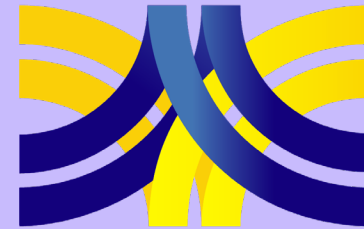


49th ASECAP DAYS

*Decarbonizing Road Infrastructure : Challenges,
Perspectives and Actions in Tough Economy*

ASECAP DAYS

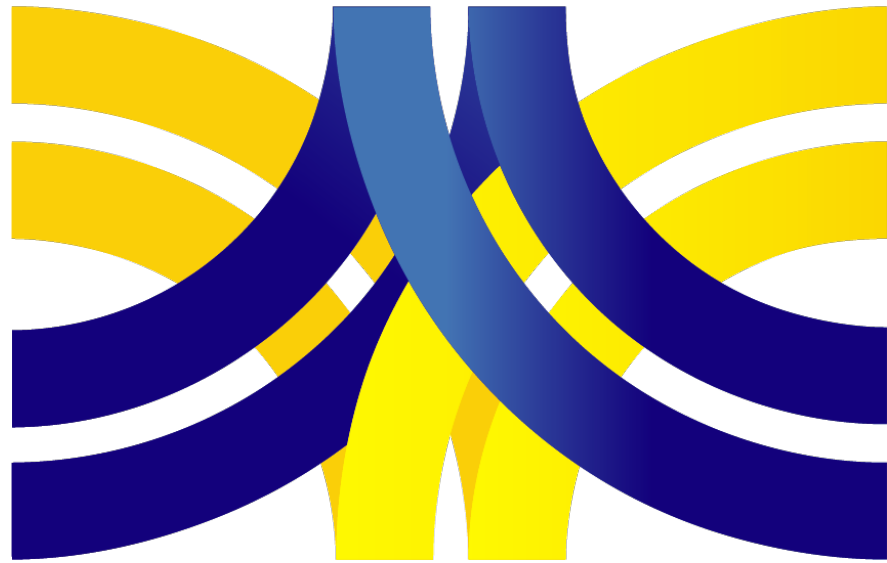


BRUSSELS 2022



Hotel Marriott Grand Place, Brussels
24 – 25 November 2022

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BRUSSELS 2022

Towards resilient roadway assets: Conditioning factors in the formation of surface runoff and flood flow estimation

Fernando Sousa – fsousa@ascendi.pt



AGENDA

/ 01 Ascendi Key Figures

/ 04 Investigation Project introduction
Case of Study

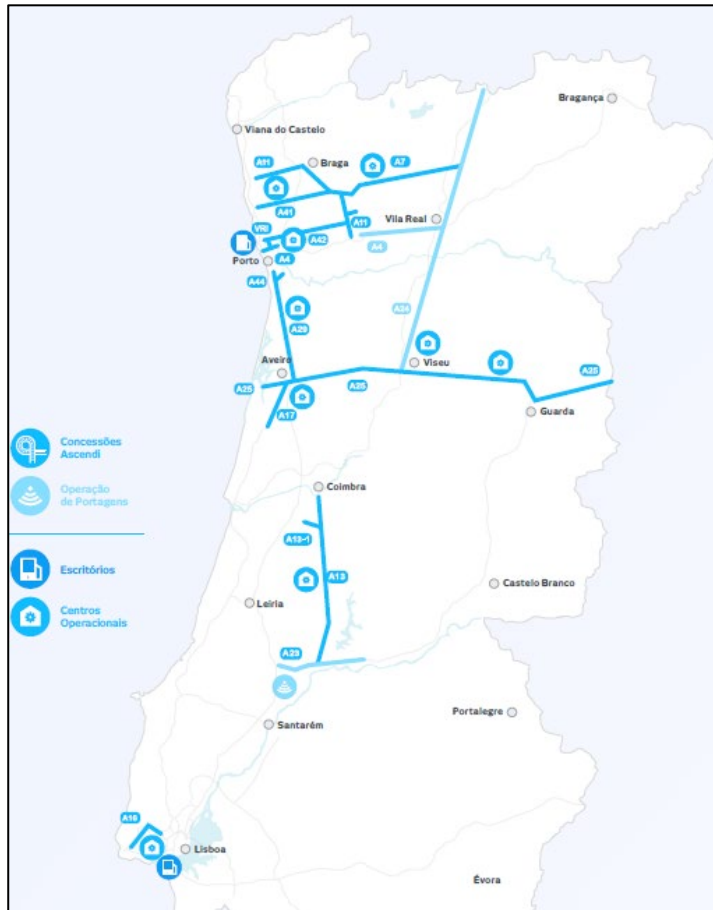
/ 02 Ascendi Culvert Management
System Implementation

