Northern Beaches

Resilience Strategy

Withstand. Adapt. Thrive.

northern
beaches
council

1

Contents

Acknowledgement of Country
We acknowledge the traditional owners of this land and elders
past, present and future. We recognise Aboriginal people
as the original custodians of the Northern Beaches.

> *Becoming resilient is kind of like exercising; you need to build up strength gradually by conditioning your muscles.*
>
> Anonymous focus group participant, resident 2021
>
> " "

Executive Summary

Resilience is a concept that epitomises the times in which we live. The storms of 2016, 2020 and 2021, Black Summer bushfires of 2019/20, and particularly the COVID-19 pandemic are strong reminders of how our lives can be turned upside down at any given moment. They highlight the need to prepare ourselves mentally and physically to put us on the front foot to meet these challenges.

While our stunning bushland, lagoons and coastline provide our community with boundless opportunities to connect with nature, it also presents us with several challenges. Over 19,000 properties are classified as bush fire prone, 22,000 flood prone, 63,000 properties at being of moderate to high-risk landslip potential, 270 properties affected by coastal erosion, and a further 4,400 associated with estuarine inundation. In addition, some of our communities such as the Offshore Communities within Pittwater, Duffys Forest, Cottage Point, and Ingleside have an increased risk due to their proximity to large areas of bushland, in combination with their geographical isolation affecting their ability to evacuate during an emergency.

Pressures from climate change, population growth and increased property values will drive increased exposure to our entire community, from a safety, wellbeing, and financial perspective unless we take active steps to limit these risks.

Furthermore, the Northern Beaches community expressed high levels of concern about housing affordability, climate change, environmental degradation and mental health, citing low levels of preparedness to these challenges.

The complexity and interconnectedness of these future challenges demands a holistic and collaborative approach that puts resilience front and centre of what we do as individuals, local neighbourhoods and as a broader community. Resilience is not a given; nor is it something we are born with or born into. It is a conscious practice and deliberate effort to be aware of threats and vulnerabilities, find ways to prepare for different scenarios, and manage and recover from impacts from shocks and stresses.

The Strategy is informed by our ongoing collaboration with the Resilient Sydney Network, and scientific evidence spanning regional, state and local plans. Local knowledge and the lived experiences of more than 1,300 community members who contributed their time and insights to the development of this Strategy played an equally important role.

The Strategy establishes seven Strategic Directions to address these shocks and stresses and support a more resilient Northern Beaches. The Strategic Directions identify key priorities and actions and creates a platform for collaboration and partnerships between the community, businesses, government agencies and non-government organisations. A Resilience Action Plan will articulate the full range resilience actions including their timeframes for delivery and key partners.

The priorities and recommendations focus on:

- building the self-sufficiency and capacity of our community
- capitalising on our strengths as a connected community
- providing support mechanisms that harness on our willingness to learn and adapt
- increasing awareness of current and emerging challenges, and
- implementing a range of mitigative and adaptive measures

The purpose of this Strategy is to outline our vision for a resilient Northern Beaches and provide a shared reference for collaborative action.

Vision
To empower our Northern Beaches community
to **Withstand**, **Adapt** and **Thrive**

Resilience Action Plan

Principles

Whole of Community Approach

Communities within Communities

Engagement & Inclusion

Evidenced Based

Build Capacity

Direction 1: Planning for Our Future

Direction 7: Activated Places and Spaces

Direction 2: Get Ready Northern Beaches

A Resilient Northern Beaches

Direction 6: A Resilient Natural and Built Environment

Direction 3: Connect for Strength

Direction 5: Adaptive Services, Assets & Infrastructure

Direction 4: A Strong and Dynamic Local Economy

Community strengths and values

Resilience Challenges

Stresses			Shocks		
Affordable Housing	Environmental Degradation	Climate Change	Disease pandemic	Natural Disasters	Tsunami
Mental Health	Drug and alcohol abuse	Inequity	Cyber attack	Heatwave	Water crisis
Increasing health services demand	Lack of transport diversity	Increasing chronic illnesses	Digital network failure	Infrastructure Failure	Terror attack
Insufficient employment diversity	Diminishing social cohesion		Financial institution failure		Earthquake

Figure 1 - Resilience Strategy

The Strategy summarises key challenges ahead for the Northern Beaches community. It assesses the risks associated with shocks and stresses that threaten the wellbeing of our community.

Shocks
Any sudden, intense, short-term events that significantly impact our community.

Bushfires	Digital network failure	Terror attacks
Storms (including floods, coastal erosion and inundation)	Financial institutional failure	Tsunamis
Heatwaves	Water crisis	Earthquake
Disease pandemic	Cyber attacks	
Utilities and infrastructure failure	Landslides	

Stresses
Systemic, interconnected and complex issues that impact our community on a daily or cyclical basis.

Housing Affordability	Drug and alcohol abuse	Lack of transport diversity
Climate Change	Employment diversity	Increasing Health Service Demand
Environmental degradation	Social cohesion	
Mental health	Inequity	

It's been five years since we developed our shared vision for the whole of the Northern Beaches to be a "safe, inclusive and connected community that lives in balance with our extraordinary coastal and bushland environment" (Community Strategic Plan - Shape 2028).

This overarching vision for the whole Northern Beaches holds truer than ever. In a world that can seem out of balance and holds some uncertainty, we strive to feel secure and safe. In the five years since we developed our first Community Strategic Plan (2018a), we have experienced storms, fires, floods, landsides and a pandemic. A lot has happened, and it is now time to pause and reflect on what we need to do in the future to stay safe and to thrive as a community. We need a specific vision and clear direction for becoming more resilient.

For me personally, if there is one thing that stands out it's the Northern Beaches lockdown. The Christmas of 2020 was spent in close quarters unable to gather with friends and family and future freedoms felt a long way off. Yet there was a strong sense of community with everyone pulling together and doing their bit to support each other and our local businesses. Our community developed a renewed gratitude for our special places - the beaches, bushland and open spaces that enabled us to reconnect with each other and our environment.

It is this community spirit we want to tap into when we look at ways to improve our collective resilience. We need a whole of community and government approach, one that looks at the big picture to enable us to tackle the complexity and urgency of future challenges, such as housing affordability, climate change, environmental degradation, mental health and natural hazards.

This Strategy puts resilience - our adaptive capacity to deal with shocks and stresses - front and centre of our planning work. This is about being aware of what's on the horizon, building on our strengths and addressing our vulnerabilities, to work together to ensure everyone is safe and given opportunities to thrive.

We are not unprepared. We already have plans in place that provide evidence-based strategies for protecting our environment, dealing with climate change, enhancing our social sustainability, and planning for our urban centres. This Resilience Strategy builds on our existing planning work in providing a shared reference for collaboration and a concise roadmap for protecting lives and properties, adapting to a changing climate, and thriving as a community in this special place.

[signature]

Michael Regan
Mayor

Part A

Introduction

"Building resilience must start at the grassroots level - building resilience in our local communities, our ability to withstand, prepare for and rebound after disruptions is really important"

Shane Fitzsimmons - Commissioner of Resilience NSW

About this Strategy

Purpose

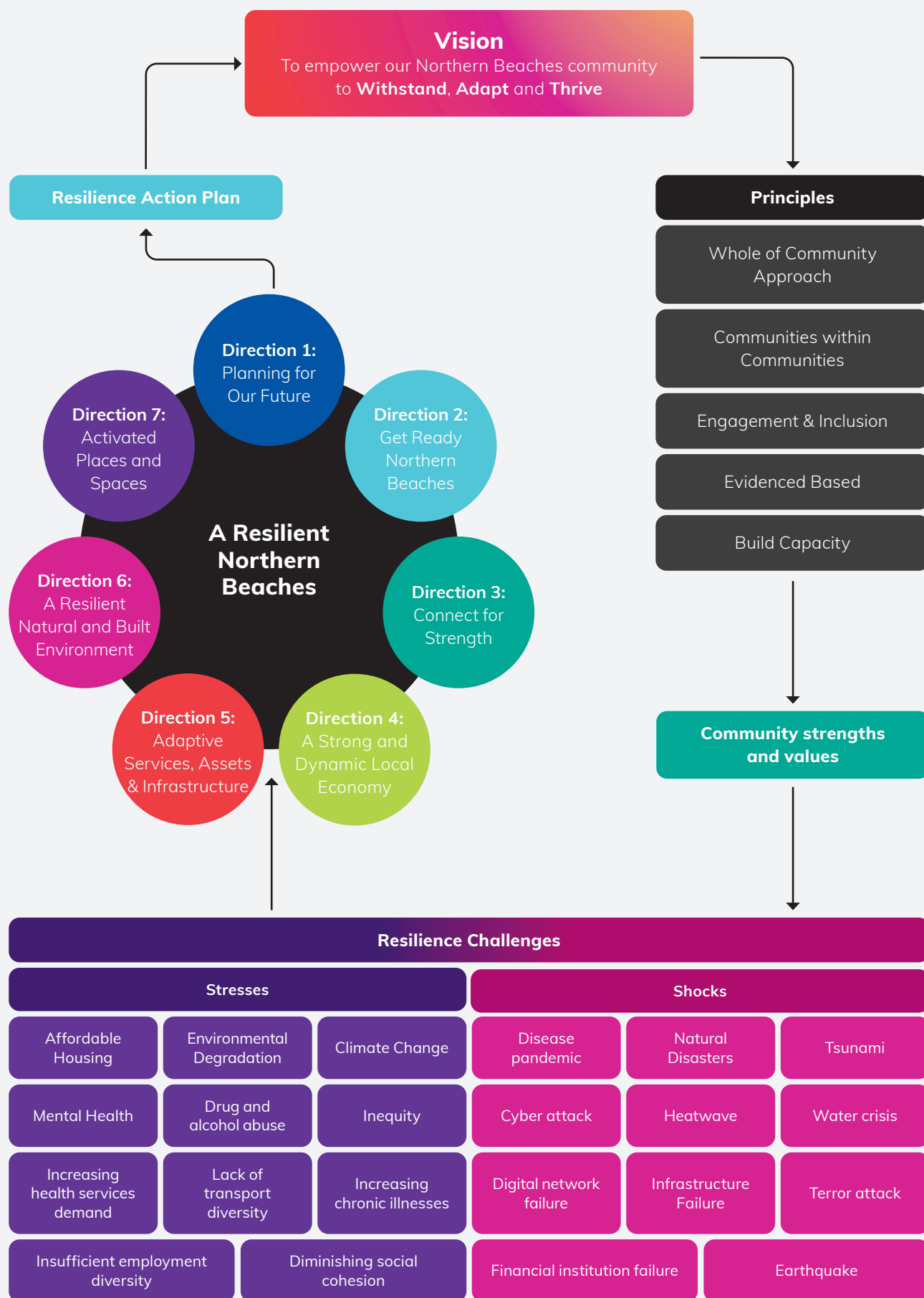The purpose of this Strategy is to outline a vision for a resilient Northern Beaches and provide a shared reference for collaborative action. Resilience planning needs to happen on different levels and across a broad spectrum of our community. This Strategy includes a framework that brings together a wide range of stakeholders and specific plans intending to boost the collective capacity of the Northern Beaches to Withstand, Adapt, and Thrive in uncertain and challenging times.

Taking a proactive resilience approach means our community has the best opportunity to implement a range of mitigative, adaptive and transformative options that allow them to face current and future challenges with confidence.

How this Strategy was developed

More than 1,300 people have contributed to developing the Resilience Strategy through three stages of community and stakeholder engagement.

The Strategy has come together through a combination of research, analysis and extensive engagement with the community and stakeholders as illustrated below Figure 2. The Strategy has also benefited from the community engagement findings from a range of other strategies including Better Together 2040 - Social Sustainability Strategy and Protect. Create. Live - Northern Beaches Environment and Climate Change Strategy 2040.

The Strategy identifies critical risks associated with the shocks and stresses that threaten the wellbeing of our community. The seven Strategic Directions and supporting key priorities and actions will help the Northern Beaches community to withstand, adapt and thrive.

1 — Research & Analysis
Review of international, national and regional science base to create a resilience framework and methodology for Northern Beaches

2 — Stakeholder Engagement
Consultation with existing partners, collaborators and experts

3 — Community Engagement
1,000+ survey participants
288 youth survey participants
3 community focus groups
1 local business focus group

4 — Strategic Alignment
Strategic Reference Group Workshop
Councillor Workshop
Stakeholder engagement

Figure 2 - Strategy method and touchpoints with stakeholders

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Engagement activities

Figure 3 presents the broad range of engagement undertaken that has enabled an in depth understanding of our strengths, vulnerabilities and where we need to prioritise our actions, all of which has shaped this Strategy.

To ensure successful execution of key recommendations, additional community engagement take place during the implementation phase.

