The Proposed Islandmagee Natural Gas Storage Facility

ENVIRONMENTAL STATEMENT

ADDENDUM

Islandmagee
Storage

Environmental Statement Addendum

Islandmagee Natural Gas Storage Facility

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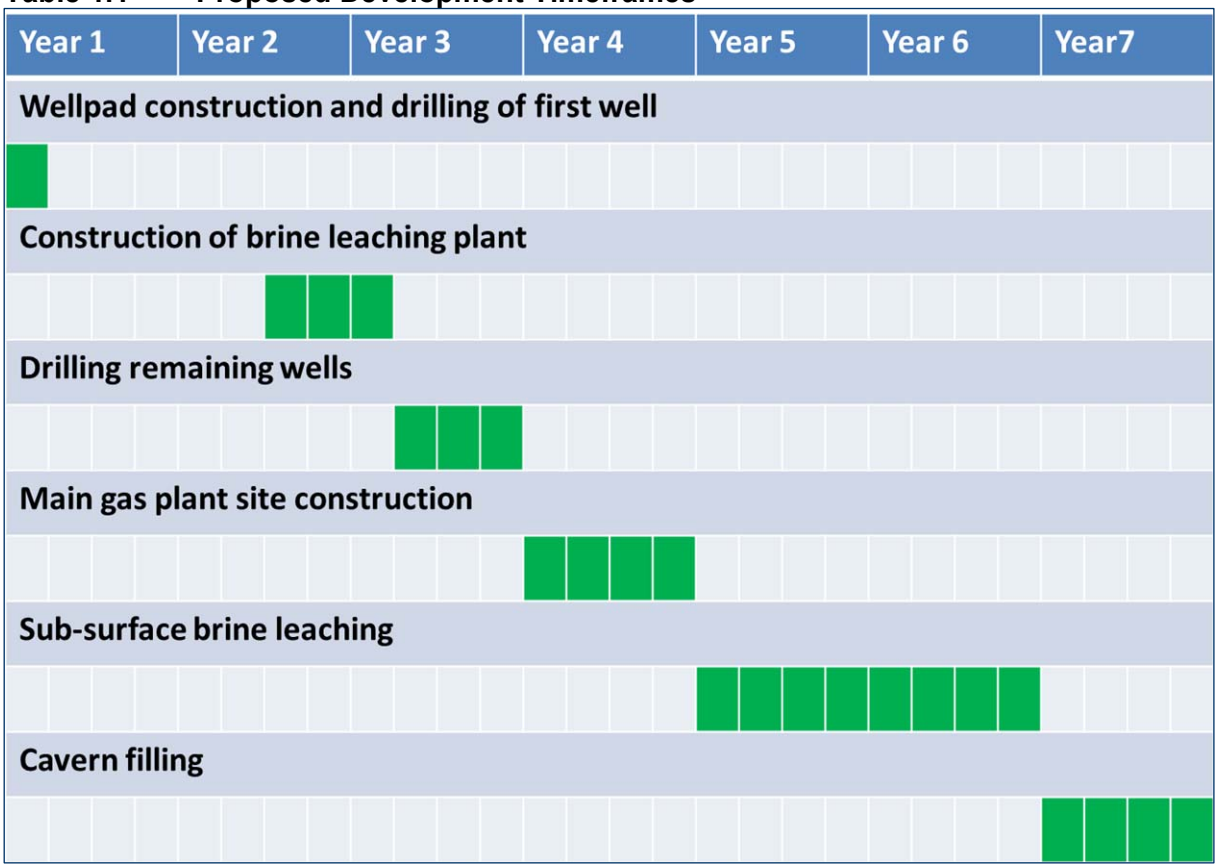
1.0 INTRODUCTION

This Addendum document for the Environmental Statement (ES) of the proposed Islandmagee Natural Gas Storage Facility has been compiled in response to the Planning Service NI request for further information in their letter of 26th August 2011, in accordance with Regulation 15 of the Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 1999. This document has been compiled in the same order as the comments in the Further Information request letter.

Within each of the responses in this document there is a degree of repetition, which mirrors the repetition in questions from the various statutory and non-statutory consultees. The main response repeated throughout this document is with regard to what activity is actually being applied for within the planning application, which the ES is supporting, and what will happen following planning approval.

The components of the proposed Islandmagee Natural Gas Storage Facility being applied for under the Planning (NI) Order 1991 are the above ground facilities and associated terrestrial pipelines. Further explanation of these proposed construction components and schedules can be found in **Appendix A - Proposed Construction Explained**. Following on from the publication of a detailed Environmental Statement (ES) and associated non-technical summary in March 2010, and as part of our ongoing consultation with the local community, Islandmagee Storage Limited produced this leaflet to summarise for local residents what would be involved in the construction process. A summary of the proposed timeframe for development construction and operation is also given below in **Table 1.1**.

Table 1.1 Proposed Development Timeframes



Any construction beyond the high water mark is not being applied for within this planning application, as it will be subject to a Marine Licence application under the Marine and Coastal Access Act 2009, and neither is any permission being sought to discharge brine to the sea, as will be subject to a discharge consent application under the Water (NI) Order 1999.

Gas storage facilities in salt sequences, such as that proposed by Islandmagee Storage Limited, have been operating safely in the UK since the 1970s. Islandmagee Storage Limited is committed to protecting the environment and undertaking all operations to the highest safety standards. In addition to requiring planning permission, the project will require approvals from third party stakeholders including the Northern Ireland Environment Agency and the Health and Safety Executive (NI) who will need to be fully satisfied on all environmental and safety aspects before licensing the construction and operational phases of the project. The site would also be subject to Control of Major Accident Hazards (COMAH) regulations in the same way as other strategically important gas infrastructure in Northern Ireland.

Although the project will take approximately seven years to complete, it is important to highlight that this is the timescale for the completion of the entire project and that the actual aboveground construction activities will be confined to non-continuous periods within the first four years of the project, set out as follows:

Year 1: Wellpad construction and drilling of first well: Construction activities will be confined to the wellpad site although some drilling equipment may be temporarily stored in a small portion of the Temporary Storage Compound. Site activities during Year 1 will only take place for 3-4 months (this includes six weeks for drilling the first well).

Year 2: Construction of brine leaching plant: There will be no construction activity for the first six months, during this time front-end engineering design will be completed and the first-phase construction contracts will be placed. During the second half of the year construction activities will be focused mainly on the leaching plant site, with some surplus rock removed from this location and transported across the road to the site of the main gas plant facility. Construction of the pipelines between the wellpad and the intake/outfall points near Bell's Port will also take place over a three-month period during this year. A small part of the Temporary Storage Compound will be used, where necessary, to store equipment and materials to ensure that deliveries to the north end of Islandmagee can be made outside peak commuting hours and periods when visitor traffic is expected to be high. The proposed Temporary Storage Compound has been shown on the planning drawings as comprising the entire area of hardstanding owned by NIE which was used formerly in the construction of the power station. In practice, only a small portion of this area will actually be required for the storage of materials associated with the gas storage project and the remaining area will not be disturbed.

Year 3: Construction of brine leaching plant and drilling remaining wells: the brine leaching facilities are expected to be completed and commissioned within the first three months of Year 3. Following this, site operations will transfer back to the wellpad site, where the

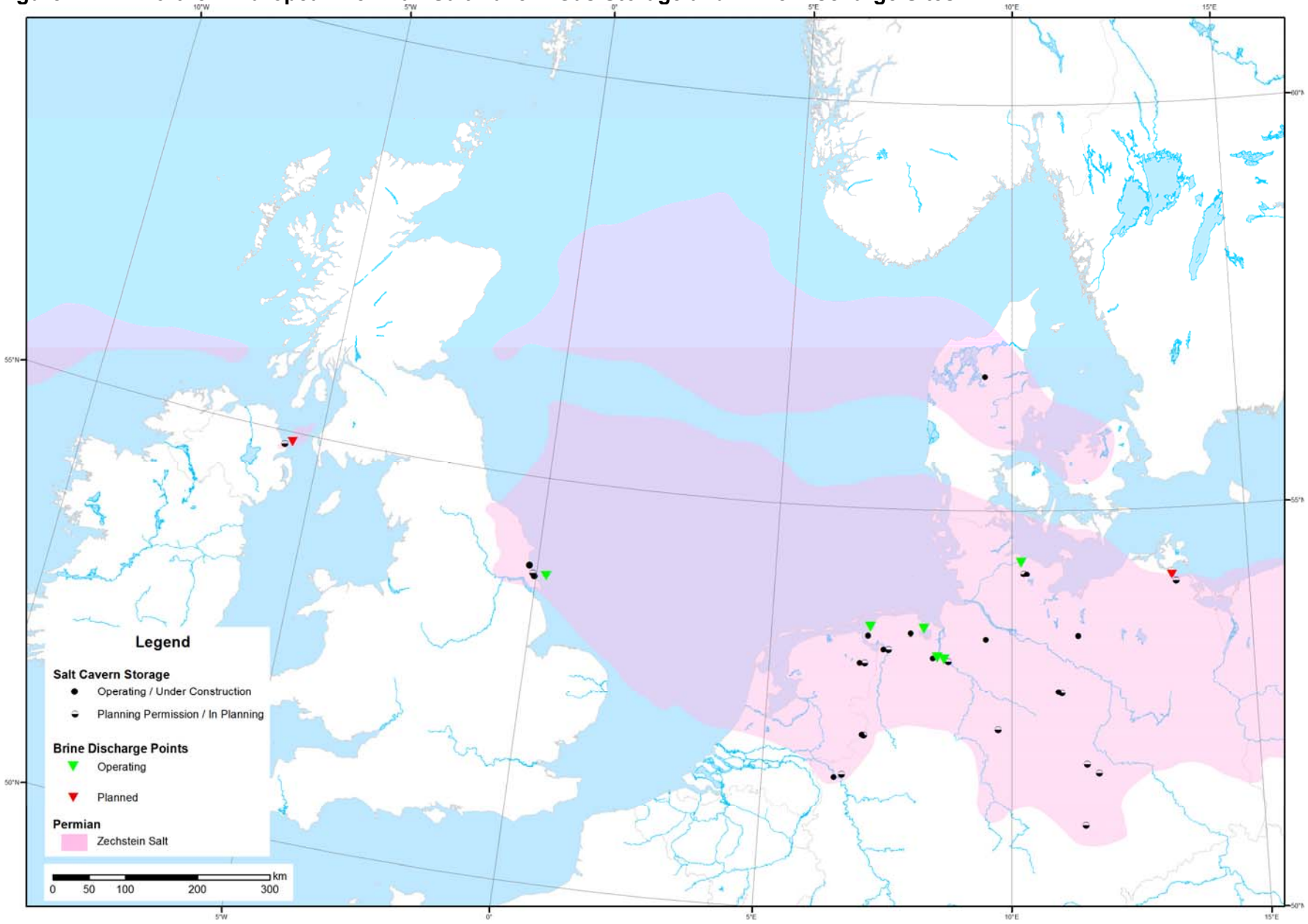
remaining six wells will be drilled. Drilling the six wells is expected to take approximately nine months in total.

Year 4: Main gas plant site: By year 4 construction works at the wellpad and leaching plant will have been completed and the focus of the construction activities will be on the main gas plant site. Construction here is expected to last for around 12 months with some equipment and materials temporarily stored in a small part of the Temporary Storage Compound, to facilitate deliveries during non-peak hours. At the end of Year 4 all surface construction activities will have been completed. Sub-surface brine leaching, where seawater is pumped down the wells and the brine is pumped back to sea, will continue until the end of Year 6 with the remaining caverns being filled with gas during Year 7. Therefore there will be no perceptible construction noise or traffic impacts arising at the surface during the last three years of project completion. Following the end of construction the brine pipelines will no longer be in operation and will be dry.

The Permian Zechstein Salt beneath Islandmagee is the same geological layer as is used for the majority of salt cavern gas storage projects throughout Europe, as shown in **Figure 1.1**. The nearest operational brine discharge from a gas storage facility is located at Aldbrough on the Yorkshire coast. The analysis of the Zechstein Salt composition at Aldbrough has been used within this ES Addendum as there is currently no salt core data available for Islandmagee. There is however wireline and drill cuttings data from the Larne-2 borehole drilled in 1981, located just 2,400 metres from the area of the proposed caverns, which indicates that a suitable salt section similar to that found in Aldbrough is expected. Indeed the data from the Larne-2 borehole well and the characteristics of the 3D seismic data acquired in 2007 by Islandmagee Storage Limited indicate that the salt is low in insoluble claystone.

The creation of a wellpad and borehole for the local salt testing requires planning permission under the Planning (NI) Order 1991, and is part of the current application to which this ES and Addendum apply. Following drilling of the borehole and physical/chemical analysis of the salt cores, the composition information will feed into the detailed design of the caverns and leaching process and hence inform the required application to NIEA for consent to discharge under the Water (Northern Ireland) Order 1999, which will also be accompanied by detailed environmental assessment. There is a statutory requirement for a further round of stakeholder consultation as part of the Water Order consenting procedure.

