival training laid down by the Company and exit the aircraft and utilize the life raft.	1	5
Single engine failure	2	Engines are subject to regular inspections and annual servicing in accordance with the Manufacturer's guidelines. Each engine has a finite life, which when reached requires that the unit is removed from the aircraft to undergo a major overhaul before it is returned to service. Any maintenance is carried out by highly qualified licenced	1	2

Risks Identified	Severity (1–5)	Control Measures in Place	Likelihood (1–5)	Risk Value
		engineers. Trend monitoring takes place during flight to highlight any potential problems that may be developing so that these can be alerted to our Part 145 M maintenance organization for their action. The fuel used by our aircraft is checked daily by our supplier for contamination. The preflight checks also involve a fuel contamination check conducted by our pilots. Engines are checked routinely prior to flight to ensure correct levels of oil are contained within the unit for the length of sortie. In the event of a single engine failure the Emergency Checklist will be actioned and in the event that the engine is unable to be stabilized then the pilot will abort the sortie, declare a mayday, select 7700 on the transponder and return to base or to the closest alternate suitable airfield. The pilot will brief the other crew members on the situation.		
Bird strike	2	The chosen flight heights for our current surveys reduces the likelihood of a bird strike occurring. Pilot and crew must remain vigilant at all times while in flight, monitoring the flight path for flying birds which may be a threat. In the event of a bird strike, an assessment must be made immediately as to whether any damage has occurred. The Commander must determine, if he decides to continue with the sortie, that no damage has occurred. He will consult with his crew for their assistance to ascertain if that is indeed the case. In the event that a decision is made to return to land a risk assessment must be made with regards to the severity of any damage and what impact this damage will have on the continuance of the flight and eventual landing. If the wind shield is compromised then consideration may have to be made as to whether it is safer to transfer seats for the Commander to land the aircraft. He will take into account the visibility available from either the captain's seat or the co-pilot's station and make a decision based on his observation. If the Commander feels that the integrity of the aircraft has been compromised then he will make a mayday transmission, select 7700 on the transponder and brief his crewmembers on the actions he intends to take.	1	2

Risks Identified	Severity (1–5)	Control Measures in Place	Likelihood (1–5)	Risk Value
Ditching survival	5	Before flight, check availability of Search and Rescue (SAR) which include the following (lifeboats, coastguard, lifeboat station and U.S Airforce helicopter bases' operational status). It is essential when operating over water that the Commander is aware of any rigs and their support vessels so that he can turn towards these to aid the possibility of rescue. If no rigs or shipping is available then it is pertinent to turn towards the nearest land taking into account wind strength. Commanders should always have a rehearsed course of action so that in the unlikely event they need to ditch they can react swiftly. In the event of having to ditch the aircraft will be trimmed to glide at the best rate, (see engine failure, fuel depletion, collision), transmit a mayday call, set 7700 on transponder, ELT to on, prepare for and execute agreed ditching procedure. In the event of ditching over water, crew are issued with manual inflatable lifejackets which must be worn at all times when over water. The life jacket must not be inflated until outside the aircraft. Survival/immersion suits are also specified for use by crews, as appropriate. The Camera Technician will open the rear door and position the life raft near to the opening ready for deployment. The life raft must be deployed on water outside the aircraft. Crews are issued with and trained to activate Personal Locator Beacons for all offshore work. All crew have undertaken sea survival training prior to flying.	1	5
Radio failure	1	Both radios will be checked prior to takeoff. A faulty radio(s) must be reported and fixed by a qualified person prior to any sortie. In the event of a single radio failure during flight, switch to the alternate box.	1	1
Double radio failure	3	Both radios will be checked prior to takeoff. A faulty radio(s) must be reported and fixed by a qualified person prior to any sortie commencing. In the event of a double radio failure, abort sortie, set 7600 on transponder, go back to base or closest alternate airfield and carry out comms failure procedure	1	3
Weather/Reduction in Visibility	2	Weather forecast checked for departure, destination and two alternate airfields at time of departure and one hour prior to expected time of arrival. The weather should be checked the day before the flight and the synoptic chart should be studied to assess the possibility	2	4

