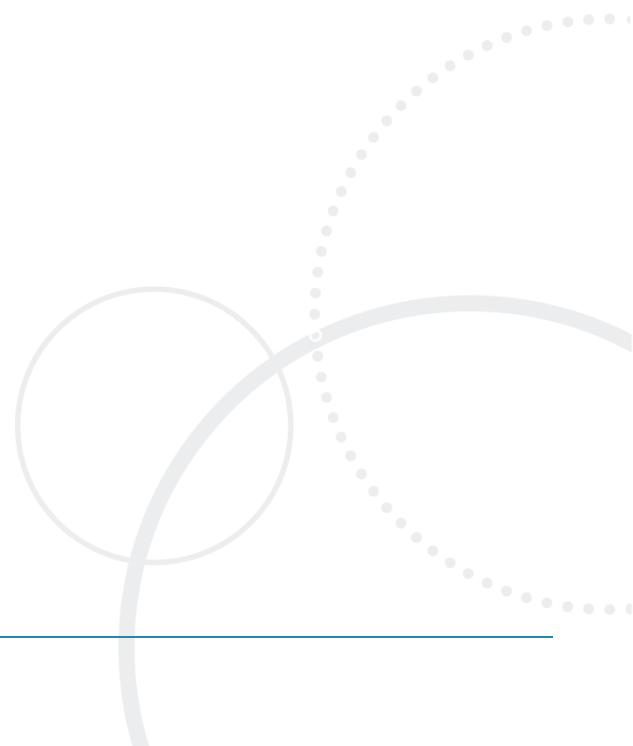




Volume IV AEE Technical Appendices



Appendix 1.1 CVs

CURRICULUM VITAE

GRAEME BLACKETT

QUALIFICATIONS:

BA Hons Economics, University of Strathclyde
 Member Institute for Economic Development
 Member Economic Development Association Scotland

CAREER SUMMARY:

2002-	Director, BiGGAR Economics
2000-2001	Senior Consultant, Deloitte
1998-1999	Consultant, Deloitte
1993-1998	Consultant, Segal Quince Wicksteed Limited
1991-1992	Parliamentary Researcher and Freelance Consultant

Graeme Blackett co-founded BiGGAR Economics in 2002. He was previously manager of Deloitte’s economic consulting practice in Scotland and Northern Ireland and a consultant with SQW Limited. Graeme is an economist with over 25 years of experience in economic development. Graeme has also been a member of the Advisory Board of the leading think tank Reform Scotland and economic advisor to the Sustainable Growth Commission, established by the First Minister of Scotland to advise on improving Scotland’s economic performance.

Selected Project Experience

- study of the potential socio-economic benefits to Iceland of developing an onshore wind energy sector and a review of international evidence on any implications for the tourism, on behalf of Landsvirkjun;
- assessment of the socio-economic impacts of the proposed wind farm on the island of Yell, on behalf of Element Power and Energy Isles;
- socio-economic assessment of the Seagreen Offshore wind farm development in the outer Firth of Forth;
- expert witness on socio-economic and tourism issues at the Scottish Land Court hearing into the proposed Viking Energy wind farm on Shetland;
- baseline economic and exchequer impacts of the North Sea oil and gas sector and scenario analysis to assess potential future economic and exchequer impacts as part of an assessment of the case for public sector support for R&D for the UK oil and gas sector;
- economic impact assessment of the University of the Highlands and Islands and its academic partners, including Shetland College and NAFC Marine Centre;
- economic impact assessment of the European research-intensive universities, based on analysis of the 23 members of the League of European Research Universities (LERU);
- assessment of the contribution to the economy of France made by the 18 members of the association of French research-intensive universities (CURIF);
- assessment of the economic contribution of the Swiss Federal Institutes of Technology (ETH) Domain institutions;

- cost-benefit analysis model and report for a Major Project Application by the University to find funding for the Scottish Centre for Regenerative Medicine;
- economic impact assessment of Aberdeen Innovation Hub, which aims to facilitate innovation and collaboration in the three key sectors: life sciences, food and drink and oil and gas;
- socio-economic impact assessment of a major hospital investment programme in Edinburgh for the National Health Service in Lothian;
- modelling future trends in the Scottish life sciences cluster for Scottish Enterprise, based on analysis of global trends and Scottish competitiveness in key sub-sectors;
- assessment of the economic impact of the Malthus Uniteam workers accommodation facility in Shetland;
- economic impact assessment, followed by and socio-economic assessment, of the proposed Nigg Bay development at Aberdeen Harbour;
- economic impact assessment of the proposed Carters yard student accommodation development in Stirling;
- economic appraisal, stress testing and business planning for the national Innovation Centre for Ageing in Newcastle;
- economic impact assessment for the proposed Edinburgh Park South development in the west of Edinburgh
- economic appraisal and impact assessment of the proposed mixed-use development St Andrews West in Fife;
- economic impact study of Peterborough United Football Club, including its current impact on the town and region and potential future economic impacts;
- economic and well-being impact assessment for Buccleuch, covering its four estates and Buccleuch Property;
- economic impact assessment of Scottish Government consultation on proposals to introduce a charge on single use plastic bags.

CURRICULUM VITAE

Dr Peter J Cosgrove

Name: Dr Peter J Cosgrove, FCIEEM
Date of Birth: 19 June 1969
Profession: Environmental Scientist
Specialisation: Ecologist, Fellow of the Chartered Institute of Ecology and Environmental Management (FCIEEM)

Recent Career Summary:

2011–present day Director of Ecology with Alba Ecology.
2009-2011 Principal Ecologist with Alba Ecology.
2005–2009 Principal Ecologist with EnviroCentre.
1998-2009 Freshwater Ecologist, Independent Ecological Consultant.
2004-2005 Ecology and Landscape Advisor, Cairngorms National Park Authority, UK.
1998-2003 Cairngorms Biodiversity Officer, Cairngorms Partnership, Cairngorms National Park Authority, UK.
1998 Wildlife Crime Investigations Officer, RSPB.
1995-1998 Ecological Research Fellow, Aberdeen University.

Education:

1991-1995 PhD. Zoology, University of Aberdeen, UK.
1987-1991 BSc. (Hons) 2[1] Environmental Studies, University of Hertfordshire, UK.

Profile:

Peter is a highly skilled ecologist with over twenty years experience in wildlife and habitat research, land-use management, conservation planning and policy development and environmental assessments. He has managed many large projects and budgets from conception through to completion and has a strong proven track record of delivery in both the public and private sector, producing over 150 peer-reviewed scientific papers, commissioned reports and books (Appendix 1). In particular, Peter specialises in bringing consensus to difficult conservation issues through innovative approaches to partnership working, negotiation and conflict resolution. In the last decade Peter has focussed his efforts on freshwater pearl mussels, invasive species, species reintroduction, environmental impact assessment, ecological clerks of work, forestry management and renewable energy developments.

Peter's work has concentrated primarily in six areas: (1) Peter co-ordinated the development and implementation of over 100 action plans with partners, for a quarter of the UK's most threatened habitats and species; (2) Peter provided advice and guidance on conservation, planning and development control issues in designated and non-designated areas and has a thorough working knowledge of national and international designation issues, especially Natura 2000 sites and carrying out Appropriate Assessments; (3) Delivery of ecological elements of EIAs, the production of Environmental Statements, Ecological Clerks of Work and negotiation with statutory authorities and private sector; (4) Peter has specialised in invasive species issues in Ireland, the UK and internationally; (5) Communication of often complex biodiversity/conservation information and messages effectively to different audiences; and (6) Peter is recognised as an international authority on the survey and conservation of the endangered freshwater pearl mussel and its aquatic habitat.

Relevant Experience:

- *Freshwater pearl mussel advisor*

Over 100 commissioned pieces of work for the public and private sector on aquatic casework issues for development control, surveying and conservation management of this endangered species. During the last decade this has included Site Condition Monitoring for all of Scotland's SACs and SSSIs where *M.*

margaritifera is a feature. Recently advisory work has included developing, testing and publishing standard deepwater survey methods for the species, advising on the removal of a fish counter on an SAC and a feasibility study for improving fish passage on another two pearl mussel SAC rivers and producing leaflet and on-line guidance on freshwater pearl mussels for developers operating in rivers in Scotland. Since 2000, Peter has been on special 'call-off' contract for the provision of expert advice on freshwater pearl mussels to the Scottish Natural Heritage and Forestry and Land Scotland and has recently concentrated on developing and implementing a project entitled the '*Restoration of freshwater pearl mussels in selected Scottish rivers*'. During 2013-2015 Peter completed SNH's 2nd national freshwater pearl mussel survey across Scotland and has recently published the findings. In 2020, Peter wrote CIEEM's COVID-19 freshwater pearl mussel survey guidance.

- *Invasive species*

Provision of expert advice leading to the development and implementation of this best-practice cross-border invasive species programme in Northern Ireland and the Republic of Ireland.

- *Ecological project co-ordination*

Project co-ordination and logistical management of large scale development projects, including the management of Ecological Clerks of Work teams across Scotland. For example, completed the delivery of biodiversity/habitat management plans for two large developments near Glasgow. The first for a 900 housing unit application and the second for a new road. The work involved updating old ES's and negotiating detailed and costed timetabled action plans for delivery of the mitigation measures outlined in the ES and also the concerns raised by the regulators (primarily local authorities and the statutory nature conservation agency). In 2012, Peter successfully completed delivery of ECoW support for the Trump Golf Development on Menie Estate, Aberdeenshire. Peter is currently providing ECoW support on several large scale projects in northern Scotland, ranging from wind farms, housing developments, a whisky distillery and bridge repair works.

- *Biodiversity Action Plan work, habitats and species*

A thorough working knowledge of most of Scotland's terrestrial and aquatic protected species and habitats, the experts who work on them and the UK BAP process. Development of standardised ecological survey methodologies and conflict resolution strategies for 'problematical' high-profile species. Development of project briefs, securing funding, management and implementation of many practical biodiversity projects in the north of Scotland. In 2020 Peter co-authored, with Alba Ecology a feasibility study for reintroducing cranes into the Cairngorms National Park.

- *Provision of expert advice on national and European conservation designations*

Provision of expert advice to competent authorities (e.g. Cairngorms National Park Authority, The Crown Estate, Irish Sea Fisheries Board and SNH) on conservation designation issues in relation development control. Peter has completed ca. 50 Appropriate Assessments for competent authorities. Peter has also provided expert witness testimony at Public Local Inquiries in Scotland (e.g. Achany Wind Farm, Caplich Wind Farm, Coul Links Golf Course).

- *Delivery of ecological elements of renewable energy EIA and ES*

In the last decade Peter has successfully completed the delivery of ten large onshore wind farm ES's (range in size from 36-103 turbines) and many small-medium sized wind farms.

Examples of recent commissioned work:

- Principal ecological/ornithological advisor on 2 on-shore wind farm, Peel Energy.
- Principal ecological/ornithological advisor on 3 on-shore wind farm, ABO Wind.
- Principal ecological advisor on-shore wind farm, WKN AG.
- Principal ecological advisor on 5 on-shore wind farms, SSE Renewables.
- Freshwater pearl mussel guidance for numerous clients operating in and around rivers.
- Site Condition Monitoring for all Scottish freshwater pearl mussel SACs, SNH and led surveys of all of Scotland's known pearl mussel rivers as part of the SNH 2nd national survey for the species.

- Developed, co-ordinated and implemented the first successful Scottish reintroduction for the globally threatened freshwater pearl mussel, SNH.
- Co-ordination and production of 44 Appropriate Assessments for aquaculture operations in Scottish Natura 2000 sites, Crown Estate.
- Development of Irish Screening Protocol for Aquaculture operations in Natura 2000 sites, Irish Sea Fisheries Board.
- Ecological Clerk of Works co-ordinator for Menie Estate, Trump International Golf Links Scotland.
- Expert ornithological witness, on-shore windfarm, N Scotland, Scottish and Southern Energy.
- Ecological advisor and ECoW co-ordinator for new road, Kirkintilloch Initiative.
- Project manager writing and reviewing the Highland Biodiversity Action Plan, Highland Council.
- As Biodiversity Officer and Ecology and Landscape Advisor in the Cairngorms National Park, provided advice and guidance on conservation and casework issues to the Cairngorms National Park Board as well as writing policies for the development of the National Park Plan, the Local Plan and writing and producing the Cairngorms Biodiversity Planning Guidance Note.
- Co-ordinated the production, development and implementation of 26 Habitat and 100 Species Action Plans in the Cairngorms on behalf of stakeholder and partner organisations. This covered collaborative biodiversity work on a quarter of the UK's most threatened species.
- Developed, co-ordinated and contributed to seven projects on non-native species: (1) Strategic water vole and American Mink plan for Cairngorms, (2) Developed and implemented Cairngorms non-native fish programme, (3) Investigated impact of non-native Mandarin ducks on native Goldeneyes in Scotland, (4) Seabird conservation and rat eradication, Eynhallow Island, Orkney, (5) Research into non-native *Ranunculus* on freshwater pearl mussels and salmon, (6) Invasive Species in Ireland, (7) UK Overseas Territories invasive species prevention.

Other qualifications:

Full, clean driving licence (Lantra 4 wheel-drive off-road trained). Fully licensed freshwater pearl mussel surveyor. Construction Skills Certification Scheme/ROLO H&S Trained: Professionally Qualified Person (Reg No: 13290751; Expires: April 2025). Fellow of Chartered Institute of Ecology and Environmental Management. Winner of the RSPB's 2014 Nature of Scotland Species Champion Award. Winner of the 2018 Neil Findlay Trophy, Scottish Forestry sectors awards. At the 2018 Chartered Institute of Ecology and Environmental Management (CIEEM) Awards, Peter and Alba Ecology were Highly Commended in the Best Practice Award for Knowledge Sharing.

Computer skills:

Peter is a skilled user of PC desktop systems; using standard packages such as Windows Excel, Word, Powerpoint etc. Peter is proficient in desktop publishing and has edited and published numerous bulletins, newsletters, reports and press releases.

Media and presentation skills:

Peter is highly experienced with all forms of contemporary media, having appeared on dozens of TV and radio programmes, as well as broadsheet and blog media. Peter is a well respected public speaker and lectures in Great Britain, Ireland and internationally on a variety of conservation topics.

Personal interests and hobbies:

Hill walking and camping, ornithology, fishing, cycling, cricket, football, public speaking, wildlife guiding.

References available on request

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- **Cosgrove, P.** Guest blog: *Tactics of the raptor haters.* Standing up for Nature. <http://markavery.info/2014/11/12/quest-blog-peter-cosgrove>
- **Cosgrove, P.,** Hastie, L. and Sime, I. 2012. *Wildlife crime and Scottish freshwater pearl mussels.* British Wildlife 24:1 pp 10-13.
- **Cosgrove, P.,** Amphlett, A., Elliott, A., Ellis, C., Emmett, E., Prescott, T. and Watson Featherstone, A. 2005. *Aspen: Britain's missing link with the boreal forest.* British Wildlife 17:2 pp 107-115.
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CURRICULUM VITAE

Dr Kate Massey, MCIEEM

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Profession: Environmental Scientist
Specialisation: Botanist and ecologist
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RECENT CAREER SUMMARY

2015–present day Principle Ecologist and Botanist with Alba Ecology.
2012 -2015 Senior Ecologist, Alba Ecology.
2010 -2012 Ecologist, Alba Ecology.
2008-2009 Post-doc Researcher, University of Aberdeen.
2007-2008 Biodiversity Officer, Environment Agency

EDUCATION

2003-2007 PhD. Biology and Environmental Science, University of Sussex.
2002-2003 MSc. Ecology, University of Aberdeen.
1998-2001 BSc. (Hons) Environmental Geoscience, University of Bristol.

PROFILE

Kate is a highly experienced ecologist with over fifteen years working in ecological research and habitat assessment. She is a particularly skilled botanist and respected habitat surveyor. She has contributed to and led on many large projects and has a strong proven track record of delivery in both the public and private sector, producing over 100 peer-reviewed scientific papers and commissioned reports.

Kate's main roles as a Principle Ecologist within Alba Ecology is carrying out habitats assessments for a range of projects and providing ecological advice particularly in relation to plants and habitats. Kate leads all the botanical based work such as Phase 1 Habitat, National Vegetation Classification (NVC), Groundwater Dependant Terrestrial Ecosystem (GWDTE) and floristic surveys for protected plants. In the last 10 years, she has successfully worked on numerous projects in the north of Scotland, and has got the vegetation and habitat element of ES's accepted on Mossy Hill Wind farm, Bhlairidh Wind Farm, Stronelaig Wind Farm, Glencassley Wind Farm and Sallachy Wind Farm with others currently going through the planning/consents process (e.g. Coul Links Golf Course). Kate has written the Ecology ES chapters for Mossy Hill Wind Farm, Beaw Field Wind Farm and many that are currently actively in the planning process. Kate has experience of attending Public Inquiry as part of the planning process.

