KPMG

Belfast City Council: Climate Change Risk Assessment

11th August 2022

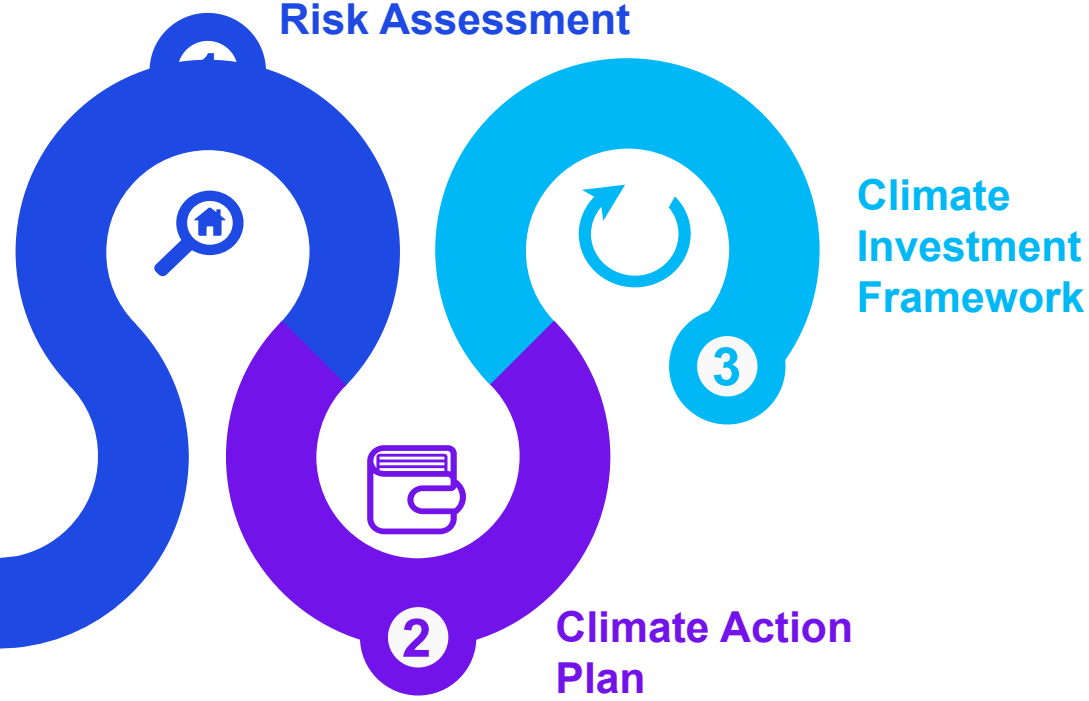
Presentation to Climate and City Resilience Committee

01

Introduction

Introduction

KPMG are working with Belfast City Council (BCC) on three individual but integrated projects which aim to develop a robust and costed Climate Action Plan for Belfast City Council



Climate Risk Assessment (June – August 2022)

- ✓ Identify key risks
- ✓ Assess the magnitude of climate risk for the Council's assets, supply chains, infrastructure
- ✓ Recommended actions

Climate Action Plan (August – October 2022)

- ✓ Identify and prioritise climate actions that are feasible, impactful and cost effective
- ✓ Prepare a Climate Action Plan
- ✓ Develop a comprehensive monitoring, learning and reporting framework to track progress

Climate Investment Framework (October – November 2022)

- ✓ Identify funding opportunities and develop a delivery plan to secure funding

02

Climate Change Risk Assessment: Overview and Progress to date

Northern Ireland's and Belfast's Changing Climate

0.8°C

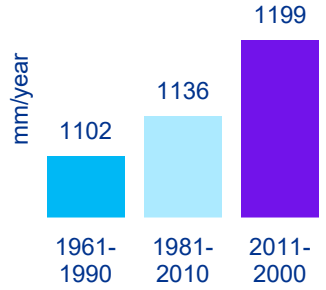
Average temperatures increase for the most recent decade when compared to a 1961-1990 baseline.

31.3°C

Highest temperature on record recorded on July 21st 2021 at Castlederg, Tyrone

Rainfall

Average annual rainfall has increased by 7% for the most recent decade when compared with the 1961-1990 baseline.



58mm (2.3 inches) of rain fell in 90 minutes in Central Belfast on July 28th 2000

Sea level Rise

Sea levels around the UK have risen by 16.5 cm since 1901 with rates of rise accelerating in recent decades

For Belfast harbour, the 5 highest tidal surges have been recorded since 1994.

Large proportions of Belfast City Centre are between 1 and 2m below extreme tide level.

6,000 properties currently considered at significant coastal flood risk.