Risks Identified	Severity (1–5)	Control Measures in Place	Likelihood (1–5)	Risk Value
		of poor weather on the day of the flight. Ensure weather is appropriate for all phases of flight. Flying should be postponed if weather conditions are worse than expected weather minima. During the sortie a close eye should be kept on any worsening weather situation and if visibility deteriorates during flight, an early decision should be made to abort the sortie.		
Mid-air collision	5	Flights are undertaken using Visual Flight Rules avoiding poor visibility. Pilots are to remain in contact with ATC whenever possible and radar cover should be requested where possible. Aviation notices (NOTAMs etc.) to be checked prior to each flight. In the event of a collision, control the aircraft, mayday call, transponder to 7700, ELT to on. If the need arises be prepared to land, trying where possible to select the safest position to set the aircraft down. Brief the other crew members and ensure they are firmly strapped in. Ensure the rear door is open to aid evacuation. Over the sea follow ditching survival section, ensuring life jackets are worn, personal ELT beacons are available and the life raft is situated close to the open door for ease of deployment.	1	5
Crew illness	2	Staff should not report for work if ill. Should the pilot be ill, a secondary pilot can be called from the 'Pool of Pilots' list. Should illness occur during flight, an early decision to abort sortie is advisable. Any illness affecting the pilot could become debilitating. Do not take any chances as things could develop quickly from what was acceptable to being completely debilitating.	1	2
Run out of fuel/fuel blockage	5	Aircraft are fueled before departure sufficient for the trip +45 minutes hold at alternate airfield and 5% contingency. Fuel levels are cross checked regularly and frequent checks are carried out looking for contaminants. Fuel feed systems are subject to regular maintenance checks. Checks made by our fuel suppliers on a daily basis will assist in preventing contamination. Preflight checks by the Commander should ensure clean and uncontaminated fuel being carried on the aircraft. Strict adherence to the Company fuel policy will prevent aircraft from running out of fuel. Fuel blockage will possibly occur when the aircraft enters icing conditions. Company aircraft are not required to be cleared for flight into known icing conditions. In the	1	5

Risks Identified	Severity (1-5)	Control Measures in Place	Likelihood (1-5)	Risk Value
		unlikely event that an aircraft enters icing conditions the pilots are trained to leave the icing asap and select alternate air to prevent fuel blockage occurring at the filters.		
Weight and Balance	3	Weight and Balance calculations to be made before each flight taking in to consideration movement of Center of Gravity caused by fuel burn. A weight and balance sheet is completed before each flight to ensure that the aircraft remains within limits throughout all phases of the flight.	1	3
Prevention of fatigue	3	Plenty of rest, always minimum 12 hours, should be taken prior to conducting a survey. FAA recommended Flight Time Limitations (FTL) requirements for duty hours and rest are observed. Individual survey flight times are restricted to 6 hours to allow the pilot and crew to take suitable rest/comfort breaks between surveys. If transit time is expected to be considerably greater, a second pilot can be employed to act as the Observer but also to allow the piloting to be shared. The pilots are required to ensure that they have adequate rest before starting any duty. While away from base we as a Company ensure that the hotels are chosen to ensure that pilots are not disturbed and that they are comfortable and so aid good rest periods.	1	3
Crew comfort	2	Survey personnel to carry plenty of fluid while on board the aircraft to prevent dehydration (especially during warmer temperatures). During colder weather staff are advised to wear extra layers. Flight lengths will be considered and rest breaks should be taken when the participating crew feel the need (see Prevention of Fatigue). The aircraft are maintained to the highest standard so that especially during cold weather the heating system fitted to the aircraft is sufficient to maintain a good safe working environment.	1	2
Lack of knowledge of survey and/or geographic area	2	Flight log to be completed for each flight to include weather, headings and distances to be flown to survey site, expected fuel burn including survey task, Air traffic control frequencies and navigation aid frequencies to be used. Region checked in advance for airspace infringements and obstacle clearance. Appropriate ATC notified and flight plan submitted if required. All pilots and Camera Technicians are routinely briefed by operations staff about the requirements for the	1	2