/ 05 Analysis and Conclusions [1st Phase]

/ 03 Culverts flood flow
and Climate change

/ 06 Investigation Project – Next Steps

/01 Ascendi Key Figures



ROAD O&M

ASSET MANAGEMENT

ITS

TOLL COLLECTION

Direct Operations

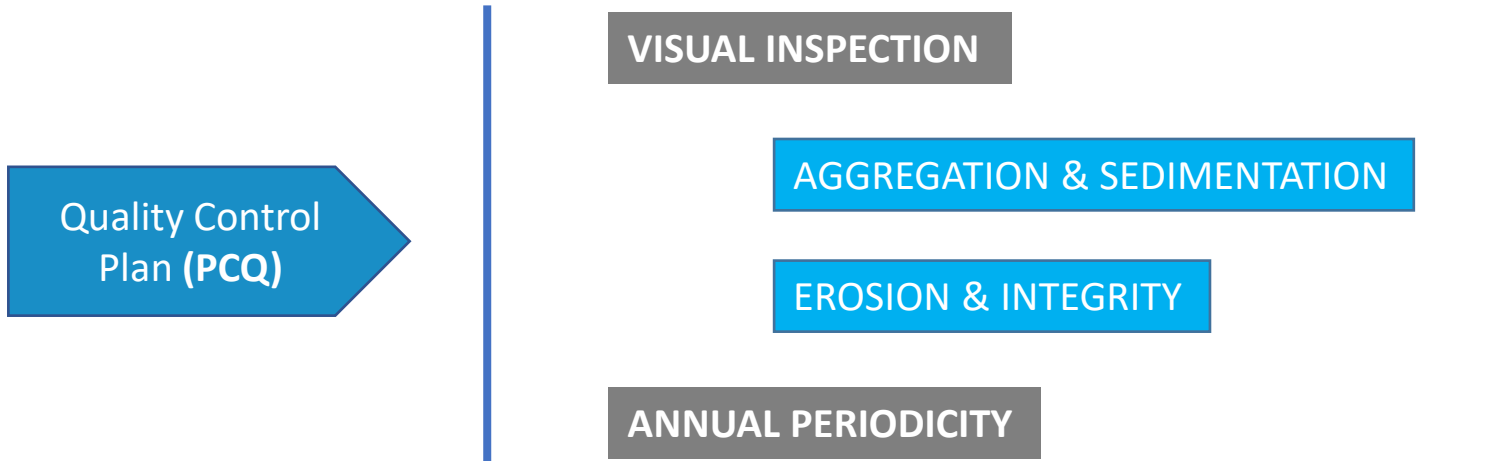
- \ 6 Road Concessions under operation
- \ 6 All Electronic Tolling Operations (AET-MLFF)
- \ 2 Traditional Tolling Operations (Manual and Electronic)

Assets Portfolio

- \ ~627 km road extension
- \ 20 Rest areas
- \ ~1200 Bridges
- \ ~1800 Culverts
- \ ~5000 Slopes and Retaining walls

/02 Ascendi Culvert Management System Implementation

COMPLIANCE

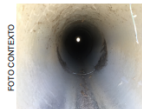


ascendi **FICHA DE INSPEÇÃO (PCQ 4.1)** SustIMS

Ascendi Pinhal Interior SPI.STM.A13.120+737.PH-254.SL

DADOS TÉCNICOS			
Tipo de Inspeção	Inspeção Visual IMT	Data	04-07-2022
Sublância	EN110 / Acessória	AE	A13
Pk de Exploração	120737	Tipo de Estrutura	Tubular
Nº de Sub-Obras	1	Material	Betão Armado
Tipo Boca de Entrada	Em Alente	Tipo Boca de Saída	Em Alente
Diâmetro (m)	1	Comprimento (m)	108

