Chloe Duddy

From: Paul Hughes <info@enaghyouthforum.com>
Sent: 14 January 2020 14:44
To: Seamus Donaghy; Maura Fox; Local Development Plan
Cc: Durkan, Mark H.; John Kelpie
Subject: Strathfoyle/Maydown/Culmore Health Impact Assessment Recommendations (LDP Inclusion)

Hi Seamus,

Eamonn O'Donnell here from Enagh Youth Forum.

I am writing to remind you that it remains our firm understanding; that the recommendations A-O outlined in the Health impact Study (Ben Cave Associates 2015) will be taking forward and formally progressed and actioned by Derry City and Strabane District Council as part of the ongoing community planning and local development plan.

This was unanimously agreed at the last ever meeting of the Health impact Study Stakeholders Forum held at The Foyle Arena.

To this end, can you please now confirm that **all** of the recommendations will now be taking forward in line with the LDP Process and formally included in the plan?

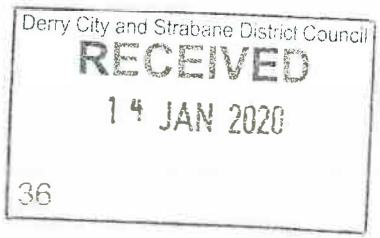
We would particularly emphasis the strong need for the inclusion of **Recommendation A** outlined within the reports recommendations.

http://meetings.derrycityandstrabanedistrict.com/documents/s12119/Appendix%201%20health%20impact%20REPORT.pdf

I would request that you acknowledge receipt of this correspondence.

Kind Regards,

Eamonn O'Donnell
Enagh Youth Forum
Tel: 02871860751



Ben Cave Associates Ltd
103 Clarendon Road, Leeds, LS2 9DF, UK
00 44 113 887 0770 : www.bcahealth.eu : information@bcahealth.co.uk

Industrial facilities: health impact study

for Derry City and Strabane District Council
Ben Cave Associates Ltd
30th April 2015

dcsdc_health_impact_report_300415

bencave associates

Ben Cave Associates Ltd
103 Clarendon Road, Leeds, LS2 9DF, UK
00 44 113 887 0770 : www.bcahealth.eu : information@bcahealth.co.uk

Contact details

T: 00 44 113 887 0770
E: information@bcahealth.co.uk

Prepared by	Ben Cave Associates Ltd
Commissioned by	Derry City Council

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Ben Cave Associates Ltd
103 Clarendon Road, Leeds, LS2 9DF, UK
00 44 113 887 0770 : www.bcahealth.eu : information@bcahealth.co.uk

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Ben Cave Associates Ltd
103 Clarendon Road, Leeds, LS2 9DF, UK
00 44 113 887 0770 : www.bcahealth.eu : information@bcahealth.co.uk

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Ben Cave Associates Ltd
103 Clarendon Road, Leeds, LS2 9DF, UK
00 44 113 887 0770 : www.bcahealth.eu : information@bcahealth.co.uk

Abbreviations and acronyms

AQMA..... Air Quality Management Area
AURN ..... Automatic Urban and Rural Network
BAT..... Best Available Technique
BiTC .....Business in the Community
BOC..... British Oxygen Company Ltd
BOD ..... Biological Oxygen Demand
CFNI..... Community Foundation Northern Ireland
COD ..... Chemical Oxygen Demand
COPD .....Chronic Obstructive Pulmonary Disease
DCC.....Derry City Council
DCSDC .....Derry City and Strabane District Council
DHSSPS..... Department of Health, Social Services and Public Safety
DRD .....Department for Regional Development
DSD..... Department for Social Development
EMF ..... Electromagnetic field
EU ..... European Union
HIA.....Health Impact Assessment
IMPEL ..... EU Network for the Implementation and Enforcement of Environmental Law
IPPC ..... Integrated Pollution Prevention and Control
IPRI ..... Industrial Pollution and Radiochemical Inspectorate
ITT..... Invitation to Tender
MDM ..... NI multiple deprivation measure
NISRA.....Northern Ireland Statistics and Research Agency
WHO..... World Health Organization
NIEA.....Northern Ireland Environment Agency
NIHE .....Northern Ireland Housing Executive
NOx ..... Nitrogen Oxides
PAHs ..... Poly Aromatic Hydrocarbons
PM .....Particulate Matter
PSNI..... Police Service Northern Ireland
RTI ..... road traffic incident
SOx ..... Oxides of Sulphur
WMU .....Water Management Unit
WWTP .....Waste Water Treatment Plant

Ben Cave Associates Ltd
103 Clarendon Road, Leeds, LS2 9DF, UK
00 44 113 887 0770 : www.bcahealth.eu : information@bcahealth.co.uk

Ben Cave Associates Ltd
103 Clarendon Road, Leeds, LS2 9DF, UK
00 44 113 887 0770 : www.bcahealth.eu : information@bcahealth.co.uk

1 Executive summary

1.1.1 We are pleased to present this report of the Health Impact Study requested by community groups in Strathfoyle and Maydown and commissioned by Derry City Council.

1.1.2 This study looks at the experiences of people living in Strathfoyle, Maydown and Culmore, and the businesses operating in Lisahally, the Londonderry Port, Maydown and in Culmore. It considers whether residential communities might be experiencing health effects as a result of exposure to industrial activity.

1.1.3 We use the World Health Organization definition of health as a 'state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity'. This tallies with the focus that the *One regeneration Plan for Derry-Londonderry*[1] places on the social determinants of health and wellbeing. Health and wellbeing are positive concepts.

1.1.4 The study area is approximately 8 kilometres from the city centre. It has poor links with the city centre. Its long-established residential communities live cheek by jowl with the greatest concentration of businesses requiring IPPC permits in Northern Ireland. These businesses, and others that operate in the area, serve regional, national and international markets. Their continued success is central to the economy of Derry-Londonderry, and to the economies of the North West of Northern Ireland and the North West of the island of Ireland.

1.1.5 No strategic document for the city or the region provides a coherent vision for the people or for the businesses in this area.

1.1.6 We heard from residents who report their health and wellbeing as being adversely affected by different sources of pollution associated with proximity to industrial facilities. People described exposure to poor air quality, night-time noise, light pollution, odour, infestation by pests and community severance from industrial traffic.

1.1.7 The wider economic, political and regulatory context does not favour a resolution of the central problem of residents in close quarters with industry. Derry-Londonderry needs inward investment and the Derry Area Plan allows for industrial development in this area. The regulatory system is complex and regulators are increasingly adopting a risk-based approach. The regulators' approach has been somewhat inconsistent based on resourcing issues. The historically poor land use planning that placed the residential communities into close proximity with industrial activities is now being exacerbated by population pressures and increased total emissions arising from increase in numbers of industrial facilities.

1.1.8 And yet, Derry City Council responded to the request for this study. Businesses and regulators participated in the study. All parties worked on the Steering Group for the study and expressed an interest in continuing to work together and in finding a way forward.

1.1.9 This study has run from December 2014 to March 2015. Our focus has been on laying the foundation for further discussion and activities. Thus, we have sought to identify:

- sources of information regarding industrial activities in the study area;
- ways in which stakeholders can work together from April 2015 onwards;
- ways in which stakeholders can hold each other to account; and

[1] See Transformational Theme 4: Health and Wellbeing

- where responsibility lies for each issue.

1.1.10 We have conducted consultation events with residents in the three communities; we have reviewed information provided by all stakeholders; we have spoken with businesses operating in Lisahally and Culmore and with officers from Derry City Council and the Northern Ireland Environment Agency.

1.1.11 No single business is responsible for all the impacts experienced by residents. However, it is important for each individual business and for the regulators to understand the nature and combination of the exposures that residents describe. This also underlines the importance of an integrated approach to addressing the problems the communities face. Moreover, this integrated approach needs to involve all key stakeholders including the communities affected.

1.1.12 Despite the adverse effects described by residents, they spoke almost with one voice in supporting the presence of industry in the area and in recognising the importance of employment, job security and the potential for job creation, especially for local people. They also recognized the importance of the port economically for the whole population of Derry-Londonderry. Residents, however, were concerned about plans for expansion and requested that their voices be heard and their rights be respected. The transfer to district councils of powers for planning presents an opportunity to develop a coherent vision for the area.

1.2 Conclusion

1.2.1 Residents from communities in the study area report they are experiencing adverse impacts on their health and well-being from proximity to industrial facilities.

1.2.2 Current monitoring data for the area is insufficient to link reported changes in health outcomes to specific sources of emissions or disturbance. For this reason impacts are generally non-attributable.

1.2.3 The area context suggests impacts are due to multiple sources, each of which is likely to be within permitted levels, but which cumulatively give rise to conditions which local residents find unacceptable.

1.2.4 Scientific evidence identified through a review of academic research suggests this is plausible.

1.2.5 The review of information regarding cancer clusters in the study area identifies the need for further information.

1.2.6 Studies of other residential communities near industrial areas show that causation is difficult to establish.

1.2.7 The evidence gathered by this study suggests that it would be appropriate to adopt the precautionary principle with regard to current practices and future development, industrial and residential.

1.2.8 The report notes the role of the industrial facilities in the study area as sources of local and regional employment. Employment is important for the health and wellbeing of people in employment, their families and dependents.

1.2.9 We recommend a small area health study to determine if there are measurable changes in clinical health outcomes due to environmental exposure to industrial activity.

1.2.10 Political and regulatory action should not wait for those results in starting to find a solution that safeguards both local jobs and local living conditions.

Ben Cave Associates Ltd
103 Clarendon Road, Leeds, LS2 9DF, UK
00 44 113 887 0770 : www.bcahealth.eu : information@bcahealth.co.uk

1.2.11 The table below presents main recommendations from the authors of this Health Impact Study. The report and its annex contain additional detailed recommendations.

Table 1-1: Recommendations: Health Impact Study team to stakeholders in the study area

Ref	Recommendation
A.	Derry City and Strabane District Council to consider using its powers under the Planning Act (Northern Ireland) 2011 to develop a vision and a plan for the study area that incorporates residential and industrial development and to meet the requirements of its *One regeneration Plan for Derry-Londonderry* and any recommendations emerging from the community plan by working with communities and businesses to develop, articulate and realise the vision and the plan.
B.	Derry City and Strabane District Council to consider convening and enabling a task force for the study area to provide a governance structure by which to address the issues faced by communities and businesses and by which to develop constructive and ongoing relations.
C.	For all stakeholders in the study area to consider setting up a liaison group with representation from business and residents: this could meet regularly. The frequency of the meetings is likely to be greatest while the liaison group is establishing itself.
D.	Businesses to consider ways to provide information about industrial processes to residents in study area to alleviate concerns (regarding standard operational practice; procedure in event of a breach of permit etc) and to notify of any extraordinary activity.
E.	Businesses that use the port and harbour to consider developing an early warning system for residents in Culmore (eg text message) in the event of work eg scheduled arrival of ship and need to work for extended period or extraordinary events such as maintenance activities taking place beyond a given hour.
F.	Derry City and Strabane District Council to consider supporting and seeking funding for a Small Area Health Study to examine links between health outcomes and environmental exposure including potential clustering of cancer morbidity and mortality, and that of other health outcomes, in the study area.
G.	For all stakeholders in the study area to consider ways to support initiatives that record and celebrate the history of the study area and the role of business and communities working together eg contributing funding towards the social history project in Strathfoyle.
H.	Derry City and Strabane District Council to consider ways to develop links between the city centre and the study area including green infrastructure in Strathfoyle and rail, pedestrian and cycle links to city centre.
I.	Transport NI to consider ways to proactively manage the industrial and residential traffic in Culmore, Strathfoyle and Maydown and to improve infrastructure for walking, cycling and public transport.
J.	Derry City and Strabane District Council to consider ways to brief elected members about roles and responsibilities within the new district council and regarding governance of assets such as the Port and ways in which to represent residents as well as businesses.

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103 Clarendon Road, Leeds, LS2 9DF, UK
00 44 113 887 0770 : www.bcahealth.eu : information@bcahealth.co.uk

Ref	Recommendation
K.	Derry City and Strabane District Council to consider ways to proactively manage the roads and perimeter areas at port/Lisahally to ensure that the roadways, verges and public realm are clean and well-maintained.
L.	The Northern Ireland Environment Agency (NIEA) and Derry City and Strabane District Council to consider establishing a permanent physical presence for the NIEA in the North West area/Derry-Londonderry/Lisahally.
M.	Derry City and Strabane District Council and the NIEA to audit and update existing permits in light of current Best Available Techniques (BAT) and understanding of cumulative impacts. There should be a three yearly review thereafter.
N.	Derry City and Strabane District Council and other regulators to consider ways to ensure that officers have sufficient resources to develop and maintain constructive relationships with operators in the study area and to review and enforce permits. This will include, but should not be limited to, having regard to dedicated officer time; seniority of officers tasked with liaising with operators; and proactive work with businesses.
O.	Derry City and Strabane District Council, and any Task Force that may be set up, to consider a monitoring regime with the remit of protecting human health. The regime should include: reviewing existing data on emission across the Study area; considering cumulative impacts; eestablishing a programme of environmental monitoring across the study area; modelling health impacts based on these results; and reporting the findings regularly to all stakeholders.

Ben Cave Associates Ltd
103 Clarendon Road, Leeds, LS2 9DF, UK
00 44 113 887 0770 : www.bcahealth.eu : information@bcahealth.co.uk

2 Introduction

2.1.1 This is the Main Report of a Health Impact Study examining the potential for health impacts in Strathfoyle, Maydown and Culmore as a result of a concentration of industrial activity around these communities. The study was initially requested by community groups in Strathfoyle and Maydown. It was commissioned by Derry City Council. This report and its Annex are an independent assessment of the situation. The intention is to inform a resolution process involving the communities, the industries and the regulators. The report concludes with recommendations for next steps. The report is laid out as follows:

- in Section 3 we describe the Method and show how the study was conducted;
- in Section 4 we describe the study area and look at its importance within Derry-Londonderry and the wider North West;
- in Section 5 we describe the industrial activities in the study area;
- Section 6 contains an initial population profile;
- in Section 7 we summarise the observations, insight and experiences from people who attended the consultation sessions;
- Section 8 provides a strategic overview of the permits that are currently in place for the operators in the study area;
- Section 9 provides key findings from our review of academic research into health outcomes and determinants of health; and
- Section 10 provides a list of all the documents cited throughout this report. Each document is numbered and referenced in brackets within the text.

2.1.2 This report can be read in conjunction with its Annex. The Annex goes into more detail than is possible in this Main Report. The contents of the Annex are shown in Table 2-1 below.

Table 2-1: Contents of Annex to the Main Report

Section	Title
1	Request for Health Impact Assessment
2	Health Impact Assessment
3	Community consultation: method and recommendations
4	Recommendations from the study team
5	Review of academic research: determinants of health
6	Permitting: an introduction
7	Review of experiences from other communities near ports and/or industrial estates
8	DHSSP and Enagh Youth Forum Management Committee
9	Investigation of Cancer Clusters
10	Small area health study
11	Documents provided to Study team
12	Permits, licences and reports provided to Study team by regulators
13	List of references

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103 Clarendon Road, Leeds, LS2 9DF, UK
00 44 113 887 0770 : www.bcahealth.eu : information@bcahealth.co.uk

3 Method

3.1 Aims of the health impact study

3.1.1 The aims of the work between January 2015 and March 2015 have been to identify:

- sources of information regarding industrial activities in the study area;
- ways in which stakeholders can work together from April 2015 onwards;
- ways in which stakeholders can hold each other to account; and
- where responsibility lies for each issue.

3.1.2 These aims focus on establishing constructive relationships between businesses in the study area and the community. This will involve establishing an understanding of the context and a description of various aspects of the current situation. This is not an epidemiological study.

3.1.3 We have reviewed existing information including permits and licences to operate; policy documents; population information and academic research. We have consulted the residential community and we have interviewed representatives from some of the businesses in the study area. We have spoken with regulators and academics. We have looked at existing studies carried out with regards to nuisance, and reviewed grey literature which is in the public domain, or which has been provided by the community.

