Comhairle Chontae Luimnigh
Limerick County Council

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Comhairle Chontae Luimnigh
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Planning Section

7th May, 2014.

Maire Buckely,
Environmental Licensing Programme,
Office of climate,
Licensing & Resource Use,
Regional Inspectorate,
Iniscarra,
County Cork.

Reg. No. W0082-03

Dear Madam,

I refer to the above planning application and the request by your Department for comments, under Section 87(1E)(a) of the EPA Act 1992, as amended , the planning application has been granted by Limerick County Council subject to 5 No. conditions on the 16th April, 2014.

The site is located at Ballykeeffe, Dock Road, Limerick with an existing industrial estate. There is an existing waste transfer station on the site. The land to the south is occupied by commercial and industrial operations.

The applicants have submitted an Environmental Impact Statement and an Appropriate Assessment Screening with the planning application. On assessment, the Planning Authority considered all elements relevant to the planning application and considered that it was in accordance with the Local Area Plan policies and the proper planning and sustainable development of the area.

Please find attached a copy of the Environmental Impact Assessment, the planners report, a copy of the Final Grant of Permission and Notification of Decision to Grant Permission.

Yours sincerely,

Joan O'Brien, Staff Officer,
Economic Development & Planning.

LIMERICK COUNTY COUNCIL

PLANNING AND DEVELOPMENT ACTS 2000-2013

NOTIFICATION OF DECISION TO GRANT

Greenstar Environmental Services Ltd (In Receivership)
c/o O'Callaghan Moran & Associates
Granary House
Rutland Street
Cork

Planning Register Number: 13/300
Valid Application Received: 22/05/2013
Further Information Received Date: 17/01/2014

In pursuance of the powers conferred upon them by the above-mentioned Act, Limerick County Council has by Order dated **13th March, 2014** decided for the reason set out in the First Schedule hereto, to GRANT **PERMISSION** for development of land in accordance with the documents submitted namely:-**an increase in the amount of waste accepted annually to 130,000 tonnes. The proposed increase does not require the construction/provision of any new buildings or structures (The development will require a revision of the Waste Licence granted by the Environmental Protected Agency, also, this application is accompanied by an Environmental Impact Statement (EIS)) at existing Materials Recovery Facility Ballykeeffe Dock Road** subject to the 5 condition(s) and the reasons for the imposition of the said condition(s) as set out in the Second Schedule.

Signed on behalf of said Council _____
for DIRECTOR OF SERVICES
ECONOMIC DEVELOPMENT & PLANNING

Date: **13th March, 2014**

Under Article 20 of the Planning & Development Regulations 2001 - 2013 the applicant shall remove the site notice in respect of the application following notification of the Planning Authority's decision.
In deciding the planning application, the Planning Authority, in accordance with Section 34(3) of the Planning & Development Acts 2000 – 2013 has had regard to submissions/observations received (if any) in accordance with the Planning & Development Regulations 2001 – 2013.

If there is no appeal to An Bord Pleanála a grant of permission shall be issued as soon as may be but not earlier than 3 working days after the expiration of the period for making of an appeal (see footnote).
THIS NOTICE IS NOT A GRANT OF PERMISSION AND WORK SHOULD NOT COMMENCE UNTIL PLANNING PERMISSION IS GRANTED.

NOTE:
An appeal against a decision of a planning authority under the provisions of the Planning & Development Acts, 2000-2013 may be made to An Bord Pleanála at any time before the expiration of the appropriate period and on payment of the appropriate fee, by an applicant for permission or any person who made submissions or observations in writing in relation to the planning application. An appeal by a person who made submissions or observations must be accompanied by the acknowledgement of receipt of the submissions or observations from the planning authority. Any such appeal must be made in writing and received by the Board within 4 weeks beginning on the date of the making of the decision by the planning authority. The appeal must be fully complete from the start otherwise it will be invalid. It is very important to note that any appeal referrals under the 2000 to 2013 Planning & Development Acts which are not accompanied by the correct fee will be invalid.

/P.T.O.

The scale of fees payable to An Bord Pleanála in respect of appeals is set out hereunder:

Case Type	Appeal received on or after 5th September 2011
Planning Acts	
a. Application for strategic infrastructure development or a request to alter the terms of such development already permitted or approved.	€100,000
b. Appeal against a decision of a planning authority on a planning application relating to commercial development, made by the person by whom the planning application was made, where the application included retention of development.	€4,500 or €9,000 if *EIS or **NIS involved
c. Appeal against a decision of a planning authority on a planning application relating to commercial development, made by the person by whom the planning application was made, other than an appeal mentioned at (b).	€1,500 or €3,000 if *EIS or **NIS involved
d. Appeal against a decision of a planning authority on a planning application made by the person by whom the planning application was made, where the application relates to retention of development, other than an appeal mentioned at (b) or (c) (non-commercial development).	€660
e. 1st party appeal solely against contribution condition(s) – (2000 Act Section 48 or 49).	€220
f. Appeal other than an appeal mentioned at (b), (c), (d) or (h)	€220
g. Application for leave to appeal.	€110
h. Appeal following a grant of leave to appeal.	€110
i. Referral.	€220
j. Reduced fee (payable by specified bodies).	€110
k. Submissions or observations (by observer) on strategic infrastructure development applications, appeals and referrals.	€50
l. Request from a party for an oral hearing.	€50
*EIS - Environmental Impact Statement **NIS - Natura Impact Statement	

Submissions or observations on appeals made by third parties must be received by the Board within 4 weeks from the receipt of the appeal by the Board and the fee in this case is €50. Development consisting of the provision of two or more dwellings is classed as commercial development for the purposes of an appeal.
Should you wish to make an appeal, the following documents are available on www.pleanala.ie

- A Planning Appeal Form/Checklist and
- A Guide to making a Planning Appeal.

Appeals should be addressed to An Bord Pleanála, 64 Marlborough Street, Dublin 1.

-PLANNING REGISTER REFERENCE NUMBER: 13/300

FIRST SCHEDULE

Having regard to the nature of the proposed development, it is considered that subject to compliance with the conditions as set out in the Second Schedule, the proposed development would be in accordance with the proper planning and sustainable development of the area.

SECOND SCHEDULE

1. The development shall be carried out in accordance with the plans and particulars lodged with the application and the E.I.S. on the 22nd May 2013 as amended by the further plans and particulars submitted on the 4th September 2013, and 17th January 2014, except as may otherwise be required in order to comply with the following conditions.

   Reason - In order to clarify the development to which this permission applies.

2. No development shall commence on site until a connection is made to the Limerick Main Drainage Scheme and is in operation to the Planning Authority's satisfaction as specified under planning permissions 06/1394 and 08/2320. The existing on site waste water system shall be decommissioned when the connection to the Limerick Main Drainage Scheme has been commissioned.

   Reason - In the interest of orderly development.

3. a. No development shall commence on site until the developer(s) submits the following for the written agreement of the Planning Authority –
      i. The developer engages the services of a suitably qualified person acceptable to the Planning Authority with professional indemnity insurance, who shall oversee all works on site as per the permission granted. Details shall be submitted for the written agreement of the Planning Authority.
      ii. The developer shall notify the Planning Authority in writing at least one week prior to the commencement of any works to the site.

   b. On completion of works to the site a written report shall be submitted to the Planning Authority from the same suitably qualified person demonstrating that the development has been carried out in accordance with the planning permission granted.

   The submission of such shall not absolve the developer of his responsibilities to construct and install infrastructural services in accordance with the requirements of this permission.

   Reason – In the interest of orderly development.

4. Prior to commencement of development details of the proposed interceptor serving the "dirty area" shall be submitted for the written agreement of the Planning Authority. The interceptor must be in accordance with BS EN 858.

Reason - In the interest of proper planning and sustainable development.

5. Discharge from the truck/wheel wash shall be to the foul sewer via the proposed interceptor if detergents are not utilised in the washing process. If detergents are utilised, a zero-discharge recycling system shall be installed. No trucks other than those using the facility shall be permitted to use the wheel wash. Prior to commencement of development full details of the system shall be submitted for the written agreement of the Planning Authority.

Reason - In the interest of orderly development.

Limerick County Council

File No: 13/300
Applicant: Greenstar Environmental Services Ltd (In Receivership)
Location: existing Materials Recovery Facility, Ballykeeffe, Dock Road
Development Description: Permission for an increase in the amount of waste accepted annually to 130,000 tonnes. The proposed increase does not require the construction/provision of any new buildings or structures (The development will require a revision of the Waste Licence granted by the Environmental Protected Agency, also, this application is accompanied by an Environmental Impact Statement (EIS))

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1) Site Notice:
N O'Connell 13/06/2013

2) Description of existing and proposed development and site analysis:
The site is located within an existing industrial area on the Dock Road.

3) Photographs:
See file

4) Planning History:
Current:
02/984 Permission granted for the construction of an extension to the existing transfer/storage building at the existing waste handling facility
02/1350 Permission granted for the construction of an ESB substation at the existing waste handling facility

Adjacent:
04/2721: Permission granted for the retention of Telecommunications Monopole, carrying GSM Telecommunication's equipment, associated equipment container and palisade fence
99/2003 Permission granted for the erection of a 20m telecommunications monopole with antennas and associated equipment container

Pre-planning
Held on 17/12/2012 with S. Duclot, SEP; N. O'Connell A.P.; P. King, Regional Waste Plan Co-Ordinator; and T. Tarpey S.E.

5) Habitats Directive Project Screening Assessment

Construction Phase: As per development description **Are substantial works required:** No **Operating phase effects:**	**Ex-situ effects:** No **Run-off:** Potential surface water run-off

N/A	**Abstraction:** none **Displacement:** None - site located outside of the SAC.

Identification of Natura 2000 sites which may be impacted by the proposed development

1	**Impacts on designated rivers, streams, lakes and fresh water dependant habitats and species e.g. bogs or otters -see abstraction/run off etc above.**	*Is the development in the relevant catchment of or immediately up/downstream of a watercourse that has been designated as a Natura 2000 site?* Name of sites: *Lower river Shannon Sac site.*	40m
2	**Impacts on terrestrial habitats and species.-see area and disturbance/displacement effects above.**	*Is the development within 1km of a SAC site with terrestrial based habitats or species?* Name of site:	No
3	**Impacts on designated marine habitats and species.**	*Is the development located within marine or intertidal areas or within 5 km of a SAC site whose qualifying habitats or species include the following habitats:* *Salmonid, Lamprey Mudflats, sandflats, saltmarsh, shingle, reefs, sea cliffs* Name of site: *Lower river Shannon Sac site*	No
4	**Impacts on birds in SPAs-**	*Is the development within 1km of a Special Protection Area* Name of site:	No
5	**Cumulative effects**	Would consideration of a number of significant projects nearby such as forested areas, quarries, wind energy together with the proposed development significantly increase the impacts listed above:	No

Conclusion:

6) Summary of relevant planning matters

Limerick County Development Plan 2010-2016

Southern Environs Local Area Plan 2011-2017

7) Services
Public Mains
Existing on-site treatment system, propose to connect to public sewerage treatment.

8) Submissions/Objections:
(a) Internal Submissions
Fire Officer: No objection to proposed development
Water Services (Limerick County Council): it is recommended that this proposed development is acceptable on the basis that it is an extension to an existing enterprise.(See full report attached)
Heritage Officer (12/7/13) No issues arising.
(b)External Submissions
Limerick City Council Water Services: (See full report attached)- Further information required in relation to water main layout, wayleave agreement for discharge to Bunlicky Wastewater Treatment Plant and the amount of discharge proposed to the treatment plant.

NRA: Will rely on the planning authority to abide by the official national policy in relation to development on/affecting national roads, as outlines in the DoECLG Spatial Planning and National Roads Guidelines for Planning Authorities (2012).

An Taisce: Appropriate management and mitigation measures are required to ensure adequate perimeter continuation including drainage to River Shannon Special Area of Conservation.

OPW: This site falls within the area deemed to benefit form The Ballynaclogh Embankment Scheme and may as a result be subject to an increased flood risk.

Mid West Road Design Office: No observations

HSE: (see full report attached): With regard to the requested increase in amount of waste accepted on site, it is not envisaged that this proposal will have nay significant impact on public health. The existing plant operation and activities are controlled and monitored under the terms of the Waste Licence which addresses all of the on-site emissions and discharges. Of concern from a public health perspective is the ongoing elevated ammonia levels noted in the groundwater monitoring. The Applicant proposes to address this matter through the mitigation measures submitted. Monitoring of all parameters shall continue on a regular basis as per the Waste Licence in order to ensure the increase in traffic and volume of waste accepted onto the site does not adversely impact the environment or public health.

Health and Safety Authority: No comments

(c)Objections
None received

(d)Submissions from Elected Representatives
None received

9) **Summary of key planning issues and assessment:**

The site is located with an existing industrial estate. There is an existing waste transfer station on the site. The land to the south is occupied by commercial and industrial operations. The Ballinacurra Creek is to the east and the lands to the north and west are undeveloped. This application is for permission for an increase in the amount of waste accepted annually to 130,000 tonnes. The applicant states that the facility accepts and processes non-hazardous mixed municipal solid waste and segregated dry recyclables. The applicant states that there will be no change to the types of waste accepted or the way waste is handled, processed and stored. There is no construction or additional equipment proposed as part of the application.

The facility can operate twenty four hours a day. At present there are two eight hour shifts from 6am to 2pm and 2pm to 10pm.The site is zoned Industrial in the Southern Environs Local Area Plan 2011-2017. The application is accompanied by an Environmental Impact Statement (EIS) and it outlines the impacts of the proposal as follows:

Soils and Geology

There is potential for leaks/spills to occur in the handling and storage of fuel and lubricating oils and a malfunction of the wastewater treatment plant. The potential pathways to the soil include direct infiltration and indirect via contaminated surface water leaks to ground. With the exception of the area around the wastewater treatment plant, the remainder of the site is either paved with concrete or occupied by buildings that prevent infiltration to the subsoil. The EIS concludes that the proposed increases in the amounts of waste accepted at the facility will have no impact on soils and geology.

Surface and Groundwater

The site is next to a river which is designated a Special Area of Conservation (SAC). Lower River Shannon SAC, 2165. An Appropriate Assessment Stage 1 Screening Document has been submitted with the application. It concludes that "*the proposed increase in annual waste throughput will not result in any new or additional emissions/disturbance that could present a significant risk to the Qualifying Interests and Conservation Objectives of either the Lower Shannon SAC or the Shannon and Fergus Estuaries SPA. Therefore a Natura Impact Statement is not required*".

Surface water

The run-off from the paved yards is collected and discharged to a man made drain at the north eastern site boundary via a three chamber oil interceptor. Run-off from the main buildings discharges to man-made perimeter drain along the western boundary. The perimeter drains discharge to Bunlicky Lake. There is a shut off valve at the outlet from the interceptor that can be closed in the event of an incident that has the potential to impact on surface water. A number of defects were identified in the surface water drainage system in 2012. These defects have been repaired. A report from Environment has been placed on file. It outlines that "Details *given in the Environmental Impact Statement submitted, under this application, indicate that the Emission Limit Values set under the EPA Waste Licence have been exceeded in 2012 for BOD (mg O2/l) and Total Suspended Solids (mg/l). There is the potential for*

stormwater on the Greenstar site to be contaminated due to the nature of the facility. The increase in the amount of waste accepted by GES Ltd potentially increases the risk of surface water contamination". The report recommends that the applicants be requested to demonstrate that *"there is the assimilative capacity in the open drain adjacent to the site to accept the stormwater discharge from GES Ltd."*
A report has been received from Environment recommending that "it *should be demonstrated that there is the assimilative capacity in the open drain adjacent to the site to accept the stormwater discharge from GES Ltd".*

Wastewater Management:
At present sanitary wastewater and wastewater from the vehicle wash area is treated in to the on-site Klargester Biodise wastewater treatment plant. The wash water from the vehicle wash passed through a grit trap and oil interceptor before entering the unit. The use of the vehicle wash has been suspended. Sanitary wastewater form the neighbouring Cussen Crane Hire Yard is also connected to the Klargester. The treated effluent discharges to an onsite percolation area. It is a condition of the Waste Licence that discharge foul water and sewage from the site must be to the Council's foul sewer, following completion of the Limerick Min Drainage Scheme, subject to the approval of the Sanitary Authority. The applicant proposes to connect to Bunlicky Treatment plant via a new pipe to be laid from the site to the Treatment works site. On the documentation submitted with the application a wayleave route for the proposed pipe is indicated, however, no wayleave agreement has been submitted with the application.

Flooding:
The site is located within Flood Zone A, (OPW Predictive Mapping). This Zone defines areas with more than 1% probability of flooding from rivers and 0.5% probability of coastal flooding. A preot has been received formWater Sevrices in relation to the issue of flooding and it outlines:Infill of this site has already taken place under previous planning permissions.
"This has removed some flood storage from this catchment. The applicant does not intend carrying out further infill works as part of the proposed development.
Table 3.1, The Planning System and Flood Risk Management Guidelines 2009, includes Waste Treatment (except landfill and hazardous waste) as Less Vulnerable Development, which is considered inappropriate for location in an area of High Probability of Flooding (Zone A).
Table 3.2 requires that a Justification Test for such development should be carried out.
However, the Planning System and Flood Risk Management, Section 5.28, states that extensions to existing commercial and industrial enterprises are unlikely to raise significant flooding issues unless they introduce a significant number of additional people into the flood risk area or entail the storage of hazardous substances."
The report recommends that the proposed development is acceptable as it is an extension to an existing enterprise.

Waste Types and Quantities
The waste licence allows the acceptance of 90,000 tonnes of non hazardous waste annually. These comprise:

- Commercial and Industrial Waste (10,500 tonnes)
- Municipal waste (75,000 tonnes)

- Construction and Demolition (4,500 tonnes)

The wastes are delivered to site by GES collection vehicles and by third party collectors. The key processes carried out at the facility include

- Segregation of recyclable materials
- Baling and wrapping of Municipal Solid Waste
- Segregation and bulking of C&D waste
- Transfer or recovered and residual materials to appropriately licensed recycling recovery and disposal outlets
- Timber shredding(a new process)

As stated previously the application does not include any change to the types of waste accepted or the way waste is handled, processed and stored.

Climate

The proposed increase in the amount of wastes accepted will result in an increase in the exhaust emissions, however these will be at a scale that will not give rise to any discernable impacts on either the microclimate or climate.

Air Quality

The EIS outlines that smells are not an issue of concern outside f the site. The existing buildings and plant and equipment have the capacity to accommodate the increased volumes and there will no increase in the time taken to process and consign the waste. The existing operation does not give rise to elevated dust emissions and the proposed changes will not give rise to any new or additional sources of dust emission. The EIS also states that the additional traffic associated with the proposed changes will not have any cumulative adverse impact on air quality in the area.

Noise & Vibration

A Noise surveys were undertaken ON 24TH May 2012 by Dixon Brosnan. The survey found that at the site access on the N69 there are no site emissions audible, apart form sporadic trucks using the access road. The EIS concludes that the additional traffic as a result of the development will not have any cumulative effect on noise levels and there will no new sources of noise emissions at the facility.

Landscape

There will be no visual impact as a result of this development.

Archaeology

No issues

Human Beings:

No real impacts as result of the proposal.

Material Assets

The proposed change will have no impact on local amenity value and will have a negligible impact on the local road network. There will be an associated increase in energy use and natural resource consumption, which will be kept to a minimum

Traffic
The Dock Road forms a part of the N69 linking Limerick to Tralee and the site entrance is located 60km/h speed limit zone. The proposed increase in the amount of waste accepted at the facility will give rise to an increase in heavy goods vehicle traffic to and from the site. There is no increase in employee numbers envisaged as result of this application and therefore additional staff car parking is not required. The applicant proposes to modify and reinstate the existing right hand turn lane for vehicles assessing the site from Limerick City.

10) Further Information
The following further information is required:

1. The applicant is requested to submit a water main layout for the proposed development.

2. The developer has indicated their intention to lay a sewer through adjoining lands and into Bunlicky Wastewater Treatment Plant, the applicant has not submitted details of their legal entitlement to lay this sewer. Accordingly the applicant is requested to submit a copy of the signed legal agreement.

3. The applicant has indicated in correspondence with the authority and it's partner companies that they intend to increase the discharge from the foul network from 0.5m3/ day to 60m3/day, the applicant is requested to substantiate this information and to indicate its intentions as to current and future foul loadings from the development.

4. It should be demonstrated that there is the assimilative capacity in the open drain adjacent to the site to accept the stormwater discharge from Greenstar Environmental Services Ltd. The assimilative capacity should be based on adjusted background concentration in accordance with "Guidance, Procedures and Training on the Licensing of Discharges to Surface Waters and Groundwaters, Volume 1 (Local Authority Services National Training Group 2011)".
   The assessment of assimilative capacity should consider the biological oxygen demand and nutrient conditions of the stormwater discharge and receiving waters (BOD (mg O2/l), Total Ammonia (mg N/l), Dissolved Inorganic Nitrogen (mg N/l), Molybdate Reactive Phosphorous (mg P/l)). Although an environmental quality standard has not been set for Total Suspended Solids in the EC Environmental Objectives (Surface Waters) Regulations, 2009, consideration should also be given to this parameter in the assimilative capacity assessment.

   This work should be carried out by a suitably qualified person.

Signed: Mary O'Mally

Date: 12/7/13

Signed:

Date: 12/07/2013

PA13/300

Limerick County Council

File No: 13/300
Applicant: Greenstar Environmental Services Ltd (In Receivership)
Location: existing Materials Recovery Facility, Ballykeeffe, Dock Road
Development Description: Permission for an increase in the amount of waste accepted annually to 130,000 tonnes. The proposed increase does not require the construction/provision of any new buildings or structures (The development will require a revision of the Waste Licence granted by the Environmental Protected Agency, also, this application is accompanied by an Environmental Impact Statement (EIS))

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1) Site Notice:
N O'Connell 13/06/2013

2) Description of existing and proposed development and site analysis:
The site is located within an existing industrial area on the Dock Road.

3) Photographs:
See file

4) Planning History:
Current:
02/984 Permission granted for the construction of an extension to the existing transfer/storage building at the existing waste handling facility
02/1350 Permission granted for the construction of an ESB substation at the existing waste handling facility

Adjacent:
04/2721: Permission granted for the retention of Telecommunications Monopole, carrying GSM Telecommunication's equipment, associated equipment container and palisade fence
99/2003 Permission granted for the erection of a 20m telecommunications monopole with antennas and associated equipment container

Pre-planning
Held on 17/12/2012 with S. Duclot, SEP; N. O'Connell A.P.; P. King, Regional Waste Plan Co-Ordinator; and T. Tarpey S.E.

5) Habitats Directive Project Screening Assessment

Construction Phase: As per development description **Are substantial works required:** No **Operating phase effects:**	**Ex-situ effects:** No **Run-off:** Potential surface water run-off

N/A	**Abstraction:** none **Displacement:** None - site located outside of the SAC.

Identification of Natura 2000 sites which may be impacted by the proposed development

1	**Impacts on designated rivers, streams, lakes and fresh water dependant habitats and species e.g. bogs or otters -see abstraction/run off etc above.**	*Is the development in the relevant catchment of or immediately up/downstream of a watercourse that has been designated as a Natura 2000 site?* Name of sites: *Lower river Shannon Sac site.*	40m
2	**Impacts on terrestrial habitats and species.-see area and disturbance/displacement effects above.**	*Is the development within 1km of a SAC site with terrestrial based habitats or species?* Name of site:	No
3	**Impacts on designated marine habitats and species.**	*Is the development located within marine or intertidal areas or within 5 km of a SAC site whose qualifying habitats or species include the following habitats:* *Salmonid, Lamprey Mudflats, sandflats, saltmarsh, shingle, reefs, sea cliffs* Name of site: *Lower river Shannon Sac site*	No
4	**Impacts on birds in SPAs-**	*Is the development within 1km of a Special Protection Area* Name of site:	No
5	**Cumulative effects**	Would consideration of a number of significant projects nearby such as forested areas, quarries, wind energy together with the proposed development significantly increase the impacts listed above:	No

Conclusion:

6) Summary of relevant planning matters

Limerick County Development Plan 2010-2016

Southern Environs Local Area Plan 2011-2017

7) Services
Public Mains
Existing on-site treatment system, propose to connect to public sewerage treatment.

8) Submissions/Objections:
(a) Internal Submissions
Fire Officer: No objection to proposed development
Water Services (Limerick County Council): it is recommended that this proposed development is acceptable on the basis that it is an extension to an existing enterprise.(See full report attached)
Heritage Officer (12/7/13) No issues arising.
(b)External Submissions
Limerick City Council Water Services: (See full report attached)- Further information required in relation to water main layout, wayleave agreement for discharge to Bunlicky Wastewater Treatment Plant and the amount of discharge proposed to the treatment plant.