FOTO CONTEXTO



RESULTADOS DA INSPEÇÃO			
COMPONENTE	AVALIÇÃO GLOBAL	INTEGRAÇÃO ESTRUTURAL (Conforme - Não Conforme)	PERTURBAÇÃO ESCOAMENTO (Conforme - Não Conforme)
Sub Obra 1 - Boca Montante	Conforme	Conforme	Conforme
Corpo Atravessamento 1	Conforme	Conforme	Conforme
Sub Obra 1 - Boca Jusante	Conforme	Conforme	Conforme

REGISTO FOTOGRÁFICO

FOTO 1


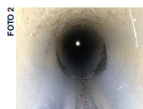
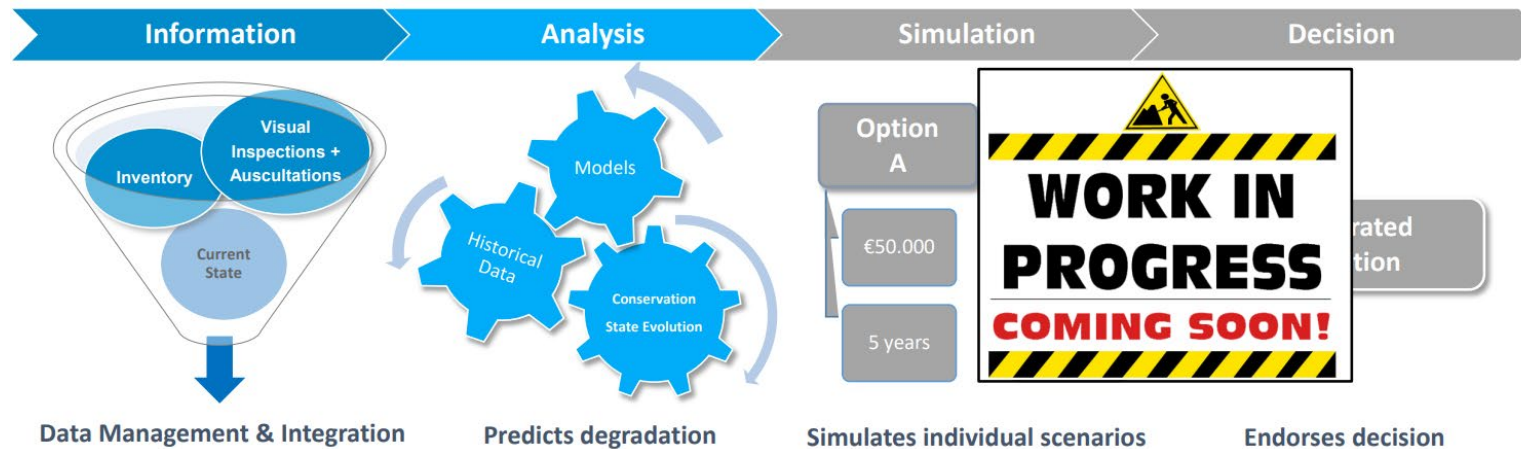