Figure 1.1 Northern European Permian Salt Cavern Gas Storage and Brine Discharge Sites.



2.0 NIEA WATER MANAGEMENT UNIT (WMU)

To comply with The Control of Pollution (Oil Storage) Regulations (Northern Ireland) 2010, Islandmagee Storage Limited will insist that all fuel and oil will be stored in bunded tanks with top outlets and inlets only within impermeable secondary containment and will have capacity to contain 110% of the maximum contents of the oil container. If more than one container is used the secondary containment system will be capable of storing not less than 110% of the largest container storage capacity or 25% of the aggregate storage capacity, whichever is greater.

The mitigation measures proposed to prevent pollution to fresh water from oil based drilling fluids and waste will be agreed between the appointed contractor and the NIEA WMU, and will be included within the detailed Method Statement for the proposed works. The Method Statement and Earthworks Management Plan will be submitted to the NIEA for agreement prior to commencement of any works on site.

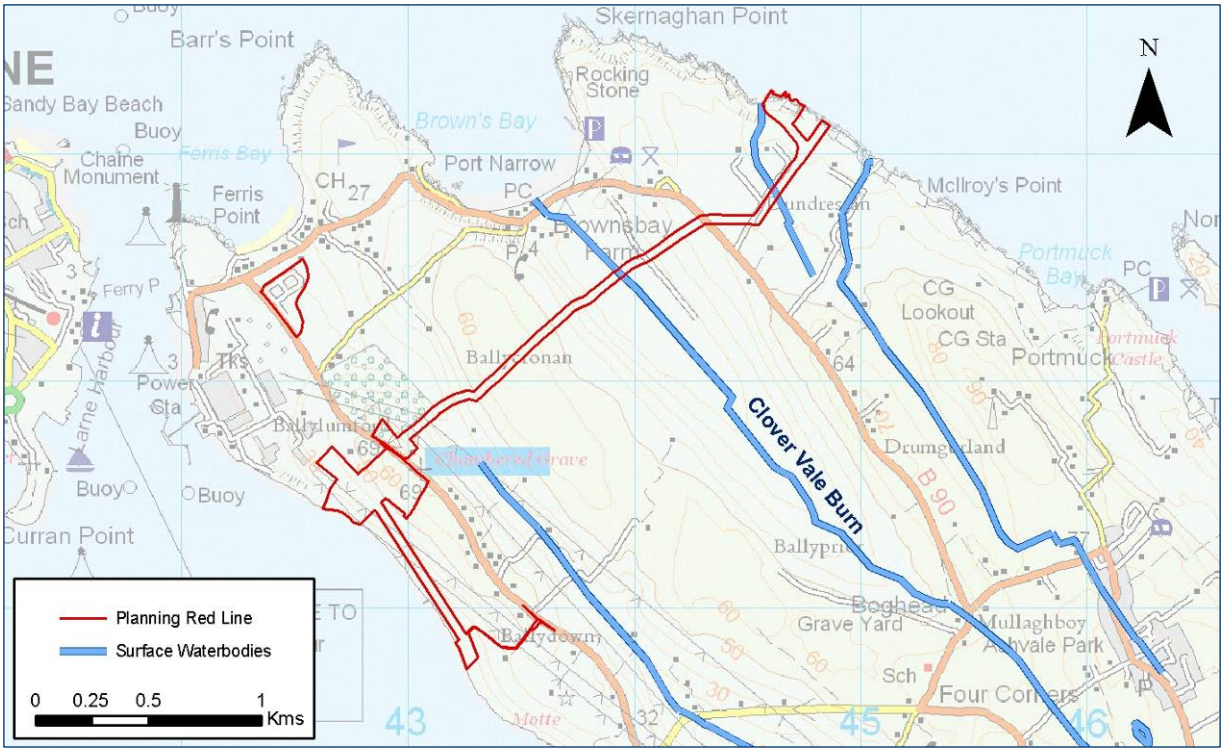
The practical use of silt fencing on site to help avoid run off will be investigated by the contractor within their Method Statement. Where appropriate this will be incorporated into the construction works.

The Method Statement regarding the installation of the pipeline will be agreed with the NIEA prior to commencement of any pipeline works on site.

Islandmagee Storage Limited will investigate the use of soakaways and SUDS in the detailed design for their site drainage. Site runoff from permanent features will be from hardstanding and thus no silty discharge would be expected. Soakaways and SUDS will also be incorporated into construction site drainage where feasible, with settlement ponds used as necessary to ensure that any material discharge has <50mg/l suspended solids.

The area of proposed works is in a coastal interbasin and so is not a reported Water Framework Directive (WFD) waterbody. This area therefore currently has no status and no water quality objective. The proposed construction works will have to cross two minor rivers during the laying of the brine and seawater pipelines; the Clover Vale Burn / Browns Bay River, 310m south of Brownsbay Farm, and an unnamed river that runs from Higginsons Lane to Castle Robin. The Clover Vale Burn is a Rivers Agency designated watercourse, but neither river is a designated salmonid or drinking water river. The method of crossing each of these two small rivers will be detailed in the Method Statement for the proposed works and will be agreed with NIEA WMU prior to commencement of works, to ensure that the water quality of these surface waters is not compromised. The location of surface waterbodies in the vicinity of the development area is given in **Figure 2.1**. Any potential disturbance to these rivers would only be limited to the relatively short construction period of the brine and seawater pipelines.

Figure 2.1 Surface Waterbodies



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The coastal waters surrounding Islandmagee are designated in the North Eastern River Basin Management Plan as coastal waterbodies, the details of which are given in **Table 2.1**. More information on the potential impact on the marine water quality is given in section 6.9 of the ES.

Table 2.1 Islandmagee Coastal Waterbodies

Name	Number	Status	Objective 2015
Larne Lough Mid	UKGBNI6NE060	Moderate	Good
Larne Lough North	UKGBNI6NE050	Good	Good Ecological Potential (Heavily modified waterbody)
Larne Lough South	UKGBNI6NE070	Moderate	Good
North Channel	UKGBNI6NE030	Good	Good

Implementation of the proposed Environmental Management Plan (EMP), and proposed mitigation measures, along with the incorporation of the required fuel and oil storage bunding measures, and soakaways/SuDS in site drainage with settlement ponds as required, will mean that construction and operation of the gas storage facility should have no negative impacts on the status of any of the surrounding coastal waterbodies, and should not prevent them from achieving their WFD status objectives for 2015. The Environmental Management Plan and the detailed Method Statement will be agreed with the NIEA WMU prior to their implementation, and an Environmental Manager will be appointed by Islandmagee Storage Limited as a contact for the NIEA WMU.

Islandmagee Storage Limited will fully comply with the requirements of the Water (NI) Order 1999 for any required discharges, the water Abstraction and Impoundment (Licencing) Regulations (NI) 2006 for any impoundments or abstractions, and marine licencing under the Marine and Coastal Access Act 2009 for any marine construction requirements, associated with the construction and operation of the gas storage facility. These consents will be applied for following the planning process. This first well drilled will provide information on the actual salt composition in strata in which it is proposed to construct the caverns, which will be essential to inform the granting of a discharge licence.

Further explanation of the proposed construction components and schedules can be found in **Appendix A** - Proposed Construction Explained.

3.0 NIEA HISTORIC MONUMENTS UNIT (HMU)

An archaeological assessment of the results of the marine geophysical survey has been carried out by ADCO and the report for this can be found in **Appendix B** of this Addendum document. This assessment did not identify the presence of any archaeological features along the proposed route of the brine outfall.

During the site preparation works for the brine pipeline, and construction of the seawater pumping station at Castle Robin, the Defence Heritage Site ANT 041:050 will be fenced off to prevent accidental encroachment upon the scheduled area, to comply with the condition posed by the NIEA Built Heritage under Policy BH 4 of PPS 6.

Archaeological monitoring of topsoil stripping and excavation works will be timetabled to occur as early as feasibly possible within the construction timeframe. The timings of works and details of the qualified archaeologist(s) will be specified within the Environmental Management Plan and the detailed Method Statement.

4.0 COUNCIL FOR NATURE CONSERVATION AND THE CONUTRYSIDE (CNCC)

The Permian Zechstein Salt beneath Islandmagee is the same geological layer as is used for the majority of salt cavern gas storage projects throughout Europe. The nearest operational

brine discharge from a gas storage facility is located at Aldbrough on the Yorkshire coast. The analysis of the Zechstein Salt composition at Aldbrough has been used within this ES Addendum as a reasonable geological assumption, as there is currently no salt core data available for Islandmagee. The creation of a wellpad and borehole obtain samples of the local salt for testing requires planning permission under the Planning (NI) Order 1991, and is part of the current application to which this ES and Addendum apply. Following drilling of the borehole and physical/chemical analysis of the salt cores, the composition information will feed into the detailed design of the caverns and leaching process and hence inform the required application to NIEA for consent to discharge under the Water (Northern Ireland) Order 1999. There is a statutory requirement for a further round of stakeholder consultation as part of the Water Order consenting procedure.

Further response with regards to the potential effects on marine flora and fauna can be found in **Appendix C**.

5.0 GEOLOGICAL SUVREY NI (GSNI)

The comments made by GSNI relate to clarification on procedures to be adopted by Islandmagee Storage Limited during construction and operation to ensure the protection of the physical environment.

This response is considered in 3 sections:

- Wellpad Site Construction;
- Drilling;
- Cavern Construction and Operation.

5.1 Wellpad Site Construction

Prior to the commencement of work on the wellpad site, a site investigation will be conducted including trial pits, trenches and shallow boreholes to determine the location of any potentially weak or permeable soils, determine soil characteristics and determine the construction of the safe slopes. Any information relating to the water table will also be noted.

Whilst this information is important to ensure the stability of the site, the construction of the initial drilling site will follow the form of construction that has been developed over the past 40 years for oil and gas drilling sites located within England. This takes account of the potential extreme vulnerability of some soil types and aquifers that may be located beneath such sites. The standards used have not been formally set (as in British Standard), but have been adopted as industry norms in England for wellpad construction in liaison with the Environment Agency, whether the sites are located within a sensitive environment, a flood plain or elsewhere. Islandmagee Storage Limited will adopt these rigorous well established standards at Islandmagee.

When the site is prepared for the first well it will be built at the width shown on the application drawings, but not necessarily the fully developed length. Upon completion of the first

borehole and the satisfactory completion of all laboratory and down-hole tests, the site may be further extended to accommodate the remaining cellars from which the boreholes would be drilled to access the remaining cavern positions. Subsequent cellars would use the information acquired whilst constructing the first cellar to refine the design, as necessary. Upon completion of the drilling, and assuming the project is proceeding to full construction, the permanent site surface would then be constructed.

The standard approach to site design is to place emphasis on the design of a watertight site that will reduce the impact of local variations in soil type upon the site construction.

It is proposed to use the following standard construction methodology for the wellpad at the Islandmagee site as follows:

- The top soil will be removed from the site area and stockpiled in a suitable location to avoid slope instability.
- The site area will be levelled by excavation into the hillside and re-utilising the excavated material as fill under the down-slope side of the site in a traditional cut-and-fill process. Provision has been made for rock-filled gabions, which will facilitate the construction of steeper cuttings without the need for excessive up-slope batters. Design of these rock retaining walls will be refined when the results of the site investigation are available.
- Surface water cut-off drains will be located uphill from the site to divert surface water run-off away from the excavated face in such a way so as to avoid erosion.
- A protective geotextile membrane would be laid upon the formation surface prior to laying a Bentomat membrane over the entire site. This Bentomat membrane comprises a composite construction of a woven fabric geotextile confining a bentonite layer. This product is mainly used on landfill sites and basements to prevent the ingress of water and is self-healing by virtue of the expansive qualities of the bentonite. This product has been successfully used on a drilling site located on highly porous chalk formations less than 200m upstream of a water abstraction point within the UK. All the drilling sites constructed under the control of the Applicant's Engineer since that first site have had a Bentomat membrane under the site and no pollution issues have been raised.
- The drilling platform would then be formed using a stone layer placed on top of the Bentomat, designed to carry a minimum bearing pressure of 200kN/m^2. This corresponds to the maximum bearing pressures experienced under crane outriggers, which normally impose the most concentrated loads. The drilling rigs are usually located on 'boats' or mats that spread the self-weight and mast loads to reduce the imposed load to about 150kN/m^2.
- The working area around the cellars is constructed of concrete to provide a relatively easily cleaned surface, over which the drilling rig would be located. The Bentomat would be continued under the concrete pad and cast into the concrete backfill around the cellars to ensure a complete seal is achieved.
- The cellar would be constructed using a standard detail adopted to prevent pollutants from leaking into any permeable soil layer that may be present beneath the cellar and, in this case, prevent any potential leakage down-slope into Larne Lough. This detail comprises the construction of a concrete base for the cellar, into which the conductor

casing is cast. The conductor casing will have flanges welded to the outside to form a collar around the pipe that is cast into the concrete.