Risks Identified	Severity (1–5)	Control Measures in Place	Likelihood (1–5)	Risk Value
		survey. An excellent level of knowledge is expected to be assimilated by our crews before embarking on any surveys. The crews undergo continuation training and the pilots are routinely line checked by the chief pilot.		
Onboard safety/minor impact injury	1	Turbulent weather is generally avoided where possible. Weather forecasts are checked for areas of turbulence, which could include Clear Air Turbulence (CAT) and Mountain Wave activity. Seat belts to be worn at all times. All survey and camera equipment secured and checked before flight. Good lookout maintained during all phases of flight for indicators of turbulence (Lenticular Cloud etc.)	1	1
Hazards around aircraft on ground	3	Wait for pilot acknowledgement & propeller to stop turning before approaching, entering, or leaving aircraft. Stay clear of protruding or hazardous aircraft parts. Exit aircraft before or be ready to make rapid exit should the need arise during fueling & do not operate a mobile phone. High visibility jackets to be worn at all times to aid the maxim "see and be seen." Be aware of all the dangers associated with operating airside at an airport. Do not become complacent.	1	3
Noise and communication in aircraft	2	Noise cancelling headsets are the preferred types and must be worn and switched on inside the aircraft once the engines start, to protect hearing from excessive noise and to allow communication between pilot and crew.	1	2
Manual Handling and lifting heavy loads	3	APEM staff are provided with manual handling training. Any tasks that are beyond the scope of the training will be subject to HSE Manual Handling Assessment charts (MAC) and review of the risk assessment where appropriate. Ensure adequate personnel are available to assist with heavy loads. As applicable, local help with manual handling has been arranged beforehand. Where this has not occurred, local help will be requested at the time.	2	6
Driving fatigue	3	Minimize journey times as much as possible, especially after long-haul flights. Driving will be shared wherever possible. When combining driving and fieldwork on same day sufficient time shall be allowed to avoid over extending the day. Try to factor in sufficient rest between tasks.	2	6

Risks Identified	Severity (1–5)	Control Measures in Place	Likelihood (1–5)	Risk Value
Working outside in hot weather	3	In hot and sunny weather, wear appropriate sun protection cream and head cover during prolonged sunny conditions. Drink plenty of bottled water to keep hydrated. If an employee complains of heat affects stop work and seek medical advice.	1	3

Environmental Risk Identification and Control Measures

Environmental Risks Identified	Severity (1-5)	Control Measures in Place	Likelihood (1-5)	Risk Value
Emissions	2	All engines should be cut when not in use, including all petrol/diesel engines on all vehicles and generators. The use of chokes should be avoided whenever possible. The aircraft and any equipment associated with its use must be well maintained so that the internal combustion engines are operated at their optimum. Do not run engines unnecessarily and shut them down when expedient to do so. Do not make any journeys by vehicle when it is possible to use other modes of transport.	2	4
Noise Pollution	2	Any equipment generating significant noise output should be constantly monitored so as to be within the limits of the European Union Physical Agents Directive 2003/10/EC. Earplugs/ear protectors must be worn where appropriate. Do not cause any machinery to be operated at excessive revs or longer than is absolutely necessary. Engines used by Company aircraft and vehicles are compliant with the current noise standard issued by EASA.	2	4
Firewater and runoff	4	All water used in fire prevention/extinguishing should be disposed of in foul water drainage, unless the water has become contaminated, in which case treatment may be required, necessitating containment.	1	4

Approved	<i>The SRA must be approved by either the Director or Associate Director of Remote Sensing. This covers the predictable, advance information ahead of survey. The Dynamic Risk Assessment is supplementary and is undertaken by the pilot ahead of the actual survey flight.</i>		
Signed:		Title:	Director
Print:	Stuart Clough	Date:	20 July 2016

Signed:		Title:	Project Manager
Print:	Stephanie McGovern	Date:	20 July 2016

Onsite Information		Location:	New York Bight, New York
Project Number:	P00000274	Time:	06:00–19:00
Date:	25 June –22 August 2016	Pilot:	
Client:	NYSERDA	Survey Team:	John McCarthy, David Mullock
Contact Information	Name:	Contact No.:	
On Site Contact:	John McCarthy	+44 (0)7918 088596	
Office Contact:	Tracy Shaw / Stephanie McGovern	+44 (0)7436 269 325 / +44 (0) 7717 421 040	
	YES / NO (Delete as applicable)	Details (where applicable)	
Has necessary training and information been given?	YES/NO	i.e., any training required to use a specific piece of equipment etc.	
Are there adequate First Aiders available?	YES/NO	i.e., names of qualified first aiders in survey team	
Is permission required to survey on site?	YES/NO	i.e., permission from FAA, USAF, etc.	
Is adequate insurance coverage in place?	YES/NO		
Other aspects to consider:			
Overall: Is the initial risk assessment approved above still relevant during the survey for each identified hazard? YES/NO			

