

3.9 AIR AND CLIMATE

3.9.1 Air Quality

3.9.1.1 Methodology

This section of the Constraints Study describes the existing air quality and noise environment within the Study Area, and identifies possible issues which have the potential to constrain the design of any flood relief scheme.

The Study Area is located in a rural area including the town of Crossmolina, Co. Mayo. Due to the non-industrial nature of the proposed scheme and the general character of the surrounding environment, air quality sampling was deemed to be unnecessary for the purposes of this Constraints Study. It is expected that air quality in the existing environment is good, since there are no major sources of air pollution (e.g. heavy industry) in the immediate vicinity of the site. Land-use in the vicinity of the site is dominated by pastoral agriculture.

The following items were the principal focus of the study:

- Identification of possible issues regarding air quality
- Identification of locations where there may be existing noise/ vibration-sensitive receptors
- Identification of any existing noise or vibration sources in the area
- A qualitative description of the existing noise climate

The following were referenced as part of the Constraints Study;

- Mayo County Development Plan (2008-2014)
- EPA website (www.epa.ie)

3.9.1.2 Air Quality Standards

In 1996, the Air Quality Framework Directive (96/62/EC) was published. This Directive was transposed into Irish law by the Environmental Protection Agency Act 1992 (Ambient Air Quality Assessment and Management) Regulations 1999. The Directive was followed by four Daughter Directives, which set out limit values for specific pollutants:

- The first Daughter Directive (1999/30/EC) deals with sulphur dioxide, oxides of nitrogen, particulate matter and lead.
- The second Daughter Directive (2000/69/EC) addresses carbon monoxide and benzene. The first two Daughter Directives were transposed into Irish law by the Air Quality Standards Regulations 2002 (SI No. 271 of 2002).

- A third Daughter Directive, Council Directive (2002/3/EC) relating to ozone was published in 2002 and was transposed into Irish law by the Ozone in Ambient Air Regulations 2004 (SI No. 53 of 2004).
- The fourth Daughter Directive, published in 2007, deals with polyaromatic hydrocarbons (PAHs), arsenic, nickel, cadmium and mercury in ambient air.

The Air Quality Framework Directive and the first three Daughter Directives have been replaced by the Clean Air for Europe (CAFE) Directive (Directive 2008/50/EC on ambient air quality), which encompasses the following elements:

- The merging of most of the existing legislation into a single Directive (except for the Fourth Daughter Directive) with no change to existing air quality objectives.
- New air quality objectives for PM_{2.5} (fine particles) including the limit value and exposure concentration reduction target.
- The possibility to discount natural sources of pollution when assessing compliance against limit values.
- The possibility for time extensions of three years (for particulate matter PM₁₀) or up to five years (nitrogen dioxide, benzene) for complying with limit values, based on conditions and the assessment by the European Commission.

Table 3.9.1 below sets out the limit values of the CAFE Directive, as derived from the Air Quality Framework Daughter Directives. Limit values are presented in micrograms per cubic metre ($\mu\text{g}/\text{m}^3$) and parts per billion (ppb). The notation PM₁₀ is used to describe particulate matter or particles of ten micrometres or less in aerodynamic diameter. PM_{2.5} represents particles measuring less than 2.5 micrometres in aerodynamic diameter.

Pollutant	Limit Value Objective	Averaging Period	Limit Value ($\mu\text{g}/\text{m}^3$)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
Sulphur dioxide (SO_2)	Protection of Human Health	1 hour	350	132	Not to be exceeded more than 24 times in a calendar year	1 st Jan 2005
Sulphur dioxide (SO_2)	Protection of human health	24 hours	125	47	Not to be exceeded more than 3 times in a calendar year	1 st Jan 2005
Sulphur dioxide (SO_2)	Protection of vegetation	Calendar year	20	7.5	Annual mean	19 th Jul 2001
Sulphur dioxide (SO_2)	Protection of vegetation	1 st Oct to 31 st Mar	20	7.5	Winter mean	19 th Jul 2001
Nitrogen dioxide (NO_2)	Protection of human health	1 hour	200	105	Not to be exceeded more than 18 times in a calendar year	1 st Jan 2010
Nitrogen dioxide (NO_2)	Protection of human health	Calendar year	40	21	Annual mean	1 st Jan 2010
Nitrogen monoxide (NO) and nitrogen dioxide (NO_2)	Protection of ecosystems	Calendar year	30	16	Annual mean	19 th Jul 2001
Particulate matter 10 (PM_{10})	Protection of human health	24 hours	50	-	Not to be exceeded more than 35 times in a calendar year	1 st Jan 2005
Particulate matter 2.5 ($\text{PM}_{2.5}$)	Protection of human health	Calendar year	40	-	Annual mean	1 st Jan 2005
Particulate matter 2.5 ($\text{PM}_{2.5}$) Stage 1	Protection of human health	Calendar year	25	-	Annual mean	1 st Jan 2015
Particulate matter 2.5 ($\text{PM}_{2.5}$) Stage 2	Protection of human health	Calendar year	20	-	Annual mean	1 st Jan 2020
Lead (Pb)	Protection of human health	Calendar year	0.5	-	Annual mean	1 st Jan 2005