3.1.4 Our approach seeks to align 'objective science' with community narratives. Through the consultation we have recorded community narratives and the ways in which residents report their health. The ITT specified that actual health effects should be reported. At each stage of the proposal and the reporting process we stated that for the purposes of this study we define self-reported health effects as actual health effects. The self-reported health effects were analysed and presented according to emerging themes. They were also placed in context through an evidence review: this summarised literature on the health impacts that have been reported in similar contexts. Examining, and concluding on, the validity and extent of the health effects reported by the community would be an outcome for a small area health study. A small area health study is recommended as one of the potential next steps arising from this study.

3.1.5 We note that the absence of 'evidence' in the published literature does not necessarily mean there is an absence of effect.

3.1.6 The study identifies issues that merit further investigation and makes a series of recommendations to Derry City and Strabane District Council, to the local communities, to local businesses and to the regulators.

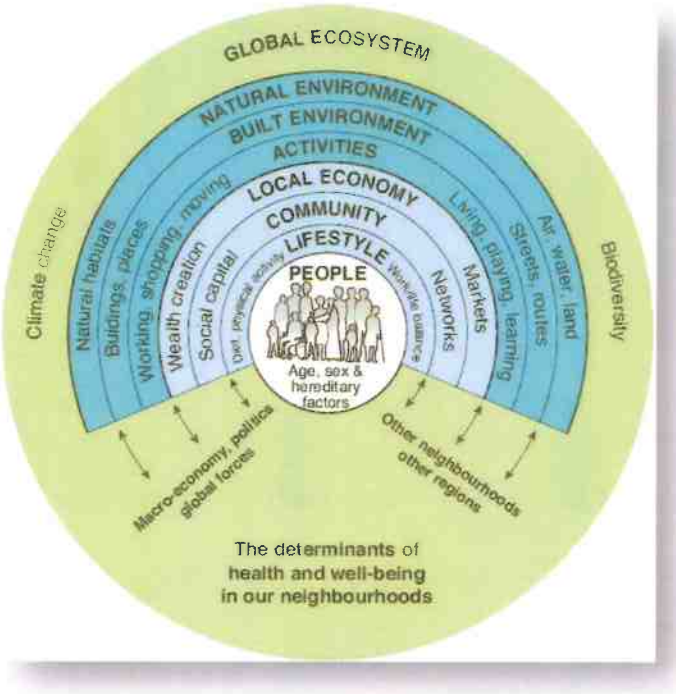
3.1.7 The final goal of this programme of work is to foster an atmosphere of mutual trust so that businesses, community, and regulators can work together for the wellbeing of all concerned, which in turn could lead to enhanced inward investment for Derry-Londonderry and a thriving local community.

3.2 Defining health and its determinants

3.2.1 The study uses the WHO definition of health, which states health is a 'state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity' (1). The study is also concerned with ensuring that differences in health between population groups are minimised. These are known as inequalities in health.

Ben Cave Associates Ltd
103 Clarendon Road, Leeds, LS2 9DF, UK
00 44 113 887 0770 : www.bcahealth.eu : information@bcahealth.co.uk

Figure 3-1: Determinants of health and wellbeing in our neighbourhoods



Source: Barton and Grant (2), based on Whitehead and Dahlgren (3)

3.2.2 Many factors in the social, economic and physical environment can influence the health of communities and the health of individuals within communities. These factors can have positive, negative or neutral effects. Figure 3-1 summarizes some of the main determinants of health and their spheres of influence, starting with those at an individual level and moving through to those at a societal level. Some factors that influence health are outside an individual's control, such as age and the macro-economy, politics and global forces. Individuals have more control over lifestyle factors including physical activity and smoking and community factors.

3.2.3 Figure 3-2 shows that this approach is integral to the regeneration plan for Derry-Londonderry which has health and well-being as one of its five themes.

Figure 3-2: Transformational Theme 4: Health and Well Being

> The health and wellbeing of any population is inextricably linked with levels of poverty and disadvantage experienced by its residents. Building on Derry-Londonderry's Healthy City designation, a City that is: 'happy, healthy, beautiful, safe and nurturing' means adopting a 'proactive' approach to our health and well-being across all ages through raised awareness and targeted preventative measures.
>
> From Derry-Londonderry Strategy Board (4)

Steering group membership

3.2.4 The health impact study is being overseen by a steering group. DCC worked with interested parties to convene the steering group. This includes representation from community groups and residents in Maydown, Strathfoyle and Culmore. It also includes representatives of businesses operating in Lisahally and Culmore as well as regulators. The Steering Group met on 27th January 2015 and 24th March, 2015. Those in attendance are shown in Figure 3-3.

Figure 3-3: Steering Group attendance

Organisation/affiliation	Name	Date of meeting	
		27/01/15	*24/03/15*
Brickkiln Waste Ltd	John Doran	Attending	-
Brickkiln Waste Ltd	John Doran, Tommy McGlinchey	-	Attending
Coolkeeragh ESB Ltd	Jim Cooke, Shauna Concannon	Attending	Attending
Culmore Resident	George Gilmour	Attending	Attending
Derry City Council	Karen Phillips, Paul McSwiggan, Ailish Daly, Gemma Scarlett	Attending	Attending
Derry City Council	Conor Canning	Apologies	Apologies
Derry Healthy Cities	Eamon O'Kane	Attending	Attending
Enagh Youth Forum	Paul Hughes, Eamon O'Donnell, David Bradley	Attending	Attending
Foyle Food Group	Nigel Mcliwaine	Attending	Attending
Fuel Preparations International	Adrian Scullion	Attending	Attending
Greater Shantallow Area Partnership	Lorraine McWilliams	Attending	Apologies
Institute Public Health Ireland	Joanna Purdy	Attending	Attending
Invista Textiles (UK) Ltd	Alan McElreavey	Attending	Attending
LSS	Alan Kerr	Attending	Apologies
Maydown Community Association	Martin McCartney	Attending	Attending
NIEA	David Bruce	Attending	-
NIEA	Keith Bradley	-	Attending
Planning Service	Johnny McNee	Attending	Attending
Port & Harbour Commissioners	Damien Rodgers	Attending	Attending
PSNI	Insp Terry McKenna	Apologies	Attending
Strathfoyle Community Association	Alex Duffy	Apologies	Apologies
Ben Cave Associates Ltd	Ben Cave, Gillian Gibson	Attending	Attending

Overview of permits

3.2.5 DCC and NIEA were approached for an up-to-date list of permits and planning applications.

3.2.6 The documentation that was received was reviewed to draw broad conclusions about this type of regulation.

3.2.7 The findings are strategic and can inform regulators (including DCSDC and NIEA) of the ways in which they might update and/or strengthen the permits when they come up for review. The report does not focus on individual businesses.

Community consultation

3.2.8 The results of the consultation are presented according to issues/themes. There is also a geographical division with a section on issues emerging from Strathfoyle and Maydown and a section on issues emerging from Culmore. There is a section which covers the issues that are shared by both communities.

3.2.9 The community voices provide detailed comments and rich information about the variety of effects that people who took part in the consultation experience.

Review of scientific evidence indicating health impacts associated with environmental issues

3.2.10 A focused rapid review was undertaken of the scientific literature. The review provides a balanced discussion of the evidence to clarify, in general terms, the links between industrial activities and health. This information is intended to be used to improve understanding for industry, communities and regulators as they find a constructive way forward with greater communication and shared understanding of the issues. Given the breadth of possible issues that could be reviewed, the topics have been selected based on concerns raised during the Strathfoyle, Maydown and Culmore scoping consultation events. This makes the discussion relevant to community concerns, which DCC took as the starting point for commissioning the health impact study. The purpose of the evidence review is to contextualise the plausibility of self-reported community health impacts in the study area. It shows those health impacts that have been reported in published studies of similar contexts. The evidence review does not involve judgement as to the validity or extent of impacts reported by the community. That judgement would be the outcome of the small area study recommended as a next step from this current study. The review focused on articles indexed in PubMed in English in the last 10 years. The review used the strongest types of evidence (systematic reviews and meta-analyses), but where there was a lack of evidence a hierarchy of other sources were also considered. The review graded both the quality of the included studies and the strength of evidence that they indicated for a particular health impact. A detailed methods statement is included alongside the full results of the review in Annex 5.

Ben Cave Associates Ltd
103 Clarendon Road, Leeds, LS2 9DF, UK
00 44 113 887 0770 : www.bcahealth.eu : information@bcahealth.co.uk

4 Context

4.1 Introduction

4.1.1 In this section we consider the economic and social context for this study and we consider how the study area is provided for in the regeneration plan for Derry-Londonderry (4) and in the Derry Area Plan (5). We conclude with a consideration of the opportunities afforded by the merger of Derry City Council with Strabane District Council and the advent of community planning.

4.2 The study area

4.2.1 The study area for the health impact study has been defined in relation to Townlands (small geographical divisions). Figure 4-1 shows the Townland boundaries in green. The industrial activities examined by the health impact study are in the Townlands of Coolkeeragh, Carrakeel and Culmore.

4.2.2 The communities examined by the health impact study are in the Townlands of Maydown, Templetown, Enagh, Lisnahawley, and Culmore. In some cases there is overlap, e.g. there are some residential areas in CoolKeeragh Townland.

4.2.3 In the report the industrial activities at Coolkeeragh and Carrakeel Townlands are collectively referred to as Lisahally as this is the name given to the industrial estate.

4.2.4 In the report the communities of Coolkeeragh, Enagh and Lisnahawley Townlands are collectively referred to as Strathfoyle.

4.2.5 Similarly the communities of Maydown and Templetown Townlands are collectively referred to as Maydown.

Figure 4-1: Study area

Spatial NI. Northern Ireland portal for Geographic Information. Accessed 17.03.15. https://www.spatialni.gov.uk/geoportal/viewer/index.jsp?title=&resource=:

4.3 Derry-Londonderry within the North West of Northern Ireland

4.3.1 Derry-Londonderry is recognised as being the principal city of the North West of Northern Ireland (6). Transport infrastructure, and the energy and communication grids are identified as being critical to enhancing the conditions necessary for Derry-Londonderry's competitiveness and sustainable economic development (6).

4.3.2 The regeneration plan for Derry-Londonderry maps out how the city seeks to improve its economic performance. It places the people of Derry-Londonderry at the centre of plans for regeneration. Challenges include reducing dependence on the public sector as an employer, creating employment opportunities by attracting inward investment and increasing the focus on skills and education (4). The regeneration plan sets high targets for social, economic and environmental performance and explicitly includes targets for health and wellbeing.

4.3.3 Derry-Londonderry will merge with Strabane in April 2015 to form Derry City and Strabane District Council. The new council will assume responsibility for planning. This is taking place in a challenging economic environment and one which is not imminently expected to improve: both districts currently have high levels of worklessness, and low levels of health, education, physical infrastructure and environment. The regeneration plan states that, in 2010, economic inactivity levels in Derry-Londonderry were estimated at around 36% of the working age population (4). The plan notes this is higher than NI and UK averages. Competition for work and for inward investment is high.

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4.4 The study area within Derry-Londonderry

Geography

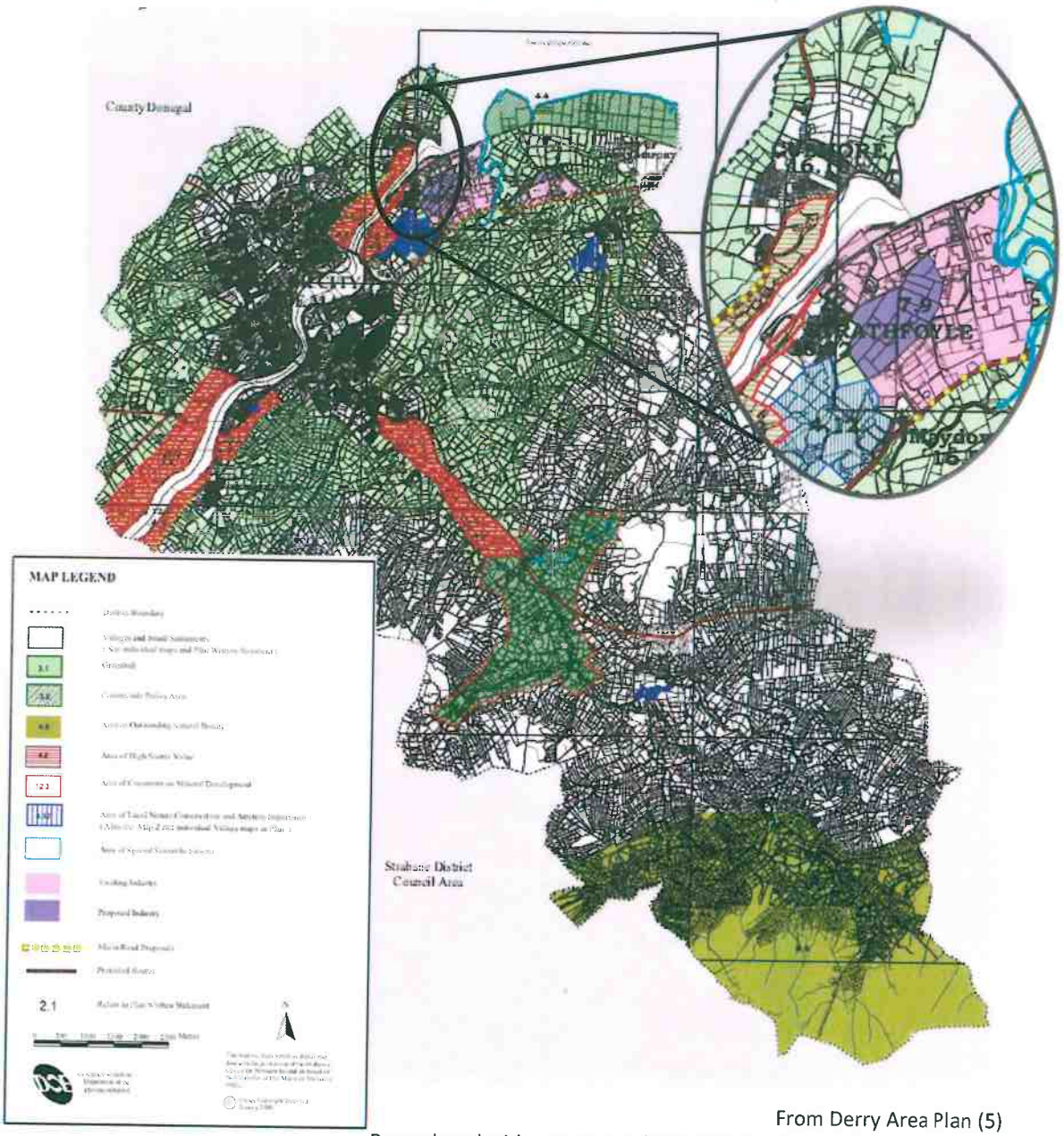
4.4.1 The study area is located to the north of the city of Derry-Londonderry (see Figure 4-2). It is located in a hilly area, which opens out to Lough Foyle, a sea Lough. The prevailing wind direction is from the south west. The city and the study area are within the river valley of the river Foyle. To the north of the river is the community of Culmore. To the south, are the communities of Strathfoyle and Maydown.

4.4.2 Figure 4-2 shows how industrial land is concentrated in the north of the city and around the study area. This is part of a 'vibrant' manufacturing and engineering sector in the North West (7). Businesses in the study area supply local, regional and international markets. Strathfoyle, Maydown and Culmore are described in the Derry Area Plan (5) (see Figure 4-4, Figure 4-6 and Figure 4-8 respectively). The Area Plan identifies sizeable portions of land that are reserved for industrial use in each of the three communities. The study area comprises both industrial areas and residential communities.

- Londonderry Port is in the townland of Lisahally. The Port limits extend beyond the study area from Craigavon Bridge to Magilligan Point/Greencastle. It is one of four Public Trust Ports in Northern Ireland (8) and it is a site of historic interest. It caters for industrial and for leisure uses (9). The port is across the bay from the townland of Culmore.
- The industrial zone of Lisahally is adjacent to the villages of Strathfoyle and Maydown.