Impacts for BCC

- **Damage to BCC infrastructure and assets**
- **Disruption and closure of services**
- **Disruption of business-critical infrastructure**
- **Safety risk for staff and public**
- **Redeployment of staff as part of emergency response**
- **Financial loss**
- **Reputational risk**

(Source: UKCP18; ClimateNI; DFI)

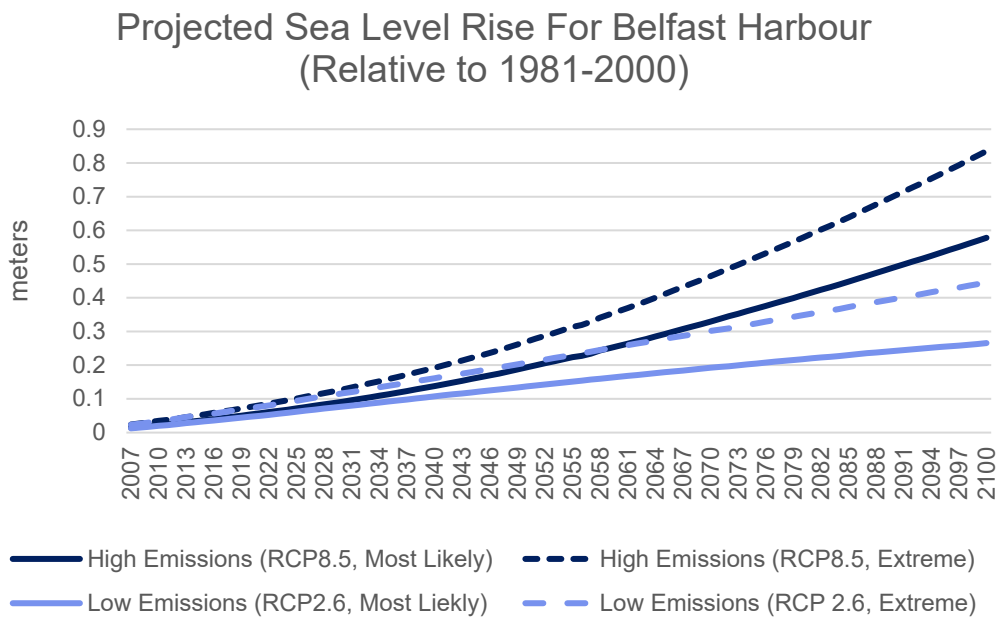
And these changes are projected to continue and intensify

A greater chance of hotter drier summers and warmer wetter winters with more extreme weather and rising sea levels.

By 2070, winters are projected to be up to 3.9°C warmer while summers could be up to 4.9°C hotter

By 2070, winters are projected to be up to 25% wetter while summers are projected to be 38% drier

By 2100, sea levels are projected to rise by up to 94cms



(Source: UKCP18 Probabilistic Projections)

Work Packages

The project is structured around 5 individual but interconnected Work Packages (WPs), the following diagram sets out the proposed Work Package (WP) structure for the project.

WP2: Climate Risk and Vulnerability Screening

Key Tasks

- Desktop review
- Stakeholder interviews
- Climate risk matrix & prioritisation

Key Outputs

- Understanding current and potential future climate risks and vulnerabilities
- 3 Climate Risk Matrices
- Prioritisation Workshop

WP3: Climate Risk & Vulnerability Assessment

Key Tasks

- Climate Impact Chains for priority climate risks
- Data identification and integration
- Spatial assessment of climate change risk and vulnerability

Key Outputs

- Climate impact chains
- Climate Risk hotspot maps for priority climate risks

WP4: Action Assessment and Recommendations

Key Tasks

- Identify ongoing and future interventions to enhance resilience
- Develop intervention profile
- Recommendations to enhance resilience of assets, infra., etc.

Key Outputs

- Climate intervention profile
- Recommendations to enhance BCC responses to identified climate risks

WP5: Final Report

Key Tasks

- Draft BCC Climate Risk Assessment
- Present draft report to stakeholders for feedback
- Finalise draft BCC Climate Risk Assessment

