1 INTRODUCTION

This Environmental Impact Assessment Report (EIAR) has been prepared by Ryan Hanley in association with MKO on behalf of the Office of Public Works (OPW) who propose to implement and maintain the River Deel (Crossmolina) Drainage Scheme. The Office of Public Works (OPW) is the lead agency for flood risk management in Ireland. The coordination and implementation of the Government's policy on the management of flood risk in Ireland, in conjunction with its responsibilities under the Arterial Drainage Acts, 1945-1995, form one of the core functions of the OPW.

1.1 BRIEF DESCRIPTION OF THE PROPOSED DEVELOPMENT

The River Deel and Crossmolina Town have a long history of flooding. The four most recent flood events in 1989, 2006, and 2015 (twice) resulted in flooding of three main streets in Crossmolina Town. Approximately 120 properties were inundated by flood water during the most extreme of these floods in December 2015. As such, there is a critical need for measures to be employed to alleviate any future flooding within the town

The proposed flood scheme for the River Deel is a diversion channel upstream of the town with a capacity of 110 cumec, which will redirect flood waters away from the town, directly to the flood plains of Lough Conn. The scheme will be designed to cater for the 1% Annual Exceedance Probability (AEP) flood event (also known as the 100 year flood event), but will also cater for a larger flood event as the diversion channel has additional capacity. This will safeguard against flooding associated with potential future climate change that could increase the size of the 100 year flood event.

The proposed infrastructure has been designed in order to prevent flooding in Crossmolina Town, while minimising resulting changes in the hydrology of the river, by avoiding any significant impact on river flows downstream of the intake structure for flows up to bank full flow.

The proposed works are detailed in Chapter 3 of this report and on the scheme drawings included in Appendix 3A. A brief description is provided in the following section.

In summary, the proposed works for the River Deel Drainage Scheme comprise the following:

- Site investigation;
- Site preparation and clearance;
- Construction of a new grass lined diversion channel commencing at the River Deel/ L1105 and terminating in the townland of Mullenmore to the East of the R315 Crossmolina to Castlebar Regional Road;
- Construction of a new reinforced concrete intake structure and spillway on the banks of the River Deel at the upstream end of the abovementioned grass lined channel complete with an adjustable steel plate at the top of the 70m reinforced concrete intake structure;
- Construction of a new river flow control structure incorporating adjustable steel plates. The structure will consist of a series of precast box culverts and will be located approximately 155 metres downstream of the intake structure;
- Construction of an earthen embankment and reinforced concrete retaining walls/ steel sheet piling at the river flow control structure;
- Construction of a new reinforced concrete energy dissipation structure within the proposed diversion channel to the south east of the R315;

- Construction of two new bridges, one each on the R315 (Mullenmore Bridge) and L1105 (Pollnacross Bridge);
- Raising the L1105 at the approach to the new bridge;
- Realignment of the Lake Road and creation of a new junction with the R315. This will necessitate the closure of a section of the existing road;
- Realignment and raising of existing avenues connecting the Lake Road to properties to the South;
- Creation of washlands between the termination point of the new channel and Lough Conn;
- Removal of existing access points/ access routes and creation of new access points;
- Construction of an access track along the top of the channel between the L1105 and the R315. An access track will also be constructed alongside the intake structure linking the L1105 to the river bank. This will be used for maintenance purposes;
- Localised regrading of ground levels, erection of fencing and access gates, to facilitate pedestrian/ vehicular access to and around flood defences, or to redirect overland surface water flow paths;
- Utility diversions where required;
- Maintenance activities and other non-structural measures.

1.2 LEGISLATIVE CONTEXT

The European Union Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment was amended by Directive 2014/52/EU (the "EIA Directive") which has been transposed into Irish law by the European Union (Environmental Impact Assessment) (Arterial Drainage) Regulations 2019 (S.I. No. 472/2019) (the "Irish EIA Regulations").

This EIAR complies with the EIA Directive and with the Irish EIA Regulations. The Environmental Impact Assessment (EIA) of the proposed project will be undertaken by the Minister of Public Expenditure and Reform (DPER), as the competent authority.

