Musselburgh
Flood Protection



PRESENTATION TO:
EDINBURGH ROAD CONSULTATION AREA
2nd September 2021

Conor Price – Project Manager
Jim Baxter – Project Delivery Manager

East Lothian Council
Jacobs
CPE CONSULTANCY
Turner & Townsend

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Approach to Meeting:

1. PRESENTATION TO SET-UP EVENING / DISCUSSION

2. QUESTION & ANSWER SESSION

3. WORKING FORUM FOCUSED ON EDINBURGH ROAD AREA

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Approach to Presentation:

1. CP - Consultation on the Outline Design
2. CP - Flood Risk – to Musselburgh and Edinburgh Road
3. CP - What is a flood protection scheme?
4. CP – Where did the Scheme come from?
5. CP - Timescales for delivery
6. JB - The Stages of the Scheme
7. JB - Option Appraisal → Preferred Scheme
8. JB - Multiple-Benefits
9. JB - Consultation
10. JB - Outline Design → At Edinburgh Road

END

11. ALL – Questions & Answers Session

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Consulting on the Outline Design (CP)

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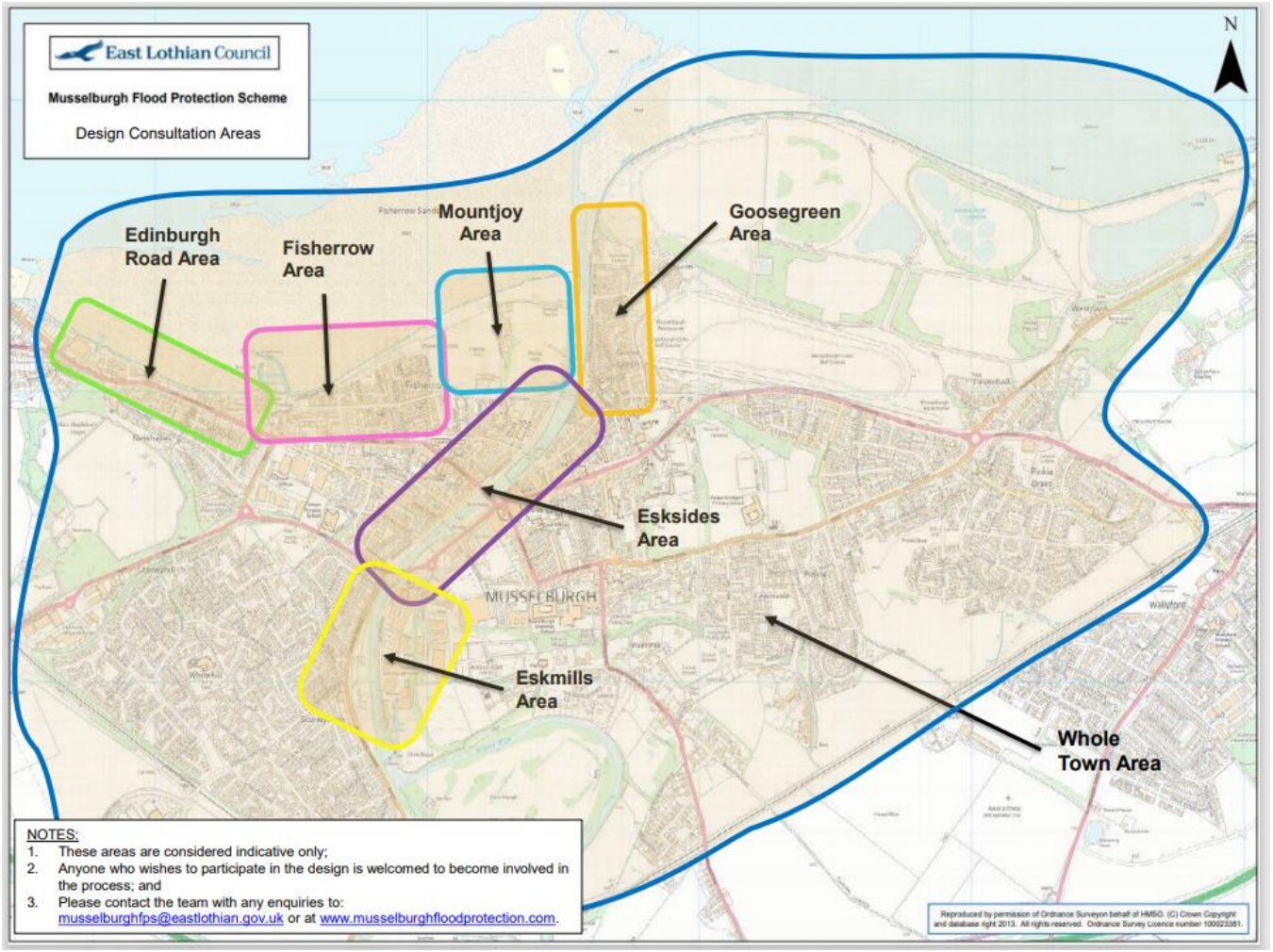
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Approach to Local Area Consultation:



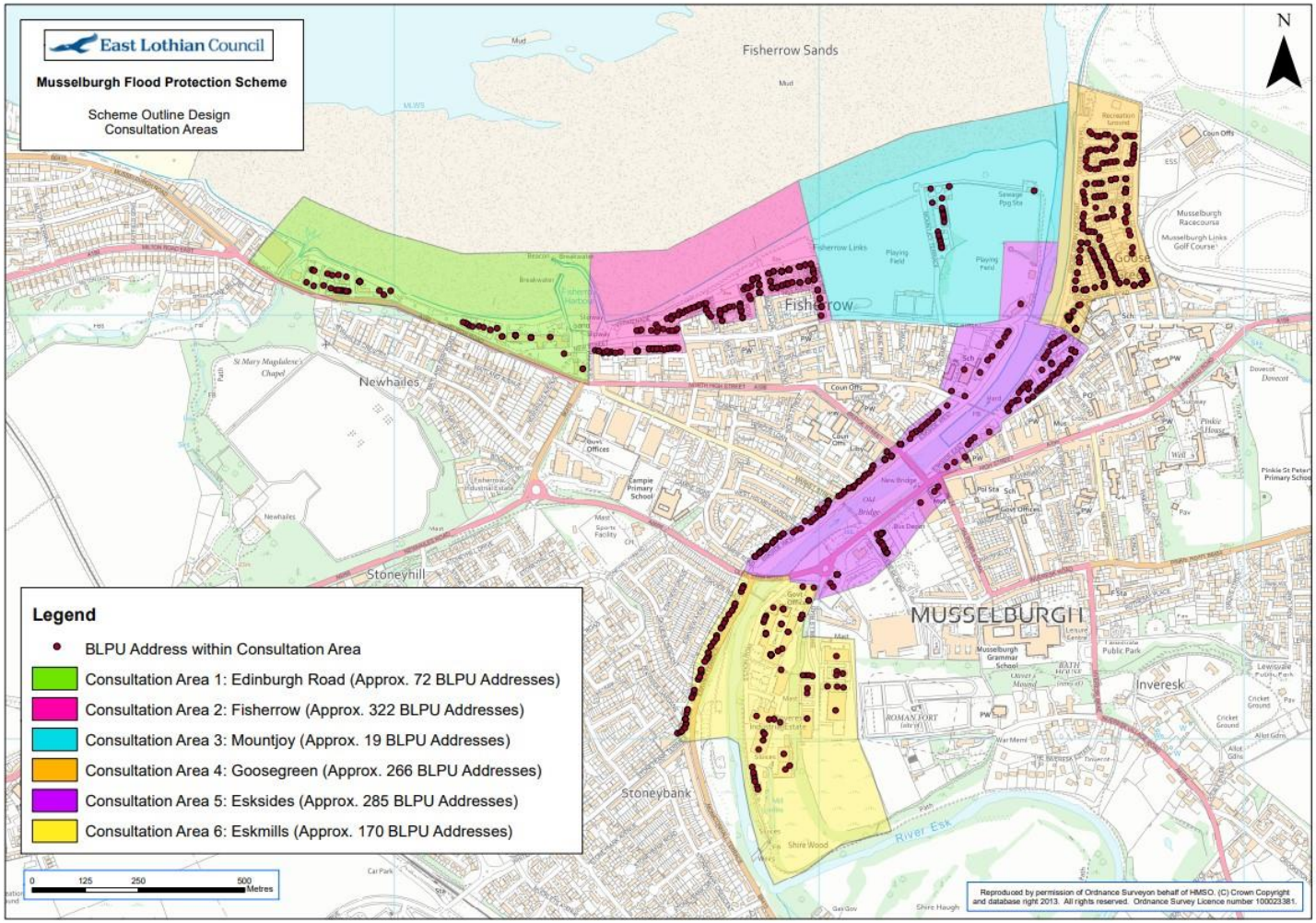
Schematic Map of Local Consultation Areas

