PMI Belgium University Contest

- This presentation is made by the five winners of the PMI Belgium University Contest, edition 2016.
- The winners have been nominated by a jury from PMI Belgium for the best group assignment for the course “Project Management” given by Mario Vanhoucke at the Faculty of Economics and Business Administration of Ghent University.
- More information on this contest can be found in the paper “PMI Belgium's recognition of young PM potential” published in the Journal of Modern Project Management (cf. http://www.or-as.be/blog/jmpm_2014c).
- Congratulations to the winners!

- Mario Vanhoucke

De Waalse Krook

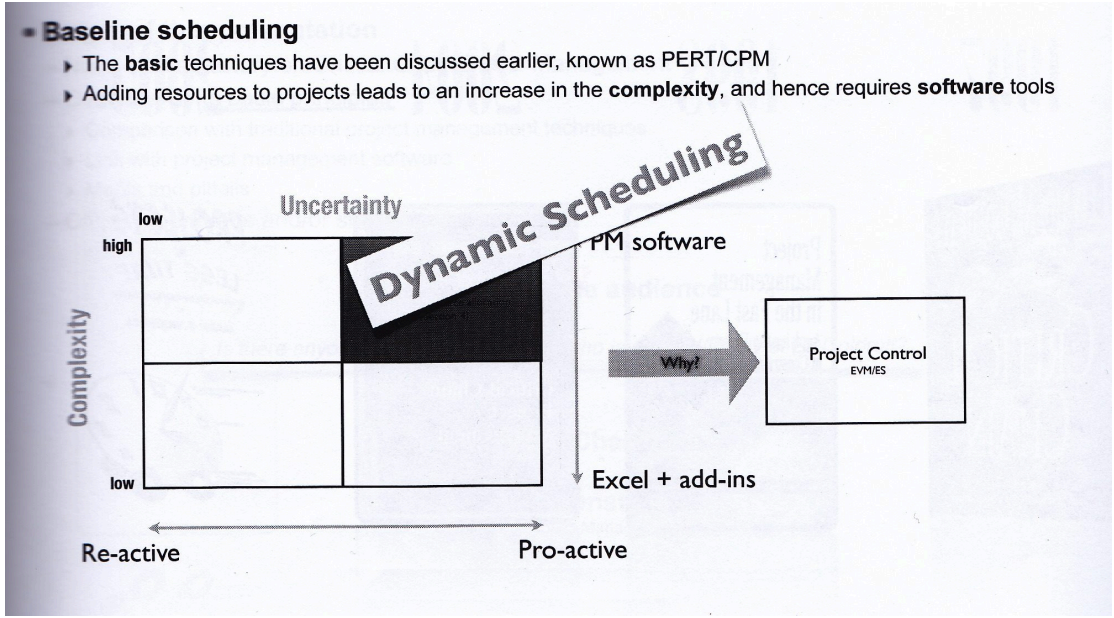
Risk Assessment using the Fuzzy Set Theory

Ellen De Backer
Rani Torrekens
Laurine Van Buggenhout
Mathilde Van Caeckenbergh
Karen Verhaeghe

Course Project Management

Based on 3 parts:

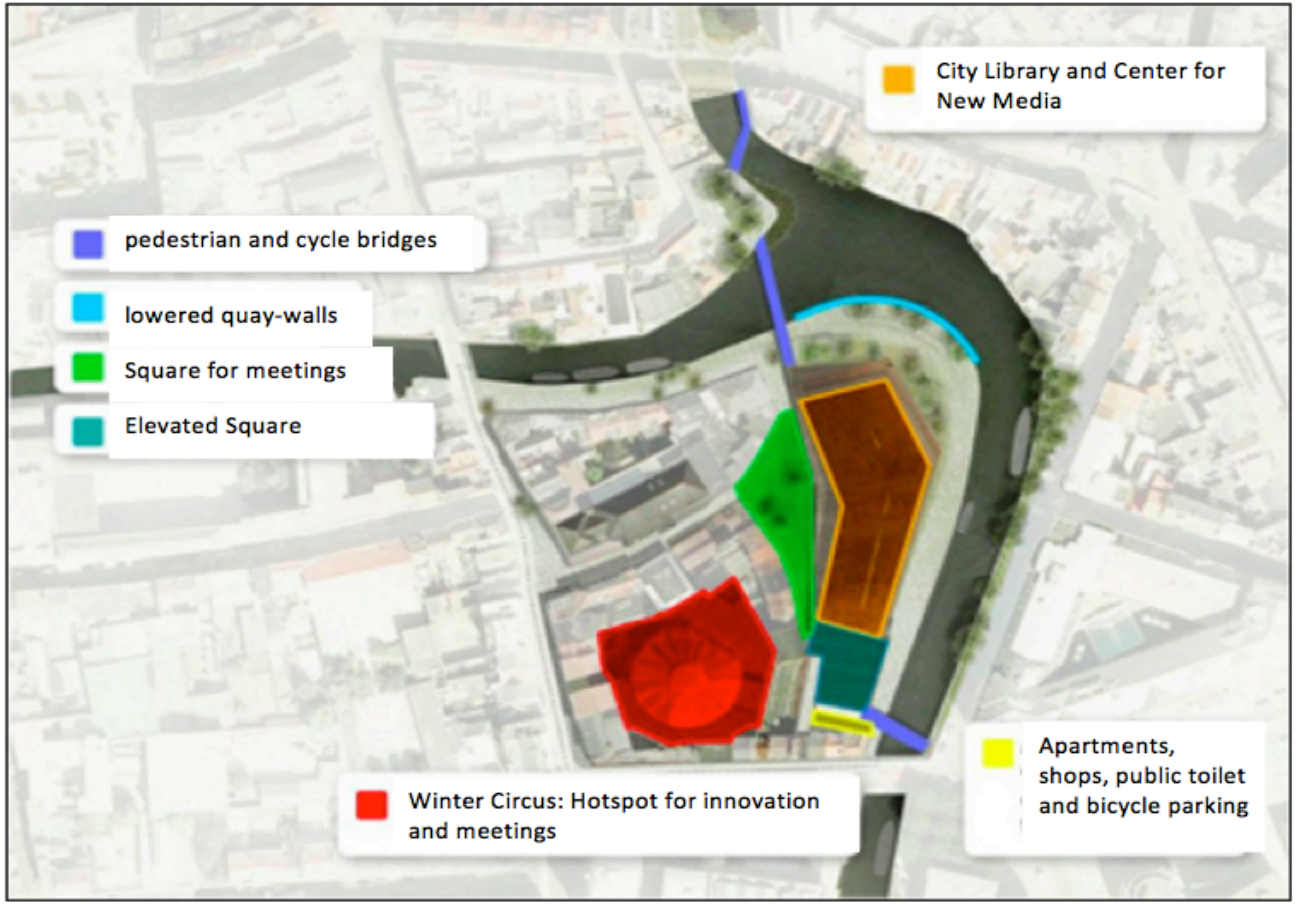
- Baseline scheduling
- Risk analysis
- Project control