- Upon completion of the installation of the mouse hole (the storage area on a drilling rig where the next joint of drilling pipe is held until needed) and conductor casing, a second concrete slab would be cast in the base of the cellar sandwiching a Bentomat layer to give further protection against leakage.
- Any additional pipes, used as containers for temporarily storing a length of drill pipe or the drilling kelly, that are embedded within the soil beneath the site would be placed within an excavation and the annulus between the pipe and the pocket concreted up to the underside of the Bentomat to ensure that there is no drainage path into the soils below. A drainage pipe or conduit will connect the mouse hole and rathole into the cellar so that any fluids returning from the mouse hole and rathole (the storage area on a drilling rig into which the kelly and swivel are placed when hoisting operations are in progress) will be discharged into the cellar.
- The initial section of the well (the conductor casing) is usually pre-installed during construction of the wellpad (discussed further below in the drilling section), prior to the arrival of the main drilling rig and the process of installation will depend on the outcome of the site investigations. Where relatively soft soils are encountered, the casing would be driven through them to embed into a more competent layer, ensuring that there is no leakage of drilling fluids into the soils. For harder materials, the conductor casing might be installed using an air hammer with air flushing to create a void into which the conductor casing would be concreted. Whichever method is adopted, the purpose of the conductor casing is to provide a stable protection to the upper, often less compacted, soils to prevent loss of fluids into the ground and to prevent the borehole excavation from collapsing underneath the cellar.
- It should be noted that the cellars will be sunk into the ground by between 2 and 5 m, thus providing an early indication of any markedly different soil conditions to those experienced in any trial pits or boreholes.
- Upon successful completion of the first borehole and the subsequent testing, the drilling platform will be extended to its full length to accommodate the other cellars. The same level would be maintained and the construction of the cellars would reflect the experience gained when building the first cellar.
- The waterproof membrane would be extended prior to the stone surfacing being laid. This is straightforward because the Bentomat membrane is extended by lapping a new strip adjacent to the existing membrane, using a line of bentonite granules along the lap. The weight of the membrane and the stone surfacing above, combined with the expansive nature of the bentonite, forms a watertight seal without mechanical bonding.
- Upon completion of the drilling, and prior to the full leaching programme taking place, the reinforced concrete service trenches and permanent pipework would be installed, retaining the Bentomat membrane and continuing it under the new trenches. The site surface would then be cleaned and left as a graded stone surface.
- Rainwater drainage from the site would be contained in a perimeter ditch that would be lined with Bentomat and protected from degradation by either a concrete lining or infilling with large single-sized stone. The ditch would discharge to an oil interceptor of either the by-pass or three chamber design, and then into a suitably-sized balancing pond for controlled discharge into a suitable water course or soakaway. The discharge valve

from the site would be closed during drilling operations to ensure total control of any spillages. The outflow from the balancing pond would also have a valve fitted to prevent any pollutants in the pond from being discharged accidentally.

5.2 Drilling

Drilling would be in accordance with the Petroleum Production Regulations (NI) 1987' and the 'Borehole Sites and Operations Regulations (NI) 1995' and the 'Offshore Installations and Wells (Design and Construction, Etc) Regulations (NI) 1996', and the information regarding well design and programming would be presented to DETI (GSNI) in an 'Application for Consent to Drill', following the format, on a point-by-point basis, as established in Sections 2 to 6 of the 'Petroleum Drilling Requirements in Northern Ireland August 2007'.

While this well is not being drilled with the intention of exploration for or development of petroleum reserves, none the less, all aspects of the well programme will be consistent with the design and operational management of a hydrocarbon exploration well in the event that any hydrocarbons were encountered whilst drilling. Experienced and qualified personnel will be on location and well control equipment will be in place throughout.

Regarding well design measures for prevention of pollution; after setting up the drilling rig on location and with the conductor casing pre-installed, the top well section will be drilled using a fresh water based drilling fluid as this section penetrates the Cretaceous Ulster White Limestone (Chalk). While drilling this top well section correlation of cuttings descriptions is expected with the nearby Larne-2 well. This will allow the section total depth to be accurately selected into the top of the Triassic Mercia Mudstone Formation at approximately 200m below site ground level. A Surface Casing string will then be set and cemented in place into the top of the Mercia Mudstone Formation, so isolating and protecting the Cretaceous Ulster White Limestone, which may be in contact with surface water ways and / or the local or regional aquifer, prior to using other than fresh water based drilling fluid. This casing point will also establish suitable well pressure integrity and strength prior to drilling the subsequent well section. The efficacy of the cementation seal of the Surface Casing's shoe into the Mercia Mudstone Formation will be confirmed during a Formation Integrity Test, to be carried out after drilling out of the Surface Casing at the start of the subsequent well section.

5.3 Cavern Construction and Operation

In 1981 a borehole, Larne-2, was drilled close to the docks in Larne and, encountered a 113 metre thick sequence of Permian salt at a depth of 1,688 meters. During 2007 Islandmagee Storage Limited carried out a 3D seismic survey in order to confirm the extent of the salt sequence seen in the Larne-2 borehole, just 2,400 metres from the proposed site of the caverns. Seismic data was acquired in the northern half of Larne Lough using shallow-draft boats and on roads adjacent to the Lough by Vibroseis trucks. Interpretation of the seismic data revealed that the salt in the target area is at a depth of approximately 1,400 metres, with a thickness of approximately 200 metres.

The first well drilled from the wellpad will confirm the seismic interpretation. In addition to collecting comprehensive wireline log data, the well will also allow cores to be cut and recovered across the Permian salt interval. The information collected in the well will provide the necessary data, including comprehensive rock mechanical properties, required during the Front-End-Engineering Design process to fully develop the design of the caverns, for their use in the storage of natural gas. DETI (GSNI) and HSE (NI) will be consulted throughout the data gathering and design period. The cavern construction and operational period will fall under the Control of Major Accident Hazards regulations (COMAH) enforced by HSE (NI). The regulations ensure that all businesses "Take all necessary measures to prevent major accidents involving dangerous substances and limit the consequences to people and the environment of any major accidents which do occur".

The design of the complete gas storage scheme, including that of the casing programme for the drilling of the wells and for the solution mining process and cavity design, will follow the established European and British Standard 'BS EN 1918 Part 3 1998' (Gas Storage system – Underground gas storage – Part 3: Functional recommendations for the storage in solution mined salt cavities). This includes in Section 6 recommendations regarding the testing and commissioning of wells and cavities and in Section 7 recommendations regarding the monitoring and maintenance of the scheme.

During the construction of the wellpad and drilling operations, and throughout cavern construction and operation, for the protection of surface water and groundwater resources, Islandmagee Storage Limited will adhere to all relevant requirements of The Water (Northern Ireland) Order 1999 and amendments, The Water Environment (Water Framework Directive) Regulations (NI) 2003 and The Groundwater Regulations (NI) 2009 and amendments.

6.0 ROYAL SOCIETY FOR THE PROTECTION OF BIRDS (RSPB)

6.1 Further Commitments to Monitoring

Islandmagee Storage Limited will insist that best practice construction guidelines and an effective project specific Environmental Management Plan (EMP) are adhered to by the successful contractor. This plan shall be submitted to the client representative and NIEA for approval prior to works and will include a monitoring strategy to monitor any impacts on nesting and foraging seabirds. It is anticipated that RSPB will be given an opportunity to comment on the active monitoring strategy as the plan is being prepared.

6.2 Brine Plume

The Permian Zechstein Salt beneath Islandmagee is the same geological layer as is used for the majority of salt cavern gas storage projects throughout Europe. The nearest operational brine discharge from a gas storage facility is located at Aldbrough on the Yorkshire coast. The analysis of the Zechstein Salt composition at Aldbrough has been used within this ES Addendum as a reasonable geological assumption, as there is currently no salt core data available for Islandmagee. The creation of a wellpad and borehole to perform the local salt

testing requires planning permission under the Planning (NI) Order 1991, and is part of the current application to which this ES and Addendum apply. Following drilling of the borehole and physical/chemical analysis of the salt cores, the composition information will feed into the detailed design of the caverns and leaching process and hence inform the required application to NIEA for consent to discharge under the Water (Northern Ireland) Order 1999. There is a statutory requirement for a further round of stakeholder consultation as part of the Water Order consenting procedure.

Concerns were raised by RSPB over the potential of the brine plume to interact with important local spawning grounds of tern prey species. Northern Ireland terns typically take the fry of sandeel, clupeid and gadoid prey species, but are opportunistic to some degree taking a wide range of prey items overall. The potential impact on sandeels, a key prey species for many seabirds associated with adjacent designated sites is detailed in **Appendix C,** however in brief the site has not been identified as being a spawning ground for important economic or ecological species, nor have spawning grounds been reported to occur near by. An interim report presenting preliminary data and interpretation from ongoing coastal seabird surveys is presented in **Appendix D1** and includes discussion on typical seabird prey items.

6.3 Pollution Event

Islandmagee Storage Limited will insist on best practice construction guidelines and an effective environmental management plan (EMP) being drawn up and adhered to by the successful contractor. This plan shall be submitted to the client representative and NIEA for approval prior to works and will include a monitoring strategy to monitor the impacts on nesting and foraging seabirds. It is anticipated that RSPB will be given an opportunity to comment on the proposed active monitoring.

6.4 Impacts on Non-SPA Birds (ASSI Features, General Bird Populations)

The potential impact of the brine discharge on the key prey species of seabirds associated with Larne Lough (and Swan Island) SPA, Ramsar Site and ASSI, Gobbins ASSI and Portmuck ASSI and additional species of conservation concern recorded from coastal seabird surveys and existing data sets has been investigated during the preparation of this response. An interim report presenting preliminary data and interpretation from ongoing coastal seabird surveys at Islandmagee is presented in **Appendix D1** and should be read with **Appendix C**. A further and final report will be submitted following completion of the full year of coastal bird surveys in April 2012.

If it is determined that blasting is required at the site of the pumping station at Castle Robin a detailed methodology will be prepared and submitted with the EMP for approval by the NIEA. The interim report presented in **Appendix D1** outlines locations of nesting black guillemots noted during 2011 within the vicinity of Castle Robin Bay. To comply with statutory legislation construction works at Castle Robin Bay will be undertaken outside of the breeding bird season. The breeding bird season is not defined in Northern Ireland legislation but is broadly acknowledged as March to August. September has been highlighted as an appropriate month during which to carry out any required blasting.

6.5 RSPB Recommendations

Relocation of vent stack: The RSPB suggestion to relocate the vent stack to an adjacent area will be taken into consideration in the final design of the proposal. However no guarantee can be given as there are safety and operational factors to be considered which may severely limit the scope to relocate.

Construction disturbance: Islandmagee Storage Limited has committed to good working practices for all construction and will adhere to all relevant noise and vibration guidelines.

Translocation: As part of the construction management plan, topsoil containing seed source of primrose at locations identified in ES figures 5.3A and 5.3B shall be retained and reused for final landscaping.

Vegetation Removal: Prior to any vegetation removal a 'pre-vegetation clearance' survey will be undertaken to ensure no offence will be committed under the Wildlife (Northern Ireland) Order 1985 as updated by the Wildlife and Natural Environment Act (Northern Ireland) 2010. Article 4 of Part II of the Wildlife (Northern Ireland) Order 1985 as updated by the Wildlife and Natural Environment Act (Northern Ireland) 2010 states that —

Subject to the provisions of this Part, if any person intentionally or recklessly—

(a) kills, injures or takes any wild bird; or
(b) takes, damages or destroys the nest of any wild bird while that nest is in use or being built; or
(ba) at any other time takes, damages or destroys the nest of any wild bird included in Schedule A1; or
(bb) obstructs or prevents any wild bird from using its nest; or
(c) takes or destroys an egg of any wild bird,

he shall be guilty of an offence.

There is no dated season within which this offence can be committed. A 'pre-vegetation clearance survey' will be undertaken by a competent third-party ecologist prior to any vegetation removal as part of the Islandmagee Storage project. Removal of vegetation will be carried out immediately after the 'pre-vegetation clearance survey' has been undertaken and only when the ecologist is satisfied that no offence will be committed under the statutory legislation.

Species rich plots and bird boxes: RPS welcomes RSPBs comments for additional habitat enhancement measures for farmland birds. RPS ecologists acknowledge that the provision of suitable foraging habitat e.g. Giant Bird Tables and Species Rich Meadows to provide seed and insect sources near to nest boxes encourages their uptake. Such measures will be discussed with landowners and it is hoped RSPB will welcome discussions regarding species rich plots, their suitability, placement and design to improve local habitats.

Black Guillemot roost and nest sites*:* In addition to the commitment to restricting blasting works outside of the breeding bird season, habitat enhancement measures will be put in place for the small colony of nesting Black Guillemots in the Castle Robin Bay locale through the installation of nest tunnels. In consultation with RSPB and NIEA, the placement of wooden nest tunnels will be considered.