Ben Cave Associates Ltd
103 Clarendon Road, Leeds, LS2 9DF, UK
00 44 113 887 0770 : www.bcahealth.eu : information@bcahealth.co.uk

Figure 4-2: Map of District Strategy and Indication of Study Area



From Derry Area Plan (5)
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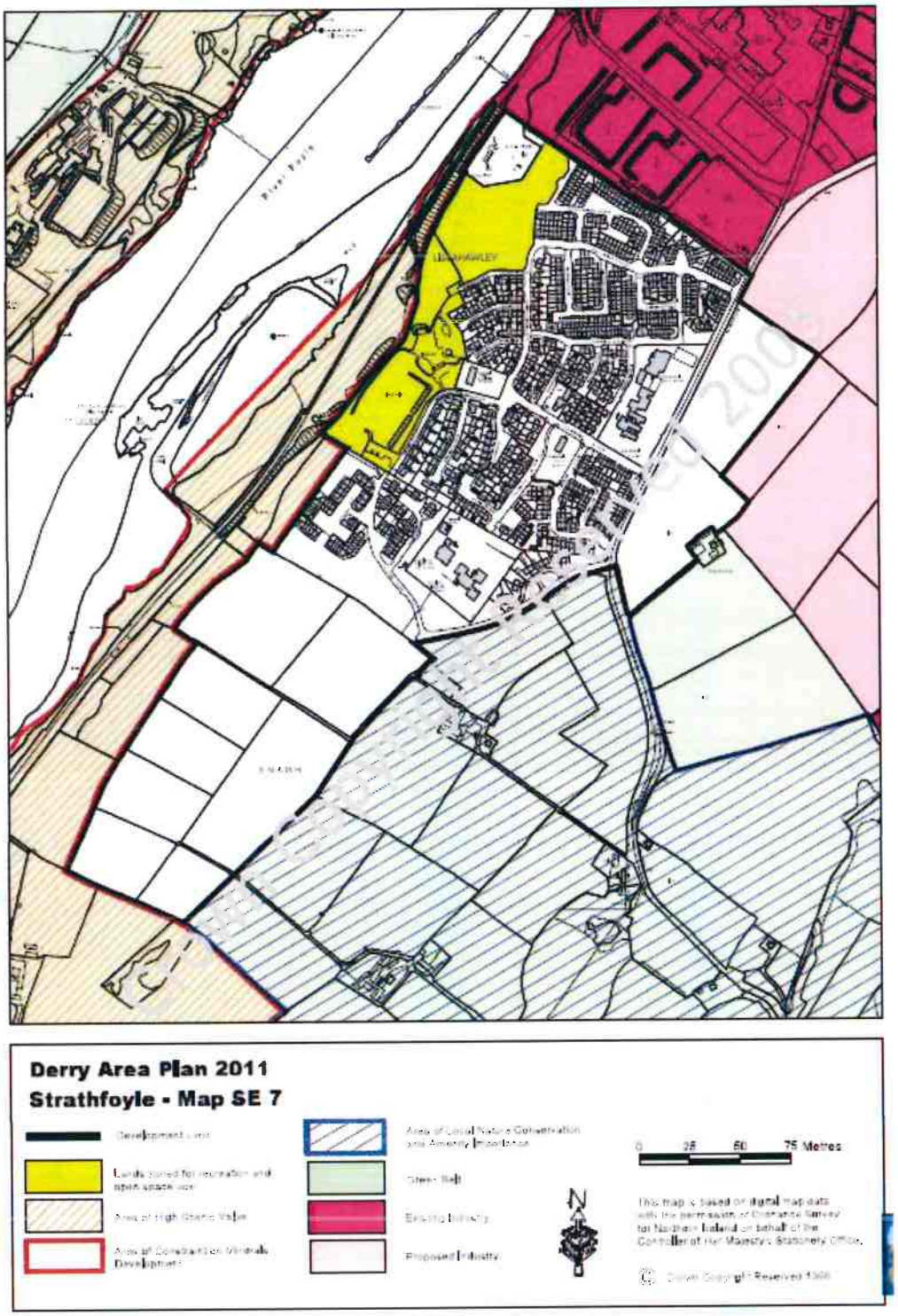
Figure 4-3: Map of Strathfoyle - Derry Area Plan 2011



From Derry Area Plan (5)

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103 Clarendon Road, Leeds, LS2 9DF, UK
00 44 113 887 0770 : www.bcahealth.eu : information@bcahealth.co.uk

4.4.3 Figure 4-3 reproduces the map of Strathfoyle that is used in the Derry Area Plan and Figure 4-4 provides the Plan's description of Strathfoyle (5). It shows that existing industrial areas adjacent to residential ones are to be preserved and further industrial areas to the east of the existing communities are planned. The allocation of open and recreational space in the Derry Area Plan does provide a buffer, but will protect the western side of the community from industrial or further residential expansion.

4.4.4 The development boundary provides separation to the west and south. We suggest that it will be important to ensure that these areas are not eroded by residential expansion.

Figure 4-4: Derry Area Plan: Strathfoyle

Strathfoyle is located some 8 kilometres north east of Londonderry and approximately 2 kilometres from the A2 Londonderry to Coleraine Road. To the north it is bounded by industry and the port complex at Lisahally and to the south by the Area of High Scenic Value along the River Foyle banks. The settlement was developed in about 1960 as a direct result of the ongoing industrial development at Maydown and its layout is typical of postwar public housing estates.

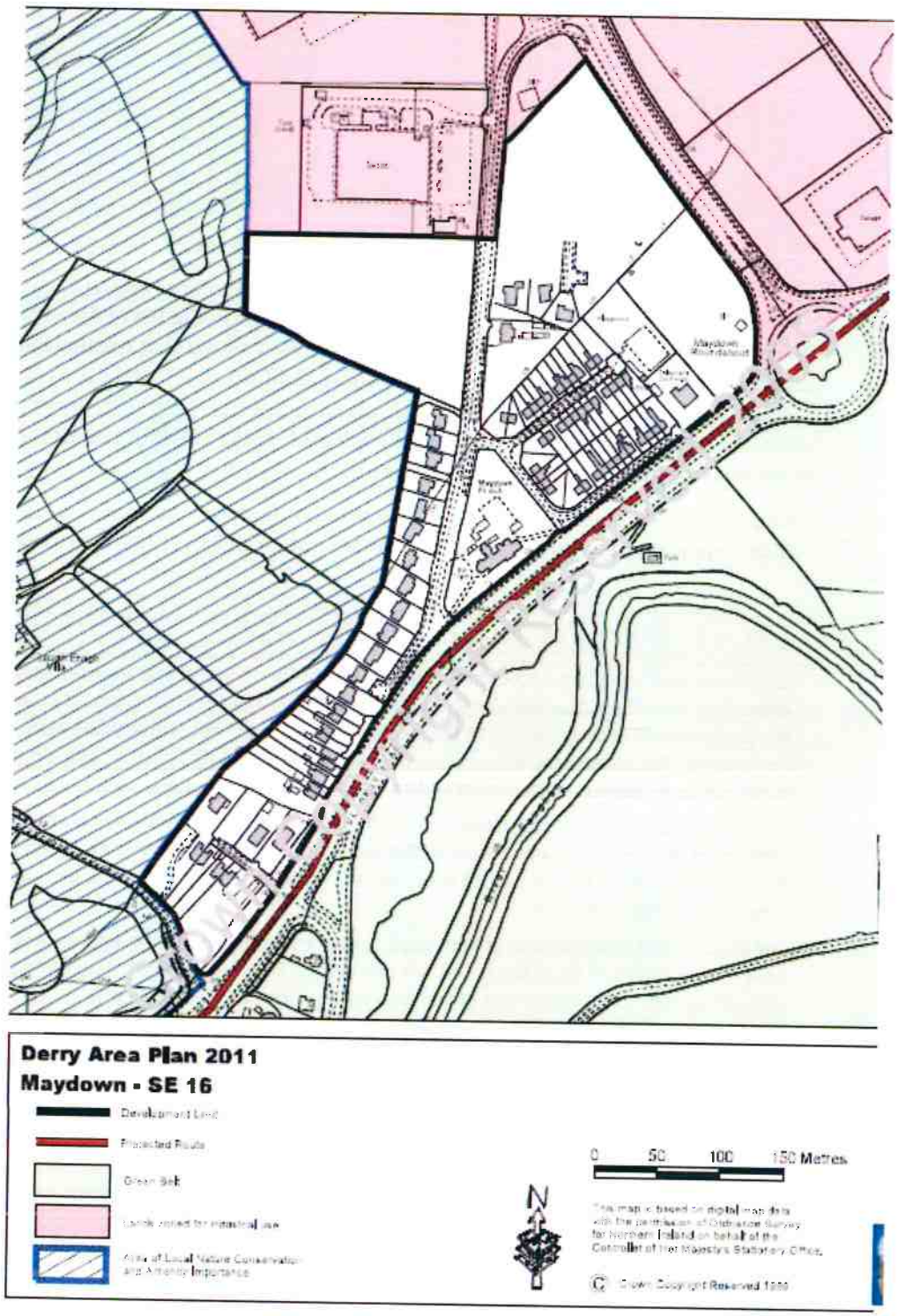
The Department has defined a development limit which provides for further expansion of the settlement. A substantial landscaping buffer will be required between any development and the Area of High Scenic Value. Access to development areas at Strathfoyle will be permitted via Temple and Otterbank roads.

The Department designates an area of open space/recreation use to the western edge of the village along the River Foyle bank. This will protect the area between the village and the River Foyle. Proposals for development in this area will be judged against Policy R1.

From Derry Area Plan (5)

Ben Cave Associates Ltd
103 Clarendon Road, Leeds, LS2 9DF, UK
00 44 113 887 0770 : www.bcahealth.eu : information@bcahealth.co.uk

Figure 4-5: Map of Maydown - Derry Area Plan 201



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103 Clarendon Road, Leeds, LS2 9DF, UK
00 44 113 887 0770 : www.bcahealth.eu : information@bcahealth.co.uk

4.4.5 Figure 4-6 reproduces the map of Maydown that is used in the Derry Area Plan and Figure 4-5 provides the Plan's description of Maydown (5).

4.4.6 The development limit allows for small-scale development. We suggest that further expansion of the settlement could lead to erosion of the separation barriers to the north.

Figure 4-6: Derry Area Plan: Maydown

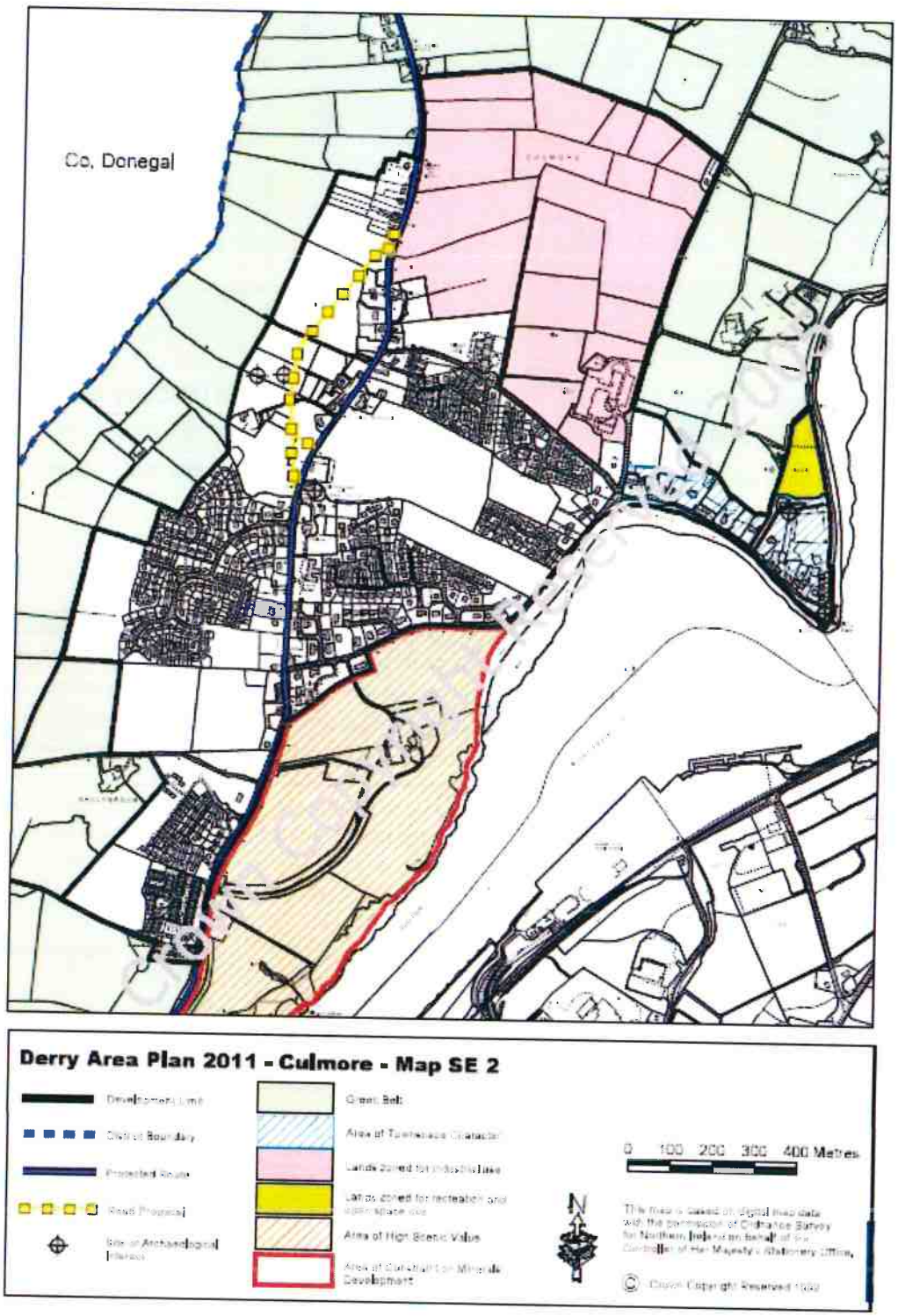
Maydown lies some 7 kilometres east of the City Centre close to the Maydown industrial estate and abutting the A2 dual carriageway on its southern side. Originally a public authority housing estate there has been some private housing constructed in the settlement during the 1980s.

The Department has defined a development limit within which small scale development and further expansion of the settlement will be accommodated. Previous zoning allowed for a limited number of housing sites along Maydown Road. A major issue in defining the settlement boundary is to avoid encroachment into the Lough Enagh area whilst providing in-depth development opportunities. Available sites are restricted by the industrial land to the north and east but there remains sufficient land in this area to provide for additional development commensurate with the scale and location of the settlement. A portion of land adjacent to the existing factory west of Maydown Road has been zoned for industry.

From Derry Area Plan (5)

Ben Cave Associates Ltd
103 Clarendon Road, Leeds, LS2 9DF, UK
00 44 113 887 0770 : www.bcahealth.eu ; information@bcahealth.co.uk

Figure 4-7: Map of Culmore – Derry Area Plan 2011



From Derry Area Plan (5)
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Figure 4-8: Derry Area Plan: Culmore

The designated area encompasses the historic area around Culmore Point which includes Culmore Fort and the mainly residential properties along Culmore Point Road. The Fort (re-fortified between 1613 and 1618) guarded the narrows of the Foyle during the 17th century when Londonderry was approached by sea. Most of the original fort was destroyed in 1688 though the tower and associated earthen ramparts and ditch remain, now designated a Scheduled Historic Monument.

The character of the area derives from a combination of the waterside setting and the informal groupings of buildings along a narrow roadway. Gardens tend to be spacious and, in most cases, contain mature landscaping. The quality is enhanced by hedgerows which are an important element in the boundary treatment and groups of buildings such as the cottages to the eastern end of Culmore Point reinforce this character.

The Department zones 40 hectares of land for industrial purposes between Culmore Road and Coney Road. The opportunity has been taken to rationalise the previous zoning in this area in order to make it more accessible and potentially more attractive to inward investors.

From Derry Area Plan (5)

4.4.7 Figure 4-7 reproduces the map of Culmore that is used in the Derry Area Plan and Figure 4-8 provides the Plan's description of Culmore (5).

4.4.8 40 hectares of land are reserved for industrial purposes. Residential development is proposed for Culmore village.

4.4.9 The land shaded green for recreation is the landfill site which is currently being restored.

4.4.10 Plan policies of particular relevance to the study area are IND 1 and 2. Policy IND 2 of the Area Plan states that proposals for large scale industrial uses will normally be permitted in Londonderry and at the Maydown-Campsey localities (5).