Overview

- **Background information**
- Project description
- Risk analysis
- Fuzzy Set Theory
- Fuzzy approach applied on De Krook
- Recommendations for the future
- Conclusion

DE KROOK


City Library and Center for New Media
pedestrian and cycle bridges
lowered quay-walls
Square for meetings
Elevated Square
Winter Circus: Hotspot for innovation and meetings
Apartments, shops, public toilet and bicycle parking

DE KROOK

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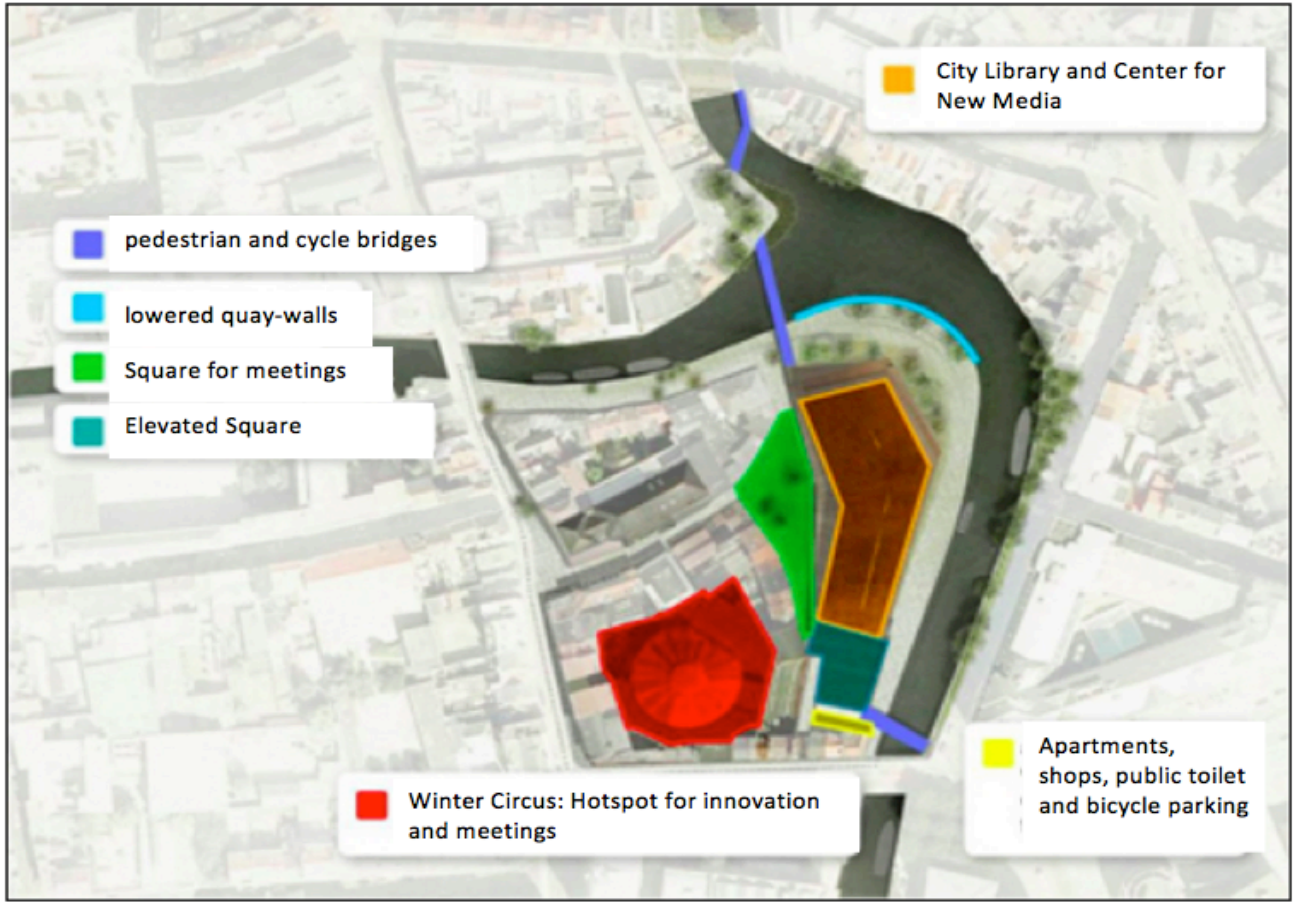
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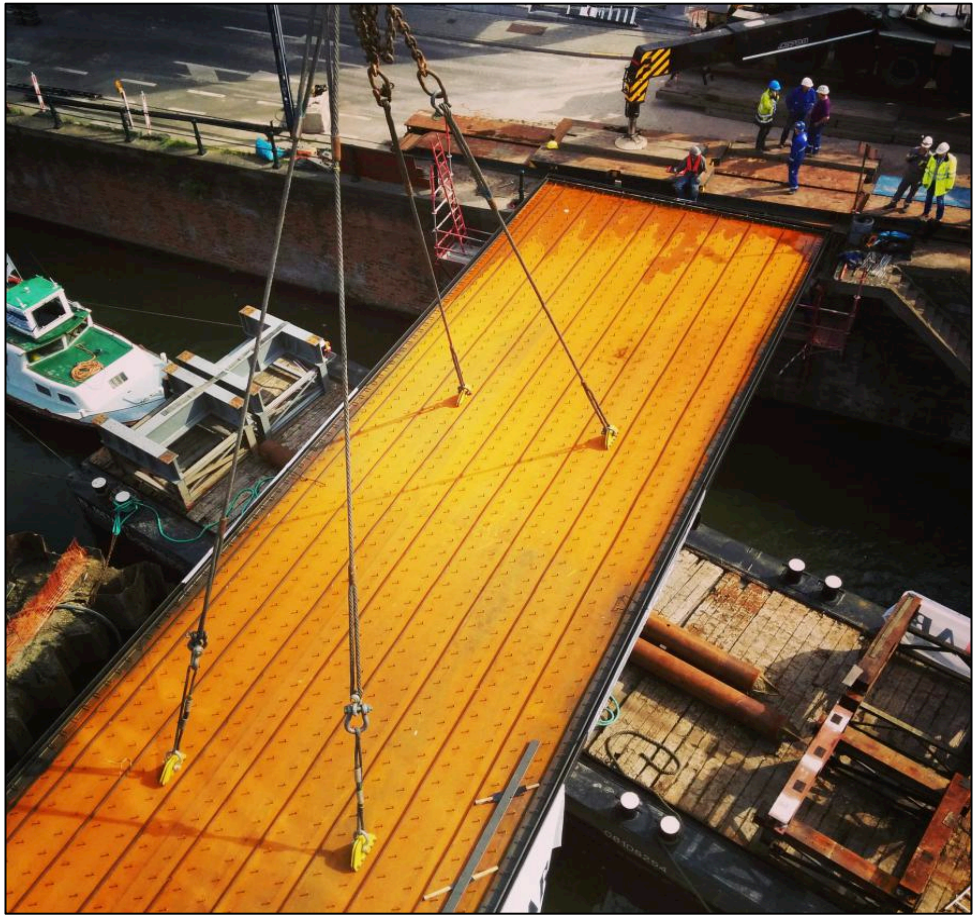

