UISCE ÉIREANN : IRISH WATER

Water Supply Project

Eastern and Midlands Region

Final Options Appraisal Report

The Preferred Scheme

Volume 5

Appendix J

Preliminary Options Appraisal Report - Consultation Submissions Report

November 2016

Final Options Appraisal Report – List of Appendices

Water Supply Project - Eastern and Midlands Region

Irish Water

Final Options Appraisal Report

Appendix J Preliminary Options Appraisal Report –

Consultation Submission Report

November, 2016

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List of Acronyms

BREEAM	Building Research Establishment Environmental Assessment Method
CER	Commission for Energy Regulation
CSO	Central Statistics Office
Cumecs	Cubic metres per second
DCC	Dublin City Council
DECLG	Department of the Environment, Community and Local Government
DHPCLG	Department of Housing, Planning, Community and Local Government
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESB	Electricity Supply Board
ESRI	Economic and Social Research Institute
FDI	Foreign Direct Investment
FOAR	Final Options Appraisal Report
GDP	Gross Domestic Product
IBEC	Irish Business and Employers Confederation
ICMSA	Irish Creamery Milk Suppliers Association
IFA	Irish Farmers' Association
IFI	Inland Fisheries Ireland
IW	Irish Water
Mld	Millions of litres per day
MCA	Multi Criteria Analysis
NGO	Non-Governmental Organisation
NIS	Natura Impact Statement
NPWS	National Parks & Wildlife Service
NTS	Non-Technical Summary
OWP	Options Working Paper
PNR	Project Need Report
POAR	Preliminary Options Appraisal Report
SAC	Special Area of Conservation
SEA	Strategic Environmental Assessment
SELL	Sustainable Economic Level of Leakage
SPA	Special Protection Area
UWWTD	Urban Waste Water Treatment Directive
WFD	Water Framework Directive

WI	Waterways Ireland
WSP	Water Supply Project Eastern and Midlands Region
WSSP	Water Services Strategic Plan
WTP	Water Treatment Plant
WWTP	Waste Water Treatment Plant

1. Introduction

1.1 Introduction

On 1st January 2014, Irish Water assumed responsibility for managing Ireland's water and wastewater investment and maintenance programmes. On that date, Irish Water also took over the management of the Water Supply Project Eastern and Midlands Region (WSP) from Dublin City Council / Department of Environment, Community and Local Government (DECLG)[1]. The project is currently in the Environmental Impact Assessment and Planning phase.

It is anticipated that Irish Water will submit a planning application, including the proposed design for the preferred new water supply option, to An Bord Pleanála towards the end of 2017 for their adjudication and consent. Detailed project design will commence upon completion of An Bord Pleanála assessments and Oral Hearings and successful receipt of Planning Consent (expected in the latter half of 2018). Subject to Planning Consent, construction is expected to commence in approximately 2021 and will continue until 2024/2025.

As the project develops there have been and will continue to be a number of stakeholder and public consultation opportunities. This report sets out the activities undertaken and feedback received from the public consultation on the Preliminary Options Appraisal Report (POAR) which was undertaken during the period 26th November 2015 – 4th February 2016. Submissions were accepted up to 11th March 2016. This was in response to requests from stakeholder groups and the bad weather and flooding experienced during the consultation period. All submissions up to 11th March 2016 are included in this report. The POAR marked the third consultation stage of the WSP; this is the stage highlighted in '*pink*' in Figure 1.1 which shows the Project Road Map.

As shown in Figure 1.2, the Project Road Map has been amended, as public consultation on the Final Options Appraisal Report (FOAR) and the EIS Scoping Report have been combined in order to efficiently seek stakeholder views on the preferred scheme and on the scope of the EIS for that scheme at the same time.

1.2 Structure of the Consultation Submissions Report

This Consultation Submissions Report is structured as follows:

- Section 1: Introduction;
- Section 2: Summarises the public consultation process and Media input / output;
- Section 3: Outlines the content of the submissions received during the public consultation period from the 26th November 2015 to 4th February 2016, subsequently extended to 11th March 2016, and categorises them into Submission Themes;
- Section 4: Includes the formal responses to the feedback received during the public consultation period;
- Section 5: Next steps in the public consultation process.

[1] Following the formation of the Government after the 2016 general election, the Department of Housing, Planning, Community and Local Government (DHPCLG) replaced DECLG as the Ministerial Department responsible for Irish Water

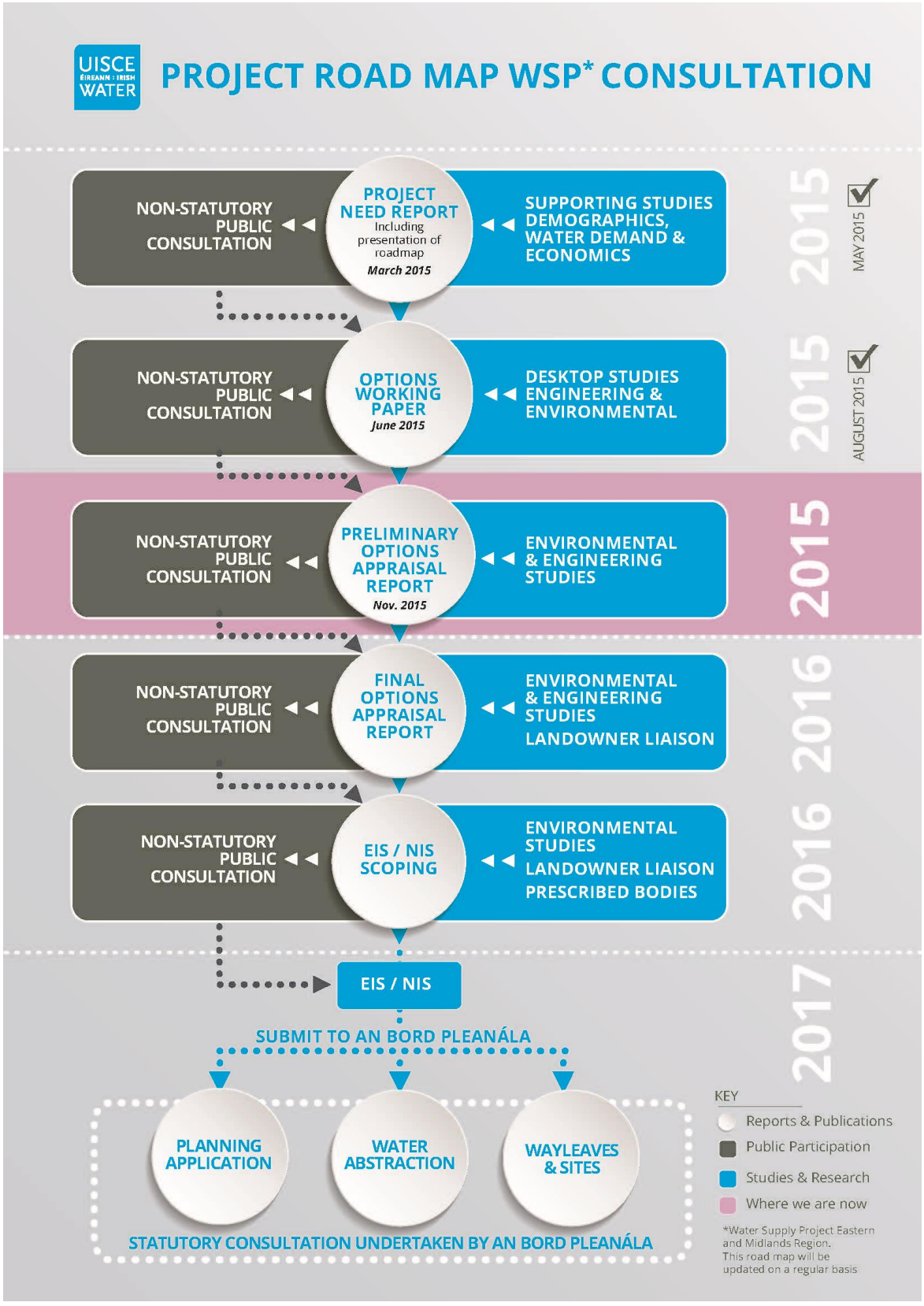


Figure 1.1 : Project Planning Road Map for the Water Supply Project at POAR Consultation

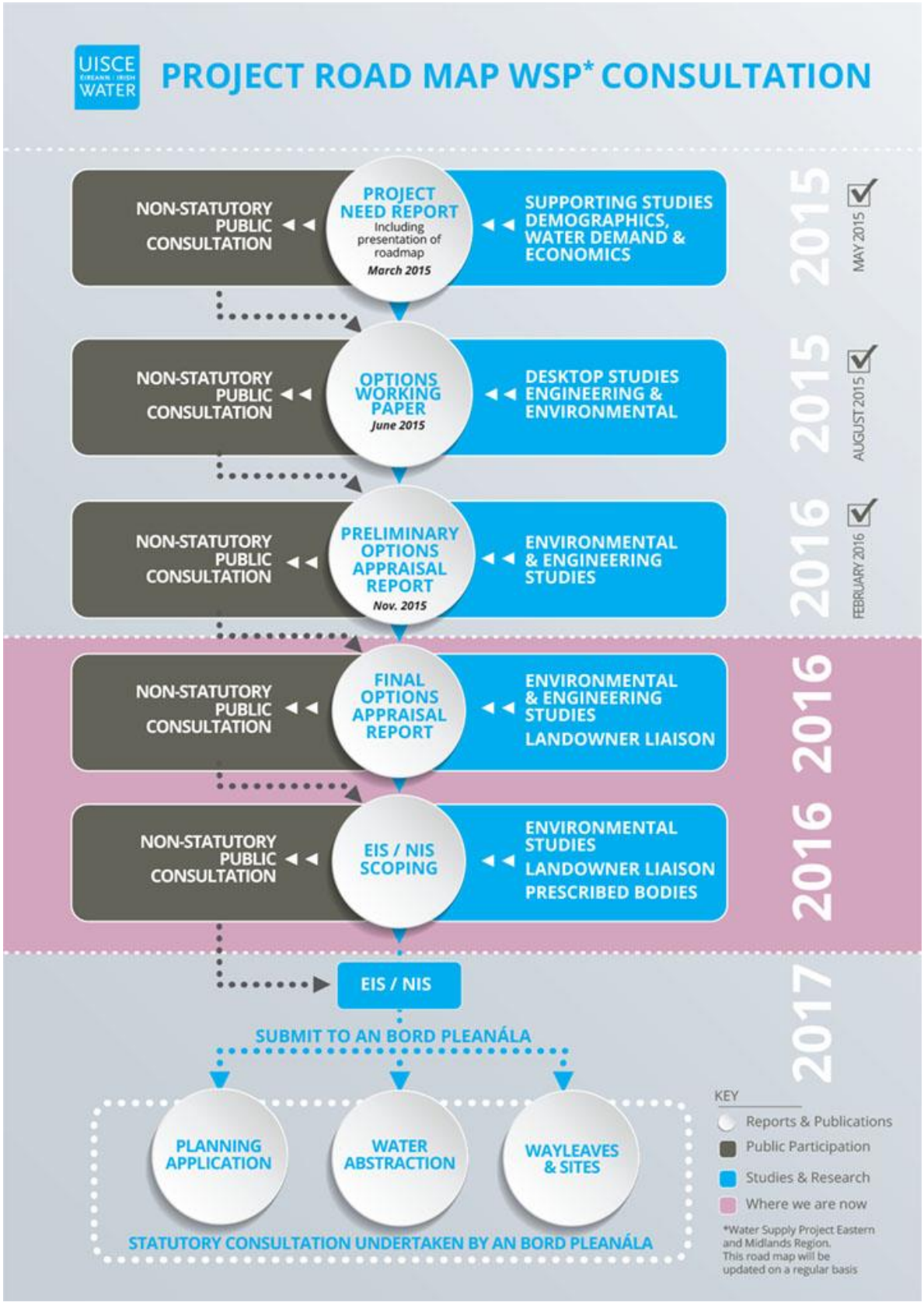


Figure 1.2 : Amended Project Planning Road Map for the Water Supply Project following POAR Consultation

2. Consultation

2.1 Introduction

Early engagement with stakeholders is an important aspect of infrastructure development. At critical points in the development of the WSP, Irish Water has invited feedback from interested stakeholders, organisations and members of the public to assist them in shaping the project (see the Project Road Map in Figure 1.2).The publication of the POAR and associated public consultation which took place for ten weeks (allowing for the Christmas break) between the 26th November 2015 and the 4th February 2016, represented a third opportunity in the development of the WSP for stakeholder engagement and the submission of feedback. Submissions have been accepted to a close out date of 11th March 2016, for the purposes of preparing this report, due to the exceptional weather conditions over the past winter, and on request from some stakeholders.

In accordance with the project Road Map, shown in Figure 1.2, the POAR details the assessment process carried out on four options for a new water supply for Irish Water's Eastern and Midlands, originally identified in the SEA (2005-2011) and subsequently deemed technically viable options in the Options Working Paper (OWP), published in June 2015. These options were:

- Desalination
- Lough Derg (direct)
- Lough Derg (with storage)
- Parteen Basin (direct)

The OWP established a robust methodology and assessment criteria, together with a range of 'constraints'[2], which were proposed in the siting of WSP infrastructure. Stakeholder feedback was invited on this methodology and assessment criteria during the second non-statutory public consultation period on the OWP. The methodology and assessment criteria, together with multiple constraints, were applied to each of the four options and the results are outlined in the POAR.

Public input via the first two public consultation stages, in combination with 'on the ground' investigations, formed a key part of the 'Emerging Preferred Option' selection process. Water quality modelling on Lough Derg and subsoil investigations at a raw water storage site in the Midlands provided important information on options involving abstraction from Lough Derg. In addition, the views of stakeholders on potential tourism, navigation, and other environmental impacts of abstraction from the lake, and of raw water storage, were taken into account in the options appraisal process.

The Irish Water response to all stakeholder feedback received to date, together with the resulting influence on the project development, is provided later in this report. Section 5 outlines the POAR stakeholder feedback and the corresponding Irish Water response and influence on the project development. The influence of PNR and OWP submissions on the project development is outlined in Appendices I and J, respectively.

The POAR identified this Emerging Preferred Option as the Parteen Basin (direct) option, as it is least constrained compared to the others and it best satisfies the assessment criteria. The Parteen Basin option involves abstraction of water at Parteen Basin, Co. Tipperary, treatment at a plant nearby, and a treated water pipeline from the treatment plant through the Midlands to the Termination Point Reservoir in Dublin.

The two Lough Derg options were ruled out, primarily due to environmental issues relating to water residence time and invasive species risk, and were therefore deemed no longer viable. While the Desalination option was found to be more constrained than the Parteen option, it is still being considered viable. The next stage of the process compares the two remaining options and identifies a Final Preferred Option, the results of which have

[2] A 'constraint' is any limiting factor on site selection for infrastructure. It can be related to human settlements, or environmental, or technical factors. The selection of the location for infrastructure sites and the routes for pipelines is therefore approached primarily through avoidance of impacts, by avoiding constraints, wherever possible.

been published in the Final Options Appraisal Report (FOAR). The Final Preferred Option will be subject to an Environmental Impact Statement (EIS) and consultation has commenced on the scope of this with the publication of the EIS Scoping Report.

Public and stakeholder consultation on the POAR is a fundamental consideration in the development of the 'Final Preferred Option'. All input from this public consultation process on the POAR has been reviewed and, where relevant, incorporated into this next stage of the process, i.e. the FOAR, which will detail the preferred scheme from abstraction to water storage that will undergo further environmental and technical studies and public consultation.

This Consultation Submissions Report sets out a summary of the feedback received on the POAR, and the Project Team's response to these submissions. The submissions and responses are organised according to a range of themes/common issues which emerged.

2.2 Terms of Reference

The consultation on the POAR sought the opinions of stakeholders and the public on the following questions:

i. Has Irish Water taken all relevant factors into account in reaching the findings outlined in the Preliminary Options Appraisal Report?

ii. How would you like to be communicated with as the project progresses?

2.3 Summary of Communication Methods

The Project Team employed a number of different methods of communication to engage with the various stakeholders and the public, to provide information on the POAR and the progress of the project as a whole, and to get feedback on the project. These communication methods are detailed in the remainder of this chapter and included:

- ***Advertising & media engagement*** – A press release was issued to national television stations, national and regional newspapers and radio stations and online media. The press release provided an overview of the key findings of the POAR as well as the details of the public consultation process, and the various methods available for engaging with the Project Team. The launch of the public consultation period on the POAR was also advertised in national and regional newspapers. Copies of the advertisement and press release are provided in Appendices A and B, respectively.
- ***Launch emails*** – The Project Team issued 850 emails at the launch of the public consultation period to interested stakeholders (including stakeholder groups, individuals, Local Authorities and Elected Representatives). The email outlined the key findings of the POAR, the details of the public consultation process, and the various methods of engaging with the Project Team. A sample email is provided in Appendix C.
- ***Stakeholder meetings*** – The Project Team met with over 40 stakeholders during the POAR consultation period. These meetings provided an additional forum for the Project Team to brief interested stakeholders on the key findings of the POAR and to discuss any stakeholder feedback. Irish Water continues to engage with and meet a range of stakeholders. Feedback received during these meetings was used by the Project Team to inform the development of the project.
- ***Public Consultation Open Days*** – Four public open days were held in the WSP Study Area during the consultation period. The Project Team met with over 60 individuals at the open days including landowners and local residents, Elected Representatives, and members of public and private local organisations. The Project Team briefed the attendees (on a one-to-one basis) on the key findings of the POAR and discussed any stakeholder feedback. Feedback received during these Open Days was taken into account by the Project Team and informed the project development.
- ***Oireachtas Open Day*** – An open day was held on the POAR launch day to brief Oireachtas members on the key findings of the report and the consultation process.

- ***Distribution of POAR documentation*** – The Project Team sent hard copies and CDs of POAR documentation, including the POAR Main Report and appendices, newsletters, non-technical summaries and CDs with the results of survey data, to over 60 interested stakeholders (individuals and stakeholder groups). A full copy of the POAR report and appendices was issued to the County Libraries and Planning Departments of the Councils in the Study Area, for public exhibition. The Project Team also issued reports and project documentation at the stakeholder meetings and public open days.
- ***Stakeholder Submissions and Responses*** – 45 emails, 14 letters and 19 phone calls relating to the POAR consultation were received from stakeholder groups and individuals during the consultation period. The Project Team responded to all stakeholder queries and submissions via email, letter or phone, and organised follow-up meetings with a number of stakeholders to address specific stakeholder feedback.

2.4 Publicising the Consultation

As part of the consultation phase, advertisements, press releases and other forms of distribution of the key messages were used to help promote consultation and to ensure that as many stakeholders and interested parties as possible were made aware of the project and its consultation opportunities.

2.4.1 WSP website

A dedicated project website continues to be provided at www.watersupplyproject.ie. The website is continuously updated as new project reports are published. The project website provides and details the following:

- The need for a new water supply as well as the four options considered in the POAR;
- The consultation process around the POAR, all relevant information on this stage of the project and a synopsis of this consultation stage;
- The various information services available for contacting the Project Team (as discussed in Section 2.5.1);
- Downloadable copies of the POAR, Non-Technical Summary and Newsletter No. 3 and associated appendices;
- Previous reports, including the Options Working Paper (OWP, June 2015), the Project Need Report (PNR, March 2015) and the associated Non-Technical Summary and Newsletter documents.
- The project Road Map, as shown in Figure 1.2.
- A dedicated Frequently Asked Questions (FAQ) page on the website;
- An explanation of the Constraints and Assessment Criteria which formed the basis of the evaluation of the four OWP options and which led to the identification of the Emerging Preferred Option in the POAR.

There is also a webpage dedicated to the WSP on the Irish Water Website. This webpage contains overview information on the WSP and the public consultation process. The dedicated WSP website is accessible through the Irish Water website (http://www.water.ie/about-us/project-and-plans/projects/Irish-Water-update/).

2.4.2 Libraries and Local Authority Planning Counters

In order to have the POAR readily accessible within the public domain, hard copies of the POAR full report including appendices, a non-technical summary (NTS) and newsletter No. 3 were sent to the County Libraries and Planning Departments of each County Council Office in the study area. The NTS provides an overview of the project and the key findings of the POAR, in order to facilitate the understanding of the more comprehensive document (POAR). The newsletter outlines the project planning to date, the key findings of the POAR and the details of the public consultation process.

Table 2.1 lists the Local Authorities in the study area. The documentation was lodged in the County Planning Department and Library of each of these Local Authorities for public display.

In addition, various stakeholder groups and individuals were sent hard copies of POAR documentation upon request, including reports, CDs, newsletters, non-technical summaries and survey results.

Clare County Council	Limerick City & County Council
Dublin City Council	Meath County Council
Dun Laoghaire Rathdown County Council	Offaly County Council
Fingal County Council	South Dublin County Council
Galway County Council	Tipperary County Council
Kildare County Council	Westmeath County Council
Laois County Council	Wicklow County Council

Table 2.1 : Local Authorities in the study area

2.4.3 Media engagement

The publication of the POAR and the details of the public consultation process were announced in a media launch on 8th November 2015. Advertisements were placed in national and regional newspapers outlining the details of the public consultation process and inviting stakeholder feedback. As can be seen in Appendix A, the advertisement outlined where copies of the POAR documentation could be obtained, as well as the various means of engaging with the Project Team.

As part of the media campaign, press releases were also issued to a wide range of national and regional newspapers, radio stations and television stations. The press release outlined the key findings of the POAR, the details and terms of reference of the public consultation process, and the various information services available to stakeholders for engaging with the Project Team. A copy of the press release is provided in Appendix B.

2.4.3.1 Media coverage

There were 14 articles about the WSP published in national newspapers, and 50 articles about the WSP in regional newspapers, during the consultation period, 26th November 2015 – 11th March 2016. These are all listed in Appendix D.

There were also a number of broadcasts on national (10 total) and regional (21 total) radio stations which referred to the WSP and the POAR during the consultation period. These are listed in Appendix E.

As shown in Appendix F, there were four television broadcasts about the WSP during the consultation period.

Finally, all online media coverage of the WSP is shown in Appendix G. The list contains comments on press releases and news reports, as well as social media activity on sites such as Twitter and Politics.ie. The main themes covered in the social media content were leakage, water demand, desalination and flooding.

2.5 Communication tools

2.5.1 Information Services available to stakeholders for engaging with the Project Team

A range of information services were made available to stakeholders and members of the public for contacting and engaging with the Project Team during the public consultation period. These included:

- Lo-call phone line: ROI 1890 252 8481 NI: 084 524 65059
- Email service: watersupply@water.ie
- Postal service: WSP, Merrion House, Merrion Road, Dublin 4
- Online messaging form on the WSP website (www.watersupplyproject.ie)

All of these information services were utilised by stakeholders throughout the public consultation period to engage with the Project Team and to make submissions to the consultation process. As discussed in Section 2.5, the Project Team also organised stakeholder meetings, public consultation open days, and an Oireachtas Members open day to inform, consult and engage with as wide an audience as possible. Details of all the submissions received are discussed in Section 3; and have been duly considered within this report.

2.5.2 Launch emails

Irish Water issued 850 emails at the launch of the POAR. These launch emails briefed stakeholders on the key findings of the POAR, the details and terms of reference of the public consultation process and details of the various methods of engaging with the Project Team. The email list comprised:

- Interested stakeholders (individuals and stakeholder groups) who previously engaged with the Project Team
- Chief Executive and Senior Planner of the Local Authorities listed in Table 2.1
- Councillors in the study area Councils listed in Table 2.1
- An Taoiseach
- Minister for Environment, Community and Local Government
- TDs
- Senators

A sample email is provided in Appendix C.

2.6 Consultation Events

2.6.1 Public Consultation Open Days

Four public consultation open days were held during the POAR public consultation period in locations along the Benefitting Corridor for the Emerging Preferred Option. The pipeline corridor from the Parteen Basin to Dublin has the potential to provide a sustainable treated supply of water to many communities within the Midlands Region, where Irish Water is examining opportunities to rationalise existing smaller water supplies, drawing from smaller, vulnerable sources.

The open days were held in the following locations:

- Nenagh, 7 December 2015
- Killaloe, 8 December 2015
- Tullamore, 15 December 2015
- Limerick, 12 January 2016

The open days were advertised in local newspapers in advance of the events. There were 66 attendees in total at the open days, including local residents and landowners, Elected Members and civil servants from Local and County Councils, local resident groups, and members of angling clubs and boating clubs.

All feedback received during the POAR public consultation open days were considered as submissions, and were reviewed by the Project Team to inform the development of the project. All stakeholder feedback is reflected in this report.

2.6.2 Stakeholder meetings

A number of interested statutory and non-statutory stakeholders were invited to meetings with the Project Team. These invitations were issued at the launch of the consultation period, and the team followed up with the

stakeholders to arrange the meetings. The Project Team also offered meetings throughout the course of the consultation period, as new interested stakeholders emerged following engagement with the Project Team. During these stakeholder meetings, members of the Project Team briefed the stakeholders on the key findings of the POAR and discussed any stakeholder feedback.

In total, over 40 meetings were held during the POAR consultation period. Irish Water continues to engage with and meet a range of stakeholders. All feedback received during stakeholder meetings was reviewed by the Project Team to inform project development. All stakeholder feedback from the POAR public consultation is reflected in this report.

2.6.3 Oireachtas Members Open Day

All 232 Oireachtas members (15 Ministers, 154 TDs, and 63 Senators) were invited to an open day in the Alexander Hotel, 41-47 Fenian Street, Dublin 2, on the launch day of the POAR, Thursday 26th November 2015. The purpose of the Open Day was to brief Oireachtas members on the purpose of the consultation, the findings of the reports, and to discuss feedback.

3. Feedback

3.1 Introduction

There were 78 incoming emails, letters and phone calls received during the POAR public consultation period (26th November 2015 – 11th March 2016), excluding automatic replies, acknowledgements, and correspondence not related to the POAR. 36 of these stakeholder correspondences were requests for POAR documentation and/or details of the stakeholder engagement process. The remaining 42 of the correspondences were classified as submissions, as the stakeholders expressed their opinions and/or recommendations on the project. The 42 submissions received are summarised in Appendix H.

Every submission received during the POAR public consultation was reviewed, logged and acknowledged by the Project Team. Specific responses were sent to address each of the issues and questions raised in the submissions received. These responses are outlined in Section 4.

All feedback received during the POAR public consultation open days and the stakeholder meetings are considered as submissions and are reflected in this report. All minutes of stakeholder meetings and open day discussions were cross-referenced with the records of the incoming emails, phone calls and letters from stakeholders to capture all of the common themes discussed in every submission. These themes are listed in Table 3.1. This section discusses the general collective content and context of the submissions received in terms of these common themes. Stakeholder identities have been withheld throughout this report to comply with Data Protection standards.

Many of the open day attendees were interested in the relationship between the WSP and communities and tourism in the Benefitting Corridor, as well as water levels, fisheries and flooding along the River Shannon. The POAR identified a 2km corridor, within which the pipeline for the Parteen Basin Option would be sited. Attendees at the open days interested in the pipeline corridor were assured that one-to-one landowner engagement would commence in spring 2016 between the Ervia Landowner Liaison Officers (LLOs) and the landowners along the proposed pipeline route. Landowner engagement is ongoing.

Submission theme
Alternative Options • Desalination • Reservoir Storage • Rainwater Harvesting • Greywater Reuse
Leakage & Water Conservation • Leakage • Water Demand & Conservation
Environment & Fisheries • Environment & Ecology • River Shannon water levels • Fisheries • Flooding
Tourism & Amenity
Communities / Benefitting Corridor • Community gain

Submission theme
• Water allocation in the Benefitting Corridor
Engineering & Planning
Public Consultation Process
Sustainability • Sustainability & Carbon Footprint • Energy

Table 3.1 : Submission themes

3.2 Alternative Options

The POAR applied a Multi Criteria Analysis (MCA) to assess four potential options for a new water supply for the Irish Water Eastern and Midlands Region. The results revealed two viable water supply options; abstraction and water treatment from the River Shannon downstream of Lough Derg at Parteen Basin, and Desalination. The Parteen Basin Option was identified as the 'Emerging Preferred Option' in the POAR. Many of the submissions received referred to alternative options to the Emerging Preferred Option, such as Desalination, alternative options involving storage reservoirs, rainwater harvesting and greywater reuse.

3.2.1 Desalination

Several submissions received referred to Desalination and the advantages and disadvantages associated with Desalination, compared with the Parteen Basin option.

Some stakeholders favoured Desalination over the Parteen Basin option, with one stakeholder stating that despite the potentially high costs for treating sea water, the benefits and positives of Desalination far outweigh the negatives as sea water is in "endless supply, compared to the size of Lough Derg". Another stakeholder was concerned that the River Shannon does not have the necessary capacity to supply water to the Eastern and Midlands Region, particularly given the growing population.

Others expressed a different view on Desalination, with one stakeholder stating that "the huge cost of the process, including high carbon emissions", means that Desalination is not the solution. This opinion was also expressed in another submission which suggested that Desalination requires large amounts of energy and that the disposal of a highly concentrated salt solution is a challenge. Another stakeholder suggested that Desalination is not needed in Ireland, "a country where rivers overflow their banks frequently, dams threaten to burst".

Another submission focused on the analysis of Desalination compared with that of the Parteen Basin Option, as presented in the POAR. The stakeholder expressed concern that the level of analysis undertaken on Desalination was 'limited', and considered the identification of the Emerging Preferred Option an irreversible decision as a result. The stakeholder questioned if the costs of Desalination and the Parteen Basin option had been compared. The stakeholder was also concerned about the level of objectivity towards Desalination, suggesting that studies on the option should be carried out independent of the Project Team. The submission also referred to the technical aspects of Desalination. The stakeholder asked about the likely composition, dilution and dispersion of the brine plume, and noted that the brine plume could impact on water quality characteristics such as temperature, chemical constituents and salinity.

3.2.2 Reservoir Storage

A number of stakeholders proposed various alternative options that included building reservoir capacity in a number of locations along and near the Benefitting Corridor. The submissions suggested that the storage of water, particularly during winter months, could facilitate in the management of water levels on the River Shannon and Lough Derg and reduce the risk of flooding.

3.2.2.1 Garryhinch

Some stakeholders called for the revisiting of Midlands storage options, such as the development of a raw water storage area at Garryhinch, that were previously investigated as part of the WSP but were subsequently deemed unviable due to environmental, technical or other constraints. One submission focused on the Lough Ree and storage option as proposed in the OWP, which involves abstraction of water from Lough Ree to a reservoir on a cutaway bog in the Midlands, potentially allowing storage of excess winter water for use in the Eastern and Midlands Region during drier periods in the summer. The stakeholder proposed that this option could "maximise capacity to abstract water at periods of threatened flooding, so as to mitigate the extent of flooding", while also avoiding abstracting water during periods when river levels are low. It was stated in the submission that the volume of water available in Lough Ree is sufficient to meet the requirements of the Eastern and Midlands Region "without any risk of a negative impact for the environment or navigation on the Shannon". The stakeholder outlined suggested features of the design to achieve these proposed benefits.

Another stakeholder stated that the Lough Derg and Storage option represented a "win-win" through the "creation of a great wetlands recreation and nature conservation park in the midlands" in Garryhinch. The stakeholder stated that this option "brought great environmental benefits, including better flood relief than the current proposal". The submission also included a number of questions for the Project Team about how and why the Garryhinch option was abandoned, and whether or not the potential eco-benefits of the park were considered in the decision.

The request to revisit the option of storing water at Garryhinch through the creation of an Eco-Park also featured in another submission. The submission acknowledged the findings of the POAR which referenced models that indicated that abstraction at Lough Derg would adversely impact the residence times in southern Lough Derg. However, the stakeholder argued that the Garryhinch storage part of the Lough Derg and Storage option could still be considered, using a different abstraction location, Parteen Basin. The submission suggested that this "arrangement would extend the storage reserves and enhance the capability of the storage facility in addressing supply during prolonged periods of drought". The tourism and economic benefits of the creation of an Eco-Park through the storage of water at Garryhinch were highlighted, including meeting the objectives of Regional Development Plans. The stakeholder called for a matrix to investigate the impacts of the four OWP options and the proposed Parteen-Garryhinch option.

Other submissions suggested that storage capacity should be incorporated into the WSP in order to "regulate water levels on the Shannon", reduce the risk of flooding and improve the energy balance of water supply. It was suggested by a stakeholder that river water removed and stored in reservoirs during flood periods could be used as a potable water supply during summer months, thus "obviating the need to take water from the Shannon and reducing the risk of having a 'dry' river". The submission also stated that pumping cost savings could be achieved using "appropriately positioned and adequately sized reservoirs, pipes and pumping equipment" to pump and store the water during low-cost electricity periods, such as during the night time. It was concluded that a Cost Benefit Analysis would be needed to assess the option of incorporating such reservoir storage.

Another stakeholder expressed support for the Parteen Basin option, but queried if storage would be needed for dry summers when water levels on the Shannon would be low. The stakeholder noted that the last major storage facilities built in the Greater Dublin Area was the Blessington Reservoir, which was built in the 1940's. Potential impacts of global warming were also discussed, with the stakeholder noting that the predicted drier summers could make extracting the water more environmentally sensitive. The potential for using reservoirs to mitigate against flooding was also discussed in the submission. The stakeholder proposed that 2% of the flow could be taken out ahead of predicted rainflow peaks, through the use of reservoirs.

3.2.2.2 Pumped Storage

A number of submissions were received which proposed the development of a pumped storage facility to both supply water and generate electricity. One stakeholder suggested that a pumped storage facility could help alleviate flooding, by releasing the water through a hydropower plant and back into the waterways during the dry seasons, "but diverting this flow out to sea during the high risk wet seasons". Another stakeholder suggested a

pumped storage option involving Ardnacrusha as the abstraction location, and the Slieve Bloom Mountains as the location for the storage reservoir.

One submission suggested that the level of Lough Dan near Roundwood Reservoir in Co. Wicklow could be raised, so as to provide “additional backup” to the existing water supply, while also availing of the treatment beds at Roundwood. While acknowledging that “volume of available water may not be huge”, the stakeholder proposed that this could be relatively cheap and that “very few properties would be affected by the increased water level”.

The potential to link in with proposals investigated by other organisations was highlighted by another stakeholder. The stakeholder cited potential proposals to construct pumped storage facilities in the Arra Mountains and in the Slieve Bernagh Mountains, and suggested that these facilities could be designed to supply water also. The submission suggested that sourcing water from mountainous locations such as these may not draw the same level of opposition as the Parteen proposal.

3.2.3 Rainwater Harvesting

A number of submissions were received which suggested that rainwater harvesting should be implemented, with one stakeholder stating that this could help to mitigate pluvial flooding in Dublin. It was suggested in another submission that rainwater harvesting should be included in the design of new buildings in Dublin, given the rainfall rates. This was echoed by another stakeholder who suggested that “rainwater harvesting, water reuse, more efficient water usage equipment and facilities” could improve the sustainability of commercial water usage. This stakeholder also highlighted the potential for rainwater harvesting on farms, suggesting that “different pricing could apply for summer/winter usage to promote rainwater conservation and reuse”.

3.2.4 Greywater Reuse

The potential for using greywater “to reduce water demand and the need for water-treatment chemicals” was also highlighted in the submissions received, with some stakeholders pointing out that our water is treated to an advanced standard and so it should be reused where possible. One stakeholder concluded that that “every litre of grey water reused means one less litre of drinking water”. Suggestions for implementing greywater reuse were made by another stakeholder, such as using grey/recycled water for toilets, encouraging the use of water butts to trap rainwater, and plumbing circuits to recycle grey water. The stakeholder suggested that this could reduce the demand for potable water considerably.

The Cost Benefit Analysis of the Parteen option versus less invasive alternatives, such as greywater harvesting, was questioned in one of the submissions received. The stakeholder called for more information on the quantitative costs that will be accrued for the various options, including greywater reuse.

One stakeholder expressed the opinion that “as in other big cities, water reuse will become a standard and required part of water supply in the GDA”, with or without the WSP. The submission also discussed environmental flow replacement and groundwater abstraction, suggesting that these options could each have a potential of up to 100 Mld if multiple small sources were developed. The stakeholder called for a detailed appraisal of groundwater sources, including exploratory drilling, as well as a Cost Benefit Analysis of all supply options, including the combination of multiple sources.

3.3 Leakage and Water Conservation

3.3.1 Leakage

The environmental sustainability of the WSP was addressed in the context of leakage in a number of submissions, with various stakeholders questioning if strategies to reduce leakage could achieve sufficient savings in water demand to negate the need for a new water source for the region. Leakage estimates quoted by stakeholders in the submissions received ranged from 40-60%.

Some stakeholders felt that the high capital and maintenance costs associated with a large infrastructure project, such as the WSP, cannot be justified given the high levels of leakage in the water pipelines. One stakeholder called for a Cost Benefit Analysis comparing the WSP with loss reduction through pipe remediation. Many submissions called for increased investment in pipe repairs and leakage reduction in order to eliminate the need for a new water source, and the associated costs of providing such a source. Another stakeholder expressed the opinion that increasing water supply through the WSP will actually reduce the incentives and funding for leak reduction.

3.3.2 Water Demand and Conservation

3.3.2.1 Water Demand

The issue of project need was raised in many submissions, with stakeholders expressing varying opinions on the likely future water demands in the Eastern and Midlands Region. Some stakeholders expressed the opinion that the water demand calculations are premature, as demand could drop if charges are based on usage and/or if Irish Water achieves its commitment to reduce leakage. One stakeholder estimated that "metered water charges would have to be in place for at least two years and preferably longer, before people would begin to change their behaviour and install water-saving measures". Another submission questioned the accuracy of water meters and suggested that the water demand for the Eastern and Midlands Region is likely to be closer to 500 Mld, than the Project Team estimation of 330 Mld. The stakeholder also advised that the demand calculations should include losses along the pipeline and in the Termination Point Reservoir, due to climate and other factors.

Another stakeholder noted that water demand in Dublin and the Benefitting Corridor (and therefore the volume of water to be extracted) will vary with changes in population, agriculture and industry, as well as weather conditions. The submission suggested that demand for water is likely to be higher in hot, dry conditions, a time when water levels on the Shannon are at their lowest. The stakeholder requested additional information on the assumptions used for projected water demand and called for "a sensitivity analysis to support the projected figures".

One submission disagreed strongly with the WSP demand projections, asserting that accurate 35-year forecasts are not possible and that demand calculations should be revisited periodically to reduce demand-side risk. Referring to historical demographic and water demand records, the submission argued that demand has plateaued for eight years. The stakeholder cited an over-designed reservoir in the UK, as a warning against over-estimating demand. Furthermore, the stakeholder suggested that the projected industrial requirements of 34-50 Mld for the next five years cannot be met by the WSP timeline, and argued that "smaller-scale more rapid and flexible sources" should be developed on a shorter time frame instead. The stakeholder proposed that 75-100 Mld could be delivered using multiple smaller sources in the next five years, and estimated that this would result in sufficient capacity for the Region.

In comparison, another submission expressed the opinion that Dublin urgently needs additional supply. The stakeholder estimated that the spare capacity in the city has been as low as 1-2% in extreme events in recent years and referred to the example of the extremely cold weather in the winter of 2010/2011 which resulted in burst pipes and water restrictions for residents and businesses. The stakeholder estimated that Dublin's spare capacity is now around 8%, but suggested that "this is still far short of the 15% that is considered a safe level of spare capacity", noting that the need for increased capacity will grow in line with population growth and economic expansion.

3.3.2.2 Water Conservation

Several stakeholders suggested that water conservation mechanisms are needed to reduce our demand, rather than finding new sources to supply the growing demand. For instance, one stakeholder highlighted our growing water demand compared with previous generations, and suggested that water metering could help conserve water. Another submission called for more information on the Cost Benefit Analysis undertaken to compare the Parteen Basin option with "less invasive alternatives such as water conservation, and repairs and improvements to Infrastructure (including less pollution from urban treatment systems)".

One submission focused in detail on water conservation, suggesting various methods of improving conservation and reducing water demand in order to delay and minimise the need for additional water supply. The stakeholder referred to water consumption statistics for Ireland and the UK and suggested that water demand per household is lower in the UK because charges are based on usage, which results in behavioural change. The stakeholder suggested that reductions in water demand can be expected in Ireland, particularly if water meters are implemented wherever possible unlike the UK where water meters are not mandatory. The stakeholder discussed the widespread focus on energy reduction and efficiency measures, and noted that there are no similar incentives for water efficiency or monitoring of consumption.

Various water conservation options based on stricter water usage standards and incentives to balance water demand were offered in the submission, including:

- Greater transparency of water usage per appliance;
- Tax based changes to encourage greater sales of more water efficient appliances and lower cost credit options for investments that result in water reductions;
- Capital investment in commercial projects to cut water usage;
- Balancing out water usage and reducing demands peaks, for instance by offering lower prices to consumers with meters or different rates for summer/winter usage to promote rainwater reuse;
- Increasing commercial water charges;
- Applying business rates to agricultural usage to promote water reuse.

A submission was received which argued that the water-pricing policies required under the WFD to “provide adequate incentives for users to use water resources efficiently” are currently not in place in Ireland. The stakeholder suggested that this shows a lack of integrated approach to the Project between Irish Water and the DHPCLG. The stakeholder concluded that a decision regarding the preferred option is premature, until compliance with the WFD with regard to pricing and other measures to incentivise conservation is achieved.

3.4 Environment and Fisheries

3.4.1 Environment and Ecology

Many of the submissions received had environmental themes, with issues relating to environment, water levels, fisheries, and flooding being widely raised.

Several stakeholders expressed concerns about potential impacts of the WSP on water levels, and subsequently the environment and ecology of the River Shannon, with many of these suggesting that abstraction should cease during dry periods “in order to protect the flora and fauna of the lower Shannon and Shannon estuary”, and to preserve biodiversity, tourism and angling in the area. One submission noted that reductions in the River Shannon water levels would “affect absorption capacity of the Shannon for dilution of treated effluent locally” and would have indirect impacts on fish stocks, local water tables and private wells, and drainage of wetlands. Another stakeholder was concerned that habitats could be disturbed, fish stocks could be depleted, and the mammals and birds that feed on the fish could be affected.

A submission was received which posed a number of potential environmental issues, including the impact of abstraction on the nutrient balance of Parteen Basin, the increase in the pH of supplies to Dublin, and impacts on Freshwater Pearl Mussel. With regards to the nutrient balance of Parteen Basin, the stakeholder suggested that calculations should include speed and density measurements for suspended solids, rather than the residence time methodology which was used in the POAR. The stakeholder recommended using this ‘nutrient rich’ suspended solid material as fertiliser for the local community.

Some stakeholders also made suggestions for reducing the environmental impacts of the project as well as enhancing the environmental benefits. One stakeholder highlighted the importance of assessing and indicating the potential environmental impacts of the construction and operation of the proposed development on national roads, drainage systems and the receiving environment.

3.4.1.1 Water Framework Directive (WFD)

The WFD was referred to in a number of submissions. One stakeholder was concerned that the proposal will result in the deterioration of the Lough Derg/River Shannon Surface Water Body, and noted that Member States are prohibited from authorising a project that results in the deterioration of a Surface Water Body under the Water Framework Directive 2000/60.

Another submission welcomed the inclusion of WFD requirements in the MCA undertaken for the POAR but suggested that an ex-ante WFD-specific assessment is needed. The submission also referred to the WFD requirement to establish controls over the abstraction of fresh surface water and groundwater and highlighted that this legislation is overdue in Ireland. The view was expressed that the absence of this legislation renders "Ireland's regulation of abstractions non-compliant" and that it is inappropriate for an abstraction on the scale of the proposed project to be decided upon in this circumstance.

The submission recommended that the Strategic Environmental Assessment which was previously undertaken on behalf of Dublin City Council should be undertaken again as the scope of the WSP has changed from a Dublin regional level to a national one. Referring to the imminent National Planning Framework, the submission suggested that this new WFD assessment should include the impact of any additional wastewater generated as a consequence of the WSP for Dublin Bay and also along the Benefitting Corridor. The stakeholder highlighted that Dublin Bay "is a sensitive water body with numerous European and international designations".

One submission proposed the addition of a WFD Research Facility in the vicinity of the proposed water abstraction point at Parteen Basin "to facilitate monitoring and research that supports WFD compliance". The stakeholder highlighted that there is no fixed facility in Ireland specifically dedicated to the aquatic environment, and suggested that such a facility at Lough Derg could improve scientific knowledge of the lake and could, in conjunction with the responsible agencies, lead to improved lake management. The stakeholder stated that the Parteen Basin option would "have a small, but perhaps not negligible, effect on the movement of water through the system", and that research is needed to properly understand these changes.

3.4.1.2 Environmental Impacts of Alternative Storage Options

Some stakeholders discussed the potential environmental impacts of alternative storage options. One of these submissions proposed a pumped storage facility using abstraction of water at Ardnacrusha and a storage reservoir in the Slieve Bloom Mountains. The stakeholder suggested that "taking the water from near the estuary would ensure that the Shannon was kept pure and free from pollutants; taking it from nearer the source might result in catastrophic drops in the level in periods of drought, just when the greatest drain would be on it."

Another submission called for the revisiting of the Garryhinch storage option. The stakeholder agreed with the selection of Parteen Basin as the abstraction point rather than Lough Derg, noting that this "resolves any possible negative impact on flushing through Lough Derg", but argued that the option could be adapted to include storage at Garryhinch. The submission outlined the benefits of Garryhinch as storage capacity in times of drought and potential reduction in the impact on the supply of ESB reserve water storage for electricity generation during drought periods. Finally, the submission addressed the environmental risk of migration of alien species into other water bodies, suggesting that the risk "can be resolved by treatment for their removal at source before pumping to the reservoir".

3.4.2 River Shannon Water Levels

Multiple submissions were received concerning the potential impacts of the WSP on River Shannon water levels. One submission expressed the opinion that the proposed abstraction rate based on average flows is misleading. The submission discussed flow rates and water levels on Lough Derg as well as ESB abstraction rates in detail, highlighting that flow rates on the lake vary considerably throughout the year from 15 cumecs to as high as 800 cumecs. The stakeholder outlined a dry summer scenario and suggested that draw down from Lough Allen and Lough Ree would be required to provide sufficient water for WSP abstraction and electricity generation. The stakeholder stated that this draw down would negatively impact on ecology and navigation

levels in the Shannon and asserted that “pumping will have to take cognisance of the actual amount of water available in real time” and should not be based on average flows.

Concern was expressed that the Parteen Basin option could negatively impact on water levels in the Shannon, with one stakeholder noting that “water levels are low enough as it is”. The stakeholder outlined the impact of low water levels in Lough Derg on local businesses and boating in the area. The stakeholder was concerned that the WSP would exasperate the situation. Similarly, another submission argued that the minimum flow that must be guaranteed under current legislation is too low to maintain the health of the river.

This concern was echoed in another submission, which queried the ‘all year round’ nature of abstraction proposed. The stakeholders were concerned that during dry weather periods, water levels are low but the demand for potable water is high, resulting in increased abstraction from Parteen and further reduced water levels. The submission outlined the importance of maintaining water levels for “the fauna and flora of the River and its Lakes” as well as for making the river and lakes an attractive tourist destination and “a key economic driver for the midlands”. The submission also expressed a concern that extraction will only increase over time with population growth, potentially reaching a point where abstraction would have to be restricted to limit ecological and environmental damage. They questioned “who will conduct the worst case analysis of abstraction levels”, and also if the possibility of building a weir or similar structure at Parteen to maintain minimum water levels has been considered.

The coincidence of peak water demand and reduced water levels during dry weather periods was also discussed in another submission. The submission referred to the storage capacity of the Peamount Termination Point Reservoir, with the stakeholder suggesting that, while not stated, the capacity is likely to be small with little spare water to pump during the peak demand period. The stakeholder stated that “it’s not at all apparent how the project will ‘protect’ supplies to Dublin at the height of the deficit period”. The stakeholder also asked what the ‘normal operating band’ referred to in the POAR is and questioned how both water levels and drinking water supply will be maintained in the case of a dry summer. In discussing future water demand scenarios, the stakeholder suggested that a scenario could arise where high water levels are maintained in the Shannon during the early summer months, in order to maintain water supplies, and stated that this would have a “serious negative knock-on effect on the callows drainage system, resulting in the loss of habitat…and a serious loss of grazing”. The stakeholder also argued that this could result in water not being released quickly enough, which could lead to increased winter flooding.

3.4.2.1 Water Level Management Options

Various alternative storage options, including pumped storage facilities, were proposed by stakeholders, many of whom cited water level management as a key benefit of incorporating reservoir capacity into the WSP. Some submissions suggested a water management scenario whereby water would be stored in reservoirs during wet weather periods to maintain water levels to within acceptable limits and reduce the risk of flooding, and water would be released from the reservoirs for water supply in times of low rainfall to reduce water abstraction from the river itself. These submissions cited a number of benefits of incorporating reservoirs in the WSP, namely water level regulation, pumping cost reduction and flood alleviation.

One stakeholder recommended pumping the water when electricity tariffs are low, such as during the night, where possible. The submission also included a discussion on the impact of water levels on pumping requirements, with the stakeholder noting that because Parteen is downstream from Lough Derg at a lower elevation above sea level, the required pipeline is longer and energy requirements for pumping are greater. Furthermore, the stakeholder argued that the “difference in energy requirements is influenced by the water level at Parteen, as any drop in level increases the pumping energy requirements”. The stakeholder outlined that during dry weather conditions when water demand is greatest and River Shannon water levels are at the lowest, “the drop in water level at Parteen could be significant”, resulting in increased pumping energy requirements as well as reduced hydropower generating capacity at Ardnacrusha.

Some stakeholders called for the revisiting of the option to develop a storage area at Garryhinch, highlighting the benefits of building a supply reserve for dry weather periods. One stakeholder suggested that storage at Garryhinch “has the potential to provide in excess of 31 days storage in times of drought”, which would reduce

the impact on the ESB generating reserve during the summer. Another stakeholder suggested that “by optimising the storage capacity of a reservoir in the Midlands, it would be possible to ensure that there would be no need to abstract water from the Shannon during summer months and any other periods of drought”, stating that this would not only maintain water supply but would also mitigate against flooding. The submission included water level calculations for Lough Ree, and a judgement that there would be adequate capacity at Lough Ree to supply the estimated 2050 demand in the Eastern and Midlands Region.

A submission concerning the organisational management of the River Shannon was also received, with the stakeholder suggesting that if the WSP is implemented Ireland will have three competing bodies for different usage of the River Shannon’s Water, namely Irish Water, ESB and Waterways Ireland. The stakeholder asked if there should be a single body responsible to the Oireachtas for safeguarding the River Shannon and its lakes, including the control of water abstraction. The stakeholder suggested that such a body would need to have an in-depth understanding of the hydrology, ecosystems and flora and fauna of the Shannon Region.

3.4.3 Fisheries

Several submissions referred to the potential impacts (positive and negative) of the WSP on fishing, angling and boating. Stakeholders were concerned that fishing and boating will be affected if water levels drop in the Shannon as a result of the WSP. One stakeholder pointed out that there are thirteen angling clubs in the area which are being affected by the already fluctuating water levels, and suggested that if water levels drop as a result of the proposal, trout fishers won't have access to the lake. The submission concluded that “It is imperative to preserve the Lough Derg environment and the future of communities” such as local anglers. This was echoed in another submission which noted the importance of ensuring that the “river level is always sufficiently deep for boating, angling and other activities”.

Some stakeholders expressed preliminary support for a fish connectivity improvement initiative at Parteen. Another stakeholder proposed the integration of the Parteen option with the Garryhinch storage option, stating that the creation of an Eco-Park at Garryhinch could have great benefits for boating, angling and water sports.

3.4.4 Flooding

Many of the submissions received during the consultation period discussed the issue of flooding. Some stakeholders felt that if diverting water from the River Shannon is being offered as a flood reduction solution, then it should only be during winter months when floods happen, and there should not be a year-round diversion of water to the Eastern Region of Ireland.