4.4.11 Policy IND 1 states that industrial proposals will be assessed for high standards of design and for protection of the environment and locality. Villages and small settlements are identified as being capable of accommodating industrial development.

4.5 "Better regulation"

4.5.1 The Mills Report looked at the implications of the City Waste landfill site at Mobuoy Road. This was an illegal site which was located close to the study area. The Mills Report considered wider implications for the regulation of waste management in Northern Ireland (10). It found great complexity in the regulatory regime and recommended simplification to ensure that regulation is more robust and more effective. The report also recommends changes to planning policies such that retrospective permission for mineral workings cannot be granted. The sand and gravel quarries that were excavated without permission subsequently provided the receptacles for the waste.

4.5.2 There has thus been a recent failure of regulation in this locality. At the time of writing the investigations into this case are ongoing.

4.5.3 As noted above current economic conditions are challenging (see para 4.3.3 on page 11). This reduces resources for the regulators and makes regulation appear more of a burden on business activity: the Northern Ireland Department of Enterprise Trade and Investment are keen not to depress opportunities for business and, through the "better regulation" agenda are reviewing the regulatory burden imposed by NI departments and regulators on business and taking action to reduce or remove burdens (11). The intention is to enable

businesses across NI to focus on their core business activities. To this end the NIEA are offering to develop prosperity agreements with businesses (12). The NIEA define Prosperity Agreements as

... voluntary agreements through which NIEA and an organisation can explore opportunities for reducing environment and heritage impacts in ways that create prosperity and well-being.

4.5.4 The intention is to enable businesses to develop and to achieve improved environmental outcomes and for them to benefit from the economic value from these improved outcomes. Prosperity Agreements recognise that high quality performance is rarely achieved through inspection regimes. They do not replace the ability of the regulator to enforce regulations but they set up a working agreement and depend on a mutual recognition of the importance of environmental outcomes.

4.6 Conclusions

4.6.1 There would appear to be the potential for conflict between the Area Plan's stated aims to allow industrial development (IND 1 and 2) and the intention to take the character of the area or settlement into account (IND 1).

4.6.2 The study area is approximately 8 km from the city centre. It is 2 km from the A2 Londonderry to Coleraine Road. It is not connected to the city centre by rail or by footpath along the river.

4.6.3 Residential settlements are currently close to industrial facilities. The study area is not recognised as an area within the Plan. It is covered by planning policies that allow for further industrial and residential development.

4.6.4 The Port and the industrial zone are clearly of great economic importance to Derry-Londonderry and the Plan provides for an increase in industrial activity on both banks of the River Foyle. However, key policy documents for Derry-Londonderry such as the Derry Area Plan (5) and the regeneration plan (4) provide no coherent vision for the study area. Nowhere is the current or the expected contribution of the Port and the industrial zone to the city's economy laid out.

4.6.5 This can be contrasted with the way in which the regeneration plan describes the Foyle Valley Gateway (4). This programme is focused on creating a positive environment for business and on enhancing development opportunities. The explicit aims of the programme are to:

... improve the quality of life of city residents and provide training and employment opportunities for those most disadvantaged.

4.6.6 Under the Planning Act (Northern Ireland) 2011 the majority of planning functions will transfer in 2015 from central government to local authorities (13). This provides an opportunity for Derry City and Strabane District Council to develop a coherent vision and plan for the study area. This should take account of community, as well as business aspirations. The residents and businesses who took part in this study described their visions for their communities and businesses alike. We will see below how these visions differ but we will also see that they are not incompatible with one another.

Ben Cave Associates Ltd
103 Clarendon Road, Leeds, LS2 9DF, UK
00 44 113 887 0770 : www.bcahealth.eu : information@bcahealth.co.uk

5 Industrial activities in the study area

5.1.1 Figure 5-1 shows the study area with the businesses relative to each other and to residential development.

Historical context

5.1.2 The brief summary below shows that there have been industrial activities in the study area since the 1940s.[2]

- Londonderry Port was established in the 17th Century. It was within the city of Derry-Londonderry.
- Strathfoyle was a base for Allied troops during World War II. The German U-boat fleet surrendered at Lisahally on 14th May 1945.
- DuPont began manufacturing in the vicinity in the 1950s.
- Coolkeeragh Power station began producing oil fired energy to the grid in 1959. The oil fired facility was closed in 2002 and demolished.
- In 1993, in order to take larger vessels, the port moved downstream to a deep-water facility at Lisahally with 365 metres of quayside and access through an eight-metre deep Lough Foyle channel.
- The Foyle Food Group have been operating from their current site since 1978.

5.1.3 The interactive map (http://maps.ehsni.gov.uk/MapViewer/) on the Northern Ireland Environment Agency website enables the user to observe the current activities. There is also an historical six inch OS map.

Current overview

5.1.4 Table 5-1 and Figure 5-1 show the range and the number of businesses operating in the study area. As might be expected in any longstanding industrial zone there is complexity in:

- land ownership;
- the structure and ownership of operational entities; and
- the use and ownership of facilities.

5.1.5 Figure 5-1 does not represent all businesses operating in the study area.

5.1.6 **Recommendation**: Derry City and Strabane District Council may wish to consider developing a register (database) of businesses operating in the study area and including information relating to planning permission and other permits.

[2] Information about the port is from the Londonderry Port and Harbour Commissioners website (9) and from Wikipedia (14).

Ben Cave Associates Ltd
103 Clarendon Road, Leeds, LS2 9DF, UK
00 44 113 887 0770 : www.bcahealth.eu : information@bcahealth.co.uk

Table 5-1: Key to Figure 5-1

Key	Existing Activity	Operator	Regulator
1.	Culmore Landfill	Derry City Council	NIEA
2.	Culmore WwTW	NI Water	NIEA
3.	Pork Processing Plant	William Grant & Company	DCC
4.	Processing & storage of scrap metal	Clearway Disposals Limited	NIEA
5.	Bulk storage of cement	Origin	DCC
6.	Animal feed storage shed	Londonderry Port & Harbour Commissioners	*
7.	End of life Vehicle/ storage of scrap metal	Clearway Disposals Limited	NIEA
8.	Animal feed storage shed (TS-2)	Londonderry Port and Harbour Commissioners	*
9.	Animal feed storage shed (TS-1)	Londonderry Port and Harbour Commissioners	*
10.	Slaughtering, meat processing and rendering	Foyle Food Group Limited	NIEA
11.	Animal feed storage (TS-11)	Burkes Shipping Services Limited	*
12.	Mineral store(TS-6)	FPI Ltd	*
13.	Vacant Shed (TS-9)	Londonderry Port and Harbour Commissioners	*
14.	Waste transfer station	Brickklin Waste Limited	NIEA
15.	Power station	Coolkeeragh ESB Ltd	NIEA
16.	Landfill	Du Pont (UK) Industrial Ltd	NIEA
17.	Fuel Terminal	LSS Limited	NIEA
18.	Synthetic Fibre Production	Invista Textiles (UK)	NIEA
19.	Synthetic Fibre Production	Du Pont(UK) Industrial Ltd	*
20.	Animal feed storage (TS-7)	Londonderry Port and Harbour Commissioners	*
21.	Animal feed storage (TS-8)	Londonderry Port and Harbour Commissioners	DCC
22.	Bonded Warehouse (TS-10)	DSV Solutions Ltd	*
23.	Coal Yard	FPI Ltd	DCC
24.	End of life Vehicle/ storage of scrap metal	BKK Metals	NIEA
25.	Storage Of Rock	Dalradian Resources	*
A.	Biomass Plant	ERE Developments Ltd	NIEA
B.	Anaerobic digester	ECOVENTI	NIEA
C.	Gasification Plant	Brickklin Waste Ltd	NIEA
D.	Anaerobic digester (currently in operation)	Foyle Food Group Limited	NIEA

Existing activities are numbered (1-25). Proposed activities are listed by letter (A-D).

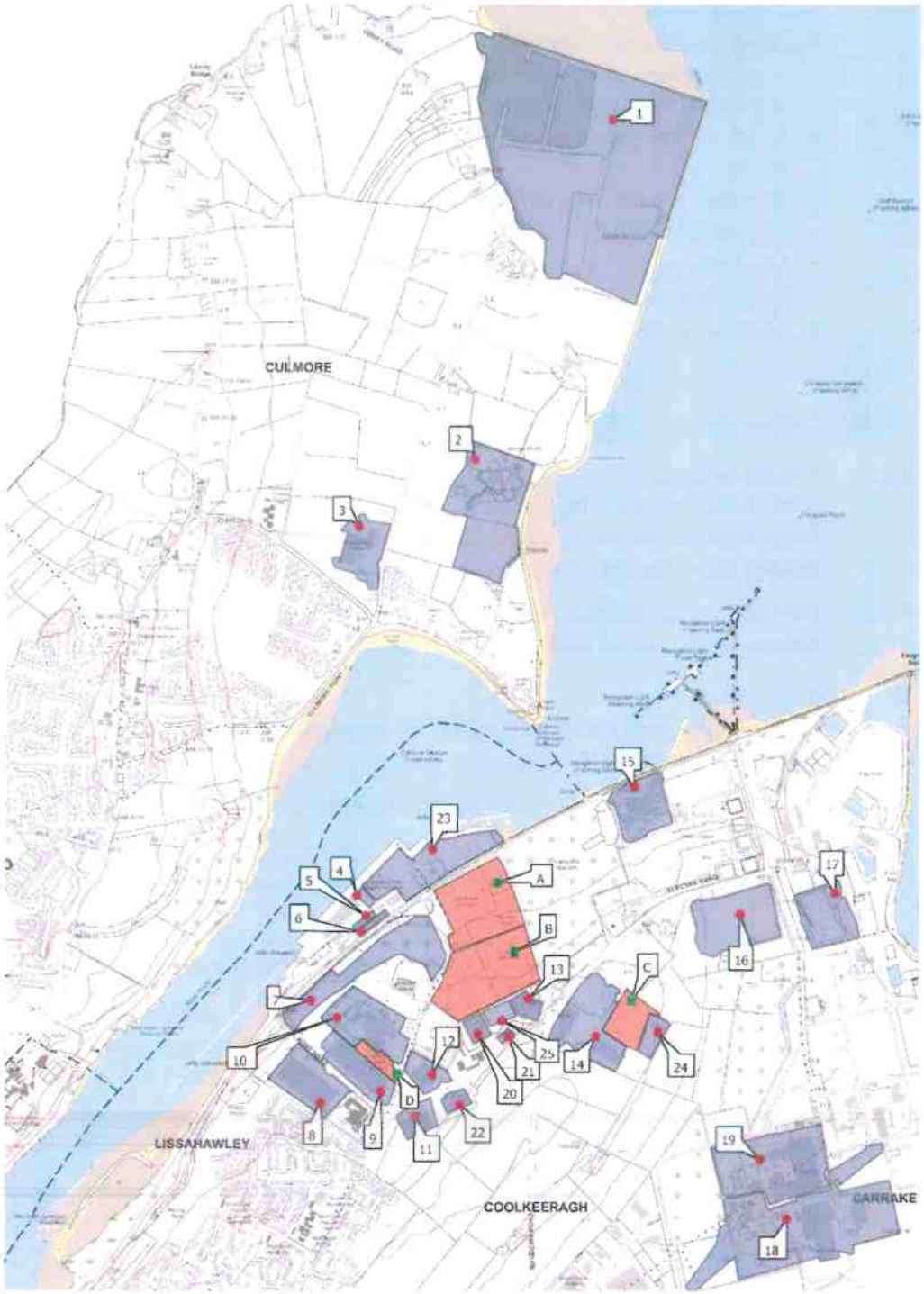
* Premises currently do not require a waste management license/ permit

TS Transit Shed

Information provided by DCC

Ben Cave Associates Ltd
103 Clarendon Road, Leeds, LS2 9DF, UK
00 44 113 887 0770 : www.bcahealth.eu : information@bcahealth.co.uk

Figure 5-1: Existing and proposed industrial premises: Lisahally, Maydown and Culmore



Base map: Spatial NI INSPIRE Map Viewer using OSNI Largescale vector mapping
Map provided by Derry City Council

5.1.7 As noted above the study area has a concentration of industrial activities that require permitting. The regulators that issue permits for operations at the Port and the Lisahally industrial complex are currently:

- Derry City Council: for IPPC Part C permits (Lower levels of emissions);
- Northern Ireland Environment Agency: IPPC Part A/B permits for businesses such as power stations, power generation associated with other businesses, sewage treatment works and those with hazardous waste;
- Northern Ireland water: authorisation to abstract water, or to discharge into sewage works;
- Northern Ireland Environment Agency Water Management Unit; consent to discharge into surface water;
- Londonderry Port and Harbour: to permit ships to berth and to discharge or to load cargo; and
- Loughs Agency: issue permits associated with management of fisheries.

5.2 Planning applications and decisions

5.2.1 The planning portal www.geopii.com provides documents relating to, and decisions taken, with respect to planning across Northern Ireland since 2010. Documents relating to the study area can be found on this site. We caution that the information it provides may be neither complete nor up-to-date as this is not a government site.

5.2.2 We have not exhaustively reviewed all planning applications but we note that, as might be expected, there are a variety of industrial and residential applications at different stages.

Industrial

5.2.3 Some applications are retrospective, for example for the shredding and bailing of metal waste at the port (**A/2011/0677/F**).

5.2.4 Some have been approved but have not been started.

- On the Culmore side (west of the River Foyle) there is a planning application for a thirty meter high wind turbine, **A/2013/0020/F** which has been approved.

Residential

5.2.5 On the Culmore side (west of the River Foyle) there is an application for 230 houses, which is pending (**A/2010/0510/F**).

5.2.6 There would appear to be a need to prevent further expansion of the residential areas, particularly where this erodes buffers between existing or proposed new industrial zones.

5.3 Liaison with business community

5.3.1 DCC invited representatives from local businesses in the study area to a meeting with two of the BCA team (Gillian Gibson and Ben Cave). Coolkeeragh Power Station hosted the meeting in the morning of 26th January 2015.

5.3.2 Discussion ranged across

- existing activities and working practices to minimise environmental effects;
- liaison, and work, with groups and individuals in the surrounding communities;
- challenges of operating in the current economic environment; and
- concern about the potential for additional restrictions on business practices.

5.3.3 We were invited to visit a number of the facilities but were unable to accept all invitations due to pressure of time. We were able to visit the coal yard (Fuel Preparations International).

5.3.4 Gillian Gibson and Ben Cave also met, on a one-to-one basis, with business representatives in the afternoon of the 26th January 2015. Some business representatives were not able to return for the afternoon meetings. Gillian Gibson spoke with them, later, on the telephone.

5.3.5 In these one-to-one meetings most operators expressed a desire for the area to be known for high standards as well as a desire to find a way to work well with their residential neighbours. Some operators were concerned that community expectations would be difficult to meet and stated that they were wary of a wish list that demanded things which could not be achieved. All operators felt that better relationship with the local community would be desirable, but also noted that this could not be an open ended offer.

Ben Cave Associates Ltd
103 Clarendon Road, Leeds, LS2 9DF, UK
00 44 113 887 0770 : www.bcahealth.eu : information@bcahealth.co.uk

6 Population profile

Introduction

6.1.1 BCA discussed the requirements for a population profile with Derry Healthy Cities Group. BCA provided a long list of indicators covering a wide range of determinants of health. Derry Healthy Cities Group has begun to look into this.

6.1.2 We provide below some population statistics for Enagh and Culmore. The study area sits within these wards. We also look at population information for the Super Output Areas. These are smaller areas that make up the wards. We provide some recommendations for a population survey.

6.1.3 There were comments at the consultation events about a letter sent to the Enagh Youth Forum by the Department of Health, Social Services and Public Safety. This included an analysis of the potential for clusters of cancer, conducted by the Northern Ireland Statistics and Research Agency (NISRA), using cancer data in Enagh and Culmore wards (15).

6.1.4 The NISRA report states that clusters of cancer do not exist in Enagh and Culmore wards (15). It makes a link with levels of smoking but does not explain how it reaches this conclusion. We suggest that this analysis is revisited and reported more fully. This may not change the final conclusion but it may provide residents with a greater degree of confidence in the analysis.

