Preliminary Resilience Assessment

Bristol | UK
November 2015

City resilience is the capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience.

About 100 Resilient Cities

100 Resilient Cities - Pioneered by the Rockefeller Foundation (100RC) is dedicated to helping cities around the world become more resilient to the physical, social and economic challenges that are a growing part of the 21st century. 100RC supports the adoption and incorporation of a view of resilience that includes not just the shocks but also the stresses that weaken the fabric of a city on a day to day or cyclical basis. By addressing both the shocks and the stresses, a city becomes more able to respond to adverse events, and is overall better able to deliver basic functions in both good times and bad, to all populations.

Cities in the 100RC network are provided with the resources necessary to develop a roadmap to resilience along four main pathways:

1. Financial and logistical guidance for establishing an innovative new position in city government, a Chief Resilience Officer, who will lead the city's resilience efforts

2. Expert support for development of a robust Resilience Strategy

3. Access to solutions, service providers, and partners from the private, public and NGO sectors who can help them develop and implement their resilience strategies

4. Membership of a global network of member cities who can learn from and help each other.

Through these actions, 100RC aims not only to help individual cities become more resilient, but will facilitate the building of a global practice of resilience amongst the public sector, the private sector, voluntary organisations and local communities.

Contents

Executive Summary

Background to the 100 Resilient Cities Initiative

The Rockefeller Foundation has committed to investing $100million in 100 cities over five years to advance the principle of global urban resilience. Bristol was successful in bidding to join this initiative and work commenced in February 2015 with the appointment of the city's first Chief Resilience Officer (CRO).

The 100 Resilient Cities (100RC) has taken a broad a view of resilience that includes not just acute shocks – terrorist attacks, fires, floods – but also the chronic stresses that can weaken the fabric of a city on a day to day or cyclical basis. The 100RC definition of resilience, which has been adopted by all cities in the initiative, is: "the capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience."

In Bristol the resilience work is looking forward 50 years to 2065 using a range of tools and engagement methods, with support from the Government Office for Science Foresight Team and others, to develop a shared set of city values and a roadmap for change. The 2065 Resilient Trajectory will be developed with three time frames in mind: short term (to 2017), medium term (to end of statutory planning in 2036) and long term to 2065. The process will draw together strategic partners and stakeholders across the city and region to work together to explore innovate ways in which co-benefits can be delivered through collective inquiry and collaboration.

Assessment Process

Bristol has a highly engaged stakeholder community which has gone from strength to strength during 2015 due to the city's European Green Capital status. It was therefore important to place a strong emphasis on stakeholder engagement and city dialogue throughout the resilience assessment process. More than 200 stakeholders were engaged in in-depth interviews, workshops or focus groups over a six month period. This was complemented by analysis of all available secondary data related to city resilience. The two strands of the process were used to identify four resilience themes for further research and development.

Findings: City Actions

The analysis of available data relating to city actions highlighted that Bristol has a large number of strategies and plans and partnerships addressing most aspects of the city system. Whilst this can be viewed as a strength many of these plans and strategic lack cross-sector integration and do not have inclusive processes. This has led to the perceived and actual risk that city operations are siloed and/or top-down. This concern was expressed by stakeholders through one-to-one meetings and workshops. Some areas of exemplar resilience-building with integrated and inclusive approaches were identified including: a Sustainable Urban Drainage pilot in Southmead, community-led Neighbourhood Plans in Lawrence Weston and Old Market and a locally-developed Code of Conduct for Streetworks and Roadworks

Findings: Stakeholder Perceptions

The high level of stakeholder participation in the assessment process can be attributed to the highly engaged nature of Bristol's civil society as well as the City Council staff's commitment to delivering excellent services. Individual conversations across all sectors revealed a wide range of views and perspectives but a common theme was a perceived mismatch between the city narrative such as being a "green" city and actual progress in delivering change which can lead to frustration and lack of trust between different groups. There was also widespread acknowledgement that the wealth and health gaps between different parts of the city are unacceptable and that communities in some areas feel disconnected and alienated by the quirky, green and unorthodox image that the city of Bristol projects.

Executive Summary

Findings: Key assets and their vulnerability to shocks and stresses

The assessments considered the resilience of both physical and socio-economic assets to shocks and stresses. Bristol's physical assets were found to be operating satisfactorily within current demands. However due to the fragmented way different assets are currently managed across the city and region there is a lack of transparency on performance data and vulnerable assets which could reduce future resilience to possible shocks and stresses. In particular the Information, Communication and Technology (ICT) sector is poorly understood due to a failure to engage in the assessment process. This was backed up by stakeholder perceptions which indicated that the ICT sector was harder to engage in city-wide conversations as compared to the water or electricity service operators.

In terms of socio-economic assets, much of Bristol's economic strength comes from knowledge-rich businesses and entrepreneurial activity, particularly high tech, creative and digital industries. The city also has a highly skilled workforce draw from the regions four universities. The resilience assessment identified a significant degree of inequity in the distribution of socio-economic assets across the city and region and concluded that this inequality leaves the city particularly vulnerable to long term stresses such as health inequality, population change and economic downturns.

In terms of shocks to the city the risk of flooding is well understood and significant actions are currently being taken to address the threat. However, the food, housing and welfare systems were noted to be significant stresses that could rapidly turn into shocks unless more is done to address them strategically.

Conclusions: Resilience themes for further development

The synthesis of the desk study and engagement work led to the identification of four resilience themes to be taken forward for further work in Phase 2 of the strategy development process. These four themes, which seek to build on the city's existing "resilience success factors", have been framed as questions for further research. These questions will be taken forward by the CRO in partnership with, and leveraging in-kind contributions from, a wide range of city stakeholders, UK organisations and 100RC global partners.

A. Organisations
How can city structures promote collaborative working and foster shared ownership of future priorities?

B. People & Families
How can every citizen have the confidence, skills and trust to play a positive and ative role in shaping the future of the city.

**C. Place**
How can the city's assets meet future demand and be resilient to the effects of climate change and other unforseen shocks and stresses?

D. Prosperity & Worth
How can prosperity and welbeing be promoted through innovative forms of financing, emplyment and sharing resourses that value local social and natural capital?

Figure 1: Resilience focus areas emerging from assessment
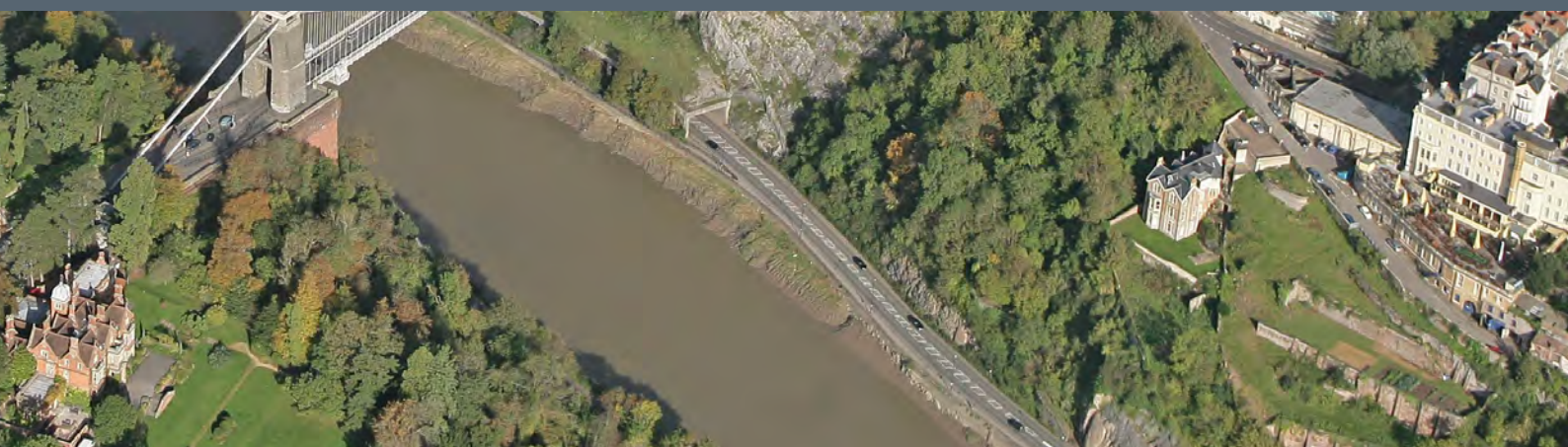
1 Introduction

The Rockefeller Foundation has committed to investing $100million over five years in developing city resilience, defined as "the capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience." They established the 100 Resilient Cities Programme (100RC) in 2013 to deliver this agenda.

Bristol was successful in its bid to join the first wave of 33 cities along with four European cities: Glasgow, Vejle in Denmark, Rotterdam and Rome The 100RC initiative is particularly exciting for Bristol as it will help build on the success of the city's year as 2015 European Green Capital. Joining the 100RC Network will consolidate the city's ambition to be a world leader in resilient and sustainable city development.

100RC provided funding for Bristol City Council to appoint a Chief Resilience Officer and Sarah Toy took up the post in February 2015. She is responsible for coordinating the development and implementation of a Resilience Strategy for Bristol, working closely with Strategy Partner Arup and a wide range of stakeholders across the city.

This document, the Preliminary Resilience Assessment (PRA), sets out work done between February to July 2015 to understand Bristol's existing resilience (the baseline) and to identify a number of Focus Areas for further work which will be contribute to development of a Resilience Strategy. The PRA represents Bristol's thinking on resilience at a point in time, which will evolve as we continue our work with 100RC.

In parallel, the city of Bristol, led by Bristol City Council (BCC) and a group of 50 Founders, embarked on an exciting shared endeavour to articulate a 50 year trajectory for the city. This work has been purposefully integrated with the resilience strategy development process and so Bristol's resilience strategy will be developed with three time frames in mind: short term (to 2017), medium term (to end of statutory planning in 2036) and long term (2065, to provide a 50 year frame in line with Government Office of Science Foresight Future Cities work).

The PRA document is structured as follows:

- **Section 2** introduces the 100RC City Resilience Framework used as the basis for this assessment and describes the work that has been undertaken to identify Focus Areas;

- **Section 3** provides an overview of aspects of Bristol's social, economic and physical context that are of particular relevance to resilience;

- **Section 4** explores the actions and strategies that are currently contributing to Bristol's resilience;

- **Section 5** reviews stakeholder perceptions relating to resilience;

- **Section 6** looks at Bristol's assets and evaluates the major shocks and stresses they might face over the coming decades;

- **Section 7** sets out the findings and synthesis from the work in sections 2-6, and introduces the themes and focus areas.

Bristol Old Vic Theatre ©Arup

2 Methodology

2.1 Resilience Concepts

100RC has taken a broad a view of resilience that includes not just the acute shocks – such as terrorist attacks, fires, floods – but also the chronic stresses that can weaken the fabric of a city on a day to day or cyclical basis. Examples of stresses are high unemployment, health inequalities and inefficient public transport systems. By addressing both the shocks and the stresses, a city becomes more able to respond to adverse events, and is overall better able to deliver basic functions in both good times and bad, to all populations.
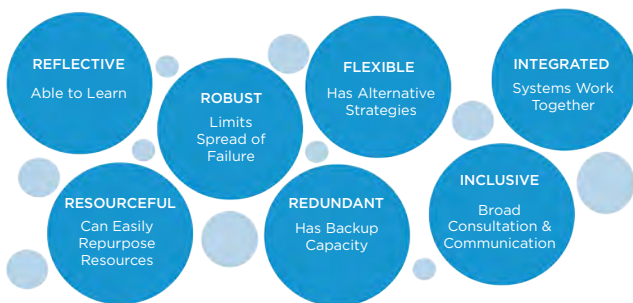

Figure 2: Qualities of a resilient system

The qualities of resilient systems shown in Figure 2 are important in preventing the breakdown or failure of a system or of enabling appropriate or timely action to be taken. Cities can determine their overall resilience by understanding the presence or absence of these qualities within their systems and services

For Bristol, the focus is on ensuring that resilience helps to move beyond business as usual, to take the city towards a flourishing future by securing multiple benefits from each resilience initiative undertaken (the 'resilience dividend').