Pollutant	Limit Value Objective	Averaging Period	Limit Value ($\mu\text{g}/\text{m}^3$)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
Carbon Monoxide (CO)	Protection of human health	8 hours	10,000	8,620	-	1 st Jan 2005
Benzene (C ₆ H ₆)	Protection of human health	Calendar Year	5	1.5	-	1 st Jan 2010

Table 3.9.1 Limit values of Directive 2008/50/EC, 1999/30/EC and 2000/69/EC (Source: EPA)

The Ozone Daughter Directive 2002/3/EC is different from the other Daughter Directives in that it sets target values and long-term objectives for ozone rather than limit values. Table 3.9.2 presents the limit and target values for ozone.

Objective	Parameter	Target Value for 2010	Target Value for 2020
Protection of human health	Maximum daily 8 hour mean	120 mg/m^3 not to be exceeded more than 25 days per calendar year averaged over 3 years	120 mg/m^3
Protection of vegetation	AOT ₄₀ calculated from 1 hour values from May to July	18,000 $\text{mg}/\text{m}^3 \cdot \text{h}$ averaged over 5 years	6,000 $\text{mg}/\text{m}^3 \cdot \text{h}$
Information Threshold	1 hour average	180 mg/m^3	-
Alert Threshold	1 hour average	240 mg/m^3	-

AOT₄₀ is a measure of the overall exposure of plants to ozone. It is the sum of the excess hourly concentrations greater than 80 $\mu\text{g}/\text{m}^3$ and is expressed as $\mu\text{g}/\text{m}^3$ hours.

Table 3.9.2 Target values for Ozone Defined in Directive 2008/50/EC

3.9.1.3 Air Quality Zones

The Environmental Protection Agency (EPA) has designated four Air Quality Zones for Ireland:

- Zone A: Dublin City and environs
- Zone B: Cork City and environs
- Zone C: 16 urban areas with population greater than 15,000
- Zone D: Remainder of the country.

These zones were defined to meet the criteria for air quality monitoring, assessment and management described in the Framework Directive and Daughter Directives. The site of the proposed development lies within Zone D, which represents rural areas located away from large population centres.

The ambient air quality monitoring carried out closest to the proposed development site is at the EPA offices on the outskirts of Castlebar, Co. Mayo. This monitoring location lies within Zone D.

3.9.1.4 Receiving Environment

The Mayo County Development Plan (2008-2014) lists the following policies with regard to Air Quality:

- **P/EH-AN 1** It is the policy of the Council to maintain and improve the air quality of the County through the monitoring of air emissions from industry, road traffic and agriculture.
- **P/ EH-AN 2** It is the policy of the Council to support the *Climate Change Strategy* on an ongoing basis through implementation of supporting policies in the Plan, particularly those supporting use of alternative and renewable energy sources, sustainable transport and promotion of the retention of, and planting of trees, hedgerows and afforestation.
- **P/EH- AN 3** It is the policy of the Council to ensure that noise levels from new and existing developments do not exceed normally accepted standards, as set down in the *DoEHLG Noise Regulations 2006*, and that the requirements of *S.I No 140 of 2006 (Environmental Noise Regulations 2006)* are complied with, with regard to existing and future development in proximity to National roads.

An air quality monitoring station is already in place in Castlebar, so there are no immediate plans to monitor air quality in the vicinity of the Study Area.

It is not envisaged that a flood relief scheme recommended by the Engineering Study will increase the volume of traffic within the Study Area in the long term. Given the size of the Study Area, it is not envisaged that a flood relief scheme will have a long term detrimental affect on air quality.

Air quality may be temporarily impacted during the construction phase of the scheme, due in particular to the generation of dust.

The air quality in the vicinity of the proposed development site is typical of that of rural areas in the west of Ireland, i.e. Zone D. Prevailing south-westerly winds carry clean, unpolluted air from the Atlantic Ocean onto the Irish mainland.

PM₁₀, ozone and nitrogen oxides are measured at the monitoring site in Castlebar. There have been no exceedances of any of the parameters measured at this site so far in 2012. The PM₁₀ limit of 50 ug m⁻³ is deemed breached if more than 35 exceedances have occurred. The Nitrogen dioxide hourly limit of 200 ug m⁻³ is deemed breached if more than 18 exceedances have occurred and The Ozone information threshold is 180 ug m⁻³.

Regarding the Castlebar suburban background data, lower measurement values would be expected for the Study Areas as it lies in a rural location, within Zone D.