Kate is interested in invasive species management and led a recent successful efforts to remove non-native American Skunk Cabbage from a tributary of the River Spey Special Area of Conservation. Kate has surveyed for a range of non-native invasive species and has produced management plans to form the bases of irradiation programs.

RELEVANT EXPERIENCE

Habitats and Vegetation

Kate has carried out numerous Phase 1 Habitat, NVC and GWDTEs surveys in a wide range of habitats and vegetation types including uplands, montane area, sand dunes and grasslands. Kate co-ordinates the projects, carries out field work, writes the associated reports figure. Recent projects include the Distillery near Craggan, Mossy Hill Wind farm, Lairg Wind farm, Coul Links Golf Course, Viking Wind Farm, Bhlairidh Wind Farm, Stronelairg Wind Farm, Glencassley Wind Farm and Sallachy Wind Farm, plus numerous smaller scale projects (single turbines, housing developments etc).

Ecological project co-ordination

Kate has led on the production of the Ecology elements of Environmental Statements for a number of large scale projects, including chapter writing, technical appendix writing and figure production. Recent projects include the Distillery near Craggan, Lairg Wind Farm, Coul Links Golf Course, Mossy Hill Wind Farm, Beaw Field Wind Farm with many still going through the planning process.

Kate also co-ordinates all habitat and vegetation projects, including managing field workers, writing report, meeting deadlines and providing advice.

Peatland Restoration

A particular strength is Kate's work on large-scale peatland restoration projects in relation to wind farm developments and the Forestry Commission land in the north and west of Scotland. This work has featured strongly in Habitat Management Plans we have developed for many of our recent clients.

GIS, Data Handling and Statistical Analysis

Kate is also our GIS specialist and statistics advisor. She is highly skilled in dealing with complex data sets. She has provided the Collision Risk Assessments (CRA) for numerous wind farm sites including Lairg Wind Farm, Blarghour Wind Farm and Mossy Hill Wind Farm. Kate performs analysis on our ecological data when required, such as modelling bird population dynamics using VORTEX.

Kate is proficient in using ArcGIS and QGIS. Her work involves creating, drawing and editing ecological data such as habitat polygons and flightlines as well as producing the maps and figures for ES submissions. Kate has a good working knowledge of statistical and data presentation packages such as Minitab, VORTEX and Simplot.

Species Surveys

Kate is experienced in undertaking surveys for a range of rare and/or protected species such as botanical surveys for rare species, freshwater pearl mussels, otters, water voles, red squirrels and badger. Kate has undertaken freshwater pearl mussel surveys in a range of rivers, including survey several Special Areas of Conservation (SACs) designated for freshwater pearl mussels.

RELEVANT SKILLS

Vascular Plants

- Excellent plant identification skills for plants found in grasslands, sand dunes and salt marshes and upland habitats including heaths, mires, flushes and montane habitats.

Non-native Invasive Species

- Excellent identification skills for non-native invasive plant species. Provides surveys for a range of non-native invasive species and produced management plans to form the bases of irradiation programs.

Non Vascular Plants

- Good bryophyte identification skills (attended bryophyte identification course, Royal Botanic Gardens, Edinburgh, and *Sphagnum* identification course).

Habitats and communities

- Highly experienced (>15 years) in Phase 1 Habitat and NVC surveying.
- Experienced (~10 years) in assessing potential groundwater dependant terrestrial ecosystems.

Mammals

- Experienced in following standard guidance and standard survey techniques for a range of mammal surveys and identifying mammal field signs for a range of species (e.g. water voles, otters, badgers, pine marten and red squirrel).

Freshwater Pearl Mussels

- Experienced in identification and following standard survey techniques at a range of rivers including several SAC designated for Freshwater pearl mussels.

Computer Skills

- Highly skilled user of PC desktop systems; using standard packages such as Windows Excel, Word, Powerpoint etc. Also skilled in GIS software using both ArcGIS and QGIS and statistical packages such as Minitab, VORTEX and Sigmaplot.

Presentation skills

- Presented scientific research at several conferences such as the British Ecological Society annual conference. Regularly presents information at project team meetings.
- Run a series of seminars at universities on a range of ecological subjects.

OTHER QUALIFICATIONS

Full driving licence. Member of Chartered Institute of Ecology and Environmental Management. Current First Aid Certificate. Safe Space Certificate.

PERSONAL INTERESTS AND HOBBIES

Hill walking. Mountain biking. Naturalist. Kate also volunteers through Girl-guiding as both a Brownies and Guide Unit Leader running weekly meetings, camps, holidays and activities for young girls and teenagers.

PUBLICATIONS

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Cosgrove, P and **Massey, K.** 2019. *Distillery at Craggan Outline Habitat Management Plan*. ES Technical Appendix. Commissioned Report.

Massey, K and Cosgrove, P. 2019. *Distillery at Craggan Environmental Statement - Ecology*. Commissioned Report.

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Massey, K. and Potter, R. 2016. *Phase 1 Habitat, NVC and GWDTE report for Coul Links*. Commissioned Report.

Massey, K. 2016. *Aerial Comparisons of Habitats at Coul Links between 1988, 2009 and 2016*. Commissioned Report.

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Massey, K. 2012. *Balnacoil Natural Heritage Desk Study*. ES Technical Appendix. Commissioned Report.

Massey, K. 2012. *Balnacoil Phase 1 Habitat and NVC Survey Report*. ES Technical Appendix. Commissioned Report.

Massey, K. 2012. *Phase 1 Habitat and NVC Survey Report for Glencassley*. ES Technical Appendix Commissioned Report.

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References available on request

Simon Waddell

Associate - Noise

Qualifications and Professional Memberships

- Environmental Geoscience BSc Hons.
- Acoustics and Noise Control PG Diploma
- Certification of Competence in Environmental Noise Measurement
- Member of Institute of Acoustics (MIOA)

Career Summary

Simon Waddell, BSc, MIOA is an experienced environmental consultant, with over 12 years of experience in environmental noise. A technical specialist in environmental noise, but with an appreciation of other environmental disciplines, Simon has extensive experience of noise assessment in accordance with various planning and permitting requirements across the UK, particularly in relation to power generation, energy storage, infrastructure, residential, industrial and waste-related developments.

Simon also has extensive international ESIA experience to both local and international standards, including IFC/World Bank. Experience includes the specification, commissioning and analysis of baseline monitoring campaigns and development of noise source inventories and computational models to international standards to determine potential environmental effects.

Selected Project Experience

UK Noise – Rockets and space

- SaxaVord Spaceport, EIA. Noise assessment of proposed spaceport on Unst, Shetland. Undertook baseline noise survey, predicted construction phase noise levels, liaised with rocket and aircraft noise specialist, interpreted predictions provided by specialist in the context of UK guidance, reported on findings. Spaceport planning application consented.
- SaxaVord Spaceport, AEE. Noise assessment of proposed spaceport on Unst, Shetland. Consulted with CAA, interpreted predictions provided by aircraft and rocket noise specialist in the context of new UK AEE guidance, reported on findings.
- Midlothian, Scotland. Noise assessment in support of proposed rocket engine testing facility. Baseline noise survey, agreement of approach with Environmental Health, prediction of operational noise levels, evaluation against agreed criteria.
- Midlothian, Scotland. Noise compliance monitoring to discharge planning conditions of rocket engine testing facility. Measurement of off-site noise levels at receptor locations, reported on findings. Planning condition discharged by Environmental Health.
- Cockenzie, East Lothian, Scotland. Noise and assessment as part of planning application for operation of proposed rocket engine testing facility within former power station coal storage area. Consulted with Environmental Health, undertook baseline noise survey, predicted operational noise levels via noise modelling, evaluated in accordance with BS4142 and appropriate guidance, attended community consultation events, specified appropriate mitigation, reported on findings.

- Port of Rosyth, Fife, Scotland. Measured noise levels during test firing of a rocket engine. Post-processed measured data to determine sound power level of test and characterise noise emissions associated with testing activities.

UK Noise – Land development

- Giants on the Quayside (Whey Aye Wheel), Newcastle-upon-Tyne, UK. Noise and vibration assessment of proposed observation wheel and associated entertainment facilities as part of EIA. Input to Scoping and consultation with Environmental Health, specified and oversaw baseline noise survey, analysed baseline data, predicted construction noise and vibration levels at sensitive receptors, predicted operational noise levels due to operation of wheel and associated facilities and from changes road traffic flows. Evaluated noise and vibration impact in accordance with BS5228, BS4142 and CRTN, specified appropriate mitigation, reported on findings.
- Whitekirk, East Lothian, UK. Assessment in support of EIA of proposed redevelopment of golf course to holiday lodges. Input to Scoping and consultation with Environmental Health, baseline noise survey, analysis of baseline data, review of baseline and projected traffic flow data, modelling of post development traffic noise in accordance with CRTN. Evaluated noise levels against BS8233 target noise levels, determined noise impacts in accordance with PAN1/2011, specified appropriate outline mitigation, reported on findings.
- Thistle Street NW Lane, Edinburgh, UK. Noise assessment of proposed hotel development within existing commercial building. Constructed detailed noise model of building, including proposed air handling plant, predicted noise levels at windows of neighbouring buildings, evaluation of plant noise against Noise Rating (NR) curves. Specified appropriate mitigation and reported on findings.

UK Noise – Manufacturing and waste

- Lochaber/Fort William, Highlands, Scotland. Noise assessment of proposed aluminum billet plant within Lochaber smelter complex. Consulted with SEPA, undertook baseline noise survey, predicted construction phase and operational phase noise levels. Evaluated predicted levels in accordance with BS5228 and BS4142, specified appropriate mitigation and reported on findings as a chapter within an EIA Report.
- Hillthorn Farm, Sunderland, England. Noise and vibration assessment of proposed business park adjacent to Nissan assembly plant. Consulted with Sunderland City Council, specified baseline monitoring campaign, predicted construction phase and operational phase noise levels, including noise from road traffic. Evaluated predicted levels in accordance with BS5228 and BS4142 and against DMRB criteria, specified appropriate mitigation and reported on findings as a chapter within an EIA Report.
- South Crosland Quarries, Huddersfield, UK. Noise assessments in support of planning applications and EIAs for quarrying and restoration of worked-out quarries using inert waste. Consulted with Environmental Health, specified and oversaw baseline surveys and noise and vibration source characterisation measurements. Predicted and evaluated operational noise and vibration levels. Specified appropriate mitigation and reported on findings.
- Tennents Wellpark Brewery, Glasgow, UK. Noise assessment to meet SEPA requirement for baseline monitoring before commissioning of new anaerobic digestion plant within existing brewery complex. Oversaw baseline noise survey, technical review of noise report.
- New distillery, Highlands, UK. Noise assessment as part of EIA for proposed whisky distillery near Grantown-on-Spey. Consulted with Environmental Health, oversaw baseline noise survey, reviewed available information and developed noise model of proposed distillery complex, evaluated noise from construction and operations phases in accordance with BS5228 and BS4142 respectively, specified appropriate mitigation, reported findings for ES.
- IAMP TWO, Sunderland, UK. Noise assessment as part of EIA for large-scale multi-unit manufacturing complex. Contributed to Scoping and undertook detailed consultation with Environmental Health. Undertook baseline noise survey, predicted noise levels during construction

and operation of the facility, and due to changes in road traffic flows. Vibration assessment considering vibration from piling and from road traffic.

- IAMP ONE, Sunderland, UK. Noise assessment as part of EIA for large-scale multi-unit manufacturing complex. Contributed to Scoping and undertook detailed consultation with EHO. Undertook baseline noise survey, predicted noise levels during construction and operation of the facility, and due to changes in road traffic flows. Specified appropriate mitigation and reported findings. Proposed development was consented and is under construction.
- Ardross Distillery, Highlands, UK. Noise assessment for proposed whisky distillery. Consulted with EHO, reviewed baseline noise data provided by others, reviewed available information and developed noise model of proposed distillery, operations phases in accordance BS4142, specified appropriate mitigation and reported findings.
- Jed Forest Distillery, Scottish Borders, UK. Noise assessment as part of EIA for two proposed whisky and gin distilleries near Jedburgh. Consulted with EHO at Scottish Borders Council, undertook baseline noise survey, reviewed available information and developed noise model of proposed distillery complex, evaluated noise from construction and operations phases in accordance with BS5228 and BS4142 respectively, specified appropriate mitigation, reported findings for ES.
- Buckie Maltings, Moray, UK. Noise assessment of new grain drying shed at maltings complex. Consulted with EHO, specified plan of study for baseline noise survey, reviewed available information and developed noise model of proposed facility, evaluated noise from operations phases in accordance with BS4142 respectively, specified appropriate mitigation, reported findings.

Employment History

- 2005 – 2006 – Mason Evans Partnership – Graduate Engineer
- 2007 – 2012 – EnviroS/SKM EnviroS/SKM – Consultant
- 2012 – 2016 – Golder Associates – Consultant
- 2016 – Present – ITP Energised – Principal Consultant

ANNIE DANSKIN

ASSOCIATE – AIR QUALITY

QUALIFICATIONS & PROFESSIONAL MEMBERSHIPS

- BEng (Hons) Environmental Engineering
- Member Institution of Environmental Sciences
- Member Institute of Air Quality Management
- Member of Environmental Protection Scotland Expert Advisory Group on Air Quality

CAREER SUMMARY

Annie Danskin has 21 years of experience in the field of air quality consultancy and research, managing projects for and providing introductory and advanced training courses to many local authorities, regulatory authorities (EA, SEPA, HSE), industrial operators and academic institutions. She has prepared expert witness reports for public inquiries and presented at public meetings, conferences and exhibitions on numerous occasions.

Key projects include air quality impact assessments for EIAs, planning applications and PPC and Environmental Permits; Local Air Quality Management studies for Local Authorities; odour impact assessments and management plans; and assessment of accidental and emergency releases including fires and flares at offshore installations. She is an experienced project manager and is a specialist in atmospheric dispersion modelling, particularly using the full suite of ADMS models. Annie is a member of the Institution of Environmental Sciences and the Institute of Air Quality Management.

SELECTED PROJECT EXPERIENCE

INDUSTRIAL & MANUFACTURING

- Rocket Engine Testing Facility, Cnockenzie – Client: Skyrora. Preparation of a dispersion modelling study to assess the potential short-term effects for local residents of exposure to carbon monoxide emissions from jet exhaust emissions during rocket launch events at a proposed rocket engine testing facility. Used the “puff” model to calculate peak exposure concentrations during the lifetime of the release and a total concentration dose experienced at each receptor for the duration of release. Launch events were simulated for a range of meteorological conditions.
- Coffee Roasting Factory, Dundee – Client: Aimers Coffee & Tea. Preparation of a detailed dispersion modelling study of emissions of odour, dust and oxides of nitrogen from a new coffee roasting factory in Dundee. Included analysis of a range of conditions dependent on the raw coffee bean source and the darkness of roasting. Included complex topography, sensitivity to building effects, time-varying emissions profiles and a range of operating scenarios and meteorological conditions. Involved extensive consultation Dundee City Council.
- Alloy Wheel Facility, Lochaber – Client: Liberty Lochaber Aluminium Ltd. Preparation of an EIA Report Air Quality Chapter submitted with the planning application. The Air Quality Impact Assessment (AQIA) included a detailed atmospheric dispersion modelling study to assess the potential impacts of emissions from a proposed new alloy wheel facility and adjacent biofuel generators at sensitive receptors for human health and ecology. Included complex topography, building effects, time-varying emissions profiles and a range of operating scenarios and meteorological conditions. Involved extensive consultation with SEPA, SNH and The Highland Council. Assessment included a Construction Phase Dust Risk Assessment.
- Rosebank and Islay Distilleries – Client: Blyth and Blyth. Technical advisor on stack height analysis, screening of boiler emissions, odour risk assessment and odour management plan.

