



OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

The Development and Construction of the Athlone Flood Alleviation Scheme.

Vincent Rhatigan
Andrew Mannion

11th March 2021.

Engineers Ireland Midland Region





OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

Presentation Layout

- 1 The Role of OPW in Flood Risk Management.
- 2 OPW East Region Construction.
- 3 History of Flooding in Athlone.
- 4 Athlone Flood Alleviation Scheme (AFAS) Overview.
- 5 Construction Challenges.
- 6 Public Realm Objectives.
- 7 AFAS – A virtual tour.
- 8 Questions.



OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

1. The Role of OPW in Flood Risk Management

- Arterial Drainage Act, 1945
- ↓
- Arterial Drainage (Amendment) Act, 1995
- ↓
- Report of the Flood Policy Review Group, 2004
- ↓
- EU Floods Directive (2007/60/EC)
- ↓
- CFRAMS Process (2010 to 2018)
- ↓
- Programme of Investment in Flood Relief Measures



OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

1. The Role of OPW in Flood Risk Management

- Arterial Drainage Act, 1945
 - *Prevent or reduce periodic flooding of lands by improving the drainage of said lands;*
 - *Arterial Drainage Schemes were undertaken on a whole catchment basis;*
 - *A additional benefit of Arterial Drainage Schemes is that they provide some level of flood protection to many towns & villages throughout Ireland.*
 - *Clause 37 obliges OPW to maintain A.D. Schemes in “proper repair and effective condition” ensuring the continuance of both these benefits.*



OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

1. The Role of OPW in Flood Risk Management

- Arterial Drainage (Amendment) Act, 1995
 - *This amended the “whole catchment” basis of the original act and allowed the Commissioners to execute arterial drainage works on “**any watercourse or any part of a watercourse**” i.e. flooding hotspots could now be tackled;*
 - *Duleek, Kilkenny, Clonmel, Fermoy and Mallow Flood Relief Schemes are examples of such schemes.*

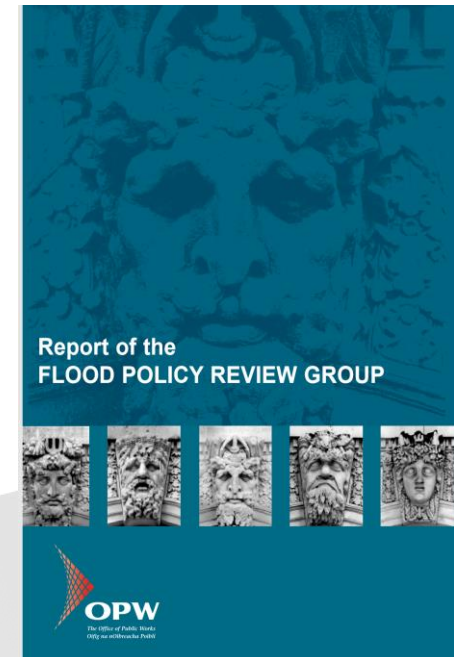


OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

1. The Role of OPW in Flood Risk Management

- Report of the Flood Policy Review Group approved by Government in 2004
 - *Provided the blueprint as to how flood risk in Ireland would be managed in the future;*
 - *Nominated OPW as the Lead Agency for flood risk management in Ireland*
 - *3 Strategic Areas: Prevention Preparedness Protection*



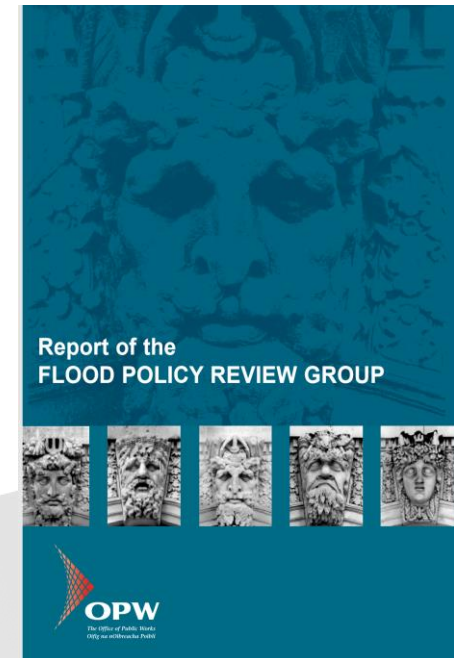


OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

1. The Role of OPW in Flood Risk Management

- Report of the Flood Policy Review Group 2004
 - *Some key recommendations:*
 - *Taking a river basin based approach to assessing & managing flood risk;*
 - *Being proactive in assessing & managing flood risk including preparation of flood maps and flood risk management plans.*
 - *Structural measures will continue to play an important role but increased emphasis on non-structural measures e.g. flood forecasting;*





OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

1. The Role of OPW in Flood Risk Management



2009: National Tide and Storm Surge Forecasting Service was initiated.

2014: Flood Studies Update (FSU).



OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

1. The Role of OPW in Flood Risk Management

- The EU Floods Directive (2007/60/EC)
 - *Very close alignment between the key recommendations of the 2004 Report and the requirements of the EU Floods Directive;*
 - *OPW, through its Catchment-based Flood Risk Assessment and Management Programme (CFRAMS), carried out the largest ever flood risk study in Ireland.*



OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

1. The Role of OPW in Flood Risk Management

The CFRAMS Process:

- National screening process to identify communities at risk from flooding.
- ↓
- Preliminary Flood Risk Assessment (PRFA) identified 300 AFAs
- ↓
- Preparation of Flood Maps
- ↓
- Preparation of Flood Risk Management Plans
- ↓
- Programme of Investment in Flood Relief Measures



OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

1. The Role of OPW in Flood Risk Management

- The CFRAMS Process:
 - *6 CFRAMS study areas including Shannon CFRAMS (Athlone)*
 - *Key outputs from CFRAMS:*
 - 40,000 Flood Maps;
 - 29 Flood Risk Management Plans
 - *3rd May 2018: Minister of State for the Office of Public Works and Flood Relief announces “ten-year €1 billion Programme of Investment in Flood Relief Measures”*
 - *This is managed by OPW Flood Project Management Services.*



OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

1. The Role of OPW in Flood Risk Management

48 - Schemes completed since 1995

91 schemes currently at various stages of development (including **8** already at construction)

A further **58** to be progressed in the lifetime of the NDP 2018-2027

118 – of these identified through the CFRAMS process.

Annual budget ramping from **€45m** to **€100m** over lifetime of NDP



OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

2. OPW East Region Construction.

- OPW East Region Construction (ERC) has 70 operational staff and are currently constructing the following projects:
 - River Dodder Flood Alleviation Scheme
 - Ashbourne Flood Alleviation Scheme
 - Athlone Flood Alleviation Scheme
 - Morell River Flood Management Scheme
- Future Projects for ERC include the following:
 - Whitechurch Stream FAS
 - River Poddle FAS
 - River Dodder Phase 3
 - Sandymount Coastal Protection Scheme – Phase1
- OPW Direct Managed Works model is a collaboration between OPW direct employees and private sector sub-contractors and suppliers. It is flexible and adaptable model that allows efficient and cost effective solutions to be developed in response to challenges during the project.
- AFAS is being constructed currently using this Model.

**OPW**

Oifig na
nOibreacha Poiblí
Office of Public Works

3. History of Flooding in Athlone

Athlone has a long history of flooding with the biggest flood being recorded in 2015 followed closely by the 2009 flood event and the 1954 flood event.