3.9.2 Climate and Weather in the Existing Environment

County Mayo has a temperate oceanic climate, resulting in mild winters and cool summers. The prevailing southwesterly winds bring moist air and frequent rain.

The Met Éireann weather and climate monitoring stations at Claremorris and Belmullet, both located in County Mayo, are both equidistant from the Study Area, located approximately 42 kilometres from the site. As the Study Area is located inland, data from the Claremorris station would be more reflective of conditions at the Study Area, rather than data from Belmullet, which is located on the coast.

Meteorological data recorded at Claremorris over the 30-year period from 1971-2000 is shown in Table 3.9.3 overleaf. Averages are not available for this station for the most recent period 1981-2010.

Mean annual temperature at the Claremorris station from 1971-2000 was 9.3° Celsius with the warmest month on average being July with a mean temperature of 15.0° Celsius for the 1971-2000 period. January was on average the coldest month with a mean temperature for this period of 4.6° Celsius. Average annual rainfall was 1173.6mm with the wettest month being December with a mean rainfall of 129.6mm. The driest month on average for the 1971-2000 period was April with an mean rainfall of 63.7mm. February was the windiest month during this 30 year period with a mean monthly speed of 10.3 knots or 1.85 kilometres per hour.



Monthly and Annual Mean and Extreme Values													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
TEMPERATURE (degrees Celsius)													
Mean daily max.	7.5	8.1	9.8	12.1	14.9	17.0	18.9	18.7	16.4	13.1	9.9	8.1	12.9
Mean daily min.	1.7	1.8	2.9	3.9	6.1	8.8	11.0	10.6	8.6	6.4	3.5	2.5	5.7
Mean	4.6	4.9	6.3	8.0	10.5	12.9	15.0	14.7	12.5	9.8	6.7	5.3	9.3
Absolute max.	13.3	13.6	16.2	22.3	25.4	29.8	30.5	28.0	25.1	19.9	15.9	14.3	30.5
Absolute min.	-2.9	0.1	0.0	5.0	6.1	11.2	11.7	12.2	10.5	6.8	1.3	-1.5	-2.9
Mean no. of days with air frost	8.7	7.3	5.2	3.3	0.8	0.0	0.0	0.0	0.1	1.2	5.3	7.6	39.5
Mean no. of days with ground frost	15	14	12	10	5	0	0	0	2	5	12	14	89
RELATIVE HUMIDITY (%)													
Mean at 0900UTC	90.7	90.3	88.7	82.5	79.3	80.4	83.6	86.2	88.1	91.6	91.2	91.0	87.0
Mean at 1500UTC	85.6	79.8	75.7	67.9	68.0	71.1	73.2	73.4	74.7	80.2	84.4	88.1	76.8
SUNSHINE (hours)													
Mean daily duration	1.3	1.9	2.6	4.3	5.0	4.4	3.7	3.8	3.2	2.4	1.7	0.9	2.9
Greatest daily duration	7.9	9.3	10.8	13.4	15.1	15.8	14.8	13.7	11.4	9.3	8.6	6.7	15.8
Mean no. of days with no sun	9.5	7.3	5.7	2.8	2.0	2.2	2.2	2.1	3.4	5.0	8.1	10.8	61.1
RAINFALL (mm)													



	Monthly and Annual Mean and Extreme Values												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Mean monthly total	127.9	102.1	101.6	63.7	68.1	64.5	70.1	95.7	94.3	128.2	127.7	129.6	1173.6
Greatest daily total	31.5	107.0	26.8	34.0	51.3	38.0	42.2	49.7	41.0	46.7	54.9	41.2	107.0
Mean no. of days with $\geq 0.2\text{mm}$	21	18	21	16	16	15	17	18	18	21	21	22	224
Mean no. of days with $\geq 1.0\text{mm}$	18	15	17	12	12	11	12	13	14	17	18	17	176
Mean no. of days with $\geq 5.0\text{mm}$	9	7	7	4	4	4	4	6	5	8	8	9	75
WIND (knots)													
Mean monthly speed	10.2	10.3	10.2	8.7	8.1	7.7	7.2	6.8	7.7	8.7	8.9	9.7	8.7
Max. gust	96	85	74	74	62	51	66	78	58	70	67	81	96
Max. mean 10-minute speed	59	48	45	41	41	34	39	32	37	46	40	52	59
Mean no. of days with gales	1.4	0.9	0.7	0.1	0.1	0.0	0.0	0.0	0.1	0.3	0.4	0.8	4.8
WEATHER (mean no. of days with:)													
Snow or sleet	5.7	4.4	3.8	1.6	0.2	0.0	0.0	0.0	0.0	0.1	1.2	3.1	20.0
Snow lying at 0900 UTC	2.3	0.7	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.7	4.6
Hail	4.4	3.2	5.4	3.2	1.6	0.4	0.1	0.0	0.7	0.8	2.6	2.7	25.2
Thunder	0.3	0.1	0.2	0.2	0.4	0.7	0.7	0.2	0.2	0.2	0.3	0.5	4.0
Fog	3.4	2.3	1.6	1.8	1.2	1.4	2.0	3.2	3.3	3.2	2.6	3.4	29.5

