

September 2019

PRESERVING PROTECTING PROGRESSING

LL LOWER LEE
FLOOD RELIEF
SCHEME **FRS**



OPW



Thomson's
2040



Cork
County Council



University of Cork



RYAN HANLEY

Consulting Engineers



the
paulhogarth
company

ARUP

THE NEED FOR THE SCHEME

Long history of both fluvial
and tidal flooding



2014

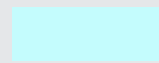


1963

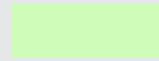


**THE 2009 EVENT
ALONE IS ESTIMATED
TO HAVE COST
HOUSEHOLDERS
AND BUSINESSES
CIRCA €90m**

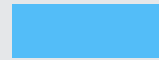
FLOOD EXTENTS AND BENEFITTING LANDS (CENTRAL ISLAND)



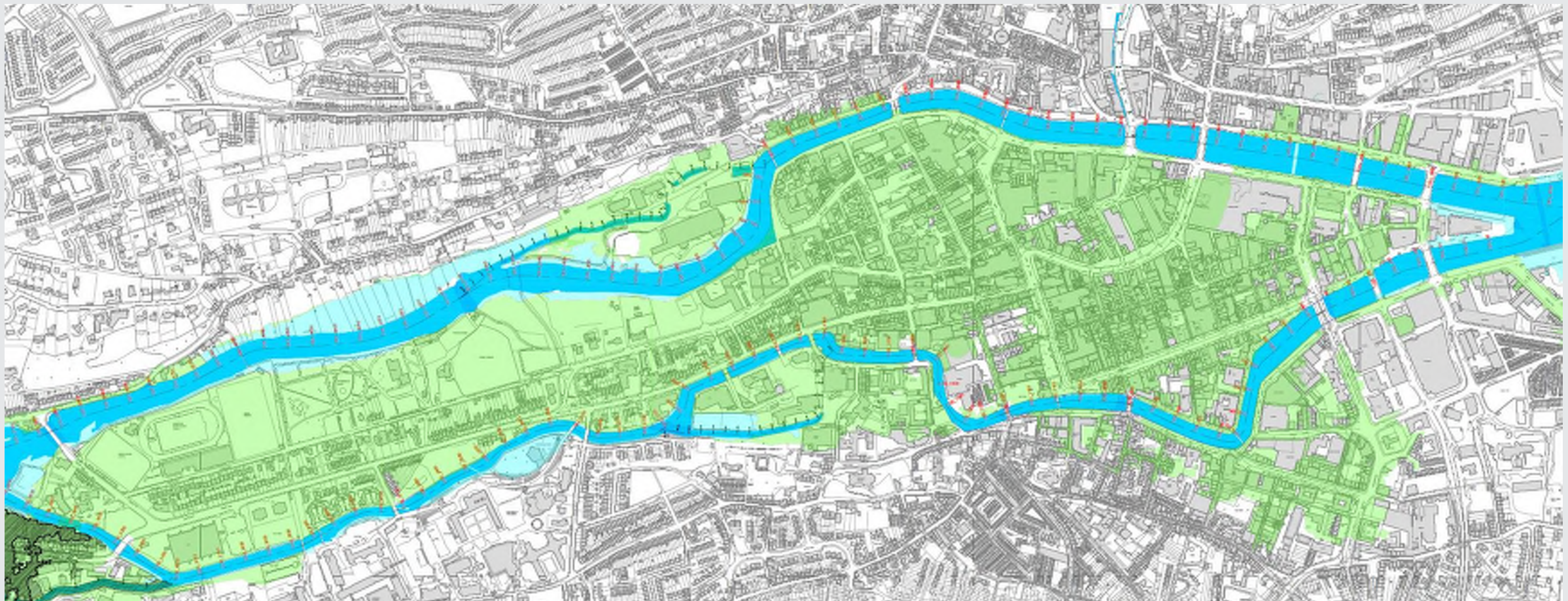
1% AEP Fluvial (River Lee) / 0.5% AEP Tidal Flood
Extent(1 in 100 year fluvial / 1 in 200
year tidal flood extent)



