A very warm welcome to our first Ezine for the Shared Waters Enhancement & Loughs Legacy (SWELL) project. As a team we have compiled and presented many project updates to different stakeholders, but this is our first digital update which we hope you will find both interesting and informative.

As programme lead for the SWELL project, I am delighted to advise that great progress has been made on all aspects of the project since it was launched at the end of June last year.

As you will read over subsequent pages of this newsletter, many key milestones were met before the end of 2019 within our capital works delivery programme, and fantastic advancements made on our modelling work.

As we put the finishing touches to this first edition of SWELL news, NI Water and our project partners - Irish Water, Agri-food and Biosciences Institute, Loughs Agency and East Border Region – have been getting used to a very different way of working due to COVID-19.

In line with Government guidelines, contractors working on all of NI Water’s SWELL upgrades ceased work towards the end of March. I would like to take this opportunity to pay tribute to the hard work and dedication of the contracting teams and project management staff on all four NI Water sites who have worked to ensure sites have been left safe and fully functioning for our operational colleagues. The situation is under constant review and we look forward to getting up and running again with our SWELL upgrade work as soon as practicably possible.

I also want to say a huge thank you to the entire SWELL team – partners and colleagues – who have embraced change with open arms. I think it’s safe to say we have all learnt new technical skills over the last few weeks as we adopt a more digital day-to-day management of the project.

As a team I know we will face these new challenges head on and continue to make as much progress as possible during these difficult times.

Martin Gillen
NI Water
SWELL Programme Lead
ALL’S WELL TO DATE WITH MAJOR €35M EU-FUNDED PROJECT

The Shared Waters Enhancement & Loughs Legacy (SWELL) project has seen a steady flow of progress since its launch last summer, with half of the wastewater capital upgrades due to be completed and commissioned by the end of 2020.

This €35m cross-border SWELL project – funded under the EU’s INTERREG VA Programme and managed by the Special EU Programmes Body – aims to improve water quality in the shared waters of Carlingford Lough and Lough Foyle through the upgrade of key wastewater assets on both sides of the border. Match-funding for the project has been provided by the Department of Agriculture, Environment and Rural Affairs (DAERA) in Northern Ireland and the Department of Housing, Planning and Local Government (DHPLG) in Ireland.

Led by NI Water working in partnership with Irish Water, the Agri-Food and Biosciences Institute (AFBI), Loughs Agency and East Border Region, SWELL will see a total of eight wastewater infrastructure upgrades, as well as catchment studies and ecosystem modelling carried out within the Carlingford Lough drainage basin and the Lough Foyle drainage basin. The improvements to the wastewater assets will help contribute to raising the current EU Water Framework Directive status of ‘moderate’ to ‘good’ in both loughs.

Officially launching the SWELL project in Derry/Londonderry, Eoghan Murphy, TD, Minister for Housing, Planning and Local Government in Ireland, stated: “Without safe and reliable water and wastewater infrastructure, social and economic development cannot happen. The SWELL project will play an important role in improving water quality in Carlingford Lough and Lough Foyle through cross-border partnership working.”

As its legacy, the four-year SWELL project will culminate in the development of a unique...
Minister Murphy addresses a packed SWELL launch event in Derry, Londonderry

Minister Murphy addresses a packed SWELL launch event in Derry, Londonderry

environmental model which can be used to determine the sources of pollution in these shared water bodies and help target investment to achieve further improvements in water quality in the future.

Speaking at the launch about the benefits of the project, Denis McMahon, Permanent Secretary at the Department of Agriculture, Environment and Rural Affairs, said: “This €35m funding will facilitate important work with the Republic of Ireland to improve water quality in both the Foyle and Carlingford catchments. The project will leave a lasting legacy through improved wastewater treatment for our border communities and will develop a new environmental model to help decision and policy makers make the difference in improving water quality.”

The unique ecosystem model being developed through SWELL, will link various aspects of environmental modelling such as urban drainage, river, coastal and ecology, undertaken in the catchments of the respective loughs over the lifecycle of the project.