Table 3.9.3 Data from Met Éireann Weather Station, Claremorris, County Mayo 1971 to 2000

3.9.2.1 Climate Change

It is widely predicted that the climate in Ireland will change in the future, leading to increases in sea level, storm event magnitude and frequency, and rainfall depths, intensities and patterns. These impacts, along with others due to land use changes such as urbanisation and deforestation, are likely to have significant detrimental implications for the degree of flood hazard, and hence flood risk, in Ireland. The degree of these impacts over time are, however, subject to significant uncertainty.

To provide an adequate understanding of the potential implications of the predicted impacts of climate change and other future changes, with due consideration of the significant uncertainty associated with such predictions, a minimum of two potential future scenarios should be assessed as part of the flood risk prediction. These two scenarios are referred to as the Mid-Range Future Scenario (MRFS) and the High-End Future Scenario (HEFS), as described below:

- The former (the MRFS) is intended to represent a 'likely' future scenario, based on the wide range of predictions available and with the allowances for increased flow, sea level rise, etc. within the bounds of widely accepted projections.
- The latter (the HEFS) is intended to represent a more extreme potential future scenario, but one that is nonetheless not significantly outside the range of accepted predictions available, and with the allowances for increased flow, sea level rise, etc. at the upper the bounds of widely accepted projections.

The allowances, in terms of numerical values for future changes to 2100 in relevant phenomena or characteristics, which should typically be used for each of these scenarios, are set out in Table 3.9.4 below.

	MRFS	HEFS
Extreme Rainfall Depths	+ 20%	+ 30%
Flood Flows	+ 20%	+ 30%
Mean Sea Level Rise	+ 500 mm	+ 1000 mm
Land Movement	- 0.5 mm / year ¹	- 0.5 mm / year ¹
Urbanisation	<i>No General Allowance – Review on Case-by-Case Basis</i>	<i>No General Allowance – Review on Case-by-Case Basis</i>
Forestation	- 1/6 Tp ²	- 1/3 Tp ² + 10% SPR ³

Note 1: Applicable to the southern part of the country only (Dublin – Galway and south of this)

Note 2: Reduce the time to peak (Tp) by a third: This allows for potential accelerated runoff that may arise as a result of drainage of afforested land

Note 3: Add 10% to the Standard Percentage Runoff (SPR) rate: This allows for increased runoff rates that may arise following felling of forestry.

Table 3.9.4 Allowances for Future Scenarios (Time Horizon – 100 years)

The following should however be noted:

- The allowances are based on current knowledge and science, and will be frequently reviewed and may be updated, as further research is undertaken
- The allowances are national, and some regionalisation or provision for the nature of the relevant catchment may be suitable where adequate knowledge or analysis would support this (although this would need to be robustly justified where the allowances are less than the assumed national allowances)

3.9.2.2 Noise & Vibration

It is not envisaged that the preferred flood relief scheme emerging from the Engineering Study will have a long term detrimental affect on the noise environment within the Study Area; however noise during the construction phase of the project may have a temporary adverse impact on the environment.

3.9.2.3 Noise/ Vibration-Sensitive Receptors within the Area

The majority of the noise/ vibration-sensitive receptors in the Study Area are concentrated in the town of Crossmolina, with sparse residential development also present throughout the remainder of the Study Area.

Vibration during construction has the potential to cause damage to structures, such as buildings, bridges and walls in the vicinity of the works.

Other noise/ vibration sensitive receptors in the Study Area include designated areas in particular the River Moy SAC and the Lough Conn and Lough Cullin SPA, which are dealt with more comprehensively in Section 3.4 of this report.

3.9.2.4 Prevailing Noise Climate

The dominant noise source in the Study Area is road traffic noise from the N59 National Secondary Road, other regional and local roads and background urban noise within Crossmolina town.

3.9.3 Summary of Key Constraints and Implication for the Proposed Scheme

- Prior to the selection of a preferred flood relief scheme as part of the Engineering Study, it is recommended that the short listed flood alleviation measure be assessed in relation to the impact of noise and vibration during the construction phase of the project.
- It is recommended that mitigation measures be put in place to reduce the impacts on air quality and the noise environment during the construction phase of any proposed flood relief scheme.
- It is recommended that the affects of vibration during the construction phase be considered in the selection process for a potential flood alleviation measures.
- Meteorological and climatological data should be consulted in the engineering design process.

- The potential impacts of climate change should be assessed with regard to the prediction of flood risk and should be taken into account in the design of a proposed flood relief scheme.