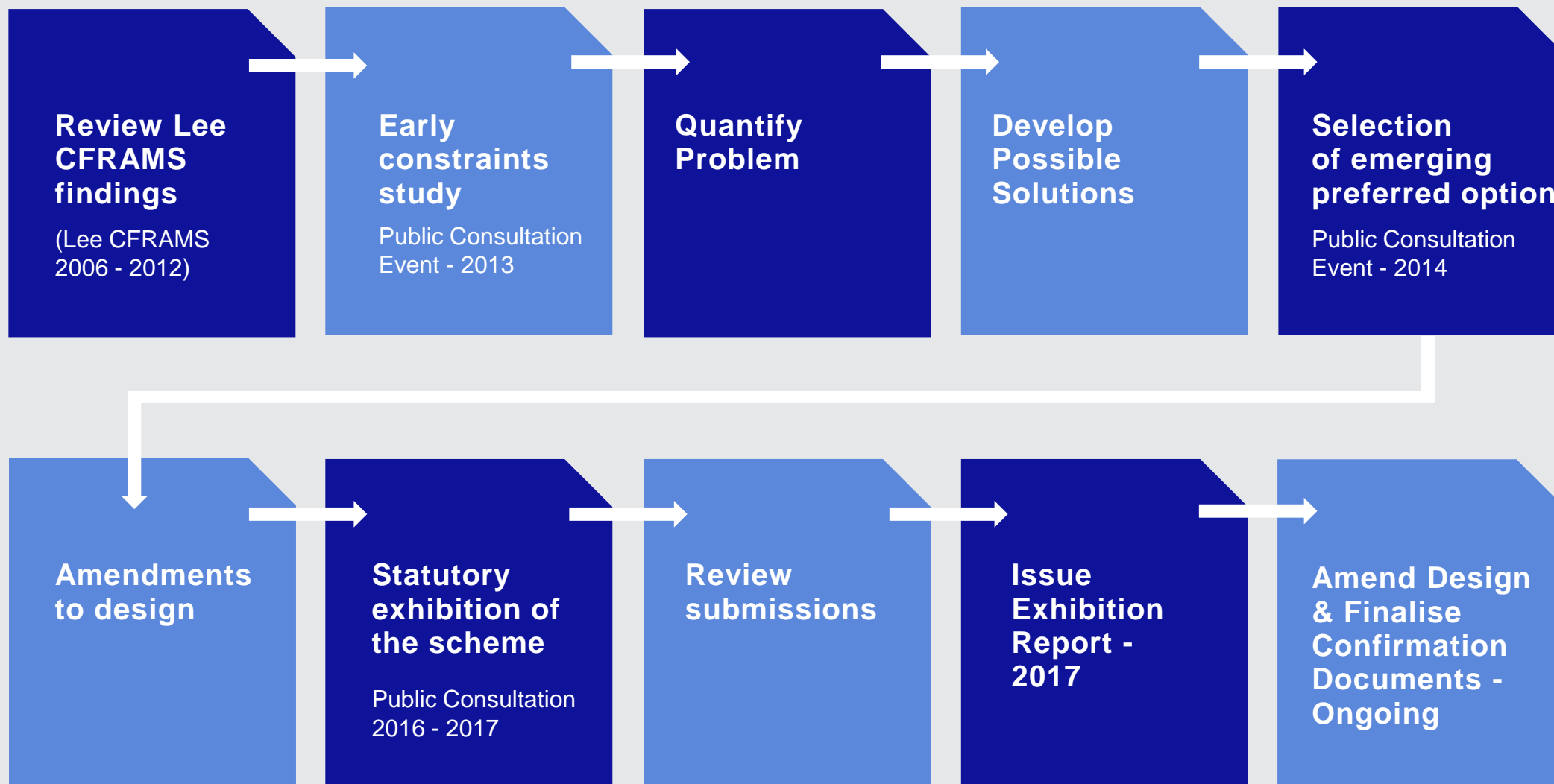
Benefitting Lands (Defended against River Lee
events up to the 1% AEP Fluvial / 0.5% AEP Tidal)