- Expansion of Wood Pellet Manufacturing Facility, Girvan, South Ayrshire – Client: Land Energy. Project Manager to co-ordinate delivery of air quality, noise, ecology and landscape and visual impact assessments. Included liaison with SEPA and South Ayrshire Council environmental protection officers, site visits, detailed modelling of emissions from wood pellet manufacturing process and Biomass CHP exhaust gases. Complex building configurations and local topography were included in the study.
- Ambient Dust Monitoring at Scrap Metal Facility – Client: Dalton Metals Recycling. Undertaken to check compliance with IPC Permit conditions related to emissions from activities and processes within the site and the ambient concentrations at the site boundary and neighborhood sensitive receptors. Results submitted to SEPA with a dust management plan.
- Granton Distillery, Edinburgh - Client: Halewood International. Odour impact assessment for a proposed new gin distillery adjacent to existing residential receptors. Included dispersion modelling with ADMS-5, and recommended abatement technologies appropriate for the scale of the plant. Submitted with the planning application to City of Edinburgh Council.
- Town Hall Energy Centre, Crawley – Client: Westrock. Assessment of the potential impacts on existing and proposed future residential receptors of emissions from each of two development phases of an energy centre comprising gas boilers and CHP units. Submitted to the local authority with the planning application. Included an assessment of the potential impact mitigation provided by options for low-NO_x equipment.
- Sainsbury's CHP Plant, Dundee – Client: Sainsbury's. Assessment of the site suitability and potential impacts on local air quality from a proposed CHP plant, packaged back-up plant and associated substation do demonstrate no adverse impacts. Dispersion modelling using ADMS-5 included assessment for a range of stack heights.
- Glasgow Caledonian University CHP Plant – Client: GCU. Detailed atmospheric dispersion modelling assessment to assess the impact of the variable emissions profile from the GCU CHP plant on proposed and existing residential receptors at nearby development sites. Included complex topography, building effects and emissions from adjacent roads. Undertaken in order to discharge a planning condition imposed by Glasgow City Council
- PPC Permit Application for Enviroco at Albert Quay, Aberdeen. Project manager for the compilation of environmental assessments to support an application for a permit under the Pollution Prevention and Control (Scotland) Regulations 2000 (the PPC Regulations) for a Part A installation in the Waste Management Sector, administered by Enviroco at a site at Albert Quay, Aberdeen. The site is involved in the storage of hazardous waste received from offshore North Sea facilities pending transfer to a licenced disposal site, where it is processed in line with the PPC Regulations, where these are appropriate. The project included pre-application meetings with the Scottish Environment Protection Agency and submission of the final application.
- Environmental Permit Variation Application for Enviroco, Great Yarmouth. Project manager for the compilation of environmental assessments to support an application for a permit variation under the Environmental Permitting Regulations (England and Wales) 2010 for a Part A installation in the Waste Management Sector, administered by Enviroco in Great Yarmouth. The site was undergoing extensive expansion and introducing significant improvements for pollution prevention and control. The permit variation consolidated the previous permit, waste management licence and previous exemptions that applied to the site. The project included pre-application meetings with the Environment Agency and submission of the final application.

PROPERTY & URBAN REGENERATION

- Edinburgh Park Southern Phase, Residential-Led Mixed Use Development, Edinburgh – Client: Parabola Edinburgh LLP. Technical lead on an air quality impact assessment of a residential-led mixed-use development. Included dispersion modelling with ADMS-Roads to predict the potential effects of traffic-generated pollutants on air quality at existing and proposed receptors including a large number of projected cumulative impacts from allocated development sites included in the West Edinburgh Transport Appraisal (WETA). Additional assessment of impacts was undertaken

within two nearby AQMAs. A comprehensive six-month ambient air quality monitoring survey was also undertaken at locations around the proposed development boundary, and the data used to verify the dispersion model. The study also included an odour risk assessment due to the proximity of the proposed development to a poultry farm and included several odour sampling surveys in a variety of meteorological conditions and operational scenarios at the poultry farm.

- Johnnie Walker Experience, Edinburgh – Client: DIAGEO. Air quality impact assessment of a visitor experience development including the potential effects on local air quality of development-generated traffic, combustion source emissions and kitchen extraction systems at existing and proposed receptors including within the adjacent Edinburgh Central AQMA.
- Ratho Station Residential Development, Edinburgh – Client: Taylor Wimpey East of Scotland. Technical lead for an air quality impact assessment of a residential development for multiple iterations of site layout and road traffic scenarios. The air quality assessment included dispersion modelling with ADMS-Roads to predict the potential effects of traffic-generated pollutants on air quality at existing and proposed receptors including within the adjacent Glasgow Road AQMA. Included a Construction Phase Dust Risk Assessment.
- Crofthead, Bishopbriggs – Client: Mactaggart & Mickel Homes. Preparation of a detailed dispersion modelling study and report assessing the effects of changes in traffic flow on the local road network and the impacts for air quality, particularly within the Bishopbriggs AQMA. Assessment included a Construction Phase Dust Risk Assessment and site suitability assessment for residential use.
- Bishopsgate Office Redevelopment, London – Client: Estates Office Shoreditch. Technical Lead for air quality assessment for the partial demolition and redevelopment of commercial premises to mixed office and retail use. Included the impact of traffic and energy centre emissions on existing local receptors and proposed future occupants of the building. An Air Quality Neutral Assessment in accordance with London Council’s Air Quality Guidance was included. Assessment included a Construction Phase Dust Risk Assessment.
- Kenmuir, Carmyle – Client: Arm Architects. Technical lead for an air quality impact assessment of a residential masterplan development and preparation of an EIA report chapter. The air quality assessment included dispersion modelling with ADMS-Roads to predict the potential effects of traffic-generated pollutants on air quality at existing and proposed receptors. Three site access routes were assessed and advice given to the design team regarding required distance of future residences from roadsides. Assessment included a Construction Phase Dust Risk Assessment and screening of the potential impacts at the development site from nearby industrial sources.
- Corton Village Development, Ayr – Client: Manse Investment. Technical lead for an air quality impact assessment of a residential/educational/commercial masterplan development and preparation of an EIA report chapter. The air quality assessment included dispersion modelling with ADMS-Roads and ADMS 5 to predict the potential effects of traffic-generated and energy centre-generated pollutants on air quality at existing and proposed receptors. The study included a large number of projected cumulative impacts from allocated development sites the Ayr/Prestwick area. Assessment included a Construction Phase Dust Risk Assessment.
- Retail Development, Cupar – Client: London and Scottish Investments Limited. Preparation of a detailed dispersion modelling study and report assessing the effects of changes in traffic flow and Drive-Thru queueing traffic on the local road network and the impacts for air quality, particularly within the Cupar Bonnygate AQMA.
- Cammo Fields Residential Development, Maybury Road, Edinburgh – Client Cala Homes. Technical lead for an air quality impact assessment of a residential development and preparation of an EIA report chapter. The air quality assessment included dispersion modelling with ADMS-Roads to predict the potential effects of traffic-generated pollutants on air quality at existing and proposed receptors including a large number of projected cumulative impacts from allocated development sites included in the West Edinburgh Transport Appraisal (WETA). Additional assessment of impacts was undertaken within a nearby AQMA. Supplementary reports including an assessment of the potential for odour impacts from a nearby composting facility

- Commercial Development, Chapelhall, North Lanarkshire – Client: Gray Planning. Preparation of a detailed dispersion modelling study and report assessing the effects of changes in traffic flow on the local road network and the impacts for air quality, particularly within the Chapelhall AQMA. Assessment included a Construction Phase Dust Risk Assessment.
- Gilston Farm, Polmont – Client: Acies Group. Management and technical delivery of an air quality impact assessment for a mixed residential and commercial development. The air quality assessment included dispersion modelling with ADMS-Roads to predict the potential effects of traffic-generated pollutants on air quality at existing and proposed receptors. An additional odour and dust risk assessment was undertaken to determine the potential for nuisance complaints from future residents due to the proximity to existing landfill and waste management sites. Mitigation measures were recommended where appropriate, to minimise the potential for adverse residual effects being experienced by sensitive receptors during the construction and operational phases of the proposed development.
- Clyde Waterfront & Renfrew Riverside and Glasgow Airport Improvement Area City Deals Projects-Client: Renfrewshire Council (2016-present). Senior team member to undertake air quality impact assessment of both schemes individually and assess the cumulative impact of both in conjunction with development projected to be facilitated by the Proposed Development. Including advanced dispersion modelling and GIS techniques and extensive data management. Preparation of material for public exhibitions and culminating in the production of three separate Environmental Statement Chapters on Air Quality with detailed technical appendices plus contributions to Climate Change chapters.
- A720 Sheriffhall Roundabout, Edinburgh – Client: Transport Scotland (2015). Senior team member to undertake DMRB Stage 2 Options Appraisal which involved a qualitative assessment of the various options based on the proximity to a range of identified sensitive receptors and the likely implications on traffic flows. Subsequent design and management of a baseline 6-month ambient air quality monitoring survey at 8 sensitive receptor locations and a detailed Stage 3 DMRB assessment of the preferred option, requiring detailed atmospheric dispersion modelling of road traffic emissions.

OIL & GAS

- Armada Kraken FPSO Vessel – Client: PI Ltd. Technical lead for assessment required to support an application to operate the vessel under Offshore Combustion Installations (Prevention and Control of Pollution) Regulations 2001. The purpose of the assessment was to predict pollutant concentrations of key substances at the nearest platforms within the North Sea, human receptors on the vessel and the nearest inhabited landfall point. The assessment considered the atmospheric emissions from the installation during normal gas and crude oil operations of the Steam Boiler Package (SBP) and the Power Generation Module (PGM).
- Montrose Alpha Offshore Installation – Client: PI Ltd. An assessment of atmospheric emissions from the existing installation and additional sources on a new bridge linked platform (BLP) adjacent to the Montrose platform, required to support an application to vary the PPC permit for the installation.
- Brent Removal and Dismantlement – Client: Shell (UK) Ltd. Management and technical delivery of Air Quality Environmental Statement chapter for the EIA to address the potential effects of the Brent Delta topside transfer to barge, inshore transit and onshore dismantlement project on air quality in Hartlepool.
- South Stream Russia to Bulgaria Pipeline. Member of project team that assessed the air quality impact of a proposed major gas pipeline between Russia and Bulgaria. The main focus of the assessment was the impact of construction phase emissions on sensitive receptors in close proximity to the landfall sections and pipeline corridor onshore. The assessment considered emissions from shipping, construction plant and road traffic within the affected areas.
- BAT Assessment of Odour Abatement Options and Odour Management Plan for PPC Compliance at Nigg Terminal. Review of potential odour emission sources on-site including jetty operations,

ship-to-ship transfer, crude oil reception and separation, ballast tanks, API separators, settlement tanks and lagoons and recommendations for priority control. The study included a BAT assessment of options for odour control and abatement and the development of new management procedures.

ONSHORE/OFFSHORE RENEWABLES

- Peaking Power Plants – Client: Forsa Energy. Technical advisor on detailed stack height analysis and dispersion modelling assessments of peaking power plants in Dundee and Greenock including assessment of Medium Combustion Plant Directive emissions limits. One site included consideration of the potential impacts of existing nearby wind turbine wakes on the dispersion of industrial emissions from new stacks.
- Gas-Fired Peaking Power Plant, Haydock – Client: LCFG Ltd. Assessment of the potential impacts on local air quality and in particular at a nearby Air Quality Management Area, of emissions from fourteen gas-fired engines. The assessment accounted for variable hours of operation and focused on the potential to exceed short-term air quality standards at sensitive receptors. The assessment also included stack height optimisation.
- Biomass Installation at Blackcraig Castle – Client: John Noel Thompson. Preparation of an air quality assessment to assess suitability of a proposed site for a wood fired biomass system.
- Biomass CHP Plant, Wellingborough – Client: Padd Energy. Technical lead on air quality assessment undertaken as part of an application for an Environmental Permit to the Environment Agency. Includes risk assessment, dispersion modelling, BAT assessment and the development of management plans to minimise emissions to atmosphere from the operation of the plant.
- River Tay District Heating Scheme – Client: Perth and Kinross Council – An assessment of the potential effects on local air quality of emissions of oxides of nitrogen (NO_x) from the use of gas-fired top-up boilers that are part of the scheme. Included an assessment of the potential net NO_x reduction in tonnes/annum across the City as public sector properties connected to the scheme.
- Raigmore Hospital, Inverness – Client: NHS Highland. Management and delivery of an atmospheric dispersion modelling study submitted with the planning application to Highland Council for the installation of two 1.7MW wood pellet boilers at Raigmore Hospital in Inverness. The study assessed the potential environmental impact and risk to human health of emissions from the existing multi-flue stack in a number of possible power generating scenarios at the hospital.

CORPORATE ADVISORY

- Review and Assessment of Air Quality for Local Authorities. Project Manager for a series of assessments for Scottish Local Authorities required as part of the Local Air Quality Management regime implemented under the Environment Act 1995. Included collation of emissions inventories including industrial, commercial, domestic and road traffic sources across the Council areas and within hotspots and Air Quality Management Areas (AQMAs); detailed dispersion modelling studies to determine source contributions and inform Action Plans for improvement; advise on air quality monitoring campaigns and preparation of annual reports.
- Assessing the Potential Air Quality Impact from Biomass Installations in the Planning Process, Workshop – Client Moray Council. Preparation and delivery of a half-day workshop for 4 personnel from the Moray Council Department of Public Health to assist the team in the assessment of planning applications for biomass installations within the Moray region with respect to local air quality impacts. Included practical exercises interpreting data supplied with the EPUK Biomass Boiler Information Request Form provided by applicants, and the use of spreadsheet screening assessment tools. Guidance was also given on when to ask applicants for more detailed assessments and how to consider cumulative impacts with other sources.

EMPLOYMENT HISTORY

- AECOM/URS – Principal Consultant - Responsible for business development in Scotland and providing training, mentoring, technical review and specialist advice on the effects of buildings and topography on atmospheric dispersion to the air quality consultancy teams located across the UK. Delivery of AQIAs for complex industrial sites and high profile developments including effects on human health and sensitive habitats and ecosystems at offshore and onshore locations.
- TSI Scotland – Air Quality Specialist - Primarily focused on the Environmental Consultancy part of the business but also provided support in the Energy business, undertaking energy audits and assessments for the Carbon Trust and developing and delivering energy awareness training programs for private and public sector clients.
- BMT Cordah – AQIAs for EIAs, planning applications and PPC permit applications for a wide range of property developers and industrial operators including companies from the oil and gas, power producing, waste management, renewables, chemical, cement and pulp and paper industries. Providing technical support and advice to UK Local Authorities on the regulatory regime of Local Air Quality Management (LAQM) and assisting them in fulfilling their obligations to review, assess and improve local air quality. Included preparation of review and assessment reports, compilation of emissions inventories including industrial, traffic and domestic sources, screening and detailed modelling studies and the development of Air Quality Action Plans (AQAP) for improvement.
- CERC - Major involvement in the development of the ADMS range of dispersion models including code testing, development of user guide documentation and completion of validation studies. Project manager on the development and delivery of introductory and advanced customised training courses in atmospheric physics and the use of dispersion models to individuals and audiences of up to 30 including personnel from industry, local authorities and regulatory agencies. Manager of the technical support helpdesk advising over 200 clients. Development of a database system for logging and responding to queries, and providing user-feedback to the model-development team in order to ensure continuous improvements to future versions of software. Consultancy services to a wide range of industrial clients from manufacturing, power producing, petrochemical and waste management industries, providing AQIAs and stack height analysis services to demonstrate compliance with environmental permit conditions or to accompany planning applications.

Ian Reach

Principal Marine Scientist

Email: ian.reach2@marinespace.co.uk

Tel: 07867 432 444

AREAS OF EXPERTISE

Ian has 28 years' experience as a marine ecologist and environmental auditor. Ian developed his marine ecological skills as part of JNCC's Marine Nature Conservation Review team and then in his role as Senior Marine Ecologist at Natural England. In this role Ian developed common standards monitoring, Natura 2000 marine SAC designations, and detailed knowledge of the legislative frameworks for UK waters; specialising in management advice to the marine aggregate and offshore renewables sectors. At MarineSpace, Ian has established himself as a leading marine environmental consultant delivering a range of projects. Ian can apply specialisms including marine ecology and nature conservation impact assessment, Expert Witness representation, and negotiation with Governmental and statutory bodies during licensing and HRA processes. He has a track record of HRA including plan-level, and strategic assessment for seabed user operations, allowing efficient and compliant delivery of assessments for operators and regulators alike. Ian is recognised as an international expert on *Sabellaria spinulosa* reefs and subtidal sandbank functionality and conservation.

KEY SKILLS

- Management and consenting advice of marine and coastal projects/developments;
- Strategic and Regional Environmental Assessment and Environmental Impact Assessment;
- Marine Protected Area advice/Habitats Regulations and Marine Conservation Zone Assessments;
- Production of adaptive environmental management plans, and mitigation and monitoring proposals;
- Managing compliance with permit conditions on behalf of clients;
- Strategic marine environmental research and assessment projects.