Some submissions were received which outlined the benefits of the Emerging Preferred Option in terms of flood alleviation. The submissions referred to the winter 2015/2016 flooding in the Shannon area, stating that an “ability to take out 2% of the flow would be beneficial in reducing flooding downstream of Parteen Weir”. One submission suggested that because the River Shannon rises slowly, taking a “week or more to reach maximum height after heavy rains”, abstraction could be increased when flooding is forecast. Agreeing with the Parteen proposal, the submission queried if some additional storage should be included to fully realise the flood reduction possibilities, noting that the “last major storage facilities built in the GDA was the Blessington Reservoir built in the 1940’s”.

Another stakeholder outlined the impacts of the flooding along the Shannon Basin on the lives of the local residents, businesses and farming communities, noting that considerable resources and expenditure will be spent on providing flood protection and relief to the impacted areas. The stakeholder asked if the proposed pipeline from Parteen Basin to Dublin (whether in its proposed form or modified to account for flooding) could be used “to drain off excessive water from Parteen and pump it into the sea at an appropriate point in a tidal area on the Eastern seaboard”. The stakeholder acknowledged the cost implications, while also highlighting the potential cost savings associated with the avoidance of the capital and human costs of flooding. The submission also suggested constructing a “new pipeline directly from Parteen to the Western seaboard to meet the sea” or developing a pumped storage facility to both supply water and alleviate flooding.

3.4.4.1 Flood Management Options

There were also a number of submissions which argued that the Parteen Basin option does not do enough to alleviate flooding, with some stakeholders offering alternative storage options to potentially achieve greater flood reduction. One stakeholder expressed the opinion that the Parteen Basin option would do nothing to alleviate flooding in the Shannon region, and suggested that resources should be spent instead on controlling flooding in the Shannon area. The submission suggested that floodwater could be allowed into former bog areas to sequester carbon as peat, as well as avoid the flooding of farmland. The stakeholder also proposed that pluvial flooding in Dublin could be reduced using rainwater harvesting.

Another stakeholder shared a similar opinion, stating that because the Emerging Preferred Option does not include a reservoir, there is reduced potential for flood relief. The stakeholder also argued that the proposed abstraction at Parteen Basin does not offer flood relief, as it is downstream of most flood sites. The submission recommended that OPW flood hazard mapping and emergency flooding maps should be included in the study for the WSP.

Another stakeholder argued that Irish Water has not considered flood reduction in its mandate for the WSP to date and that the Parteen Basin option therefore represents a missed opportunity from a national interest perspective. The submission focused on the revisiting of the Lough Ree and Storage option investigated in the earlier stages of the WSP, with the stakeholder proposing that storage capacity in the Midlands could be optimised to ensure that there would be no need to abstract water from the Shannon during periods of drought. The stakeholder further suggested that excess water could be abstracted from the Shannon to relieve flooding and run off to the Irish Sea (if it is not required for consumption or storage).

The submission included the stakeholder's estimations of the capacity of Lough Ree to meet the water demand of the Eastern and Midlands Region and future water demand predictions, as well as potential features of the proposed water supply and flooding solution including:

- The reservoir would only be filled during high water levels in Lough Ree and during low water levels water would be supplied from the reservoir;
- During flood periods, the maximum amount of water would be abstracted from Lough Ree, used firstly to supply Dublin, secondly to top up the reservoir, and thirdly, the surplus water would be run off into the Irish Sea;
- Rainfall forecasting could be used to schedule water abstraction in advance of flooding, in order to maximise flood protection.
- The stakeholder recommended that a full Cost Benefit Analysis is needed to evaluate the flooding proposal, and that Irish Water consider the Lough Ree option or any other option to explicitly combine flooding and water supply objectives.

Another submission was received which questioned the level of attention afforded to flooding in the POAR, with the stakeholder suggesting that flooding along the Shannon was underestimated in the POAR. The stakeholder referred to a section of the POAR which stated that "Some flooding does occur within the Study Area", and suggested that this does not adequately capture the level of flooding that occurred along the River Shannon in winter 2015. The stakeholder felt that this is "a typical underestimation of the problems of the people in this area of the country".

3.5 Tourism and Amenity

A number of submissions referred to potential impacts of the Parteen Basin option on tourism and amenity in the study area. Some stakeholders were concerned about the potential impacts of the proposal on tourism, and highlighted the importance of preserving angling activity and fishing tourism, and maintaining the fauna and flora of the river and its lakes.

Another stakeholder focused on the challenges to Dublin commerce and tourism caused by a lack of water capacity. The stakeholder stated that the city's spare capacity is below the considered safe level of spare

capacity, and outlined the risks associated with this low capacity, using the example of the severely cold winter of 2010/2011 when pipes burst and supply had to be restricted. The stakeholder stated that this had "a particularly severe impact in our restaurants, pubs and hotels". The submission highlighted that this capacity problem will only grow as the Dublin population is predicted to grow rapidly between now and 2031. Furthermore, the link between the need for increased supply and economic expansion was stressed.

One of the submissions received focused on the potential tourism benefits of the Garryhinch storage option investigated by the WSP Team, with the stakeholder noting that this "has the potential to provide a major Eco-Park tourism development consisting of high quality outdoor leisure, recreation and education facilities" and to "expand the region's tourism offering by the provision of water-based sports". The submission referred to the tourism benefits of other similar facilities created at Rutland in the UK by Anglian Water, which considerably enhanced the economic earning potential of the Region. The stakeholder expressed the opinion that the economic and employment opportunities associated with Garryhinch have not been considered by Irish Water and recommended that a matrix be developed to investigate all of the impacts, both positive and negative, of the WSP options, including storage at Garryhinch.

3.6 Communities / Benefiting Corridor

3.6.1 Community Gain

There were several submissions which discussed community gain. Some of these were explicitly in favour of the Emerging Preferred Option, citing the community benefits to the Midlands Region as a reason for this stance. The stakeholders recognised the potential job opportunities associated with the pipeline construction, as well as the advantages of having strategic infrastructure in the Midlands Region and the potential for external investment from water dependent industries. One stakeholder stated that the provision of strategic infrastructure would "provide rationalisation opportunities, resilience and security to the existing water supplies". Some stakeholders also highlighted the importance of engaging with Local Authorities, with one stakeholder suggesting that a fund should be established to support Community Initiatives.

Other stakeholders expressed the view that more work is needed on the matter of community gain, with one stakeholder suggesting that the community gain proposals "would need to go much further than proposed to meet any economic shock following from any prolonged and damaging abstraction." Another stakeholder queried why Irish Water cannot start a community gain proposal immediately (rather than as part of the submission to An Bord Pleanála), as has been carried out by Eirgrid and ESB Networks for overhead cables projects. The stakeholder also referred to flooding, and suggested that the community gain proposal is not extensive enough given that households in flooded areas are still paying water charges "for non-existent sewage treatment due to flooding".

Many submissions referred to previous and existing community gain and development contribution schemes in place in individual counties along the proposed pipeline route between Parteen Basin and Dublin. Some stakeholders signalled their approval of Irish Water's plan to "get local support for the project". In contrast, another stakeholder called for information on the planned weekly costings to be paid to County Councils, and felt that the proposed community gain scheme is "deeply offending" to local residents in Tipperary.

Another stakeholder pointed out that "small communities along the pipeline corridor will be impacted (whether the community is positive/negative/neutral in its stance)". The stakeholder suggested that because Irish Water has a "high level of expertise necessary to prepare a project like this and get it through the Planning process", support should be provided to enable small communities to a have meaningful input, thus ensuring a balanced public consultation process. The stakeholder asked about Irish Water's plans to facilitate funding for small communities and asked about the status of similar requests made previously by Local Authorities.

3.6.2 Water Allocation in the Benefitting Corridor

A number of submissions included discussions about the projected water demand and proposed new supply to the counties within the Benefitting Corridor, as defined in the Emerging Preferred Option. Some stakeholders expressed the view that the counties in the Midlands which have been included in the water supply proposal as

part of the Parteen Basin Option are not actually in need of additional supply, and queried the projected population growth scenarios. One of these submissions asked if the existing water supplies in the towns are actually under stress and if there are any other viable options for improving supplies. The stakeholder outlined the importance of ensuring that connecting to the proposed WSP pipeline is definitely the most cost-effective water source for each benefitting town, highlighting that this would likely involve decommissioning a number of existing supplies.

In contrast, another stakeholder stated that water demand in the Benefitting Corridor is greater than the proposed supply outlined in the Emerging Preferred Option. The stakeholder expressed their support for the WSP, stating that it "has the capacity to deliver a means of ensuring an adequate and resilient water supply" for the Benefitting Corridor, but suggested that the proposed allocation of water is not equitable. The submission focused in particular on County Laois, providing details of the recent and planned future growth of the County town of Portlaoise, as well as the existing groundwater source for the town's water supply. The stakeholder suggested that the allocation of 4.3 Mld to Laois, out of a total 96.1 Mld, is unacceptable, particularly if it is likely that a large portion of the proposed pipeline will pass very close to if not through some part of the county. The submission requested that Portlaoise be added to the proposed list of towns to receive water from the project, and that the allocation of water for Laois County be increased to 15 Mld.

3.7 Engineering and Planning

3.7.1 Engineering

Many of the submissions received referred to the engineering and/or planning stages for the WSP, with stakeholders offering advice to the Project Team for progressing these stages. One stakeholder provided guidance on policies for interacting with existing and proposed new transport infrastructure, road and motorway crossings, means of access to/from national roads, traffic management, and environmental issues during the construction and operation of the proposed development, including any implications for the safety of road users. Another stakeholder advised on Group Water Supply Schemes along the proposed pipeline route, stating that any potential impacts to existing Group Water Supply Schemes should be acknowledged and addressed. Another stakeholder highlighted the "problems of having to close down whole sections of Dublin while new pipe laying is being done" and recommended that Irish Water should consult with ESB, Telecommunications and all other utilities.

Some stakeholders discussed the proposed Termination Point Reservoir for the Emerging Preferred option. The POAR identifies Peamount as the proposed location for this reservoir. One stakeholder expressed their concern about the proposed location of the reservoir, suggesting that the potential master planning of surrounding lands would be "significantly compromised by the proposed location of the terminal reservoir." From an Engineering perspective, the stakeholder expressed concerns about changes in the top water level at the Reservoir, suggesting that the proposed level is too low to service some lands.

Another stakeholder considered that the identification of the proposed Termination Point Reservoir at an elevation of 70-80m rules out other possible sites, as the elevation of the final reservoir will impact on the overall pipeline design. The pumping requirements, and resulting economic costs, were also discussed in the submission, with the stakeholder pointing out that the route from Parteen to the proposed Termination Point Reservoir at Peamount is 35% longer than that from the northern shores of Lough Derg and that the pumping head will be greater. The stakeholder also queried the capacity of the proposed reservoir, and if any further treatment would be required before being distributed for consumption. The stakeholder expressed the view that this information was not clearly provided in the POAR.

3.7.2 Planning

Some stakeholders were supportive of the Emerging Preferred Option, referring to the potential benefits to the Midland counties in the proposed Benefitting Corridor of pipeline construction, the provision of strategic infrastructure, and the potential for external investment from water dependent industries. One submission further suggested that the extended provision of a quality water supply to the counties in the Benefitting Corridor would favour relevant SME sectors already or potentially operating in the Midlands. This submission referred to

the Local Economic and Community Plan for 2016-2021 developed by Offaly County Council which included a key objective to “Maximise the opportunities for Offaly arising from strategic infrastructural projects/priorities”.

Another submission outlined the importance of integrating the WFD in the planning process, stating that water services planning, particularly for large-scale infrastructure projects such as the WSP, should only take place “within and not alongside, the river basin planning and integrated water management approach required by the WFD”. The stakeholder expressed the opinion that there is a “lack of a co-ordinated approach between Irish Water and the Department of the Environment”, and questioned if and how the WSP is being integrated with integrated catchment management. To improve the level of integrated planning, they suggested that Irish Water should be engaging with all water governance organisations, such as the EPA Catchment Science and Implementation Unit, the DECLG (subsequently DHPCLG), and the NPWS. The stakeholder indicated that a new governance system is in the process of being put in place in Ireland, and argued that the final preferred option for the WSP should not be decided until this system as well as the river basin management plans and the WFD catchment characterisation are complete.

The submission also discussed the imminent National Planning Framework 2016-2036 (NPF), suggesting that there is a “policy interregnum” in a number of crucial national planning areas directly related to the WSP. The stakeholder stated that because a number of the crucial national plans are pending, the WSP should be postponed “until the NPF has been finalised in order that the WSP can be ‘proofed’ against it”. The water demand scenarios for the Midlands were discussed as an example, with the stakeholder suggesting that these calculations are speculative and premature until the National Planning Framework is published.

One submission was concerned that Irish Water is limiting the WSP options to abstraction from the Shannon and is therefore acting as “policymaker on FDI and wider industrial and spatial policy in Ireland”. The submission suggested that the number of public water supplies in Ireland is irrelevant and that any deficiencies in water supplies along the Benefitting Corridor should be resolved locally. The stakeholder raised concerns that smaller schemes within the Benefitting Corridor will be abandoned so as to justify the need for the WSP in these areas and argued that devoting a large budget to one scheme would divert resources away from other parts of the Midlands outside of the Benefitting Corridor. They called for a Cost Benefit Analysis comparing the WSP with the development of smaller schemes along the Benefitting Corridor, and argued that replacing a number of small sources with one large system does not improve resilience as more areas would be affected if the system shut down.

Some submissions suggested that more resources need to be invested in developing the West and locating more industry along the major water resources there, rather than “over-developing Dublin” and moving water into different river basins in order to do so. One stakeholder expressed the opinion that Dublin is getting too big for the country, and that we need to “explore spreading economic activity and jobs to other and sustainable areas of the country”. The submission considered that the Eastern Region of Ireland will have less rainfall in the future while the West will have more, owing to climate change, and suggested that future economic policy should therefore direct more economic activity to Western regions along the Shannon.

Another stakeholder expressed the opinion that the WSP is Dublin-centric and is therefore contrary to the National Spatial Strategy. The submission argued that the project prioritises the expansion and centralisation of development in Dublin and reduces the capacity and attractiveness of the Midlands and west of Ireland. In addition, the stakeholder suggested that the proposal represents poor planning policy as it introduces unsustainable development capacity in the Greater Dublin Area by providing a new drinking water source without additional wastewater capacity. The stakeholder suggested that this would reduce the resilience of potable water systems.

3.7.3 Engineering and Planning of Alternative Options

A number of stakeholders discussed the engineering and planning aspects of alternative options. One stakeholder asked if the costs (including long-term costs for maintenance and community gain) of abstracting water from other sources, such as Blessington Reservoir, had been compared with those for abstraction at Parteen Basin. The stakeholder also pointed out the advantage Irish Water has in terms of expertise compared

with small communities, and queried if Irish Water plans to provide funding or support to ensure that the planning process is balanced and that small communities can have a meaningful input.

Another stakeholder suggested incorporating storage capacity at Garryhinch into the Emerging Preferred Option, stating that "a viable model exists to accommodate 2 months' supply storage to counter drought periods while improving residence times in Lough Derg". The stakeholder agreed with the preference of abstraction at Parteen rather than Lough Derg, suggesting that while variable abstraction rates could be accommodated at Parteen Basin, they would not be required unlike for abstraction on the north eastern shore of Lough Derg. The submission discussed the engineering challenges posed by the geological and hydrogeological setting of the proposed storage location at Garryhinch, suggesting that the reservoir design could be refined to reduce or remove risks associated with karst bedrock.

The stakeholder further stated that the creation of a storage facility at Garryhinch "would meet many of the goals and policies outlined in the Midland Regional Planning Guidelines 2010 to 2022", and suggested that the socio-economic benefits of the scheme should be included in the assessment of the options available. The stakeholder advised that a matrix should be developed to assess all of the impacts, both positive and negative, as well as all of the capital and operating costs of the WSP options, including their proposed sub-option of abstraction at Parteen and storage at Garryhinch. The submission stated that "all options need to be examined in terms of the National Spatial Strategy and Regional Planning Guidelines 2010 to 2022".

Another submission favoured abstraction at Lough Ree and storage at Garryhinch. The stakeholder suggested that the inclusion of storage capacity would have benefits for flood alleviation. The stakeholder argued that the WSP planning to date has not considered flooding, and so potential solutions should not be limited to those set out in the OWP. The submission included a technical assessment of the capacity of Lough Ree to supply the water demand of the Eastern and Midlands Region, as well as suggestions on the engineering features of a potential design, including mechanisms to maintain water levels.

3.8 Public Consultation Process

A number of submissions commented on the Project Team's engagement with stakeholders during the POAR and previous consultation periods as well as planned future stakeholder engagement. Some submissions contained recommendations about who to engage with going forward in the Project, with suggested consultees including Transport Authorities and Group Water Schemes. One stakeholder suggested that public consultation days should be held in Carrick on Shannon as it is the main activity area for the Shannon and "actions which take place on any part of the river network ultimately affect" the town.

Another submission referred to the Local Economic and Community Plan (LECP) for 2016-2021 developed by Offaly County Council, which includes an objective to "Maximise the opportunities for Offaly arising from strategic infrastructural projects/priorities". The stakeholder stated that one of the actions arising from this objective was to actively engage with Irish Water and the relevant departments to ensure that Offaly benefits from the WSP.

One submission suggested that the consultation period is only "lip service" as Irish Water has made its mind up already. Another submission outlined the stakeholder's previous experience with a large engineering project in their locality, and suggested that such projects are implemented regardless of submissions from the public, based on this previous experience.

Another stakeholder shared this negative view of stakeholder engagement, with the submission focusing on the POAR public consultation period. The stakeholder felt that the timelines for the public to engage with the Project Team are very tight and that the amount of time taken by members of the public to read and analyse the report and then compose a submission is not appreciated by the Project Team. Stakeholder meetings were also mentioned in the submission, which expressed the view that the Project Team is holding numerous "closed sessions" with stakeholder groups, many of whom have vested interests, but the public are largely excluded.

Others considered that the consultation documents are long, extensive, detailed and technical, and expressed the opinion that this makes effective engagement in the consultation almost prohibitively challenging for small

organisations of limited capacity. One stakeholder commented that the national significance and historic scale of the project is "grossly under appreciated by the vast majority of the Irish public" and considered that there is a lack of confidence among the public in the meaningfulness of public participation. The submission recommended that the WSP engagement should represent a genuine partnership with stakeholders, with an opportunity for real influence, to deliver their shared water goals, and argued that the WSP public engagement process has not been "meaningful, effective or adequate".

The stakeholder suggested that there are flaws in the WSP public engagement process in four areas:

- *Public awareness, education and information*. They stated that there is a very low level of awareness amongst the public of the challenges of successfully maintaining limited fresh water supplies, and suggested that the public is not aware of the pivotal role that can be played by citizens, groups, businesses and industry in addressing these challenges. They consider that Irish Water's large scale, centralised water management approach plays a role in reducing the perceived relevance of involvement amongst the public. The submission included a recommendation to provide national information and education to highlight the importance of stakeholders in relation to water resources, and encourage individuals and groups to fulfil that role.
- *Access to information and technical expertise.* The submission stated that technical support to help stakeholders fully understand the WSP was not provided for those being consulted.
- *Accessible opportunities to participate.* They consider the main report and appendices too complex to comprehend in the absence of technical support, and argued that in comparison the non-technical summary reports, are lacking in detail so as to make any comment in response of very limited use.
- *Clarity and transparency of participation proposed.* They questioned how WSP submissions are analysed and if and how their contents are used as input to the development of the project. They pointed out that stakeholders have to wait until the new consultation period to assess if their previous inputs have been addressed, and suggested that the feedback provided to submissions "comprised consistent resistance to almost all points made by consultees". The stakeholder called for a "detailed analysis of stakeholder input by specialists".

3.9 Sustainability

3.9.1 Sustainability and Carbon Footprint

General comments, suggestions and recommendations regarding the sustainability of the options for a new water source for the Eastern and Midlands Region were included in ten of the submissions received, with many of these discussing both sub-themes; Sustainability & Carbon Footprint and Energy. Some stakeholders felt that the WSP is Dublin-centric, and that we should "explore spreading economic activity and jobs to other and sustainable areas of the country" rather than trying to find a new water source for Dublin.

One submission commented that because the project is focused on a new drinking water source and does not include capacity for the additional treated effluent, it could reduce the resilience of potable water systems as well as introducing unsustainable development capacity in the Greater Dublin Area. Another stakeholder expressed the view that the construction of the pipeline and other WSP infrastructure will have a big carbon footprint, which will impact on our efforts to address climate change. However, this stakeholder also disagreed with the Desalination option, owing to the large costs of the process, including high carbon emissions.

Another stakeholder also favoured the Parteen Basin option over Desalination, stating that Desalination "will require large amounts of energy (at a time when Ireland is trying to reduce energy consumption) and will also lead to the production of a highly concentrated salt solution that will need disposal". In contrast, another stakeholder stated that while Desalination is expensive, sea water is "endless in supply, compared to the size of Lough Derg" so it is a sustainable source with more benefits and positives than negatives.

One stakeholder felt that resources should be spent on trying to control flooding in the Shannon area rather than providing a new source of water for the Eastern and Midlands Region. The submission discussed the

option of allowing floodwater into former bog areas in order to reduce the flooding of farmland as well as to help sequester carbon as peat, thus reducing national greenhouse gas emissions.

3.9.2 Energy

A number of stakeholders commented on the energy costs and opportunities associated with the Emerging Preferred Option. Some expressed concern about using water that is currently being employed by ESB for hydroelectricity generation, and the implications of displacing this renewable energy with fossil fuels. One stakeholder commented that the reduction of renewable energy generation capacity at Ardnacrusha does not fit in with government policy to realise a low carbon/energy economy, and suggested that a comparative energy balance analysis should be included in the assessment of the options. The stakeholder also commented on the increased energy needed to pump water from Parteen rather than Lough Derg, owing to the longer pipeline and greater head required.

Some submissions proposed alternative reservoir storage options to incorporate energy generation in the WSP. One stakeholder noted the increase in energy costs for pumping water from Parteen Basin rather than from Lough Derg, and highlighted that any drop in water level at Parteen would result in increased WSP pumping energy requirements as well as reduced generating capacity at Ardnacrusha. The stakeholder proposed the incorporation of raw water storage in the WSP, as a means of managing water levels (and therefore pumping requirements) as well as optimising energy expenditure by only pumping water when electricity tariffs are low.

Another stakeholder suggested that off-peak electricity from sources such as wind could be used to pump water from Ardnacrusha to a storage dam in the Slieve Bloom Mountains. They suggested that a dam would be a great source of revenue to the area and that the proposal could help regulate the Shannon water levels while using low cost off-peak energy.

4. Response to Feedback

4.1 Introduction

Section 3 discusses the general collective content, and context, of the submissions and queries received during the public consultation process in terms of common themes. Irish Water has listened very carefully to the submissions and queries received, and to the views expressed by stakeholders in direct discussions. This section outlines Irish Water's responses to the issues and views expressed in these submissions and discussions.

A summary table of the stakeholder issues raised during the POAR consultation period is provided in Section 5. This table also outlines Irish Water's response to each of the issues, and the resulting decision made in relation to the development of the project. Similarly, Appendices I and J outline the stakeholder issues and the resulting IW responses and decisions in the PNR and OWP consultations, respectively.

4.2 Alternative Options

Over the 2005 – 2011 period, two phases of high level Strategic Environmental Assessments (SEA) were carried out, initially on three, and later on ten, potential new water supply options for meeting demand in the Dublin Region Water Supply Area.

The options considered were centred on the River Shannon, Groundwater, Desalination of seawater, and possible conjunctive use of the Rivers Barrow and Liffey. The project has now moved into the planning phase and requires an Environmental Impact Assessment and Appropriate Assessment on a preferred option, where the reasonable alternatives considered are also presented.

It was necessary to review the original appraisal (2005-2011) of these alternatives in the SEA, in light of developments in the interim period since the SEA Statement and Plan were published in 2011, and in the light of submissions made in public and stakeholder consultation at the time and since then.

The OWP (June 2015) marked a point of independent review of options. It validated a commencement point for detailed appraisal of technically viable reasonable alternatives. The updated review process in the OWP involved:

- a desktop review of the SEA options appraisal process, taking cognisance of developments in the intervening period, to reconfirm those options previously considered as reasonable alternatives;
- examining the list of reasonable alternatives against stakeholder feedback received during public consultations and subsequently up to the time of publication of the OWP;
- assessment of the yield of the sources, which is their ability to provide the necessary quantities of water;
- checking compliance of the proposed abstraction with the Habitats Directive;
- endorsing the options proposed for further study. Options B (Lough Derg Direct), C (Parteen Basin Direct), F2 (Lough Derg with Storage) and H (Desalination) were confirmed as technically viable alternatives for more detailed investigation.

In the SEA (2007-2011), the ten options were assessed on an MCA basis involving:

- Technical attributes of the source
- Technical attributes of the required infrastructure
- Environmental impacts assessed under SEA
- Habitats Directive impacts
- Economics

- Socio-economic impacts

There was also a risk appraisal of the options carried out at that time. The top four options under the original MCA assessments (2011) and the Risk Appraisal process (2011) were Option F2 (Lough Derg with Storage), Option B (Lough Derg Direct), Option C (Parteen Basin Direct), and Option H (Desalination). These four Options were taken forward for further analysis in the POAR.

Six options were eliminated in the OWP for one or a combination of the following reasons;

- Insufficient availability of water in a sustainable manner
- Failure to comply with the Habitats Directive

4.2.1 Desalination

Desalination of seawater has been deemed 'Possible but not recommended', as based on the MCA of options discussed in the POAR. In responding to the queries and submissions received concerning Desalination, Irish Water outlined the following advantages and disadvantages:

Advantages of Desalination are:-

- Water availability is not a constraining factor.
- It is a solution which would, given its relative location, account for an area representing two-thirds of the projected water demand.
- It can be modularly expanded in response to emerging water demand, thereby de-risking, to some degree, water demand projection and timing.

Disadvantages of Desalination are:-

- It is a Dublin-centric solution to a water supply problem which affects the Midlands and Eastern Region. In the forecasted demand, one-third of the water would be allocated to those areas of the Midlands which have substandard water supplies, or are abstracting unsustainably from small and vulnerable sources at present.
- It is an energy intensive process, with a high capital and operating cost, and high carbon footprint. This makes it a less environmentally friendly option than the Parteen Basin option.
- Desalination has additional environmental impacts, in terms of disposal of the brine waste product from the Desalination process, construction impacts in the marine environment, and pipeline routing impacts from the Desalination site.
- Operation of Desalination as an auxiliary source or as a supplementary source in drought periods would have significant operational challenges.

One submission received was neither decisively for nor against Desalination, but raised a number of queries concerning the Team's assessment of the option. A meeting was arranged with this stakeholder to discuss all of his concerns and queries, including the level of analysis undertaken on Desalination. The assessment of all options for a new water source for the Eastern and Midlands Region is an open, transparent process as outlined in the OWP, POAR and Final Options Appraisal Report (FOAR). A detailed MCA was carried out for the options considered, with independent experts providing technical, social and environmental reviews of the options. Therefore, all options, including Desalination have been subjected to equal objective investigation, with Desalination and the Parteen Basin option being examined in further detail in the FOAR.

4.2.2 Reservoir Storage

Numerous stakeholders, during the POAR and earlier public consultation periods, proposed various alternative options that included raw water reservoir capacity, with some stakeholders referring to options investigated by the Project Team and others proposing new alternative reservoir storage options. All options proposed by

stakeholders, in submissions and in one-to-one discussions with the Project Team, were reviewed; the results of which are outlined in the following paragraphs.

The MCA revealed that abstraction from Lough Derg, either directly or with raw water storage in the Midlands, would have significant impact on water residence times in Lough Derg in prolonged dry summer conditions, such as occurred in 1995. This impact on Lough Derg was an area of concern for the aquatic ecologists responsible for assessing the options. Many stakeholders also expressed their concern about abstraction from Lough Derg, in submissions and discussions with the Project Team during the Public Open Days and stakeholder meetings. 'Residence time' is a measure of how quickly the flow through a water body provides a turnover of the volume of that water body. Abstraction from Parteen Basin was identified as the Emerging Preferred Option because this would avoid such impacts on lake residence time, as Parteen Basin is situated downstream of Lough Derg. Abstraction from Parteen also provides additional benefits along a more extensive Benefitting Corridor.

The Parteen Basin option would be covered by agreement with ESB, such that the abstraction can be managed within the existing normal operating band on Lough Derg, and with no impact on the statutory minimum flow to the River Shannon downstream of Parteen Weir. Adjustment of water used in generation would be covered in this agreement, to avoid impact on water levels or compensation flows. Minimum statutory flow requirements which are maintained below Parteen weir would also remain unaffected. This has been modelled in the 83 years of historic flow and level record, including the history of power generation, and it has been established that such operation is possible, including in the year 1995, the driest year on record. Consequently no raw water storage is needed for residence time issues, or for management of abstraction in drought conditions.

Treated water would be distributed to locations across the Eastern and Midlands region of the country via an underground pipeline running from Parteen Basin to Dublin. This would provide a reliable and sustainable water supply to current and future domestic, commercial and industrial consumers along the proposed pipeline's route. The reasons why abstraction from the Shannon in the Parteen Basin area has emerged as preferred can be summarised as:

- This option has, by far, the least environmental impact of the three Shannon options which have been under consideration. It is the closest location to the river estuary with all of the water having already flowed through the Shannon to Parteen. By contrast, the Lough Derg abstraction options, either directly or in combination with storage at Garryhinch, involve abstraction much further up-river in Lough Derg, they carry greater risk of environmental impact and the option to store untreated water in the midlands also risks transfer of potentially environmentally damaging alien species such as Asian clams and zebra mussels into other river catchments.
- The pipeline from Parteen has the potential to serve treated water to more Midland locations, towns and communities along the route from Shannon to Dublin than any other option.
- Parteen already includes existing storage regulating assets because of the presence of the hydro-power plant. The proposed abstraction of water is, in essence, an abstraction of water from the hydro-power scheme, utilising existing assets. Abstraction of water from hydroelectric power schemes is commonly employed worldwide to enable environmentally sustainable availability of drinking water.

That emerging preference has been subjected to ongoing modelling and water quality data collection, and Irish Water has taken into account the views of the public and stakeholders collected during the public consultation period. A final preferred option is confirmed, with detailed appraisal of both a Shannon abstraction at Parteen and Desalination, in the FOAR.

4.2.2.1 Garryhinch

While some stakeholders proposed the revisiting of the option of creating a raw water storage area at Garryhinch, the POAR outlines in detail why this option which was taken forward in the OWP is not being brought further in the EIA & Planning Process. The key findings from the options appraisal process are summarised in the following paragraphs.

The proposal to abstract water from the lower Shannon at Parteen, downstream of Lough Derg, and from a manmade storage area located upstream of Ardnacrusha, would allow all water to pass right through Lough Derg, just as it does naturally at present. It would not have the impacts on residence time that abstraction from Lough Derg would have, and it would also leave the flow to the lower Shannon at Parteen Weir unaffected. The quantity of water involved is 2% of the average flow in the river at Parteen. While it is acknowledged that flows will be below average in dry weather, it should be recalled that the abstraction is taken from water stored in the normal operating water level band, rather than from inflow alone. The abstraction would take place in agreement with ESB, so that they reduce their use of water for power generation, in the same measure as water is abstracted for water supply. The water would be effectively taken from water which is currently stored and used for power generation.

The primary water services purpose of the Garryhinch storage facility was to mitigate the impacts on residence time of abstraction from north east Lough Derg in prolonged drought conditions, recognising that this abstraction location offered the shortest pipeline route. However, the modelling results revealed that this fundamental prerequisite would *not* be met by such a storage capacity, at Garryhinch or elsewhere, to a standard that would underpin the sustainability of the option of abstraction from the north east of Lough Derg with seasonal raw water storage. The modelling results also showed that no raw water storage is required to mitigate lake residence time issues at Parteen, because the water passes naturally through the lake towards the abstraction point.

The storage at Garryhinch would have a working volume of 12 million cubic metres, and in prolonged dry weather it would have to be drawn down over a two month period to meet water services requirements. In contrast, the normal operating band in Lough Derg/Parteen Basin has a storage volume of the order of 55 million cubic metres, which is further assisted by natural inflow, even in drought periods.

While some stakeholders suggested reservoir storage as a means of flood alleviation, the storage of raw water for a longer period, up to six months, would require a much larger storage capacity than was proposed for Garryhinch, and the raw water pipeline would remain effectively underused for half the year. The condition and treatability of water held in such storage for long periods of dry weather is also a factor. Delivering raw water over a long distance to a reservoir in the Midlands carries risks of transfer of alien invasive species to other catchments. Moreover, as detailed in Appendix B of the POAR (Volume 2), ground conditions emerging from investigations at the prospective storage site indicate that estimated costs of construction of the storage, and risks of environmental impacts associated with such work, would be significantly increased (over originally anticipated costs / impacts).

Further detailed discussion on flooding is provided in Section 4.4.4. However, it should be noted here that the scale of the recent flooding in Winter 2015/2016 is such that a raw water storage capacity of the order of 12 million cubic metres (as proposed at Garryhinch) would have no significant impact on flood flows. Flood flows experienced in the middle Shannon catchment are of the order of 400 to 500 cubic metres per second (cumecs). Garryhinch represents a matter of hour's storage at such flows even if the pumping and pipeline capacity to move water at such a significant rate were installed. Water supply abstraction at 4 cumecs, about 1% of recent flood flows at Athlone, is not significant in that scale. The area of land which is predicted by modelling to flood between Athlone and Portumna during a 1% Annual Exceedance Probability (AEP) event ('100 year flood') is 88 km^2. The storage area being considered for Garryhinch is approximately 0.2km^2 in area, so there is a considerable disparity in scale, even compared to the middle Shannon floodplain alone.

With regards to the tourism benefits of an Eco-Park discussed by some stakeholders, the storage must be justified, and must meet its' primary water services purposes, with a prospect of being constructed on a suitable site with an acceptable profile of environmental and engineering risk, before any ancillary benefit that might be possible can have any meaning. The technical analysis has concluded that it does not meet these requirements.

Consultation submissions have indicated that, of the three options considered on the Shannon, and without prejudice to the need to fully define the merits of the option, abstraction from Parteen would be preferred over the other two options. With a shorter pipeline distance, pumping raw water into storage at Garryhinch is also not

favoured in terms of meeting Irish Waters' national remit to improve water supplies in an optimum 'benefiting corridor'.

4.2.2.2 Pumped Storage

As discussed previously, water abstraction from Parteen Basin would avoid negative impacts on lake residence time, as it is situated downstream of Lough Derg, and water levels can be controlled without the need for storage. Additionally, the existing water level regulating infrastructure at Parteen Basin obviates the need for additional storage infrastructure. Abstraction of water from hydro-electric power schemes is commonly employed worldwide to enable environmentally sustainable availability of drinking water. The design of the project will maximise use of off-peak electricity.

While there are benefits of renewable electricity generation in a pumped storage hydropower facility which might justify the additional cost of reservoir construction and maintenance, the environmental risks of raw water storage, such as the transfer of alien species, make this a non-preferred option. As discussed further in Section 4.4, Asian clam and zebra mussels are two invasive species which are present in the Shannon catchment, and which can colonise surfaces in engineering infrastructure in dense mats. In all options involving pumping raw water from the Shannon and flushing out a pipeline afterwards, there would be a risk of transferring such invasive species along the pipeline to catchments where they are not currently present.

The responses issued to stakeholders also highlighted the considerable scale of storage capacity required for a pumped storage facility. It was noted that the existing abstraction at Ballymore Eustace on the Liffey is rated at 318 Mld, compared with the proposed demand of 330 Mld for the WSP, and that the whole of the Blessington Reservoir is required to sustain the water abstracted at Ballymore Eustace.

Further detailed discussion on flooding is provided in Section 4.4.4. However, it should be noted here that the flood flows experienced in winter 2015, of the order of 400 cumecs at Athlone and 800-850 cumecs at Parteen, are a vastly larger scale than the proposed WSP abstraction from Parteen Basin, 4 cumecs. Therefore, the diversion of these floodwaters is likely to involve an open channel hydraulics solution rather than a pumped solution due to the considerable pumping power required to move such large volumes of floodwater, compared with the proposed 4 cumec abstraction. The large discrepancy in scale also impacts on the sizing of a pipe required to transport the floodwaters compared with the fractionally smaller WSP abstraction. Also, recent research has indicated that the optimum sites for pumped storage facilities near the River Shannon are located at Newcastle West, Abbeyfeale and in the East Clare area, and the requirement for an independent coastal outfall from such locations, for floodwater from such storage, would be a complication which would rule out feasibility.

4.2.3 Rainwater Harvesting

All suggested options have been considered by the Project Team, and Irish Water welcomes and appreciates the submissions received which explore ways in which rainwater harvesting can be used to support existing sources of supply. Irish Water reiterates that rainwater harvesting can make an important contribution to extend the lifespan of existing water supply systems. However, the need identified for the WSP in the Project Need Report (http://www.watersupplyproject.ie/wp-content/uploads/2015/03/Vol-1_Irish-Water-Needs-Report.pdf) cannot be met by rainwater harvesting alone, as the objective of the WSP is not only to meet projected water demand, but also to diversify climate change risk, existing source risks and bring resilience into existing supplies.

As indicated in previous responses concerning rainwater harvesting, Irish Water supports the promotion of rainwater harvesting in new build designs. However, the installation of such systems in existing properties is less straightforward, where the correct and safe adaption of domestic plumbing systems (whilst possible) is substantial. All retrofit designs to install rainwater harvesting in existing properties would have to ensure that the consumer is safe from a public health perspective, and the implementation of this in practice is challenging.

Over a decade ago, the original Preliminary Design Report on the WSP extensively researched the potential to harvest rainwater, including within the domestic context. It was shown that substantial time and economic

resources are needed to adapt domestic plumbing systems in existing dwellings and promote harvesting designs in new builds, in a manner which is safe from a public health viewpoint.

As discussed further in Section 4.3.2.2, the Government introduced a water conservation grant in 2015 to encourage customers to improve or repair their home's plumbing system or to invest in water saving devices. In addition, Irish Water has recently been granted funding by the CER to trial domestic water savings measures, both behavioural measures and water saving devices, including external water savings devices such as rainwater harvesters in the garden. This trial, which will also utilise domestic metering as a method to appraise the effectiveness of the various devices and technologies, will serve to inform Irish Water and the CER of the merits of demand management devices. If the trial proves successful, Irish Water will apply to the CER for funding to roll out a more comprehensive conservation initiative.

Apart from conservation measures in existing dwellings, Irish Water is also working with national standards authorities and housing stakeholders to improve the inclusion of dual plumbing systems in new build housing stock, which effectively promotes rainwater harvesting, in a manner which is safe for public health.

4.2.4 Greywater Reuse

Irish Water emphasises that it welcomes and considers all suggested options, including greywater reuse. As with rainwater harvesting, greywater reuse designs would have to ensure that the consumer is safe from a public health perspective and there would still be concerns about how the public would implement the technology in practice. Additionally, greywater reuse is not considered a primary source option for the Eastern and Midlands Region but rather an additional source used for augmentation purposes.

Where greywater reuse was promoted by stakeholders in previous consultation periods, Irish Water has highlighted the absence of European standards for greywater reuse, as well as the need for resilience in the augmented system. The driver for the WSP is not just for additional water to meet the growing demand, but also for improved headroom and resilience in the overall water supply system, which is 84% dependent upon the Liffey, and where peak demand in 2013 reached 570 Mld, against available capacity in existing sources in the region of 600-620 Mld. The scale of the requirement is such that the response must be a decisive improvement in water availability, and in the resilience of the water supply overall. Nonetheless greywater reuse, and indeed rainwater harvesting, can contribute in reducing our national demand for potable water, thus improving the overall sustainability of the water sector.

Previously Investigated Alternative Options

As discussed, Irish Water has considered all alternative options with potential to supply the Eastern and Midlands Region, including all suggestions submitted during previous consultation periods, such as the reuse of treated wastewater, recirculated river flow in an environmental flow replacement scheme, and the use of multiple sources. These options were considered at earlier stages in the optioneering process and were re-examined upon receipt of stakeholder submissions. However, the public health and safety concerns and environmental impacts associated with the reuse of treated wastewater and recirculated river flow (owing to effluent discharges to these water bodies) were considered too great. The EPA submission agrees with this position, deeming treated wastewater reuse as not desirable due to high contamination risk. In addition, recirculating the low flow in a river over a prolonged period of time would be a significant intervention in its hydrology, water quality and hydromorphology.

The potential for using multiple sources was also investigated at various stages in the WSP. However, it was found that while many sources, such as groundwater, rainwater and greywater, could be attractive secondary resources supporting local water supply, they are not sustainable primary water sources. Irish Water reiterates that the scale of source needs to align with the scale of water demand, and the need for a sustainable, resilient supply in to the future. The driver for the WSP is not just the need for additional water for growing demand, but also for improved resilience in the overall water supply system. Also, it needs to be recognised that a multiple source approach over decades has brought about a situation where over 850 public water supplies and many more abstraction locations serve 4.6 million people in the Republic, compared to 47 water treatment plants

serving 1.8 million people in Northern Ireland. These smaller isolated water sources are often of low yield, often not associated with higher water quality, and are more vulnerable to pollution.

One submission referred to the work on groundwater and queried why it was solely based on desk studies, but groundwater test drillings have been carried out by others in the Fingal/Meath border area and extending into South Louth. Thirteen test areas were examined and sustainable yields were found to be less than desk study estimates.

4.3 Leakage and Water Conservation

Issues relating to water demand, leakage and conservation were raised in twenty submissions as well as in one-to-one discussions with stakeholders. The Water Services Strategic Plan (WSSP), covering a 25 year planning period, includes an objective to prepare and implement Regional Water Conservation Strategies to drive conservation efforts against measureable targets within the lifetime of the Strategic Plan. A key objective in the 25 year WSSP is to implement national water conservation strategies to significantly reduce leakage levels across the country.

4.3.1 Leakage

Irish Water agrees that leakage is a national problem, and the utility is committed to minimising leakage in tandem with the WSP, rather than instead of futureproofing supplies. Water leakage is an inheritance of 100 years of underinvestment and Irish Water is taking a national approach to tackling this problem. It is Irish Water's intention to achieve the earliest affordable reductions in leakage nationally, reducing leakage levels as quickly and effectively as possible.

Leakage can be partitioned into Customer Side Leakage and Distribution Network Leakage, as discussed in Sections 7 and 8 of the Project Need Report (PNR), respectively. The report (including the three appendices) is available in full on the WSP website (http://www.watersupplyproject.ie/publications/). Irish Water has emphasised its commitment to reducing leakage, as outlined in the WSSP. However, doing so is challenging in light of the required resources, and the maximum reduction that can be realistically achieved in a best case scenario based on current projections would result in a recovery of 48.1 Mld by 2041, as outlined in the Water Demand Review, Appendix C of the PNR.

Guaranteeing a reliable, safe, water supply in the Eastern and Midlands Region will involve a combination of all three elements of water conservation, leakage reduction and new source development. It is necessary to tackle leakage and losses alongside developing a new water source for the Eastern and Midlands Region, it cannot be 'either/or', both parts are necessary. Also, fixing the leakage problem alone is not enough, the supply of water must be maintained, even as we work to make progress on the leakage problem. The availability of a new source of water will not eliminate the need to reduce leakage or promote water conservation. The converse is also true, as the forecasted savings from leakage reduction and water conservation strategies are already factored into the water demand projections for the Eastern and Midlands Region.

The question of 'Need' was fully explored in the PNR published in March 2015. The water demand projections in the PNR assume that significant progress will be made, as it has to be, in curtailing leakage, with the forecasted savings from leakage reduction factored into the water demand projections. It was explained in the PNR that Need covers not just additional water requirement, but also the need to bring resilience to the overall supply position, and to diversify risks, such as 84% of supplies in the Dublin Region Water Supply Area coming from a single water source. This is particularly pertinent as the region continues to expand both in population and infrastructure terms, adding to the demand for a robust and resilient water supply infrastructure.

There is an ongoing water conservation programme of works for the Dublin area, which includes identification and replacement of sub-standard pipes. As a result, Dublin has made significant progress on leakage reduction in recent years. It is intended to lower this leakage level further to recover 32.1Mld by 2026, and 48.1Mld by 2041. This level of leakage reduction over such a short timeframe is very ambitious in technical terms and would require a significant level of asset replacement and funding. It has taken several decades in a regulated

environment for the larger UK water utilities, in comparable conditions of pipeline age and materials, to bring leakage to 25%. The 2012 position in the major UK water utilities is illustrated in the figure below:

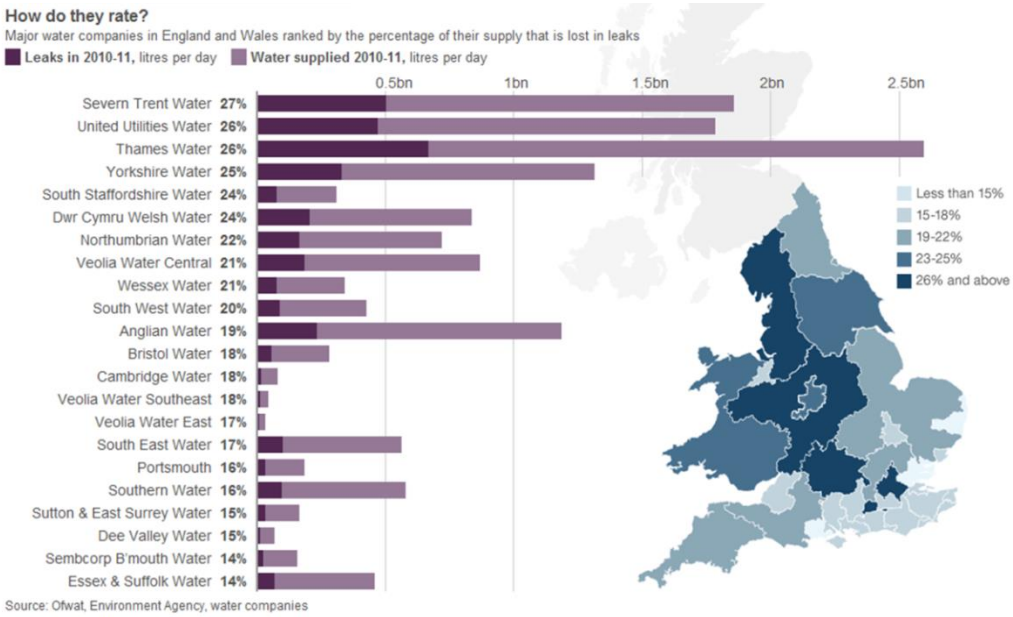


Figure 4.1: UK Leakage Levels

It should be noted that finding and repairing leaks is very expensive with ever lower leakage reductions being achieved (for the same expenditure) over time as the situation improves. Evidence from water main rehabilitation and household-side leakage work over the past decade in Dublin suggests that recovery of 1Mld costs in the order of €0.75m for household leakage and €7m-8m for water main network leakage (due to traffic management, road replacement, etc.). Pressure management, Find and Fix activities, and water main rehabilitation work become progressively more expensive, as leakage levels are reduced.

Irish Water is committed to moving from the traditional approach to leakage, which was relatively passive and reactive, to a proactive approach with the long-term objective of ultimately reducing public and customer side leakage nationally to a Sustainable Economic Level of Leakage (SELL). This is the level of leakage at which it would cost more, in both capital and in social disruption, to make further reductions in leakage than to produce the water from another source. It is the same customer who pays for the combined effort to save water and to supply it from a new source, and neither part of that combination can be permitted to grow disproportionately, as affordability for the customer is a key Irish Water objective.

In summary, Irish Water is obliged to reduce leakage but doing so is challenging in view of the costs and resources available. As outlined in the Water Demand Review, PNR Appendix C (http://www.watersupplyproject.ie/wp-content/uploads/2015/03/Vol-4_Water-Demand-Review.pdf), the maximum reduction that can be realistically achieved in a best case scenario by 2041 is likely to yield 48.1 Mld in recovered water. This reduction has already been assumed and factored into water demand projections for the WSP.

4.3.2 Water Demand and Conservation

4.3.2.1 Water Demand

While perspectives on the need for a new source varied among project stakeholders, extensive independent research has been undertaken on behalf of Irish Water to investigate and predict water demand in the Eastern and Midlands Region.

The sustainable capacity of existing sources serving the Dublin Water Supply Area is estimated at 623 Mld, and demand is currently in the region of 565 Mld. The creation of new households in response to projected population growth will increase that requirement, and there is repressed demand inherent in the current housing shortage. The views of the IDA, expressed in the PNR, show that over 50% of the available spare capacity is likely to be called for in meeting industrial water requirements for foreseeable projects under active development within the next ten years, so that the current position is quite tight. The problems of deploying water to where it is needed in the network, if a source is disrupted, are separately detailed in Section 6.1 of the PNR.

Two-thirds of the calculated water requirement of the Midlands is for the replacement of existing inadequate sources; this has beneficial environmental and service quality results, without any planning implications. The remainder of the projected Midlands demand allocation is a provision for growth, but only in accordance with proper spatial planning and development should it arise. The projected allocation of demand for Dublin is to meet growth requirements, provision of resilience and headroom to enable operation to international standards. While Irish Water is not a planning policy maker, it has a role in supporting approved planning wherever it occurs.

As discussed in Section 4.3, the water demand projections in the PNR include ambitious leakage targets which have been adopted by Irish Water, resulting in a very conservative approach to overall demand. This has resulted in a revision of the projected water requirement from 350 Mld by 2040 to 330 Mld by 2050. As such, the requirement to ensure that only water which is truly needed is sought from a new source has been met.

In response to concerns that abstraction could increase if demand exceeds the projections, Irish Water emphasises that the projected requirement of 330 Mld by 2050 is the requirement on which the proposed abstraction and planning application will be based. If any abstraction in the years after 2050 were to be contemplated by future generations, they would have to embark on a completely new planning application and abstraction agreement to obtain that. The projected water demand is already inclusive of peaking factors for seasonality of water usage. The impact of abstraction up to this maximum figure has recently been assessed in over 80 years of records on Lough Derg/Parteen Basin, and the results of this have been published in the FOAR.

Project Needs Report (PNR)

The PNR was devoted entirely to investigating water demand in the Eastern and Midlands Region, as well as developing projections of future water demand scenarios. The various criteria considered in these calculations (such as population, industrial activity and conservation strategies), as well as the methodology employed and the results obtained are outlined in full in the PNR. Supporting detail on water demand and conservation is also available in the responses to the submissions made on the OWP, and in Appendix A of the OWP, which are available in full on the WSP website (http://www.watersupplyproject.ie/publications/).

The decision by Irish Water to examine the fundamentals of need, and the economic value of sustainable water supplies in Ireland, brought about a detailed demographic review, which has significantly reduced previous population projections. In the PNR and the Water Demand Review Appendix, three water demand scenarios were examined, including changing occupancy on dwellings, and expected reductions in per capita consumption with water charging and improved water conservation. The range of domestic water demand, across the High, Low and Most Likely scenarios is within 10% of overall projected demand. If behavioural change towards lower consumption can be achieved, and Irish Water agrees that this must be a key objective, then the useful life of a Phase 1 scheme can be extended, for the benefit of all.

The demographic projections were developed by specialist planning advisers and demographers, having regard for the legislative planning position and the spatial planning framework in Ireland, and these projections were used to frame the scenarios presented in the Demographics Report. They have also considered, in framing these scenarios, possible impacts of failure to achieve the balanced regional development which is the objective of good spatial planning, but Irish Water must ensure that it can respond to any unfolding position. The WSP is being developed within the planning approach to water services which is set out in the WSSP. The final WSSP was approved by the Minister for Environment, Community and Local Government in October 2015, following

two phases of public consultation, a Strategic Environmental Assessment (SEA) and an Appropriate Assessment (AA).

Domestic water consumption figures have been developed, not only by a rigorous review of population projections, but also by abstracting the most up to date information on per capita consumption, from domestic metering validation data gathered in 2014. The metering programme has informed and reduced estimates of per capita consumption, and international falling trends in industrial water use intensity are also factored into projections. Ambitious targets have been set for water conservation and leakage control, and these may be compared with the utilities in the UK in Appendix A of the OWP.