In order for a city to be resilient, it is important that each of its constituent parts is resilient. In Bristol, the idea of a resilience 'holarchy' has been developed to recognise that resilient systems are comprised of resilient individuals, family units or friendship groups, neighbourhoods, organisations which are connected to city systems and regional, national and international systems. This is represented in Figure 3.

Figure 3: Resilience Holarchy

2.2 Geo-political Boundaries

As shown in Figure 3, resilience thinking needs to be applied at every level from the individual up to city and city-region scale. This is a practical challenge as it transcends administrative boundaries. Many of the infrastructure systems that are crucial for the city's resilience need to be assessed at a regional scale (e.g. water supply reservoirs are located outside the City's administrative boundary and all the strategic public transport corridors straddle two or more local authorities). The resilience assessment has identified strategic, cross-boundary issues and has not been confined to the administrative city centre area. The relevant boundary or authority has been identified on a case by case basis where relevant.

2.3 Tools

100RC have adopted the City Resilience Framework (CRF) shown in Figure 4 which was developed by Arup and the Rockefeller Foundation to guide a common approach to city resilience across cities. The CRF was designed using evidence from over 150 literature sources, case studies taken from 14 cities and detailed fieldwork with a broad range of stakeholders in six cities across the world. The framework provides a lens through which the complexity of cities and the drivers that contribute to a city's resilience can be understood.

The CRF identifies 12 drivers in a city which collectively determine the city's resilience. These 12 drivers are further described by 58 sub-drivers.
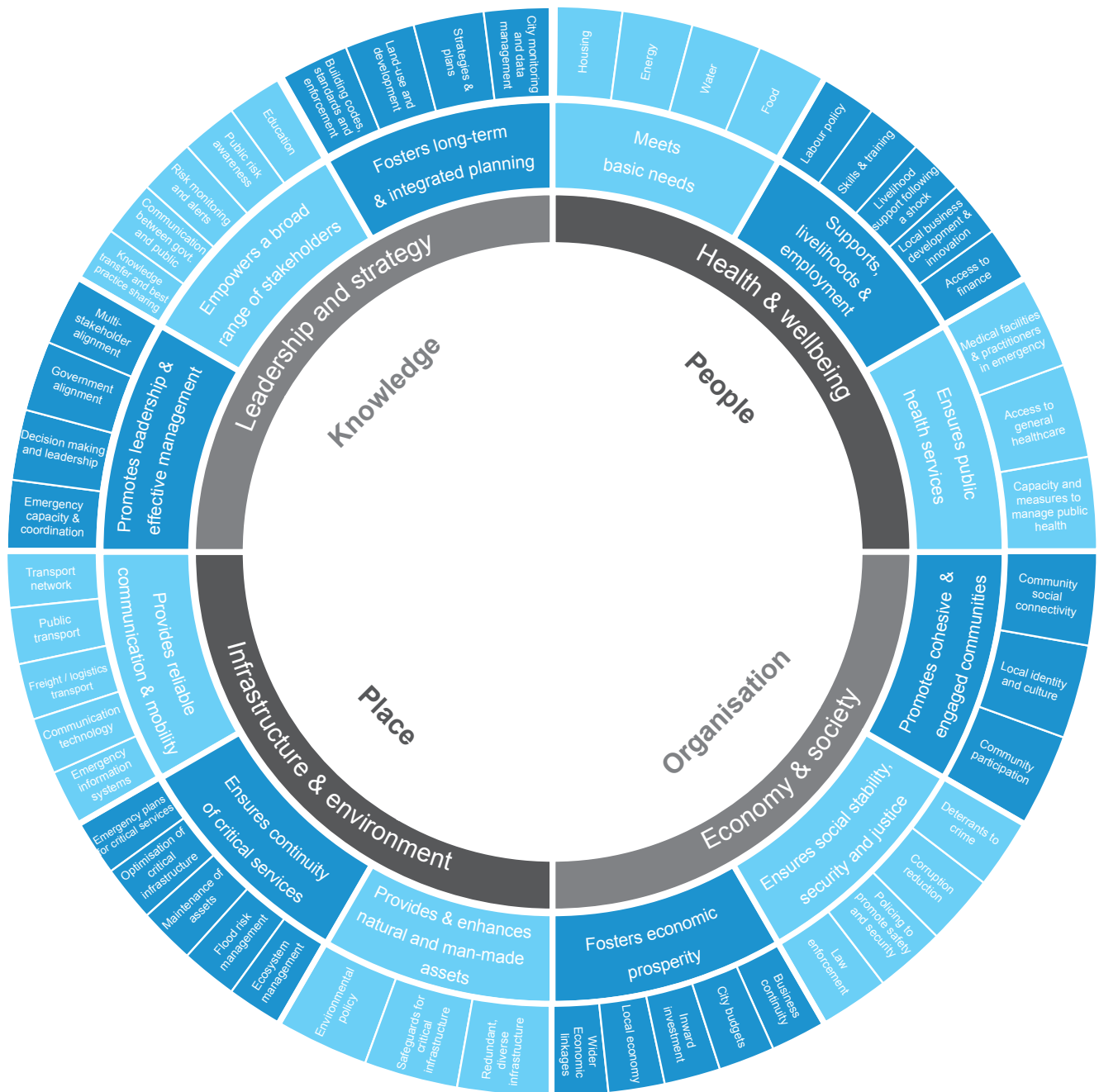
Figure 4: City Resilience Framework (Arup/The Rockefeller Foundation, 2014).

Building on the CRF, 100RC has developed a range of new tools to help cities understand their resilience challenges, risks and opportunities. The tools available for Bristol to carry out the resilience assessment were:

- Stakeholder perceptions tool;
- City actions tool;
- Assets and risks tool.

Some work was also undertaken by the consultant Buro Happold, on a pro bono basis, to test their resilience assessment tools. The work to assess shocks and stresses was validated using their process, which is complementary to the 100RC tools and process.

The following section describes how these were deployed as part of the Preliminary Resilience Assessment process.

2.3 Governance

The CRO reports to the Future City Director, Stephen Hilton, who in turn reports to the City Director, Nicola Yates. This ensures that the CRO has good reach across all four city council departments (People, Place, Neighbourhoods and Change) rather than being siloed under any one directorates. Progress towards the PRA has been reviewed by the Strategic Leadership Team, comprising all four directorates.

The role is recognised as being a city role rather than a council role and it was important to get the right governance structure to support the PRA process. A Resilience "Sounding Board" was set up with a selected group of high profile stakeholders from the university, private, public and third sectors. The group had three meetings (roughly bi-monthly) to support the PRA process and provide objective feedback from a breadth of perspectives. The composition and terms of reference for this group is shown in Appendix 1.

2.4 Process

100RC has already developed a well-defined process for cities to follow in carrying out a preliminary resilience assessment and Bristol had the benefit of learning from early participating cities, including San Francisco, Berkeley, Melbourne, Byblos, Rotterdam and New Orleans, that had already completed their PRAs.

The process for Bristol, which has a highly engaged stakeholder community thanks to a long history of activism, as well as the 2015 European Green Capital Award, placed a strong emphasis on stakeholder engagement and this element was led by the CRO.

Stakeholder engagement was complemented by a desk study to collect secondary data to populate the 100RC tools and provide a snap shot of current city resilience. This part of the process was completed by a team assembled from BCC teams (sustainable city, strategic planning, and public health), the University of Bristol and Arup. Figure 5 shows the elements of these two parallel workstreams and how they were combined to identify the themes and Focus Areas.
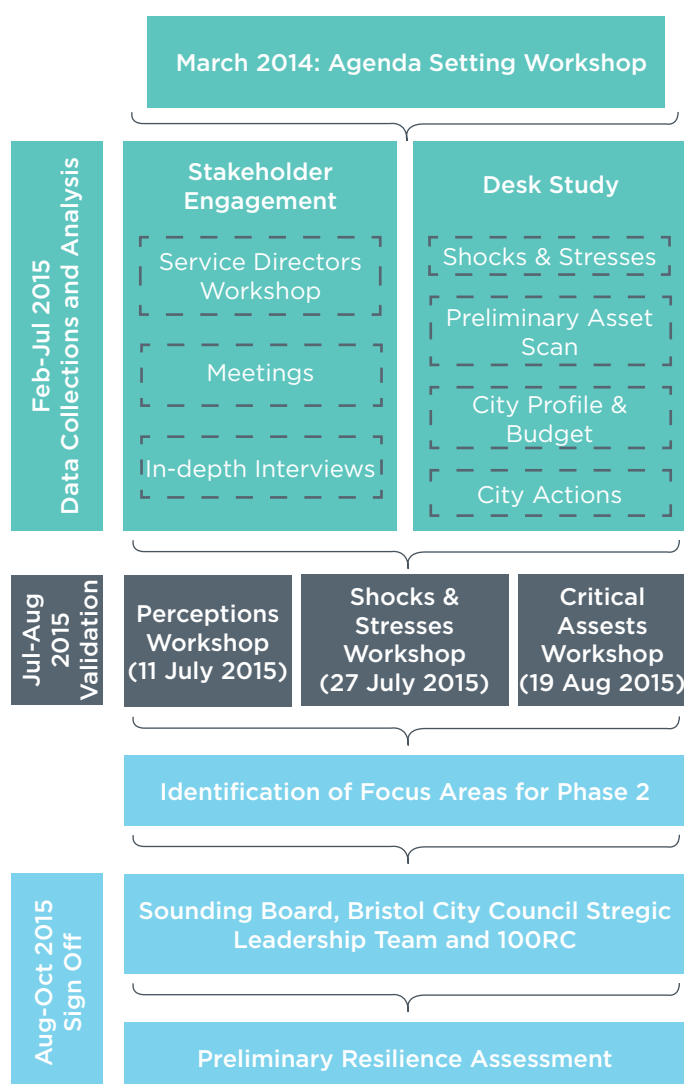
Figure 5: Preliminary Resilience Assessment process

2.4.1 Stakeholder Engagement

The development of a stakeholder engagement plan with the strategy partner Arup helped to identify the broad range of public, private, statutory and third sector stakeholders that have an interest in city resilience.

The subsequent stakeholder engagement process was specifically designed to harness the commitment of those considered to have resilience-related interest and power (top right hand quadrant) and to seek to influence those who were considered to have power but less interest in resilience (top left hand quadrant).

A range of engagement techniques were used including:

Semi-structured face-to-face interviews;

Formal group presentations;

Targeted workshops;

Speaking contributions; and

Bi-monthly Sounding Board meetings.

Appendix 2 contains a list of all individuals and groups that were met as part of the engagement process.

This process formed the basis of the stakeholder perceptions assessment that is presented in Section 5.

2.4.2 Desk Study

The team were tasked with collecting and analysing all the secondary data to populate the tools to assess city actions, assets, shocks and stresses. The team met weekly with the CRO to review progress, identify data gaps and discuss emerging findings.

The sources of secondary data used in the assessment included:

- BCC internal strategic planning data on city strategies and action plans;
- BCC Asset Management Plans;
- Publicly available data from regulatory bodies (e.g. Ofwat, Ofgem);
- Publicly available data and plans from third parties; and
- Avon and Somerset Community Risk Register.

2.4.3 Synthesis

The synthesis of the findings from the desk study and the stakeholder engagement work was led by the CRO with support from Arup and BCC colleagues as well as the Resilience Sounding Board. The outputs from the tools were shared and discussed at a number of forums and workshops to validate the conclusions. This resulted in the development of themes and focus areas for further research as discussed in Section 7.

3 Bristol City Context

Bristol has a pioneering and independent spirit and personality that's been within us throughout our 800 years as a city. It is a city with vibrant cultures and a high quality of life. Bristol is the European Green Capital in 2015, which the judges awarded to "the city with the sense of fun".