Article 5 of the EIA Directive provides where an EIA is required, the developer shall prepare and submit an environmental impact assessment report (EIAR). The information to be provided by the developer shall include at least:

> (a) a description of the project comprising information on the site, design, size and other relevant features of the project;
>
> (b) a description of the likely significant effects of the project on the environment;
>
> (c) a description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;
>
> (d) a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment;
>
> (e) a non-technical summary of the information referred to in points (a) to (d); and (f) any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.

MKO and Ryan Hanley were engaged as environmental consultants on the proposed project and commissioned to prepare this EIAR in accordance with the requirements of the EIA Directive and the Irish EIA Regulations.

The EIAR provides information on the receiving environment and assesses the likely significant effects of the proposed project on it and proposes mitigation measures to avoid or reduce these effects. It then provides an assessment of the residual effects of the scheme taking into account the implementation of mitigation. The function of the EIAR is to provide information to allow the competent authority to conduct the Environmental Impact Assessment (EIA) of the proposed project.

All elements of the project, (including the weir, spillway, flow control structure, washlands, hydromorphology of the River Deel, maintenance and all ancillary works) have been assessed individually, and cumulatively together, and then in combination with other plans and projects as part of this EIAR.

Guidance

The Environmental Protection Agency (EPA) published its *'Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports'* (EPA, August 2017), which is intended to guide practitioners preparing an EIAR and the EIAR complies with these draft Guidelines.

The preparation of this EIAR has been undertaken in compliance with the provisions of the '*Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessment*', published by the Department of Housing, Planning and Local Government (DHPLG) in August 2018.

The European Commission also published a number of guidance documents in December 2017 in relation to Environmental Impact Assessment of Projects (Directive 2011/92/EU as amended by 2014/52/EU) including '*Guidance on Screening*', '*Guidance on the preparation of the Environmental Impact Assessment Report*'. Ryan Hanley & MKO has prepared the EIAR in compliance with these guidelines also.

An EIAR for this project was put on public display in accordance with the Arterial Drainage Act (1945) and Amendment Act (1995), in Crossmolina Library and the offices of Mayo County Council for a period of four weeks between May 21st2018 and the 15th June 2018. Any observations and submissions relating to the project were reviewed and the EIAR has been updated and revised where relevant, to take account of any issues raised and to assess amendments to the design of the scheme that have occurred during the detailed design process. Following the exhibition in 2018, detailed hydromorphological assessments were undertaken along with additional flow modelling and detailed design and assessments. This led to the requirement for a change in the design of the scheme that included changes to the intake structure, the requirement for an instream flow control structure within the River Deel and the provision of an energy dissipation structure within the bypass channel. The EIAR has been updated to consider any comments received from the public and other consultees following the exhibition and also to reflect the changes in the design of the scheme.

1.3 PURPOSE AND SCOPE OF THE EIAR

The purpose of this EIAR is to enable the competent authority to carry out an assessment of the likely significant effects on the environment of the River Deel (Crossmolina) Drainage Scheme before it is consented. The EIAR describes the current state of the environment in the vicinity of the proposed development site in an effort to quantify the possible effects, if any, of the proposed development on the environment. It then provides details of the alternatives considered and the full details of all elements and stages of the proposed development. Following this, the environmental impacts of the proposed development

are assessed individually, and cumulatively together, and then in combination with other plans and projects. This assessment process served to highlight any areas where mitigation measures may be necessary in order to protect the receiving environment from any significant negative effects as a result of the proposed development. Where necessary and appropriate, mitigation measures are prescribed and residual impacts are then assessed.

1.4 STRUCTURE AND CONTENT OF THE EIAR

1.4.1 General Structure

This EIAR uses the grouped structure method to describe the existing environment, the potential impacts of the proposed development thereon and the proposed mitigation measures and the residual impacts that remain thereafter. Background information relating to the proposed development, scoping and consultation undertaken and a description of the proposed development are presented in separate sections. The grouped format sections describe the methodologies followed and an assessment of the individual, cumulative and in combination impacts of the proposed development in terms of: population and human health; biodiversity; land, soils and water; air and climate, noise and vibration; landscape and visual; cultural heritage, and; material assets (including traffic and transportation), along with separate chapters presenting a consolidated version of all the mitigation from each of the chapters and an assessment of the interaction of the foregoing.

