

14 INTERACTIONS

14.1 Introduction

As a requirement of Planning Regulations and the Environmental Protection Agency's 'Guidelines on information to be contained in Environmental Impact Assessment Reports' (2017), interrelationships between various environmental aspects must be considered when assessing the impact of the Proposed Development, as well as individual significant impacts. The significant impacts of the Proposed Development and the proposed mitigation measures have been detailed in the relevant chapters of this report. However, as with all developments that pose potential environmental impacts, there also exists potential for interactions/interrelationships between the impacts of different environmental aspects. The results may exacerbate or ameliorate the magnitude of impacts. This chapter of the EIAR addresses the interactions between the various environmental factors of the Proposed Development.

The following Section is directed by Article 3 section 1(e) of the EIA Directive. The EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports (Draft, 2017) and Advice Notes for Preparing Environmental Impact Statements (Draft, September 2015) were also considered.

Article 3 of the Directive states:

1. The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:
 - a) population and human health;
 - b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;
 - c) land, soil, water, air and climate;
 - d) material assets, cultural heritage and the landscape;
 - e) the interaction between the factors referred to in points (a) to (d)

14.1.1 Quality Assurance and Competence

This Chapter was prepared by Arthur Greene, Graduate Environmental Consultant, Enviroguide Consulting. Arthur has a Master of Science (Hons) in Ecosystem Science and Policy from University College Dublin and Justus Liebig University and a Bachelor of Arts (Hons) in Geography from Trinity College Dublin. Arthur has experience preparing Environmental Impact Assessment (EIA) Screening Reports, Introduction Chapters, Archaeology Chapters and Archaeology & Cultural Heritage Chapters of EIARs.

14.1.2 Description of the Proposed Development

Milford Quarries Limited intend to apply for planning permission for the demolition of existing derelict buildings and the development of a quarry.

The proposed quarry void will be extracted to a depth of 2 no. benches of c. 10m from top of bedrock, with a final floor level of c. 56.5m AOD with a proposed rate of rock extraction of

c.30,000 cubic metres (84,000 tonnes) per annum. A proposed working area of c. 1.2 hectares to the south of the extraction zone will provide for the crushing / processing of the unusable stone and storage of dimensional stone and will include machinery storage shed, staff welfare, wastewater holding tank, weighbridge and parking area.

The Proposed Development will also include for earthen screening berms to a height of c. 3 m, a wheelwash facility; Installation of surface water attenuation and settlement ponds for the treatment of suspended solids in the floor of the quarry; soil storage area with an average storage depth of c. 3.85 m and all other site development works above and below ground including the restoration of the final quarry void (extractive area).

Access to the Proposed Development will be facilitated by a HGV site entrance from the Local Road to the east of the proposed site via a proposed access haul road. As part of the Proposed Development, all staff and visitor parking will occur within a designated parking area to be delineated within reasonable proximity to the welfare unit office.

14.2 Study Methodology

The interactions between impacts on different environmental factors have been addressed throughout this EIAR. Close co-ordination and management with the EIAR team was carried out to ensure that all likely relevant interactions were addressed at the scoping stage of the EIAR, and interactions have been adequately assessed.

Following an assessment of the EIAR, a matrix was produced to display where interactions between impacts on different factors have been addressed. This has been carried out by use of chapter headings included in the EIAR and details of any interaction during all phases of the Proposed Development.

14.3 Interactions

The following matrix has been produced to show where potential significant interactions between effects on different factors have been addressed, see Table 14-1.

As this EIAR has been prepared by a number of specialist consultants, an important aspect of the EIA process was to ensure that interactions between the various disciplines have been taken into consideration. The principal interactions requiring information exchange between the environmental specialists and the design team are summarised in Table 14-2 to Table 14-10.