Rank	Hydrological Year	Date of Peak	Flow (m ³ /s)	Estimated Frequency (%AEP)
1	2015	05/01/2016	400.53	1%
2	2009	25/11/2009	396.39	1.1%
3	1954	14/12/1954	312.12	9%
4	2006	13/12/2006	305.39	11%
5	1999	30/12/1999	303.50	12%
6	2001	11/02/2002	300.26	12%
7	1994	02/02/1995	300.09	12%
8	2002	16/11/2002	267.26	26%



OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

3. History of Flooding in Athlone



January
2016



OPW Oifig na
nOibreacha Poiblí
Office of Public Works

3. History of Flooding in Athlone



January
2016



OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

3. History of Flooding in Athlone



January
2016



OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

3. History of Flooding in Athlone



January
2016



OPW Oifig na
nOibreacha Poiblí
Office of Public Works

3. History of Flooding in Athlone



January
2016



OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

3. History of Flooding in Athlone



January
2016



OPW Oifig na
nOibreacha Poiblí
Office of Public Works

3. History of Flooding in Athlone



January
2016



OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

4. Athlone Flood Alleviation Scheme - Overview



CLIENT



PSDP



OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

PSCS

www.athlonefas.ie



OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

4. Athlone Flood Alleviation Scheme - Overview

Some numbers:

Residential Properties protected:	499
Commercial Properties Protected:	55
Total Project Budget:	€12,000,0000
Benefit to cost Ratio (BCR) :	4.27
Construction Start	Q4 2017
Project Completion	Q2 2022



OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

4. Athlone Flood Alleviation Scheme - Overview

- The flood risk in Athlone is well documented and has been subject to hydrological and hydraulic analysis, flood risk assessment and development of a preferred option through the Shannon CFRAM Study.
- CFRAM was a catchment scale high level study (Used data from 1952 to 2009) – Q100: $407m^3/s$
- RPS carried out a project level detailed assessment (Used data from 1952 to 2015) – Q100: $438.2m^3/s$
- This 8% increase in Q100 resulted in an increase of between 100mm and 300mm in **peak flood levels** compared to the Shannon CFRAM study.
- In terms of climate change, Mid-Range Future Scenario (MRFS) and High End Future Scenario (HEFS) were assessed during the detailed design and structural foundations have been designed to accommodate future increases in height.



OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

4. Athlone Flood Alleviation Scheme - Overview

8 nr. Flood Cells

FC1: Deerpark

FC2: The Strand

FC3: The Quay

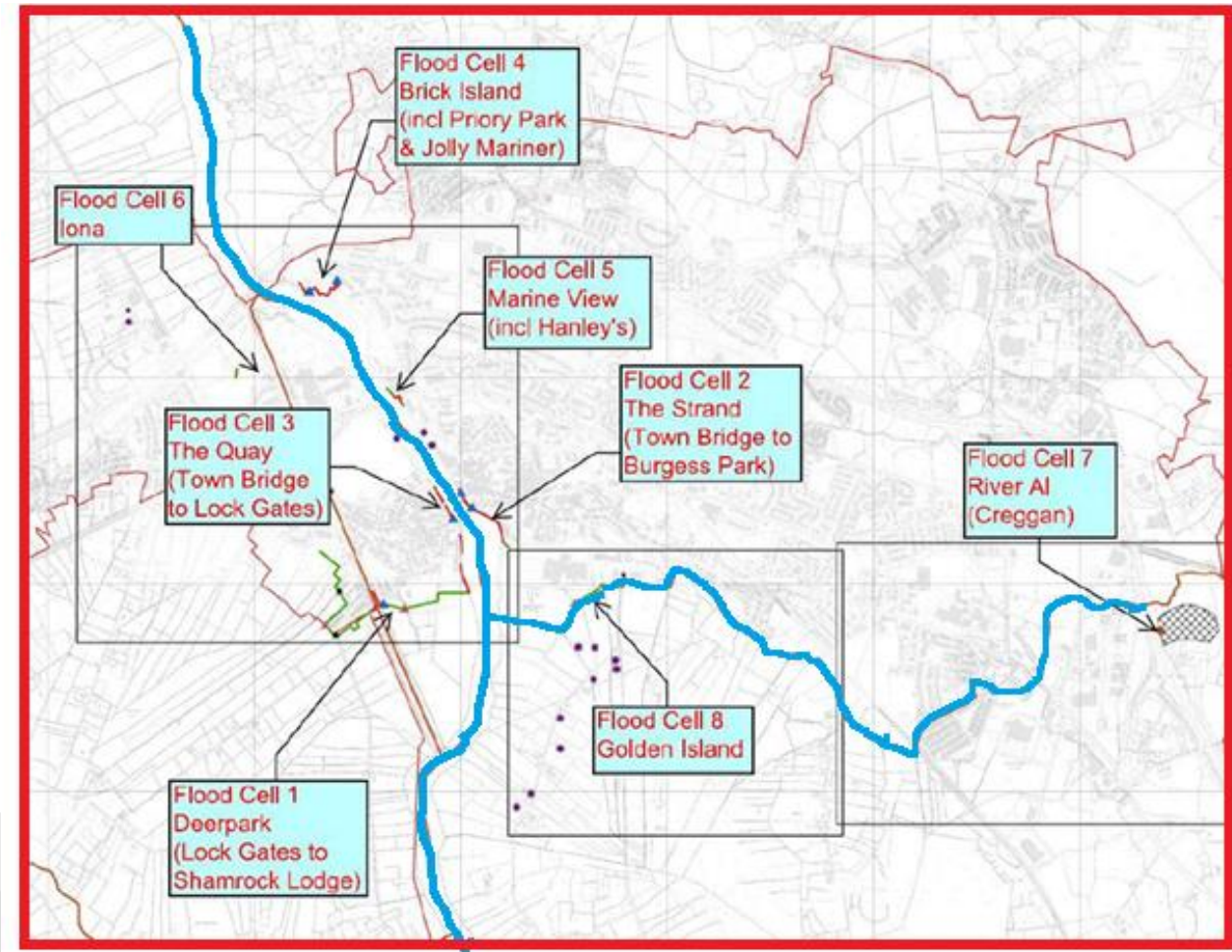
FC4: Brick Island

FC5: Marine View

FC6: Iona

FC7: River AI (Creggan)

FC8: Golden Island





4. Athlone Flood Alleviation Scheme - Overview

ATHLONE FLOOD ALLEVIATION SCHEME				
Flood Cell Name.	Flood Wall (Lin.m.)	Earthen Embankments (Lin.m.)	Glass Walls (Lin.m.)	Total length of defence assets per flood cell
FC1 Deerpark	710	900	0	1610
FC2 The Strand	450	0	6	456
FC3 The Quay	240	0	20	260
FC4 Brick Island	210	480	0	690
FC5 Marine View	330	225	0	555
FC6 Iona Park	90	100	0	190
FC7 River AI	0	0	0	0
FC8 Golden Island	110	230	0	340
Totals	2140	1935	26	4101