Watercourse



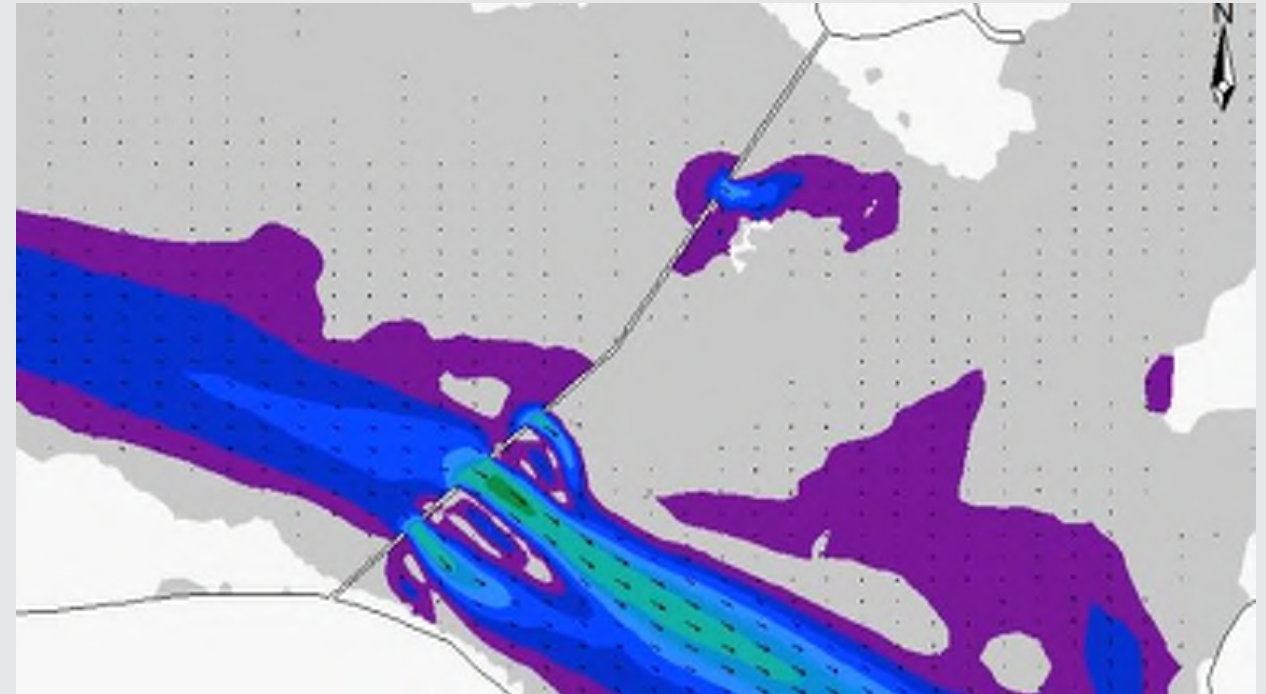
THE PROCESS



OPTIONS CONSIDERED

(In Lee CFRAMS and/or in Lower Lee FRS)

- **Modified Operation of Inniscarra and Carrigadrohid Dams**
- **Flood Forecasting and Flood Early Warning System**
- Planning Control and Building Regulations
- Public Awareness Campaign
- Upstream Flood Storage and Land Use Management (incl. NFM and physical alterations to existing dams)
- **Washlands**
- **Direct Flood Defences**
- Channel Widening
- **In-channel Flow Regulation**
- Bridge/Weir Modifications
- Local Conveyance Improvements
- Property Occupier Relocation
- Individual Property Protection
- **Pumping**
- Tidal Barrier