For the first time in Ireland, non-domestic water requirements have been estimated by an independent economist, using a sectoral analysis of how businesses and industry use water, linked to econometric projections of how each sector will grow (grounded in ESRI work). Their approach is consistent with best practice internationally, and is reflected in guidelines by the UK Water Industry Research (1997), and the UK Water Resource Planning Guidelines (2012)[3]. International trends in declining intensity of water use have been acknowledged, and the alignment of the economist on the issue of the strategic industrial provision is outlined on p56-57 of the Economic Needs Report, PNR Appendix B (http://www.watersupplyproject.ie/wp-content/uploads/2015/03/Vol-3_WSP-Economic-Needs-Report.pdf). Developing existing sources to their sustainable maximum yield has been factored into the projections.

The Project Need investigated in the PNR, such as the domestic and industrial growth scenarios, the need to provide adequate working headroom at existing water treatment plants, climate change, leakage and water conservation, occur at a regional level. The imminent National Planning Framework will deal with matters at a level of detail which could alter the details of the distribution or location of supply or need, but will not alter the high-level strategic considerations that determine the treated water requirement, or pipeline diameters and pumping configurations to deliver it.

Nonetheless, Irish Water has adopted the approach that the elements of water demand should be kept under review as the project moves towards a formal Planning Application. Since the time of drafting the PNR, for example, the number of installed domestic meters have doubled to a figure in excess of 780,000 (as of Q4, 2015), with continuous improvement in knowledge of per capita consumption.

The demographic projections prepared by the demographers, are a view at a point in time, based on guided assessment and use of the available data sources. The work of the independent economists, approaching the issue by correlation of population with measures of growth in the national economy, validated the projections of the demographers, and this increases confidence in their accuracy. These projections will however be reviewed, following the preliminary results of the 2016 Census, prior to making a Planning Application on a preferred option.

4.3.2.2 Water Conservation

Many stakeholders called for increased water conservation measures to reduce water demand. Irish Water agrees with the assertion that water conservation is a vital goal, and has outlined various strategies to minimise water usage among domestic and non-domestic users.

However, it must also be remembered that the objectives of the WSP project are not only to meet water demand, but also to increase the resilience of the water supply system and its sources. The country's ability to attract FDI is dependent on sustainable availability of sufficient water combined with the resilience of that water availability. Planning for a resilient water supply must take place independently of any progress on water conservation or on success in reducing leakage, because loss of a key water source through pollution or degradation of crucial infrastructure remain separate risks to be managed, even as the drive to minimise water demand continues. As discussed, the water conservation and leakage targets in the PNR are consistent with those objectives, and savings in per capita consumption have been included in water demand forecasting. The

[3] Page 6 Economist Report

full details of the calculations used to determine the current and future water needs, including the demographic and economic projections, are provided in the PNR and three associated appendices which are available in full on the WSP website (http://www.watersupplyproject.ie/publications/).

Irish Water encourages water conservation for domestic customers through its “Be Water Smart” initiative, which features guidance on reducing water usage in the kitchen, in the bathroom and in the garden. That work is being implemented in a continuous programme over a number of investment cycles. The Government introduced a water conservation grant in 2015 to encourage customers to improve or repair their home's plumbing system or to invest in water saving devices. This is being administered by The Department of Social Protection and Reform. Irish Water also provides advice and information on how to conserve water in the home on its website www.water.ie.

As discussed in Section 4.2.3, Irish Water has submitted a funding request to the CER under the Innovation Fund to trial water savings measures within the home, including both internal and external behavioural and water saving devices. The request for funding has recently been granted by the CER, and Irish Water is commencing this project at two trial sites. This trial, which will also utilise domestic metering as a method to appraise the effectiveness of the various devices and technologies, will serve to inform Irish Water and the CER of the merits of demand management devices. If this can be demonstrated, Irish Water will apply to the CER for funding to roll out a more comprehensive conservation initiative.

In addition to conservation measures in existing dwellings, Irish Water is working with national standards authorities and other stakeholders and is represented on the relevant Technical Committees, to provide enhanced guidance on national domestic plumbing standards in new build and upgraded housing stock, and will examine incentives for retrofitting in existing dwellings. Irish Water also actively engages with large industrial users on water conservation initiatives. As discussed, the PNR has researched international trends in the intensity of industrial water usage, and has factored improved efficiency in industrial water usage into water demand projections.

Irish Water is committed to social learning through environmental awareness initiatives. For example, Irish Water is the sole sponsor of the Green-Schools Water Theme where, through partnership with An Taisce, they work with over 200,000 students in schools throughout the country, to help them increase awareness of water conservation in their schools and local communities. A recent survey of schools awarded the Green Flag for the Water theme shows that on average they decreased the amount of water consumed by 38%, which translates to 7 litres of water per capita per day (1164 litres of water per capita per school year). This was achieved through actions including increasing user awareness, installation of water displacement devices, rainwater collection, and installing water saving devices.

Since Irish Water has installed water meters across the country, customers are more aware of their water consumption and are alerted to potential leaks in their homes through higher than average water consumption, which is shown on their bills. 780,200 meters have been installed and 36,000 customers have been notified of leaks. One of Irish Water’s priorities is to reduce the amount of water being wasted through leaks. To work towards this, Irish Water has introduced the First Fix Free scheme to support customers in reducing the amount of water being wasted through leaks on their properties. Already, as of March 2016, an estimated 48.5 Mld of customer side leakage has been recovered through this scheme.

Other water conservation projects and programmes include Pressure Management, Watermains Rehabilitation, a new Special Award within the Tidy Towns competition (Irish Water’s Value Water Award) and a partnership with An Taisce’s Clean Coasts Programme. The Irish Water website also has water conservation guidance http://www.water.ie/water-supply/water-conservation/.

4.4 Environment and Fisheries

The environmental issues raised in many submissions are of the utmost importance to Irish Water, and the response to each issue is presented below. Irish Water acknowledges that the WSP must be delivered in an environmentally sensitive manner if it is to meet its core objective of developing a new sustainable water source for the Eastern and Midlands Region. The successful outcome to the planning application and the achievement

of the WSP objectives are dependent on the demonstration of full environmental compliance across all aspects of the proposed scheme.

The identification of a technically viable option has environmental and ecological issues at the forefront of the assessment process and these have been paramount in the option selection criteria and MCA, initially, as part of the short-listing of options (outlined in the OWP) and subsequently in the development of the Emerging Preferred Option in the POAR. As discussed in Section 3.2, two of the four OWP options were discounted in the POAR because of specific environmental / ecological concerns. The option selection criteria and MCA studies have been carried out in conjunction with independent experts in a variety of specific topics, such as environment, fisheries and ecology.

The abstraction of water cannot adversely impact on the Shannon catchment or on the coastal zone of North County Dublin, or be at the expense of any other community. A new abstraction must also be sustainable from environmental, economic and socio-economic perspectives in the short, medium and long term, otherwise it cannot be implemented. These pre-conditions must be satisfied before the project could receive planning approval or be allowed to commence.

Similarly, abstraction from the Shannon could not be proposed if it significantly impacted on the Shannon catchment's aquatic or terrestrial ecology. Extensive environmental investigations are being carried out in relation to potential impacts of the proposed developments on aquatic and terrestrial ecology.

As part of Irish Water's commitment to take all environmental concerns into consideration, we have commissioned one of the largest water quality surveys ever carried out in the State. These surveys are being used to build and calibrate a computer model of Lough Derg and Parteen Basin, which will be an important management tool in protecting the water quality in the lough. These surveys are ongoing and the model is now enabling environmental scientists and others to assess the environmental significance of any impacts. Potential impacts on fisheries are also being assessed and the scoping of these assessments has been agreed with the relevant fisheries bodies.

That model is being used to help define the best options in terms of abstraction location, pumping, treatment and pipeline siting, in the event that a Shannon option emerges as preferred solution. In addition, siting for different infrastructural elements of the project is being selected, from the outset, using constraint mapping, which is predicated on locating infrastructure within its environment where it is least likely to have an impact. These constraints have been consulted upon in the OWP (published in June 2015) and have been applied in the POAR (published in November 2015).

The Final Preferred Option will be subject to an EIS and consultation has commenced on the scope of that. Any project which fails to fully take into account the requirements of Irish and European environmental legislation and legitimate environmental concerns of the Shannon catchment population and businesses would be compromised and would not be successful in seeking planning permission from An Bord Pleanála.

4.4.1 Environment and Ecology

As discussed in detail in Section 4.2.2, abstraction of water at Parteen Basin is already highly regulated because of the presence of the Ardnacrusha hydropower plant. Water levels on Lough Derg and Parteen Basin will be managed within the same water level 'normal operating band' as currently applies. By abstracting at Parteen rather than at a location in the north east of Lough Derg, the water will already have passed through the lake, contributing to 'turn over' of the lake water, in the same way as it naturally does at present. Therefore the residence time of water, which is important for the Lough Derg ecosystem, will remain unaffected.

The location of the facility for abstracting and treating the water is close to the mouth of the River Shannon. This limits any impacts upstream and avoidance of the need for separate storage, as is the case with North East Lough Derg options, and it also reduces the possibility of introducing invasive species into other rivers. Impacts on assimilative capacity would be minimised by abstraction near the most downstream point in the Shannon system, close to the tidal limit. This is accompanied by a regulation regime where abstraction is compensated

for by reduced volumes applied to power generation, whilst guaranteeing the statutory compensation water flows on the Shannon below Parteen Weir.

Irish Water recognises that many fish, bird and mammal species depend on the health of the ecosystem of Lough Derg, and that the presence of invasive species can itself bring about change in that system. The Shannon options have been assessed in the POAR in the context of possible change in the ecosystem of Lough Derg/Parteen Basin due to the possible extension of invasive species, and on risks of transferring invasive species.

The Project Team is consulting closely with environmental stakeholders and specialists expert in the topics of biodiversity, ecology, and invasive species. Irish Water is supporting independent research on invasive species propagation in Lough Derg. Protocols against spreading these species are in place for survey work, and propagation risks have been taken into account in options appraisal. Extensive environmental investigations are being carried out in relation to potential impacts of the proposed developments on aquatic and terrestrial ecology, and the POAR has taken a very responsible and precautionary position with respect to biodiversity.

Asian clam and zebra mussels are two invasive species which are present in the Shannon catchment, and which can colonise surfaces in engineering infrastructure in dense mats. Where concerns regarding the transfer of invasive species were raised in previous consultation periods, Irish Water outlined that all options involving pumping raw water from the Shannon would bring a risk of transfer of invasive species present in Lough Ree and Lough Derg along the pipeline, to catchments where they are not present. There would also be a risk of extensive growths within a raw water pipeline, and the effects of prolonged periods of no, or low flow, on possible die off and tainting of water, are unknown. The position of the Project Team is that the risk of transfer of alien invasive species is most effectively and decisively managed by water treatment at source, and the POAR adopted this position. Treatment of water near the source is the only sure way of avoiding transfer to catchments which are not currently impacted, and avoiding fouling and roughening of the pipeline.

4.4.1.1 Water Framework Directive (WFD)

Irish Water stresses that the WSP has from the beginning been developed in line with the requirements of the WFD and has followed an integrated water management approach. Demonstrating this compliance will be a key component in the planning application to An Bord Pleanála.

Water quality surveys, lake bathymetry surveys and hydrodynamic modelling are being carried out on a very extensive scale. The Project Team is actively engaging in extensive environmental surveys as well as ongoing consultation with environmental stakeholders and specialists to ensure that the project will comply in full with the WFD. The final non-statutory public consultation period prior to the submission of the planning application to An Bord Pleanála focuses on the findings of the FOAR, which identifies the final preferred option for a new water source, and the EIS Scoping Report, which outlines the proposed EIS Scoping methodology. The launch date for the consultation period, and the publication of the FOAR and EIS Scoping Report, is November 8th, 2016.

Project work to date has included consultation with stakeholders in the upper, middle and lower sections of the Shannon catchment, and with statutory and NGO bodies whose interests cover the whole catchment, and the EPA have been consulted on it. The options appraisal process has involved these stakeholders in the decision making process, on abstraction location, on the protection of flows through sensitive water bodies and on the management of water levels in the Lough Derg and Parteen area. A project specific WFD Assessment will also be carried out on the Project.

The options appraisal process has considered ‘whole catchment’ issues on the Shannon, the Barrow, the Liffey, and in groundwater appraisal throughout these catchments, and in the Boyne catchment. The WSP proposal also has complementary wastewater management measures including the Greater Dublin Drainage project (http://www.greaterdublindrainage.com) and the Ringsend Wastewater Treatment Plant Upgrade (http://www.water.ie/about-us/project-and-plans/projects/ringsend/), and it is designed, inter alia, to relieve existing abstraction stresses on smaller Midlands sources, in accordance with WFD objectives.

Irish Water acknowledges that work by others under the WFD is proceeding simultaneously with the WSP, and the Project Team is in regular consultation with the EPA and the DHPCLG, on the progress of work of river basin management planning under the WFD, including water status, review of the first cycle River Basin Management Plans (RBMPs), catchment characterisation, definition of environmental objectives and Environmental Quality Standards (EQS's), protected areas, Artificial Water Bodies (AWBs) and Heavily Modified Water Bodies (HMWBs), and programmes of measures. Irish Water has taken their views on the WSP methodology and approach into account, and is ensuring that WSP planning aligns with national planning under the WFD.

The Project Team is in regular consultation with the key environmental authorities and organisations, including the DHPLG (and previously DECLG), EPA, NPWS, IFI, ESB and environmental NGOs active on Lough Derg to ensure that the plans are in line with all existing and likely future environmental legislation. Irish Water is also keeping the Local Government Water and Community Office (LAWCO) and the Water Policy Advisory Committee (WPAC) informed of the development of planning work on the WSP project.

Irish Water is actively investigating the potential benefits of drawing key data on the Shannon system to a single location in the Parteen area as a potential community gain project, in consultation with environmental groups on Lough Derg, and with the governance structure established for implementation of the WFD in Ireland. The cooperation of many stakeholders will be needed, but the prospect of a real-time River Shannon data depository at such a location, where any person can come and inspect it or gain online access to it, along with facilitating aquatic ecosystem scientific research on Lough Derg, would be a substantial contribution to the management of the water body under the WFD. The Project Team has discussed the prospect of transparent data availability with ESB and Waterways Ireland. The recent bathymetry survey of Lough Derg/Parteen undertaken as part of the WSP has assisted in this work and has been widely shared with environmental agencies and NGOs.

4.4.1.2 Environmental Impacts of Alternative Storage Options

As discussed in Section 4.2.2, it was found that reservoir storage is not necessary for the Emerging Preferred Option, as modelling results have shown that raw water storage is not required to mitigate lake residence time issues at Parteen because the water passes naturally through the lake towards the abstraction point, just as it does at present. Therefore, the provision of storage capacity was shown to be not required and would have disadvantages from both siting and environmental perspectives.

4.4.2 River Shannon Water Levels

In response to stakeholder concerns that River Shannon water levels could be lowered as a result of the proposal, Irish Water emphasises at the outset that it does not require, or seek, any change in the operating regime of Lough Allen, Lough Ree, or indeed Lough Derg.

Irish Water reiterates that abstraction from Lough Derg would be within the normal operating range that currently applies under ESB management of water levels on the lake. This 460mm (18 inch) band, which has been operated since the late 1970's, represents the stored water which is managed for power generation, and ESB control water level within this range, across a wide range of flow conditions. This operating band is necessary for the safety of the engineering embankments in the Parteen/Ardnacrusha area. The Parteen Basin proposal will not change the limits of this minimum operating band, other than to respect operating restrictions within this band that may be required by ESB, and Irish Water will operate within these requirements.

This would be part of any abstraction agreement with ESB, which would include a reduction in water used for power generation, matching in volume the water proposed for abstraction. ESB will be compensated by agreement, for the power generation foregone, by the abstraction of water upstream of the power station. This is already well established practice at Pollaphuca and Leixlip on the Liffey, and at Inniscarra on the Lee, and the power compensation cost is a transparent part of water cost at all three sites. There are ongoing discussions with ESB on the terms of an agreement to abstract from the Shannon at Parteen, and the detail of commercial terms have not yet been finalised.

ESB has accepted that the abstraction can be managed within the normal operating band, based on the results of extensive modelling of historic water level records and ESB generation history, to replicate the presence of the proposed abstraction in parallel with the ESB abstraction. The Project Team has analysed these models of more than 80 years of historic record, and in particular the driest year of 1995, and have found that water abstraction for the WSP can operate within the normal range. ESB has accepted this position. At times of no power generation in summer, continued abstraction for potable water, drawing upon but within the confines of the normal operating band, has been demonstrated to be sustainable.

In response to concerns expressed that abstraction from Parteen Basin could increase over time if water demand increases, it is emphasised that abstraction is proposed at a rate of approximately 2% of mean annual flow, and it would be managed within the same water level operating band as currently exists with any additional restrictions required by ESB. The statutory compensation water of 10 cumecs spilled from Parteen Weir into the Old Shannon will remain unchanged and undiminished under this proposal. Navigation and tourism will experience the same operating water level range as normal.

The projected water requirement of 330 Mld (which is equivalent to approximately 4 cumecs), already includes a peaking factor to allow for water requirements in a peak week of the year. Therefore, there is no risk that dry weather will exert an unforeseen additional impact as it is already factored into the water demand projections. The abstraction quantity needs to be agreed between Irish Water, ESB and Waterways Ireland, and approved by the Minister for Housing, Planning, Community and Local Government. This quantity will be the maximum upper limit on abstraction; an entirely new planning process would be required by a future generation to increase that limit, and it would have to acknowledge the baseline conditions at the time.

Some stakeholders have taken issue with the representation of the abstraction as a small percentage of average flow, pointing out that it would be a much higher percentage of low flows. However, the actual position is that abstraction would be taken from the water stored between the limits of the normal operating water level band, and not directly from the inflow.

4.4.2.1 Water Level Management Options

It has been shown that water abstraction from Parteen can be effectively managed within the existing normal operating range for electricity generation, thus negating the need for additional control structures. In the view of the Project Team, the provision of additional storage capacity would not bring environmental benefits and could not be justified.

As discussed in detail in Section 4.2.2, storing raw water for a longer period in order to control flood water levels would require a much larger raw water storage capacity than was proposed for Garryhinch (which was sized for water supply solely). Also the raw water pipeline would remain effectively underused for half the year as the seasonal difference in water levels is considerable. The storage of water for long periods of dry weather also introduces water quality and treatability issues.

The option of constructing a weir to maintain the recognised minimum water levels along the Shannon was raised in one of the submissions received. In responding to this stakeholder, the Project Team reiterated that there will not be water level or flow impacts along the entire Shannon, not merely as a matter of opinion of Irish Water, but because of the channel hydraulics.

The River Shannon has five distinct sections:

- Source to Lough Allen outlet
- Lough Allen to Lough Ree outlet
- Lough Ree to Meelick Weir
- Meelick Weir to Parteen Weir and Ardnacrusha
- Parteen Weir and Ardnacrusha to the mouth of the Shannon

The ‘stepped’ profile of the weirs and locks means that in low and medium flows, these define distinct and separate management reaches. In low and medium flows, when a section of free flow over a weir exists at each weir, water level at all points upstream cannot physically be influenced by water level downstream. This is the case at Meelick, for example, where it is not physically possible for water levels in Lough Derg, in low and medium flows, to influence water levels upstream of Meelick. In floods, however, as weirs become drowned, sections of ‘critical hydraulic flow’ become drowned out, the different sections of the river interact hydraulically, and Parteen becomes the effective hydraulic control in floods. Water levels downstream of a section of ‘critical hydraulic flow’ cannot affect flow or level conditions upstream of that. Therefore, it is not physically possible to design a weir at Parteen to influence water levels upstream of Meelick, during low to medium flows.

4.4.3 Fisheries

The preservation of angling along the Shannon emerged as one of the key concerns of stakeholders throughout the public consultation period, in stakeholder meetings and public Open Days as well as in eight of the submissions received. To permit the appraisal of the proposed abstraction in light of the WFD, one of the largest water quality survey contracts commissioned on a large water body in Ireland is currently operating on Lough Derg and in Parteen Basin, and data from that survey is informing the development of a hydrodynamic model which will define the expected impacts of abstraction for water supply and ecological water quality.

Loss of spawning ground is not expected where the existing normal operation band of water level will remain unchanged and where power generation curtailment is proposed to offset water abstraction, and it is proposed to maintain the old Shannon statutory compensation water flow undiminished.

Irish Water has been in discussions with the DHPLG (and previously DECLG), NPWS, IFI and various angling bodies on fish stock surveys in the Lower Shannon and fish connectivity in the Parteen area. Irish Water is contributing towards the cost of important fish stock surveys in the lower Shannon, to be undertaken in cooperation with IFI.

Irish Water has engaged an internationally respected fisheries specialist to advise on fisheries issues relevant to the development of the project and to engage effectively with anglers, IFI, ESB, and all other relevant stakeholders. Irish Water has taken this measure in an effort to ensure that any abstraction does not impede on stakeholder activity.

4.4.4 Flooding

It should be noted that flooding issues have been raised in public consultations as far back as the SEA stage (2007-2011), before the extreme flooding events in 2009 and 2015. It arose frequently in stakeholder consultations, particularly during the most recent POAR consultation period. All stakeholder suggestions, including the incorporation of water storage to minimise flood risk as well as supply water, have been considered in detail by the Project Team. A number of options investigated by the team included reservoir storage as well as the potential to transfer flood water into the existing Liffey reservoirs. The Project Team examined and reported on in the Options Working Paper (OWP, published in June 2015) the option to maintain high water levels in Pollaphuca by preferential winter supplies from the Shannon, drawing higher summer abstractions on Pollaphuca. However, this option was not recommended as the increased flood risk in the Liffey was found to be a major constraint.

The WSP infrastructure would be optimally sized, to treat and deliver 330 Mld (approximately 4 cumecs). Limiting this water abstraction is itself an important factor for many stakeholders who have sought assurances on the control of water levels at Parteen. Two abstraction rates (a summer abstraction for water supply and a winter abstraction for water supply and flood risk reduction) would be technically very difficult to achieve. The pipeline diameter and the pumping power required are optimised according to the required abstraction rate. Therefore, if the abstraction rate changes considerably, the pipeline diameter and the pump size are no longer optimal, creating challenges in transporting the water. The pump would need to operate at very different duty points, thus increasing the strain on the machine and considerably increasing the energy requirements and associated carbon footprint for pumping. In our view, this would compromise the fundamental objective of a new water supply without achieving any significant benefit for the alleviation of flooding. In conclusion, from both

technical and energy perspectives, it is a major operational problem to operate a pumping system and pipeline that is sized for a flow rate of 4 cumecs in conditions of considerably higher flood flows.

The difficulty is that the scale of the two issues, in hydrological terms, is so widely different. Therefore, it is extremely difficult to develop a single hybrid solution across such a scale that would be effective in achieving both objectives (water supply and flood reduction); a hybrid solution would risk the effectiveness of achieving either objective.

Flooding on the Shannon occurs not only downriver from Parteen Weir, but also extensively in the Shannon Callows floodplain, in areas upstream of Lough Ree and in areas in the upper tributaries, as is evident from the experience of Carrick on Shannon and Ballinasloe over the past winter (2015).

The rate of flow of 4 cumecs is not significant within the flood flows of circa 400 cumecs at Athlone in December 2015, and circa 800-850 cumecs at Parteen, and indeed a higher variable flow rate of perhaps 10 cumecs, would also not be significant relevant to the manner in which flood flows in Lough Ree, the middle Shannon and Lough Derg behave. Such a marginal reduction in flow would not result in a significant reduction in flood water level, given the constraints on flood flows on the Shannon.

Extracting a flow of the order of 10 cumecs directly from Lough Ree does not necessarily mean the flow downstream of Lough Ree will reduce by 10 cumecs, because it would be extracted from storage, and the effect on the flood peak depends on the overall attenuation through that storage. The flow between Lough Ree and Meelick also receives large inputs from major tributaries and is controlled by the water levels in Lough Ree and the water levels in Meelick. No benefits would accrue in the Carrick on Shannon area, as flows upstream of Lough Ree are controlled by water levels at Termonbarry.

In the exact same way, extracting say 20 cumecs directly from Parteen Basin would not necessarily mean the flow downstream of Parteen Basin will reduce by 20 cumecs. The flow between Parteen and Limerick also receives large direct inputs from the Mulkear River. No benefits from such an approach would accrue in the Shannon Callows or Lough Ree, and points upstream.

4.4.4.1 Flood Management Options

As part of the Shannon Catchment Flood Risk Assessment and Management Study (CFRAMS), the use of Lough Ree for storage during a flood event was considered, and modelled. Modelling showed that while Lough Ree might be operated to provide additional storage at the start of a flood event, this storage was used up in the rising flood hydrograph, and at the peak of the event this had the impact of increasing water levels downstream during the peak.

It should also be appreciated that the scale of the recent flooding is such that a raw water storage capacity of the order of 12 million cubic metres would have no significant impact on flood flows. Flood flows experienced in the middle Shannon catchment are of the order of 400 to 500 cumecs, so WSP abstraction at 4 cumecs, about 1% of recent flood flows at Athlone, is not significant in that scale. The area of land which is predicted by modelling to flood between Athlone and Portumna during a 1% AEP event (‘100 year flood ’) is 88 km^2. The storage area being considered for Garryhinch is approximately 0.2km^2 in area, which represents just a matter of hours storage at such flows even if the pumping and pipeline capacity to move water at such a significant rate were installed. Therefore, there is a considerable disparity in scale, even compared to the middle Shannon floodplain alone.

A hybrid approach whereby water would be raised in a pumped storage hydropower project, with a possible independent outlet at times of flooding, was suggested by some stakeholders. This would require an independent coastal outfall for floodwater from such storage, which would be an additional requirement that would rule out feasibility.

Some stakeholders queried if flood flows could be transferred in the proposed potable water pipeline as part of the Parteen Basin option. However, the transfer of contaminated floodwaters through a pipeline designed to

carry disinfected potable water, involves a complete change of function, which would be highly disruptive in the water supply system itself. This would also introduce great uncertainty and inefficiencies in the pipeline sizing.

The use of the WSP pipeline during flood events to bypass the treatment facilities at Peamount and transport raw floodwaters along the treated water pipe network, and beyond the proposed Termination Point Reservoir at Peamount, to the coast is greatly challenging for a number of reasons:

- The distribution network from the proposed Termination Point Reservoir at Peamount is not configured for an outfall of any kind.
- Installed pumping capacity for transporting large volumes of floodwater would not otherwise exist or be required for normal water supply use, and pipeline overpressure would have to take place if delivering multiples of the design flows for water supply.
- Contaminating a treated water pipeline downstream of a WTP with raw floodwaters would require a considerable follow-up sterilisation and recommissioning operation on each occasion, during which time the water supply would be heavily disrupted, and its integrity compromised.

A separate gravitational pipeline bypassing the proposed Termination Point Reservoir at Peamount in west Dublin, routed through a congested urban area would be required. This pipeline would need to be capable of carrying a larger flood flow rate (of the order of one hundred times the WSP flow rate) to a point of outfall not itself impacting flooding locally, and operating only intermittently, would be required but could not be reasonably justified.

Attempting to size the pipeline and pumping plant for both duties would not succeed, because the age of (disinfected) water within a pipeline of diameter suitable for transferring some floodwaters, would not be acceptable. The pumping duty range would be too wide and the pressures generated within a pipeline in flood flows, compared to potable water duty, would be excessive.

The movement of, or diversion of, a significant fraction of floodwaters of the order of 600 to 800 cumecs, is likely to involve an open channel hydraulics solution rather than a pumped solution, simply because of the disparate scale of water to be handled, compared to the pump and pressure conduit technology likely to be required.

4.5 Tourism and Amenity

A number of stakeholders discussed the importance of tourism and amenity to communities along the River Shannon and its lakes in submissions as well as in the stakeholder meetings and Open Days. Irish Water recognises the importance of tourism in the Lough Derg area. It is proposed to address this at its most fundamental level, through designing any option which might be based on the lower Shannon, to operate within the same water level range as currently applies on Lough Derg and in Parteen Basin, by agreement with ESB.

As outlined in responses issued to submissions on tourism and amenity in previous consultation periods, Irish Water favours the transparent availability of real time data on water levels and flow rates at any abstraction point, so that any concerns in this area can be allayed. Any abstraction option in the lower Shannon would be designed to harmonise with tourism development plans for the region, which Irish Water would wish to support. The water demands of the tourism sector in the Eastern and Midlands Region have been included in the projected requirement and are detailed in Section 6.2.1 of the PNR.

A sustainable abstraction could only involve water which is not required for local use, either for drinking purposes or for angling, navigation, tourism or agricultural purposes. The abstraction of water cannot adversely impact on the Shannon catchment or be at the expense of tourism development in the area of any other community. It must also be sustainable from an environmental, economic and socio-economic perspective in the short, medium and long term, otherwise it cannot be implemented. These pre-conditions must be satisfied before the project could receive planning approval or be allowed to commence.

One stakeholder favoured storage at Garryhinch, based on the potential tourism and amenity benefits of an Eco-Park. With respect to any engineered storage of large volumes of raw water, Irish Water stresses the

importance of determining that such facilities can meet their primary water supply objectives, that they can be properly sited with respect to engineering and environmental risks, and that they are an effective component part of a sustainable option. These design priorities have been investigated, for the option involving raw water storage, and have been considered in the options appraisal.

While the potential benefits of raw water storage at Garryhinch for complementary tourism development are acknowledged in concept, it must be recognised that the primary environmental and water services purpose of a raw water storage capacity must first be achieved; that is to effectively improve the water residence time impacts of abstraction on Lough Derg in prolonged drought conditions. The POAR and the modelling work to date indicate that this fundamental prerequisite would not be met by such a storage capacity at Garryhinch or elsewhere.

There are other site-specific technical, operational and environmental risk reasons, set out in the POAR, why raw water storage is not recommended, consequently there is no recommended core raw water storage element around which tourism related benefits can develop.

4.6 Communities / Benefiting Corridor

4.6.1 Community Gain

Irish Water has reviewed and taken on board each and every submission and query made relating to community gain, in the POAR as well as earlier public consultation periods. The opinions and advice offered in POAR submissions have been incorporated into the development of the FOAR, including the progressing of the community gain proposals.

Community gain aims to provide lasting benefits to communities and/or the surrounding environments of large infrastructure projects, such as the WSP. Community gain seeks to redress any imbalance and perceived losses incurred by a community where a major infrastructure project, such as the WSP, is proposed for its locality. While compensation addresses ‘direct & measureable ‘losses’, such as the compensation of landowners for wayleaves on their land, community gain can take many forms including financial assistance for projects or initiatives, new or improved community amenities, education, volunteering and benefit-in-kind-donations and social clauses.

As the WSP is a Strategic Infrastructure Development, the planning process and legislation requires that due consideration of community gain is undertaken by the Project Team. Community gain was introduced into the Planning & Development Acts (Strategic Development) in 2006, which applies to Irish Water in relation to attaining planning consent for the WSP from An Bord Pleanála.

In progressing a Planning Application under the Strategic Infrastructure Act, An Bord Pleanála, should they decide to grant permission, may specify conditions that provide for community gain. As part of its planning application, Irish Water would request An Bord Pleanála to include a Community Gain Fund as a planning condition attached to any planning permission.

Irish Water would therefore propose to fund community gain initiatives through a Community Gain Fund, as based on best international practice for projects in rail and highways, renewable energy, energy transmission and waste management. It is anticipated that the fund would be managed by Trustees drawn from a wide range of representative stakeholder groupings and administered, for example, by relevant Local Authorities. A typical Community Gain Fund could involve:

- A ‘Once-Off’ Lump-Sum payment (normally based on a percentage of the Capital Expenditure)
- A ‘Variable’ Annual Payment based on some measureable variable component of the scheme e.g. a payment could be linked to water throughput (this would probably be more appropriate to an inland surface water source, than for desalination)

The disbursement of the initial once-off lump sum (and disbursement in future years) would normally be targeted at a number of specific ‘community related’ areas or projects, such as tourism, environmental projects,

training & education or sport and leisure. The trustees of the fund will decide on projects for implementation based on a number of qualifying criteria.

4.6.2 Water Allocation in the Benefitting Corridor

Stakeholder opinions on water demand and the proposed water supply to the counties along the Benefitting Corridor varied in the submissions received. As with stakeholder feedback received on all themes, the views expressed in all submissions were reviewed and responded to by the Project Team, and the feedback was incorporated in the project development.

The provision of adequate water supplies to communities in the Midlands is as much a priority for Irish Water, as it is for every region in the State and the sharing of resilient, reliable water supplies in the Benefiting Corridor and upgrading of many existing supplies is an important part of this project. In discussions with the EPA, the importance which they attach to this approach to small Midland water supplies was strongly emphasised.

The WSP preferred scheme, with abstraction from the Shannon at Parteen, and a transfer pipeline which brings treated water close to many communities across the Midlands, defines a Benefitting Corridor. Irish Water has reviewed more than 100 water supply schemes in the region which can benefit from the WSP, and considers that these can be consolidated to fewer schemes, using the best of the existing sources up to their sustainable yields, supported by treated water from the WSP to cover future water requirements beyond that point. In the development of the National Water Resources Plan Irish Water will target a rationalised approach towards fewer schemes based on larger and more sustainable sources to provide reliability of service, network resilience and value for money to our customers, This approach will optimise the resources available, including consideration of sustainable catchment transfers, where necessary, for adequacy and security of service. The Interim Midlands and GDA Water Resource Plan is presented in Appendix A of the FOAR.

Benefitting Corridor Demand and Source Consolidation

The spatial planning of the Eastern and Midlands Region, including the Benefitting Corridor, will take place under national and regional planning policy and the consideration of flood risk and sustainable transport planning are part of that process. The WSP makes provision for the water requirements of development of settlements in the Benefiting Corridor, but that is subject, in its detail, to proper planning and sustainable development requirements.

In addition to making provision for the Greater Dublin Area (GDA), the project provides opportunities to supply water to support the development, and prioritisation, of areas that have already been identified for growth in each of the County Development Plans, as well as the Regional Planning Guidelines - through the Benefitting Corridor routed between a new water source in the west and the GDA.

The methodology adopted for the project entailed a review of relevant spatial plans as set out in the applicable Regional and County Development Plans. Towns and villages in the Benefitting Corridor that have already been identified as being suitable for further growth in the relevant spatial plans, were assessed in terms of their proximity to the proposed pipeline corridor. Any new supplies will be decided with reference to the spatial plans for the areas, including the new National Planning Framework which is expected for publication by the Government in Q4 2016/Q1 2017 to revise the National Spatial Strategy.

Ireland has over 850 water treatment plants, serving 4.6m people, compared to less than 50 in Northern Ireland, serving 1.8m people, and 297 in Scotland, serving 5.2m people. Many of these water treatment plants and supply schemes, throughout the country, operate in effective isolation, with little supporting connectivity which would maintain supplies around disruption of a source, or treatment plant, or key section of trunk main. Our dispersed, isolated sources and treatment plants are a legacy of planning at county level and consolidation to achieve consistently high standards and benefits of scale are now needed.

Irish Water aims to consolidate existing smaller water sources of unreliable yield, or elevated vulnerability to pollution, or low linkage and resilience, to achieve nationally uniform standards of service from consolidated, efficient water treatment plants and resilient distribution systems.

4.7 Engineering and Planning

Many of the submissions received referred to the engineering and/or planning stages for the WSP. All advice offered in these submissions, public open days, and stakeholder meetings, was considered by the Project Team in developing the Preferred Option as part of the FOAR. All responses issued to stakeholders interested in engineering and planning themes reiterated the status of the project in terms of the overall Project Plan. The POAR focused on moving from four options to an emerging preference for a source and abstraction area, and an associated proposed pipeline route to transport the water from this source to the areas of demand, along a 2km wide 'least constrained corridor'. The FOAR identified the Parteen Basin option as the Final Preferred Option for water supply.

4.7.1 Engineering

In line with guidance and advice provided in the submissions received and in discussions with stakeholders at meetings and public Open Days, the final chosen pipeline route and infrastructure design has taken due cognisance of all known constraints, including disruption to traffic, interacting with existing and proposed new transport and utilities infrastructure, and environmental issues during the construction and operation of the proposed development. The engineering design will incorporate appropriate mitigation measures to minimise any potential impacts on the natural and built environment, and will include risk assessments, traffic management plans, and an EIS.

As outlined in responses issued to submissions made in earlier consultation periods, structural integrity is an essential component of pipe material selection, including potential for leakage control. Consequently, the chosen pipe material will give appropriate weight to the highest measures of quality controls and technologies available and which have a demonstrable track record of performance. With regards to Engineering Operation & Maintenance, it is Irish Water's view that all water infrastructure will require effective planned linkage. A national perspective is necessary to build resilient networks.

The proposed Termination Point Reservoir for the Parteen Basin option will have a capacity of approximately 150 million litres, and will be integrated with the existing potable water network at Peamount. The location and elevation of the reservoir, together with the planning implications, are issues which are under development as part of the preparation of the WSP design.

4.7.2 Planning

In response to the view expressed in some submissions that it would be better to locate more industry near water sources rather than finding new supplies for urban areas, Irish Water reiterates that water supply, while essential for industrial development, is not the only determining factor in decisions on locating industry. Other key factors in planning policies include wastewater treatment capacity, transportation links, broadband, resilient utilities, and the availability of a skilled labour pool with supporting local facilities like schools.

Irish Water does not form national policy in this, or any other area of planning and development; it endeavours to ensure that water supply and wastewater services are not limiting factors on properly approved development anywhere in the country. As discussed in Section 4.3.2, the demographic scenarios examined by the Project Team in the PNR covered a wide range of scenarios of economic and regional development. Irish Water will ensure water supplies are available to sustain proper planning and development in accordance with national spatial planning policy and actual unfolding development. The utility will also ensure that demand for water supply, and for corresponding wastewater treatment capacity, will be met in good time and in accordance with the objectives of the WSSP.

As discussed in Section 4.3.2, an independent economic evaluation of the likely future deficiency in water supply infrastructure to meet the residential, industrial and commercial requirements of the Irish economy has been carried out, with particular reference to the economic need for water in the Eastern and Midlands Region. This assessment included new independent estimates of the demand for water over the planning period, based on new empirical findings, as well as detailed econometric and other modelling of water demand, in line with best international practice, which had not been undertaken previously in Ireland. This research estimated that

the cost of even a one day disruption for the Greater Dublin Area would likely to be in excess of €78 million. There are also very significant negative employment impacts if adequate water supply is not available to meet the needs of indigenous and overseas businesses.

The WSSP, a strategy for the next 25 years, is a holistic strategy between water supply and wastewater treatment, overarched by a WFD approach to protecting source water quality, ecology and morphology. This aligns with the views of many stakeholders, who in both submissions to and one-to-one discussions with the Project Team outlined the importance of integrating the WFD as well as national planning policies in the planning process for the WSP.

While any increased need for wastewater services depends on population and industry growth, and is independent of the decision about which WSP source is developed, Irish Water is overseeing the planning of all water and wastewater projects and is ensuring that wastewater management planning and infrastructure development will keep pace with the water supply increase. The Greater Dublin Drainage (GDD) project (http://www.greaterdublindrainage.com/), the Ringsend Wastewater Treatment Plant (WWTP) Upgrade (http://www.water.ie/about-us/project-and-plans/projects/ringsend/) and the WSP are a collective entity.

With regards to the Midlands, two-thirds of the WSP demand is estimated to arise from the replacement of inadequate sources; the replacement of one water source with another does not in itself give rise to additional wastewater. Nonetheless, Irish Water will keep the wastewater requirements of each community in the Midlands under review with commitment to maintain adequate treatment capacity.

Some submissions expressed the view that a single water body should be charged with managing the River Shannon and its lakes, including the control of water abstraction. At the outset, Irish Water emphasises that the engineering and planning processes for the WSP are being undertaken in close coordination and consultation with key environmental and planning authorities, government bodies and representatives, national and regional stakeholder groups, and members of the public. The WSP planning process is therefore integrated with the various key national and regional planning activities. Irish Water is cognisant of the pending changes and is undergoing extensive consultation to ensure that the WSP is developed in tandem with these changes.

It is important to note also that the success of a planning application relies on robust demand projections so Irish Water has adopted the approach that the elements of water demand should be kept under review as the project moves towards a formal Planning Application. This will include a review following the release of Census 2016 figures and following further feedback from the metering programme. There are difficulties associated with adopting a design horizon 60 years hence, in that the reliability of demographic projections, or of econometric modelling of non-domestic requirements, or of climate change pressures, declines as the horizon moves beyond 35 years. The technical options which may be available at 2050 to extend the life of assets also need to be given fair appraisal at that time.

One submission criticised the approach to consolidation of existing small schemes relying on vulnerable sources of low yield, but the EPA has emphasized the importance of this approach. This rationalised approach towards fewer schemes based on larger and more sustainable sources will provide reliability of service, network resilience and value for money and will involve network interconnections between existing schemes to tie existing networks into adjacent sources being retained, supported by connections from the treated water transfer pipeline.

4.7.3 Engineering and Planning of Alternative Options

A multitude of options have been considered in the development of the WSP, including all options suggested by stakeholders. The various reasons why Parteen Basin has been identified as the Emerging Preferred Option have been discussed in detail in the POAR, together with the reasons why alternative options were deemed not feasible. In addition to fewer environmental and economic impacts, the Parteen Basin also has greater benefits for national planning than alternative options, as it supports the development of areas throughout the Benefitting Corridor as well as the Greater Dublin Area.

The WSP planning process has focused on the areas throughout the Benefitting Corridor that have already been identified for growth in each of the County Development Plans, as well as in the Regional Planning Guidelines. Irish Water reiterates that water is only one service that is required to support growth; there is a corresponding need to address waste water issues in many urban and rural areas, as well as the need to ensure the availability of a workforce within sustainable travel distances, transportation infrastructure, adequate broadband, power supply and other infrastructure services. Furthermore, future growth of towns will be determined by 'proper planning and sustainable development' as outlined in the Planning Acts. The National Planning Framework, Regional Planning Guidelines, and County Development Plans will determine where growth occurs within a legislative framework.

Furthermore, this Benefitting Corridor provides an opportunity to rationalise existing water infrastructure in the midlands which is under "stress" from a combination of poor quality sources, low reliability, doubtful sustainability and inadequate resilience. This has an impact not only on current need but also on the ability to respond to changing demands. Communities in the Benefiting Corridor, for the first time, have the prospect that the same utility which brings opportunity with clean water can simultaneously prevent wastewater treatment capacity becoming an impediment to taking up that opportunity. Irish Water has responsibility for both sides, and can prioritise both sides, when the need requires it. An appraisal of all of the schemes being considered within the Benefitting Corridor is included in Appendix A of the FOAR.

4.8 Public Consultation Process

The stakeholder engagement process was discussed in nine of the submissions received, as well as in the Public Open Days and stakeholder meetings. As outlined in Section 2, as well as the same section of the Consultation Submissions Reports on the OWP and PNR, Irish Water has strived to engage with the widest possible audience since the inception of the WSP, and began by consulting publicly on the Consultation Road Map itself, inviting views on it in March 2015.

While not a statutory requirement, public consultation has been carried out at each stage of the project. The full project reports and an extensive range of supporting documentation together with summaries and infographics on all phases of the WSP have been made available to the public, either in hard copy or via the project website. The Project Team recognises that there is always room for improvement and welcomes all opinions and suggestions for enhancing the public consultation process.

All stakeholder feedback is logged and reviewed by the Project Team. The various issues raised by stakeholders in the three public consultation periods to date are outlined in Appendices I (PNR), J (OWP) and K (POAR). The tables in these appendices also summarise the Irish Water response to each of the issues raised and the resulting decision made in relation to the development of the project.

The methods of consultation and engagement are detailed in Section 2, with additional information provided in the supporting Appendices A-G. An overview list is as follows:

- Advertising & media engagement – A press release was issued to national television stations, national and regional newspapers and radio stations, and online media. Adverts announcing the launch of the consultation period and the means of engaging with the Team were issued in national and regional newspapers.
- Launch emails – The Project Team issued 850 emails at the launch of the public consultation period to interested stakeholders (including stakeholder groups, individuals, Local Authorities and Elected Representatives).
- Stakeholder meetings – The Project Team met with over 40 stakeholders during the POAR consultation period. Irish Water continues to engage with and meet a range of stakeholders at the present time and onwards.
- Public Consultation Open Days – Four public open days were held in the WSP Study Area during the consultation period. The Project Team met with over 60 individuals at the open days, including landowners and local residents, Elected Representatives, and members of public and private local organisations.

- Oireachtas Open Day – An open day was held on the POAR launch day to brief Oireachtas members on the key findings of the report and the consultation process.
- Distribution of POAR documentation – The Project Team sent hard copies and CDs of POAR documentation, including the POAR Main Report and appendices, Newsletters, Non-Technical Summaries and CDs with the results of survey data, to over 60 interested stakeholders (individuals and stakeholder groups), as well as additional stakeholders at the stakeholder meetings and Public Open Days. A full copy of the POAR report and appendices was issued to the County Libraries and Planning Departments of the Councils in the Study Area, for public exhibition.
- Stakeholder Submissions and Responses – There were 78 incoming emails, letters and phone calls received during the POAR consultation period.

All stakeholder engagement, including emails, letters and phone calls, as well as discussions at stakeholder meetings and open days, is regularly logged and reviewed by the Project Team. This enables the Team to gauge stakeholder interest in and perspectives on the WSP over time, as well as to take on board all suggestions and proposals as soon as they are made.

Stakeholder engagement

The number of submissions and queries received during public consultation has increased over time, with 27 submissions on the PNR, 46 on the OWP, and 78 (42 submissions and 36 queries) on the POAR. Half of all submissions in the three public consultation periods came from a wide range of national and regional stakeholder groups. Many stakeholder groups and individuals have submitted to more than one consultation period. The Project Team responded to submissions and queries received during the POAR consultation period, by email, letter, phone call, or meeting, addressing the specific points raised by each stakeholder. This reflects the level of detail and comprehension in the submissions received as well as the strengthening of relationships with stakeholders through ongoing meaningful engagement.

As the project has progressed to identify an Emerging Preferred Option and an indicative pipeline route, more stakeholders with interest in the project have been identified and consulted with, such as landowners along the proposed pipeline route. Similarly, the number of stakeholder meetings increased from 12 during the previous consultation period on the OWP, to over 40 meetings during the POAR consultation period.

Four public open days were held during the POAR public consultation period in key locations along the Benefitting Corridor to extend the stakeholder meetings with the Project Team to all interested parties. There were 66 attendees in total at the open days, including local residents and landowners, Elected Members and Civil Servants in Local and County Councils, and members of fishing and boating clubs, the majority of whom had not previously been in contact with the Project Team. Therefore, the open days provided the Team with the opportunity to get feedback on the project and POAR from a wide range of individuals with specific interests in the project. Eight of the attendees at the open days made subsequent contact with the Project Team, and 37 attendees provided their email addresses so that they can be sent WSP updates.

Eight public open days have been planned for the final public consultation period on the FOAR and EIS Scoping Report. As for the POAR consultation period, all stakeholders (individuals and groups) who previously engaged with the consultation process will be emailed at the launch of the final consultation period, to inform them of the key findings of the reports, the details of the consultation process and the means of engaging with the Project Team.

Incorporating stakeholder feedback

Irish Water has strived from the beginning of this project to ensure that everyone who wishes to engage with and contribute to the consultation process has full access to all of the relevant documentation. Given the significant scale of research and assessment involved in the project, there are a large number of documents and reports. In order to make it easier for people to understand and navigate through the various reports, we have included summaries with each report produced and also partitioned the individual sections of the documentation on the project website.

The Project Team has taken on board all of the stakeholder suggestions for improving the public consultation process and increasing the clarity and ease of navigation. For instance, the Team has developed a 'document library' approach for presenting the various sections of the FOAR and EIS Scoping Report documentation on the project website to enhance the accessibility of the information presented, as suggested by a stakeholder.

Throughout the public consultation process, the Project Team has presented all stakeholder opinions on the WSP, both positive and negative, and has declared the outcome of each stage of consultation. The approach of 'response by theme' adopted in the Consultation Submissions Reports allows Irish Water to report and respond to stakeholder feedback, whilst respecting stakeholders' privacy.

As outlined in Section 5 and Appendices I and J, Irish Water has made important changes to the project following stakeholder feedback expressed through consultation. For instance, Irish Water has revised the previous option preference, and taken on board stakeholder opinions on demand calculation, leakage targets and alternative options. Specialist workshops were held at various points in the consultation process to present the stakeholder feedback to the various specialists involved in the Multi Criteria Analysis of options.

A complete overview of the outcomes of these specialist workshops, in which stakeholder submissions were reviewed and incorporated in the project development, is provided in Section 5 and Appendices I and J. Section 5.0 summarises the submissions received during the POAR public consultation according to the common themes, and outlines the Irish Water responses to each of the issues raised, as well as the manner in which the submissions have influenced the development of the WSP. Similarly, the range of issues raised by stakeholders in the PNR and OWP consultation periods, as well as the Irish Water responses and the resulting influence on project development are outlined in Appendices I and J, respectively.

4.9 Sustainability

4.9.1 Sustainability and Carbon Footprint

Sustainability was a key issue for many stakeholders, with a number of submissions highlighting the importance of climate change in demand and yield calculations and option design and appraisal. The choice of water sources, locations, routes, construction methodology, materials used, etc. have and will all be, influenced by climate change considerations.

Irish Water has a national remit, which extends in this case to water supplies throughout the Eastern and Midlands Region, and not just to the Greater Dublin Area. Irish Water aims to consolidate existing smaller water sources of unreliable yield, or elevated vulnerability to pollution, or low linkage and resilience, to achieve nationally uniform standards of service from consolidated, efficient water treatment plants and resilient distribution systems.

The Termination Point Reservoir is proposed at Peamount, with a treated water pipeline from the Shannon at Parteen, in an approach which seeks to make treated water supplies available over the maximum Benefitting Corridor in a far more sustainable and efficient manner than providing a number of individual local dispersed schemes in isolation. In comparison, a raw water pipeline across the Midlands to a treatment plant near Dublin in a multi-objective approach to provide flood alleviation (as suggested by some stakeholders) would require retention of a multiplicity of small scale public water treatment plants.

Irish Water continues to monitor the latest research on climate change in Ireland, including studies published by climate scientists at NUI Maynooth in Q1, 2016. Climate change brings challenges not only in the design of the proposed WSP, but also in relation to the reliable yield of existing water sources. Both of these aspects are being considered in the design development.

Sustainable development involves planning for future economic growth. Where and when particular industries will be located and what industries will be permitted, is a matter for national and regional policies and for legislation applicable to industrial locations, including permissible developments and the implications of same for water quality and quantity. These are matters which are outside the control of Irish Water.

4.9.2 Energy

Stakeholder queries about the energy costs associated with pumping water from Parteen Basin, the comparative energy costs of alternative options, such as Desalination, and the potential impact of the Emerging Preferred Option on energy production at Ardnacrusha are addressed in the paragraphs below.

The Project Team recognises that additional pumping energy is required at Parteen, primarily due to the additional friction losses in the additional length of pipeline. The FOAR details the energy requirements for pumping in all water level circumstances. As discussed in detail in Section 4.4.2 of this Consultation Submissions Report, the tight range of existing operating water levels which are maintained by ESB will be unchanged by any water abstraction from Parteen Basin for the Eastern and Midlands Region.

In any comparison between options from an energy viewpoint, it must be recalled that it is first necessary that the options are on an equal footing of environmental sustainability. Abstraction from the North East of Lough Derg, or from any other site drawing from the lake, would have impacts on water residence time within the lake, in prolonged dry weather, which would not be mitigated by raw water storage, as demonstrated in the hydraulic models presented in the POAR. As discussed in Section 4.2.1, the Desalination option is a high energy intensive process when compared with the Emerging Preferred Option. Further detailed assessment on carbon footprint / energy requirements is presented in the FOAR.

Irish Water and ESB are in discussions working towards an agreement to curtail their power generation water usage by an equal amount to the water abstracted for water supply, so that the water supply abstraction is counterbalanced by that. ESB will be compensated by agreement, for the power generation foregone, by the abstraction of water upstream of the power station. This is already a well-established practice at Pollaphuca and Leixlip on the Liffey, and at Inniscarra on the Lee, and the power compensation cost is a transparent part of water cost at all three sites.