With built-in source apportionment, the legacy model will represent a first-time integration of continuous and intermittent point source and diffuse pollution sources on a large-scale catchment-wide basis. The delivery of a GIS (Geographic Information System) representation of the results will help to identify the dominant sources causing water quality issues and allow policy makers on both sides of the border to apply targeted management measures and investment for remediation.

Highlighting the importance of cross-border working, Gina McIntyre, CEO of the SEUPB said: “Nature does not respect geographical borders between regions, therefore cross-border cooperation is vital if we are to help protect our shared environment. This project represents a significant and long-term investment from the European Union in the water quality of the entire region. It is a testament to what can be achieved when two jurisdictions work together to help address a common problem.”

Following the launch, NI Water hit the ground running with their four major capital upgrades – two in the Carlingford Lough catchment at Warrenpoint Wastewater Treatment Works (WwTW) and Newpoint Wastewater Pumping Station (WwPS) and two in the Lough Foyle catchment at Donemana WwTW and Strabane WwTW.

Paul Harper, Director of Asset Delivery at NI Water, commented: "Northern Ireland Water is pleased to be lead partner in this strategic EU-funded project which will improve wastewater treatment for an additional 10,000 people on a cross-border basis. “The project provides a welcome opportunity for both water utilities to work collaboratively to prioritise and align projects in a coordinated way so as to make maximum positive impact on the shared waterbodies on the island of Ireland.”

SWELL partners pictured with Mark Durkan MLA at the launch event

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ECI is an innovative way of working and allows the contractor’s experience and expertise to be utilised from the very outset of each project. As part of the ECI work, the NI Water contractors developed 3D videos of their respective upgrades which proved instrumental in showing the end product to operational colleagues and importantly gaining buy-in from the end user.

Construction work on all four NI Water sites hit the ground running following the launch of the SWELL project at the end of June 2019 and progress continued at pace with all sites reaching the half-way stage before the end of the year.

As we moved into 2020, NI Water’s SWELL upgrades were really taking shape with on-site structures increasingly resembling the 3D videos that each contractor had produced at the start of the project.

Huge pieces of kit such as new treatment units, pumps, tanks, aeration equipment not to mention tonnes of concrete and realms of cable have been installed to provide modern new wastewater processes at these key NI Water sites.

By mid March, the upgrades at Newpoint, Warrenpoint and Donemana were around 80% complete, and with construction work completed at Strabane, the contract team had moved to performance trials. Towards the end of March, with the COVID-19 situation becoming increasingly difficult and social distancing measures being put in place, work at Newpoint, Warrenpoint and Donemana was suspended.

However, in a bid to progress to completion at Strabane, our contractor, BSG Civil Engineering, put together a special training video which provided a step-by-step guide for NI Water colleagues who will eventually be required to operate and maintain the new equipment. This clever intervention has meant that the SWELL upgrade at Strabane has continued uninterrupted despite the currently imposed social distancing measures.

See below a collage of pictures and captions that will show how far we’ve come with our capital upgrade programme. More progress photos will be available soon on the SWELL website www.swellproject.com which is currently being extended.
Newpoint Wastewater Pumping Station
Installation of a new screen on the incoming sewer and new overflow screens to reduce the impact of storm water spilling to the adjacent Newry River.

Donemana Wastewater Treatment Works
Installation of a modern new treatment plant to cope with residential growth and produce higher quality discharge to the Burn Dennet River.

Strabane Wastewater Treatment Works
Upgrade of existing treatment facility to include installation of a new inlet works, pumping station and fine screening facilities to protect the water environment.
Within the SWELL project AFBI’s role is to coordinate, manage and implement the science programme which underpins the project. This includes field sampling within the relevant catchments and marine waters – assisted by Loughs Agency - data management and ecosystem modelling.