Bristol is a prosperous city; an attractive location for knowledge-rich businesses and entrepreneurial activity. At the same time, the City's success is not equally available to all; there are inequalities in health and wealth.

The City is situated at the heart of the West of England sub-region, it is geographically well connected and draws commuters from a wide area, with the longest average in-commute in the UK after London.

3.1 Leadership and Strategy

On the 16th November 2012, the independent candidate George Ferguson was announced as the newly elected Mayor of Bristol, one of the few to be directly elected in the UK. The Mayor represents the interests of Bristol's citizens and leads the city council and its full range of services, with a turnover of around £1billion a year.

The City Council has responsibility for delivering a large number of city services, but there are many more delivered by other private, public and third sector bodies. Mayor Ferguson has chosen to retain ultimate responsibility for all major policy decisions, which he makes through a number of partnership Boards including the Health and Wellbeing Board and the Learning City Board.

There are also cross-boundary interdependencies, with a need for Bristol to work in partnership with its three neighbouring authorities in the West of England, as well as further afield. The Local Enterprise Partnership (LEP) brings together the public and private sectors across the four authorities around issues relating to economic growth. The Planning, Housing and Community Board makes recommendations on cross-boundary issues. This body is overseeing the production of the Joint Spatial Plan (JSP) for 2036 and there is a Joint Transport Board overseeing the production of a Joint Transport Plan 2036 to inform the JSP.

On paper Bristol has a fairly robust emergency planning framework. Under Civil Contingencies legislation, the City Council works with other emergency responders, including the Police, Fire Service, Ambulance Service and others, in a 'Local Resilience Forum' to assess risks, write multi-agency plans and train and exercise. Two of the Local Resilience Forum key products are the Community Risk Register; a comprehensive assessment of all the civil contingency risks facing the Avon and Somerset area, and the Major Incident Response Guide; a locally agreed division of emergency response roles. The City Council itself maintains a 'Civil Protection Unit' (CPU) consisting of 4 emergency planners. The CPU use the Community Risk Register to identify local (Bristol) risks, write emergency plans and train and exercise staff on the Authority's response and recovery roles.

Following the global recession in 2008, the public sector in the UK has faced growing austerity and budget cuts. This is changing the role of local government, meaning it is often becoming a facilitator, rather than deliverer of services. This is reflected in the inclusive approach to this work.

The UK government announced a big shift in local government's responsibility for delivering and financing public services in the Autumn Statement in November 2015. The changes will ultimately give local authorities the power to retain and vary business rates to invest locally. Many of the cities, including Bristol, have been engaged in confidential negotiations around devolution of power since the Conservative government was formed in May 2015. It is not yet clear what the result of these negotiations will be for Bristol, but what is certain is that the city is set to gain more powers and autonomy in the future. This increased autonomy will help the city to prioritise investing in projects and initiatives that make the city more resilient.

437,500 current 2013 528,200 projected 2037
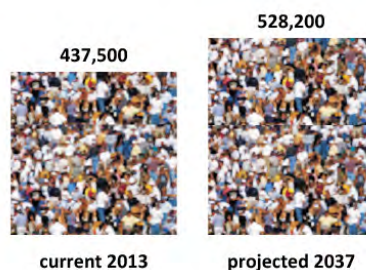
3.2 Economy and Society

Bristol has a fast growing population, with a 21% rise predicted by 2037 (see figure 5). With a 2013 population of 437,500, it sits at the heart of the West of England (population 1.1 million), which reaches from Bath to Weston-Super-Mare to Yate.
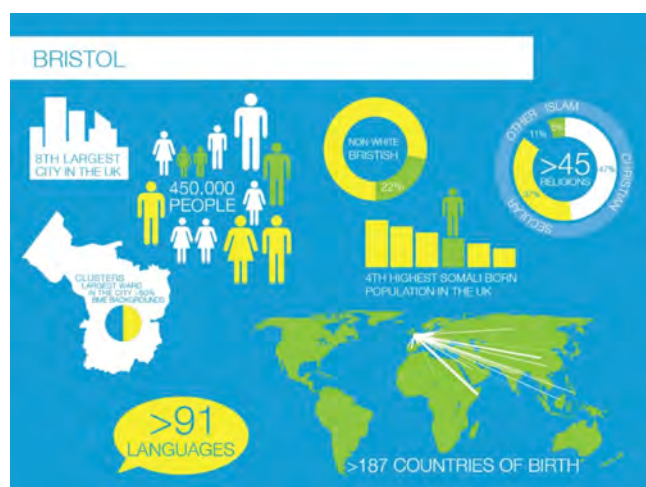

Figure 5: Rapidly growing diversity of Bristol's populations

1 The Core Cities are England's eight largest city economies outside London, along with Glasgow and Cardiff,

Since 2003, the population is estimated to have risen by 46,000 people (12%), higher than the England and Wales average. This large increase can be attributed to a number of factors. The city attracts many young people come to study and its 'stickiness' means that a high proportion choose to stay and start families (seen in the significant rise in births). The other noticeable trends are a significant increase in net-international migration, and an ageing population.

The population of Bristol has also become increasingly diverse in recent decades as shown in Figure 6 and some local communities have changed significantly. There are now at least 45 religions, at least 180 countries of birth represented and at least 91 main languages spoken by people living in Bristol.
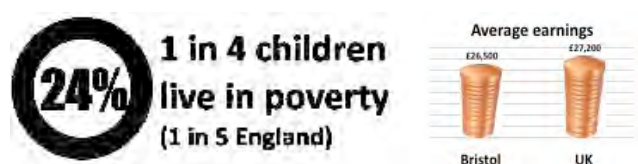
This story of a prosperous and creative city hides a large gap between the rich and poor. The average earnings are higher in Bristol than the UK average but there is also a higher than national average proportion of children living in poverty (ref. DWP Tax Credits data, 2012).

3.3 Health and Wellbeing

Generally the population of Bristol is healthy with 82% of people feeling in good health, similar to the national average; and people are living longer. There is a high level of satisfaction as a place to live amongst Bristol residents.

82% of residents are happy with Bristol as a place to live (Quality of Life survey 2014)

However, the gap between rich and poor in Bristol is also manifested in longstanding, deep seated inequalities in health and wellbeing between some of the most affluent and most disadvantaged areas. For example, life expectancy is rising, but there is a persistent gap between the most and least deprived wards (an estimated gap of 8.9 years for men and 6.6 years women between Henleaze and its neighbouring ward of Southmead, 2011-13).

3.4 Infrastructure and Environment

Traffic congestion is consistently reported as the top concern of residents in Bristol's Quality of Life Survey. This is despite the fact that more people in Bristol commute to work by bicycle or on foot than in any other Local Authority in England and Wales (57,000 - 27% of the working age population[2]).

It has been estimated that traffic congestion could cost the local economy some £600 million a year by 2016. Air quality also remains a concern; despite improvements, ozone and NO_2 levels are still above EU limits in central areas and on main radial roads.

There is an ongoing need for more affordable housing in the city. Over the past decade (February 2005 to February 2015), average house prices in Bristol increased by £44,100, an increase of 29%, higher than the national average. In 2009 it was estimated over 1,500 new affordable homes would be required each year, more than have ever been built.

Bristol has made some major advances in reducing CO_2 emissions. In the last decade the city's population grew by 12% and the economy by 40%, whilst between 2005 and 2013, there was a 17% reduction in CO_2 emissions[3].

Within the city boundary there are 1500 hectares of accessible green space. Over 25 million visits are made by 83% of the Bristol population to parks and green spaces every year. However, these facilities are unevenly distributed throughout the city, both in terms of quality and quantity[4].

Summary

- The changing role of local governments in the UK means Bristol's 50 year resilience trajectory needs to be a citywide effort
- Bristol's population is growing and becoming more diverse
- Bristol is an affluent city, but this masks inequalities
- Bristol has challenges such as transport congestion due to in-commuting and a lack of affordable housing due to market pressures and low delivery of new units.

2 2014 ASHE ONS and Centre for Cities data tool http://www.centreforcities.org/data-tool/
3 DECC figures
4 Bristol City Council, Bristol's Parks and Green Space Strategy, 2008
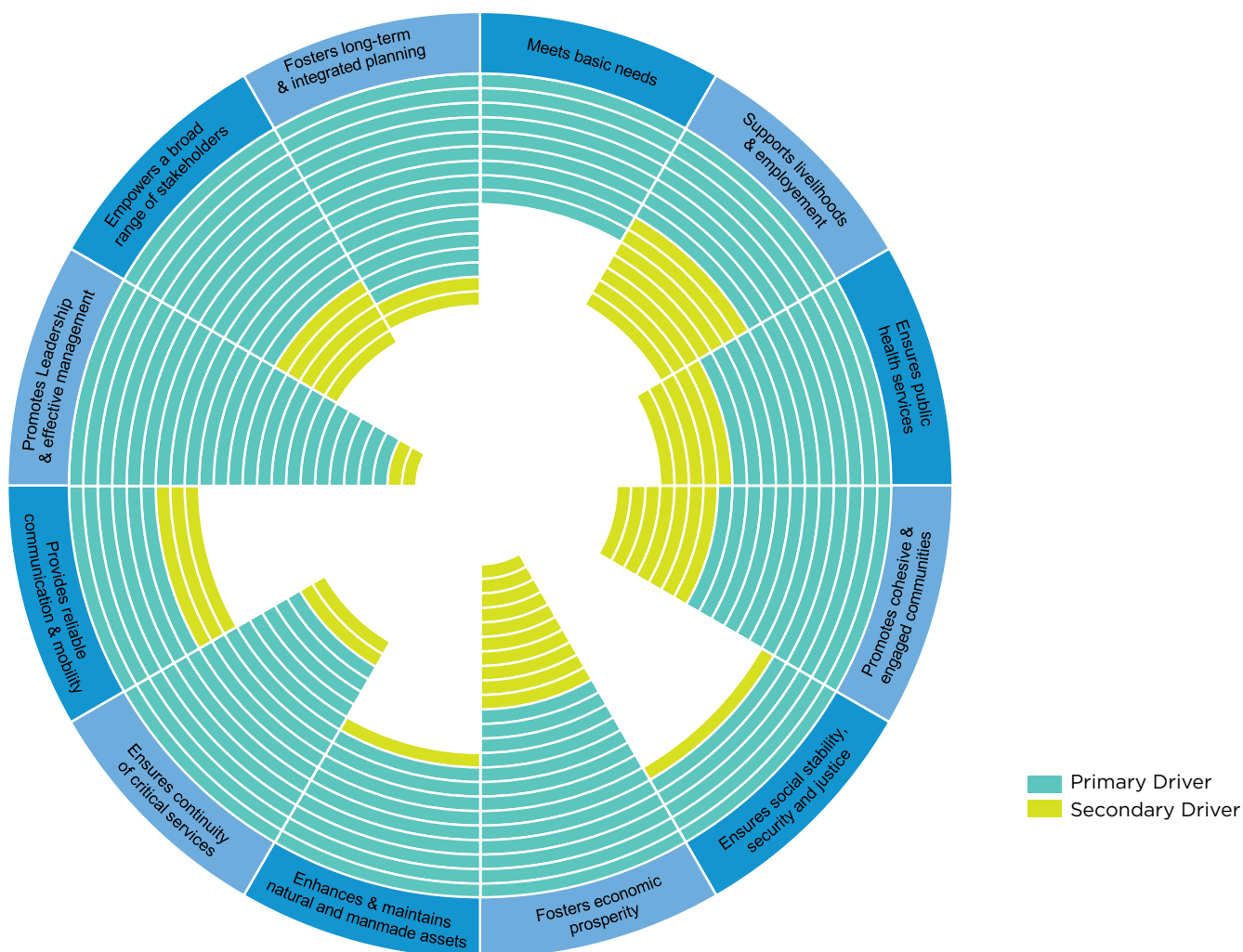
Figure 6: Primary & secondary drivers identified in citywide plans & strategies

4 City Actions

4.1 Review of Plans and Strategic Programmes

In a city the size and scale of Bristol, it is almost impossible to understand everything that is happening at all scales that might contribute towards our resilience.