6.1.5 We review this report in the Annex.

6.1.6 We recommend that consideration is given to conducting a small area health study. This would examine the potential links, especially any evidence regarding causation, between population health effects and environmental exposure for the study area. Absence of evidence does not mean that effects are absent. Some effects have a long lag phase. Similarly, the presence of an activity does not mean that adverse effects will be experienced, or that health effects which may be experienced in a locality are directly attributable to any single environmental component. We summarise key characteristics of a small area study in the Annex to this report. The literature review (also provided in the Annex) shows that while there are examples of associations between adverse health outcomes near industrial sites, there are fewer instances in which causation can be conclusively demonstrated.

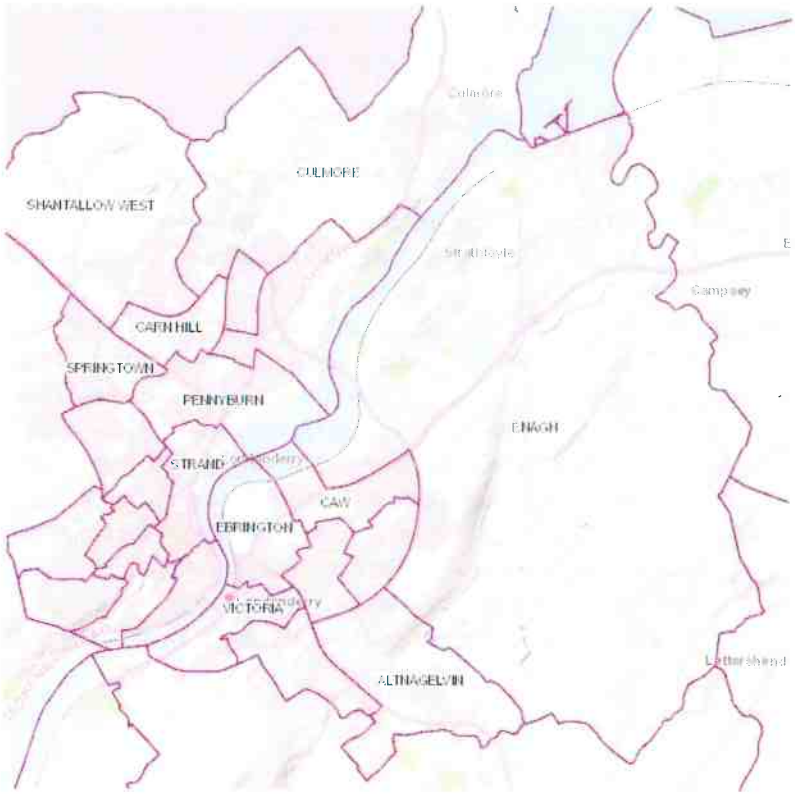
Population: in brief

6.1.7 Table 6-1 shows that at the 30th June 2013 the estimated populations of Culmore and Enagh wards were 8,915 and 5,829 respectively. Figure 6-1 below shows that the wards cover large geographical areas, particularly Enagh, and are therefore not necessarily representative of the more localised issues considered in this study.

6.1.8 Each Ward is made up of Super Output Areas (SOA). Culmore Ward is divided into 5 Super Output Areas. The SOA Culmore_5 covers the community included in this study and has a population of 2,331. Enagh Ward is divided into 2 SOAs. The SOA Enagh_1_Derry covers the community in Strathfoyle and Maydown who are included in this study. Enagh_1_Derry has a population of 2,421.

6.1.9 Figure 6-2 shows NI multiple deprivation measure (MDM) 2010 ranks for Super Output Areas: Culmore_5 and Enagh_1_Derry. Figure 6-2 is from the NISRA interactive map.[3] This does not provide a comparator but a simple reading of Figure 6-2 shows that Culmore_5 is less deprived than Enagh_1_Derry. The SOA ranked 1 is the most deprived while the SOA ranked 890 is the least deprived. A general conclusion is that the community in Strathfoyle may be more susceptible to emissions due to pre-existing deprivation than the wider population.

Figure 6-1: Ward boundaries in the Study Area



6.1.10 Table 6-2 shows that both Enagh and Culmore wards have a higher proportion of people aged 0-15 than the Derry-Londonderry average.

Strathfoyle

6.1.11 The Department for Social Development's (DSD) 'Areas at Risk' Programme has identified Strathfoyle as an area at risk (16). This means that it lies outside of the Noble 10% most disadvantaged[4] but it is at risk of decline. The 'Areas at Risk' Programme focuses on

- community empowerment;
- building social cohesion within the area;
- confidence in dealing with neighbouring communities; and,
- building a wider sense of belonging.

[3] available on http://bit.ly/1xdYdvm
[4] The 2005 measures of spatial deprivation were constructed by a team led by Professor Mike Noble. These measures of spatial deprivation are often referred to as the 'Noble' measures.

6.1.12 A survey and community audit was conducted in 2010. Enagh Youth Forum provided BCA with a draft copy of the report (16). Initial contacts were made with the Strathfoyle Community Association (SCA). Community Evaluation NI (CENI) met with the key *Areas at Risk* project members to discuss the needs of their local area, agree a formula for arriving at a baseline position and develop a means for measuring progress in their local area. We do not report the results in detail but note the overlap with issues reported in a 2013 study conducted by NIHE (17).

6.1.13 In 2013 NIHE contacted a sample of 170 of the 700 dwellings in Strathfoyle Estate and the adjacent New Fort development (17). This included a mixture of Housing Executive, housing association, private rented and privately owned properties. The summary below looks at results of direct relevance to this study. It does not look at community relations or community safety. The survey found the following results.

- 48% of survey respondents had lived in their present home for more than 15 years at the time of survey.
- 46% rented from the NIHE.
- High levels of satisfaction with many of the services – when asked what services were missing the two most common suggestions were safe play areas for children and facilities for youths.
- Specific question on the neighbouring industrial zone elicited support (92%) for 'comprehensive health impact study' to establish if there is any correlation between existing industry and the health and well-being of residents. 97% of respondents either strongly agreed or agreed that residents should be fully consulted regarding all future planning applications prior to the location of any further industry.
- 70% of respondents were either very satisfied or satisfied with Strathfoyle as a place to live. Less than one-tenth (9%) of respondents were dissatisfied with Strathfoyle as a place to live, and the remaining respondents (21%) had no strong feelings.
- Respondents who were dissatisfied with Strathfoyle as a place to live gave reasons for their dissatisfaction; the most common reason being that the area needs to be tidied up

Ben Cave Associates Ltd
103 Clarendon Road, Leeds, LS2 9DF, UK
00 44 113 887 0770 : www.bcahealth.eu : information@bcahealth.co.uk

Table 6-1: Ward and Super Output Area Population Estimates, by sex and age groups, 2013

		Male					Female					Persons				
Admin area	Code	0-15	16-39	40-64	65+	Total	0-15	16-39	40-64	65+	Total	0-15	16-39	40-64	65+	Total
Derry-Londonderry		12,406	17,615	16,809	6,287	53,118	11,841	18,380	17,840	7,430	55,494	24,249	35,994	34,653	13,715	108,608
Culmore	95MM13	1,318	1,316	1,292	357	4,283	1,228	1,485	1,527	393	4,633	2,546	2,802	2,819	749	8,915
Enagh	95MM16	778	950	876	273	2,877	721	1,074	890	266	2,952	1,499	2,024	1,767	539	5,829
Culmore_1	95MM13S1	125	181	202	84	592	126	160	237	69	591	251	341	439	152	1,182
Culmore_2	95MM13S2	156	205	150	51	561	153	238	224	57	672	309	443	374	108	1,234
Culmore_3	95MM13S3	242	274	187	52	755	203	288	228	62	781	444	562	415	115	1,536
Culmore_4	95MM13S4	427	342	373	118	1,261	389	416	433	135	1,372	816	758	806	253	2,633
Culmore_5	95MM13S5	368	315	380	51	1,114	357	384	405	70	1,216	725	698	785	121	2,331
Enagh_1_Derry	95MM16S1	330	463	311	93	1,197	319	467	334	104	1,224	650	930	645	197	2,421
Enagh_2_Derry	95MM16S2	448	487	565	180	1,680	402	607	557	162	1,728	850	1,094	1,122	342	3,408

Estimated population on 30 June for the year noted, rounded to the nearest person

Table 6-2: Ward Population Estimates (percentages), by sex and age groups, 2013

		Male				Female				Persons			
Admin area	Code	0-15	16-39	40-64	65+	0-15	16-39	40-64	65+	0-15	16-39	40-64	65+
Derry-Londonderry		23.4%	33.2%	31.6%	11.8%	21.3%	33.1%	32.1%	13.4%	22.3%	33.1%	31.9%	12.6%
Culmore	95MM13	30.8%	30.7%	30.2%	8.3%	26.5%	32.1%	33.0%	8.5%	28.6%	31.4%	31.6%	8.4%
Enagh	95MM16	27.0%	33.0%	30.4%	9.5%	24.4%	36.4%	30.1%	9.0%	25.7%	34.7%	30.3%	9.2%

Estimated population on 30 June for the year noted, rounded to the nearest person

Ben Cave Associates Ltd
103 Clarendon Road, Leeds, LS2 9DF, UK
00 44 113 887 0770 : www.bcahealth.eu : information@bcahealth.co.uk

Table 6-3: Super Output Area Population Estimates (percentages) for Culmore Ward, by sex and age groups, 2013

		Male				Female				Persons			
Admin area	**Code**	**0-15**	**16-39**	**40-64**	**65+**	**0-15**	**16-39**	**40-64**	**65+**	**0-15**	**16-39**	**40-64**	**65+**
Culmore_1	95MM13S1	21.1%	30.6%	34.1%	14.2%	21.3%	27.1%	40.1%	11.7%	21.2%	28.8%	37.1%	12.9%
Culmore_2	95MM13S2	27.8%	36.5%	26.7%	9.1%	22.8%	35.4%	33.3%	8.5%	25.0%	35.9%	30.3%	8.8%
Culmore_3	95MM13S3	32.1%	36.3%	24.8%	6.9%	26.0%	36.9%	29.2%	7.9%	28.9%	36.6%	27.0%	7.5%
Culmore_4	95MM13S4	33.9%	27.1%	29.6%	9.4%	28.4%	30.3%	31.6%	9.8%	31.0%	28.8%	30.6%	9.6%
Culmore_5	95MM13S5	33.0%	28.3%	34.1%	4.6%	29.4%	31.6%	33.3%	5.8%	31.1%	29.9%	33.7%	5.2%

Estimated population on 30 June for the year noted, rounded to the nearest person

Table 6-4: Super Output Area Population Estimates (percentages) for Enagh Ward, by sex and age groups, 2013

		Male				Female				Persons			
Admin area	**Code**	**0-15**	**16-39**	**40-64**	**65+**	**0-15**	**16-39**	**40-64**	**65+**	**0-15**	**16-39**	**40-64**	**65+**
Enagh_1_Derry	95MM16S1	27.6%	38.7%	26.0%	7.8%	26.1%	38.2%	27.3%	8.5%	26.8%	38.4%	26.6%	8.1%
Enagh_2_Derry	95MM16S2	26.7%	29.0%	33.6%	10.7%	23.3%	35.1%	32.2%	9.4%	24.9%	32.1%	32.9%	10.0%

Estimated population on 30 June for the year noted, rounded to the nearest person

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103 Clarendon Road, Leeds, LS2 9DF, UK
00 44 113 887 0770 : www.bcahealth.eu : information@bcahealth.co.uk

Figure 6-2: N1 multiple deprivation measure 2010 ranks for Super Output Areas: Culmore_5 and Enagh_1_Derry

SOA: Super Output Area
The SOA ranked 1 is the most deprived in Northern Ireland while the SOA ranked 890 is the least deprived.
http://www.ninis2.nisra.gov.uk/InteractiveMaps/Deprivation/Deprivation%202010/SOA_Deprivation_Map/atlas.html

Population survey

6.1.14 Derry Healthy Cities Group is discussing ways in which to conduct a community audit with residents in the study area. BCA and Derry Healthy Cities Group discussed options for a population survey. The term 'survey' is used in a variety of ways, but generally surveys provide a 'snapshot of how things are at a specific time' and they include the following steps (18):

- selecting a relatively large sample of people from a pre-determined population e.g. the study area;[5] and then
- collecting a relatively small amount of data from those individuals;
- using the information from the sample of individuals to say something about the wider population.

6.1.15 This is usually, but not necessarily, done by means of a questionnaire or interview. Data are collected in a standardized form. (18). Figure 6-3 suggests some issues to consider when designing a survey.

6.1.16 BCA advised working with local groups to develop the questions and to elicit information about specific or general factors in the environment (built or natural) that affect health.

6.1.17 The wording of any questionnaire would have to be carefully defined.

[5] This is the 'population of interest' - the wider group of people in whom the researcher is interested in a particular study.

Figure 6-3: Issues to consider when designing a survey

Governance and accountability

Who will be responsible for overseeing the design and conduct of the survey, and for approving the results before publication and/or dissemination?

Research question

What will the survey investigate?

Research methods

Will it be a postal survey, a telephone survey or will people be visited by a researcher?

Designing the research tool

Will questions from validated survey tools be included to facilitate the comparison of responses with those from other surveys? Will people from the communities affected be involved in helping to design the questionnaire?

Sample and sampling

Who will be invited to take part in the survey? How will they be selected? Will steps be taken to make the sample representative of the local population? If so, which characteristics will be used to ensure representativeness?

Data collection

Who will collect the data? Will an external agency collect the data or will local people be involved in data collection. Each of these two options has pros and cons. An important consideration if involving local people in survey administration is the issue of confidentiality, and data protection.

Data analysis

How will the data be analysed and by who? Will the data be quality assured by an independent person or organisation?

Reporting

Who will be responsible for reporting the results of the Survey? How will the results be presented, and disseminated?

Ethics

Is ethical clearance required for the survey?

Adapted from Kelley et al (18)

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103 Clarendon Road, Leeds, LS2 9DF, UK
00 44 113 887 0770 : www.bcahealth.eu : information@bcahealth.co.uk

7 Community experience

7.1 Introduction

7.1.1 BCA undertook a series of community consultation events, two as part of the Scoping phase of the study, and four as part of the Appraisal phase of the study.

7.1.2 The aim of the consultation events was to elicit the views of communities living in the vicinity of industrial activities in the study area regarding the potential effects of those activities on residents' health and wellbeing.

7.1.3 The responses in this summary reflect the views of people from the local communities in the study area who attended consultation events.

7.1.4 These responses are the views and experiences as presented to BCA by people who attended the consultation events. They are wholly from the consultation events and are not the result of monitoring or auditing or any other form of investigation.

7.2 Summary of findings

7.2.1 Residents in the local communities in the study area described a range of mainly negative impacts on their health and wellbeing (see Table 7-1). It is noted that issues raised by the community were supported by varying levels of evidence from this study's literature review. In some cases issues reported by the communities were consistent with scientific evidence; in other cases there was either a lack of evidence, or evidence that measurable changes in health outcomes were unlikely.

7.2.2 The positive impacts on health and wellbeing that were identified related to the employment opportunities from the industrial activities in the study area provided for local people, the potential for future job creation, and the overall economic benefits for the population of Derry-Londonderry as a whole.

7.2.3 The dominant negative environmental factors arising from industrial activities in the study area that participants at the community consultation events said affected people's health and wellbeing negatively were:

- noise;
- odour;
- air pollution;
- airborne dust and other particulate materials;
- vermin/infestations (rats and flies);
- the volume and speed of HGVs in the local environment, which lead to risks for community and personal safety, increased noise levels, and increased air pollution associated with this traffic;
- effect on property values;
- physical activity and the local area no longer being a scenic place to walk;
- loss of biodiversity; and
- the location, size and number of electricity pylons in the area.

7.2.4 For residents in Culmore, other negative impacts from the industrial activities in the study area included light pollution, and vibration from HGVs.

7.2.5 For residents in Strathfoyle, other negative impacts from the industrial activities in the study area were personal and community safety issues arising from poor street lighting in places, fire risks from defunct factory buildings, road traffic incidents (RTIs) involving oil tankers, and certain industrial activities, and poor driving practices by some of the HGV drivers.