CAREER

2011 – Present:	MarineSpace Ltd, Principal Marine Scientist
2010 – 2011:	Natural England, Principal Specialist Marine Ecology and Marine Operations
2007 – 2010:	Natural England, Senior Specialist Marine Ecology and Marine Aggregate Operations
2006 – 2007:	Natural England, Specialist Marine Operations – Offshore Wind
2001 – 2006:	English Nature, Specialist Marine Ecology and Marine Protected Area Officer
1999 – 2001:	English Nature, Wildlife Warden – Lundy Marine Nature Reserve
1994 – 1997:	JNCC, Marine Ecologist – Marine Nature Conservation Review

QUALIFICATIONS/PROFESSIONAL AFFILIATIONS / POSITIONS

1993 BSc. (Hons) Marine Biology with Fish Biology, University of Plymouth, UK
Professional Member of the Marine Biological Association UK. Advisor to: ICES Working Group on Marine Systems; Pelagic Advisory Council; New York Energy Research and Development Authority Offshore Wind State of the Science Benthos and Birds Working Groups; U.S. Regional Wildlife Science Entity Bird and Bat, and Ecosystems Subcommittees; JNCC Offshore Wind Environmental Evidence Register Working Group.

SELECTED RECENT PROFESSIONAL EXPERIENCE

2022 - ongoing Skyrora XL LV – AEE, Syrora

Technical lead. Transboundary AEE Chapter.

2021 Astraius LV – MERA for AEE, Astraius/Prestwick Space Port

Technical lead. Transboundary MERA for AEE Chapter.

2021 Shetland Space Centre – AEE, SaxaVord

Technical lead. Transboundary AEE Chapter.

2021 Shetland Space Centre – AEE, SaxaVord

Technical lead. Review of the CAA AEE Regulations for client.

2020 - 2021 Shetland Space Centre – EIA, SaxaVord

Technical lead. Transboundary EIA Chapter.

2021 - ongoing 3 Array Assets, Ørsted

Technical lead. Environmental appraisal, HRA and MCZ Risk Assessments, Marine Licence applications for Array Cable Protection System stabilisation emergency work campaigns for 3 arrays/offshore wind farms.

2021 4 Array Assets, Ørsted

Technical lead. Environmental appraisal, HRA and MCZ Risk Assessments, Marine Licence applications for Array Cable Protection System stabilisation emergency work campaigns for 4 arrays/offshore wind farms.

2021 - ongoing Gas Pipeline Stabilisation and Decommission Programme, Perenco

Technical lead. Environmental appraisal, HRA and survey scope for all southern North Sea pipeline assets. Developing survey Sop's. Biogenic reef data interpretation and assessment. Liaison with SNCBs.

2020 - ongoing Round 4 Offshore Wind, Site Characterisation

Technical lead. Critical review of consenting risk associated with HRA issues for client.

2020 - ongoing Erebus Floating Offshore Windfarm – Environmental Statement, Blue Gem Wind

Technical Lead. HRA and EIA co-ordinator and lead assessor and QC.

2019 - ongoing Race Bank Wind Farm – Annual Monitoring Reporting, Ørsted

Technical Lead. Analysis of post-construction survey data, HRA compliance and innovative sandeel monitoring programme lead.

2019 - ongoing Lincs Wind Farm – Annex I reef habitat survey – Ørsted

Technical Lead. Analysis of acoustic data to identify Annex I *Sabellaria spinulosa* reef habitat within the wind farm array and Inner Dowsing, Race Bank and North Ridge SAC.

2019 – ongoing Morlais Tidal Array Demo – EIA, Mentor Môn

Technical lead. EIA chapters for assessment of tidal stream demonstration project. Benthic ecology, migratory fish baseline and assessment chapters. Advice concerning HRA issues.

2018 – ongoing Lincs Wind Farm, Transmission Capitol

Technical Lead. Information to identify consenting risk and inform HRA in support of export cable remediation O&M licence.

2014, 206, 2018 The Crown Estate Marine Mineral Licensing Round HRA, The Crown Estate

Technical Lead. Plan-level HRA in support of the last three marine aggregates licensing rounds.

2018 Race Bank Wind Farm – Annex I reef habitat survey – Ørsted

Technical lead. Design of subtidal drop-down video survey to identify Annex I *Sabellaria spinulosa* and cobble reef habitat along export cable route post-installation.

2018 Regional Cumulative Effect Assessments of Marine Aggregate Extraction Operations on Atlantic Herring Spawning Habitat and Sandeel Habitat, various Dredging Associations

Project Director and Technical Lead. Updated 2013 methodology to identify, map and assess herring and sandeel habitats and assessment of impacts from marine aggregate dredging for 4 strategic regions.

2017 – 2019 London Array Wind Farm, London Array Ltd

Technical Lead. HRA of cable remediation O&M licence/turbine replacement HRA / mitigation plan.

2017 – 2019 London Array Wind Farm, Blue Transmission London Array

Technical Lead. HRA in support of export cable remediation O&M licence.

2014 – 2015 Dogger Bank Creyke Beck Offshore Wind Farm Public Examination, Forewind Ltd

Expert Adviser. Benthic ecology and marine nature conservation support and HRA for Dogger Bank SCI. Support during examination, including expert witness client representation during public hearings.

2014 Atlantic Herring Spawning Habitat Strategic Assessment Workshop, European Dredging Association and International Council for the Exploration of the Sea (ICES)

Technical Expert. Led session at the ICES Working Group on Marine Systems (WGMARS) in Copenhagen, regarding innovative strategic methods of regional-scale Atlantic herring habitat classification.

2014 Race Bank Wind Farm – Annex I reef habitat survey – Centrica

Technical Expert. Design of subtidal drop-down video survey to identify and characterise Annex I *Sabellaria spinulosa* and cobble reef habitat along export cable route pre-installation.

2013 – 2014 Lincs Wind Farm, Centrica Renewables Energy Ltd / Lincs Wind Farm Ltd

Technical Expert. Developed innovative approach to HRA delivery for a 20 year O&M licence regarding HRA of jack-up rigs in a SAC. Adopted by MMO as a standard for efficient delivery of long-term O&M licenses.

SELECTED PUBLICATIONS

Contributing author to: Cook, A., K.A. Williams, E. Jenkins, J. Gulka, and J. Liner. 2021. Bird Workgroup Report for the State of the Science Workshop on Wildlife and Offshore Wind Energy 2020: Cumulative Impacts. Report to the New York State Energy Research and Development Authority (NYSERDA). Albany, NY. 37 pp. Available at <https://www.nyetwg.com/2020-workgroups>.

Contributing author to: Degraer, S., Z.L. Hutchison, C. LoBue, K.A. Williams, J. Gulka, and E. Jenkins. 2021. Benthos Workgroup Report for the State of the Science Workshop on Wildlife and Offshore Wind Energy 2020: Cumulative Impacts. Report to the New York State Energy Research and Development Authority (NYSERDA). Albany, NY. 45 pp. Available at <http://www.nyetwg.com/2020-workgroups>.

Reach I.S., 2016. *UK Aggregate Extraction and Atlantic Herring Spawning Habitat: Identification, Assessment, and Adaptive Environmental Management*. Proceedings of the ICES Annual Science Conference, Riga 2016.

Lloyd Jones D., Langman R., **Reach I.S.**, Gribble J., and Griffiths N., 2016. *Using Multibeam and Sidescan Sonar to Monitor Marine Aggregate Dredging*. In: *Seafloor Mapping along Continental Shelves: Research and Techniques for Visualizing Benthic Environments*. C.W. Finkl and C. Makowski (eds.), Coastal Research Library 13. Springer International Publishing, Switzerland.

Pastors M., **Reach I.S.**, Worsøe Clausen L., Russell M., Wiseman A., Ohms V., Reedtz-Sparrevohn C., Strehlow H., Dankel D.J., and Goldsborough D., 2015. *Using a science-industry partnership to identify herring spawning locations in the North Sea*. Proceedings of the ICES Annual Science Conference, Copenhagen 2015.

Lloyd Jones D., Backstrom J., and **Reach I.S.**, 2014. *Regional Environmental Assessment of Marine Aggregate Dredging Effects: The UK Approach*. In: *Environmental Management and Governance: Advances in Coastal and Marine Resources*. C.W. Finkl and C. Makowski (eds.), Coastal Research Library 8. Springer International Publishing, Switzerland.

Reach I.S., Henson K., Golding T.J., Murphy K.J., Langman R.J., Coates A.S., Warner I.C., Hatton L., Wright, S., and Leake S., 2013. *Marine Aggregate Licence, Renewal and Application Areas: A Report to Inform an*

Appropriate Assessment (in combination), on the classified Red-throated Diver population of the Outer Thames Estuary Special Protection Area - Version 1.0. A Report produced for BMAPA to inform MMO.

Reach I.S., Latto P., Alexander D., Armstrong S., Backstrom J., Beagley E., Murphy K., Piper R., and Seiderer L.J., 2013. *Screening Spatial Interactions between Marine Aggregate Application Areas and Atlantic Herring Potential Spawning Areas.* A Method Statement produced for British Marine Aggregate Producers Association.

Reach I.S., Cooper W.S., Firth A.J., Langman R.J, Lloyd Jones D., Lowe S.A. and Warner I.C., 2012. *A Review of Marine Environmental Considerations associated with Concrete Gravity Base Foundations in Offshore Wind Developments.* A report for The Concrete Centre by Marine Space Limited. 160pp.

Limpenny D.S., Foster-Smith R.L., Edwards T.M., Hendrick V.J., Diesing M., Eggleton J.D., Meadows W.J., Crutchfield Z., Pfeifer S., and **Reach I.S.**, 2010. *Best methods for identifying and evaluating Sabellaria spinulosa and cobble reef.* Aggregate Levy Sustainability Fund Project MAL0008. Joint Nature Conservation Committee, Peterborough, 134 pp. ISBN: 978-0-907545-33-0.

Morris R.K.A., **Reach I.S.**, Duffy M.J., Collins T.S., and Leafe R.N., 2004. Forum: On the loss of saltmarshes in south-east England and the relationship with *Nereis diversicolor*. *Journal of Applied Ecology*, 41: pp. 787-791.

Reach I., 2002. The occurrence of the non-native brown alga *Sargassum muticum* and red alga *Asparagopsis armata* at Lundy. *Annual Report of the Lundy Field Society*, 51, 113-115.

Gavin Bollan

Technical Director

Qualifications and Professional Memberships

- BSc (Hons.) Environmental Science
- Chartered Environmentalist (CEnv)
- Chartered Scientist (CSci)
- Member of the Institution of Environmental Sciences (MIEnvSc)
- Fellow of the Institute of Air Quality Management (FIAQM)

Career Summary

Gavin has over 25 years of experience in the environment industry, more than 20 years of which has been in consulting. He has been active in Environmental and GHG Inventories and Permitting and industrial air pollution control and management in the UK since the 1990s. He has also been a practitioner and verifier of life cycle impact assessments at product and project level since 2011.

Gavin is an analytical chemist by training, having spent four years after graduation in industry as site environmental chemist, with responsibility for measuring emissions to air and water.

His work in consultancy was initially in air quality management, in the fields of industrial emissions, ambient air quality and occupational hygiene monitoring. Gavin has produced a suite of guidance for UK regulators in the UK on gaseous and particulate monitoring techniques which called on this direct experience.

In the 2000s he developed innovative major capital project carbon footprinting and lifecycle analysis services for Atkins, with a focus on transparency and traceability in source data, emission factors and calculation methodologies. He has also worked on some of the UK's largest infrastructure projects including major highway upgrades, high speed rail and the development of the London Olympic Park.

At ITP Energised, Gavin is Technical Director with the Advisory Services business stream with responsibilities covering industrial air pollution permitting and pollution control issues, assisting clients with their obligations under the Industrial Emissions Directive and the latest iterations of Best Available Techniques for pollution control. He brings the benefit of long experience across multiple sectors in pollution control and especially greenhouse gas management to clients promoting clean and future energy projects. Since joining ITP Energised in 2018 he has written several Environmental Statement / EIA Report climate chapters for transportation, industrial and commercial building developments, examining climate vulnerability and resilience, generating greenhouse gas inventories for project lifecycles and working with design teams on practical and measurable ways to reduce energy usage and GHG emissions. He is ITP Energised's principal author of Major Accident and Disaster chapters for Environmental Statements, which calls on his extensive experience of industrial process operation and control.

Selected Project Experience

Climate Change Impact Assessment and Sustainability

- Climate Change (Resilience and GHG Emissions), various, England / Scotland, 2019-2022 chapters on several project including the Saxa Vord Space Centre, the Hillthorn Farm commercial development and the Alvanca Aluminium Smelter extension. Analysis of future Met Office projections and assessment of project vulnerability. Development of GHG and energy inventories for critical review and development of mitigation strategies at construction and operational stages.
- Offshore Wind supply chain carbon strategy, Inch Cape, Scotland, 2021. Development of supply chain GHG emissions evaluation strategy and internal awareness presentation.
- Carbon analysis and energy efficiency optioneering, Trans Adriatic Pipeline (TAP), Greece and Albania, 2019-2020. Detailed analysis of fixed asset operating options to reduce GHG emissions and operating costs.
- Energy Statement and Project GHG Inventory, Ras al-Khair Industrial City, Royal Commission in Jubail, Saudi Arabia, 2011-2019. Thermal power and industrial emission inventory.

Major accidents and disasters

- Environmental Statement / EIA Report chapters, England / Scotland, 2019-2022. Qualitative environmental risk chapters for several project including the Saxa Vord Space Centre, the Hillthorn Farm commercial development and the Alvanca Aluminium Smelter extension.

Renewable Energy Advisory

- Confidential green hydrogen development projects, Protium Green Solutions, England / Scotland / Wales, 2020 - date. Account Manager and Adviser on project facilitation and compliance, on several prospective renewably-powered electrolytic hydrogen production installations.
- Uskmouth Power Station Conversion, Wales, Simec Atlantis Energy, 2018-2021. Client's Agent, Simec Uskmouth Power. Embedded technical adviser in client's permitting and engineering teams for a former coal fired power station conversion in Wales
- Keadby Power Station, SSE Thermal, England, 2020. Carbon intensity evaluation for GHG abatement and alternative fuel scenarios.
- Low Carbon Infrastructure Transition Plan, Scottish Government, 2019 – date. Technical evaluation of Scottish Government grant applications for low carbon technology developments including water source heat pumps, green hydrogen and wind Power to X projects.
- Solar and Wind Energy Resource Assessments, Various Clients, Scotland and England, 2020-date. Project director and critical reviewer.
- Clean Development Mechanism Prefeasibility, Fadhili Gas Plant, Saudi Aramco, 2015. Review of planned activities with potential to generate carbon credits

Lifecycle Assessment

- Energy and Carbon Assessment, Thames Tideway Tunnel, 2011 – 2012. Tasks included a full lifecycle carbon model for the construction and operation of the tunnel, an Energy Statement to London Plan requirements and an options appraisal for renewable offsetting technologies.
- Full Multiparametric LCA, Sulzer Pumps, Germany 2011-2014 Cradle-to-grave assessments and voluntary disclosure report verification for industrial pumping products and construction products. Working in the capacity of official verifier for the International Environmental Performance Declaration consortium; developed assessment methodology, audit framework and reporting protocols. Desktop audit complemented by site visits in Germany and Switzerland.

Peter Dunmow BA(Hons) DipLA MA(Hons)

Chartered Landscape Architect



Qualifications

BA (Hons) Landscape Architecture, Greenwich University, 1991

Dip LA, Landscape Architecture, Greenwich University, 1993

MA (Hons) Landscape Architecture, Greenwich University, 1996

Affiliations

Chartered Member of the Landscape Institute

Fields of Competence

Peter has twenty five years of experience in Landscape Architecture and Urban Design, managing and working on a range of projects throughout the UK and overseas. His experience covers the full range of landscape consultancy services including landscape and visual impact assessments, comprehensive planning supporting statements and public inquiry evidence for a range of developments including wind farms and other renewable developments, overhead power lines, substation projects, biomass plants, business parks, housing, roads, quarry and mineral developments. Peter has prepared a range of townscape assessment work for a variety of new retail, commercial and residential developments as well as analysis and survey for urban renewal, regeneration and design studies. In addition, Peter complements these skills with considerable experience in masterplanning, detailed site planning and contract management.