Key Outputs

- Draft BCC Climate Risk Assessment
- Finalised BCC Climate Risk Assessment

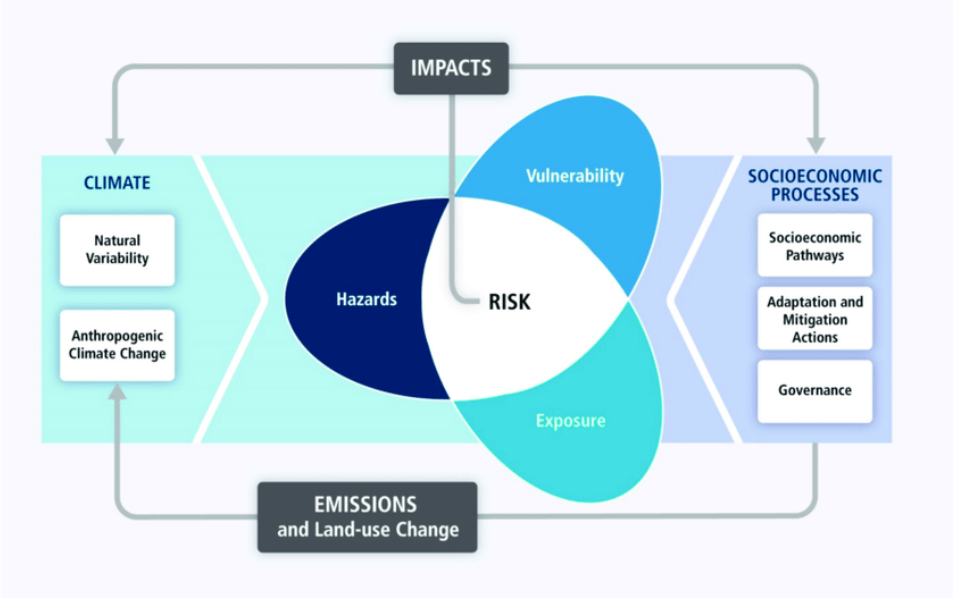
WP1: Project Management

Aims and Objectives

The Climate Change Risk Assessment of Belfast will:

- Identify and assess key climate risks and vulnerabilities for Belfast City Councils' assets and infrastructure.
- With this enhanced understanding of climate change risk, assess the efficacy of existing interventions to offset current climate change risk and to provide for resilience in the medium to short term.
- Make recommendations to enhance the resilience of BCC to current and projected future climate impact risks.

In assessing climate change risk for Belfast, we have adopted the Intergovernmental Panel on Climate Change (IPCC) Climate Risk Assessment Framework which identifies three key components of climate change risk (Hazard, Exposure, and Vulnerability).



Hazard: potential source of climate-related harm, i.e. damage or loss of property.

Exposure: presence of people, livelihoods, environmental services and resources, infrastructure, or economic and social or cultural assets in places that could be adversely affected.

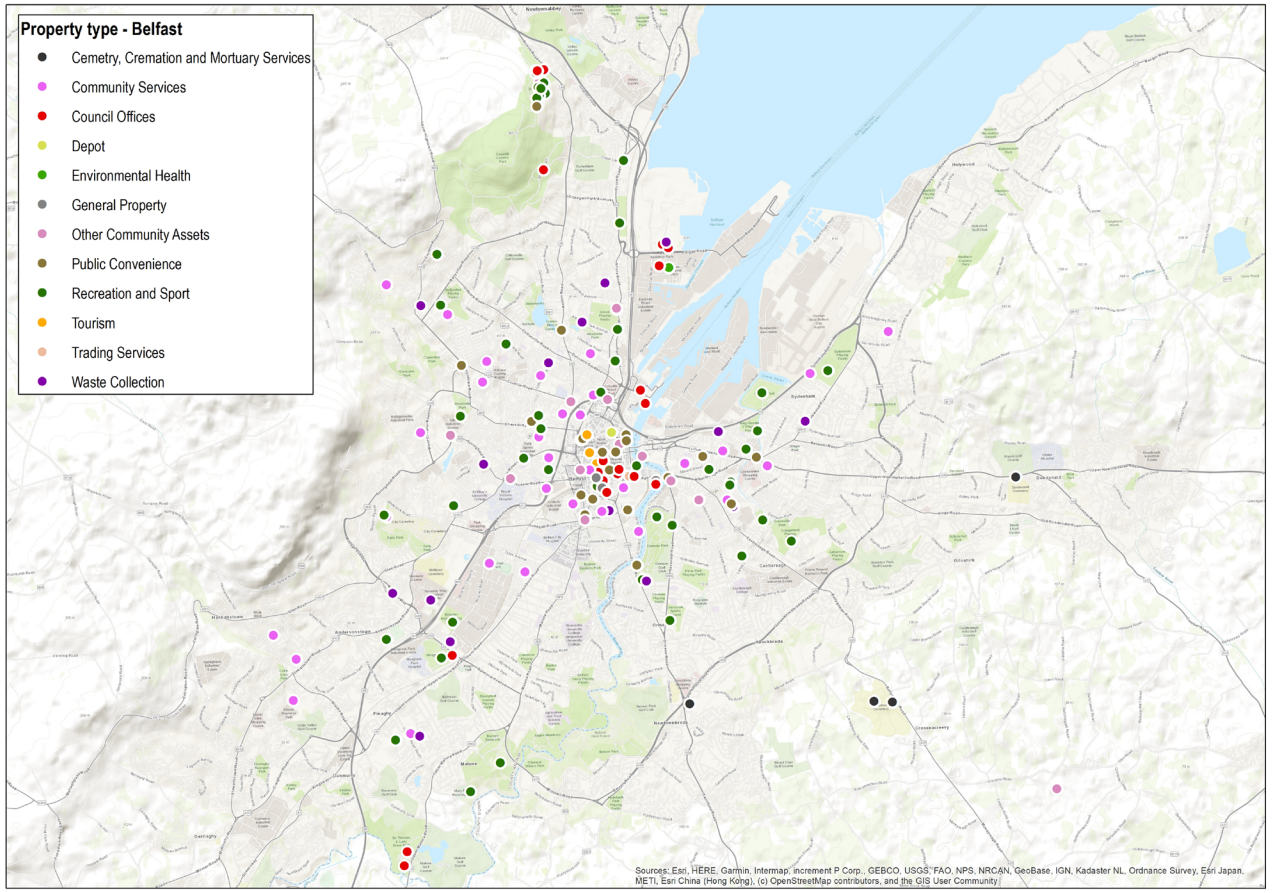
Vulnerability: propensity / disposition to be adversely affected.