NRA: Will rely on the planning authority to abide by the official national policy in relation to development on/affecting national roads, as outlines in the DoECLG Spatial Planning and National Roads Guidelines for Planning Authorities (2012).

An Taisce: Appropriate management and mitigation measures are required to ensure adequate perimeter continuation including drainage to River Shannon Special Area of Conservation.

OPW: This site falls within the area deemed to benefit form The Ballynaclogh Embankment Scheme and may as a result be subject to an increased flood risk.

Mid West Road Design Office: No observations

HSE: (see full report attached): With regard to the requested increase in amount of waste accepted on site, it is not envisaged that this proposal will have nay significant impact on public health. The existing plant operation and activities are controlled and monitored under the terms of the Waste Licence which addresses all of the on-site emissions and discharges. Of concern from a public health perspective is the ongoing elevated ammonia levels noted in the groundwater monitoring. The Applicant proposes to address this matter through the mitigation measures submitted. Monitoring of all parameters shall continue on a regular basis as per the Waste Licence in order to ensure the increase in traffic and volume of waste accepted onto the site does not adversely impact the environment or public health.

Health and Safety Authority: No comments

(c)Objections
None received

(d)Submissions from Elected Representatives
None received

9) **Summary of key planning issues and assessment:**

The site is located with an existing industrial estate. There is an existing waste transfer station on the site. The land to the south is occupied by commercial and industrial operations. The Ballinacurra Creek is to the east and the lands to the north and west are undeveloped. This application is for permission for an increase in the amount of waste accepted annually to 130,000 tonnes. The applicant states that the facility accepts and processes non-hazardous mixed municipal solid waste and segregated dry recyclables. The applicant states that there will be no change to the types of waste accepted or the way waste is handled, processed and stored. There is no construction or additional equipment proposed as part of the application.

The facility can operate twenty four hours a day. At present there are two eight hour shifts from 6am to 2pm and 2pm to 10pm.The site is zoned Industrial in the Southern Environs Local Area Plan 2011-2017. The application is accompanied by an Environmental Impact Statement (EIS) and it outlines the impacts of the proposal as follows:

Soils and Geology

There is potential for leaks/spills to occur in the handling and storage of fuel and lubricating oils and a malfunction of the wastewater treatment plant. The potential pathways to the soil include direct infiltration and indirect via contaminated surface water leaks to ground. With the exception of the area around the wastewater treatment plant, the remainder of the site is either paved with concrete or occupied by buildings that prevent infiltration to the subsoil. The EIS concludes that the proposed increases in the amounts of waste accepted at the facility will have no impact on soils and geology.

Surface and Groundwater

The site is next to a river which is designated a Special Area of Conservation (SAC). Lower River Shannon SAC, 2165. An Appropriate Assessment Stage 1 Screening Document has been submitted with the application. It concludes that "*the proposed increase in annual waste throughput will not result in any new or additional emissions/disturbance that could present a significant risk to the Qualifying Interests and Conservation Objectives of either the Lower Shannon SAC or the Shannon and Fergus Estuaries SPA. Therefore a Natura Impact Statement is not required*".

Surface water

The run-off from the paved yards is collected and discharged to a man made drain at the north eastern site boundary via a three chamber oil interceptor. Run-off from the main buildings discharges to man-made perimeter drain along the western boundary. The perimeter drains discharge to Bunlicky Lake. There is a shut off valve at the outlet from the interceptor that can be closed in the event of an incident that has the potential to impact on surface water. A number of defects were identified in the surface water drainage system in 2012. These defects have been repaired. A report from Environment has been placed on file. It outlines that "Details *given in the Environmental Impact Statement submitted, under this application, indicate that the Emission Limit Values set under the EPA Waste Licence have been exceeded in 2012 for BOD (mg O2/l) and Total Suspended Solids (mg/l). There is the potential for*

stormwater on the Greenstar site to be contaminated due to the nature of the facility. The increase in the amount of waste accepted by GES Ltd potentially increases the risk of surface water contamination". The report recommends that the applicants be requested to demonstrate that *"there is the assimilative capacity in the open drain adjacent to the site to accept the stormwater discharge from GES Ltd."*
A report has been received from Environment recommending that "it *should be demonstrated that there is the assimilative capacity in the open drain adjacent to the site to accept the stormwater discharge from GES Ltd".*

Wastewater Management:
At present sanitary wastewater and wastewater from the vehicle wash area is treated in to the on-site Klargester Biodise wastewater treatment plant. The wash water from the vehicle wash passed through a grit trap and oil interceptor before entering the unit. The use of the vehicle wash has been suspended. Sanitary wastewater form the neighbouring Cussen Crane Hire Yard is also connected to the Klargester. The treated effluent discharges to an onsite percolation area. It is a condition of the Waste Licence that discharge foul water and sewage from the site must be to the Council's foul sewer, following completion of the Limerick Min Drainage Scheme, subject to the approval of the Sanitary Authority. The applicant proposes to connect to Bunlicky Treatment plant via a new pipe to be laid from the site to the Treatment works site. On the documentation submitted with the application a wayleave route for the proposed pipe is indicated, however, no wayleave agreement has been submitted with the application.

Flooding:
The site is located within Flood Zone A, (JBA Predictive Mapping). This Zone defines areas with more than 1% probability of flooding from rivers and 0.5% probability of coastal flooding. A preot has been received formWater Sevrices in relation to the issue of flooding and it outlines:Infill of this site has already taken place under previous planning permissions.
"This has removed some flood storage from this catchment. The applicant does not intend carrying out further infill works as part of the proposed development.
Table 3.1, The Planning System and Flood Risk Management Guidelines 2009, includes Waste Treatment (except landfill and hazardous waste) as Less Vulnerable Development, which is considered inappropriate for location in an area of High Probability of Flooding (Zone A).
Table 3.2 requires that a Justification Test for such development should be carried out.
However, the Planning System and Flood Risk Management, Section 5.28, states that extensions to existing commercial and industrial enterprises are unlikely to raise significant flooding issues unless they introduce a significant number of additional people into the flood risk area or entail the storage of hazardous substances."
The report recommends that the proposed development is acceptable as it is an extension to an existing enterprise.

Waste Types and Quantities
The waste licence allows the acceptance of 90,000 tonnes of non hazardous waste annually. These comprise:

- Commercial and Industrial Waste (10,500 tonnes)
- Municipal waste (75,000 tonnes)

- Construction and Demolition (4,500 tonnes)

The wastes are delivered to site by GES collection vehicles and by third party collectors. The key processes carried out at the facility include

- Segregation of recyclable materials
- Baling and wrapping of Municipal Solid Waste
- Segregation and bulking of C&D waste
- Transfer or recovered and residual materials to appropriately licensed recycling recovery and disposal outlets
- Timber shredding(a new process)

As stated previously the application does not include any change to the types of waste accepted or the way waste is handled, processed and stored.

Climate

The proposed increase in the amount of wastes accepted will result in an increase in the exhaust emissions, however these will be at a scale that will not give rise to any discernable impacts on either the microclimate or climate.

Air Quality

The EIS outlines that smells are not an issue of concern outside f the site. The existing buildings and plant and equipment have the capacity to accommodate the increased volumes and there will no increase in the time taken to process and consign the waste. The existing operation does not give rise to elevated dust emissions and the proposed changes will not give rise to any new or additional sources of dust emission. The EIS also states that the additional traffic associated with the proposed changes will not have any cumulative adverse impact on air quality in the area.

Noise & Vibration

A Noise surveys were undertaken ON 24TH May 2012 by Dixon Brosnan. The survey found that at the site access on the N69 there are no site emissions audible, apart form sporadic trucks using the access road. The EIS concludes that the additional traffic as a result of the development will not have any cumulative effect on noise levels and there will no new sources of noise emissions at the facility.

Landscape

There will be no visual impact as a result of this development.

Archaeology

No issues

Human Beings:

No real impacts as result of the proposal.

Material Assets

The proposed change will have no impact on local amenity value and will have a negligible impact on the local road network. There will be an associated increase in energy use and natural resource consumption, which will be kept to a minimum

Traffic
The Dock Road forms a part of the N69 linking Limerick to Tralee and the site entrance is located 60km/h speed limit zone. The proposed increase in the amount of waste accepted at the facility will give rise to an increase in heavy goods vehicle traffic to and from the site. There is no increase in employee numbers envisaged as result of this application and therefore additional staff car parking is not required. The applicant proposes to modify and reinstate the existing right hand turn lane for vehicles assessing the site from Limerick City.

10) Further Information
The following further information is required:

1. The applicant is requested to submit a water main layout for the proposed development.

2. The developer has indicated their intention to lay a sewer through adjoining lands and into Bunlicky Wastewater Treatment Plant, the applicant has not submitted details of their legal entitlement to lay this sewer. Accordingly the applicant is requested to submit a copy of the signed legal agreement.

3. The applicant has indicated in correspondence with the authority and it's partner companies that they intend to increase the discharge from the foul network from 0.5m3/ day to 60m3/day, the applicant is requested to substantiate this information and to indicate its intentions as to current and future foul loadings from the development.

4. It should be demonstrated that there is the assimilative capacity in the open drain adjacent to the site to accept the stormwater discharge from Greenstar Environmental Services Ltd. The assimilative capacity should be based on adjusted background concentration in accordance with "Guidance, Procedures and Training on the Licensing of Discharges to Surface Waters and Groundwaters, Volume 1 (Local Authority Services National Training Group 2011)".
   The assessment of assimilative capacity should consider the biological oxygen demand and nutrient conditions of the stormwater discharge and receiving waters (BOD (mg O2/l), Total Ammonia (mg N/l), Dissolved Inorganic Nitrogen (mg N/l), Molybdate Reactive Phosphorous (mg P/l)). Although an environmental quality standard has not been set for Total Suspended Solids in the EC Environmental Objectives (Surface Waters) Regulations, 2009, consideration should also be given to this parameter in the assimilative capacity assessment.

   This work should be carried out by a suitably qualified person.

Signed: Mary O'Mally

Date: 12/7/13

Signed:

Date: 12/07/2013

PA13/300

Limerick County Council

File No:	**13/300**
Applicant:	**Greenstar Environmental Services Ltd (In Receivership)**
Location:	**existing Materials Recovery Facility, Ballykeeffe, Dock Road**
Development Description:	**Permission for an increase in the amount of waste accepted annually to 130,000 tonnes. The proposed increase does not require the construction/provision of any new buildings or structures (The development will require a revision of the Waste Licence granted by the Environmental Protected Agency, also, this application is accompanied by an Environmental Impact Statement (EIS))**

A request for clarification issued and the following response was received:

1. *The Planning Authority note the response to the further information request and you are advised that they are not favourable towards surface water and storm water discharging to the sewer network. You are invited to submit details, including letters of agreement as appropriate, securing the proposed connection of effluent from the site to the sewer network.*

The response includes correspondence between the applicant and Limerick City Council and Severn Trent agreeing to the proposal to connect effluent from the site to the sewer network. The report has been assessed by the Water Services Section and a report has been received setting out that the proposal is acceptable subject to condition.

2. *The proposed truck/wheel wash should be a zero discharge system. You are invited to provide details of a recycling system, ensuring that there will be no discharge of vehicle wash effluent to the sewer network, from the truck/wheel wash.*

Response sets out that the truck/wheel wash is to the north of the main processing building which will minimise the distance travelled by trucks exiting the building. The response sets out that if conditioned Greenstar will install a closed loop system. Report has been submitted setting out that proposal is acceptable subject to condition.

3. *The Planning Authority have concerns with regard to the proposal to increase the discharge from the foul network from 0.5m3/day to 60m3/day by discharge of the waste run off from the paved areas to the adjoining receiving water and discharge all to the foul sewer. Accordingly the applicant is invited to increase the roof coverage on site to reduce the impact of surface water missing with residential debris from processing. Therefore any area of the site directly involved in the process which may be susceptible to surface water run off must be covered by a roof with the uncontaminated run off being discharged to the river. The applicant should submit appropriate drawings. Please be advised that these works are considered significant and will require you to re-advertise your proposal.(standard re-advertisement).*

Response received outlined that the roofed area on site will not be increased as it is impractical and uneconomical. The response proposes to delineate and segregate the total site area into clean surface water run –off area and potentially polluted surface water run off areas. The clean surface water will continue to discharge to the adjacent receiving watercourses and the potentially polluted water will discharge to the foul sewerage system. It is set out that the delineation of clean and potentially polluted areas can be achieved by undertaking minor alterations and re-routing to the drainage system within the boundary of the site. Calculations have been carried out on the annual anticipated trade effluent that will be generated from the site. This figure is an average based on the polluted yard area, the annual average rainfall amount for the area, the average amount of domestic waste generated and truck and bin washing waste. This results in an average figure of 25m3 per day. Based on average rainfall figures for the area the report concludes that the maximum volume of trade effluent generated is not expected to exceed 8040m3.

The response noted that it is the intention to the landowner to construct a new foul sewer system through adjoining lands and connect to the municipal treatment plant at Bunlicky. It is proposed to discharge trade effluent generated within the Greenstar facility to this new foul sewer system. Subsequently the existing on-site wastewater treatment system shall be decommissioned.

A report has been received from the Environment Section which sets out that *"details have been submitted of the connection to the foul sewer, discharging 25m3/day to the Limerick main drainage: prior to the commencement of development, connection to the main sewer shall be carried out and completed. the existing waste-water treatment plant on-site should be decommissioned.*

if detergents are to be used on the truck/wheel wash, then a zero-discharge recycling system must be used. if detergents are not used, the discharge from the wash should discharge to the foul sewer via the proposed "dirty area" interceptor.

I have no objection to the grant of Planning Permission" subject to condition.

Part V
Not applicable

Development Contributions:
Application relates to the modification to an existing site with no increase in site area. In line with application 13/625 it is considered that development does not fall into any of the parameters set out in the Development Contributions Jan 2014 -2016. Accordingly development contributions are not levied.

Recommendation:
It is recommended that permission is granted as follows:

FIRST SCHEDULE

Having regard to the nature of the proposed development, it is considered that subject to compliance with the conditions as set out in the Second Schedule, the proposed development would be in accordance with the proper planning and sustainable development of the area.

SECOND SCHEDULE

1. The development shall be carried out in accordance with the plans and particulars lodged with the application and the E.I.S., on the 22nd day of May 2013, as amended by the further plans and particulars submitted on the 4th day of September, 2013m and the 17th day of January 2014 except as may otherwise be required in order to comply with the following conditions.
Reason - In order to clarify the development to which this permission applies.

2. No development shall commence on site until the proposed connection to the Limerick Main Drainage Scheme has been carried out to the Pl's satisfaction and is in operation as specified under 06/1394 and 08/2320. The existing on site waste water system shall be decommissioned when the connection to the Limerick Main Drainage Scheme has been commissioned.
Reason: In the interest of orderly development.

3. Std 118.

4. Prior to commencement of development details of the proposed interceptor serving the "dirty area" shall be submitted for the written agreement of the Planning Authority. The interceptor must be in accordance with BS EN 858.
Reason: In the interest of proper planning and sustainable development.

5. Discharge from the truck/wheel wash should be to the foul sewer via the proposed interceptor if detergents are not utilised in the washing process. If detergents are utilised, a zero-discharge recycling system should be installed. No trucks other than those using the facility shall be permitted to use the wheel wash. Prior to commencement of development full details of the system shall be submitted for the written agreement of the Planning Authority.
Reason: In the interest of orderly development

Signed: Noreen O' Connell
Noreen O' Connell

Date: 12/03/14.

Signed:
Stephane Duclot

Date: 12/03/2014

PA 13/300

TABLE OF CONTENTS

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1. INTRODUCTION

Greenstar Environmental Services Ltd (GES) intends to apply to for planning permission for its existing waste recovery and transfer facility in the townland of Ballykeefe, County Limerick. At a pre-application meeting with Limerick County Council, the Council requested that a Screening Assessment be prepared to inform the Appropriate Assessment of the application. GES appointed O'Callaghan Moran & Associates to carry out the assessment.

The European Union (EU) Habitats Directive (92/43/EC) and the EU Birds Directive (2009/147/EC) identify designated areas (Special Areas of Conservation (SAC) and Special Protection Areas (SPA) respectively) that are collectively known as Natura 2000 Sites. The Habitats Directive, which is implemented under the European Communities Birds and Natural Habitats) Regulations 2011 (S.I. No 477 of 2011), requires an "appropriate assessment" of the potential impacts any proposed development that may have an impact on the conservation objectives of any Natura 2000 site.

Article 6(3) of the Directive stipulates that *any plan or project not directly connected with or necessary to the management of a Natura 2000 site, but likely to have a significant effect thereon…shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives.*

Guidance documents issued by Department of Environment, Heritage and Local Government and the National Parks and Wildlife Services recommend that the assessment be completed in a series of Stages, which comprise:

Stage 1: Screening

The purpose of this Stage is to determine, on the basis of a preliminary assessment and objective criteria, whether a plan or project, alone and in combination with other plans or projects, could have significant effects on a Natura 2000 site in respect of the site's conservation objectives.

Stage 2: Appropriate Assessment

This Stage is required if the Stage 1 Screening exercise identifies that the project is likely to have a significant impacts on a Natura 2000 site.

Stage 3 : Assessment of Alternative Solutions.

If Stage 2 determines that the project will have an adverse impact upon the integrity of a Natura 2000 site, despite the implementation of mitigation measures, it must be objectively concluded that no alternative solutions exist before the plan can proceed.

Stage 4 : Compensatory Measures:

Where no alternative solutions are feasible and where adverse impacts remain but imperative reasons of overriding public interest require the implementation of a project an assessment of compensatory measures that will effectively offset the damage to the Natura site 2000 is required.

1.1 Methodology

The Screening Assessment was based on a site inspection and the proposed changes to facility operations. It followed the guidance presented in the "Assessment of Plans and Projects significantly affecting Natura 2000 sites, Methodological Guidance on the provisions of Articles 6(3) and 6(4) of the Habitats Directive 92/43/EEC" (2001); The DEHLG (2009, revised February 2010) Appropriate Assessment of Plans and Projects in Ireland and the NPWS (2010) Circular NPW 1/10 & PSSP 2/10 Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities.

2. DESCRIPTION OF PROJECT

2.1 Site Location

The GES facility is located in the townland of Ballykeefe, off the main N69 Limerick to Tralee road on Dock Road (Figure 2.1). It is in the northern end of an industrially zoned area and is bounded to the south, southeast and southwest by warehousing units, oil distribution centres and truck sales and repair and Cussen Crane Hire.

To the east and north is the Ballinacurra Creek, which is where the Ballynaclough River joins the Shannon. The lands north of the Ballinacurra and between it and the Shannon are undeveloped. The Limerick City Council wastewater treatment plant is to the west of the site and separated from it by an open field. Further west is Bunlickey Lake. .

2.2 Site Layout

The site layout is shown on Drawing No 002. The facility is accessed off the Dock Road by a private road common access road serving the facility and other occupiers of the industrial estate. The site encompasses 1.8ha, the vast majority of which is either paved or occupied by buildings.

There are two adjoining waste handling buildings (Building 1 and 2). Building 1 is currently used for sorting and compacting recyclables (paper, cardboard, plastics etc.) recovered from the incoming wastes. Building 2 is currently used for compacting and wrapping the mixed municipal solid wastes. There is a separate office building and adjoining vehicle and plant maintenance workshop near the site entrance. An electrical substation along the south-western boundary wall is owned by Electric Ireland.

The open yards are paved and are used for external waste storage bays (C&D, glass, metals, timber and baled waste), skip storage, truck parking and a vehicle wash area. There is palisade

security fence on the north, east and west boundaries, with block work walls along the south-western boundary south of Building 1 and west of the site offices and workshop.

2.3 Site Operations

There are currently 20 full time employees based at the facility, including management, administration, general operatives and maintenance staff. The facility is authorised to operated seven days per week twenty four hours per day. At present, there are two eight hour shifts operating from 06:00 – 14:00 and 14:00 to 22:00.

The facility accepts and processes non hazardous mixed municipal solid waste and mixed and source segregated dry recyclables that are primarily collected in the Mid West Region.

The waste processing includes sorting of the mixed dry recyclables into separate categories (paper, plastic, cardboard), which are then compacted; the baling of the source segregated dry recyclables and the baling of the mixed municipal solid waste. The baled recyclables are sent to off-site recovery facilities for further processing, while the baled mixed municipal solid waste is sent to overseas waste to energy plants

2.4 Drainage

2.4.1 Surface Water

Surface water run-off is generated by rainfall on the roof of the offices and workshop building, the waste handling buildings and the paved open yard areas. The run-off from the paved yards is collected and directed through 2 No. three chamber oil interceptors before being discharged to a man made drain at the north-eastern site boundary. There is a shut off valve at the outlet from the last oil interceptor that can be closed in the event of an incident that has the potential to impact on surface water quality and contain the surface water within the site boundary.

Run-off from the main buildings discharges to manmade perimeter drain along the western boundary. The drainage layout is shown on Drawing No IE 580-002A.

The perimeter drains, which also take run-off from other occupants in the industrial estate, discharge to Bunlickey Lake. The water in the lake discharges to the Shannon River Estuary via valves and sluices that prevent tidal inflow.

The lower reaches of the Shannon are tidal and are part of the Shannon Transitional and Coastal Water Management Unit (WMU) designated in the Shannon River Basin District (ShIRBD) Management Plan prepared under the EU Water Framework Directive (WFD). The WMU comprises twenty Water Bodies and the stretch of the river to the north of the site is in the Limerick Dock Water Body.

Reports have been prepared on the 'Status' of each water body. Status means the condition of the water in a watercourse and is defined by its ecological status and chemical status, whichever is worse. Waters are ranked in one of five status classes, High, Good, Moderate, Poor and Bad. The WFD requires measures to ensure waters achieve at least 'Good Status' by specified period and that their current status does not deteriorate

The Limerick Dock Water Body Status Report, a copy of which is in Appendix 1, states that the water overall status of is 'Good', with a High status for Biochemical Oxygen Demand, nutrients (phosphate and nitrogen) and dissolved oxygen. However, the overall chemical status is classified as 'Fail' and the water body is 'At Risk' of not achieving its restoration objective of reducing chemical pollution by 2021.

The risk assessment was prepared in 2008 and at that time the primary pressure on water quality identified in the Shannon Transitional and Coastal WMU Plan was combined sewer overflows and wastewater treatment plant overflows. Since then, the completion of the Limerick Main Drainage Scheme has significantly reduced the pressures on the Limerick Dock Water Body

The Waste Licence requires GES to monitor the quality of the surface water at specified locations monthly. These include the outlet from the interceptors (FE 1A) and in the receiving drain up (WS-9) and downstream (WS-10) of the discharge point. The locations

are shown on Figure 2.2 As the discharge is dependant on rainfall it is not always possible to collect samples at monthly intervals.

The monitoring parameters include pH, electrical conductivity, total suspended solids (TSS), ammonia, biochemical oxygen demand (BOD), Fats Oils and Grease (FOG), Mineral Oil, Total Organic Carbon (TOC) and dissolved metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc).

The Waste Licence does not specify any emission limit values (ELVs) for the discharge, GES developed proposed ELVs for ammonia, BOD Mineral Oil and TSS, however these have not yet been agreed by the EPA. The monitoring results for 2012 are presented in Table 2.1

Table 2.1 Water Quality Range 2012

Parameter	Units	WS9	FE1A	WS10	ELV	EQS
pH	pH units	7.24-8.28	6.41-7.76	6.82-8.24	-	
BOD	mg/l	1-7	3-176	2-89	*25*	*1.5*
TSS	mg/l	1-12	50-130	2-51	*60*	
Ammonia	mg/l	0.27-1	0.14-3.64	0.04-<1	*4*	*0.065*
FOG	mg/l	<0.01-<1	0.29-17.2	<0.01,3.3	-	-
Mineral Oils	mg/l	<0.01-<1	<0.01-2.03	<0.01-<7	*5*	
TOC	mg/l	3.57-18	22.63-48	4.25-20	-	-
Arsenic	ug/l	0.001-3	0.002-5	0.001<3		*25*
Cadmium	ug/l	<0.03-0.5	>0.03-0.02	0-<1	-	*5*
Chromium	ug/l	<1.5-2	0.5-2.4	0.2-<1.5	-	*30*
Copper	ug/l	<0.2-13	<0.2-16	<0.2-13	-	*30*
Mercury	ug/l	<0.0001-1	<0.0001-<1	<0.0001-<1	-	*1*
Nickel	ug/l	<0.2-2	<0.2-14.1	<0.2-2.4	-	*20*
Lead	ug/l	0.2-<2	0.2-<5	<0.2-<5	-	*10*
Zinc	ug/l	<0.2-11	<0.2-47.5	<0.2-15	-	*100*

For those parameters for which ELVs have not been established the Environmental Quality Standards (EQS) specified for 'Good Status' in the Environmental Objectives (Surface Water) Regulations 2009 (S.I. No.272 of 2009) are provided. The EQS are not emission

limit values, but are the concentrations that must be achieved in a water body, taking into consideration the available assimilative capacity, if the water body is to meet the objectives set for the water body.