Table 14-1: Interactions between Factors

Interaction	4. Population and Human Health	5. Biodiversity	6. Land and Soils	7. Hydrology	8. Air Quality & Climate	9. Noise & Vibration	10. Landscape & Visual Amenity	11. Archaeology, Architecture & Cultural Heritage	12. Material Assets – Waste & Utilities	12. Material Assets - Traffic
Population and Human Health	Grey	Yellow	Yellow	Yellow	Green	Green	Green	Yellow	Green	Yellow
Biodiversity	Yellow	Grey	Yellow	Yellow	Green	Green	Green	Yellow	Green	Yellow
Land and Soils	Yellow	Green	Grey	Yellow	Yellow	Yellow	Yellow	Green	Green	Yellow
Hydrology	Green	Green	Green	Grey	Yellow	Yellow	Yellow	Yellow	Green	Yellow
Air Quality and Climate	Green	Green	Yellow	Yellow	Grey	Yellow	Yellow	Yellow	Yellow	Yellow
Noise and Vibration	Green	Green	Yellow	Yellow	Yellow	Grey	Yellow	Yellow	Yellow	Green
Landscape & Visual Amenity	Green	Green	Yellow	Yellow	Yellow	Yellow	Grey	Yellow	Yellow	Yellow
Archaeology, Architectural and Cultural Heritage	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Green	Grey	Yellow	Yellow
Material Assets – Waste & Utilities	Yellow	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Grey	Yellow
Material Assets - Traffic	Green	Yellow	Yellow	Yellow	Green	Green	Yellow	Yellow	Green	Grey

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Green	No Interaction
Yellow	Interaction
Grey	N/A

Table 14-2 Population and Human Health

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Population and Human Health	
Summary	
<p>Chapter 4 of this EIAR, <i>Population and Human Health</i>, details the direct and indirect effects of the Proposed Development on Population and Human Health; and sets out any required mitigation measures where appropriate.</p> <p>Construction Phase:</p> <ul style="list-style-type: none"> • There are no negative impacts expected at the Proposed Development during the Construction Phase. <p>Operational Phase:</p> <ul style="list-style-type: none"> • There is a potential for impact on noise, air quality and traffic during the Operational Phase of the Proposed Development. However, necessary mitigation measures will be in place to ensure the impacts are not significant. 	
Interactions	
Hydrology	<p>Pollution events can impact the water quality and thus impact the human health of the surrounding population. Appropriate surface water control measures will be implemented as part of the Proposed Development. No public health issues associated with the water conditions at the Site have been identified for the Construction Phase or Operational Phase of the Proposed Development. There are no likely significant adverse impacts as a result of Hydrology and as such there will be no significant impacts on population and human health. Hydrology has been fully assessed in Chapter 7 of this EIAR.</p>
Air Quality and Climate	<p>Interactions with air quality during the construction and operational phase has the potential to cause issues relating to dust and traffic emissions impacting human health. However, Chapter 8 has concluded that there will be no significant air quality impacts. All ambient air quality legislative limits will be complied with and therefore the predicted impact is not significant with a neutral effect on human health. Air quality is discussed further in Chapter 8 of this EIAR.</p>
Material Assets: Traffic and Transport	<p>Construction and operational activities will result in an increased number of HGV movements. There is a potential impact on population and human health in relation to the capacity and operation of the surrounding road network. The overall impact of the Proposed Development on the transportation infrastructure in the local area will not be significant and</p>

	<p>subsequently there will be no significant impact on population and human health.</p>
<p>Noise and Vibration</p>	<p>Construction activities such as site clearance, building construction works, and trucks and vehicles entering and exiting the site have the potential to interact with the surrounding population and human health and cause noise disturbance. The impact assessment of noise and vibration has concluded that additional noise associated with the construction and operational phase will not cause a significant negative impact.</p> <p>Operational Phase noise impacts have also been assessed in relation to traffic and plant equipment and no significant negative impacts will be experienced. As such, there will be no significant impact on population and human health. Noise is fully assessed in further detail in Chapter 9 of this EIAR.</p>
<p>Landscape and Visual</p>	<p>The Proposed Development will alter the visual appearance of the site which is predominantly a greenfield site. It is not considered that the Proposed Development by virtue of its visual appearance and in the context of the proposed zoning of the site of the Proposed Development and the rural and residential nature of the surrounding landscape, will cause any significant impacts and as such there will be no significant impact on population and human health.</p>
<p>Conclusions</p>	
<p>There is a potential for impact on air quality, noise and vibration, and traffic during the Operational Phase of the Proposed Development. However, no public health issues or negative impacts are expected due to the implementation of the mitigation measures outlined in the respective Chapters.</p>	