The EIAR also includes a non-technical summary, which is a condensed and easily comprehensible version of the EIAR document. The non-technical summary is laid out in a similar format to the main EIAR document and comprises a description of the proposed development followed by the existing environment, impacts and mitigation measures presented in the grouped format.

1.4.2 Description of Impacts

As stated in the 'draft Guidelines on the Information to be contained in Environmental Impact Statements' (EPA, 2017), an assessment of the likely significant effects of a proposed development is a statutory requirement of the EIA process. The statutory criteria for the presentation of the characteristics of potential impacts requires that potential significant impacts are described with reference to the extent, magnitude, complexity, probability, duration, frequency, reversibility and transfrontier nature (if applicable) of the impact.

The classification of impacts in this EIAR will follow the definitions provided in the Glossary of Impacts contained in the following guidance documents produced by the Environmental Protection Agency (EPA):

- 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports – Draft August 2017' (EPA, 2017).
- 'Revised Guidelines on the Information to be contained in Environmental Impact Statements – Draft September 2015' (EPA, 2015)
- 'Advice Notes for Preparing Environmental Impact Statements – Draft September 2015' (EPA, 2015).
- 'Advice Notes on Current Practice in the Preparation of Environmental Impact Statements' (EPA, 2003)
- 'Guidelines on the Information to be contained in Environmental Impact Statements' (EPA, 2002).

This EIAR also has complied with the publication 'Environmental Impact Assessment of Projects -Guidance on the preparation of the Environmental Impact Assessment Report' (European Commission, 2017).

Table 1.1 presents the glossary of impacts as published in the EPA guidance documents. Standard definitions are provided in this glossary, which permit the evaluation and classification of the quality, significance, extents, probability, duration and type of impacts associated with a proposed development on the receiving environment. The use of pre-existing standardised terms for the classification of impacts ensures that the EIA employs a systematic approach, which can be replicated across all disciplines covered in the EIAR, as advised in 'Guidelines on the Information to be contained in Environmental Impact Statements' (EPA, 2017). The consistent application of terminology throughout the EIAR facilitates the assessment of the proposed development on the receiving environment.

Impact Characteristic	Term	Description
Quality	Positive	A change which improves the quality of the environment
	Neutral	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative	A change which reduces the quality of the environment
Significance	Imperceptible	An effect capable of measurement but without significant consequences
	Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
	Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
	Moderate	An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends
	Significant	An effect, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
	Very significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment
	Profound	An effect which obliterates sensitive characteristics
Extent & Context	Extent	Describe the size of the area, number of sites and the proportion of a population affected by an effect
	Context	Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions
Probability	Likely	Effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented
	Unlikely	Effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented
Duration and Frequency	Momentary	Effects lasting from seconds to minutes
	Brief	Effects lasting less than a day
	Temporary	Effects lasting less than a year
	Short-term	Effects lasting one to seven years
	Medium-term	Effects lasting seven to fifteen years
	Long-term	Effects lasting fifteen to sixty years
	Permanent	Effect lasting over sixty years
	Reversible	Effects that can be undone, for example through remediation or restoration
	Frequency	Describe how often the effect will occur. (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually)

Impact Characteristic	Term	Description
Type	Indirect	Impacts on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway
	Cumulative	The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
	'Do Nothing'	The environment as it would be in the future should the subject project not be carried out
	Worst Case'	The effects arising from a project in the case where mitigation measures substantially fail
	Indeterminable	When the full consequences of a change in the environment cannot be described
	Irreversible	When the character, distinctiveness, diversity, or reproductive capacity of an environment is permanently lost
	Residual	Degree of environmental change that will occur after the proposed mitigation measures have taken effect
	Synergistic	Where the resultant effect is of greater significance than the sum of its constituents

Table 1.1 Effect Classification Terminology (EPA, 2017)

Each impact is described in terms of its quality, extent, duration, significance and type, where possible. A 'Do-Nothing' impact is also predicted in respect of each environmental theme in the EIAR. Residual impacts are also presented following any impact for which mitigation measures are prescribed. The remaining impact types are presented as required or applicable throughout the EIAR.