3.10 MATERIAL ASSETS

The Material Assets within the Study Area which are considered within this section of the Constraints Study include:

- Wastewater Infrastructure
- Waste Management Facilities
- Roads & Transportation Infrastructure
- Utilities

3.10.1 Methodology

The following sources were consulted in the assessment of material assets within the Study Area:

- EPA Waste Water Discharge Licence Applications database
- Mayo County Development Plan (2008 - 2014)
- Replacement Waste Management Plan for the Connacht Region (as implemented through the Mayo County Development Plan)

3.10.2 Receiving Environment

3.10.2.1 Wastewater Infrastructure

Crossmolina Town is served by a partially combined sewerage network, which includes six sewage pumping stations and a WWTP.

The Crossmolina Wastewater Treatment Plant is located in the townland of Knockglass to the North east of Crossmolina Town and discharges treated effluent to the River Deel downstream of the town. The average volume of treated effluent discharged is estimated at 787m³/day, as per the Waste Water Discharge Licence Application for the Crossmolina agglomeration.

The WWTP currently provides primary, secondary and sludge treatment for a Population Equivalent (PE) of 3,150. This Waste Water Treatment Plant was constructed in 2003 and was designed to treat to the following standard;

BOD ₅	=	25mg/litre
Suspended Solids	=	35mg/litre
Phosphates	=	2mg/litre

In addition to the Waste Water Treatment Plant treated effluent outfall pipe, there is an additional wastewater outfall to the River Deel from the main pumping station located in Abbeytown, approximately 250m downstream of the Jack Garret Bridge. This is an emergency overflow pipe from the pumping station only comes into operation during extreme rainfall events or the prolonged loss of pumping ability.

There are 5 additional pumping stations within the wastewater agglomeration; however, the Waste Water Discharge Licence Application does not refer to emergency overflows in connection with these pumping stations.

3.10.2.2 Waste Management

The Connacht Waste Management Plan was consulted in relation to Waste Management Facilities in the vicinity of the Study Area. There is one redundant landfill site within the Study Area in the townland of Gortnalyer. This closed landfill has been identified in the Connacht Waste Management Plan in accordance with Section 22 (7)(h) of the Waste Management Act 1996 – 2005. It is not intended to re-commission this landfill as part of the Waste Management Plan.

3.10.2.3 Roads & Transportation Infrastructure

The primary road access to the Study Area and to Crossmolina town is via the N59 National Secondary Route. It provides access to Ballina to the East, and travels West through County Mayo as far as Bangor before turning south to pass through Westport and Clifden, County Galway before terminating in Galway City. The N59 passes through Crossmolina in an East West direction and directly serves a large portion of the town centre along with the surrounding houses.

The Mayo County Development Plan refers to plans for a bypass of Crossmolina town to be incorporated into planned improvements to the N59 between Ballina and Crossmolina. Details of this proposed bypass were obtained through an information brochure entitled “*N59 Crossmolina – Ballina Emerging Preferred Route – Public Consultation July 2008*”. This brochure presents the emerging preferred route for a proposed upgrade of the N59 Crossmolina-Ballina route which includes a bypass of Crossmolina town. The emerging preferred route commences in the townland of Cloonawillan on the footprint of the existing N59 approximately 750m west of Crossmolina. From here it diverges in a north-easterly direction as it passes through the townlands of Lecarrow and Crossmolina, running parallel with and south of the Fotish River before it crosses the R315 Ballycastle Road. From here it passes through the townland of Abbeytown, crosses the River Deel and enters the townland of Glebe. It continues in an easterly direction as it passes through the townland of Gortskeddia, crosses the Gortskedia Road, and enters the townland of Knockglass before it merges with the existing N59. The emerging preferred route is 12.2km long. It consists of a 3.9km northern bypass of Crossmolina town, a 3.6km upgrade of the existing N59 and a 4.7km off-line new road on its approach to its intersection with the N59 Ballina Relief Road. The emerging preferred route crosses the River Deel twice where the existing Knockadangan Bridge will be used and a new bridge will be required.

The National Roads Authority (NRA) website describes this project as “suspended”. Depending on the potentially viable flood risk management measures identified, consultation may be required with Mayo County Council Roads Department and the NRA to determine the status, extent and the interaction between the two projects.

Crossmolina is also served by the R315, travelling in a North South direction. It terminates in to the west Ballycastle, to the north of the Study Area, and travels along the Western and Southern coast of Lough Conn to terminate in Foxford.

All roads in the Study Area are maintained by Mayo County Council; however any proposed modifications to the N59 National Secondary Road will require consultation with the NRA.

3.10.2.4 Utilities

Utilities in the Study Area include water supply networks, telecommunications, electricity supply and gas pipelines. It is highly likely that these services also cross the Rivers within the Study Area at various locations. These locations will need to be identified once the potentially viable flood risk management measures are identified.