FOTO 2



MANAGEMENT



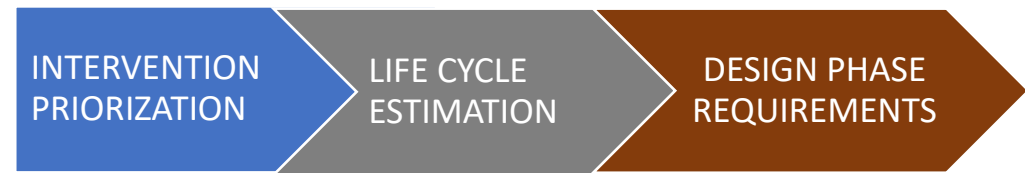
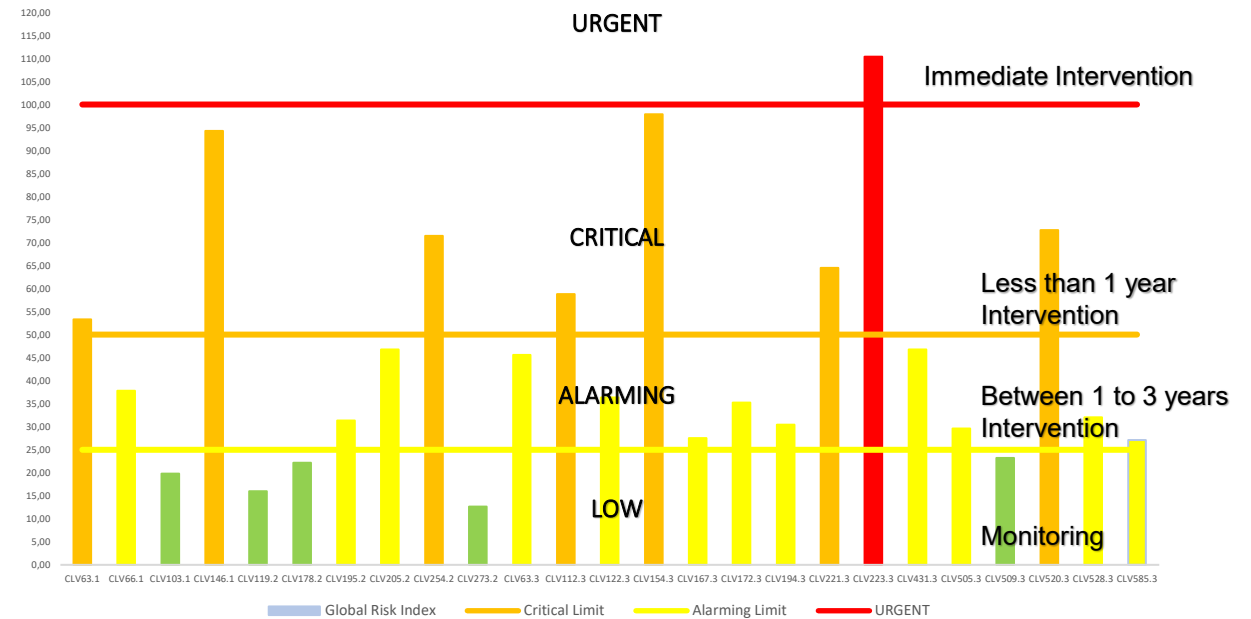
- ✓ Inspection schedule depends on Risk Assessment;
- ✓ Detailed Inspection with pathologies analysis (Severity vs Extension);
- ✓ Pre-defined calculation schemes are applied to each culvert component;