Yellow Hammer and Twite: Refer to rich plots above. Through consultation and agreements with landowners measure but a habitat enhancement would be considered. Islandmagee Storage Limited is committed to local wildlife conservation.

Monitoring: Islandmagee Storage Limited will employ a third party auditor as best practice to undertake monitoring. It is hoped that RSPB and NIEA will welcome discussions in producing a clear list of tern and non-SPA bird species prey items, which will be included in investigative studies on the impact of elevated salinity and also in real-time monitoring. On RSPB recommendations an annual assessment i.e. colony count of nesting black guillemots and terns, will be undertaken as part of a monitoring strategy under the projects Environmental Management Plan (EMP). Details of the annual assessment will be agreed with NIEA in advance.

Currently RSPB undertake an annual tern colony count at Swan and Blue Circle Island. It is important to note that terns in Northern Ireland are suffering a steep decline. There are a number of theories as to why this is occurring, but is thought that noise is not the critical element. Annual colony counts for species cited (terns and black-guillemots) for the duration of the drilling operations could be undertaken in cooperation with RSPB and NIEA to assist with bird count databases.

7.0 DOE LANDSCAPE ARCHITECTS (LA)

In response to the request from DOE Landscape Architects please see submitted drawings titled Vegetation Removal and Restoration Plan (Dwg nr: 1024.0.01 to 03) in **Appendix E** of this document. These drawings indicate the vegetation to be removed and retained and are cross-referenced to Chapter 5 Terrestrial Flora, Fauna and Birds Section 5.3.6.1 Habitat Description for individual species. Replacement species have been included where vegetation has to be removed. Replacement species reflect those found on site. It is not feasible, and in our view not necessary, to photograph every tree or shrub to be removed as the drawings now submitted are an accurate record of vegetation on site and also complies with all previous planning applications where RPS have been requested to submit vegetation removal and retention drawings.

RPS can confirm that where the pipeline runs parallel to a hedgerow to be retained or crosses hedgerows that a temporary protective fence in accordance with BS 5837:2005 will be erected and that where the pipeline crosses a hedgerow the working area will be kept to a minimum as illustrated in Vegetation Removal and Restoration Plan.

Enhancement of existing hedgerows with native species has been included in the Vegetation Removal and Restoration Plan drawings.

With regards to the traversing of watercourses DCAL Inland Fisheries (see section 23.0), NIEA and Rivers Agency will be consulted prior to commencement of works. Although the Clover Vale Burn / Browns Bay River is a Rivers Agency designated watercourse, we note they comment in the Further Information request "Rivers Agency has no comment to make from the environmental aspect".

The submitted Vegetation Removal and Restoration Plan drawings will ensure that reinstatement results in little change to the landscape.

8.0 FISHERIES AND AQUATIC ECOSYSTEMS BRANCH (FAEB)

The FAEB made several comments on information and recommendations to take into account for the assessment of this proposal. The FAEB commented that the EIA should note the significant dredge fishery for scallop (*Pecten maximus*) in the vicinity of the discharge, however the general area is acknowledged as "an important area for scallop fishing" under section 6.7.3.2 Bivalve Fishery of the ES.

The FAEB recommend the use of moored instrumentation to validate modelling studies, notably at the mixing area around discharge point, for the period during operations. This recommendation has already been included in the ES in section 6.7.5.2, Monitoring of Brine Dispersion: "It is recommended that brine dispersion be monitored continuously through the deployment of sonde devices located on the seabed at selected positions throughout the mixing zone. In addition it is suggested that, in advance of the commencement of leaching, a trigger level be set for salinity at a pre-determined distance from the outfall. Exceedance of the trigger level would result in a temporary suspension of leaching".

The FAEB comment that ecotoxicological consent may be necessary for brine discharge. It should be noted that the brine discharge will be subject to extensive testing post planning approval, before application for consent to discharge under the Water Order. The creation of a well pad for drilling a borehole to obtain cores for salt testing requires planning permission, and forms part of the current application that this ES and Addendum supports. Following drilling of the borehole and physical/chemical analysis of the salt cores, the composition information will feed into the detailed design of the caverns and leaching process and hence inform the required application to NIEA for consent to discharge under the Water (Northern Ireland) Order 1999. There is a statutory requirement for a further round of stakeholder consultation as part of the Water Order consenting procedure.

9.0 RIVERS AGENCY

DARD Rivers Agency has commented on the design of the seawater intake, pumping station and brine outfall. The Agency advises that these structures may be subject to flooding from

the sea and that the predicted 1 in 200yr sea level at this location is 2.92m OD Belfast. However in response, both the seawater intake pumps and the brine outfall are designed to be submerged. The seawater intakes will be slightly offshore of the pumping station at -5.73m OD Belfast to ensure that they are always submerged below the minimum recorded tidal level. The brine outfall will be located 450m offshore in water 27m deep. This distance and depth has been selected to provide adequate dispersion of the brine solution, and thus minimise any impact on local marine communities. The seawater pumping station is designed with an internal floor level at an elevation of +5.5m OD Belfast, taking into account that the 2100 Estimated Still Water Level (EWL) based on current climate change projections is +3.86m OD Belfast. This structure needs to be located at a relatively low level for operational reasons and the final design and construction of the pumping station will be required to withstand potential wave action at the site. All openings will be located on the landward side of the structure and only materials suitable for a marine environment will be used for the construction of this facility. Any electrical equipment located within the pumping station will also be required to be adequately protected against water ingress due to the presence of open water in the chambers within the curtilage of the building.

Islandmagee Storage Limited, in liaison with the chosen contractor, will consult with Rivers Agency with regards to the brine pipeline crossing of designated and un-designated rivers during compilation of their Method Statement for the proposed works to receive advice and for consent as required under the Drainage Order.

10.0 ROADS SERVICE

Roads Service commented on the requirement for additional detail on access drawings i.e. edge of road identified, alterations for provision of splays, proposals at the back of splays, drainage etc. The drawings requested have been provided in **Appendix F** and are listed below:

- IBH0284/0010 – Overall Site Layout;
- IBH0284/0020 – Site Access 1 – to Sea Water and Brine Pumping Facilities and Main Gas Facilities;
- IBH0284/0030 – Site Access 2 – to Well Pad;
- IBH0284/0040 – Site Access 3 – to Sea Water Intake Pumping Station and Brine Outfall.

Roads Service commented that there was no detailed drawing of the access lane to the sea water intake pumping station or proposals to alter this access. Roads Service sought a plan of the visibility splays at this junction. Drawing number IBH0284/0040, here included, details the proposed access to the sea water intake pumping station and brine outfall from the B90, Brown's Bay Road. Visibility splays of order 2.4m x 90m are provided at both accesses at this location. The drawing shows the existing hedge lines and the areas to be removed and disposed of in order to maintain visibility splays.

Roads Service also commented that Hollow Road has been identified as having potential problems with visibility and unsupported edges, which if overrun by HGVs would lead to

damage. Roads Service request advice if the route is under consideration for use or like Millbay Road is deemed unsuitable. Hollow Road has been identified as a potential route for use during construction of the proposed development. Construction traffic would preferentially use the B90 Browns Bay Road for the majority of HGV trips, however during busy periods (e.g. holidays and weekends) Hollow Road may have to be used to prevent congestion at Browns Bay. In relation to the condition of Hollow Road, the route assessment was previously carried out in 2008 and it appears repairs have been made to the road where previously unsupported edges may have been reported. Monitoring of the road surface during construction periods will identify any problems with the road surface and will allow for appropriate action/repair to be taken as necessary. Visibility concerns were raised regarding overgrown hedges, which could be trimmed back to ensure there is no impact on visibility particularly at the bend highlighted in the previous route assessment. The final construction traffic proposals will have to be agreed with Roads Service, in consultation with local stakeholders, as part of the traffic management plan for the construction phase.

Roads Service has requested more elaboration on the construction/set down area. This is an existing area of hard-standing on Ballylumford Road, in the vicinity of the junction with the Ferris Bay Road (noted on drawing IBH0284/0010) which is proposed to be used as an area for the temporary storage of materials during periods of construction in the event that there is not sufficient space on the actual construction site. It is not anticipated that there will be significant traffic movements associated with the temporary set down area.

Roads Service commented that Photos 13-17 in the ES Appendix 8.9 appear to be labelled incorrectly. Please confirm to avoid confusion. RPS has found that the photographs are labelled incorrectly, and apologise for the inconvenience. The following are the correct captions for each of the photographs:

- Photo 13 – Details the access to the sea water pumping station and brine outfall (LHS emerging looking south) on Browns Bay Road.

- Photo 14 – Looking north along the B90 with the pumping station access on the right of the photo.

- Photo 15 – Details a crest on the B90 approximately 50m north of the proposed well pad access.

Photo 16 – Details the access to the Well Pad (RHS emerging view south) on Ballylumford Road.

- Photo 17 - Details the LHS emerging view from the Well Pad access (looking north).

11.0 NIEA NATURAL HERITAGE

Islandmagee Storage Limited do not agree that there is insufficient information to support the application for planning under the Planning (NI) Order 1991, for which this current application and Addendum apply. This application to which this ES and Addendum apply is for the following proposal:

"Above ground facilities associated with proposed Gas Storage Facility for the storage of natural gas. Includes underground pipelines, gas storage plant, leaching plant, seawater pumping station, temporary construction compound and wellpad to accommodate drilling rig for 7 no. borehole."

The application is not for the consent to discharge under the Water (Northern Ireland) Order 1999, which will be accompanied by a detailed assessment of potential impacts on the marine environmental based on the actual chemical analysis of the Larne salt derived from the cores obtained from the first drilled borehole. The creation of a wellpad from which to drill a borehole to obtain salt cores for testing requires planning permission under the Planning (NI) Order 1991. Following drilling of the borehole and physical and chemical analysis of the salt cores, the detailed design of the caverns and leaching process will be completed and hence all the information necessary to make an application to NIEA for consent to discharge under the Water (Northern Ireland) Order 1999, will be available. This will include a review of the assessment of marine impacts based on the actual characteristics of the proposed discharge, if different from that presently assumed.

A methodology for additional bird surveys aiming to address NIEA NH concerns was submitted to NIEA NH for approval (**Appendix D2 Correspondence**). These additional coastal seabird surveys are ongoing and are due to conclude in March 2012. An interim report presenting some preliminary data and interpretation is presented in **Appendix D1**.

NIEA NH noted that data provided by JNCC tern tracking studies presented in the ES represented only a single survey season with no evidence that this was representative and that the technique adopted followed individual birds from nest sites. Additional information from subsequent survey years collected from the JNCC tern tracking studies is now presented in the interim report (**Appendix D1**). The work undertaken by JNCC on tern colonies in Northern Ireland including Larne Lough is part of a UK-wide project currently being undertaken by JNCC, in collaboration with other Statutory Nature Conservation Bodies, to identify important marine areas used by terns during the breeding season. The data collected will be used to inform the identification of a UK-wide network of areas that may be suitable for designation as marine Special Protection Areas (SPAs) under the EC Birds Directive. RPS acknowledge the use of one year of summary data was insufficient to provide a complete picture of total tern usage of the waters off Islandmagee, but feel that the information does provide a meaningful picture of key tern foraging locations and that this was the most comprehensive dataset available at the time of drafting the original ES.

NIEA NH stated that an assessment of the potential impact from a worst case scenario would be useful in determining the likelihood of an adverse impact. This is the basis of the present assessment in that when estimating brine quantities etc the most conservative assumptions have always been made. However this assessment will be revisited during the preparation of the application to be submitted to NIEA for the consent to discharge under the Water (Northern Ireland) Order 1999 when the actual composition of the brine discharge is confirmed. NIEA NH have requested this worst case scenario should be based on the vulnerability of prey items (species commonly taken by tern, auks etc.) to the discharge plume characteristics and the habitat (seabed character) suitability for prey items in the area affected by the discharge plume. **Appendix C** and Chapter 6 of the ES detail the potential impacts of the brine discharge on intertidal and benthic flora and fauna, marine mammals and fisheries. **Appendix C** specifically details the potential impact of the brine discharge on sandeels a key prey item of seabirds known to frequent the Islandmagee coastal waters and describes the habitat suitability for sandeels around the outfall location.

In light of additional information regarding the potential impacts on tern prey species based along with additional ornithological survey data, RPS withhold the original assessment made in the Islandmagee Storage ES in that no significant impact as a result of brine emissions are predicted on tern species associated with Larne Lough and Swan Island SPA, as a result of the brine discharge leading to loss of foraging potential. The reduction in fish prey species by avoidance of areas of increased salinity is likely to be localised to within the limit of significant brine influence (<100m from the outfall), not recorded as a key foraging location of terns and breeding seabirds associated with adjacent ASSIs. Following the granting of permission to drill the deposits and obtain salt cores for detailed physical/chemical analysis this assessment can be re-visited if required.