	Inform	Consult	Involve	Collaborate
Objective	Create awareness and interest to encourage participation in engagement activities.	To gain an in depth understanding of our community's values, concerns, strengths, vulnerabilities and perceptions of resilience.	Deep exploration of the community's behavioural responses to the challenges they face.	Engage with community representatives to identify key priorities, generate ideas and shape the strategic directions.
Activities	Social Media — Email — Presentations	Surveys — Youth Poster	Focus Groups	Workshops
Results	Your Say webpage 2227 visits Council eNewsletter 150,000 reach 530 page views Community Engagement newsletter 22,000 reach Social media 150,000 reach 198 clicks Youth Face to Face sessions 4 sessions 200+ attendees 6 Strategic Reference Groups briefings	602 internet survey responses 401 telephone survey responses 288 youth survey responses	3 community focus groups (including representation of priority populations) 1 business focus group	Strategic Reference Group (SRG) all-in workshop Representation from all 6 Strategic Reference Groups 1 Councillor workshop 10+ workshops with internal stakeholders
Outcome of engagement	Awareness	Knowledge	Deep Understanding	Idea Creation — Strategic Directions

Figure 3 - Community engagement activities

Our vision is to:

| Empower our Northern Beaches community to withstand, adapt and thrive.

The Strategy has strong links with all of Council's strategic documents, therefore it is necessary to embed resilience as core principle across the full spectrum of Council's strategic and operational activities. The Strategy will be implemented in tandem with a range of key strategies and plans with progress monitored through the Integrated Planning and Reporting Framework (IP&R), as shown in Figure 4.

This Strategy establishes seven Strategic Directions towards achieving this vision in building the coping, adaptive and transformative capacity across all levels of our community, from individuals, to neighbourhood, to businesses and the broader community.

Each Strategic Direction identifies:

- outcomes we seek
- a description of resilience challenges and opportunities, and
- key priorities and actions.

A Resilience Action Plan will be developed to further articulate the full range of resilience actions and be implemented in close collaboration with our community and partners. We acknowledge that some of the challenges ahead are 'wicked problems' with global and national influence that cannot be solved 'head-on' or in isolation.

The Chief Executive Officer will oversee the Resilience Strategy, and it will be reviewed in line with Council's four-yearly Delivery Program cycle. Public updates on progress of actions will be provided as part of Council's annual reporting program.

Shape 2028
Northern Beaches Community Strategic Plan

Resilience Strategy
Withstand. Adapt. Thrive.

Resilience Action Plan

Lead Council Strategies
- Local Strategic Planning Statement
- Environment Strategy
- Social Sustainability Strategy
- Transport Strategy

- Climate Change Action Plan
- Environmental Education and Sustainable Living Action Plan
- Coast Action Plan
- Bushland and Biodiversity Action Plan
- Community Safety Plan

Other Council Strategies
- Events Strategy
- Destination Northern Beaches
- Digital Transformation Strategy
- Community Centres Strategy
- Asset Management Strategy

- Disability Inclusion Action Plan
- My Place Plans
- Bike Plan
- Connect Through Creativity
- Events Strategy
- Destination Northern Beaches
- Community Centres Strategy

Figure 4 - Relationship to other Council strategies and plans

Strategic alignment

This Strategy supports and complements priorities and actions within a range of global, national, state, regional and local frameworks; however, is tailored to reflect the unique needs of our local community.

As organisations, business and the community develop a greater understanding of their collective and shared responsibility for community resilience, plans and policies will mature to reflect new knowledge.

Global

National

Regional
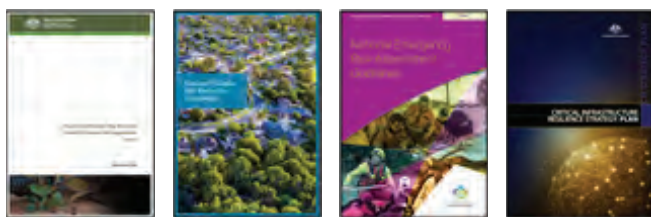
Local

Guiding principles

The following principles have guided the development of the Strategy and will continue to provide a solid foundation for future engagement activities and decision making during implementation. The core principles include:

Whole of Community Approach

Everyone in our community has a shared and collective responsibility, requiring a whole of community approach involving individuals, households, communities, service providers, businesses as well as infrastructure providers and governments.

Communities within Communities

The Northern Beaches community is made up of many layers and smaller communities influenced by their social and geographical settings, each with their own unique set of strengths, vulnerabilities, and evolving levels of resilience.

Engagement & Inclusion

Everyone should have equitable opportunities to genuinely participate in decisions which affect their lives. Equal rights should be established and promoted, with opportunities for all people.

Evidenced Based

There will be a focus on using the most current evidence to respond effectively to the priorities of this Strategy. Best practice models, where available, will be identified for implementation. Where these are not available, new innovative actions will be developed with rigorous evaluation to strengthen the evidence base.

Build Capacity

The strategy implementation will aim to ensure the best conditions are created for success in achieving effective resilience outcomes for the community. Capacity building activities will be led and supported by collaboration between the community, stakeholders and Council. Collaboration will ensure any initiatives build on existing community strengths and reflect the local context.

Figure 5 - Resilience Strategy guiding principles

Part B

Our Community and Resilience

"The capacity of individuals, communities, businesses and systems within a city to survive, adapt and thrive no matter what kinds of chronic stresses and acute shocks the experience."

Definition of resilience - Resilient Cities Network

Our definition of resilience

The capacity to deal with acute shocks and chronic stresses requires action at all levels of society from individuals to the collective and broader community. When we asked our community, what resilience means to them, they described it as: "stepping up", "bouncing back", "ability to keep going", "persistence" (Focus Groups, May 2021). The engagement also showed that some community members view resilience as a reactive response rather than something we can continually work towards.

This Strategy seeks to reinforce the importance of proactive action in an evolving process of adapting to new and emerging challenges, "rather than simply return to the status-quo" (Skerrat, 2013, p. 26).

For this Strategy we have adopted the Resilient Cities Network definition of resilience (left) as it resonates with agencies, business groups and communities.

Resilience in this sense, means having a keen awareness of our strengths, and vulnerabilities and understanding the shocks and stresses that threaten the values and wellbeing of our community. It also means having robust structures, plans and supporting measures (capacity) to deal with these vulnerabilities in the face of hardship.

To build and maintain resilience, the Northern Beaches community must:

1. Understand its vulnerabilities

2. Harness its strengths to overcome resilience challenges

3. Monitor and manage critical issues (shocks and stresses)

4. Develop its capacity to:

   - **Withstand**
     Acknowledge that shocks and stresses will continue to occur, and that it will be necessary for our community to build self-sufficiency and take protective action to limit their impact. Often referred to as coping or absorptive capacity.

   - **Adapt**
     Make intentional and incremental adjustments in anticipation of, or in response to change, in ways that create more flexibility in the future. Often referred to as adaptive capacity.

   - **Thrive**
     Our community is empowered to make intentional change to overcome significant challenges to achieve an improved state of wellbeing. Often referred to transformative capacity.

Characteristics of a resilient community

A resilient community is one that is self-sufficient, they are able to support each other to prepare, act, respond and recover from challenges both individually and collectively. The Resilient Cities Framework identifies the critical characteristics of a resilient community include:

- **Integrated** - there is consistency in decision-making that ensures all investments achieve a common outcome.

- **Flexible** - the community can change, evolve and adapt in response to changing circumstances.

- **Reflective** - we have mechanisms to continuously learn from their past experiences and modify standards or norms based on emerging evidence.

- **Robust** - assets and infrastructure can withstand the impacts of hazard events without significant damage or loss of function. There is sufficient investment in critical systems and infrastructure to minimise impacts. Over-reliance on a single asset, cascading failure and design thresholds that might lead to catastrophic collapse if exceeded are actively avoided.

- **Resourceful** - the community can rapidly find different ways to meet their needs during a shock or when under stress. This may include investing in capacity to anticipate future conditions, set priorities, and respond, for example, by mobilising and coordinating wider human, financial and physical resources.

- **Redundant** - there is spare capacity purposely created within systems so that they can accommodate disruption, extreme pressures or surges in demand. It includes diversity: the presence of multiple ways to achieve a given need or fulfil a particular function.

- Inclusive - there is consultation and engagement with communities, including the most vulnerable groups. An inclusive approach contributes to a sense of shared ownership or a joint vision to build community resilience.

Human behaviour and resilience

Understanding human behaviours in how we respond to the shocks and stresses that we face, helps us implement any planned actions and build resilience effectively. Through review of current literature and engaging with our communities several key influences were identified that impact on the effectiveness of resilience initiatives and presented in Appendix B.

Relationship to community wellbeing

The concepts of community wellbeing and resilience are intrinsically linked.

Community resilience -is a process of anticipating change and responding in a way that maintains or enhances community wellbeing (McCrae et al, 2014). It's an ever-evolving process and characterised as an act of doing.

Wellbeing on the other hand is a state of being, at a moment in time. and is often the focus of resilience actions (Norris et al., 2008)

Figure 7 below describes the relationship of both community wellbeing and resilience and how it influences future community wellbeing.

Figure 7 - A conceptual model for community wellbeing and resilience for the Northern Beaches (adapted from McCrae, Walton and Leonard, 2014, p. 278)

A snapshot of our community

The Northern Beaches encompasses an area of 254km², stretching from its southern border at Sydney Harbour to Broken Bay and Pittwater to the north and Middle Harbour and Cowan Creek to the west.

Pittwater Ward
Mackerel Beach
Coasters Retreat
Currawong
Scotland Island
Lovett Bay
Elvina Bay
Morning Bay (Towlers Bay)
Palm Beach
Whale Beach
Careel Bay
Cottage Point
Duffys Forest
Ku-ring-gai Chase
Avalon
Clareville
Bilgola
Bilgola Plateau
Newport
Scotland Island
Church Point
Mona Vale
Bayview
Terrey Hills (partial)

Narrabeen Ward
Warriewood
Ingleside
Elanora Heights
Narrabeen
Narrabeen North
Terrey Hills (partial)
Cromer
Wheeler Heights
Collaroy Plateau
Collaroy
Oxford Falls

Frenchs Forest Ward
Belrose
Davidson
Frenchs Forest
Forestville
Beacon Hill
Allambie Heights
Killarney Heights

Curl Curl Ward
Narraweena
Dee Why
Curl Curl
North Curl Curl
Brookvale
North Manly
Freshwater
Queenscliff

Manly Ward
Manly Vale
Seaforth
Clontarf
North Balgowlah
Balgowlah
Balgowlah Heights
Fairlight
Manly
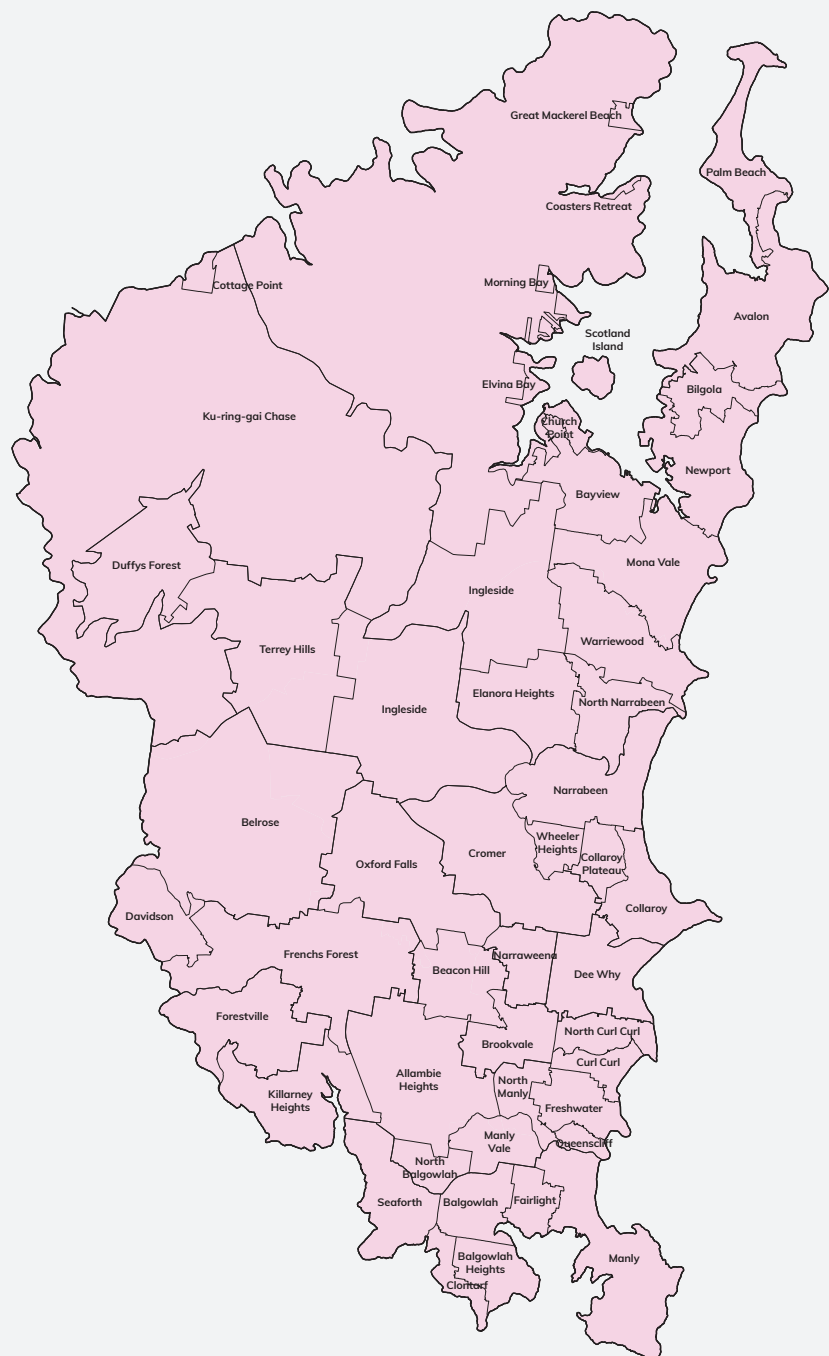
Where we come from