7.2.6 Residents in the study area described factors which will be likely to have effects on mental health and wellbeing. These arise as a result of procedures in different stakeholder organisations and certain attitudes and/or behaviours shown towards them. The main issues were:

- lack of information readily available to residents about the industrial activities in the study area and their regulation;
- poor communication with the community by some stakeholders;
- lack of a clear process, or set of processes, by which residents can make complaints;
- lack of consultation about proposals to develop industrial and other activities in the area;
- disrespectful attitudes by some stakeholders of community views; and
- lack of willingness to engage with the issues raised by the communities.

7.2.7 All these factors combined can lead to frustration for some residents, and apathy for others.

7.2.8 Of most importance to residents' mental wellbeing was the fear, anxiety and stress that arises from a combination of factors:

- the continuing industrialisation of the area, which among other things contributes to a feeling of being 'hemmed in' or 'encased', and the associated loss of both greenspace and biodiversity;
- concern about the effect on property value due to the proximity of industrial activities, and the consequence of not being able to move out of the area, which contributes to the feeling of being trapped and of being powerless to counter the negative impacts;
- the lack of a 'voice', and the feeling that no-one 'cares' about the impacts people in the surrounding communities experience;
- the 'unknown' effects of 'unknown' emissions, which is exacerbated by the information deficit or vacuum that residents currently experience;
- the potential for a cumulative effect of several determinants of health over a prolonged period of time;
- the severity of health outcomes observed in some people living in the surrounding communities, but about which residents do not know whether these outcomes are associated with the industrial activities in the study area – again, this is exacerbated by the information deficit or vacuum that residents currently experience.

7.2.9 If residents are exposed to fear, anxiety and stress for a prolonged period of time, they could begin to experience negative impacts on their physical health.

7.2.10 In addition to the effects of industrial activities in the study area, residents also separately identified (as potential negative impacts on their health and wellbeing) the issue of waste and especially of illegal dumping of various materials (some of which are unknown) at several sites in the area. This also contributed to levels of fear, anxiety and stress. Although any impacts from these waste sites are not the responsibility of operators in the study area and the associated industrial activities, it is possible that there could be additive or synergistic effects.

7.2.11 Finally, residents experience an inequity that also affects their mental wellbeing. This arises as a result of experiencing mainly negative impacts due to their proximity to the businesses

and other industrial activities in the study area. In contrast, the general population of Derry-Londonderry is not in close proximity to the industrial activities and, overall, can be expected to benefit from the economic activity generated by industries in the study area.

7.2.12 This underlying inequity is exacerbated by the needs and/or conditions of the surrounding communities. For instance, there is an expressed need for social housing for local people in Strathfoyle, and in Strathfoyle, Maydown and Culmore there is an expressed need for infrastructure, and services and facilities. All communities wanted improved road infrastructure and active travel infrastructure. Strathfoyle residents expressed a need for more green and open space, including play areas for children. Culmore residents expressed a need for a community centre, and other public amenities (e.g. more shops), whereas Strathfoyle residents expressed a need for viable public and voluntary services in the community. The provision of infrastructure, facilities and services in these communities could help to ameliorate some of the negative impacts they are experiencing.

7.3 Conclusion

7.3.1 One of the reasons for a disjunction between residents and the associated industries is the nature of exposure to environmental and other determinants of health. As can be seen from Table 7-1, residents are experiencing a variety of negative effects which arise from several different sources.

7.3.2 Thus, although no one single industry in the study area is responsible for all the impacts experienced by residents, it is important for individual businesses and the regulators to understand the nature and combination of the exposures that residents might experience.

7.3.3 The nature of exposure for residents underlines the importance of an integrated approach to addressing the problems the communities face.

7.3.4 Moreover, this integrated approach needs to involve all key stakeholders including the communities affected.

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103 Clarendon Road, Leeds, LS2 9DF, UK
00 44 113 887 0770 : www.bcahealth.eu : information@bcahealth.co.uk

Table 7-1: Factors reported at the community consultation events that residents feel have a negative effect on health and wellbeing

Factor affecting health & wellbeing	Strathfoyle & Maydown[6]		Culmore[6]	
	Scoping	Appraisal	Scoping	Appraisal
Noise pollution	Not mentioned at event	Industrial activities Traffic	Factor mentioned at event	Disturbance in day Sleep disturbance & disruption at night
Odour	Factor mentioned at event	Factor mentioned at event	Not mentioned at event	Factor mentioned at event
Air pollution	Factor mentioned at event	Industrial activities Traffic	Factor mentioned at event	Factor mentioned at event
Airborne dust & other materials	Factor mentioned at event	Industrial activities Traffic	Factor mentioned at event	Factor mentioned at event
Vermin/infestation	Rats Flies	Rats Flies	Not mentioned at event	Rats
Light pollution	Not mentioned at event	Not mentioned at event	Factor mentioned at event	Factor mentioned at event
Vibration	Not mentioned at event	Not mentioned at event	HGVs	Not mentioned at event
Construction	Not mentioned at event	Loss of supply: • power • water	Not mentioned at event	Not mentioned at event
Traffic volume, particularly HGVs	Not mentioned at event	Road safety/risk of road traffic incidents (RTIs) Congestion/reduced access & mobility	Not mentioned at event	Road safety/risk of RTIs Congestion/reduced access & mobility
Traffic speed, particularly HGVs	Not mentioned at event	Road safety/risk of RTIs	Factor mentioned at event	Road safety/risk of RTIs
Driver behaviour, particularly in HGVs	Not mentioned at event	Road safety/risk of RTIs	Not mentioned at event	Not mentioned at event
Community safety: poor street lighting	Not mentioned at event	Factor mentioned at event	Not mentioned at event	Not mentioned at event

[6] Any specific observations are noted with text.

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Factor affecting health & wellbeing	Strathfoyle & Maydown[6]		Culmore[6]	
	Scoping	**Appraisal**	**Scoping**	**Appraisal**
Fire risk and other hazards	Defunct factory buildings	Industrial activities Traffic	Not mentioned at event	Not mentioned at event
Waste, & illegal dumping	Factor mentioned at event	Tarry wastes Toxic dump at Culmore	Radio-active waste BOC waste Waste on beach	Waste washed up on shoreline (after high tide) Tarry wastes & risk of leakage increased by flooding in area
Water quality	Factor mentioned at event	Contamination by tarry wastes	Untreated sewage Tarry waste seepage Oil & petrol	Not mentioned at event
Change in property values	Not mentioned at event	Factor mentioned at event	Not mentioned at event	Factor mentioned at event
Loss of biodiversity	Not mentioned at event	Factor mentioned at event	Not mentioned at event	Factor mentioned at event
Loss of green space	Not mentioned at event	Factor mentioned at event	Not mentioned at event	Not mentioned at event
Location, size & number of electricity pylons	Not mentioned at event	Factor mentioned at event	Not mentioned at event	Not mentioned at event
Poor communication & information provision	Factor mentioned at event	Factor mentioned at event	Not mentioned at event	Factor mentioned at event
Lack of consultation	Factor mentioned at event	Factor mentioned at event	Factor mentioned at event	Factor mentioned at event
Attitude of some stakeholders to complainants	Factor mentioned at event	Factor mentioned at event	Factor mentioned at event	Factor mentioned at event
Unknowns, & health outcomes of concern	Asthma Cancer deaths Heart	Fear, anxiety, stress Cancer deaths	Cancer Rare genetic condition	Fear, anxiety, stress Cancer deaths Rare genetic disorders
Housing need	Factor mentioned at event	Factor mentioned at event	Not mentioned at event	Not mentioned at event
Need for infrastructure & facilities	Factor mentioned at event	Play areas Green and open space Connections in and out of the area especially for active travel Road infrastructure	Factor mentioned at event	Community facilities Road infrastructure Active travel infrastructure

Ben Cave Associates Ltd
103 Clarendon Road, Leeds, LS2 9DF, UK
00 44 113 887 0770 : www.bcahealth.eu : information@bcahealth.co.uk

8 Overview of current permits in the study area

8.1 Introduction

8.1.1 We have reviewed the documents listed in Section 11 of Annex 1 to this report.

8.1.2 The regulatory regime is complex. This presents a challenge for regulators and businesses.

8.1.3 The complexities of the regulatory regime are also a challenge for communities and in Section 5 of the Annex to this report we provide, for community groups, a brief introduction to permitting.

8.1.4 This study has sought to identify ways in which current issues can be addressed. These solutions are not based on site inspections but on consultation with residents, businesses and regulators and on a review of permits issued to businesses in the study area.

Access to permits

8.1.5 While all regulators were willing to assist in providing permits the review of the permits for the study area was complicated by the fact that the permits are not readily available via the regulator's website. We are not aware of any formal requirement for permits to be held as electronic record but we note that this lack of electronic availability limits both the public and studies such as this in determining what is, and what is not, within the permits to operate.

8.1.6 It has been difficult to ascertain whether the permits which have been given to us are the most current ones. It appears that some permits have not been reviewed for some time. The oldest IPPC permit with which we were provided is from 2005. It may be that a review has been conducted but that we have not received the information. Good practice suggests that permits should be reviewed every three years, and always in the light of the issue of updated guidance or change in regulation (19).

Permit quality

8.1.7 The recent permits are stronger than the older ones, and have a level of consistency. Those which have been granted and written since the implementation of the Industrial Emissions Directive (IED) was brought into legislation carry a requirement to ensure that odour, noise and nuisance are minimised, irrespective of whether the process is inherently odorous or noisy. (If the latter applies, there are specific conditions over and above the general ones) This is important, as it means that the permit holder cannot claim that conditions do not apply to them by means of omission.

8.1.8 **Recommendation**: All permits which are older than three years are reviewed.

8.1.9 **Recommendation**: All permit conditions are reviewed at a minimum every 3 years with the operator to ensure that the operator has reviewed BAT and that it is being applied.

8.1.10 **Recommendation**: Permits issued by the NIEA and by DCSDC have commonality, and that one is not seen as less stringent than the other.

8.1.11 **Recommendation**: that the regulatory bodies take a more proactive approach to implementing EU regulation, in particular how it can be actively and effectively incorporated into existing permitting, and that there is accountability for it having been

carried out. The Northern Ireland place on IMPEL (European Union Network for the Implementation and Enforcement of Environmental Law) should support this.

Oversight of regulated premises

8.1.12 Community members during the public consultation for this study expressed a concern that premises were not inspected regularly, and that their concerns were not listened to. The NIEA is aware of issues regarding odour for the locality, and that complaints normally increase during the summer months. The NIEA state that they would expect to have an inspector is in the vicinity of Lisahally at least weekly. The inspector has the leeway to determine the time of the visit for it to be strategically useful. The NIEA state that the visit would not occur if the wind was blowing away from the houses in the area. However, businesses also noted the presence and the intensity of odour. With this in mind the NIEA need to have greater investigation of the multiple source of odours, and the impact beyond legal boundaries. Liaison with other agencies may also be useful.

8.1.13 IPRI have a procedure in place which requires them to get back to the complainant within 24 hours. This may be simply to say that they have received the complaint and they are acting on it. Some complaints received are vague, and it is difficult to make a response. However, if a specific complaint is received, NIEA will respond to it and tell the complainant what has been done.

8.1.14 The type of complaint received and the severity of the issue will determine whether the NIEA go to visit the complainant.

8.1.15 The Council respond to complaints quite rapidly. This was acknowledged by the community.

8.1.16 Continued liaison with operators is time intensive and depends as much on good relations and understanding as it does on enforcement of permit conditions. Consideration should be given to the ways in which the teams in charge of regulation are resourced.

8.1.17 **Recommendation**: Regulators should have protected time for the surveillance of permitted premises, especially as part of this role is guidance and support, not prosecution.

Environmental determinants of health

8.1.18 In Section 9 below and in the Annex to this report we examine evidence from scientific research. We look at the impact on human health of a variety of environmental outputs, such as particulates in the air, or noise disturbing sleep. Each of the issues which have been reviewed apply to the communities of Maydown, Culmore and Strathfoyle, though not all residents are equally affected. Nor is it possible to say within the scope of this study that those affected residents will be suffering all (or any of) the effects described in the research papers. It is important to note that there can be a long time lag between environmental exposure and a health outcome.

8.1.19 Some environmental issues give rise to feelings of lack of control, of not being able to change the situation. This can lead to anxiety and stress and reduce mental health and wellbeing.

8.2 Impacts from industrial activities in the locality

8.2.1 There are distinct types of impacts: those which are generating complaints from the community, such as noise, dust and odour, which are discussed below, and further issues which have the potential to impact health, and which are considered under a separate heading.

8.2.2 Here we consider

- odour;
- air quality; and
- noise.

Odour

8.2.3 Members of the local communities and businesses are being affected by odour. The odours are invariably described in strong terms. Odour can be transient. There are several processes which are permitted for Lisahally which have the potential to cause odour:

- breaking of vehicles and collection of waste oils;
- storage of agricultural feedstocks;
- meat and bone meal storage;
- waste transfer stations; and
- meat processing.

8.2.4 There is a waste water treatment plant and a meat processing plant on the Culmore side of the river. The waste water treatment plant is known to produce odour. It is also alleged that it loses containment of materials which it is processing, and it is subject to disruption by the tide.

8.2.5 Activities that do not require a permit, such as spreading of farm slurry, are also odorous.

8.2.6 DCC state that they receive complaints from local residents of Strathfoyle regarding odour from industries in Lisahally: they state that they have confirmed the presence of foul odours on some occasions and that on other occasions complaints have not been substantiated (20). On 21st July 2014 NIEA provided a written response to Enagh Youth Forum which tabulates the number of incidents and complaints regarding odour related to one of the industries in Lisahally (21).

8.2.7 **Recommendation:** That a system of proactive odour monitoring is established, and odours are investigated and action is taken to eliminate them.

Drainage

8.2.8 The drainage system beneath the industrial estate is complex. Planning applications on www.geopii.com have requests for clarification of drainage plans and arrangements from the water management team at NIEA.

8.2.9 Drains can get blocked by vegetation, silt and other materials. Interceptors can get blocked as a result of poor maintenance. This can give rise to odours. Odours take a line of least resistance, and can surface at a distance from the source. This makes them difficult to trace and to eliminate.

8.2.10 When BCA staff visited Lisahally we saw evidence of several areas of impact to surface water drains. There was poor control of sand and ground glass in the area. It was washing into the local surface water drains. There was oily waste entering the surface water drains in the vicinity of the port. NIEA have told us that the surface water drains discharge into the river Foyle. They also told us that the discharge points are not monitored on a frequent basis; usually only when a problem is reported. Transport NI is responsible for the surface water drains, and has a permit to discharge into the River Foyle. The Water Management Unit of the NIEA are responsible for monitoring this outflow, but would only do so if a problem was reported.

8.2.11 **Recommendation:** The regulators should have a focus on the functioning of all interceptors, whether as part of a business process, or part of the public drains service. It should include an operator's demonstration of compliance with their permit conditions

regarding maintenance, and monitoring. Investigation of odour via the various drainage systems is important.

8.2.12 **Recommendation:** There needs to be liaison between all the regulators to ensure that their collective impact on water quality is appropriate: NI water for consent to discharge into sewage works; NIEA for consent to discharge into surface waters and Loughs Agency for contribution to eutrophication which can impact health. Eutrophication will also lead to fish kill, which will be malodorous.

River silt

8.2.13 The river receives the effluent from many surface water drains in Derry, and includes those from Lisahally. Surface water run off includes wear and tear from vehicles (brakes, tyres etc) as well as spills and general pollution. The sewage treatment works also discharges into the river.

8.2.14 The river is tidal. It also has a great deal of activity in the form of boats coming and going, which stir up the silt.

8.2.15 River silt in the river Foyle has been evaluated for pollutants by NIEA (22). In addition to impact on water quality the silt can enucleate the heavy metals. River silt can become airborne as fine dust. This may be inhaled and cause health issues. The greater the levels of pollution in the river, the greater the potential for impact on human health. (See section on air quality.)

Water

8.2.16 Protection of surface water is achieved by means of discharge permits, which are issued by the Water Management Unit (WMU) of NIEA. The WMU also licence water abstraction. They support the water framework directive (23).