SUSTAINABLE MULTIFACETED SOLUTION



**FLOOD FORECASTING AND
WARNING SYSTEM**



REVISED DAM OPERATING



**DESIGNATION OF UPSTREAM
WASHLANDS**



**DEFENCES IN PARKS AND
AMENITY AREAS INTEGRATED
INTO LANDSCAPE**



**FLOW REGULATION
STRUCTURE ON SOUTH
CHANNEL**



**LOW LEVEL QUAY SIDE DEFENCES
INTEGRATED INTO PUBLIC REALM**

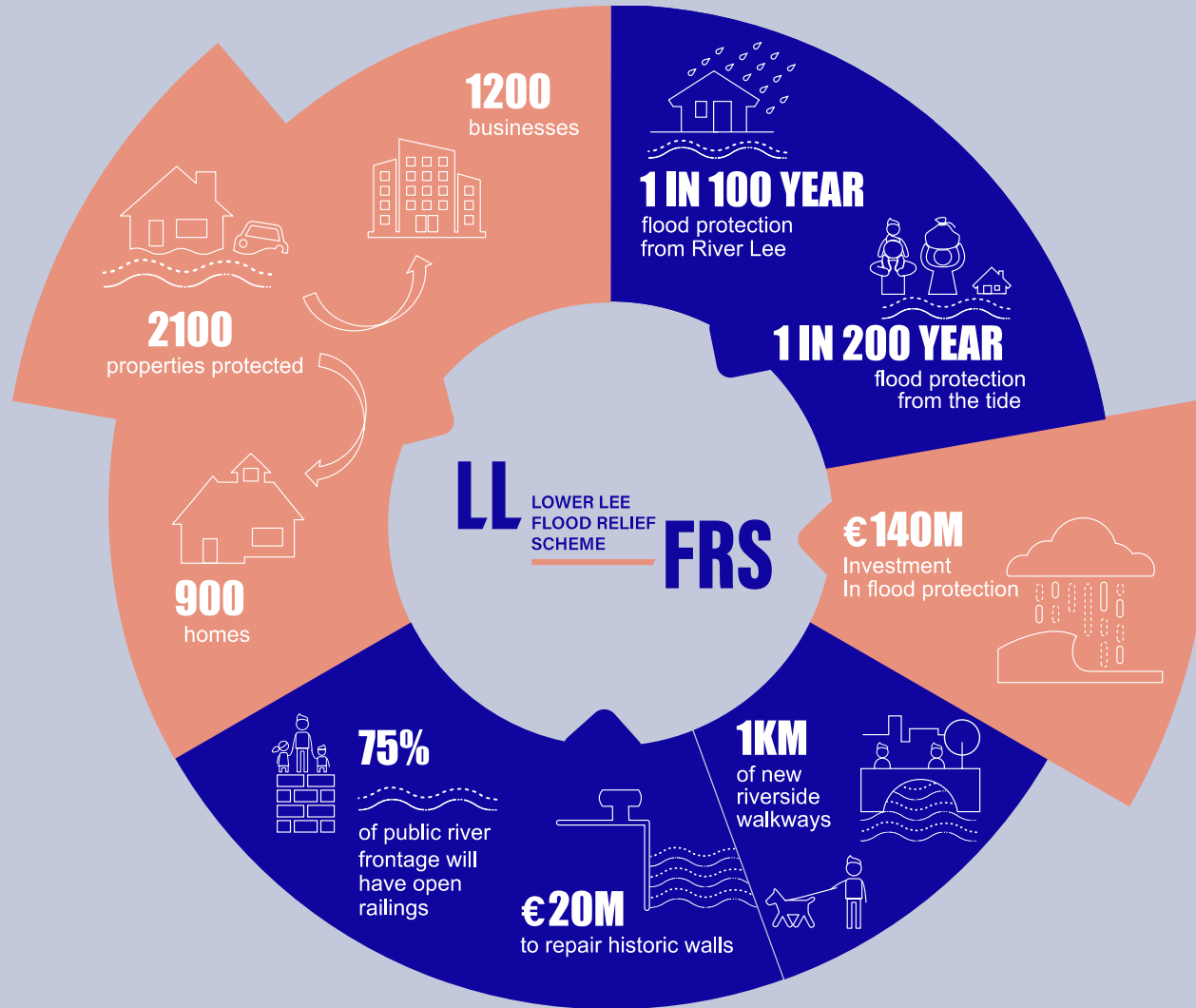


SMALL NUMBER OF FLOOD GATES
at some footbridges and
boardwalk locations



**LOCALISED 'BACK OF DEFENCE'
DRAINAGE SYSTEM**

BENEFITS OF THE SCHEME

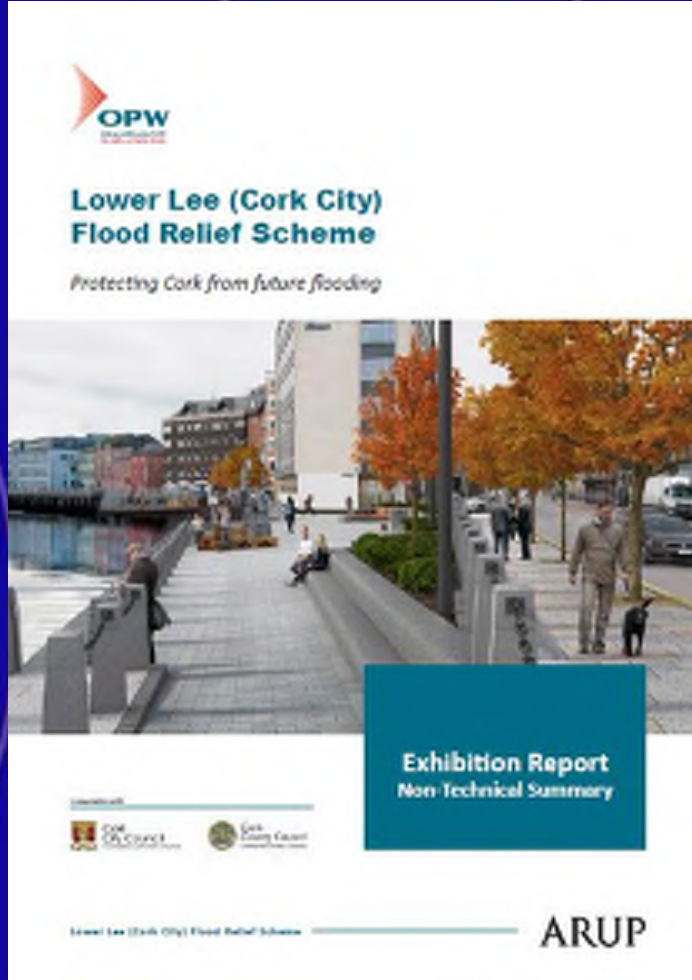


- A city free from the regular flooding events of the past
- Incentivising significant future investment in the City & Environs
- Improved Public Realm spaces such as proposed works on Morrison's Island
- Plan supported by City and County Councils, Cork Chamber and CBA and National Flood Forum etc.
- Positive Benefit Cost Ratio (1.44) (Benefit - €185m, Cost - €140m)
- Adaptable as part of long term climate change strategy
- 393 protected structures and 20 RMPs in city protected by scheme

The background is a solid blue color. On the left side, there are several concentric white circles of varying radii, some of which are dashed. On the right side, there is a large, irregular orange shape that resembles a stylized letter 'E' or a series of overlapping rectangular blocks. The text 'WE HAVE LISTENED' is written in white, bold, uppercase letters within the orange shape.

**WE HAVE
LISTENED**

Exhibition Report and Responses



www.lowerleefrs.ie

- Large number of received.
- Vast majority of issues addressed in general by publication of reports in 2017
- Individual responses being prepared to be issued imminently
- No submissions were ignored.

The background is a solid blue color with several thin, white, concentric circular lines on the left side. On the right side, there is an orange, angular shape that serves as a container for the text.