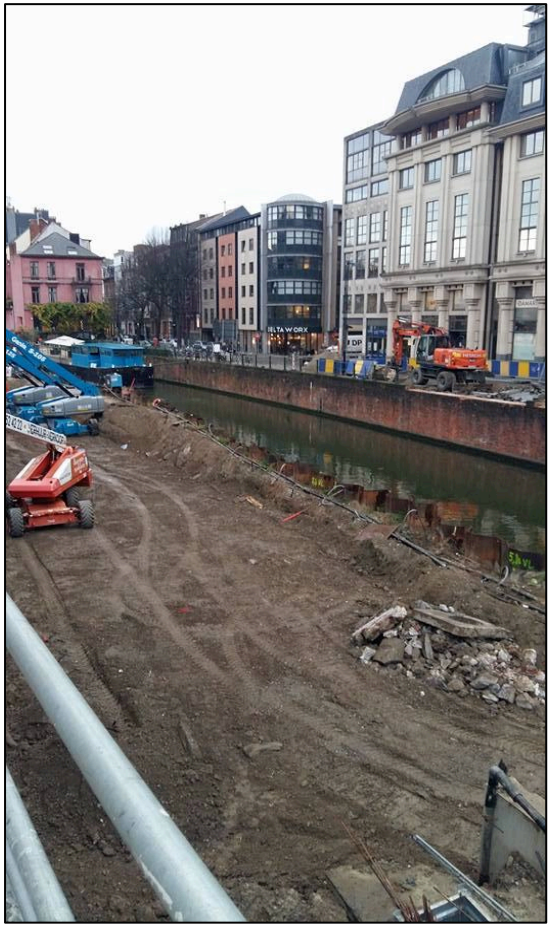

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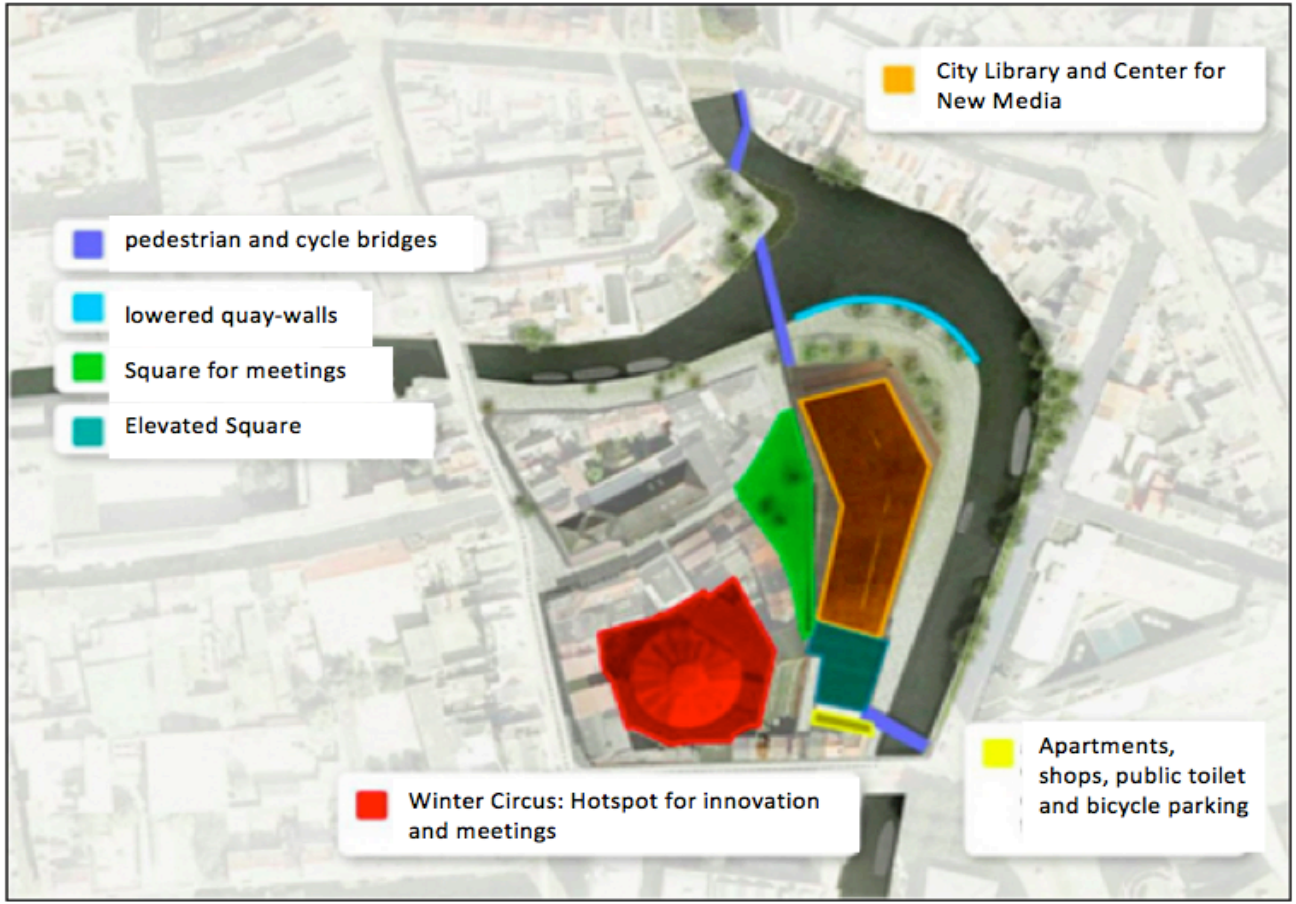
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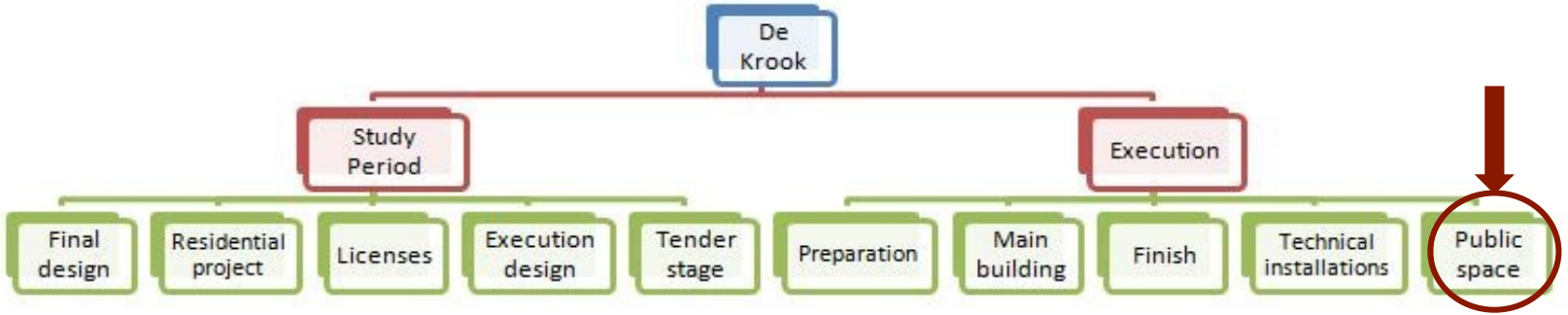
Project Description