8.2.17 Protection of surface water and groundwater is undertaken at catchment zone level. Locally to the study area the Faughan is a tributary of the Foyle. The Faughan is currently being evaluated for potential contamination from the waste dump at Mobuoy Road.

8.2.18 IPPC permits which fall under part A require protection of groundwater, from process water such as washing of pipes, blow down from chimney stacks, or contaminated water.

8.2.19 The use of interceptors needs to be overseen, and to be appropriately managed, by the organisations using them. For those organisations which fall under IPPC this would be assessed as part of BAT. This process would be regulated by the NIEA (IPRI).

8.2.20 Water from Lisahally goes to Culmore Point Waste Water Treatment Plant (WWTP), which is itself subject to IPPC. There is evidence of recent prosecution for release of bloody, contaminated water from the WWTP to the River Foyle (24;25).

8.2.21 IPPC requires operators to clean up pollution as close to source as possible. Ideally, this should be on site, or preferably by eliminating the need to produce contaminated water. Contamination may mean thermally contaminated, such as from a cooling process; it may be by chemical or biological contamination which then requires large levels of oxygen to destroy the contamination but which lead to eutrophication; it may be by heavy metals, suspended particles, or a combination of all of the above.

8.2.22 Reliance on a WWTP to clean up contaminated water is counter to the intention of IPPC.

8.2.23 Duty of care by operators means that they should ensure that the WWTP is capable of treating the waste which they discharge. WWTPs should be sure to enforce the conditions which they impose in their waste water acceptance criteria.

8.2.24 NIWater has been prosecuted 30 times over two years by the NIEA. Although these are not all for Derry-Londonderry, it suggests that greater care is needed either from a management perspective (including oversight of permits for use of the WWTP) or that greater investment is needed for the infrastructure.

8.2.25 The Lough's Agency ensures that the water quality in the Loughs remains appropriate to support aquatic species. They too may prosecute any organisation which breaches the conditions which are set down in a permit to discharge.

8.2.26 Residents in the study area have complained about issues that they associate with Culmore WWTP. These include odour, overtopping of waste from the treatment plant into the river, and wind-blown waste from the plant. We suggest that these claims are investigated. The NIEA has issued Culmore WWTP with an IPPC permit.

Air quality

Dust

8.2.27 Residents in Culmore and in Strathfoyle described the deposition of dust on and in their houses.

8.2.28 There are two permits for activities which have the capacity to generate significant quantities of dust; these are for the loading and unloading of coal at the port, and for processing of coal at an adjacent plant for a different operator. A third permit is in place for bagging of cement which takes place indoors, though there is still the potential for very fine dust to be released. There are additional activities that are permitted in the area, which are inherently dusty, including the breaking yard, the agri-feed shed and the waste transfer stations. Ground glass is stored in the vicinity; it is not an activity which requires a permit. (It is currently stored out of doors. This makes it prone to wind blow, as well run-off).

8.2.29 There are many natural means of particulates being generated; the area is adjacent to an estuary and the sediment can be whipped up by the wind and is exposed twice daily as the tide changes. The wind speed will determine the drying time of sediment and thus the potential for release. However the sediment is known to be contaminated with heavy metals as well as organic pollutants. (See section above on drainage) Breathing in these materials may be problematic for health.

8.2.30 The dust complaints have been investigated by DCC by monitoring dust deposition. This was conducted by specialist independent contractors, most recently in March to May of 2014. Results of this indicate that PM_{10} deposition (as a measure of dust) was below the guidelines of 200mg/m^3 (26;27). The inorganic fraction of the 'dust' sample should be analysed for the presence and relative percentage of heavy metal fraction.

8.2.31 However, the literature suggests (qv) that the 200mg/m^3 limit is not one which is appropriate; that the level of deposition is only pertinent when time bound; that what is in the dust rather than the dust as of itself is the important parameter for health. This is different from the issue of dust as a nuisance. (Nuisance is discussed in the annexe to this report). The monitoring identified the presence of fibres (see Figure 8-1). We suggest below that Derry City and Strabane District Council may wish to investigate this issue.

Figure 8-1: Analysis of the composition of dust

In 2008 Londonderry Port and Harbour Commissioners commissioned a study into air quality in Culmore to determine how much coal dust was being deposited from the coal yard to the homes (28). The analysts collected the dust, on a monthly basis and measured its weight (a criterion of evaluation of nuisance) and analysed its composition.

Very few of the samples were contaminated with coal. There was organic material including botanical matter and also inorganic material. 'Botanical matter' is a catch -all phrase used by the researchers to describe plant material, plant seeds, etc. and which changed seasonally. This may be the product of storms at sea which break down seaweed etc, as well as natural vegetation from the nearby surroundings.

In addition there was, as would be expected, inorganic material. There are several potential sources for the inorganic material in the vicinity, such as

- the river sediment;
- sand from the shoreline;
- dust from landfill sites (whether currently operational, or closed);
- emissions from burning coal (industrial and residential emissions); and
- break down products from vehicles, such as tyre wear and tear, brakes, windscreen wipers, etc.

Sometimes anthropogenically generated dust becomes part of a locality.

Most of the samples contained something referred to as fibres. There is no further detail provided. They were not plant material, which were referenced separately.

There are no permits, in the study area, which refer to the need for the containment of fibres. The permit for DuPont allows for waste fibres to be stored in a skip indoors.

There are several issues:

- the size of the fibre particles means that they are readily airborne;
- the fibres may also be depositing on other properties over a widespread area depending upon weather conditions, but as other residents have not complained about dust, they have not been remarked upon.
- depending upon the structure and nature of the fibres, they may be causing lung irritation; and
- as the fibres denature they have the potential to become part of the fraction of airborne material referred to as $PM_{2.5}$, which can have a detrimental impact on health, irrespective of the nature of the fibres.

The deposition of dust should be seen as a proxy for smaller particles in the atmosphere. If there is enough airborne material to create dust, there may also be additional fine particulate matter, including finer suspended sediments which themselves may be carriers of other contaminants.

8.2.32 **Recommendation:** If the study samples from the study described in Figure 8-1 are still available, Derry City and Strabane District Council might wish to consider re-categorising them. If the study samples no longer exist then Derry City and Strabane District Council might consider collecting fresh samples, analysing the samples for the presence of fibres and determining the composition of the fibres.

8.2.33 **Recommendation:** The inorganic fraction of the 'dust' sample should be analysed for the presence and relative percentage of heavy metal fraction.

Air emissions other than dust

8.2.34 Air quality can be impacted by many processes in the vicinity. Certain emissions may be regulated under IPPC, notably the power station, as well as boiler plants at Invista; the newly commissioned anaerobic digester at Foyle Food Group, and the biomass burner

(expected to become operation in 2015). These would be regulated by NIEA, and inspected by IPRI.

8.2.35 There are permits in place (regulated by DCSDC) for the control of vapours from unloading of oil at the deepwater terminal, and at the re-loading from the oil storage depot.

8.2.36 Although some emissions may be permitted, fugitive emissions (that is, those which have not been permitted, but arise because of poor control of activities, and/or poor maintenance) also contribute to poor air quality.

Cumulative impact

8.2.37 These mixed emissions are likely to combine with unregulated emissions (homes, vehicles) to drive down air quality in the vicinity, and have an attendant impact on health.

8.2.38 **Recommendation:** Derry City and Strabane District Council should consider that a review of cumulative impact and headroom of all air emissions from permitted premises be carried out, with attendant modelling of PM_{10}, $PM_{2.5}$, NOx, and SOx, which should then inform the appropriate locality for monitoring to take place. This should link to the Automatic Urban and Rural Network (AURN) monitoring which takes place (29).

Noise

8.2.39 Residents in Culmore have indicated that noise, especially at night, is problematic and that it interferes with their sleep. Some health impacts from noise depend on a person's susceptibility to the exposure.

8.2.40 All premises which are permitted under the 2013 regulations under the NIEA have a common clause requiring minimisation of noise. There are no inherently noisy processes in the study area which have an IPPC permit. There are no permits for Lisahally which have specific noise limits placed on them.

8.2.41 Noise experienced at Culmore appears to arise from the following sources:

- the coal processing facility;
- ships loading and unloading at the port;
- ships conducting maintenance; and
- ships discharging their cargo at the oil terminal.

8.2.42 The Port Authority is responsible for permits for berthing of boats at the port.. There is a code of practice for Harbour boards, but this is not binding in law.[7] DCSDC is responsible for permitting of industrial activity at the port. (In addition, DCSDC acts as the Port Authority in overseeing the docking of boats from overseas, and ensuring that contagious and communicable diseases are not taken ashore.)

8.2.43 The coal processing yard has no permit conditions regarding noise. Complaints are therefore a matter for the local authority, both as a responsibility to investigate the problem of noise as an issue of statutory nuisance, and as the regulator for the coal yard.

8.2.44 Two of the BCA team visited the coal yard on a windy January evening. Noise of the operating machinery was not excessive. It was possible to hold a conversation in the yard at normal levels. At the river side of the barrier created by the coal piles, traffic noise from the other side of the river was the only sound which could be heard and the coal yard machinery was not audible. That same evening we visited Culmore and noted that the activities at the coal yard were audible.

[7] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/79296/guide-good-practice-port-marine.pdf

8.2.45 **Recommendation:** The dialogue which has been opened between the coal yard operators and the residents be supported and fostered, and an acceptable outcome achieved.

8.2.46 The large ships coming to the port and to the fuel terminal/NaOH terminal are also a source of noise. There is a source of tension between the needs of the residents to sleep and the needs of a working port: ship movements (and associated port activities) are tide dependent and therefore not always readily restricted to daytime.

8.2.47 These ships do not put into port. They remain in deep water and dock with the pipeline terminals. During this time they are not regulated by any of the NIEA, DCSDC, or the Harbour Authority. It also appears that they fall outside the Marine Licencing Regime.[8]

8.2.48 **Recommendation** That consideration is given to ways in which businesses can notify surrounding communities of the need for work outside usual hours for business.

8.2.49 **Recommendation:** Derry City and Strabane District Council and the Harbour Authority work with the pipeline owners, pipeline operators, and users of the delivered material, to determine who has jurisdiction and where that starts and ends. All parties to develop a common code of conduct.

Regulation

8.2.50 NIEA Have had only two self-reported breaches of permit conditions in the last five years.

8.2.51 **Recommendation:** NIEA/ Derry City and Strabane District Council to encourage a pro-active regime of admitting to breaches of permit conditions. This is a legal obligation. We suggest that operators are reminded of this responsibility and also of the fact that failure to report a breach is treated as a serious dereliction of duty.

8.2.52 The complexity of the regulatory regime means that specialist knowledge is required to navigate it, to seek help or to register a complaint. Responsibility for regulation is not immediately apparent. Absence of integration between regulatory regimes was noted, in the Mills Report, as making overall site management at Mobuoy Road far more complex (10). Failure to integrate regulatory regimes and to provide responsive regulation carries a risk for residents, for regulators and for businesses.

8.2.53 The Mills Report recommended that a:

... new concept of 'intelligent regulation' should be considered. Regulators should adopt a differentiated enforcement strategy based on the behaviour and history of the businesses they deal with ... ***Links with community would*** *help establish who the regulator is dealing with and how they might be operating. The term 'intelligent' is used because it can cover both the use of intelligence and the necessary responsiveness to deal with a range of operators from the criminal who has no intention of compliance to the legitimate operator who is prepared to go beyond regulation (10).* [Emphasis in **bold** type is that of BCA and is not included in the original quotation].

8.2.54 This report has seen no evidence of, and does not suggest that, criminal activity is taking place in the study area but it is clear that the regulatory regime is complex and that there is scope for enhancing the levels and the efficiency of regulatory scrutiny.

8.2.55 **Recommendation** That consideration is given to intelligent and responsive regulation of activities in the study area.

[8] http://www.doeni.gov.uk/niea/water-home/marine_licence_applications_and_legislation.htm

8.2.56 **Recommendation** That consideration is given to the ways in which industrial activities in the study area are regulated and to the ways in which compliance with regulation is demonstrated.

8.2.57 **Recommendation** That consideration is given to ways in which the public can gain access to up to date information and guidance and where complaints and inquiries can be registered.

Wider implications of waste and its control

Waste

8.2.58 The definition of waste is "... any substance or object which the holder discards or intends or is required to discard." Defra provide extensive guidance on waste classification.[9]

8.2.59 The European Waste Framework directive is designed to move communities towards sustainability, by implementation of the waste hierarchy, and aims to achieve a 'zero waste to landfill' policy. It also provides protection to land and groundwater by removal of the option to send waste to landfill.

8.2.60 The Waste Regulations (Northern Ireland) 2011 implement the European Directive.[10]

8.2.61 Planning departments are responsible for determining where an incinerator with energy recovery should be built; a landfill site created, anaerobic digester sited.

8.2.62 District councils are responsible for issuing permits to operate by stating the type of waste which can be accepted, how it must be stored, how long it can be stored for. Waste may not go to disposal, but via a waste transfer station for onward shipment to a recovery facility. District Councils are also responsible for the collection, recovery, recycling, and ultimate disposal of household waste.

8.2.63 The NIEA's first compliance report[11] identified waste as a problem to society, and being associated with a great deal of criminal activity. This is not unique to Northern Ireland. [12]

8.2.64 Within the Lisahally area, there are twelve licenses for waste management. Some sites have multiple licences, for management of closed landfill sites, potentially closed, and about to become operational.

8.2.65 Some sites are for transfer of waste only, and do not allow it to stay on site. Some are specialist and allow breakage of end-of-life vehicles.

8.2.66 There are no facilities in the area for hazardous waste disposal. Some hazardous waste from the locality is shipped to Denmark for disposal. In order for this to occur, the waste shipment needs to comply with the Hazardous waste regulations[13] as well as the Basel convention on transfrontier shipment of hazardous waste (which includes shipment between the Republic of Ireland and Northern Ireland).[14]

8.2.67 Local residents have been concerned about poor waste control. It has led to flies and vermin. This may not be about poor control on site, but rather about the state of waste when it is received.

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[9] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69590/pb13813-waste-legal-def-guide.pdf
[10] http://www.legislation.gov.uk/nisr/2011/127/contents/made
[11] http://www.doeni.gov.uk/niea/compliance_and_enforcement_report_2008_to_2010.pdf
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[13] http://www.doeni.gov.uk/niea/waste-home/regulation/regulations_hw.htm
[14] http://www.doeni.gov.uk/niea/uk_plan_for_shipments_of_waste-2.pdf

8.2.68 Culmore landfill site has now been closed. However it continues to pose a threat to local watercourses and groundwater by virtue of being situated below the water table.

Figure 8-2: Aerial photo of Culmore landfill site

Image provided by DCC

8.2.69 Although there is a permit in place requiring the collection, monitoring and treatment of leachate, which goes to Culmore waste water treatment works, Figure 8-2 suggests that tidal changes could affect the landfill. This could in turn lead to contaminating wastes impacting the groundwater as well as the river silt.

Historical and wider impacts on health

8.2.70 Industrial activity in the study area pre-dates the Environmental Protection Act and the current permitting regime. Northern Ireland does not have a control of contaminated land regime and so there is no register of contaminated land in the vicinity. It is possible that some of the land has become contaminated either directly as a result of industrial activity or the use of unlined landfill sites.

8.2.71 We note one planning application where the regulator referred to historical uses of the site and requested further information regarding site data and potential contamination risks (30).

Summary of potential impacts to health and actions required

8.2.72 As stated earlier, exposure to environmental pollutants does not necessarily give rise to health effects. Conversely, causality of ill health as a result of environmental exposure can be difficult to prove, sometimes because of small numbers, sometimes because of time lag associated with a particular effect.

8.2.73 What can be seen is that the communities of Strathfoyle, Culmore and Maydown are exposed to a wide variety of environmental issues, some within a permitted regime, some historical, and some as a result of day to day activities.

8.2.74 Some of these issues are likely to be more straightforward to address than others. Noise and odour can be dealt with via rigorous enforcement of the permitting regime.

8.2.75 Air quality including dust, particulates, SOx and NOx could be evaluated as an examination of permitted activities contributing to a cumulative impact, and modelled to include the impacts of poor air quality from Derry City.