1.5 PROJECT TEAM

1.5.1 Protect Team Responsibilities

The companies and staff involved in the production of this EIAR are listed in Table 1.2 along with their relevant skills, experience and qualifications.

Company	Principal Staff Involved in Project	Qualifications & Affiliations	EIAR Input and Biopic
MKO Tuam Road Galway H91 VW84	Pat Roberts	B.Sc. (Environmental Science) (2005) National University of Ireland, Galway Member of Chartered Institute of Ecology and Environmental Management (CIEEM)	Pat was responsible for co-ordination of the EIAR along with the preparation of the Introduction (Ch.1), Background Chapter (Ch.2) and Biodiversity Chapter (CH.5). Pat is a Senior Ecologist and director of the Ecology team with MKO. with over 15 years' post graduate experience as a professional ecologist. Pat has worked as a senior ecologist on numerous OPW projects for over 10 years. These have included including flood relief schemes and drainage maintenance projects. Pats key strengths include his depth of knowledge and experience of a wide range of ecological and biodiversity topics. He currently manages the ecological team within MKO and ensures that the outputs from that team are of a very high standard and meet the requirements of the clients.
	James Owens	M.Sc Plant Ecology, National University of Ireland, Galway (2017) BSc (Hons) Environmental Science, Ulster University Coleraine (2010) BSc Forest Management, Galway-Mayo Institute of Technology, Galway (2009) Botanical Society of Britain and Ireland (BSBI)	James assisted in preparing the Biodiversity Chapter (Ch.5). James has over 6 years' post graduate experience in private practice where he has worked as both an ecological sub-consultant and in the private forestry sector. James' main areas of expertise are in vegetation surveys, habitat assessments, tree surveys, silvicultural practices habitat mapping, Appropriate Assessment Screening, Natura Impact Statements and Ecological Impact Assessments.
	Evelyn Sikora	Bachelor of Landscape Architecture (2006) Edinburgh College of Art/Heriot Watt University	Evelyn is a Landscape Architect & Planner with five years of experience working as a landscape architect in private practice in Ireland. She prepared the Landscape & Visual Chapter (Ch.9). Evelyn worked with McCarthy Keville O'Sullivan between 2014 and 2018. Evelyn's key strengths and expertise are in the Landscape and Visual Impact

		Masters in Planning and Sustainable Development (2010) University College Cork	Assessment field, while she also has experience in landscape design, master planning, recreation planning and project management.
	Joanna Mole	MSc Renewable Energy Systems Technology, 2005, Loughborough University. Post-Graduate Diploma in Landscape Architecture, 1995, Leeds Metropolitan University. BSc(Hons) in Landscape Design and Plant Science, 1992, Sheffield University.	Joanna Mole is a Landscape and Visual Impact Assessment Specialist and Chartered Landscape Architect with McCarthy O'Sullivan Ltd. with over 15 years of experience working as a landscape architect in both private practice and local authorities. Joanna inputted into Chapter 9 of the EIAR. Prior to taking up her position with McCarthy Keville O'Sullivan in October 2017, Joanna worked as a Landscape Architect with Kav-Banof in Israel and held previous posts with CSR in Cork, LMK in Limerick, Geo Architects in Israel and Groundwork Bridgend in South Wales. Joanna is a Chartered Landscape Architect with specialist knowledge in Landscape and Visual Impact assessments for projects ranging from individual houses to large windfarms, cycle route design and landscape contract management. Since joining MKO Joanna has been involved in projects such as energy infrastructure, extraction industry and residential projects. Within MKO Joanna works as part of a large multi-disciplinary team to produce EIA Reports. Joanna holds chartered membership of the British Landscape Institute since 1998 and has been an examiner for British Landscape Institute professional practice exam.
	Dr. John Staunton	B.Sc. (1st class hons) Environmental Science - NUI Galway. PhD. Environmental Science - NUI Galway	Dr. John Staunton completed the Population & Human Health Chapter (Ch.4). He has a scientific background and has a proven record in project design, field survey techniques, GIS mapping, report writing, and publishing, being lead author on four peer-reviewed publications in international scientific journals. He has over three years professional experience in environmental consultancy during which time he has completed fieldwork, data analysis literature reviews and written reports for various EIS/EIAR chapters in a wide range of projects including multi-million euro developments. He has also supervised research projects dealing with various aspects of wind energy and the environment.
	Owen Cahill	Master of Science Environmental Engineering, Queens University Belfast (2010). Master of Science Construction Management, Galway Mayo Institute of Technology (2007). Bachelor of Science (Hons) Construction Management, Galway Mayo Institute of Technology (2004).	Owen is an Environmental Engineer with MKO, with over 11 years of experience in the Environmental Management and Construction Industries. He contributed to the Population and Human Health Chapter (Ch.4) of the EIAR. Owen's wide ranging multi sector experience has provided him with specialist knowledge and understanding of the challenges in the planning and delivery of developments with the minimum environmental impact and with practicality and constructability in mind. Owen has been involved as a Project Manager on a range of energy infrastructure, commercial, residential, waste facility and quarry projects as well as managing the licensing requirements of a number of EPA licensed facilities.