The monitoring indicates that, with the exception of BOD and TSS, all of the parameters are below the proposed ELV and significantly below the EQS. In particular mineral oils have never been detected. It is noted that the BOD and ammonia levels in the drain upstream of the discharge point exceed the EQS.

In 2012, GES conducted an extensive CCTV survey of the surface water drainage system. The survey identified a number of defects in the surface water lines, some small cracks in the first chamber of the interceptor and further cracks in the pipeline connecting the final chamber of the interceptors to the discharge point. These defects were repaired in May 2012.

2.4.2 Foul Water

Sanitary wastewater and wastewater from the vehicle wash area is treated in to the on-site Klargester Biodisc wastewater treatment plant. The vehicle wastewater passes through a grit trap and oil interceptor before connecting to the Klargester. Sanitary wastewater from the neighbouring Cussen Crane Hire Yard is also connected to the Kalrgester. The treated effluent discharges to a percolation area and the quality of the discharge is monitored in accordance with the requirements of the Waste Licence.

In 2012 GES commissioned a detailed assessment of the operation of the treatment plant. The assessment established that the average daily discharge to the percolation area is 0.4m3/day. Taking into consideration rainfall on the percolation area, the total hydraulic loading is 0.483m3/day. The effluent quality monitoring has established that the quality meets the recommended minimum performance standards set by the EPA and are within the manufacturer's design standards.

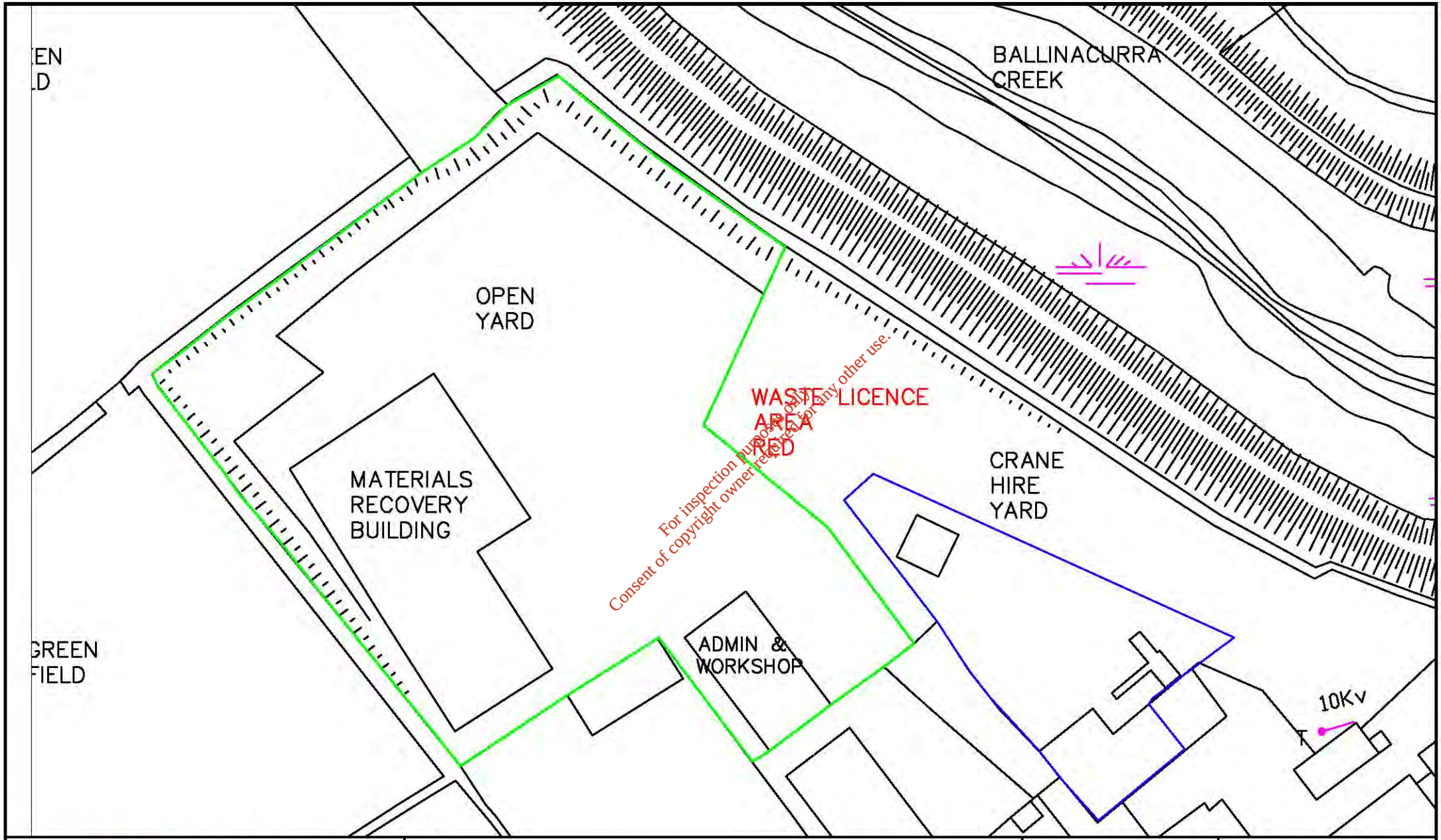
It is a condition of the waste licence that discharge foul water and sewage from the site must be to the Council's foul sewer, following the completion of the Limerick Main Drainage Scheme, subject to the approval of the Sanitary Authority-Limerick City Council.

In 2009, the City Council gave its approval in principle to the connection to the municipal wastewater treatment plant, however due to difficulties in obtaining way leaves to install the sewer line, the connection could not be completed at that time. GES is currently engaged with both the City and County Councils regarding the connection and the necessary wayleaves and it is expected that the connection will be completed by ??? Following this the on-site wastewater treatment plant will be decommissioned.

2.5 Proposed Development

GES intends to increase the amount of waste that can be accepted to 130,000 tonnes/year. The proposed increase is to allow GES compete for business in domestic and commercial waste collection market and offer waste treatment services to authorised waste collectors in the Mid West and adjoining Regions.

There will be no change to either the types of waste accepted, or the way the waste is handled, processed and stored. The only change will be an increase in the number of vehicles that bring the unprocessed waste to the site and remove the processed materials.



O' Callaghan Moran & Associates.
Granary House, Rutland Street,
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Tel. (021) 4321521 Fax. (021) 4321522
email : info@ocallaghanmoran.com

CLIENT
Greenstar Environmnetal Services Ltd

TITLE
WASTE LICENCE AREA

details

Figure No.
2.1

SCALE
1:750 A4

REV.
A

NOTES

Monitoring locations
Grid references
Eastings Northings

DM-1	154913, 155617
DM-2	154842, 155714
DM-3	155003, 155750
Ni-1	154840, 155712
Ni-2	154920, 155745
Ni-3	154910, 155618
FE-1A	154974, 155769
WS-9	155003, 155750
WS-10	154922, 155776
FE-2A	154858, 155720
GW-M1	154923, 155667
GW-M2	154920, 155770
GW-M3	155049, 155684

SITE BOUNDARY (RED)
SURFACEWATER DRAINAGE
FOULWATER DRAINAGE
NOISE MONITORING LOCATION
DUST MONITORING LOCATION
GROUNDWATER MONITORING LOCATION
FOULWATER MONITORING LOCATION

REV	DATE	DESCRIPTION	DRN	CHKD	APP
A	02/08/13	PRELIMINARY ISSUE	MW	JOC	**

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Granary House, Rutland Street,
Cork, Ireland.
Tel. (021) 4321521 Fax. (021) 4321522
email : ocm@indigo.ie

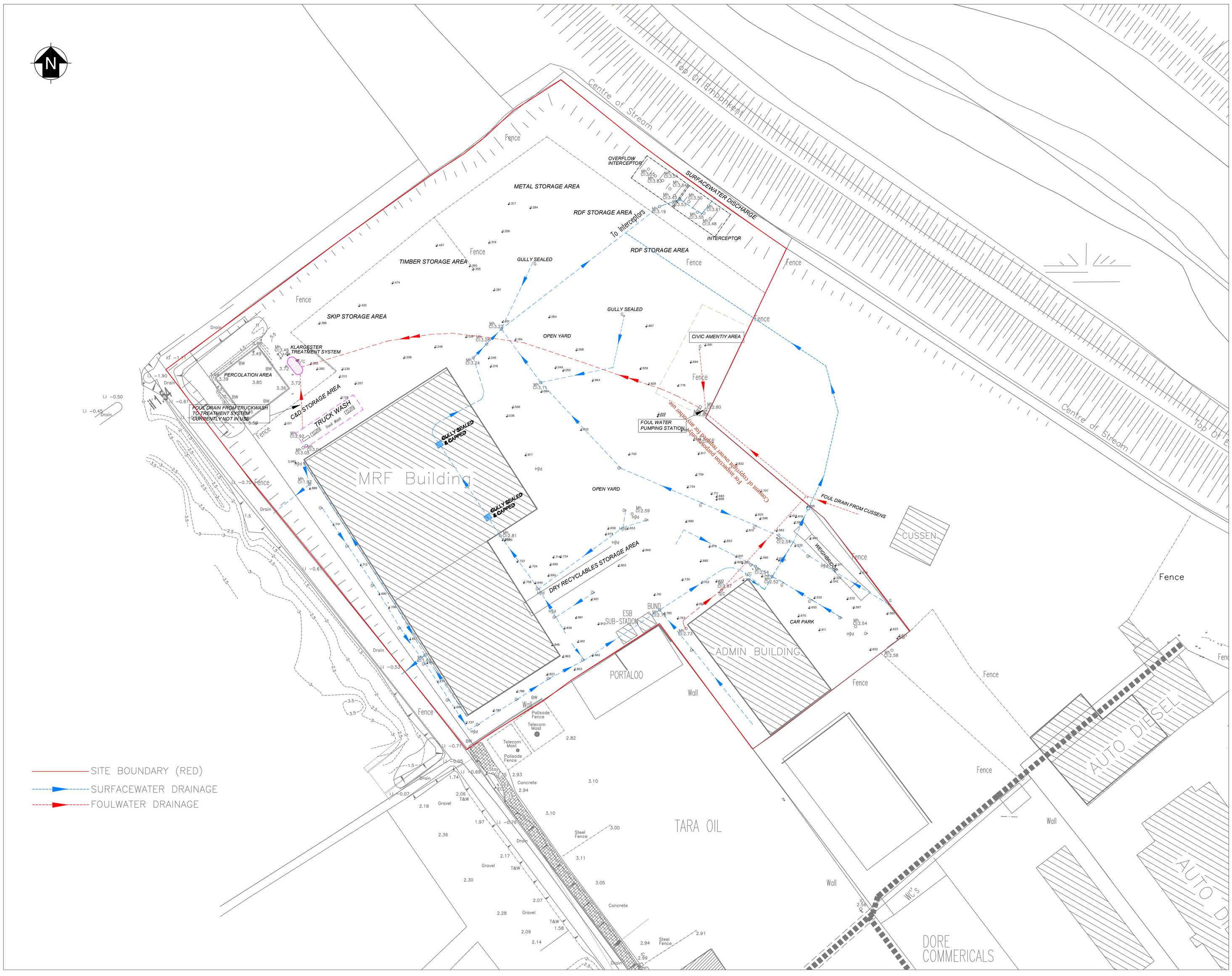
CLIENT: GES Ltd

TITLE: GES Limerick
Monitoring LocationS
W0082-02

SCALE	DRAWING No.	REV.
NTS A3	2.2	A

DOS Filename: **********

A1



NOTES

REV	DATE	DESCRIPTION	DRN	CHKD	APP
A	01/05/13	PRELIMINARY ISSUE	MW	JOC	**

O' Callaghan Moran & Associates.
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email : info@ocallaghanmoran.com

CLIENT

GES Limerick

TITLE

SITE LAYOUT & DRAINAGE

SCALE	DRAWING No.	REV.
1:500 A1	002	A

DOS Filename : ********

3. NATURA 2000 SITES

SACs are selected for the conservation and protection of habitats listed on Annex I and species (other than birds) listed on Annex II of the Habitats Directive, and their habitats. The habitats on Annex I require special conservation measures. SPAs are selected for the conservation and protection of bird species listed on Annex I of the Birds Directive and regularly occurring migratory species, and their habitats, particularly wetlands. The selected habitats and species are termed Qualifying Interests

A statement of Conservation Objectives is prepared for each designated site which identifies the qualifying interests or conservation features. The Conservation Objectives are intended to ensure that the relevant habitats and species present on a site are maintained, and where necessary restored, at a Favourable Conservation Status.

Favourable Conservation Status of a habitat, as defined in 2011 Birds and Natural Habitats Regulations, is when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable

Conservation Status of a species is when:

- the Favourable population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats,
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

A list of designated Natura 2000 sites within 15 km of the facility is given in Table 3.1

Table 3.1. Natura 2000 Sites Within 15 km of the AES Facility

Site	Code	Distance
SAC		
Lower River Shannon	002165	400m to the north of the site.
Glenorma Wood	1013	11.4 km to the north east
Ratty River Cave	2316	14.5 km to the north east
Danes Hole Poulnalecka	0030	15 km to the north
Tory Hill	0439	13 km to the south
Askeaton Fen Complex	002279	14km to the south west
SPA		
River Shannon & River Fergus	004077	400 m to the north of the site

3.1 Natura 2000 Sites Potentially Affected by the Project

The facility is not located in or immediately adjacent to a Natura 2000 Site. The closest Natura 2000 Sites are the Lower River Shannon SAC and the River Shannon & River Fergus SPA, which are 400m to the north.

Stormwater run-off from the site discharges to Bunlickey Lake which is in the River Shannon & River Fergus SPA and is hydraulically connected to the River Shannon. The remaining Sites are between 10 and 15 km from the facility and there is no pathway by which the current and proposed site activities can impact on these Sites

3.2 Lower Shannon SAC

The Site Synopsis for the Lower Shannon SAC that lists the full Qualifying Interests are in Appendix 2, and the Conservation Objective are in Appendix 3 and the information is summarised below.

Qualifying Interests

The Lower Shannon SAC is selected for the following habitats listed in Annex 1 of the Habitats Directive: lagoons and alluvial wet woodlands, floating river vegetation, *Molinia* meadows, estuaries, tidal mudflats, Atlantic salt meadows, Mediterranean salt meadows, *Salicornia* mudflats, sand banks, perennial vegetation of stony banks, sea cliffs, reefs and large shallow inlets and bays all habitats

The site is also selected for the following species listed in Annex II of the Directive – Bottle Nosed Dolphin, Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Atlantic Salmon and Otter.

Conservation Objectives

The conservation objectives are t maintain or restore the favorable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected??

- [1029] Freshwater pearl mussel *Mrgaritifera margaritifera*
- [1095] sea lamprey *Pertromyzon marinus*
- [1096] Brook Lamprey *lampretra planeri*
- [1099] River Lamprey *Lampetra fluviatilis*
- [1106] Atlantic Salmon *Salmo salar* (only in freah water)
- [1110] sandbanks which are slightly covered by sea water all the time
- [1130] Estuaries
- [1140] Mudflats and sandflats not covered by seawater at low tide
- [1150] *Coastal lagoons
- [1160] Large shallow inlets and bays

- [1170] Reefs
- [1220] Perennial vegetation of stony banks
- [1230] vegetated sea cliffs of the atlantic and Baltic coasts
- [1310] *Salicornia* and other annuals colonizing mud and sand
- [1330] Atlantic salt meadows (*glauco-puccinellietalia maritimae)*
- [1349] Bottlenose Dolphin *Tursiops truncatas*
- [1355] Otter *lutra lutra*
- [1410] Mediterranean salt meadows (*Juncetalia maritime)*
- [3260] water courses of plain to montane levels with the *ranunculion fluitantis* and *Callitricho- Batrachion vegetation*
- [91EO] *Alluvial forests with Alnus gutinosa and Fraxinus excelsior (Alno-padion, alnion incanae, salicion albae)

3.3 River Shannon & River Fergus SPA

The Site Synopsis and for the River Shannon & River Fergus SPA listing the Qualifying Interests and the Conservation Objective are in Appendix 2 and are summarised below.

Qualifying Interests

The Shannon and Fergus Estuaries SPA comprises the entire estuarine habitat west of Limerick City and south of Ennis extending approximately 25 km west to Killadysert and Foynes on the north and south shores of the Shannon.

The Site is the most important coastal wetland site in the country and regularly supports in excess of 50,000 wintering waterfowl. Other species occurring include Common Cockle (*Cerastoderma edule*), Lugworm (*Arenicola marina*), polychaete *Nepthys hombergii*, gastropod *Hydrobia ulvae* and the crustacean *Corophium volutator*. Eelgrass (*Zostera* spp.) is present in places, along with green algae (e.g. *Ulva* spp. and *Enteromorpha* spp.). The Site also has extensive intertidal flats, which is a listed habitat in Annex 1 of the Habitats Directive.

Conservation Objectives

The conservation objectives are to maintain or restore the favorable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SPA has been selected:

- [A017] Cormorant *phalacrocorax carba*
- [A038] Whooper swan *Cygnus Cygnus*
- [A046] Light-bellied Brent Goose *Branta bernicla hrota*
- [A048] Shelduck *Tadorna tadorna*
- [A050] Wigeon *Anas Penelope*
- [A052] Teal *Anas crecca*
- [A054] Pintail *Anas acuta*
- [A056] Shovelor *Anas clypeata*
- [A062] Scaup *Aythya marila*
- [A137] Ringed Plover *chahrius hiaticula*
- [A140] golden plover *pluvialis apricaria*
- [A141] Grey plover *pluvialis apricaria*
- [A142] Lapwing *Vanellus vanellus*
- [A143] Knot *Calidris canus*
- [A149] Dunlin *Calidris alpine*
- [A156] Blacktailed Godwit *Limosa limosa*
- [A157] Bar-tailed godwit *limosa lapponica*
- [A160] Curlew *Numenius arquata*
- [A162] Redshank *Tringa tetanus*
- [A164] Greenshank *Trina nebularia*
- [A179] Black headed Gull *Chroicocephalus ridibundus*
- [A999] Wetlands

4. LIKELY EFFECTS

4.1 Proposed Development

The proposed increase in the annual waste throughput will not require the expansion of the site, the construction/provision of any new buildings/structures, or any alteration to the existing site layout and operations.

There will be no change to the waste acceptance and operational hours and it will not require the use of any new raw materials that have the potential to cause contamination. It will not result in any new or additional abstraction from groundwater or surface water. It will not give rise to any new emissions to surface water or sewer, nor will it contribute to increased noise, dust and odour emissions or illumination.

4.2 Direct Impacts

The GES facility is not located within any designated Natura 2000 Site and therefore the proposed changes will not result in any direct habitat loss or fragmentation of either the Lower River Shannon SAC or the River Shannon and River Fergus Estuaries SPA.

These Natura 2000 Sites are approximately 400m to the north and west of the GES facility. The facility is extensively developed and almost entirely covered with paving and buildings, which means it does not support the species for which the Natura 2000 sites were selected.

Based on the above, the project does not present any risk of a direct adverse affect on either the habitats or species for which the Natura 2000 Sites were selected.

4.3 Indirect Impacts

There is the potential for indirect impacts on the Natura 2000 Sites, as surface water run-off from the yards and roofs discharges to the Bunlickey Lake, which is part of the River Shannon & Fergus SPA and hydraulically connected to the River Shannon via sluices. However, the project will not result in any changes to either the volume or quality of the surface water run-off from the facility and therefore will have no impact of the Natural 2000 Sites.

Disturbance impacts are considered with regard to the potential for effects on the Annex II species for which the Lower River Shannon SAC is designated and the bird species listed as special conservation interests of the River Shannon and River Fergus Estuaries SPA.

The GES facility is located within an industrial estate and is 2km west of Limerick Docks. There are extensive and ongoing traffic movements, artificial lighting and noise emissions associated with both areas. It must be noted that the presence of the listed species of conservation interest within the environs of Limerick City indicates they have become acclimatised to the background levels of disturbance.

The project does not require the provision of any new plant and equipment or changes to the operational hours therefore there will be no additional sources of disturbance to the listed species present in both the SAC and SPA.

4.4 Cumulative Effects

Recent projects completed within the SAC include the River Fergus Lower (Ennis) Drainage Scheme and maintenance works carried out by the OPW on upstream of Limerick City and on the River Maigue at Adare in 2010. Maintenance works are being undertaken in the Abbey River corridor which will include dredging from the Park Canal confluence to the confluence with the Shannon.

Point and diffuse sources of water pollution in the urban area comprise a cumulative pressure on the conservation interests of the SAC, where Annex II aquatic species are considered to be under stress due to poor background water quality. The proposed increase in the amount of waste accepted will not result in any changes to either the volume or quality of the surface water run-off

that therefore and will not contribute to any significant cumulative impact on the Natura 2000 Sites

The proposed changes does not involve the construction of new buildings, the introduction of new plant an equipment or the changes to the operational hours, and therefore will not add to the cumulative disturbance effects on the Natura 2000 Sites.

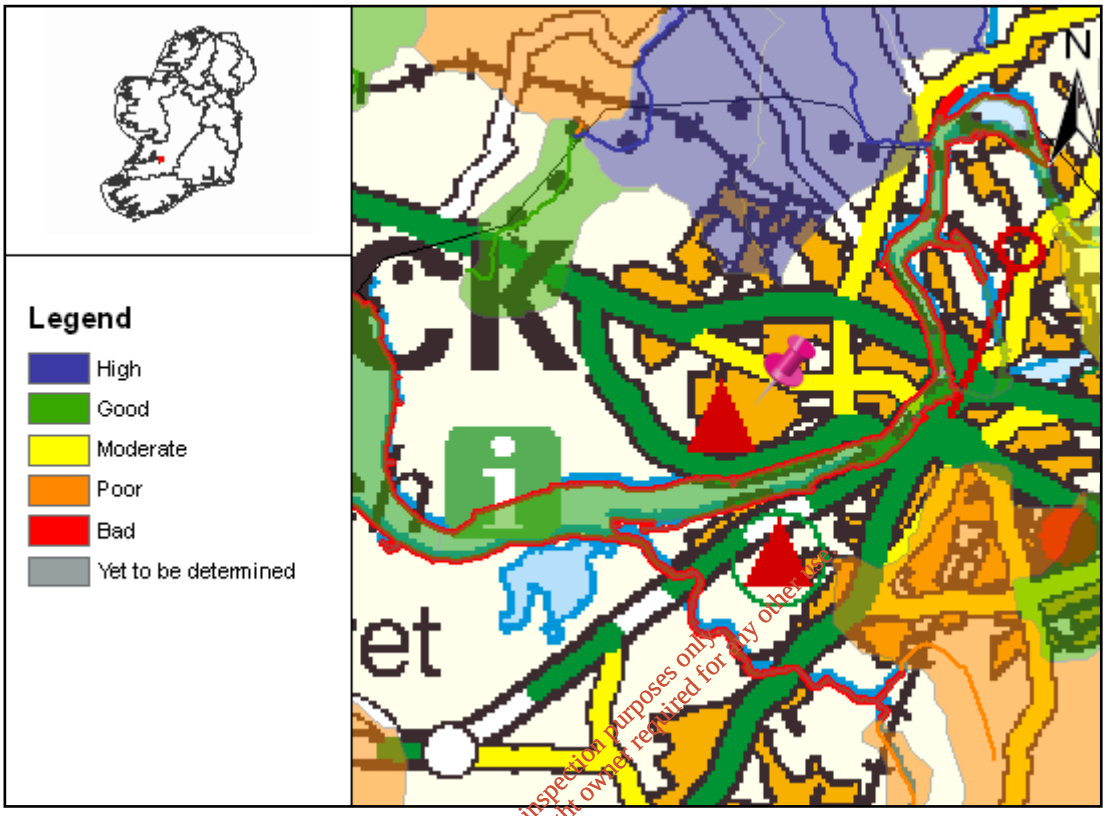
5. SCREENING CONCLUSION & STATEMENT

The proposed increase in the annual waste throughput will not result in any new or additional emissions/disturbance that could present a significant risk to the Qualifying Interests and Conservation Objectives of either the Lower Shannon SAC or the Shannon and Fergus Estuaries SPA. Therefore a Natura Impact Statement is not required.