272,184 population

+31,816 residents by 2036 (3% of Greater Sydney's growth)

304,000 residents by 2036

Where we come from

28.8% Northern Beaches residents born overseas

36.7% Greater Sydney residents born overseas

For those born overseas

three highest countries of birthplace are:
**United Kingdom,
New Zealand
and China**

Population growth by age

1%
Children
(less than 5 years)

9%
Youth
(5-19 years)

16%
Young adult
(20-30 years)

2%
Adult
(30-45 years)

55%
Retirees
(65+ years)

17%
Mature adult
(45-65 years)

Household composition

6%
Group

26%
Couples
only

22%
Single
person

8%
Single
parent
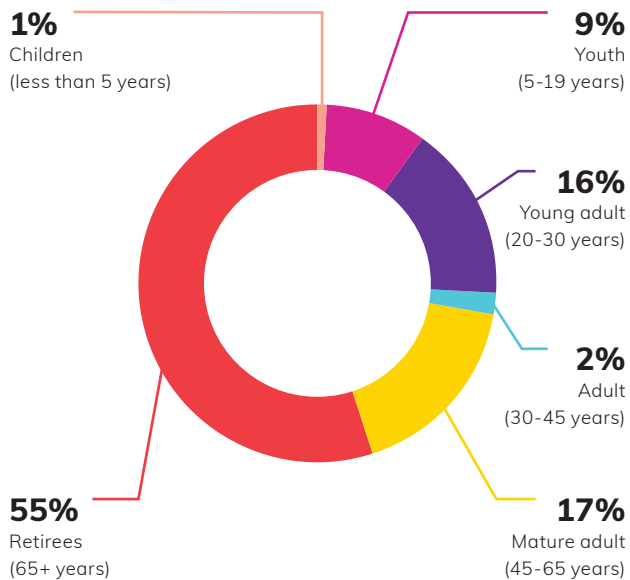
38%
Couples
with children
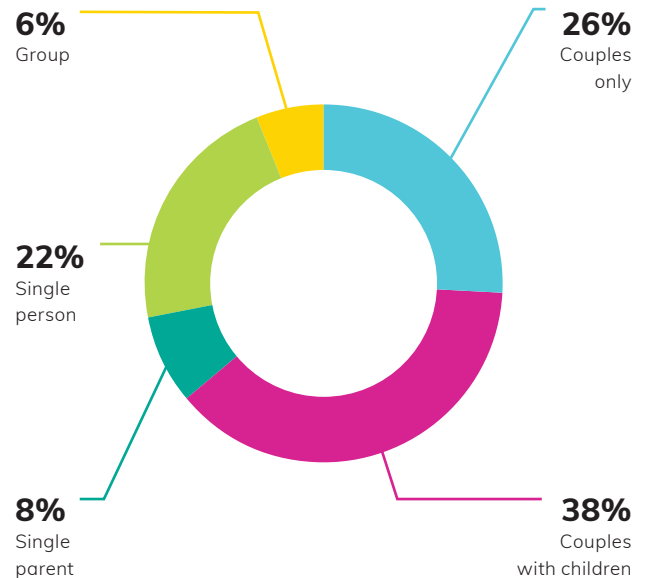
Environment

114km² national parks

80km coastline

254km² total area

1,460 native plant species

540 native animal species

19,000 bush fire affected properties

20,000 flood affected properties

63,000 properties affected by moderate to high-risk landslip potential

270 properties affected by coastal erosion

4,400 associated with estuarine inundation

Economy

82,700 jobs

32,700 businesses

130,000 employed residents

Our labour force

3.5% unemployment rate

66.2% participation

52% live and work locally

Top 5 professions

Managers

Professionals

Community and personal service workers

Technicians and trades workers

Clerical and administrative workers

Jobs by industry

15% Industrial

24% Knowledge-intensive

23% Health and education

38% Population-serving

Commuting to work

60% drive

17.6% transport

7.1% work from home

3.4% walk

1% cycle

Let's talk money

$2,173 Northern Beaches weekly median income

$1,745 Greater Sydney weekly median income

$2.1m+ median house price

$895 Northern Beaches average rental cost

$520 Greater Sydney average rental cost

5.9% Northern Beaches experiencing housing stress

11.8% Greater Sydney experiencing housing stress

Rent vs own

67% own

25% rent

8% other/not stated

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Part C

Key Findings
Our Values, Strengths and Challenges

The resilience of our community is defined by its strengths and our ability to overcome challenges and vulnerabilities.

Northern Beaches is blessed with vast bushland areas, an iconic coastline, and waterways that are deeply valued by the community and support our wellbeing. While recent experiences such as the pandemic, highlight the importance of the natural environment and open space to our capacity to thrive, it also exposes us to some natural hazards especially floods, bush fires, coastal erosion and landslides.

Our values

We asked our community what they value about the Northern Beaches, and this is important as many shocks and stresses threatened these values.

Our community values:

- a distinct sense of place and identity
- the geographic isolation, however we are still able to access world class services, facilities and amenities
- unfettered access to nature and the abundance of space

- a very high level of self-sufficiency
- the sense of community and laid-back lifestyle

For our business owners:

- Work-life balance - they cite that having a business on the Northern Beaches is not easy, primarily due to transport constraints in and out of the area. However, they are willing to make sacrifices to maintain their lifestyles.

Our strengths

Respondents to our Resilience Survey highlighted some key strengths which are outlined in Figure 8. These findings were reiterated by participants of our community focus groups, who reflected on our community possessing:

- a very strong attachment to the area
- a well-connected community
- a high level of self-sufficiency
- access to services that support our community
- a willingness to learn how to be more resilient

High quality of life

71% rate their quality of life as very good or excellent

1% only rate their quality of life poor or very poor.

Community support

52% said we are a well-connected community, coordinated and support each other in times of need.

30% stating we are doing well, but can improve.

Support networks

66% would turn to a neighbour in a time of crisis

89% would turn to a family member, professional service, or friend.

Community preparedness

81% are prepared to make changes in order to be more prepared

71% said that our local emergency services are capable and resourced adequately .

Figure 8 - Community Strengths (Phone survey n=401)

The Australian Disaster Resilience Index (Parson et al, 2020), provides a snapshot of the disaster resilience and capacities of communities across Australia. According to this index the Northern Beaches possess an "enhanced capacity" to use available resources to cope with adverse events, and can adjust to change through learning, adaptation and transformation.

These strengths have played a vital role in the way we have managed the numerous shocks and stresses we have faced over the years and will be at the heart of future initiatives to enhance and build our resilience.

Our resilience challenges - shocks and stresses

We surveyed over 1000 residents to understand the greatest shocks and stresses affecting our community. We ask them to identify their:

- Level of concern for each shock and stress, and

- Perceived level of preparedness as a community

While community concerns suggested moderate levels of awareness and preparedness for shock events, concerns over chronic stresses such as housing affordability, mental illness, climate change, environmental degradation and transport were dominate themes. There was a general appreciation for the high quality of life the Northern Beaches offers however, there were also deep concerns about the wellbeing of our community and the environment in face of increasing pressures of life.

Housing affordability is also one of our key challenges for many in our community, as it is critical to our ability to retain a diverse population and attract and retain key workers, young families and youth in the area. For example, we all experienced first-hand during the pandemic how important

essential workers such as nurses, teachers, health care workers and cleaners are critical to the health and wellbeing of our community, however affordable housing options for essential workers is limited.

Local shocks

When shock events occur such as storms, floods, bush fires, heatwaves, disease pandemics, terrorism and cyber-attacks, there is a significant acceleration in the demand for services and information, often as a matter of extreme urgency.

The information below provides a general characterisation of risk across the LGA. It is important to note that some communities are likely to have a higher or lower risk depending on their exposure to a particular shock.

Results of the community survey showed that for acute shocks (Figure 9):

The highest levels of concern were for:

1. Disease (pandemic)

2. Bush fires

3. Storms, cyber-attack, digital network failure, infrastructure failure

The highest perceived level of preparedness were for:

1. Disease (pandemic)

2. Bush fires

3. Storms

Whilst the engagement showed moderate levels of preparedness, there remains a large proportion of the community that is not adequately prepared for shocks as represented in Figure 10.
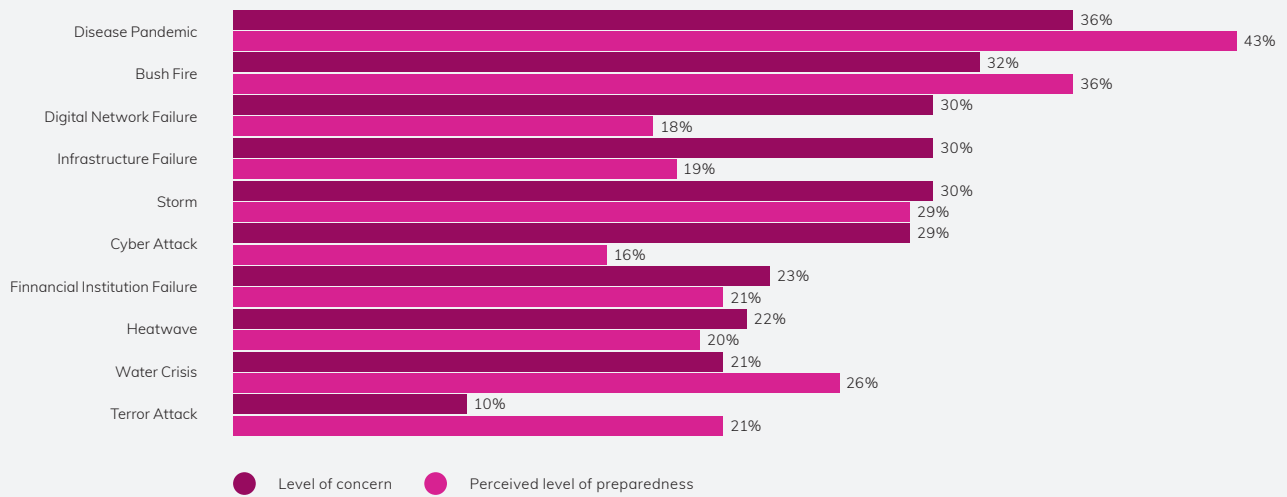
Figure 9 - Community shock analysis - Concern vs Preparedness (Telephone Resilience Survey 2021. N=401)

The lowest levels of preparedness, in addition to the greatest gap between levels of concern and low levels of preparedness were for:

- Cyber attack
- Digital network failure
- Infrastructure failure

This may be an indication of the lack of a clear authority and who has primary responsibility to respond to such shock events, given the varying ownership arrangements of digital network systems and critical infrastructure. In comparison to events such as bush fire and storms which illustrate higher levels of preparedness, which possess a clearly identifiable emergency service to manage these situations.
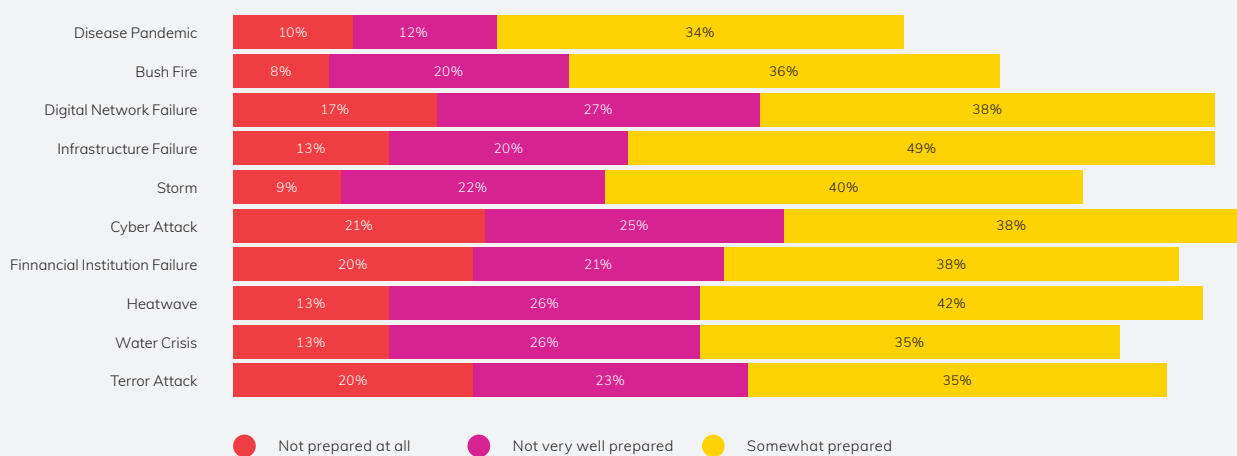
Figure 10 - Community shock analysis - Low levels of preparedness (Telephone Resilience Survey 2021. N=401)

Local shocks risk assessment

Table 1 represents the specific shocks affecting the Northern Beaches using a likelihood and consequence analysis from a range of data sources including the Northern Beaches Local Emergency Management Plan and Council's Enterprise Risk Framework. It's important to note that some risks may possess a lower residual risk based on existing mitigation activities. Conversely some locations, communities and socio-demographic groups may possess a higher (or lower risk) depending on their potential exposure.