Work Breakdown Structure



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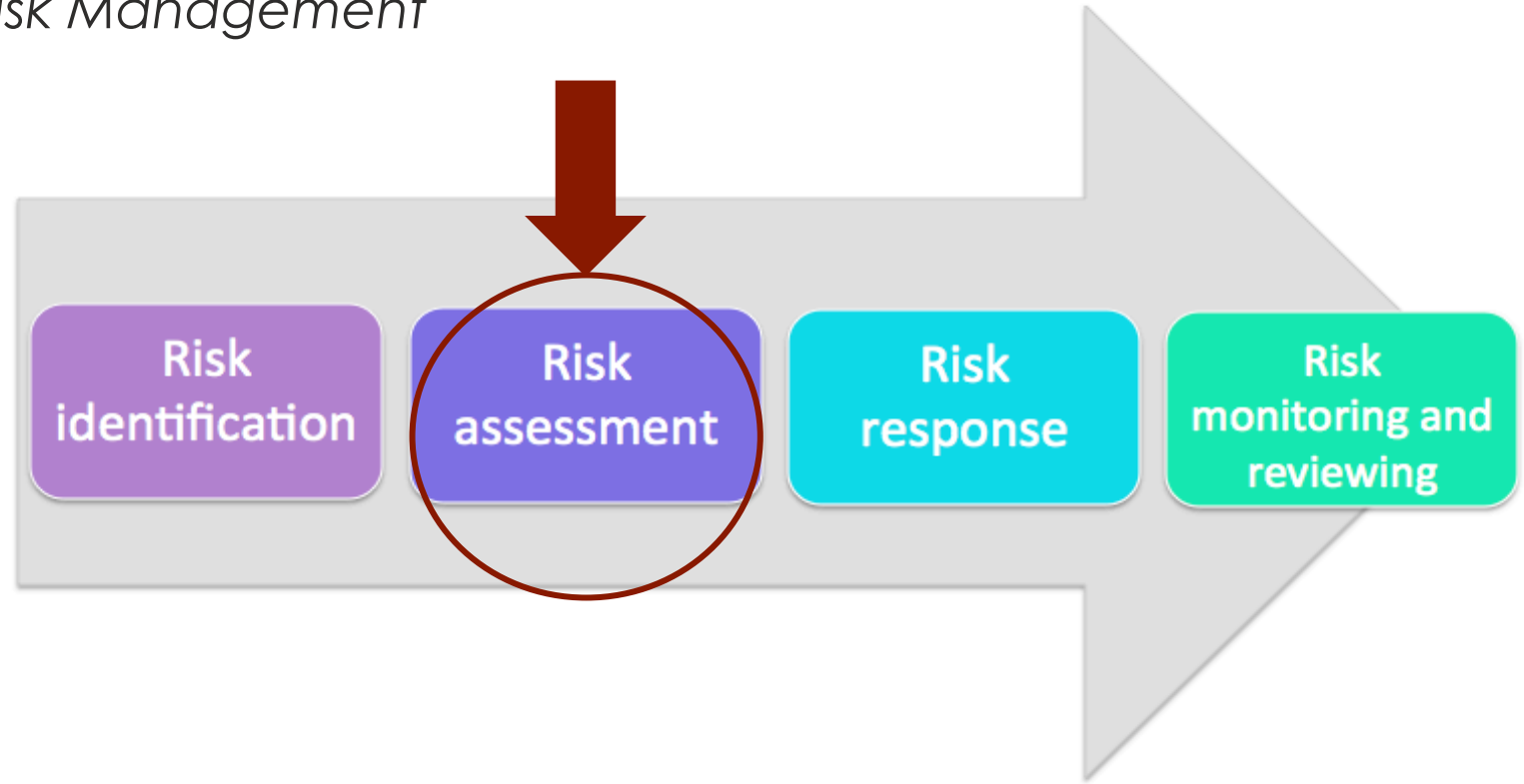
Risk Analysis

Risk Management



Risk Analysis

Risk Assessment

*RISK = PROBABILITY * IMPACT*

Probability	Impact				
	Hardly noticable	**Little Damage** *Damages narrow pieces of the project*	**Big Damage** *Damage important pieces of the project*	**Unacceptable Damage**	**Useless** *Make the project useless and will end the project immediately*
Certain > 90% chance	High	High	Extreme	Extreme	Extreme
Likely 50-90% chance	Moderate	High	High	Extreme	Extreme
Moderate 10-50% chance	Low	Moderate	High	Extreme	Extreme
Unlikely 3-10% chance	Low	Low	Moderate	High	Extreme
Rare < 3% chance	Low	Low	Moderate	High	High

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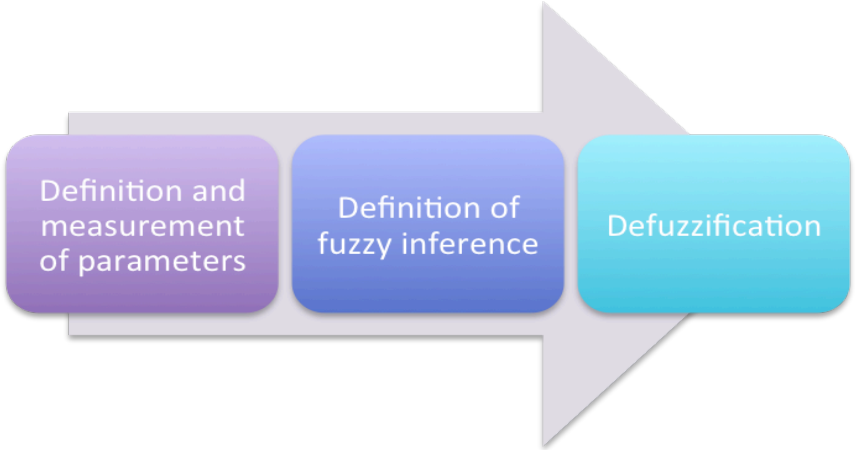
Fuzzy Set Theory

- Based on the HRBS
- Cause and effect diagrams
- Qualitive risk assessment descriptions modeled mathematically
- Nice overview of the overall impact of risk on your project