Table 14-3: Biodiversity

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Biodiversity	
Summary	
<p>Chapter 5 of this EIAR, <i>Biodiversity</i>, details the direct and indirect effects of the Proposed Development on the local flora and fauna; and sets out any required mitigation measures where appropriate. Construction Phase:</p> <ul style="list-style-type: none"> • The bulk removal of soils, sands and gravel at the Site has the potential to impact biodiversity. • Potential pollution of habitats and biodiversity hydrologically linked to the Site. • Potential impact from dust on air quality but minimisation and mitigation measures will be implemented. • Construction waste arising from Site operations could negatively affect local fauna. <p>Operational Phase:</p> <ul style="list-style-type: none"> • Potential pollution of habitats and biodiversity hydrologically linked to the Site. • Potential impact from dust on air quality but minimisation and mitigation measures will be implemented. • There is potential for interactions between noise and sensitive fauna, however, these impacts are not expected to be significant. • The landscaping at a development site can have significant implications for biodiversity. Significant negative effects are not predicted. 	
Interactions	
Land and Soil	<p>An assessment of the potential impact of the Proposed Development on the existing land, soils and geological environment; with emphasis on the impact of the Proposed Development on the receiving soils underlying the site during the Operational Phases of the Proposed Development, is described in Chapter 6 - 'Land and Soil' of this EIAR. These impacts are considered to be relevant to the ecological sensitivities associated with the site of the Proposed Development discussed in this Chapter; and mitigation measures addressing these potential impacts are described in full in Chapter 6. The bulk removal of soils, sands and gravel at the site can have implications for biodiversity. Natural regeneration of native and local seeds is the preferred option for re-vegetating areas to be retained for biodiversity.</p>
Hydrology	<p>The key environmental interaction with biodiversity is water. An assessment of the potential impact of the Proposed Development on the hydrological and hydrogeological environment is described in Chapter 7 - 'Hydrology' of this report as well as in this Chapter, to ensure the quality (pollution and sedimentation) and quantity (surface water run-off) of water is of</p>

	<p>appropriate standard. Interactions between hydrology and biodiversity can occur through impacts to water quality, arising, for example from an accidental pollution event during the Construction and Operational Phase. This interaction has the potential to result in impacts on habitats and fauna that are hydrologically linked to the site.</p>
Air Quality	<p>An assessment of the potential impact of the Proposed Development on air quality and climate is included in Chapter 8 of this EIAR. Dust emissions arising from the Construction Phase of the Proposed Development were identified as having potential impacts on local biodiversity. Once dust minimisation measures are implemented, impacts to biodiversity are not predicted to be significant.</p>
Noise and Vibrations	<p>An assessment of the potential impact of the Proposed Development in the form of excess noise and vibrations associated with the Proposed Works are laid out in Chapter 9 - 'Noise and Vibrations'. These impacts are considered to be relevant to the ecological sensitivities associated with the site of the Proposed Development discussed in this Chapter; and mitigation measures addressing these potential impacts are both referenced in this Chapter and described in full in Chapter 9. There is potential for interactions between noise and sensitive fauna, e.g., birds, that occur in adjacent habitats from increased noise levels during the Construction Phase. However, as described, noise related impacts are not deemed to be significant.</p>
Landscape and Visual	<p>An assessment of the potential impacts of the Proposed Development on the surrounding landscape character is outlined in Chapter 10 – Landscape and Visual. These impacts are considered to be relevant to the ecological sensitivities associated with the site of the Proposed Development discussed in this Chapter; and mitigation measures addressing these potential impacts are both referenced in this Chapter and described in full in Chapter 10. Landscaping at a development site can have significant implications for biodiversity. Significant negative effects are not predicted.</p>
Material Assets: Waste and Utilities	<p>Construction waste arising from site operations could negatively affect local fauna through entrapment, for example. However, appropriate waste management practices on site will ensure no significant effects occur on local biodiversity.</p>
Conclusions	
<p>There are several interactions expected during both the Construction and Operational Phase. However, with the implementation of mitigation and monitoring measures outlined in the respective Chapters, significant negative effects are not predicted.</p>	

Table 14-4: Land and Soils

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Land and Soil	
Summary	
<p>Chapter 6 of this EIAR, <i>Land and Soil</i>, details the direct and indirect effects of the Proposed Development on the local land, soils, and geology; and sets out any required mitigation measures where appropriate.</p> <p>There are several risks throughout both the Construction and Operational Phases of the Proposed Development due to the nature of the Proposed Development.</p> <p>Hydrology can potentially be impacted through pollution and contamination of watercourses during both the Construction and Operational Phases of the Proposed Development.</p>	
Interactions	
Hydrology	Interactions with the water environment can potentially occur through erosion of soils/subsoils. This is discussed and assessed in Chapter 7.
Conclusions	
<p>With the implementation of mitigation and monitoring measures outlined in the respective Chapters, significant negative effects are not predicted.</p>	

Table 14-5: Hydrology and Hydrogeology

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Hydrology and Hydrogeology	
Summary	
Chapter 7 of this EIAR, <i>Hydrology and Hydrogeology</i> , provides an assessment of the potential impacts of the Proposed Development on hydrology, water and hydrogeology and sets out any required mitigation measures where appropriate.	
Interactions	
N/A	No interactions have been identified for Hydrology and Hydrogeology.
Conclusions	
No interactions have been identified for Hydrology and Hydrogeology.	