Ryan Hanley Consulting Engineers Sherwood House, Sherwood Avenue, Taylor's Hill, Galway	Jonathan Reid	BE (Hons) Bachelor of Engineering (Civil), National University of Ireland, Galway, (2003) CEng, Chartered Engineer MIEI, Member of Engineers Ireland MIAHS, Member of the International Association of Hydrological Sciences	Jonathan has 17 years' experience in the management, design, planning and development of major civil engineering projects, including flood relief schemes. Jonathan has led Ryan Hanley's team in the preparation of EISs (and EIARs) on several flood schemes including the Lower Lee (Cork City), Blackpool (Cork), and Bandon. He was responsible for the completion of the Description, Soils & Geology and Material Assets chapters (Ch.3, 6 & 11) in conjunction with Kathryn Carney. He also worked in conjunction with Dr. David Drew to complete the karst hydrogeology assessment.

	Sinead Gavin	BSc Environmental Biology, Staffordshire University (2000) MSc Environmental Resource Management, University College Dublin (2005) CEcol, MCIEEM Chartered Ecologist and Member of Institute of Ecology and Environmental Management	Sinead has 13 years' experience as an environmental scientist and ecologist. She has undertaken environmental assessments for a wide range of large and small-scale infrastructural projects. Sinead has been responsible for the management and writing of a number of EISs/ EIARs, Strategic Environmental Assessment (SEA) and Appropriate Assessment (AA) (Screenings and Natura Impact Statements) for development of schemes close to and within Natura 2000 sites (SAC/SPA). Sinead has been involved in Oral hearings for road schemes, been responsible for the management of expert witnesses and acted as expert witness for EIS/EIA Reports. Sinead was responsible for the water chapter (Ch.7) in conjunction with Dr. Connie O'Driscoll and the Air Quality, Noise & Vibration Chapter (Ch.8) in conjunction with Dr. Kathy Carney.
	Dr. Kathryn Carney	BE (Hons), Bachelor of Engineering (Civil), National University of Ireland Galway (2008) PhD Civil Engineering, National University of Ireland Galway (2012) MIEI –Member of Engineers Ireland	Kathryn is a civil engineer with 8 years' post graduate experience in the field of civil and environmental engineering. Kathryn was responsible for the Air Quality, Noise & Vibration Chapter (Ch.8) in conjunction with Sinead Gavin and the Description of the Proposed Development, Land Use, Soils & Geology and Material Assets Chapters (Ch.3, 6 & 11) in conjunction with Jonathan Reid.
	Dr. Connie O'Driscoll	BSc Marine Science, National University of Ireland, Galway (2004) HDip Education, National University of Ireland, Galway (2006) PhD Environmental Engineering, National University of Ireland Galway (2012) MCIEEM, Chartered Institute of Ecology and Environmental Management	Connie is an Ecologist and Environmental Scientist with 9 years' post graduate experience in the field of Environmental and Ecological Research, Environmental Impact Assessment, and Appropriate Assessment. Connie specialises in aquatic and wetland assessment and water quality. Connie was responsible for the water chapter (Ch.7) in conjunction with Sinead Gavin.