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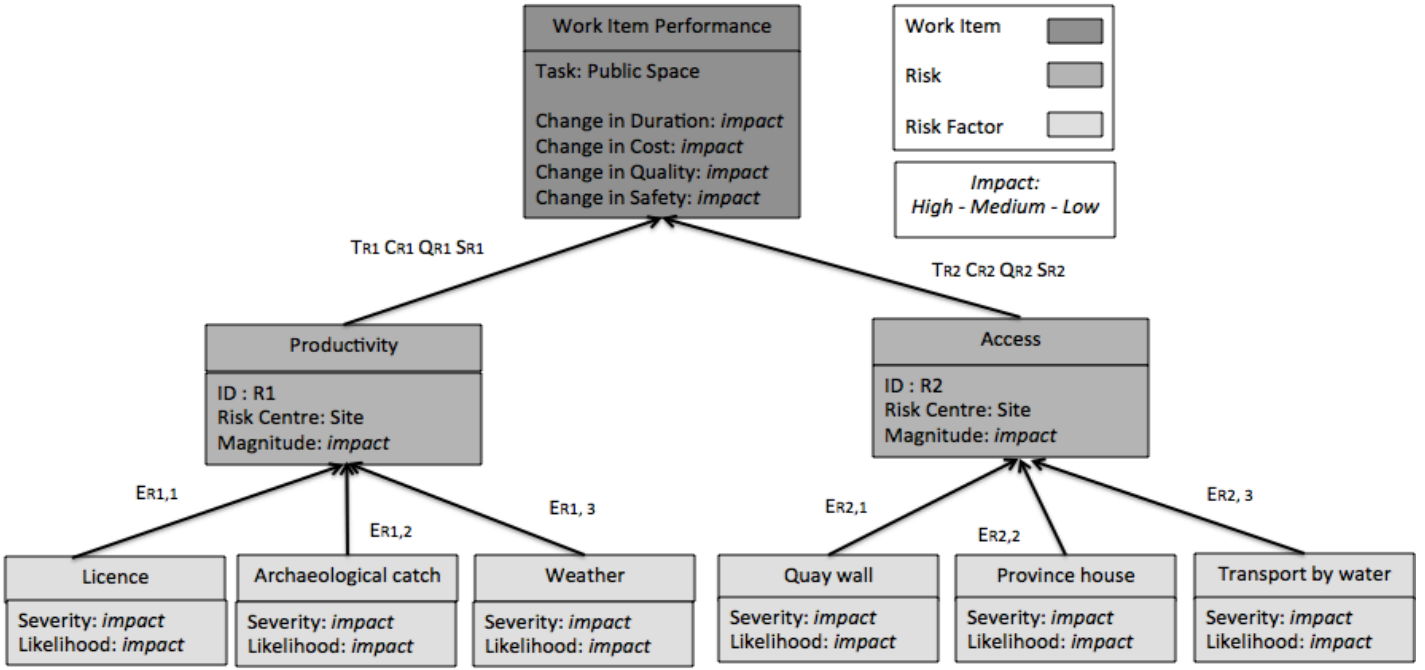
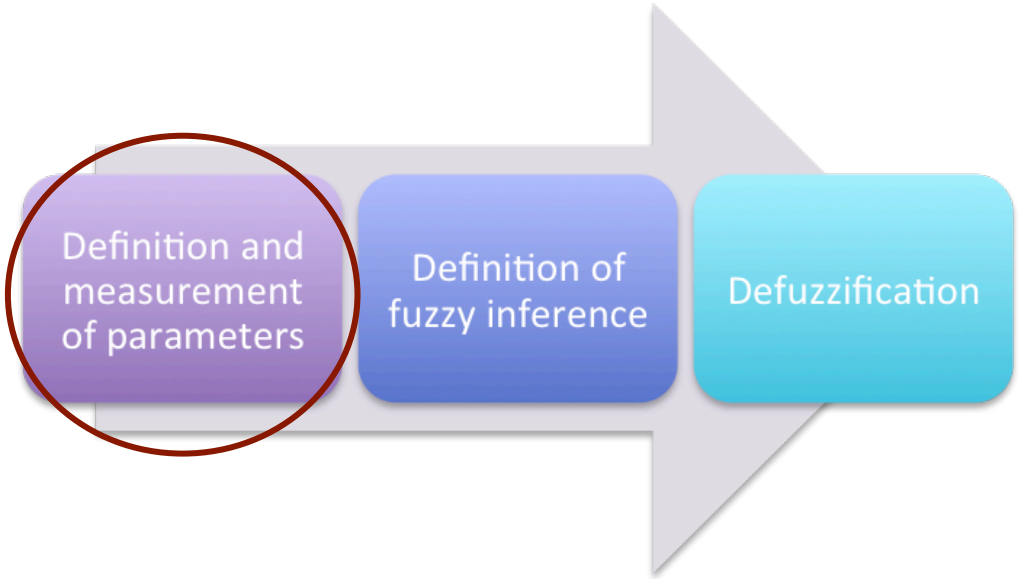
Fuzzy approach applied on De Krook