Table 14-6: Air Quality and Climate

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Air Quality and Climate	
Summary	
<p>Chapter 8 of this EIAR, <i>Air Quality and Climate</i>, provides an assessment of the potential impacts of the Proposed Development on ambient air quality and climate, and sets out appropriate mitigation measures where necessary.</p> <p>A potential risk is posed Population and Human Health during the Construction and Operational Phases of the Proposed Development through dust nuisances, including silica dust, and potential traffic derived pollutants.</p>	
Interactions	
Population and Human Health	<p>Interactions between Air Quality and Population and Human Health have been considered as the Proposed Development has the potential to cause health issues as a result of impacts on air quality from dust nuisances, including silica dust, and potential traffic derived pollutants. However, the mitigation measures employed at the Proposed Development will ensure that all impacts are compliant with ambient air quality standards and human health will not be affected.</p>
Biodiversity	<p>It is not considered that the interaction between Air Quality and Climate and Biodiversity will be significant due to the implementation of the proposed mitigation measures.</p>
Material Assets: Traffic	<p>Traffic derived pollutants which may affect Air Quality and Climate are deemed insignificant due to the marginal change in traffic volume and movement associated with the Proposed Development as outlined in Chapter 12, Section 12.1 Traffic.</p>
Conclusions	
<p>There are potential interactions between Population and Human Health, Traffic and Biodiversity during both the Construction and Operational Phases of the Proposed Development. However, no significant adverse impacts are expected due to the implementation of appropriate mitigation and monitoring measures outlined in the respective Chapters of this EIAR.</p>	

Table 14-7: Noise and Vibration

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Noise and Vibration	
Summary	
<p>Chapter 9 of this EIAR, <i>Noise and Vibration</i>, provides a description and assessment of the likely impact of the proposed activities from noise, and sets out appropriate mitigation measures where necessary.</p> <p>A potential risk is posed to Population and Human Health, and Biodiversity during the Construction and Operational Phases of the Proposed Development through noise associated with the operation of construction and on-site machinery.</p>	
Interactions	
Population and Human Health	<p>The impact assessment of noise and vibration has concluded that additional noise associated with the Proposed Development will be intermittent and will not create any major negative impacts beyond the site boundary. Mitigation and monitoring measures will be incorporated to further reduce the potential for noise generation from the Proposed Development. No human health impacts are anticipated as a result of noise from the Proposed Development.</p>
Biodiversity	<p>It is not considered that the Noise and Vibration effects of the Proposed Development will have an adverse impact on biodiversity in the local area due to the implementation of the proposed mitigation measures.</p>
Material Assets: Traffic	<p>The Proposed Development will have no significant impact on traffic volumes in the local network, and therefore traffic will not result in any significant increases of noise at sensitive receptors.</p>
Conclusions	
<p>There are potential interactions between Population and Human Health, Traffic and Noise and Vibration and Biodiversity during both the Construction and Operational Phases of the Proposed Development. However, no significant adverse impacts are expected due to the implementation of appropriate mitigation and monitoring measures outlined in the respective Chapters of this EIAR.</p>	

Table 14-8: Landscape and Visual

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Landscape and Visual	
Summary	
<p>Chapter 10 of the EIAR, <i>Landscape and Visual Assessment</i>, provides a description and assessment of the likely impact of the Proposed Development on the landscape and visual amenities of the area.</p> <p>The Landscape and Visual Amenities of the site will not negatively impact Population and Human Health, Biodiversity or Archaeology and sites of cultural heritage during the either the Construction or Operational Phases of the Proposed Development.</p>	
Interactions	
Population and Human Health	<p>It is not considered that the Proposed Development by virtue of its visual appearance and in the context of the proposed zoning of the site of the Proposed Development and the nature of the surrounding landscape, will cause any issues for the residential local population.</p>
Biodiversity	<p>The proposed landscaping of the Site interacts with its biodiversity and ecology through the changes that will occur to the existing habitats and flora at the Site. The landscaping proposals will entail losses and contributions in terms of vegetation at the Site, which in turn will affect the ecology of the Site.</p> <p>The majority of vegetation at the site will not be retained, due to the nature of the Proposed Development. As described, vegetation will be stripped, and the quarry excavated. The impacts on local flora and fauna will be localised (i.e., only within the proposed extraction area) and will be mostly mitigated through the adoption of a suitable landscape and restoration plan which will be undertaken on completion of the extraction works. The Restoration Plan includes the reestablishment of vegetative corridors surrounding the site, and the “restoration” of scrubby grassland on the portion of the site previously occupied by the conifer plantation.</p>
Archaeology and Cultural Heritage	<p>As there are no known archaeological or architectural remains found during the desk top survey as well as the walkover survey, it is not predicted that any changes in landscape or visual impact will affect in any way the archaeology of the area.</p>
Conclusions	