It is expected that just 2% of the output of the Ardnacrusha Power Station will be foregone by ESB, if permission to abstract 4 cumecs is obtained in order to serve the water needs of 40% of the population of the State. Ardnacrusha as a whole supplies approximately 2% of Ireland's energy needs, so the impact of the water supply abstraction is very small. ESB has confirmed that it can be accommodated within their existing management regime for the hydropower plant. Irish Water would be subject to compliance with ESB requirements as set out in '*The Regulations and Guidelines for the Control of the River Shannon*'.

5. Next Steps

The issues, opinions and suggestions raised by stakeholders during the POAR public consultation phase, and categorised in this Consultation Submissions Report into common themes, have been thoroughly reviewed by the Project Team to inform the development of the WSP. Table 5.1 summarises the POAR submissions received according to the themes and outlines the Irish Water response, and the influence on the project development. Similarly, Appendices I and J summarise the issues raised in the two previous public consultation periods (on the PNR and OWP, respectively) and the resulting influence on project development.

These summary tables demonstrate how issues raised at different stages of the public consultation process were addressed and incorporated in the development of the project. It can be seen in Appendices I and J that at the time some issues were raised, there was not enough information to address them in earlier consultations. These issues were brought forward to the subsequent consultation stages to ensure that all issues were fully addressed by the Project Team. In this way, all stakeholder feedback received throughout the project development is continuously considered by the Project Team. Similarly, all advice offered by stakeholders on environmental issues has been incorporated in the EIS Scoping Report.

As shown in the Project Road Map (Figure 1.2 in Section 1), this consultation is part of a series of non-statutory public consultations which aim to elicit views from stakeholders and interested parties at each stage in the WSP. The final non-statutory public consultation period is focused on the Final Options Appraisal Report (FOAR), which identifies the preferred water supply scheme for the Eastern and Midlands Region, and the EIS scoping for that scheme.

All stakeholder feedback received during the WSP public consultation process will be further reviewed by the Project Team as more data becomes available from the final non-statutory public consultation on the FOAR and EIS Scoping Report. The submissions received during the final consultation period, and the resulting Irish Water responses and influences on project development, will be reported on and made available on the project website. It will also be included as part of the development of the planning application. The planning application for the WSP to be lodged with An Bord Pleanála will incorporate stakeholder feedback from the consultation on the FOAR and EIS Scoping Report, as well as the POAR, OWP and PNR consultation periods. As part of processing the planning application, An Bord Pleanála will conduct statutory consultation, including an Oral Hearing, during which all interested parties will have the opportunity to comment upon the scheme which is submitted for planning permission.

POAR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
Alternative Options	Submissions were received suggesting alternative options with storage facilities, rainwater harvesting and greywater reuse.	Six options were eliminated in the OWP for one or a combination of the following reasons; (a) Insufficient availability of water in a sustainable manner, (b) Failure to comply with the Habitats Directive.	
Alternative Options • Desalination	The benefits of Desalination outweigh the negatives. Sea water is in endless supply. River Shannon does not have the capacity to supply water to the Eastern and Midlands Region. Others against Desalination due to cost and high carbon emissions. Large amounts of energy required, difficulties with disposal of a highly concentrated salt solution. Concern with detail comparing Desalination with the Emerging Preferred Option. Concern about objectivity towards Desalination, studies should be carried out independently. .	Desalination has been deemed 'Possible but not recommended'. The advantages and disadvantages of desalination are set out in Section 4.2.1 of POAR Volume 6 Appendix H. Assessment of options is open & transparent as outlined in the OWP, POAR & FOAR. An MCA was carried out for the options. Independent experts provided technical, social and environmental reviews. All options, incl. Desalination were subjected to equal investigation. Desalination and the Parteen option were examined in the FOAR.	The FOAR has determined that Desalination, while technically viable, is not the preferred option. It does not at all address water supply issues in the Midlands Benefitting Corridor, and therefore does not address a key project objective. Irish Water will proceed with the Preferred Option of abstraction from the lowermost section of the River Shannon at Lower Lake (Parteen Reservoir).
Alternative Options • Reservoir storage	Stakeholders proposed various alternative options that included reservoir capacity.	Reservoir storage, and the reasons why abstraction from the Shannon in the Parteen Basin area has emerged as preferred, are discussed in Section 4.2.2 of POAR Volume 6 Appendix H. No raw water storage is needed for residence time issues, or for management of abstraction in drought. The emerging preference has been subjected to modelling and water quality data collection.	Abstraction from North East quadrant of Lough Derg had to be modelled. With or without storage the modelling demonstrated that abstraction would have an environmental impact on the Lake.

POAR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
Alternative Options • Reservoir storage *Garryhinch*	Storage options studied previously, but deemed unviable should be revisited. Lough Ree & storage option in the OWP could maximise capacity to abstract water in flooding, to mitigate flooding, and avoid abstracting water during low river levels. Water volume in Lough Ree is sufficient, without risk of negative environmental or navigation impacts. The Lough Derg and Storage option has environmental benefits, including better flood relief than the current proposal. Why was Garryhinch option abandoned? Analysis to support the decision was questioned. Garryhinch storage option could still be considered, using Parteen Basin for abstraction. This would extend storage reserves and enhance supply in drought. Tourism and economic benefits to an Eco-Park at Garryhinch. Incorporate storage to regulate water levels on the Shannon, reduce risk of flooding and improve energy balance of water supply. River water stored in reservoirs in floods could be used as potable water in summer, obviating the need to take water from the Shannon. Cost savings could be achieved during low-cost electricity periods. Cost Benefit Analysis needed.	Abstracting at Parteen, downstream of Lough Derg, from manmade storage upstream of Ardnacrusha, would allow water to pass through Lough Derg, as it does naturally. It would not impact on residence time & flow to the lower Shannon at Parteen Weir would be unaffected. Water quantity involved is 2% of average river flow at Parteen, abstraction would be in agreed with ESB, so that they reduce their water for power generation, in the same measure as water is abstracted for water supply. Water would be taken from water which is stored and used for power generation. The reasons as to why the Garryhinch option is not viable are discussed in Section 4.10 of POAR Volume 6 Appendix H. Regarding the tourism benefits of an Eco-Park, storage must be justified, and meet its' primary water services purposes, with a prospect of being constructed on a suitable site with an acceptable profile of environmental and engineering risk, before any ancillary benefit can have any meaning. Technical analysis has concluded that it does not meet these requirements. Winter 2015/2016 flooding was such that raw water storage capacity of 12 million cubic metres would have no significant impact on flood flows.	Assessment of the Raw Water Storage option at Garryhinch, which was part of option F2, abstracting from the NE quadrant of Lough Derg has shown that it does not fulfil its intended environmental purpose, and the proposed Garryhinch site carries significant environmental and engineering risks. It is not proposed to proceed with raw water pumping and storage.

POAR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	Would storage be needed for dry summers when Shannon water levels are low? Drier summers could make extracting water environmentally sensitive. Use reservoirs to mitigate against flooding. 2% of flow could be taken out before predicted rainflow peaks, through the use of reservoirs.		
Alternative Options • Reservoir storage *Pumped Storage*	A pumped storage facility could help alleviate flooding, by releasing the water through a hydropower plant and back into the waterways during the dry seasons, but diverting this flow out to sea during the high risk wet seasons. Ardnacrusha suggested as the abstraction location, and the Slieve Bloom Mountains as the location for the storage reservoir. The level of Lough Dan could be raised, to provide additional backup to existing water supply, while availing of the treatment beds at Roundwood. Available water may not be huge, but it could be relatively cheap and very few properties would be affected by the increased water level. Construct pumped storage facilities in the Arra Mountains and in the Slieve Bernagh Mountains, these facilities could be designed to supply water also. Sourcing water from mountainous locations such as these may not draw the same level of opposition as the Parteen proposal.	Water abstraction from Parteen Basin would avoid negative impacts on lake residence time, as it is situated downstream of Lough Derg, and water levels can be controlled without storage. Existing water level regulating infrastructure at Parteen Basin obviates the need for additional storage infrastructure. Abstraction from hydro-electric power schemes is used worldwide to enable environmentally sustainable availability of drinking water. Existing abstraction at Ballymore Eustace is 318 Mld, compared with proposed demand of 330 Mld for WSP. All of Blessington Reservoir is needed to sustain water abstracted at Ballymore Eustace. Movement of, or diversion of floodwaters, of 600 to 800 cumecs, is likely to involve an open channel hydraulics solution rather than a pumped solution, as explained in Section 4.2.2 of POAR Volume 6 Appendix H. The requirement for coastal outfall for floodwater	The scale of pumped storage facilities would bring no significant flood relief benefit. The creation of new impoundments brings significant environmental impacts and the required yield precludes small upland catchment sources. Irish Water does not favour pumped storage as an option.

POAR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
		from such storage would rule out feasibility.	
Alternative Options • Rainwater Harvesting	Rainwater harvesting should be implemented, this could help to mitigate pluvial flooding in Dublin. Rainwater harvesting should be included in the design of new buildings in Dublin, given the rainfall rates. Rainwater harvesting, water reuse, more efficient water usage equipment and facilities could improve the sustainability of commercial water usage. There is potential for rainwater harvesting on farms, different pricing could apply for summer/winter usage to promote rainwater conservation and reuse.	Rainwater harvesting can make a contribution to extend the lifespan of existing water supply systems. These recovery systems are not a primary source option for the WSP. Over a decade ago, the Preliminary Design Report extensively researched the potential to harvest rainwater. Substantial time and economic resources are needed to adapt domestic plumbing systems in existing dwellings and promote harvesting designs in new builds. Details of Government and CER water conservation initiatives are included in Section 4.2.3 of POAR Volume 6 Appendix H.	Rainwater Harvesting is not being pursued as a primary option, but is included among water conservation initiatives which are under trial and being encouraged by Irish Water, to displace some potable water usage, with due regard to health & safety.
Alternative Options • Greywater Reuse	Greywater could reduce water demand and the need for water-treatment chemicals. Water is treated to an advanced standard and so it should be reused where possible. Greywater reuse could include using grey / recycled water for toilets, encouraging the use of water butts to trap rainwater, and plumbing circuits to recycle grey water. This could reduce the demand for potable water considerably. Cost Benefit Analysis of the Parteen option versus alternatives, such as greywater harvesting, was questioned. Request information on costs that will be accrued for the various options, including greywater reuse. Water reuse will become a standard and required part of water supply in the GDA, with	Greywater reuse designs must ensure that the consumer is safe from a public health perspective; there are concerns about how the public would implement the technology. Greywater reuse is not a primary source option for the WSP but rather an additional source used for augmentation. There is an absence of European standards for greywater reuse. The driver for the WSP is not just for additional water, but also for improved headroom and resilience. . Alternatives considered and the concerns associated with them are explained in Section 4.2.3 of POAR Volume 6 Appendix H. Potential for using multiple sources was	Irish Water does not favour any approach based on multiple small source development, due to continuing source yield and vulnerability risks and wide scale planning and legal risks.

POAR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	or without WSP. Environmental flow replacement and groundwater abstraction options could have a potential of up to 100 Mld if multiple small sources were developed. Request a detailed appraisal of groundwater sources, including exploratory drilling, and a Cost Benefit Analysis of supply options, including the combination of multiple sources.	investigated at various project stages. Many sources could be attractive secondary water resources, but are not sustainable primary sources. Small isolated water sources are often of low yield, often not associated with higher water quality, and more vulnerable to pollution.	
Leakage and Water Conservation • Leakage	Could strategies to reduce leakage achieve sufficient savings in water demand negate the need for a new water source for the region? Leakage estimates in submissions received ranged from 40-60%. High capital and maintenance costs associated with a large infrastructure project, such as the WSP, cannot be justified given the high levels of leakage in the water pipelines. Call for a Cost Benefit Analysis comparing WSP with loss reduction through pipe remediation. Call for increased investment in pipe repairs and leakage reduction to eliminate the need for a new water source, and the associated costs of providing such a source. Increasing water supply through the WSP will reduce incentives and funding for leak reduction.	Irish Water is committed to reducing leakage. However, doing so is challenging in light of required resources, the maximum realistically achievable reduction based on current projections would result in recovery of 48.1 Mld by 2041. Guaranteeing reliable, safe, water supply in the East & Midlands will include water conservation, leakage reduction and new source development. It is necessary to tackle leakage and losses alongside developing a new water source, it cannot be either/or. Fixing leakage is not enough; water supply must be maintained as progress is made on leakage. A new water source will not eliminate the need to reduce leakage or promote water conservation. The converse is also true. Details of water demand projections, water conservation works, costs associated with finding / repairing leaks and leakage reduction can be found in Section 4.3.1 of POAR Volume 6 Appendix H.	WSP objectives are to meet water demand, to diversify source risks and to increase the resilience of the water supply system. Planning for WSP will proceed alongside the drive for water conservation and reduction of leakage. Water demand projections already assume ambitious leakage targets will be met.

POAR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
Leakage and Water Conservation • Water Demand & Conservation *Water Demand*	Water demand calculations are premature, demand could drop due to charges or if Irish Water reduces leakage. Question the accuracy of water meters, water demand likely to be closer to 500 Mld, than the estimate of 330 Mld. Demand calculations should include losses along the pipeline and in the terminal reservoir, due to climate / other factors. Water demand in Dublin and the Benefitting Corridor, and the volume of water extracted, will vary with changes in population, agriculture and industry, and weather conditions. Demand for water is likely to be higher in hot, dry conditions, when Shannon water levels are lowest. Request information on assumptions used for projected water demand and a sensitivity analysis to support projections. Disagree strongly with WSP demand projections, accurate 35-year forecasts are not possible, demand calculations should be revisited periodically to reduce demand-side risk. Demand has plateaued for eight years. The projected industrial requirements of 34-50 Mld for the next 5 years cannot be met by WSP timeline, smaller-scale, more rapid / flexible sources should be developed on a shorter time frame instead. 75-100 Mld could be delivered using multiple smaller sources in the next 5 years.	The sustainable capacity of existing sources serving the Dublin Water Supply Area is estimated at 623 Mld, demand is in the region of 565 Mld. New households will increase that requirement; there is repressed demand inherent in the current housing shortage. IDA believes that over 50% of available spare capacity will be used in meeting industrial water requirements for foreseeable projects under development within the next 10 years. PNR water demand projections include ambitious leakage targets, resulting in a conservative approach to overall demand. This has resulted in revision of projected water requirement from 350 Mld by 2040 to 330 Mld by 2050. The projected requirement of 330 Mld by 2050 is the requirement on which proposed abstraction / planning application will be based. If abstraction after 2050 were contemplated by future generations, a new planning application & abstraction agreement would be required. Details of how demographic projections, water consumption figures and Non-domestic water requirements have been developed are discussed in Section 4.6 of POAR Volume 6 Appendix H.	Water demand already includes peak requirements in extreme drought. Allowance for climate change impacts has been made. Demand review is continuously undertaken; an interim review at September 2016 has been made, and will again be carried out on publication of Census 2016 results.

POAR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	Dublin urgently needs additional supply. Spare capacity has been as low as 1-2% in extreme events. Dublin's spare capacity is around 8%, but this is still far short of the 15% that is considered a safe level of spare capacity, the need for increased capacity will grow in line with population growth and economic expansion.		
Leakage and Water Conservation • Water Demand & Conservation *Water Conservation*	Water conservation mechanisms are needed to reduce demand, rather than finding new sources. Water demand is growing compared with previous generations; water metering could help conserve water. More information is needed on the Cost Benefit Analysis undertaken to compare the Parteen Basin option with less invasive alternatives such as water conservation, and repairs and improvements to Infrastructure. There are various methods of improving conservation and reducing water demand. Water demand per household is lower in the UK because charges are based on usage, resulting in behavioural change. Reductions in demand can be expected in Ireland, if water meters are implemented wherever possible. Regarding the focus on energy reduction and efficiency measures, that there are no similar incentives for water efficiency or monitoring of consumption.	Irish Water agrees that water conservation is a vital goal, and has outlined strategies to minimise water usage among domestic and non-domestic users. WSP aims not only to meet water demand, but to increase resilience of the water supply system and its sources. The country's ability to attract FDI is dependent on sustainable availability of water combined with the resilience of that water availability. Planning for resilient water supply must take place independently of progress on water conservation or on success in reducing leakage, because loss of a key water source through pollution or degradation of crucial infrastructure remain separate risks to be managed, even as the drive to minimise water demand continues. Water conservation and leakage targets in the PNR are consistent with those objectives, and savings in per capita consumption have been included in water demand forecasting. Various Irish Water conservation initiatives are	WSP objectives are to meet water demand, to diversify source risks and to increase the resilience of the water supply system. Planning for WSP will proceed alongside the drive for water conservation and reduction of leakage.

POAR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	Water conservation options could include water usage per appliance, tax changes, capital investment in commercial projects to cut water usage; balancing out water usage and reducing demands peaks, increasing commercial water charges; applying business rates to agricultural usage. The water-pricing policies required under the WFD to provide adequate incentives for users to use water resources efficiently are currently not in place in Ireland. A decision regarding the preferred option is premature, until compliance with the WFD is achieved.	discussed in Section 4.3.2 of POAR Volume 6 Appendix H. 780,200 meters have been analysed and 36,000 customers have been notified of leaks. One of Irish Water's priorities is to reduce the amount of water being wasted through leaks and have introduced the First Fix Free scheme to support customers in reducing leaks on their properties. Already, as of March 2016, an estimated 48 Mld of customer side leakage has been recovered through this scheme.	
Environment & Fisheries • Environment & Ecology	Concerns about potential impacts of the WSP on water levels, and the environment / ecology of the River Shannon. Abstraction should cease during dry periods to protect the flora and fauna of the lower Shannon and Shannon estuary, and to preserve biodiversity, tourism and angling. Reductions in the River Shannon water levels would affect absorption capacity of the Shannon for dilution of treated effluent locally and would have indirect impacts on fish stocks, local water tables, private wells, and drainage of wetlands. Habitats could be disturbed, fish stocks depleted, and the mammals and birds that feed on the fish could be affected. Potential environmental issues, including impact of abstraction on the nutrient balance	WSP must be delivered in an environmentally sensitive manner to meet its objective of developing a new sustainable water source for the Eastern and Midlands Region. A successful outcome is dependent on demonstrating environmental compliance. A technically viable option has environmental and ecological issues at the forefront of assessment. 2 of the 4 OWP options were discounted in the POAR because of environmental / ecological concerns. Selection criteria and MCA studies have been carried out in conjunction with independent experts. Details of a current water quality survey, abstraction at Parteen Basin and ecology are discussed in Section 4.7 of POAR Volume 6	Irish Water has selected an abstraction location which sits downstream of the natural flow regime of Lough Derg and all points upstream, and which will not affect the ecology of the lake.

POAR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	of Parteen Basin, the increase in the pH of supplies to Dublin, and impacts on Freshwater Pearl Mussel. With regards to the nutrient balance of Parteen Basin, calculations should include speed and density measurements for suspended solids, rather than the residence time methodology which was used in the POAR. Recommend using this nutrient rich suspended solid material as fertiliser for the local community. Important to assess and indicate the potential environmental impacts of the construction and operation of the proposed development on national roads, drainage systems and the receiving environment.	Appendix H. The Final Preferred Option will be subject to an Environmental Impact Statement, consultation has commenced its' scope. Any project failing to consider the requirements of Irish & European legislation and legitimate environmental concerns of the Shannon catchment population and businesses would be compromised and would not be successful in seeking planning permission from An Bord Pleanála.	
Environment & Fisheries • Environment & Ecology *Water Framework Directive (WFD)*	The proposal will result in deterioration of the Lough Derg/River Shannon Surface Water Body. Member States are prohibited from authorizing a project that results in the deterioration of a Surface Water Body under the Water Framework Directive 2000/60. Welcome the inclusion of WFD requirements in the MCA undertaken for the POAR but an ex-ante WFD-specific assessment is needed. WFD requires establishment of controls over the abstraction of fresh surface water and groundwater, this legislation is overdue in Ireland. Absence of this legislation renders Ireland's regulation of abstractions non-compliant. Propose a WFD Research Facility at Parteen Basin to facilitate monitoring and research supporting WFD compliance. This	WSP has been developed in line with the requirements of the WFD and has followed an integrated water management approach. Extensive water quality surveys, lake bathymetry surveys and hydrodynamic modelling have been carried out. The Project Team is engaging in extensive environmental surveys and ongoing consultation with environmental stakeholders / specialists to ensure compliance with the WFD. Details of consultations with stakeholders can be found in Section 2.4 of POAR Volume 6 Appendix H.	There will be no raw water transfers across river basin district boundaries as part of the project, and the option which did involve such transfers is not preferred. The EIS for the project will include a Water Framework Directive Assessment, and will include appropriate assessment under the Habitats Regulations.

POAR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	could improve scientific knowledge of the lake and could lead to improved lake management. SEA previously undertaken should be undertaken again as the scope of the WSP has changed from a Dublin regional level to a national one. New assessment should include the impact of additional wastewater generated due to WSP for Dublin Bay and along the Benefitting Corridor. Dublin Bay is a sensitive water body with European / international designations.		
Environment & Fisheries • Environment & Ecology *Environmental Impacts of Alternative Storage Options*	Propose a pumped storage facility using abstraction of water at Ardnacrusha and a storage reservoir in the Slieve Bloom Mountains. Taking water from near the estuary would ensure the Shannon was kept free from pollutants; taking it from nearer the source might result in catastrophic drops in the level in periods of drought. Agree with the selection of Parteen Basin as the abstraction point, this resolves negative impact on flushing through Lough Derg, but could be adapted to include storage at Garryhinch. Environmental risk of migration of Alien Species can be resolved by treatment for removal before pumping to the reservoir.	It was found that reservoir storage is not necessary for the Emerging Preferred Option, as modelling results have shown that raw water storage is not required to mitigate lake residence time issues at Parteen because the water passes naturally through the lake towards the abstraction point, just as it does at present. The provision of storage capacity was shown to be not required and would have disadvantages from both siting and environmental perspectives.	A raw water reservoir is not required with abstraction from Parteen and is not proposed.
Environment & Fisheries • River Shannon water levels	Basing proposed abstraction rate on average flows is misleading. Flow rates on the lake vary during the year from 15 cumecs to 800 cumecs. In a dry summer, draw down from Lough Allen & Lough Ree would be required	Irish Water does not require, or seek change in the operating regime of Loughs Allen, Ree or Derg. Abstraction from Lough Derg would be within the normal operating range, as discussed in Section 4.10 of POAR Volume 6	The proposed abstraction would always be from water stored within the limits of the normal operating band, which will remain unchanged. Abstraction is not based on average flows; it is modelled on all flows.

POAR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	to provide sufficient water for WSP abstraction and electricity generation, impacting negatively on ecology and navigation levels. Query year round abstraction. In dry weather, water levels are low but demand is high, resulting in increased abstraction from Parteen and reduced water levels. Important to maintain water levels for fauna & flora, and making River / Lakes an attractive tourist destination and economic driver. Extraction will increase with population growth; abstraction would have to be restricted to limit ecological and environmental damage. Who will conduct the worst case analysis of abstraction levels? Has a weir or similar structure at Parteen to maintain water levels been considered? Storage capacity at Peamount Terminal Reservoir will be small with little spare water to pump during peak demand. How will supplies to Dublin be protected in the deficit period. A scenario could arise where high water levels are maintained in the Shannon during early summer months, with a serious negative knock-on effect on the callows drainage system, resulting in the loss of habitat and a serious loss of grazing. This could result in water not being released quickly enough, leading to flooding.	Appendix H. The projected water requirement of 330 Mld (approx. 4 cumecs), includes a peaking factor to allow for water requirements in a peak week of the year. There is no risk that dry weather will exert unforeseen additional impact as it is already factored into water demand projections. The abstraction quantity needs to be agreed with ESB and approved by the Minister for the Environment, Community and Local Government. This quantity will be the maximum upper limit on abstraction; a new planning process would be required by a future generation to increase that limit.	
Environment &	It is possible that water would be stored in	Parteen water abstraction can be managed	The existing normal operating band of water

POAR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
Fisheries • River Shannon water levels *Water Level Management Options*	reservoirs during wet weather periods to maintain water levels to within acceptable limits and reduce the risk of flooding, and water could be supplied from the reservoirs in times of low rainfall to reduce water abstraction from the river. Pumping water is recommended when electricity tariffs are low. Because Parteen is downstream from Lough Derg at a lower elevation above sea level, the required pipeline is longer and energy requirements for pumping are greater. During dry weather when water demand is greatest and River Shannon water levels are lowest, the drop in water level at Parteen could be significant, resulting in increased pumping energy requirements and reduced hydropower capacity at Ardnacrusha. Optimising reservoir storage capacity could ensure there would be no need to abstract water from the Shannon during summer or drought, maintaining water supply and mitigating against flooding. Adequate capacity at Lough Ree to supply 2050 demand in the East & Midlands.	within the existing normal operating range for electricity generation, negating the need for control structures. Storage would not bring environmental benefits and could not be justified. Storing raw water to control flood water would require a larger raw water storage capacity than was proposed for Garryhinch (which was sized for water supply solely). The raw water pipeline would be underused for half the year as the seasonal difference in water levels is considerable. Storage of water for periods of dry weather introduces water quality & treatability issues. There will not be water level or flow impacts along the Shannon, not just as a matter of Irish Water opinion, but because of the channel hydraulics. River Shannon has five distinct sections. It is not physically possible to design a weir at Parteen to influence water levels upstream of Meelick, during low to medium flows.	level would remain unchanged.
Environment & Fisheries • Fisheries	Fishing and boating will be affected if water levels drop in the Shannon as a result of WSP. There are 13 angling clubs in the area which are being affected by the already fluctuating water levels, if water levels drop as a result of the proposal, trout fishers won't	Preservation of Shannon angling was a key stakeholder concern. One of the largest water quality survey contracts commissioned in Ireland is operating on Lough Derg & Parteen Basin. Survey data is informing a hydrodynamic model which will define impacts	Irish Water is working closely with angling and fishery stakeholders to ensure no adverse impacts arising from the project.

POAR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	have access to the lake. It is imperative to preserve the Lough Derg environment and the future of communities such as local anglers. It is important to ensure that the river level is always sufficiently deep for boating, angling and other activities. It would be inconceivable for any project to take place involving the Parteen Basin without the issue of fish connectivity across the Parteen Dam being addressed. An Eco-Park at Garryhinch could have benefits for boating, angling and water sports.	of abstraction for water supply & water quality. Spawning ground loss is not expected. Irish Water has been in discussions with DECLG, NPWS, IFI & angling bodies on fish stock surveys in the Lower Shannon and on a community gain project to enhance fishery connectivity in Parteen. Irish Water has engaged an internationally respected fisheries specialist, to advise on fisheries issues, and to engage with stakeholders, to ensure that abstraction does not impede their efforts and design supports restoration of migratory fish connectivity.	
Environment & Fisheries • Flooding	If diverting water from the River Shannon is being offered as a flood reduction solution, it should only be during winter months when floods happen, there should not be a year-round diversion of water to Dublin. There are benefits of the Emerging Preferred Option in terms of flood alleviation. Regarding winter 2015/2016 flooding in the Shannon area, taking out 2% of flow would be beneficial in reducing flooding downstream of Parteen Weir. Because the River Shannon rises slowly, taking a week or more to reach maximum height after heavy rains, abstraction could be increased when flooding is forecast. Could additional storage be included to fully realise flood reduction possibilities, the last major storage facilities built in the GDA was	Flooding arose in stakeholder consultations, and was a constraint in conjunctive use option assessment, between the Shannon & existing Liffey impoundments. Flooding issues on the Liffey are a constraint on this option. The scale of the differences between WSP infrastructure and flood relief, in hydrological terms, are discussed in Section 4.12.3 of POAR Volume 6 Appendix H. Shannon flooding occurs not only downriver from Parteen Weir, but also in the Shannon Callows floodplain, in areas upstream of Lough Ree and areas in the upper tributaries. Flow of 4 cumecs is not significant within flood	The project cannot include a flood alleviation dimension, because of the wide disparity of scale between water supply requirements, and flood flows. While there will be abstraction during flood periods, as during all periods, the beneficial impact on flooding is negligible.

POAR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	the Blessington Reservoir built in the 1940's. There are impacts of the flooding along the Shannon Basin on the lives of the local residents, businesses and farming communities, considerable resources and expenditure will be spent on providing flood protection and relief to the impacted areas. Could the proposed pipeline from Parteen Basin to Dublin be used to drain off excessive water from Parteen and pump it into the sea at an appropriate point in a tidal area on the Eastern seaboard? Acknowledge the cost implications, but there are potential cost savings associated with the avoidance of the capital and human costs of flooding. Suggest constructing a new pipeline directly from Parteen to the Western seaboard to meet the sea or developing a pumped storage facility to both supply water and alleviate flooding.	flows of 400 cumecs at Athlone in December 2015, and 800-850 cumecs at Parteen, and a higher variable flow rate of 10 cumecs, would also not be significant, relevant to the manner in which flood flows in Lough Ree, the middle Shannon and Lough Derg behave. A marginal reduction in flow would not result significantly reduce flood water level.	
Environment & Fisheries • Flooding *Flood Management Options*	Parteen Basin option does not alleviate flooding; alternative storage options could achieve greater flood reduction. Resources should be spent on controlling flooding in the Shannon area. Floodwater could be allowed into former bogs to sequester carbon as peat, avoiding flooding farmland. Pluvial flooding in Dublin could be reduced using rainwater harvesting. Because the Emerging Preferred Option does not include a reservoir, there is reduced	As part of Shannon Catchment Flood Risk Assessment and Management Study (CFRAMS), the use of Lough Ree for storage during floods was considered. Modelling showed that while Lough Ree might provide additional storage at the start of a flood event, it was used up in the rising flood hydrograph, and at the peak of the event this increased water levels downstream during the peak. The scale of recent flooding is such that a raw water storage capacity of 12 million cubic	Irish Water abstraction proposals will involve no change to current flood management on the River Shannon.

POAR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	potential for flood relief. The proposed abstraction at Parteen Basin does not offer flood relief, it is downstream of flood sites. Irish Water has not considered flood reduction in the WSP; the Parteen Basin option is a missed opportunity. Storage capacity in the Midlands could be optimised to ensure that there would be no need to abstract water from the Shannon during periods of drought. Excess water could be abstracted from the Shannon to relieve flooding and run off to the Irish Sea. Question the level of attention afforded to flooding in the POAR, flooding along the Shannon was underestimated. The POAR stated that "Some flooding does occur within the Study Area", this does not capture the level of flooding that occurred along the Shannon in 2015.	metres would have no significant impact on flood flows. The transfer of contaminated floodwaters through a pipeline designed to carry disinfected potable water involves a change of function, and would be highly disruptive in the water supply system. This would also introduce uncertainty and inefficiencies in pipeline sizing. Movement/diversion of a significant fraction of floodwaters of 600-800 cumecs, would involve an open channel hydraulics solution rather than pumping, because of the disparate scale of water to be handled.	
Tourism and Amenity	Concerns about impacts on tourism, including the importance of preserving angling activity and fishing tourism, and maintaining the fauna and flora of the River and its Lakes. Challenges to Dublin commerce and tourism are caused by a lack of water capacity. The city's spare capacity is below the considered safe level of spare capacity, there are risks associated with this low capacity, e.g. the severely cold winter of 2010/2011 when pipes	Irish Water recognises the importance of tourism in the Lough Derg area. Any lower Shannon option will operate within the same water level range as currently applies on Lough Derg / Parteen Basin, by agreement with ESB. Any abstraction option in the lower Shannon would harmonise with tourism development plans for the region. A sustainable abstraction could only involve water not required for local use, for drinking or	The Preferred Option has been identified as abstraction from the Shannon downstream of Lough Derg in the Lower Lake (Parteen Reservoir). Its design operates within the existing normal operating range of water level, and within current compensation water and generator flow rates, and will not adversely impact on tourism, navigation, or on flow patterns in the estuary. It will respect the economic value and

POAR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	burst and supply had to be restricted. This had a particularly severe impact in restaurants, pubs and hotels. Capacity problem will grow as the Dublin population is predicted to grow rapidly between now and 2031. The potential tourism benefits of the Garryhinch storage option has the potential to provide a major Eco-Park tourism development consisting of high quality outdoor leisure, recreation and education facilities and to expand the region's tourism offering by the provision of water-based sports. The economic and employment opportunities associated with Garryhinch have not been considered by Irish Water, a matrix should be developed to investigate all of the impacts, both positive and negative, of the WSP options, including storage at Garryhinch.	angling, navigation, tourism or agriculture. Abstraction of water cannot adversely impact on the Shannon catchment or be at the expense of tourism development. It must be sustainable environmentally, economically and socio-economically. These pre-conditions must be satisfied before the project could receive planning approval or be allowed to commence. There are tourism benefits of raw water storage at Garryhinch, but the primary environmental and water services purpose of a raw water storage capacity must be achieved; that is to improve water residence time impacts of abstraction on Lough Derg in drought conditions. This would not be met by a storage capacity at Garryhinch or elsewhere, to underpin the sustainability of abstraction from NE Lough Derg, with storage. There are site-specific technical reasons set out in the POAR, why raw water storage is not recommended.	importance of tourism, fisheries, navigation and port activities. The Garryhinch storage would not effectively ameliorate the water residence time impacts of abstraction on Lough Derg in drought conditions. For this reason, among other technical, operational and environmental risk reasons, set out in the Preliminary Options Appraisal Report, raw water storage at Garryhinch is not being proceeded with.
Communities / Benefiting Corridor • Community Gain	In favour of the Emerging Preferred Option because of community benefits to the Midlands. Recognise the job opportunities, the advantages of strategic infrastructure and the potential for external investment. Strategic infrastructure would provide rationalisation opportunities, resilience & security to existing water supplies. Important to engage with Local Authorities, a fund should support	Community gain seeks to redress imbalance between community benefits and impacts. While compensation addresses 'direct & measureable 'losses', such as compensating landowners for wayleaves / crop loss / disturbance, community gain is more high level. Community gain / provides benefits which can be shared by a range of communities in the 'impacted environment'.	Irish Water will propose a Community Gain fund as part of its Planning Application to An Bord Pleanála.

POAR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	Community Initiatives. More work is needed on community gain. Community benefits proposal is not extensive enough given that households are still paying water charges for non-existent sewage treatment due to flooding. Previous and existing community gain and development contribution schemes are in place in counties along the proposed pipeline route. Request information on the weekly costings to be paid to Councils, the community gain scheme is offensive to residents in Tipperary. Small communities along the pipeline will be impacted. Because Irish Water has a high level of planning expertise, support should be provided to enable communities to have meaningful input, ensuring balanced public consultation. Query Irish Water's plans to facilitate funding for small communities. What is the status of previous similar requests?	In progressing a Planning Application under the Strategic Infrastructure Act, An Bord Pleanála, may specify conditions that provide for community gain. Examples of community gain opportunities in the Benefitting Corridor are detailed in the POAR.	
Communities/ Benefiting Corridor • Water allocation in the Benefitting Corridor	The towns within the Benefitting Corridor in the Midlands are not in need of additional supply, and query the projected population growth scenarios. Are the existing water supplies in the towns actually under stress? Are there any other viable options for improving supplies? Important to ensure that connecting to the proposed WSP pipeline is definitely the most cost-effective water source for each benefitting town, this would involve	Some anticipated water requirement in the Midlands arises from replacing unsuitable water sources due to yield/pollution vulnerability, or to relieve environmental impacts of over-abstraction. This has environmental and service quality results, without planning implications. Adequate water supply to communities in the Midlands is as much a priority for Irish Water, as it is for every region in the State. Sharing resilient,	Irish Water is considering consolidation of more than 100 Midlands and Eastern schemes, as part of water resource planning. Ireland has over 850 water treatment plants, serving 4.6m people, compared to less than 50 in Northern Ireland, serving 1.8m people, and 297 in Scotland, serving 5.2m people. Many of these water treatment plants and supply schemes, throughout the country,

POAR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	decommissioning a number of existing supplies. Water demand in the Benefitting Corridor is greater than the proposed supply in the Emerging Preferred Option. WSP has the capacity to deliver a means of ensuring an adequate and resilient water supply for the Benefitting Corridor. The allocation of water was not equitable. Allocation of 4.3 Mld to Laois, out of 96.1 Mld, is unacceptable, particularly if a large portion of the proposed pipeline will pass close / through some part of Laois. Portlaoise should be added to the list of towns to receive water from the project, the water allocation for Laois should increase to 15 Mld.	reliable water supplies in the Benefiting Corridor & upgrading supplies is important. EPA emphasise the importance of this approach. Project provides opportunities to supply water to support development and areas identified for growth. The project could indirectly benefit existing Midland water bodies (Lough Owel), which are under pressure from local abstractions. Benefit in fisheries terms is clear. Where existing abstractions are unsatisfactory, capacity of inadequate Midland sources should not be taken into account, where the intention is to retire them.	operate in effective isolation, with little supporting connectivity which would maintain supplies around disruption of a source, or treatment plant, or key section of trunk main. Our dispersed, isolated sources and treatment plants are a legacy of planning at county level and consolidation to achieve consistently high standards and benefits of scale are now needed. Irish Water aims to consolidate existing smaller water sources of unreliable yield, or elevated vulnerability to pollution, or low linkage and resilience, to achieve nationally uniform standards of service from consolidated, efficient water treatment plants and resilient distribution systems.
Engineering & Planning • Engineering	Interactions with existing & proposed new transport infrastructure should include road / motorway crossings, access to/from national roads, traffic management, construction environmental issues and operation of the development, safety of road users. Impacts to existing Group Water Supply systems should be acknowledged and addressed. Problems with having to close down whole sections of Dublin while new pipe laying is being done. Irish Water should consult with ESB, Telecom and other utilities. Concern about the proposed location of the	Advice offered in submissions & face-to-face discussions, was considered in developing the FOAR Preferred Option. The final pipeline route and infrastructure design will consider all known constraints, incl. traffic disruption, existing/proposed transport & utilities infrastructure, and environmental issues during construction & operation. Engineering design will incorporate mitigation measures to minimise impacts on the natural & built environment, incl. risk assessments, traffic management plans, and EIS/NIS scoping. Structural integrity is an essential component	The proposal to site the Termination Point Reservoir at Peamount has emerged as optimum and will be proceeded with.

POAR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	Termination Point Reservoir, the potential master planning of surrounding lands would be significantly compromised. Concerns about changes in the top water level at the Reservoir, the proposed level is too low to service some lands. Identification of the proposed terminal reservoir site at an elevation of 70-80m rules out other possible sites. The route from Parteen to the Peamount Reservoir is 35% longer than that from the northern shores of Lough Derg and pumping head will be greater. Query the capacity of the proposed reservoir and if further treatment would be required.	of pipe material selection. The chosen pipe material will give appropriate weight to the highest measures of quality controls and technologies available; and which have a demonstrable track record of performance. The Termination Point Reservoir for the Parteen Basin option will have a capacity of 150 million litres, and will be integrated with the existing potable water network at Peamount. The location and elevation, and the planning implications, are issues which are under development.	
Engineering & Planning • Planning	Support the Emerging Preferred Option, benefits to Midland counties in the Benefitting Corridor. Provision of quality water supply to towns in the Benefitting Corridor favours SMEs already / potentially operating in the Midlands. Important to integrate the WFD in the planning process. Lack of a co-ordinated approach. Irish Water should engage with EPA Catchment Science and Implementation Unit, DECLG, and NPWS. New governance system is being put in place in Ireland, and final preferred option for the WSP should not be decided until this system and the river basin management plans and the WFD catchment characterisation are complete.	Irish Water does not form national policy on industrial planning, or any area of planning and development; it ensures that water supply and wastewater services are not limiting factors on properly approved development. Irish Water will ensure water supplies and wastewater treatment capacity are available for proper planning and development in accordance with national spatial planning policy and unfolding development. Independent economic evaluation of the likely future deficiency in water supply infrastructure to meet the requirements of the Irish economy has been carried out. Research estimated the cost of a 1 day disruption for the Greater Dublin Area would be over €78 million. There	Irish Water is proceeding in an integrated way with spatial and environmental planning authorities.

POAR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	National Planning Framework 2016-2036 (NFP) is imminent. Because national plans are pending, WSP should be postponed until the NPF has been finalised so WSP can be proofed against it. Irish Water is limiting WSP options to Shannon abstraction and is acting as policymaker on FDI and industrial / spatial policy. Deficiencies in water supplies along the Benefitting Corridor should be resolved locally. Smaller schemes will be abandoned to justify the need for WSP in these areas. Devoting a large budget to one scheme diverts resources away from Midland areas outside the Benefitting Corridor. Recommend a Cost Benefit Analysis comparing WSP with developing smaller schemes on the Benefitting Corridor, replacing small sources with one large system does not improve resilience, area would be affected if the system shut down. Resources must be invested in developing the West and locating industry along the major water resources there, rather than over-developing Dublin and moving water into different river basins to do so. Dublin is getting too big for the country, need to spread economic activity and jobs. East of Ireland will have less rainfall in future, the West will have	are significant negative employment impacts if adequate water supply is not available for indigenous & overseas businesses. The Water Services Strategic Plan (WSSP, Feb 2015), a strategy for the next 25 years, is the strategy between water supply and wastewater treatment, overarched by a WFD approach to protecting source water quality, ecology and morphology. This aligns with the views of many stakeholders. With regards to the Midlands, two-thirds of WSP demand is estimated to arise from replacing inadequate sources; replacing one water source with another does not give rise to additional wastewater. Engineering & planning processes for WSP are being undertaken in consultation with environmental and planning authorities, government bodies, national/regional stakeholder groups, and members of the public. WSP planning process is integrated with national & regional planning activities. Irish Water is cognisant of pending changes. The success of a planning application relies on robust demand projections, so water demand will be kept under review as the project moves towards a formal Planning Application. This includes a review following	

POAR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	more, due to climate change, future economic policy should direct more economic activity to Western regions along the Shannon. WSP is Dublin-centric, contrary to National Spatial Strategy. The project prioritises expansion / centralisation of development in Dublin and reduces capacity and attractiveness of the Midlands and West. Poor planning policy, it introduces unsustainable development capacity in the Greater Dublin Area by providing a new drinking water source without additional wastewater capacity, reducing resilience of water systems.	Census 2016 and following further feedback from the metering programme. A case to An Bord Pleanála and to the CER needs a high degree of predictive reliability to be accepted.	
Engineering & Planning • Engineering and Planning of Alternative Options	Have costs of abstracting water from other sources, been compared with abstraction at Parteen? Irish Water has expertise advantages compared with small communities, has Irish Water plans to provide funding / support to ensure that planning is balanced & small communities have meaningful input. Incorporate Garryhinch storage into the Emerging Preferred Option, it could accommodate 2 months' supply storage to counter drought, and improve residence times in Lough Derg. Prefer abstraction at Parteen rather than Lough Derg. While variable abstraction rates could be accommodated at Parteen Basin, they would not be required, unlike for abstraction at NE Lough Derg.	A multitude of options were considered, including all options suggested by stakeholders. Parteen Basin has fewer environmental and economic impacts and greater benefits for national planning than alternatives. It supports the development of areas in the Benefitting Corridor as well as the Greater Dublin Area. WSP planning process has focused on areas in the Benefitting Corridor identified for growth in County Development Plans & Regional Planning Guidelines. Future growth will be determined by 'proper planning and sustainable development' as outlined in the Planning Acts. The National Planning Framework, Regional Planning Guidelines, and County Development Plans	Irish Water is proceeding with the Preferred Option of abstraction from the Shannon at Parteen Basin.

POAR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	Garryhinch reservoir design could reduce / remove risks with karst bedrock. Garryhinch storage would meet goals & policies of Midland Regional Planning Guidelines. Include socio-economic benefits in assessment. Assess impacts & capital/operating costs of options. Examine Options in terms of National Spatial Strategy & Regional Planning Guidelines. Favour abstraction at Lough Ree and Storage at Garryhinch. WSP has not considered flooding. Lough Ree could supply water demand.	will determine where growth occurs, in a legislative framework. Benefitting Corridor is an opportunity to rationalise existing stressed water infrastructure in the midlands. This impacts not only current need but the ability to respond to changing demands. Communities in the Benefiting Corridor have the prospect that the same utility which brings opportunity with clean water can prevent wastewater treatment capacity becoming an impediment to taking up that opportunity.	
Public Consultation Process	Public consultation days should be held in Carrick on Shannon, actions which take place on the River Shannon network ultimately affect the town. Consultation period is only lip service as Irish Water has already made its mind up. Timelines to engage are tight. Irish Water is holding “closed sessions” with stakeholder groups who have vested interests, public are largely excluded. Consultation documents are extensive, detailed & technical, making engagement almost prohibitively challenging for organisations of limited capacity. The national significance and historic scale of the project is grossly under appreciated by the Irish public and there is a lack of confidence among the public in the meaningfulness of public participation.	While not a statutory requirement, Public Consultation has been carried out at each stage of the project. Reports and supporting documentation have been made publically available. Opinions / suggestions for enhancing public consultation are welcomed. Due to the large study are we kept events within the study area. Carrick on Shannon is upstream of Lough Derg and therefore will not be impacted by any abstraction from Parteen Basin or Lough Derg. Details of the comprehensive media campaign undertaken and written briefings sent to individuals and stakeholder groups are detailed in Sections 2.3 and 2.4 of POAR Volume 6 Appendix H.	

POAR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	The Offaly County Council Local Economic & Community Plan 2016-2021, includes an objective to maximise opportunities for Offaly arising from strategic infrastructural projects/priorities.		
Sustainability • Sustainability & Carbon Footprint	WSP is Dublin-centric; explore spreading economic activity and jobs to other and sustainable areas of the country. Because the project is focused on a new drinking water source and does not include capacity for additional treated effluent, it could reduce the resilience of potable water and introduce unsustainable development capacity in the Greater Dublin Area. Pipeline and infrastructure construction have a carbon footprint, impacting on efforts to address climate change. Disagree with Desalination - cost & carbon emissions. Favour the Parteen Basin option over Desalination, Desalination requires large amounts of energy and will also lead to the production of a highly concentrated salt solution that will need disposal. While Desalination is expensive, sea water is endless in supply, compared to Lough Derg so it is a sustainable source with more benefits and positives than negatives.	The choice of water sources, locations, routes, construction methodology, materials used will be influenced by climate change considerations. Irish Water monitors research on climate change in Ireland. Climate change brings challenges. Irish Water aims to consolidate existing smaller water sources of unreliable yield, or elevated vulnerability to pollution, or low linkage and resilience, to achieve nationally uniform standards of service. The Termination Point Reservoir is proposed at Peamount, with a treated water pipeline from the Shannon at Parteen, making treated water supplies available over the maximum Benefitting Corridor more sustainably and efficient than providing individual local dispersed schemes in isolation. Sustainable development involves planning for future growth. Where / when particular industries will be located and what industries will be permitted, is a matter for national / regional policies and legislation.	Irish Water will pursue a policy of ensuring that water services are not a constraint on proper planning and development anywhere in the country. National planning policy remains the responsibility of Government and Irish water will support that policy as it develops.

POAR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	Resources should be spent on controlling flooding in the Shannon area rather than providing a new water source for the Eastern & Midlands Region. Allow floodwater into former bog areas to reduce farmland flooding and sequester carbon as peat, reducing greenhouse gases.		
Sustainability • Energy	Energy costs & opportunities associated with the Emerging Preferred Option. Concern about water currently used by ESB for hydroelectricity generation, and implications of displacing renewable energy with fossil fuels. Reducing renewable energy generation capacity at Ardnacrusha does not fit with government policy for a low carbon / energy economy. Increased energy needed to pump from Parteen rather than Lough Derg. Proposal for an alternative reservoir storage option. Increased energy costs for pumping water from Parteen Basin rather than from Lough Derg. Water level drop at Parteen would result in increased pumping energy needs & reduced generating capacity at Ardnacrusha. Incorporate raw water storage to manage water levels, optimise energy use by pumping water when electricity tariffs are low. Off-peak electricity from wind could pump water from Ardnacrusha to a storage dam in the Slieve Bloom Mountains. A dam would be a source of revenue and could help regulate the Shannon water levels while using	Additional pumping energy is required at Parteen due to friction losses in the additional pipeline length. The FOAR details the energy requirements for pumping in all water level circumstances. The tight operating water levels maintained by ESB will be unchanged by water abstraction from Parteen. Abstraction from NE Lough Derg, or a site drawing from the lake, would impact on lake water residence time, in prolonged dry weather, not mitigated by raw water storage. Desalination is a high energy intensive process compared to the Emerging Preferred Option.	Ardnacrusha supplies approximately 2% of the national grid energy requirement, and the WSP agreement with ESB will reduce the power generated at Ardnacrusha by approximately 2%. Discussions with ESB will seek to ensure this very small reduction is replaced from renewable sources.

POAR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	low cost off-peak energy.		

Table 5.1 : Summary of stakeholder issues raised during the POAR Consultation Period (26th February 2015 – 11th March 2016), Irish Water responses and influence on Project Development

Appendix A. POAR Advertisement

Public Consultation on Water Supply Project
Eastern and Midlands Region

UISCE ÉIREANN : IRISH WATER

A New Report Identifies Emerging Preferred Option For New Source of Water Supply

Irish Water invites you to have your say

Over the past two years Irish Water has, through extensive research and two phases of public consultation, established that there is a need for a new source of water supply for the Eastern and Midlands region of Ireland and identified four technically viable options for that new source.

A preliminary Options Report, published 26th November 2015, concludes two options remain as potentially viable solutions. They are: abstraction of water from the lower Shannon at Parteen Basin in Tipperary or Desalination from the Irish Sea (Dublin). The report identifies that Parteen Basin is the "emerging preferred option."

A 10 week public consultation period on the findings of the report is now taking place and concludes on 4 February 2016. All contributors are asked to give their views on:-

1. "Whether Irish Water has taken all relevant factors into account in reaching the findings outlined in the Preliminary Options Appraisal Report";
2. "How you would like Irish Water to communicate with you on future developments on this project".

The Report is available to view in County Libraries and at Local Authority Planning Offices in the counties within the Project Study Area (Clare, Dublin, Kildare, Galway, Laois, Limerick, Meath, Offaly, Tipperary, Wicklow and Westmeath) and can be downloaded from www.watersupplyproject.ie.

Submissions to the consultation process can be sent either by email to watersupply@water.ie or by post to Water Supply Project, Merrion House, Merrion Road, Dublin 4.

The closing date for receipt of submissions is 4 February 2016.

Irish Water will consider all submissions it receives, in combination with extensive research and assessments, as it moves towards deciding on and announcing a 'final' preferred option in mid-2016. Following the announcement of the final option, Irish Water will hold another public consultation before making a final decision and submitting its formal planning application to An Bord Pleanála in mid-2017.

For more information on this consultation phase and on the project generally, please visit www.watersupplyproject.ie or please call us on **1890 252 848 (from the Republic of Ireland) or 084 524 65059 (from Northern Ireland).**

Appendix B. POAR Press Release

EMERGING PREFERRED OPTION IDENTIFIED FOR NEW MAJOR WATER SOURCE FOR THE EASTERN AND MIDLANDS REGIONS

26th November 2015

Irish Water has today published a report that identifies the 'Emerging Preferred Option' for developing a new source of drinking water supply for the Eastern and Midlands Region. Over 40% of Ireland's population lives in this region and work has been on-going for 8 years to identify a new and sustainable water source to enable the region to grow into the future.

Over the past two years Irish Water, through extensive research and two phases of public consultation, has considered the need for a new source of water supply for the Eastern and Midlands Region and has identified four potential technically viable options for that new source. A Preliminary Options Appraisal Report, published today and based on an extensive assessment process applied to the four potential options, has found two of the four options remain as potential viable solutions. They are abstraction of water from the lower Shannon at Parteen Basin in Tipperary or desalination of water from the Irish Sea in Dublin. Of these two, the report identifies abstraction of water at Parteen Basin as Irish Water's emerging preferred option.