Onsite (Dynamic) Risk Assessment				
Additional Hazards Identified	Severity (1–5)	Control Measures in Place	Likelihood (1–5)	Risk Value (Severity x Likelihood)

Onsite (Dynamic) Risk Assessment				
Additional Hazards Identified	Severity (1–5)	Control Measures in Place	Likelihood (1–5)	Risk Value (Severity x Likelihood)
Assessment undertaken by pilot: Signed:				
Name (Print):				
Title:				
Is it safe to proceed with the survey? (mark as appropriate)		YES ☐ NO ☐		

Survey Team		
I confirm I have read and understood the risks highlighted in this risk assessment and have had the opportunity to raise any issues or concerns.		
Name (Print):	Signed:	Date:

Appendix 2. Wearing Immersion Suits for Offshore Operations

APEM Risk Assessment (RA) Form

Assessment Code: FRA009	Location / Dept: Aerial Surveys (New York Bight) Assessor's Name: Mark Jowett, RS H&S Coordinator	Further assessments required (attach subsequent assessments to this form where applicable):	Persons involved in or affected by the task:	Special Groups required (attach subsequent assessments to this form where applicable):																																										
Title: Wearing of Immersion suits for offshore operations. Risk Assessment Key <table border="1"> <thead> <tr> <th colspan="3">Severity of Consequences</th> <th colspan="3">Likelihood of Occurrence</th> </tr> <tr> <th>Definition</th> <th>Meaning</th> <th>Value</th> <th>Definition</th> <th>Meaning</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>Catastrophic</td> <td>Equipment destroyed, fatality</td> <td>5</td> <td>Frequent</td> <td>Likely to occur many times</td> <td>5</td> </tr> <tr> <td>Hazardous</td> <td>A large reduction in safety margins. Serious injury</td> <td>4</td> <td>Occasional</td> <td>Likely to occur sometimes</td> <td>4</td> </tr> <tr> <td>Major</td> <td>A significant reduction in safety margins. Serious incident, injury to persons</td> <td>3</td> <td>Remote</td> <td>Unlikely but possible to occur</td> <td>3</td> </tr> <tr> <td>Minor</td> <td>Nuisance. Operating limitations. Use of emergency procedures. Minor incidents</td> <td>2</td> <td>Improbable</td> <td>Very unlikely to occur</td> <td>2</td> </tr> <tr> <td>Negligible</td> <td>Little consequence</td> <td>1</td> <td>Extremely improbable</td> <td>Almost inconceivable that the event will occur</td> <td>1</td> </tr> </tbody> </table> The Severity and Likelihood values are multiplied together to derive a risk value. The risk value must be lower than 6, otherwise the risk is unacceptably high and a further review of the task will be required.		Severity of Consequences			Likelihood of Occurrence			Definition	Meaning	Value	Definition	Meaning	Value	Catastrophic	Equipment destroyed, fatality	5	Frequent	Likely to occur many times	5	Hazardous	A large reduction in safety margins. Serious injury	4	Occasional	Likely to occur sometimes	4	Major	A significant reduction in safety margins. Serious incident, injury to persons	3	Remote	Unlikely but possible to occur	3	Minor	Nuisance. Operating limitations. Use of emergency procedures. Minor incidents	2	Improbable	Very unlikely to occur	2	Negligible	Little consequence	1	Extremely improbable	Almost inconceivable that the event will occur	1	Fire COSHH Manual Handling Display Screen Equipment Nursing and Expectant Mothers Young Persons	Employees ✓ Visitors Contractors ✓ Members of the public Others	Nursing and Expectant Mothers Young Persons Disabled Service Users
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		Risk Assessment Date:		05/10/2016																																										
		Risk Assessment Review Date:		05/10/2017																																										