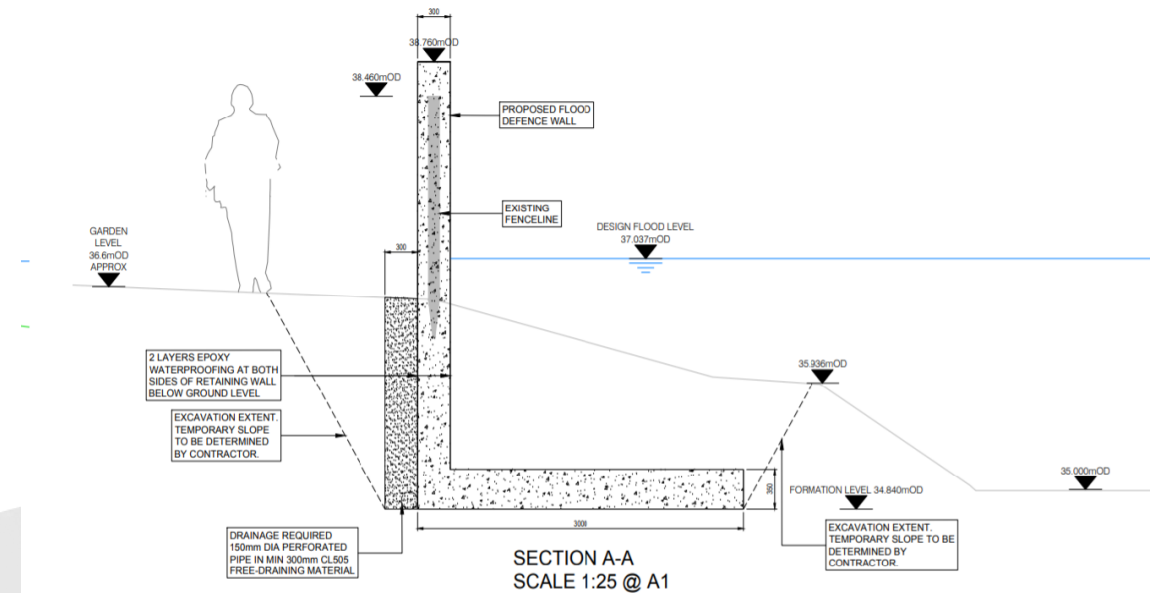
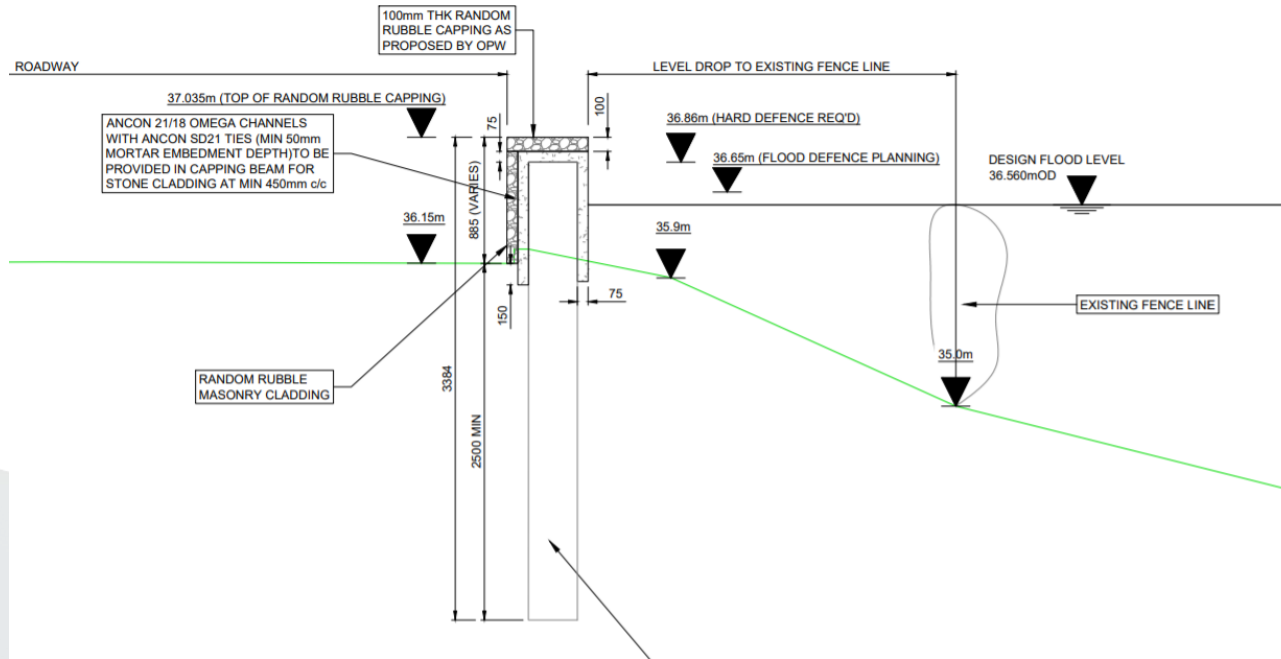


OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

4. Athlone Flood Alleviation Scheme - Overview

Typical Flood Wall Sections



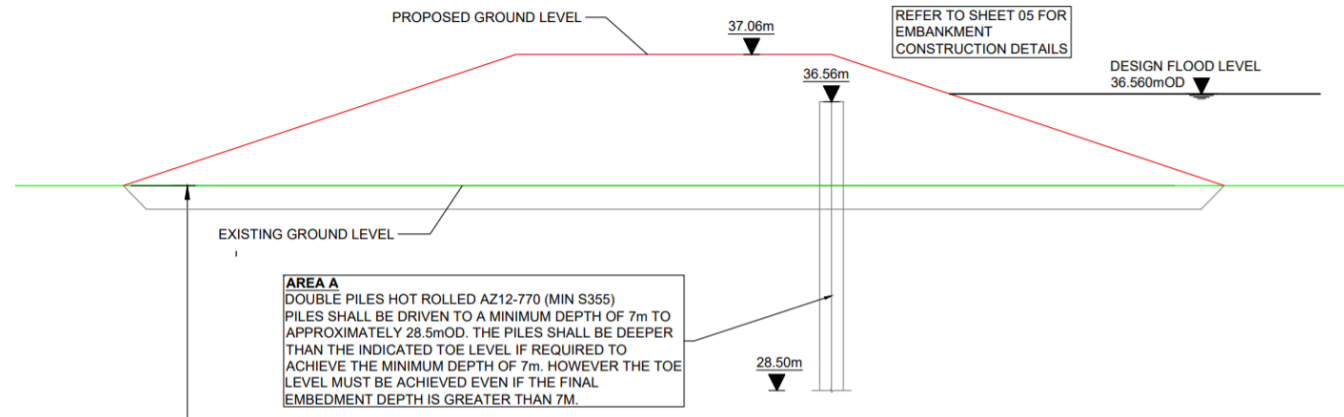
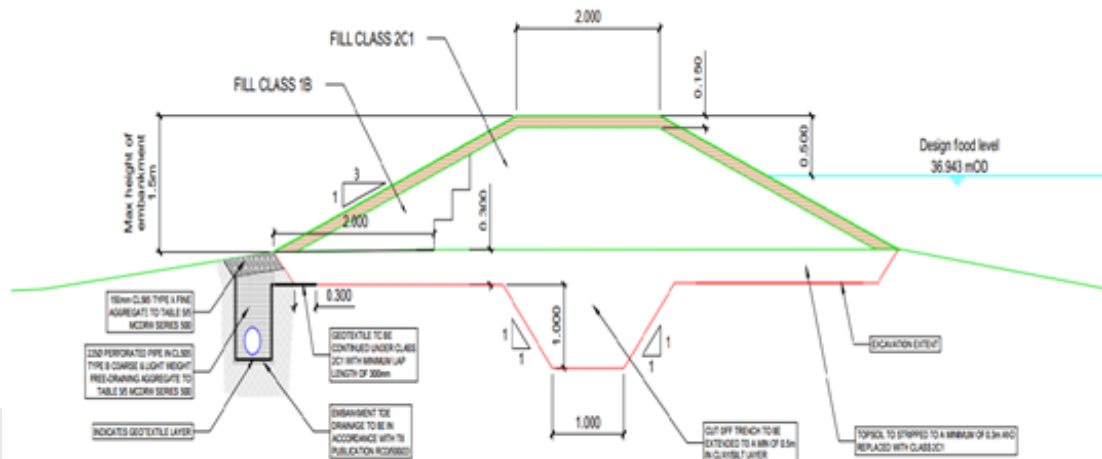


OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

4. Athlone Flood Alleviation Scheme - Overview

Typical Embankment Sections



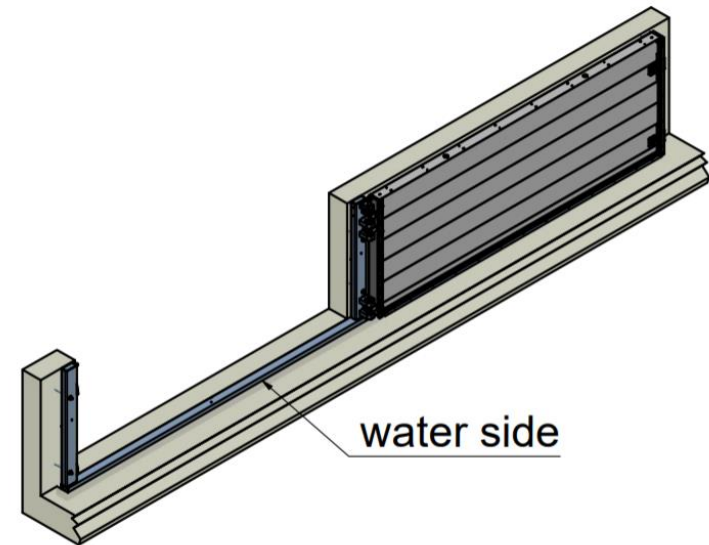
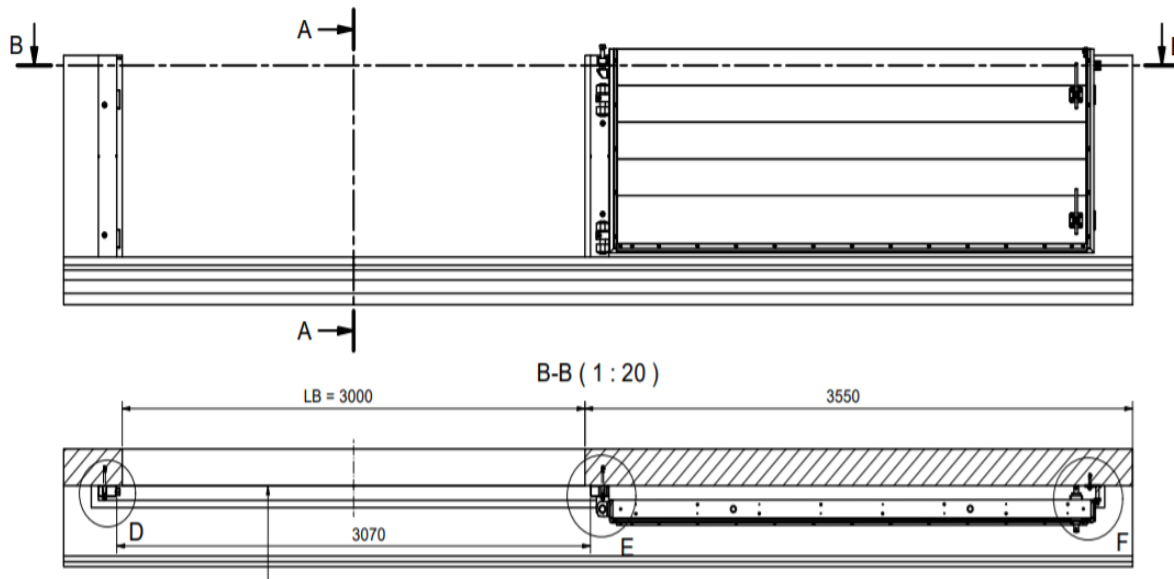


OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

4. Athlone Flood Alleviation Scheme - Overview

Typical Flood Gate Details



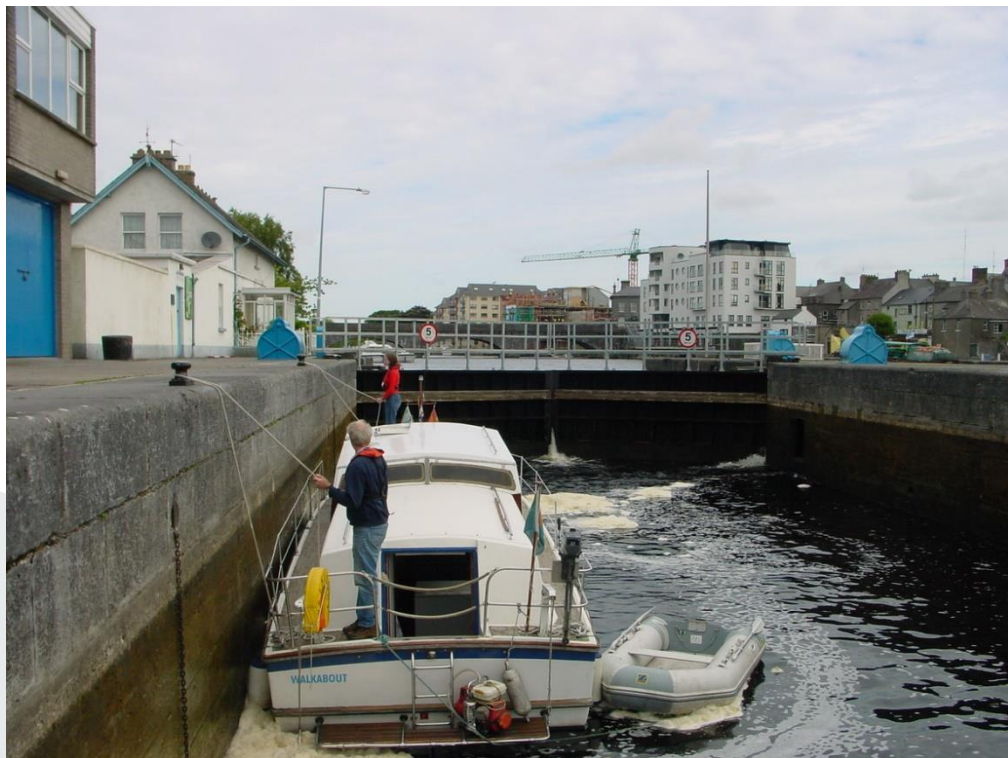


OPW

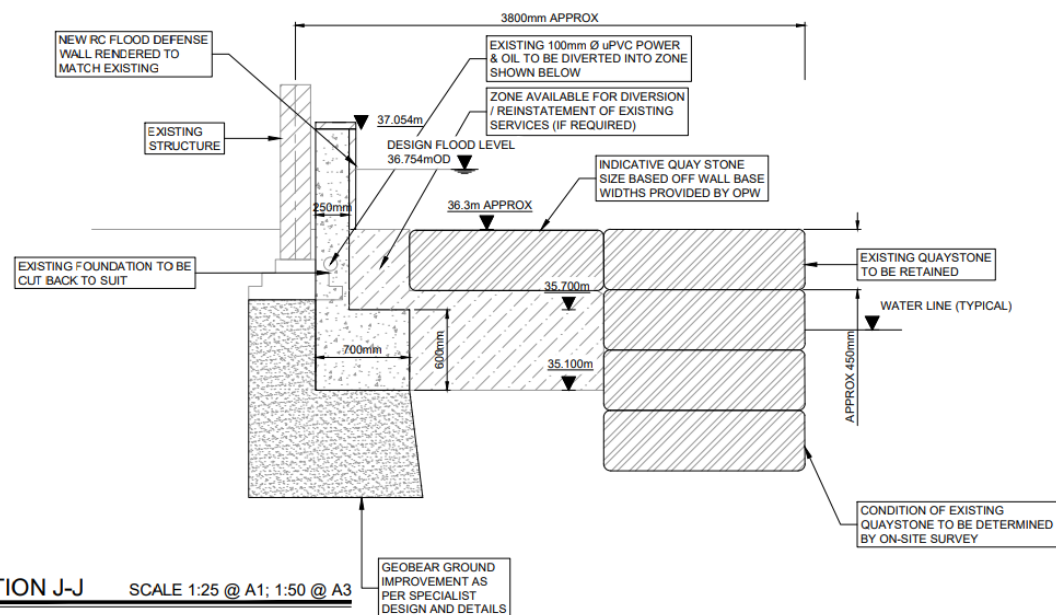
Oifig na
nOibreacha Poiblí
Office of Public Works

4. Athlone Flood Alleviation Scheme - Overview

Innovative Solutions



SECTION E-E SCALE 1:25 @ A1; 1:50 @ A3





OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

5. Construction Challenges

The Scheme had 6 notable Challenges to overcome

1. Land owner access restrictions and Tourism.
2. Protected structures and Archaeology.
3. Unknown service routes and complex diversions.





OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

5. Construction Challenges

4. Covid-19 Challenges

- i. *Shut down for 8 weeks.*
- ii. *Reduced Staff numbers absent due to testing ,quarantine etc.*
- iii. *All new safe working procedures.*
- iv. *UK Subcontractors travel restrictions.*





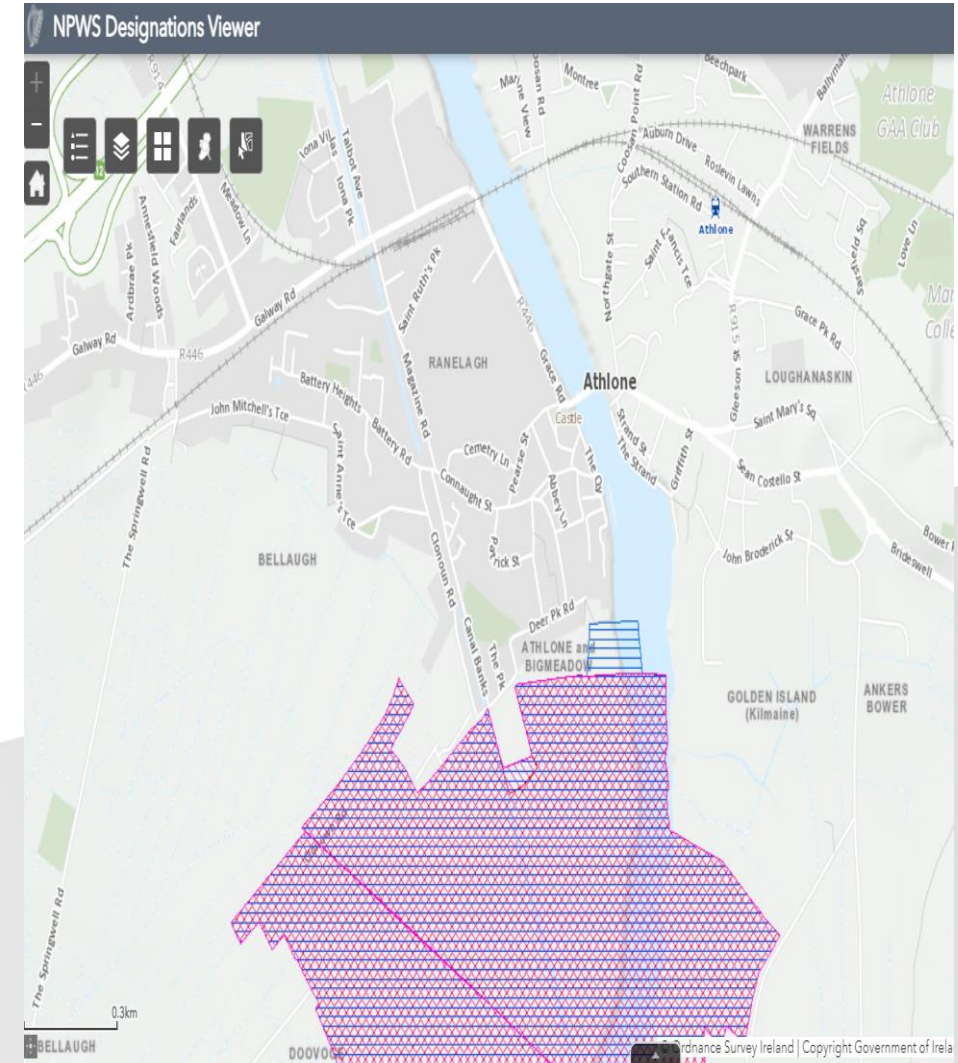
OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

5. Construction Challenges

5. Environmental Challenges

- i. *Special Area of conservation.
Shannon Callows SAC.*
- i. *Special Protection Area
Shannon Callows SPA.*
- ii. *CEMP- Environmental
working protocols.*
- iii. *Water Quality
management.*
- iv. *Illegal Dumping.*
- v. *Invasive species*