Tonight is all about Area 1 – Edinburgh Road

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Local Area Consultation Groups:



GIS Map of Local Consultation Areas – property identification

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Update on Communication Tools:

1. Public Information Boards
2. New Scheme Website
3. New Scheme Newsletters
4. Stakeholder Email List
5. Public Consultations
6. Presentations to Community Organisations
7. Door-to-Door Site Visits
8. Letters to properties
9. Formal Public Exhibitions
10. Press Releases - media

WE DID NOT PROCEED WITH THE DESIGN DURING LOCKDOWN → COULD NOT CONSULT


Musselburgh COURIER

'A SCOURGE'
VANDALS SLAMMED AS PLAQUE TRASHED: P10

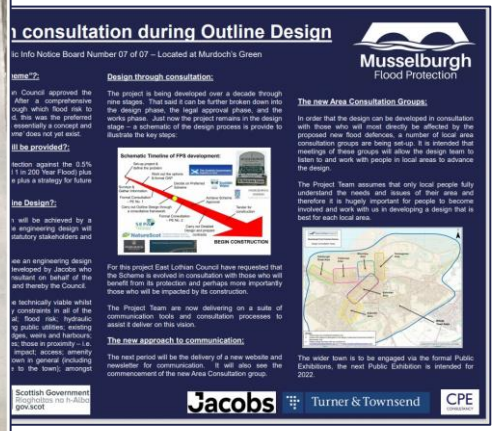
WHEEL DONE
TOP AEROBATIC STUNTS THRILL AT NEWHAILES

Residents urged to have their say on flood defences

OH MICKY, YOU'RE SO FINE!

Inside-Out Fun Morning!

A trusted part of the legal landscape since 1926


n consultation during Outline Design

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Design through consultation:

The new Area Consultation Groups:

The new approach to communication:

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Overview of flood risk (CP)

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How do we define a flood risk?:

- It is a statistical concept through which we state the probability of a flood of a certain magnitude at any given time
- **The key event from a planning perspective (i.e. Within SPP) is the 0.5% AEP (Annual Event Probability) Flood Event - known as the 1 in 200 Years Flood Event**
- This DOES NOT mean it will happen once every 200 years: it could happen today and again next week or not for 500 years

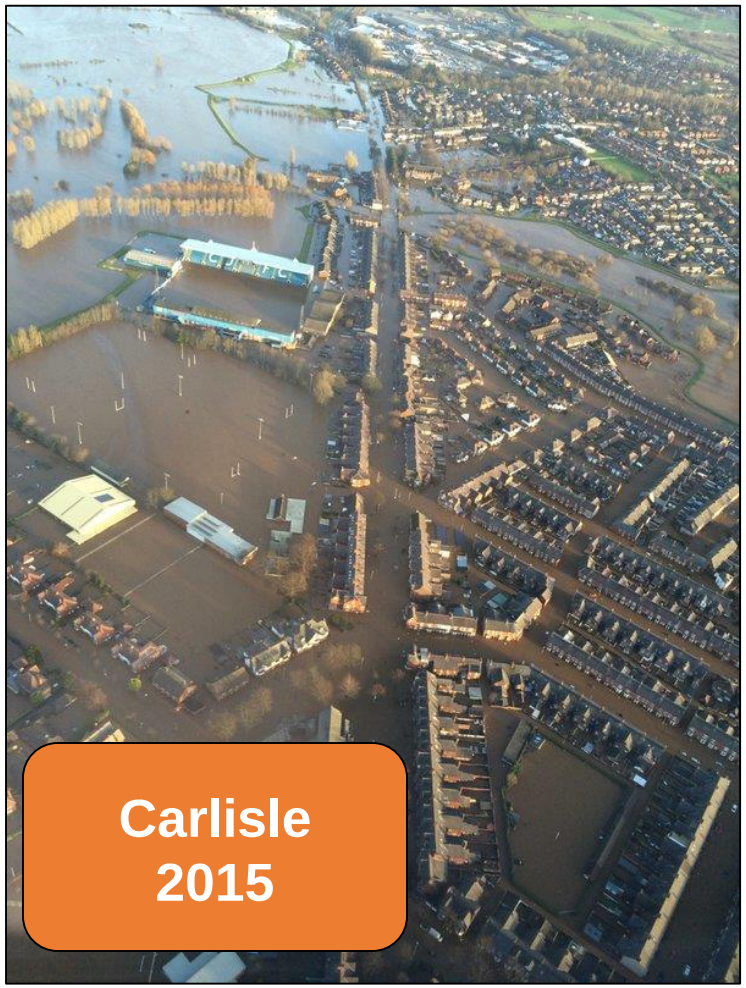
Musselburgh had a 0.5% AEP flood event in 1948

- Climate Change adds an allowance to river flows and sea level to account for changes happening due to predicted climate change

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Recent examples of major UK flooding:



Carlisle
2015



Cockermouth
2009

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A History of Flooding

Exhibition Board from Public Exhibition No. 1 in July 2019 at The Brunton









24th July 1888: pluvial flooding, several shops in the High Street flooded

12th Feb 1894: Beuccleugh House in Fisherrow flooded to 0.45m, rail track submerged

11th August 1901: pluvial flooding of shops in High Street, New Street and Millhill

17th August 1920: River Esk flooded fields; one tier of iron bridge knocked down by a tree

13th August 1948: Worst event on record. River Esk flooded Shorthope Street, Millhill, James Street, Eskside East & Eskside West. Many houses flooded to two feet

6th October 1990: Flooding from River Esk after debris retained water at structures

4th January 2014: Cycle path and Eskside West flooded

1888 — 2014

Sept 1891: River Esk flooded the Paper Mills and other factories, as well as nearby houses

July 1897: pluvial flooding, High Street and Shorthope Streets flooded

October 1907: pluvial flooding on High Street and Newbigging to 0.6m. Streets and railway flooded near Newhails Station

Sept 1927: River Esk flooded Shirehaugh and other areas upstream. Footbridge at Shirehaugh swept away.