Hazard Identification and Control Measures

Hazards Identified	Severity (1–5)	Control Measures in Place	Likelihood (1–5)	Risk Value
Ditching at sea: Survival times when immersed in sea can be as low as half an hour in sea temperatures of 12°C without an immersion suit.	5	All aircraft are fully serviced to ensure their continued serviceability for offshore work. Only twin engine aircraft can be used for offshore work to provide redundancy in the event of a single engine failure. Aircraft are fully inspected prior to takeoff to check for any faults. With all faults reported back to the person or company responsible for the aircraft airworthiness. Weather forecasts are checked daily during survey to ensure they meet the minima required (see APEM Aerial Surveys H&S P&P). Surveys are postponed if weather conditions do not satisfy these requirements. NOTAMS are checked daily to ensure no other aerial operations will affect the survey i.e. other aircraft flying at similar altitudes. Radio contact will be maintained with local RADAR / Radio services, with 'Ops Normal' calls made at a prearranged time interval to maintain communication. Survey plans are forwarded to these stations to indicate our area of operation. All survey crew engaging in offshore survey work must have Sea Survival training. All survey personnel must be trained in the use of and must wear manual inflating lifejackets when operating offshore. Survey Personnel are encouraged to wear suitable Immersion Suits at all times while working over open water. Survey crew are trained in the use of and must have an inflatable life raft on board when operating off shore.	1	5

Hazards Identified	Severity (1-5)	Control Measures in Place	Likelihood (1-5)	Risk Value
		Survey crew are trained in the use of and must carry Emergency Personal Locator Beacons for offshore operations.		
Overheating, Heat Exhaustion, and Dehydration: Wearing immersion suits in hot weather conditions inside the confines of the survey aircraft rapidly increase body heat and sweating. This can facilitate overheating, Heat Exhaustion and dehydration.	4	When mean sea temperatures are above 12°C It is acceptable to not wear immersion suits in on survey. These criteria are in line with conditions set by the armed forces. However the crew must have satisfactorily factored in the following criteria when making a decision not to wear a suit and should consult further literature if required. • Short and Long range weather forecast • Distance from shoreline • Survey altitude • Aircraft performance figures • Pilot Experience • Exposure and Remoteness of the survey area • Search and Rescue (SAR) coverage • Distance to nearest SAR facility and secondary facility • Maritime activity within the survey area • Sea currents and tidal patterns within the survey area If the crew is unable to satisfactorily answer the previous statement then provisions will need to be made to manage Overheating, Heat Exhaustion, and Dehydration. This can be done through various methods and techniques such as the following or consult further literature. • Increase airflow into the aircraft • Managed intake of liquid and food	1	4

Hazards Identified	Severity (1–5)	Control Measures in Place	Likelihood (1–5)	Risk Value
		• Increase time on the ground between flights • Wearing appropriate layers underneath the suit • Ensure the suit is made of a breathable fabric • Avoid flying during the warmer part of the day • The pilot can apply shading to the aircraft windows when parked in exposed sun		
Mobility: Overheating can reduce your body's ability to move quickly becoming 'sluggish' and also reducing reaction times. In the event of an emergency, reaction times need to be sharp and the ability to react in an emergency cannot be hampered.	3	See above.	1	3
Increased fluid intake: Overheating causes dehydration. Increased fluid intake to re-hydrate the body increases the need for a comfort break. Prolonging this causes stress to the body, affecting survey crew performance and ultimately flight safety.	3	See above.	1	3
Approved				
Signed:		Title:		
Print:		Date:		

Onsite (Dynamic) Risk Assessment				
Additional Hazards Identified	Severity (1–5)	Control Measures in Place	Likelihood (1–5)	Risk Value (Severity x Likelihood)

Is it safe to conduct the survey without an Immersion Suit? (mark as appropriate)	YES ☐ NO ☐
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If the answer to the previous question is “YES” please provide reasoning	
Reasoning (Minimum of 4 must be Identified)	Method of Mitigating Hazards Identified (Source of information, Weather outlook, SAR cover, etc.,)

Risk assessment undertaken by pilot and crew:			
Signed:			
Name (Print):		Title:	