/02 Ascendi Culvert Management System Implementation

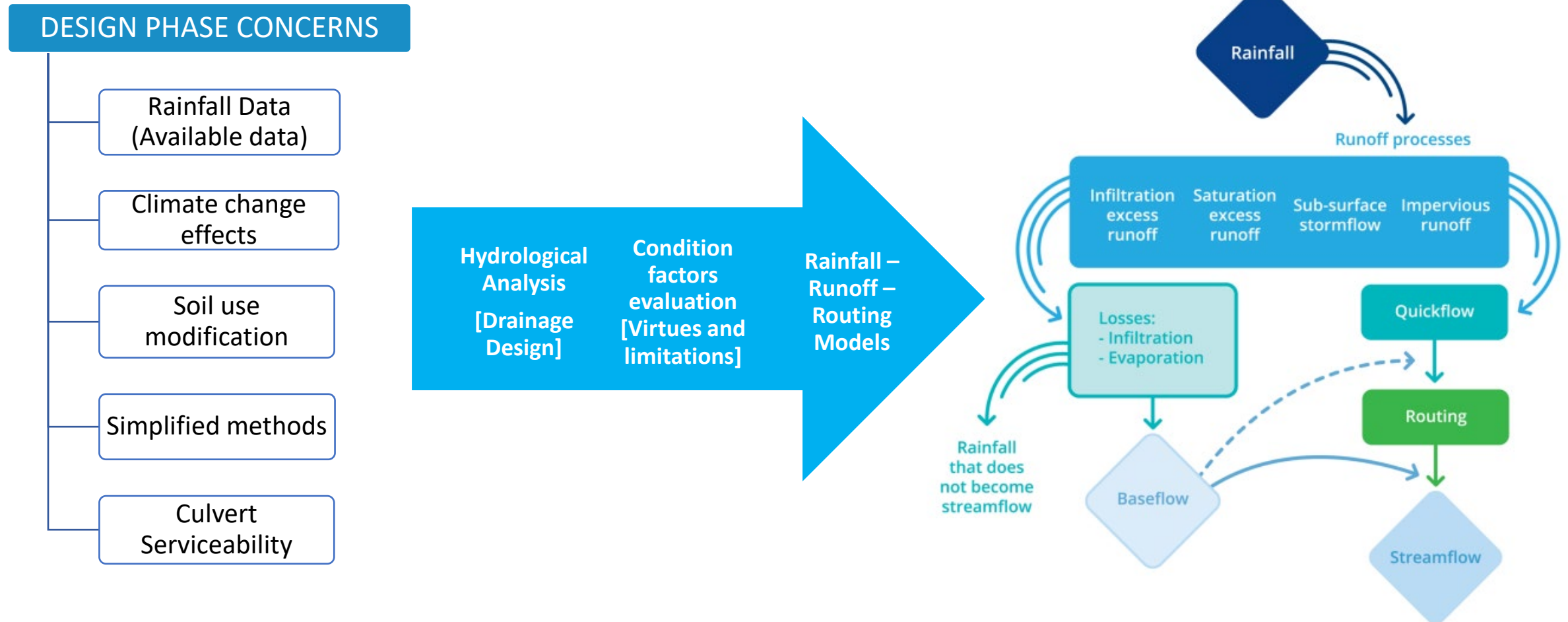
GLOBAL RISK INDEX – PRELIMINARY RISK ASSESSMENT



DECISION MAKING – INTERVENTIONS PRIORITIZATION



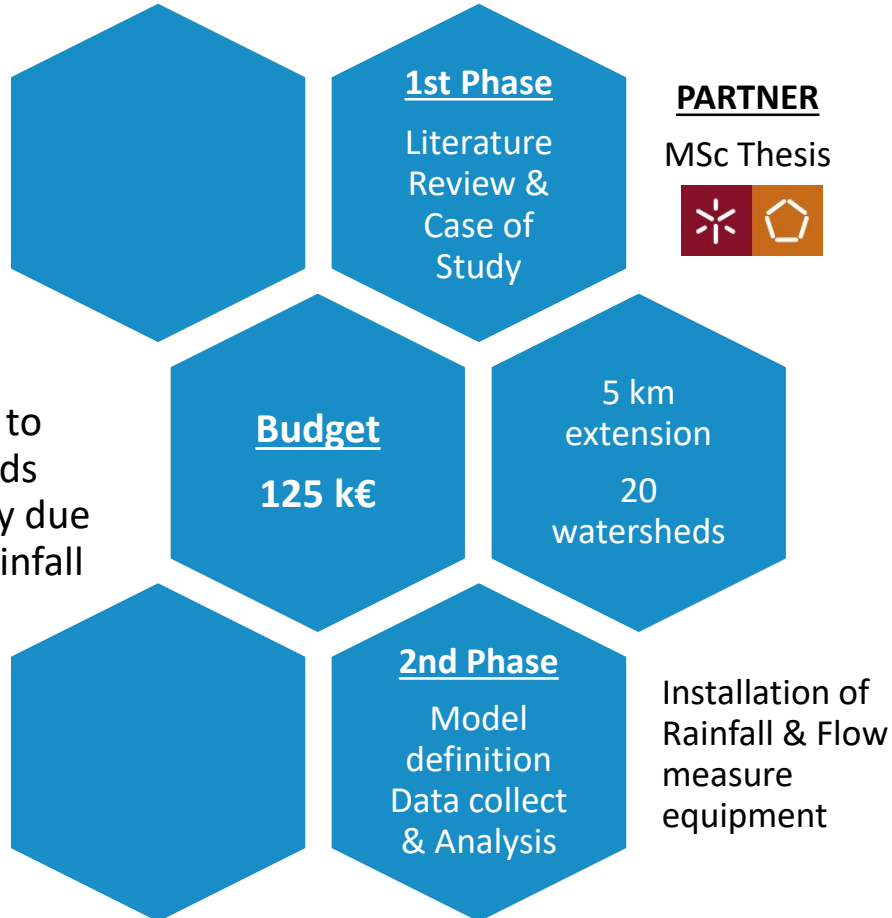
/03 Culverts flood flow and Climate change