This element of the assessment focused reviewing policies and plans that are citywide (and predominantly owned by Bristol City Council). A total of 53 plans and strategic programmes were identified (see Appendix 2) and these were mapped against the city resilience framework. Each strategy was assessed, identifying the relevant primary (i.e. direct) and secondary (i.e. indirect) resilience drivers that each one contributes to. The results of this are shown below illustrating the relative frequency of actions in relation to the 12 drivers of city resilience.

This output provides a starting point for discussion, rather than a comprehensive view of Bristol's existing performance.

This output shown in Figure 7 highlights that Bristol is good at producing strategies and plans; from an autism strategy to a biodiversity action plan, from a river basin management plan to a cycling strategy. Many of these strategies and plans are overseen by multi-sector strategic partnerships. This wide range of existing strategic partnerships will be an important consideration in thinking about long-term governance of resilience.

The conclusion from this exercise is that there is a lot happening in Bristol, but that it is not always integrated, meaning that there are someone overlaps and potential inefficiencies.

It has not been possible to assess the extent to which these strategies and plans have the resources to be implemented, nor the extent to which they embody the seven resilience qualities introduced earlier in Figure 1.

4.2 Exemplar Projects

Whilst it was outside the scope of this study to carry out a review of all projects currently underway and contributing to resilience it was important to recognise the many exemplar projects already being undertaken by a wide range of stakeholders in the city; those set out below provide some limited examples. The ways in which these examples can be scaled up and included in the 50 year resilience trajectory will be considered in the next phase of work.

one day : Day One

one day: Day One is a pop-up participatory artwork, which helps individuals to explore the concepts of resilience. The project has, very simply, created a light-footed and roving pop-up structure where the people of Bristol can enter and imagine their own future resilient Bristol as if that were today's Bristol. Their visions for the future-now are documented in audio and video, collected and represented online and in public spaces, while the structure itself moves daily and weekly around the greater Bristol area.

This project is particularly **inclusive**, engaging with individuals in diverse communities across the City. It is also **reflective**, gathering information and views on the future to inform future actions and priorities.

Bristol is Open[6]

Bristol is Open is a Joint Venture between the University of Bristol and Bristol City Council, which aims to deliver research and development initiatives that contribute to the development of a smart city and the 'Internet of Things'.

Small sensors, including the smart phones and GPS devices of willing participants, will supply the three new fast networks in the centre of Bristol, with information about many aspects of city life, including energy, air quality and traffic flows. A city operating system will dynamically host this machine-to-machine communication, allowing the development of a wide range of applications. All data generated will be made available on an open data portal.

The project is working with a range of partners, including large telecom and software companies, small hi-tech start-ups, public service delivery organisations, academics and others.

The project is particularly enabling Bristol to be **reflective** by developing an environment for new technologies to be tested, and allowing partners to learn. It is also encouraging **integration**, both technical and organisational.

Severn Project[5]

The Severn Project began in 2010, producing salad leaves and herbs at urban farms in Bristol, with an aim to empower individuals and communities by providing training, education and employment opportunities.

The project uses otherwise disused land, bringing it into productive use, contributing to wildlife and biodiversity, providing a local food source (reducing carbon emissions) and supporting the local economy. The project supports people recovering from drug and alcohol misuse, people with poor mental health and those with offending backgrounds to go back to work. Working with the City of Bristol College and Bridgwater College, the project provides education, training and apprenticeships.

The project's particular resilience qualities include;

• It is **inclusive**, enabling a range of individuals to engage with training, work opportunities and their communities

• It is **integrated**, bringing together multiple outcomes and organisations

• It is **resourceful**, bringing together resources from a number of sources (including soil from Avon and Somerset Police, disused land from Bristol City Council, a range of referral organisations, food businesses and individuals, both as consumers and volunteers)

• It is **flexible**, with its approach to satellite growing allowing new and evolving business models

Southmead Embleton Road SuDS Project

This project, funded by a Green Capital award, is working with residents to help make streets greener and improve drainage, using Sustainable Drainage Systems – SuDS. The project recognises that Sustainable Drainage Systems help to manage flood risk and water quality, as well as providing other benefits that create great places to live; making the streets safer for walking and cycling, as well as bringing people in the neighbourhood together.

The project embodies a number of resilience qualities;

• It is **inclusive**, with school groups and other local people being involved in the design

• It is **integrated**, bringing together multiple outcomes and organisations

• It is **resourceful**, bringing together resources from a number of sources (financial resources from Bristol City Council and Bristol 2015, intellectual resources from Bristol City Council, Sustrans, Arup and local people)

• The project aims to be **reflective**, learning lessons for future SuDs projects across the City

Bristol Code of Conduct for Streetworks and Roadworks

An award-winning partnership formed to help reduce disruption during roadworks and streetworks has saved Bristol from 150 days of activity on the city's highways in 2014.

The Council established the Bristol Code of Conduct for Streetworks and Roadworks in collaboration with Bristol Water, Wessex Water, Wales and West Utilities and Western Power Distribution. The streetworks code goes over and above existing legislation whilst encouraging utilities to take a collaborative approach to reduce inconvenience to road users during essential work. The agreement involves sharing plans and coordinated improvements wherever possible.

The project embodies a number of resilience qualities;

- It is **integrated**, bringing together multiple projects and organisations

- It is helping to ensure that Bristol's infrastructure is maintained and can remain **robust.**

Lawrence Weston Neighbourhood Plan[7]

Ambition Lawrence Weston (ALW) is a community driven Regeneration Project for the Lawrence Weston community in North Bristol. In 2012, The Lawrence Weston Neighbourhood Planning Group (LWNPG) was formed. It has over 30 resident members and elected local councillors. It worked with residents and other stakeholders to develop a Neighbourhood Development Plan for the area.

LWNPG was assisted by Arup in order to produce a Neighbourhood Plan, to enable the Group to influence development in the area. The Plan identifies objectives such as providing new high quality housing, improving green spaces and the wider public realm and allocating land for a new retail use.

Following the development of the Neighbourhood Plan, the Neighbourhood Planning Group have been able to secure a new supermarket and lead a community housing project in partnership with a developer.

The project embodies a number of resilience qualities;

- It is inclusive, with the process engaging and consulting with a wide range of residents and businesses

- It is integrated, bringing together multiple projects and organisations

- It is reflective, with local residents learning about the planning process, and understanding their role within it

Summary

There are some great projects and initiatives already happening in Bristol – particularly at neighbourhood level – that display resilience qualities. The 50 year resilient trajectory will aim to learn form and build on these exemplars. The challenges will be in scaling up and in integrating with existing activities.

5 Information from http://www.thesevernproject.org/the-purpose/ [accessed October 2015]
6 Information from http://www.bristolisopen.com/ [accessed October 2015]
7 Information drawn from; http://www.ambitionlw.org/ambitionlworg/link/main/one/wordpress/welcome/planninggroup/
8 BBC News, 2014 http://www.bbc.co.uk/news/magazine-26730705 [accessed October 2015]
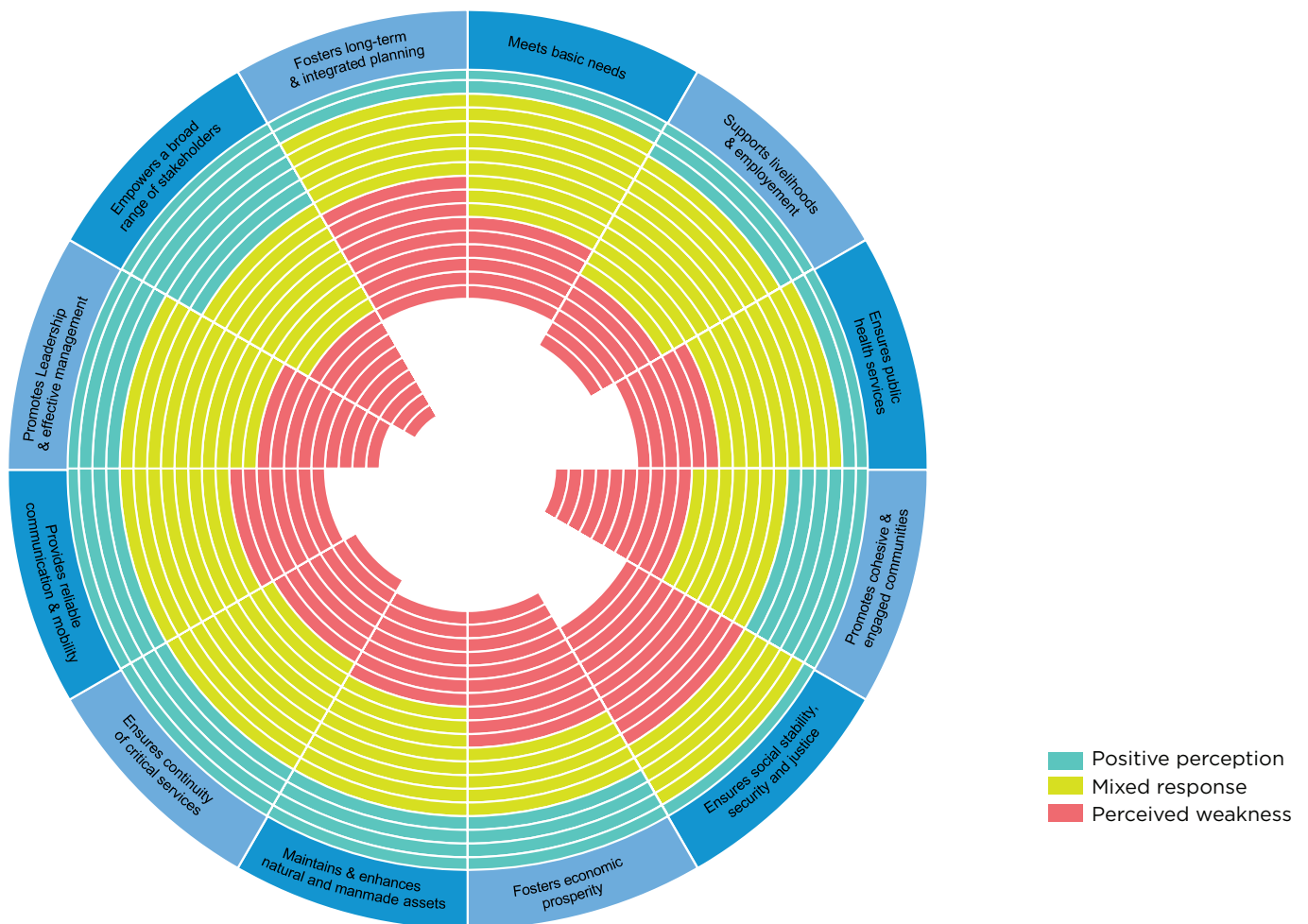
Figure 7: Output from analysis of stakeholder engagement

5 Stakeholder Perceptions

As described in Section 2.4.1 stakeholder engagement formed a significant and intensive part of the assessment process. In total more than 200 people have been convened through the process and this section distils the main findings in relation to their perceptions of current city resilience.

The main groups convened through this process were:

- Senior council officials across departments of Bristol City Council;
- Council officials from neighbouring local authorities;
- Category 1 responders (Local Resilience Forum, emergency services);
- Category 2 responders (utility companies);
- Senior academics interested in resilience;
- Third sector actors;
- Community leaders and advocates;
- Professionals working in the private sector; and
- Network representatives.

There are gaps that have been identified in the engagement carried out to date. Notable gaps that should be addressed in Phase 2 are business leaders, local policing, faith communities and young people.