INTEGRATED PUBLIC REALM DESIGN

THE SCHEME CATCHMENT AREA





LEE FIELDS

LEE FIELDS

LL LOWER LEE
FLOOD RELIEF
SCHEME FRS



LEE FIELDS

LL LOWER LEE
FLOOD RELIEF
SCHEME
FRS



LEE FIELDS



LEE FIELDS



FERRY WALK AND FITZGERALD'S PARK

FERRY WALK AND FITZGERALD'S PARK



FERRY WALK AND FITZGERALD'S PARK

LL LOWER LEE
FLOOD RELIEF
SCHEME FRS



FERRY WALK AND FITZGERALD'S PARK



FERRY WALK AND FITZGERALD'S PARK



FITZGERALD'S PARK



FITZGERALD'S PARK



The background is a solid blue color with several concentric circles of varying radii. Some circles are solid blue, while others are dashed white. A bright green rectangular box with a slanted right edge is positioned on the right side of the image.

SULLIVAN'S QUAY

SULLIVAN'S QUAY




SULLIVAN'S QUAY



SULLIVAN'S QUAY





KYRL'S QUAY AND ALBERT QUAY WEST

KYRL'S QUAY



KYRL'S QUAY



ALBERT QUAY WEST



ALBERT QUAY WEST



ALBERT QUAY WEST

LL LOWER LEE
FLOOD RELIEF
SCHEME FRS



ALBERT QUAY WEST

LL LOWER LEE
FLOOD RELIEF
SCHEME FRS



The background is a solid blue color. On the right side, there are several concentric, curved lines in a lighter blue shade, resembling ripples or a stylized horizon. On the left side, there is a white text box with an orange border and a jagged, torn-edge effect on its right side. The text inside the box is white and bold.

**LAPP'S QUAY,
GEORGES QUAY
AND MORRISON'S QUAY**

LAPP'S QUAY



LAPP'S QUAY

LL LOWER LEE
FLOOD RELIEF
SCHEME FRS



LAPP'S QUAY



LAPP'S QUAY



GEORGE'S QUAY



GEORGE'S QUAY



TRINITY BRIDGE



TRINITY BRIDGE



The background is a dark blue-grey color. It features several concentric circles and arcs in a light green color. Some of these arcs are solid, while others are dashed. In the lower-left quadrant, there is a bright green banner with a white border. The banner has a rectangular shape with a small triangular notch on its right side.