14th August 1966: Major flooding of Eskside West, Eskside East, Shorthope Street & Millhill

7th July 2012: Fields along River Esk flooded to depth of 2-3m









All historic images provided courtesy of John Gray Centre, Haddington

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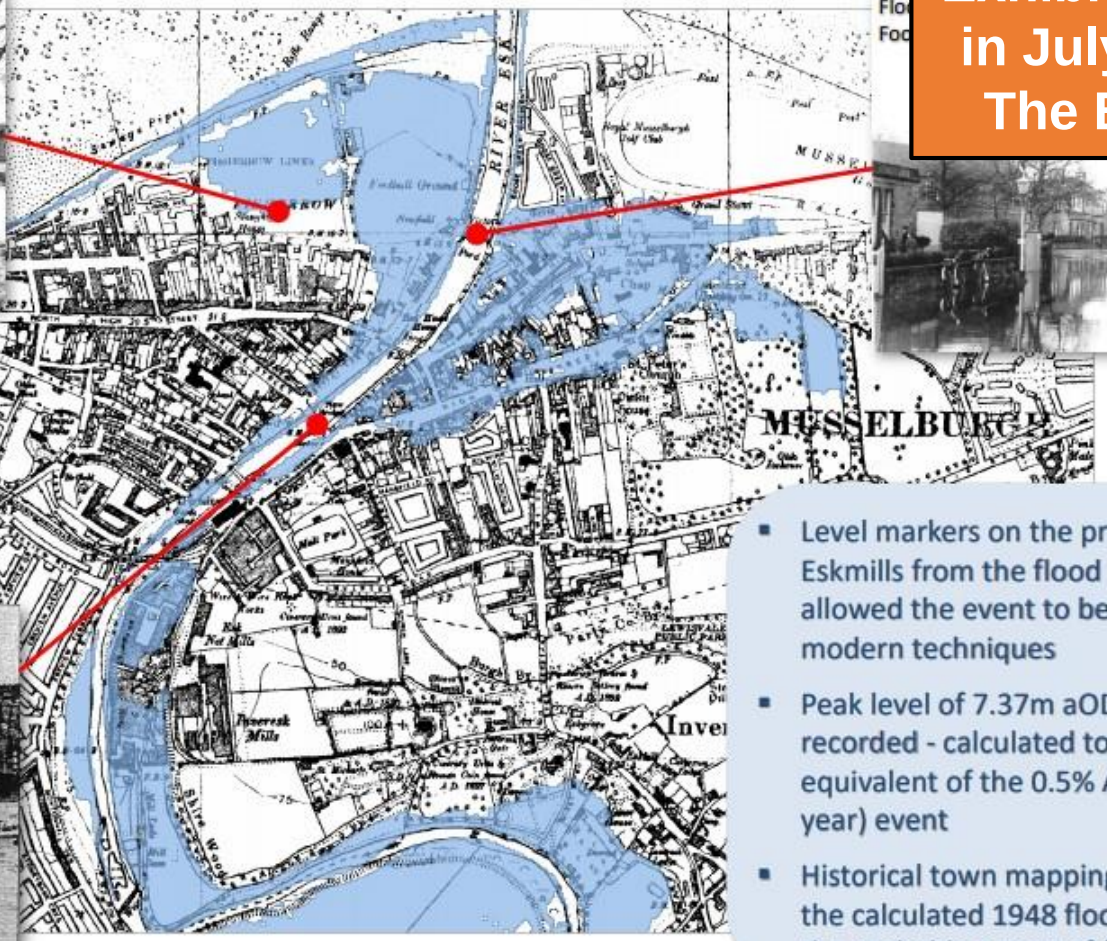
MUSSELBURGH FLOOD PROTECTION SCH

August 1948 Flood Event

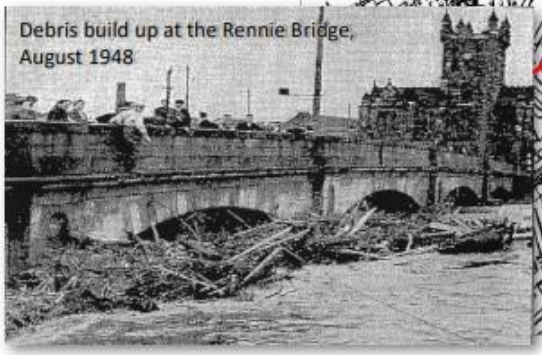
Exhibition Board from Public Exhibition No. 1 in July 2019 at The Brunton