Focus of Assessment

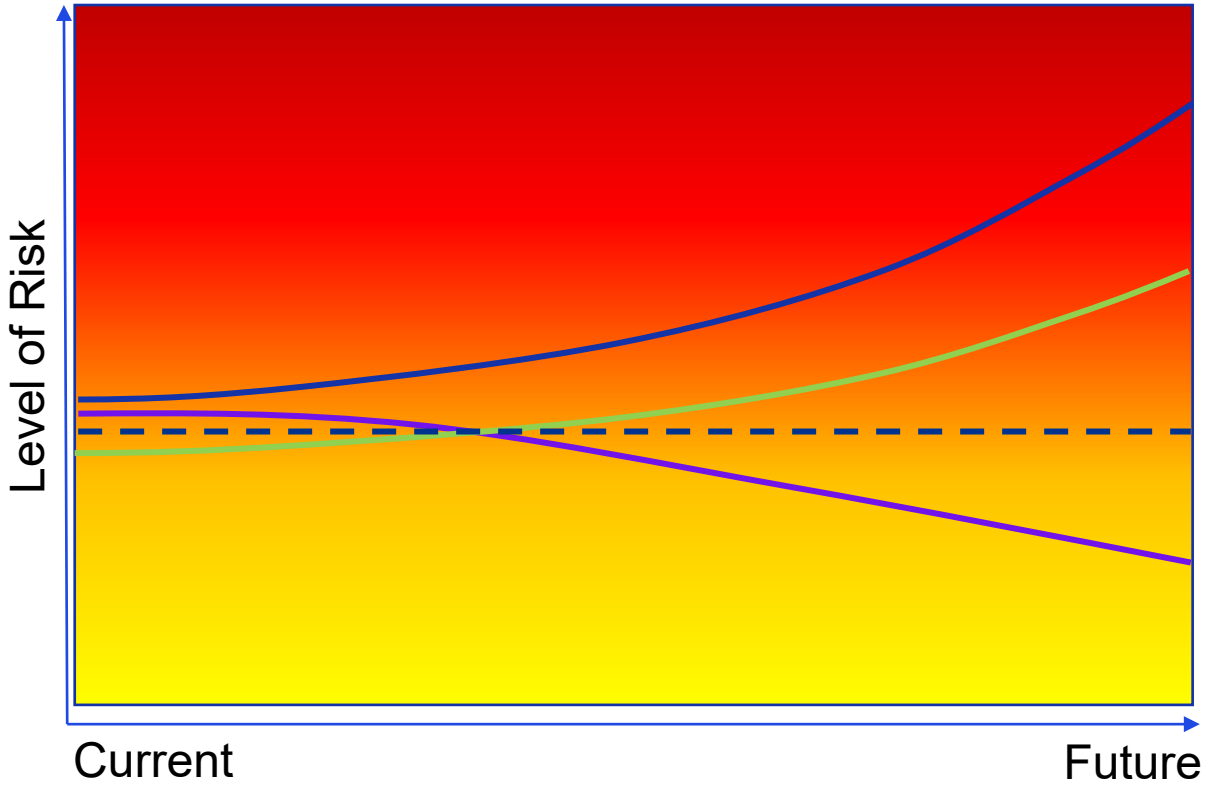
The Climate Change Risk assessment has a specific focus on BCC assets, infrastructure and people.