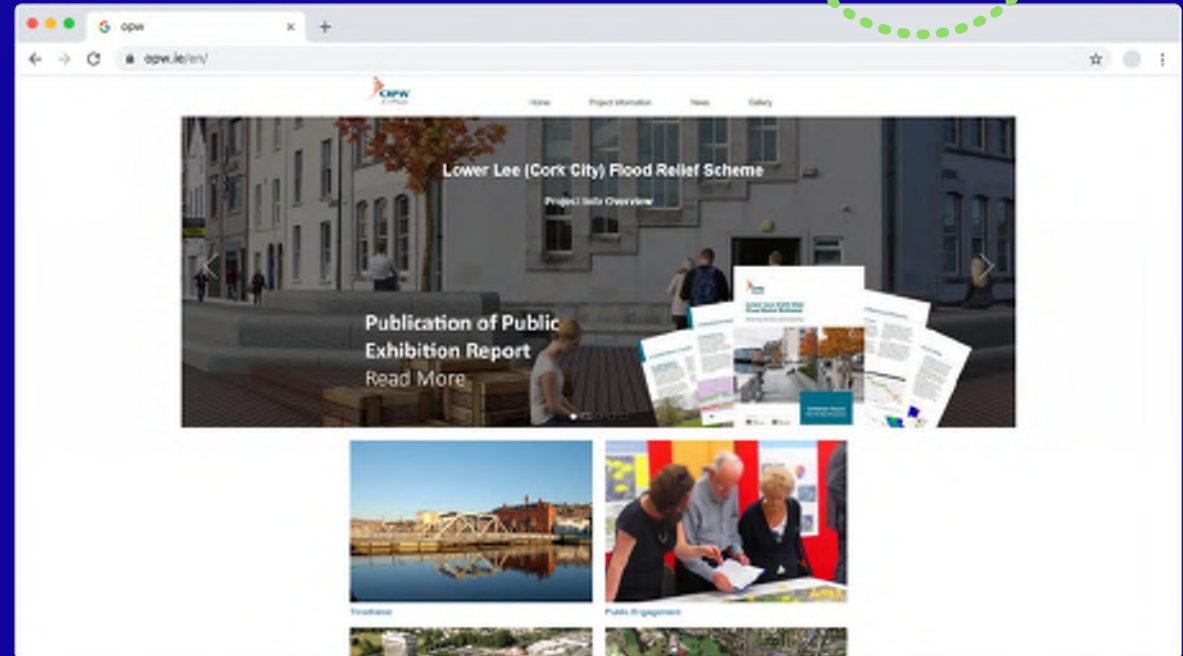
Addressing Misunderstandings

INCORRECT



CORRECT

LL_FRS



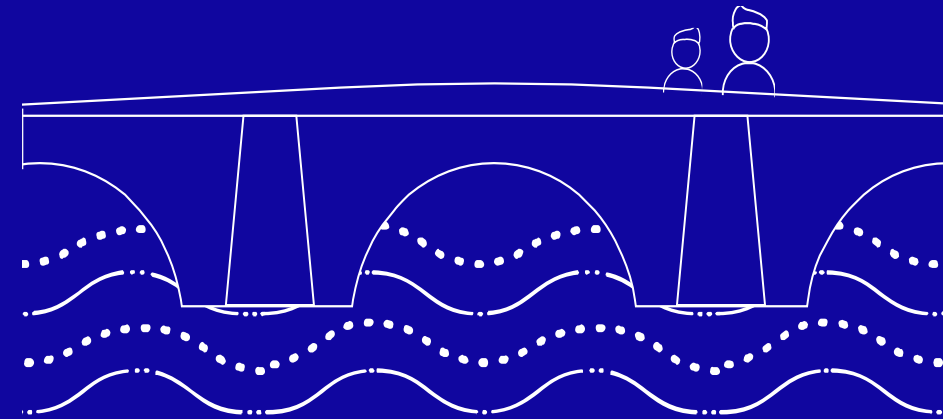
INCORRECT



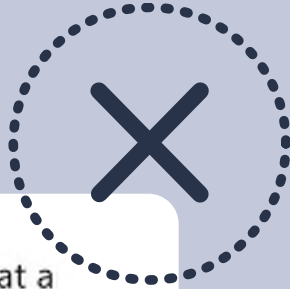
CORRECT



- **Never proposed to be demolished**
- **In fact, no alterations at all proposed**



INCORRECT



The photo on the left shows the view that a child sees when they look across the Lee to City Hall.

The photo on the right, shows the view that they will see if the OPW are allowed to build walls around our river.

Cork deserves better, Cork deserves imagination, not concrete.



8:23 am - 23 Apr 2019

CORRECT



INCORRECT



CORRECT




Flows and thus velocities are reduced on both channels as a result of the Scheme.

- The current regime does not maintain flows to a maximum of 250m³/s. 2009 flow was 650m³/s.
- The existing 1 in 100year design flow is circa 860m³/s
- The Scheme reduces the design flow to 550m³/s, thus actually significantly reducing velocities
- Flow in the south channel (including Albert Quay and Morrison's Island) is further reduced by the proposed flow control structure at the head of the south channel.



A TIDAL BARRIER?