3.10.3 Summary of Key Constraints and Implications for the Proposed Scheme

- It is recommended that the existing and proposed location of watermains and underground services in the vicinity of any proposed flood relief scheme be ascertained as part of the Engineering Study. It is recommended that Mayo County Council and other utility providers with services in the area be consulted regarding the location and priority of existing and proposed services. It is further recommended that the services be protected as part of any proposed flood relief scheme.
- It is recommended that the Crossmolina Waste Water Treatment Plant remains operational at all times.
- It is recommended that any proposed change in the hydrological regime of the River Deel and its tributaries be assessed in relation to the assimilative capacity of the river at the locations of the two discharges from Wastewater Infrastructure within the Study Area.
- It is recommended that Mayo County Council and the National Roads Authority be consulted in relation to any effects on the existing and proposed roads infrastructure in the Study Area from a proposed flood relief scheme.

4 PUBLIC CONSULTATION

The details and analysis of the first Public Consultation event are contained within this section of the report.

4.1 PUBLIC CONSULTATION ARRANGEMENTS

An initial Public Information Event was held in Crossmolina Town Hall on Friday the 14th of September 2012 from 4pm to 8pm. Members of staff from the Office of Public Works, Environmental Team (Ryan Hanley and McCarthy Keville O'Sullivan) and Design Team (Ryan Hanley and JBA Consulting) were available to answer questions from the members of the public in attendance.

4.1.1 Advertising of Public Consultation

Advertising of the Public Consultation Event was undertaken by the Environmental Team, in the local press in the week preceding the event. This included an advert in the local publication; The Western People. In addition, notices were placed on the local radio in the week and weekend preceding the event and notices were placed in local parish newsletters on the Sunday preceding the event. A press release was also issued to local news websites www.crossmolina.ie and www.mayonews.ie who included features on their websites during the week leading up to the event.

4.1.2 Literature Available for the Consultation

Brochures and Questionnaires were available at the exhibition on the 14th of September. Stamped addressed envelopes were provided to those who wished to return questionnaire by post with a return date for the questionnaires of the 21st of September. Information in addition to the questionnaires was also accepted on the evening of the event or subsequently by post.

4.2 PUBLIC CONSULTATION MATERIALS

4.2.1 Public Consultation Brochure

A Constraints Study Public Consultation brochure was produced for the scheme, which showed the Study Area under consideration and provided a brief explanation as to the process involved and the options being considered. Brochures were freely available to the members of the public and interested parties, both during and after the exhibition. A copy of the brochure is attached in Appendix H.

4.2.2 Public Consultation Questionnaire

A questionnaire with pre-printed questions was provided to each attendee, in association with the brochure. This provided an opportunity for members of the public to express their views on the Study Area shown and to provide information regarding flooding in their area, in addition to other comments they may have had relating to the design or the Environmental Constraints

Study. A prepaid envelope was also provided for the return of the questionnaire. A copy of the blank questionnaire is attached in Appendix H.

4.2.3 Public Consultation Exhibition Posters

The format of the Constraints Study Consultation exhibition was based on a number of scheme posters. The posters included:

- Scheme Objectives and Overview
- Constraints Study
- Study Area Map – Archaeological & Ecological Sites
- Statutory Process
- Public Involvement

A copy of the panels is included in Appendix H.

4.3 PUBLIC CONSULTATION EXHIBITION

4.3.1 Staffing of Exhibition

At the venue, staff from the Office of Public Works, Environmental Team (Ryan Hanley and McCarthy Keville O'Sullivan) and Design Team (Ryan Hanley and JBA Consulting) were available to answer questions from the members of the public in attendance.

4.3.2 Numbers of Public Attendees

Members of the public visiting the exhibition were invited to sign a visitor's book to enable a record of the number of attendees to be maintained. A total of 16 attendees signed the attendance book at the event in Crossmolina Town Hall.

4.4 PUBLIC CONSULTATION RESPONSE

4.4.1 Verbal Comments at Exhibition

Visitors to the exhibitions are considered to have in the main understood the proposals as presented at the exhibition. Comments received generally related to the level of flooding in the past. Some members of the public brought photographs or maps of their property or demonstrated to project team staff the location of their property and their general concerns regarding the level of flooding and damage which arose from the events. In addition to provision of information about flooding, members of the public also provided information regarding previous maintenance of the river and their suggestions relating to potential flood alleviation measures.

4.4.2 Questionnaires Returned

Approximately 20 questionnaires were distributed on the night, or taken by members of the public to distribute locally. By the 26th of September 2012, a total of six questionnaires had been returned to the Environmental Team. Questionnaires received after this date were not included within the analysis.

4.4.3 Other Submissions

Submissions were made by a number of members of the public both at the public consultation event and by post following the event. The information generally provided related to flood levels, photographs of previous flooding events and articles regarding flooding history or information about the River Deel. This information was provided to the design team to assist in the production of the flood model when ascertaining the levels of flooding in previous events.