	Shock	Likelihood	Consequence	Overall Risk	Areas with highest risk
	Disease Pandemic	Unlikely	Major[1]	High[1]	Whole of community
	Bush Fire	Likely	Major	Extreme	Duffys Forest, Terrey Hills, Ingleside, Narrabeen, Cromer, Cottage Point, Belrose and Oxford Falls and the offshore communities of Pittwater Refer Northern Beaches Emergency Preparedness webpage for information on bush fire
	Flood	Possible	Major	High	Mona Vale, Avalon, Newport, Brookvale, Beacon Hill, Forestville, Davidson and Belrose Narrabeen Lagoon, South Creek (including Cromer), Dee Why Lagoon, Curl Curl Lagoon, and Manly Lagoon Refer Northern Beaches Emergency Preparedness webpage for information on flood risks
	Storm (inc. coastal erosion and inundation)	Likely	Moderate	High	Whole of community Refer Northern Beaches Emergency Preparedness webpage for information on coastal erosion and inundation.
	Digital Network Failure	Possible	Moderate	High	Whole of community
	Infrastructure Failure	Possible	Moderate	High	Whole of community
	Cyber Attack	Possible	Major[2]	High[2]	Whole of community
	Financial Institution Failure	•	Variable	•	Whole of community
	Heatwave	Likely	Major	Extreme	Whole of community, particularly the elderly and young children
	Water Crisis	Possible	Moderate	High	Whole of community
	Terror Attack	Probable[3]	Not rated	Not rated	Whole of community
	Landslide/ Rockfall	Possible	Moderate	High	Communities within Existing or old landslide areas, at the or on the top or base of slopes, within or at the base of drainage hollows, any sloping ground in an area known to have a landslide problem
	Tsunami	Unlikely	Major	Medium	Coastal communities below 10m AHD within 1km of the coast. Refer to Figure 26 NSW SES Tsunami Evacuation Area
	Earthquake	Possible	Moderate	High	Whole of community

Table 1 - Risk assessment of shock events for the Northern Beaches

[1] *Northern Beaches emergency risk assessment undertaken prior to COVID-19 pandemic*
[2] *Cyber-attack risk assessment taken from Council's Risk Management Framework*
[3] *Current Terror Alert Level as of December 2021 (Source: NSW Police)*

Local stresses

Stresses are the slow burn issues which are systemic, interconnected and complex in nature that weaken the fabric of our community on a daily or cyclical basis. They have the potential to erode the identity, values and lifestyle that our community treasures.

The issues themselves, and responses to them, are more complex and less tangible than shocks.

The community survey showed that for chronic stresses, the highest levels of community concern were as follows. (Figure 11).

These results were consistent with the findings of the youth survey:

1. Housing affordability
2. Climate change and environmental degradation (equal second rating)
3. Mental health

The lowest perceived levels of preparedness were for:

1. Housing affordability
2. Inequity
3. Employment diversity

"A natural disaster is just something that people can understand, you can prepare, it's something about nature you accept it, but with social ones there's something scary about that it creeps up on you and undermines your own individual power or your own freedom"

(SRG Workshop participant)
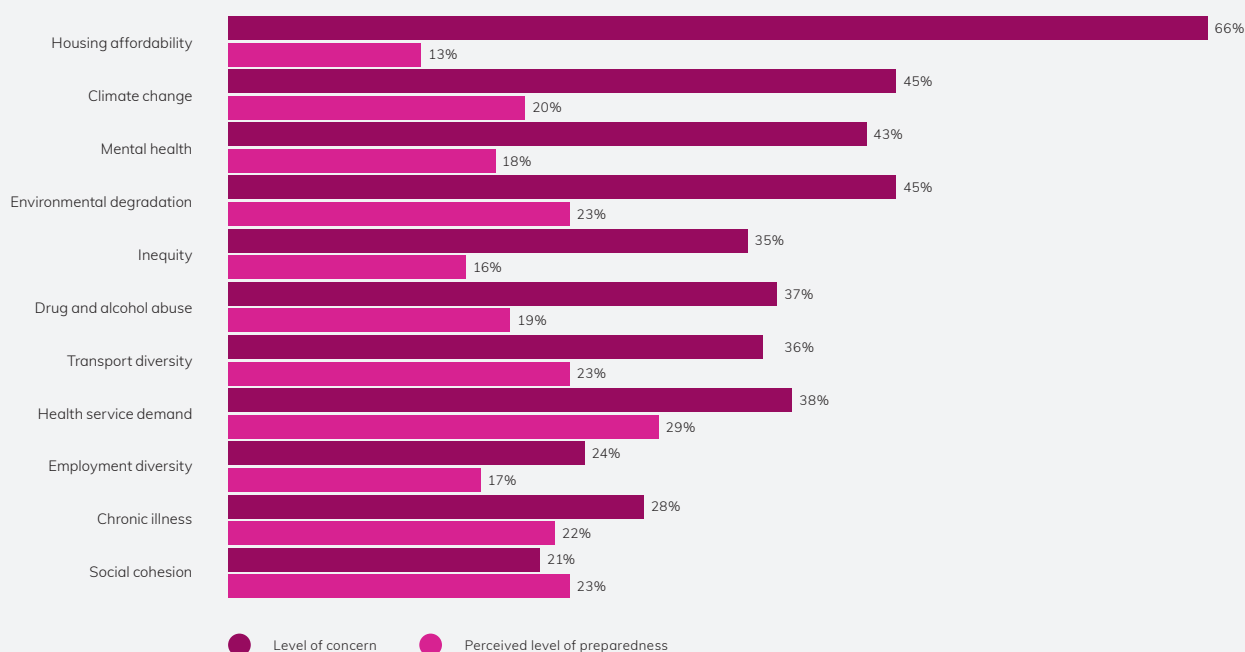
Figure 11 - Community stresses analysis (Telephone Resilience Survey 2021. N=401)

Housing affordability — 66% / 13%
Climate change — 45% / 20%
Mental health — 43% / 18%
Environmental degradation — 45% / 23%
Inequity — 35% / 16%
Drug and alcohol abuse — 37% / 19%
Transport diversity — 36% / 23%
Health service demand — 38% / 29%
Employment diversity — 24% / 17%
Chronic illness — 28% / 22%
Social cohesion — 21% / 23%

● Level of concern ● Perceived level of preparedness

We also asked the community about effects of recent events on their quality of life. There is a strong correlation between the top three shocks and stresses (Figure 9 and Figure 11) and the recent events that have impacted on residents (Figure 12). Figure 12 shows the events with more than 25% of people registering as being affected or very affected are:

- COVID-19
- Cost of housing
- Transport
- Lack of social contact (likely as a result of COVID-19)
- Bush fires

	Phone - Affected/Very affected	Online - Affected/Very affected
COVID-19	40%	50%
Cost of housing, be it rent of loan repayments	31%	29%
Transport stresses in the Northern Beaches area	31%	40%
Lack of social contact with friends/relatives	30%	38%
Last summer's bushfires in NSW, including smoke pollution	26%	35%
Climate change	23%	38%
Australia's economy	22%	32%
Work/life balance	18%	24%
Negative impacts on your physical and/or mental health	16%	27%
Employment opportunities and job securities	16%	20%
Excessively hot days and/or nights	15%	21%
Last summer's storms and floods in NSW	11%	16%
Crime/safety in the Northern Beaches area	10%	14%

Figure 12 - Resident reported affects from recent shocks and stresses (n=1003)

Inter-relationship and cascading effects of shock events and stresses

There is an intrinsic relationship between the cascading impacts of shock events and stresses and the effect they collectively have on community wellbeing. Figure 13 illustrates this synergy whereby significant shock events such as a pandemic, a bush fire or earthquake have the potential to have long-lasting effects on the community well after the impacts of the event have subsided.

It may also be the case that the secondary and tertiary impacts possess a greater effect on community wellbeing than the initial event itself.

This highlights the need to understand the association of impacts relating to a shock event, particularly those that have long-term impacts on community wellbeing.

The resilience of our community

Shock Event
- Bushfire
- Flood
- Storm
- Pandemic
- Terror attack

Stresses influencing shock events
- Climate change
- Decline social cohesion
- Environmental degradation

Primary impacts
- Risk to life and property

Secondary/ Tertiary impacts
- Extended power outage
- Interrupted supply chains
- Communication failure

Stresses
- Economic impacts
- Mental health
- Decline social cohesion
- Environmental impacts

Community wellbeing

Figure 13 - Examples of interrelated and cascading impacts of shocks and stresses

Emerging risks and resilience challenges
- A global and regional perspective

The Northern Beaches community is influenced by many regional and global challenges. The 2021 Global Risks Report describes the clear and present dangers the world is likely to face within the next two years (Figure 14).
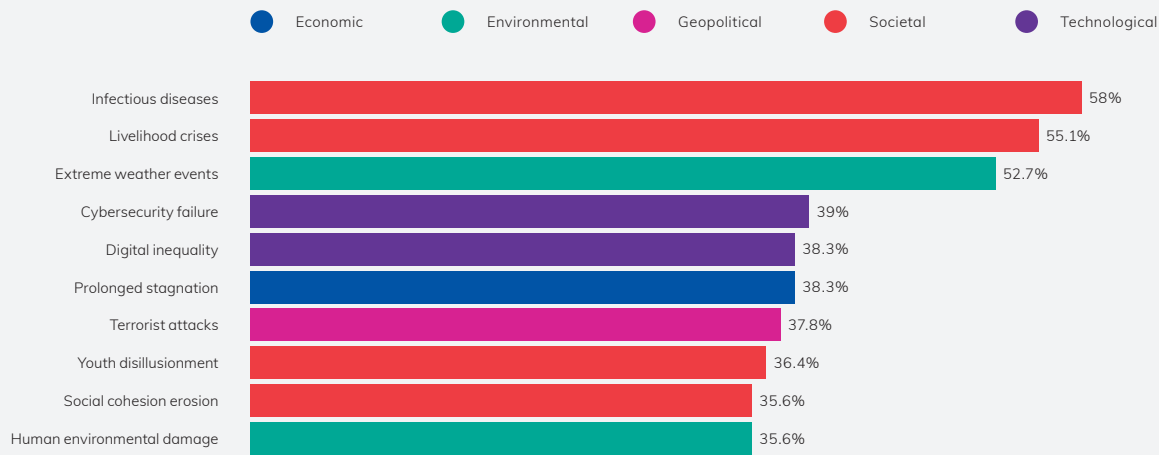
Figure 14 - Clear and present dangers 0 - 2 years (World Economic Forum, Global Risks Report, 2021)

In terms of global risks by likelihood and by impact, extreme weather has dominated the primary risk by likelihood over the past four years as shown in Figure 15.

Figure 15 - Top Global Risks by Likelihood (World Economic Forum, Global Risks Report, 2021)

Whilst Figure 16 illustrates infectious diseases as the highest risk by impact, which is understandable given recent events, interestingly it has only featured on one other occasion since 2012. This occurred in 2015 which coincided with the Zika virus outbreak, highlighting how quickly the global risk landscape evolves.

There is strong consensus between this global risk assessment and concerns relating to shock and stresses affecting the Northern Beaches obtained through the engagement with our community during the development of this strategy.

1st	2nd	3rd	4th	5th	6th	7th
Infectious diseases	Climate action failure	Weapons of mass destruction	Biodiversity loss	Natural resource crises	Human environmental damage	Livelihood crises

Figure 16 - Top Global Risks by Impact (World Economic Forum, Global Risks Report, 2021)

From a regional perspective, Resilient Sydney Strategy (2018) identified a range of megatrends anticipated to have the most influence in shaping Sydney's resilience over the next 30 years. These emerging trends include:

- continued pressure on housing affordability and diversity of housing supply
- increased rate and distribution of chronic illnesses
- increased interdependencies with global supply chains
- increase in domestic and drug-related crime
- increased cultural diversity and distribution of population
- unequal access to multimodal transport options
- increased reliance on digital solutions
- Increase in global temperatures and rising sea levels
- Increased focus on metropolitan scale governance
- Short-term political cycles and fragmented governance of the metropolitan city.