The Permian Zechstein Salt beneath Islandmagee is the same geological layer as is used for the majority of salt cavern gas storage projects throughout Europe. The nearest operational brine discharge from a gas storage facility is located at Aldbrough on the Yorkshire coast. The analysis of the Zechstein Salt composition at Aldbrough has been used within this ES Addendum as a reasonable geological assumption, as there is currently no salt core data available for Islandmagee. The creation of a wellpad and borehole to perform the local salt testing requires planning permission under the Planning (NI) Order 1991, and is part of the current application to which this ES and Addendum apply. Following drilling of the borehole and physical/chemical analysis of the salt cores, the composition information will feed into the detailed design of the caverns and leaching process and hence inform the required application to NIEA for consent to discharge under the Water (Northern Ireland) Order 1999. There is a statutory requirement for a further round of stakeholder consultation as part of the Water Order consenting procedure.

There has been a misunderstanding regarding the location of the discharge point as there has been no change in the location of the discharge point, all studies informing the ES have considered the same discharge position as is currently proposed and indicated in the documents submitted for planning.

12.0 LARNE BOROUGH COUNCIL – ENVIRONMENTAL HEALTH SERVICE (LBCEHS)

The plan to minimise construction dust to be implemented by the contractor will be detailed in their Method Statement for the proposed works and will incorporate all the dust mitigation measures proposed by Larne Borough Council. Islandmagee Storage Limited and the appointed contractor will consult with Larne Borough Council before construction to discuss the proposed phases of development.

Comments and queries have been raised regarding a noise impact assessment conducted by F.R. Mark and Associates (Noise and Vibration consultants) for the planning application.

12.1 Background Noise Monitoring

Larne Borough Council Environmental Health Service (LBCEHS) have questioned why Measurement Location 3 has not been noted on the measurement location plan. Measurement Location 3 was not within the extents of the original location plan. This location is situated south of Glynn village on the Shore Road and is represented in **Figure 12.1**.

Figure 12.1 Noise Measurement Location 3

The LBCEHS have raised concern over differing background noise levels measured by themselves and F.R. Mark and Associate. Measurements were recorded by F.R. Mark and Associates at all six locations during daytime on 30th November 2009 and night time on 9th December 2009. Conditions were good, with no rainfall and low wind speed during all measurements. All their measurements during both daytime and night time were at least 20 minutes in duration. Whilst F.R.Mark and Associates are convinced that their measurements recorded during these site visits are representative of the measurement location at the time of measurement, Islandmagee Storage Limited have agreed to use the LBCEHS values in this ES Addendum, even though there appears to be some difference in professional opinion. The adoption of these criteria does not materially affect the conclusions of this section of the ES.

Islandmagee Storage Limited would, respectfully, request that at the earliest opportunity a joint background noise monitoring exercise be undertaken with LBCEHS to try to agree a consolidated position.

The LBCEHS have also stated: '...the night-time measurement recorded at location 5 is higher at night-time than day-time, an unusual occurrence.' This is agreed and it is noted that the presented background measurements recorded by the LBCEHS at this location also agree with the findings of the F.R.Mark and Associates survey on this matter. The daytime noise levels recorded by the LBCEHS at Location 5 were 46.8 L_{Aeq} and 35.0 L_{90}, with night time results of 47.4 L_{Aeq} and 39.0 L_{90}.

12.2 Noise Limits/ Criteria

The LBCEHS has noted that since the noise assessment was undertaken for the planning application, a revised edition of BS:5228 has been published entitled 'BS 5228:2009 *Code of practice for noise and vibration control on construction and open sites*.'

F.R. Mark and Associates have duly undertaken a new assessment using the daytime and night time ambient and background noise levels recorded by the LBCEHS. They have now also used the LBCEHS background levels in this revised assessment of construction noise at the six locations chosen to represent individual properties or clusters of properties near to the proposed gas storage facility, temporary construction compound and well pad.

12.2.1 Maximum Permissible Construction Noise Levels

BS 5228 provides recommendations for temporary construction noise limits, based on an assessment of the existing ambient noise levels within the vicinity of the works. The 'ABC' method, as found in BS 5228 Section E.3.2, provides an appropriate assessment method for determining temporary construction noise level targets. The level is determined by rounding the ambient noise level within the vicinity of the construction works to the nearest 5 dB. This resultant level is then compared with Category A, B and C values. When a resultant level is 5 dB less than the Category A values, then noise limits are set in line with Category A values. When a resultant level is similar to the Category A values then noise limits should be set in

line with Category B values. When a resultant level is similar to the Category B values or higher then noise limits should be set in line with Category C values. **Table 12.1** outlines Values for Categories A, B and C.

Table 12.1 Example Threshold of Significant Effect at Dwelling

Assessment Category and Threshold Value Period LAeq	Threshold Value, in Decibels (dB)		
	Category A	Category B	Category C
Night-time (23:00-07:00)	45	50	55
Evenings and weekends	55	60	65
Daytime (07:00-19:00) and Saturdays (07:0-13:00)	65	70	75

Therefore, as it is expected that ambient levels at nearest residential properties to the gas storage facility will be relatively low based on the LBCEHS recordings, it would be appropriate to set noise target levels “similar to Category A”.

A computer based 3D predictive environmental noise model (Cadna/A) was completed for the site. The digital 3D models of the scheme were produced using the digital drawings provided by RPS. All models were based on the most up to date designs. Any screening (where present) was incorporated as per the finalised design. Each property was modelled as a 3D element within the design and assigned properties such as height and reflective attributes.

In each case a ‘worst case’ scenario was considered. This assumed the activities to be occurring at the periphery of the proposed site. Each item of plant was introduced within the model as a point source and attributes such as height and directionality were applied to each source. In this instance each source was considered to have an even hemispherical propagation pattern. As a further reasonable worst case, all items of plant were considered to be running continuously.

In each circumstance for each receptor location and height the noise sources have been positioned to provide an approximation of a ‘worst case’ scenario. Several different noise models were produced to incorporate the worst case scenario for each receptor. The location of each item of plant is located at the very perimeter of the works. This has ensured that the results represent the highest likely and assume that all plant is operating simultaneously. In reality the different items of plant will be located for the majority of the time further from the most proximate residential properties and it is unlikely that all plant will operate simultaneously; therefore, the impact at the existing noise sensitive properties will be lower than assessed.

On this basis, the Cadna/A 3D environmental noise model predicts that the noise impact during Phase 1 of construction would be slightly above the daytime noise target only at locations 3, 4, 5 & 6 and above the daytime noise target at location 4 only during the daytime in Phase 2 of construction. However as has been said the Cadna/A environmental noise model has used the highest sound power levels for individual items of plant and assumed minimum attenuation by distance or screening with no allowance for quieter periods and so even under worst case conditions these exceedances are unlikely to be significant.

In practice, all plant does not normally operate continuously and no allowance has been made here for 'on time'. For example if plant runs continuously for 15 minutes in an hour the correction to allow for 'on time' or duration is 10log 15/60dB or – 6dB.

The highest likely noise impact is at location 5 during pipe laying in Phase 1. The predicted noise level is 74.0dB(A) during pipe laying, however the impact will be less as in reality pipe laying equipment moves along the route so this impact is likely to be very short-lived. The model is based on continuous activity at the minimum distance to properties at this location and with a receptor height of 4m to represent a bedroom window. However construction activity will be during the daytime and it is not anticipated that there would be trenching or pipe laying outside of normal daytime hours.

The threshold values L_{Aeq} are to be assessed over the appropriate period during the daytime, evenings or night-time. This means that the predicted levels should be assessed over the appropriate reference period otherwise the results are meaningless. The Daytime levels are to be assessed over 12 hours from 07:00 to 19:00 hours and Night-time over 8 hours from 23:00 hours to 07:00 hours. The short term predicted levels for construction noise may appear to exceed the limits but these limits are an average value that allows for quieter periods when not all plant is operating close to the property.

The Cadna/A model has predicted the highest likely noise impact at any property without taking account of the quieter periods during the daytime, evening or night-time, when not all plant is running continuously or at the nearest location to these properties. When that is taken into account none of the Threshold Values or average level over the appropriate period will be exceeded as they are an average value over 12 hours during the daytime and 8 hours at night.

The Cadna/A model predicts that all night time construction noise activity will be within night time noise targets based on this methodology.

For the reasons given above, Islandmagee Storage Limited predicts that the daytime, evening and night-time noise levels based on Category A values averaged over the appropriate periods are unlikely to be exceeded during the construction phase.

LBCEHS note that an alternative method to determine the significance of construction noise levels is to consider the change in ambient noise level with construction noise. LBCEHS consider that the alternative method to determine the significance of construction noise levels should be included in the noise impact assessment and so this has been incorporated below (Method 2).

Method 2 for assessing the impact of construction noise for works of duration of one month or more is a follows.

Noise levels generated by construction activities are deemed to be significant if the total noise (pre-construction ambient plus construction noise exceeds the pre-construction

ambient noise by 5 dB or more, subject to lower cut off values of 65dB,55dB and 45dB$L_{Aeq\ period}$, from construction noise alone, for the daytime, evening and night-time periods, respectively. These evaluative criteria are generally applicable to residential housing, hotels, churches, schools or buildings in health and community use

Given that Method 2 is subject to a lower cut off value based on Category 'A' levels for daytime evening and night. The model would predict that the pre-construction ambient plus construction noise exceeds the pre-construction ambient noise by 5 dB or more only at location 5 during pipe laying activity in the daytime in Phase 1. The limits are not exceeded at other locations during the daytime, evening or night and there is a considerable margin of safety in the calculation of the predicted noise levels based on the model. Pipe laying activities will move past the house so that the model predicts the very short term noise impact only when the pipe laying is taking place at the shortest distance to these properties.

The Cadna/A 3D environmental noise model predicts that in the worst case the noise impact may slightly exceed the daytime noise limits at several locations. Mitigation measures have been suggested in the noise impact assessment and are based on guidance in BS5228:2009. This includes selection and use of well positioned, silenced and well maintained plant. Noise and vibration monitoring will be undertaken and a responsible person employed to liaise with residents. Temporary screening will be used if and where necessary.

The exact method of performing the works has not been determined at this stage. Noise and vibration monitoring can be carried out with the agreement of the local authority as to chosen measurement locations and frequency of monitoring at a later date.

12.3 Cadna/A Models

The LBCEHS has noted that blasting may be required at the location of the proposed leaching plant. This however is not confirmed and this form of construction may be avoided. It is assumed that LBCEHS refer to the sea water intake pumping station at Castle Robin. The Cadna/A model has included the operation of six tracked excavators similar to those used for rock breaking and ripping equipment at this location. This would be deemed a more significant potential impact due to the extended period of time required to rip the rock out as opposed to blasting the rock out. Should drilling and blasting be required then that activity would occur over a much shorter period of time.

The working Cadna/A model can be made available to LBCEHS on a CD on request

12.4 Drilling Activity

While drilling activity occurs 24 hours a day 7 days a week, the other activities will not. There will be reduced drilling works in operation during the night time. However at night time there will be no construction activity at the wellpad site, with the only noise created by drilling activity. This reduced activity at the wellpad site should ensure that the noise impact at noise

sensitive property No. 1 is greatly reduced during the night time hours and below the acceptable threshold.

12.5 HGV's on Access Roads

This has been analysed using the *Haul Road Method* in BS5228 and assuming a minimum of 5m from access roads to nearest premises. We have assumed 5 HGV movements per hour (Q=10) impacts of 53dB $L_{Aeq,1hr}$ may occur during maximum vehicle movement in the daytime.

HGV Movement	=	Average SWL	-	33	+	10 log Q	-	10 log V	-	10 log d
Noise Impact	=	98	-	33	+	10 log 10	-	10 log 30	-	10 log 5
	=	98	-	33	+	10	-	15	-	7
	=	53 dB $L_{Aeq,1h}$								

The calculated figure of 53 dB for HGV impact is an unscreened value. This unscreened value is still well within the target for construction activity, and will also comply with construction noise targets outlined in BS 5228 (2009). The access road to the main drilling areas will be effectively screened from residential properties due to the topography of the land. Assuming a reduction 10 dB by the full visual screening the impact at the nearest property will be 43 dB.

12.6 Operational Noise Limit

When the leaching of the salt from the cavern is completed the leaching plant facility will cease to operate, and while it may not be dismantled, it will remain dormant. It will then be the turn of the gas plant facility to be operated. All plant within this facility will be designed to operate within the limits of the noise level targets calculated with regard to BS 4142.

13.0 THE NI FIRE AUTHORITY

The development will comply fully with all relevant Building Regulations.

14.0 HEALTH AND SAFETY EXECUTIVE FOR NI (HSENI)

Issues raised by the HSENI in this Further Information request have subsequently been dealt with in direct consultation with the Executive. A response letter from HSENI confirming this position can be found in **Appendix G** of this Environmental Statement Addendum document.