The diagram in Figure 7 captures information from all the stakeholder engagement using the following approach:

- During the perceptions workshop in June 2015, individuals were asked to express what they felt Bristol's areas of strength were across the holarchy, as described in section 1. These were interpreted in terms of their alignment with the drivers set out in the City Resilience Framework.

- During the perceptions workshop questions were captured that participants would like to see answered to move the city towards a more resilient future. These have been interpreted as areas that could be improved, and in terms of their alignment with the drivers set out in the City Resilience Framework.

- During individual meetings, perceptions were captured about Bristol's performance against each of the four dimensions of resilience. These have been assumed to apply to each of the three drivers in each dimension.

© Chris Bahn

Whilst not a comprehensive analysis of stakeholder perceptions, this suggests that perceptions are mixed, with examples of good and bad performance across the board.

The workshop, in particular, highlighted the strength of some of Bristol's grassroots activity (as shown through responses in relation to cohesive and engaged communities and stakeholder empowerment). However, individual conversations often uncovered frustrations that this activity did not link to strategic planning and delivery in the city.

There was a lack of positive response about the City's ability to foster long-term integrated planning, reflecting the number of different plans and strategies identified when considering current actions. There was also a negative response to Bristol's capabilities to ensure social stability, security and justice. There is evidence to suggest that whilst, in the UK, trust in the police over the past 30 years has been reasonably consistent, the public trusted the police much more in the early 1960s[8]. There are a range of possible explanations for this, but it may not be a coincidence that this change in attitude happened at a time of activism and wider social change (e.g. following the St Paul's riots).

The relatively poor perceived performance in meeting basic needs may seem an anomaly in a developed city, but this reflects the fact that housing, energy and food are all challenges for the city, both in terms of equality of access, but also in terms of the complexity of control and oversight for these city systems.

Summary

- There is a perception that the City Council is too top-down in its approach

- There are gaps between the City Council's approach and the vibrant grassroot community activity in the City.

- Housing, energy and food are perceived challenges for Bristol

- There is a perceived need for integrated long-term planning in the City

- Through the next phase of work, engagement with young people, business leaders, local policing and faith communities will be important.

6. Assets, Shocks and Stresses

6.1. Bristol's Existing Assets

Bristol's assets can be described as the things that support the city's ability to function. In scope were physical assets (both natural and manmade assets) as well as the less tangible socio-economic assets (social and human capital) that are important for Bristol's resilience. Money was not considered as an asset in its own right, as this is simply a means to value physical and socio-economic assets.

This section of the PRA draws on desk-top research, interviews with stakeholders including Council officers and a workshop with infrastructure providers. It provides a high-level understanding of how the identified range of assets contribute to Bristol's resilience, and where possible, the condition of those assets.

6.1.1 Physical Assets

Using the 100RC risk assessment tool, a very high level overview of the current performance of key physical infrastructure types was undertaken. It was largely a qualitative assessment, based on publicly available data.

The assessment had a number of limitations which should be acknowledged when using the results:

- Fragmented nature of city asset management;
- Lack of transparency on performance data and vulnerable assets and the lack of availability of a mechanism for bringing all of this information and stakeholders together;
- Lack of information on how Bristol's critical infrastructure operates within wider national infrastructure framework.

Utilities

Based on current metrics, the assessment found that the electricity, water, gas and sewerage companies are all delivering satisfactory performance. Across the board these privately owned companies are, thanks to strong regulation, investing funds to upgrade their ageing assets, improve their environmental performance and facilitating the evolution of more decentralised, low-carbon systems. Water supply restrictions haven't been in place since 1990 and Bristol Water states that a range of measures can provide security of supply until 2040. Both gas and electricity companies are facilitating the connection of renewables into the network although there are

some issues of reserved capacity having been reached in some locations. Wessex Water is anticipated to approve new connections and adopt certain types of sustainable drainage systems.

Transport

Bristol's highways network suffers from congestion and air quality targets for nitrogen dioxide are being missed. Conversations are being facilitated by the Council with other transport providers on a better functioning transport system in the city. A new tool is being used to assess the vulnerability of the city's highways and an extensive condition assessment programme is underway backed up by a new asset management plan. The updated Joint Local Transport Plan's network management strategy has the aim of providing the city region with a resilient, adaptable and well-maintained highway network. There have been efforts to consider alternative fuels for transport in Bristol, such as First Group's "poo bus", using waste products as fuel.

However, Bristol lacks a combined transport authority, which can make integrated long-term decision-making challenging.

Bristol's port and airport can be considered strategic assets for the City. However, they can also be key points of vulnerability, and if closed could have wider impacts.

Information and Communications

Significant work is needed to better understand Bristol's communications network especially the increasing dependency of other systems on ICT infrastructure, which brings with it many benefits but also increased cyber security risks. Energy in turn is needed to drive this ICT system. Bristol's waste system needs to be reframed from a circular economy perspective.

Food and Natural Environment

The foundations of the Who Feeds Bristol? Report, which mapped Bristol's food system and explored its resilience to the stress of peak oil, need to be built upon elevating the status of the food system so it is on a parity with other key infrastructures. An assessment of the ecosystems services provided by Bristol's natural environment could enable a better valuation and utilisation of Bristol's natural assets as an integral component of the city's infrastructure systems. This 'systems thinking' approach needs to be extended to consider and understand Bristol's other key city systems, namely the emergency services, financial services, government and health.

Energy and Carbon

Infrastructure systems that reduce their energy consumption and carbon emissions not only help to combat climate change but also increase their resilience to shocks by reducing dependency on fossil fuels. Early indications are that Bristol's citywide energy consumption and carbon emissions are unlikely to meet the 40% emissions reduction by 2020 for the energy and transport sectors (the waste and water sectors are not measured by the UK Department of Energy and Climate Change). The forthcoming update of the Climate Change & Energy Security Framework will highlight the options for achieving this target and an 80% emissions reduction by 2050.

Key Physical Assets

- Transport infrastructure (footpaths, pavements, rail, including the many suburban stations, from Avonmouth to parson street, roads, waterways – in particular the River Avon and the floating harbour, Bristol pPort, Bristol aAirport, the extensive cycle network including Sustrans' first route between Bristol and Bath, and a growing number of electric vehicle charging points)

- Energy infrastructure (generation, e.g.such as the Avonmouth wind turbines and solar panels on roofs across the City, and the transmission and distribution network)

- Water infrastructure (six reservoirs owned by Bristol water, rivers, drainage, waste water treatment plants)

- Green infrastructure (parks, playing fields, the Downs, informal green space, gardens, nature reserves, Severn estuary coastline, green belt, trees)

- Digital and communications infrastructure (Bristol is Open, mobile phone networks, fixed broadband, WiFi hotspots, plus digital TV and radio coverage, open data, control centres, CCTV)

- Food system (Bristol's 110 allotments, private gardens,; city farms such as St Werburghs and Lawrence Weston; St Philips Wholesale Fruit, Flower & Vegetable Market; Bristol's vibrant independent retail sector; food banks, and innovative schemes such as fareshare, and food cycle)

- Waste and resource system (recycling, composting, storage, transfer and disposal of waste, including energy recovery, maker lab, poo bus)

6.1.2 Socio-Economic Assets

Socio-economic assets can be both physical and intangible; encompassing human and social capital. Human capital can be seen through our knowledge and creativity, whereas social capital can be seen through networks, relationships and co-operation.

In identifying some of the key assets (e.g. numbers and locations of neighbourhood community groups, community venues, places of worship) it was not possible to measure the effectiveness or strength of these elements, for example in terms of social capital, and therefore this review of assets is quantitative rather than qualitative.

Much of Bristol's economic strength comes from knowledge-rich businesses and entrepreneurial activity, particularly high tech, creative and digital industries. The city has many business start-ups, with organisations like the SETsquared Partnership, which supports high tech start-up companies[9].

It is the core city with the highest Gross Value Added (GVA) per worker[10]. Although it has areas of deprivation, it is the most prosperous of England's eight core cities, and wealth per capita is higher than the national average. There are a number of partnerships that work together to continue this trend.

Bristol has a highly skilled workforce. There is, however, a lack of access to lower skilled occupations, with over 45% of claimants looking for work in the retail sector[11]. Performance of Primary and Secondary Education in the city can be assessed through educational attainment for children and young people. This is rising steadily in state schools in Bristol, and GCSE results have now reached the national average[12]. There are a number of organisations in the city working together through Learning City Partnership to plan for the future and retain this trend. There are also a number of youth organisations working with those who struggle to access traditional education.

Bristol has a large number of active community groups (and venues for them to meet in) and a voluntary sector contributing to the city's resilience, providing a range opportunities for communities to engage and actively participate through volunteering.

The city is home to partnerships working to improve the health and wellbeing of people of all ages, religions, and neighbourhoods. This shows the structures that are in place to enable Bristol to take an integrated approach to delivering city services.

9 http://www.setsquared.co.uk/ [accessed July 2015]
10 GVA per worker, 2013, http://www.centreforcities.org/data-tool [accessed October 2015]
11 State of Bristol- Key Facts 2015, Bristol City Council, April 3015, version 3.
12 http://www.education.gov.uk/schools/performance

Key Socio-Economic Assets

- The local currency the Bristol Pound and strength of local economy and businesses

- Support for SMEs and start-ups (e.g. SETsquared Partnership, Engine Shed)

- Key economic sectors and associated support (Advanced Engineering and Aerospace, High Tech, Creative & Digital Media, Low Carbon and Professional Services).

- Business West and other networks (e.g. Bristol and Bath Social Enterprise Network)

- Local Enterprise Partnership

- Innovation (as shown through patent registrations)

- Education institutions (universities, schools and FE colleges)

- Youth organisations (e.g. LPW, CYN)

- Bristol Learning City Partnership

- Highly engaged third sector and active partnerships e.g. Green Capital Partnership

- Community venues[13]

- Over 900 local community, voluntary and self-help groups, clubs and societies[14]

- Health and social support, with access through Well Aware[15]

- Bristol Ageing Better programme (e.g. Bedminster Our Place Project[16])

- Cities of Service[17]

- Bristol's faith communities and buildings (perhaps best collectively represented through Bristol Multi-Faith Forum[18])

- Neighbourhood Partnerships[19]

Socio-economic assets are not equally accessible or provided across the city or the region. There are some existing organisations and programmes (i.e. assets) that are aiming to address this, but ultimately socio-economic assets will be particularly vulnerable to social stresses such as health inequality, economic downturns and unemployment

Summary

- Given the highly regulated nature of much of the physical infrastructure in Bristol, it is mostly operating to a satisfactory level against current standards.

- However, there may be further opportunities to integrate understanding of long-term stresses in our plans for future infrastructure.

- There are greater gaps in our knowledge or performance in less regulated infrastructure including food, green infrastructure, transport and ICT.

- Socio-economic assets are as important as physical assets, but less tangible.

- Consideration of socio-economic assets highlights inequalities in the city.

13 Bristol City Council, Community Venues- Available online at http://maps.bristol.gov.uk/communityvenues/ [accessed July 2015]

14 Bristol City Council, Local Organisation Database- Available online at http://www.bristol.gov.uk/OrganisationFinder?Task=orgsearch [accessed July 2015]

15 Well Aware is a signposting and information site on health and wellbeing events and activities across the Avon region. Available online at http://www.wellaware.org.uk/ [accessed July 2015]

16 Available online at http://www.bristolageingbetter.org.uk/bedminster-our-place-project/ [accessed July 2015]

17 http://www.citiesofservice.org/content/bristol-uk [accessed July 2015]

18 http://bristolmultifaithforum.org.uk/ [accessed July 2015]

19 http://www.bristol.gov.uk/page/council-and-democracy/neighbourhood-partnerships [accessed July 2015]

6.2 Shocks and Stresses

The analysis of acute, short-term shocks and chronic long-term stresses that Bristol is facing drew on information from the stakeholder engagement activity (in particular the agenda setting workshop and a shocks and stresses workshop), and from secondary data. The primary data sources were the Avon and Somerset Community Risk Register[20], work done by other key agencies, such as Bristol Water to identify their key challenges and the Joint Strategic Needs Assessment (JSNA)[21] which sets out likely future health trends and challenges. Past events that have occurred in the city were also taken into account. This analysis was supplemented by a review of international and national trends that will have some relevance to Bristol[22].