Career History

HEPLA - Hermitage Environmental Planning and Landscape Architecture Limited

Director 2015

Enviros Consulting/ SKM Enviros/ Jacobs

Landscape Technical Lead 2005 – 2015

Farningham McCreddie Partnership

Principal Landscape Architect 1999 - 2005

Chris Blandford Associates, Sussex

1994 - 1999 Landscape Architect

British Waterways, Northamptonshire

Assistant Landscape Architect 1991 - 94

Technical Skills

- Expert Witness
- Landscape and Visual Impact Assessment
- Environmental Impact Assessment
- Masterplanning
- Urban Design
- Townscape Studies and Assessments
- Landscape Design and Implementation

Management Skills

- Organisation and Motivation
- Team Management
- Technical Leadership
- Commercial Focus
- Market Adaption
- Project Management
- Contract Management

Relevant Experience

Public Inquiries

- Pencloe Wind Farm Inquiry (2017) – Provision of support Inquiry Team on landscape and visual matters including preparation of an updated cumulative landscape and visual impact assessment, input to the Inquiry Report and Precognition, cross examination strategy. Appeal allowed. (North British Wind Energy/Invenergy)
- Fallago Rig Extension Inquiry (2017) –Preparation of Inquiry Report, Precognition and acted as Landscape Expert Witness at this wind farm Inquiry, held in the Scottish Borders. Appeal decision pending. (Scottish Borders Council)
- Kentish Flats Offshore Wind Farm Extension - Preparation of submissions to the Examination In Public (Vattenfall)
- Inverness Local Plan Inquiry – Preparation of a Statement of Evidence and accompanying documents in support of an allocation for residential development, including attendance and presentation of evidence at Inquiry. (William Gray Construction)
- Shawfair Local Plan Inquiry - Preparation of a Statement of Evidence including an independent Landscape and Visual Impact Assessment of the 'South East Wedge' area of Edinburgh for presentation at a Local Plan Inquiry with specific reference to housing land allocations. (Edmonstone Developments Ltd)
- Dungannon and South Tyrone Local Plan Inquiry - Preparation of Statements of Evidence including Landscape and Visual Impact Assessments of various subject lands for presentation at a Local Plan Inquiry with specific reference to housing/business land allocations. (Dungannon and South Tyrone Borough Council)
- Shawfair Local Plan Inquiry - Preparation of a Statement of Evidence including a supporting Landscape and Visual Impact Assessment for presentation at a Local Plan Inquiry with specific reference to housing land allocations. (Bett Homes Ltd)

Planning Appeals

- Dell Wind Farm – Preparation of landscape and visual aspects of the Statement of Appeal and associated appendices. (Coriolis Energy Limited)
- Article 33 Inquiry - Campbell College, Belfast - Preparation of Statements of Evidence in support of proposed residential developments including supporting Landscape and Visual Impact Assessments and full and detailed mitigation strategies for presentation at an Article 33 Planning Inquiry. (Campbell College Board of Governors)
- London Road, Kilmarnock - Preparation of a Townscape and Visual Impact Assessment in support of the conversion of a former nursing home, forming part of a written submission to the Scottish Executive, Planning and Conservation Area Consent Appeal . (Silverdale Developments Ltd)
- St. Patrick's Church, Cowgate — Preparation of Townscape and Visual Impact Assessment in support of a hotel development in the Edinburgh Old Town Conservation Area forming part of a written submission to the Scottish Executive, Planning and Conservation Area Consent Appeal.
- Straid Road, Ballycastle – Preparation of statement of evidence and documents in support of a small residential development, including attendance and participation in an informal hearing. (Private Client)

Presentations, Consultation and Lecturing

- Delivery of lecture to the MSc / Diploma Postgraduate Course in EIA – Landscape and Visual impact Assessment in EIA, Scottish Rural College. (2020)
- All Energy Conference Paper, Aberdeen, June 2013 – ‘Cumulative Assessment – Visualisation Techniques’. Peter set out a review current best practice in the use of graphics to support the cumulative assessment of wind farms.
- Renewables UK Conference Paper, Glasgow, November 2010 – ‘Views from the Front: Residential Visual Amenity and Settings Assessment’. Peter set out a user friendly guide to the evolving methodologies for the presentation of robust assessments.
- Provision of EIA module lecturing to the MSc/PG Dip in Ecological Economics – Introduction to Landscape and Visual impact Assessment lecturing role with the Scottish Agricultural College. (2009-2011)
- Scottish Government Planning Advice - Enviro Consulting Ltd MacRoberts LLP were appointed by the Scottish Government to provide support and advice including landscape advice to planning authorities on the preparation of their supplementary planning guidance (SPG) for wind farms from the period between March 2008 and March 2009. Details at www.spgadvice.co.uk. (Scottish Government)
- British Wind Energy Association - Enviro Consulting Ltd were appointed by BWEA to undertake a review of Draft Supplementary Planning Guidance (SPG) Wind Energy in Northern Ireland’s Landscapes, prepared on behalf of the Department of the Environment NI by Julie Martin Associates. This review was prepared to assist BWEA in drawing up a formal response to the Draft SPG. (BWEA)

Landscape and Visual Impact Assessments

A wide experience on a very wide range of assessment work including Environmental Impact Assessment, and Landscape and Visual Impact Assessment for over 20 onshore and offshore wind farms. LVIA experience includes preparation of comprehensive planning supporting statements and public Inquiry evidence for a range of developments including business parks, housing, roads, quarry and mineral developments.

Renewables Experience

- Pencloe Wind Farm, New Cumnock, East Ayrshire – review of Landscape and Visual Impact Assessment for a tip height extension, Section 36c application.
- Yell Wind Farm, Yell, Shetland - Landscape and Visual Impact Assessment for a proposed 32 turbine, Section 36 application. Engagement with Shetland Island Council and SNH at an early stage to agree parameters and sensitivities associated with the proposal. Detailed design optimisation process to achieve a careful landscape fit. Element Power Ltd / energy Isles
- Bilbo Solar Farm, Crimmond, Aberdeenshire – Landscape and Visual Impact Assessment for a proposed 44.5 Ha solar array (Green Energy International)
- Patrickston Solar Farm, Kippen, Stirlingshire– Landscape and Visual Impact Assessment for a proposed 17.4 Ha solar array (Green Energy International)
- Greystone Knowe Wind Farm – Feasibility Study for a proposed 12 turbine wind farm in the Moorfoot Hills (Coriolis Energy Limited)
- Ulzieside Wind Farm, Dumfries and Galloway – Preparation of supplementary environmental information, including a comprehensive cumulative landscape impact assessment, to refresh an existing planning application following resolution of aviation constraints. NBW Wind Energy Ltd

- Bettyhill Farm Extension, Sutherland – Preliminary feasibility and design advice followed by ongoing Landscape and Visual Impact Assessment for a proposed c.7 turbine extension. NBW Wind Energy/ Invenergy
- Turnalt Wind Farm, Argyll and Bute – Preliminary feasibility and design advice for a proposed wind farm site near Ardfern in mid Argyll. Coriolis Energy Limited
- Tidal Stream Array, Anglesey – site search for onshore cable land fall and sub station, for a proposed tidal stream array, to minimise landscape and visual effects. Anglesey Marine Energy, Morlais
- Blar Gavary Farm, near Bonar Bridge, Highlands – Baseline Landscape and Visual Impact Assessment for a proposed 10 turbine development. Eneco
- New Wind Farm Proposal, Powys – Preliminary feasibility and design advice for a non-TAN8 site in the Cambrian Mountains. Infinis
- Margree Wind Farm, Dumfries and Galloway – Preparation of supplementary environmental information to refresh an existing planning application following resolution of aviation constraints. NBW Wind Energy Ltd
- Starryshaw Wind Farm, Shotts, North Lanarkshire – Post application supplementary environmental information and consultation. Willowind
- Blairadam Wind Farm, Fife – Post application consultation. Partnership for Renewables
- Pencloe Wind Farm, New Cumnock, East Ayrshire - Landscape and Visual Impact Assessment for a proposed 19 turbine, Section 36 application. Engagement with East Ayrshire Council and SNH at an early stage to agree parameters and sensitivities associated with the proposal. Detailed design optimisation process to achieve a careful landscape fit. NBW Wind Energy Ltd
- Cummings Hill, nr. Jedburgh, Scottish Borders - Landscape and Visual Impact Assessment for a proposed 7 turbine development. Early stage submission of representations with regard to designation of Special Landscape Areas. Design optimisation process to balance production capacity and sensitive landscape receptors. Infinis
- Dell Wind Farm north of the Glendoe Hydro project, Highland - Ongoing Landscape and Visual Impact Assessment for a proposed 18 turbine wind farm, Section 36 application. Detailed design optimisation to eliminate effects on Castle Urquhart. Completion of challenging and remote site work. Coriolis
- Balunton Wind Farm near Bargrennan, Dumfries and Galloway - Ongoing Landscape and Visual Impact Assessment for a proposed 9 turbine application. The project became viable following a successful representation to the Dumfries and Galloway Interim Planning Policy for Renewables, arguing that the site was appropriate to be included as an unconstrained area of search. NBW Wind Energy Ltd.
- Kentish Flats Offshore Wind Farm Extension – Preparation of a landscape, seascape and visual impact assessment for 17 turbine extension to an existing offshore wind farm. Key tasks included seascape characterisation of the study area and advice on design optimisation. (Vattenfall)
- Blyth Offshore Demonstrator Project – Landscape Technical Lead for the now consented NaREC 15 turbine offshore test array. Key tasks include working within a ‘Rochdale envelope’ project description to identify the maximum scale of development with the least environmental harm and consultation with the MMO. (NaREC)
- Tullo Wind Farm Extension, Aberdeenshire - Landscape and Visual Impact Assessment for a proposed 5 turbine extension to an existing wind farm, near Stonehaven.
- Seagen Sea Skerries Tidal Stream Array, Anglesey – Technical review of Landscape and Visual Impact Assessment for the proposed turbine array. (MCT Ltd)

- Belmore Wind Farm – Settings assessment of Scheduled Ancient Monument sites prepared as an addendum to a EIA for a proposed wind farm in Northern Ireland. (Airtricity)
- Park Head Wind Farm – Landscape and Visual Impact Assessment for a proposed 9 turbine wind farm in Castle Morpeth District, Northumberland. (Renewable Energy Systems)
- Butterwell Wind Farm, Northumberland – Preparation of a detailed Landscape and Visual Impact Assessment for a 9no. turbine wind farm, including cumulative assessment of 7 adjacent sites. (Renewable Energy Systems)
- Tallentire Wind Farm, Cumbria –Baseline Landscape and Visual Impact Assessment for a 9no. turbine wind farm. (Renewable Energy Systems)
- Goonhilly Wind Farm – Landscape and Visual Impact Assessment for a proposed wind farm on the site of Goonhilly Downs Earth Station Site. (British Telecom/PMSS)
- Yelvertoft Wind Farm – Landscape and Visual Impact Assessment for a proposed wind farm close the M1 motorway in Northamptonshire. (Your Energy Ltd)
- Crockandun Wind Farm - Landscape and Visual Impact Assessment for a proposed wind farm on Slieve Gallion near Draperstown. (SWS Energy)
- Craignagapple Wind Farm - Landscape and Visual Impact Assessment for a proposed wind farm east of Strabane within the western extent of the Sperrin Mountains. (SWS Energy)
- Heysham Wind Turbine – Preparation of a Landscape and visual impact Assessment of a proposed large single wind turbine to the east of Heysham. (British Telecom)
- Tormywheel Wind Farm, Fauldhouse – Preparation of a comprehensive landscape strategy to provide mitigation to a proposed development of 14no. wind turbines. (PI Renewables)
- Perth and Kinross Wind Farm Policy – Preparation of representations to the Perth and Kinross Structure Plan on of behalf of the Scottish Renewables Forum as part of an objection to strategic wind farm planning policy in the region. (Scottish Renewables Forum)
- Slievekirk Wind Farm – Landscape and Visual Impact Assessment for an overhead pole mounted grid connection for a new wind farm in Northern Ireland. (Airtricity)
- Durran Mains – Feasibility and design work associated with a proposed borrow pit for a wind farm in Caithness. (DP Energy)
- Scottish Wind Farm Site Search – Support to RES in their prospecting for new Scottish Wind Farm sites. Advice focussed on a review of Landscape Character Types and their capacity for wind farm development. (RES)
- South and East of England Site Search – Services to RWE NPower in the preparation of sieve maping in GIS, followed by the identification and ranking of search areas. (RWE Npower)
- Numerous Planning Policy Representations on behalf of Wind Farm developers. (Wind Prospect, North British Wind Ltd, Infinis)
- Dunduff Quarry Wind Farm - Preparation of a landscape appraisal to inform the potential planning of a new small scale wind farm adjacent to an existing quarry development. (Patersons of Greenoakhill)
- Tesco CHP Plant Goole – Landscape and Visual Impact Assessment for a proposed Combined Heat and Power Plant at the Tesco distribution warehouse near Goole, East Riding of Yorkshire. (Tesco)
- Tesco CHP Plant Livingston – Landscape and Visual Impact Assessment for a proposed Combined Heat and Power Plant at the Tesco distribution warehouse in Livingston, West Lothian. (Tesco)

Environmental Impact Assessment

- Wavegarden, Ratho – Preparation of scoping correspondence with City of Edinburgh Council, including preliminary Zone of Theoretical Visibility plans to confirm that Landscape and Visual matters could be scoped out of the EIA process – (Tartan Leisure)
- Trengothal Radio Station, Land's End, Cornwall – Landscape and Visual Impact Assessment for a proposed large new satellite dish antenna at the Trengothal Radio Station site, including the preparation of indicative photomontages. The site is located in close proximity to sensitive Cornwall AONB. (BT/Avanti)
- Peffermill Sports Complex and Athletes Village – Landscape and Visual Impact Assessment for the proposed re-development of the Peffermill Sports Complex and associated Athletes Village, Peffermill, Edinburgh (Edinburgh University)
- Bangour Village – Landscape and Visual Impact Assessment for a residential development within the former Bangour Village Hospital site (Ambassador Group)
- Mixed Use Development Comprising Film & TV Studio Including Backlot Complex, Mixed Use Employment Uses, Straiton, Midlothian – Preparation of a comprehensive landscape and visual impact assessment for 36 Ha site to the south of Edinburgh. (Pentland Film Studios Ltd)
- Dolphingston, East Lothian – Preparation of a comprehensive landscape and visual impact assessment for a proposed new 8.72 Ha residential development to the south-west of Prestonpans. (Hallam Land)
- Orchardfield, East Linton, East Lothian – Preparation of a comprehensive landscape and visual impact assessment for a proposed new 6.32 Ha residential development, including indicative wireframe visualisations. (Stewart Milne Homes Ltd)
- Millerhill Zero Waste Facility. LVIA for a new large scale waste facility at Millerhill, Edinburgh. (Midlothian Council)
- Garreg Lwyd Hill Wind Farm, Wales - Preparation of a Landscape and Visual Impact Assessment and as part of an Environmental Impact Assessment for a new overhead power line connecting from the substation in the middle of the Proposal site at Tre-foel over a course of 39km south to just beyond Kington in Herefordshire. (RES)
- Robin House Children's Hospice, Balloch - Landscape and Visual Impact Assessment Children's Hospice Association Scotland's second children's hospice for Scotland, Robin House in Balloch near Loch Lomond, open to children with life-limiting / terminal conditions and their families. Significantly the LVIA was carried out in the context of the newly formed Loch Lomond and the Trossachs National Park. Despite the design having been commended by bodies such as The Royal Fine Arts Commission, the new Park Authority's Planning advisor recommended the project for refusal on site and policy issues. Permission was granted at committee following completion of the LVIA.
- Global Point International Business Park, Belfast – Preparation of a Landscape and Visual Impact Assessment and Concept Design Statement as part of an Environmental Impact Assessment for a new 200 acre Business Park. (Invest Northern Ireland/Pro Logis)
- Castlecourt, Belfast – Preparation of a Townscape and Visual Impact Assessment as part of an Environmental Impact Assessment for a 500,000 ft² extension to city centre shopping mall. (Westfield Shopping)
- Dunadry, Nr. Antrim – Preparation of a Landscape and Visual Impact Assessment and Concept Design Statement as part of an Environmental Impact Assessment for a new garden village settlement. (Lagan Developments)

- Mullingar Business Park, County Westmeath, Eire – Preparation of a Landscape and Visual Impact Assessment as part of an Environmental Impact Assessment for a new 70 acre business park. (IDA)
- Ballyoan, Londonderry – Preparation of a Landscape and Visual Impact Assessment and as part of an Environmental Impact Assessment for a 95 acre settlement expansion. (Various)
- 'K' Village, Kendal - Detailed townscape assessment forming part of an Environmental Impact Assessment for the redevelopment of a former shoe factory as a factory outlet centre. (Guinea Group)