APPENDIX 1

water matters
'our Plan'

Full Report for Waterbody Limerick Dock



River Basin Management Plans (RBMPs) have been published for all River Basin Districts in Ireland in accordance with the requirements of the Water Framework Directive. The WaterMaps viewer is an integral part of the River Basin Management Plan and provides access to information at individual waterbody level and at Water Management Unit level for all the River Basin Districts in Ireland.

The following report provides summary plan information about the selected waterbody (indicated by the pin in the map above) relating to its status, risks, objectives, and measures proposed to retain status where this is adequate, or improve it where necessary. Waterbodies can relate to surface waters (these include rivers, lakes, estuaries [transitional waters], and coastal waters), or to groundwaters. Other relevant information not included in this report can be viewed using the WaterMaps viewer, including areas listed in the Register of Protected Areas.

You will find brief notes at the bottom of some of the individual report sheets that will help you in interpreting the information presented. More detailed information can be obtained in relation to all aspects of the RBMPs at www.wfdireland.ie.

Date Reported to Europe:July 2010

Date Report Created 11/07/2012

water matters
'our Plan'

Summary Information:

Water Management Unit:	N/A
WaterBody Category:	Transitional Waterbody
WaterBody Name:	Limerick Dock
WaterBody Code:	IE_SH_060_0900
Overall Status:	Good
Overall Objective:	Restore 2021
Overall Risk:	1a At Risk
Heavily Modified:	Yes

shannon river basin district

Report data based upon final RBMP, 2009-2015.

The information provided above is a summary of the principal findings related to the selected waterbody. Further details and explanation of individual elements of the report are outlined in the following pages.

Date Reported to Europe:July 2010

Date Report Created 11/07/2012

water matters
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Status Report

Water Management Unit: N/A

WaterBody Category: Transitional Waterbody

WaterBody Name: Limerick Dock

WaterBody Code: IE_SH_060_0900

Overall Status Result: Good

Heavily Modified: Yes

shannon river basin district

	Status Element Description	Result
	Status information	
DIN	Dissolved Inorganic Nitrogen status	Good
MRP	Molybdate Reactive Phosphorus status	High
DO	Dissolved oxygen as per cent saturation status	High
BOD	Biochemical Oxygen Demand (5-days) status	High
PHY	Macroalgae - phytobiomass status	High
OPP	Macroalgae - opportunistic algae status	N/A
RSL	Macroalgae - reduced species list status	N/A
ANG	Angiosperms - Seagrass and Saltmarsh status	N/A
BIN	Benthic Invertebrates status	N/A
FIS	Fish status	Good
HYD	Hydrology status	N/A
MOR	Morphology status	Less than Good (pHMWB)
SP	Specific Pollutant Status	Pass
PAS	Overall protected area status	At least good
ES	Ecological Status	Good
CS	Chemical Status	Fail
SWS	Surface Water Status	N/A
EXT	Extrapolated status	N/A
DON	Donor water bodies	N/A

Date Reported to Europe:July 2010

Date Report Created 11/07/2012

n/a - not assessed

Status
By 'Status' we mean the condition of the water in the waterbody. It is defined by its chemical status and its ecological status, whichever is worse. Waters are ranked in one of 5 status classes: High, Good, Moderate, Poor, Bad. However, not all waterbodies have been monitored, and in such cases the status of a similar nearby waterbody has been used (extrapolated) to assign status. If this has been done the first line of the status report shows the code of the waterbody used to extrapolate.

You can read more about status and how it is measured in our RBMP Document Library at www.wfdireland.ie (Directory 15 Status).

Date Reported to Europe:July 2010

Date Report Created 11/07/2012

water matters
'our Plan'

Risk Report

Water Management Unit: N/A

WaterBody Category: Transitional Waterbody

WaterBody Name: Limerick Dock

WaterBody Code: IE_SH_060_0900

Overall Risk Result: 1a At Risk

Heavily Modified: Yes

shannon river basin district

	Risk Test Description		Risk
	Hydrology		
THY1	Water balance - Abstraction	2b	Not At Risk
	Marine Direct Impacts		
TMDI 1	Dangerous Substances		N/A
TMDI 2	OSPAR		N/A
TMDI 3	UWWT Regs Designations		N/A
TMDI O	Marine Direct Impacts Overall - Worst Case		N/A
	Morphological Risk Sources		
TM1	Channelisation		N/A
TM2	Deposition		N/A
TM3	Coastal Defences		N/A
TM4	Impoundments		N/A
TM5a	Built Structures - Port Tonnage		N/A
TM5b	Built Structures - Industrial Intakes		N/A
TM6	Intensive Landuse		N/A
TMO	Morphology Overall - Worst Case		N/A
TMO	Overall (MIMAS) Morphological Risk - Worst Case (2008)		N/A
	Overall Risk		
RA	Transitional Overall - Worst CaseOverall (MIMAS) Morphological Risk - Worst Case (2008)	1a	At Risk
	Point / MDI Worst Case		
TPOL	Worst case of Point Overall and MDI OverallOverall (MIMAS) Morphological Risk - Worst Case (2008)	1a	At Risk

Date Reported to Europe:July 2010

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	Point Risk Sources		
TP1	WWTPs (2008)	2b	Not At Risk
TP2	CSOs	1a	At Risk
TP3	IPPCs (2008)	2b	Not At Risk
TP4	Section 4s (2008)	2b	Not At Risk
TP5	WTPs/Mines/Quarries/Landfills		N/A
TPO	Overall Risk from Point Sources - Worst Case (2008)	1a	At Risk

Risk
By 'risk' we mean the risk that a waterbody will not achieve good ecological or good chemical status/potential at least by 2015. To examine risk the various pressures acting on the waterbody were identified along with any evidence of impact on water status. Depending on the extent of the pressure and its potential for impact, and the amount of information available, the risk to the water body was placed in one of four categories: 1a at risk; 1b probably at risk; 2a probably not at risk; 2b not at risk. Note that '2008' after the risk category means that the risk assessment was revised in 2008. All other risks were determined as part of an earlier risk assessment in 2005.

You can read more about risk assessment in our 'WFD Risk Assessment Update' document in the RBMP document library, and other documents at www.wfdireland.ie (Directory 31 Risk Assessments).

Date Reported to Europe:July 2010

Date Report Created 11/07/2012

water matters
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Objectives Report

Water Management Unit: N/A

WaterBody Category: Transitional Waterbody

WaterBody Name: Limerick Dock

WaterBody Code: IE_SH_060_0900

Overall Objective: Restore 2021

Heavily Modified: Yes

shannon river basin district

	Objectives Description	Result
	Extended timescale information	
E1	Extended timescales due to time requirements to upgrade WWTP discharges	No Status
E2	Extended timescales due to delayed recovery of chemical pollution and chemical status failures	2021
E3	Extended timescales due to winter dissolved nitrogen exceedances	No Status
E4	Extended timescales due to time requirements for status recovery	No Status
E5	Extended timescales from Northern Ireland Environment Agency	No Status
E0V	Overall extended timescale - combination of all extended timescales fields	2021
	Objectives information	
OB1	Prevent deterioration objective	No Status
OB2	Restore at least good status objective	No Status
OB3	Reduce chemical pollution objective	Restore 2021
OB4	Protected areas objective	Protect
OBO	Overall objectives	Restore 2021

Extended timescales
Extended timescales have been set for certain waters due to technical, economic, environmental or recovery constraints. Extended timescales are usually of one planning cycle (6 years, to 2021) but in some cases are two planning cycles (to 2027).

Objectives
In general, we are required to ensure that our waters achieve at least good status/potential by 2015, and that their status does not deteriorate. Having identified the status of waters (this is given earlier in this report), the next stage is to set objectives for waters. Objectives consider waters that require protection from deterioration as well as waters that require restoration and the timescales needed for recovery. Four default objectives have been set initially:-

Prevent Deterioration
Restore Good Status
Reduce Chemical Pollution
Achieve Protected Areas Objectives

These objectives have been refined based on the measures available to achieve them, the latter's likely effectiveness, and consideration of cost-effective combinations of measures. Where it is considered necessary extended deadlines have been set for achieving objectives in 2021 or 2027.

Date Reported to Europe:July 2010

Date Report Created 11/07/2012

water matters
'our Plan'

Measures Report

Water Management Unit: N/A

WaterBody Category: Transitional Waterbody

WaterBody Name: Limerick Dock

WaterBody Code: IE_SH_060_0900

Heavily Modified: Yes

shannon river basin district

	Measures Description	Applicable
BC	Total number of basic measures which apply to this waterbody	16
BW	Directive - Bathing Waters Directive	No
BIR	Directive - Birds Directive	Yes
HAB	Directive - Habitats Directive	Yes
MAE	Directive - Major Accidents and Emergencies Directive	Yes
EIA	Directive - Environmental Impact Assessment Directive	Yes
UWT	Directive - Urban Waste Water Treatment Directive	No
PPP	Directive - Plant Protection Products Directive	Yes
NIT	Directive - Nitrates Directive	Yes
IPC	Directive - Integrated Pollution Prevention Control Directive	Yes
POI	Other Stipulated Measure - Control of point source discharges	Yes
DIF	Other Stipulated Measure - Control of diffuse source discharges	Yes
PS	Other Stipulated Measure - Control of priority substances	Yes
MOD	Other Stipulated Measure - Controls on physical modifications to surface waters	Yes
OA	Other Stipulated Measure - Controls on other activities impacting on water status	Yes
AP	Other Stipulated Measure - Prevention or reduction of the impact of accidental pollution incidents	Yes
TP1	WSIP - Agglomerations with treatment plants requiring capital works	No
TP2	WSIP - Agglomerations with treatment plants requiring further investigation prior to capital works	No
TP3	WSIP - Agglomerations requiring the implementation of actions identified in Shellfish PRPs	No
TP4	WSIP - Agglomerations with treatment plants requiring improved operational performance	No
TP5	WSIP - Agglomerations requiring investigation of CSOs	No
TP6	WSIP - Agglomerations where exisitng treatment capacity is currently adequate but predicted loadings would result in overloading	No
OTS	On-site waste water treatment systems	Yes
SHE	Shellfish Pollution Reduction Plan	No
IPR	IPPC licences requiring review	Yes
WPR	Water Pollution Act licences requiring review	Yes

Date Reported to Europe:July 2010

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HQW	Protect high quality waters	No

Measures
Measures are necessary to ensure that we meet the objectives set out in the previous page of this report. Many measures are already provided for in national legislation and must be implemented. Other measures have been recently introduced or are under preparation. A range of additional potential measures are also being considered but require further development. Any agreed additional measures can be introduced through the update of Water Management Unit Action Plans during the implementation process.

You can read more about Basic Measures in 'River Basin Planning Guidance' and in other documents in our RBMP Document Library at www.wfdireland.ie.

Date Reported to Europe:July 2010

Date Report Created 11/07/2012

APPENDIX 2

SITE SYNOPSIS

SITE NAME : LOWER RIVER SHANNON

SITE CODE : 002165

This very large site stretches along the Shannon valley from Killaloe to Loop Head/ Kerry Head, a distance of some 120 km. The site thus encompasses the Shannon, Feale, Mulkear and Fergus Estuaries, the freshwater lower reaches of the River Shannon (between Killaloe and Limerick), the freshwater stretches of much of the Feale and Mulkear catchments and the marine area between Loop Head and Kerry Head. The Shannon and Fergus flow through Carboniferous limestone as far as Foynes, but west of Foynes Namurian shales and flagstones predominate (except at Kerry Head, which is formed from Old Red Sandstone). The eastern sections of the Feale catchment flow through Namurian Rocks and the western stretches through Carboniferous Limestone. The Mulkear flows through Lower Palaeozoic Rocks in the upper reaches before passing through Namurian Rocks, followed by Lower Carboniferous Shales and Carboniferous Limestone. The Mulkear River itself, immediately north of Pallas Green, passes through an area of Rhyolites, Tuffs and Agglomerates. Rivers within the sub-catchment of the Feale include the Galey, Smearlagh, Oolagh, Allaughaun, Owveg, Clydagh, Caher, Breanagh and Glenacarney. Rivers within the sub-catchment of the Mulkear include the Killeenagarriff, Annagh, Newport, the Dead River, the Bilboa, Glashacloonaraveela, Gortnageragh and Cahernahallia.

The site is a candidate SAC selected for lagoons and alluvial wet woodlands, both habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected for floating river vegetation, *Molinia* meadows, estuaries, tidal mudflats, Atlantic salt meadows, Mediterranean salt meadows, *Salicornia* mudflats, sand banks, perennial vegetation of stony banks, sea cliffs, reefs and large shallow inlets and bays all habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected for the following species listed on Annex II of the same directive – Bottle-nosed Dolphin, Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Atlantic Salmon and Otter.

The Shannon and Fergus Estuaries form the largest estuarine complex in Ireland. They form a unit stretching from the upper tidal limits of the Shannon and Fergus Rivers to the mouth of the Shannon estuary (considered to be a line across the narrow strait between Kilcredaun Point and Kilconly Point). Within this main unit there are several tributaries with their own 'sub-estuaries' e.g. the Deel River, Mulkear River, and Maigue River. To the west of Foynes, a number of small estuaries form indentations in the predominantly hard coastline, namely Poulnasherry Bay, Ballylongford Bay, Clonderalaw Bay and the Feale or Cashen River Estuary.

Both the Fergus and inner Shannon estuaries feature vast expanses of intertidal mudflats, often fringed with saltmarsh vegetation. The smaller estuaries also feature mudflats, but have their own unique characteristics, e.g. Poulnasherry Bay is stony and unusually rich in species and biotopes. Plant species are typically scarce on the mudflats, although there are some Eel-grass beds (*Zostera* spp.) and patches of green

algae (e.g. *Ulva* sp. and *Enteromorpha* sp.). The main macro-invertebrate community, which has been noted from the inner Shannon and Fergus estuaries, is a *Macoma-Scrobicularia-Nereis* community.

In the transition zone between mudflats and saltmarsh, specialised colonisers of mud predominate: swards of Common Cord-grass (*Spartina anglica*) frequently occur in the upper parts of the estuaries. Less common are swards of Glasswort (*Salicornia europaea* agg.). In the innermost parts of the estuaries, the tidal channels or creeks are fringed with species such as Common Reed (*Phragmites australis*) and Club-rushes (*Scirpus maritimus, S. tabernaemontani* and *S. triquetrus*). In addition to the nationally rare Triangular Club-rush (*Scirpus triquetrus*), two scarce species are found in some of these creeks (e.g. Ballinacurra Creek): Lesser Bulrush (*Typha angustifolia*) and Summer Snowflake (*Leucojum aestivum*).

Saltmarsh vegetation frequently fringes the mudflats. Over twenty areas of estuarine saltmarsh have been identified within the site, the most important of which are around the Fergus Estuary and at Ringmoylan Quay. The dominant type of saltmarsh present is Atlantic salt meadow occurring over mud. Characteristic species occurring include Common Saltmarsh Grass (*Puccinellia maritima*), Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Sea-milkwort (*Glaux maritima*), Sea Plantain (*Plantago maritima*), Red Fescue (*Festuca rubra*), Creeping Bent (*Agrostis stolonifera*), Saltmarsh Rush (*Juncus gerardi*), Long-bracted Sedge (*Carex extensa*), Lesser Sea-spurrey (*Spergularia marina*) and Sea Arrowgrass (*Triglochin maritima*). Areas of Mediterranean salt meadows, characterised by clumps of Sea Rush (*Juncus maritimus*) occur occasionally. Two scarce species are found on saltmarshes in the vicinity of the Fergus Estuary: a type of robust Saltmarsh-grass (*Puccinellia foucaudii*), sometimes placed within the compass of Common Saltmarsh-grass (*Puccinellia maritima*) and Hard-grass (*Parapholis strigosa*).

Saltmarsh vegetation also occurs around a number of lagoons within the site. The two which have been surveyed as part of a National Inventory of Lagoons are Shannon Airport Lagoon and Cloonconeen Pool. Cloonconeen Pool (4-5 ha) is a natural sedimentary lagoon impounded by a low cobble barrier. Seawater enters by percolation through the barrier and by overwash. This lagoon represents a type which may be unique to Ireland since the substrate is composed almost entirely of peat. The adjacent shore features one of the best examples of a drowned forest in Ireland. Aquatic vegetation in the lagoon includes typical species such as Beaked Tasselweed (*Ruppia maritima*) and green algae (*Cladophora* sp.). The fauna is not diverse, but is typical of a high salinity lagoon and includes six lagoon specialists (*Hydrobia ventrosa, Cerastoderma glaucum, Lekanesphaera hookeri, Palaemonetes varians, Sigara stagnalis* and *Enochrus bicolor*). In contrast, Shannon Airport Lagoon (2 ha) is an artificial saline lake with an artificial barrier and sluiced outlet. However, it supports two Red Data Book species of Stonewort (*Chara canescens* and *Chara cf. connivens*).

Most of the site west of Kilcredaun Point/Kilconly Point is bounded by high rocky sea cliffs. The cliffs in the outer part of the site are sparsely vegetated with lichens, Red Fescue, Sea Beet (*Beta vulgaris*), Sea Campion (*Silene maritima*), Thrift and Plantains (*Plantago* spp.). A rare endemic Sea Lavender (*Limonium recurvum* subsp.

pseudotranswallinum) occurs on cliffs near Loop Head. Cliff-top vegetation usually consists of either grassland or maritime heath. The boulder clay cliffs further up the estuary tend to be more densely vegetated, with swards of Red Fescue and species such as Kidney Vetch (*Anthyllis vulneraria*) and Bird's-foot Trefoil (*Lotus corniculatus*).

The site supports an excellent example of a large shallow inlet and bay. Littoral sediment communities in the mouth of the Shannon Estuary occur in areas that are exposed to wave action and also in areas extremely sheltered from wave action. Characteristically, exposed sediment communities are composed of coarse sand and have a sparse fauna. Species richness increases as conditions become more sheltered. All shores in the site have a zone of sand hoppers at the top and below this each of the shores has different characteristic species giving a range of different shore types in the pcSAC.

The intertidal reefs in the Shannon Estuary are exposed or moderately exposed to wave action and subject to moderate tidal streams. Known sites are steeply sloping and show a good zonation down the shore. Well developed lichen zones and littoral reef communities offering a high species richness in the sublittoral fringe and strong populations of *Paracentrotus lividus* are found. The communities found are tolerant to sand scour and tidal streams. The infralittoral reefs range from sloping platforms with some vertical steps to ridged bedrock with gullies of sand between the ridges to ridged bedrock with boulders or a mixture of cobbles, gravel and sand. Kelp is very common to about 18m. Below this it becomes rare and the community is characterised by coralline crusts and red foliose algae.

Other coastal habitats that occur within the site include the following:

- stony beaches and bedrock shores - these shores support a typical zonation of seaweeds (*Fucus* spp., *Ascophyllum nodosum* and kelps).
- shingle beaches - the more stable areas of shingle support characteristic species such as Sea Beet, Sea Mayweed (*Matricaria maritima*), Sea Campion and Curled Dock (*Rumex crispus*).
- Sandbanks which are slightly covered by sea water at all times – there is a known occurrence of sand/gravel beds in the area from Kerry Head to Beal Head.
- sand dunes - a small area of sand dunes occurs at Beal Point. The dominant species is Marram Grass (*Ammophila arenaria*).

Flowing into the estuaries are a number of tidal rivers.

Freshwater rivers have been included in the site, most notably the Feale and Mulkear catchments, the Shannon from Killaloe to Limerick (along with some of its tributaries, including a short stretch of the Kilmastulla River), the Fergus up as far as Ennis, and the Cloon River. These systems are very different in character: the Shannon being broad, generally slow-flowing and naturally eutrophic; the Fergus being smaller and alkaline; while the narrow, fast-flowing Cloon is acid in nature. The Feale and Mulkear catchments exhibit all the aspects of a river from source to mouth. Semi-natural habitats, such as wet grassland, wet woodland and marsh occur by the rivers, however, improved grassland is most common. One grassland type of

particular conservation significance, *Molinia* meadows, occurs in several parts of the site and the examples at Worldsend on the River Shannon are especially noteworthy. Here are found areas of wet meadow dominated by rushes and sedges and supporting a diverse and species-rich vegetation, including such uncommon species as Blue-eyed Grass (*Sisyrinchium bermudiana*) and Pale Sedge (*Carex pallescens*).

Floating river vegetation characterised by species of Water-crowfoot (*Ranunculus* spp.), Pondweeds (*Potamogeton* spp.) and the moss *Fontinalius antipyretica* are present throughout the major river systems within the site. The rivers contain an interesting bryoflora with *Schistidium alpicola* var. *alpicola* recorded from in-stream boulders on the Bilboa, new to county Limerick.

Alluvial woodland occurs on the banks of the Shannon and on islands in the vicinity of the University of Limerick. The woodland is up to 50m wide on the banks and somewhat wider on the largest island. The most prominent woodland type is gallery woodland where White Willow (*Salix alba*) dominates the tree layer with occasional Alder (*Alnus glutinosa*). The shrub layer consists of various willow species with sally (*Salix cinerea* ssp. *oleifolia*) and what appear to be hybrids of *S. alba* x *S. viminalis*. The herbaceous layer consists of tall perennial herbs. A fringe of Bulrush (*Typha* sp.) occurs on the riverside of the woodland. On slightly higher ground above the wet woodland and on the raised embankment remnants of mixed oak-ash-alder woodland occur. These are poorly developed and contain numerous exotic species but locally there are signs that it is invading open grassland. Alder is the principal tree species with occasional Oak (*Quercus robur*), Elm (*Ulmus glabra, U. procera*), Hazel (*Corylus avellana*), Hawthorn (*Crataegus monogyna*) and the shrubs Guelder-rose (*Viburnum opulus*) and willows. The ground flora is species-rich.

Woodland is infrequent within the site, however Cahiracon Wood contains a strip of old Oak woodland. Sessile Oak (*Quercus petraea*) forms the canopy, with an understorey of Hazel and Holly (*Ilex aquifolium*). Great Wood-rush (*Luzula sylvatica*) dominates the ground flora. Less common species present include Great Horsetail (*Equisetum telmeteia*) and Pendulous Sedge (*Carex pendula*).

In the low hills to the south of the Slievefelim mountains, the Cahernahallia River cuts a valley through the Upper Silurian rocks. For approximately 2km south of Cappagh Bridge at Knockanavar, the valley sides are wooded. The woodland consists of Birch (*Betula* spp.), Hazel, Oak, Rowan (*Sorbus aucuparia*), some Ash (*Fraxinus excelsior*) and Willow (*Salix* spp.). Most of the valley is not grazed by stock, and as a result the trees are regenerating well. The ground flora feature prominent Greater wood-rush and Bilberry (*Vaccinium myrtillus*) with a typical range of woodland herbs. Where there is more light available, Bracken (*Pteridium aquilinum*) features.

The valley sides of the Bilboa and Gortnageragh Rivers, on higher ground north east of Cappamore, support patches of semi-natural broadleaf woodland dominated by Ash, Hazel, Oak and Birch. There is a good scrub layer with Hawthorn, Willow, Holly and Blackthorn (*Prunus spinosa*) common. The herb layer in these woodlands is often open with a typically rich mixture of woodland herbs and ferns. Moss species diversity is high. The woodlands are ungrazed. The hazel is actively coppiced in places.

There is a small area of actively regenerating cut away raised bog at Ballyrorheen. It is situated approx. 5km north west of Cappamore Co. Limerick. The bog contains some wet areas with good moss (*Sphagnum*) cover. Species of particular interest include the Cranberry (*Vaccinium oxycoccos*) and the White Sedge (*Carex curta*) along with two other regionally rare mosses including *S. fimbriatum*. The site is being invaded by Birch (*Betula pubescens*) scrub woodland. Both commercial forestry and the spread of rhododendron has greatly reduced the overall value of the site.

A number of plant species that are Irish Red Data Book species occur within the site - several are protected under the Flora (Protection) Order, 1999:

- Triangular Club-rush (*Scirpus triquetrus*) - in Ireland this protected species is only found in the Shannon Estuary, where it borders creeks in the inner estuary.
- Opposite-leaved Pondweed (*Groenlandia densa*) - this protected pondweed is found in the Shannon where it passes through Limerick City.
- Meadow Barley (*Hordeum secalinum*) - this protected species is abundant in saltmarshes at Ringmoylan and Mantlehill.
- Hairy Violet (*Viola hirta*) - this protected violet occurs in the Askeaton/Foynes area.
- Golden Dock (*Rumex maritimus*) - noted as occurring in the River Fergus Estuary.
- Bearded Stonewort (*Chara canescens*) - a brackish water specialist found in Shannon Airport lagoon.
- Convergent Stonewort (*Chara connivens*) - presence in Shannon Airport Lagoon to be confirmed.