6.2.1 Shocks

Shocks can be described as one-off incidents that threaten a city's ability to function. They can be environmental (such as severe weather), physical (such as collapse of a bridge), social (such as a riot) or economic (such as industrial action).

Avon and Somerset Community Risk Register[23] is the main way in which agencies come together to assess risks to the City (and its surrounding area) over the next five years. There are existing multi-agency plans in plans to increase preparedness to these risks.

Extreme weather events over the last three years have caused major service disruption and infrastructure damage at multiple locations along Network Rail's Western Route. Particularly high profile events were the damage to the Dawlish railway and seafront from coastal storms (2013/2014) and flooding of the Somerset Levels.

Severe weather, in particular snowfall, gales and flooding, are identified as major risks to the area. This type of severe weather has, in the past, been seen to cause a wider range of impacts, including transport disruption, school closures and damage to property. Flooding is a risk that has been the subject of many studies. The most recent studies predicts that approximately 22,000 residential properties are at risk of surface water flooding across Bristol and that tidal flooding from the River Avon represents the most significant flood risk facing the city centre and the industrial area of Avonmouth[24].

The flood defences at Avonmouth (banks and bunds including the Severn Beach railway line, M4 crossing and Avonmouth Docks) currently provide a mixed level of protection, up to around a 1 in 200 annual chance flood year event (without climate change) and less than 1 in 20 annual chance flood event (with climate change). Similarly for the city centre the level of protection provided by flood assets is varied, but the risk is relatively low. However, with climate change, the level of protection is significantly less, at around 1 in 20. The city is also one of the Top 10 UK cities for surface water flood risk threatening approximately 26,000 homes and businesses.

The Avon Strategic Defences feasibility study[25] identifies the existing properties as well as areas of regeneration in the city which are at risk of flooding. It also identifies those critical infrastructure assets including roads, rail, pumping stations, electricity sub-stations, transmission lines and gas stations plus other essential services and assets. It states that the road network is particularly vulnerable due to its limited resilience, as well as power, drainage and communications assets.

The city are also working with the Environment Agency to deliver improved flood mitigation to the Avonmouth and Severnside area, to improve its resilience against existing and future flood risks.

20 Avon and Somerset LRF, Community Risk Register v5, May 2014
21 Bristol City Council, Joint Strategic Needs Assessment, 2013 http://www.bristol.gov.uk/page/adult-care-and-health/joint-strategic-needs-assessment-jsna
22 These include, for example, the European Environment Agency's review of megatrends, http://www.eea.europa.eu/soer-2015/global/setting-the-scene
23 Avon and Somerset LRF, Community Risk Register v5, May 2014
24 http://www.bristol.gov.uk/page/environment/flooding-and-drainage
25 Arup for Bristol City Council, Avon Strategic Defences feasibility study, 2014

The storm surge in January/February 2014 (tide level of 8.7m AOD) brought flooding to a number of areas next to the River Avon: Cumberland Road, Portway, Clarence Road, Sea Mills, Cattle Market Road, the RSPCA Cats and Dogs Home in St Philips, Crewshole Road and Avon Crescent (where the demountable flood barrier was deployed). Surface water flooding and blocked highways drains in January 2014 affecting Lower Ashley Road and Dean Lane flooded 8 properties. Surface water flooding around Bristol affected the following neighbourhoods and flooded 18 properties: Hengrove, Bishopston, Bioshopsworth, Hartcliffe, Lawrence Hill, Windmill Hill, Southmead, Knowle, Frome Vale, Henbury and Brentry.

Another potential shock in Bristol is public protest and disorder. This is not identified as the highest risk shocks in the next five years. However, it is recognised that this might change in the longer-term when considered in conjunction with stresses such as changing demographics and economic downturn.

In April 2011, in the inner city Stokes Croft area of Bristol, a riot broke out triggered by the heavy-handed policing of a sustained campaign opposed to the building of a Tesco store in the area. Stokes Croft is adjacent to the St Paul's area where, thirty- one years ago, the first of the 1980s series of riots, across cities throughout Britain, took place.

Following global outbreaks of swine flu, bird flu and Ebola, an influenza type outbreak is considered as a high-risk eventuality. Again, when considered in conjunction with longer-term stresses, this could become higher-risk in the longer-term.

Through the Community Risk Register, Bristol has identified the potential for shock events, which can be described as "international events"; events which happen elsewhere that might have a knock-on impact on Bristol. This could be a manmade or natural disaster, that is unlikely to happen in Bristol, but which could impact on the City's ability to function, through its supply chains or an influx of refugees, for example.

Shocks relevant to Bristol
- Disease Outbreak
- Public Protest/Disorder
- Terrorist & Malicious Attacks
- Industrial Action
- Major Infrastructure Failure
- Industrial Accidents, Environmental Pollution & Ordnance
- International Event
- Transport Accidents
- Severe Weather (esp. flooding)
- Structural Hazard

6.2 Stresses

Stresses are cumulative, often long term, issues that weaken and degrade the fabric of the city on a daily or cyclical basis. Stresses can be physical stresses on the natural or built environment, such as environmental degradation or ageing infrastructure. Stresses also include social stresses on the population for example on economic or health issues.

The stress that stakeholders perceive as being the greatest threat to Bristol is transport congestion[26]. Between 2001 and 2011 car-ownership in the city increased by 13%[27]. This is despite a doubling of cycle use and a 40% increase in walking over that period[28]. It has been estimated that by 2016 traffic congestion could cost the local economy some £600 million a year[29].

Ageing infrastructure is also an important stress. This includes systems such as transport, energy and water systems, which were often not built to accommodate the increasing population of the city. Most of these urban systems are highly interdependent and if one is disrupted a cascading disruption can be seen across the infrastructure; particularly if the infrastructure is working at capacity with no system redundancy.

Health inequality was identified as a key stress at two workshops. Although life expectancy in the City is generally increasing, residents in the most deprived areas live on average 7.75 years less than the least deprived areas[30].

Many perceive that an ageing population will be a stress on the city. Between 2010 and 2020, Bristol's estimated growth in population for older people (65 and over) is 9.3%[31]. On average, older people use health and social care services more; for example adult Social Care predict a 13% increase (in the 10 years 2012-22) in the number of older people in Bristol using services[32].

Population growth more broadly may be a greater issue, which risks putting pressure on a range of city systems, from the need to provide housing, to wider physical and social infrastructure provision. Based on current trends[33], Bristol is also expected to have a more diverse demographic profile in the future.

Growing unemployment was considered as a stress for Bristol as, although unemployment has fallen in the last two years, the city still had a 7.2% unemployment rate in 2014, 1% higher than the national average[34]. Levels of unemployment link directly to health inequality, as set out in Bristol's Health and

Wellbeing Strategy. There is also a clear link between unemployment and economic downturn. Growing unemployment will impact on individuals' abilities to meet their basic needs, as well as on the wider socio-economic assets described above.

Climate change is considered to be a stress for the city, with 71% of residents concerned about the impacts of climate change[35]. It will likely cause changes in weather patterns, with impacts on physical infrastructure, health and wellbeing, and economic supply chains. However, there is not a consolidated up-to-date evidence-base for the city covering the likely impact of climate change on all city systems over the next 50 years.

Water quality in the city is not good. Previous years have shown a slight improvement, but this trend may or may not be continued with new data expected by the end of the year.

The World Health Organisation describes anti-microbial resistance (AMR) as "a global health security threat that requires concerted cross-sectional action by governments and society as a whole"[36]. Whilst there may not be particular factors that make this stress more chronic in Bristol, over a fifty year time period, it has the potential to impact on the health and wellbeing of the City's population.

Bristol's Peak Oil Report[37] showed the fundamental vulnerability of transport, healthcare, food, social cohesion, public services and emergency response to oil prices and availability.

Over 80% of food is supplied by four companies through global supply chains and less than 10% supplied locally[38]. Hazards can interrupt supplies for days and stresses will affect food poverty & security.

Devolution and political change can be conceived as potential stresses for Bristol. The current narrative in the UK with regards to devolution leaves the potential for stresses in Bristol to become apparent in a number of ways. For example, it could result in Bristol obtaining powers that it doesn't have the capacity to deliver, or in it obtaining fewer powers than other places, resulting in less investment over time.

26 As reported in the agenda-setting workshop, March 2014
27 ONS 2011 Census
28 Ibid.
29 Ibid.
30 Ibid.
31 Bristol Joint Strategic Needs Assessment 2012: Baseline, Appendix 1. Population
32 Ibid.
33 For children (0-15), the Bristol average is 27.8% BME (31.9% non-white British), considerably higher than the overall rates in Bristol (16% BME population or 22% BME including non-British white). JSNA
34 Ibid.

Stresses Relevant to Bristol

- Transport congestion
- Ageing infrastructure
- Climate change
- Environmental degradation
- Food supply
- Fuel supply
- Water shortages
- Change in political leadership
- Ageing population
- Health inequality
- Growing unemployment
- Economic downturn
- Population growth
- Civil and political unrest
- Anti-microbial resistance
- Devolution

Summary - Top Risks

The analysis considered the direct and indirect relationships between shocks and stresses. It is apparent that almost all shocks are either directly or indirectly linked to each of the stresses identified. In this context, there is no single outstanding shock or stress that emerges as the most important for Bristol.

This provides the opportunity to consider new shocks and stresses that are likely to emerge over the coming decades, looking forward to 2065. Strengthening the city's ability to react and adapt quickly to these unknown threats, alongside existing shocks and stresses, is an important part of Bristol's resilience trajectory.

35 Bristol City Council, Quality of Life in Bristol survey results 2013, published April 2014
36 World Health Organisation, Antimicrobial Resistance: Global Report on Surveillance, 2014
37 Green Momentum Group & Bristol City Council, Building a Positive Future for Bristol after Peak Oil, 2009
38 Joy Carey on behalf of Bristol City Council & partners, Who Feeds Bristol? Towards a resilient food plan, 2011

7.0 Themes and Focus Areas

The Preliminary Resilience Assessment has given Bristol the unique opportunity to take a rapid, high-level but critical look at all parts of the city's current systems. The insights from this assessment have laid the foundations for Phase II work which will seek to deepen understanding of practical responses to resilience-building in the context of Bristol city and the region. The four themes introduced below in Figures 9 and 10 provide the framework for Phase II which will inform the development of the 50 year resilient trajectory.

Whilst the qualities of resilience (as outlined in Section 1) did not form part of the formal Phase I assessment of Bristol's current performance the assessment highlighted that Bristol, with its combination of grass roots activism and top-down strategic planning, would benefit particularly from efforts related to becoming more:

• Integrated;

• Resourceful; and

• Inclusive.

It is clear that making the case for redundancy, or spare capacity, will be challenging during times of austerity. The concept of a 'resilience dividend' can help highlight the opportunities for Bristol to be more innovative and far-sighted to ensure that there is the capacity in the city to respond to unforeseen future challenges.

Phase II of developing Bristol's Resilience Strategy will provide the opportunity to analyse more deeply thematic areas identified in Phase I as particularly critical to building Bristol's resilience. This will help ensure that priority is given to implementation of projects that bring tangible benefits at all scales of the holarchy, with effects felt both today and by future generations. This section describes the overarching themes and proposed focus areas, including why each has been selected.

Overview and Structure

This section sets out the synthesis of the findings of the PRA and the rationale behind developing:

• Themes, which provide the framework for Phase II of Bristol's work;

• Focus Areas posed as questions because Phase II is still part of the enquiry stage for Bristol (Figure 8);

• Current 'resilience paradoxes' and aspirational goals for 2065 which have been used to articulate diagnostic questions;

• Rational for the selection of focus areas.