HRBS



Fuzzy approach applied on De Krook

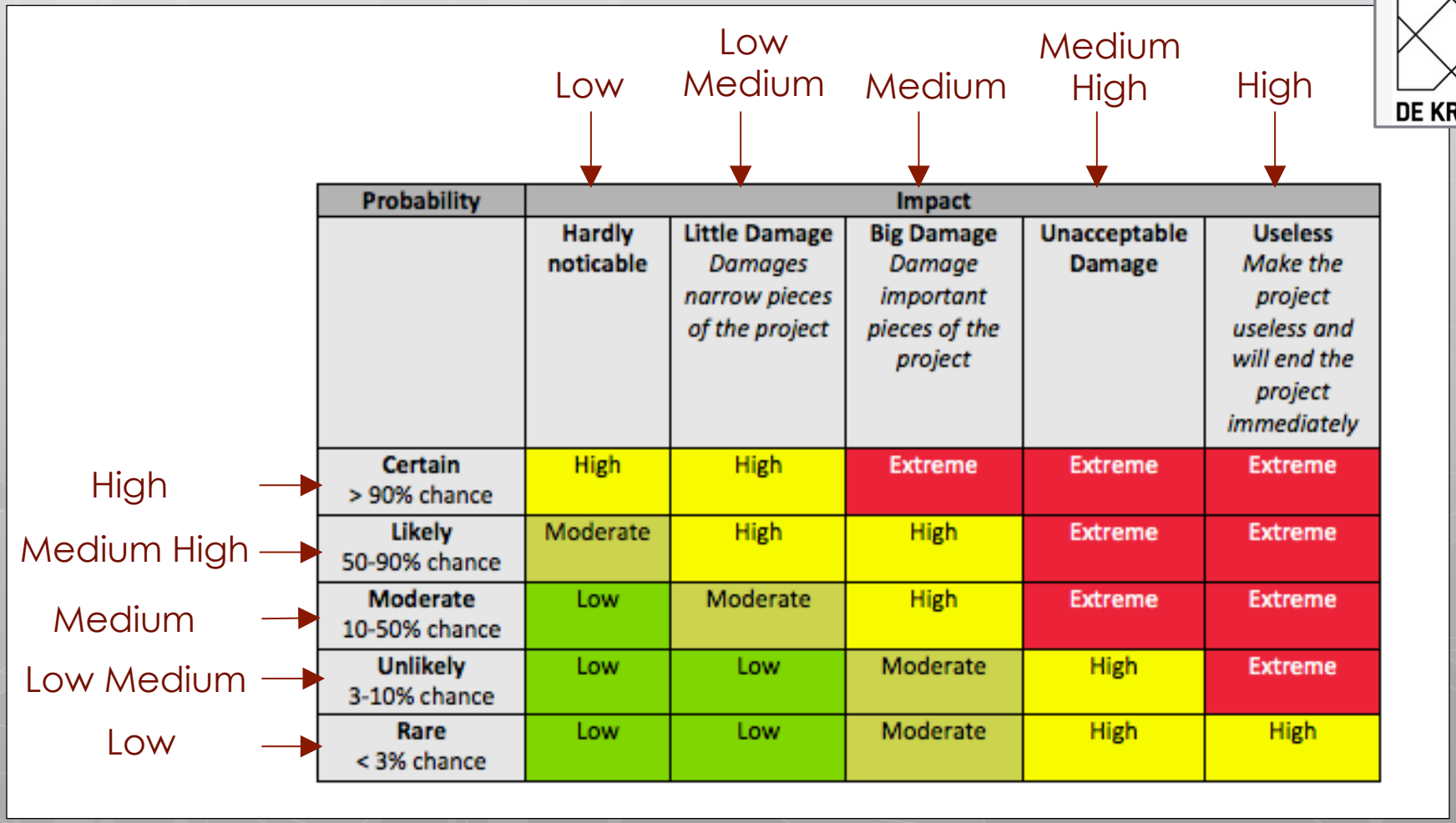
Step 1



Step 1: The fuzzy associative memories (FAMs)

Risk severity	**Risk magnitude**				
High (1.0)[1]	Medium	Medium	Medium High	High	High
Medium High (*)[1]	Low Medium	Medium	Medium	Medium High	High
Medium (0.5)[1]	Low Medium	Low Medium	Medium	Medium	Medium High
Low Medium (*)[1]	Low	Low Medium	Low Medium	Medium	Medium
Low (0.1)[1]	Low	Low	Low Medium	Low Medium	Medium
	Low (0.1)[1]	Low Medium (*)[1]	Medium (0.5)[1]	Medium High (*)[1]	High (1.0)[1]
	Risk likelihood				

Risk = probability * impact


Low
Low Medium
Medium