Assets and Infrastructure have been grouped into the following categories:

- Cemetery, Cremation and Mortuary Services
- Community Services
- Council Offices
- Depots
- Environmental Health
- General Property
- Other Community Assets
- Public Convenience
- Recreation and Sport
- Tourism
- Trading Services
- Waste Collection



Current and Future Climate Risk Profile



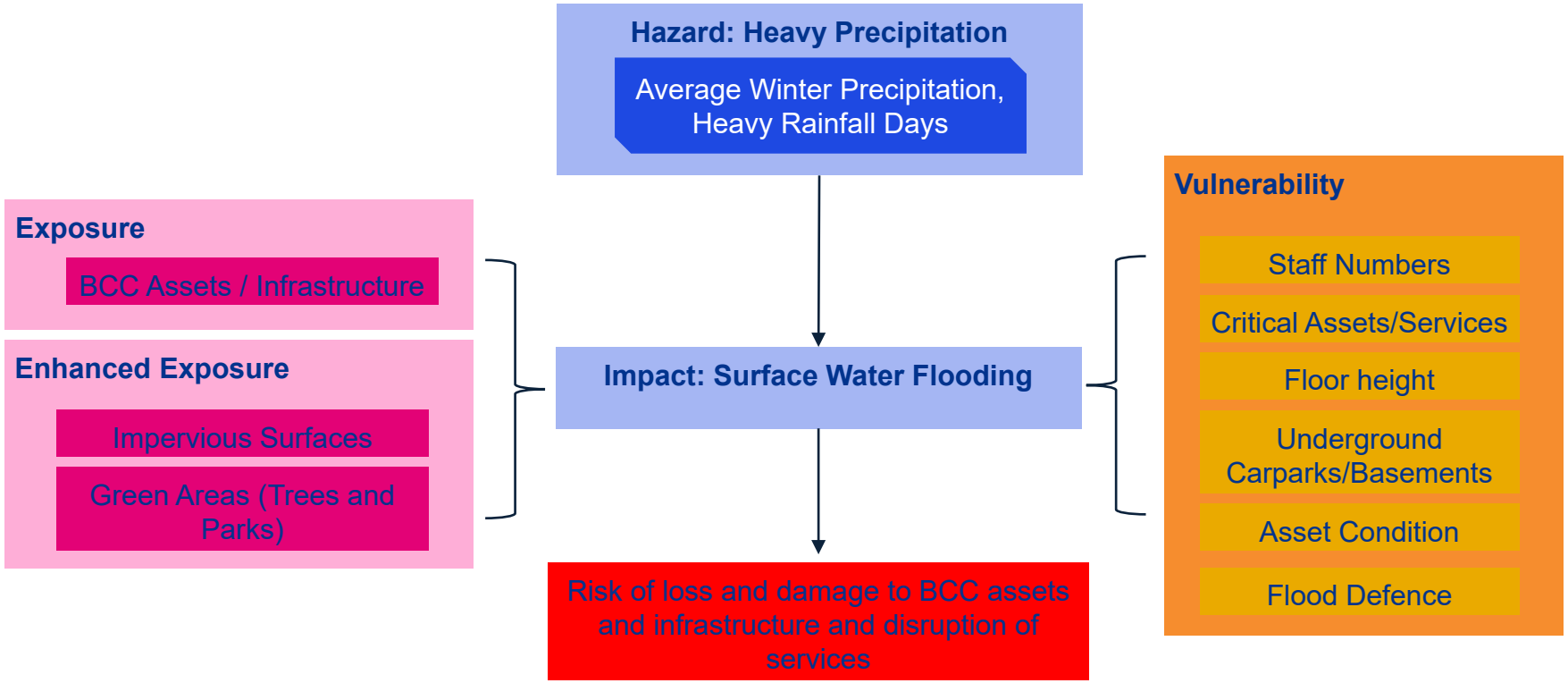
Current climate related risks (e.g. **coastal and surface water flooding**) are **projected to increase** as a result of projected changes in climate parameters and future development pathways (e.g., urbanisation)

Projected changes in climate parameters (e.g., average and maximum temperatures) and development will result in **new and emerging climate- related impacts and risks** (e.g**. heat-related risks**).

Current climate related risks are **projected to decrease** (e.g. cold related morbidity and mortality) as a result of projected changes in climate parameters and future development pathways