Overall, the Shannon and Fergus Estuaries support the largest numbers of wintering waterfowl in Ireland. The highest count in 1995-96 was 51,423 while in 1994-95 it was 62,701. Species listed on Annex I of the E.U. Birds Directive which contributed to these totals include: Great Northern Diver (3; 1994/95), Whooper Swan (201; 1995/96), Pale-bellied Brent Goose (246; 1995/96), Golden Plover (11,067; 1994/95) and Bar-tailed Godwit (476; 1995/96). In the past, three separate flocks of Greenland White-fronted Goose were regularly found but none were seen in 1993/94.

Other wintering waders and wildfowl present include Greylag Goose (216; 1995/96), Shelduck (1,060; 1995/96), Wigeon (5,976; 1995/96); Teal (2,319; 1995-96); Mallard (528; 1995/96), Pintail (45; 1995/96), Shoveler (84; 1995/96), Tufted Duck (272; 1995/96), Scaup (121; 1995/96), Ringed Plover (240; 1995/96), Grey Plover (750; 1995/96), Lapwing (24,581; 1995/96), Knot (800; 1995/96), Dunlin (20,100; 1995/96), Snipe (719, 1995/96), Black-tailed Godwit (1062; 1995/96), Curlew (1504; 1995/96), Redshank (3228; 1995/96), Greenshank (36; 1995/96) and Turnstone (107; 1995/96). A number of wintering gulls are also present, including Black-headed Gull (2,216; 1995/96), Common Gull (366; 1995/96) and Lesser Black-backed Gull (100; 1994/95). This is the most important coastal site in Ireland for a number of the waders including Lapwing, Dunlin, Snipe and Redshank. It also provides an important staging ground for species such as Black-tailed Godwit and Greenshank.

A number of species listed on Annex I of the E.U. Birds Directive breed within the site. These include Peregine Falcon (2-3 pairs), Sandwich Tern (34 pairs on Rat Island, 1995), Common Tern (15 pairs: 2 on Sturamus Island and 13 on Rat Island, 1995), Chough (14-41 pairs, 1992) and Kingfisher. Other breeding birds of note include Kittiwake (690 pairs at Loop Head, 1987) and Guillemot (4010 individuals at Loop Head, 1987)

There is a resident population of Bottle-nosed Dolphin in the Shannon Estuary consisting of at least 56-68 animals (1996). This is the only known resident population of this E.U. Habitats Directive Annex II species in Ireland. Otter, a species also listed on Annex II of this directive, is commonly found on the site.

Five species of fish listed on Annex II of the E.U. Habitats Directive are found within the site. These are Sea Lamprey (*Petromyzon marinus*), Brook Lamprey (*Lampetra planeri*), River Lamprey (*Lampetra fluviatilis*), Twaite Shad (*Allosa fallax fallax*) and Salmon (*Salmo salar*). The three lampreys and Salmon have all been observed spawning in the lower Shannon or its tributaries. The Fergus is important in its lower reaches for spring salmon while the Mulkear catchment excels as a grilse fishery though spring fish are caught on the actual Mulkear River. The Feale is important for both types. Twaite Shad is not thought to spawn within the site. There are few other river systems in Ireland which contain all three species of Lamprey.

Two additional fish of note, listed in the Irish Red Data Book, also occur, namely Smelt (*Osmerus eperlanus*) and Pollan (*Coregonus autumnalis pollan*). Only the former has been observed spawning in the Shannon.

Freshwater Pearl-mussel (*Margaritifera margaritifera*), a species listed on Annex II of the E.U. Habitats Directive, occurs abundantly in parts of the Cloon River.

There is a wide range of landuses within the site. The most common use of the terrestrial parts is grazing by cattle and some areas have been damaged through over-grazing and poaching. Much of the land adjacent to the rivers and estuaries has been improved or reclaimed and is protected by embankments (especially along the Fergus Estuary). Further, reclamation continues to pose a threat as do flood relief works (e.g. dredging of rivers). Gravel extraction poses a major threat on the Feale.

In the past, Cord-grass (*Spartina* sp.) was planted to assist in land reclamation. This has spread widely, and may oust less vigorous colonisers of mud and may also reduce the area of mudflat available to feeding birds.

Domestic and industrial wastes are discharged into the Shannon, but water quality is generally satisfactory - except in the upper estuary, reflecting the sewage load from Limerick City. Analyses for trace metals suggest a relatively clean estuary with no influences by industrial discharges apparent. Further industrial development along the Shannon and water polluting operations are potential threats.

Fishing is a main tourist attraction on the Shannon and there are a large number of Angler Associations, some with a number of beats. Fishing stands and styles have been erected in places. The River Feale is a designated Salmonid Water under the

E.U. Freshwater Fish Directive. Other uses of the site include commercial angling, oyster farming, boating (including dolphin-watching trips) and shooting. Some of these may pose threats to the birds and dolphins through disturbance. Specific threats to the dolphins include underwater acoustic disturbance, entanglement in fishing gear and collisions with fast moving craft.

This site is of great ecological interest as it contains a high number of habitats and species listed on Annexes I and II of the E.U. Habitats Directive, including the priority habitat lagoon, the only known resident population of Bottle-nosed Dolphin in Ireland and all three Irish lamprey species. A good number of Red Data Book species are also present, perhaps most notably the thriving populations of Triangular Club-rush. A number of species listed on Annex I of the E.U. Birds Directive are also present, either wintering or breeding. Indeed, the Shannon and Fergus Estuaries form the largest estuarine complex in Ireland and support more wintering wildfowl and waders than any other site in the country. Most of the estuarine part of the site has been designated a Special Protection Area (SPA), under the E.U. Birds Directive, primarily to protect the large numbers of migratory birds present in winter.

6.10.2006

SITE SYNOPSIS

SITE NAME: RIVER SHANNON AND RIVER FERGUS ESTUARIES SPA

SITE CODE: 004077

The estuaries of the River Shannon and River Fergus form the largest estuarine complex in Ireland. The site comprises all of the estuarine habitat west from Limerick City and south from Ennis, extending west as far as Killadysert and Foynes on the north and south shores respectively of the River Shannon (a distance of some 25 km from east to west). Also included are several areas in the outer Shannon estuary, notably Clonderalaw Bay and Poulnasherry Bay, as well as the intertidal areas on the south shore of the Shannon between Tarbert and Beal Point.

The site has vast expanses of intertidal flats. The main macro-invertebrate community present is a *Macoma-Scrobicularia-Nereis* community which provides a rich food resource for the wintering birds. Other species occurring include Common Cockle (*Cerastoderma edule*), Lugworm (*Arenicola marina*), the polychaete *Nepthys hombergii*, the gastropod *Hydrobia ulvae* and the crustacean *Corophium volutator*. Eelgrass (*Zostera* spp.) is present in places, along with green algae (e.g. *Ulva* spp. and *Enteromorpha* spp.). Salt marsh vegetation frequently fringes the mudflats and this provides important high tide roost areas for the wintering birds. Characteristic species occurring include Common Saltmarsh-grass (*Puccinellia maritima*), Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Sea-milkwort (*Glaux maritima*), Sea Plantain (*Plantago maritima*), Red Fescue (*Festuca rubra*) and Saltmarsh Rush (*Juncus gerardi*). In the innermost parts of the estuaries, the tidal channels or creeks are fringed with species such as Common Reed (*Phragmites australis*) and club-rushes (*Scirpus maritimus, S. lacustris* subsp. *tabernaemontani)*. Also found is the nationally rare Triangular Club-rush (*Scirpus triqueter*). Elsewhere in the site the shoreline comprises stony or shingle beaches.

The site is the most important coastal wetland site in the country and regularly supports in excess of 50,000 wintering waterfowl (mean of 59,183 for the 4 seasons 1996-97 to 1999/00), a concentration easily of international importance. The site has internationally important populations of Dunlin (14,987), Black-tailed Godwit (706) and Redshank (1,983) - all figures are average peaks for 3 of the 5 seasons in the 1995/96-1999/00 period. A further 16 species have populations of national importance, i.e. Cormorant (148), Whooper Swan (141), Greylag Goose (88), Shelduck (895), Wigeon (3,025), Teal (1,558), Pintail (40), Shoveler (56), Scaup (76), Golden Plover (4,073), Grey Plover (564), Lapwing (13,007), Knot (686), Bar-tailed Godwit (481), Curlew (1,231) and Greenshank (33). The site is among the most important in the country for several of these species, notably Dunlin (11% of national total), Grey Plover (7.5% of total), Lapwing (6.5% of total), Redshank (6% of total) and Shelduck (6.0% of total). The site is also used by Oystercatcher (363), Ringed Plover (70), Brent Goose (135), Great Crested Grebe (47), Red-breasted Merganser (14), Mallard (247), Turnstone (71), Mute Swan (54), Grey Heron (25), Black-headed Gull (1,233) and Common Gull (194).

The Shannon / Fergus system was formerly frequented by a Greenland White-fronted Goose population but this declined during the 1980s and 1990s and the birds now appear appear to have abandoned the area. The site provides both feeding and roosting areas for the wintering birds. Habitat quality for most of the estuarine habitats is good. Some species, particularly Whooper Swan and Greylag Goose, utilise areas outside of the site for feeding.

Apart from the wintering birds, large numbers of some species also pass through the site whilst on migration in spring and/or autumn. Regular species include Black-tailed Godwit, Whimbrel and Greenshank.

Much of the land adjacent to the rivers and estuaries has been reclaimed and improved for agriculture and is protected by embankments (especially along the River Fergus estuary). Further reclamation, especially near to the urbanised and industrial areas continues to pose a threat. The site receives pollution from several sources, including industry and agriculture, but it is not known if this has any significant impacts on the wintering birds. Aquaculture occurs in some areas of the site – future increases in this activity could cause disturbance to the habitats and the associated birds. Common Cord-grass (*Spartina anglica*) is well-established and may threaten some of the estuarine habitats. Some disturbance occurs from boating activities.

This site is of great ornithological interest, being of international importance on account of the numbers of wintering birds it supports. It also supports internationally important numbers of three species, i.e. Dunlin, Black-tailed Godwit and Redshank. In addition, there are 16 species that have populations of national importance. For several of the bird species, it is the top site in the country. Also of note is that three of the species which occur regularly are listed on Annex I of the E.U. Birds Directive, i.e. Whooper Swan, Golden Plover and Bar-tailed Godwit. The site is most effectively censused from the air and this is carried out in most winters.

1.4.2005

APPENDIX 3

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Lower River Shannon SAC 002165

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

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Citation:

NPWS (2012) Conservation Objectives: Lower River Shannon SAC 002165. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editors: Rebecca Jeffrey & Naomi Kingston
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Introduction

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

002165 Lower River Shannon SAC

1029	Freshwater Pearl Mussel *Margaritifera margaritifera*
1095	Sea Lamprey *Petromyzon marinus*
1096	Brook Lamprey *Lampetra planeri*
1099	River Lamprey *Lampetra fluviatilis*
1106	Atlantic Salmon *Salmo salar* (only in fresh water)
1110	Sandbanks which are slightly covered by sea water all the time
1130	Estuaries
1140	Mudflats and sandflats not covered by seawater at low tide
1150	*Coastal lagoons
1160	Large shallow inlets and bays
1170	Reefs
1220	Perennial vegetation of stony banks
1230	Vegetated sea cliffs of the Atlantic and Baltic coasts
1310	*Salicornia* and other annuals colonizing mud and sand
1330	Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
1349	Bottlenose Dolphin *Tursiops truncatus*
1355	Otter *Lutra lutra*
1410	Mediterranean salt meadows (*Juncetalia maritimi*)
3260	Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation
6410	*Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)
91E0	*Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)

Please note that this SAC overlaps with River Shannon and River Fergus Estuaries SPA (004077), Loop Head SPA (004119), Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA (004161), Slievefelim to Silvermines Mountains SPA (004165) and Kerry Head SPA (004189). It is also adjacent to Clare Glen SAC (00930). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping and adjacent sites as appropriate.

Supporting documents, relevant reports & publications (listed by date)

Supporting documents, NPWS reports and publications are available for download from: www.npws.ie/Publications

Title: Aspects of brook lamprey (*Lampetra planeri* Bloch) spawning in Irish waters

Year: in press

Author: Rooney, S.M.; O'Gorman, N.M.; Green, F.; King, J.J.

Series: Biology and Environment

Title: Lower River Shannon SAC (002170): Conservation objectives supporting document - Coastal lagoons [Version 1]

Year: 2012

Author: NPWS

Series: Unpublished Report to NPWS

Title: Lower River Shannon SAC (002170): Conservation objectives supporting document - Marine habitats and species [Version 1]

Year: 2012

Author: NPWS

Series: Unpublished Report to NPWS

Title: Lower River Shannon SAC (002170): Conservation objectives supporting document - Coastal habitats [Version 1]

Year: 2012

Author: NPWS

Series: Unpublished Report to NPWS

Title: Lower River Shannon SAC (002170): Conservation objectives supporting document - Woodland habitats [Version 1]

Year: 2012

Author: NPWS

Series: Unpublished Report to NPWS

Title: Lower River Shannon SAC (002170): Conservation objectives supporting document - Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [Version 1]

Year: 2012

Author: NPWS

Series: Unpublished Report to NPWS

Title: Intertidal Hard and Soft Bottom Investigations in Lower River Shannon cSAC (Site Code: IE002165)/Shannon Fergus Estuary SPA (Site Code: IE004077)

Year: 2011c

Author: Aquafact

Series: Unpublished Report to NPWS

Title: Reef Investigations in Lower River Shannon cSAC (cSAC Site Code: IE002165)

Year: 2011b

Author: Aquafact

Series: Unpublished Report to NPWS

Title: Subtidal Benthic Investigations in Lower River Shannon cSAC (cSAC Site Code: IE002165)

Year: 2011a

Author: Aquafact

Series: Unpublished Report to NPWS

Title: National survey and assessment of the conservation status of Irish sea cliffs

Year: 2011

Author: Barron, S.J.; Delaney, A.; Perrin, P.M.; Martin, J.; O'Neill, F.

Series: Irish Wildlife Manuals No. 53

Title: Comparison of field- and GIS-based assessments of barriers to Atlantic salmon migration: a case study in the Nore Catchment, Republic of Ireland

Year: 2011

Author: Gargan, P. G.; Roche, W. K.; Keane, S.; King, J.J.; Cullagh, A.; Mills, P.; O'Keeffe, J.

Series: J. Appl. Ichthyol. 27 (Suppl. 3), 66–72

Title: Fine-scale population genetic structuring of bottlenose dolphins in Irish coastal waters

Year: 2011

Author: Mirimin, L.; Miller, R.; Dillane, E.; Berrow, S.D.; Ingram, S.; Cross, T.F.; Rogan, E.

Series: Animal Conservation 2011: 1–12

Title: The use of Cork Harbour by bottlenose dolphins (*Tursiops truncatus* (Montagu, 1821))

Year: 2011

Author: Ryan, C.; Cross, T.F.; Rogan, E.

Series: Irish Naturalists' Journal 31(1): 1-9

Title: Irish cetacean review (2000-2009)

Year: 2010

Author: Berrow, S.D.; Whooley, P.; O'Connell, M.; Wall, D.

Series: Irish Whale and Dolphin Group

Title: Bottlenose Dolphin SAC Survey 2010

Year: 2010

Author: Berrow, S.D.; O'Brien, J.; Groth, L.; Foley, A.; Voigt, K.

Series: Unpublished Report to NPWS

Title: Otter tracking study of Roaringwater Bay

Year: 2010

Author: De Jongh, A.; O'Neill, L.

Series: Unpublished Draft Report to NPWS

Title: Second Draft Cloon (Shannon Estuary) Freshwater Pearl Mussel Sub-basin Management Plan (2009-2015)

Year: 2010

Author: DEHLG

Series: Unpublished Report to NPWS

Title: Social structure within the bottlenose dolphin (*Tursiops truncatus*) population in the Shannon Estuary, Ireland

Year: 2010

Author: Foley, A.; McGrath, D.; Berrow, S.D.; Gerritsen, H.

Series: Aquatic Mammals 36(4): 372-381

Title: Irish Semi-natural Grasslands Survey. Annual report no. 3: Counties Donegal, Dublin, Kildare & Sligo

Year: 2010

Author: O'Neill, F.H.; Martin, J.R.; Devaney, F.M.; McNutt, K.E.; Perrin, P.M. ; Delaney, A.

Series: Unpublished Report to NPWS

Title: A provisional inventory of ancient and long-established woodland in Ireland

Year: 2010

Author: Perrin, P.M.; Daly, O.H.

Series: Irish Wildlife Manuals No. 46

Title: Monitoring and Assessment of Irish Lagoons for the purpose of the EU Water Framework Directive

Year: 2010

Author: Roden, C.M,; Oliver, G.

Series: EPA

Title: Report of the standing scientific committee to the DCENR. The status of Irish salmon stocks in 2010 and precautionary catch advice for 2011

Year: 2010

Author: SSC

Series: Unpublished Report to DCENR

Title: The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. [S.I. 296 of 2009]

Year: 2009b

Author: Government of Ireland

Series: Irish Statute Book

Title: The European Communities Environmental Objectives (Surface Water) Regulations 2009. [S.I. 272 of 2009]

Year: 2009a

Author: Government of Ireland

Series: Irish Statute Book

Title: Winter distribution of bottle-nosed dolphins (*Tursiops truncatus* (Montagu)) in the inner Shannon Estuary

Year: 2009

Author: Berrow, S.D.

Series: Irish Naturalists' Journal 30(1): 35-39

Title: Towards a bottlenose dolphin whistle ethogram from the Shannon Estuary, Ireland

Year: 2009

Author: Hickey, R.; Berrow, S.D.; Goold, J.

Series: Biology and Environment: Proceedings of the Royal Irish Academy 109B (2), 89–94

Title: Saltmarsh Monitoring Report 2007-2008

Year: 2009

Author: McCorry, M.; Ryle, T.

Series: Unpublished Report to NPWS

Title: Cetaceans in Irish waters: A review of recent research

Year: 2009

Author: O'Brien, J.; Berrow, S.D.; McGrath, D.; Evans, P.G.H.

Series: Biology and Environment: Proceedings of the Royal Irish Academy 109B (2): 63-88

Title: A note on long-distance matches of bottlenose dolphins (*Tursiops truncatus*) around the Irish coast using photoidentification

Year: 2009

Author: O'Brien, J.; Berrow, S.D.; Ryan, C.; McGrath, D.; O'Connor, I.; Pesante, G.; Burrows, G.; Massett, N.; Klotzer, V.; Whooley, P.

Series: Journal Cetacean Res. Mgmt. 11: 69–74

Title: An updated population status report for bottlenose dolphins using the Lower River Shannon SAC in 2008

Year: 2008

Author: Englund, A.; Ingram, S.; Rogan, E.

Series: Unpublished Report to NPWS

Title: National Survey of Native Woodlands 2003-2008

Year: 2008

Author: Perrin, P.; Martin, J.; Barron, S.; O'Neill, F.; McNutt, K.; Delaney, A.

Series: Unpublished Report to NPWS

Title: Rapid Assessment of *Margaritifera margaritifera* (L.) populations in Ireland: Rivers assessed in 2007

Year: 2008

Author: Ross, E.D.

Series: Unpublished Report to NPWS

Title: Marine surveys of two Irish sandbank cSACs

Year: 2007

Author: Aquafact

Series: Unpublished Report to NPWS

Title: Population status report for bottlenose dolphins using the Lower River Shannon SAC, 2006-2007

Year: 2007

Author: Englund, A.; Ingram, S.; Rogan, E.

Series: Unpublished Report to NPWS

Title: Evolutionary history of lamprey paired species *Lampetra fluviatilis* (L.) and *Lampetra planeri* (Bloch) as inferred from mitochondrial DNA variation

Year: 2007

Author: Espanhol, R.; Almeida, P.R.; Alves, M.J.

Series: Molecular Ecology 16, 1909-1924

Title: Supporting documentation for the Habitats Directive Conservation Status Assessment - backing documents, Article 17 forms and supporting maps

Year: 2007

Author: NPWS

Series: Unpublished Report to NPWS

Title: A Survey of Juvenile Lamprey Populations in the Corrib and Suir Catchments

Year: 2007

Author: O'Connor, W.

Series: Irish Wildlife Manuals No. 26

Title: Inventory of Irish coastal lagoons

Year: 2007

Author: Oliver, G.

Series: Unpublished Report to NPWS

Title: Using T-PODs to investigate the echolocation of coastal bottlenose dolphins

Year: 2007

Author: Philpott, E.; Englund, A.; Ingram, S.; Rogan, E.

Series: Journal of Marine Biological Association, UK. 87: 11-17

Title: Otter Survey of Ireland 2004/2005

Year: 2006

Author: Bailey, M.; Rochford, J.

Series: Irish Wildlife Manuals No. 23

Title: Whistle Production by Bottlenose Dolphins *Tursiops truncatus* in the Shannon Estuary

Year: 2006

Author: Berrow, S.D.; O'Brien, J.; Holmes, B.

Series: Irish Naturalists' Journal. 28(5): 208-213

Title: The status of host fish populations and fish species richness in European freshwater pearl mussel (*Margaritifera margaritifera*) streams

Year: 2006

Author: Geist, J.; Porkka, M.; Kuehn, R.

Series: Aquatic Conservation: Marine and Freshwater Ecosystems 16, 251–266

Title: Otters - ecology, behaviour and conservation

Year: 2006

Author: Kruuk, H.

Series: Oxford University Press

Title: A survey of rare and scarce vascular plants in County Limerick

Year: 2006

Author: Reynolds, S.; Conaghan, J.; Fuller, J.

Series: Unpublished Report to NPWS

Title: National Inventory of sea cliffs and coastal heaths

Year: 2005

Author: Browne, A.

Series: Unpublished Report to NPWS

Title: Developing sustainable whalewatching in the Shannon estuary

Year: 2003

Author: Berrow, S.D.

Series: p198-203; In Marine Ecotourism: Issues and Experiences. Garrod, B and Wilson. J. (Eds.) Channel View Publications

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Title: Identifying lamprey. A field key for sea, river and brook lamprey

Year: 2003

Author: Gardiner, R.

Series: Conserving Natura 2000 rivers, Conservation techniques No. 4. English Nature, Peterborough

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Title: Monitoring the river, sea and brook lamprey, *Lampetra fluviatilis*, *L. planeri* and *Petromyzon marinus*

Year: 2003

Author: Harvey, J.; Cowx, I.

Series: Conserving Natura 2000 Rivers Monitoring Series No. 5. English Nature, Peterborough

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Title: Bottlenose dolphins (*Tursiops truncatus*) in the Shannon Estuary and selected areas of the west-coast of Ireland

Year: 2003

Author: Ingram, S.; Rogan, E.

Series: Unpublished Report to NPWS

Title: The ecology of seabirds and marine mammals in a fluctuating marine environment

Year: 2003

Author: Rogan, E.; Kelly, T.; Ingram, S.; Roycroft, D.

Series: Unpublished Report to Higher Education Authority of Ireland

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Title: Irish Whale and Dolphin Group cetacean sighting review (1991-2001)

Year: 2002

Author: Berrow, S.D.; Whooley, P.; Ferriss, S.

Series: Irish Whale and Dolphin Group

Title: Organochlorine concentrations in resident bottlenose dolphins (*Tursiops truncatus*) in the Shannon estuary, Ireland

Year: 2002

Author: Berrow, S.D.; McHugh, B.; Glynn, D.; McGovern, E.; Parsons, K.; Baird, R.W.; Hooker, S.D.

Series: Marine Pollution Bulletin 44: 1296-1313

Title: Identifying critical areas and habitat preferences of bottlenose dolphins (*Tursiops truncatus*)

Year: 2002

Author: Ingram, S.; Rogan, E.

Series: Marine Ecology Progress Series 244: 247-255

Title: Reversing the habitat fragmentation of British woodlands

Year: 2002

Author: Peterken, G.

Series: WWF-UK, London

Title: An extensive survey of bottlenose dolphins (*Tursiops truncatus*) on the west coast of Ireland

Year: 2001

Author: Ingram, S.; Englund, A.; Rogan, E.

Series: Unpublished Report to the Heritage Council

Title: The ecology and conservation of bottlenose dolphins in the Shannon Estuary, Ireland

Year: 2000

Author: Ingram, S.