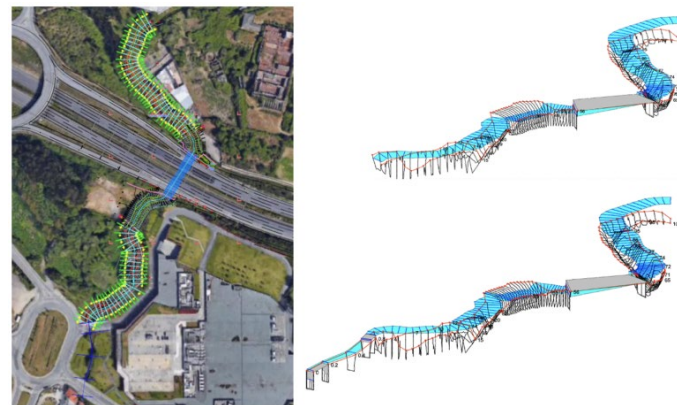
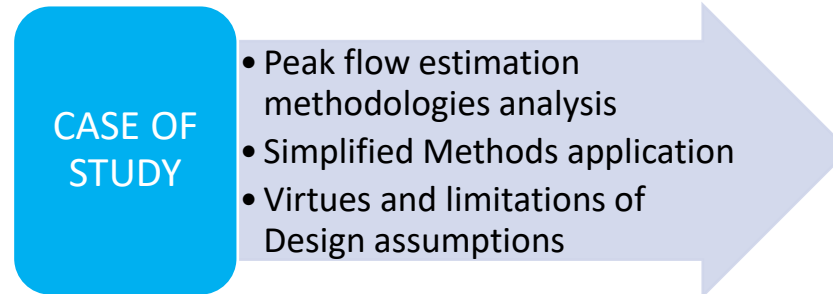
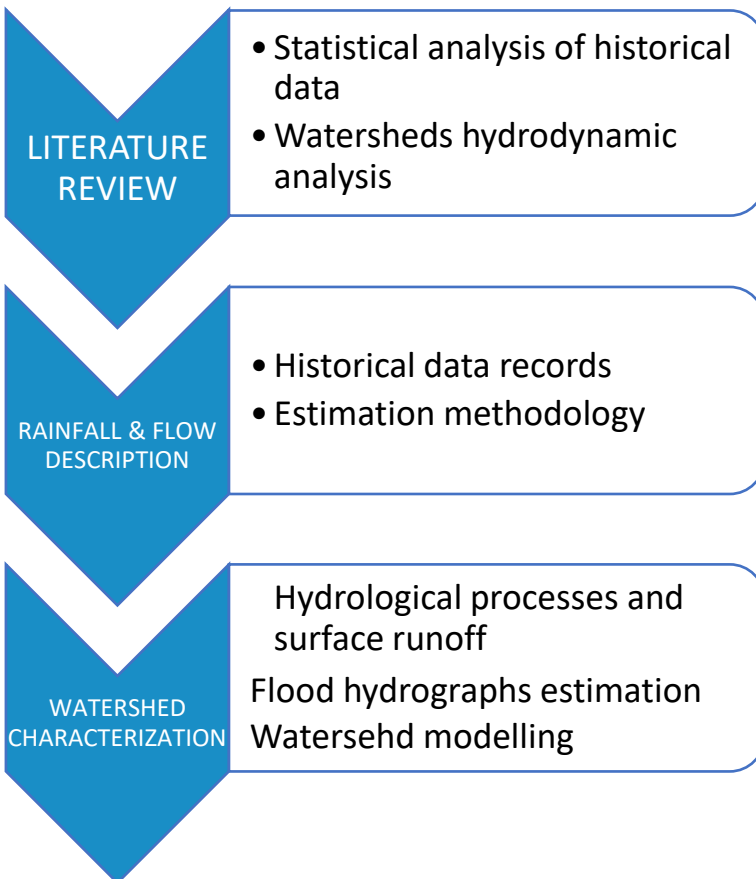
/04 Investigation Project introduction - Case of Study

Purpose

Framework to identify roads vulnerability due intensive rainfall



/05 Analysis & Conclusions [1st Phase - MSc Thesis]