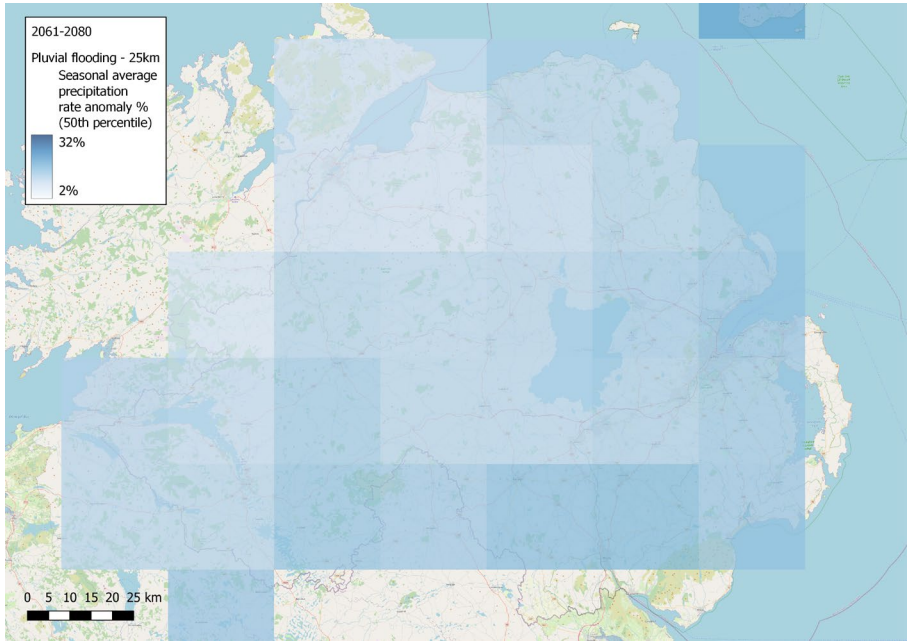
Risk Assessment Procedure – Surface Water Flooding

Risk Statement: Projected increases in the frequency of heavy precipitation events leading to surface water flooding of BCC assets and infrastructure resulting in increased costs and disruption of services.

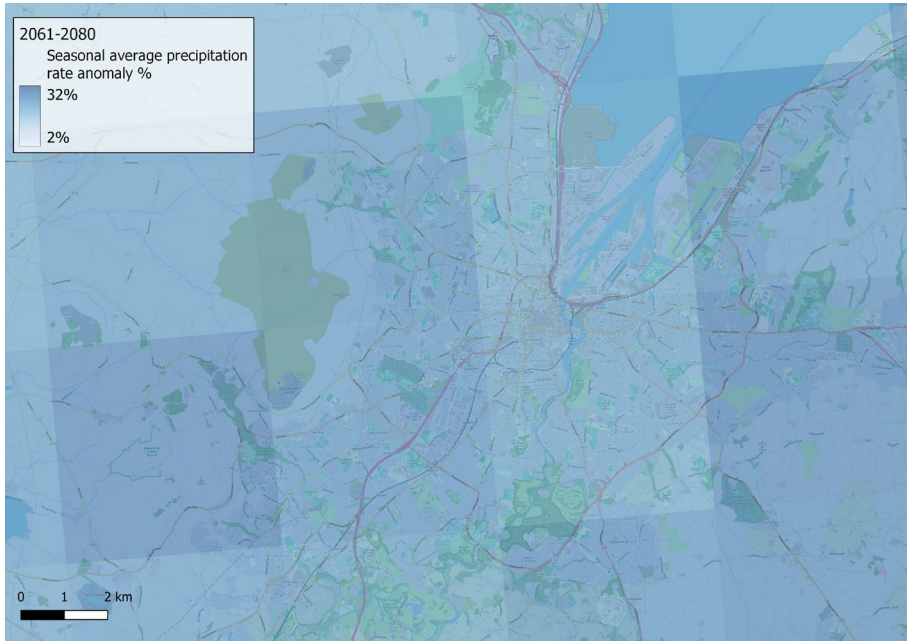


Risk Assessment Procedure – Surface Water Flooding

Our approach employs the most up-to-date climate projection data for Northern Ireland and Belfast. We assess projected changes in the key drivers of climate risk for both high (RCP8.5) and low (RCP2.6) emission scenarios and the period 2021-2041 and 2061-2080 (with reference to 1981-2000). We employ both UKCP18 Probabilistic (25km²) and Local Projections (5km²).