Abstraction at Parteen Basin has the least environmental impact of the four options under consideration. It can avail of existing 'hydro-power' infrastructure which ensures that the proposed water abstraction can be implemented within existing normal operating water levels and with no impact on statutory flow requirements in the Lower Shannon, meaning that there is very limited impact on the lake. Abstraction from hydro-power facilities is common practice worldwide and the Parteen Basin option will use only a small fraction (approximately 2%) of 'hydro-power' water that would otherwise have been used for power generation and then discharged to sea. Importantly, the proposed new scheme also creates multiple opportunities to supply treated water to communities in the vicinity of Parteen Basin and along a route corridor from Parteen Basin to Dublin. Counties to be supplied include Clare, Tipperary, Offaly, Laois, Westmeath, Kildare, Meath and Dublin.

The Preliminary Options Appraisal Report concludes that desalination, as the only other potentially viable option at this stage of the project, is much less suitable than the Parteen Basin option, due primarily to higher costs, being a Dublin-centric solution, and being a less environmentally friendly option with a considerably higher energy requirement, chemical usage and brine discharge.

The Water Supply Project is now undergoing rigorous environmental assessment to ensure that all possible relevant factors are examined in reaching a final decision on the best option. As part of that process, a ten week period of public consultation on the 'Preliminary Options Appraisal Report' is now taking place which concludes on 4 February 2016. Any considerations arising from this third consultation process will be evaluated as part of the determination of the final choice of a new water supply for the Eastern and Midlands Region.

John Tierney, Managing Director of Irish Water explained the importance of this project for Ireland's future economic growth. "The existing water supply sources for the Eastern and Midlands Regions do not have the capacity or resilience to meet demand for an additional 330 million litres of water per day which increased population and economic growth will generate by 2050." "A new source must be identified", he said. "This project is not simply about finding a solution for Dublin's future water supply, it is also about ensuring that the entire country can thrive by facilitating growth in the Eastern and Midlands where 40% of our population lives", John Tierney explained. "Irish Water is working to deliver the most efficient and cost-effective solution to this challenge which can be implemented with minimal environmental impact. Parteen Basin, the emerging preferred option, can deliver a sustainable water supply with the least environmental impact while benefiting the widest number of domestic and commercial water customers throughout the region", John Tierney said.

Copies of the Preliminary Options Appraisal Report for the Water Supply Project Eastern and Midlands Region can be downloaded from the project website www.watersupplyproject.ie. The site also provides FAQ's, covering a wide range of project related topics and also details on the previous phases of this project.

For media queries contact the Irish Water press office on 087 145 8896 or email press@water.ie.

ENDS

NOTE TO EDITORS

Water Supply Project Eastern and Midlands Region – Preliminary Options Appraisal Report

Summary of findings

Why the Shannon?

- The Shannon is the most suitable source of new supply for a number of reasons;
- It provides treated water, delivered in a way which brings the greatest availability and economic advantages to the widest group of communities in Irish Water's Eastern and Midlands Region. Towns and communities along the proposed pipeline route through the Eastern and Midlands Region will gain a secure water supply to meet future domestic, commercial and industrial water requirements and therefore the opportunity to grow and boost their economies. This option will help to ensure that all consumers will have a reliable and sustainable water supply with minimal risk of outages.
- It enables the delivery of a more efficient and up to date water supply infrastructure by facilitating the development of fewer and more modern water treatment plants to replace the numerous small, inefficient and outdated plants currently operating across the region.
- It is less expensive by a factor of 1.5, with a lower carbon footprint than desalination which is the only other remaining technically viable option under consideration.

Why Parteen Basin?

The Parteen Basin is the most suitable location on the River Shannon because:

- It has, by far, the least environmental impact of the three Shannon options which have been under consideration. It is the closest location to the river mouth with most of the water having already flowed through the Shannon. By contrast, the other two Shannon options based on North East Lough Derg abstraction (one with storage at Garryhinch), involve abstraction much further up-river, carry greater risk of environmental impact and also risk transfer of potentially environmentally damaging species such as Asian clams and zebra mussels into other river catchments;
- The pipeline from Parteen will serve treated water to more locations, towns and communities en route from the Shannon to Dublin than any other option;
- Abstraction of water at Parteen is already highly regulated because of the presence of the existing hydro-power plant. The proposed abstraction of water is, in essence, an abstraction of water from the hydro-power scheme.
- Abstraction of water from hydro-electric power schemes is commonly employed worldwide to enable environmentally sustainable availability of drinking water.

Why not Desalination?

Desalination is emerging from the assessment process, carried out to date, as the only other viable option but is much less suitable than the Parteen Basin option for a number of reasons;

- It is at least 1.5 times as expensive regarding cost of water delivered

- It is a Dublin-centric solution so it does not deliver the widespread benefits to towns and communities throughout the Eastern and Midlands Region.
- It is a less environmentally friendly option than the Parteen Basin option because the provision of desalinated water requires long-term high energy inputs in the overall treatment process leading to a greater carbon footprint. It also uses numerous chemicals and consequently represents a greater potential environmental threat.

Community gain

As with all strategic infrastructure projects, the planning process requires that due consideration of community gain is undertaken by the planning applicant. In addition to improved and sustainable domestic and commercial water supplies, the communities along the route of the pipeline are also in a position to gain some specific additional benefits. Many products and services needed during construction will be sourced from local businesses; the construction phase of the project will provide a range of employment opportunities for local people. Irish Water propose to engage with Local Authorities and other relevant bodies with a view to sponsoring training schemes to enable those local businesses/ workers to develop the necessary skills to be employed on the project - e.g. welding, metalwork, plant operators, skilled operatives, general operatives. Irish Water also propose to support projects that contribute towards achieving the conservation objectives of the Lower Shannon Special Area of Conservation (SAC) and the objectives of the River Basin Management Plans and the development of environmental education and protection initiatives and sports & leisure facilities.

Of the two remaining water supply options under consideration, the Emerging Preferred Option (Parteen Basin) has the potential to give rise to the greatest breadth and variety of community gain as its 165km pipeline crosses several counties en route between the Shannon and Dublin. The Desalination Option benefits a much smaller area. See further information on community gain below.

Consultation Process

A ten week public consultation process which seeks views on the content and findings of the Report now begins. It is open to everyone. Details of how to take part can be found at www.watersupplyproject.ie. National and local media advertisements will also advise of opportunities to participate.

The feedback on this upcoming consultation will be included as part of the final phase of research and assessment on the options which will conclude in mid-2016 with the publication of the Final Options Appraisal Report. At that point a 'final' preferred option will be put forward for public consultation before proceeding to the remaining phases of the planning process in 2017 which will involve consulting on the 'Scope of the Environmental Impact Statement (EIS)' and submission of the planning application to An Bord Pleanála for their independent adjudication. An Bord Pleanála will undertake all necessary statutory consultations including Oral Hearings where everyone will again be entitled to have their say.

The following note on community gain accompanied the press release:

WATER SUPPLY PROJECT EASTERN AND MIDLANDS REGION - COMMUNITY GAIN

NOTE:

The details provided in this document are indicative figures and outcomes only and based on information available at this point in the assessment process. Further work will be undertaken in the coming months, including incorporating feedback from the consultation process, in order to determine the final position.

Irrespective of the eventual solution for the project, Community Gain is part of the planning process for Strategic Infrastructure Development (SID). Since the Emerging Preferred Option (Parteen Basin) has the potential to

give rise to the greatest breadth and variety of community gain it is being used for Community Gain illustrative and consultative purposes – this is in accordance with 'best practice impact assessment'. The desalination option potentially benefits a much smaller area than Parteen.

PLEASE NOTE:

The details provided in this document are indicative figures and outcomes and are best estimates based on information available at this point in the assessment process (November 2015). Further work will be undertaken in the coming months, including incorporating feedback from the consultation process, in order to determine the final position.

Background

Over the past two years Irish Water has, through extensive research and two phases of public consultation, established that there is a need for a new source of water supply for the Eastern and Midlands Region of Ireland and identified four technically viable options for that new source.

A Preliminary Options Appraisal Report which details the extensive assessment process applied to those four potential options, three of which are located on the Shannon with the fourth being Desalination (Dublin), was published on 26 November 2015.

The report concludes that the assessment process has found two of the four options remain as potential solutions. They are abstraction of water from the lower Shannon at Parteen Basin in Tipperary or Desalination (Dublin). Of these two, the report identifies abstraction of water at Parteen Basin as Irish Water's "emerging preferred option."

The WSP project is currently undergoing rigorous environmental assessment (including comprehensive water quality modelling / monitoring of Lough Derg / Parteen Basin in order to simulate abstraction impacts under a wide range of representative climatic conditions). This continuing research and assessment needs to be done to ensure that all possible relevant factors are examined in reaching a final decision. As part of that process a 10 week period of public consultation on the 'Preliminary Options Appraisal Report' is now taking place and it concludes on 4 February 2016. Any considerations arising from that third consultation process will be evaluated as part of the determination of the final choice of scheme.

Emerging Preferred Option

The studies to date strongly suggest that the Parteen Basin option has the least environmental impact of all options under consideration for meeting future water supply needs in Irish Water's Eastern and Midlands Region. It avails of existing state-owned hydro-power infrastructure which enables water abstraction within existing normal operating water levels and with no impact on statutory flow requirements in the Lower Shannon. Therefore this option would have very limited impact on the lake. Abstraction from hydro-power facilities is common practice worldwide for enabling sustainable availability of water for use by communities and industry. The scheme will use a small fraction (approximately 2%) of 'hydro-power' water to develop a new water source for 40 per cent of Ireland's population resident in the Eastern and Midlands Region. The abstracted water would otherwise have been used for power generation and then discharged to sea. The abstraction of water will result in a 2% reduction in hydro-power generation at Ardnacrusha.

Water Supplies (Mid-West & Midlands)

The proposed new scheme creates multiple opportunities to supply treated water to communities in the vicinity of Parteen Basin and along a route corridor from Parteen Basin to Dublin. Counties to be supplied include Clare, Tipperary, Offaly, Laois, Westmeath, Kildare, Meath and Dublin.

An Bord Pleanála

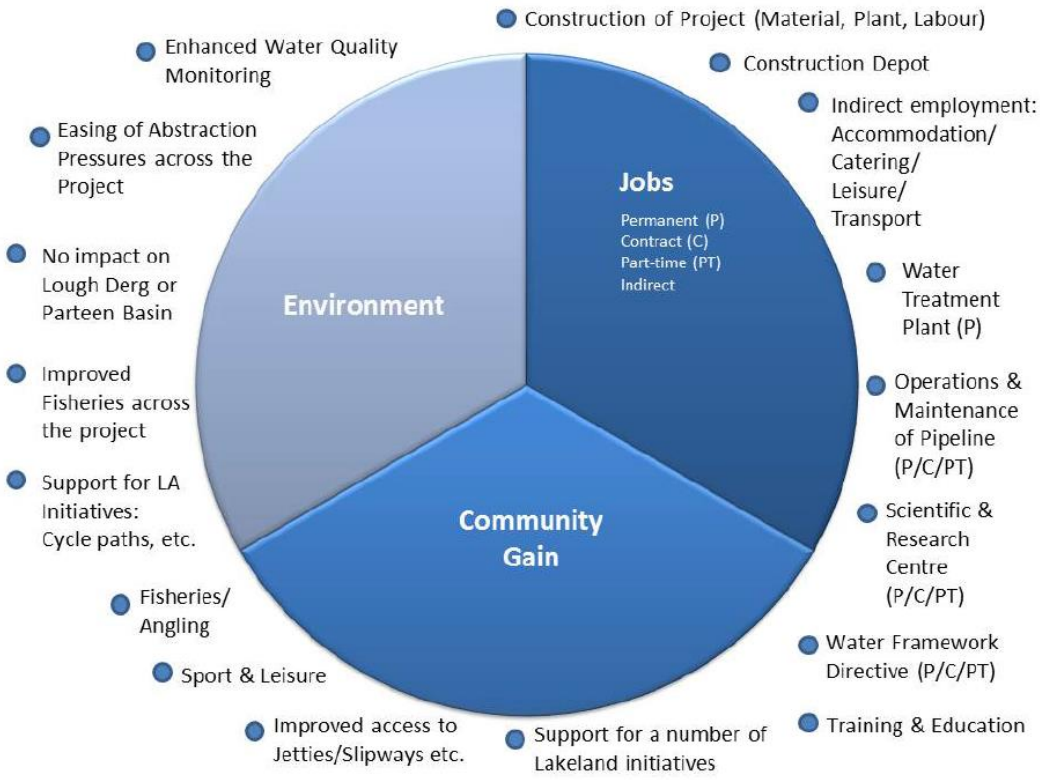
The planning application will involve a direct submission by Irish Water to An Bord Pleanála. The planning application will be supported by an Environment Impact Statement (EIS) and it will also include Water Abstraction Agreements and procedures for acquisition of land for pipeline wayleaves and sites. Planning consent will be subject to compliance with environmental law, compliance with all requirements of relevant statutory stakeholders and planning permission for the overall water supply scheme from An Bord Pleanála.

Community Benefit

In progressing a Planning Application under the Strategic Infrastructure Act, An Bord Pleanála, should they decide to grant permission, may specify conditions that provide for 'community gain'. This recognises the nature of this scheme as providing national benefit, with the potential for local impacts offset by 'community gain' measures. Meaningful 'community gain' is normally best developed in consultation with stakeholders, culminating in proposals developed in partnership with such stakeholders, and proactively submitted to An Bord Pleanála, and this is the approach which Irish Water propose to follow on WSP.

A water supply project from the Shannon to the Midlands and East would involve a transfer of water across catchment boundaries, and community benefit proposals being developed by Irish Water acknowledge this. The communities in the vicinity of the project share in the primary benefit of the proposed scheme which is the availability of secure and high quality water supplies to facilitate economic growth and employment creation. The primary benefits of WSP also extend to availability of secure and high quality water supplies in the Limerick / Ennis corridor, using opportunities to deploy excess capacity at the Clareville Water Treatment Plant together with the new proposed WSP Treatment Plant in Tipperary.

The following 'Pie-Chart' provides a high level overview of areas which would normally be targeted for Community Benefit and which Irish Water propose to pursue in their planning application with An Bord Pleanála.



Preliminary Assessment of Community Benefit for WSP

This section looks at both the potential direct benefits of the project to the local economy but also examines potential complementary activities which could be incorporated into the project in order to enhance local social, economic and environmental benefit for the Lower Shannon Region at Parteen & Lough Derg. Such benefits would largely be realised by creation of a 'Community Benefit Fund' associated with the project.

On the assumption that Irish Water's current 'emerging preferred option' is also the 'final preferred option' to be brought successfully into and through the planning process, then Capital Spending on Labour (Job Creation), Plant and Materials would typically be anticipated as outlined in Table 1 below.

WSP Construction Phase

Based on an estimated Capital Spend of €700m - €800m over a 4 year period and making due allowances for potential Plant, Labour and Material sourced 'Outside Ireland', typical high level estimates of 'spend per county' or 'spend per region' associated with the 'Construction Phase' of the WSP Project, based on similar engineering projects, would be as outlined below in Table 1.

Table 1

County / Region	Capital Spend per 'County'	Construction Jobs Labour (Peak)	Construction Plant*	Construction Material	Indirect Jobs
Limerick & Clare	€57m	112 (€23m)	€17m	€17m	Accommodation Catering Leisure Transport etc.
Tipperary	€124m	247 (€38m)	€28m	€58m	
Midlands	€117m	233 (€53m)	€22m	€42m	
Kildare & Dublin	€133m	264 (€38m)	€45m	€50m	
Rest of Ireland	€73m	170 (€30m)	€24m	€19m	
Total (rounded)	**€504m**	**1026 (€182m)**	**€136m**	**€186m**	

**Excavators, bulldozers, cranes, trucks, compressors, welding equipment etc*

WSP Operational Phase

Additional jobs associated with Pipeline Operation & Maintenance Activities and a 'Data & Scientific Centre' co-located near the proposed abstraction facility in Co Tipperary are as outlined in Table 2.

Table 2

Activity	Permanent	Contract / Part-Time
Water Treatment Plant	15	5
Pipeline Operations & Maintenance Centre	3	50
Data, Research & Scientific Centre / WFD	3	25
Total	21	80

Community Benefit Fund

A typical Community Benefit Fund would involve:

- A 'Once-Off' Lump-Sum payment (normally based on a percentage of the Capital Expenditure). In this regard every percentage point would be the equivalent of €7m-€8m of funding.
- A 'Variable' Annual Payment based on some measureable variable component of the scheme e.g. a payment could be linked to water throughput. In this regard, every cent per cubic metre would be approximately equivalent to €1m per annum at full water throughput.

The disbursement of the initial once-off lump sum (and disbursement in future years) would normally be targeted at relevant 'community related' areas of which the following appear worth considering in the context of the WSP project:

Tourism

- Support for '**Lakelands'** Projects on Lower Shannon e.g.
  - Support for Branding / Awareness Creation
  - Hiking-trail & cycle path furnishings / enhancements, Jetties
- Support for **'Lakelands'** Interpretive Centre (Lough Derg)
  - Raising Awareness / Promotion (Location / Attraction)
  - Educational (Interpretive)
  - Protection (Environmentally fragile Locations)
- Angling is worth €0.75bn annually to the Irish economy, and sustains 10,000 rural jobs. Potential enhancement of fisheries amenities on the Shannon, in partnership with other relevant statutory authorities and fisheries bodies (ESB / Inland Fisheries Ireland / Local Clubs) Fishery improvement works along pipeline route (river & stream crossings)
- Navigation – transparent availability of water level data in real-time

Environmental

- The good ecological status of Lough Derg is a top priority, and independence of monitoring helps to build trust. A Scientific & Research Centre on L Derg with transparent availability of water quality and abstraction data, brings water supply from Parteen under public scrutiny of schools, anglers, navigation, tourism and graduate researchers, and protects the resource that underpins the tourism economy on Lough Derg
- Measures to limit construction impacts by keeping plant off roads as far as possible and improving rural roads (following their use as 'haulage routes)
- Support for local authority environmental initiatives / projects such as refurbishment or expansion of facilities such as greenways, walkways, cycle paths

Sport and Leisure

- Support for improved water access with jetties /slipways
- Support for improvement of existing and development of new water sports facilities
- Support for schools, playgrounds, sporting complexes, and community halls/centres

Training and Education

- Support for sponsorship and organising relevant courses to up-skill welders, skilled workers and other occupations needed for construction of pipeline and other on-going work.
- Support to 3rd level water research programmes on Lough Derg allied to the WFD Centre
- Liaison with University of Limerick and Institute of Technology bodies to ensure appropriate up-skilling support
- Work with local businesses to help them identify their training needs and provision of support with access to suitable training.
- Work with Local Authorities to provide support for other relevant training and educational support schemes.

Disbursement of Community Benefit Funds among the targeted areas could typically expect to be apportioned as per Table 3.

Table 3

Benefiting Sector	Anticipated % Allocation
Tourism	20%
Sport & Leisure	15%
Training & Education	15%
Environmental	35%
Other 'Initiatives'	15%

Miscellaneous

In addition to examples outlined above, the proposed Water Supply Scheme has the potential for generating further economic benefits resulting from:

- New Industry potentially locating in the Region resulting from availability of new Water Infrastructure e.g.
  - **Agri-Food:** The Department of Agriculture, Food and the Marine is currently preparing a national strategy for the Agri-Food Sector up to 2025 which will outline the key actions required to ensure that the agri-food sector (primary agriculture, the food and beverage industry, forestry and forestry processing) maximises its contribution to overall economic growth, job creation and environmental sustainability over the coming decade and builds upon the progress achieved under Food Harvest 2020 – availability of secure, resilient water supplies are essential for achieving these goals
  - **Information Communications Technology (ICT):** Ireland's ICT sector is world-renowned and continues to grow. Nine of the world's top 10 ICT companies are located here and the IDA supports over 200 firms. The industry employs over 37,000 people and generates €35 billion in exports annually. The ICT Sector comprises 'water-intensive' industries which are reliant on secure, resilient water supplies into the foreseeable future
  - **Pharma:** Ireland is home to a highly successful pharmaceutical industry, attracting businesses from overseas as well as supporting local enterprises. The industry has performed impressively over the last few years (despite economic slow-down);
    - 9 out of 10 of the world's largest pharmaceutical companies have a presence in Ireland with 120 overseas companies having plants here
    - The sector employs over 25 000 people directly with a further 25 000 people employed in providing services to it
    - 50% of all Ireland's exports are now pharmaceutical and within the EU, Ireland is the largest net exporter of pharmaceuticals.
    - The pharma sector is reliant on continuous secure& resilient water supplies.

See also WSP website (www.watersupplyproject.ie) 'Frequently Asked Questions (FAQs)' in relation to further aspects of the project including FAQs on different aspects of Community Gain and Landowner Engagement Proposals and Codes of Practice for Operations on Land.

26th November 2015.

Appendix C. Sample POAR launch email sent to stakeholders

Dear X,

As part of its remit to deliver a sustainable and resilient national water supply, Irish Water published its Preliminary Options Appraisal Report (POAR) on 26th November 2015. The report details the two year assessment process carried out on the four viable options for a new water supply for the Eastern and Midlands region of Ireland. It also identifies abstraction and treatment of water at the Parteen Basin on the lower Shannon in County Tipperary together with a treated pipeline between Parteen and Dublin, as the Emerging Preferred Option.

The Preliminary Options Appraisal Report provides detail on the assessment process and can be read at www.watersupplyproject.ie.

Submissions can be made by email to watersupply@water.ie, or by post to Water Supply Project, Merrion House, Merrion Road, Dublin 4. If you require any further information, please contact us on lo-call 1890 252 848 in the Republic, or on 0845 246 5059 in Northern Ireland. Closing dates for receipt of submissions is 4th February, 2016.

Kind regards,

Project Manager

Appendix D. Newspaper articles on the WSP published during the POAR consultation

Media Outlet	Publication Date	Headline
Irish Independent	26 Nov 2015	Shannon to supply capital with 300m litres of water daily
Kildare Nationalist	26 Nov 2015	Irish Water set to confirm plans to use River Shannon to deal with Dublin shortages
Sunday Business Post	26 Nov 2015	Irish Water to take water from the Shannon to supply Dublin
Wexford Echo	26 Nov 2015	Irish Water set to confirm plans to use River Shannon to deal with Dublin shortages
Clare Champion	27 Nov 2015	Parteen Basin abstraction is favoured
Irish Daily Mail	27 Nov 2015	Fear over Irish Water plans to take supplies from Shannon
Irish Examiner	27 Nov 2015	Parteen option has least environmental impact
Irish Examiner	27 Nov 2015	Plan to take Shannon water is complex
Irish Independent	27 Nov 2015	Irish Water's plans for Shannon faces European challenge
The Herald	27 Nov 2015	Plans to pipe water from Shannon to city will be opposed under EU rules
Offaly Independent	28 Nov 2015	Garryhinch reservoir option flushed by Irish Water
Sunday World	29 Nov 2015	Shannon not water cash cow
Limerick Leader	30 Nov 2015	Fury over plans for Shannon
Clare Courier	01 Dec 2015	McDonagh opposes plan to supply Dublin from Shannon River source
Clare People	01 Dec 2015	Irish Water to face 'political battle'
Irish Times	01 Dec 2015	Supplying Dublin's water
Leinster Express	01 Dec 2015	Political joust over the loss of reservoir
Leinster Express	01 Dec 2015	Water Plan to build reservoir on bog abandoned after cost escalated
Limerick Chronicle	01 Dec 2015	Extraction plans: Opposition mounts to Irish Water's proposals for River Shannon
Athlone Topic	03 Dec 2015	River Shannon Protection Alliance pledge to oppose plans to extract water from river
Limerick Leader	03 Dec 2015	River is seen as a cash cow and Dublin want to milk it
Tipperary Star	03 Dec 2015	Lough Derg abstraction is ruled out
Clare Champion	04 Dec 2015	Group warns Lough Derg abstraction will threaten tourism enterprises
Limerick Leader	05 Dec 2015	(Newport local news) Water Scheme
Limerick Post	05 Dec 2015	Local concern over Lough Derg water extraction plan
Nenagh Guardian	05 Dec 2015	Economic boost stressed by Irish Water

Media Outlet	Publication Date	Headline
Nenagh Guardian	05 Dec 2015	Mixed views on water plan
Nenagh Guardian	05 Dec 2015	Parteen focus for Dublin supply
Laois Nationalist	08 Dec 2015	Vexed issue of water charges leads to war of words from general election candidates
Limerick Post	12 Dec 2015	Down the drain
Nenagh Guardian	12 Dec 2015	Storm causes flooding and havoc
Westmeath Independent	12 Dec 2015	Questions remain on flooding saga
Sunday Business Post	13 Dec 2015	Government must act now to stop future flooding
Leinster Express	15 Dec 2015	Time to cut out the 'silly little games'
Leinster Express	15 Dec 2015	Garryhinch 'dead in the water'
Leitrim Observer	16 Dec 2015	O'Hora calls on Irish Water to host public meeting in Carrick
Tullamore Tribune	17 Dec 2015	Shannon-Dublin Water Pipeline will supply Birr, Tullamore and Edenderry
Irish Times	18 Dec 2015	Giving developers a free ride on water infrastructure is not a long-term solution
Leinster Express	22 Dec 2015	'I did not seek publicity' insists Deputy Brian Stanley *(Opinion letter)*
Leinster Express	22 Dec 2015	'Garryhinch is dead in the water' councillors told
Midland Tribune	24 Dec 2015	Shannon-Dublin Water Pipeline would supply Birr, Tullamore and Edenderry
Athlone Advertiser	30 Dec 2015	New water proposals will impact Shannon in Athlone area - RSPA
Irish Mail on Sunday	10 Jan 2016	Irish Water plan boost
Tullamore Tribune	14 Jan 2016	Garryhinch reservoir could store water from Shannon
Clare Champion	15 Jan 2016	Derg abstraction incentive branded a 'bribe'
Limerick Leader	16 Jan 2016	Landowners set for pay-off if extraction plans go ahead
Limerick Leader	18 Jan 2016	Irish Water dispute claims by RSPA over extraction
Limerick Chronicle	19 Jan 2016	Council votes to reject water extraction plans
Irish Examiner	20 Jan 2016	Politicians unite to block Irish Water proposal
Clare Champion	22 Jan 2016	Diverse views expressed on water abstraction
Tipperary Star	2 Feb 2016	Concerns over choosing route for water abstraction plan from the Shannon
Irish Examiner	4 Feb 2016	Landowners await route of 165-km water pipeline
Clare Champion	5 Feb 2016	Irish Water insists Lough Derg abstraction cannot adversely affect environment
Clare Champion	5 Feb 2016	Hands off our Shannon *(Opinion letter)*
Midland Tribune	18 Feb 2016	Plan to divert water from River Shannon to Dublin
Clare Champion	19 Feb 2016	Meeting on Lough Derg water abstraction

Media Outlet	Publication Date	Headline
Connacht Tribune	19 Feb 2016	Water diversion
Nenagh Guardian	20 Feb 2016	Meeting on Derg abstraction
Midland Tribune	25 Feb 2016	The River Shannon Protection Alliance
Clare Champion	26 Feb 2016	Lough Derg lobby group seeks support from General Election candidates
Connacht Tribune	26 Feb 2016	Portumna: Water lobby
Midland Tribune	10 Mar 2016	Proposed Plans to Divert Water from River Shannon
Connacht Tribune	11 Mar 2016	Meeting is told about Shannon water plans
Nenagh Guardian	12 Mar 2016	Lough Derg Water Proposal

Table D.1 : Relevant newspaper articles referencing the POAR (26th November 2015 – 11th March 2016)

Appendix E. Radio broadcasts on the WSP during the POAR consultation

Media Outlet	Publication Date	Headline
Clare FM - 9am news	26 Nov 2015	Irish Water outlines plans on water extraction from Parteen Basin
Clare FM - 11am news	26 Nov 2015	Irish Water outlines plans on water extraction from Parteen Basin
Clare FM – 1pm news	26 Nov 2015	Opposition to Water Extraction Plans remains strong in Clare
Clare FM – 5pm news	26 Nov 2015	Opposition of Irish Water vowed to set up their campaign against the project
FM104 – 1pm news	26 Nov 2015	Plan to pipe water from Shannon to Dublin will destroy tourism around Lough Derg
FM104 – 3pm news	26 Nov 2015	Plan to pipe water from Shannon to Dublin will destroy tourism around Lough Derg
Galway Bay FM – 1pm news	26 Nov 2015	Lough Derg group says water extraction plan could devastate tourism
Kildare FM – 9am news	26 Nov 2015	New supply of drinking water for Dublin and Midlands
Kildare FM - 11am news	26 Nov 2015	Irish Water proposes Shannon pipeline to serve Dublin and Midlands
Kildare FM – Kildare Today	26 Nov 2015	New supply of drinking water for Dublin and Midlands
Limerick's Live95FM – 9am news	26 Nov 2015	New supply of drinking water for Dublin and Midlands
LMFM – 9am news	26 Nov 2015	New supply of drinking water for Dublin and Midlands
NewsTalk – 8am news	26 Nov 2015	Shannon pipeline could supply Dublin and Midlands
NewsTalk – The Breakfast Show	26 Nov 2015	Shortfall in Water Supply
Radio Kerry – 9am news	26 Nov 2015	New supply of drinking water for Dublin and Midlands
RTE Radio1 – 7am news	26 Nov 2015	Shannon pipeline could supply Dublin and Midlands
RTE Radio1 – 8am news	26 Nov 2015	Shannon pipeline could supply Dublin and Midlands
RTE Radio1 – 9am news	26 Nov 2015	Shannon pipeline could supply Dublin and Midlands
RTE Radio1 – Morning Ireland	26 Nov 2015	Irish Water proposes Shannon pipeline to serve Dublin and Midlands
RTE Radio1 – Morning Ireland	26 Nov 2015	RSPA view on Shannon pipeline to serve Dublin and Midlands
South East Radio FM – 12:55 news	26 Nov 2015	Lough Derg has enough water to supply Dublin
Tipp FM – 10am news	26 Nov 2015	New supply of drinking water for Dublin and Midlands
Tipp FM – Tipp Today	26 Nov 2015	Lough Derg group says water extraction plan could devastate tourism

Media Outlet	Publication Date	Headline
Tipp FM – 1pm news	26 Nov 2015	Lough Derg group says water extraction plan could devastate tourism
Tipp FM – 5pm news	26 Nov 2015	Lough Derg group says water extraction plan could devastate tourism
Tipp FM – Tipp Today	26 Nov 2015	Shannon pipeline could supply Dublin and Midlands
Today FM – The Last Word	26 Nov 2015	Irish Water proposes taking water from Shannon to supply Dublin
NewsTalk – The Pat Kenny Show	27 Nov 2015	Irish Water's plans for Shannon faces European challenge
Limerick's Live95FM	2 Dec 2015	Irish Water insists Parteen Basin extraction plan isn't bade for Limerick
NewsTalk – The Pat Kenny Show	8 Dec 2015	Interview with Tony Cawley, Hydrologist, about Shannon water levels
Tipp FM – 1pm news	28 Jan 2016	Concerns over lack of information on Shannon extraction plans

Table E.1 : Relevant Radio Broadcasts referencing the POAR (26th November 2015 – 11th March 2016)

Appendix F. Television broadcasts on the WSP during the POAR consultation

Media Outlet	Publication Date	Headline
TV3 – TV3 News at 5.30	26 Nov 2015	Critics slam Shannon water plan
TV3 – TV3 News at 8	26 Nov 2015	Critics slam Shannon water plan
RTE1 – Six One News	26 Nov 2015	Irish Water identifies preferred option to supply drinking water for Dublin and Midlands
RTE1 – Nine News	26 Nov 2015	Irish Water identifies preferred option to supply drinking water for Dublin and Midlands

Table F.1 : Television Broadcasts referencing the POAR (26th November 2015 – 11th March 2016)

Appendix G. Online Media coverage of the WSP during the POAR consultation

Published	Post	Key themes	Media Type
26 Nov 2015	***"Irish Water set to confirm plans to use River Shannon to deal with Dublin shortages"*** Irish Water is expected to confirm plans to store water from the River Shannon in a reservoir in Tipperary to supply Dublin and the Midlands. The proposal being put forward would see more than 300 million litres of water being taken from the Parteen Basin near Limerick every day. The company has been considering a number of options to deal with shortages in the Dublin region. There has already been strong local opposition in North Tipperary when the suggestion was first put forward. It is proposing the construction of a 165-kilometre pipeline from a reservoir on the Tipperary side, to the south of Lough Derg. The utility said that this option will have the least environmental impact of the four it examined and is close to the Ardnacrusha hydro-electric power station. Gerry Grant from Irish Water said that the detailed design process will start after a period of public consultation. "The next steps now are to have a 10-week public consultation process where we will have quite intensive engagement with stakeholders right around the Shannon," he said. "At the same time, we'll be finishing out some of the studies that we've been carrying out so far, surveys and so on, and we'll be beginning the process of detailed design, because we now have to establish the technical details of the works of extraction - the precise location for the treatment plant, for example." ***Comments relevant to WSP:*** • If only they spent the money on fixing leaks instead of fitting meters...with all the leaks fixed it would give them a comfortable 20% over-supply for Dublin. • That unfortunately would be the common sense solution, but as we know there is no place for common sense in government organizations like Irish Water. This Shannon idea seems like a complex and expensive solution to a simple problem. There is probably more money to be made from doing the	**Leakage & Water Conservation** • Leakage	Breaking News.ie

Published	Post	Key themes	Media Type
	complex Shannon solution rather than the simple fix the leaks solution. It doesn't take a rocket scientist or a civil engineer to conclude that if the leaks aren't fixed adding more water to the system doesn't make any God given sense. • They needed to install the meters to establish where the major leaks are. • This Shannon water plan has been around for almost a decade.....long before Irish Water was set up. The 'spake' as usual is waffle... 'Expected to 'confirm' plans' - not 'will now go ahead and do it'.		
26 Nov 2015	***"Irish Water wants to pump River Shannon water to Dublin and Midland homes"*** The company said taking water from the Parteen Basin and pumping it through a pipeline is the best option to deal with the growing population. IRISH WATER HAS identified the Parteen Basin on the River Shannon as the best option for a new drinking water supply for Dublin and the Midlands. Work has been going on for eight years to identify a new and sustainable water source to enable the region to grow. Currently, 40% of the population lives in this region. A POAR published today identified two potentially viable solutions: • The abstraction of water from the lower Shannon at Parteen Basin in Tipperary • Desalination of water from the Irish Sea in Dublin. Of the two, the report identifies abstraction of water at Parteen Basin as the preferred option. The plan would involve taking hundreds of millions of litres of water from the river and pumping it through a pipeline. The report found this option would have the least environmental impact. The method would use existing hydropower infrastructure, ensuring abstraction can be done within existing normal operating water levels and with no impact on statutory flow requirements in the lower Shannon. Approximately 2% of the river's water from the Parteen Basin would be taken. "The existing water supply sources for the Eastern and Midlands Regions do not have the capacity or resilience to meet demand for an additional 330 million litres of water per day, which increased population and economic growth will generate by 2050," commented managing director John Tierney. "A new source must be identified." Counties to be supplied include Clare, Tipperary, Offaly, Laois, Westmeath, Kildare, Meath and Dublin. An environmental assessment is now underway and a ten week period of public consultation has begun. ***Comments relevant to WSP:***	**Alternative Options** • Desalination **Leakage & Water Conservation** • Leakage • Water demand & conservation **Sustainability** • Sustainability & Carbon Footprint **Environment & Fisheries** • Environment & Ecology	The Journal.ie

Published	Post	Key themes	Media Type
	• Wait for all the clowns saying the dubs are robbing our water. Same river that floods every year. I bet someone will suggest a desalination plant next costing billions. Our most precious resource belongs to us all. • The plan was to pump water from the Shannon to Dublin long before Irish water was even heard of!!!!! • Here is one article from 2008 that mentioned the plan to get water from the Shannon. In 2011 Dublin City Council published its Strategic Environmental Assessment for the Dublin Region WSP that mentioned getting water from the Shannon • That still doesn't make it right • "That still doesn't make it right" What's wrong with it? Water has to come from somewhere. Where else will it come from? The Dodder? Leaks should be fixed, but that still won't be sufficient for the growing population of Dublin and surrounding areas. Additional supply required even after fixing the leaks. • But Fingal has the best springs in the area for drinking water as well as the best farming land and the Palmerstown Ashbourne Residents Against the Superdump had trouble with the Fingal County council. The biggest threat to fresh water here is council dumps, farm waste getting into streams, the chemicals used to products to clean items and clothing like soaps, detergents and antibacterial chemicals to medications that come out of people through their water as in urine. All these thinks are found in drinking water and have an effect on the wildlife on and in the rivers as well as in people. It is causing sterility and intersex in fish, so what is it doing to people then. The best sources of fresh water these days is from wells but farm practices have effected them with e-coli in many cases but still better that cancer causing chemicals… • It is a good idea. Dublin needs the water. The west has a lot of it. • Dublin at the moment has only enough water with a very small reserve of only 1-2%, that's cutting it very fine indeed as supply could easily be affected by small weather changes. If we are to believe that 42% of the water going through the system leaks out before it gets to its destination, then it would be prudent to fix the leaks and end up with a reserve of at least 42%. So, fix the bloody leaks. Stop with the fancy money eating ideas about diverting the Shannon that could eat billions of euro and still end up leaking out of the pipes before it gets to its destination. The Shannon already has water level problems during the summer for the boating and cruise companies. • It would probably cost a lot more to replace all the old leaking pipes in Dublin, than what this project is		

Published	Post	Key themes	Media Type
	going to cost. 42% is a massive amount, but to even to get that down to below 20% would take years, cost lots of money, and lots of disruption to traffic as water mains would have to be dug up. That figure of 42% will drop though when people actually start paying for the water they use, any leaks will be fixed (I found a massive leak on my own house when I got my water bill, couldn't understand why my usage was so high). As for the Shannon, this won't affect the boats, as the water is coming out in near the mouth of the Shannon; the levels of the Shannon are actually controlled by Ardnacrusha power station anyway. Also, the water isn't being pumped directly to Dublin; a reservoir is being built in Tipperary. • Installing water meters is a small job compared to replacing mains pipes. To install the meters, at the connection to the mains, the manhole is increased in size, and the fitting to the mains is replaced with one that has the water meter. To change mains pipes you literally have to dig up whole roads and foot paths, and also, turn off mains water to large areas at a time for many hours. The upper Shannon will be unaffected by this, as the volume of water being removed would not even come close to the volume of the river suck, which flows into the Shannon at Shannon bridge. If the water was to be extracted above Lough Ree, then there would be an issue. This is not destroying taxpayers money, without this development, Dublin cannot expand. • If it was decided to change all the water mains in Dublin, it would take years, and cost billions, and cause massive disruption (Power cables, data cables and sewage mains may also have to be moved for access). It would be like having Luas works in most streets at some stage. When the project would be finished, the cost of a litre of water saved through fixing the leaks would be more than pumping it from the Shannon, while at the same time, all you have done is just leaks, and not increase the overall capacity of the water supply to Dublin. In 50 years time, the water demands of Dublin would probably be greater than the current supply with zero leaks, so at some stage, water has to be pumped from somewhere to Dublin. • Water conservation goes out the window because of cost and that 42% has to be paid for even though it is not used, so we'll all be paying double because you think the leaks should not be fixed…because it's difficult! You cannot continue to let 42% of Dublin's treated water seep into the ground unused…its lunacy. Do note that if you stop 42% of the water from leaking out of the system…..that would allow Dublin to get at least 35% bigger than it presently is with a decent 6% reserve. • If you stop 42% of the water from leaking out of the system", Impossible. There is no city in the world that has zero leaks, London loses around 50% to leaks, even to get it down to 25% would be a massive undertaking. My point is very simple, the cost of bring up water from the Shannon, is a hell of		

Published	Post	Key themes	Media Type
	a lot cheaper than fixing the leaks. • Holland got it down to 6%. Singapore got leakage to below 5%. • This project needs to start, it's a no brainer. I understand that they will take the water in times of flood and store in cutaway bogland in the midlands. • Use the money to fix the leaks instead of fitting meters and you'll solve that problem and have no need to take water from the Shannon. • This will now be followed by interminable appeals, compensation claims, etc., etc. Any other country would simply put the infrastructure in place and get the much needed water flowing as quickly as possible. Unfortunately, that is not the Irish way. • Wait!!!!. What's that to the east of Dublin….is it…is it THE SEA!!!!..Could they not take water from there and build a water cleaning place (can't think of the correct word!) Would be cheaper then trying to bring it all the way from the west/midlands….. • No it wouldn't. It is far, far cheaper to pump it from the Shannon. • Desalination costs are prohibitive and a desalination plant would make no sense in Ireland where there is a plenty of water that can be relatively cheaply pumped across country. Check out this link about proposed desal plants in California where they may make sense despite the costs. • Essentially Dublin has water issues because they have a growing population. Those issues are supposedly due to a lack of water reserves but really it is due to the fact that 42% of all the water pumped into Dublin is lost in leaks. To put that in perspective Dublin currently uses approximately 524 million litres of water a day, 42% of this is 220 million litres. It's said that Dublin will need an additional 330 million litres per day by 2050 but really they will only need 58% of that given that 42% of it is lost. So in real numbers Dublin would need an additional 192 million litres by 2050 (assume the leak rate stays the same). Therefore fixing the leaks would fix Dublin's water problems with about 28 million litres per day to spare (or leak). Now those figures are cutting it fine, so in reality sourcing water from somewhere else is a good idea given it will probably be needed in the future but draining water from a source only to lose almost half of it through old, leaky and, in some cases, poisonous infrastructure is a poor solution. Really the best solution would be to concentrate on fixing the leaks first and then talk about getting water from another source. Maybe this is what will happen given that it will probably be at least a decade before a single drop of water is diverted from the Shannon but it's still better for Irish Water to get their own house is order before they think about building an extension. • You have the Shannon river supplying Dublin. It supplies all the taps no problem. It'll even supply the		

Published	Post	Key themes	Media Type
	taps when the washer is gone. As long as the water is being replaced you don't worry about fixing the washer. Now switch off the supply to the Shannon and see what happens. It runs dry! Unless Irish Water repair the multiple leaks in the system in Dublin they are just taking from a diminishing source. All will be fine until there's a drought, and with global warming, that'll happen more regularly. So in the short term boating, angling and other forms of tourism all along the Shannon system will suffer as levels drop. In the long term the system will run dry. Fix the leaky bucket first !!!!! • The average discharge from the Shannon is 208 cumecs. In a day that equates to almost 18 Billion Litres and they only want 330 million litres (1.8% of the average flow). That is a tiny percentage, it becomes even more minuscule (0.0055%) in winter time when you could have 700 cubic meters or even more flowing through the system. • Fix the leaky bucket and then Pollaphuca and Roundwood will be able for the demand. If the approximate loss is 40 percent then there is that room for improvement in supply. Irish Water should spend the money repairing the system first before going after another source. • Really it wouldn't take a genius to figure out that water from the Shannon could be used for Dublin. • Is it not ridiculous that Irish Water have yet to suggest or maybe not suggest but make a firm commitment & plan to fixing the leaky pipes? The leaky pipes where we lose millions of gallons of water every year? It's just phenomenal when you really think of it! We are now being charged for water under the banner of utilising our resource of water better but when in fact nothing is being done to conserve or protect! • I think there are wider issues than any local concerns in the West or concerns about the costs associated with the piping of such volumes of water and related tasks. Water supply is just one of the many infrastructural problems that Dublin is facing and is going to face (especially if the predicted increase in population by 2050 happens). All of these infrastructural issues should be roughly priced as one overall price so as to allow a real analysis of our options. We need to ask bigger questions than we do …. and we should stop taking it as some sort of truth, for which nothing can be done, that the population of Dublin will expand in such an uncontrolled and unbalanced way. Surely a greater percentage of the population of the island working (and not necessarily sleeping) in Dublin is not a good thing for Dublin or for the country. Therefore, one question we could ask is would it be advantageous for both Dublin and Ireland to move national government along with the IDA, EI and government department to one place somewhere in the middle of the country e.g. North Tipperary? New roads, buildings and infrastructure would have to be built but this could be planned and would be		

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	cheaper than building similar infrastructure in Dublin. The vacated accommodation and other buildings in Dublin would then be available for the people who wish to work and live in Dublin. The new centre for government would take away some but not all of the draw to Dublin – i.e. it would relieve Dublin from the continuous pummeling it receives from unplanned expansion. • The Shannon is miles and one whole Province away, the Boyne, a very large river, is just a few miles north, what's wrong with harnessing resources locally, the Bann is just as close, what's wrong with H2O from there? • Boyne is a much smaller river with much lower flow rate and couldn't be tapped for 330 million litres per day without environmental harm. Also nowhere practical for storage between Meath & Dublin whereas there is lots of cutaway bog on state owned lands between Shannon & Dublin to build a reservoir. The Bann is in another country, we'd have to pay for it. • There are already two reservoirs in the Dublin area. Fix the leaky bucket and they'll suffice. Why would you build another in the Midlands? Huge amounts of money will be spent by Irish Water developing this pipeline and then a huge percentage of the water will leak out. Yes. Dig up the streets and replace the faulty pipes. • That's about right spend billions pumping water from the Shannon region to Leakey pipes in Dublin so 40% of it can disappear into the ground. • Public consultation? Does that me we are going to be consulted? Or will they be paying for consultants?		
26 Nov 2015	***"Anger at 'outrageous' Irish Water river extraction Plans"*** PLANS by Irish Water to pump more than 300 million litres of water a day from the Parteen Basin near Limerick have provoked fury in Limerick and throughout the Mid-West. The plans are based on projections that demand for water in the Dublin region will greatly exceed supply in the coming years. Former Mayor of Limerick, Independent councillor John Gilligan, said the council voted unanimously against these plans, which he described as "shocking and laughable." "I am just absolutely disgusted about this, but not surprised. Irish Water is saying there will be a consultation process, but they will listen to people's objections with bored expressions on their faces, dismiss them and go back and do exactly what they were going to do anyway," he said. "It's about time our TDs stood up for Limerick for once and for all, and put their party politics aside. I'll be putting forward a motion at the next council meeting to re-iterate our stance on this," he told the Limerick Leader. Brendan Russell, a former chairman of the Lough Derg working group, said that the plans are "outrageous" and said the	**Public Consultation Process** **Tourism & Amenity**	Limerick Leader

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	"Government need to go to Specsavers" to recognise the problems that this plan could create in terms of environmental issues and tourism in the Mid-West. "I am extremely appalled by the plans that the Government is proceeding with. They are stealing water from the Shannon and have an attitude of 'let's screw rural Ireland and look after Dublin'," Mr Russell, who is a former regional manager of Bord Fáilte, told this newspaper. Irish Water is expected to confirm plans to store water from the River Shannon in a reservoir in Tipperary to supply Dublin and the Midlands. It is proposing the construction of a 165-kilometre pipeline from a reservoir on the Tipperary side, to the south of Lough Derg. They claim that this option will have the least environmental impact of the four it examined and is close to the Ardnacrusha hydro-electric power station. Gerry Grant, of Irish Water, said that the detailed design process will start after a period of public consultation. A 10-week public consultation process is expected to begin shortly, which will include "intensive engagement with stakeholders right around the Shannon." Labour deputy and Minister for Education Jan O'Sullivan was among those who strongly objected to these plans in the past. Speaking at a meeting of the Shannon Protection Alliance in 2010, Minister O'Sullivan said: "This is essentially about power and trust and that's why I'm very concerned about the proposal. We should learn from the recent past where there wasn't transparency, where there was power to abuse resources of one kind or another. My fear would be once you allow this to happen you can't control it." She said at that time that if "the people who had the Shannon at heart", rather than those on the East coast, were in control of the scheme it would be a different matter. Former minister Mary O'Rourke has also spoken out strongly against the proposals. ***Comments relevant to WSP:*** • Jan doesn't give a fiddlers as she is already in semi-retirement as she knows she will lose her seat in the next election • Great we can use this resource to drive our country forward. I don't see any argument here in this article against it? Why would it be a bad thing? Please explain. • "Former minister Mary O'Rourke has also spoken out strongly against the proposals." Another half-truth from the Leader. O'Rourke only spoke out about the proposals when Dublin wanted to take the water from Athlone. She doesn't give a shite now that the water is being taken from limerick. We'll see what o dea noonan and o'sullivan are made of now. We have to get Europe on our side.		
26 Nov 2015	***"Shannon to supply capital with 300m litres of water daily"*** Irish Water plans to take more than 300 million litres of water a day from the River Shannon before pumping it across a 165km pipeline to provide a new supply for Dublin and the Midlands.	**Alternative Options** • Desalination	Campus.ie

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	The company will today announce plans to take 2pc of the river's water from the lower Shannon at Parteen Basin, near Limerick. It aims to provide a new water source for counties Clare, Tipperary, Offaly, Laois, Westmeath, Kildare, Meath and Dublin. It will cost between €700m and €900m to deliver the plan, which could be built within five years. But crucially, the scheme does not include a storage facility on Bord na Móna lands in the Midlands, where a planned water park was mooted. Instead, Irish Water has decided that the best option is a single pipeline which counties can tap into. Planning permission will be sought from An Bord Pleanala in 2017, and if approved the scheme is expected to be operational by 2022. Affected landowners will receive a one-off payment for allowing the pipeline through their lands. Four options for a new source were considered before being whittled down to two, one of which was to desalinate sea water. However, desalination was ruled out on cost and environmental grounds, and because it would only serve Dublin and not deal with shortages across the Midlands. Some 1.6 billion litres of water are currently produced by Irish Water every day, of which around 600 million litres are used in Dublin. However, there is little spare capacity in the system, meaning that in the event of a problem with treatment plants, the city can run short - which notably occurred during the 2013 Web Summit. "The present infrastructure is struggling to meet current need, as evidenced by a number of significant and costly outages in Dublin over the past four years," Irish Water said. "While fixing leaks and water conservation initiatives will provide valuable water savings, this will not provide a long term solution for our water supply requirements." The additional water will provide much-needed headroom for the capital, but also cater for future population growth. However, stiff local opposition is expected to the Shannon plan. Irish Water said the total amount to be drawn would be just 2pc of the river's flow, which would ordinarily be used by the Ardnacrusha hydro-electric power plant to produce electricity. Around 1,000 construction jobs will be created, with 21 full-time and 80 part-time positions becoming available once operational. Bord na Móna is also expected to be bitterly disappointed at the decision to rule out a Midlands storage	**Public Consultation Process** **Leakage & Water Conservation** • Leakage • Water Demand & Conservation	

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	option. It had hoped to create an Eco-Park on the Garryhinch bog, on the Offaly-Laois border, where water drawn from the Shannon would be stored before being pumped to Dublin. John Tierney, managing director of Irish Water, said the new supply was needed to provide for future economic development and population growth. "This project is not simply about finding a solution for Dublin's future water supply, it is also about ensuring that the entire country can thrive by facilitating growth," he said. "Parteen Basin can deliver a sustainable water supply with the least environmental impact while benefiting the widest number of domestic and commercial water customers." Parteen Basin has been deemed the most suitable location because it is at the mouth of the river, with most of the water having already flowed through the Shannon. The closing date for submissions is February 4. See www.watersupplyproject.ie		
26 Nov 2015	***"Irish Water proposes Shannon pipeline to serve Dublin and Midlands"*** Irish Water has identified the Parteen Basin on the River Shannon as its preferred option for a new supply of drinking water for Dublin and the Midlands. The water company was given the task of sourcing a new supply, because the existing supply sources will not meet the requirements of an increasing population and the growing economy. Irish Water is proposing the construction of a 165km pipeline from a reservoir on the Tipperary side of the Parteen Basin. The Parteen Basin is located south of Lough Derg and close to the point where counties Clare, Tipperary and Limerick meet. It is also near the Ardnacrusha hydro-electric power station which is why it is Irish Water's preferred option. It says taking water from this point will use approximately 2% of water that would otherwise have been used for power generation and then discharged to sea. The other three options considered were taking water directly from Lough Derg, taking water from a storage facility to be built at Lough Derg, or desalination of sea water. There is a long-standing campaign against sourcing a future water supply from the River Shannon, and opposition to this proposal is likely to be strong.	**Alternative Options** • Desalination • Reservoir Storage **Public Consultation Process** **Leakage & Water Conservation** • Leakage	Rte.ie/news