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High
Probability
Impact
Hardly noticable
Little Damage
Damages narrow pieces of the project
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Unacceptable Damage
Useless
Make the project useless and will end the project immediately
Certain
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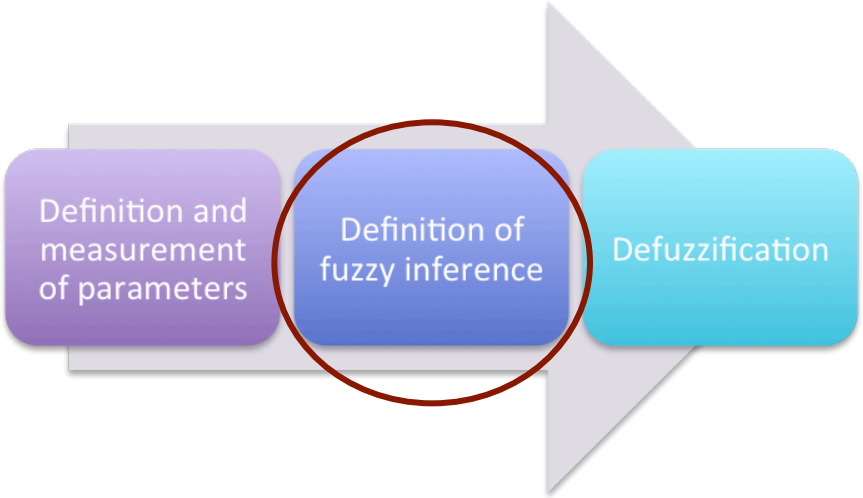
50-90% chance
Moderate
10-50% chance
Unlikely
3-10% chance
Rare
< 3% chance
High
Medium High
Medium
Low Medium
Low
DE KROOK

Fuzzy approach applied on De Krook

Step 2



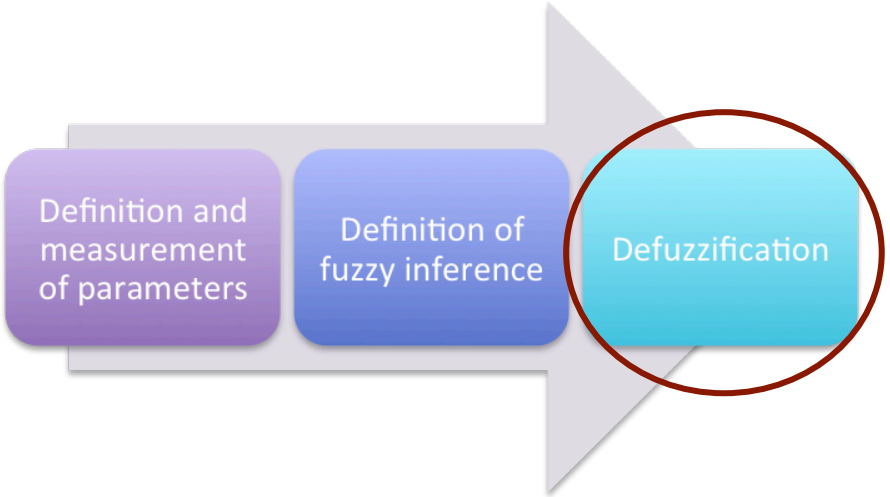
Step 2: Assessment of the likelihood and severity