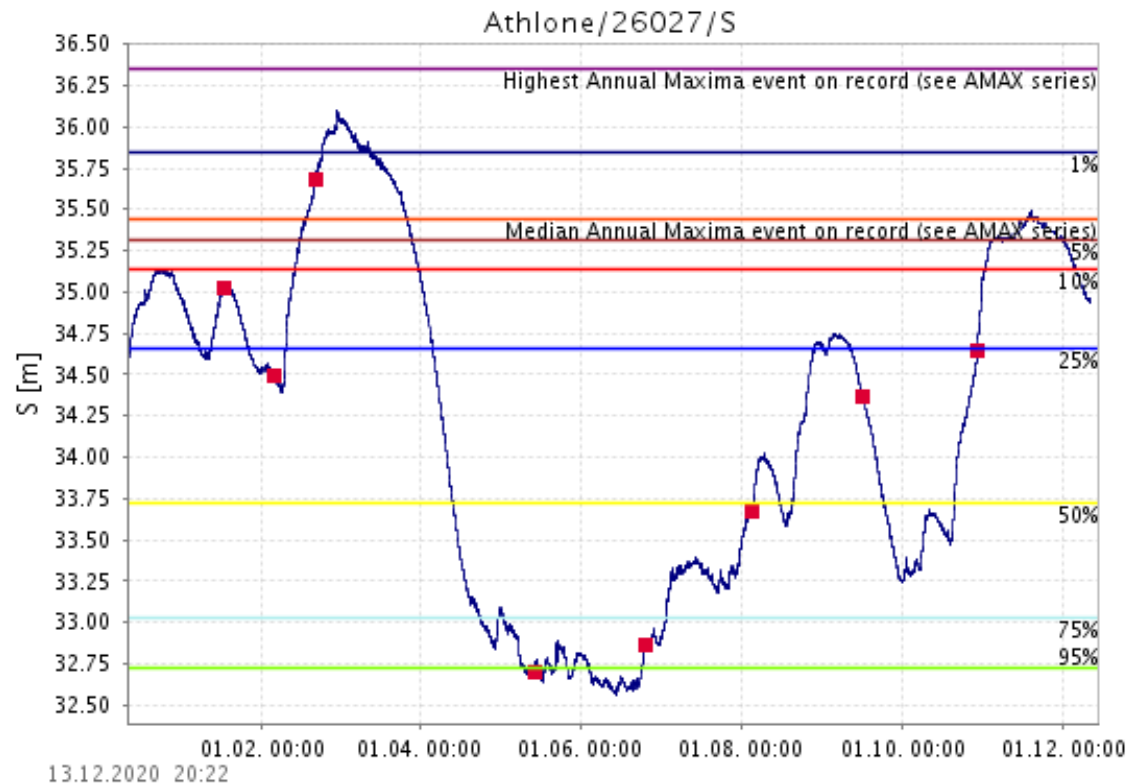


OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

5. Construction Challenges

6. Flood events during Construction



3 of 5



Energy for
generations

Lough Ree

Date of Prediction: 23 February 2020

Catchment Rainfall

Historical: based on daily records for Lough Allen and Athlone in OISHYDRO (ESB Database)

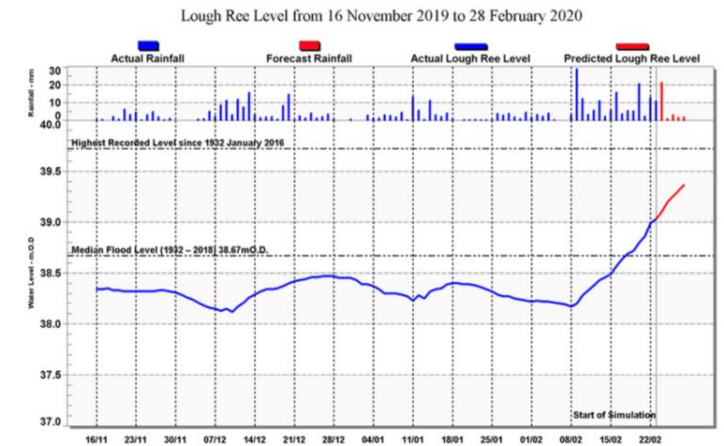
24 February 2020 to 28 February 2020: based on Met Éireann forecast for Lough Ree catchment

Historical Peak Levels

Flood Event	Peak Level (m.O.D.)
Winter 1994/1995 (March 1995)	38.97
Winter 1999/2000 (December 1999)	39.17
Winter 2006/2007 (January 2007)	39.19
Winter 2009/2010 (November 2009)	39.67
Winter 2015/2016 (January 2016)	39.72
Highest since 1932 (January 2016)	39.72

Predicted Highest Level (using the ESB Shannon Forecasting Model)

39.37 m.O.D. on 28 February 2020



Assumptions

Note: All sluices at Athlone Weir closed throughout forecast period.

All levels refer to metres above Poolbeg Ordnance Datum



OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

5. Construction Challenges

*6. Flood events
during Construction*

February
March
2020





OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

5. Construction Challenges

*6. Flood events
during Construction*

March
2020



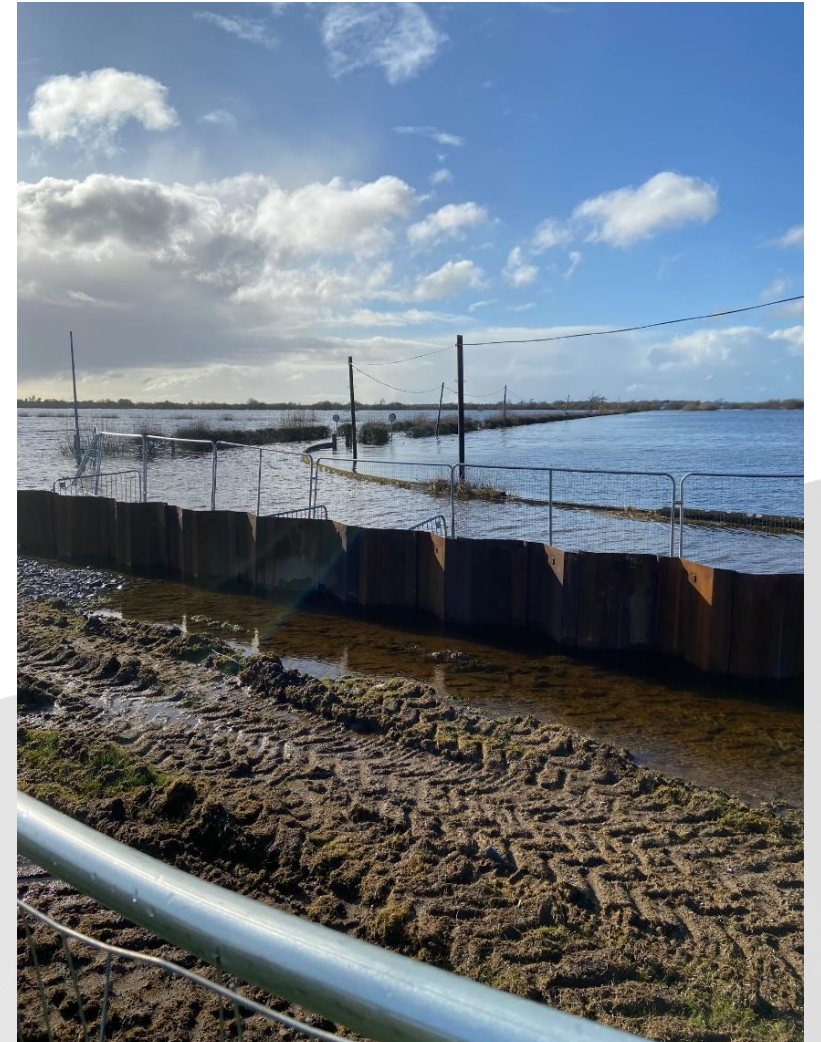


OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

5. Construction Challenges

- 6. Flood events during Construction



March
2020



OPW Oifig na
nOibreacha Poiblí
Office of Public Works

5. Construction Challenges

ATHLONE FLOOD ALLEVIATION SCHEME (Completion Rate 09/03/2021)										
Flood Cell Name.		Flood Wall (Lin.m.)		Earthen Embankments (Lin.m.)		Glass Walls (Lin.m.)		Percentage Completion per flood cell.		
		Proposed	Constructed	Proposed	Constructed	Proposed	Constructed	Proposed (Lin.m.)	Constructed (Lin.m.)	% Flood Cell Complete
FC1 Deerpark	Proposed	710		900		0		1610		
	Constructed		405		630		0		1035	64%
FC2 The Strand	Proposed	450		0		6		456		
	Constructed		250		0		0		250	55%
FC3 The Quay	Proposed	240		0		20		260		
	Constructed		200		0		0		200	77%
FC4 Brick Island	Proposed	210		480		0		690		
	Constructed		210		480		0		690	100%
FC5 Marine View	Proposed	330		225		0		555		
	Constructed		260		150		0		410	74%
FC6 Iona Park	Proposed	90		100		0		190		
	Constructed		90		100		0		190	100%
FC7 River AI	Proposed	0		0		0		0		
	Constructed		0		0		0		0	0%
FC8 Golden Island	Proposed	110		230		0		340		
	Constructed		0		0		0		0	0%
Overall Scheme Elements		2140		1935		26		4101	2775	68%



OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

6. Public Realm Objectives

The Athlone Flood Alleviation Scheme in collaboration with WMCC has allowed for many public realm opportunities.