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	A ten-week period of public consultation will now begin. Irish Water hopes to submit the final planning application to An Bord Pleanála in 2017. Irish Water's Head of Asset Management Jerry Grant said the Parteen Basin is its preferred option because it will have the least environmental impact on Lough Derg. He said consultation is currently being carried out and once the option has been confirmed a lengthy environmental impact assessment on the design of the scheme will be carried out next year. Speaking on RTÉ's Morning Ireland, he said the plan is to remove 2% of the water going through Ardnacrusha and that will not change and cannot be changed without fresh planning applications being made in the future. He said it is a one-off project for two generations. Mr Grant also added that there was a short term objective to reduce leakage significantly in the Dublin area which should buy enough time to build the new pipelines before there was a risk of water shortage. He said leakage currently was at 35% and needed to be reduced to 25%. Mr Grant said that reducing leakage remained an important part of Irish Water's overall plans.		
26 Nov 2015	***"River Shannon could provide drinking water to Dublin"*** Irish Water have proposed building a pipeline from the River Shannon to Dublin to source drinking water. Irish Water have chosen the Parteen Basin in Co Tipperary as its preferred new source for drinking water for Dublin and the Eastern part of the country. They plan to take 330 million litres of water per day from the river and pump it across a 165 km pipeline to the capital. Counties Clare, Tipperary, Offaly, Laois, Westmeath, Kildare and Meath, which are along the route corridor, will also be supplied with the treated water. Irish Water say that as over 40% of Ireland lives in the Eastern and Midlands region there is a need for a new water supply. They have been working on this plan for eight years, and have identified four options as potential viable solutions. Parteen Basin is their preferred option as it has existing 'hydro-power' infrastructure and will therefore have the least environmental impact of the four. Managing Director of Irish Water John Tierney said that new source must be identified.	**Engineering & Planning** **Leakage & Water Conservation** • Leakage • Water Demand & Conservation	Utv.ie/news

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	"The existing water supply sources for the Eastern and Midlands Regions do not have the capacity or resilience to meet demand for an additional 330 million litres of water per day which increased population and economic growth will generate by 2050. "This project is not simply about finding a solution for Dublin's future water supply, it is also about ensuring that the entire country can thrive by facilitating growth in the Eastern and Midlands where 40% of our population lives," he said. However, Clare Fianna Fáil general election candidate Michael McDonagh told UTV Ireland he is against the proposals. "I am against water being taken from any place and totally opposed to plans to remove water from the River Shannon or the Parteen Basin and take it all the way in a line to Dublin. "So much water in Dublin is wasted through broken pipes. I believe there is plenty of water in Dublin and the council need to concentrate on their leaks before they take water from another place." A period of consultation has now started and will finish on 4 February 2016.		
26 Nov 2015	***River Shannon Proposed to Supply Drinking Water for Dublin"*** Irish Water has identified the Parteen Basin on the River Shannon as it preferred option for a new supply of drinking water for Dublin and the Midlands. It's proposing the construction of a 165 kilometre pipeline from a reservoir on the Tipperary side, to the south of Lough Derg. The utility says this option will have the least environmental impact of the four it examined and is close to the Ardnacrusha hydro-electric power station. Gerry Grant from Irish Water says the detailed design process will start after a period of public consultation:	**Environment & Fisheries** • Environment & Ecology **Public Consultation Process**	98fm.com
26 Nov 2015	***"Irish Water Identifies Source of New Supply of Dublin/Midlands Water"*** Irish Water has identified the Parteen Basin on the River Shannon as it preferred option for a new supply of drinking water for Dublin, Kildare and the Midlands. It's proposing the construction of a 165 kilometre pipeline, which will probably traverse Kildare, from a reservoir on the Tipperary side, to the south of Lough Derg. The utility says this option will have the least environmental impact of the four it examined and is close to the Ardnacrusha hydro-electric power station.	**Environment & Fisheries** • Environment & Ecology **Public Consultation**	Kfmradio.com

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	Gerry Grant from Irish Water says the detailed design process will start after a period of public consultation.	**Process**	
26 Nov 2015	***"Lough Derg group says water extraction plan could devastate tourism"*** It's claimed the plan by Irish Water to extract millions of litres of water every day from the Shannon at the Parteen Basin below Lough Derg has the potential to destroy tourism in the area. The utility is proposing to extract over 300 million litres of water each day from the river to provide a new supply of drinking water for Dublin and the Midlands. However Irish Water's assurances that it won't impact on Lough Derg haven't allayed the fears of local opposition groups. Declan Collison of the Shannon Protection Alliance says it could have a devastating effect on tourism. He says water levels on the lake reached a historic low last May when the ESB dropped the level leading to cruisers running aground on Lough Derg. The Dromineer based proprietor of The Lake Café is fearful this could be made worse if Irish Water put further pressure on the levels.	**Environment & Fisheries** • Environment & Ecology • River Shannon water levels	Tippfm.com./ news
26 Nov 2015	***"Irish Water outlines plans on water extraction from Parteen Basin"*** Irish Water has identified the Parteen Basin on the River Shannon as it preferred option for a new supply of drinking water for Dublin and the Midlands. It's proposing the construction of a 165 kilometre pipeline from a reservoir on the Tipperary side, to the south of Lough Derg. Their plan means no water would be extracted from the lake itself - this had been the focus of intense opposition in the local area. Irish Water says the preferred option will have the least environmental impact of the four it examined and is close to the Ardnacrusha hydro-electric power station. Gerry Grant from Irish Water says the detailed design process will start after a period of public consultation.	**Environment & Fisheries** • Environment & Ecology **Engineering & Planning** **Public Consultation Process**	Clare.fm/news
26 Nov 2015	***"Opposition to water extraction plans remain strong in Clare"*** Opposition remains strong in Clare and the MidWest to Irish Water's plans to shore up supply for the East and Midlands.	**Environment & Fisheries** • Environment &	Clare.fm/news

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	The water company plans to take more than 300 million litres of water a day from the River Shannon, with the water being extracted from the Parteen Basin rather than Lough Derg. This project will cost between 700 and 900 million euro. Irish Water wants it completed within five years, aims to provide a new water source for Clare, as well as Dublin and other counties in the East and midlands. A 165 kilometre pipeline would be built from a reservoir on the Tipperary side of the Basin, to the south of Lough Derg, though no water would be extracted from the lake itself - this had been the focus of intense opposition in the local area. One of those opponents, Whitegate FG Councillor Pat Burke says the plan will have absolutely no benefit for Co. Clare. Irish Water says the preferred option has been chosen as it will have the least environmental impact of the four it had considered. Two of those would have seen water taken from the lake, and the other was desalination. The utility insists the project won't impact on Lough Derg but Declan Collison of the Shannon Protection Alliance isn't convinced. Planning permission will be sought from An Bord Pleanala in 2017, and if approved the scheme is expected to be operational by 2022. A ten week period of public consultation runs up until February 4th.	Ecology **Public Consultation Process**	
26 Nov 2015	Irish Water is expected to confirm plans to store water from the River Shannon in a reservoir in Tipperary to supply Dublin and the Midlands. The proposal being put forward would see more than 300 million litres of water being taken from the Parteen Basin near Limerick every day. Irish water is proposing the construction of a 165 kilometre pipeline from a reservoir on the Tipperary side, to the south of Lough Derg. The utility says this option will have the least environmental impact of the four it examined and is close to the Ardnacrusha hydro-electric power station. The company has been considering a number of options to deal with shortages in the Dublin region. There's already been strong local opposition in North Tipperary when the suggestion was first put forward.	**Public Consultation Process**	Beat news.com
26 Nov 2015	***"River Shannon Protection Alliance says extraction of water will impact Shannonside region"*** News report referenced in tweet:	**Environment & Fisheries**	Twitter; Shannonside FM

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	"River Shannon Protection Alliance says extraction of water will impact Shannonside region" The River Shannon Protection Alliance says extraction of water from below Lough Derg will still impact the Shannonside region. Gerry Siney was speaking after Irish Water today announced that it's identified the Parteen Basin on the River Shannon as its preferred option to supply drinking water for Dublin and the Midlands by 2022. This will involve the development of a 165 kilometre pipeline from the Parteen Basin, which is close to the Ardnacrusha hydro-electric power station. Gerry Siney of the River Shannon Protection Alliance says taking this water will have a detrimental effect on all parts of the river and lands surrounding it, including the Shannonside region. Meanwhile, Green Party candidate in Sligo Leitrim, Leslie O'Hora is calling for a series of public meetings over the proposed plan to extract water from the Shannon. The Carrick-on-Shannon election candidate is describing Irish Water's consultation process as inadequate, and says there are a range of questions the public needs answered before the plan can go ahead. He says without knowing what the environmental impact will be, people can't make informed submissions to Irish Water, and with angling, tourism, water sports, and boating tourism – which supports 50 towns and villages along the waterway, people deserve to know the full implications of the plan.	• Environment & Ecology • Fisheries **Public Consultation Process** **Tourism & Amenity**	News
26 Nov 2015	Irish Water plan for 165km pipeline from Parteen Basin south of Lough Derg to Dub and Midlands #water" ***Comments relevant to WSP:*** How about just fixing the Victorian pipes under the road. Take water from Shannon and put into broken pipes. ClassicIrish This project is certainly divisive and will be scrutinised at every turn #water Interesting. What is the plan for the crumbling infrastructure?	**Leakage & Water Conservation** • Leakage	Twitter, RTE
26 Nov 2015	***Comments relevant to WSP:*** Looks like they're going ahead with this project and expect plans to be submitted in 2017. Seems like a mighty job of work to deliver something we're literally swimming in most of the year. I may be missing something but I'm curious why they can't build reservoirs like they do in other cities, how does London manage for example, do they pipe water from Wales? It may make perfect sense, but appears to be another massive waste of money.	**Alternative Options** **Leakage & Water Conservation** • Leakage	Boards.ie

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	The plan from what I heard is to build a reservoir in Tipperary that siphons from a basin near Limerick and then it gets pumped to Dublin. West of money imo considering how much is being lost through the pipes currently. Why do we not spend the time and money fixing all the leaks and if then we still have problems look in this direction? If they construct massively expensive infrastructure now, it will make it more attractive when Irish Water is eventually privatised.	• Water Demand & Conservation	
26 Nov 2015	***Comments relevant to WSP:*** • It'll be interesting to see if all the Dubliners who don't want to pay for their water rise up on the streets to protest that Irish Water is proposing to siphon the Shannon to fulfill their greedy needs. Why do I suspect that they will simply shrug their shoulders and say 'roll it out'. • What's wrong with taking water from the Shannon for use in Dublin? • Well, there might be a strategic case to be made to supply water to Dublin from the west. But it will have environmental costs apart from the infrastructural cost. There is a suspicion that there are still considerable leaks in Dublins water system, leaks that would be expensive to fix and disruptive to it's population. Unpopular in a word. • Your point about large disruptive works being required to fix leaks may have some validity but I really don't see that Dubliners, or anyone else for that matter, needlessly use water. But has anyone worked out just how much water is lost in the Dublin system, how best to tackle the problem and how much water would be saved in doing so? The whole Irish Water thing has been spoken off in terms of bar room platitudes and generalities. If we had some solid figures then the debate about water supply in Ireland might move forward in a slightly more mature manner. • Dublin has a leakage rate of a bit over 25%. In a city of Dublin's age as the leakage rate is reduced there is ever decreasing returns for capital investment and eventually it becomes cheaper to supply more water to the network than it does to deliver an equivalent amount through leak reduction. Investment decisions should be made on the basis of what gives us most bang for our buck. Dublin has redundant capacity of less than 2% in its water supply infrastructure. Most major European cities would have more than 10%. That makes Dublin vulnerable where problems like the one a couple of years back in Ballymore Eustace arise. From the perspective of attracting investment that it something that cannot be allowed persists. There is also a shortage of raw water. We already draw more than 650 million litres a day from the Liffey. We can draw no more without the raw water quality deteriorating to a point where the water becomes very difficult and very expensive to treat. Where water comes from is	**Leakage & Water Conservation** • Leakage • Water Demand & Conservation	Politics.ie

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	immaterial. The Shannon is a resource to be used by the entire country. This parish mentality is nonsense. Dublin generates a lot more tax revenue than the rest of the country but tax spending per capita is less. That's just the way it is and griping about it would be silly. Just like griping about Shannon water being used in Dublin is also silly. • People on public water supplies have grown accustomed to using as much water as they want. Showering 2 & 3 times a day, running the dishwasher or washing machine every day or even twice a day, washing their cars, watering gardens, leaving taps running in cold weather, multiple ensuite bathrooms - they just don't have a notion. They may think they are only using what the need, but those needs have grown and grown with no limits. Metered water, paid for is the only way to go to reduce this wanton waste. There will be an environmental cost to taking supplies from the Shannon to feed the insatiable appetite of Dublin, quite what this cost is will be the subject of forthcoming debate. There's no free lunch. The question I'm posing though is, will the anti water charges brigade be losing any sleep over this?? Somehow I don't think so - and they'll be shown up as a la carte protestors. • I've no problem with piping water over from the Shannon, just so long as it's not harmful to the environment. I should imagine though that a new storage facility would be needed for best effect. Is there room for a reservoir anywhere close to Dublin, or maybe it could be constructed this end to save the winter floods for the capital. Some firm ideas and a few options to consider would be good. Your point about leakage rate is one that is echoed elsewhere. I have seen the figure of 20% being that below which it becomes uneconomic to fix the leaks, as a general rule of thumb. How best to pay for this? Clean water benefits everyone, it's not like electricity where an unmetered supply would encourage overuse (we would all like a warmer house, but who wants a wetter one?) so meeting the cost of provision out of general taxation is by far the most cost effective way of doing it. Just how much bang is Irish Water supplying for the many millions of bucks it's costing? • Most thinking on using Shannon water seem to envisage bulk storage of raw water in a stripped bog in the midlands as being the most cost effective option. On leakage 20% is a decent rule of thumb figure but you have to take local factors into account. For example some parts of Europe have much lower leakage rates. Why? They were bombed into oblivion during WW2 and consequently started from a newer infrastructure base afterwards. General taxation simply doesn't work for me. When governments are short of cash capital spending is always first to get cut as it is politically less sensitive than current spending. If you were a TD what would you prefer to have to defend, a social welfare cut or a new sewage plant being cancelled? The general taxation model hasn't worked and the evidence is in the state of our infrastructure. Metered charges are the way to go as far as I'm concerned. It secures a revenue stream and also encourages reduction in consumer waste. Supporting that model however is		

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	very different from saying that all is rosy in the Irish Water garden. If you want people to pay you need to be able to demonstrate efficiency in your own operations. That has not been the case with Irish Water and never could have been. The big problem is that setting up Irish Water is something that should have been planned and implemented over a much longer period. It has been a cack-handed rush job from start to finish. • How many people shower two or three times a day? If the energy cost of doing so is not stopping them then I doubt that metering their water would. Are we to all have dirty cars? What about the car washes at garages, how much do they use? Ban those if you want to save water. It's not the number of en-suite bathrooms you have but the number of people using them that will dictate how much water gets used. Both dishwasher and washing machines use a lot of energy, see my note about showers above. What do you propose as an alternative to a washing machine and how much more water does a dishwasher use as compared to doing the dishes in the sink? How much water is used in watering gardens? Running taps in cold weather is on the face of it a waste of water, but should pipes burst then how much more will get wasted and at what cost to the economy • You don't take 300+ million litres of water a day from a river catchment without impacting on many aspects of the waterway. Mind constructing a 165 km pipeline and large storage reservoirs. Far better to look at the three core principles of sustainability: 'reduce, reuse and recycle'. Reduce water consumption by metering and fixing leaks, treating grey water etc. The Liffey, Vartry and Upper Dodder rivers have already been hugely degraded. Go read up on the flooding of the river basin to create the Pollaphuca reservoir in the 1930s and the disgraceful treatment of the small farmers who were kicked (evicted even) off their land. If it were proposed now, it wouldn't get off the ground at all and we're not talking NIBYism here - we're talking major landscape and cultural impacts. Impacts on the Shannon may be less that the Liffey but all will become clearer in due course when the debate cranks up. • The average flow in the River Shannon is 208.1 m3/s. That equates to an average daily flow of 17,979,840 m3. The proposal is to extract 300,000 m3/day. That equates to 1.6% of the total average flow. By way of comparison the average flow in the River Liffey is 13.8 m3/s. That equates to an average daily flow of 1,192,320 m3. We already extract about 650,000 m3/day. That equates to more than 50% of the total average flow. The environmental effect on the river will be negligible. How farmers were treated during the construction of hydro-electric schemes 80 years ago is completely irrelevant. • I've no argument with you over the Shannon or leakage rates but we keep hearing about general taxation not working and yet nearly all of us have a clean water supply, so I would say that it has in fact		

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	worked. Investment in infrastructure is ongoing, always has been and always will be, and I really don't see that a separate entity formed to try and raise money for it will make a hoot of difference, in fact we can see that the governments efforts have only made things worse. If the money spent on metering went into infrastructure then it would have been a big step forward. The provision of water, including investment, was costing us 1.2bn a year, how much will it be costing in future? • Average consumption in Ireland is about 150 litres per person per day. From memory Denmark is the most efficient at a little over 100 litres per person per day. Denmark also has the highest water charges in Europe and probably the best water infrastructure too.		
26 Nov 2015	***"Irish Water proposes Shannon pipeline to serve Dublin and Midlands"*** - No water should be taken from the River Shannon without first reviewing the compensation flow for the Lower River Shannon. The Old River Shannon currently receives just 10 cumecs - equivalent to a 1:50 year drought flow. It is nonsense to say that this proposed abstraction of 4 cumecs is just 2% of the water. This proposal will have to be looked at in terms of natural low summer flows in the river to ensure that this abstraction does not close the door on sustainable water management in the Lower River Shannon in the future. ***Comments relevant to WSP:*** Why is Dublin going to need so much water? Perhaps that should be addressed. Water is the new oil Fix the leaks now and do not interfere with Mother Nature. When Irish Water have stopped the water leaking to ground let them talk about harvesting water from the Shannon.	**Environment & Fisheries** • River Shannon water levels **Leakage & Water Conservation** • Leakage • Water Demand & Conservation	Facebook
26 Nov 2015	***"Jobs for Tipp not water for Dublin! Like and Share!"*** Speaking on Tipp FM today I outlined my objections to the plan to lay pipes to divert water, through the industrial laying of pipes, from Lough Derg to feed the needs of Dublin. First of all this is being carried out by a company, Irish Water PLC, that has absolutely no credibility with the Irish people, a company to which any responsible government or Minister would immediately call a halt to as it's wasting of taxpayer's money is truly out of control. We have an economically viable county, the Midlands Region has one of only two European deep water ports, the port of Foynes, that with sustained investment could facilitate the largest category of cargo ship. Along with Shannon Airport and the lack of traffic congestion Tipperary and the Midlands could become a	**Communities / Benefitting Corridor** • Community gain **Public Consultation Process**	Facebook

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	hub of economic activity and commerce. All that is needed is sustained smart investment and some vision by those Tipperary ministers and TDs that are supposed to be fighting on Tipperary's behalf not towing the usual line of Dublin takes all, Dublin is the priority. There is expected to be a mere 20 Tipp jobs from this whole operation. International economists agree and the actions of international conglomerate banks and consortia prove that, "water will be to this century what oil was to the last, it will be the most fought over resource of the 20th century." When this pipeline begins operation Tipperary will barely gain a pittance. The value of the asset being diverted from Tipperary will over time run into the billions. And what will Tipperary get then? Nothing. There is actually no need to divert this water to Dublin, there are closer water resources to Dublin than Lough Derg, this is the setting up of a long-term smash and grab operation of Tipperary resources. The real clincher is that this is creeping privatisation facilitated by Ministers working on behalf of their next employers not their constituents. Should the Irish Water PLC scam succeed the entire asset of our ground water will be privatised. Lough Derg should be protected as a natural and Tourism asset but if we can't force the government to desist from this snake oil scheme then at least Tipperary should get something out of it. Sinn Féin Tipperary and myself will continue to stand up for Tipperary and fight for a better deal for Tipperary. As your TD in the next Dáil I will be able to make an even bigger impact for Tipperary, it's about time that they stopped forgetting us and started to invest in us instead!	**Tourism & Amenity**	
25 Nov 2015	***"IWAI expresses deep concern at Irish Water proposals for Shannon abstraction"***		IWAI.ie
27 Nov 2015	***"The Newspaper Review"*** *The Irish Sun*: The Shannon protection alliance are getting geared up to fight Irish Water plans to extract drinking water for Dublin's population - Ivan didn't take kindly to that story. "Right, so we'll have no water in Dublin - thanks for that lad."		NewsTalk.com
01 Dec 2015	***"Supplying Dublin with water from the Shannon"*** Proposals by Irish Water to serve Dublin and adjacent counties with water abstracted from the River Shannon appear to be based on existing weather and rainfall patterns. These elements may alter significantly with climate change, when summers are likely to become considerably drier and warmer. As a WSP that will affect many interests into the second half of this century, long term planning should consider likely variables and include specific eco-friendly tolerances.	**Alternative Options** • Desalination • Reservoir Storage	Irish Times.com

Published	Post	Key themes	Media Type
	An assurance that Irish Water will take only two per cent of the water normally used by the ESB for electricity generation does not carry weight locally. There is a belief that, rather than deprive regional households of water during a drought, the scale of abstraction at Parteen Basin would rise. A sure, if more expensive, way of addressing such concerns would be to pipe water from below the ESB generating station at Ardnacrusha, before it is discharged to sea. Dublin needs an urgent upgrade to its water supply system. But this has more to do with leaks and antiquated facilities than available water. Dealing with historic issues will not, however, serve longer-term needs. A new supply will have to be harnessed and treated. Irish Water has decided against building a desalinisation plant in Dublin and in favour of abstracting water from the Shannon to serve eight counties up to 2050. The plan, first conceived by Dublin city Council, contains elements of corner-cutting and short-term thinking. Two years ago, when Bord na Móna was bidding to become Ireland's water utility, it proposed that – to minimise the effect of water abstraction from the Shannon during dry weather – it would build a winter reservoir on cutaway bog at Garryhinch, Co Offaly which would double as a summer leisure, recreational and educational facility. If Irish Water and Bord na Móna were to cooperate on such a project, it would provide useful reassurance and ease public concerns. Water will become a much more valuable resource. We should guard it carefully. ***Comments relevant to WSP:*** • I must, for once, congratulate Irish Water on this decision. As a resident of Ardnacrusha, I believe the extraction point for water could hardly be better located. The idea that a 2% or even a 5% extraction rate, at the point of the dam below Killaloe, would be harmful to the environment is nonsensical. As a nearby resident who regularly walks both the head-race, and the Shannon fields bank near Limerick, I never cease to be amazed by the vast amount of water flowing in both. At Limerick, the Shannon pumps over 200 cumecs, twice the rate of next biggest river, the Corrib. It is quite conceivable that, in time, water will be shipped from both Limerick and Galway, and the mouth of the Bann rivers, to parts of the world that need it. The Shannon, and indeed all river water, should be seen as a national resource that should be used for the benefit of the nation, and not abrogated for the benefit of any one region, or allowed to go unutilised, as it would in this case. The neanderthal notion that 'Limerick' should not be supplying Dublin is, frankly, anti-national. The fact that regional policy is so heavily skewed in favour of Dublin and the Eastern region is a separate and serious issue that urgently needs its own platform for debate and redress. Well done to Irish Water and Jerry Grant on this one. • I agree. Local opposition will mount when rural people see the vast sums being spent by a Dublin-	**Leakage & Water Conservation** • Leakage	

Published	Post	Key themes	Media Type
	centric establishment to take the easy option to pump water across the country. With up to 40% of water being lost in leaks what about fixing that problem first.		
02 Dec 2015	***"Irish Water insists Parteen Basin extraction plan isn't bad for Limerick"*** Irish Water is insisting its plan to extract water from the Parteen Basin won't impact negatively on people in Limerick. The state utility has identified the Basin as its preferred option to provide water for Dublin and other parts of the Eastern seaboard in the decades ahead. Consultations on the plan will continue until the middle of next year and it's hoped to submit a planning application for the project to An Bord Pleanala in July or August 2017. Gerry Geoghegan is project manager for the WSP. He says the Parteen Basin is ideally suited to the task...	**Public Consultation Process**	Live 95 FM News
02 Dec 2015	***"Extracting water from the Parteen basin will damage all of Shannon"*** "Irish Water's plan to extract water from the Parteen basin will damage all of the Shannon". That's according to the River Shannon Protection Alliance, who say that the State Utility's favoured method for meeting the future water supply needs are seriously deficient. Irish Water claim that taking water from the Parteen Basin will have the least environmental impact. Gerry Siney is from the Limerick branch of the alliance and he says that there's nothing good about what's being proposed. "You take water out of any part of the Shannon, whether it's Parteen Basin or anyway, you're going to damage all of the Shannon. What's at risk specifically for Limerick City is shipping. Ships quite possibly would not reach Limerick Port because it has been explained to us that we need the rush of water to clear the shipping channels. If there is insufficient clearance then the shipping lanes will silt up and as a result of that ships will not reach Limerick Port.	**Environment & Fisheries**	Live 95 FM News
03 Dec 2015	***"Irish Water's Shannon Pipeline Project – "Deep Concern' Over Shannon Pipeline Proposal for Dublin Water Supply"*** - A pipeline from the Shannon may be the solution for future water supply demands in Dublin and the Midlands. But critics have expressed "deep concern" over its potential effects on boating tourism and biodiversity throughout the Shannon system. Irish Water today (Thursday 26 November) announced that the Parteen Basin on the Shannon, close to the ESB's hydroelectric plant at Ardnacrusha, is its preferred option for the supply point of a 165km	**Environment & Fisheries** • River Shannon water levels **Alternative Options** • Desalination	Twitter; Foras Teamhrach; Afloat.ie

Published	Post	Key themes	Media Type
	pipeline to serve a growing population in Midlands and East Coast counties, as RTE News reports. Around 2% of water that would otherwise be used for power generation at the Ardnacrusha plant would be taken for distribution to a region that already comprises 40% of Ireland's population and is expanding rapidly, according to the Journal.ie However, the Inland Waterways Association of Ireland (IWAI) claims that Irish Water's option does not account for the effects on water levels throughout the Shannon system. "The preferred option of abstraction from Parteen Basin provides for all year round abstraction. This means that in good weather as water levels decrease on the Shannon it will also have to meet the increased water supply needs of Irish Water," said the IWAI in a statement. "This will see further decreases in water levels all along the entire Shannon as the level is maintained in Parteen Basin to supply water and electricity." Loss of boating traffic to the region and threats to already vulnerable waterways habitats are key concerns expressed by the IWAI, which has itself suggested desalinisation of coastal waters as an option for future needs. The association also notes that Irish Water's neglecting to provide for surplus water storage "is a missed opportunity as it would allow for heavy abstraction during flood conditions and also provide a valuable resource to Midlands communities for new activities and enterprises." A 10-week public consultation is now underway on Eastern and Midlands Region WSP.	**Public Consultation Process**	
03 Dec 2015	***"River is seen as a cash cow and Dublin want to milk it"*** CONTROVERSIAL plans to pump 300 million litres of water daily out of the Shannon for Dublin and the Midlands could present an "ecological disaster", an opposition group to Irish Water's plans has warned. Speaking to the Limerick Leader, Gerry Siney, chairman of the River Shannon Protection Alliance, said this is the "third attempt in the past 10 years to commandeer the Shannon" and warned that the plans by Irish Water to pump water from the Parteen basin on the outskirts of Limerick have to be stopped. The latest proposal involves taking two per cent of the river's water from the lower Shannon at Parteen Basin, close to the Ardnacrusha hydroelectric power station. But Mr Siney has urged that solutions closer to the capital should be first examined instead of "tapping the supply in the Shannon". "Dublin has all the water it needs both now and into the future. Saying that the water is needed to prevent severe drops in supply is a red herring. The pipeline into the Shannon is the soft option, because the	**Leakage & Water Conservation** • Leakage • Water Demand & Conservation **Environment & Fisheries** • River Shannon water levels	Limerick Leader.ie

Published	Post	Key themes	Media Type
	piping in Dublin has suffered decades of neglect and under-investment," the Castletroy resident told the Leader. "These proposals are being driven by vested interests in Dublin City Council and its east coast satellite counties who want to insure a limitless supply of water so that they can continue to attract foreign direct investment to Dublin and the eastern region, with scant regard for the economic development requirements of the regions beyond the Pale. Irish Water now see the Shannon as a 'cash cow', and seem intent on milking it for all it's worth," he claimed. He said claims that the greater Dublin area is running short of water are completely false. "Dublin has all the water it needs both now and well into the future, but it is throwing nearly half of it away. As a result of decades of neglect and under investment on the part of Dublin City Council, the supply system is riddled with leaks, and no serious effort is being made to deal with the problem. Should they be allowed to introduce Shannon water into such a system, most of this water would be lost to the leaks also. He described the current plans as "ludicrous" and said the figure of pumping 300 million litres a day could present the thin end of the wedge if the plans are allowed to progress. "They will increase it exponentially. It could be the death knell of the River Shannon as we know it. This is a license to waste, and poses huge risks to the environment. "It could create an ecological disaster, as the levels of the Shannon will drop, and aquatic life is very sensitive to fluctuating levels of water especially in the summer period. It could also pose economic risks to tourism in terms of angling and so on. It could also amount to a violation of the EU Water Framework directive. I would like to convince the powers that be that this madness has to stop." At risk, he believes, would be shipping from Limerick Port, boating, tourism, water- based activities, sport and festive initiatives, and the ecological and environmental welfare of the river system. Irish Water is proposing the construction of a 165-kilometre pipeline from a reservoir on the Tipperary side, to the south of Lough Derg. They claim that this option will have the least environmental impact of the four it examined. Jerry Grant, of Irish Water, said that the detailed design process will start after a period of public consultation. A 10-week public consultation process is expected to begin shortly, which will include "intensive engagement with stakeholders right around the Shannon." Former Mayor of Limerick, Independent councillor John Gilligan, said the council voted unanimously against these plans, which he described as "shocking and laughable", in the past. "I am just absolutely disgusted about this, but not surprised. Irish Water is saying there will be a	• Flooding	

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	consultation process, but they will listen to people's objections with bored expressions on their faces, dismiss them and go back and do exactly what they were going to do anyway. It's about time our TDs stood up for Limerick for once and for all, and put their party politics aside." ***Comments relevant to WSP:*** • I wonder how many members of this Shannon Protection Alliance had their houses flooded by the Shannon? The photo above clearly shows that there is excess water in the river. I say pump it to Dublin and they are welcome to it, rather than have houses and land in Limerick flooded.		
15-16 Dec 2015	***Comments relevant to WSP:*** • Perhaps the idea of taking water from the Shannon to Dublin could be modified so that the system could be used for flood relief also? It would probably mean bigger pipes and pumps or possibly just running the pumps continuously in times of heavy rain? I have no doubt there is an engineering solution if there was the political will to spend the cash and overcome objections. • I doubt very much that it would be possible to pump enough water away to make any difference. Thing is, way too much water in Shannon right now but come a drought, water shortages in Dublin and the Shannon will be at its lowest then just when peak demand would be on it. • You can dredge the Shannon a bit, but as an engineer pointed out this morning on the radio, its topography and size means that even the Whizz kid Dutch specialists in flood relief would find the challenge of it prohibitively expensive and uncertain of success. • Prime Time on Thursday last - 28th June, reported on the mounting pressure on the public water supply in Dublin. Demand for water is at such a pitch that some radical suggestions and models for supplementing the Blessington reservoir are getting attention. One is to take seawater and make it consumable but the process is very expensive. Another is to tap into an aquifer that is under Dublin Meath, Kildare. Yet another is to take some water from the Shannon via pipe but locals down there feel that the river will go dry within a decade. What do ye think of this boys and girls? By the way, the report mentioned that between the reservoir and your tap, 30% of the supplied water is lost in leakage... Did they put any figures on this or was it just wet finger in the air guesses again? • There was some figures, can't remember the exact figures but a desalination plant in Dublin bay was about the same cost as piping the Shannon to Dublin. Downside was that Desalination has waste that has to be got rid of. This is the same waste (salt) that we import for the roads....no mention of this of course. Since this Irish Water has reared its ugly and very expensive head, whatever happens to solve water shortages you can be sure there will be millions wasted on logos, overpaid figureheads and seat	**Leakage & Water Conservation** • Leakage • Water Demand & Conservation **Environment & Fisheries** • Flooding	Politics.ie

Published	Post	Key themes	Media Type
	warmers.....the usual.... • I believe the Intel factory uses at least one-third of Greater Dublin's water supply. Can anybody confirm that? If that is the case the Kildare needs the water, and not Dublin. • Just a thought - but what will pumping large volumes of water from Limerick to Dublin do to Ireland's carbon footprint? And then there is the power requirement from the electric grid. • It's the cheapest and most efficient way of moving it around and the larger the pipe better. • The obvious solution here is to stop Bord na Mona pumping silty water out of their bogs and create a large reservoir there to hold winter flood water = new water supply for Dublin and a significant reduction in flooding on the Shannon • However it's done it needs a proper assessment of the situation and options with detailed planning/costing to arrive at the best way of supplying extra water to Dublin, if that is what is required. Trouble is that the logical approach is anathema to Irish politicians because it restricts the scope for cronyism, brown envelopes, nods and winks and generally using a project to political advantage. • Could you drain the Royal and Grand canal in advance of a flood and then open them up to absorb some of the excess? Or in most of the water trapped in the middle so isn't drainable? • Difficult because of different levels and also potentially likely to weaken parts of it by draining and refilling • I didn't consider the structural element, I'm more familiar with canals that follow rivers so you assume they are generally going downhill , those 2 probably have section that are higher. But for sure build some kind of reservoir in the midlands that can have multiple uses. • Relatively easy to accomplish in setting up a major reservoir in the midlands which can be used as a recreational area and during Autumn have its levels lowered considerably so it can take some of the Shannon overflow.		

Table G.1 : Relevant online media activity referencing the WSP / POAR (26th November 2015 – 11th March 2016)

Appendix H. POAR Submission Summaries

Summary of submissions received	Issue / Theme
• Suggested an alternative pumped storage option, drawing water from Ardnacrusha and storing it in a dam in the Slieve Bloom Mountains. Proposed that the facility could use off-peak electricity from sources such as wind, to pump the water to the storage dam in the Slieve Bloom Mountains. • A dam would be a great source of revenue to that area. • Besides, taking the water from near the estuary would ensure that the Shannon was kept pure and free from pollutants; taking it from nearer the source might result in catastrophic drops in the level in periods of drought, just when the greatest drain would be on it.	**Alternative Options** • Reservoir Storage **Environment & Fisheries** • Environment & Ecology • River Shannon water levels **Sustainability** • Energy
• Expressed opposition to the proposal to abstract water from the River Shannon; favoured desalination. • Enjoys rowing and kayaking on Lough Derg; feels that the lake belongs to the boaters, swimmers, anglers, divers, sailors, rowers, kayakers, historians, environmentalists and mammals, fish and birds who use it. • Water levels are low enough as it is. It has become a struggle some days during the summer months to even get boats out of some local harbours. This has already had an impact on local businesses and on the number of boats even out on the lake. If global warming is going to increase the temperatures in the coming years and if your plans to extract water go ahead there will be no boats out on the water at all. • The pipes in Dublin are old, leaky and badly maintained. • The extraction of water will affect many aspects of our environment. Habitats will be disturbed by the laying of pipelines. The fish stocks will deplete. May fly, white tailed sea eagles, mammals and birds like sea gulls, cormorants etc. that feed on the fish will be affected. • Extracting water from Lough Derg is not sustainable. Desalination is sustainable as sea water is in endless supply, compared to the size of Lough Derg. The cost of desalination is expensive, but is it not better to invest money into a real sustainable source?	**Alternative Options** • Desalination **Environment & Fisheries** • Environment & Ecology • River Shannon water levels **Leakage & Conservation** • Leakage **Sustainability** • Sustainability & Carbon Footprint **Tourism & Amenity**
• Discussed an alternative option featuring reservoir storage, based on potential proposals to construct additional storage and power generation facilities in the Arra Mountains, or Crag Mountain.	**Alternative Options** • Reservoir Storage
• In a country where rivers overflow their banks frequently, dams threaten to burst (Cork), the mind boggles at the proposal for	**Alternative Options**

desalination.	• Desalination
• Have the leaks in Dublin area been fixed? The cast iron pipes in central Dublin are of the 1890-1910 vintage; estimated that leakage in Dublin is around 45-55% of the water being produced. • Aware of the problems of having to close down whole sections of Dublin while new pipe laying is being done and the gridlock that can cause. Advised the Project Team to consult with ESB, Telecom and all other utilities.	**Leakage & Conservation** • Leakage **Engineering & Planning**
• Expressed opposition to the Parteen Basin Option. • Requested cost data, including proposed contributions to Councils in the Benefitting Corridor. • Advised that Tipperary County Council has a Development contribution scheme in place, as well as an "abstraction tax"-which is Tipperary's own community gain for their own residents instead.	**Communities / Benefitting Corridor** • Community gain
• Expressed the opinion that leakage and water conservation measures are more important than finding a new water source for the Eastern and Midlands Region. Outlined various suggestions including pipe repair, charges per usage to encourage domestic and commercial behavioural change and water conservation, rainwater harvesting, water reuse, more water-efficient appliances (including tax incentives or low cost credit options to promote these) and variable water charges throughout the day to even out demand for water. • Estimated that the average water consumption in Ireland is higher than the UK, and suggested that the metered charges in the UK are a primary reason for this. • Suggested that there is no incentive presently to consider more water efficient appliances and that there is a greater emphasis on energy reduction than water conservation and efficiency. Felt that water charges are too low and there is little understanding about how to conserve water and the benefits of this. • Suggested that agricultural consumers should be charged business rates to encourage conservation and reuse.	**Leakage & Conservation** • Leakage • Water Demand & Conservation **Alternative Options** • Rainwater Harvesting • Greywater Reuse
• Raised concerns about the public consultation process implemented by the Project Team. • Requested that Carrick on Shannon be included in the public briefing sessions, as the town is the main activity area for the Shannon and tourism in the town is greatly reliant on the River.	**Public Consultation Process**
• Suggested an alternative option featuring reservoir storage, based on raising the level of Lough Dan and treating the water in the nearby existing treatment works at Roundwood. • Acknowledged that the volume of available water might not be sufficient but that it could serve as an additional backup. • Felt that the development cost could be relatively low and that few properties would be affected by the increased water level.	**Alternative Options** • Reservoir Storage
• Proposed rainwater harvesting instead of the Parteen Basin option as rainfall rates in Ireland are high. • Queried why rainwater harvesting is not included in any of the new building proposals for Dublin.	**Alternative Options** • Rainwater Harvesting

• Felt that the consultation period is only “lip service” and those in charge have their minds made up already. • Concerned that the Parteen Bain proposal could result in deterioration of the Lough Derg/River Shannon Surface Water Body and suggested that this would be in breach of the WFD. • Suggested that pipes be repaired to reduce leakage before sourcing a new water supply for the region.	**Environment & Fisheries** • Environment & Ecology **Leakage & Conservation** • Leakage **Public Consultation Process**
• Advised that there could be up to 30 Group Water Supply schemes with sources and distribution networks along the proposed pipeline corridor, which could be impacted upon by the WSP. Outlined the importance of these schemes for the development of the rural communities they supply and suggested that the Project Team should consult with the organisers and members of these schemes.	**Engineering & Planning** **Public Consultation Process**
• Requested cost data on the project, including a cost comparison of abstracting water from Parteen versus other water bodies, such as at Blessington. Queried the long term abstraction costs, including maintenance and community gain. • Highlighted that small communities along the pipeline corridor will be impacted (whether the community is positive/negative/neutral in its stance), and that Irish Water has an advantage in terms of expertise compared to small communities. Asked if Irish Water will facilitate funding for small communities to prepare submissions to Irish Water so that project analysis is somewhat balanced and a small community can have a meaningful input into the process.	**Communities / Benefitting Corridor** • Community gain **Engineering & Planning**
• Primary focus of the submission was the Garryhinch storage option and why this is no longer under consideration by the Project Team. Suggested that this would have great environmental benefits, including better flood relief than the current proposal and ecological and tourism benefits through the creation of a wetlands recreation and nature conservation park in the midlands. Asked the following questions: 1. On what date was this option abandoned? 2. Why was this option abandoned? 3. Have you any analysis to support its abandonment? 4. Who took the decision to abandon this option? 5. To your knowledge, has this eco-benefit been taken into account in the current option? 6. To your knowledge was any SWOT analysis undertaken regarding the changed option?	**Alternative Options** • Reservoir Storage
• Following on from a previous submission, the stakeholder outlined their support for an alternative pumped storage option based on abstraction at Ardnacrusha and storage in the Slieve Bloom Mountains. Suggested that such a scheme could help regulate water levels and could operate using low cost off-peak wind energy. Proposed also that excess water could potentially run off from the storage area to the Barrow & Nore Rivers. • Felt that none of the schemes suggested aims to conserve water & all seem more of a 'fire-brigade' solution to drip-feed a	**Alternative Options** • Reservoir Storage **Leakage & Conservation** • Water Demand &

thirsty Dublin in a summer emergency. • Concerned about River Shannon water levels and the electricity costs for pumping.	Conservation **Sustainability** • Energy
• Following on from a previous submission, the stakeholder outlined their concern about the legitimacy of the stakeholder engagement process. • The stakeholder outlined their previous experience with public consultation for large engineering projects; suggested that the project will go ahead regardless of submissions from the public.	**Public Consultation Process**
• Concerned about the potential impact of the WSP on tourism and the environment in the Lough Derg area. • There are thirteen angling clubs in the area which are being affected by the already fluctuating water levels. They are concerned that if this area is used as a new source, trout fishers won't have access to the lake, as the land will be too low. Highlighted that any loss of the fishing tourism would be devastating to the area and so the preservation of the Lough Derg environment is crucial for anglers in the area.	**Environment & Fisheries** • Environment & Ecology • Fisheries **Tourism & Amenity**
• Expressed the opinion that effective leakage measures could negate the need for a new water supply. Estimated losses to be in the region of 40-60% and suggested that a significant and rapid investment in leakage reduction is needed, which would eliminate the costs of developing a new water source.	**Leakage & Conservation** • Leakage
• Felt that the project is Dublin centric and runs contrary to the latest National Spatial Strategy. Expressed the view that centralisation is not prudent or sustainable, and that it reduces the capacity of other areas. Suggested that the WSP introduces unsustainable development capacity in the Greater Dublin Area, as the project does not account for the additional wastewater to be treated. • Queried the Cost Benefit Analysis undertaken for the project, asking if a comparative analysis of the quantitative costs for all options has been carried out. Felt that the full economic benefit has not revealed for less invasive alternatives such as greywater harvesting, water conservation, repairs and improvements to Infrastructure (including less pollution from urban treatment systems). The new project will involve running costs and maintenance (filters, treatment, reservoirs, pumping stations, pipe lines etc.) • Queried if the benefiting corridor is facing a water shortage, and highlighted that the water allocation to the Benefitting Corridor is the same in all the scenarios for assessment and population growth. • Concerned about the reduction in energy generation at Ardnacrusha as a result of the Parteen Basin proposal. Suggested that an energy balance analysis should be included in the assessments of each option, including a comparative energy assessment looking at embodied energy of pumping, filtration etc. versus water conservation and intrinsic energy conservation. • Also concerned about the potential impact of the WSP on River Shannon water levels and suggested that the methodology used to assess the capacity of the Shannon is not longitudinal or over a sufficiently long timescale. Highlighted that any	**Engineering & Planning** **Communities / Benefitting Corridor** • Water allocation in the Benefitting Corridor **Sustainability** • Sustainability & Carbon Footprint • Energy **Environment & Fisheries** • Environment & Ecology • Flooding **Alternative Options**

reduction in water levels will affect the absorption capacity of the Shannon for the dilution of treated effluent locally. Suggested there would also be indirect impacts of water level reduction including drainage of wetlands and reduction of habitat, destruction of fisheries, lowering of the local water table and impact on private wells especially during droughts. • The emerging preferred solution does away with a reservoir which would offer some new habitat and offer flood relief. Taking water downstream of most flood sites means no abatement and also means more treatment. No reference has been made to OPW flood hazard mapping and emergency flooding maps for comparison.	• Greywater Reuse **Leakage & Conservation** • Water Demand & Conservation
• Proposed an alternative pumped storage option to reduce flooding and deliver a new water source. • Outlined that the flooding of the Shannon basin has had and will continue to have a significant impact on the lives of the residents, businesses and farming communities in these regions. Proposed that the flood alleviation should be included as an objective of the WSP. • Queried if the proposed pipeline from Parteen Basin to Peamount, or a modified version, could be used to drain off excessive water from Parteen and pump it into the sea. Acknowledged that the economic costs would likely be significant but suggested that the capital and human costs associated with ongoing flooding could be avoided. Suggested that we have considerable experience in Ireland with the transportation of gas from sea to land and land-based Gas networks, and that we could use this knowledge and expertise to provide a lasting engineered flooding solution. • Also discussed the potential for pumped storage to store flood water during winter.	**Alternative Options** • Reservoir Storage **Environment & Fisheries** • Flooding
• Suggested that it is Irish Water's intent to take ownership of the Shannon • The WSP calculations are based on an average inflow to Lough Derg. The stakeholder argued that the inflow can fluctuate during the year from 800 m^3/s to 15 m^3/s, and does not obey the law of "average". Pumping will have to take cognisance of the actual amount of water available in real time, at any time of the year. The pumping strategy should not be based on an "average" flow or level. • During summer low flows, only 15 m^3/s flows into Lough Derg. Abstraction of 4 m^3/s would represent 26% of the inflow, and leaves only 11 m^3/s for ESB generation. This would require a draw down from Lough Allen and Lough Ree to provide sufficient water for generation and abstraction, and maintain the required level in Lough Derg, at a time when rainfall is low, water levels are low but water demand is high. This could have serious consequences for ecology and navigation levels in the Shannon. • Expressed the opinion that the 1-2% operating margin quoted is historical in the current context (2015) and is no longer relevant. • Queried what effect would an algal bloom in Lough Derg have if a significant portion of the country was directly dependent on this proposed new source, suggesting that, as an alternative source, groundwater would not be affected by an algal bloom. • Queried the demand projections for industry. Argued that if the industrial need estimates do prove true, the WSP, as a long-term project, cannot meet the short term needs of industry. Called for the development of smaller-scale, more rapid and flexible sources.	**Environment & Fisheries** • Environment & Ecology • River Shannon water levels **Leakage & Conservation** • Water Demand & Conservation **Communities / Benefitting Corridor** • Water allocation in the Benefitting Corridor **Alternative Options**

• Suggested that 75-100 Mld could be delivered from multiple additional sources, or demand reduction, in a shorter time frame than the WSP, suggesting the upgrading of other water supply elements, such as the Vartry Tunnel. • Argued that demand has plateaued for 8 years, and suggested the 2026 projection should be 540 MlD rather than 630 Mld. Suggested that the capacity for peaking allowance and headroom outage in 2050 should be significantly lower than 160 Mld. • Expressed the opinion that any deficiencies in Midlands's water supply are the result of underinvestment and can be locally resolved. Stated that the number of water treatment plants in Ireland is irrelevant, arguing that changing a diverse array of smaller sources to one large system does not necessarily improve resilience if something goes wrong with the singular new system. Further suggested that the large capital budget of the WSP would divert resources away from other parts of the Midlands outside of the Benefitting Corridor. Called for the publication of the economic analysis of upgrading existing water schemes or constructing new schemes in the Benefitting Corridor, in comparison with servicing these areas using the WSP. • Called for additional investigations of groundwater, using exploratory drilling as well as desk studies, and economic costings. Suggested that at least 100 Mld could be viably supplied using groundwater.	
• Expressed preliminary support for a fish pass improvement at Parteen.	**Environment & Fisheries** • Fisheries
• The Metropolitan District of Limerick agreed a Notice of Motion to "reject the proposal to pump water from Limerick to Dublin".	
• Expressed support for the Parteen Basin option, noting particular favour of: 1. Pipeline construction benefits to Offaly, 2. The advantages of this strategic infrastructure for the county 3. The potential for external investment in Offaly jobs from water dependent industries 4. The extended provision of a quality water supply to the relevant SME sectors already or potentially operating in the county 5. General community gain to local areas in the county. • Offaly County Council developed a Local Economic and Community Plan (LECP) for 2016-2021, which included an objective to "Maximise the opportunities for Offaly arising from strategic infrastructural projects/priorities" as part of the Economic Goal 1 for "Employment, Enterprise and Innovation". An action arising from this objective was to "actively engage with Irish Water and relevant Departments to ensure Offaly benefits from the WSPs, Eastern and Midlands Region (WSP)".	**Engineering & Planning** **Public Consultation Process** **Communities / Benefitting Corridor** • Community gain
• Suggested that consideration of the issue of supplying water from the Shannon to Dublin should be progressed in the context of the Shannon flooding issue. Felt that flooding has not been considered in the WSP plans to date and as such the Parteen Basin option is a missed opportunity from a national interest perspective. Suggested therefore that the assessment of potential supply options should not be limited to those set out in the OWP. Proposed the development of an option which: 1. Maximises capacity to abstract water during wet weather, to mitigate the extent of flooding	**Alternative Option** • Reservoir Storage **Environment & Fisheries** • River Shannon water levels