Work undertaken through the SWELL project will extend the prior modelling frameworks developed through the SMILE (Sustainable Mariculture in Northern Irish Sea Lough Ecosystems) and EASE (Enhanced Application of the SMILE Ecosystem model to Lough Foyle) projects in a number of key aspects, through developments to the SWAT model, the Delft3D-Flow platform for hydrodynamic modelling, the AquaShell model for simulation of shellfish growth, EcoWin.NET for modelling biogeochemical processes, and FARM to simulate shellfish production at the local scale. In addition, Delft-WAQ will be used to determine the temporal and spatial impact of individual bacterial sources on existing and planned aquaculture areas. The SWELL modelling chain will interface with Sewerage Network Models (DAPs) at all key points, i.e. in the catchment, lough areas, and adjacent marine system.

AFBI’s work on the development of the SWELL Legacy Ecosystem models is progressing as planned and the calibration of the water quantity (using rainfall radar) of the SWAT models for the Foyle and Carlingford catchments has been completed. Major improvements have been made to the configuration of the existing Delft3D-Flow model setup for Carlingford Lough. Grid resolution was improved from ~ 1 km over all the domain to a size of ~25 m near the mouth of the Newry River, ~70 m inside the lough and ~120 m at the adjacent shelf. Work is now underway on the Coastal Domain model.

For many bays and loughs along the Irish coast the main drivers of hydrodynamics and water quality processes are not the tide alone but also the wind and the general inner-shelf and mesoscale circulation resulting from the wider pressure field. To simulate these three-dimensional processes and shelf circulation on a bay scale, a model...
was developed for the larger region spanning from south of Carlingford Lough to north of Larne, referred to as the Irish Sea Coastal Domain.

The individual shellfish growth models for *Mytilus edulis*, *Crassostrea gigas*, and *Ostrea edulis* have been calibrated and validated within both Loughs. The subcatchment pre-improvement sampling programme commenced in April 2019 and continued to March 2020, when no further samples could be taken due to COVID-19.

23 freshwater sites and 11 marine sites were sampled fortnightly within Carlingford Lough and the Carlingford catchment, and 48 freshwater sites and 14 marine sites were sampled fortnightly within the Foyle catchment and Lough Foyle. Approximately 740 samples have been collected and analysed for marine nutrients, 1,320 samples have been collected and analysed for freshwater nutrients and 2,020 samples have been collected and analysed for colony forming units of *Escherichia coli*.

The unique SWELL ecosystem model will - for the first time - link various aspects of environmental modelling such as urban drainage, river, coastal and ecology.

**SWELL ON SHOW**

The modelling side of the SWELL project – the ‘Loughs Legacy’ – was showcased during the NI Science Festival in February as part of AFBI’s public exhibition on board their research vessel Corystes.

Members of the public were able to board the ship to view information, ask questions and pick up some information and SWELL promotional items. Thanks to AFBI for showcasing SWELL in this year’s exhibition!
Welcoming EBR’s board to Warrenpoint, Martin Gillen, SWELL Programme Lead for NI Water, said:

“East Border Region is a valued partner in the SWELL project and we are delighted to have the opportunity to show their members the extensive work being undertaken at Warrenpoint WwTW - the biggest of the eight SWELL projects - and explain in detail the improvements being made at the site which will help improve water quality in Carlingford Lough.”

EBR is a local authority-led organisation which was established in 1976 to promote cross-border economic development in sectors such as agriculture, industry, commerce and tourism. The organisation has been involved in many EU-funded projects over the years, but wastewater treatment is a first!

Its members comprise elected representatives from Louth, Meath and Monaghan County Councils; Newry, Mourne & Down District Council; Armagh, Banbridge & Craigavon Borough Council and Ards and North Down Borough Council and it was great for the SWELL team to invite them along to view the processes that go into treating our wastewater so that it can be safely discharged back to the environment.

Before guests were shown around the Warrenpoint WwTW site, they were given a detailed presentation on the other NI Water and Irish Water SWELL projects relating to the Carlingford Lough catchment – the significant upgrade ongoing at Newpoint Wastewater Pumping Station (WwPS) in Newry and the wastewater project planned for Omeath due to get underway in 2021.

The presentation also provided a detailed overview on the unique legacy model that’s being developed as part of the SWELL project and how it can be used in the future.