New Street looking towards Fisherrow, August 1948





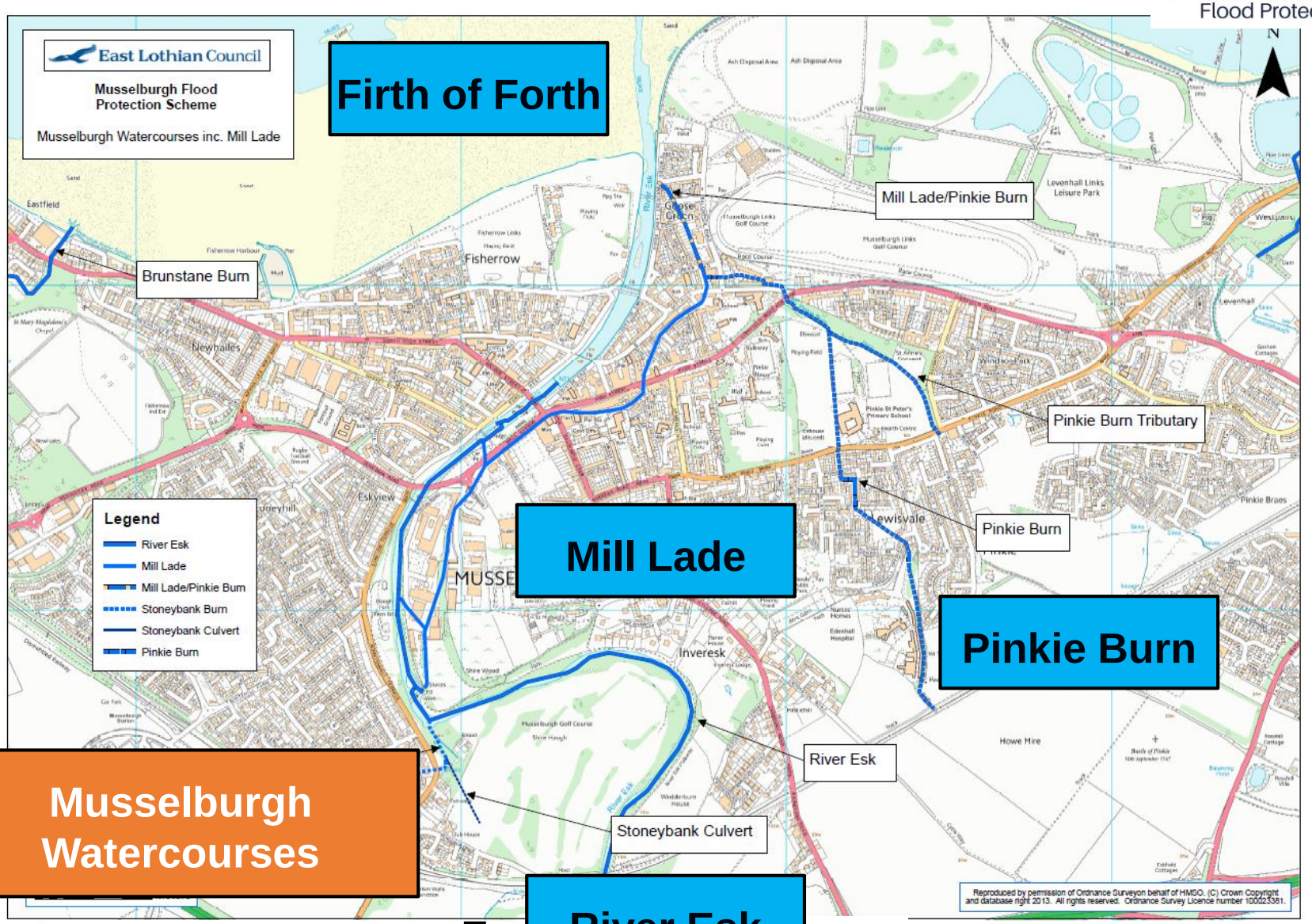


Debris build up at the Rennie Bridge, August 1948

- Level markers on the properties at Eskmills from the flood event have allowed the event to be analysed using modern techniques
- Peak level of 7.37m aOD at Eskmills was recorded - calculated to be the equivalent of the 0.5% AEP (1 in 200 year) event
- Historical town mapping overlain with the calculated 1948 flood event shows the probable extent of flooding

Rennie Bridge image provided as extract from local history publication, author unknown, all other historic images provided courtesy of John Gray Centre, Haddington

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Musselburgh Watercourses

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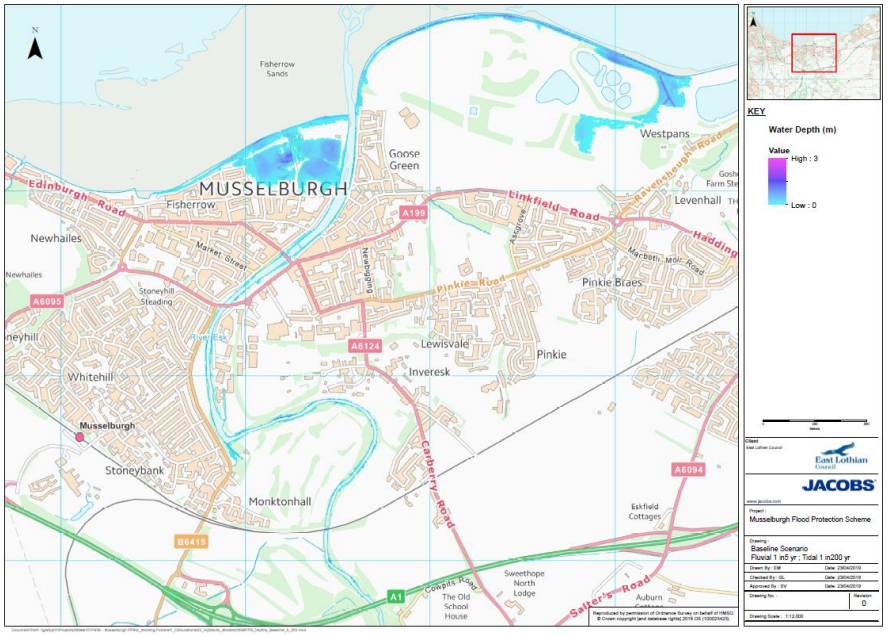
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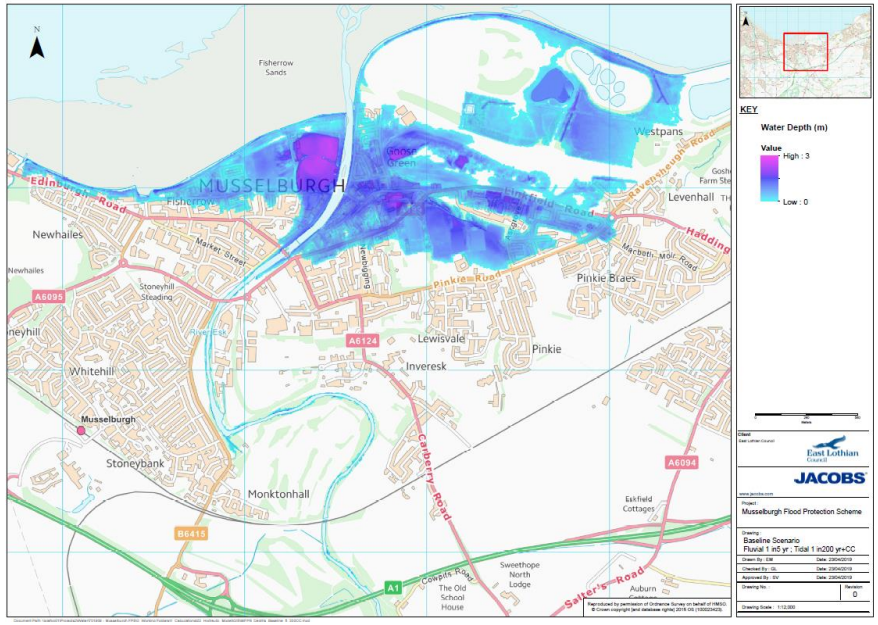
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Coastal flood risk – climate change:



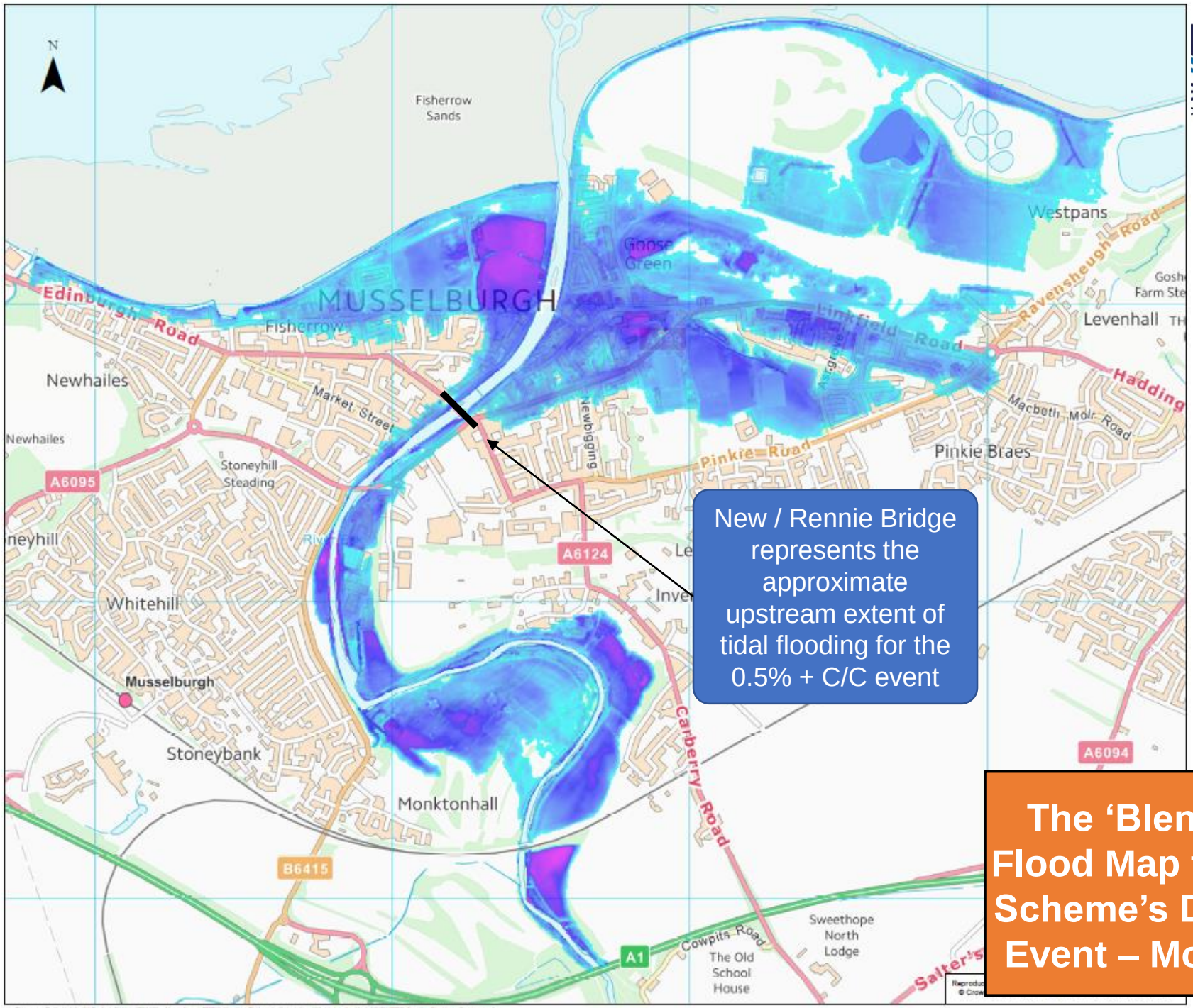


20% Esk, 0.5% coastal

20% + CC Esk, 0.5% + CC coastal

Greatest impacts of climate change are:
Significant increase in flood depth and extent in all areas downstream of the New Bridge; Note that all sea front flooding occurs as a result of wave overtopping. Inundation near the racecourse; risk to life flood depths occur at a number of locations, flooding occurs over 1.5km from the channel; flooding of A199 Edinburgh Road near Newhailes Burn is observed

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The 'Blended' Flood Map for the Scheme's Design Event – Model A

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Advancing a flood scheme (CP)

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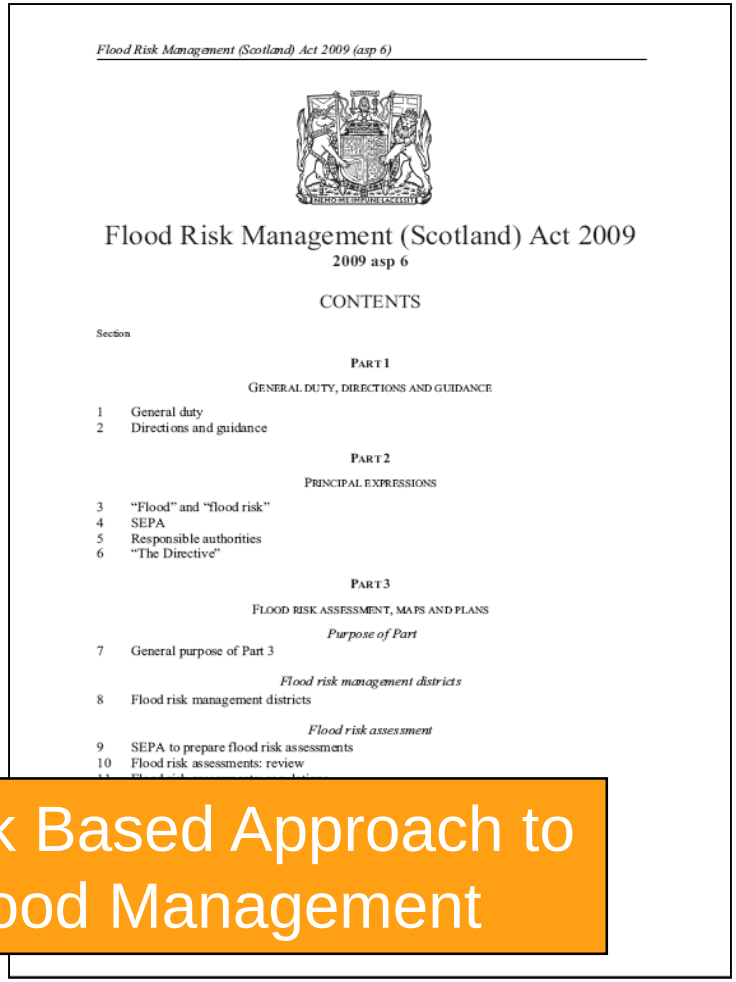
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The Legislation and a FPS:

- This (new) Act superseded the (old) Flood Prevention (Scotland) Act 1961
- Maps out how flood risk will be managed in Scotland and who will be responsible for managing that risk
- New approach – i.e. professionally manage: not just bigger walls
- Major projects to reduce flood risk are delivered through a 'flood protection scheme'
- Formal approval under FRM with DPP



Flood Risk Management (Scotland) Act 2009 (asp 6)

Flood Risk Management (Scotland) Act 2009

2009 asp 6

CONTENTS

Section

PART 1

GENERAL DUTY, DIRECTIONS AND GUIDANCE

1 General duty
2 Directions and guidance

PART 2

PRINCIPAL EXPRESSIONS

3 "Flood" and "flood risk"
4 SEPA
5 Responsible authorities
6 "The Directive"

PART 3

FLOOD RISK ASSESSMENT, MAPS AND PLANS

Purpose of Part

7 General purpose of Part 3

Flood risk management districts

8 Flood risk management districts

Flood risk assessment

9 SEPA to prepare flood risk assessments
10 Flood risk assessments: review

Ethos of Act: Catchment & Risk Based Approach to Sustainable & Natural Flood Management

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What is a flood protection scheme?:

- FPS's are defined in Section 60 & Schedule 2

Flood protection schemes

60 Flood protection schemes

(1) A flood protection scheme is a scheme by a local authority for the management of flood risk within the authority's area.