8.2.76 As referenced above, anecdotal information suggests that an underground storage tank for fuel oil may be present. If this tank is present it would appear that it has not been managed. This calls into question its integrity, and the possibility of Volatile Organic Compounds leaking into the ground. Historical data needs to be investigated.

8.2.77 **Recommendation** Derry City and Strabane District Council to consider working with regulators and businesses to prepare a conceptual model for the ground contaminants in the study area. This conceptual model would map out the source-pathway-receptor relationship and it would take account of the fact that different contaminants have different migratory pathways.

Ben Cave Associates Ltd
103 Clarendon Road, Leeds, LS2 9DF, UK
00 44 113 887 0770 : www.bcahealth.eu : information@bcahealth.co.uk

9 Key findings from research studies and lessons from case studies

9.1 Academic information

9.1.1 Annex 5 sets out the literature review findings in full. The following sections provide a very brief overview of the main issues. It is recommended that Annex5 is used to provide industry, communities and regulators with a shared and more informed understanding of the potential health impacts associated with industrial activities in general.

General approach

9.1.2 A focused rapid review approach has been adopted consistent with the resources available. The review has summarised relevant high quality information, but should not be regarded as exhaustive given that it was conducted using the major database of PubMed; no other databases were searched.

9.1.3 The evidence review has been written in the context of sensitivities both within local industry and within local communities. The evidence base is therefore presented as a statement of current understanding of potential health impacts associated with industrial activities in general. The evidence review was focused on adverse impacts because that was the remit for the health impact study as commissioned by DCC. The wider health impact study highlights the important positive impacts that industry brings to the area, including direct and indirect employment, economic and utility functions.

It is important that the outputs of the evidence review remain in the context of the wider health impact study undertaken at Strathfoyle, Maydown and Culmore and is not reported out of context as evidence for or against health impacts in any individual case.

9.1.4 The impacts discussed in this evidence review clarify, in general terms, the links between industrial activities and health. This information is intended to be used to improve understanding for industry, communities and regulators as they find a constructive way forward with greater communication and shared understanding of the issues.

9.1.5 For Strathfoyle, Maydown and Culmore the health case is neither proven nor discounted by this review. In some cases issues reported by these communities are consistent with current scientific evidence; in other cases there is either a lack of evidence of an effect occurring in the locality or evidence that measurable changes in health outcomes are unlikely. We note also that absence of evidence does not necessarily mean absence of effect.

9.1.6 The evidence review highlights that regulatory emissions thresholds and operating practices will in many cases prevent measurable changes in a population's health outcomes. However both individual sensitivities and health impacts which have no lower threshold of harm cannot be fully mitigated. Health impacts may therefore be possible even when industry is in full compliance with its permitting conditions. From a societal point of view this may or may not be acceptable. Many of these emissions are non-attributable, but rather are a cumulative effect of industrial, commercial and domestic emissions, examples being emissions from chimney stacks, as well as vehicle emissions both private and business driven.

9.1.7 In all cases the regulatory environment in which industry operates is an important factor in reducing actual and perceived health risks. Even when operating to standard, lack of community confidence in the regulatory system may detract from the reassurance (and thus wellbeing protection) that such regulation should offer. This evidence base is therefore also aimed at regulators to inform not only their discussions with industry and the community, but also any future monitoring plans.

9.1.8 The objective of this evidence review is to identify key health impacts associated with a selection of topics. Given the breadth of possible issues that could be reviewed, the topics have been selected based on concerns raised during the Strathfoyle, Maydown and Culmore consultation events. In general terms the evidence review contextualises the self-reported community health impacts in the study area by establishing what health impacts have been shown to be credible in published studies. The evidence review does not involve judgement as to the validity or extent of impacts reported by the community. That judgement would be the outcome of the small area study recommended as a next step from this health impact study. The transferability of these findings to the local conditions is a key question for further investigation. The health impacts identified in the evidence review are therefore likely to represent a worst case scenario for all but the most sensitive individuals. Independently verified local data on both environmental conditions and health outcomes are required to move beyond determining the broad credibility of self-reported health outcomes. This is the purpose of the recommended small area study.

Summary of general literature of living in proximity to industrial sites

9.1.9 Studies find many examples of associations between increased risks of various health conditions and proximity to industrial sites. However the results show limited or inadequate evidence for a causal relationship. This is likely to reflect scarcity of evidence as opposed to strong evidence of no effect. This highlights the difficulty for policy makers and health protection teams in justifying a mandate to act.

9.1.10 Although the current evidence for causal relationships between residential proximity to environmental hazards and adverse health outcomes is very limited, the evidence is sufficient to justify the application of the precautionary principle. Even in the absence of complete scientific proof, enough evidence of potential harm being done exists to justify taking steps to rectify the problem and to protect the public from potentially harmful exposures.

9.1.11 However the variability in the findings of studies examining the same health outcome for different industrial sites highlights that it may be inappropriate to generalise issues as being associated with specific industrial sectors, or even industry generally. Site specific data and action plans are therefore needed.

Summary of evidence for potential health effect by topic areas

Noise

9.1.12 The evidence base that noise has the potential to impact on health outcomes is strong, with many good quality studies both in community as well as occupational settings. Noise can lead to: loss of hearing; annoyance; sleep disturbance; impairment of cognitive performance; and increases in hypertension and cardiovascular disease. Intermittent noise of relatively short duration is most disruptive, particularly where it interferes with speech or cognitive tasks. The evidence base highlights that subjective influences can be as important to adverse reactions as the actual noise levels themselves. These include: attitude towards the noise source; trust in the authorities involved; direction of change of noise level; and information available about the change. Despite these subjective

influences there are health based noise thresholds set by the WHO (31;32) below which impacts are generally not expected.

Vibration

9.1.13 There is little evidence that vibration impacts outside of occupational scenarios (such as working with vibrating machinery) have a strong impact on health. However, although vibration effects generally do not propagate far, there is emerging evidence that under certain conditions vibration can cause disturbance on its own, as well as increasing levels of disturbance from sources that produce both noise and vibration. Vibrations transmitted from site activities to a neighbourhood can cause: anxiety; annoyance; sleep disturbance; and disrupt work or leisure activities. Vibrations can also cause structure-borne noise which can be an additional irritant to occupants of buildings e.g. loose fittings are prone to rattle. Low frequency noise (often termed a 'hum') are recognised as a problem because they are perceived by residents, but do not register as exceeding recommended thresholds on commonly used assessment methods.

Air quality

9.1.14 There is strong evidence from the scientific literature for the adverse health impacts of poor air quality. Ambient outdoor air pollution consists of a mixture of various solid, liquid or gaseous substances from different sources e.g. vehicle, domestic and industry fuel combustion. Most prevalent air pollutants are fine particles ($PM_{2.5}$), carbon monoxide (CO), nitrogen dioxide (NO_2), sulphur dioxide (SO_2) and secondary ozone (O_3). Chronic exposure to outdoor air pollution is associated with a wider range of adverse health outcomes including: reduced lung function; increased asthma and chronic obstructive pulmonary disease (COPD) severity; hypertensive pregnancy disorders; cardiovascular and respiratory diseases, including lung cancer; and increased susceptibility to respiratory infections.

Dust (nuisance)

9.1.15 Dust covers a spectrum of particulates of different sizes and compositions from both natural (e.g. sea salt) and man-made (e.g. tyre wear) origins. This summary focuses on impacts other than fine particulates (e.g. $PM_{2.5}$) which are covered under air quality. Scientific evidence for community (non-occupational) dust health impacts is limited. Impacts range from reductions in well-being from property being covered in layers of precipitated dust, to respiratory conditions from inhalation. The former are not well documented in the scientific literature, with no well-evidenced thresholds for impacts. At high concentrations, exposure to low-toxicity dusts can cause respiratory diseases. Dust particles are also known to adsorb and concentrate odorants, as well as volatile organic compounds (VOCs), which can be harmful to health. Therefore in addition to particle size and the level of exposure, the type of dust (e.g. coal or wood dust) and the conditions it has been exposed to (e.g. odorants or VOCs) can determine its health impact.

Water quality

9.1.16 The water environment (surface and ground water) can impact upon health due to a range of biological and chemical contaminants. Severe weather, close proximity to animal populations, and poor maintenance and treatment practices are all associated with disease outbreaks linked to drinking water contamination. Local hydrogeology is an important risk factor in the likelihood of pathogen presence in groundwater supplies, e.g. due to faecal waste ingress. Aerosols are another pathway, as viruses, bacteria and parasites can also be transmitted in airborne water droplets generated during aeration or mechanical moving of the sewage. Recreational exposure to cyanobacteria toxins (during eutrophication blooms caused by uncontrolled nutrient releases into waterways) has the potential to cause serious injury. Similarly toxic effects may arise from chemical contaminants in waters from which drinking water is derived e.g. nutrients, metals, pesticides, persistent organic

pollutants (POPs), chlorination by-products, and pharmaceuticals. Bioaccumulation of such toxins into the human food chain is an important health hazard. Finally flooding also carries the potential for serious, widespread and long-lasting health impacts, including: infectious diseases; loss of essential urban infrastructure and services; and stress.

Odour (nuisance)

9.1.17 The scientific evidence base on odour health impacts is incomplete and highly dependent on subjective outcome measures. Odours arise due to complex olfactory receptor exposures to a wide variety of different chemicals. There is limited evidence that clinical health outcomes are directly affected by odour. In cases of toxic substances that also have a distinctive odour the detection of the odour is generally independent of the toxic impact. Despite subjective influences there is often broad consensus on whether an odour impact is unpleasant. Odour affects mood and emotions, stress levels, and perceived health. Aversive odour may trigger symptoms by a variety of physiological mechanisms, including: exacerbation of underlying medical conditions; innate odour aversions; aversive conditioning phenomena; and stress-induced illness. Odour impacts may be detectable up to 3 km from the source and are often weather dependent. The stable atmospheric conditions often experienced between dusk and dawn can increase night-time exposure, a time when plant operators may be absent. Furthermore occupational odour exposure may desensitise plant operators, making them unaware of potential community impacts.

Traffic (safety/severance)

9.1.18 Air quality, including fine particulate matter, is a particularly important transport health impact, which is addressed separately in the sections covering air quality, dust and odour. The scientific evidence is strong for physical injury and death impacts from motorised transport. The evidence is weaker for more indirect impacts including changes to: physical activity and obesity; social exclusion and inequalities; and mental health. Community severance (where road traffic speed or volume inhibits access to goods, services, or people) is associated with a range of poor health outcomes, although the causal relationships are understudied. Mental health impacts include posttraumatic stress disorder following a traffic accident have been shown to result in serious and long-lasting consequences for quality of life and absenteeism from work. Built environment features that either slow traffic down (traffic calming) or separate children from traffic (playgrounds) were associated with both increased walking and less pedestrian injury.

Light (nuisance)

9.1.19 The evidence base for health impacts of night-time light disturbance is emerging but should be treated cautiously as the evidence is weak. The research focuses on shift workers, where long-term exposure to light during the hours of darkness affects the body's circadian rhythms. Community impacts are less well studied, although it is generally noted that a disturbed circadian rhythm is not conducive to good health. The weak occupational evidence suggests that exposure to light at night while awake (especially during shift work), may be associated with: an increased risk of breast cancer; circadian rhythm disruption; and sleep, gastrointestinal, mood and cardiovascular disorders. Caution should be exercised in generalising these findings to a community context.

Pests and vermin (nuisance/disease vectors)

9.1.20 Health impacts associated with pests and vermin are generally associated either with disease transmission or reductions in well-being from sharing living or recreational space with infestations. The former has some well evidenced examples in the literature. The latter is less well evidenced. Flies constitute a major group of nuisance species as well as being potential disease vectors due to their association with contaminated substrates. The mere presence of flies in sensitive locations can be an indication of poor hygiene. However

most complaints about flies are due to annoyance. Rats and mice can be infected with a large variety of parasites and zoonotic agents, which elevates their status from mere nuisances to public health pests. There is weak, but developing, evidence that toxins used in pest control carry potential health hazards.

9.2 Case studies: working ports/industrial estates and residential settlements

Case studies

9.2.1 Strathfoyle, Maydown and Culmore are not the only communities to have experienced tensions with neighbouring port and industrial uses. The following case studies provide some insight into the experiences of other communities internationally. These examples illustrate a variety of approaches that have been used in attempting to investigate or to resolve community concerns. Whilst informative of the potential challenges, these approaches are not necessarily directly applicable and therefore transferable to the Derry-Londonderry context.

Port Talbot (Wales) Action Plan

9.2.2 The community of Port Talbot in Wales raised concerns with the local council about air quality (particularly fine particulate matter), partly due to local industrial activities. In response the Welsh Government developed a short term action plan (33).

9.2.3 The context in Swansea is of a large industrial port complex operating at the boundary of a community covered by an Air Quality Management Area (AQMA). Fugitive emissions from the industrial complex were recognised as being a significant factor alongside other sources, including: road transport; construction projects; natural sources (such as sea spray); and transboundary sources. In this case the proximity of the AQMA was a significant factor in compelling action due to the implications of breaching statutory air quality standards. In the case of Strathfoyle, Maydown and Culmore an AQMA designation has not been declared in the area in which these communities live. The closest AQMA is some distance away in central Derry-Londonderry[15].

9.2.4 The driver behind the Port Talbot action plan was a clear breach of internationally set statutory air quality thresholds. Although equivalent evidence of breaches is not available at Strathfoyle, Maydown and Culmore, this case study demonstrates how an integrated process between regulators, local government and national government could be emulated. The action plan provides a useful example of setting clear: roles; responsibilities; governance arrangements; actions; monitoring; and evaluation measures. Notably each action in the plan is linked to a lead organisation and to a process or outcome measure.

US Port Case Study

9.2.5 The second case study is developed by the US Trade, Health and Environment Impact Project (34).

9.2.6 The case study concerns people living near the San Pedro Bay Ports of Los Angeles and Long Beach. The project report explains that although port growth produced economic benefits, it also resulted in significant negative environmental and public health impacts. Environmental justice organisations formed near the ports to: raise awareness; help local communities to measure pollution; and to take legal action. This community involvement and advocacy led to the establishment of new port policies, standards, and programs. However the report notes that emissions remained at significant levels.

[15] Defra AQMA interactive map. Accessed 27.02.15. http://uk-air.defra.gov.uk/aqma/maps

9.2.7 This case study is included to illustrate the pitfall of not including regulators. The reporting of the project presents a picture of the local communities pressuring local industry without reference to the legislative and regulatory frameworks within which those businesses operated. The project identifies a long list of policy recommendations to further advance environmental justice and improve the health of residents living near port operations. Although potentially effective the lack of regulator engagement limits the likelihood that these recommendations could be worked into the operations of the businesses in a way that was acceptable to both the industries and the community.

WHO Sicilian Case Study

9.2.8 The final case study in the report is from Sicily (35).

9.2.9 The situation in Sicily arose from a period of rapid industrialisation quickly followed by unplanned urban growth. Although the main issue was contaminated land from the petrochemical industry, there are several similarities with the situation in Strathfoyle, Maydown and Culmore. It is noted from the outset that the scale of both the problem (across three large industrialised areas) and the response (including an extensive three year research project by the WHO) are different from the situation in Derry-Londonderry. The important learning point to take from this case study is the adoption of a strategy that encompassed a wide range of different health determinants and stakeholders. To move forward the project effectively and simultaneously involved citizens, health authorities, municipalities and environmental agencies. The report emphasises the need for realistic suggestions for both policy responses and investigative approaches.

9.2.10 The WHO Sicilian case study demonstrates that establishing the relevant health effects and assessing the adverse impacts on health of large industrial facilities are challenging. The report notes the complexity of the interaction between multi-agent contamination and populations of both residents and workers. The project found that in polluted areas, decisions about remediation and health surveillance must be made when outcomes are uncertain and univocal scientific findings are absent.

9.2.11 The case study identifies the following conditions as essential to build trust with the public:

- direct involvement of the population, with a programme of public events at various levels, taking into account the views of citizens' associations that are directly involved in environment and health issues;
- a highly transparent decision-making processes, informing the population about the rationale of the decisions being made, with adequate explanations given when decisions are at odds with the expectations of the population; and
- full availability of relevant scientific evidence and information on risks to the environment and health.

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