2. Avoids abstracting water during periods when river levels are low 3. Provides for adequate supply of water to meet the projected needs of the Eastern and Midlands Region. • Suggested the revisiting of the OWP Lough Ree and option, which involves abstraction of water from Lough Ree to a reservoir on a cutaway bog in the Midlands, in order to store excess winter water for use in Dublin during drier periods in the summer. Suggested that by optimising the storage capacity of a reservoir in the Midlands, it would be possible to ensure that there would be no need to abstract water from the Shannon during periods of drought. The system could be managed to ensure that the levels in Dublin's existing water storage facilities, such as Pollaphuca and other reservoirs, are optimised and that water would not be abstracted during dry periods in order to preserve water levels on the Shannon. • Suggested exploring the possibility of piping excess water, which is abstracted from the Shannon to relieve flooding but is not required for consumption or storage, into the Irish Sea. The excess water abstracted during periods of high water levels would be used firstly to supply Dublin, secondly to top up the reservoir and, thirdly, surplus water is run off into the Irish Sea. Highlighted the potential for using rainfall forecasting to maximise the effectiveness of flood mitigation by commencing abstraction several days in advance of flooding. • Highlighted the importance of assessing the capacity of Lough Ree to supply the WSP demand, particularly during periods of drought. Stated that it would also be important to show that such an option could actually alleviate flooding in the Shannon River below Lough Ree. Acknowledged also that many other actions to mitigate flooding in particular areas will be required along the Shannon but that the abstraction of large volumes of water from Lough Ree for several days in advance of and during periods of excessive flooding (up to 860,000 m^3 per day) could benefit flood reduction efforts. Suggested that, as with any option to be considered, a full Cost Benefit Analysis will be required.	• Fisheries • Flooding **Engineering & Planning**
• Suggested an alternative reservoir storage option to regulate water levels and reduce the risk of flooding, whereby water could be removed and stored in reservoirs during periods of high water levels and in times of low rainfall, water could be supplied from the reservoirs, obviating the need to take water from the Shannon and reducing the risk of having a 'dry' river. Called for an evaluation of the benefits of having water levels controlled within tighter limits compared with the costs of providing large size reservoirs. • Discussed the various factors, such as population, agriculture, industry and climate, which affect water demand and highlighted the importance of accurate demand projections. Also called for a sensitivity analysis to assess the impacts of water extraction on water levels at Parteen. • Highlighted the energy and cost implications of the Emerging Preferred Option given that Parteen is downstream from Lough Derg, is at a lower elevation above sea level and also needs a longer pipeline. Outlined that the difference in energy requirements is influenced by the water level at Parteen, as any drop in level increases the pumping energy requirements. If Parteen is the source of water supply, then under hot, dry weather conditions, when demand for water is highest and the volume of water in the Shannon is at its lowest, the drop in water level at Parteen could be significant. Called for energy analysis of this 'worst case' water level scenario, including the impacts of abstraction on generating capacity at Ardnacrusha,	**Alternative Option** • Reservoir Storage **Environment & Fisheries** • River Shannon water levels • Flooding **Leakage & Conservation** • Water Demand & Conservation **Sustainability** • Energy

particularly during periods of low water levels when pumping costs are higher. Concluded that the difference in energy requirements between Lough Derg and Parteen projects needs to be assessed over the lifetime of the proposed developments to ensure that the alternatives are properly evaluated.	
• Expressed support for the Parteen Basin option. • Queried if extra storage is needed for dry summers when the flow of the Shannon would be low. Highlighted that he last major storage facilities built in the GDA was the Blessington Reservoir built in the 1940's and that there extra storage could be needed since that time. Suggested that Global Warming predictions of having drier summers could make extracting the water more environmentally sensitive. • Also discussed flooding along the Shannon, stating that an ability to take out 2% of the flow would be beneficial in reducing flooding downstream of Parteen Weir. While 2% may not seem a lot the Shannon rises slowly, taking a week or more to reach maximum height after heavy rains, so the full amount could be taken when flooding was predicted. This could start a week ahead of the predicted peak. Concluded that some means of putting this water into the Liffey or reservoirs would be needed to ensure it worked. Suggested that this aspect of the plan could be increased to move more water to different catchments in flooding emergencies. • Discussed community gain, with a particularly focus on Wicklow, referring to the Dublin Corporation Waterworks Act 1861.	**Alternative Option** • Reservoir Storage **Environment & Fisheries** • Flooding **Communities / Benefitting Corridor** • Community gain
• Expressed opposition to the Parteen Basin option and preference for alternative options. • Discussed flooding and suggested that this problem is worsening due to climate change. Felt that if the WSP is being considered for flood alleviation, the aim of the project has changed (from water supply) and therefore this is a totally new situation that needs careful study. Expressed the view that the diversion of water from the Shannon should take place only be when during winter months and that there should not be year-round diversion of water to the Dublin area. • Stated that leakage reduction and water conservation should be carried out in the first place, suggesting that modern lifestyles waste a lot of water compared to previous generations, by excess showering, toilet use and clothes washing. Proposed the use of water meters to promote conservation as well as the use of grey/recycled water for toilets using rainwater harvesting and plumbing circuits to recycle grey water. • Concerned that the use of Shannon water will have ecological impacts on the region, especially in dry periods, and that increasing abstraction of water could reduce river flow significantly, impacting on tourism and biodiversity along the Shannon. • Felt that there will be a big carbon footprint in the construction of the infrastructure, which will impact on our efforts to address climate change. However, also stated that Desalination is not the solution due to the huge cost of the process, including high carbon emissions. • Concluded that if Dublin still has a water problem after all these issues have been addressed, then future economic policy should direct more economic activity to Western regions along the Shannon. With climate change, the East will have less water, while the West will have more. Dublin is getting too big for the country, and if we can't supply water for this burgeoning	**Alternative Option** • Desalination • Greywater Reuse **Environment & Fisheries** • Environment & Ecology • Flooding **Engineering & Planning** **Leakage & Conservation** • Leakage • Water Demand & Conservation **Tourism & Amenity**

entity, then we must explore spreading economic activity and jobs to other and sustainable areas of the country.	
• Expressed the view that the "Needs" concept should be revisited before any final decision is made, to include savings from leakage measures. Queried if savings due to leakage repairs have been factored in the demand calculations. Also discussed hydraulic and climatic losses along the pipeline. Concerned that allocating water to towns other than Dublin is a red herring, and asked if the Midlands actually needs the allocated water. Felt that there is no evidence that the availability (or otherwise) of water is a serious factor in the failure of midland towns to attract FDI. • Discussed the energy implications of the WSP, highlighting that reducing the generating capacity of Ardnacrusha could have national consequences for our renewable energy generating capacity, leading to an increase in fossil fuel energy needed to make up the deficit. Furthermore, the national energy demand will increase due to the pumping requirements of the WSP. Stated that the route from the Parteen Basin facility to the Peamount Reservoir will be 35% longer than that from the northern shores of Lough Derg and that there will be a greater pumping head, in excess of 80m, to be achieved, with a concomitant increase in costs. • Discussed River Shannon water levels, and queried the normal operating band, as well as the impact of abstraction during dry summer months. Asked if either Waterways Ireland or the HAS have given their approval and consent for the abstraction. • Concerned that Irish Water would maintain high water levels in the Shannon and Lough Derg during the early summer months, so that this water is available for pumping. Suggested that this would have a serious negative impact on the callows drainage system, resulting in the loss of habitat for summer migrants and a serious loss of grazing and fodder for farmers who own such lands. Outlined the converse to this-the worry that in the event of a "dry" Summer, the water will not be released quickly enough, which could lead to increased Winter flooding, similar to what we have seen in the recent past. • Stated that there is no one authority responsible for the Shannon, and suggested that the WSP adds another 'player' to an already dysfunctional system. Expressed the opinion that nothing should be allowed to happen until the question of "who is responsible" is clearly and legally defined. Queried who will be ultimately responsible for monitoring and publicly reporting the measurement of the amount of water being abstracted. Suggested that abstraction could be closer to 500 Mld than 330 Mld, highlighting the importance of having accurate and verifiable measurements. • Asked if planning permission is given, will Irish Water agree to consult with the public should they wish to alter in any way their Licence(s)? What happens if the minimum statutory flow requirements are increased or indeed decreased in order to achieve whatever is being promoted? Will it be done by Ministerial Order, that is by-passing public consultation or will there be further consultation at that stage? • Expressed the opinion that the time-lines for the public consultation process are tight, and that the Team does not appreciate the amount of time involved in reading the Report, checking its 'facts' and then making a submission. Also felt that there are many oral consultation meetings with stakeholders of interest when the public, notwithstanding their interests, knowledge and expertise, are excluded. • Queried the impact of abstraction at Parteen on water levels along the shore-line of Lough Derg as well as possible	**Alternative Option** • Desalination **Environment & Fisheries** • Environment & Ecology • River Shannon water levels • Flooding **Engineering & Planning** **Public Consultation Process** **Leakage & Conservation** • Leakage • Water Demand & Conservation **Sustainability** • Energy **Communities / Benefitting Corridor** • Community gain

archaeological underwater impacts and the effects on shallow water communities in the lake. • Discussed the WFD and its relevance to the River Shannon. Suggested that the WFD is not as relevant as it used to be and that in the light of the new interpretation being placed on the WFD by both government and the EC the concept of "compliance with the WFD" needs to be revisited in regard to this entire Project. • Queried if the using 'Parteen water' could result in an increase in the pH of supplies to Dublin, which is presently reliant on water coming from more acidic rocks and soils. • Referred to the POAR which stated that the "works will need to incorporate protection against infestation of alien species such as zebra mussels". Stakeholder believed that the zebra mussel is already present in many places along the Grand Canal and indeed along the River Barrow, all of which can be traced to the River Shannon; so don't know what the concern is. • Discussed the hydrological survey data for Lough Derg. Expressed the opinion that public consultation on the POAR should have been postponed until this data is available to the public to negate any time advantages for the Project Team. Queried when this modelling study of Lough Derg will be completed, asking will the results be available for submission to An Bórd Pleanála. • Stated that the Project Team undertook a very good ground survey of the karst features at Garryhinch, and queried if a similar study of the probable existence of karst features within Lough Derg have been addressed. • Suggested the use of actual speed and density measurements of suspended solids rather than residence time, stating that the suspension and deposition of suspended solids is logarithmic. Suggested that such measurements could inform the estimations of waste which will be generated and the energy requirement to pump the water eastwards. Proposed that this suspended solid material is nutrient rich and so represents a very ready supply of fertiliser for the local community. • Queried how much more work will be carried out on the Desalination option, and felt that even if there are radical technical (and costing) changes to the Parteen Basin option and/or significantly increased costs and/or major environmental constraints which were not identified originally, nevertheless it appears that the decision will not be reversible. Suggested that the Desalination studies should be carried out independent of the Project Team to ensure objectivity. Stated that whilst quite general costing figures are given for the Desalination option in the POAR, no comparative figures are given for the Parteen Basin option. Suggested a comparative study, including costs, based on the new Desalination plant located on the Thames. Queried the composition of the brine plume from the Desalination plant, as well as the dilution measures proposed. • Queried the storage capacity of the Peamount Termination Point Reservoir and asked how the project will 'protect' supplies to Dublin at the height of the deficit period. Discussed the location and sizing of the Termination Point Reservoir, stating that if the elevation of the termination site is decided to be 70-80m, if for some reason the preferred option is not suitable, it has apriori ruled out other possible sites. Queried if any further treatment of the Peamount water will be required before it is distributed by the potable water network. • Expressed the opinion that the "Community Benefits" package reads very hollow, considering that consumers are paying for non-potable water in flooded homes and for non-existent sewage treatment. Also queried why the community gain proposal is	

being included as part of the submission to An Bord Pleanála, asking if instead community gain could start immediately like the one that was carried-out by Eirgrid and ESB Networks in relation to the overhead transmission line cables.	
• Concerned about the impact of year-round abstraction on water levels, particularly during periods of dry weather which causes naturally lower river levels as well as increased water demand. Suggested that this will result in further decreases in water levels all along the entire Shannon as the level is maintained in Parteen basin to supply both potable water and water for electricity generation. Highlighted that water levels are vital for the fauna and flora of the River and its Lakes. This makes them an attractive destination for national and international tourists. This makes it a key economic driver for the midlands. • Highlighted that if this proposal succeeds Ireland will have three competing bodies for different usage of the River Shannon's Water-Irish Water, ESB and Waterways Ireland. Concerned that abstraction will only increase over time (with population growth) quite possibility to a point where a decision has to be made to restrict abstraction or risk causing ecological and environmental havoc. Queried if the Shannon grow to meet this growing population need or is desalination the option that should really be considered, as well as who will conduct the worst case analysis of abstraction levels. • Expressed the opinion that Shannon abstraction unlike the Desalination proposal is not comparing like with like as the Shannon at any given time is a finite resource whereas the oceans are infinite. • Asked if Ireland needs a body charged with and responsible to the Oireachtas for safeguarding the River Shannon and its Lakes. Suggested that this body would control when and who, can abstract water, and would need to have the necessary expertise of the systems unique hydrology and its needs to support the unique ecosystems that support the important flora and fauna of the Shannon Region. • Has the possibility of building a weir or similar structure at Parteen been considered to maintain the recognised minimum levels along the entire Shannon and prevent abstraction when Shannon levels fall below the weir level which is set to an agreed level to prevent extreme low levels? • Stated that the WSP is a concern to the boating community who use the Shannon and its lakes as well as the many towns and villages along the Shannon and the Lakes. Felt that the WSP community gain proposals would need to go much further than proposed to meet any economic shock following from any prolonged and damaging abstraction. • Agreed with the view that WSP reservoir storage would have capacity to meet flooding needs and its requirement to act as water store mitigates as a potential water sports amenity.	**Alternative Option** • Desalination **Environment & Fisheries** • River Shannon water levels **Communities / Benefitting Corridor** • Community gain **Tourism & Amenity**
• Strongly support the Parteen Basin option. Considered it a much better option than Desalination, which would require large amounts of energy (at a time when Ireland is trying to reduce energy consumption) and would also lead to the production of a highly concentrated salt solution that will need disposal. • Suggested that Dublin badly needs extra water supply, as they estimated the spare capacity in Dublin in recent years as being as low as 1-2%. Suggested that the city often uses more water than it could produce during weekdays, relying on reduced consumption at the weekends to replenish supplies. Highlighted that a lack of spare capacity caused serious problems with the	**Alternative Option** • Desalination **Leakage & Conservation** • Water Demand & Conservation

water supply to the capital in 2010 and 2011 when the country experienced severe cold weather, and burst pipes, and water restrictions were in place for residents and to business. Stated that these restrictions had a particularly severe impact in our restaurants, pubs and hotels. Suggested that the spare capacity has improved somewhat in recent years to around 8%, but that this is still far short of the 15% that is considered a safe level of spare capacity. Expressed the view that there will be need for increased capacity in Dublin as our population is predicted to grow rapidly between now and 2031, and we will also need to increase supply to allow for economic expansion.	**Tourism & Amenity**
• Following on from a previous submission, the stakeholder proposed an alternative storage option. • Expressed the opinion that the benefits of having capability to store 'raw water' in large reservoirs is not confined to water level management, but that there are also pumping energy costs to be considered. Suggested that, with appropriately positioned and adequately sized reservoirs, pipes and pumping equipment, it would be possible to pump the daily water requirements at times when electricity costs are minimal (e.g. 'night rate' electricity). Two operating scenarios would then be possible. Under 'normal' weather conditions (say 95% of the time) water to be pumped at times when electricity costs are minimal. Under abnormal weather conditions (say 5% of the time), water to be pumped at times to ensure that Shannon water levels are maintained within 'tighter' limits. Stated that the cost saving by using 'night rate' electricity is considerable, given the estimated demand of 4 cumecs.	**Alternative Option** • Reservoir Storage **Environment & Fisheries** • River Shannon water levels **Sustainability** • Energy
• Expressed support for the Parteen Basin option. • Queried if extra storage is needed for dry summers when the flow of the Shannon would be low, particularly given Global Warming predictions of drier summers which could make extracting the water more environmentally sensitive. • Suggested that the removal of 2% of the flow at Parteen could be beneficial in reducing flooding downstream of Parteen Weir. Stated that while 2% may not seem a lot the Shannon rises slowly, taking a week or more to reach maximum height after heavy rains, so the full amount could be taken when flooding was predicted. Highlighted that flood alleviation is a major national priority, particularly in the Shannon area. • Discussed community gain proposals, referring to rules for Wicklow, outlined in the Dublin Corporation Waterworks Act 1861.	**Alternative Option** • Reservoir Storage **Environment & Fisheries** • Flooding **Communities / Benefitting Corridor** • Community gain
• Primarily concerned with the Garryhinch storage option and water allocation in the Benefitting Corridor, with a particular focus on County Laois. • Welcomed the publication of the POAR, stating that the WSP has the capacity to deliver a means of ensuring an adequate and resilient water supply for County Laois into the future. • Outlined the considerable urbanisation and expansion of Portlaoise in recent years, as well as the growing population in the town environs, highlighting that Portlaoise is the joint largest town in the midlands. Stated that the town is experiencing pressure for residential, retail and commercial development, and that a growing population has placed an even greater demand on the town's infrastructure. Stated that Portlaoise is currently served by groundwater sources and that the existing demands are estimated at approximately 8 Mld. Estimated the 2025 water demand to be 20 MLd to cater for domestic, commercial,	**Alternative Option** • Reservoir Storage **Environment & Fisheries** • Environment & Ecology **Communities / Benefitting Corridor** • Water allocation in the Benefitting Corridor

industrial, institutional and agricultural needs. Highlighted the importance of providing a resilient, sustainable high quality water supply to ensure the long-term physical, environmental, social and economic development of Portlaoise. Expressed the opinion that the proposed allocation of water to Laois (4.3 MLd out of 96.1 Mld to the Benefitting Corridor) is too low, and that Portlaoise should be allocated water. • Agreed with the environmental concerns associated with abstracting water from Lough Derg, as predicted by the WSP model. Suggested that reservoir storage at Garryhinch should be considered with abstraction at Parteen Basin (rather than Lough Derg as originally investigated). Stated that a viable model exists to accommodate 2 months' supply storage to counter drought periods while improving residence times in Lough Derg. The location of the abstraction at Parteen Weir would allow variable abstraction rates if required but would not impose the constraints requiring variable abstraction rates that applied to the abstraction located on the north eastern shore of Lough Derg. Such an arrangement would extend the storage reserves and enhance the capability of the storage facility in addressing supply during prolonged periods of drought. Suggested that this is extremely important when one takes into account the likely impact Climate Change has on exacerbating drought conditions not only in the Shannon region but on the excising sources of supply to Dublin and the Benefitting Corridor. It has also the potential to reduce the impact on the supply of reserve water storage for Generation of electricity by the ESB during drought periods. • Outlined the potential economic, tourism and amenity benefits of an Eco-Park at Garryhinch, referring to a similar successful facility which was created at Rutland in the UK by Anglian Water. • Stated that solutions could be developed to counter the engineering challenges associated with the geological and hydrogeological setting of the proposed storage location at Garryhinch, suggesting that the design of the storage facility could be refined to reduce or remove risks associated with karst bedrock. • Suggested that the potential environmental risk of migration of Alien Species – the Zebra Mussel and the Asian Crab into other water bodies can be resolved by treatment for their removal at source before pumping to the reservoir and provision of a resilient supply for Roscrea and Shinrone (4.05 and 1.2 Mld) can be provided by a separate treatment plant at a suitable site. • Expressed the opinion that there has been no appraisal of the Socio-Economic benefit of the WSP for any of the options. Suggested that there are highly significant socio-economic benefits associated with the Garryhinch option, including meeting many of the goals and policies outlined in the Midland Regional Planning Guidelines 2010 to 2022. • Proposed that a matrix needs to be developed which looks at all the impacts of the present 4 options and the additional sub-option – C-F2 both negative and positive, Capital Cost and Operating Cost and which clearly identifies where there is economic potential and employment potential for the Benefitting Corridor a factor which we consider has not been considered in relation to the significant benefit of the storage area at Garryhinch has for Laois and Offaly in particular. All options need to be examined in terms of the National Spatial Strategy and Regional Planning Guidelines 2010 to 2022.	**Engineering & Planning** **Tourism & Amenity**
• Expressed support for the Parteen Basin option, and was particularly in favour of: 1. Pipeline construction benefits to Offaly, 2. The advantages of this strategic infrastructure for the county in terms of its ability to provide rationalisation opportunities,	**Communities / Benefitting Corridor** • Community gain

resilience and security to the existing water supplies in the County 3. The potential for external investment in Offaly jobs from water dependent industries • Stated that groundwater is the predominant water source in Offaly, and the WSP would provide significant opportunities to eliminate and/or rationalise a number of smaller public water supply schemes from a vulnerability perspective whilst providing greater security of supply and resilience to schemes serving larger urban centres such as Tullamore, Edenderry and Birr. • Highlighted the importance of considering those residing and working within the selected areas in Co Offaly and that a fund be established which would support Community Initiatives such as Tourism, Environmental, Sport, Leisure, Amenity, Training and Education etc.	**Engineering & Planning**
• Expressed opposition to the Parteen Basin option, suggesting that alternative options together with Leakage and Conservation measures should be the focus instead. • Felt that calculations of existing water demand is premature, pending water charges based on usage, stating that there were strong indications that demand for water would be reduced if metered water charges were introduced. Demand did actually fall for a short time, before the water charges became flat-rate. There is no reason why water consumption in Dublin should be so much above that in say, Germany. Estimated that metered water charges would have to be in place for at least two years and preferably longer, before people would begin to change their behaviour and install water-saving measures, allowing an accurate assessment to be made of projected need for any extra water supply. Believed that unless there is a sudden large jump in demand for water by, say, industry, there is no need for extra water capacity in Dublin in the short and medium term. • Discussed WSP planning, stating that the Shannon/Limerick area already has the foundations for electronics industry, due to the efforts of Shannon Development. Instead of over-developing Dublin and under-developing the West, it would be better to locate industry in the west that uses the resources of the West, ie Shannon water. It would be better to locate industry proximate to major water sources rather than to move the water into a different river basin or basins. • Expressed the opinion that a new water supply in Dublin would reduce the incentive to repair the pipes, and would therefore lead to environmental damage. Dublin's water is treated with an aluminium flocculent as well as chlorine and fluoride. The cumulative effect of much of this leaching into the ground and/or ending up in the sea is already a heavy load on the environment. Instead, existing leaks in the pipes should be repaired to reduce the demand for water and water-treating chemicals. Similarly, believes that increased water supply will reduce usage of rainwater and grey water. Rainwater harvesting would help to mitigate pluvial flooding in Dublin. Use of domestic greywater would also reduce water demand and the need for water-treatment chemicals. • Suggested that the Parteen Basin proposal would do nothing to alleviate flooding in the Shannon region, stating that resources should instead be spent in controlling flooding in the Shannon area. Discussed the arguments in favour of allowing floodwater into former bog areas, suggesting that this would help to sequester carbon as peat, which would reduce Ireland's effective Greenhouse Gas emissions, as well as bringing environmental benefits and avoiding the flooding of farmland. • Concerned that the extra abstraction, especially during dry periods, will have an impact on the environment and ecology of the	**Alternative Option** • Rainwater Harvesting • Greywater Reuse **Environment & Fisheries** • Environment & Ecology • Flooding **Leakage & Conservation** • Leakage • Water Demand & Conservation **Engineering & Planning**

lower Shannon. Suggested that abstraction should not be allowed during dry periods in order to protect the flora and fauna of the lower Shannon and Shannon estuary.	
• Guidance and information was provided by the stakeholder in relation to the Engineering & Planning project phases, including: 1. National Roads and Policy including existing national roads, proposals to provide new national roads or improve existing national roads, interaction with any national road structures, and means of access to/from the development to/from the national roads. 2. Road and Motorway Crossings 3. Traffic Management 4. Environmental Issues during the construction and operation of the proposed development, including any implications for the safety of road users.	**Engineering & Planning** **Public Consultation Process** **Environment & Fisheries** • Environment & Ecology
• Expressed preliminary support for a fish pass improvement at Parteen. Expressed the opinion that improvements in fish connectivity are long overdue. • The stakeholder proceeded to ask a series of specific questions (19 in total) about the proposed design of various aspects of the Parteen option, with a particular focus on environmental and fisheries themes.	**Environment & Fisheries** • Fisheries
• Concerned about the location of the Termination Point Reservoir for the scheme, as the proposed location has the potential for development. • Concerned about changes in the top water level at the reservoir. Suggested that the current proposed level is too low to service some lands.	**Engineering & Planning**
• Proposed the development of a WFD Research Facility in the vicinity of the proposed water abstraction point at Parteen Basin to facilitate monitoring and research that supports WFD compliance. • Highlighted that there is no fixed facility in Ireland specifically dedicated to the aquatic environment, and suggested that such a facility at Lough Derg could improve scientific knowledge of the lake and could, in conjunction with the responsible agencies, lead to improved lake management. Stated that the Parteen Basin option would “have a small, but perhaps not negligible, effect on the movement of water through the system”, and that research is needed to properly understand these changes. • Potential features of such a Research Facility were outlined in the submission, including monitoring, research into the functioning of freshwater ecosystems and their response to introduced species and changing climate, a rapid response in the event of equipment failure or unusual events, and access to real-time data for authorized researchers, regulatory bodies and other relevant utilities. Suggested that the proposed WFD Research Facility would: - serve as a data centre for all activities associated with the abstraction; - provide meeting facilities and laboratory space to assist short-term projects;	**Environment & Fisheries** • Environment & Ecology

- serve as a water education centre by means of demonstrations, displays and lectures; - be a pioneering advance in Irish water management and encourage similar initiatives in other parts of the country; - help to build local support for the national water utility and be recognized as a key Information and Technical Resource Centre for water; and - provide educational opportunities for schools, universities and the public.	
• Following on from a previous submission on a range of topics including leakage, conservation, and alternative options, the stakeholder acknowledged the Project Team response on all points raised, but expressed the opinion that more work is needed on water conservation. • Suggested that Ireland needs to move to water metering (like the rest of Europe) to reduce water consumption.	**Leakage & Conservation** • Water Demand & Conservation
• Stated that the POAR is clearly written, but that the large volume of documentation (including appendices) could be confusing for stakeholders trying to engage with the consultation process. • Expressed their support for the increased references to the WFD in the POAR and the inclusion of WFD requirements as a factor in the multi criteria analysis, but argued that the integrated water management approach required by the WFD has not been exhibited as there is a lack of co-ordination between key water bodies along the Shannon. Queried how Irish Water is co-ordinating with the activities of other water bodies and Government departments. Called for increased Irish Water engagement with all water governance organisations, such as the EPA Catchment Science and Implementation Unit, the DECLG (subsequently DHPCLG), and the NPWS. • Indicated that a new governance system is in the process of being put in place in Ireland, as the Local Authority Water and Community Office (LAWCO) is only place since 2016, the WFD catchment characterisation and the draft River Basin Management Plans are not expected to be complete until the end of 2016, and there are currently no WFD stakeholder forums in place. Argued that the final preferred option for the WSP should not be decided until these steps are complete. • Discussed the imminent National Planning Framework 2016-2036 (NPF), suggesting that there is a “policy interregnum” in a number of crucial national planning areas directly related to the WSP. Stated that because a number of the crucial national plans are pending, the WSP should be postponed “until the NPF has been finalised in order that the WSP can be ‘proofed’ against it”. The water demand scenarios for the Midlands were discussed as an example, with the stakeholder suggesting that these calculations are speculative and premature until the National Planning Framework is published. • Suggested that the Strategic Assessment conducted when the project was the responsibility of Dublin City Council should be re-visited, given the revised national remit and within the context of the imminent NPF. Suggested that this may include the impact of any additional wastewater generated as a consequence of the WSP, for Dublin Bay and also along the Benefitting Corridor. • Discussed water conservation, arguing that sufficient conservation measures in line with the WFD, such as water pricing	**Engineering & Planning** **Public Consultation Process** **Environment & Fisheries** • Environment & Ecology **Leakage & Conservation** • Water Demand & Conservation **Communities / Benefitting Corridor** • Water allocation in the Benefitting Corridor

policies that incentivise efficiency, are not place. • Requested clarification on the rationalisation of water schemes in the Benefitting Corridor, querying if there are other viable options for supplying the towns in demand and if the costs of such options have been compared with the costs of supplying the areas using the WSP. • Highlighted the importance of the public consultation process, favouring a high level of public participation, rather than providing just information or receiving stakeholder feedback, in the decision-making process. Recommended that the WSP engagement should represent a genuine partnership with stakeholders, with an opportunity for real influence, to deliver their shared water goals, and argued that the WSP public engagement process has not been meaningful, effective or adequate. • Suggested that the national significance and historic scale of the project is grossly under appreciated by the vast majority of the Irish public. Expressed the opinion that there is a lack of confidence among the public in the meaningfulness of public participation. • Suggested that there are flaws in the WSP public engagement process in four areas: - *Public awareness, education and information*. Stated that there is a very low level of awareness amongst the public of the challenges of successfully maintaining limited fresh water supplies, and suggested that the public is not aware of the pivotal role that can be played by citizens, groups, businesses, and industry, in addressing these challenges. Expressed the view that Irish Water's large scale, centralised water management approach plays a role in reducing the perceived relevance of involvement amongst the public. Recommended that national information and education are provided by Irish Water to highlight the importance of stakeholders in relation to water resources, and encourage individuals and groups to fulfil that role. - *Access to information and technical expertise.* Stated that technical support to help stakeholders fully understand the WSP was not provided for those being consulted. - *Accessible opportunities to participate.* Suggested that the main report and appendices are too long and complex to comprehend in the absence of technical support, and argued that in comparison the non-technical summary reports, are lacking in detail so as to make any comment in response of very limited use. - *Clarity and transparency of participation proposed.* Questioned how WSP submissions are analysed and if and how their contents are used as input to the development of the project. Indicated that stakeholders have to wait until the new consultation period to assess if their previous inputs have been addressed, and suggested that the feedback provided to submissions comprised consistent resistance to almost all points made by consultees. Called for a detailed analysis of stakeholder input by specialists.	

Table H.1 : Summaries of submissions received during the POAR Consultation Period (26th November 2015 – 11th March 2016)

Appendix I. Summary of issues raised, responses and influence on Project Development – Project Need Report (PNR, March 2015)

PNR Submission themes
Need • General Comments • Water Supply Network Resilience and Connectivity • Water Supply • Demographics • Planning and Balanced Regional Development
Project Road Map
Economic Development
Water Conservation • Leakage • Other Conservation Initiatives
Communities • The Benefitting Corridor
Water Demand • Water Demand Projections (domestic and non-domestic) • Peak and Headroom
Environment • Water Framework Directive • Biodiversity • Climate Change
Tourism & Amenity
Options • Desalination • Groundwater • Alternatives
Other

Table I.1 : Themes of submissions received during the PNR Consultation Period (10th March 2015 – 5th May 2015)

PNR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
Need • General Comments • Water Supply Network Resilience and Connectivity	The Project is unnecessary and costly; it is not needed; there are ample supplies of raw water available in the GDA.	In 2013, treated water supply availability exceeded demand in the Dublin Water Supply Area by an operating margin of 1%- 2%. Growing water demand since the 1990's has largely been met by encroachment into 'headroom', or operating margin, that should have been held in reserve. Treatment Plants have been operating at the limits of their capacity, almost all the time. This is unsustainable. Maximum deployable supply of 623 Mld by 2026 assumes all infrastructure is fully operational working to maximum capacity which is a highly unlikely scenario, and a new water source is needed well before 2026 to avoid rationing. Some 85% of Dublin's water comes from one single source. Supplying sources must be diversified. Future proofing approach is prudent and allows for system resilience. Dublin water network operates at 99% capacity at any given time, this is unsustainable and a direct consequence of years of underinvestment. Resilience of supply is essential for existing businesses to plan their future.	Notwithstanding progress on water conservation and leakage control since the PNR was published, and that these elements will continue to be part of the strategy, the WSP is needed. Water Demand will be reviewed when the preliminary results of Census 2016 are available. Irish Water have been developing works to improve network resilience in the Dublin Water Supply Area, the diversification of source risks and the deployment of headroom to centres of water production continues to be required. Algal blooms in Spring at Vartry are occurring frequently. Water demand has risen above 570 Mld, and operationally available capacity lies in the range of 600-623Mld. Achieving water supply resilience is an important part of the 'Need', and the WSP is required in order to address it.

PNR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
		3 events in the past 5 years highlighted how finely balanced the supply - demand position is. Improved water treatment capacity at Ballymore Eustace / Leixlip, and available daily treated water supply ranges are discussed in Section 4.2.2 of OWP Appendix A. The treated water supply position is, tight, and becoming more so. Issues relating to essential routine maintenance and increasing exposure, where probability of failure is elevated, are discussed in Section 4.2.2 of OWP Appendix A. The current operating position is incompatible with resilient service, and Irish Water is taking steps to address these key network constraints.	
Need • Water Supply	Differentiation should take place between raw water and treated water supply. Disruptions experienced in the GDA are not as a result of the raw water being unavailable, but as a result of disruption to treated water supply and the link between disruption and the need for a new raw water supply is without basis. There are a range of options on the supply side and demand side for meeting requirements in the next 30 or more years.	There are both raw water and water treatment issues. Over 84% of Dublin's' water treatment capacity is dependent on the River Liffey, over 40% of mean annual flow from the catchment is used in water supply, diversification of water supply sources is an important part of resilience planning. Maximum sustainable availability of raw water from the River Liffey, and river catchments	Many factors contribute to an increasing risk environment in the Dublin Water Supply Area, where relatively small events can cause disproportionate disruption. These are both on the raw water and treated water side. Such events ought to be manageable without disruption to service, small scale interim measures cannot meet the requirement to 2050, and a change in strategic approach, embodied in the WSP, is called for.

PNR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
		near Dublin are discussed in Section 4.2.3 of OWP Appendix A. Vartry Reservoir, Bog of the Ring and Ballyboden source operate at or near their sustainable yields. Kildare wellfields are operating at their assessed sustainable yields.	
Need • Demographics	Population growth is linked to net migration and there has been a lot of variation in this over the past 35 years. A 2006 report from the project shows a disparity between predictions and what actually occurred. Accurate population growth predictions are not possible over 35 years.	Demographics are discussed in Section 4.2.4 of OWP Appendix A. Comparisons drawn between water consumption and GDP in the Economists Report (PNR Appendix B - Economic Needs Report) underline the link between economic activity and water demand. There is a statutory obligation on Irish Water to strategically plan, in accordance with the Water Services Strategic Plan (WSSP, Feb 2015) for success in developing our economy.	The demographic projections are soundly based and aligned with those of other infrastructural planning in the Region. Planning for water supply on the developed demographic scenarios is prudent and is justified. The scenarios will be reviewed when the preliminary results of Census 2016 are available.
Need • Planning Balanced Regional Development	Project need was not justified, it is wrong to allow Dublin to expand without consideration for proper planning, social, environmental & uncongested needs & the needs of the remainder of its citizens. Balanced regional development is needed. The project would bring water to industry rather than bringing industry to water, copper-fastening the imbalance in regional economic opportunity.	Irish Water is committed to balanced regional development, and will strive to ensure that water services provision supports planned growth nationally. Balanced regional development is the responsibility of government, and of all State agencies. Irish Water is a strategic planner across many scenarios and is responders to emerging requirements, rather than policymakers.	The development of the National Planning Framework (NPF), will be studied by Irish Water when it comes to public consultation later in 2016, and the project submitted for Planning Permission will have regard to the NPF

PNR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	If a Shannon option were progressed, this shows scant regard for the economic development requirements of regions outside the pale, particularly riparian Shannon communities (more than one million people).		
Project Road Map	The additional public consultation periods were welcomed, in addition to the statutory consultation phase. Concerns were raised about the length of time it would take to implement the Project Road Map, given that it has taken almost twenty years to develop these plans into a tangible roadmap for planning and delivery of the project. Irish Water should move quickly to the next phases of delivery. The project needs to commence as soon as possible.	Irish Water is committed to compliance with the Aarhus Convention and have drawn up the WSP 'public consultation roadmap' to seek engagement with relevant stakeholders and the general public. Implementing the project roadmap must avoid information overload, each phase of consultation is discrete and feedback is fed forward into the next stage.	Irish Water will continue to consult on its published Roadmap, and the ongoing work on the Project will take into account the consultation submissions received and the views expressed by stakeholders at briefings and Open Days.
Economic Development	The Eastern and Midlands region is critical for the economic wellbeing of the state, its strategic importance for the national economy means that adequate reliable water supply is crucial for the wellbeing of existing, indigenous businesses and it is a prerequisite for future growth, especially for meeting targets for tourism and Foreign Direct Investment (FDI). Dublin and the surrounding region are important to the national economy. Economic and reputational damage caused by water shortages can't be overestimated,	A 25 Year Strategic Plan covering all water services in Ireland was published in February 2015, for the first time, taking a national view in all its objectives, and it aims to ensure that water supply, or adequate wastewater treatment, are not opportunity-limiting factors anywhere in the country. In consultations with IDA, they emphasized the importance of resilient water supplies, even for industries already established here. The Eastern and Midlands Region includes 44% of the population of the State at the 2011	The WSP is an important infrastructural support to economic development of the Eastern and Midlands Region. This has been emphasized by many stakeholders, and the project is part of prudent national strategic planning.

PNR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	reliable water supply sustains jobs and investment. Reputational damage as a result of water shortages / interruptions risks dissuading investors from establishing enterprises in the region. Evidence points to intensifying competition of FDI and importance of city regions. Cities are battling global competitors in winning FDI; Dublin is more likely to compete with London / Singapore than with Cork or Galway. Upgrading water services infrastructure in the Midlands and diverting water resources to areas of need will make the area attractive to FDI bringing both jobs and economic growth to the region.	Census, and the Economist Report, in Section 2, documents the importance of the Dublin area in our National Economy. Global competition for industrial development is acute, and large manufacturing industry constantly reviews the mix of factors, such as educational, labour force, utilities, supply chain, that lead to a decision to locate, or indeed to remain in Ireland. It is not so much the regions of Ireland competing with each other, as Ireland together competing with Israel, or Singapore, or Bangalore, where availability of resilient water supply and synergies within global city regions are key competitive factors.	
Water Conservation • Leakage	Environmental sustainability was compromised by the fact the current estimated rate of leakage in Dublin city is at 40%, and it does not seem sustainable to pump water from the Shannon until leakage has been adequately addressed and reduced. The timeline for addressing this issue has not been fully developed to date and will be a slow process. There was no serious commitment toward a system of repairs included in the Irish Water proposal, and if water was taken from the River Shannon it would be a disincentive to	Water leakage is a national problem, an inheritance of 100 years of underinvestment, and Irish Water is taking a national approach to tackling it. Falling leakage levels and the costs of finding / repairing leaks are detailed in Section 4.5.1 of OWP Appendix A. Irish Water intends to achieve the earliest affordable reductions in leakage nationally. WSP project objectives are to meet water demand, and to increase the resilience of the water supply system and its sources Planning a resilient water supply must take place, independently of progress on water	Irish Water is committed to a pro-active strategy of water conservation and leakage control. Since publication of the PNR, and with more than 800,000 domestic water meters in place, great strides have been made in recovering customer-side leakage, and in refining estimates of Unaccounted For Water nationally, and in the Eastern and Midlands Region. The water supply position is such that these strategic strands are not ‘alternatives’ but are

PNR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	eliminate waste of hundreds of millions of litres per day. Dublin City Council has been throwing water away through years of leak ridden supply pipes and creaking treatment facilities, and reducing leakage rates to international standards would double existing supplies.	conservation or in reducing leakage, because loss of a key water source through pollution, or loss of a treatment plant element, or key aqueduct, remains a separate risk to be managed. Leakage reduction alone will not be enough to solve headroom issues or address water demand. Irish Water is committed to moving from a passive leakage control status to a proactive approach with the long-term objective of reducing public and customer side leakage nationally to a sustainable economic level of leakage. This is the level at which it would cost more, in both capital and in social disruption, to make further reductions in leakage than to produce the water from another source. Controlling leakage nationally is part of the WSSP; specific targets for this project are set out in Section 8 of the Water Demand Review in the PNR. Savings from leakage reduction are factored into water demand projections. A new source won't diminish the drive to curtail leakage.	essential parallel activities to the provision of a new water supply source. Water Demand Projections already assume that significant volumes of water will be recovered in water conservation and leakage control. Irish Water is represented on technical committees reviewing Building standards, and is contributing in areas affecting water consumption. Proceeding to develop the WSP, alongside leakage recovery towards sustainable economic levels, and water conservation, is the right overall approach.
Water Conservation • Other Water Conservation	In the PNR, there is no indication as to what steps will be made to address water conservation. Regulation or other incentives	Irish Water encourages water conservation through their "Be Water Smart" initiative, covering guidance on minimisation of usage in	Irish Water developed the "Free First Fix" Scheme and this has made an important contribution to raising customer awareness of

PNR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
Initiatives	should be introduced to encourage people to invest in modernisation of equipment with a view to conserving water. Rainwater harvesting and the treatment and re-use of wastewater to produce portable drinking water, was another option put forward, e.g. the Singapore model of water conservation. The PNR does not address the impact on water usage that can be achieved in the next 35 years by ensuring that all new houses are built to store and use rain water and brown water where appropriate and by ensuring that appliances are suitably careful about water usage. We can live within our current resources if we reduce wasteful consumption and minimise leakage. Modern day water usage in showers, toilets, washing machines, gardens etc. is excessive and can come down significantly with water metering. Water consumption plummeted across the Dublin region when charges were introduced last October, but rose again the following month when the Government changed its charging plans.	the kitchen, in the bathroom and in the garden, on domestic water. The WSSP, covering a 25 year period, includes an objective to prepare and implement Regional Water Conservation Strategies. Water conservation and leakage targets in the Project Need Report are consistent with those objectives; savings in per capita consumption have been included in water demand forecasting. Irish Water will work with national standards authorities and housing stakeholders to improve the inclusion of dual plumbing systems in new build housing, which effectively promotes rainwater harvesting. Irish Water actively engages with large industrial users on water conservation. The PNR has researched international trends in the intensity of industrial water usage, and has factored improved efficiency in industrial water usage into demand projections.	elevated water usage.
Communities	Concerns over the impact of a Shannon abstraction on communities in that area. Irish Water is not considering the needs of the community in this (Shannon) area. The Shannon is key to many communities, including Limerick and Athlone populations.	The abstraction of water cannot adversely impact on the Shannon catchment or be at the expense of any other community. Many communities along the Shannon already abstract water and return it as treated wastewater with little impact on the flows in the river. A new abstraction must also be	Irish Water, in deciding to develop the WSP based on an abstraction in the Lower Lake (Parteen Reservoir) downstream of Lough Derg, have taken into account concerns expressed by stakeholders related to abstraction from L Derg, and the results of modelling of water abstraction.

PNR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	The project poses a high risk to communities along the complete length of the Shannon Pot to the Shannon Estuary economically, socially and environmentally.	sustainable from an environmental, economic and socio-economic perspective in the short, medium and long term, otherwise it cannot be implemented. These pre-conditions must be satisfied before the project could receive planning approval or be allowed to commence.	Abstracting water at this location under an operational regime managed by ESB, which retains the same operating water level band as currently applies, and which reduces flows to hydropower generation, to offset water abstracted for water supply, is environmentally sustainable.
Communities • Benefitting Corridor	Expansion of the project's scope being extended beyond the boundaries of the GDA had the potential to benefit more counties benefitting the Region for generations to come. Investment into Benefitting Corridors will ensure that water infrastructure is enhanced in a number of different regions, thus supporting wider economic growth. Identification of the Benefitting Corridor will help maximise return on investment, which will support economic activity and investment throughout the Midlands and East. The Benefitting Corridor was an add-on feature that has little relevance to the GDA water supply. There is a plentiful supply of raw water available in the counties in this corridor and any problems are due to poor investment in local treatment infrastructure. Certain towns were not included in the Benefitting Corridor. The project could serve	Of the 314 Mld overall treated water requirement, over 25% would be required in the Benefiting Corridor. Providing adequate water supplies to Midlands communities is as much a priority for Irish Water, as it is for every region in the State PNR Figure 6A shows how Ireland has 856 water treatment plants, serving 4.56m people, compared to less than 50 in Northern Ireland, serving 1.8m people, and 297 in Scotland, serving 5.2m people. Irish Water aim to consolidate existing smaller water sources, of unreliable yield, or elevated vulnerability to pollution, or low linkage and resilience, to achieve nationally uniform standards of service from consolidated, efficient water treatment plants and resilient distribution systems. Midland issues of reliable water supply & adequacy of wastewater treatment with discharge into small receiving waters are linked. Irish Water can ensure that both sides of the water in-water out balance are	Irish Water proposes to rationalise water supplies in the Midlands, in accordance with the objectives in the WSSP, and will provide consistency of water supply standards of service throughout the Eastern and Midlands Region

PNR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	other areas in Meath such as, Ballivor, Athboy, Rathcairn, Kildalkey, Trim, Rathmoylon & Summerhill. The Project does not provide sufficiently for Meath. Irish Water should consider how companies in the Benefitting Corridor can effectively engage in the procurement process. Matching wastewater treatment capacity in tandem with the water supply must be planned for at an early stage, as assimilative capacity is likely to be an issue within the midlands and other parts of the corridor in the future and the need to plan for options at an early stage is imperative.	managed. IDA places particular importance on this capability in allowing them to promote centres in the Midlands for water using industry.	
Water Demand • Water Demand Projections	Water demand forecasting by relevant authorities has been poor. The 2006 Needs Report painted a picture of supply being on a knife edge. In 2015, these demand projections are, after less than 10 years, 75 MLD too high as demand has plateaued since 2007 at 540 MLD. The PNR figures are essentially meaningless and based on past forecasting experience. Soundness of the methodology used to predict the demand of the supply area and the Benefitting Corridor was recognised. Irish Waters future National Water Supply	Domestic water consumption was developed, by a rigorous review of population projections, and by abstracting up to date information on per capita consumption, from 2014 domestic metering validation data. In the PNR, water consumption for business and industry has been projected using Independent Economist econometric modelling, sector by sector, and by using traditional methods by water engineers. Developing existing sources to sustainable maximum yield has been factored into projections. Targets for leakage control have been adopted, and a conservative approach	Irish Water has based its water demand projections on well tested demographics, reliable consumption data, and on prudent provision for industry, respecting the developing national strategy for spatial planning and economic development. Comments on the water consumption of industry, and on the other elements of demand projections, have been taken on board in an interim review of water demand. It will continue to develop the WSP based on those demographic projections, and holding to the design horizon of 2050, but will review the

PNR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	Strategy should inform the Water Supply Project- Eastern and Midlands Region project to ensure the extent to which the new source can replace existing sources/ schemes. **Domestic Demand & Non-domestic Demand Projections** Domestic demand was underestimated in Laois; Portlaoise has experienced considerable urbanisation and expansion in recent years and has a growing population due to its proximity to Dublin. It is feeling the pressure for residential development. Regarding Dunboyne & Clonee, Co. Meath, demand figures underestimate future water supply needs and Ashbourne / Rathoath should be supplied in future and provided for in demand projections. The addition of readily available water supply to support further demand was also reflected in County Offaly, there are no large surface water sources readily available to serve the towns of Tullamore and Edenderry. The design horizon should be extended to 2075 to allow for increasing demands over that extended timeframe through phasing, modular design or other appropriate means.	to demand overall means that the requirement is estimated at 330 Mld by 2050, compared to the previous 350 Mld at 2040. Non-domestic water requirements have been estimated by the Economist, using a sectoral analysis of how businesses and industry use water, linked to econometric projections of how each sector will grow. Their approach is consistent with best practice internationally International trends in declining intensity of water use have been acknowledged, and the alignment of the Economist on the issue of the strategic industrial provision is outlined on p56-57 of the Economist Report (PNR Appendix B - Economic Needs Report). The design horizon must be a reasonable balance between forecast accuracy and affordability.	demographic projections following publication of the results of Census 2016. It is reviewing domestic consumption patterns based on the metering data. It will bring forward phasing proposals which align over time, as closely as possible, treated water availability to growth of water demand with due allowance for the requirements of source risk diversification and resilience. Irish Water has carried out an interim water demand review, addressing the issues raised, including occupancy, per connection consumption. Phasing proposals developed to address flexibility.

PNR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	Per Capital Consumption (PCC) - baseline information should be recalculated based on information from domestic metering, as previous data was based on the absence of this information. Reduction in PCC envisioned in the PNR may be overstated; it may not be certain that reduction would be sustained long term and not all domestic properties are metered. Regarding the 10% vacancy rate, and given the resurgence in the economy and increasing demand / shortage of housing, 10% is high. Some criticised the 100 MLD Strategic Industrial Allowance, equating it to 12 further full St. James Gate breweries. Need to be flexible if demand exceeds expectations in addressing capacity. Non domestic water demand forecast takes account of expected FDI, tourism growth and implications for water requirements, but these forecasts need to take into account potential large scale water requirements on the indigenous enterprise side.		
Water Demand • Peak and Headroom	It is vital to achieve the targets for headroom capacity to ensure a resilient and secure water supply. The current low headroom capacity in the Greater Dublin Region bears a	The peaking allowance has both a raw water and a treated water aspect to it.	Irish Water has taken on board the comments on peaking and headroom, in developing Phasing proposals. Irish Water has also addressed the Midlands water supplies

PNR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	high risk of water shortages, which can result in high disruption costs for businesses and domestic water users. The ambition to increase spare headroom capacity to sustainable levels in line with international best practice is supported. International best practice - many great European cities had a reserve of at least 10% of the daily water usage for their citizens. Headroom should be distinguished from raw water supply and treated water supply, the amount attributed to Peaking allowance and Headroom and outage is not explained in the context of how it relates to both treated water and raw water supplies. Summer drought shortages could be related to raw water supplies, the classical shortage associated with running taps in freezing winter will not be related to raw water shortage but rather treated water shortage and this requires further explanation. Current water supply capacity in the Benefitting Corridor has been omitted. Concerns regarding the projection of future demand being understated, when the projections allow 15% for headroom and 20% for peaking, which will provide a buffer,	Sustainable raw water yield of the existing source was determined based on average demand over the year. Seasonal variation in water demand is an additional burden on impounded raw water storage, particularly where Leixlip & Ballymore Eustace WTPs are collectively sized at the 533 Mld historic yield based on average demand. 20% peaking allowance is in line with international norms, and is used to define Peak Week demand across the Eastern & Midlands Region, but it is not applied to leakage or strategic industrial water. It also covers quickly refilling a strategic reservoir/section of pipeline. The main water treatment plants serving the Dublin Water Supply area operate close to peak capacity. The lack of headroom has made supplies vulnerable to disproportionate interruption from events which would be manageable in a system with adequate headroom. The WSSP (Feb 2015), at Objective [WS2e] Manage has a statement regarding future regulatory requirements for abstraction licencing, headroom in treatment facilities and population growth (see Section 4.7.2 of OWP Appendix A.	position, and is taking a rationalised approach towards fewer schemes based on larger and more sustainable sources, which will provide reliability of service, network resilience and value for money and will involve network interconnections between existing schemes to tie existing networks into adjacent sources being retained, supported by connections from the treated water transfer pipeline.

PNR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
		The headroom provision covers uncertainty in the balance of supply and demand, and covers a provision for potential gradual erosion in the sustainable yield of the existing sources due to climate change.	
Environment	Potential environmental impacts were highlighted in terms of any abstraction from Lough Derg, should abstraction take place from the Shannon, it should be from the southern end of Parteen Reservoir, because removal of water from the north-eastern part of Lough Derg might contribute to ecological stress in the lake. Drawing down of water during low-flow periods would have an environmental impact. Environmental studies occurring as part of the project were welcomed, as well as the sharing of data gathered. A full habitat and Roxanne (sediment structure) survey is needed, together with hydrographic observations. While many rivers are not designated under the Habitats Directive, they hold species designated under the directive. The Project should give regard to sustainable development of inland and marine fisheries. Water quality, Surface water hydrology, Fish spawning and nursery areas, Passage of migratory fish, Areas of natural heritage importance, Biological diversity and Ecosystem structure and functioning should	The environmental concerns of people in the River Shannon area are of the utmost importance to Irish Water and are discussed in Section 4.8 of OWP Appendix A. Any project which fails to fully take into account the requirements of Irish and European environmental legislation and legitimate environmental concerns of the Shannon catchment population and businesses would be compromised and would not be successful in seeking planning permission from An Bord Pleanála.	Progression of the design from the OWP through the POAR and onwards has prioritised the environment in option appraisal. The risks of transfer of alien species have been addressed and Irish Water has retained specialist fisheries advice.

PNR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	be considered. Any loss of water from the catchment or loss or potential damage to fishery and fisheries habitat due to abstraction should be compensated. Water crossings should be assessed from a fisheries perspective. River Shannon water quality is at risk from abstraction which would have consequences on the ecology particularly during summer/ dry periods. Biodiversity must be considered in economic and social development policies, particularly in relation to key strategic infrastructural projects. Invasive alien species - Lough Derg Catchment, there would be a high risk of cross-contamination if pumped untreated water from Lough Derg was sent to a reservoir or any exposed facility in another catchment.		
Environment • Water Framework Directive	The precautionary principle should be applied to this project. The development should take into account the European Union Water Framework Directive (WFD).	The WSSP, covering a 25 year period, includes a strategic aim to operate Irish Water infrastructure in a manner that supports the achievement of water body objectives under the WFD. This is discussed in Section 4.8.1 of	Irish Water will include a project specific Water Framework Directive Assessment of the Project in the EIS.