Critical assets, infrastructure and supply chains support our everyday lives such as energy, food, water, transport, communications, health and banking and finance. Secure and resilient infrastructure and supply chains support productive communities and help to drive the business activity that underpins economic growth. A disruption to these systems could have serious implications for business, governments and the community, impacting supply security and service continuity.

The vulnerability of our infrastructure systems and services is influenced by:

- high levels of dependency and growing system interconnectedness
- just-in-time supply, low levels of storage, centralised distributions
- single sources or lines of supply and few alternative sources
- dependence on imports to meet demand (e.g. food, fuel)
- high expectations of continuous ongoing supply

- low tolerance for loss and disruption
- complex supply chains involving multiple entities at local, regional, national and international scales (Resilient Sydney, 2018)

Critical infrastructure

The 100 Resilient Cities process identified the critical city assets and infrastructure of Sydney as:

1. Health infrastructure - increased demand from ageing and growing population

2. Wastewater and stormwater - capacity constraints and ageing network polluting the city's waterways

3. Commercial buildings and structures - interdependencies with city systems

4. Communication networks - criticality of information technology services

5. Energy network - strong interdependency for a reliable supply

6. Water supply - limited diversity and availability during droughts.

From a Northern Beaches perspective, Figure 17 below represents a range of critical assets and infrastructure that supports the very basic needs of our community.

Regional roads	Mona Vale Road, Wakehurst Parkway, Forestway, Warringah Road, Pittwater Road, Condamine St/ Burnt Bridge Creek Deviation, Barrenjoey Road
Local roads	distributed across the local government area
Telecommunications infrastructure	distributed across the local government area
Educational facilities	all schools and tertiary education facilities within the local government area
Electricity infrastructure	distributed across the local government area
Health facilities	Mona Vale and Frenchs Forest Hospitals
Waste management facilities	Kimbriki Resource Recovery Centre, Belrose Resource Recovery Centre
Wastewater treatment facilities	North Head and Warriewood treatment facilities
Water supply and treatment facilities	distributed across the local government area
Stormwater infrastructure	distributed across the local government area
Bridges servicing regional roads	Spit, Roseville & Narrabeen Bridges
Public wharves & jetties for transport purposes	major/critical transport routes - Manly Wharf, Palm Beach Wharf, Offshore Community Wharves
Fuel	distributed across the local government area
Supermarkets	distributed across the local government area

Figure 17 - Critical Infrastructure supporting the Northern Beaches community

In addition to the above, there is a range of important assets and infrastructure that supports the wellbeing of our community including:

- Paths and walkways
- Sporting and recreational facilities
- Community and cultural facilities and amenities
- Parks, reserves and community gardens
- Public wharves and jetties for recreation use.

Supply chains

Supply chains are the processes and support networks that process raw materials into goods that are delivered to users, whether they be industries or consumers and often rely on a combination of local, national and international supply chains (refer Figure 18).
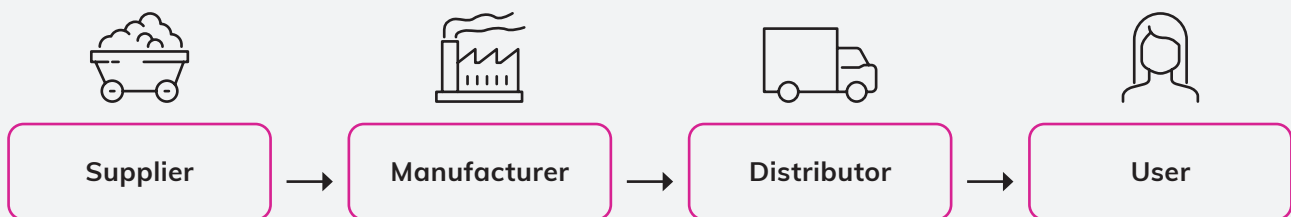

Figure 18 - From raw materials to the user (adapted from Australian Productivity Commission, 2021).

Supply chains are potentially exposed to a range of shocks and stresses that can affect our local community and economy, including:

- geopolitical shocks, such as a trade war that might affect regional or global trade, such as a fuel supply shortage

- environmental shocks, such as the 2019-2020 bush fires in Australia that affected transport and communication

- economic shocks, such as the 1973 oil crisis that changed how firms and households use energy

- societal shocks, such as recent labour disputes or the COVID-19 pandemic that affect labour supply and demand, especially in tourism and hospitality sector reliant on international skills and students

- infrastructure related shocks such as disruptions at a port or along a road

- technological related such as cyberattacks

The COVID-19 pandemic has highlighted the fragility of our collective dependency on national and international supply chains. There were immediate impacts on logistics and transport, as well as panic buying and a number of economies placing export restrictions on some essential goods (Australian Productivity Commission, 2021).

The Northern Beaches community have a high dependency on critical supply chains:

- High levels of food importation as a result of low levels of local food production.

- Wholesale trade and manufacturing industries are the two largest export industries contributing 18% and 33% respectively to our local economy, with manufacturing contributing 16% to the NSW economy.

- High levels of importation of goods and services from global suppliers with manufacturing being the largest total imports by industry, accounting for 30% of the Northern Beaches economy, generating $4,455 million in 2019/20 (.idcommunity, 2021).

Whilst supply chain vulnerability is heavily influenced by national and international forces, it is important for Northern Beaches businesses to be aware of and understand supply chain vulnerabilities and develop strategies to reduce these risks.

Interdependency and interconnectedness of infrastructure systems and supply chains

The infrastructure and supply chains that supports our everyday lives is an intricate web of assets and systems that are interconnected and rely on each other for continued service provision. Disruptions to one or more parts of a system, particularly as a result of natural disasters can trigger cascading effects, particularly within highly integrated systems.

They can expose vulnerabilities and inequities throughout society - particularly if disrupted for extended periods (National Resilience Taskforce, 2018).

Figure 19 highlights the complex nature and interdependency of critical systems, services and infrastructure. This emphasises the need to promote resilience across the entire system, network or supply chain and not simply focus on single elements in isolation to remainder of the system.
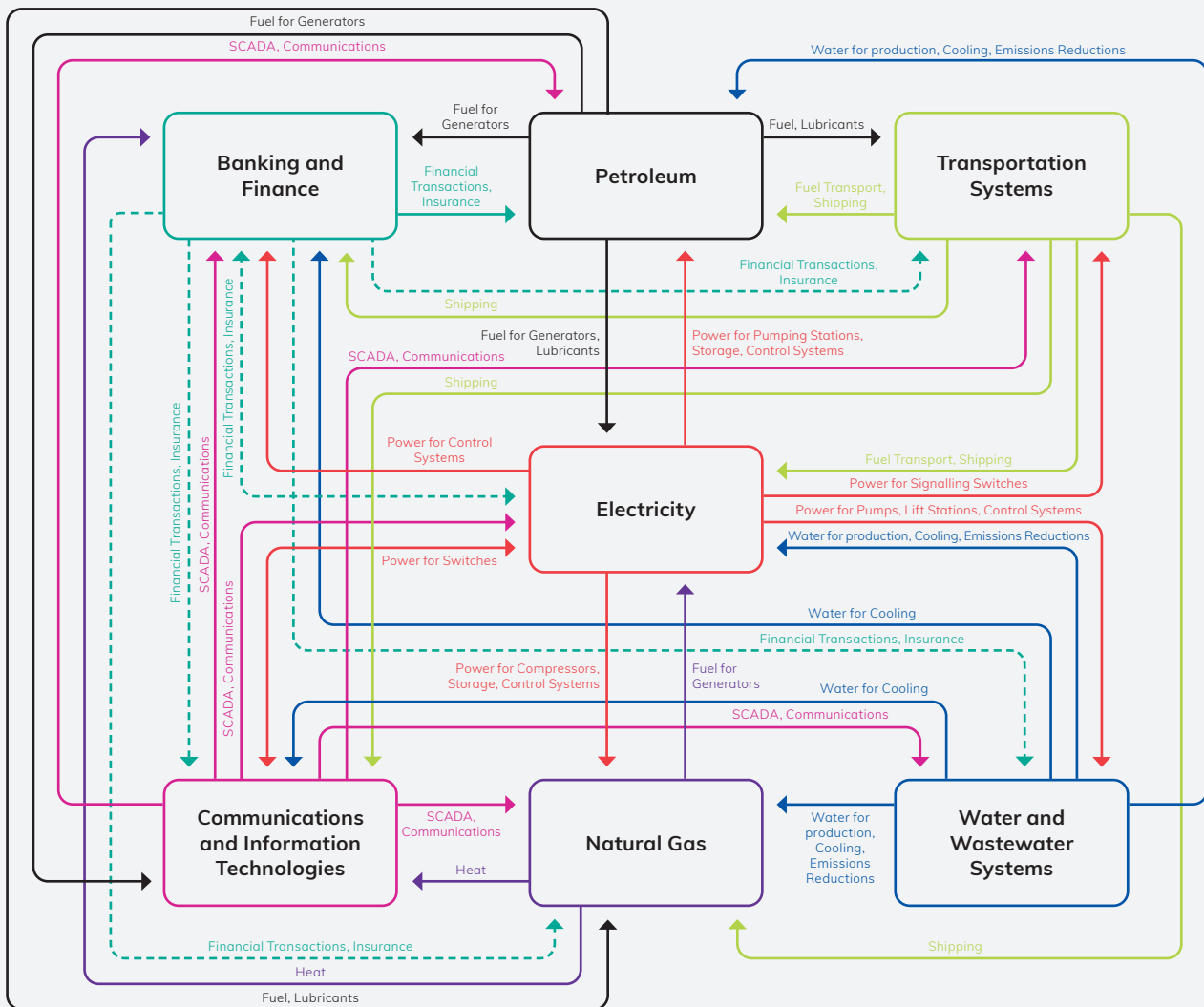
Figure 19 - Example of complex nature of infrastructure system interdependence (NSW Department of Justice, 2018)

Infrastructure resilience

Infrastructure resilience refers to the ability of the infrastructure to continue providing an adequate level of service in the face of significant disruption. There are four critical elements that determine the resilience of infrastructure, including:

Resistance	is concerned with direct physical protection. It is infrastructure's ability to withstand shocks to continue operation (e.g. storm surge barriers built to withstand severe storms)
Reliability	is the capability of infrastructure to maintain operation in a variety of conditions (e.g. electricity networks designed to operate in extreme heat or extreme cold)
Redundancy	is the adaptability of an asset or network to cope with loss of individual components (e.g. a hospital with two physically separate water supplies)
Enhancing Response and Recovery	is infrastructure resilience designed to enhance a provider's ability to recover from disruptions (e.g. modular infrastructure for single part replacement

Figure 20 - Elements of Infrastructure Resilience (NSW Department of Justice, 2018)

To understand the resilience of an asset or infrastructure we need to develop a mature understanding of:

1. Infrastructure criticality

Infrastructure criticality refers to the consequences of a failure of the asset on the Northern Beaches community from a social, environmental or economic aspect.

Elements that determine the criticality of an asset may include:

- Safety
- Cost of failure
- Complexity
- Impact of failure
- Impact on the environment
- Location
- Loss of service
- Number of customers serviced
- Site function
- Public image impacts
- Cross-dependency with other assets

2. Infrastructure vulnerability

The vulnerability of infrastructure is determined by its exposure to a range of hazards, particularly the impacts of bush fire, flood, storms and landslides pose a clear risk to these assets. The level of exposure may be influenced by:

- the type of hazards to which the asset is exposed
- the likelihood, intensity and frequency of hazard events
- the effectiveness of existing mitigation and adaptation measures
- geospatial context

Assets and infrastructure are not only exposed to the impacts of natural disasters, however their vulnerability and criticality is influenced by a range of other changes including:

- rapid population growth and change
- rapid urbanisation
- changes in climatic conditions
- decline of biodiversity
- decline of soil productivity; and
- fluctuations in the global economic market (Australian Government, 2018).

Other shocks and stresses also pose a risk to assets and infrastructure but are less obvious and like the slow-burn stresses are more complex issues to resolve, such as inadequate investment in infrastructure maintenance and renewal. Further, climate change is likely to change the exposure to a range of hazards over time.

Principles for determining resilience investments

It is well document that increased investment on risk reduction activities leads to a reduction of avoidable damages and recovery costs, clearly highlighting the financial benefit to focus on anticipatory, mitigative and adaptive actions.

Failing to adequately invest in infrastructure resilience will result in:

- significant increase in insurance costs or inability to obtain insurance
- the asset becoming vulnerable to current and future risk
- significant disruption to services, particularly in times of crisis

- the asset is unable to achieve the level of service as intended
- repair or replacement costs may exceed the mitigation/adaption costs
- a reduction in mitigation/adaption opportunities as options are no longer available or feasible.