4.5 Analysis of Public Consultation Response

4.5.1 Analysis of Questionnaires

In total, there were six respondents to the questionnaire, all of whom lived within the Study Area and most of whom had been directly affected by the most recent and historical flooding events in the area. Full details of the response to the questionnaire are provided in Appendix H. Outlined below is a summary of the information obtained from the questionnaire.

4.5.1.1 Flooding Information

When asked about previous flood events, most respondents listed other flood events, with dates including the most recent event in December 2006, October and September 1989. Events in 2003 and 1987 and 1985 were also listed. At the public information day, the general consensus was that the flood event in 1989 was the worst event. The depth to which flooding was reported varied from 6 inches (in houses on Chapel St.) to 6 feet of water in gardens and open spaces.

Of those who responded, most had residential property affected (3 respondents), with one responding that their retail property would have flooded except flood defences were erected with haste as flood waters approached. One respondent listed retail property which had been flooded.

The majority of those who responded expressed that flooding occurred directly from the River/Stream, while 2 respondents listed overground flow (surface water) as a source and one respondent considered listed drains as a source.

Question 11 asked if respondents had put in place any measures to reduce the impact of flooding. All of those who had been flooded in previous events responded that they had now put in place measures. Seals for doors and entrances, sandbags and timber barriers and marine ply were listed as measures, in addition to replacement of wooden floors with concrete as a result of the flooding in 2006.

4.5.1.2 Flood Alleviation Information

When asked in Question 12 if they had a preference for the type of flood alleviation method (from a selection of six measures) most respondents expressed dredging and cleaning/deepening of the River Deel as their first preference. Channel widening and construction of walls/embankments also ranked as the next highest preferences for most respondents. Overall numbers of individuals who rated answers to this question are provided in Table 4.5.1 below.

Preference Rating	1	2	3	4	5	6
No Works				1		1
Early Flood Warning System	1			1	1	
Walls & Embankments	1	1				
River Dredging	3	2				
River Widening			3			
Relocation				1	1	1

Table 4.5.1 Answers to Question 12 – Indicate in order of preference, your preferred flood defence works

Most respondents also made their own suggestions as to flood alleviation measures. Many of the respondents mentioned the ‘infilling of swallow holes’ which happened previously, and believe that removal of the infill would allow the passage of water and reduce the risk of flooding. Cleaning the river of debris and widening the river at locations where development has narrowed the channel, in addition to the creation of flood plains on agricultural land were other suggestions the respondents made.

4.5.1.3 Environmental Constraints

In the final question on the questionnaire (Q14) respondents were given seven environmental topics and asked to rank their opinion of the importance of each constraint, from very important to unimportant.

Water Quality was considered the most important of the environmental constraints, with half of the respondents indicating it as ‘very important’. Angling Recreation and Tourism was considered generally as ‘Important’ by half of the respondents while there was no particular consensus in relation to the other environmental constraints, with Flora and Fauna, Local

Fisheries, Habitats, Architectural/Cultural and Landscape/Visual all receiving a spread of answers. Overall answers to this question are summarised in Table 4.5.2 below:

	Very Important	Important	Moderately Important	Low Importance	Unimportant
Flora & Fauna	1	1	1	1	2
Local Fisheries	0	2	1	2	1
Habitats	1	1	1	2	1
Water Quality	3	2	0	0	1
Architectural/Cultural	0	2	1	2	1
Landscape/Visual	0	2	1	2	1
Angling/Tourism/Rec.	0	3	2	0	1

Table 4.5.2 Answers to Question 14 – In your opinion, how important are the following environmental constraints to the proposed Flood Relief Scheme.

In addition to ranking the importance of the various environmental constraints, respondents were also given the opportunity to provide comments specific to each of the environmental topics. A summary is provided below.

Flora and Fauna: Flood prevention is of much greater importance than Flora and Fauna. As far as we are aware, only 'pearl mussel' is affected by any works on the River. These have already survived the original Moy Drainage work and have colonised the river bed below Crossmolina Bridge. See Crossmolina Biodiversity Plan.

Local Fisheries: Local fisheries are due consideration but in proportion to the damage potential of flooding. Only in the last few years have tourist anglers appeared on the Deel above Crossmolina. Reinstating the river to its pre 1982 state is unlikely to have any major deleterious effect.

Habitats: Flood prevention is of much greater importance than habitats. Habitats are unlikely to be affected. So far in the seven major flooding events, water quality has not been affected. We see no reason why this should change. Otter and Kingfisher habitat along river banks.

Water Quality: Water Quality is important because of fisheries on the lake. If river was cleaned up it would draw tourism to the region and town. Water quality is important for all life forms. Clean water is essential for freshwater pearl mussels and crayfish as well as the local otter population and the kingfishers that nest along the river.