Series: Unpublished PhD thesis, University College Cork

Title: A survey of bottlenose dolphins (*Tursiops truncatus*) in the Shannon Estuary

Year: 2000

Author: Rogan, E.; Ingram, S.; Holmes, B.; O'Flanagan, C.

Series: Marine Institute Marine Resource Series No. 9

Title: Tour boats and dolphins: A note on quantifying the activities of whale watching boats in the Shannon estuary, Ireland

Year: 1999

Author: Berrow, S.D.; Holmes, B.

Series: Journal of Cetacean Research and Management 1(2): 199-200

Title: Diet of Otters *Lutra lutra* on Inishmore, Aran Islands, west coast of Ireland

Year: 1999

Author: Kingston, S.; O'Connell, M.; Fairley, J.S.

Series: Biol & Environ Proc R Ir Acad B 99B:173–182

Title: National Shingle Beach Survey of Ireland 1999

Year: 1999

Author: Moore, D.; Wilson, F.

Series: Unpublished Report to NPWS

Title: The saltmarshes of Ireland: an inventory and account of their geographical variation

Year: 1998

Author: Curtis, T.G.F.; Sheehy-Skeffington, M.J.

Series: Biology and Environment, Proceedings of the Royal Irish Academy 98B: 87-104

Title: A survey of intertidal sediment biotopes in estuaries in Ireland

Year: 1997

Author: Falvey, J.P.; Costello, M.J.; Dempsey, S.

Series: Unpublished Report

Title:	Distribution and Abundance of Bottle-nosed Dolphins *Tursiops truncatus* (Montagu) in the Shannon Estuary, Ireland
Year:	1996
Author:	Berrow, S.D.; Holmes, B.; Kiely, O.
Series:	Biology and Environment: Proceedings of the Royal Irish Academy 96B (1), 1-9

Title:	The spatial organization of otters (*Lutra lutra*) in Shetland
Year:	1991
Author:	Kruuk, H.; Moorhouse, A.
Series:	J. Zool, 224: 41-57

Title:	Otter survey of Ireland
Year:	1982
Author:	Chapman, P.J.; Chapman, L.L.
Series:	Unpublished Report to Vincent Wildlife Trust

Spatial data sources

Year:	Interpolated 2012
Title:	Sandbank Survey 2007
GIS operations:	Clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used for:	1110 (map 3)
Year:	Interpolated 2012
Title:	Sandbank survey 2007; subtidal benthic survey 2010; reef survey 2010; intertidal hard and soft bottom survey 2010
GIS operations:	Polygon feature classes from marine community types base data sub-divided based on interpolation of marine survey data. Expert opinion used as necessary to resolve any issues arising
Used for:	Marine community types, 1110, 1140, 1170 (maps 3, 5, 8, 9)
Year:	2010
Title:	EPA WFD transitional waterbody data
GIS operations:	Clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used for:	1130 (map 4)
Year:	Revision 2011
Title:	Inventory of Irish Coastal Lagoons. Version 3
GIS operations:	Clipped to SAC boundary
Used for:	1150 (map 6)
Year:	2005
Title:	OSi Discovery series vector data
GIS operations:	High Water Mark (HWM) polyline feature class converted into polygon feature class; clipped to SAC boundary. EPA WFD transitional waterbody data erased from extent. Expert opinion used as necessary to resolve any issues arising
Used for:	1160 (map 7)
Year:	2005
Title:	OSi Discovery series vector data
GIS operations:	High water mark (HWM) and low water mark (LWM) polyline feature classes converted into polygon feature classes and combined; EU Annex I Saltmarsh and Coastal data erased out if present
Used for:	Marine community types base data (map 9)
Year:	Revision 2012
Title:	National Shingle Beach Survey
GIS operations:	Clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used for:	1220 (map 10)
Year:	2011
Title:	National Survey and assessment of the conservation status of Irish sea cliffs
GIS operations:	Clipped to SAC boundary
Used for:	1230 (map 11)

Year:	Revision 2010
Title:	Saltmarsh Monitoring Project 2007-2008. Version 1
GIS operations:	QIs selected; clipped to SAC boundary; overlapping regions with Coastal CO data investigated and resolved with expert opinion used
Used for:	1310, 1330, 1410 (map 12)
Year:	Derived 2012
Title:	Internal NPWS files
GIS operations:	Dataset created from spatial references supplied by NPWS experts. Expert opinion used as necessary to resolve any issues arising
Used for:	3260 (map 13)
Year:	Revision 2010
Title:	National Survey of Native Woodlands 2003-2008. Version 1
GIS operations:	QIs selected; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used for:	91E0 (map 14)
Year:	2012
Title:	NPWS rare and threatened species database
GIS operations:	Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising
Used for:	1029 (map 15)
Year:	Revision 2012
Title:	Margaritifera Sensitive Areas data
GIS operations:	Relevant catchment boundaries identified. Expert opinion used as necessary to resolve any issues arising
Used for:	1029 (map 15)
Year:	2005
Title:	OSi Discovery series vector data
GIS operations:	Low Water Mark (LWM) polyline feature class converted into polygon feature class; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used for:	1349 (map 16)
Year:	2005
Title:	OSi Discovery series vector data
GIS operations:	Creation of an 80m buffer on the marine side of the high water mark (HWM); creation of a 10m buffer on the terrestrial side of the HWM; combination of 80m and 10m HWM buffer datasets; creation of a 10m buffer on the terrestrial side of the river banks data; creation of 20m buffer applied to canal centreline data. These datasets are combined with the derived EPA WFD Waterbodies data and Coastal Lagoon data for the 1355 CO. Overlapping regions investigated and resolved; resulting dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising. Creation of 250m buffer on marine side of HWM to highlight potential commuting points
Used for:	1355 (map 17)

Year:	2010
Title:	EPA WFD Waterbodies data
GIS operations:	Creation of a 20m buffer applied to river and stream centreline data; creation of 80m buffer on the aquatic side of lake data; creation of 10m buffer on the terrestrial side of lake data. These datasets are combined with the derived OSi data and Coastal Lagoon data for the 1355 CO. Overlapping regions investigated and resolved; resulting dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used for:	1355 (no map)

Year:	Revision 2011
Title:	Inventory of Irish Coastal Lagoons. Version 3
GIS operations:	Creation of 80m buffer on the aquatic side of lagoon data; creation of 10m buffer on the terrestrial side of lagoon data. These datasets are combined with the derived OSi data and EPA WFD Waterbodies data for the 1355 CO. Overlapping regions are investigated and resolved; resulting dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used for:	1355 (no map)

1029 Freshwater Pearl Mussel *Margaritifera margaritifera*

To restore the favourable conservation condition of Freshwater Pearl Mussel in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Kilometres	Maintain at 7km. See map 15	This conservation objective applies to the freshwater pearl mussel population in the Cloon River, Co. Clare only (see also the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009 (Government of Ireland, 2009b)). The Cloon population is confined to the main channel and is distributed from Croany Bridge to approx. 1.5km upstream of Clonderalaw Bridge (Ross, 2008; DEHLG, 2010)
Population size	Number of adult mussels	Restore to 10,000 adult mussels	The Cloon population was estimated as less than 10,000 in 2009 (DEHLG, 2010)
Population structure: recruitment	Percentage per size class	Restore to least 20% of population no more than 65mm in length; and at least 5% of population no more than 30mm in length	Mussels of no more than 65mm are considered 'young mussels' and may be found buried in the substratum and/or beneath adult mussels. Mussels of no more than 30mm are 'juvenile mussels' and are always buried in the substratum. No juvenile or young mussels were found in the Cloon in 2007, with the smallest mussel measuring 80.3mm (Ross, 2008). A single 'young mussel' measuring 61.3mm was recorded in 2009 (DEHLG, 2010)
Population structure: adult mortality	Percentage	No more than 5% decline from previous number of live adults counted; dead shells less than 1% of the adult population and scattered in distribution	5% is considered the cut-off between the combined errors associated with natural fluctuations and sampling methods and evidence of true population decline. 1% of dead shells is considered to be indicative of natural losses. The Cloon failed the target for dead shells in 2009, with 31% dead shells across the single transect counted. There were no previous data on the number of live adults (DEHLG, 2010)

1029 Freshwater Pearl Mussel *Margaritifera margaritifera*

To restore the favourable conservation condition of Freshwater Pearl Mussel in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat extent	Kilometres	Restore suitable habitat in more than 3.3km (see map 15) and any additional stretches necessary for salmonid spawning	The species' habitat covers stretches of a short coastal river; and is a combination of 1) the area of habitat adult and juvenile mussels can occupy and 2) the area of spawning and nursery habitats the host fish can occupy. Fish nursery habitat typically overlaps with mussel habitat. Fish spawning habitat is generally adjacent to mussel habitat, but may lie upstream of the generalised mussel distribution. Only those salmonid spawning areas that could regularly contribute juvenile fish to the areas occupied by adult mussels should be considered. The availability of mussel habitat and fish spawning and nursery habitats are determined by flow and substratum conditions. The habitat for the species is currently unsuitable for the survival of adult mussels or the recruitment of juveniles (DEHLG, 2010). The target is based on the stretches of river identified, from a combination of dedicated survey and incidental records, as having habitat for the species
Water quality: macroinvertebrate and phytobenthos (diatoms)	Ecological quality ratio (EQR)	Restore water quality-macroinvertebrates: EQR greater than 0.90; phytobenthos: EQR greater than 0.93	These EQRs correspond to high ecological status for these two Water Framework Directive biological quality elements. They represent high water quality with very low nutrient concentrations (oligotrophic conditions). The habitat in the Cloon failed both standards during 2009 sampling for the Sub-basin Management Plans (DEHLG, 2010). See also The European Communities Environmental Objectives (Surface Water) Regulations 2009 (Government of Ireland, 2009a)
Substratum quality: filamentous algae (macroalgae), macrophytes (rooted higher plants)	Percentage	Restore substratum quality-filamentous algae: absent or trace (<5%); macrophytes: absent or trace (<5%)	The habitat in the Cloon failed both standards during 2009 sampling for the Sub-basin Management Plans, with cover abundance values of up to 50% recorded for filmentous algae and 80% for macrophytes (DEHLG, 2010). Recruitment of juvenile mussels is being prevented by the poor quality of the river substrata

1029 Freshwater Pearl Mussel *Margaritifera margaritifera*

To restore the favourable conservation condition of Freshwater Pearl Mussel in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Substratum quality: sediment	Occurrence	Restore substratum quality- stable cobble and gravel substrate with very little fine material; no artificially elevated levels of fine sediment	The habitat for the species is currently unsuitable for the recruitment of juveniles owing to sedimentation of the substratum. In many locations, it is also unsuitable for the survival of adult mussels (DEHLG, 2010). Significant sedimentation has been recorded during all recent mussel monitoring surveys (Ross, 2008; DEHLG, 2010). Recruitment of juvenile mussels is being prevented by the poor quality of the river substrate
Substratum quality: oxygen availability	Redox potential	Restore to no more than 20% decline from water column to 5cm depth in substrate	Differences in redox potential between the water column and the substrate correlate with differences in oxygen levels. Juvenile mussels require full oxygenation while buried in gravel. In suitable habitat, there should be very little loss of redox potential between the water column and underlying gravels. Redox potential measurements in 2009 yielded losses of 32.3 - 43.5% (average of 39%) at 5cm depth (DEHLG, 2010)
Hydrological regime: flow variability	Metres per second	Restore appropriate hydrological regimes	The availability of suitable freshwater pearl mussel habitat is largely determined by flow (catchment geology being the other important factor). In order to restore the habitat for the species, flow variability over the annual cycle must be such that: 1) high flows can wash fine sediments from the substratum, 2) low flows do not exacerbate the deposition of fines and 3) low flows do not cause stress to mussels in terms of exposure, water temperatures, food availability or aspects of the reproductive cycle

1029 Freshwater Pearl Mussel *Margaritifera margaritifera*

To restore the favourable conservation condition of Freshwater Pearl Mussel in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Host fish	Number	Maintain sufficient juvenile salmonids to host glochidial larvae	Salmonid fish are host to the larval form of the freshwater pearl mussel and, thus, they are essential to the completion of the life cycle. 0+ and 1+ fish are typically used, both because of the habitat overlaps and the development of immunity with age in the fish. Fish presence is considered sufficient, as higher densities and biomass of fish are indicative of enriched conditions in mussel rivers. Geist et al. (2006) found that higher densities of host fish coincided with eutrophication, poor substrate quality for pearl mussels and a lack of pearl mussel recruitment, while significantly lower densities and biomass of host fish were associated with high numbers of juvenile mussels. Fish movement patterns must be such that 0+ fish in the vicinity of the mussel habitat remain in the mussel habitat until their 1+ summer. No fish stocking should occur within the mussel habitat, nor any works that may change the salmonid balance or residency time. The Cloon freshwater pearl mussel population appears to favour native brown trout, with 17.2% of 1+ and older trout caught in 2009 hosting glochidia (DEHLG, 2010). Therefore, it is particularly important that trout are not out-competed by stocked fish

1095 Sea Lamprey *Petromyzon marinus*

To restore the favourable conservation condition of Sea Lamprey in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	% of river accessible	Greater than 75% of main stem length of rivers accessible from estuary	Artificial barriers can block or cause difficulties to lampreys' upstream migration, thereby limiting the species to lower stretches and restricting access to spawning areas. See Gargan et al. (2011). Specific barriers serve to constrain the up-river migration of sea lamprey. The upper extent of the SAC in the R. Fergus is delineated by a barrier to migration. Barriers are also present in the Mulkear and Feale
Population structure of juveniles	Number of age/size groups	At least three age/size groups present	Attribute and target based on data from Harvey and Cowx (2003) and O'Connor (2007)
Juvenile density in fine sediment	Juveniles/m²	Juvenile density at least 1/m²	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on data from Harvey and Cowx (2003)
Extent and distribution of spawning habitat	m² and occurrence	No decline in extent and distribution of spawning beds	Lampreys spawn in clean gravels. Surveys by Inland Fisheries ireland (IFI) commonly indicated accumulations of redds downstream of major weirs. (See also Gargan et al., 2011)
Availability of juvenile habitat	Number of positive sites in 3rd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	Despite observed spawning activity, sampling for ammocoetes consistently fails to find these in many samplling stations and never in any great numbers

1096 Brook Lamprey *Lampetra planeri*

To maintain the favourable conservation condition of Brook Lamprey in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	% of river accessible	Access to all water courses down to first order streams	Artificial barriers can block or cause difficulties to brook lampreys' migration, both up- and downstream, thereby possibly limiting the species to specific stretches and creating genetically isolated populations (Espanhol et al., 2007)
Population structure of juveniles	Number of age/size groups	At least three age/size groups of brook/river lamprey present	Attribute and target based on data from Harvey and Cowx (2003). It is impossible to distinguish between brook and river lamprey juveniles in the field (Gardiner, 2003), hence they are considered together in this target
Juvenile density in fine sediment	Juveniles/m²	Mean catchment juvenile density of brook/river lamprey at least 2/m²	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on data from Harvey and Cowx (2003) who state 10/m² in optimal conditions and more than 2/m² on a catchment basis
Extent and distribution of spawning habitat	m² and occurrence	No decline in extent and distribution of spawning beds	Spawning site and redd attributes established by IFI (Rooney et al., in press)
Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	Many sites with suitable larval attributes i.e. fine sediment in low velocity habitat, are found not to contain larval lamprey. This may be a function of chance or probability, or may be a consequence of insufficient recruitment to fill all spatial niches. Occupancy in excess of 50% of sites would be 'reasonable' for the Irish catchments examined to date (King et al., unublished data)

1099 River Lamprey *Lampetra fluviatilis*

To maintain the favourable conservation condition of River Lamprey in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	% of river accessible	Access to all water courses down to first order streams	Artificial barriers can block or cause difficulties to river lampreys' migration, both up- and downstream, thereby possibly limiting species to specific stretches and creating genetically isolated populations (Espanhol et al., 2007)
Population structure of juveniles	Number of age/size groups	At least three age/size groups of river/brook lamprey present	Attribute and target based on data from Harvey and Cowx (2003). It is impossible to distinguish between river and brook lamprey juveniles in the field (Gardiner 2003), hence they are considered together in this target
Juvenile density in fine sediment	Juveniles/m²	Mean catchment juvenile density of river/brook lamprey at least 2/m²	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on data from Harvey and Cowx (2003) who state 10/m² in optimal conditions and more than 2/m² on a catchment basis
Extent and distribution of spawning habitat	m² and occurrence	No decline in extent and distribution of spawning beds	
Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	Many sites with suitable larval attributes i.e. fine sediment in low velocity habitat, are found not to contain larval lamprey. This may be a function of chance or probability, or may be a consequence of insufficient recruitment to fill all spatial niches. Occupancy in excess of 50% of sites would be 'reasonable' for the Irish catchments examined to date (King et al., unpublished data)

1106 Atlantic Salmon *Salmo salar* (only in fresh water)

To restore the favourable conservation condition of Salmon in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	% of river accessible	100% of river channels down to second order accessible from estuary	Artificial barriers block salmons' upstream migration, thereby limiting the species to lower stretches and restricting access to spawning areas. The large hyrdo-electric station at Ardnacrusha and the Parteen regulating weir present considerable obstructions to upstream passage of salmon on the Shannon main channel. While both have fish passes installed, upstream migration of salmon is still problematical. Further weirs upstream on the Shannon also restrict access to spawning habitat. No such obstacles, causing significant fish passage issues for salmon are present on the Feale and Mulkear rivers
Adult spawning fish	Number	Conservation Limit (CL) for each system consistently exceeded	A conservation limit is defined by the North Atlantic Salmon Conservation Organisation (NASCO) as "the spawning stock level that produces long-term average maximum sustainable yield as derived from the adult to adult stock and recruitment relationship". The target is based on the Standing Scientific Committee of the National Salmon Commission's annual model output of CL attainment levels. See SSC (2010). Stock estimates are either derived from direct counts of adults (rod catch, fish counter) or indirectly by fry abundance counts. The salmon stocks in the Shannon above the impoundments are significantly below their Conservation Limits. Salmon stocks in the Feale and Mulkear rivers are above CL
Salmon fry abundance	Number of fry/5 minutes electrofishing	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 min sampling	Target is threshold value for rivers currently exceeding their conservation limit (CL). The abundance of salmon fry at monitored sites on the Shannon main channel, above the hydro-electric station, is significantly below this target
Out-migrating smolt abundance	Number	No significant decline	Smolt abundance can be negatively affected by a number of impacts such as estuarine pollution, predation and sea lice (*Lepeophtheirus salmonis*). On the Shannon main channel, salmon smolt abundance may be significantly affected by mortality passing through hydro-electric turbines
Number and distribution of redds	Number and occurrence	No decline in number and distribution of spawning redds due to anthropogenic causes	Salmon spawn in clean gravels. Artificial barriers are currently preventing salmon from accessing suitable spawning habitat on the Shannon main channel

1106 Atlantic Salmon *Salmo salar* (only in fresh water)

To restore the favourable conservation condition of Salmon in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Water quality	EPA Q value	At least Q4 at all sites sampled by EPA	Q values based on triennial water quality surveys carried out by the Environmental Protection Agency (EPA)

1110 Sandbanks which are slightly covered by sea water all the time

To maintain the favourable conservation condition of Sandbanks which are slightly covered by sea water all the time in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat distribution	Occurrence	The distribution of sandbanks is stable, subject to natural processes. See map 3	Distribution established using the Valentia Island to River Shannon Admiralty Chart (no. 1819_0)
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 3	Habitat area was estimated as 1,353ha using the Valentia Island to River Shannon Admiralty Chart (no. 1819_0)
Community distribution	Hectares	Conserve the following community type in a natural condition: Subtidal sand to mixed sediment with *Nephtys* spp. community complex. See map 9	The likely area of the community was derived from a sandbank survey in 2007 (Aquafact, 2007) and a subtidal survey in 2010 (Aquafact, 2011a). See marine supporting document for further details

1130 Estuaries

To maintain the favourable conservation condition of Estuaries in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 4	Habitat area was estimated as 24,273ha using OSi data and the Transitional Water Body area as defined under the Water Framework Directive
Community distribution	Hectares	Conserve the following community types in a natural condition: Intertidal sand to mixed sediment with polychaetes, molluscs and crustaceans community complex; Estuarine subtidal muddy sand to mixed sediment with gammarids community complex; Subtidal sand to mixed sediment with *Nucula nucleus* community complex; Subtidal sand to mixed sediment with *Nephtys* spp. community complex; Fucoid-dominated intertidal reef community complex; Faunal turf-dominated subtidal reef community; and Anemone-dominated subtidal reef community. See map 9	The likely area of these communities was derived from intertidal and subtidal surveys undertaken in 2010 (Aquafact, 2011a and c). See marine supporting document for further details

1140 Mudflats and sandflats not covered by seawater at low tide

To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 5	Habitat area was estimated using OSi data as 8,808ha
Community distribution	Hectares	Conserve the following community types in a natural condition: Intertidal sand with *Scolelepis squamata* and *Pontocrates* spp. community; and Intertidal sand to mixed sediment with polychaetes, molluscs and crustaceans community complex. See map 9	The likely area of these communities was derived from an intertidal survey in 2010 (Aquafact, 2011c). See marine supporting document for further details

1150 *Coastal lagoons

To restore the favourable conservation condition of Coastal lagoons in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes. Favourable reference area 33.4ha- Shannon Airport Lagoon 24.2ha; Cloonconeen Pool 3.9ha; Scattery Lagoon 2.8ha; Quayfield and Poulaweala Loughs 2.5ha. See map 6	Areas calculated from spatial data derived from Oliver, 2007. Site codes IL031- IL034. See lagoon supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 6	Sites IL031-IL034 in Oliver, 2007. See lagoon supporting document for further details
Salinity regime	practical salinity units (psu)	Median annual salinity and temporal variation within natural ranges	The lagoons in the site vary from oligohaline to euhaline. See lagoon supporting document for further details
Hydrological regime	Metres	Annual water level fluctuations and minima within natural ranges	Lagoons listed for this site are all considered to be shallow. See lagoon supporting document for further details
Barrier: connectivity between lagoon and sea	Permeability	Appropriate hydrological connections between lagoons and sea, including where necessary, appropriate management	The lagoons within this site exhibit a variety of barrier types including cobble/shingle, karst and artificial embankment. See lagoon supporting document for further details
Water quality: chlorophyll a	µg/L	Annual median chlorophyll a within natural ranges and less than 5µg/L	Target based on Roden and Oliver (2010). See lagoon supporting document for further details
Water quality: Molybdate Reactive Phosphorus (MRP)	mg/L	Annual median MRP within natural ranges and less than 0.1mg/L	Target based on Roden and Oliver (2010). See lagoon supporting document for further details
Water quality: Dissolved Inorganic Nitrogen (DIN)	mg/L	Annual median DIN within natural ranges and less than 0.15mg/L	Target based on Roden and Oliver, 2010). See lagoon supporting document for further details
Depth of macrophyte colonisation	Metres	Macrophyte colonisation to maximum depth of lagoons	As these lagoons are all shallow, it is expected the macrophytes should extend to their deepest points. See lagoon supporting document for further details
Typical plant species	number and m^2	Maintain number and extent of listed lagoonal specialists, subject to natural variation	Species listed in Oliver, 2007. See lagoon supporting document for further details
Typical animal species	number	Maintain listed lagoon specialists, subject to natural variation	Species listed in Oliver, 2007. See lagoon supporting document for further details
Negative indicator species	Number and % cover	Negative indicator species absent or under control	Low salinity, shallow water and elevated nutrient levels increase the threat of un-natural encroachment by reedbeds

1160 Large shallow inlets and bays

To maintain the favourable conservation condition of Large shallow inlets and bays in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 7	Habitat area was estimated as 35,282ha using OSi data and the Transitional Water Body area as defined under the Water Framework Directive
Community distribution	Hectares	Conserve the following community types in a natural condition: Intertidal sand with *Scolelepis squamata* and *Pontocrates* spp. community; Intertidal sand to mixed sediment with polychaetes, molluscs and crustaceans community complex; Subtidal sand to mixed sediment with *Nucula nucleus* community complex; Subtidal sand to mixed sediment with *Nephtys* spp. community complex; Fucoid-dominated intertidal reef community complex; Mixed subtidal reef community complex; Faunal turf-dominated subtidal reef community; Anemone-dominated subtidal reef community; and *Laminaria*-dominated community complex. See map 9	The likely area of these communities was derived from intertidal and subtidal surveys in 2010 (Aquafact, 2011a and c). See marine supporting document for further details