Quarry Related Experience

- Willington Sand and Gravel Pit Extension, Trent Valley, Derbyshire – Landscape and Visual Impact Assessment and mitigation strategy for the proposed quarry extension. (Cemex)
- Swinton Quarter Craft Stone Quarry, Swinton, Scottish Borders – Landscape and Visual Impact Assessment and mitigation strategy for the proposed re-opening of a small stone quarry in the Scottish Borders. (Hutton Stone)
- Comrie Colliery Reclamation Scheme, Comrie Open Cast Site, Oakley, Fife – Restoration planting strategy for the re-formed earthworks associated with this former open cast coal mine.
- Borrow Pits, Burn of Whilk Wind Farm, Caithness – Quarry phasing design and mitigation strategy for the proposed re-opening of a small hard rock quarry.
- Tarfhaugh Sand Pit, West Linton, Scottish Borders – Preparation of draft quarry development proposals as part of feasibility study for the potential opening of a sand and gravel quarry on the site of a glacial kame feature near West Linton.
- Durran Mains – Feasibility and design work associated with a proposed borrow pit for a wind farm in Caithness. (DP Energy)
- East Garnock, Quarry Design and Restoration - Lead design and planning of a 120Ha quarry proposal for a site in North Ayrshire. The design proposals include progressive restoration of the 7 million tonne extraction phased over 20 years. Restoration is focussed on the creation of extensive areas of new wetland habitat and tidal lagoons. (NPL Estates)
- Levenseat Quarry Extension, Fauldhouse, West Lothian – Preparation of full and detailed Landscape and Visual Impact Assessment in support of an application for a 12Ha extension to an existing sand and gravel quarry. (WBB Minerals)
- Levenseat Quarry Re-Phasing – Preparation of a presentation to illustrate proposals for an application to vary a Planning Consent. The presentation prepared in Powerpoint included the design of the proposed quarry phasing over a 20 year period alongside an accompanying landscape mitigation strategy. (WBB Minerals)
- Edston Quarry, Peebles – Preparation of a Landscape and Visual Impact Assessment (LVIA) in support an application to re-open a small hard rock quarry. The assessment included proposals for mitigation and quarry phasing.
- Craigiehill Quarry, Edinburgh - Dormant hard rock quarry. Landscape and Visual Impact Assessment (LVIA) as part of an EIA and Restoration Strategy for a change of use from a quarry to a recycling facility. (Tarmac)
- Beltmoss Quarry, Kilsyth, North Lanarkshire - Hard rock quarry. LVIA as part of an EIA and Restoration Strategy for an extension to an existing quarry. Followed by Determination of Conditions Application in respect of Conditions appended to Planning Permission. (Patersons of Greenoakhill)

- Cruicks Quarry, Inverkeithing, Fife - Hard rock quarry making aggregates. LVIA followed by Determination of Conditions Application in respect of Conditions appended to Planning Permission. Contract Administration of initial phase of the restoration planting works. Subsequent preparation of detailed restoration proposals to support an application for quarry deepening. (Tarmac)
- Cotside Quarry, Carnoustie, Angus - Sand and gravel quarry. LVIA and Restoration Strategy as part of an Environmental Impact Assessment for an extension to the existing quarry. Followed by Determination of Conditions Application in respect of Conditions appended to subsequent Planning Permission.
- Cunmont Quarry, Dundee, Angus - Hard rock quarry LVIA as part of EIA and Restoration Strategy for an extension to an existing quarry. Followed by Determination of Conditions Application in respect of Conditions appended to Planning Permission. (Ennstone Thistle)
- Boyne Bay, Portsoy, Aberdeenshire - Limestone quarry. Preparation of a Restoration Strategy as part of an application to modernise working conditions and a Planning Application for a quarry extension. (Boyne Bay Lime Company)
- Lough Fea, Draperstown, County Antrim, Northern Ireland - Sand and gravel quarry LVIA as part of an EIA and Restoration Strategy for a new sand and gravel quarry. (FP McCann)
- Altnamuskin Quarry, County Tyrone, Northern Ireland - Sand and gravel quarry. Preparation of a Restoration Strategy as part of a Determination of Conditions Application to the Planning Permission. (Mullin and Sons)

Masterplanning

- Bangour Village Hospital, West Lothian – Preparation of the Landscape Masterplan for the conversion of the former hospital site in a housing led masterplan. Ambassador Group Ltd.
- Winning entry for the Moorside Earthworks Competition in the west of Cumbria. The earthworks will form the setting to Europe's largest nuclear new build power station site at Moorside, planned by NuGen. <http://moorside.landscapeinstitute.org/>
- Preparation of a Concept Master Plan of Belad Al-Husayneya, Mecca, Saudi Arabia – Preparation of a concept masterplan and early stage design principles for a new suburban extension to the Holy City of Mecca. The preliminary concept design was developed from initial masterplan baseline studies, through a series of design options, followed by the adoption a final concept masterplan. (Al Waqif Family/Khatib and Alami)
- Raith Estate, Kirkcaldy West - Preparation of Concept Masterplan and detailed supporting statement as part of representation to the FIFEPlan Local Development Plan. (Raith Estates)
- Ardeer Peninsula, North Ayrshire - Masterplan led regeneration strategy for a 100 Hectare site to deliver of a mix of suitable and sustainable end uses. A series of Masterplan options have been prepared for the heavily constrained and contaminated site which are subject to an ongoing SEA process. Enviro have coordinated Stakeholder consultation and a series of public exhibitions which have led to the selection of a preferred Masterplan option.
- Tamfourhill, Falkirk – Preparation of a Concept Masterplan to guide Falkirk Council in planning the redevelopment of contaminated lands adjacent to the Union Canal. The proposals considered the integration of the Falkirk Wheel Visitor Centre, the Antonine Wall and the redevelopment proposals beside the canal including: residential; business; and commercial boat services/canal basins. (Falkirk Council)
- Former Woodilee Hospital, Lenzie - Masterplan led regeneration of a former hospital site for a new village development at Woodilee, Lenzie. The detailed site planning of the

village was designed in accordance with the 'home zones' principle and included the formation of a market street as the core to the proposed development.

- Dunadry Garden Village, Nr. Antrim – Preparation of a Concept Master plan, as part of an Outline Planning Application, for an innovative garden village of potential regional significance. The new village proposals include a mixed use development of approx. 1500 houses arranged around a central core, including parkland, local services, community facilities and a small business park. (Lagan Developments)
- Global Point International Business Park – Preparation of a detailed Master plan, as part of an Outline Planning Application, in support of a new 200 acre business park on the edge of Belfast. The development proposals consist of 1.45million ft² of business floor space set within a high quality landscape that includes linear parks, formal recreational facilities, a 'village centre,' and structural woodlands. Following on from the master planning stage a design brief was developed to provide a coherent and practical framework for the future development of the business park. (Invest Northern Ireland/Pro Logis)
- Middlefield, Falkirk – Preparation of a Concept Master plan in support of a proposed mixed use Business Park at Middlefield, Falkirk. The masterplan was accompanied by a design guide for the long term sustainable development of the site. (Callendar Estate)
- Dundee Western Villages – Master planning for a new village development to the west of Dundee. The detailed site planning of the village was designed in accordance with the 'home zones' principle and included the formation of a market street as the core to the proposed development. The proposed development has received detailed planning consent. (Bett Homes)
- Collinswell Park, Burntisland – Master planning for the development of a new residential development on the site of a former Aluminium Works. The scheme is centred on a new public park which was carefully designed to accommodate flood waters from the Kirkton Burn. (Collinswell Land)
- Blair's College Aberdeen - Preparation of Concept Masterplan for the re-development of a seminary college near Banchory. The proposals include a luxury hotel and signature golf course and golf related facilities, integrated with the development of 280 residential units. (Muir Group)
- Land at East Haddington – Preparation of a Concept Masterplan for a proposed settlement expansion and golf course extension to the existing Amisfield Golf Course on lands to the east of the village of Haddington in East Lothian. (Bryant Homes)
- Longniddry, East Lothian – Preparation of a Concept Masterplan for the expansion of an existing settlement incorporating a new golf course and country Club. (Bryant Homes)

Major Infrastructure Projects

- Jubilee River (Maidenhead, Windsor and Eton Flood Alleviation Scheme) - Design and implementation of 11.5km of new river channel to alleviate flooding along the River Thames, including Environmental Management throughout the contract period. (Environment Agency)
- M25 Widening - Comprehensive scheme design for proposed Motorway widening between Junctions 12-15 including comprehensive landscape and visual impact assessments and mitigation design. (Highways Agency)
- A1M Alconbury to Peterborough - Design and implementation of highway upgrade and widening including Environmental Management throughout the contract period. (Highways Agency)

Infrastructure Projects

- EE Mobile Phone Mast Roll Out – Preparation of landscape and environmental planning services to support the implementation of emergency mast sites throughout Scotland.

- Finnieston substation, Glasgow - Preparation of detailed landscape mitigation proposals for the city centre development (Scottish Power, 2011)
- Kentish Flats Offshore Wind Farm Extension - Preparation of a landscape, seascape and visual impact assessment for 17 turbine extension to an existing offshore wind farm. The work included the assessment of the cable landfall, transition pit and options for routing of the underground cable corridor over a 2km route from Whitstable to the onshore grid station. Support given on this NSIP through EIP process (Vattenfall, 2011).
- Proposed Substation, Swansea North - LVIA for a proposed 400kV substation near at Swansea North. The scheme has successfully been granted planning permission (National Grid plc, 2010)
- Blyth Offshore Demonstration Project - Confirmation of preferred route corridor for connection of a 1.5km underground HVDC route for the 275 kV export cables from the cable landfall and transition pit to the Blyth substation (formerly Blyth Power Station) owned by National Grid. Included extensive consultation and negotiation with Natural England (NAREC, 2011)
- Slievekirk Wind Farm - Landscape and Visual Impact Assessment for an overhead pole mounted grid connection for a new wind farm in Northern Ireland. (Airtricity, 2010)
- Garreg Lwyd Hill Wind Farm, Wales - Preparation of a Landscape and Visual Impact Assessment and as part of an Environmental Impact Assessment for a new overhead power line connecting from the substation in the middle of the Proposal site at Tre-foel over a course of 39km south to just beyond Kington in Herefordshire. (RES, 2010)

Townscape Studies and Assessments

Experience with a range of urban assessment work for a variety of new retail, commercial and residential development, covering a wide range of townscape analysis and surveys for urban renewal, regeneration and design studies.

- Iona Street – Preparation of verified visualisations to support a proposed residential development in Edinburgh (Manson Architects)
- Bonnington Road Lane – Preparation of verified visualisations to support a proposed residential development in Edinburgh (JM Architects)
- Jeffrey Street - Preparation of Townscape and Visual Impact Assessment and verified visualisations to support a proposed hotel extension development in Edinburgh (CFP Architects)
- Calton Hill, City Observatory Project – Townscape and Visual Impact Assessment for the proposed refurbishment and re-development of the City Observatory Compound. Key issues included consideration of the effects of a proposed new ‘Salon’ housing a restaurant, designed to reflect the adjacent neoclassical architecture, on the city skyline, the Edinburgh World Heritage Site and associated conservation designations.
- Royal Edinburgh Hospital (REH) Edinburgh - Townscape and Visual Assessment (TVA) for the proposed redevelopment of existing hospital complex in south Edinburgh suburbs to modernise and improve facilities, while retaining the key parkland edges and other important townscape/ landscape features and minimising effects on patients and surrounding residents. Hub South-east Scotland
- Port of Leith Redevelopment - Responsible for townscape and visual impact assessment and advice and guidance on the overall project design optimisation for the proposed redevelopment and extension of the Port of Leith, Edinburgh. Within this complex environment close to conservation areas, listed buildings and extensive areas of residential development key services included negotiation on the scope of the assessment with Statutory Consultees. 2012 – Ongoing. Scottish Enterprise / Forth Ports

- Audley Square, Mayfair – Preparation of a Townscape and Visual Impact Assessment as part of an Environmental Impact Assessment for a new hotel and apartment complex within the heart of Mayfair. The proposals for the eight storey building were developed with Foster and Partners. Architects. (Hedleigh (Mayfair) Ltd)
- Royal Shakespeare Theatre, Stratford Upon Avon – Detailed Townscape and Visual Impact Assessment forming part of an Environmental Impact Assessment for the redevelopment of the existing Royal Shakespeare Theatre. (Royal Shakespeare Company Ltd)
- Woodside Quarry, Horsforth, Leeds – Preparation of a Townscape and Visual Impact Assessment as part of an Environmental Impact Assessment for a mixed use development within the context of a former sandstone quarry within suburban Leeds. The proposals include a mix of residential and commercial uses including a small community hub centred around a high quality public realm. (Burford Group Ltd)
- Gallowgate, Newcastle Upon Tyne - Preparation of a Townscape and Visual Impact Assessment, including a night time lighting impact assessment as part of an Environmental Impact Assessment for a mixed use development on the former Tyne Brewery site. The proposals included: a hotel; offices; student halls of residence; and a residential accommodation, located within five separate buildings. (Storeys SSP/Downing)
- St. Andrews Greenbelt Study.
- South East Wedge, Edinburgh, Green Belt Study.
- Donaghadee – Preparation of a Town Strategy presenting an overview of the area's key characteristics, needs, issues and priorities, including a literature review, local survey/public consultation and report. (Ards Borough Council)
- Glengormley and Ballyclare – Town centre re-generation studies. (Newtownabbey Borough Council)
- Lee Valley Regeneration Study – Preparation of a regeneration strategy and associated environmental enhancements for the River Lee. (London Borough of Hackney)

Landscape Design and Implementation

- Nationwide House, Croft Campus, Swindon – Lead design consultant for major projects at Nationwide Building Society's Headquarters in Swindon, associated with the development of the Headquarters Campus for the Nationwide Building Society. These have included: the design and implementation of a new Decked Car Park and associated roof garden; major campus wide environmental enhancements; and, the construction of a new system of site access and circulation. All projects have included liaison with an extended project team, detailed contract management and inspection within the context of an extremely busy campus environment used by 3000 employees. (Nationwide Building Society)
- West Mill Road, Colinton, Edinburgh – Preparation of detailed hard and soft landscape proposals for a new residential development to discharge Planning Conditions, followed by the implementation of the scheme on site. (Applecross Properties Ltd)
- New Baptist Church, Moira, Northern Ireland – Preparation of detailed hard and soft landscape proposals for a new church to discharge Planning Conditions, followed by the implementation of the scheme on site.
- Eastfieldburn, Cambuslang – Preparation of detailed hard and soft landscape proposals for the restoration of a disused mine. Specifically, the proposals included the formulation of strategy to eradicate a Japanese knotweed infestation.
- 23a Northumberland St, Edinburgh – Preparation of detailed hard and soft landscape proposals associated with a domestic extension and new garden, followed by the implementation of the scheme on site.

- Cruicks Quarry, Inverkeithing – Preparation of detailed quarry restoration planting proposals to discharge Planning Conditions followed by on site implementation, contract management and inspection and ongoing maintenance.
- Altonhill, Kilmarnock – Preparation of detailed soft landscape proposals associated with a new residential development, initially to discharge Planning Conditions, followed by on site implementation, contract management and inspection and ongoing maintenance.
- Swanley Town Centre - Detailed design and implementation of town centre environmental enhancements. (Swanley Borough Council)
- Kuwait Oil Sector Complex - Preparation of detailed proposals for the design of a new flag ship development in Kuwait City. (Kuwaiti Ministry of Oil)

Urban Design

- Bells Mills, Dean Village, Edinburgh – Site planning and preparation of hard and soft landscape proposals as part of a Planning Application for 24no. apartments within 4no. 3-4 storey blocks for a vacant overgrown site adjacent to the Water of Leith. The scheme was successfully taken to appeal following a deemed refusal and is currently being worked up in detail for implementation. (Bishop Loch/BUREDI)
- Belford Lodge, Dean Village, Edinburgh – Similar scale and form of flatted apartment development for a nearby site beside the Water of Leith. The approved scheme is now also being worked up in detail for implementation. (Gregor Properties)
- Donaghadee – Preparation of a Town Strategy presenting an overview of the area's key characteristics, needs, issues and priorities, including a literature review, local survey/public consultation and report. (Ards Borough Council)
- Royal Quay, Harefield – Detailed planning application for a new residential development within the context of a Conservation Area, including hard and soft landscape proposals. (Ravenblack Developments)
- Gravesend – Detailed planning application for a new flatted apartment development overlooking the River Thames in Kent. The waterfront scheme includes the formation of a new riverside walkway focussed on a redeveloped pier and restaurant. (Ravenblack Developments)
- Ards Shopping Centre, Newtownards – Detailed hard and soft landscape design for the proposed re-development of a shopping centre. The extended development includes the creation of significant areas of formal and informal public open space, new squares, plazas and a water garden. A proposal for an extended earthwork feature forms the gateway to the development itself, Newtownards and the county of Ards and North Down. (Private Client)

Historic Garden Restoration Design

- Houghton Park - Preparation of detailed Restoration Management Plan for a Grade 1 registered park funded by English Heritage to improve the legibility of the landscape for visitors, re-create lost parkland and restore key relationships between the park and surrounding buildings. (Lord Cholmondeley)
- Regency Parks Brighton - Preparation of detailed proposals for the restoration of the existing dilapidated parks within Brighton. (Brighton and Hove Borough Council)
- Norfolk Square, Brighton - Site planning through to on site implementation for the restoration of Norfolk Square, Brighton. (Brighton and Hove Council)

Other Interests

- World travel, walking and mountaineering, climbing, ski-touring, cycling, vegetable growing, cooking, river and sea-kayaking, art.