Adele Boyd, SWELL Project Lead for AFBI told delegates: “Through extensive investigations and use of innovative modelling techniques, the SWELL ecosystem model will be able to track the pathways of nutrients and contaminants of wastewater, industrial or agricultural sources to determine their impact on the receiving waters. This legacy model will assist the water utilities and regulatory bodies on both sides of the border by identifying best approaches to achieving further improvement of overall water quality in the future.”

While EBR members didn’t visit Newpoint WwPS due to its confined site, they had the opportunity to get a closer feel for the upgrade work through the innovative virtual reality function created by our contractor GRAHAM.

Thanking the SWELL team and their contractors following the visit, Cllr Erin McGreehan, East Border Region Vice Chair commented: “East Border Region has been at the heart of local INTERREG programmes for more than 20 years and during that time has partnered with many organisations to successfully manage and deliver a wide variety of cross-border projects.

“It has been great for EBR’s members to see first-hand the scale of the new infrastructure being implemented at Warrenpoint WwTW to help improve water quality in Carlingford Lough and get an insight into the innovation and science behind the unique environmental model that will form the legacy of SWELL.”
The SWELL project team was delighted to show SEUPB around the NI Water sites in the autumn.

Timings of the visits were arranged to coincide with key milestones such as the installation of the new fully enclosed treatment tanks at Donemana and the huge screw pumps at Strabane.

The visits gave NI Water and the wider SWELL team the opportunity to explain first-hand the upgrades being made at each site, the engineering involved and how the vast array of new equipment would help improve the treatment processes and have a positive impact on the discharge from each site.

At the end of November 2019, following on from the series of sites visits, Martin Gillen, SWELL Programme Lead gave an in-depth presentation on the progress of the project to SEUPB’s Programme Monitoring Committee.

The SWELL team kicked off 2020 with presentations and site visits to NIEA and our match-funder DAERA.

During January, representatives from NI Water’s environmental regulator, NIEA were shown around Warrenpoint Wastewater Treatment Works and given a presentation on the SWELL upgrades – including the new Inlet Works, Balancing Tank and Activated Sludge Plant – that were around 80% complete, and when commissioned later in the year will help improve the quality of discharge to Carlingford Lough.

At the end of the month the NI Water SWELL team was delighted to welcome Tracey Teague, Stephanie Miller and Ros Stewart from NIEA/DEARA to the Warrenpoint and Newpoint SWELL sites. As well as a progress overview and presentation of 3D animations for the sites, the DAERA reps were given an in-depth insight into the modelling programme for SWELL by AFBI which was very well received. Subsequent visits to the Lough Foyle sites (Donemana WwTW and Strabane WwTV) which were planned for March have been postponed until COVID-19 restrictions have been lifted. We look forward to welcoming DAERA to our Lough Foyle sites as soon as possible.

THANKS TO OUR CONTRACTORS
GEDA Construction, Water Solutions Ireland, GRAHAM, Deane Public Works and BSG for facilitating site visits.

The SWELL project provides a welcome opportunity for NI Water and Irish Water to work together to prioritise and align projects in a coordinated way so as to make maximum positive impact on the shared waterbodies on the island of Ireland.

Through regular meetings, workshops and site visits the two water companies have been sharing knowledge and expertise on all aspects of wastewater capital upgrades - from planning to procurement and from efficient treatment to technology - so that the project as a whole can benefit from each utility’s experiences.
In December, NI Water and GRAHAM – the contractor for the upgrade of Newpoint Wastewater Pumping Station in Newry - came together to promote the SWELL project and highlight the opportunities that exist for women within the construction industry to Year 11 students at St. Mary’s High School in Newry.

The girls got the opportunity to view the innovative 3D animation of the SWELL upgrade that’s taking place at Newpoint and hear from GRAHAM representatives on the benefits of working in the construction industry.

WOMEN IN CONSTRUCTION HIGHLIGHTED THROUGH SWELL

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SUSTAINABILITY ON SWELL

NI Water and Irish Water are working to incorporate sustainable practices into the design for all the SWELL wastewater asset upgrades.