- What is a flood protection scheme?:

A combination of engineering options that will provide a designed level of flood protection to a defined area for a defined timescale

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Schematic Timeline of FPS development:

Set-up project & define the problem

Work out the options & formal OAP

Surveys & Gather information

Decide on Preferred Scheme

Formal Consultation – PE No. 1

Achieve Scheme Approval

Carry out Outline Design through a consultative framework

Tender for construction

Formal Consultation – PE No. 2

Carry out Detailed Design and prepare contracts

BEGIN CONSTRUCTION

The Scottish Government
Riaghaltas na h-Alba

Scottish Water



MUSSELBURGH & INVERESK COMMUNITY COUNCIL

SEPA
Scottish Environment Protection Agency

NatureScot
Scotland's Nature Agency
Buidheann Nàdair na h-Alba

MUSSELBURGH RACECOURSE
SINCE 1816



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How do we advance and OAP?:

The guidance to be followed depends on the type of appraisal to be carried out



- Weighted Scoring
- Benefit Cost Analysis
- Incremental Benefit Cost Analysis
- Multi Criteria Analysis

Complexity

Cost

Resources

Time

Accuracy?

Test this level of analysis against 1 in 200 + CC flood event in first instance



Flood and Coastal Erosion Risk Management - Appraisal Guidance

Ref: LIT 4909
PDF, 1.85MB, 325 pages

This file may not be suitable for users of assistive technology. Request an accessible format.



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Background to the Scheme (CP)

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Where has this Scheme come from:

1. There is a history of flooding to Musselburgh
2. The Council are already managing that risk from the sea via Demountable Barriers at the lower reach of the Esk
3. The situation is getting worse due to climate change
4. The new FRM put in place a national approach to managing flood risk in 2009
5. From this the Local Flood Risk Management Plans were developed and approved
6. The Forth LFRMP highlights a FPS for Musselburgh
7. The SG then declared the Scheme as a priority via its Cycle 1 FPS Programme – 42 No. FPS's across Scotland
8. The Council → Project Team have been advancing it since 2016

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Timescales for delivery (CP)

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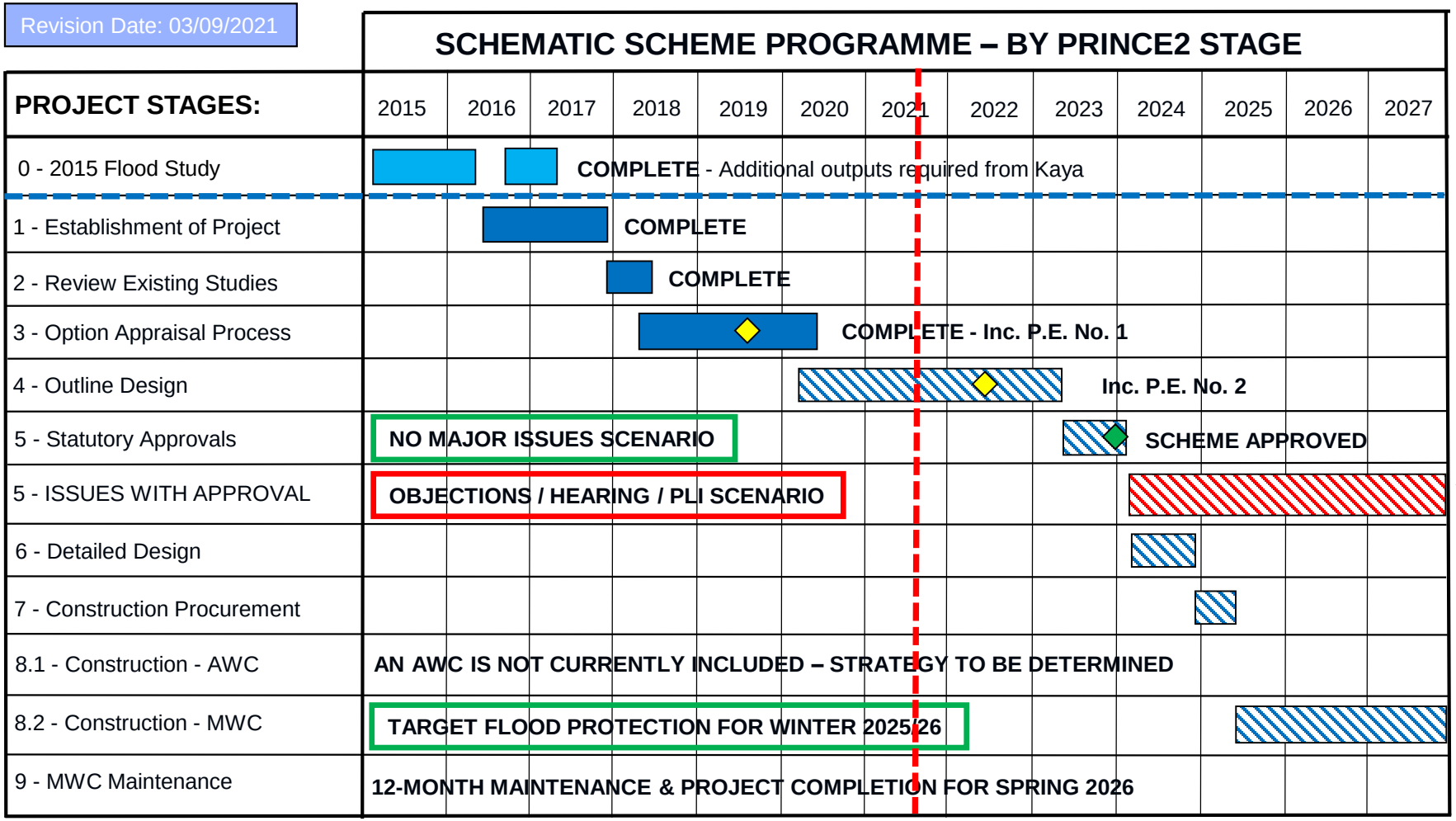
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What is the lightly delivery timetable:

Revision Date: 03/09/2021



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The Stages of the Scheme (JB)

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Project Stages

- Stage 1 – Establishment of the scheme
- Stage 2 – Review of existing studies
- Stage 3 – Option appraisal
  - Consult public on the need for flood protection
  - Work with statutory stakeholders to identify options
  - Assess feasibility and effectiveness of options
  - Selected options become a ‘preferred scheme’

COMPLETE

- Stage 4 – Outline design
  - Gather further information
  - Consult stakeholders on the preferred scheme
  - Develop an outline design
  - Assess the impact of the outline design on the environment
  - Refine the outline design to form a ‘Proposed Scheme’

IN PROGRESS

- Stage 5 – Statutory approvals
- Stage 6 – Detailed design
- Stage 7 – Procurement
- Stage 8 - Construction

SUBJECT TO APPROVAL

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The Option Appraisal Process (JB)

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The Option Appraisal Process

- The option appraisal was carried out by technical specialists and representatives of statutory bodies.
- 97 options were identified, 28 of which were considered further.
- The positive and negative impacts of each option were evaluated on a wide range of technical, environmental, social, economic, and health & safety criteria
- Some of the rejected options include: property abandonment, dredging, bypass channels, tidal barrages, breakwaters, new flood storage reservoirs, and weir demolition.