To determine the priority of resilience investments, an assessment of likelihood, vulnerability and criticality of the asset must be undertaken. The general principle is that resilience investments are prioritised for assets that possess a higher level of criticality and vulnerability as described in Figure 21. Whilst these principles apply to infrastructure resilience, they equally apply to broader resilience actions.
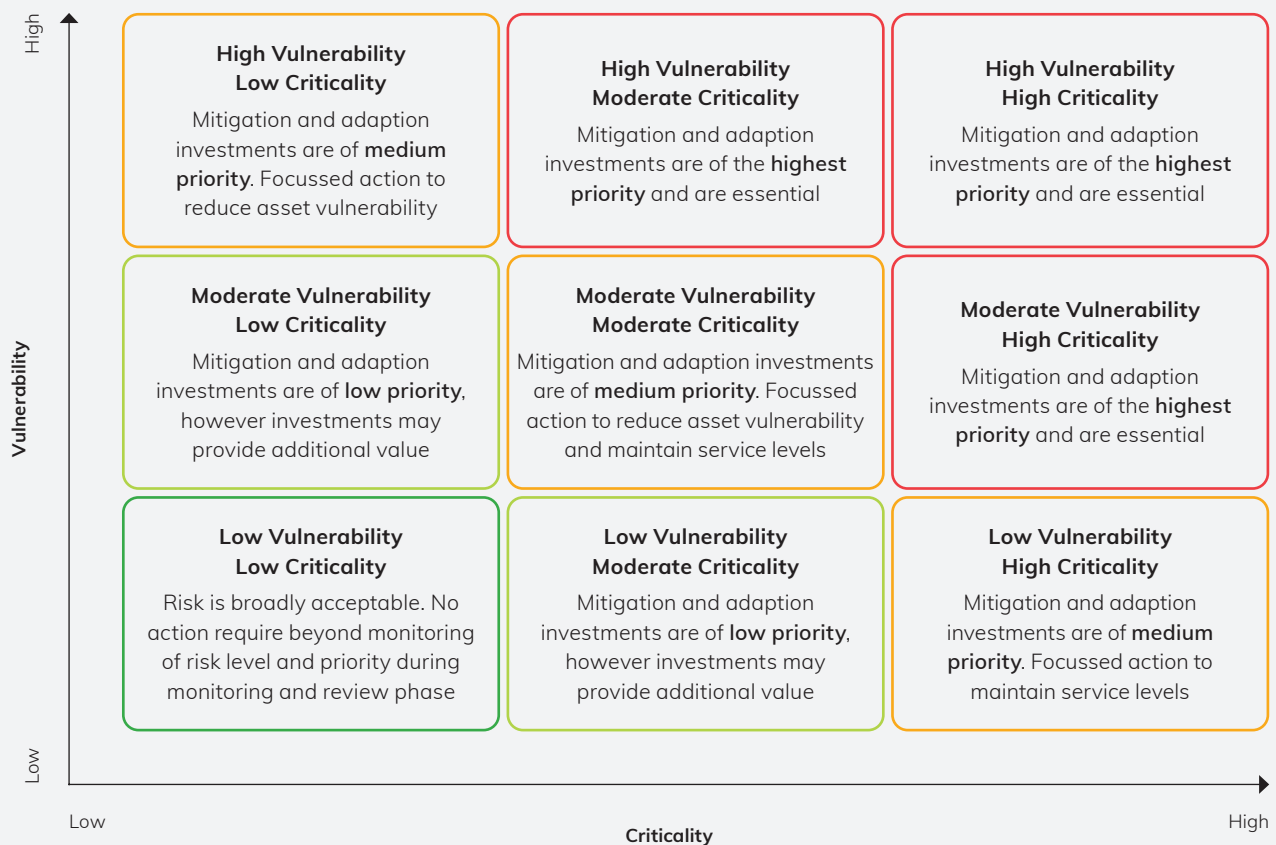
Figure 21 - Resilience investment priority matrix

Figure 22 below describes the staged process for assessing and prioritising resilience actions. The assessment should be informed by robust data, where available, in order to adequately characterise the criticality and vulnerability of infrastructure assets.

Asset Portfolio

- Identify and map each asset and their critical components and interdepencies
- Identify relevent risks potentially impacting the asset

Assess

- Undertake a detailed risk assessment for each asset and their current and future impacts on physical asset and operational capacity including:
    - **Likelihood** - the occurrence of events potentially impacting the asset. Based on known or modelled values
    - **Vulnerability** - the extent of which the asset, or exposed elements
    - **Critcaility** - the projected or anticipated impact of the hazard occurring
- Determine the risk rating as per Table 3 in Appendicies

Prioritise

- Assess mitigation and adaptation priorites as per Table 4 in Appendices

Action

- Develop action plans based on the highest value risk resilience options per vulnerability reductions and incorporate into asset management plans

Review

- Review of the asset portfolio must be undertaken at appropriate intervals, particularly when risk profiles change, infrastructure is modified, or new infrastructure created

Figure 22 - Process for determining infrastructure resilience investments

Part D
Strategic Directions

"Make me feel empowered to take action myself - I want to feel I can do something and am supported in taking that action"
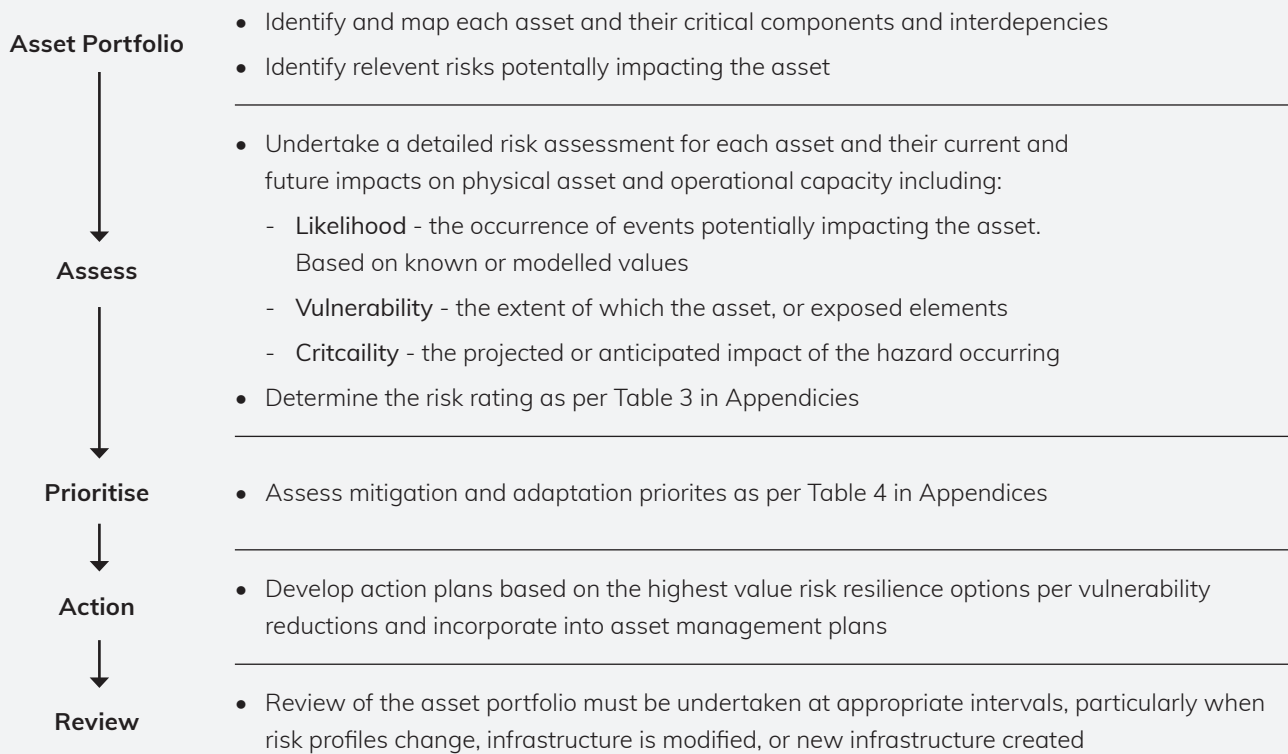
(SRG Workshop Participant)

The pathway to a resilient Northern Beaches requires a multifaceted approach that not only addresses immediate risk and vulnerabilities, but also responds to longer-term and emerging challenges. The Strategic Directions establish the outcomes we seek and identify a range of key priorities and key actions which have been developed based on the extensive research and engagement with our community.

In addition to adopting the recommendations provided in a number of state and national inquiries.

A Resilience Action Plan will be prepared that will further articulate the full array of initiatives across all Strategic Directions, their timeframe for delivery and key partners.

The actions will use a combination of:

Direct action

Actions that directly target and reduce the impact of the shock or stress on our community i.e. hazard reduction works to protect critical infrastructure

Supportive action

Actions that are designed to improve supporting mechanisms that reduce the impact of shocks and stress on our community, particularly where no clear solution or targeted action can be applied i.e. increasing opportunities to access community services

Advocacy

Supporting our community to influence change where the primary responsibility lies with another entity i.e. changes to legislation

The timeframes for delivery of key recommendations are categorised as:

- Short term actions (S) - action to be undertaken within five years,

- Medium term actions (M) - actions to be undertaken between five to 10 years,

- Longer term actions (L) - actions that will likely take 10+ years to implement, and

- Ongoing actions (O) - actions that will be undertaken on a regular or continuous basis.

Direction 1: Planning for our future

Resilient land use planning reduces the impact of natural hazards on our community and enables access to a broad range of housing, employment, education, and transport options that support individual and community needs.

Areas of our community are highly exposed to a range of natural hazards with over 19,000 properties classified as bush fire prone, 22,000 flood prone, 63,000 properties at being of moderate to high-risk landslip potential, 270 properties affected by coastal erosion, and a further 4,400 associated with estuarine inundation. Some communities are geographically isolated and/or possess evacuation constraints that compound the risks to those communities.

It is critical that land use planning limits intensification of development in areas that pose a threat to the health and wellbeing of our community. Given our community's passion about our environment, these values must not be compromised in order to achieve risk mitigation measures for new development, and where possible environmental condition enhanced.

Population diversity is essential to the socio-economic resilience of any community. From an LGA level and strategic planning perspective, service group diversity is essential to the best use of assets and infrastructure, ensuring a relatively stable and equal distribution of aged groups are continuously catered for instead of needing divestments/reinvestments in different types of social infrastructure if the demographic profile changes over time. For example in the case of a non-diverse population, there would be a need to divest from aged care to reinvest in social services to support a change in demographics over time to young families.

Professional diversity is similarly critical to our local economy and community by ensuring a multiskilled and essential workforce is able to access affordable housing options. Similarly, young people and young families are increasingly priced out of the area. Affordable housing - and greater housing choice that can cater for our ageing population - is of central importance to our individual resilience and personal wellbeing.

On an LGA level, affordable housing and broad employment, education and transport options all contribute to our ability to attract and retain a diverse population, which is of fundamental importance to our collective capacity to withstand, adapt and thrive into the future.

> ***Be mindful of growth and our ability to cope with it (environment and lifestyle)***
>
> (SRG Workshop participant)

Key Priorities	Key Actions
1. Avoid intensification of development, inappropriate development and incompatible land uses in areas exposed to natural and urban hazards	1a. Establish planning controls that limit intensification, inappropriate development and incompatible land uses to reduce or avoid risks from natural hazards (S-M)
2. Carefully manage population growth without compromising our local environment, wellbeing and lifestyle of our community	2a. Establish planning controls that limit impact on our local environment and the wellbeing and lifestyle of our community (S)
3. Integrate resilience principles into land use planning processes	3a. Establish resilience assessment processes within Council's planning and development application frameworks (S)
4. Develop a mature understanding of climate change risks and its influence on strategic land use planning	4a. Undertake a Climate Change Risk Assessment to inform planning controls with a focus on bush fire, flood, urban heat, coastal erosion and inundation (S-M)
5. Improve disaster recovery provisions within the planning process	5a. Implement "build back better" provisions into the local planning framework to reduce future risk and improve community recovery (S)
6. Increase the resilience of infrastructure to support current and future communities	6a. Engage with infrastructure providers to ensure critical infrastructure on the Northern Beaches achieves the objectives of the NSW Critical Infrastructure Resilience Strategy (S-L)
7. Improve social and affordable housing options particularly for very low to moderate income earners and essential workers	7a. Deliver the Housing Strategy that establishes mechanisms to increase affordable housing options to support our low to moderate income earners and essential workers (M-L)
8. Improve transport accessibility & diversity within, and out of the Northern Beaches	8a. Advocate for improved transport accessibility & diversity within, and out of the Northern Beaches area (M-L)
9. Increase local food production to increase food security and reduce reliance on regional and global supply chains.	9a. Explore urban agriculture initiatives to increase local food production such as increasing community growing spaces, partnering with private enterprise, engagement and education, promotion of existing community gardens (M).

Links to Existing Plans and Strategies
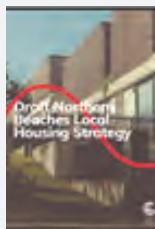
Direction 2: Get Ready Northern Beaches

Our community understands the risks they face and works together to prevent, prepare, respond, and recover from significant disruptions.