15.0 DARD QUALITY ASSURANCE BRANCH

No further comments.

16.0 FOREST SERVICE

Forest Service has commented that there is grant aided woodland within the buffer of the proposed works. As stated in the Landscape and Visual section 11.8.1.3 of the ES, "All woodland and trees to be retained will be fenced off prior to construction in accordance with BS:5837 2005 '*Trees in Relation To Construction'*. All existing individual trees and hedgerows will be protected and retained as far as possible." Section 11.8.1.1 of the ES also states the intention of Woodland Framework Planting "A native woodland planting framework will be created on the side slopes of the plateaus to assist with reduction in visual impact and create an attractive environment within the site to blend it within the agricultural landscape. Species will be native, suitable for an exposed coastal location and reflect those found in adjacent woodland and hedgerows. Planting belts along boundaries will include semi-mature trees to help reduce the scale of the proposal and to integrate it with the surrounding rural landscape." If Forest Service supply the location of the Grant Aided woodland that is "within buffer" of the proposed works this can then potentially be mitigated for or avoided completely.

17.0 VETERNARY SERVICE

The appointed contractor will include the requests of DARD Veterinary Service within their Method Statement for the proposed works and implement these measures throughout the construction phase, as listed below:

- Boundary fences with surrounding fields containing livestock remain stock proof during construction;
- Livestock do not have access to the material being stored and processed;
- Materials for processing are not stored where vermin could have access to them and there is adequate vermin control on site.
- The construction and operation of these premises does not result in contamination of surrounding lands and/or waterways by building materials, their by-products or leachate from the site;
- Livestock do not have access to electricity cables or other live components;
- The proposal does not compromise any of the 5 essential welfare freedoms of livestock in the vicinity i.e. from hunger, thirst or malnutrition, provision of shelter, freedom from injury or disease, freedom from fear and freedom to express their normal behaviour.

18.0 AGRI-FOOD AND BIOSCIENCES INSTITUTE

AFBI comment that they will be further consulted at the Marine Licencing stage, however that continuous salinity monitoring of the discharge should be implemented and that the

discharge location should not be deeper as this would encroach on scallop fishery grounds. The ES has proposed salinity monitoring within the mitigation measures and acknowledges the presence of the scallop fishery grounds in the vicinity.

19.0 NORTHERN IRELAND TOURIST BOARD (NITB)

The NITB commented on the potential impact of the development on coastal walks and cycling routes, Browns Bay, the slipway at Port Muck and key diving areas off the eastern shore of Islandmagee. Section 11 of the ES, Landscape and Visual, predicted no significant residual impacts from the construction and operation of the proposed gas storage facility with the implementation of the proposed mitigation measures. However there are no public coastal walks or cycle routes at the proposed location of the seawater pumping station (Castle Robin), as the site is private land, and the nearest Ulster Way view is 10km to the west of the proposal at Woodburn Forest. The appointed contractor will adhere to all required construction guidelines to ensure that the proposal will not impact upon the tourism potential of Browns Bay and Port Muck, as will be detailed in their Method Statement for the proposed works. The location of the brine outlet off the east coast of Islandmagee will only have a very localised underwater visual impact and should have no impact on dive sites within the vicinity, as it has been sited in an area of low archaeological potential, with no known dive sites or wrecks, and lower ecological and commercial value relative to the rest of the vicinity. The nearest wreck site is 150m to the south east of the brine outfall, with subsurface visibility in the Irish Sea only likely to be up to around 25m.

20.0 DRD ECONOMICS BRANCH (EB)

There are no specific comments from DRD Economics Branch to respond to.

21.0 NIEA HISTORIC BUILDINGS UNIT (HBU)

Islandmagee Storage Limited will ensure that appropriate landscaping works are carried out to screen the proposed storage facilities and pipelines to preserve the settings of the listed Iniscreen House (HB 06/04/026) and the Druids Cottage (HB 06/04/015).

22.0 NIEA LAND AND RESOURCE MANAGEMENT (LRM)

Waste minimisation has been a key consideration in the overall design of the Islandmagee Storage Facility, with excavation and filling operations being balanced where possible etc. It is acknowledged that if waste materials are to be imported to or from the development site during construction works then a waste authorisation will have to be requested by the appointed contractor from the Waste Management Licensing Section of the NIEA Land and Resource Management Unit. It is also accepted that any surplus material to be exported from the site will be considered waste and will be transported and disposed of in accordance with

waste legislation. Similarly any local landowners that wish to utilise any of this material will also require the authorisation from the Waste Management Licensing Section of the NIEA Land and Resource Management Unit.

23.0 DCAL INLAND FISHERIES GROUP

Two watercourses will be crossed by the proposed pipelines, as shown previously in **Figure 2.1**. The smaller, un-named watercourse is essentially a ditch/drain discharging near the proposed pumping station at Castle Robin. It is less than 1m wide, heavily overgrown and is highly unlikely to contain fish stocks. The Clover Vale Burn / Brown's Bay stream is a more substantial watercourse, being 1.5 - 2m wide, with reasonable quality substrate and habitat. Eels, brown trout and sea trout are potentially present in this watercourse. All works will be carried out in accordance with Good Practice Guidance notes proposed by EA/SEPA/EHS, including:

- PPG1: General Guide to the Prevention of Water Pollution;
- PPG5: Works In, Near or Liable to Affect Watercourses.

All works near watercourses will be carried out in accordance with DCAL Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites, including:

- Restriction of principal stream crossings to the May to September period;
- Restoration of stream bed habitat;
- Additional mitigation measures if required in terms of habitat restoration.

Brine dispersion modelling from section 9 of the ES indicates that there is no possibility of the dispersion plume penetrating into Larne Lough during the flood tide. Although the plume is shown to spread northwards towards the inlet of the lough, dispersion will be very effective and salinity will remain within normal levels of variation. There will therefore be no impacts on migrations of salmon and sea trout within the lough.

All mitigation measures given in the ES will be upheld in the construction and operation of the proposal. Any proposed discharge from the construction and operation of the proposal will be consented by the NIEA WMU, under the Water (NI) Order 1999. The applicant understands that it is an offence under section 47 of the Fisheries (NI) Act 1966 to cause pollution which is subsequently shown to have a deleterious effect on fish stocks and of the consequences.

24.0 FISHERIES COMMENTS

24.1 Anglo-North Irish Fish Producers Organisation Ltd (ANIFPO)

The Anglo-North Irish Fish Producers Organisation Ltd (ANIFPO) commented on the potential impacts on ecosystems at the brine outfall and cite an example of the impact on the Baltic Sea ecosystem due to small decrease in salinity. Section 9.3 of the ES Brine Dispersion Modelling shows:

- A dilution of >200:1 producing a salinity of 36.6psu is predicted to arise and peak at some 5-10m from the discharge;
- Any elevated levels of salinity (>36.6psu) will only occur during two short periods of the tidal cycle, at high tide and low tide slack;
- Any salinity increase in excess of normal seasonal variation is anticipated to be restricted to the initial mixing zone <100m from the outfall;
- There will be a significant decrease in salinity up through the water column with no significant impact in the surface layer.

This dispersion modelling demonstrates the very small area that may be subject to slightly elevated salinity levels. **Appendix C** of this Addendum provides more information.

ANIFPO then comment that the brine is likely to contain chemicals and substances other than salt. Salt samples from the first well will be fully analysed and the brine discharge composition will be tested on a regular basis to ensure compliance with the anticipated discharge consent. It should be further noted that the anticipated brine discharge will be predicted with better accuracy and subject to appropriate testing before any discharge consent is granted under the Water Order by NIEA. The creation of the wellpad and the well for salt testing is part of the current application to which this ES and Addendum apply. Following drilling of the borehole and physical/chemical analysis of the salt cores, the composition information will feed into the detailed design of the caverns and leaching process and hence inform the required application to NIEA for consent to discharge under the Water (Northern Ireland) Order 1999. There is a statutory requirement for a further round of stakeholder consultation as part of the Water Order consenting procedure.

ANIFPO also make the comments that they have no doubt that brine discharge will have an impact on the immediate environment of Islandmagee, that filter feeders including commercial scallop stocks and fish populations will be affected, that currents will carry brine into the Irish Sea, and that the potential impacts on these have not been described and may be solely based on computer modelling. In response, computational modelling was indeed used within the ES to predict potential impacts, however examples of similar projects were also described and utilised, such as the Gas Storage Plant at Aldbrough in England, where detailed monitoring of the brine discharge has indicated that adequate dispersion of brine has no discernable impact on fisheries, including the most productive lobster fishery area in the UK.

24.2 Northern Coast Lobster Fisherman's Association (NCLFA)

The NCLFA comment on the potential impact of the brine outfall and increase in salinity on crustaceans. Section 9.3 of the ES Brine Dispersion Modelling shows:

- A dilution of >200:1 producing a salinity of 36.6psu is predicted to be achieved at 5-10m from the discharge;
- Any elevated levels of salinity (>36.6psu) will only occur during two short periods of the tidal cycle, at high tide and low tide;
- Any salinity increase in excess of normal seasonal variation is anticipated to be restricted to the initial mixing zone <100m from the outfall;
- There will be a significant decrease in salinity up through the water column with no significant impact in the surface layer.

This dispersion modelling demonstrates the very small area that may be subject to slightly elevated salinity levels. **Appendix C** of this Addendum provides more information.

At Aldbrough on the Yorkshire coast of England, beside the largest lobster fishery in the UK, crustacean stock assessment has been undertaken using strings of pots deployed close to the brine diffuser and extending through the 250m mixing zone. As part of the Environmental Impact Assessment Islandmagee Storage Limited consulted with the UK Environment Agency, the North Eastern Sea Fisheries Committee's Chief Fisheries Officer and the Institute of Estuarine and Coastal Studies (IECS) who have first-hand experience of monitoring an existing brine outfall arising from the solution mining for gas storage caverns between 2005 and 2009 at Scottish and Southern Energy's gas storage project at Aldbrough, Yorkshire. Whilst final results of these investigations throughout the leaching period are not yet available we understand that epifaunal and fish communities appear to be within the normal range of variation for a highly dynamic coast with no clear indication of significant impacts immediately adjacent to the discharge. Furthermore, the maximum quantity of brine being discharged at Aldbrough is almost twice that which is proposed at Islandmagee and the discharge point is in much shallower water depths of only 10 metres, compared to the 27 metres proposed for the Islandmagee Storage Project. Continuous monitoring of ambient salt levels by deployment of measuring devices on the seabed at various locations around the Aldbrough discharge has demonstrated effective dispersion of the brine.

Further recent consultation with the Chief Fishery and Conservation Officer North Eastern Inshore Fisheries and Conservation Authority (November 2011) confirmed that the brine discharge is continuing without any apparent impact on local fisheries and biodiversity. We understand that a planning application has been submitted by E.ON for a second gas storage facility in the same general area as the Aldbrough operation.

The NCLFA commented that the waters surrounding the outfall will not be able to be fished notwithstanding the toxicity of the water in the area. There will be no exclusion zone for pot fishing around the outfall and although it is acknowledged that salinity levels will be elevated within the mixing zone during the leaching period, the waters will not be toxic. As noted in the previous paragraphs the research at similar plants has shown no impacts outside of

prescribed mixing zones and these will return to normal once the leaching has been completed.

The NCLFA commented that larval stages of lobster will be vulnerable to changes in salinity as they float in plankton for several weeks prior to settling on the seabed. Larval lobster would most probably be impacted by increased salinity; however the brine dispersion modelling discussed previously suggests rapid dilution and dispersal of brine. Modelling also shows a significant decrease in salinity up through the water column with no significant impact in the surface layer, and thus planktonic organisms are much less likely to be affected.

The NCLFA commented their concern for larval stage lobsters that will be killed by the seawater intake. It is likely that some lobster larvae will be entrained at this seawater intake facility and will pass through the screens. This has been acknowledged in the EIA and it has been recommended that additional funding of the V notching project and stock enhancement should be provided by Islandmagee Storage Limited, as stated in section 6.7.5.5 of the ES.

The NCLFA also commented that the ES does not recognise V-notching scheme they carry out, however section 6.7.3.1 of the ES, Crustacean fishery, provides a two-paragraph outline of the project and acknowledges its success.

Finally the NCLFA commented that the ES does not recognise the lost fishing opportunities and reduced incomes from implementation of the proposal. However impacts on commercial fishing are addressed in section 6.7.6.1 of the ES, Commercial fishing, which states: “Provided the dispersion of brine from the outfall diffuser approximates to the predicted levels there should be no significant impact on the productivity of local fishing operations for lobster, crab and scallop. Localised impacts in the immediate area of the outfall during the leaching period could be offset through stock enhancement measures. Local impacts could be more significant if the ionic composition of the salt deposits is found to be significantly different from that of normal seawater or if this material is contaminated by heavy metals.” In response, the significance of the ionic composition and the non-saline compounds within the brine will be established once cores are available for testing and prior to seeking consent to discharge under the Water Order. Any conditions attached to any such discharge consent will be adhered to by Islandmagee Storage Limited.