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An Example of Option Appraisal

Option	Technical	Economic	Environmental	Social	Health & safety	Conclusion
New flood storage reservoir(s)	Only protects against river flooding	Very high cost, but the benefits can be quantified	If it avoids the need for direct defences it might be justifiable; otherwise it could have a large environmental impact on greenfield sites	Would impact the landowner's ability to use the land for other purposes	Dams need careful design, management and maintenance to minimise risk to downstream communities	
Sustainable FRM – use of existing reservoir(s)	Only protects against river flooding	Lesser cost than new flood storage areas	Modest additional environmental impact because the reservoirs already exist. Modifications would involve lowering the water level, which would impact the reservoir perimeter	Changes to reservoir operation may affect anglers and other users of the reservoirs	Dams need careful management and maintenance to minimise risk to downstream communities	Use of existing asset is preferred due to lower cost and lower environmental impact

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The Preferred Scheme (JB)

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The Preferred Scheme

- The terminology comes from: “Flood Risk Management (Scotland) Act 2009 – Flood Protection Schemes – Guidance for Local Authorities”.
- The preferred scheme is a preferred combination of options from the option appraisal process.
- The preferred scheme is not a design – it is a collection of concepts which, subject to further development, could collectively reduce the risk of flooding to Musselburgh from coastal, fluvial, pluvial and groundwater sources.
- We need engagement with the community and other stakeholders to develop the preferred scheme into a design which best meets the needs of the people of Musselburgh

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The Preferred Scheme Components

1. **Attenuation** – Sustainable flood management, using Rosebery and Edgelaw reservoirs to store floodwater at the height of the storm and reduce the peak flow of water entering Musselburgh
2. **Debris management** – Sustainable flood management to intercept large woody debris to reduce the risk of blockage beneath bridges
3. **Conveyance improvement** – replace bridges at a higher level, above the flood to reduce restrictions to the flow of water
4. **Containment** – direct defences to contain the river and keep out the sea
5. **Urban drainage** – pumping stations to collect rainwater caught behind defences and return it to the river

None are effective on their own – their combined effect is required

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Multiple-Benefits (JB)

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Multiple Benefits

- One of the Scheme's objectives is to, *"where possible… strive to achieve multiple benefits"*.
- Multiple benefits are opportunities to add further value to the town besides reducing flood risk. Some of the potential multiple benefits already identified are:
  - Working with FH&SA
  - Working with Musselburgh Active 'Toun' project
  - Working with Musselburgh Traffic Management Plan
  - Working with Scottish Power Assets

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Consultation (JB)

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Consultation

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- Elected members
- Community Council
- Roads Services
- Amenity Services
- Planning
- Economic Development
- Finance

Statutory Bodies

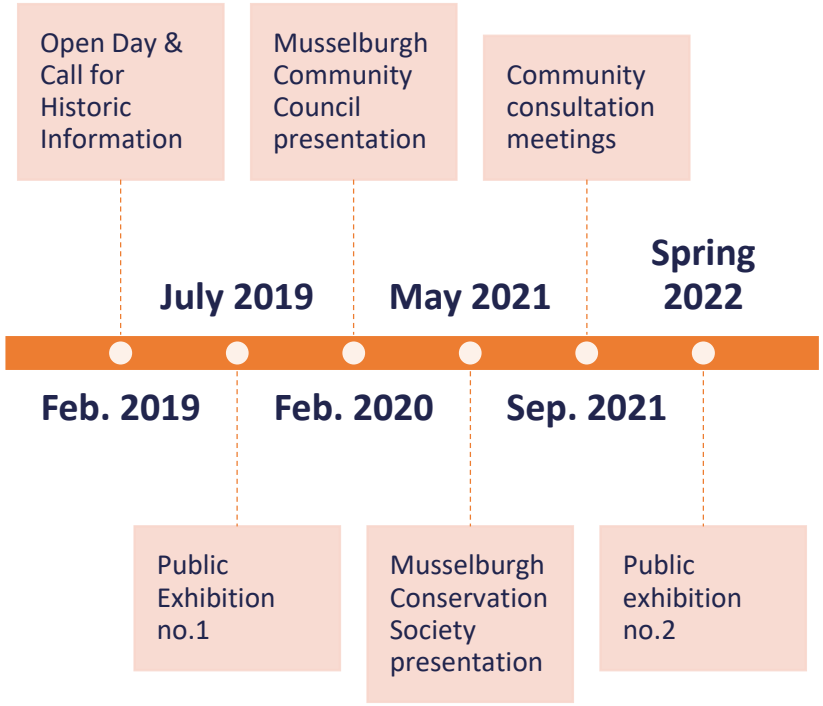
- SEPA
- NatureScot
- Historic Environment Scotland
- Forth Rivers Trust
- Marine Scotland
- Scottish Government
- Scottish Water
- Scottish Gas Network
- Scottish Power
- BT Openreach

Other Stakeholders

- Public
- Landowners
- Businesses
- Local Interest Groups

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Public Consultation Programme





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The Outline Design –
At Edinburgh Road Area (JB)

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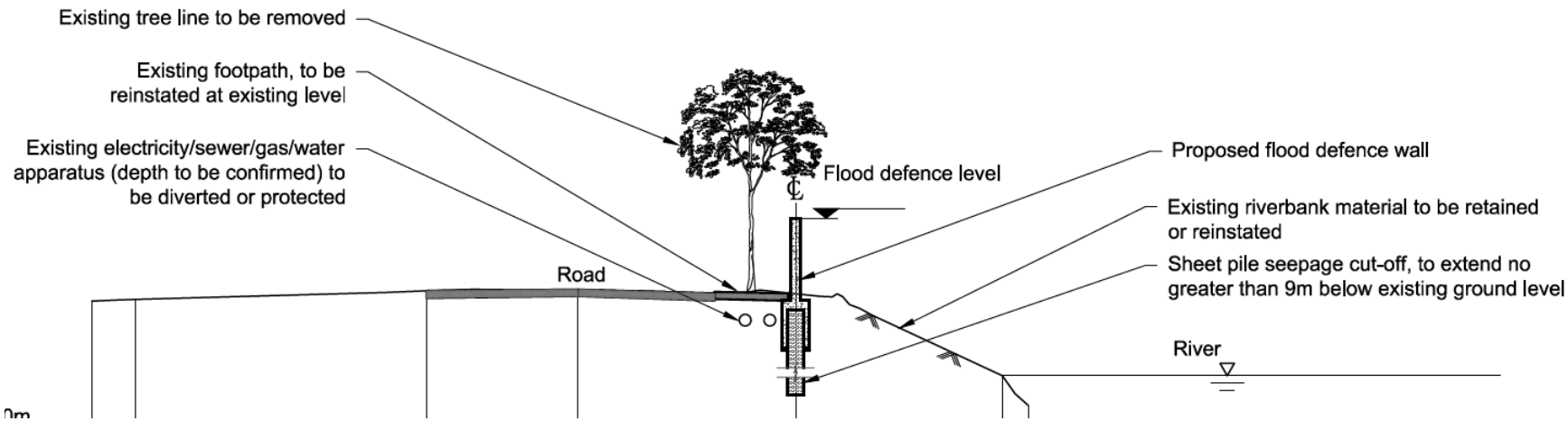
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Outline Design

- **It will…**establish the general position, size and appearance of the works, similar to a planning application.
- **It will not…** include detailed construction drawings and product specifications (this happens later, during detailed design).
- The outline design requires a balance between sufficient detail for stakeholders to consider its merits, and sufficient flexibility for the designer to develop the design.
- Once complete, the outline design will be formally published in the form of scheme drawings and a written description of scheme operations. If confirmed through the statutory process, the Scheme will then proceed to detailed design and construction.