Such practices include for re-use of existing assets where possible; the use of materials with minimum embodied carbon; locally sourced materials to reduce transport and promote the local economy and the efficient use of wastewater treatment technologies that have reduced energy requirements.

Examples of sustainable working on SWELL sites to date include:

» Refurbishment of inlet screen and storm tank at Donemana instead of replacement.
» Reuse of stone at Donemana in gabion baskets to form retaining wall (as shown in photo).
» Reuse of the existing concrete structure at Strabane that held the original 6mm screens.
» Leftover concrete at Strabane used to make blocks to support the wooden shutters and all pipe cuttings recycled.
» Reusable/modular formwork at Newpoint and Warrenpoint.
» Stone excavated for the aeration tank at Warrenpoint used to construct the temporary road to the site compound. This negated the need for large quantities of stone to be transported to site.
» A special type of cement - with less than 4% of the carbon footprint of normal cement - used in the concrete at all NI Water SWELL sites.
» Social sustainability adopted through employment of students, community liaison and using local labour and suppliers.

The Considerate Constructors Scheme is a not-for-profit organisation which seeks to improve the image of the construction industry by striving to promote and achieve best practice.

Sites, companies and suppliers that register with the Scheme are monitored against a five-point code of Considerate Practice which commits them to: care about appearance, respect the community, protect the environment, secure everyone’s safety and value their workforce.

IT’S OFFICIAL - SWELL HAS ‘CONSIDERATE CONSTRUCTORS’

Contractors working for NI Water on their SWELL upgrades signed up to the ‘Considerate Constructors Scheme’ at the beginning of the project and we are delighted to report that all have had glowing reports – with second visits earning some sites ‘Performance Beyond Compliance’ certificates.

Congratulating the SWELL contractors on their achievements, Martin Gillen, SWELL Programme Lead, said: “In line with NI Water’s corporate values, it is paramount that our contractors also show respect for their workforces and their surroundings and ultimately be seen as considerate constructors. I would like to thank all our SWELL contracting teams who have worked to ensure that robust measures are in place to protect the environment, support their workforce, minimise impact and support local communities.”
IRISH WATER PROGRESSING TO PLANNING AND PROCUREMENT

Under the SWELL project, Irish Water will carry out capital upgrades to wastewater assets at four locations.

Three upgrades are in Co. Donegal within the Lough Foyle catchment and consist of two significant upgrades at Lifford Wastewater Treatment Plant (WwTP) and Killea WwTP, and a new wastewater pumping station in Carrigans. This new pumping station will transfer wastewater via a new 3500m rising main to an existing Irish Water treatment plant. The other upgrade will involve wastewater network improvements in Omeath, Co. Louth, within the Carlingford Lough catchment. All Irish Water sites are nearing completion of the detailed design phase and planning applications are due to be submitted this summer. Other important deliverables such as land acquisition and wayleaves have been progressing well and are nearing completion.

Omeath Network Improvements
Upgrade capacity of the sewer network to transfer more wastewater to a new treatment plant that is currently being designed by Irish Water (separate to the SWELL project). This will involve surface water separation and redirection of storm flows.

Killea Wastewater Treatment Plant
Construction of a new wastewater treatment plant on the site of the existing plant as well as providing storm storage. This will reduce the risk of storm water flooding and protect the environment.

Carrigans Wastewater Treatment Plant
New pumping station and rising main to transfer wastewater from the existing septic tank at Carrigans to St. Johnston Wastewater Treatment Plant.

Lifford Wastewater Treatment Plant
Building a new plant to provide secondary wastewater treatment for Lifford. Upgrading the sewer network to reduce the amount of overflow and improve water quality in the Foyle.

STILL TO COME

Lots of events that were in the pipeline for the SWELL team unfortunately had to be postponed recently. We look forward to reorganising these as soon as we can. Meantime, we will endeavour to keep you posted on progress through the newly extended SWELL website, which should be live late May.

www.swellproject.com

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