The importance of a community that is aware and prepared for shocks and stresses cannot be overstated. We know from recent experiences, and particularly from the Black Summer bush fires, that the ability to protect lives and properties are contingent on the community's capacity for planning ahead and supporting each other to respond in times of crises.

In recent years, Northern Beaches has experienced floods, coastal erosion, landslides, bush fires, and the COVID-19 pandemic. Despite the severity of these shocks, the level of preparedness in the community remains a priority area, with only approximately 42 percent of survey respondents stating they are prepared for major events.

We know that the effects of climate change will increase the frequency, magnitude, and duration of events that it will affect everyone, directly or indirectly. The risks cannot be isolated to specific places and compounding effects emphasises the need for a holistic and collaborative approach.

According to Deloitte Access Economics (2021), natural disasters currently cost the Australian economy over $38 billion per year with the majority of disaster funding consumed in the recovery phase, with only 3 percent investment to preparation and mitigation activities (Productivity Commission, 2014).

By 2060, this cost will rise to at least $73 billion for a low emission scenario and as high as $94 billion under a high emissions scenario.

The three drivers of this increase are:

- Population growth
- Climate change
- Property value increase.

It's vital we increase investment in prevention and mitigation activities in order to minimise the cascading effects of shock events on our community.

Resilience to natural disasters is extremely important for community to be prepared for the inevitable increasing e.g., storm surges, flooding, bushfires, so preparation is necessary via education, training, developing skills

(SRG Workshop participant)

Key Priorities	Key Actions
	1a. Continue to support the Emergency Services in delivering community prevention and preparedness campaigns (O)
	1b. Develop a "Get Ready Animals" program to improve the preparedness of owners of domestic and large animals (S)
1. Empower our communities to enable them to effectively prevent, prepare, respond and recover from shock events	1c. Develop a "Get Ready Business" program to ensure local business owners are aware of the risks to business continuity and are able to identify and implement strategies to minimise the negative economic impact of shock events (S)
	1d. Continue to work with priority populations, vulnerable communities and facilities (aged care, childcare and schools) to ensure they have plans in place to respond effectively to shock events (O)
2. Increase understanding of the cascading impact of shock events and their interconnectedness with stresses	2a. Undertake local risk assessment to increase understanding of community's awareness of risks, improve response protocols and identify mitigation/adaptation initiatives (S)
3. Focus investment on disaster prevention activities to avoid or minimise the impacts of shock events	3a. Seek to increase natural hazard prevention activities by maximising grant funding opportunities (O)
	4a. Work with the emergency service organisations and supporting agencies to continue to improve emergency planning and response arrangements to reduce impacts on our community (O)
4. Improve emergency planning and response arrangements to reduce impacts on our community	4b. Continue to strengthen Council's Incident Management and Business Continuity arrangements (O)
	4c. Invest in technologies that improve access to natural hazard information, emergency communications, monitoring and forecasting capability (S-M)
5. Further develop local disaster recovery arrangements to ensure our community is able to recover from significant shock events	5a. Prepare a Northern Beaches Recovery Plan in line with the requirements of the NSW Recovery Plan and Toolkit (S)
6. Increase regional resilience through prevention, preparedness, response and recovery activities with regional partners	6a. Actively engage with Councils in the region to build relationships and capability, and establish resource sharing arrangements to build regional capacity (S-M)

Links to Existing Plans and Strategies

Direction 3: Connect for strength

Connected communities are stronger together. We look after each other in good times and bad, and care for those of who may need extra support.

We know from the research from our Better Together 2040 - Social Sustainability Strategy (2021a) that social cohesion and connectedness is critical for a community's vitality and wellbeing. COVID-19 has emphasised the absolute importance of social connections in dealing with crisis events and provides a platform for individual and collective adaptive resilience.

At global, national and community levels, the pandemic also highlighted the existing and deepening inequalities in our societies and placed the need to look after those groups who may be particularly vulnerable to effects of shocks and stresses front and centre of resilience planning.

Our research shows that while the community generally feel they have a high quality of life, there are a range of chronic stresses and pressures that impact on our community.

Housing affordability, mental health, and looking after people who may need extra support are some of the key concerns coming out of the community. Similarly, our ability to support each other through acute crisis and recover from traumatic events rests on our capacity to pull together as a community.

Building capacity in others and not living in silos... Having lots of interconnected community groups offering their ideas and solutions to other community groups

(SRG Workshop participant)

Key Priorities	Key Actions
1. Strengthen social cohesion, community and cultural connection in alignment with Council's Better Together 2040 - Social Sustainability Strategy (2021a)	1a. Continue to undertake the actions identified in Council's Better Together 2040 - Social Sustainability Strategy (2021a) (S,M,L & O)
	1b. Celebrate the diversity of our community and increase inclusivity through activities, events and programs that promote connection, engagement and participation (O)
2. Increase recognition of our First Nations Australians and their connection to country	2a. Develop actions (such as a Reconciliation Action Plan or treaty) that improves recognition, relationships, respect and opportunities with First Nations Australians (S)
3. Support programs that maximise the community's motivation to participate in volunteering activities	3a. Support agencies and programs to maximise the community's motivation to participate in volunteering activities (O)
	3b. Continue to celebrate and acknowledge the commitment of our volunteers and their contribution to our community (O)
4. Increase the resilience of our priority populations to shocks and stresses	4a. Engage with our priority populations and initiate capacity building and support programs to increase their resilience to shocks and stresses (S)
5. Build the capacity of the community services sector to support priority populations to strengthen relationships, personal resilience and increase wellbeing	5a. Engage and partner with the social service sector to build capacity to support priority populations when needed (O)

Links to Existing Plans and Strategies
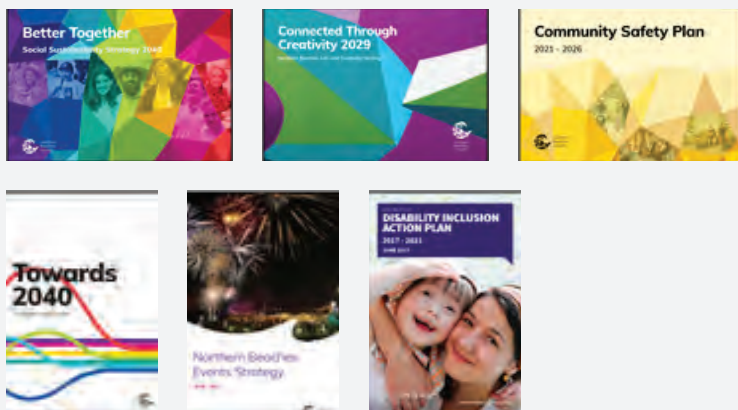
Direction 4: A strong and dynamic local economy

Our local economy is diverse and offers rich opportunities for innovation, education and career growth, and community vitality.

A diverse local economy is critical to resilience as it minimises reliance and stimulates innovation through participation in broader and global economies and helps to attract and retain a diverse population (namely young people and key workers). While an outward focus is essential to stay innovative, it is equally important for an economy to be open, offer a degree of self-containment and self-reliance in job and education offerings as this creates stability and minimises pressures on transport systems. For the Northern Beaches, one of the most urgent and critical gaps is access to local tertiary educational facilities. Along with housing affordability (see Direction 1 above), the lack of tertiary education options is a significant driver for young people to leave the area (Northern Beaches Council, 2017).

The COVID-19 pandemic has changed the nature of how we work or study, reducing the 'insular peninsula' economic vulnerability by making working or studying from home more viable and reducing our reliance on (restricted) transport options.

This however exposes us to other vulnerabilities in step with increased dependency on communications, digital infrastructure, and energy provision and security.

Supporting our local businesses to navigate these challenges as well protecting our employment lands in the face of increasing residential land-use pressures, will be of critical importance not only to the health of the local economy, but also to the ability of the community to thrive into the future.

Remove barriers for business to be flexible in their local area and be drivers for sense of community

(SRG Workshop participant)

Key Priorities	Key Actions
1. Increase the resilience of our local businesses to effectively prepare, respond and recover from shock events and adapt to a changing climate	1a. Prepare an Economic Development Strategy that reflects our local resilience challenges, opportunities and priorities (S)
	1b. Develop a "Get Ready Business" program to ensure local business owners are aware of the risks to business continuity and are able to identify and implement strategies to minimise the negative economic impact of shock events (S)
	1c. Continue to undertake natural hazard mitigation and adaptation actions in areas that support economic development (O)
	1d. Support local businesses to transition to a green economy and adapt to climate change (O)
2. Increase the resilience of infrastructure that supports our local businesses, particularly telecommunications and energy supply	2a. Undertake a critical infrastructure risk assessment and partner with infrastructure providers to undertake mitigation/adaptation to increase business resilience and continuity (S-L)
3. Protect critical employment lands to strengthen economic growth and industry diversity	3a. Review planning controls to ensure critical employment lands are protected and encourage innovation (S)
4. Increase affordable housing options for our essential work force	4a. Deliver the Housing Strategy that establishes mechanisms to increase affordable housing options for our essential workforce (M)
5. Increase education options on the Northern Beaches to address skill gaps, promote local training and jobs opportunities, particularly for our youth	5a. Investigate opportunities and partnerships to increase job skill, education and training opportunities (M-L)
6. Support community and economic vibrancy through diverse night-time and weekend activities	6a. Explore opportunities to increase night-time and weekend economies, in appropriate locations (S-M)

Links to Existing Plans and Strategies
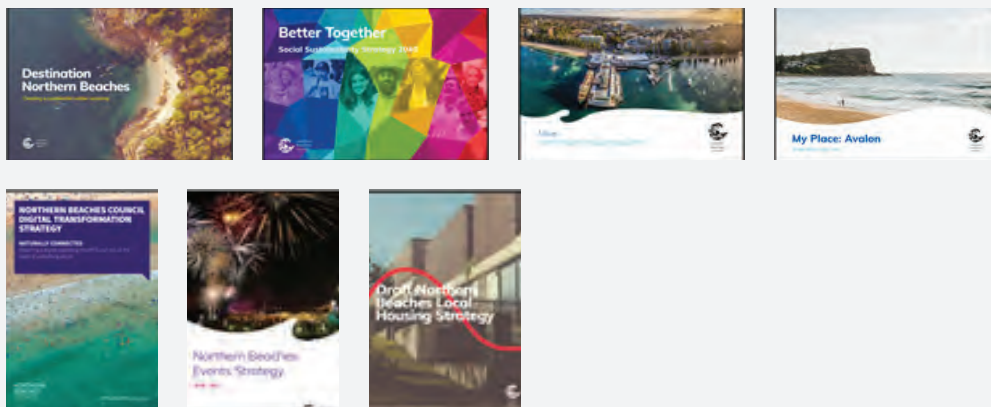
Direction 5: Adaptive services, assets and infrastructure

We partner with key agencies and providers to protect our diverse portfolio of services, assets, and infrastructure so that we continuously, and through significant disruptions, can meet the needs of our community.

The events of recent years (global pandemic, bush fires, droughts, floods, other extreme weather events and cyber threats) have highlighted Australia's and the Northern Beaches' vulnerability to natural and non-natural threats and their social, environmental and economic impacts. They have emphasised the critical role services, assets and infrastructure has in our adaptive capacity to withstand, adapt and thrive.

When faced with acute shocks and crisis, we rely on critical infrastructure to continue to service the very basic needs of our community including communication, food, water, transport and electricity.

In our day to day lives, we rely on secure water and energy provision in addition to communications services to access increasingly digitalised employment and education sectors. Similarly, as emphasised during the pandemic, equitable access to supportive services and community facilities is critical to our ability to deal with stresses and hardships and are essential to our individual and collective wellbeing.

Adaptive services, assets and infrastructure are lynchpins in our society; the 'glue' that holds us together. It highlights the need for a collaborative and systems-based approach to minimise reliance on single assets or systems with a high level of interdependency.

We need to invest in infrastructure resilience, build in redundancy and effectively mitigate against existing shocks and stresses, and adapt to the challenges ahead. "No infrastructure asset exists in isolation. Failure of a single asset can amplify impacts for people, economies and the natural environment and increase the risk of cascading, systemic failures. (A Pathway to Infrastructure Resilience, Infrastructure NSW 2021: page 8).

Planning needs to anticipate threats to the resilience of infrastructure

(SRG Workshop participant)

Key Priorities	Key Actions
1. Ensure critical infrastructure is not placed in areas that are exposed to current and future risk	1a. Undertake a Resilience and Climate Change Assessment across all of Council's infrastructure and assets that identifies: - risks and vulnerabilities to critical assets as a result of natural disasters and climate change impacts - critical assets that will have a consequential impact on the community due to the failure - adaptation/mitigation actions strategies that minimise impact on the asset and community to ensure continuity and reduce recovery time (S).
2. Focussed adaptation and mitigation investment for critical assets and infrastructure to ensure they are resilient to natural disasters and climate change impacts	2a. Update Council's Asset Management Strategy (2018b) and plans to: - embed resilience as a core principle - articulate adaptation/mitigation actions identified in the Resilience and Climate Change Assessment, - include "build back better" processes to reduce future risk and aid recovery (S).
3. Build understanding of system and asset risks, interdependencies and vulnerabilities and identify opportunities to improve service continuity, redundancy and scalability	3a. Engage and partner with critical service and infrastructure providers to increase resilience investment across all critical asset and service portfolios within the Northern Beaches (M-L, O)
4. Ensure assets, services and infrastructure are adaptive and multifunctional to meet the varied and changing needs of our community	4a. Continue to focus on resilience outcomes through the implementation of Council's Community Centre Strategy, asset and delivery plans with a focus on supporting priority populations (O)

Links to Existing Plans and Strategies

Direction 6: A resilient natural and built environment

We live in balance with our natural and built environments, and proactively take steps to protect and enhance our environment, cool our suburbs and green our buildings.