This was achieved by

- Identify key areas for adding specific aesthetic value.
- Recognise value and significance of certain Historic structures.
- Recognise value and significance of certain local materials.



OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

6. Public Realm Collaboration.

Example 1 / Limestone Cladding and Paving on the Strand and Quay:



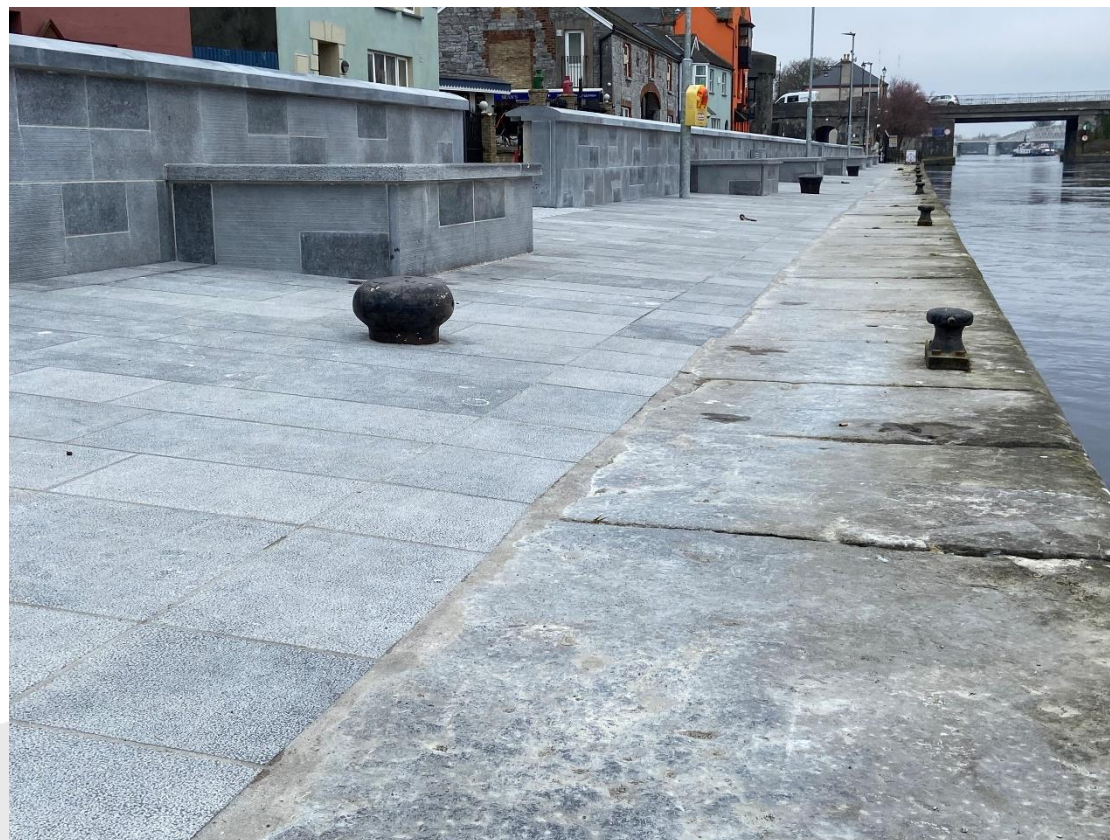


OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

6. Public Realm Collaboration.

**Example 1 / Limestone
Cladding and Paving on
the Strand and Quay:**





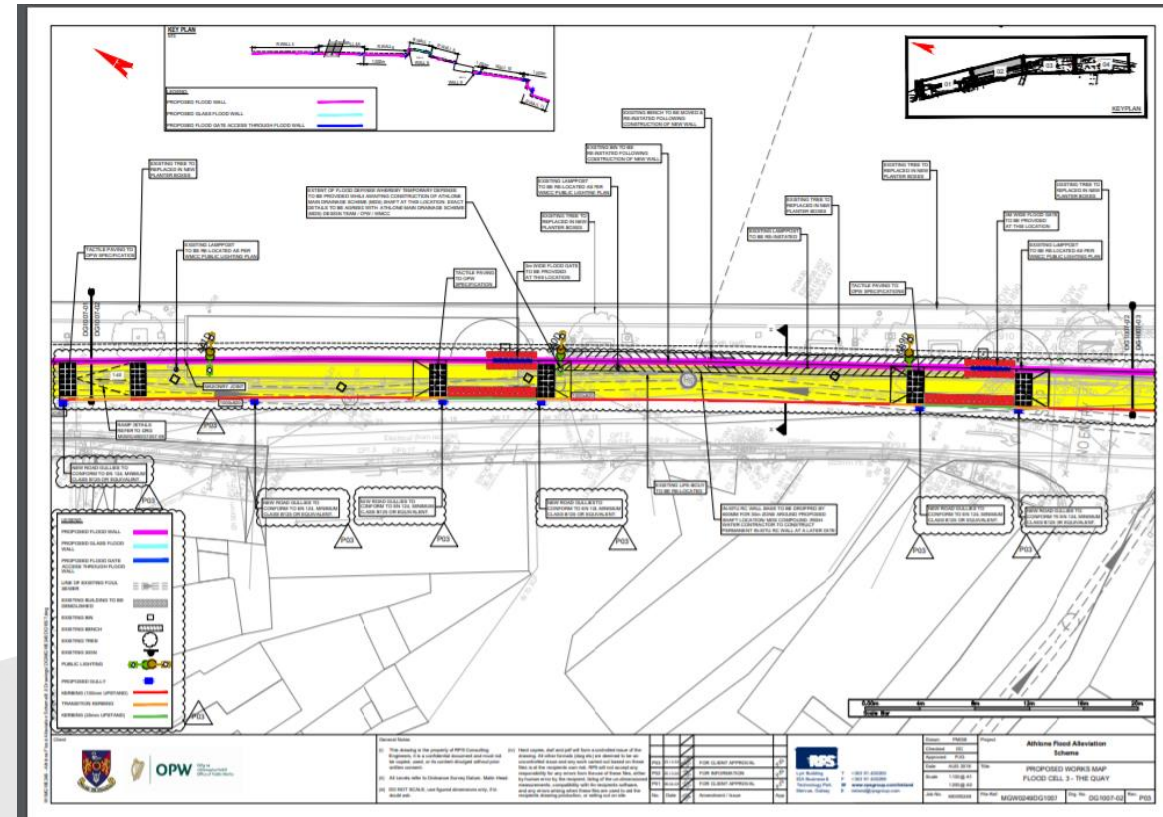
OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

6. Public Realm Objectives

Example 2 / Public Cycleway and Walkway:

- Combined use Cycleway on Flood Cell 3 The Quay.
- Embankment widening on Flood Cell 1 Deerpark to facilitate potential future use as a walkway.