24.3 Aquaculture Initiative (AI)

The Aquaculture Initiative (AI) have recommended that the contractor install an additional monitoring buoy in Larne Lough during the construction of the well pad and pipeline to monitor suspended solids, to ensure that discharges do not breach Shellfish Waters Directive. The AI also recommends that a monitoring and preventative maintenance scheme be implemented for the portion of the pipeline falling within the catchment of the Lough. The AI ask that monitoring data of the brine discharge be made available in real time to stakeholders. Finally the AI asks if there will be ongoing sampling for metal or organic components in the brine discharge.

In response, in the unlikely event of direct discharge of construction runoff from the wellpad, we agree that it may be prudent to install a suspended solids monitoring buoy in the area in case the proposed silt traps are not effective. This buoy should however be installed well in advance of the commencement of construction to establish the baseline suspended solids levels within the Lough. A monitoring and preventative maintenance scheme will be implemented for the brine pipeline, which will be developed further within the Environmental Management Plan for the operation. It is anticipated that NIEA will request that ongoing sampling for potential metal and organic components in the brine discharge, is undertaken under the Water Order discharge consent. Any data collected via real-time monitoring of discharges will be made available to the NIEA.

24.4 DARD Fisheries Division

DARD fisheries division comment on the importance of the area for various fisheries and that the ES does not adequately measure the impacts or changes that would result from the proposed development in either immediate toxic effects or changes in primary production which would impact on shellfish. Section 9.3 of the ES Brine Dispersion Modelling shows:

- A dilution of >200:1 producing a salinity of 36.6psu is predicted to be achieved at 5-10m from the discharge;
- Any elevated levels of salinity (>36.6psu) will only occur during two short periods of the tidal cycle, at high tide and low tide;
- Any salinity increase in excess of normal seasonal variation is anticipated to be restricted to the initial mixing zone <100m from the outfall;
- There will be a significant decrease in salinity up through the water column with no significant impact in the surface layer.

This dispersion modelling demonstrates the very small area that may be subject to slightly elevated salinity levels. **Appendix C** of this Addendum provides more information.

At the Aldbrough gas storage plant on the Yorkshire coast, beside the largest lobster fishery in UK, a crustacean stock assessment has been undertaken using strings of pots deployed close to the diffuser and extending through the 250m mixing zone. Whilst final results of these investigations throughout the leaching period are not yet available however we understand that epifaunal and fish communities appear to be within the normal range of variation for a highly dynamic coast with no clear indication of significant impacts immediately adjacent to the discharge. This is further enforced by recent consultation with the Chief Fishery and Conservation Officer North Eastern Inshore Fisheries and Conservation Authority (November 2011) who confirmed that the brine discharge is continuing without any apparent impact on local fisheries and biodiversity. We understand that a planning application has been submitted by E.ON for a second gas storage facility in the same general area as the Aldbrough operation.

Proposed real time monitoring using sonde devices located at distance intervals from the discharge diffuser with pre-set trigger levels could ensure any impacts are minimal. Proposed ecological monitoring will pick up any impacts on primary production and the use of sentinel

organisms will reinforce this monitoring programme. The Environmental Quality Standards (EQS) and monitoring requirements of for the brine discharge will be set by the NIEA under the required Water Order discharge consent.

24.5 The NI Fish Producers Organisation Ltd (NIFPO)

The NI Fish Producers Organisation Ltd has commented on the potential fisheries at risk in the area of the proposed discharge, and the potential impacts of salinity and other chemical impurities on the local environment and fisheries. The ES has acknowledged the potential risks to local crustacean fisheries, and continues that there is no risk to the more distant fisheries in Belfast Lough, the Copelands and the North Channel. Section 9.3 of the ES Brine Dispersion Modelling shows:

- A dilution of >200:1 producing a salinity of 36.6psu is predicted to be achieved at 5-10m from the discharge;
- Any elevated levels of salinity (>36.6psu) will only occur during two short periods of the tidal cycle, at high tide and low tide;
- Any salinity increase in excess of normal seasonal variation is anticipated to be restricted to the initial mixing zone <100m from the outfall;
- There will be a significant decrease in salinity up through the water column with no significant impact in the surface layer.

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Proposed real time monitoring using sonde devices located at distance intervals from the discharge diffuser with pre-set trigger levels could ensure any impacts are minimal. Proposed ecological monitoring will pick up any impacts on primary production and the use of sentinel organisms will reinforce this monitoring programme. The Environmental Quality Standards (EQS) and monitoring requirements of for the brine discharge will be set by the NIEA under the required Water Order discharge consent.

Finally, the NIFPO commented that the developers did not consult them on these proposals. However, during the EIA process there were consultations with the Scallop Fishermen's Association and the North Coast Lobster Fishermen's Association who are active in the area and are representative of the inshore fleet.

24.6 Northern Ireland Scallop Fisherman's Association

The NI Scallop Fisherman's Association comments that the scale of the proposal is extreme and that the volume of brine discharge is massive. They comment on the significant scallop fishery in the area of the proposed discharge, the potential impacts on the plankton food source, and the effects of brine and other impurities directly on the scallops. The Association also comment that if scallop grounds were lost, then re-seeding is not good enough to address this. Finally the Association comment that consultation did not take place with them when the EIA was in preparation.

Section 9.3 of the ES Brine Dispersion Modelling shows:

- A dilution of >200:1 producing a salinity of 36.6psu is predicted to be achieved at 5-10m from the discharge;
- Any elevated levels of salinity (>36.6psu) will only occur during two short periods of the tidal cycle, at high tide and low tide;
- Any salinity increase in excess of normal seasonal variation is anticipated to be restricted to the initial mixing zone <100m from the outfall;
- There will be a significant decrease in salinity up through the water column with no significant impact in the surface layer.

This dispersion modelling demonstrates the very small area that may be subject to slightly elevated salinity levels. **Appendix C** of this Addendum provides more information.

The brine dispersion models predict that the entire intertidal area will not experience salinity concentrations more than 0.5psu above normal background levels. Much of the near shore area will be only marginally affected by the discharge, thus eggs and larvae released into the plankton by littoral gastropods and other intertidal species will have a higher chance of being entirely unaffected.

Scallop grounds are only likely to be impacted in the immediate area as brine will disperse quickly. However this direct discharge area may be abandoned by more mobile species such as scallops (*Pecten* and *Chlamys*). Late larval stages settling in this zone from the plankton are likely to experience increased rates of mortality.

Several attempts were made to arrange meetings with the Association both before and after completion of EIA. These meetings were arranged and cancelled by the Association.

25.0 CONCERNS FROM THIRD PARTY REPRESENTATIONS

Local residents have asked questions with regards to the proposal. These questions / comments and are laid out exactly as presented in the Planning Service NI FI request, with our responses following each comment.

1. Residents have cited incidents at numerous underground gas storage sites and ask what guarantee can be given that a similar incident will not occur at Islandmagee?

A. The safe operation of a gas facility is paramount. The project will have to gain approvals from the Health and Safety Executive, before licensing the construction and operational phases of the project. Similar projects have been in operation in the UK, in Yorkshire and Cheshire, and continental Europe, for over 30 years. Past experience of operations and a rigorous safety management culture will ensure that this facility is operated safely.

2. Are the boreholes lined with concrete?

A. The borehole is drilled in a number of sections, each of which is cased with steel and cemented in place and pressure tested to ensure its integrity.

3. What safeguards are in place to ensure that brine will not leak from pipelines carrying seawater and brine across Islandmagee?

A. The pipeline material will be selected taking into account the resistance to corrosion by brine and ability to withstand other environmental conditions. All pipelines will be subject to testing following installation and prior to operation to ensure the watertight integrity of these assets. The pipelines will also be monitored during their short operational period. The pipelines will be dry once the leaching has been completed.

4. Exactly what hazardous waste will be produced and why is it necessary to transport the waste to England by Road and Ferry?

A. Although the drill cuttings and oil based “drilling mud” are classified as “hazardous waste” under current NI legislation, these wastes are not “dangerous” and in GB can be recycled by composting. However this mechanism for recycling is unavailable in Northern Ireland and therefore the waste drilling materials will have to be sealed in an appropriate container and transported to GB for disposal or reuse at an appropriately licensed site using a licensed waste carrier, registered under the Controlled Waste Regulations.

4a. Residents are concerned that noise and vibration from drilling will have a detrimental effect on birds at the SPA at Swan Island.

Swan Island and Blue Circle Island that support the breeding tern including SPA feature species Common and Roseate Tern, are located at a distance from the drilling site, where noise and vibration levels from construction activities would be expected to be much lower than in areas where noise monitoring was undertaken. Birds are known to habituate to

elevated noise levels and with the temporary nature of construction works within the Lough, the impact on SPA species at Swan Island and Blue Circle Island will not be significant.

Further work that has been carried out on bird surveys and impact assessment following completion of the ES is included in **Appendix D** of this document.

5. What size of dead-zone at the brine outfall is acceptable?

A. There will be a small area impacted temporarily during the leaching of the caverns. A full description of the species which will be most impacted within a 10 metre zone and the effects they are likely to experience is given in section 6.6.5.1 of Chapter 6 of the ES. Briefly summarised, the most impacted species will be the benthic infauna (species that live within the sediments of the seabed) and epifauna (species that live on the seabed as opposed to within it) with species which are immobile or which can only move very slowly, being the most likely to be affected. The presence of mobile species within the 10 metre zone will be considerably reduced, as they will avoid the immediate area rather than being harmed by any elevated salinities. Once the discharge has ceased these species will be able to re-colonise the area immediately. Results of computer modelling of the brine dispersion indicate that salinities beyond 100m from the outfall will be close to background levels and therefore will not cause any adverse impacts to marine species. This will be confirmed throughout the leaching phase by constant monitoring of salinity levels at various locations around the outfall to ensure they do not breach safe limits which will be overseen by the Northern Ireland Environment Agency.

As with all large industrial projects in Northern Ireland which involve a discharge to the natural environment the Northern Ireland Environment Agency will determine the acceptable size for a dispersion zone. The area immediately surrounding the outfall discharge point has been extensively surveyed by diver and video surveys to record the species visible on the seabed and anchor dredge to record the species buried beneath the surface of the sea bed which might also be impacted. The discharge point corresponds to Station No. 19, which is described in various sections of the Environmental Impact Statement (ES). The main photographs and descriptions of the seabed in this area are presented within section 6.4.7 of Chapter 6 of the ES. Stills from the video surveys are presented in Appendix 6.4. A species list recorded during the diver survey is presented in Appendix 6.5 and the raw data from the anchor dredge is presented in Appendix 6.10.

6. Is there a possibility that discharged material will be washed ashore during periods of strong easterly winds?

A. It is true that a salt plume will move in the water with the direction of a strong wind; however this is a brine solution in which the salt is dissolved within the water. It will not be washed ashore. Also, the majority of the dispersion occurs in the lower section of the water column where wind effects are much reduced but the currents assist with the dispersion.

7. Why is there no reference to the size of the brine plume at periods of slack?

A. Maximum salinity plots have been produced as part of the ES, which show the maximum salinity over the area at any point over a spring or neap cycle. This includes all stages of a tidal cycle, from high tide/slack water, through ebb tide, to low tide/slack water and back to flood tide. The maximum plume envelopes therefore include both slack water when the concentrations will be highest and peak tidal flows when the plume excursion is the greatest. The worst case scenario for each model cell over this period is then reflected in the maximum plots, as a very conservative approach.

8. Over what size of area will the contaminants within the salt horizon settle out on the sea bed and what depth will they accumulate to?

A. It is not anticipated that significant quantities of settleable material will be discharged with the brine. The solution mining process is design to cause the majority of settleable material to settle out of suspension within the cavern prior to the brine being returned to the surface, the cavern design includes a sump specifically for this purpose. Any traces of non-salt components that do get carried through the cavern with the brine will either be dissolved or very fine and as such will disperse over a wide area prior to settling on the sea bed. It is not possible to quantity the amount or nature of any non-saline components within the brine at this time as no actual cores of the Islandmagee salt are available. Data from the first well will inform a subsequent application for consent to discharge under the Water Order which may impose certain conditions on the discharge in order to ensure any impact on the marine environment does not breach acceptable limits.

9. Should it not be standard practice to drill a test borehole to identify impurities such as heavy metals, hydrocarbons and unknown mineral?

A. Yes and that is what is being proposed. The creation of a well pad suitable for the drilling of a well to obtain cores for salt testing is part of the current planning application which this ES and Addendum is supporting. Following drilling of the well and chemical analysis of the salt cores the brine composition information will feed into the application to NIEA for consent to discharge under the Water (Northern Ireland) Order 1999. Thus the discharge will be subject to further detailed environmental assessment and a further round of stakeholder consultation as part of this process.