1170 Reefs

To maintain the favourable conservation condition of Reefs in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat distribution	Occurrence	The distribution of Reefs is stable, subject to natural processes. See map 8	Distribution is established from intertidal and subtidal reef surveys in 2010 (Aquafact, 2011b and c)
Habitat area	Hectares	The permanent habitat area is stable, subject to natural processes. See map 8	Habitat area was estimated as 21,421ha from the 2010 intertidal and subtidal reef survey (Aquafact 2011b and c)
Community distribution	Hectares	Conserve the following reef community types in a natural condition: Fucoid-dominated intertidal reef community complex; Mixed subtidal reef community complex; Faunal turf-dominated subtidal reef community; Anemone-dominated subtidal reef community; and *Laminaria*-dominated community complex. See map 9	Based on the 2010 intertidal and subtidal reef survey (Aquafact, 2011b and c). See marine supporting document for further details

1220 Perennial vegetation of stony banks

To maintain the favourable conservation condition of Perennial vegetation of stony banks in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession	Current area unknown. It was recorded to be present but extent was not mapped from nine sub-sites during the National Shingle Beach Survey (Moore and Wilson, 1999): Ross Bay, Kilbaha Bay, Cloonconeen Lough and Rinevella Bay, Carrigholt Bay, Ballymacrinan Bay, Bunaclugga Bay, Corcas and Sandhills, Bromore and Ballybunnion. NB further unsurveyed areas maybe present within the site
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 10 for recorded locations	Full distribution currently unknown. An excellent array of shingle beaches is known to occur, including three that are ranked of high interest (Ross Bay, Bunaclugga Bay and Cloonconeen Lough and Rinevella), the last of which is associated with a lagoonal system (Moore and Wilson, 1999). Habitat likely to be more widespread. See coastal habitats supporting document for further details. See also the conservation objective for coastal lagoons (1150)
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Based on data from Moore and Wilson (1999). Shingle features are relatively stable in the long-term and shingle beaches within this SAC appear to be functioning naturally with few artifical restrictions to beach dynamics (Moore and Wilson, 1999). See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Moore and Wilson (1999). Lichens are present at Ross Bay and Cloonconeen and Rinevella Bay indicating a degree of stability. See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain the typical vegetated shingle flora including the range of sub-communities within the different zones	The Carrigaholt sub-site is a small site with a diverse flora. The Bunaclugga Bay sub-site supports yellow horned-poppy (*Glaucium flavum*), which contributes to the site's high interest ranking. Based on data from Moore and Wilson (1999). See coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Based on data from Moore and Wilson (1999). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. See coastal habitats supporting document for further details

1230 Vegetated sea cliffs of the Atlantic and Baltic coasts

To maintain the favourable conservation condition of Vegetated sea cliffs in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat length	Kilometres	Area stable or increasing, subject to natural processes, including erosion. For sub-sites mapped: Kilbaha- 4.1km; Ladder Rock- 1.0km; Moyarta- 0.9km; Lisheencrony- 1.1km; Burrane- 0.2km; Kerry Head- 33.4km; Ballybunion- 15.6km; Kilclogher- 4.9km; Loop Head- 6.1km. See map 11	Based on data from the Irish Sea Cliff Survey (ISCS) (Barron et al., 2011). Nine sub-sites were identified using a combination of aerial photos and the DCENR helicopter viewer. The length of each cliff was measured (in some cases the cliff was measured in sections) to give a total estimated area of 67.3km within the SAC. Cliffs are linear features and are therefore measured in kilometres. Length of cliff likely to be underestimated. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 11	Based on data from the Irish Sea Cliff Survey (Barron et al., 2011). Most of the SAC west of Kilcredaun Point and Kilconly Point is bounded by high rocky sea cliffs. Both hard and soft cliffs occur in this SAC (ISCS; Browne, 2005). See coastal habitats supporting document for further details
Physical structure: functionality and hydrological regime	Occurrence of artificial barriers	No alteration to natural functioning of geomorphological and hydrological processes due to artificial structures	Based on data from the Irish Sea Cliff Survey (Barron et al., 2011). Maintaining natural geomorphological processes including natural erosion is important for the health of vegetated sea cliff. Hydrological processes maintain flushes and in some cases tufa formations that can be associated with sea cliffs. Freshwater seepage was noted from the cliffs at Loop Head and Kilclogher. Stream or cascade was noted from Kerry Head. Sea coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain range of sea cliff habitat zonations including transitional zones, subject to natural processes including erosion and succession	Based on data from the Irish Sea Cliff Survey (Barron et al., 2011). At Loop Head sub-site the zones recorded were: splash, crevice ledge and ungrazed coastal grassland on hard cliffs. At Kerry Head sub-site the zones recorded were: splash, pioneer, crevice ledge, ungrazed/grazed coastal grassland on hard cliffs and coastal grassland on soft cliffs. See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	Based on data from the Irish Sea Cliff Survey (Barron et al., 2011). See coastal habitats supporting document for further details

1230 Vegetated sea cliffs of the Atlantic and Baltic coasts

To maintain the favourable conservation condition of Vegetated sea cliffs in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain range of sub-communities with typical species listed in the Irish Sea cliff survey (Barron et al., 2011)	Based on data from the Irish Sea Cliff Survey (Barron et al., 2011). See coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage	Negative indicator species (including non-natives) to represent less than 5% cover	Based on data from the Irish Sea Cliff Survey (Barron et al., 2011). See coastal habitats supporting document for further details
Vegetation composition: bracken and woody species	Percentage	Cover of bracken (*Pteridium aquilinum*) on grassland and/or heath to be less than 10%. Cover of woody species on grassland and/or heath to be less than 20%	Based on data from the Irish Sea Cliff Survey (Barron et al., 2011). See coastal habitats supporting document for further details

1310 *Salicornia* and other annuals colonizing mud and sand

To maintain the favourable conservation condition of *Salicornia* and other annuals colonizing mud and sand in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Carrigafoyle - 0.005ha; Inishdea, Owenshere - 0.003ha; Knock - 0.029ha; Querin - 0.185ha; Rinevilla Bay - 0.001ha. See map 12	Based on data from Saltmarsh Monitoring Project (SMP) (McCorry and Ryle, 2009). Habitat recorded at five of the ten sub-sites surveyed and mapped, giving a total estimated area of 0.223ha. NB further unsurveyed areas maybe present within the site. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 12 for known distribution	Based on data from McCorry and Ryle (2009). Habitat recorded at six out of ten sub-sites by McCorry and Ryle (2009). NB further unsurveyed areas maybe present within the site. *Salicornia* is an annual species, so its distribution can vary significantly from year to year. See coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain natural circulation of sediments and organic matter, without any physical obstructions	Sediment supply is particularly important for this pioneer saltmarsh community, as the distribution of this habitat depends on accretion rates. See coastal habitats supporting document for further details
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession	Based on data from McCorry and Ryle (2009). Creeks deliver sediment throughout saltmarsh system. Creeks and pan structures well developed in the larger sections of the marsh at Carrigafoyle, Shepperton/Fergus Estuary and Inishdea/Owenshere. See coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	This pioneer saltmarsh community requires regular tidal inundation. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from McCorry and Ryle (2009). See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimeters	Maintain structural variation within sward	Based on data from McCorry and Ryle (2009). See coastal habitats supporting document for further details
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated	Based on data from McCorry and Ryle (2009). See coastal habitats supporting document for further details

1310 *Salicornia* and other annuals colonizing mud and sand

To maintain the favourable conservation condition of *Salicornia* and other annuals colonizing mud and sand in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Vegetation composition: typical species and sub-communities	Percentage cover	Maintain the presence of species-poor communities with typical species listed in Saltmarsh Monitoring Project (McCorry and Ryle, 2009)	Based on data from McCorry and Ryle (2009). Species of local distinctiveness recorded include sea wormwood (*Seriphidium maritimum*), meadow barley (*Hordeum secalinum*) and hard grass (*Parapholis strigosa*) (McCorry and Ryle, 2009; internal NPWS files). See coastal habitats supporting document for further details
Vegetation structure: negative indicator species-*Spartina anglica*	Hectares	No significant expansion of common cordgrass (*Spartina anglica*), with an annual spread of less than 1%	Based on data from McCorry and Ryle (2009). *Spartina* was recorded at all sub-sites and is considered a significant threat to the habitat. See coastal habitats supporting document for further details

1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

To restore the favourable conservation condition of Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Carrigafoyle- 6.774ha; Barrigone, Aughinish- 10.288ha; Beagh- 0.517ha; Bunratty- 26.939ha; Shepperton, Fergus Estuary- 37.925ha; Inishdea, Owenshere- 18.127ha; Killadysert, Inishcorker- 2.604ha; Knock- 0.576ha; Querin- 3.726ha; Rinevilla Bay- 11.883ha. See map 12	Based on data from the Saltmarsh Monitoring Project (SMP) (McCorry and Ryle 2009). Ten sub-sites that supported Atlantic salt meadow were mapped (119.36ha) and additional areas of potential saltmarsh (376.07ha) were identified from an examination of aerial photographs, giving a total estimated area of 495.43ha. Saltmarsh habitat also occurs at 11 other sub-sites within the SAC (Curtis and Sheehy-Skeffington, 1998). NB further unsurveyed areas maybe present within the site. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 12 for mapped distribution	Based on data from McCorry and Ryle (2009). Within the sites surveyed by the SMP, estuary type saltmarsh over a mud substrate is most common and ASM is the dominant saltmarsh habitat. See coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain natural circulation of sediments and organic matter, without any physical obstructions	Based on data from McCorry and Ryle (2009). Embankments along much of the shoreline are a feature of this SAC. These embankments were erected in the past and much of the site has been remodelled and large areas of land reclaimed as a result. See coastal habitats supporting document for further details
Physical structure: creeks and pans	Occurrence	Maintain creek and pan structure, subject to natural processes, including erosion and succession	Based on data from McCorry and Ryle (2009). Creeks and pan structures well developed at the larger sections of ASM in the Carrigafoyle sub-site. At the ASM at Shepperton, Fergus Estuary, the larger patches still retain a natural creek and salt pan structure. At Inishdea, Owenshere sub-site within some of the intact saltmarsh, there is a complex network of creeks, salt pans and depressions. At Killadysart, Inishcorker and Querin, creek and pan development is generally poor. See coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	See coastal habitats supporting document for further details

1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

To restore the favourable conservation condition of Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from McCorry and Ryle (2009). Zonations to other saltmarsh habitats as well as brackish and terrestrial habitats were recorded at all sub-sites. See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimeters	Maintain structural variation within sward	Based on data from McCorry and Ryle (2009). All of the sub-sites are grazed to some extent. Overgrazing was noted from Carrigafoyle, Shepperton, Fergus Estuary and Knock sub-sites. See coastal habitats supporting document for further details
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of the saltmarsh area vegetated	Based on data from McCorry and Ryle (2009). Some poaching was noted from most of the sub-sites. See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain range of sub-communities with typical species listed in Saltmarsh Monitoring Project (McCorry and Ryle, 2009)	See coastal habitats supporting document for further details
Vegetation structure: negative indicator species-*Spartina anglica*	Hectares	No significant expansion of common cordgrass (*Spartina anglica*), with an annual spread of less than 1%	Based on data from McCorry and Ryle (2009). *Spartina* is a major element of the vegetation at all sub-sites in this SAC. See coastal habitats supporting document for further details

1349 Bottlenose Dolphin *Tursiops truncatus*

To maintain the favourable conservation condition of Bottlenose Dolphin in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Access to suitable habitat	Number of artificial barriers	Species range within the site should not be restricted by artificial barriers to site use. See map 16 for suitable habitat	See marine supporting document for further details
Habitat use: critical areas	Location and hectares	Critical areas, representing habitat used preferentially by bottlenose dolphin, should be maintained in a natural condition. See map 16	Attribute and target based on Ingram and Rogan (2002), Englund et al. (2007), Englund et al. (2008), Berrow (2009), Berrow et al. (2010) and review of data from other studies. See marine supporting document for further details
Disturbance	Level of impact	Human activities should occur at levels that do not adversely affect the bottlenose dolphin population at the site	See marine supporting document for further details

1355 Otter *Lutra lutra*

To restore the favourable conservation condition of Otter in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Percentage positive survey sites	No significant decline	Measure based on standard otter survey technique. FCS target, based on 1980/81 survey findings, is 88% in SACs. Current range in Shannon catchment estimated at 70.5% (Bailey and Rochford 2006)
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 596.8ha above high water mark (HWM); 958.9ha along river banks/ around ponds	No field survey. Areas mapped to include 10m terrestrial buffer along shoreline (above HWM and along river banks) identified as critical for otters (NPWS, 2007)
Extent of marine habitat	Hectares	No significant decline. Area mapped and calculated as 4,461.6ha	No field survey. Area mapped based on evidence that otters tend to forage within 80m of the shoreline (HWM) (NPWS, 2007; Kruuk, 2006)
Extent of freshwater (river) habitat	Kilometers	No significant decline. Length mapped and calculated as 500.1km	No field survey. River length calculated on the basis that otters will utilise freshwater habitats from estuary to headwaters (Chapman and Chapman, 1982)
Extent of freshwater (lake/lagoon) habitat	Hectares	No significant decline. Area mapped and calculated as 125.6ha	No field survey. Area mapped based on evidence that otters tend to forage within 80m of the shoreline (NPWS, 2007)
Couching sites and holts	Number	No significant decline	Otters need lying up areas throughout their territory where they are secure from disturbance (Kruuk, 2006; Kruuk and Moorhouse, 1991)
Fish biomass available	Kilograms	No significant decline	Broad diet that varies locally and seasonally, but dominated by fish, in particular salmonids, eels and sticklebacks in freshwater (Bailey and Rochford, 2006) and wrasse and rockling in coastal waters (Kingston et al., 1999)
Barriers to connectivity	Number	No significant increase. For guidance, see map 17	Otters will regularly commute across stretches of open water up to 500m. e.g. between the mainland and an island; between two islands; across an estuary (De Jongh and O'Neill, 2010). It is important that such commuting routes are not obstructed

1410 Mediterranean salt meadows (*Juncetalia maritimi*)

To restore the favourable conservation condition of Mediterranean salt meadows (*Juncetalia maritimi*) in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Carrigafoyle- 4.193ha; Barrigone, Aughinish- 2.407ha; Bunratty- 0.865ha; Inishdea, Owenshere- 11.609ha; Killadysert, Inishcorker- 0.705ha; Knock- 0.143ha, Querin- 0.008ha; Rinevilla Bay- 2.449ha. See map 12	Based on data from the Saltmarsh Monitoring Project (SMP) (McCorry and Ryle, 2009). Eight sub-sites that support Mediterranean salt meadow were mapped (22.379ha) and additional areas of potential saltmarsh (25.646ha) were identified from an examination of aerial photographs, giving a total estimated area of 48.025ha. Saltmarsh habitat also occurs at 11 other sub-sites within the SAC (Curtis and Sheehy-Skeffington, 1998). NB further unsurveyed areas maybe present within the site. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 12 for known distribution	Based on data from McCorry and Ryle (2009). Within the sites surveyed by the SMP, estuary type saltmarsh over a mud substrate is most common. See coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/absence of physical barriers	Maintain natural circulation of sediments and organic matter, without any physical obstructions	Based on data from McCorry and Ryle (2009). Embankments along much of the shoreline are a feature of this SAC. These embankments were erected in the past and much of the site has been remodelled and large areas of land reclaimed because of them. See coastal habitats supporting document for further details
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession	Based on data from the Saltmarsh Monitoring Project (McCorry and Ryle, 2009). The MSM at Carrigafoyle contains some large salt pans. See coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	Mediterranean salt meadow is found high up in the saltmarsh but requires occasional tidal inundation. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from McCorry and Ryle (2009). Zonations to other saltmarsh habitats as well as brackish and terestrial habitats were recorded at most sub-sites. See coastal habitats supporting document for further details

1410 Mediterranean salt meadows (*Juncetalia maritimi*)

To restore the favourable conservation condition of Mediterranean salt meadows (*Juncetalia maritimi*) in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	Based on data from McCorry and Ryle (2009). All of the sub-sites are grazed to some extent. Overgrazing was noted from Inishdea, Owenshere and Knock sub-sites. See coastal habitats supporting document for further details
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated	Based on data from McCorry and Ryle (2009). Some poaching was noted from most of the sub-sites. See coastal habitats supporting document for further details
Vegetation composition: typical species	Percentage cover	Maintain range of sub-communities with typical species listed in Saltmarsh Monitoring Project (McCorry and Ryle, 2009)	See coastal habitats supporting document for further details
Vegetation structure: negative indicator species - *Spartina anglica*	Hectares	No significant expansion of common cordgrass (*Spartina anglica*), with an annual spread of less than 1%	Based on data from McCorry and Ryle (2009). *Spartina* is a major element of the vegetation at all sub-sites in this SAC. See coastal habitats supporting document for further details

3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation

To maintain the favourable conservation condition of Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Kilometres	Area stable or increasing, subject to natural processes	Three sub-types of high conservation value are know to occur in the site. See Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation supporting document for further details. **Note: rooted macrophytes should be absent or trace (< 5% cover) in freshwater pearl mussel (*Margaritifera margaritifera*) habitat. The freshwater pearl mussel (1029) conservation objective takes precedence over this objective for habitat 3260 in the Cloon River within this SAC, because the mussel requires environmental conditions closer to natural background levels**
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 13	See Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation supporting document for further details
Hydrological regime: river flow	Metres per second	Maintain appropriate hydrological regimes	See Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation supporting document for further details
Hydrological regime: tidal influence	Daily water level fluctuations - metres	Maintain natural tidal regime	See Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation supporting document for further details
Hydrological regime: freshwater seepages	Metres per second	Maintain appropriate freshwater seepage regimes	See Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation supporting document for further details
Substratum composition: particle size range	Millimetres	The substratum should be dominated by the particle size ranges, appropriate to the habitat sub-type (frequently sands, gravels and cobbles)	Although many of the high-conservation-value sub-types are dominated by coarse substrata, for certain sub-types, notably triangular club-rush (*Schoenoplectus triqueter*) and opposite-leaved pondweed (*Groenlandia densa*), fine substrata are required. See Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation supporting document for further details

3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation

To maintain the favourable conservation condition of Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Water quality: nutrients	Milligrammes per litre	The concentration of nutrients in the water column should be sufficiently low to prevent changes in species composition or habitat condition	The specific targets may vary among sub-types. See Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation supporting document for further details
Vegetation composition: typical species	Occurrence	Typical species of the relevant habitat sub-type should be present and in good condition	See Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation supporting document for further details
Floodplain connectivity	Area	The area of active floodplain at and upstream of the habitat should be maintained	See Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation supporting document for further details
Riparian habitat	Area	The area of riparian woodland at and upstream of the bryophyte-rich sub-type should be maintained	See Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation supporting document for further details. See also the conservation objective for Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) (91E0)

6410 *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)

To maintain the favourable conservation condition of *Molinia* meadows on calcareous, peaty or clayey-silt laden soils (*Molinion caeruleae*) in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Full extent of this habitat in this site is currently unknown- see distribution below
Habitat distribution	Occurrence	No decline, subject to natural processes	This habitat has been recorded on the eastern bank of the Shannon, just north of Castleconnell, Co. Limerick (NPWS internal files). Full distribution of this habitat in this site is currently unknown and it almost certainly occurs elsewhere. The Irish semi-natural grasslands survey will cover Co. Limerick in 2012 and additional information is likely to be available following this survey
Vegetation structure: broadleaf herb: grass ratio	Percentage	Broadleaf herb component of vegetation between 40 and 90%	Attribute and target based on O'Neill et al. (2010)
Vegetation structure: sward height	Percentage	30-70% of sward between 10 and 80cm high	Attribute and target based on O'Neill et al. (2010)
Vegetation composition: typical species	Number	At least 7 positive indicator species present, including 1 "high quality" species	List of positive indicator species, including high quality species, identified by O'Neill et al. (2010). Note that purple moor-grass (*Molinia caerulea*) is a positive indicator species, but not necessarily an essential component of the habitat
Vegetation composition: notable species	Number	No decline, subject to natural processes	A number of notable species have been recorded in this habitat at this site including smooth brome (*Bromus racemosus*), pale sedge (*Carex pallescens*) and blue-eyed grass (*Sisyrinchium bermudiana*) (Reynolds et al., 2006)
Vegetation composition: negative indicator species	Percentage	Negative indicator species collectively not more than 20% cover, with cover by an individual species less than 10%. Non-native invasive species, absent or under control	List of negative indicator species identified by O'Neill et al. (2010)
Vegetation composition: negative indicator moss species	Percentage	Bog mosses (*Sphagnum* spp.) not more than 10% cover; hair mosses (*Polytrichum* spp.) not more than 25% cover	Attribute and target based on O'Neill et al. (2010)

6410 *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)

To maintain the favourable conservation condition of *Molinia* meadows on calcareous, peaty or clayey-silt laden soils (*Molinion caeruleae*) in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Vegetation structure: woody species and bracken (*Pteridium aquilinum*)	Percentage	Cover of woody species and bracken not more than 5% cover	Attribute and target based on O'Neill et al. (2010)
Physical structure: bare ground	Percentage	Not more than 10% bare ground	Attribute and target based on O'Neill et al. (2010)

91E0 *Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)

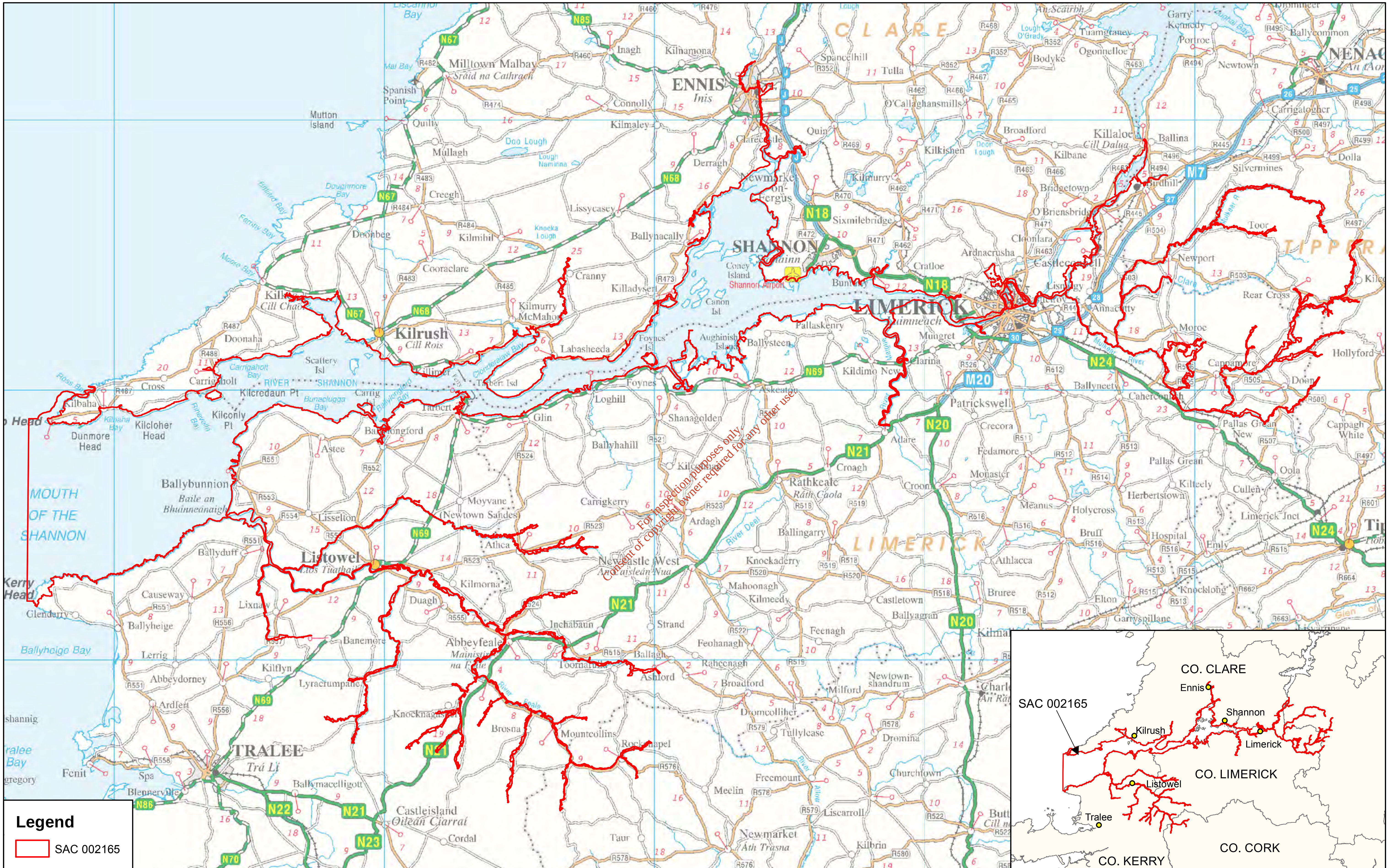
To restore the favourable conservation condition of Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, at least c.8.5ha for sites surveyed. See map 14	Minimum area, based on 5 sites surveyed by Perrin et al. (2008) - site codes 1286, 1577, 1857, 1861, 1995. See woodland habitats supporting document for further details. NB further areas are likely to be present within the SAC
Habitat distribution	Occurrence	No decline. Surveyed locations shown on map 14	Distribution based on Perrin et al. (2008). NB further areas are likely to be present within the SAC
Woodland size	Hectares	Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and “small” woods at least 3ha in size	The sizes of at least some of the existing woodlands need to be increased in order to reduce habitat fragmentation and benefit those species requiring ‘deep’ woodland conditions (Peterken, 2002). Topographical and land-ownership constraints may restrict expansion
Woodland structure: cover and height	Percentage and metres	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semi-mature trees and shrubs; and well-developed herb layer	Described in Perrin et al. (2008). See woodland habitats supporting document for further details
Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types	Described in Perrin et al. (2008). See woodland habitats supporting document for further details
Woodland structure: natural regeneration	Seedling: sapling: pole ratio	Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy	Alder and oak regenerate poorly. Ash often regenerates in large numbers although few seedlings reach pole size
Hydrological regime: flooding depth/height of water table	Metres	Appropriate hydrological regime necessary for maintenance of alluvial vegetation	Periodic flooding is essential to maintain alluvial woodlands along river floodplains
Woodland structure: dead wood	m^3 per hectare; number per hectare	At least 30m^3/ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter (greater than 20cm diameter in the case of alder)	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem

91E0 *Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)

To restore the favourable conservation condition of Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Woodland structure: veteran trees	Number per hectare	No decline	Mature and veteran trees are important habitats for bryophytes, lichens, saproxylic organisms and some bird species. Their retention is important to ensure continuity of habitats/niches and propagule sources
Woodland structure: indicators of local disctinctiveness	Occurrence	No decline	Includes ancient or long-established woodlands, archaeological and geological features as well as red-data and other rare or localised species. Perrin and Daly (2010) list four sites as containing potential ancient/long established woodland. See woodland habitats supporting document for further details
Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%	Species reported in Perrin et al. (2008)
Vegetation composition: typical species	Occurrence	A variety of typical native species present, depending on woodland type, including alder (*Alnus glutinosa*), willows (*Salix* spp) and, locally, oak (*Quercus robur*) and ash (*Fraxinus excelsior*)	Species reported in Perrin et al. (2008). See woodland habitats supporting document for further details
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control	The following are the most common invasive species in this woodland type: Himalayan balsam (*Impatiens glandulifera*), giant hogweed (*Heracleum mantegazzianum*), sycamore (*Acer pseudoplatanus*)



MAP 1:
LOWER RIVER SHANNON SAC CONSERVATION OBJECTIVES SAC DESIGNATION

Map to be read in conjunction with the NPWS Conservation Objectives Document.