Architectural/Cultural Heritage: Due consideration of Architecture and Cultural Heritage should not outweigh Flood prevention. The flood relief works are likely to have a protective effect on the older buildings in Crossmolina.

Landscape and Visual Amenity: Embankments and walls may not be aesthetically pleasing so they may have a limited role. Assuming the river is cleaned and deepened, there will be no adverse effect on landscape and visual amenity. The River Deel is a key focal point for Crossmolina Town and is important to the town's appearance and to the local beauty spots along the river's length.

Angling Tourism and Recreation: Angling, tourism and recreation are of concern but the potential damage which another flood could cause means they should be considered but they should not limit the scheme. No effect on Angling, Tourism and Recreation. Prior to 1982 local people enjoyed the River without the risk of flooding. We expect a return to river condition at that time will have no adverse effect.

The Tidy Towns Plan includes a recommendation to develop a river walk from the Town Centre. This would improve access for local people to the river and encourage people to walk along its banks. The river is used regularly by visiting anglers and local fishermen. There is a strong fishing community in Crossmolina which spans all age groups.

4.5 CONCLUSION

The Public Consultation was held to inform the general public of the Constraints Study and preliminary aspects of the Bandon Flood Relief Scheme and to obtain information about flooding or other relevant environmental information about the Study Area presented. Interested persons were able to scrutinise the consultation materials, have relevant questions answered and take away a brochure setting out the project for future reference.

The Public Consultation event was very successful in terms of attendance and replies to the questionnaire. A significant amount of valuable information was obtained both on the evening and circulated to the project team.

Overall feedback from members of the public was that they were happy to have been involved in the Public Consultation; they felt like their views were being heard, but wanted to see action arise out of the information as soon as possible.

5 SOURCES OF INFORMATION

General

Environmental Protection Agency (EPA) guidelines “Advice Notes on Current Practice in the Preparation of Environmental Impact Statements, 2003”

Ordnance Survey Discovery Series Mapping at 1:50,000 scale

Old Raster 6” Mapping

Old Raster 25” Mapping

EPA ENVision Online Database

Human Beings

Mayo County Development Plan, 2008 - 2014

Regional Planning Guidelines for the West Region 2010

Census of Ireland 2006 and 2011 (www.cso.ie)

Mayo County Council Website

Local Websites www.crossmolina.ie and www.crossmolina.net

Environmental Protection Agency Website – www.epa.ie

Ecology

1:50,000 scale Discovery series mapping

1:10,560 OS Maps of the Study Area

Aerial photography of the Study Area

NPWS site synopses and database of information on designated sites and records of protected species.

New Atlas of the British & Irish Flora (Preston et al., 2002)

‘The Atlas of Breeding Birds in Britain and Ireland’ (Sharrock, 1976), ‘The New Atlas of Breeding Birds in Britain and Ireland: 1988-1991’ (Gibbons et al., 1993) and ‘The Atlas of Wintering Birds in Britain and Ireland’ (Lack, 1986)

The EPA website <http://www.epa.ie/rivermap/data>

<http://www.fishinginireland.info>

Mapping of the Distribution of *Margaritifera margaritifera* in the River Deel (Moy Catchment), Co. Mayo (Moorkens and Killeen, 2009)

The Water Framework Directive website www.WFD.ie

A Survey of Juvenile Lamprey Populations in the Moy Catchment (O’Connor, 2004; Accessed at <http://www.npws.ie/publications/irishwildlifemanuals/IWM15.pdf>)

Biodiversity and Generic Recommendations for Crossmolina Community Council Ltd. (Woodrow, 2011)

Water

The EPA website <http://www.epa.ie/rivermap/data>

The Water Framework Directive website www.WFD.ie

EPA water quality database and maps.

Well card data compiled by the Geological Survey of Ireland (GSI)

OPW Database of Hydrometric Stations

Western River Basin District Management Plan
Conn Water Management Unit Action Plan

Soils and Geology

The GSI online database
Mayo County Council Planning Department (Application for Registration of Quarries under Section 261, Planning and Development Act 2000),
Mayo County Development Plan
Concrete Products Directory (Irish Concrete Federation)
ENVision Mines Site, the EPA's online Historic Mines Inventory
<http://maps.epa.ie/EnvisionMinesViewer/mapviewer.aspx>

Archaeology

See references in report included in Appendix F for information sources

Landscape

Mayo County Development Plan, 2008 - 2014
Landscape Appraisal of County Mayo, 2008
Environmental Protection Agency CORINE Land Cover Map

Air Quality

Mayo County Development Plan, 2008 – 2014
EPA website (www.epa.ie)

Material Assets

EPA Waste Water Discharge Licence Applications for Waste Water Agglomerations within the Study Area <http://www.epa.ie/terminalfour/wwda>
Mayo County Development Plan, 2008 - 2014
N59 Crossmolina – Ballina Road Project July 2008 Public Consultation Brochure