No significant adverse effects are expected for any of the interactions above and mitigation and monitoring measures are outlined in the respective Chapters within this EIAR.

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Table 14-9: Archaeology and Cultural Heritage

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Archaeology and Cultural Heritage	
Summary	
Chapter 11 of the EIAR, <i>Archaeology and Cultural Heritage</i> , provides information on the known architectural, archaeological, and cultural heritage sites in the study area.	
Interactions	
Land, Soil and Geology	The Proposed Development will involve the movement of soil for the site to reach the required levels. There is potential for previously unrecorded archaeological features or deposits to be discovered during this process.
Conclusions	
With the implementation of all mitigation measures detailed in Chapter 11, there will be no negative residual impacts upon the archaeological or cultural heritage resource.	

Table 14-10: Material Assets - Waste and Utilities

Material Assets - Waste and Utilities	
Summary	
<p>Chapter 12 of the EIAR, <i>Material Assets</i>, provides an assessment of the potential impacts of the Proposed Development on Material Assets including traffic, built services and infrastructure.</p> <p>There is potential for negative interaction between Material Assets and Population and Human Health during the Construction and Operational Phases of the Proposed Development through dust, noise or vibration.</p> <p>Land, Soil and Geology as well as Hydrology and Hydrogeology are at risk of pollution and contamination during both the Construction and Operational Phases of the Proposed Development.</p>	
Interactions	
Population and Human Health	<p>In the event of uncontrolled releases of dust, noise or vibration, this could negatively impact on the surrounding human population and their overall health. Potential impacts on population and human health are addressed in Chapter 4. Additional potential impacts and interactions with the local population are addressed in detail in Chapters 8 (Air Quality), 9 (Noise and Vibrations) and 10 (Landscape and Visual Impact).</p>
Land and Soil	<p>In the event of spillage/ leaks from waste storage areas, this could negatively impact on the land and soil. Potential impacts on land and soils are addressed in Chapter 6.</p>
Material Assets: Traffic	<p>The Proposed Development has the potential to impact upon traffic movements in the Old Leighlin area. Potential impacts on traffic are addressed in Chapter 12.1.</p>
Hydrology & Hydrogeology	<p>The Proposed Development has the potential to increase volumes of water being discharged from the site to the Baunleath stream, which in turn discharges into the Madlin River. This increase in surface water discharge will be as a consequence of the increased volumes of surface and groundwater being generated within the proposed quarry void. Quarrying activities below the water table have the potential to impact on local groundwater levels in the vicinity of the Proposed Development. Once the quarrying operations extend below the groundwater table, groundwater levels in the surrounding area will be lowered as the groundwater flows towards the newly created void. Drawdown may have a negative impact on</p>

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	local private groundwater wells. Potential impacts Hydrology & Hydrogeology addressed in Chapter 7.
Biodiversity	The improper handling and storage of waste could negatively impact on biodiversity. Potential impacts on biodiversity are addressed in Chapter 5.
Conclusions	
Although risks are posed to Population and Human Health, Land, Soil and Geology, and Hydrology and Hydrogeology throughout the Construction and Operational Phases of the Proposed Development, no significant adverse impacts are expected due to the upholding of industry and environmental standards as well as the implementation of appropriate mitigation and monitoring techniques discussed in the relevant Chapters of this EIAR.	

Table 14-11: Material Assets - Traffic

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Material Assets - Traffic	
Summary	
Chapter 12 of the EIAR, <i>Material Assets</i> , provides an assessment of the potential impacts of the Proposed Development on Material Assets including traffic, built services and infrastructure.	
Interactions	
Noise and Vibration	The analysis contained within this chapter interacts with the Noise Assessments contained within this EIAR. This is primarily due to the potential for an increase in HV traffic movements on the surrounding road network due to development.
Conclusions	
With the implementation of all mitigation measures detailed in Chapter 12, there will be no negative residual impacts upon the Traffic.	

14.4 References

EIAR Chapters 4 to 12 inclusive.