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Department of Arts, Heritage and the Gaeltacht

SITE CODE: SAC 002165
CO. CLARE; version 1.2, CO. CORK; version 1.01, CO. KERRY; version 1.11, CO. LIMERICK; version 1.11, CO. TIPPERARY; version 1.05

0 5 10 15 20 km

N

Map Version 1
Date: June 2012

SPA 004119

SAC 002165

SPA 004189

SPA 004077

SAC 000930

SPA 004165

SPA 004161

Legend

- 002165 Lower River Shannon SAC
- 000930 Clare Glen SAC
- 004077 River Shannon and River Fergus Estuaries SPA
- 004119 Loop Head SPA
- 004161 Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA
- 004165 Slievefelim to Silvermines Mountains SPA
- 004189 Kerry Head SPA
- OSi Discovery Series County Boundaries

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MAP 2:
LOWER RIVER SHANNON SAC CONSERVATION OBJECTIVES ADJOINING / OVERLAPPING DESIGNATIONS

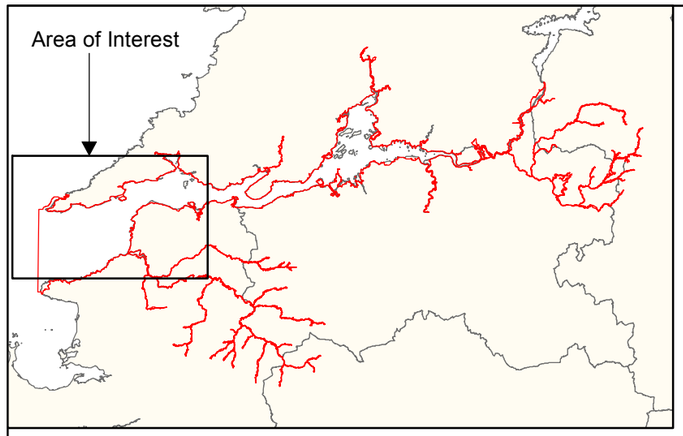
Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 002165 CO. CLARE; v1.2, CO. CORK; v1.01, CO. KERRY; v1.11, CO. LIMERICK; v1.11, CO. TIPPERARY; v1.05/SAC 000930 CO LIMERICK; v1, CO. TIPPERARY; v1
SPA 004077 CO CLARE; v 1.03, CO KERRY; v1.02, CO LIMERICK; v1.03/SPA 004119 CO CLARE; v1.02
SPA 004161 CO CORK; v2.12, CO KERRY; v2.17, CO LIMERICK; v2.14
SPA 004165 CO LIMERICK; v2.05, CO TIPPERARY; v2.09/SPA 004189 CO KERRY; v2.01

0 5 10 15 20 km

N

Map Version 1
Date: June 2012



Legend

- SAC 002165
- 1110 Sandbanks which are slightly covered by sea water all the time
- OSi Discovery Series County Boundaries

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MAP 3:
LOWER RIVER SHANNON SAC
CONSERVATION OBJECTIVES
SANDBANKS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE: SAC 002165
CO. CLARE; version 1.2, CO. CORK; version 1.01, CO. KERRY; version 1.11, CO. LIMERICK; version 1.11, CO. TIPPERARY; version 1.05

0 1 2 3 4 5 km

N

Map Version 1
Date: June 2012

Legend

- SAC 002165
- 1130 Estuaries
- OSi Discovery Series County Boundaries

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MAP 4:
LOWER RIVER SHANNON SAC CONSERVATION OBJECTIVES ESTUARIES

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE: SAC 002165
CO. CLARE; version 1.2, CO. CORK; version 1.01, CO. KERRY; version 1.11, CO. LIMERICK; version 1.11, CO. TIPPERARY; version 1.05

0 2 4 6 8 10 km

N

Map Version 1
Date: June 2012

Legend

- SAC 002165
- 1140 Mudflats and sandflats not covered by sea water at low tide
- OSi Discovery Series County Boundaries

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MAP 5:
LOWER RIVER SHANNON SAC
CONSERVATION OBJECTIVES
TIDAL MUDFLATS AND SANDFLATS

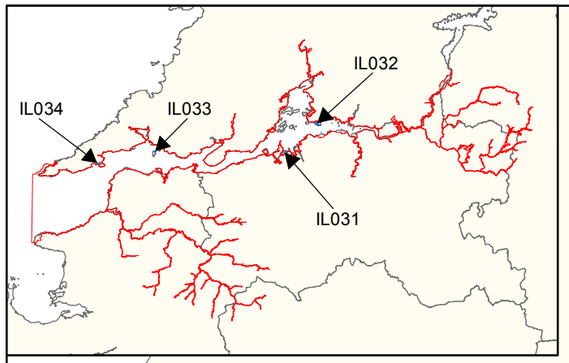
Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE: SAC 002165
CO. CLARE; version 1.2, CO. CORK; version 1.01, CO. KERRY; version 1.11, CO. LIMERICK; version 1.11, CO. TIPPERARY; version 1.05

0 5 10 15 km

N

Map Version 1
Date: June 2012



Quayfield and Poulaweala Loughs
IL031

Shannon Airport Lagoon
IL032

Scattery Lagoon
IL033

Cloonconeen Pool
IL034

Legend

- SAC 002165
- 1150 Coastal lagoons
- OSi Discovery Series County Boundaries

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MAP 6:
LOWER RIVER SHANNON SAC
CONSERVATION OBJECTIVES
COASTAL LAGOONS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE: SAC 002165
CO. CLARE; version 1.2, CO. CORK; version 1.01, CO. KERRY; version 1.11, CO. LIMERICK; version 1.11, CO. TIPPERARY; version 1.05

0 100 200 300 400 500 m

N

Map Version 1
Date: June 2012

Legend

- SAC 002165
- 1160 Large shallow inlets and bays
- OSi Discovery Series County Boundaries

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MAP 7:
LOWER RIVER SHANNON SAC
CONSERVATION OBJECTIVES
LARGE SHALLOW INLETS AND BAYS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE: SAC 002165
CO. CLARE; version 1.2, CO. CORK; version 1.01, CO. KERRY; version 1.11, CO. LIMERICK; version 1.11, CO. TIPPERARY; version 1.05

0 1 2 3 4 5 km

N

Map Version 1
Date: June 2012

Legend

- SAC 002165
- 1170 Reefs
- OSi Discovery Series County Boundaries

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MAP 8: LOWER RIVER SHANNON SAC CONSERVATION OBJECTIVES REEFS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE: SAC 002165
CO. CLARE; version 1.2, CO. CORK; version 1.01, CO. KERRY; version 1.11, CO. LIMERICK; version 1.11, CO. TIPPERARY; version 1.05

0 5 10 15 km

N

Map Version 1
Date: June 2012

Legend

- SAC 002165
- OSi Discovery Series County Boundaries

Marine Community Types

- Anemone-dominated subtidal reef community
- Estuarine subtidal muddy sand to mixed sediment with gammarids community complex
- Faunal turf-dominated subtidal reef community
- Fucoid-dominated intertidal reef community complex
- Intertidal sand to mixed sediment with polychaetes, molluscs and crustaceans community complex
- Intertidal sand with *Scolelepis squamata* and *Pontocrates* spp. community
- *Laminaria*-dominated community complex
- Mixed subtidal reef community complex
- River
- Subtidal sand to mixed sediment with *Nephtys* spp. community complex
- Subtidal sand to mixed sediment with *Nucula nucleus* community complex

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MAP 9:
LOWER RIVER SHANNON SAC
CONSERVATION OBJECTIVES
MARINE COMMUNITY TYPES

Map to be read in conjunction with the NPWS Conservation Objectives Document.

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0 5 10 15 km

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N

Map Version 1
Date: June 2012

Carrigaholy Bay

Ballymacrinan Bay

Ross Bay

Kilbaha Bay

Cloonconeen Lough and Rinevella Bay

Bunaclugga Bay

Corcas and Sandhills

Bromore

Ballybunion

Area of Interest

Legend

- SAC 002165
- 1220 Perennial vegetation of stony banks
- OSi Discovery Series County Boundaries

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MAP 10:
LOWER RIVER SHANNON SAC
CONSERVATION OBJECTIVES
PERENNIAL VEGETATION OF STONY BANKS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE: SAC 002165
CO. CLARE; version 1.2, CO. CORK; version 1.01, CO. KERRY; version 1.11, CO. LIMERICK; version 1.11, CO. TIPPERARY; version 1.05

0 1 2 3 4 5 km

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N

Map Version 1
Date: June 2012

Loop Head
Site Id: 01006

Kilclogher
Site Id: 01007

Kilbaha

Moyarta

Lisheencrony

Ladder Rock

Burrane

Ballybunion
Site Id: 06001

Kerry Head
Site Id: 06002

Legend

- SAC 002165
- 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts
- Undocumented 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts
- OSi Discovery Series County Boundaries

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MAP 11:
LOWER RIVER SHANNON SAC
CONSERVATION OBJECTIVES
VEGETATED SEA CLIFFS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE: SAC 002165
CO. CLARE; version 1.2, CO. CORK; version 1.01, CO. KERRY; version 1.11, CO. LIMERICK; version 1.11, CO. TIPPERARY; version 1.05

0 1 2 3 4 5 km

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N

Map Version 1
Date: June 2012

SMP 0083

SMP 0082

SMP 0081

SMP 0084

SMP 0086

SMP 0085

SMP 0080

SMP 0079

SMP 0087

SMP 0078

Legend

SAC 002165

OSi Discovery Series County Boundaries

SMP 0078 Saltmarsh Monitoring Project Site Codes

Saltmarsh Habitats

Qualifying Interests

1310 *Salicornia* and other annuals colonising mud and sand

1310 / 1330 *Salicornia* and other annuals colonising mud and sand / Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

1330 / 1410 Atlantic salt meadows (Glauco-Puccinellietalia maritimae) / Mediterranean salt meadows (Juncetalia maritimi)

1410 Mediterranean salt meadows (Juncetalia maritimi)

Potential 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

Potential 1330 / 1410 Atlantic salt meadows (Glauco-Puccinellietalia maritimae) / Mediterranean salt meadows (Juncetalia maritimi)

Potential 1410 Mediterranean salt meadows (Juncetalia maritimi)

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MAP 12:
LOWER RIVER SHANNON SAC
CONSERVATION OBJECTIVES
SALTMARSH HABITATS

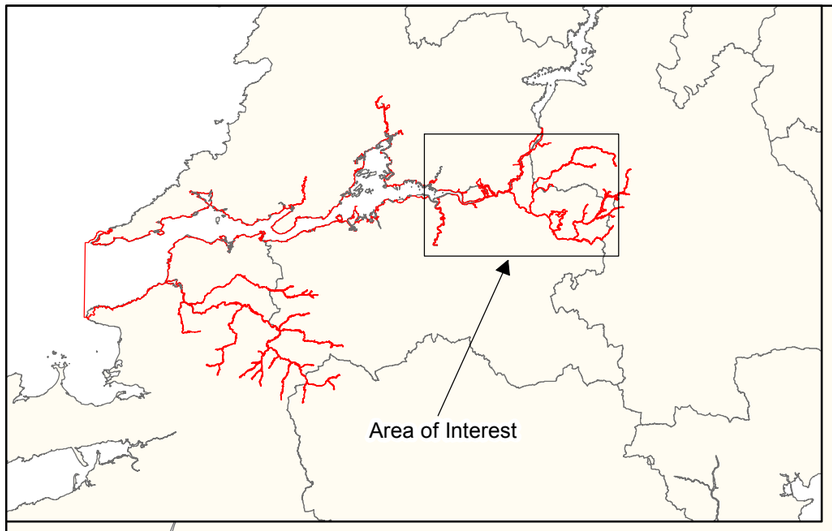
Map to be read in conjunction with the NPWS Conservation Objectives Document.

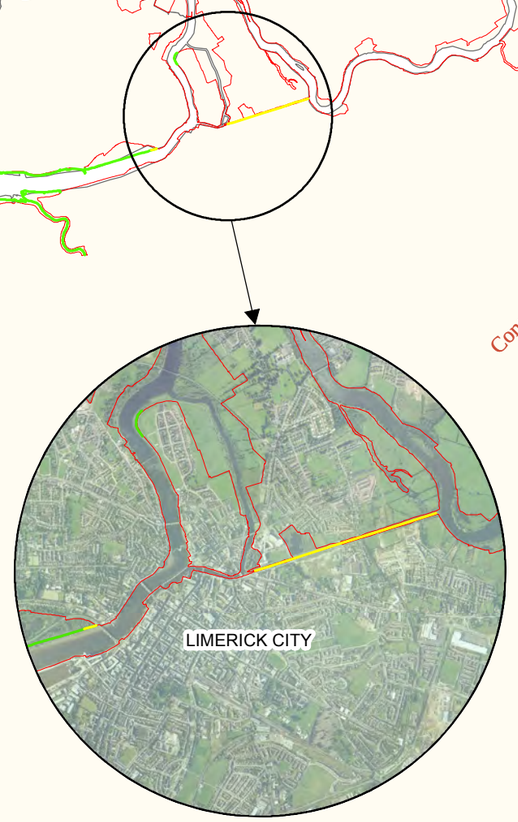
SITE CODE: SAC 002165
CO. CLARE; version 1.2, CO. CORK; version 1.01, CO. KERRY; version 1.11, CO. LIMERICK; version 1.11, CO. TIPPERARY; version 1.05

0 2 4 6 8 10 km

N

Map Version 1
Date: June 2012





Legend

- SAC 002165
- OSi Discovery Series County Boundaries

3260 Watercourses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation

- *Groenlandia densa*
- *Schoenoplectus triqueter*
- Bryophyte-rich streams and rivers sub-type

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MAP 13:
LOWER RIVER SHANNON SAC
CONSERVATION OBJECTIVES
FLOATING RIVER VEGETATION

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE: SAC 002165
CO. CLARE; version 1.2, CO. CORK; version 1.01, CO. KERRY; version 1.11, CO. LIMERICK; version 1.11, CO. TIPPERARY; version 1.05

0 1 2 3 4 5 km

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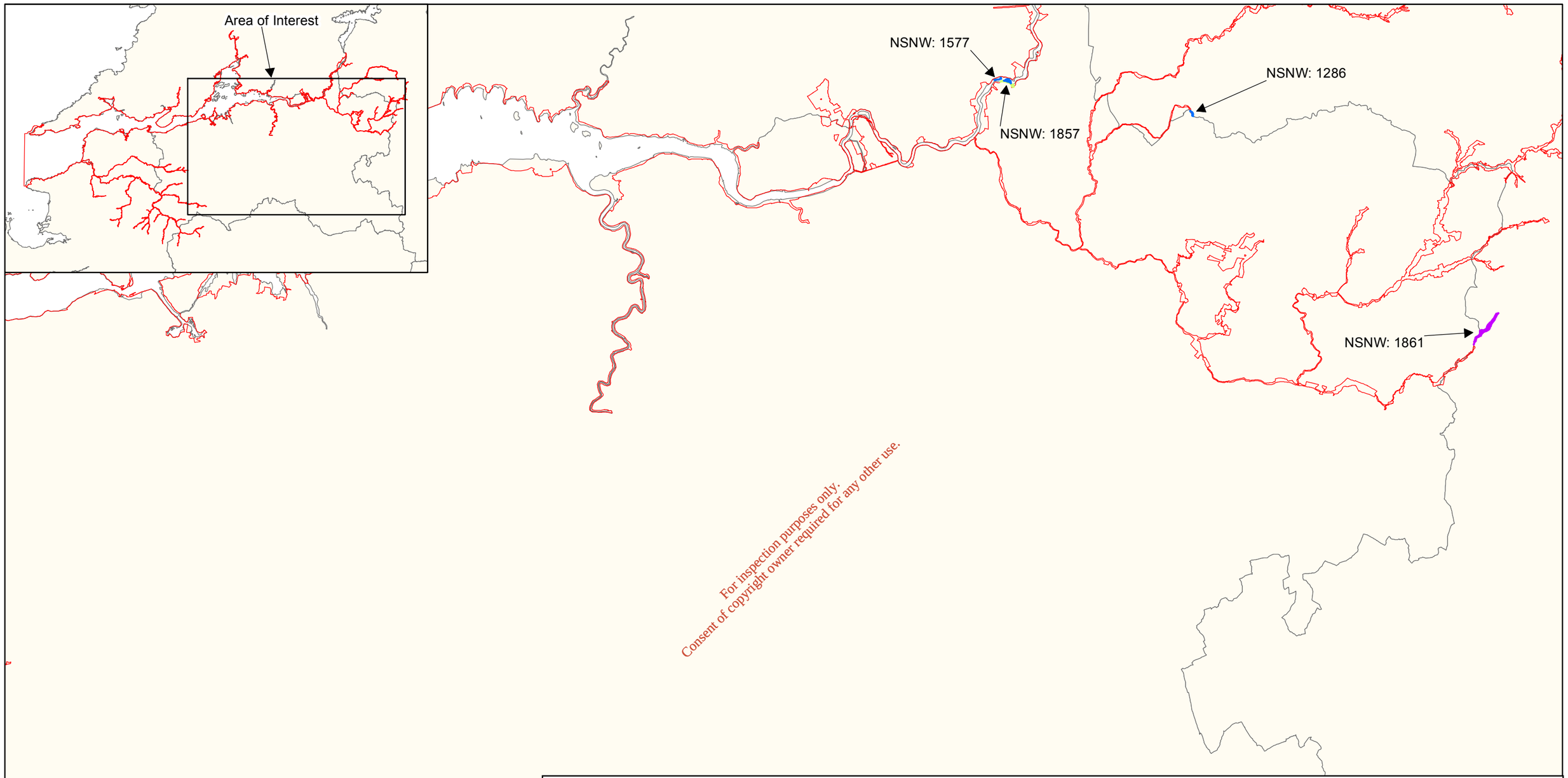
N

Map Version 1
Date: June 2012



Legend

- SAC 002165
- OSi Discovery Series County Boundaries
- NSNW: 1857 National Survey of Native Woodland Site Codes

Woodland Habitats

- 91E0 *Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-padion, Alnion incanae, Salicion albae) Qualifying Interest
- 91A0 / 91E0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles / *Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-padion, Alnion incanae, Salicion albae) Qualifying Interest
- 91A0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles
- WN2 Oak-ash-hazel woodland

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MAP 14:
LOWER RIVER SHANNON SAC
CONSERVATION OBJECTIVES
WOODLAND HABITATS

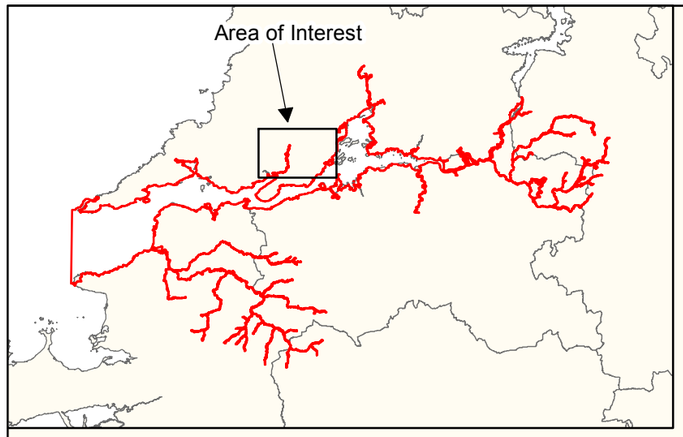
Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE: SAC 002165
CO. CLARE; version 1.2, CO. CORK; version 1.01, CO. KERRY; version 1.11, CO. LIMERICK; version 1.11, CO. TIPPERARY; version 1.05

0 2 4 6 8 10 km

N

Map Version 1
Date: June 2012



Legend

- SAC 002165
- 1029 Freshwater Pearl Mussel - *Margaritifera margaritifera* Suitable Habitat
- 1029 Freshwater Pearl Mussel - *Margaritifera margaritifera* Distribution
- 1029 Freshwater Pearl Mussel - *Margaritifera margaritifera* Catchment
- OSi Discovery Series County Boundaries

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MAP 15:
LOWER RIVER SHANNON SAC
CONSERVATION OBJECTIVES
FRESHWATER PEARL MUSSEL

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE: SAC 002165
CO. CLARE; version 1.2, CO. CORK; version 1.01, CO. KERRY; version 1.11, CO. LIMERICK; version 1.11, CO. TIPPERARY; version 1.05

0 0.5 1 1.5 2 km

N

Map Version 1
Date: June 2012

Legend

- SAC 002165
- 1349 Bottlenose Dolphin - *Tursiops truncatus* Critical Habitat
- 1349 Bottlenose Dolphin - *Tursiops truncatus* Habitat
- OSi Discovery Series County Boundaries

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MAP 16:
LOWER RIVER SHANNON SAC
CONSERVATION OBJECTIVES
BOTTLENOSE DOLPHIN

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE: SAC 002165
CO. CLARE; version 1.2, CO. CORK; version 1.01, CO. KERRY; version 1.11, CO. LIMERICK; version 1.11, CO. TIPPERARY; version 1.05

0 5 10 15 km

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N

Map Version 1
Date: June 2012

Legend

- SAC 002165
- 1355 Otter - *Lutra lutra* 250m Commuting Buffer
- OSi Discovery Series County Boundaries

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MAP 17: LOWER RIVER SHANNON SAC CONSERVATION OBJECTIVES OTTER COMMUTING

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE: SAC 002165
CO. CLARE; version 1.2, CO. CORK; version 1.01, CO. KERRY; version 1.11, CO. LIMERICK; version 1.11, CO. TIPPERARY; version 1.05

0 5 10 15 km

N

Map Version 1
Date: June 2012