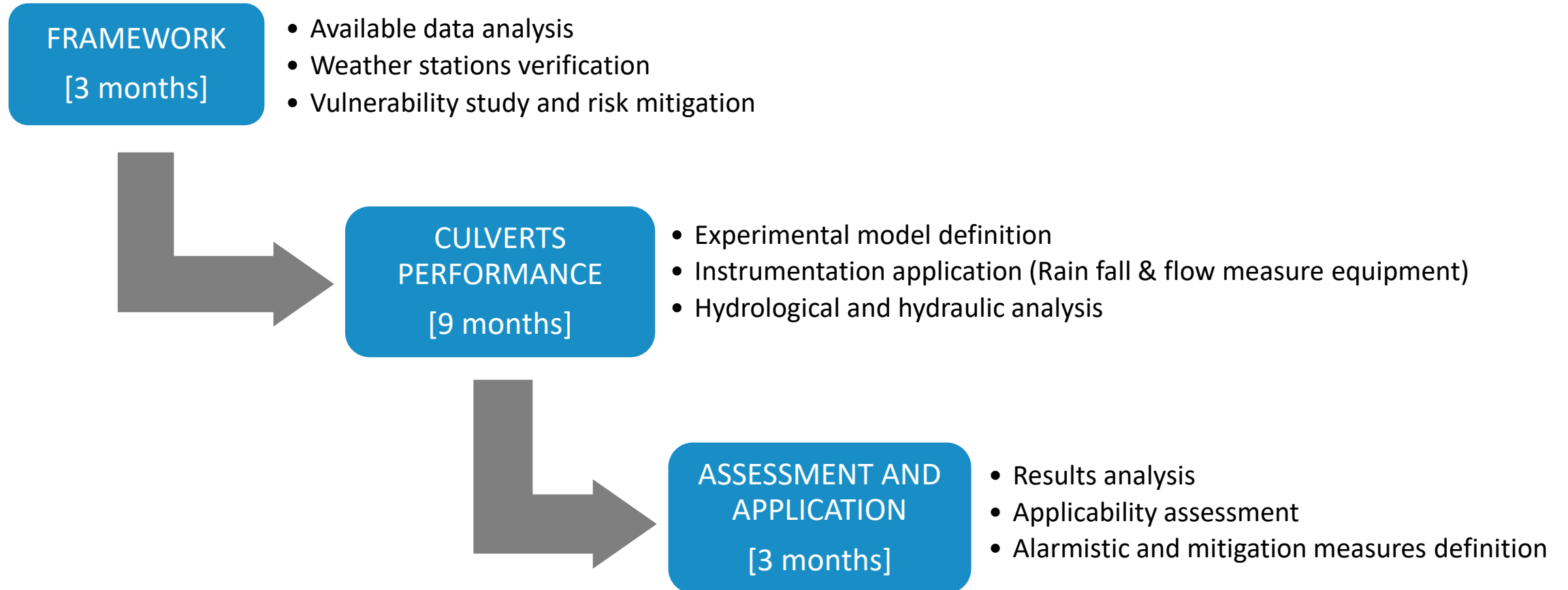


CULVERT HEC-RAS 3D MODEL EXAMPLE

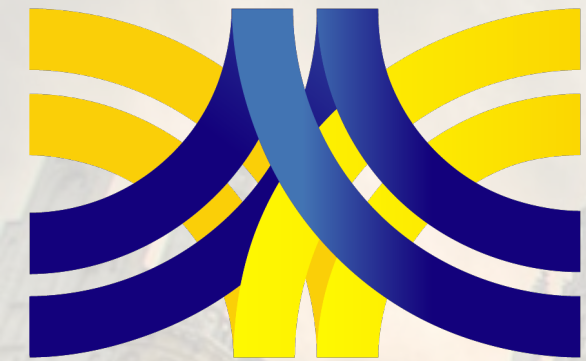
CONCLUSIONS

- Rainfall Intensity, used with Rational Method, doesn't consider rainfall data from the lastest decades
- The surface runoff coefficient was considered uniform in time and invariant in space
- Urban watersheds are more likely to change over time
- Increasing rainfall events data, and modelling with continuous simulation, can reduce the uncertainty and improve infrastructure resilience

/06 Next Steps – Project Framework



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**THANK YOU FOR
YOUR ATTENTION**

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