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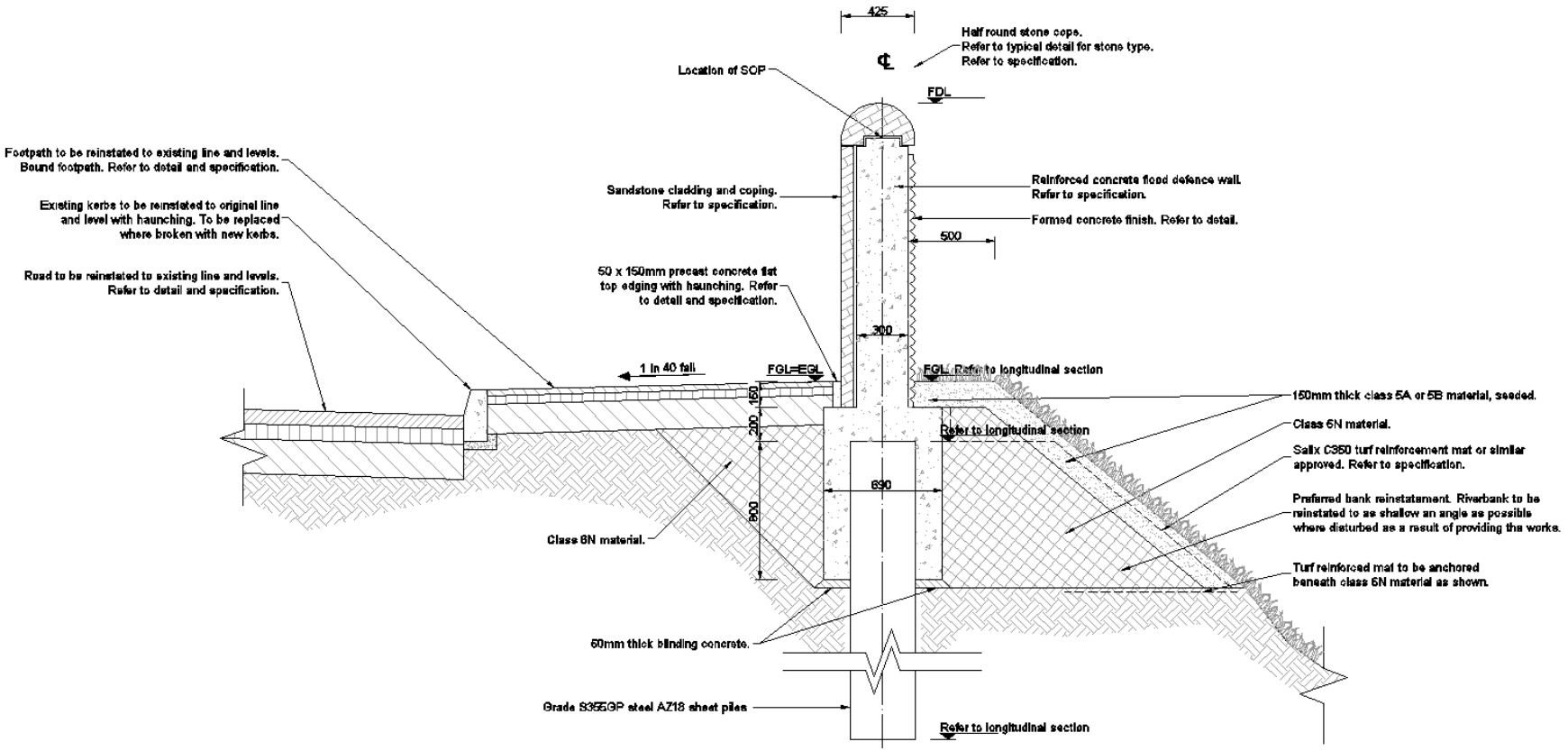
Outline Design Example



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Detailed Design Example



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Scheme Overview


Sands
East Lothian
Fisherrow Links Park
Musselburgh Links: The Old Golf Course
Musselburgh Road
Eastfield
Milton Road East
A199
Edinburgh Road
North High Street
Fisherrow
Newhailes House (NTS)
Newhailes Road
Olive Bank Road
Market Street
High Street
Musselburgh
A6124
A6095
B6454
Inveresk Road
Linkfield Road
Pinkie Road
Pinkie
Lewisvale
Musselburgh Grammar School
Inveresk Industrial Estate
Newhailes Industrial Estate
Eskview
Eskview Terrace
Monktonhall Terrace
Stoneybank
B6415
Inveresk
former Edenhall Hospital
Practice Ground
Inveresk Lodge Garden
Carberry Road
Crookston Road
Goose Green Road
Millhill
Loretto Senior School
Brunton Court
Newbigging
Inveresk Village Road
the Inveresk Estate
Lewisvale Park
Pinkie Burn
River Esk
Esk Mills Road
Claylands Crescent
Claylands Drive
Claylands Place
Whitehall Avenue
Whitehall Garden
Stoneybank Crescent
Riverside Gardens
Stoneyhill Avenue
Stoneyhill Road
Stoneyhill Terrace
Derrylyn Road
Maitland Avenue
Newhailes Crescent
Links Street
Links View
Beach Lane
New Street
Promenade
Mountjoy Terrace
Balcarres Road
Millhill Lane
Ashgrove
Windsor
Rothesay Place
Grove Street
Park Lane
Edenhall Road
Pinkie Avenue
Pinkie Terrace
Hill Crescent
Brunton Court
Mercat Loan
South Street
Campie Road
West Holmes Gardens
Eskview Road
Eskview Crescent
Inveresk Road
Esk Mills Road
Practice Ground
Musselburgh
East Coast Main Line
City of Edinburgh
Coillesdene Avenue
Milton Glen
Milton Burn
Shore
Crescent
Road
Gardens
Avenue
Drive
Place
Crescent
Terrace
Road
Garden
Gardens
Avenue
Crescent
Drive
Road
Terrace
Lane
Street
Court
Mercat Loan
Square
Avenue
Crescent
Road
Terrace
Lane
Street
Court

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Edinburgh Road



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29-59 Edinburgh Road



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Outline Design Considerations



- Form of construction of defences
- Ground conditions
- Public utilities
- Property boundaries
- Firth of Forth Special Protected Area (SPA)
- Public amenity area

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Thank you for listening to our presentation

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FOLLOWED BY QUESTIONS & ANSWERS SESSION

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FOLLOWED BY OPEN DISCUSSION / BRAINSTORMING SESSION

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