		CWEM, Chartered Water and Environmental Manager, CIWEM CEnv, Chartered Environmentalist, SocENV CSci Chartered Scientist, Science Council	
	Dr. David Drew	BA, Nottingham University (1964) PhD, Bristol University (1967)	Dr Drew is a former professor of Trinity College and was Senior Lecturer in Hydrogeology, Hydrology and Karst, Trinity College Dublin 1972 – 2011. Dr Drew has worked extensively in karst hydrogeological assessments throughout Ireland. Dr. Drew completed a karst hydrogeology assessment that is included as Appendix 7A.
John Cronin & Associates 3a Westpoint Trade Centre, Link Road, Ballincollig, Cork	John Cronin	B.A. (UCC), 1991, MRUP (UCD) 1993, MUBC (UCD), 1999	John and Colm were responsible for the production of the Cultural Heritage Chapter (Ch.10). Both John and Colm have each amassed a wide range of experience in the preparation of archaeological and cultural heritage assessments, including EIA assessment for flood relief schemes in Bandon, Cork City and Blackpool.
	Colm Chambers	B.A. (UCC) 2008, M.A. (UCC) 2011	
Proviz Courthouse Rd., Kinvara, Co. Galway	Mel Durkan	Dip. Design Communication Dun Laoghaire College of Art & Design	Proviz Limited are 3D visualisation company specialising in the provision of verifiably accurate photomontages for planning, public consultations and visual impact assessments. With over 17 years' experience, Proviz have evolved techniques in line with new technologies to ensure faithfully accurate visualisations for private, commercial and public works nationwide.

Triturus Environmental Ltd. 42 Norwood Court, Rochestown, Co. Cork	Ross Macklin	BSc Applied Ecology (2004) UCC HDip GIS (2006) UCC PDip Integrated Pest management UCD (2016) PhD (in progress) UCC	Ross Macklin is an environmental scientist who specialises in freshwater ecology, fisheries and water quality analysis. He completed a fisheries habitat assessment of the River Deel to support the Biodiversity Chapter of the EIAR. He has been involved in numerous projects that examine the impact of land use practices on the ecology and water quality of lakes, rivers and wetlands. He is currently completing his PhD on the ecology and impact of common carp (*Cyprinus carpio* L.) in Ireland.
Dr. Jonathan Turner UCD	Dr. Jonathan Turner	BSc Univ Newcastle upon Tyne MSc University College London PhD Univ.of Wales Aberystwyth	Dr. Jonathan Turner is a Lecturer in Physical Geography in the UCD School of Geography. Jonathan teaches courses on Earth Systems, River, Estuaries and Coasts and River Catchment Management. His research interests lie in the fields of River Science, Geomorphology and Environmental Change. Jonathan is a Director of the UCD Geography Itrax Core Scanner platform, which was acquired under HEA Equipment Renewal funding in 2009. Much of his research centres on the application of this facility, alongside other complementary palaeoenvironmental methods, to answer research questions related to environmental change and reconstruction. These collaborative projects range from research in deep marine contexts to shallow floodplain environments and more recently rock cores. Jonathan is currently involved in a number of research projects including HydroSed (2020-2024) which is investigating the hydrological and sediment impacts of forestry operations in Ireland and Reconnect (2016-2020) which focuses on the ecohydromorphological impacts of barriers to flow, such as weir structures. Jonathan is also involved in the Ancient Methone Archaeology which includes integrated geophysical and geomorphological investigations to reconstruct the buried harbour and shoreline of the ancient port of Methone, Greece. Recently completed projects include SILTFLUX (2012-2016), INFER (2012-14) and Source2Sink (2016-2018). Jonathan completed an assessment of the Bed Sediment: Characterisation, Entrainment Thresholds and Transport Rates for the River Deel that is included as Appendix 7B.

Table 2.2 Project Team