Risk	Severity (=V)	Likelihood (=L)	Magnitude (=E)
Productivity			
Licence	High	High	High
Archaeological catches	Low	Low	Low
Weather	High	Medium	Medium High
Access			
Quay wall	High	Medium High	High
Province house	High	High	High
Transport by water	High	Medium High	High

→ The value of the risk factor with the greatest effect ($E = jE_{max}$) determines total effect on the risk

Fuzzy approach applied on De Krook

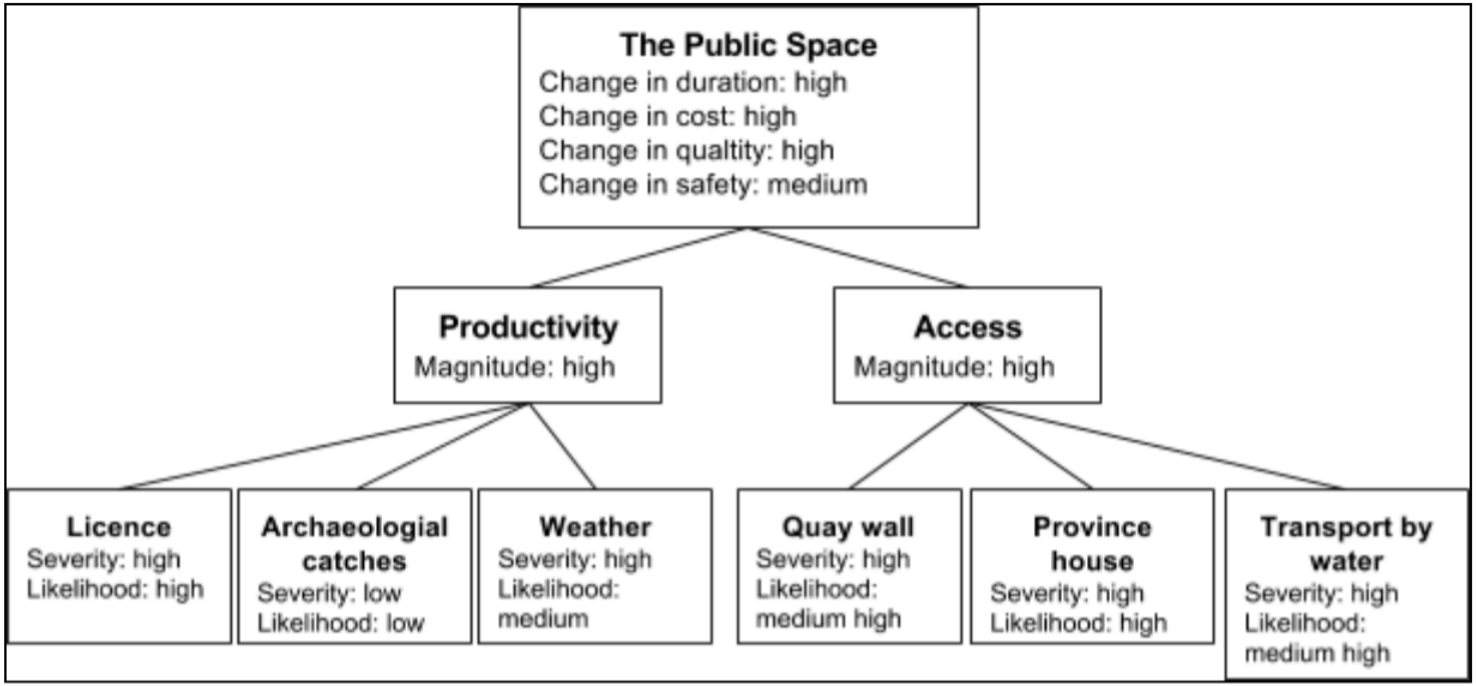
Step 3



Step 3: Compute the changes in the performance measurements of the work item by the individual risks

	Risk magnitude	Change in duration	Change in cost	Change in quality	Change in safety
Productivity	High	High	High	High	Low
	Medium	Medium	Medium	Medium	Very low
	Low	Low	Low	Low	Very low
Access	High	High	High	Medium	Medium
	Medium	Medium	Medium	Low	Low
	Low	Low	Low	Low	Low

Result


The Public Space
Change in duration: high
Change in cost: high
Change in qualtity: high
Change in safety: medium
Productivity
Magnitude: high
Access
Magnitude: high
Licence
Severity: high
Likelihood: high
Archaeologial catches
Severity: low
Likelihood: low
Weather
Severity: high
Likelihood: medium
Quay wall
Severity: high
Likelihood: medium high
Province house
Severity: high
Likelihood: high
Transport by water
Severity: high
Likelihood: medium high

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Recommendations future

- Expanding the scales

	Severity (S)		
Likelihood (L)	High impact level (1.0)	Medium impact level (0.5)	Low impact level (0.1)
Highly likely (1.0)	1.0	0.5	0.1
Likely (0.5)	0.5	0.25	0.05
Less Likely (0.1)	0.1	0.05	0.01

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Conclusion

What have we learned today?

- ✓ Easy method to rank the risks for a construction project

  & Nice overview of the overall impact of risk

- ✓ Identify relationships risk sources - consequences

- ✓ Makes effective management possible

The management of a construction project is a very complex task

Thank you for your attention!