The four focus areas have emerged through much iteration in the assessment process and have been identified and validated through a triangulation process of secondary data collection, stakeholder perceptions and wider engagement. They were not purposely selected to map onto the four dimensions of the City Resilience Framework but it does indicate that there is work to be done in all areas across the city system.

The focus area questions shown in Figure 8 below have been arrived at through an iterative process with the strategy partner Arup, the Resilience Sounding Board and other senior stakeholders in the city. Their feedback and input has been essential to honing these questions so that they reflect the priority areas for action that have emerged through the assessment process.

A. Organisations
How can city structures promote collaborative working and foster shared ownership of future priorities?

B. People & Families
How can every citizen have the confidence, skills and trust to play a positive and ative role in shaping the future of the city.

C. Place
How can the city's assets meet future demand and be resilient to the effects of climate change and other unforseen shocks and stresses?

D. Prosperity & Worth
How can prosperity and welbeing be promoted through innovative forms of financing, emplyment and sharing resourses that value local social and natural capital?

Figure 8: Four resilience themes to be explored in Phase II

The sections below set out the rationale behind the identification of the focus areas and the diagnostic questions.

Focus Area A: Organisations

How can city structures promote collaborative working and foster shared ownership of future priorities?

Curent Resilience Paradox

Many parts of the city already highly engaged in working collabratively around future of city (e.g. Green Capital Partnerships, grassroots activitsts, BCC Futures, UoB, UWE, KWMC) but power still lies in top-down, siloed systems

2065 Goal

Organisations and formal structures allow people to work together flexibly acress traditional boundaries to achive shared outcomes for the city and its people.

Diagnostic A1

What is the shared city narrative (based on future scenarios) that can drive new ways of working?

Diagnostic A2

How can formal and informal civic leaders acquire new skills & mind-sets to work collaboratively.

Diagnostic A3

What steps could be taken to build relationships at a regional scale?

Figure 9: Focus area A Organisations – resilience paradox, 2065 goal and diagnostic questions

A Organisations

This theme is focused on improving the formal decision-making processes and engagement structures and relationships across the city and the region. The assessment identified a degree of disconnect between the extensive community engagement activities undertaken e.g. through Neighbourhood Partnerships and the strategic decisions being made in the city.

Responding to this focus area will help Bristol to understand how it can build on the engagement and commitment of formal and informal leaders and engaged citizens in the city and move towards more resilient planning and decision-making. It will help to identify structures, skills and mind-sets that will encourage long-term thinking in a way that is inclusive, integrated and adaptive.

Activities to respond to these questions will include a workshop with key stakeholders to develop future city scenarios for Bristol in 2065, research into systems leadership models and identification of opportunities for regional engagement related to resilience.

Rationale

Through the Phase I research and analysis this theme and focus area emerged as significant opportunity for building resilience into the city's structures. It captures some of the drivers from the City Resilience Framework that were identified as weaknesses. In particular, this should help Bristol to better meet basic needs, foster long-term and integrated planning, and empower a broad range of formal and formal leaders. The full set of drivers that addressing this focus area should help to foster is highlighted (in blue) in Figure 10.

This focus area will help Bristol to address the full-range of shocks and stresses identified as relevant, but the focus on the long-term is a result of our identification of stresses that Bristol will face. Those that have particularly been highlighted in our analysis are set out in Figure 10. Figure 10 also sets out how this focus area also builds on Bristol's existing strengths and activities, as well identifying the resilience qualities that should be strengthened through addressing this focus area.

Shocks/Stresses
Change in political leadership
Ageing population
Health inequality
Population growth
Devolution

Existing perceptions/actions
Government Foresight Future of Cities programme
Bristol is Open and open data platform
West of England joint spatial plan

Resilient Institutions

CRF Qualities
Reflectiveness
Resourcefulness
Flexibility
Integration

Fosters long-term & integrated planning

Empowers a broad range of stakeholders

Promotes leadership & effective management

Supports, livelihoods & employment

Ensures public health services

Leadership and strategy

Health & wellbeing

Knowledge

People

Infrastructure & environment

Place

Organisation

Economy & society

Figure 10: Focus area A: Organisations - Resilience drivers, shocks, stresses and qualities

Focus Area B: People and Families

How can every citizen have the confidence, skills and trust to play a positive and ative role in shaping the future of the city.

Curent Resilience Paradox

Bristol's diverse population (45 religions, 91 languages and 187 places of birth) mainly co-exist respectfully and peacefully despite stark health & wealth inequalities between neighbours.

2065 Goal

Diversity is valued and actively encouraged and each person is able to reach their full potential at work, at play, when learning and in their community and family life.

Diagnostic B1	Diagnostic B2	Diagnostic B3
How can all citizens take part in an on-going conversation about the future of the city?	What are the best ways to build trust between diverse groups?	What are the resilience-building opportunities at family scale (early intervention)?

Figure 11: Focus area B: People and families – resilience paradox, 2065 goal and diagnostic questions

B People and families

This theme is about enabling all the citizens of Bristol to play a positive and active role in shaping the future of the city. During the first phase of work, engagement was a key part of the methodology. However, not all stakeholder groups were equally represented (for example, business, youth, and faith communities have all been identified as gaps). The 'engaged' section of the city is typically the white, professional middle-class and it could be argued that the power of their voice is reinforcing the gap between rich and poor.

Activities in response to these questions will include activities such as desk-study, interviews and focus groups. We will also conduct pilot projects to test new approaches, for example, Bristol Day (as part of the Festival of the Future City in November 2015) will be an opportunity to test a new experiential way to have a conversation about the future of Bristol.

Rationale

Figure 12 highlights (in blue) the set of drivers that this focus area addresses. In particular, this should help Bristol to better empower a broader range of stakeholders and promote fairer, more cohesive and engaged communities.

This focus area will help Bristol to address the full-range of shocks and stresses identified as relevant, but those that have particularly been highlighted in our analysis are set out in Figure 12. Figure 12 also sets out how this focus area builds on Bristol's existing strengths and activities, in particular Bristol active community groups.

Shocks/Stresses
Public Protest/Disorder
International Event
Severe Weather (esp. flooding)
Change in political leadership
Ageing population
Health inequality
Population growth
Civil and political unrest

Existing perceptions/actions
Strong grassroots activities and enthusiasm of some communities
Bristol Green Capital Partnership
Festival of the Future City
Neighbourhood Partnerships

Resilient People

CRF Qualities
Reflectiveness
Resourcefulness
Inclusiveness
Integration

Fosters long-term & integrated planning

Meets basic needs

Empowers a broad range of stakeholders

Supports, livelihoods & employment

Leadership and strategy

Health & wellbeing

Knowledge

People

Promotes cohesive & engaged communities

Place

Organisation

Infrastructure & environment

Economy & society

Ensures social stability, security and justice

Fosters economic prosperity

Figure 12: Focus area B: People and families - Resilience drivers, shocks, stresses and qualities

Focus Area C: Place
How can the city's assets meet future demand and be resilient to the effects of climate change and other unforseen shocks and stresses?

Curent Resilience Paradox
Bristol seen as a 'green' but more audacious, bolder steps are needed to transform the built environment and behaviours to meet climate targets and to adapt to future risks.

2065 Goal
The city's natural ad physical assets are re-purposed to function in ways that promote health, protect the environment, defend against natural/climatic impacts whilst meeting people's daily needs.

Diagnostic C1	Diagnostic C2	Diagnostic C3
How can critical infrastructure/ supply chains be designed or adapted to cope with future risks?	What role does data have in creating integrated city solutions?	What pattern disruptors will change the way people use assets?

Figure 13: Focus area C: Place – resilience paradox, 2065 goal and diagnostic questions

C Place

This theme is focused on achieving more robust and integrated physical systems in the city. The assessment found that, whilst individually organisations are preparing for shocks to their systems, there is less evidence of the ways in which interdependencies are being addressed.

This focus area will provide the opportunity to better understand some of the key physical assets in the city, as well as facilitating conversations between the organisations that operate these assets to enable more adaptive, integrated responses, developing more robust and flexible infrastructure solutions. There are a number of shocks and stresses that are important to Bristol. Climate change is one example that is a priority for the city and where a gap in current knowledge was identified.

Rationale

The assessment found that, although good progress has been made in some aspects of future-proofing the city – for example a strong focus on improving energy efficiency and de-carbonising the city - there is a need to take bold and ambitious approaches to other physical systems such as mobility and the 'blue-green' protective natural assets. The full set of drivers that addressing this focus area should help to foster is shown in Figure 14.

This focus area will help Bristol to address the full-range of shocks and stresses identified as relevant, but those that have particularly been highlighted in the analysis, from climate change to ageing infrastructure, are set out in Figure 14. Figure 14 also sets out how this focus area also builds on Bristol's existing strengths and activities and identified which resilience qualities will be strengthened through addressing this focus area.

Shocks/Stresses
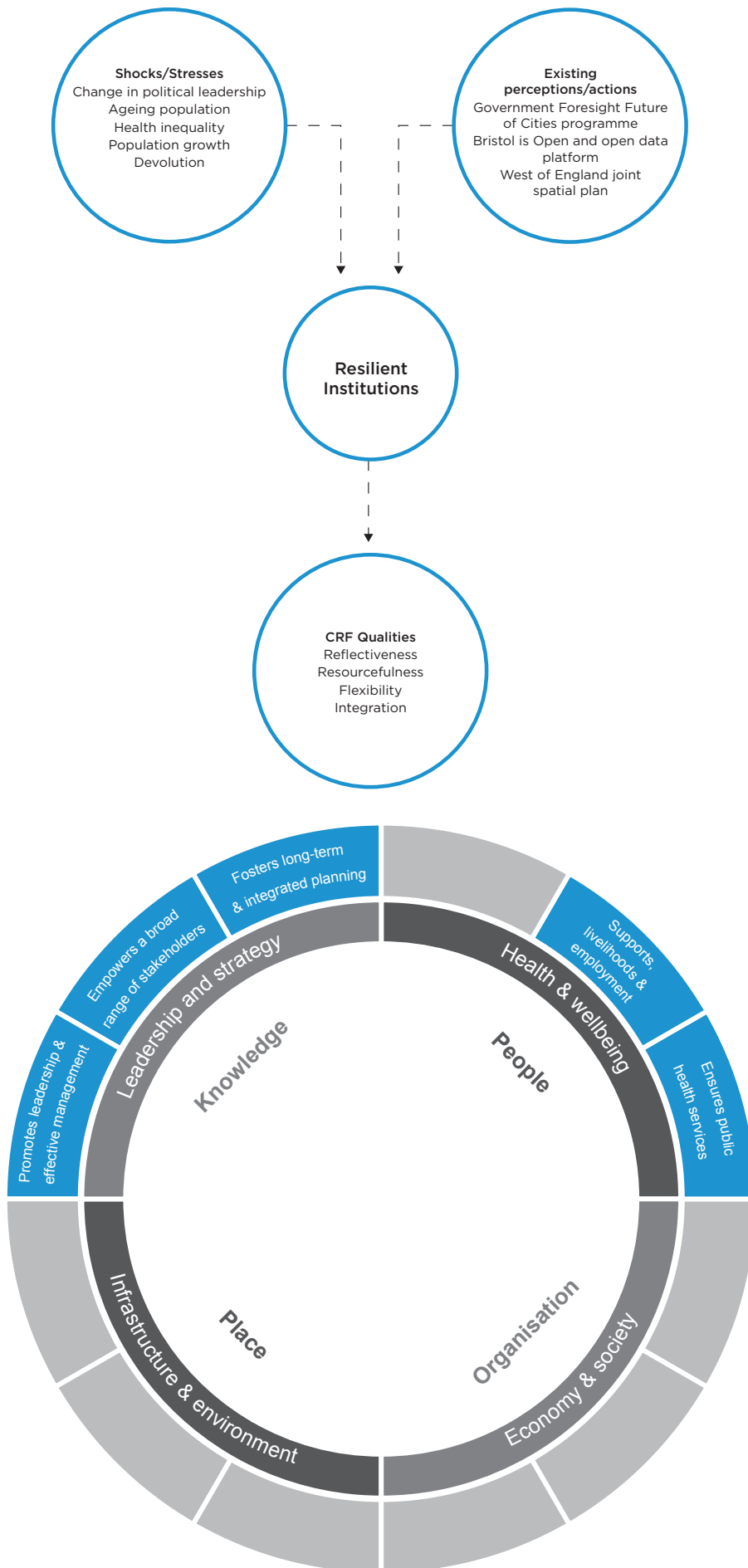Major Infrastructure Failure
Transport Accidents
Severe Weather (esp. flooding)
Transport congestion
Ageing infrastructure
Climate change
Water shortages
Population growth

Existing perceptions/actions
Climate Security and Energy Framework
Smart Mature Resilience
Highways Infrastructure
Resilience Assesment
Modelling

Resilient Place

CRF Qualities
Reflectiveness
Robustness
Integration

Fosters long-term & integrated planning

Leadership and strategy

Knowledge

Health & wellbeing

People

Provides reliable communication & mobility

Infrastructure & environment

Place

Organisation

Economy & society

Ensures continuity of critical services

Provides & enhances natural and man-made assets

Figure 14: Focus area C: Place - Resilience drivers, shocks, stresses and qualities

Focus Area D: Future of Work
How can prosperity and welbeing be promoted through innovative forms of financing, emplyment and sharing resourses that value local social and natural capital?