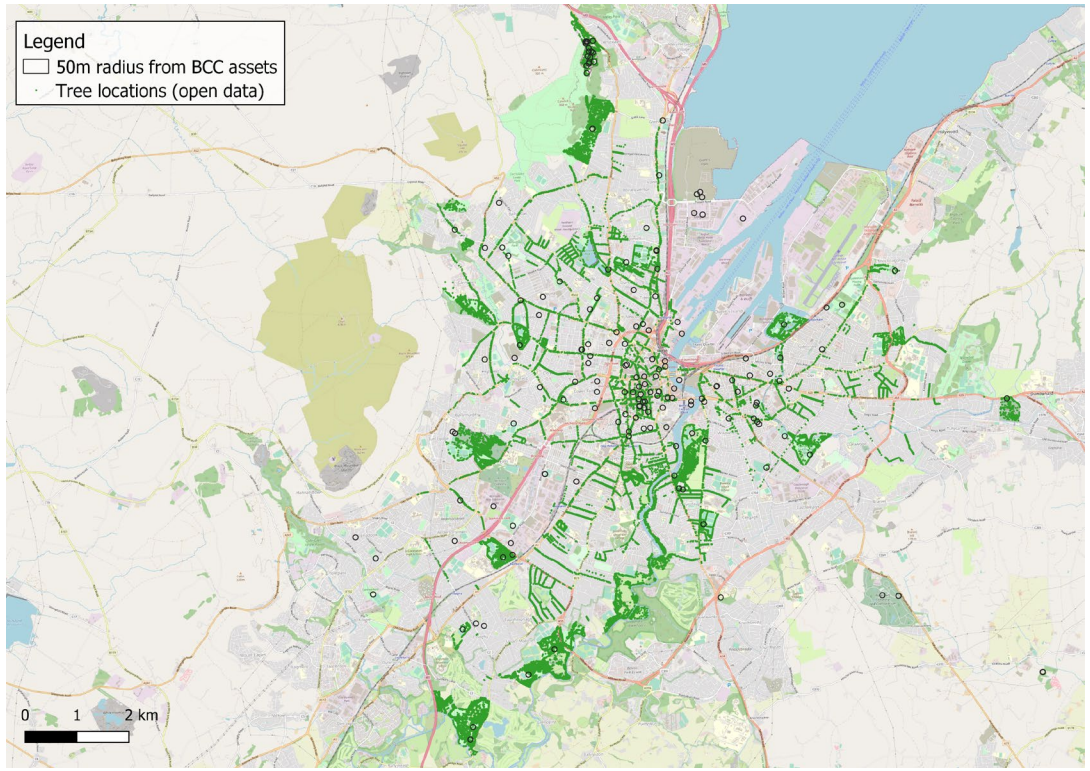
Projected changes in winter precipitation for Northern Ireland for an RCP8.5 scenario and the period 2061-2080 (source: UKCP18 Probabilistic Projections, 50th percentile)



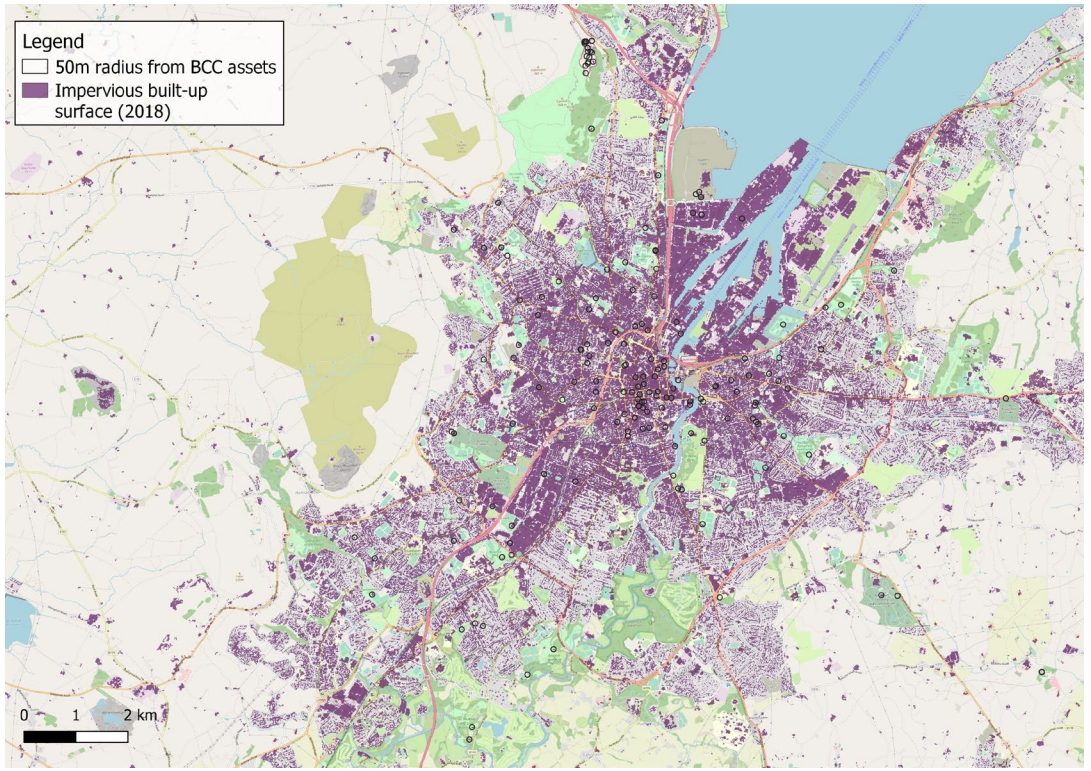
Projected changes in winter precipitation for Belfast for an RCP8.5 scenario and the period 2061-2080 (source: UKCP18, Local Projections, Ensemble Median)

Risk Assessment Procedure – Surface Water Flooding

To further understand the level of exposure of BCC assets and infrastructure, we have employed environmental data to assess factors that can enhance exposure to pluvial flooding. Examples of datasets that assess how environmental conditions can serve to enhance exposure to climate risk are provided below.