Ruth Fain

Associate Director – Environmental Planning and Advisory

Qualifications and Professional Memberships

- MGeol (Hons) Environmental Geology
- Chartered Scientist (CSci)
- Member of the Institute of Environmental Sciences (MIEnvSc)
- Member of the Institute for Air Quality Management (MIAQM)
- NEBOSH General Certificate in Occupational Health and Safety (Distinction)

Career Summary

Ruth is a Chartered Scientist and Member of the Institute of Air Quality Management with over 18 years' experience in managing and delivering environmental impact assessment (EIA) and compliance projects, with a focus on renewable energy and industrial developments. She is an experienced client and project manager and is a specialist in development consenting.

In addition to her Project Management skills, Ruth is a technical expert in air quality and odour and is experienced in all aspects of environmental regulation and management. She utilises this operational knowledge in her EIA project management, bringing a whole project approach to the planning and design stages.

Ruth is knowledgeable in the latest UK EIA Regulations and their implementation, best available techniques, and conversant in international best practice guidance and standards for ESIA's issued by the International Finance Corporation and World Bank Group. She has experience of Development Consent Order applications and experience of working with all stakeholder groups associated with planning and consenting.

Selected Project Experience

Environmental Impact Assessment

- SaxaVord Spaceport, Unst - Assessment of Environmental Effects (AEE) and reporting to the Civil Aviation Authority as part of the Spaceport Operator License Application under the Space Act 2018. Management and reporting of AEE focusing on operation effects of launching small satellites from the three vertical launchpads on Unst.
- Shetland Space Centre - SaxaVord Spaceport, Unst - Management and reporting of EIA as part of major planning application for a vertical launch space port and associated infrastructure at Lamba Ness. Assessment over three years with particular focus on marine and transboundary effects, minimisation of impact on scheduled monuments and assessment and mitigation of effects on a diverse bird and animal population.
- Alvalde British Aluminium – Billet and Casting Facility, Fort William - Management of EIA for 12,254 m² billet casting facility. Works included multi-discipline EIA, flood risk management, drainage strategy design and peat management planning.

- Sembcorp - Combined Cycle Power Plant, Teesside. Air Quality, Noise and Greenhouse gas assessment works to support DCO variation required by design change to alternative technology.
- Legal & General - Hillthorn Business Park, Sunderland. Management and delivery of EIA technical input for a large industrial business park.
- Giants on the Quayside, World Wheel Company, Newcastle - Management and delivery of technical input to planning and EIA process including production of Environmental Statement for £100M urban regeneration project in Newcastle, comprising Europe's largest observation wheel and associated entertainment developments.
- International Advanced Manufacturing Park, Sunderland - Assessment and delivery of air quality input into Environmental Statement and Non-Technical Summary for Phase 1 and 2 of an advanced manufacturing park, including DCO process at phase 2.
- Forsa Energy - Air Quality Impact Assessment and delivery of air quality input into Environmental Statement and Non-Technical Summary for a proposed peaking power plant site with approximate output of 19.9 MWe and located in an area with particularly onerous council requirements.
- Distilleries – Management of development EIA for proposed distilleries including Glenmorangie, Glenrothes and a new distillery in Jedburgh. Assessment included multi-disciplinary assessment of construction and operational effects in accordance with appropriate standards.
- Mining Development, Gabon - Air quality monitoring (in-field) and EIA assessment to support a World Bank standard environmental and social impact assessment for the construction and operational phase of a mine in Gabon, Africa.
- Kosovo Motorway, Kosovo Ministry of Transport - World Bank standard environmental and social impact assessment for the construction and operational phase of the Kosovo Motorway Project. Assessment of impacts on air quality of a 102 km dual carriageway road scheme.

Associated Projects

- Locate Solar – Development and utilisation of a bespoke methodology with Lichfields for assessing site suitability for solar development.
- Confidential Client, South east England - feasibility assessment of developing ground mounted solar installations including identification of potential sites and grid and wider environmental constraints assessment.
- Project technical and development support, confidential thermal and fuel cell hydrogen installations, Protium Green Solutions, UK
- Bruichladdich – Project Hyladdie, Islay. Technical input into BEIS Green Distilleries funded feasibility study on incorporating innovative hydrogen combustion technology into an existing distillery.
- Permitting and Industrial Pollution Control
 - PPC / EP permit application, variations and surrenders - Project management and delivery of PPC/ EP permit applications, variations and surrenders for clients in the Manufacturing, Power, Oil and Gas and Waste sectors including Nestlé, Refresco, British Nuclear Group, Egdon Resources, National Oilwell Varco, AES Kilroot, Biffa, Shanks Waste Solutions, Princes, Thomas Hardy Brewery and Premier Foods. Support during negotiations with regulatory authorities, coordination of specialist studies and ongoing compliance and stakeholder engagement work.
 - Nestlé UK – Long term regulatory compliance support to various UK Sites including emissions dispersion modelling, odour impact assessment, Best Available Technique (BAT) assessment, cost benefit analysis and general EP compliance support during planning, permitting and divestiture stages of operation. Various sites across the UK. Regularly liaising between site contacts, regulators, client and external legal advisors and client commercial/PR teams regarding issues of nuisance, civil claims, EP permit breaches and transactional risk management.

- BAT Assessment - Assessment of particulate abatement plant for emissions from gas and coal fired boilers and other site process emissions for confidential manufacturing client. In addition to planning and permitting requirements, the investigation was submitted as a case study to an Environment Agency large combustion plant (LCP) BAT reference document working party.
- Air Quality and Odour Assessment and Modelling
 - Co-author: “Guidance on the Assessment of Odour for Planning”, Institute of Air Quality Management.
 - Odour Dispersion Modelling, Impact and BAT Assessments – odour impact assessment, BAT assessment and cost benefit analysis for planning, permitting and due diligence stages of operation for clients in the waste and manufacturing sectors. Regularly working with client legal and commercial teams regarding issues of statutory and private nuisance and operational risk management.
 - AERMOD and ADMS dispersion modelling and assessment of emissions from various manufacturing, waste and power facilities. Site impact assessment (base case) and investigation into modelled impact of operational improvement scenarios, including varying stack designs, locations and heights and BAT assessment of various abatement technologies.



Appendix 1.2 EIA Report Schedule of Environmental Commitments

Table 18.1 Schedule of Environmental Commitments

Subject Area	Commitment	Timing
Proposed Development		
CEMP	<p>All construction works will be subject to a Construction Environmental Management Plan (CEMP) to minimise environmental impacts during this phase of the Proposed Development. The CEMP will contain, as a minimum, the following management plans:</p> <ul style="list-style-type: none"> ➤ Pollution Prevention Management Plan ➤ Emergency Response and Flood Risk Management Plan; ➤ Biosecurity Management Plan; ➤ Construction Noise Management Plan; ➤ Dust and Air Quality Management Plan; ➤ Construction Waste Management Plan; ➤ Water Quality and Pollution Management Plan; ➤ Peat Management Plan; ➤ Habitat Management Plan; ➤ Protected Species Management Plan; ➤ Construction Traffic Management Plan; and, ➤ Archaeological Management Plan. <p>An outline CEMP, for information at the planning stage, is included in Volume IV as Technical Appendix 3.1. On appointment of the Principal Contractor, the outline CEMP will be reviewed, updated and submitted to Shetlands Islands Council for agreement prior to any construction activities commencing at the Proposed Development.</p>	Pre-construction and construction
Pollution Prevention Strategy	Prior to commencement of construction activities, a pollution prevention strategy, contained within a CEMP, will be agreed with SEPA to ensure that appropriate measures are put in place to protect watercourses and the surrounding environment.	Pre-construction and construction

	High standards of health and safety will be established and maintained at all times. All activities will be undertaken in a manner compliant with applicable health and safety legislation and with relevant good practice, as defined under applicable statutory requirements and codes of practice and guidance.	
OEMP	All operational works will be subject to an Operational Environmental Management Plan (OEMP) to minimise environmental impacts during this phase of the Proposed Development. An outline OEMP, for information at the planning stage, is included in Volume IV as Technical Appendix 3.2. On receipt of planning permission, the Applicant will work with relevant Launch Service Providers to review and update the OEMP and submit to Shetlands Islands Council for agreement prior to operational activities commencing at the Proposed Development.	Pre-operation and operation
DEMP	During decommissioning of the Proposed Development, the Applicant will produce, and adhere to, a Decommissioning Environmental Management Plan. The DEMO shall be developed in accordance with current legislation and guidance at the time of decommissioning.	Pre-decommissioning
Landscape and Visual		
Visual impact	The design of the Proposed Development has evolved as part of an iterative process which has aimed to provide an optimal design in environmental, as well as technical and economic terms and, landscape and visual mitigation measures have been a central consideration in the design process. The proposed design layout has been developed to minimise the effect on the surrounding landscape and visual resource. The layout design has therefore evolved with the intention of presenting a simple, well balanced image of the Proposed Development in the majority of views.	Pre-construction
	Reflecting the expansive nature of the site and the surrounding topography, each of the buildings to be located on the proposed Launch Site has been designed with simple forms, reflecting the characteristic scattering of barns in the landscape, helping the structures to integrate with the surrounding landscape. The clusters of new buildings at Lamba Ness will be given unity by use of similar recessive colour themes and palettes that draw upon colours seen in buildings across Unst and natural colours occurring within the local Unst landscape. To assist in breaking up the elevations, the buildings will be finished with a coloured horizontal cladding, transitioning from a dark red at ground level to light grey blending with the sky above.	Pre-construction
	The adjustment of site levels and earth working will be minimised where possible with the use of bunds, cuttings and embankments also minimised. Changes in level will be carefully reprofiled where possible to tie in with the natural flow of the landscape. Sharp, angular transitions in earthworks will be avoided where possible. The exception to this will be the formation of earth sheltered berms at the launch pads which will necessarily have steep profiles.	Pre-construction
	Sections of drystone walling which are in the way of the works will be re-positioned and rebuilt on new alignments where possible, tying in with the local network of field boundaries.	Site restoration

	Disturbed ground and areas of earthworks will be re seeded with seed of local and native provenance, to restore the semi-natural coastal grasslands. As appropriate, more sheltered areas may be left to natural regeneration and exposed areas restored with retained turves cut from the site.	Site restoration
	The use of lighting at the Proposed Development will be minimised, with cut off lighting used where possible to reduce lighting overspill and glare. Unnecessary lighting will not be introduced and only task specific lighting will be used. Flood lighting will be used at the launch pads in the few days preceding a launch, to illuminate the launch vehicle, with cowls used to prevent unnecessary overspill and glare.	Operation
Ornithology and Ecology		
Breeding Birds Protection Plan	The Applicant will develop a detailed Breeding Birds Protection Plan to be informed by, and updated annually through, targeted breeding bird surveys. The Applicant will engage an experienced ornithologist to undertake a series of repeat ornithological surveys to update the baseline information as required.	Pre-construction & Operation
Construction Work and Vegetation Removal	An experienced ornithologist will be employed on-site in an ECoW capacity during the pre-construction and construction phases. Wherever possible, all vegetation clearance will occur outside the breeding season (i.e. between September – March inclusive), to ensure that no active nests are damaged or destroyed by the proposed works. This includes any areas of vegetation removed for infrastructure.	Construction
Habitats Disturbance	Avoidance of unnecessary disturbance to habitats by minimising the extent of ground clearance and other construction practices as far as practicable. ➤ Reinstatement of habitats (e.g. preserving the topsoil from the habitat that is lost and laying it over the top of the areas to be reinstated). Micro-siting e.g. avoiding sensitive habitats. This will necessarily be carried out on the ground under supervision by the ECoW.	Construction
Species Licensing	Where planned activities may result in potential disturbance which would likely be considered unlawful under the 1981 Wildlife and Countryside Act and the 2004 Nature Conservation (Scotland) Act unless they were licensed, appropriate licenses will be acquired.	Construction
Habitats Management	Implementation of an Outline Habitat Management Plan to deliver the following aims: ➤ Enhance habitats for species of importance present on, or linked to, the study area.	Construction, Operation

	<ul style="list-style-type: none"> ➤ Restore important habitats and associated species. ➤ Create a wildlife watching hide. ➤ Peatland restoration. ➤ Create native riparian broadleaf tree/scrub cover. ➤ Coastal grassland habitat management. ➤ Creation of artificial otter holts. <p>Three of the above aims are focussed on breeding Schedule 1 bird species. Two of these objectives target mitigation for species likely to be adversely affected by the Proposed Development. One is better described as enhancement, as the objective is for a species where no adverse or likely significant effects are predicted.</p>	
Cultural Heritage and Archaeology		
Archaeological Programme of Works at the proposed Launch Site	An Archaeological Programme of works including Historic Building Recording, Peat Coring, a Strip, Map and Record Exercise and an Archaeological Watching Brief will be undertaken to mitigate direct impacts of the proposed Launch Site on archaeological remains. Where required, assets will be demarcated and/or construction works and plant movements will be monitored to avoid inadvertent damage to assets and features outwith the development footprint. All works will be overseen by an Archaeological Clerk of Works.	Pre-construction; Construction
Archaeological Watching Brief at Northdale Road	An Archaeological Watching Brief will be undertaken on ground-breaking works associated with the construction of the New Section of Access Road at Northdale. The aim of this will be to identify and assess the significance of any archaeological remains that may be present and, where these cannot be preserved in situ, to ensure they are preserved by record.	Construction
Archaeological Watching Brief at the proposed LRCC	An Archaeological Watching Brief will be undertaken on any ground-breaking works associated with the adaptation of the existing building on site for use as the LRCC. The aim of this will be to identify and assess the significance of any archaeological remains that may be present and, where these cannot be preserved in situ, to ensure they are preserved by record.	Construction
Vibration Monitoring	Vibration monitoring will be undertaken on archaeological Sites 96, 98, 99 and 111 in the vicinity of Launch Pad 3 and Site 85 in the vicinity of Launch Pad 2 and Site 90 between Launch Pads 2 and 3 during the operation phase. Furthermore, baseline data will be gathered prior to launches commencing on Site and monitoring will initially take place during launches to ensure that there is no damage to structures as a result of the operation of the Proposed Development. A programme of regular monitoring will be established thereafter and be dependent upon the results of initial monitoring. Where monitoring identifies the potential for structural damage, HES and the Shetland Regional	Operation

	Archaeologist will be informed immediately and further mitigation strategies will be discussed, agreed and implemented to prevent damage to any affected structures.	
Traffic and Transport		
Construction Traffic Management Plan (CTMP)	Review, update and adherence to the CTMP detailing mitigation measures deemed necessary to offset the temporary adverse effects of construction vehicles and including agreed operational times and haulage routes to the satisfaction of Shetland Islands Council. The CTMP is included in, and will be implemented through, the Construction Environmental Management Plan (Volume IV Technical Appendix 3.1).	Construction
Operational Traffic Management	<p>The primary mitigation for the operational phase will be the proposed New Section of Access Road at Northdale which will remove the need for vehicles accessing the proposed Launch Site to travel through Saxa Vord.</p> <p>Site entrance roads will be well maintained and monitored during the operational life of the development. Regular maintenance will be undertaken to keep the site access track drainage systems fully operational, the road surface in good condition, and to ensure there are no adverse issues affecting the public road network.</p> <p>Staff travel within the launch cycle will be managed using two private coaches to significantly reduce vehicle traffic. In addition, any visitors to the Proposed Development will be picked up and transported by the Applicant's electric vehicles to minimise traffic movements and reduce greenhouse gas emissions.</p> <p>Spectators will be controlled by a Spectator Traffic Management Plan (STMP) which will be agreed with Shetland Islands Council in advance of the first launch.</p>	Operation
Noise and Vibration		
CEMP	<p>A Construction Environmental Management Plan (CEMP) will be produced and implemented to minimise unnecessary disruption associated with construction works. The CEMP will provide contact details for the contractor undertaking the works, name the personnel responsible for communication with residents, and set out a complaints procedure such that noise complaints are handled appropriately.</p> <p>Where reasonably practicable, quiet working methods will be employed, including the use of the most suitable plant, reasonable hours of work for noisy operations, and economy and speed of operations.</p> <p>Where possible, given ferry timetables, deliveries to site by heavy goods vehicle (HGV) will be scheduled to minimise disruption during sensitive times.</p>	Construction