Curent Resilience Paradox
Bristol is recognised as a leader in next economy 'pattern disruptions' such as Bristol Pound, Happy City and is home to a higher number of creative industry start-ups than any other UK core city but success of a city is measured by GDP/GVA not quality of life.

2065 Goal
Bristol attracts and retains businessess and investors which aontribute to social and natural capital and offer diverse, high quality jobs for all in 'next economy' so that the prosperity/success of the city can be measured in non-monetary terms.

Diagnostic D1
Are there new ways of accessing future investment and financing for Bristol?

Diagnostic D2
Are there innovative city metrics that help lock-in social and environmental good?

Diagnostic D3
How can the private sector be incentivised to invest in Bristol for the long term?

Figure 15: Focus area D: Future of work – resilience paradox, 2065 goal and diagnostic questions

D Future of work

This is potentially the most challenging and important theme for Bristol, and one where the Sounding Boards has recommended efforts should be focused in Phase II.

Rationale

A resilience focus on the future of work has been developed to help Bristol to ensure that prosperity is linked to human wellbeing and protection of the natural environment. It will also ensure that inward investment is firmly linked to long-term investment in Bristol as a place and does not simply exploit human and natural capital. The full set of drivers that addressing this focus area should help to foster is shown in Figure 16.

This focus area will help Bristol to address the full-range of shocks and stresses identified as relevant, but those that have particularly been highlighted in our analysis are set out in Figure 16. Figure 16 also sets out how this focus area also builds on Bristol's existing strengths and activities, including initiatives such as the Bristol pound, Great Western Regional Investment Capital and New Economy Organisers Network (NEON). The resilience qualities that should be strengthened through addressing this focus area are also identified.

It is worth noting that, as shown in Figure 16, this focus area address a broader range of drivers and shocks and stresses than the other three themes. This would signify its importance as a system-wide set of thematic interventions to build long-term resilience.
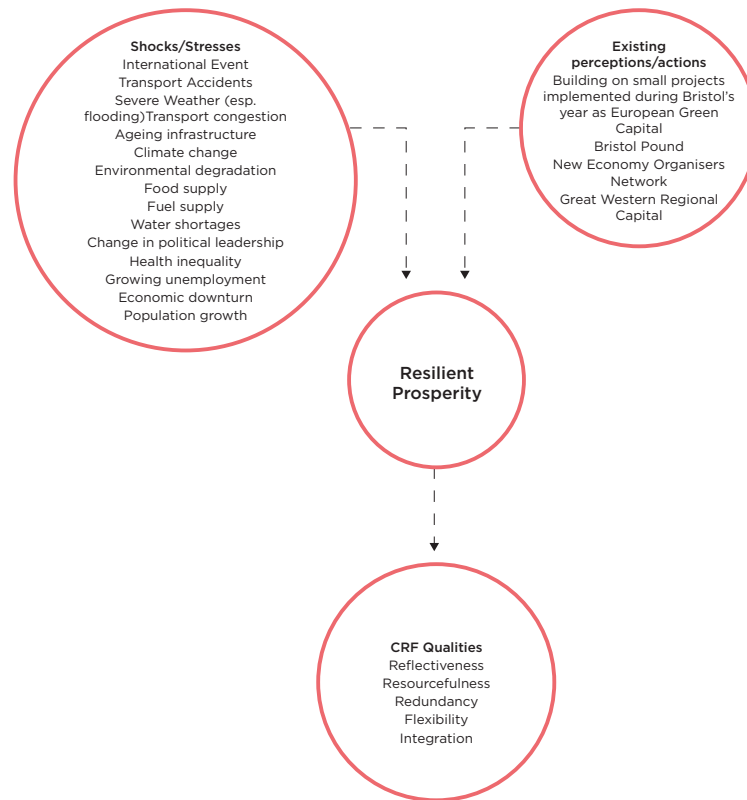
Shocks/Stresses
International Event
Transport Accidents
Severe Weather (esp. flooding)Transport congestion
Ageing infrastructure
Climate change
Environmental degradation
Food supply
Fuel supply
Water shortages
Change in political leadership
Health inequality
Growing unemployment
Economic downturn
Population growth

Existing perceptions/actions
Building on small projects implemented during Bristol's year as European Green Capital
Bristol Pound
New Economy Organisers Network
Great Western Regional Capital

Resilient Prosperity

CRF Qualities
Reflectiveness
Resourcefulness
Redundancy
Flexibility
Integration

Fosters long-term & integrated planning

Supports, livelihoods & employment

Promotes leadership & effective management

Leadership and strategy

Health & wellbeing

Knowledge

People

Promotes cohesive & engaged communities

Infrastructure & environment

Place

Organisation

Economy & society

Provides & enhances natural and man-made assets

Fosters economic prosperity

Figure 16: Focus area D: Future of work - resilience drivers, shocks, stresses and qualities

Next Steps

A Scope of Work will be developed for Phase II, which will include specific planning for the management and delivery of tasks relating to each Focus Area. It is anticipated that the Resilience Trajectory will be completed by summer 2016. An overview of the process for arriving at this stage is set out below.

Diagnostic activities
Nov 2015–Feb 2016

Opportunities &
Resilience Lens
Analysis
Feb–Mar 2016

Development and
sign-off of Resilience
Trajectory
Mar–Jun 2016

Appendix 1: Terms of Reference and composition of Sounding Board

Background

The Rockefeller Foundation has committed to investing $100million over five years in developing city "resilience" - the ability to survive, adapt, and grow in the face of stresses and shocks - through their 100 Resilient Cities Programme www.100resilientcities.org. Bristol successfully bid to Rockefeller and has funding for a Strategic Resilience Officer (SRO) for two years; Sarah Toy took up the post in February 2015 and she is responsible for coordinating the development and implementation of a Resilience Strategy for Bristol.

Purpose

The Bristol Resilience Sounding Board, comprising 12-15 members, will act as an informal "critical friend" to the SRO. The Board will offer a safe but expert and challenging exchange of ideas on all aspects of Bristol's resilience as they emerge through the strategy development process and on-going implementation. The contributions of the Board will feed into the formal resilience governance structure that reports through to the Strategic Director for Place, the City Director and the Mayor.

Board members will be asked to:

• Offer objective feedback and specialist advice to the SRO;

• Comment on draft outputs or recommendations;

• Share examples of resilience stories, best practice and evidence;

• Identify resilience-related partnership or funding opportunities;

• Act as resilience champions within their teams, organisations and networks.

In return Board members will:

• Be part of a select group of forward-looking resilience thinkers in Bristol;

• Help to inform the scale and ambition of Bristol's Resilience Strategy;

• Get access to free resilience-related expertise and products offered by 100RC Platform Partners;

• Learn from the global resilience discourse of the 100RC Officer Network.

Membership

Membership will be by invitation of the SRO to reflect the breadth of resilience and will comprise:

Stephen Hilton, Director of Futures, BCC

Di Robinson, Director of Neighbourhoods, BCC

Becky Pollard, Director of Public Health, BCC

Ian Roderick, Schumacher Institute

Professor Rich Pancost, Cabot Institute, University of Bristol

Rob Davis, Avon Fire and Rescue and Deputy Chair of LRF

Sumita Hutchinson, Equality and Community Manager, Avon and Somerset Police

Caroline Macdonald, Low Carbon Group Sector Chair, Local Enterprise Partnership

Wendy Stephenson, Voscur

Clare Reddington, Watershed

Doug Owen, Lloyd's Register Consulting

Peter Lipman, Global Transition Network and Sustrans

Patric Bulmer, Bristol Water

James Vaccaro, Triodos Bank

Frequency of meetings

The Board will meet quarterly with the first meeting planned for June 2015 but will be expected to communicate and exchange information with the SRO on a monthly basis.

Secretariat

The secretariat function to plan meeting dates and agendas, circulate papers in advance and write and circulate minutes will be performed by the resilience strategy partner Arup.

Appendix 2: List of city actions (strategies and plans) included in assessment

- Bristol Local Plan - Core Strategy
- Affordable Housing Delivery Framework
- Bristol Child Poverty Strategy
- Bristol Housing Strategy
- Local Enterprise Partnership Strategic Economic Plan (2015-2030)
- Avon and Somerset Police and Crime Plan
- Bristol Health and Wellbeing Strategy
- West of England Joint Local Transport Plan
- West of England Joint Waste Core Strategy
- Bristol Central Area Plan
- West of England Joint Strategic Planning Strategy
- Strategic Housing Market Assessment
- Bristol City Council Corporate Plan 2014-17
- Preventing Homelessness Strategy 2013-18
- BCC Site Allocations and Development Management Policies
- BCC Supplementary Planning Documents
- BCC Children and Young People's Plan
- Safer Bristol Crime and Disorder Strategic Assessment 2015
- Care Home Commissioning Strategy 2014-17
- Local Flood Risk Management Strategy
- Climate Change and Energy Security Framework
- Bristol Emotional Health and Wellbeing Strategy for Children and Young People 2009-14
- Delivering better health and sustainable healthcare for Bristol: 2014-2015 Operational Plan
- South Western Ambulance Service Strategic Plan 2014-19
- Bristol Parks and Estates Allotment Strategy 2009-19
- Avon Fire and Rescue Corporate Plan 2011-15
- Avon Fire and Rescue Integrated Risk Management Plan 2012-15

- School Organisation Strategy 2013-17
- Transitions Strategy: Young People with Additional Needs Aged 14-25
- Sport4Life Strategy 2013-18
- Living Well with Dementia in Bristol: A Joint Commissioning Strategy 2011-15
- The Carer's Strategy 2015-20
- Learning City
- Cities of Service
- Bristol Ageing Better Partnership
- Bristol Cycle Strategy
- Bristol Energy Company
- Bristol Autism Strategy 2012-15: Children and Adults
- Neighbourhood Planning Areas
- Bristol City Region City Deal
- Public Realm and Movement Strategy
- Temple Quarter Enterprise Zone Spatial Framework
- A Good Food Plan for Bristol
- Bristol is Open
- The Bristol Biodiversity Action Plan
- Water for Life and Livelihoods: River Basin Management Plan - Severn River Basin District
- Strategic Flood Risk Assessment
- Water in the Future
- Water - A New Direction
- Wessex Water - Performance Commitments
- Western Power Distribution -Long Term Development Statement
- Wales and West Utilities - Long Term Development Statement
- South Western Ambulance Service Operational Plan 2014-16