9a. Residents have raised concerns that proposed discharge may threaten Common skate and spurdogs. Both are known to inhabit waters close to the proposed brine discharge. Both species are listed on the Conservation Red List as Critically endangered (2006).

A. There has been some limited fishing activity in the area by gill net for skate and ray which apparently was quite productive in the past but has now declined significantly. A report was commissioned by the NIEA and produced recently by AFBI in 2009 - Position statement on sharks, skates and rays in Northern Ireland waters. As part of this report data from the AFBI scallop survey (partly carried out off Islandmagee) was examined for by-catch of skates and rays but was not included as few individuals were recorded over several years. This may suggest that these species are not particularly abundant in this area. The report concluded that:

- Common skate are now severely depleted in Northern Ireland waters, and
- The overall North-east Atlantic population of spurdog is depleted and, although angling catches appear to be increasing in Northern Irish waters; this reflects recent changes in recreational fishing patterns and intensity.

Although apparently not abundant we acknowledge the conservation significance of these species and in our view the brine discharge will not impact on these species due to the rapid dilution and dispersal of the brine as predicted by modelling. In addition these species will probably avoid the localised area of high salinity but may enter this zone without difficulty when foraging for food etc.

9b. Residents point out that since 1992 the Irish Whale and Dolphin Group have recorded increased sighting of Whales and Dolphins around Islandmagee and also raise this as a potential tourist attraction.

A Any potential impacts of the proposal on marine mammals have been assessed within section 6.8 of the ES. This section concluded that it seems very unlikely that the brine outfall would have any impact on the cetacean foraging areas or on the seals in the vicinity of the Maidens Rocks, as the rocks are 7-10km from the proposed outfall site. It was recommended that care will have to be taken during construction to ensure no damage to marine mammals, and that there be monitoring of marine mammals in the vicinity, to help gain a better understanding of both the local and transient whale, cetacean and seal populations.

10. Residents have asked, why endanger our marine life?

A. The project will be developed in conjunction with NIEA and a licence will need to be obtained to cover the discharge of brine into the Irish Sea. The discharge will be managed in a manner that fully considers the local marine life.

11. What will the part that is not salt be and what damage might it cause?

A. The non-salt element is insoluble clay minerals and minor heavy metals components. They are natural components that are present normally in the sea. The salt sequence represents a dried up former sea. The mechanisms for leaching salt caverns are very well understood; the salt caverns behave as a type of settlement tank with almost all of the insoluble particles (e.g. interbedded clays) sinking to the bottom of the cavern as there is very little turbulence inside the cavern. In a recent leaching project in Yorkshire it was found that the brine being discharged almost always had lower levels of suspended solids than the “clean” sea water being pumped into the caverns as the suspended solids naturally occurring in the sea water were also settling out in the cavern. The salt is expected to have very low levels of heavy metals. Islandmagee Storage Limited will be required to demonstrate that these can be discharged without harm to the receiving environment as part of the Water Order discharge consent process. The results of this analysis will be fully examined and independently verified by the NIEA Water Management Unit, who will oversee continuous

monitoring of the brine discharge during the cavern construction phase to ensure that the chemical composition does not change significantly during leaching and that adequate dispersion is achieved during the period of brine discharge. The Larne area deposit of Permian salt is expected to be very similar to that which has been leached to form caverns at Aldbrough. That salt had very low levels of heavy metals and the same is expected to be true of the Larne deposit. More detail on the salt composition at Aldbrough is given in **Appendix C**.

11a. The ES give figures for landings of crab / lobster in 2006 and gives a figure of approx 1500kg for all boats in the area. Whilst RPS will say that these figures are from DARD, DARD issue figures with the caveat that the figures are for those landings recorded by DARD. The significance of this is that the ES figures present a very small, unviable fishery which is not the case. In the later part of 2009 in excess of 250 kg of lobster per week was landed.

A. DARD have informed us that these figures are based largely on fishing by vessels of less than 10m, which are required to make monthly returns of shellfish landed into the various ports. This data is therefore self-declared by the fishermen involved. There was no intention to create the impression of a small unviable fishery. Although it is a small fishery in the immediate area it is part of a bigger fishery along the north coast.

12. What will happen to the livelihood of these fishermen?

A. The brine discharge and site drainage for the proposed development will be carefully designed and will be subject to rigorous and, in the case of the outfall, continuous monitoring to ensure that the fishing is not affected for the period of the leaching. Threshold limits for various parameters of the discharge will be agreed with the NIEA as part of the discharge consenting process. Failsafe mechanisms will be in place to avoid breaching the threshold limits which will be set to ensure that marine species or habitats will not be subject to unacceptable levels of impact. It is therefore extremely unlikely that the proposed development will give rise to any fish kills or deleterious effects on fish stocks.

13. The ES states that in relation to Cetaceans a desktop survey has been carried out. Why not obtain data from IWDG, the premier database for cetaceans in Ireland? Their records (which cover all of Ireland) show SE Co Antrim to be one of the 'hotspots' for cetaceans in Ireland and the hotspot on the east coast.

A. Section 6.8 Marine Mammals of the ES states “Additional records of casual sightings of porpoises, dolphins and small whales in the area were obtained from the Irish Whale and Dolphin Group (IWDG) website.”

The ES suggests that the breeding seabirds do not feed in the area of the outfall. The objection document contends that this is wrong as a desktop study took data from a JNCC survey of breeding terns and this was a 'snap shot' in time, June 2009. It should be noted that separate studies currently underway on other species with satellite tracking show that the feeding grounds vary from year to year.

14. Why doesn't the ES take into account that the birds will go to where the food species are located?

A. The foraging habits of seabirds is a complex issue, but will largely reflect the availability of preferred prey items. **Appendix C** discusses the potential of the outfall location to support sandeels, a key prey species for many seabirds associated with adjacent designated sites, and the potential impacts on sandeels from the brine discharge.

Unfortunately at the time of writing the original ES only one year of tracking studies by JNCC had been completed and was therefore available to RPS for the purposes of assessing the impact of the Islandmagee Storage Project on foraging terns. Subsequent data has now been provided by JNCC from tern tracking studies undertaken in Northern Ireland in 2010 and 2011. These external datasets along with the results and interpretation of ongoing coastal seabird surveys are included in an interim report featuring preliminary coastal seabird survey data and interpretation and collation of the JNCC tern tracking data as presented in **Appendix D1**.

14a. There is little or no reference to planktonic species. Most of our shellfish in the Irish Sea start out as plankton. They are extremely susceptible to even slight variations in salinity. Even if we accept the ES as accurate, it makes no difference if the plume of saltier water does not travel too far. Tides and weather will bring plankton to the vicinity of the salt at some stage which would be detrimental to the plankton. The potential consequences for the wider Irish Sea are significant.

A. Additional information has been provided on planktonic species within **Appendix C** of this document.

15. Tidal dispersal models used are 2D. We understand but cannot verify it, that there is actually no tidal dispersion computer that operates in 3D. In other words, the model deals with surface dispersal. 1 cubic metre of normal seawater weighs about 1035kg. What will be discharged will weigh approx. 1300kg. The discharged water will be denser and will settle on the seabed. What use then is surface dispersal?

A. This statement is incorrect as the modelling simulations reported in the ES have been undertaken using MIKE3, a comprehensive modelling system for three dimensional flows which includes for dispersion processes in three orthogonal directions, two horizontally and one vertically. The brine discharge is negatively buoyant therefore 3D modelling was required to evaluate the dispersion of brine through the water column which occurs by means of density currents. Within the modelling undertaken for the ES the brine dispersion was evaluated for three layers at sub-surface, mid-depth and near the seabed, as part of one integrated modelling process, in order to determine the salinities in the relevant layer, for subsequent impact assessments, in most cases close to the seabed.

16. Why were the road surveys not taken at peak holiday time and weekends?

A. The ES traffic impact assessment was undertaken in accordance with the guidelines produced by the Institute of Highways and Transportation in 2004 and the DRD Roads Service in 2006, which are the standard guidelines used for assessment of traffic impacts of a proposed development. It is not standard practice to do road surveys at peak holiday time and weekends, when there is less likelihood of construction occurring and potentially less AM and PM peak traffic.

16a. Pedestrians walking from Ballycarry station to Ballystrudder have to negotiate a small bridge without a footpath. It is impossible for both pedestrian and car drivers to see oncoming traffic at this point.

A. It is correct that pedestrians walking from Ballycarry station to Ballystrudder have to negotiate a small bridge without a footpath and visibility is indeed restricted along a short section of the road, which was mentioned in the ES section 8.1.1.1 Existing Road Network. Road Service is clearly aware of this, as demonstrated by Plates 1 and 2, which show the existing signage on the road warning drivers to keep below a maximum speed of 30mph as there may be pedestrians on the bridge with no footpath. However, this route is an approved haul route for heavy vehicles servicing Islandmagee with adequate existing signage in place to inform drivers and pedestrians of this risk that Roads Service have recommended be used to service the proposed construction activities associated with the Islandmagee Storage Facility. The existence of this constraint will be identified as a potential risk in the pre-construction health and safety pack and any issues arising will be dealt with in the construction phase traffic management plan.

Plate 1: Bridge Signage approaching from West

Plate 2: Bridge Signage approaching from East

16b. This is a £250 million project and according to Islandmagee Storage Ltd, 200 staff will be required during the construction period with 20 permanent jobs upon completion. However, offset against this are the local people who will lose jobs, particularly those in the fishing industry and tourism.

A. We do not believe that there would be any local job losses attributed to this project. On the contrary, in the current environment of economic slow-down we believe that this project will create not only good quality direct jobs, but also indirect employment for local hoteliers, caterers and transportation firms. This is discussed further in the answer to Question 17.

17. How many people (not jobs) will be employed on completion of the project?

A. A number of people will be required on permanent basis to operate the gas storage facility. These most likely will include the following daytime positions, based at Islandmagee:

- Site manager;
- Deputy site manager;
- Health, Safety & Environment Manager;
- Approximately 12 people required to work shifts.
- Also a number of local contracts likely to be awarded (e.g. security, administration, building services etc).

The skills required on shifts would include mechanical, electrical, control and instrumentation, and piping engineering.

The additional services would be most likely contracted out to local companies, such as security, cleaning, catering, and general / site maintenance etc. During the construction

phase there will be a wide range of temporary positions and local contracts. The head office for the company will require additional staff to deal with the overall project management, storage capacity bookings etc. The location of the head office in the long-term will probably also be in County Antrim. The Company has given an undertaking to employ local people where possible and provide the necessary training subject of course to prevailing employment, procurement and contract law.

18. How many of the 200 jobs will be specialist contractors from outside of the area?

A. It is not possible to answer this question with any accuracy at this time. In compliance with guidelines on competitive tendering, the project will seek bids for work from a range of sources and it is expected that these contractors would do the same with their sub-contractors. Local contractors and labour (skilled, semi-skilled or unskilled) should not be disadvantaged (and indeed may be advantaged by their locality) from offering their services at the appropriate time during the project construction.

19. What is the breakdown of these jobs and timescale of these jobs?

A. The construction will be intermittent and so the construction jobs will also be intermittent and short-term. The jobs will cover a wide range of skills to support the main contractors appointed. There will be several longer-term jobs supporting the management of the activities by Islandmagee Storage Limited.

19a. Islandmagee Gas Storage Ltd is a joint venture between Infrastrata plc and Mutual Energy Limited. This is a commercial enterprise; therefore they are in business to make a profit. The company will buy gas on the open market when it is cheap and store it to sell on when gas prices increase. As a company it needs to make a profit, therefore it will sell to the highest bidder. This could be Ireland, the UK or even further afield.

A. This is more of a comment rather than a question. Clearly the project is a commercial venture and needs to make a return on investment.

20. Are there any guarantees in place that Northern Ireland will receive cheaper gas than that available in the open market?

A. No. However, Northern Ireland will benefit from the security of supply and price stability, especially in extreme demand periods.

21. If the company were sold, what guarantee is there that any agreement made with Islandmagee Storage is honoured?

A. It is not the intention to sell the company, although the shareholdings may alter over time. Any change of ownership will not alter the obligations and commitments that the company has made both contractually and as part of the planning process.

22. Will Islandmagee Storage Ltd lease out the caverns?

A. Yes it is normal for capacity contracts in a storage project.

23. Does the company have plans for more caverns?

A. Seven caverns have been chosen to create a storage volume of 500 million cubic metres. In designing the facility a balance has to be reached between storage space and the speed of gas injection/withdrawal, which is limited by the currently existing gas infrastructure. Constructing 7 caverns (500 million cubic metres of stored gas) allows for a flexible facility, if it were larger it would be much less flexible storage, less able to respond to demand fluctuations. The Company does not have plans for any additional caverns.

24. In the event of Islandmagee Storage Ltd going bankrupt, who would be responsible for making good and safe the damage already caused and who would pick up the bill?

A. It is not clear what the damage is being envisaged by the questioner, but the winding up of a company in the event of bankruptcy would be dealt with in accordance with the provisions of the Companies Act.