PNR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	Any Shannon abstraction would be in breach of the WFD, as taking volumes of water from the Shannon Catchment and discharging to the Irish Sea would be contrary to the principles of the WFD.	OWP Appendix A. Objective WS2b in the draft WSSP commits to managing existing water resources and planning for new resources, taking a regional view of needs and having regard to WFD objectives.	
Environment • Climate Change	Climate change was raised in the context of need for the Project, future water demand & available future water supply. Vulnerability of Dublin to impact of climate change - Dublin relies on rainfall or surface-based resources for its water supply, a reduction in rainfall could seriously impact that supply, leading to water restrictions. Potential impacts of climate change should be addressed to ensure secure and resilient water supply capacity. Early adaption to climate change can reduce costs, and availability of reliable water supplies could become an important competitiveness asset for Ireland.	Irish Water acknowledges the views expressed on Climate Change and the value of sustainable water supplies in Ireland when water stress is growing throughout the world. Section 6.2 of the PNR sets out the approach being taken to climate change. We are consulting with specialists in this area, and Headroom provisions in water demand projection include a provision for erosion in yield of existing water supply sources. Irish Water will take climate change into account, and will plan strategic infrastructural adaptations to manage the risks associated with it.	Irish Water is considering the likely impacts of Climate Change on the reliable yield of existing sources. Irish Water is prudently planning for conservative drought conditions at the lower River Shannon, and for latest and best available projections of climate change impacts on extreme drought events.
Tourism and Amenity	Levels on Lough Derg should always remain above summer levels and should be agreed and adhered to between Waterways Ireland, ESB, Irish Water and OPW, and be controlled through the high court who could set minimum flow rates and minimum water levels.	The importance of tourism in Lough Derg area is recognised; it has been emphasized in stakeholder consultations to date. Irish Water propose designing any option which might be based on the lower Shannon,	Irish Water has decided to develop the Water Supply Project based on an abstraction in the Lower Lake (Parteen Reservoir) downstream of Lough Derg. Concerns expressed by stakeholders related to possible impacts of abstraction from L Derg, on tourism, on lake ecology and on fisheries have been taken into

PNR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	Fishing and angling impacts, as well as impacts on sport and commercial fishing and angling amenity and recreational areas. Water quality on the River Shannon is at risk from abstraction, affecting navigation, angling, boating, hotel, B&B and catering industries. Dublin Region must plan for tourists. 2014 Tourism revenue was €6.45 billion, 4% of GNP. 5,000 tourism jobs created in 2014, 8,000 more anticipated for 2015. The Region must be equipped to deal with visitors. New hotel developments are critical to accommodate visitors. Developments will require a safe and secure water supply.	to operate within the same water level range as currently applies on Lough Derg and in Parteen Basin, agreed with ESB. Irish Water favours the transparent availability of real time data on water levels and flow rates at any abstraction point. Any Shannon option would be designed to harmonise with tourism development plans. Water demands of the tourism sector in the Eastern and Midlands region have been included in the projected requirement and are detailed in Section 6.2.1 of the Water Demand Review.	account in arriving at this decision. Abstracting water at Lower Lake, Parteen reservoir, under an operational regime managed by ESB, under an agreement with Irish Water, will retain the same operating water level band as currently applies. Volumes of water used in hydropower generation, will be reduced in like measure, to offset water abstracted for water supply.
Options • Desalination	Desalination should be considered as a viable option moving forward. Singapore Water Supply Model uses desalination as part of its 'sweet water' supply measures. Desalination in the context of using brackish water in the Shannon Estuary would be cheaper than desalination.	Desalination will be considered in Options appraisal. Experience of its inclusion within a range of water sources will be examined, and recent experience of desalination of brackish estuarine waters will be included in that review.	Desalination has been considered, in both the Preliminary and Final Options Appraisal Reports, but it has not emerged as a preferred option.
Options • Groundwater	Groundwater as an option to supply some or all of the water supply. Groundwater accounts for a very small amount of the water supply in the GDA in stark contrast to the situation worldwide.	Groundwater will be considered in Options appraisal. Groundwater proposals at Project Need stage will be addressed in responding on the Options Working Paper. Irish Water acknowledges the desirability of	The position on the available groundwater resource in Leinster has been reviewed. The Groundwater Regulations have been taken into account, as has the current state of legislation governing groundwater development. Groundwater is considered to be best employed as a longer term local water

PNR Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	Since the SEA, no further critique has been undertaken into the nature of the total groundwater resource.	research and of modelling development, to reliably predict impacts of large scale wellfields.	supply resource.
Options • Alternatives	Poulaphuca (reservoir) dam as a potential point for storing water as a result of the filter beds there. Environmental flow replacement as another way to meet demand. Fresh water required by Dublin should be extracted from the Shannon Estuary. Re-use of wastewater would produce the potable drinking water required, e.g. Singapore's water supply model.	Irish Water will include in options appraisal, the outcome of work to maximise the yield of existing Liffey sources, including Poulaphuca, alongside a new source, with due regard to flood management and Water Framework Directive requirements. Recovery of brackish water in an estuarine environment will be reviewed in the context of desalination options generally. Effluent re-use will be taken forward and examined with submissions on the OWP overall.	Alternatives such as additional abstraction from the River Liffey, environmental flow replacement, abstraction from the Shannon Estuary, and re-use of treated wastewater, have been examined, and are not considered suitable options.
Other • Innovation in the water industry	New processes, procedures & technologies in Irish Water may offer sub-supply opportunities for Irish Firms and potential to attract FDI, providing opportunities for mobile investors (Irish and foreign) to develop innovative products and services	Irish Water continuously reviews its supply chain for goods & services, and has resources dedicated to innovation in developing new processes / procedures / technologies. Irish Water work with state agencies to support development of Irish industry and services in the water sector.	Irish Water will work with the supply chain as the project progresses.

Table I.2 : Summary of stakeholder issues raised during the PNR Consultation Period (10th March 2015 – 5th May 2015), Irish Water responses and influence on Project Development

Appendix J. Summary of issues raised, responses and influence on Project Development – Options Working Paper (OWP, June 2015)

OWP Submission themes
Options • Desalination • Lough Derg (Direct) / Lough Derg and Storage / Parteen Basin • Other Options and Alternatives
Water Conservation and Leakage Control • Leakage • Conservation Initiatives
Constraints and Assessment Criteria
Economic Development
Water Demand
Environment • Biodiversity • Climate Change • Fisheries • Alien Invasive Species
Water Framework and Habitats Directives • Water Framework Directive • Habitats Directive
Communities / Benefitting Corridor • Benefitting Corridor Demand & Source Consolidation • Farming
Tourism & Amenity • Tourism & Raw Water Storage
Planning • Planning Policy • Planning Horizon • Legal Issues
Other • Plumbosolvency • Recommendations • Questions raised

Table J.1 : Themes of submissions received during the OWP Consultation Period (9th June 2015 – 4th August 2015)

OWP Theme	Summary of Issue	Irish Water Response	Influence on Project Development
Options • Desalination	Desalination would have little or no environmental impact and would be the least costly to construct and maintain. The shorter treated water pipeline required for desalination reduces the negative impact on communities dependent on agriculture and tourism. Insufficient weight given to desalination relative to the Shannon Options. Desalination is not the solution due to cost and high carbon emissions, least attractive option economically and ecologically, especially in a country with 1,000mm rainfall annually. Desalination is energy intensive and reliant on fossil fuels adding to the challenge of our emissions targets. Desalination costs have declined due to advances in membrane technology, costs will reduce further. Desalination of brackish / estuarine water, and potential co-location with energy production may reduce cost.	The advantages and disadvantages of desalination are set out in Section 4.2.1 of POAR Volume 6 Appendix H. Desalination has environmental impacts, e.g. disposal of brine waste product from desalination, construction impacts in the marine environment, and pipeline routing impacts from the desalination site. A comparative assessment of desalination with a Shannon source has been included in the POAR and will be developed in the FOAR.	The FOAR has determined that Desalination, while technically viable, is not the preferred option. Irish Water will proceed with the Preferred Option of abstraction from the lowermost section of the River Shannon at Lower Lake (Parteen Reservoir)
Options • Lough Derg (Direct) / Lough Derg and Storage / Parteen Basin	Evidence shows the inter-catchment transfer of water is detrimental for the river, for people and various river species. Objection to abstracting water from one catchment and transferring it to be used in another. Reasonable fear that water extraction from Lough Derg/ Parteen Basin would negatively impact tourism, fishing, agriculture, local water supply.	Irish Water has examined results from water quality monitoring / modelling of Lough Derg and Parteen Basin; and the subsoil investigation of the Garryhinch site, the conclusions are set out in Section 4.2.2 of POAR Volume 6 Appendix H. Ground conditions at the site are such that construction costs of the storage would be greater than originally estimated, the risk of transfer of invasive species to the upper	Irish Water has set aside options which proposed abstraction from the NE quadrant of Lough Derg, with or without raw water storage. The proposed abstraction from the Lower Lake (Parteen Reservoir) will be accompanied by an agreement with ESB which protects water levels within the existing normal operating band, and which protects flows to

OWP Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	Irish Water should use the supply of fresh water in the Shannon to benefit people who need water. Abstraction from Lough Ree is favoured. The Parteen Option should be explored in more depth. it appears to be the most cost effective, bringing benefits, not just to Dublin, but also to the Benefitting Corridor underpinning economic development in these areas. Removal of water from the north eastern Lough Derg might contribute to ecological stresses. The lake ecosystem is naturally undergoing change due to improving water quality, and presence of invasive species. Recommend the Parteen Option is explored further, there may be fewer ecological issues arising here, than may be the case for other options.	Barrow catchment would remain. Irish Water has regard to addressing water supply deficiencies in the Eastern & Midlands Region and the benefits from water treatment at source, rather than from raw water transfer to a water treatment site in the east Midlands. It has considered pipeline corridor routing options, and those offered by existing linear infrastructure. Abstracting from northern Lough Derg, would not meet the necessary environmental sustainability standard. Abstraction downstream of Lough Derg, where water flows have already passed through the lake, are in a qualitatively different position. Where concerns have been expressed that the presence and propagation of alien invasive species already point to a lake ecosystem naturally experiencing change, abstraction at a point downstream of the lake would avoid any direct impact altogether.	the lower Shannon unchanged.
Options • Other options and alternatives	Groundwater largely unexplored on the East Coast, aquifers (Curragh & Nevit) have untapped potential. Consumption over estimates can be sourced from underground aquifers. Recently a test bore near Newbridge was reported as yielding the largest waterbore flow rate in the state. Rainwater Harvesting would result in fewer	A response to submissions received on Groundwater issues can be found in Section 4.2.3 of POAR Volume 6 Appendix H. A response to submissions received on Rainwater Harvesting issues can be found in Section 4.2.3 of POAR Volume 6 Appendix H. A response to submissions received on	Groundwater is not being pursued as a primary option. It remains as a local source option in a supplementary capacity. Rainwater Harvesting is not being pursued as a primary option, but is included among water conservation initiatives which are under trial and being encouraged by Irish Water, to displace some potable water usage, with due

OWP Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	environmental impacts. 20-30% of the requirement could be met from rainwater harvesting, creating employment and alleviating flooding in the process. A typical household could save up to 50% mains water by using rainwater harvesting. Recommend creating hybrid treatment networks, harvested rainwater can be augmented with partially treated municipal supply. This would address Irish Waters goal to reduce rainwater run-off into combined sewer systems. Use grey/recycled water for toilets, and use water butts to trap rainwater and install plumbing circuits to recycle grey water. New houses should be designed to facilitate the use of rainwater and greywater. Could current treated water discharges not be extended to other east coast treatment plants? Ringsend WwTP could be re-engineered to generate / collect methane, methane could be sold to Energy plant or ESB, resulting electricity could power a desalination plant. Collection, treatment and re-use of wastewater should have been examined. Reprocessing and reusing water from wastewater facilities in major urban areas has not been considered in previous studies. Most Member States do not engage in this practice and in some cases it is prohibited.	Treated Wastewater Reuse issues can be found in Section 4.2.3 of POAR Volume 6 Appendix H A response to submissions received on Environmental Flow Replacement issues can be found in Section 4.2.3 of POAR Volume 6 Appendix H. A response to submissions received on Multiple Sources issues can be found in Section 4.2.3 of POAR Volume 6 Appendix H	regard to health & safety. Redirection of part, or all, of the compensation water flow on the River Liffey at Leixlip, towards water supply, has been examined, but is not considered sustainable. Treated wastewater re-use has been considered and for the reasons set out in Appendix H of the POAR is not considered sustainable. A Multiple Source approach is not preferred where the Need consists not only of a requirement for substantial additional water, but also for source risk diversification and improved resilience of the water supply overall.

OWP Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	Environmental Flow Replacement – consider dedicating the existing compensation flow on the lower Liffey at Leixlip to water supply, and replacing it with a recirculated pumped flow of freshwater in the section of lower Liffey from Leixlip dam to Islandbridge. Multiple Sources - Supplying from one source regardless of treatment overhead, is presented as outweighing the option of drawing from multiple sources or from a lower volume source but higher quality source.		
Water Conservation and Leakage Control • Leakage	Environmental sustainability of WSP was compromised because current estimated leakage in Dublin city is 40%, it is unsustainable to pump water from the Shannon until leakage is reduced. Money could be better spent fixing existing leaks. The project should be developed alongside efforts to reduce leakage rates. Support reducing water leakage levels. Even if ambitious targets of reducing leakage to 25% are met by 2021, existing sources are not sufficient to meet the region's needs. Irish Water should reduce leakage in tandem with developing a new water supply, not as an alternative. No serious commitment to repairs, if water was taken from the River Shannon it would be	The Water Services Strategic Plan (WSSP, Feb 2015) includes an objective to prepare & implement Regional Water Conservation Strategies. Irish Water has committed to reduce leakage but doing requires resources and the maximum achievable reduction would be 20%. Projected savings from leakage reduction are factored into water demand projections and availability of a new source of water won't eliminate the need to reduce leakage. Guaranteeing a reliable, safe, water supply in the Eastern & Midlands Region will involve a combination of water conservation, leakage reduction and new source development. Dublin's progress on leakage reduction and	WSP objectives are to meet water demand, to diversify source risks and to increase the resilience of the water supply system. Planning for WSP will proceed alongside the drive for water conservation and reduction of leakage. There is commitment to ambitious targets for leakage reduction and there is tangible progress on customer side leakage. The leakage targets are already assumed in water demand projection.

OWP Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	a disincentive to eliminate waste of hundreds of millions of litres / day. Reducing leakage rates would double supplies. There is an unjustified assumption that the leaks, which are deemed not cost effective to fix, will remain static and effectively sustainable. High national leakage levels must be addressed before planning any new infrastructure. Leakage reduction alone will not be enough to solve headroom issues or address increased water demand. Queries on the quantity of water which can be saved by remediation of old pipework and through customer side leakage reduction.	the costs associated with it are discussed in Section 4.3.1 of POAR Volume 6 Appendix H. WSP objectives are to meet water demand, and to increase the resilience of the water supply system. Planning must take place independently of progress on water conservation or reducing leakage, loss of a key water source through pollution, or loss of a treatment plant element, or a key aqueduct, remains a separate risk to be managed, as minimising water demand continues.	
Water Conservation and Leakage Control • Conservation Initiatives	Need to introduce regulation or incentives to encourage people to invest in modernisation of equipment to conserve water. Suggest the provision of grants to house owners to save water from rooftops. A Code of Sustainable Homes, similar to the BREEAM (BRE Environmental Assessment Method), adopted in the UK could help Ireland to achieve demand reduction from 125 to 80 litres/person/day. Need new ways of protecting, preserving and	Irish Water encourages water conservation through “Be Water Smart”. Water conservation and leakage targets in the Project Need Report, for the Water Supply Project, are consistent with those objectives. Irish Water will work with national standards authorities and stakeholders to provide guidance on national domestic plumbing standards in new build and upgraded housing. This may promote rainwater harvesting / other water saving measures.	Declining domestic consumption based on the success of these initiatives, is already assumed in water demand projections.

OWP Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	exercising efficiency in the use of water resources. Need more ambitious, progressive and imaginative strategies to encourage water conservation. Ensure that new houses are built to store and use rain water and brown water where appropriate and by ensuring that appliances are suitably careful about water usage has not been taken into account. Reduce wasteful consumption and minimise leakage. Modern day water usage is excessive and can come down with water metering. Address obligations of the WFD to ensure sustainable use of water resources. Irish Water has not engaged in any meaningful conservation exercise.	Irish Water engages with large industrial users on water conservation initiatives. The PNR has researched international trends in the intensity of industrial water usage, and factored improved efficiency in industrial water usage into water demand projections. The Government has provided a conservation grant to encourage customers to improve or repair their home's plumbing system or invest in water saving devices. Irish Water provides advice and information on how to conserve water in the home on its website www.water.ie and further information can be found in Section 4.3.2 of POAR Volume 6 Appendix H.	
Constraints and Assessment Criteria	Support Irish Water's assessment of preferred options using the criteria in the OWP, particularly those pertaining to Sustainability and Capital / Operating Costs. Identification of the initial grouping of key constraints is appropriate and consistent with best practice for this type of assessment. Assessment criteria are not clear on the website, they should be published and include the criteria measurement method (weighting). Add a constraint to reflect coastal zone management and maritime impacts arising	Constraints and Assessment Criteria were published and explained in the Options Working Paper, and on the project website (www.watersupplyproject.ie). The methodology of application of these constraints and criteria has now been further detailed in the POAR. Views on the inclusion of 'timescale of delivery', risks of delays, and streamlining of planning and procedures, as differentiating factors in options appraisal are covered in the whole question of risk on the project, and this was addressed in the POAR. Impacts on	Options Appraisal has proceeded under the published criteria, and infrastructure site selection has been carried out having regard to the published constraints. Pipeline routing has been developed within a least constrained corridor defined with respect to all the published constraints The Preferred Option for WSP, abstraction from the Shannon at Parteen, and the approach to agreeing adjustment to hydropower water flows to match water supply abstraction, has emerged from consideration

OWP Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	from desalination. Project timescale is a constraint. The preferred option should be the one that ensures speed and efficiency of execution while minimizing environmental impacts / cost inefficiencies. State owned lands should be utilised to minimise disturbance & impact on third party lands. Use publicly owned property to transport water and / or associated infrastructure compatible with the canal structure. Consider potential impacts on: Water quality, Surface water hydrology , Fish Spawning & nursery areas, Passage of migratory fish, natural heritage importance areas, Biological diversity, ecosystem structure & function, sport & commercial fishing & angling amenity / recreation. Deficit in assessment criteria regarding credibility and objectivity applied. Failure to require robust and transparent record of assumptions and data underpinning evaluations & comparisons. Cost needs to be explicit and transparently covered in assessment criteria. Consider obligations to ecological water quality, aquatic / dependent terrestrial ecosystems; sustainable water use; water source protection; and pollution limitation.	tourism, and its future development on Lough Derg, are already being considered under the published criteria. Irish Water has in the POAR transparently presented the case on each option, on each of the assessment criteria, giving reasons in each environmental or technical area, for positions taken on options. In response to the query on how people-related, technical and risk criteria are weighted, the methodology is described in the appendices to the Preliminary Options Appraisal Report (PAOR). Risk is assessed under technical, environmental, planning, financial and socioeconomic, on a five-point graduated scale, from low, through medium to high, as detailed in the POAR. Each criterion is assessed for each of the Options by Specialists, experts in their discipline, individually and collectively, categorising impact on a five-point graduated scale; the objective being to reach a consensus on an Option that was least constrained when compared to the others. Numerical weightings were not used across the criteria. The OWP published in June 2015 made available the detailed work of review, attached	of the obligations in respect of ecological water quality and also the aquatic and terrestrial ecosystems dependent on it. Options which involve abstraction from NE Lough Derg have been set aside, due to concerns expressed by stakeholders and on the results of modelling impacts on flows through Lough Derg. Independent Cost Benefit Analysis will be provided in later stages of options appraisal.

OWP Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	The Regulations and Guidelines relating to abstraction of water from the River Shannon should be complied with. Stability of the embankments at Ardnacrusha Headrace and upstream of Parteen Weir are constraints Capital & Operational Costs must be considered in assessment criteria. Project cost will feed into customer tariffs and cost of delivery, potential delays should be considered when making a final decision. A rigorous Cost Benefit Analysis of the Shannon project and other alternatives has never been published. Advocate inclusion of tourism benefits and whole life costs in the Cost Benefit Analysis. Energy cost, usage & security are recommended for inclusion in assessment criteria. Impacts / interactions with the national roads network require clarification. Tourism & amenity value of areas of Lough Derg and north Dublin, and weightings associated with these factors should be developed so that tourism impacts can be assessed. Water based activities should have a greater weighting than impacts on landscape & cultural heritage, as impacts could be alleviated through mitigation	as Appendices B, C and D, and E. These examined the sustainable availability of water in each of the ten options considered, quantifying the hydrological and hydrogeological grounds of assessment. It reviewed those options with respect to the Habitats Directive, again detailing the sources of data used in reaching the conclusions. In the PNR, detail was provided on every element of need, including domestic usage, nondomestic usage in commerce and business, industrial water usage, and leakage on both the public mains and on private residential water connections. Demographic projections were grounded in CSO data, National and Regional, and the scenarios were linked to CSO projections, as interpreted by experienced demographers, in the Demographic Report in the PNR. Analysis of the Dublin Water Supply Area was conducted at the District Electoral Division level. Four scenarios were examined; projections were validated by those prepared by the independent economists, who approached the problem by modelling population growth against GDP. Irish Water agrees that the WSP should be informed first and foremost by the obligations in respect of ecological water quality and also the aquatic and terrestrial ecosystems	

OWP Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	measures in an EIA. Lough Derg water levels and water quality are key to ensuring the amenity value of the lake is maintained. Important to conserve / enhance “Blueways”. Landscape impacts should be considered in evaluation. How will people-related, technical and risk criteria be weighted. Query the sensitivity of the preferred option to the population growth assumptions, and was how risk defined or applied in the assessment. Should the assessment criteria include the number of and potential impact on higher lying areas by lowering water levels. Recommend an Integrated Spatial Planning Criteria so that economic development opportunities associated with the options, and opportunities to schedule works to coincide with other state works could be recognised.	dependent on it, and this has been the approach adopted in options appraisal. Irish Water has, both through internal expertise and by engaging reputable advisors, provided and will provide information which it believes is as accurate and as comprehensive as possible. A main objective of a consultation process is to subject this information to scrutiny by the public, statutory authorities and NGOs. In the current process, Irish Water is going above and beyond statutory requirements to do this.	
Economic Development	To be an attractive location for FDI, Ireland needs to retain all competitive advantage, uncertainty over water cost is weakening the country’s hand. The lack of headroom in the Eastern region could result in significant losses to the economy if additional supply is not provided, it is crucial that water supply constraints do not impede development.	A 25 year WSSP was published by Irish Water in February 2015 and it took a national view in its objectives. The WSSP aims to ensure that water supply, or adequate wastewater treatment, are not opportunity-limiting factors in the country. The Eastern and Midlands Region includes 44% of the population of the State (2011 Census), and the Economist Report in the	The Preferred Option has been identified as abstraction from the Shannon downstream of Lough Derg in the Lower Lake (Parteen Reservoir). Its design operates within the existing normal operating range of water level, and within current compensation water and generator flow rates, and will not adversely impact on tourism, navigation, or on flow patterns in the

OWP Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	There is a high and unsustainable cost on the Mid-West region, in terms of the economic and social cost, ecologically and environmentally if an option of abstracting from Lough Derg goes ahead. WSP would stifle economic development in the Shannon Region. Abstraction from Lough Derg could cause a decline in the use of the waterways with loss of marine and leisure jobs. Abstraction from the Shannon RBD area should provide for commercial / environmental compensation, fishery rights are property rights and the value of the inland fisheries resource to Ireland is estimated at €750m.	PNR documented the importance of the Dublin area in our National Economy. Global competition for industrial development is acute, large manufacturing industry constantly reviews the mix of factors leading to a decision to locate, or remain in Ireland. It is not the regions of Ireland competing with each other, Ireland competes with Israel, Singapore, or Bangalore, where availability of resilient water supply and synergies within global city regions are factors. The links between economic activity and water demand are discussed in Section 4.5 of POAR Volume 6 Appendix H.	estuary. It will respect the economic value and importance of tourism, fisheries, navigation and port activities.
Water Demand	Regarding future water demand for domestic and non-domestic use, the projected demand to 2050 is understated even allowing for 15% headroom and 20% for peaking. The base projections should be realistic. There are differences between metered records and figures for non-domestic consumption and domestic consumption. The baseline non-domestic consumption must be reviewed in light of metered consumption. Current supply to the Greater Dublin Region is critical and a new source, is essential. The capacity of the supply has been reached and incidents, such as algal blooms, result in	Examining Need brought about a detailed demographic review, which is discussed in Section 4.6 of POAR Volume 6 Appendix H. The work of the independent economists, approaching the issue by correlation of population with measures of growth in the national economy, validated the projections of the demographers, and this increases confidence in their accuracy. Projections will however be reviewed, following the Census of 2016, prior to making a Planning Application on a preferred option. The Project is being developed within the planning approach to water services which is	Water demand review is continuous and the need for the new source supply is supported by it.

OWP Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	water shortages. A new source should ensure that the existing shortage in capacity and future anticipated capacity is addressed in a sustainable and secure manner.	set out in the WSSP.	
Environment	There is a need for the sustainable development of the inland and marine fisheries resource, including the conservation of fish and other species of fauna and flora, aquatic habitats and the biodiversity of inland and marine water ecosystems. A desalination option could be environmentally attractive and sustainable, as disruptive construction works will be reduced.	The WSP must be delivered in an environmentally sensitive manner to meet its core objective of developing a new sustainable water source. A successful outcome to its planning application is dependent on demonstrating environmental compliance across the scheme. A response to environmental issues can be found in Section 4.7 of POAR Volume 6 Appendix H.	Fishery stakeholders concerns were considered. Irish Water engaged specialist fishery expertise to facilitate this. The Preferred Option, alongside agreement on management of water used in hydropower to facilitate management of water abstraction, so that the normal operating water level range does not change, will not adversely impact on fisheries, aquatic habitats & water ecosystems. Desalination, while technically viable, is not the preferred FOAR option. Irish Water will proceed with the Preferred Option of abstraction from the lowermost section of the River Shannon at Lower Lake (Parteen).
Environment • Biodiversity	Biodiversity must be considered in economic and social development policies particularly in relation to key strategic infrastructural projects. Drawing down water during low flow in dryer summers could result in changes to lake ecology. Ecological surveys should be conducted independently prior to grant of permissions, surveys should extend to Shannon Callows. Focus on Freshwater Pearl Mussel is welcome, need to focus on	Abstraction from Lough Derg would be within the normal operating range currently applying under ESB management of water levels on the lake. This would be part of any abstraction agreement with ESB, which would include a reduction in water used for power generation, matching in volume the water proposed for abstraction. At times of no power generation in summer, continued abstraction, drawing upon but within the confines of the normal operating band, will be demonstrated to be sustainable through hydrological modelling.	Irish Water have selected an abstraction location which sits downstream of the natural flow regime of Lough Derg and all points upstream, and which will not affect the ecology of the lake. Irish Water will also enter into an agreement with ESB, whereby curtailment of water volume used in hydropower generation will take place to counterbalance water abstracted for public water supply, so that the long established normal operating water band, and

OWP Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	other protected aquatic species and habitats, in particular other Annex IV species. High risk of cross contamination of water if pumping untreated water from Lough Derg (where both zebra mussels and Asian clams exist) to a reservoir/open facility in another catchment. The White-tailed Sea Eagle is sensitive to environmental change and disturbance. Fish supplies as much as 90-95% of the White-tailed Eagles diet. Schemes that would impact on these birds would be opposed. Options of greatest risk to the biodiversity & ecological integrity of Lough Derg are: 1. Option F2 –; and 2. Option C. Potential positive impacts on biodiversity may arise from Option F2 - Lough Derg & Storage. Cutaway bog rehabilitation and creating an open water body will result in a species and habitat rich complex. Lough Derg abstraction would result in catastrophic outcomes. Impacts on flora, advance of invasive species, aggravation of pollution / erosion.	Irish Water acknowledges the importance of maintaining biodiversity and this is discussed further in Section 4.7.1 of POAR Volume 6 Appendix H. In response to concerns expressed that abstraction from Lough Derg, or Parteen Basin, would be of a scale comparable to heavy abstractions on large rivers in the United States, Mexico or Australia, and would have similar impacts on biodiversity, it is emphasised that abstraction on the Shannon is proposed at a rate of approximately 2% of mean annual flow, and it would be managed within the same water level operating band as currently exists. Extensive environmental investigations are being carried out in relation to potential impacts of the proposed developments on aquatic and terrestrial ecology, and the POAR has taken a very responsible and precautionary position with respect to biodiversity.	the statutory compensation water flow, will remain unchanged. Assessment of the Raw Water Storage option at Garryhinch, which was part of option F2, abstracting from the NE quadrant of L. Derg has shown that it does not fulfil its intended environmental purpose, and the proposed Garryhinch site carries significant environmental and engineering risks. The point related to potential to transfer aquatic invasive species with raw water storage at Garryhinch has also been taken into consideration. Option F2 has not been preferred, and the Garryhinch storage is not being proceeded with.
Environment • Climate Change	The precautionary principle needs to be applied given that the abstraction from Lough Derg / Parteen basin appears the only possible viable option. Essential that the modelling matrices are re-assessed and a rigorous approach to climate change impact	Renowned climate change experts at NUI Maynooth have been consulted, and will continue to be consulted. The choice of water sources, locations, routes, construction methodology, materials used, etc. have and will be, influenced by Climate Change	Climate change continues to be taken into account, and Irish Water is monitoring closely the most recent research on this question. The view that existing sources may experience increased yield under climate change is not supported by the evidence, and

OWP Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	assessment should be taken. Emerging data on climate change in Ireland suggests that we will have wetter weather and therefore the supply system presently in place will have a greater amount of supply within the present catchment area. The factoring of the fundamental requirements of Ireland's climate change targets should be brought to bear on industrial policy. The 4 technically viable options will increase Irelands carbon footprint; impact environmental and green credentials; give rise to huge capital and operational cost; while not addressing rainwater run-off.	considerations. Further comments on submissions received on climate change can be found in Section 4.7.2 of POAR Volume 6 Appendix H. The energy intensity of desalination is recognised and acknowledged, and will be taken into account in appraisal of that Option. Climate change will also be taken into account in options appraisal.	is rejected. Wider extremes of winter and summer rainfall will more likely result in a reduced yield where the impounding storage volume is substantially fixed. Where the requirements of flood attenuation bring pressure to reduce the maximum normal operating water level of existing impoundments, this effect is exacerbated.
Environment • Fisheries	Abstracting water from Lough Derg / Parteen basin would result in loss of assimilative capacity for pollutants. Potential to damage fishery and the fisheries habitat for certain coarse fish species. Water abstraction should not compromise potential for reestablishment of a viable salmon population. The coarse fishery in the Shannon catchment is valuable and extends to the dam at Parteen. While the extraction of a relatively small volume of water should in itself have little effect upon the resident fish populations of the Shannon, the manner of the extraction, location and intake velocities, should be carefully considered, designed and assessed.	To permit appraisal of the proposed abstraction in light of the WFD, one of the largest water quality survey contracts commissioned on a large water body in Ireland is currently operating on Lough Derg and in Parteen Basin, and data from that survey is informing the development of a hydrodynamic model which will define the expected impacts of abstraction for water supply and ecological water quality. Loss of spawning ground is not expected where the existing normal operation band of water level will remain unchanged. It is proposed to maintain the old Shannon statutory compensation water flow	Irish Water and its fisheries adviser have engaged extensively with anglers, the fishery owner ESB and with IFI. Water abstraction will not compromise fisheries, fishery habitat or the fishery management objectives on the river. The long established normal operating water band, and the statutory compensation water flow at Parteen Weir, will remain unchanged. The abstraction location and proposed intake velocities have taken into account the requirements of protecting juvenile fish.

OWP Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	Future development & maintenance of ESB's fishery, and its economic benefits, must not be sacrificed to address the future water supply needs of Eastern & Midlands Region. The ESB's River Shannon Salmon Management Programme has failed. Essential that an EIA is carried out, including a detailed stock abundance survey. The system must provide the statutory necessary volume of water to the Old River Shannon.	undiminished. Irish Water has been in discussions with anglers and with IFI on supporting fish stock surveys in the Lower Shannon. Irish Water has engaged an internationally respected fisheries specialist, and this is discussed in Section 4.7.3 of POAR Volume 6 Appendix H.	
Environment • Alien Invasive Species	It would not be permissible, to pump untreated water from Lough Derg (where both Zebra mussels and Asian clams exist) to a reservoir or open / exposed facility in another catchment where cross contamination would be high. If it is necessary to pump water to Dublin, full or partial treatment will have to take place in the Shannon River Basin District area. A new reservoir would need to be assessed by Irish Water to determine if it will constitute a new artificial body of water under the WFD and to assess the implications of the Directive for its management of that reservoir including the consideration of potential spread of alien invasive species.	Issues associated with Alien Invasive Species are discussed in Section 4.7.4 of POAR Volume 6 Appendix H. The experience with microfiltration of raw water to try to interdict larvae, and use of biochemical approaches to inactivation of zebra mussel and Asian clam larvae have been examined. The risk of transfer of alien invasive species is most effectively and decisively managed by water treatment at source.	This issue has been considered, and the decision has been made not to proceed with raw water storage in the Midlands.
Water Framework and Habitats Directives • Water Framework Directive	The project should not give rise to impact or effect contrary to the WFD. Potential issues with transfer of raw water from one River Basin District to another, in the transfer of invasive species, mixing waters and loss of designation under WFD. Consider any pipe	Consideration of the requirements of this Directive is at the forefront of Irish Water's approach. The statutory framework for compliance with it is not a matter for Irish Water. The role of the WFD across all of Irish Water's activities is recognised, in the Water	There will be no raw water transfers across river basin district boundaries as part of the project, and the option which did involve such transfers is not preferred.

OWP Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	crossing & drainage regime and the impacts of an overflow in a water storage area. Increasing and varying flows on the old Shannon is a fundamental step in getting salmon and other migratory fish species (i.e. lampreys) back to the upper Shannon. Increasing / varying flows is essential for maintaining the ecology and geomorphology of the old River Shannon SAC Concerns regarding WFD obligations, particularly Annex V & Quality Elements for Classification of Ecological Status. WFD Article 9 requires water pricing policies providing incentives to use water resources efficiently & contribute to the Directive's environmental objectives. River basin district planning, hydromorphological obligations, assessment of ecology impacts, abstraction legislation suitability, must be considered. WFD, ecology and water must be specifically mentioned under Constraints on the project website. Inaccurate to list WFD only under Water Quality as a constraint, an important element of the WFD is quantitative & hydro morphological status in addition to water quality.	Services Strategic Plan, and in the options appraisal process for this Project. ESB has statutory responsibilities relating to the Shannon and its requirements must be taken into account. An approach whereby an abstraction from any of the River Shannon options can be compensated, by a corresponding reduction in water used at Ardnacrusha in hydropower generation, is an important attribute of all options on the lower Shannon. Such an abstraction can operate within the same operating water level band as currently operates with ESB, and without impact on compensation flows. Each of the water source options will be assessed for sustainability with respect to the aquatic ecology of the source water body, and for compliance with the WFD. This will be part of the appraisal of the options. Constraints identified in Section 7.1.3 (d) of the OWP under Water Quality included Water Framework Directive water bodies. The current water quality survey and development of a hydrodynamic model are discussed in Section 4.8.1 of POAR Volume 6 Appendix H. Impacts on coastal waters are being taken into account in appraisal of the desalination option. Field surveys are also under way in these coastal waters. The implications of compliance with the WFD and	The EIS for the project will include a WFD Assessment, and will include appropriate assessment under the Habitats Regulations.

OWP Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	Obligations arising from the WFD should be core to the proposal, but are sub-ordinated to considerations on ESB supply & energy requirements. To ensure the sustainability of the project, the WFD should be included in the assessment criteria and the WFD should be promoted so as to join the source yield technical assessment and Habitats Directive Assessment.	with the Habitats Directive with regard to the question of raw water storage in the Midlands, and for protection of the groundwater environment in the vicinity of the storage site, have also been studied.	
Water Framework and Habitats Directives • Habitats Directive	The focus of the OWP on the Appropriate Assessment obligations for the Natura 2000 was welcome, but it was misplaced in informing the strategy, and seems to derive solely from a somewhat too narrow view based on a limited focus on the planning consent process and the desire to avoid the legal obstacle in the consent process. Disagreement with the conclusion of the 2008 Habitats Directive Appropriate Assessment Report that there would be no adverse effects of water abstraction from the Slevoir Bay of Lough Derg North-east Shore SAC and Lough Derg (Shannon) SPA. Welcomed the acknowledgment that adverse effects on the integrity of these sites could occur. Disagree with the OWP that these options, at the desk study level of appraisal, can satisfy Stage Two of Appropriate Assessment without triggering Article 6(4) of the Habitats Directive.	Meeting requirements of the Birds & Habitats Directives is a primary objective of Irish Water, which is conscious of the requirements for protected habitats and protected species. Irish Water will comply with Birds & Habitats Directives. Information on protected species outside protected habitats is welcomed. All legal requirements will be complied with in the preparing the application. Birds and habitats requirements are important in assessing options to avoid compromising biodiversity. Irish Water welcomes the acknowledgement of its focus on the Appropriate Assessment obligations for the Natura 2000 network. We disagree that the focus is narrowly placed on the planning consent process in a legalistic fashion. The consideration of qualifying interests and conservation objectives associated with European Sites, is part of the interaction between environmental and technical specialists. Conservation objectives are a high priority.	Irish Water will include a project specific Water Framework Directive Assessment of the Project in the EIS.

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	If ESB approval is relied on as a key mitigation measure for any future proposed WSP and relied on for an appropriate assessment, it will need to be feasible prior to consent. Recent Irish and European jurisprudence has underlined the importance of appropriate assessments being complete, precise and definitive. Any required modelling should scientifically analyse the potential effects of the WSP on the European sites and be included in the Natura Impact Statement prepared by Irish Water.	Irish Water took a precautionary approach in reviewing previous work with respect to compliance with the Habitats Directive. Options taken forward in the Options Working Paper, and considered viable and likely to satisfy Stage 2 of the Appropriate Assessment process, without triggering Article 6(4) of the Habitats Directive are recognised as carrying the burden of proof to establish this position.	
Communities / Benefitting Corridor	The Benefitting Corridor is an add-on feature with little relevance to the primary objective which is the GDA Water supply. There is a plentiful water supply of raw water available in the counties in this corridor; current problems are due to poor investment in local treatment infrastructure. It is an important step to bring Midlands and Eastern Region water services onto a resilient, reliable standard of service. It would maximise the return on investment in Tipperary, Meath, Offaly, Westmeath & Laois. Diverting water resources to the Midlands facilitates becoming attractive to FDI. More areas will benefit from investment which supports economic expansion. Portlaoise should be included in the Benefitting Corridor to ensure a resilient supply of potable water,	Of the 314 Mld overall treated water requirement estimated in the Project Need Report, almost 25% would be required in the Benefiting Corridor. Provision of adequate water supplies to Midlands's communities is as much a priority for Irish Water, as it is for every region in the State and the sharing of resilient, reliable water supplies in the Benefiting Corridor and upgrading of many existing supplies is an important part of this project. In discussions with the EPA, the importance which they attach to this approach to small Midland water supplies was strongly emphasised.	The water requirements in the Benefiting Corridor have continued to be reviewed by Irish Water. Consolidation of more than 100 water supplies in the area towards a resilient lesser number is being considered.

OWP Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	allowing economic growth. Development in a Benefitting Corridor needs to be considered in the context of flood risk and more sustainable and energy efficient transport.		
Communities / Benefitting Corridor • Benefitting Corridor Demand & Source Consolidation	Drinking water supply in Ireland has historically been characterised by small local supplies providing water within county boundaries, consolidating water supplies would allow efficiencies of operation and resolve treatment issues that are more acute in small supplies. A regional approach is favoured for the supply of water in the Eastern and Dublin Region. This will allow small public supplies in the Midlands to be discontinued and replaced with the larger and more robust Eastern and Midlands Water Supply. Some of the existing midland supplies are on a remedial action list or are having localized impacts (e.g. Clonaslee WTP). A large water supply source would bring economies of scale and greater security of supply to the production and treatment of water. Endorsement of Irish Waters efforts to consolidate / rationalise number of water and wastewater treatment plants across the country.	Spatial planning of the Benefiting Corridor and the Eastern area take place under national and regional planning policy, consideration of flood risk and sustainable transport planning are part of that process. The Project makes provision for water requirements of settlements in the Benefiting Corridor. The PNR and the OWP have defined the foreseeable water need. They set out the options to meet that need, which can be phased and can respond to unfolding development. They define an approach to achieving least environmental impact. Source consolidation and the potential benefits of the Benefitting Corridor are discussed in Section 4.9.1 of POAR Volume 6 Appendix H.	Irish Water has addressed the Midlands water supplies positions and is taking a rationalised approach towards fewer schemes based on larger and more sustainable sources will provide reliability of service, network resilience and value for money and will involve network interconnections between existing schemes to tie existing networks into adjacent sources being retained, supported by connections from the treated water transfer pipeline.
Communities /	Impact on farmers - restrictions the project	Irish Water would consider that normal best	Irish Water has engaged directly with farming

OWP Theme	Summary of Issue	Irish Water Response	Influence on Project Development
Benefitting Corridor • Farming	could place on land use in the vicinity of abstraction points. Impact on farms would be significant, it is essential that the established procedure for wayleave consultation and compensation are fully implemented and that farmers are adequately compensated for any disruption to their farming enterprise. The interests and requirements of farmers whose lands are prone to flooding must be taken into account in any such new arrangements for the management of the Shannon flow, water levels and extraction. An adequate and reliable source of quality water is a basic requirement for the further development of the farming and food processing sector. It is important for the WSP to provide for water, to the so-called benefit corridor and not just the greater Dublin region. Has Irish Water considered the possibilities of algal bloom, pollution or other crisis and the implication of such single source dependency?	practices for farming near watercourses, developed in partnership with IFA, Teagasc, EPA, IFI, DECLG and other stakeholders, will continue to be appropriate for protection of any surface water source for the Water Supply Project. Irish Water agrees that an adequate and reliable source of quality water is a basic requirement for further development of farming and food processing, and it underlined that view in its submission in Spring 2015 on consultation on Harvest 25, the national strategy for food. In relation to flooding, the proposed abstraction of 3.82m³/s is many orders of magnitude smaller than flood flows and no significant beneficial impact can be expected. The abstraction regime would be managed entirely within the existing normal operating water level on Lough Derg / Parteen Basin, and will not impact on the ability of ESB to manage flood flows.	organisations, and have issued clarification on the question of land use near the WSP abstraction point. Extensive engagement with landowners is also proceeding related to wayleaves and minimisation of disruption associated with construction.
Tourism and Amenity	Water abstraction would result in a loss of amenity for water users such as motor and sail boat use, and would impact tourism/amenity. In drought, low water levels expose unmapped pinnacles of limestone, a major	Tourism in Lough Derg was emphasized by many in stakeholders. Irish Water propose to design any option based on the lower Shannon, to operate within the same water level range as currently applies on Lough Derg and in Parteen Basin, by agreement with ESB.	The Preferred Option has been identified as abstraction from the Shannon, but at a point downstream of Lough Derg in the Lower Lake (Parteen Reservoir). Its design operates within the existing normal operating range of water level, and with

OWP Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	cause of injuries and fatalities to the boating community. Extracting water from the Shannon system will exasperate this situation. Low flows in the River Shannon have impacted on navigation particularly in Killaloe. Water levels on Lough Derg always remain above the Waterways Ireland minimum summer level to allow boating activities to take place. Dropping below this would damage flora and fauna, and affect the local, national and international boating events that take place on the Lough. Two competing bodies control water levels on Lough Derg. Introducing a third competing body seeking to divert water from these bodies presents a significant risk. An independent body charged n should be designated as final arbiter on whom competing needs are decided. A weighting should be attached to water based (participatory) activities and the Blueway Project. The Shannon is important to communities that live and work by its shores both in terms of a tourism and. Poorly implemented drainage schemes have wrecked areas with devastating consequences e.g. Colorado River.	Irish Water favours transparent availability of real time data on water levels and flow rates at any abstraction point. Any abstraction option in the lower Shannon would harmonise with tourism plans for the region. Water demands of the tourism sector in the Eastern and Midlands region have been included in the projected requirement (detailed in Section 6.2.1 of the Water Demand Review in the PNR). Sustainable abstraction could only involve water which is not required for local use (for drinking purposes or for angling, navigation, tourism or agricultural purposes). Water abstraction cannot adversely impact on the Shannon catchment or be at the expense of tourism development in any other community. It must be sustainable from an environmental, economic and socioeconomic perspective in the short, medium and long term, otherwise it cannot be implemented.	current compensation water flows remaining unchanged, and will not adversely impact on tourism, navigation, or on flow patterns in the lake. It will respect the economic value and importance of tourism, fisheries, navigation and related sporting activities.

OWP Theme	Summary of Issue	Irish Water Response	Influence on Project Development
Tourism and Amenity • Tourism & Raw Water Storage	Garryhinch reservoir could be developed as an amenity offering potential for tourism development in Laois and Offaly. Value should be placed on creating new amenity facilities. Interim storage provides potential of establishing amenity facilities for walking, cycling, water sports, fishing, etc. The tourism potential of the project should be included in any Cost Benefit Analysis, as same is of local, regional and national importance.	A response to submissions received on tourism and raw water storage can be found in Section 4.10 of POAR Volume 6 Appendix H.	The Garryhinch storage would not effectively ameliorate the water residence time impacts of abstraction on Lough Derg in drought conditions. For this reason, among other technical, operational and environmental risk reasons, set out in the POAR, raw water storage at Garryhinch is not being proceeded with.
Planning • Planning Policy	Abstracting water from the mid-west to Dublin is against spatial planning, it will promote unsustainable development in the Dublin region while weakening the mid-west region. This volume of water will generate considerable waste and significant infrastructure will be required to deal with water treatment. Risk of deleterious and polluting effects during construction, and pipeline flushing. Fragmentation of Irish Waters perspective and limitations of its vision on this project is disturbing. Providing more water, increases waste water volume, Ireland is significantly in breach of its obligations under the UWWTD. The pipeline and treatment / pumping facilities are a significant environmental & economic cost. Concern with the potential waste generated by a new Water Treatment Plant.	Irish Water will ensure water services infrastructure will not be development-limiting, and water supply demand / wastewater treatment capacity will be met. The WSSP is a strategy between water supply & wastewater treatment, overarched by a WFD approach to protecting source water quality, ecology and morphology. The Greater Dublin Drainage Project, which is well advanced in planning, is the obverse side of the WSP coin. Communities in the Benefiting Corridor have the prospect that the utility which brings opportunity with clean water, can prevent wastewater treatment capacity becoming an impediment to taking up that opportunity. Irish Water have responsibility for both sides, and can prioritise both sides. The perspective and vision that would ally	Irish Water will, in the design of the WSP, respect the National Planning Framework. Irish Water is not an agency which defines spatial planning, rather it provides essential water services to any development which is permitted by planning authorities under proper planning and development. The wastewater aspect of water supply development will be addressed in the Greater Dublin Drainage Project and in the Ringsend Wastewater Treatment Plant upgrade. It will also monitor the wastewater centres in the Midlands to ensure

OWP Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	Potential future sterilisation of lands for mining purposes. Maritime Spatial Planning Framework should be considered, co-locate other state facilities at the abstraction, storage or desalination facilities.	sustainable, abundant, clean water to agriculture, food processing and industry in the Midlands and Eastern areas, on an equal footing throughout the Region, are entirely present in this approach.	
Planning • Planning Horizon	Very long term estimates are just guesswork but estimates should be regularly reviewed with a 10-20 year maximum aspect. Current design horizon to 2050 is not long enough. Likely to be 2025 before the project is brought into service and 2050 is just 25 years beyond that. The project should look to a design horizon of 2075, and design / planning approvals should allow for increasing demands over that time.	The importance of phased, modular designs for timely and proportionate response to unfolding water demand is acknowledged. The difficulties with adopting a design horizon 60 years hence are set out in Section 4.11.1 of POAR Volume 6 Appendix H. A case to An Bord Pleanála, and the CER, needs a high degree of predictive reliability.	Irish Water has developed the optimum balance between phased investment of resources, and addressing the pressing water supply needs of the Midlands and Eastern Region, over a planning horizon in which projections can be made with the right balance of accuracy, and utility.
Planning • Legal Issues	Irish Water is dysfunctionally structured and targeted. Generating revenues and future privatisation interests, while stimulating conservation, reducing water consumption and curtailing revenues are contradictory. The OWP fails to reflect the requirement under Article 5 of the Birds & Habitats Directive (Annex IV) to document the effects of the project. The scoping of the project, as regards cumulative impacts, should ensure that all aspects necessary to its development and operation need to be included for the purposes of the assessment required under	Irish Water has obligations to prevent water leakages, promote sustainable water uses etc. but legal powers to require comprehensive conservation measures have not been conferred on Irish Water. There is no conflict between conservation and cost recovery of water services. Irish Water has no statutory function to aim for privatisation - see Section 2 of Water Services Act 2014. Eurostat requirements have no relevance to the need for the project. Legislative planning and other policy requirements must be taken into account in	Irish Water will proceed to develop the WSP, based on an abstraction from Lower Lake (Parteen reservoir), by agreement under law with ESB, seeking consent from the Minister for Housing, Planning and Local Government, and complying with other obligations in law, in that process.

OWP Theme	Summary of Issue	Irish Water Response	Influence on Project Development
	the EIA Directive, if the process is not to be fatally legally flawed. Ireland's institutional arrangements to support the evaluation of the effects of surface water abstraction need to be modernised, the Water Supplies Act 1942 does not consider environmental issues.	the planning application / applications for regulatory consents. Failure to would be enforced by regulatory authorities and would make project decisions liable to judicial review. The project has regard to the water services planning approach set out in the WSSP. Environmental impacts are considered.	
Other • Plumbosolvency	Consider Irish Water's proposed policy of ortho-phosphate dosing to reduce plumbosolvency under the Irish Water National Implementation Strategy for Lead.	Irish Water will consider the environmental impacts of measures to curtail the impact of lead service connections on water quality.	This issue lies outside the scope of the Water Supply Project Eastern and Midlands Region.
Other • Recommendations	Recommend the preferred option should maximize the project's technical flexibility to satisfy future changing water demand and usage patterns. Wastewater capacity should be matched with treated water. Recommend engagement with IFA on use of environmentally friendly fertilisers. Investment is welcomed, recommend a random sampling approach to consultation with business. Subject to environmental protection, the shortest pipeline route from Lough Derg is preferred, with a commitment of 20% of work value to go to local contractors. Recommend that Irish Water engage underwater archaeologists to carry out an archaeological assessment of impact of all potential water supply options.	Irish Water seeks to develop a safe, environmentally sustainable, affordable, modular and adjustable solution to growing water demand, with secure planning permissions and consents in place, to permit water supply to match demand. It should create resilience and leverage advantage from existing assets. Engagement of underwater archaeology expertise would be kept under review with statutory stakeholders in this area and considered in the context of a proposed abstraction point. Developing a Code of Sustainable Homes to help water conservation is a matter for Building Control Regulations, Irish Water will contribute towards developing standards for sustainable water use.	Irish Water has proposed the optimum balance between phased investment of the WSP, and the ability to adjust quickly for any acceleration in water demand and usage patterns. Irish Water will also plan for and will facilitate the maximum possible engagement by the local supply chain in the project, consistent with the constraints of procurement law.

OWP Theme	Summary of Issue	Irish Water Response	Influence on Project Development
Other • Questions Raised	Clarity required on abstraction rate, per hour, per day, or other time period, and would it be curtailed in dry weather. Would it be feasible to build a new dam or weir with locks downstream from Foynes? How would flooding bear on the emerging preferred option? Refer to implications for the Mid-West Region, impact on people's lives and if the project would relieve flooding along the Shannon. Assess the impact on fisheries. Any implication for the Ardnacrusha Power Station or for flood reduction in the Shannon catchment? Could the project include a flood alleviation element for the Shannon region prone to flooding?	Details of the proposed abstraction rate are set out in Section 4.12.3 of POAR Volume 6 Appendix H. In relation to building a new dam or weir with locks downstream from Foynes, Irish Water would not favour extensive works in the estuarial environment of a working port where water is essentially seawater. Regarding flooding, average abstraction of 3.82 m^3/s (2% of average flow), will not significantly impact on flood flows in the region of 800 - 1000 m^3/s, they are of different orders of magnitude. Normal operating levels on Lough Derg won't change.	The project cannot include a flood alleviation dimension, because of the wide disparity of scale between water supply requirements, and flood flows. It is proposed to abstract 330 million litres/day, at average abstraction rate of 3.82 m^3/s (4.58 m^3/s maintained over 20 hours in a 24 hour period), avoiding peak tariffs. This corresponds to 16.5 Ml per hour over a 20 hour day. In exceptional circumstances, if supply is disrupted over 2 days, it is proposed to abstract the permitted 7 day volume, over 5 days, to permit recovery of the system.

Table J.2 : Summary of stakeholder issues raised during the OWP Consultation Period (9th June 2015 – 4th August 2015), Irish Water responses and influence on Project Development


UISCE
ÉIREANN : IRISH
WATER