Trees serve to decrease exposure to extreme heat and provide for areas of reprieve (Source: BCC Open and Linked Data)



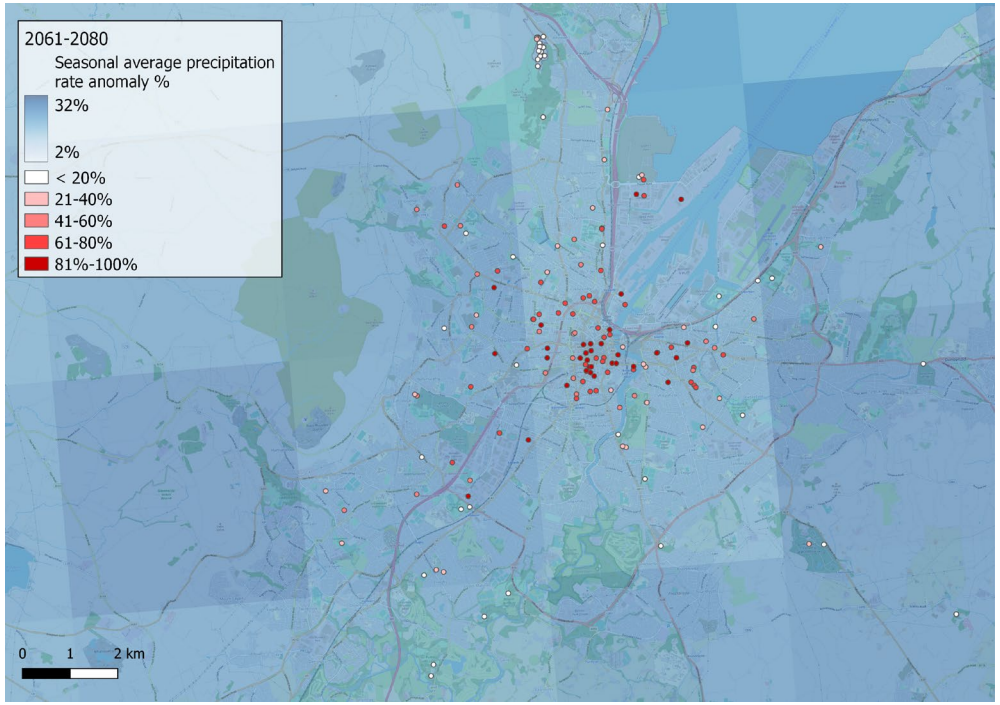
Impervious surfaces serve to exacerbate flood risk by increasing overland flows and causing pooling (Source: Copernicus Land Monitoring Service)

Assessing Surface Water Flooding – Exposure and Hazard

We combine information on projected changes in hazards, exposure to hazard and vulnerability to provide assessments of climate risk on a spatial basis and on a site basis.

ID	Belfast City Council Asset	% impervious surface within 50m	2021-2040 precip. rate anomaly (%)		2061-2080 precip. rate anomaly (%)	
			Median	2nd highest	Median	2nd highest
1	AGNES ST CIVIC AMENITY SITE	80.0%	6.34	10.51	20.05	29.48
2	AGNES ST PUBLIC CONVENIENCE	77.6%	6.34	10.51	20.05	29.48
3	ALBERT CLOCK	68.8%	3.83	11.99	16.88	24.63
4	ALBERT SQUARE PUBLIC CONVENIENCE	81.0%	6.34	10.51	20.05	29.48
5	ALDERMAN TOMMY PATTON MEMORIAL PARK - BOWLING PAVILION	0.0%	4.79	12.97	17.27	25.99
6	INVERARY COMMUNITY CENTRE	18.4%	6.34	10.51	20.05	29.48
7	ALEXANDRA PARK RECYCLING CENTRE	40.5%	6.34	10.51	20.05	29.48
8	ANDERSONSTOWN LEISURE CENTRE	53.2%	5.01	10.94	20.87	24.67
9	ANTRIM RD AUTOMATED PC	22.8%	6.34	10.51	20.05	29.48
10	ARDOYNE COMMUNITY CENTRE	74.0%	6.53	11.10	20.62	25.76

For a sample of BCC assets, the table provides data on % of impervious surfaces with 50m of the asset and projected changes in average winter precipitation for RCP8.5 and the periods 2021-2040 and 2061-2080. Projected changes are with reference to the 1981-2000 period and refer to the median and 2nd highest value of the local projection ensemble.



Projected change in average winter precipitation for RCP8.5 and the period 2061-2080. BCC assets are also depicted and characterised according to % of impervious surfaces within 50m of the asset location.

04

Next Steps

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