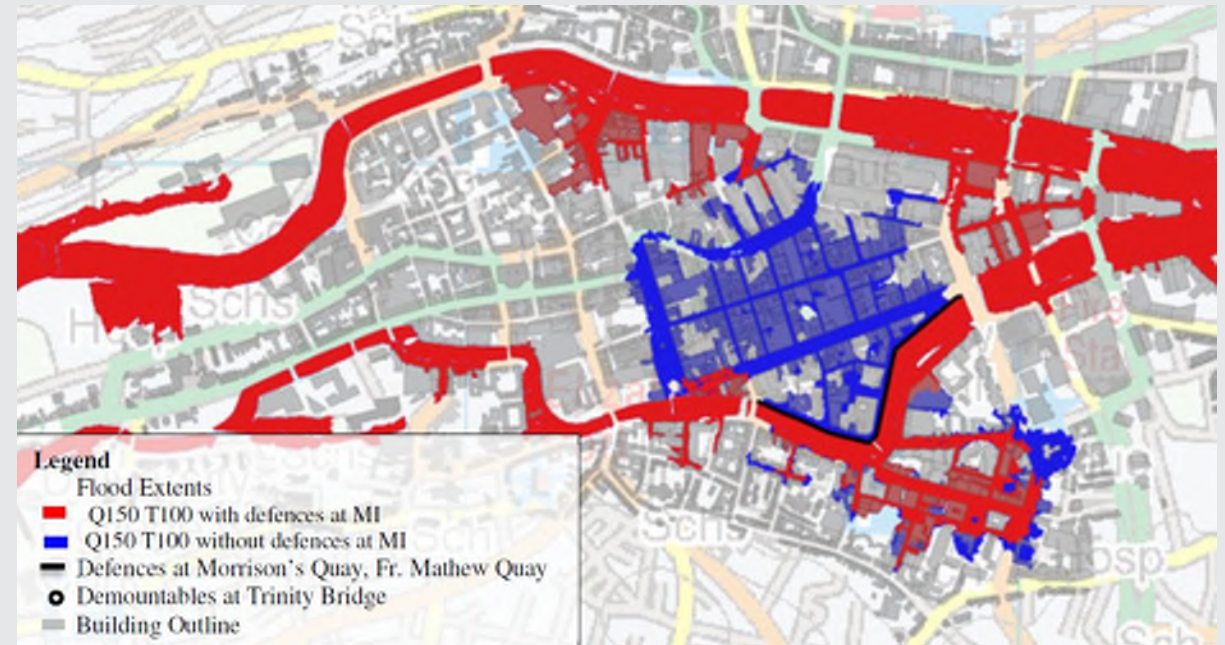
- Could resolve the tidal problem, but would not address the more destructive river flooding problem. E.g 2009 event.
- International tidal barriers exist in locations where tidal risk is dominant, which is not the case in Cork
- Tidal Barrier concept at Little Island as proposed by Save Cork City is not viable on grounds of:
*Navigational safety | Environmental impacts
 | Climate change adaptability | Cost*
- If a tidal barrier were built, similar to other international cities, river side defences would still be required through the city to address the problem of river flooding and to reduce the frequency of required closures to acceptable levels.
- These low level quayside defences, integrated into the Public Realm, form part of the current scheme. They provide the required standard of protection now and are the first part of a longer-term strategy
- Detailed analysis confirms that a tidal barrier is neither viable or appropriate for Cork at this time.
- If the various initiatives to combat climate change in the coming decades are unsuccessful and if a tidal barrier becomes necessary in the future the currently proposed quayside defences will be an essential component of such a solution.

The background is a solid blue color with several concentric circles of varying radii and colors (light blue, medium blue, and orange) centered on the left side. An orange rectangular box with a slight 3D effect is positioned on the right side, containing the text.

TIMELINE AND RISK OF PROJECT DELAY

MORRISON'S ISLAND PUBLIC REALM PROJECT

- Potential “early win” identified by Steering Group
- Incorporates public realm improvements and flood defence measures
- Would provide significant reduction in frequent tidal flood risk to city centre businesses
- Would act as a catalyst for regeneration of south channel quaysides
- Currently in the planning process
- Can be delivered in the short term



LOWER LEE FLOOD RELIEF SCHEME CONFIRMATION PROCESS

- Finalised Scheme Documentation to issue to Minister in late 2019/early 2020
- Period for Ministerial Consent likely to be 6 to 9 months minimum
- Many Significant Risks including Risk of Judicial Review Challenge
- Construction Work to commence on Phase 1 in early 2021 at the earliest

September 2019

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OPW



Thomson's Firearm
2040



Cork County Council
Commitment to the future



University of Cork
Cork City Council



RYAN HANLEY

Consulting Engineers



the paulhogarth
company

ARUP