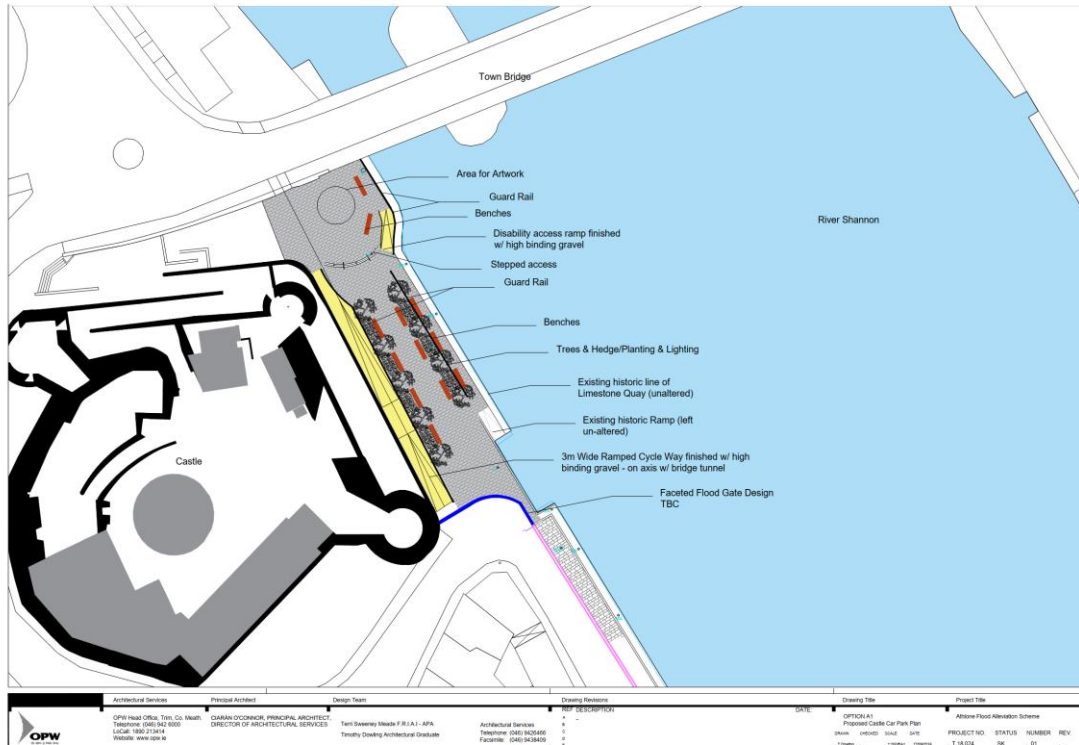


OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

6. Public Realm Collaboration.

Example 3 Athlone Castle Amenity Area:





OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

7. AFAS – A virtual tour

- Flood Cell 1
Deerpark





OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

7. AFAS – A virtual tour

- Flood Cell 1
Deerpark





OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

7. AFAS – A virtual tour

- Flood Cell 2
The Strand



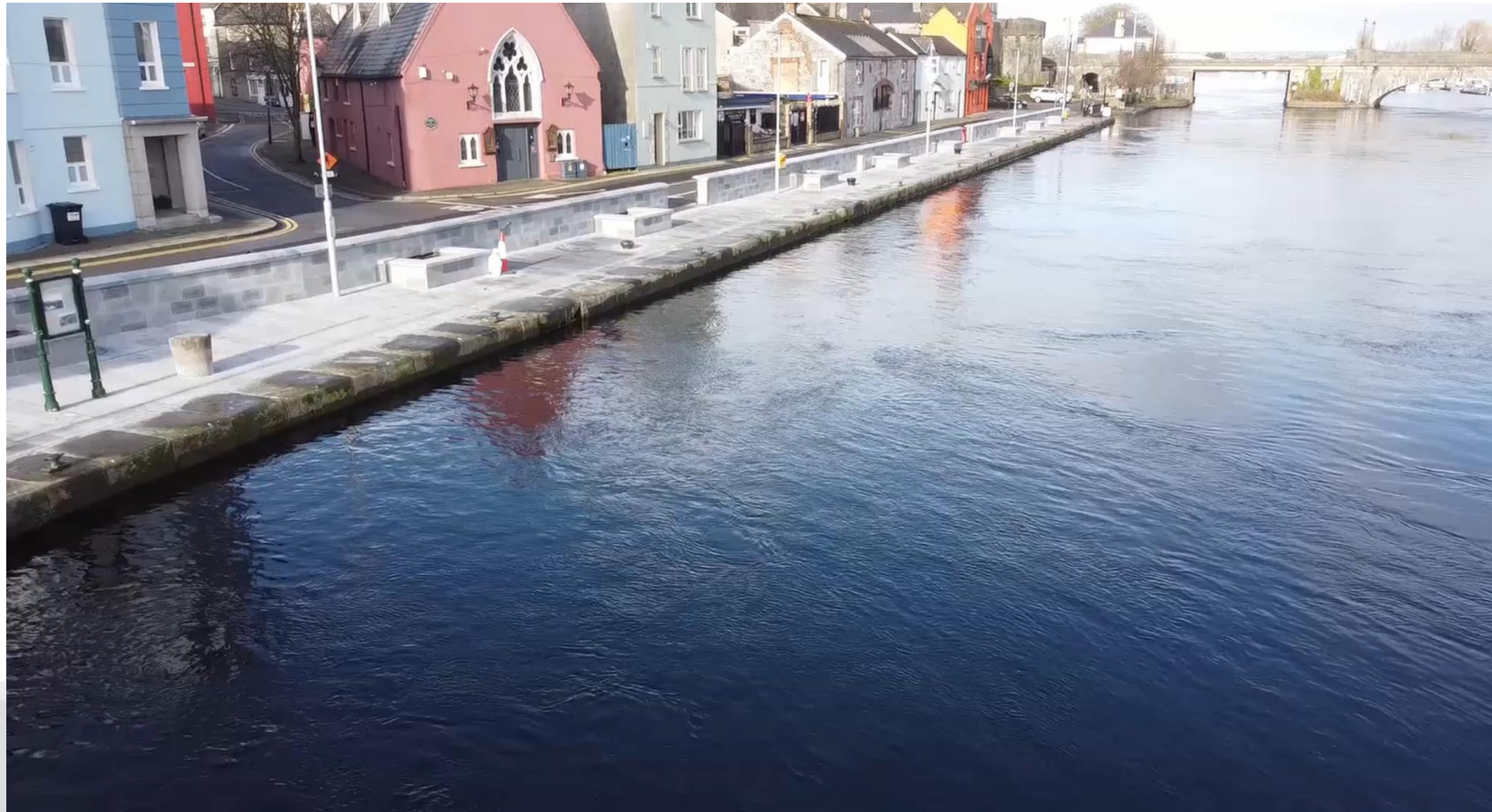


OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

7. AFAS – A virtual tour

- Flood Cell 3
The Quay





OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

7. AFAS – A virtual tour

- Flood Cell 4
Brick Island



OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

7. AFAS – A virtual tour

- Flood Cell 5
Marine view





OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

Questions

Vincent Rhatigan
Andrew Mannion

11th March 2021.

Engineers Ireland Midland Region