	Plant will be switched off when not in use, and unavoidably noisy works will, if required, be screened to reduce noise propagation towards neighbouring properties.	
General Noise Management	<ul style="list-style-type: none"> ➤ Fixed plant will be specified such that it meets appropriate noise limits at noise sensitive receptors; ➤ Where necessary, attenuation such as acoustic enclosures will be specified to enable noise limits to be met; ➤ Where possible, noisy items of plant will be situated such that project infrastructure provides screening (e.g. fans and air handling plant will be situated on the opposite side of buildings from the closest noise sensitive receptors); and, ➤ The Applicant will seek to minimise additional vehicle journeys by providing local accommodation for site workers. 	Operation
Community Engagement Protocols	<p>No mitigation is possible to reduce instantaneous noise levels associated with launches. However, the following community engagement protocols will be followed to seek to minimise the potential for annoyance:</p> <ul style="list-style-type: none"> ➤ Although predicted noise levels inside the closest dwellings will be substantially below the level at which discomfort or hearing damage would occur, the timing of launches will be advertised well in advance, in local media and online, such that local residents can avoid launch noise if they choose. Residents wanting to minimise their noise exposure may then choose to remain indoors when the launch is scheduled; and, ➤ The Applicant will engage with the local community to support local jobs and increase employment, increase tourism to the area and connect with local schools and colleges to aid teaching of science and technology subjects. Further details of proposed community engagement and expected local benefits are provided in Chapter 14 Socio-Economics of this EIA Report. 	Operation
Air Quality		
CEMP and CTMP	Mitigation measures during construction will comprise implementation of a Construction Environmental Management Plan (CEMP) and a Construction Traffic Management Plan (CTMP) in relation to staff movements to and from the site. The measures recommended for inclusion in the CEMP with respect to mitigating against potential dust nuisance and human health impacts are outlined in Volume IV Technical Appendix 11.1.	Construction

<p>Operational Controls</p>	<p>Improvements to the existing public road network and the construction of the New Section of Access Road at Northdale will mitigate against potential congestion pinch points that can lead to an increase in vehicle emissions due to reduced speed and stop-start behaviour.</p> <p>A Staff Travel Plan will promote car sharing. Staff travelling to the Proposed Development will be collected by coach from the ferry terminals thereby avoiding the generation of additional traffic numbers. The Applicant will use electric vehicles to collect and transport visitors to and around the Proposed Development.</p> <p>A Spectator Traffic Management Plan (STMP) has been developed to avoid congestion and encourage sustainable transport choices and is described in more detail in Chapter 9 Traffic and Transport of this EIA Report. The STMP will mitigate against the generation of air pollution from vehicles.</p> <p>Generators proposed for the LSPF will be compliant with EU Stage IIIa emissions limits (FG Wilson, 2020), and all other generators across the proposed Launch Site will be fuel optimised to minimise NOx emissions. Generator stack heights will be designed to ensure compliance with the Chimney Height Memorandum as defined in the 1956 Clean Air Act and to ensure effective dispersion and avoidance of potential downwash effects.</p> <p>The Applicant intends to secure a permanent three phase power supply for the proposed Launch Site, enabling the number of diesel generators to be reduced significantly to two standby generators and two mobile generators supplying the deluge pump systems used during launch events.</p>	<p>Operation</p>
<p>Geology, Hydrology and Hydrogeology</p>		
<p>CEMP</p>	<p>Mitigation measures during construction will comprise pre-construction site investigation works, and implementation of a Construction Environmental Management Plan (CEMP) relating to construction works at the proposed Launch Site, New Section of Access Road and LRCC.</p> <p>Pre-construction site investigation works will be undertaken to further characterise ground conditions, inform detailed foundation and infrastructure design, and refine proposed construction environmental management measures.</p> <p>The CEMP will include:</p> <ul style="list-style-type: none"> ➤ a detailed breakdown of the phasing of construction activities; ➤ a pollution risk assessment of the site and the proposed activities; ➤ identification of all Controlled Waters that may be affected by the works and temporary discharge points to the on-site drainage ditches and the marine environment; 	<p>Construction</p>



	<ul style="list-style-type: none"> ➤ planning and design of dewatering activities to minimise the local drawdown of perched groundwater in peatland habitat, and maintain the hydrology of identified sensitive habitats; ➤ planning and design of appropriate pollution control measures during earthworks and construction; ➤ details of appropriate fuel and chemical storage measures, including storage of such materials in suitably designated areas with impermeable bunding/containers, maintaining oil booms and absorbent pads within all work areas, keeping spill kits in all vehicles to enable a rapid and effective response to any accidental spillage or discharge, and training all construction staff in the effective use of this equipment; ➤ management of the pollution control system, including dewatering of excavations away from drainage ditches and the marine environment; ➤ contingency planning and emergency procedures; and, ➤ on-going monitoring of construction procedures to ensure management of risk is maintained. 	
Peat	<p>To minimise environmental effects as far as is reasonably practical, the following additional mitigation measures will be undertaken during construction and operation of the Proposed Development:</p> <ul style="list-style-type: none"> ➤ Excavated peat will be re-used on-site as far as is reasonably practicable and to provide suitable restoration, landscaping and localised habitat enhancement at identified disturbed/degraded areas of peat on-site without adversely affecting the Scheduled Monument designation or sensitive ornithological or ecological receptors, as set out in AECOM’s Outline Peat Management Plan (AECOM, 2020) (included as Appendix 12.4), and discussed in Appendix 6.3: Outline Habitat Management Plan (HMP). ➤ However, it has not been possible to identify on-site areas suitable for habitat restoration/enhancement in this manner, and large enough to re-use the predicted volume of excavated peat, without potentially having a detrimental impact on the site’s Scheduled Monument designation or ornithological/ecological receptors. As discussed in the Outline HMP, identified areas of degraded blanket bog habitat in the local area (off-site to the west and/or south-west) will therefore be subject to habitat restoration using excavated peat from the development which cannot be appropriately re-used on-site. This will include deposition of excavated peat (avoiding areas of established vegetation), hag re-profiling, erosion gully blocking and other actions (refer to Appendix 6.3 for further detail). A monitoring programme will be 	Construction

	<p>agreed to review the effectiveness of the HMP and agree any further work or modification. The HMP will be agreed with NatureScot (previously SNH), SEPA and Shetland Islands Council prior to construction, and will be implemented during the operation of the Proposed Development.</p> <ul style="list-style-type: none"> ➤ Through the on-site and off-site re-use and restoration, all excavated peat will be used without the requirement for any disposal of excavated peat. This therefore mitigates the effect of peat excavation (although recognising that habitat restoration will take time and will require monitoring as noted above). ➤ The above-noted habitat restoration works will also likely result in beneficial, though not material, hydrological effects on watercourses local to the agreed HMP area. ➤ A programme of surface water monitoring in the Burn of Norwick, upstream and downstream of the proposed New Section of Access Road, will be devised and implemented prior to and during construction. This will ensure that any impact on water quality in the Burn of Norwick can be identified, and extra measures introduced to address the cause of such impact. ➤ The area of geological interest along the cliffs in the south of the proposed Launch Site (designated as a GCR) will be appropriately demarcated on site during construction, and site operatives will be informed of the geological interest to ensure that construction works do not directly impact on this area. 	
Drainage	A detailed drainage strategy will be implemented. The AECOM Drainage Strategy report and associated drawings provided with Chapter 12 of this EIA Report, set out full details of the proposed arrangements for the management of drainage throughout the Proposed Development areas.	Operation
Marine and Transboundary Effects		
Launch Exclusion Zone and Protocol – Orbital Launches	<p>The Federal Aviation Administration (FAA) methodology will be applied to define an exclusion zone. This will apply to sea and air. Using FAA defined exclusion zones ensures a precautionary approach, as these are larger than UK exclusion zones. The direction from land will vary with the launch azimuth, with bearings currently projected to range from 330 to 030 True. The exclusion zone will span between the aforementioned bearings and extend outwards from the Launch Site to at least 3.3 nautical miles. Once an exclusion zone has been identified, the area will be registered on Marine Charts and will be activated via a Notice to Mariners.</p> <p>An exclusion zone is not anticipated to be required for the stages and fairings. For these, a Notice to Mariners will be published, with the exact areas dependent upon individual launches/rockets.</p>	Operation

<p>Launch Protocol – Sub-orbital Launches</p>	<p>In order to avoid Sullum Voe and Shetland airspace, stratospheric weather balloon launches will not take place if the weather conditions and modelling outputs predict the balloon will travel south-west and potentially land on any of the Shetland Islands or in the nearshore areas. This also minimises and essentially eliminates any risk to nearshore receptors, such as ports and harbours, areas of dense shipping activity, and breeding seabird species that utilise Shetland’s beaches and cliffs.</p> <p>Sounding rockets will use the FAA defined exclusion zone approach described above. Operational areas (nearshore of the rocket launch and the calculated drop zone) will be clearly marked and promulgated through Notice to Mariners if required by the Maritime and Coastguard Agency. If the zones are expected to be active for extended time periods, consultation with the UK Hydrographic Office will determine whether the zones need to be marked on Admiralty paper and electronic charts.</p> <p>Prior to launch, a Notice to Mariners will be published, and NAVTEX warnings and Sécurité messages will be broadcast over Very High Frequency (VHF) radio. This will ensure that other maritime users are aware of the launch and recovery operations and will assist in the implementation of temporary exclusion zones. In addition, continuous monitoring of AIS and radar will be carried out from land to ensure navigational safety at all times in the indicative impact zone. NAVTEX warnings will be provided at least five days in advance of launches.</p> <p>The recovery/patrol vessel will be present in the calculated drop zone throughout the launch of the sub-orbital (stratospheric weather balloon or single stage rocket). The vessel will monitor launches and the trajectory of the sub-orbital payload, receiving continuous real-time updates from land and the GPS receiver and tracker on the payload. The payload will also be monitoring visually, from land and from the vessel, using observers with binoculars. This will enable the recovery/patrol vessel to inform nearby and approaching vessels of the impending payload drop and recovery.</p> <p>In order to increase visibility, the Applicant will ensure that payloads are marked with bright yellow tape/paint and will affix a flashing beacon light.</p>	<p>Operation</p>
<p>Socio-economic Effects</p>		
<p>Stakeholder Framework Analysis (LaunchUK, Open University)</p>	<p>No mitigation is applicable to this chapter as the effects were all assessed as beneficial. However, the Applicant is committed to further study of the socio-economic effects of the Proposed Development as part of its preparations for operation. The Applicant has partnered with the Open University to research development of socio-economic opportunities arising from the Proposed Development beyond the usual indicators.</p>	<p>Pre-operation, Operation</p>



	<p>The Open University study will develop a stakeholder analysis framework to assess the socio-economic benefits of the Proposed Development as part of the Launch UK spaceflight programme. It is recognised that space ports can involve highly sensitive, rural areas, and consultations for stakeholder input analysis regarding socio-economic benefit assessments must be carefully planned (and tailored to the specific locale) in collaboration with local partners. Working with the Applicant, the Open University team will determine the stakeholders involved in the space port and define the most appropriate consultation and analytical process, thus enabling the Open University's socio-economic benefits evaluation framework to be applied. The focus of the framework is on determining the less tangible socio-economic benefits that arise from such activities, beyond the traditional financial analyses performed to date.</p>	
<p>Climate Change</p>		
<p>Climate Effects / Resilience</p>	<p>A range of standard mitigation measures will be implemented to lessen the impact of potentially significant climate effects on the Proposed Development:</p> <ul style="list-style-type: none"> ➤ Dust is likely to be generated during the construction phase and the magnitude will be exacerbated by hot and dry weather conditions, hence a Construction Dust Assessment has been carried out to determine the impact magnitude and sensitivity of receptors and to propose targeted mitigation recommendations. ➤ The launch vehicles (LVs) and Launch Service Provider (LSP) personnel will be protected from lightning strikes by a lightning protection mast which will function to dissipate lightning surges. ➤ Lamba Ness has localised areas at risk from pluvial surface water flooding, meaning the site is vulnerable to heavy rainfall. Within the proposed Launch Site there are small unnamed natural streams and watercourses, and drainage ditches have been cut in the flatter areas to aid drainage into these natural streams. A comprehensive drainage system will be implemented to mitigate flood risk during the construction and operation of the Proposed Development. ➤ Site activities during the construction and operational phases will be suspended during extreme weather events to mitigate against health and safety risks for site personnel and potential damage to structures and equipment. ➤ Construction and site personnel must be provided with appropriate personal protective equipment (PPE) to mitigate against the health and safety risks posed by extreme weather. For example, eyewear to mitigate against the health effects of dust mobilisation in high winds. ➤ Deluge pumps will be installed as a fire protection measure. 	<p>Construction, Operation</p>

<p>Greenhouse Gas (GHG) Emissions</p>	<p>IEMA best practice guidance considers all GHG emissions to be significant due to their contribution towards climate change. The following measures will be applied to reduce resulting GHG emissions:</p> <ul style="list-style-type: none"> ➤ A Construction Environmental Management Plan (CEMP) will be compiled in advance of the construction work. This will define mitigation measures to be incorporated into the construction process, including reducing emissions related to the embodied carbon of construction materials and minimising emissions associated with construction equipment and transport. An outline CEMP is included as Technical Appendix 3.1. ➤ The Applicant is seeking to maximise the local economic impact of the Proposed Development whilst simultaneously reducing the GHG emissions by sourcing goods and services from local suppliers where possible. This measure will reduce GHG emissions resulting from the transportation of personnel and goods in the construction and operational phases. For example, stone, the construction material required in the highest quantity, is proposed to be sourced from a quarry on Unst located only 4.5 miles away from the Proposed Development. ➤ A Peat Management Plan has been developed to prevent any extracted peat from drying and degrading before re-use and hence emissions due to breakdown of organic matter from the extracted peat are expected to be minimal. Pre-construction site investigation works will be carried out and a conservation management plan will be developed. Implementation of the conservation management plan will offset any loss of habitat by improving the condition of damaged peatland off-site and provide an improvement in comparison to the current baseline. The restoration of peat off-site proposed as part of the Outline Habitats Management Plan (OHMP) will result in net carbon sequestration. 	<p>Construction</p>
<p>Major Accidents and Disasters</p>		
<p>Safety case and risk assessment</p>	<p>Mitigation measures will be informed by the outcome of the emerging requirements of UKSA licensing guidance on safety case and risk assessment work required at the proposed Launch Site. Standard mitigation will also include the following:</p> <ul style="list-style-type: none"> ➤ Development of a management system and operating procedures; ➤ Maximising separation distance between launch vehicles and site operatives during testing and launch events; ➤ Minimal storage of reagents on site in favour of "just-in-time" delivery; and, 	<p>Operation</p>



	<p>➤ Bunded tanker transfer locations during launch vehicle fuelling.</p> <p>Inherent safe operating practices are required under UKSA licensing requirements. Other than where fluid bunding and transfer arrangements are noted, the mitigation of other accidents and disasters will be managed through parallel risk and hazard management processes under UKSA licensing.</p>	
Defence, Aviation and Telecommunications		
Defence	There will be no permanent structures above 15.2 metres in height nor any overhead power lines, in line with Ministry of Defence (MOD) requirements. The launch vehicles (LVs) themselves will potentially exceed this height when erected for launch. However, the MOD will be notified of all launch events which, in any case, represent only a temporary activity of short duration.	Operation
Aviation	The Proposed Development requires a Change of Airspace Use to be approved by the CAA, as a volume of airspace between the proposed Launch Site and orbit is required to be vacant before, during and after launches. This is a multistage process which is progressing as the detailed design of the Proposed Development emerges. Necessary design principles and industry consultations have taken place and the CAA has approved the application's progression to Stage 2 of the seven-stage decision and validation process, which is currently ongoing. The CAA will seek to minimise risks from the Proposed Development to all other airspace users.	Operation