Our community deeply values the natural environment of the Northern Beaches. It is a core feature of our landscapes, way of life, and culture. It also supports our local economy by attracting skilled workers and vibrant recreation and tourism industries.

The need to protect our bushland and beaches and live in balance with our urban environments is a core principle of all community engagement, including the engagement for this Strategy. Although our unique natural environment poses threats such as bush fires and floods, we also directly rely on it for our livelihoods and wellbeing. Our vast natural reserves, parks, coasts, lagoons, wetlands and waterways not only provide much needed reprieve, particularly in times of stress or hardship such as during the pandemic, they also clean the air we breathe and help regulate the climate.

There is an urgent need to reduce our environmental footprint, reduce climate emissions, cool our cities, reduce runoff to protect our waterways, and create more sustainable homes and buildings.

Appreciating and protecting what we have in terms of our natural environment

(SRG Workshop participant)

Key Priorities	Key Actions
1. Focussed investment on natural hazard and climate change mitigation and adaptation actions to avoid and reduce future risk	1a. As per Direction 5 - Undertake a Resilience and Climate Change Assessment across all of Council's infrastructure and assets that identifies: - risks and vulnerabilities to critical assets as a result of natural disasters and climate change impacts - critical assets that will have a consequential impact on the community due to the failure - adaptation/mitigation action strategies that minimise impact on the asset and community to ensure continuity and reduce recovery time (S).
	1b. Continue to enhance Council's approach to how we manage natural hazards with increased focus on prevention and mitigation/adaption actions (O)
2. Our local environment is resilient, protected and enhanced in recognition of its contribution to community wellbeing and support of critical ecological processes	2a. Increase investment in programs that protect and enhance our natural environment in alignment with the Council's Environmental Sustainability and Climate Change Strategy (2021d) (S,M,L,O)
	2b. Continue to deliver environmental education activities to foster awareness, understanding and ownership of our environment (O)
3. Buildings and precinct-scale developments are adaptive and ready to transition to a low carbon future	3a. Develop planning controls to improve energy, water and waste efficiencies in new developments, support the push for net zero buildings and require sustainability certification for certain developments (threshold to be developed) (S)
	3b. Prepare decarbonisation plans for existing precincts to identify opportunities for retrofitting and precinct scale opportunities (e.g. community solar) - as per the GBCA Climate Positive Roadmap for precincts (new and existing) (S-M)
4. Ensure the natural environment is recognised as key priority within disaster recovery plans and programs	4a. Include environmental recovery strategies within the Northern Beaches Recovery Plan (S-M)
5. Our community has sustainable access, recreation and engagement opportunities in natural areas	5a. Prepare an Open Space and Recreation Strategy that enables sustainable access, recreation and engagement opportunities in natural areas (S)
6. Invest in urban heat mitigation programs to cool homes, streets and public spaces	6a. Develop an urban heat mitigation program to reduce the impact of urban heat stress, improve amenity and increase ecological function (M)

Links to Existing Plans and Strategies
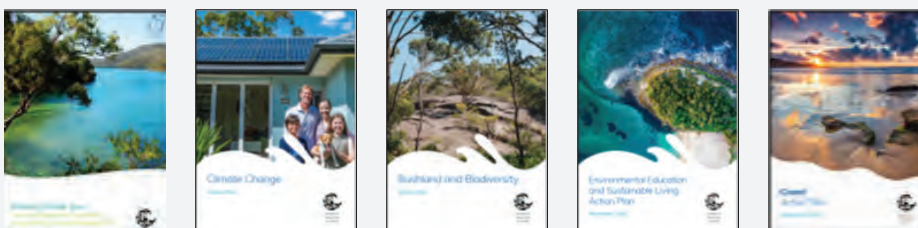
Direction 7: Activated places and spaces

Our safe and accessible public places and spaces support our social, emotional and physical wellbeing.

There is a large and growing body of knowledge that confirms the importance of activated social places and community connectedness to our wellbeing and resilience. For example, a decade of research by the Australian Unity Wellbeing Index (2020) demonstrates a strong correlation between the wellbeing of people and the sense of community, belonging and social opportunities where they live. Having a sense of 'being connected' to people and places in meaningful ways is especially important to young people as they seek stability, balance and identity at a time of great personal transformation and growth.

As we are facing a mental health crisis and emerge from multiple lockdowns the need for activated places and spaces are more urgent than ever and critical to our individual wellbeing and collective resilience.

Our Arts and Creativity Strategy (2021f) recognises the fundamental importance of the arts and creativity to the Northern Beaches way of life and the wellbeing of its community and considers active, vibrant places integral to our mental health.

Our Community Centre Strategy (2021g) creates a vision for a network of multipurpose centres that are attractive spaces for our community. At the core of this is accessibility, with good connections to public transport and affordable rates for hire. Council is committed to delivering inclusive community centres that embrace diversity and are available and inviting to all ages, cultures and abilities.

This Direction builds on this Strategy in providing focussed direction for making sure our public places and spaces cater for a wide range of needs and interests in supporting our wellbeing.

Designs should reflect and integrate the diversity of the community that they're serving and ensure there is access to services.

(SRG Workshop participant)

Key Priorities	Key Actions
1. Create environments that connect us to place and to each other, enriching our community and sense of belonging	1a. Continue to undertake the iniatives within Council's Creative Arts Strategy (2021f) to cultivate creativity, identify opportunities for arts and cultural expression and connect our diverse communities (S,M,O)
	1b. Continue to hold a diverse range of public events that activate and increase vibrancy of public spaces, provide economic benefits to local business and bring the community together in line with Council's Events Strategy (2018c) (O)
2. Our community has access to places and spaces that inspire creativity and connection	2a. Investigate options to increase opportunities for our community to access places that encourage and inspire creativity and connection
3. Places and spaces are designed to promote accessibility and inclusion and cater to the varying needs of our community	3a. Continue to deliver on the actions within Council's Community Safety Plan (2021e) and Disability Inclusion Action Plan to create safe and accessible places for our community (S,O)
4. Celebrate our cultural heritage through creative expression in public places and spaces	4a. Increase opportunities to recognise our diverse cultural identities in public spaces in alignment with Council's Public Space Vision & Design Guidelines (2021h) (O)
5. Facilitate active and passive recreation to improve the physical and mental wellbeing of our community	5a. Prepare an Open Space and Recreation Strategy that embeds resilience as a core principle and acknowledges the importance of quality, safe, accessible and inclusive open space and its contribution to the physical and social wellbeing of our community (S)

Links to Existing Plans and Strategies

Implementing the Strategy

The Strategy will be supported by the Resilience Action Plan which will articulate the full spectrum of projects and actions that Council will undertake to deliver the key priorities in this document and drive us towards achieving resilience outcomes. The Action Plan will also establish a range of key indicators to monitor and evaluate progress of key actions and their effectiveness to achieving the Strategy outcomes and priorities.

We will aim to deliver the Strategy and Action Plan within existing resources in line with the Long Term Financial Plan.

However, we will seek opportunities to leverage external sources of funds where possible. Evaluation on our progress against the outcomes, priorities and actions will be undertaken on an annual basis in accordance with the Integrated Planning and Reporting Framework (refer Figure 23).

A detailed assessment, report and review will be completed every four years. This will allow us to adapt the priorities and actions in order to be adaptive to changes in our community, knowledge, technology, science as well as federal and state policies.
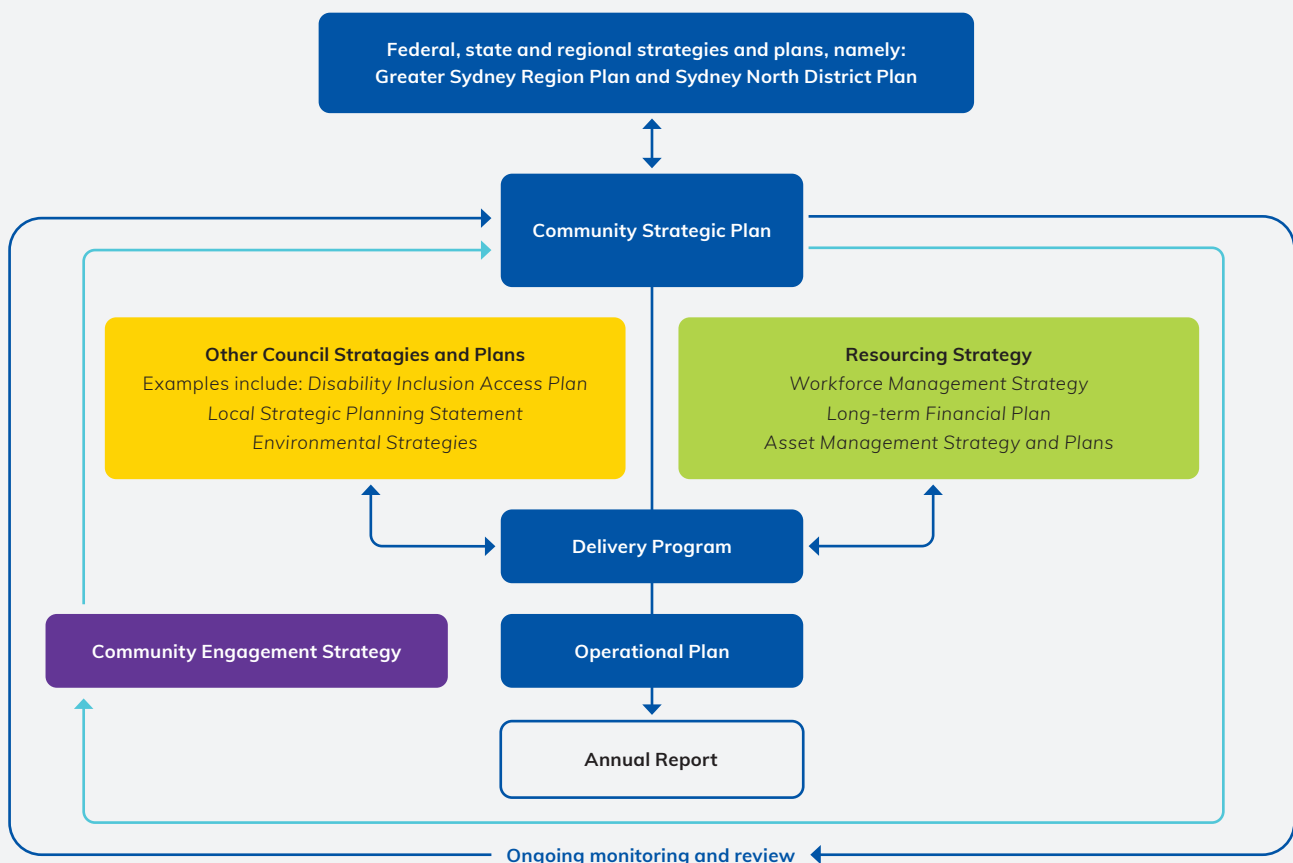
Figure 23 - Integrated Planning and Reporting Framework

Everyone has a role to play to increase our collective resilience as a community. We will work closely with our community and stakeholders to deliver on the priorities within this Strategy to empower the Northern Beaches community to **Withstand, Adapt** and **Thrive.**

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Appendix A
Summary of the risk profile for the shocks and stresses

Council continuously monitors and manages a broad range of risks as an integral part of our operations. For the purposes of defining the Key Directions, priorities and actions for this Strategy, a summary of shocks and stresses is provided in the following summary. This also include an indicative assessment of the risks of highest concern and greatest relevance to the Northern Beaches, given our geographic, social, economic, and environmental characteristics.

Some communities will have a higher or lower rating of risk depending on their exposure to a particular shock.

This section also provides indication of levels of community concern, based on the engagement outcomes. It's important to note these results do not reflect the capability of our community service providers, rather they are an indication of how our community perceives the gravity of the issue.

In partnership with key stakeholders, agencies and emergency services, Council continues to assess and monitor these and other risks on an ongoing basis using rigorous systems and processes that enable timely mitigation and management.

Disease pandemic

While COVID-19 naturally dominated discourse about pandemics, worldwide there is an increase in a broad range of infectious diseases. This reflects the combined impacts of rapid demographic, environmental, social, technological and other changes to our way of living.

Since European settlement, Australia has experienced a number of pandemics such as the Smallpox, Spanish flu, Polio, H1N1 Influenza and Swine Flu etc some of which resulted in significant mortality and morbidity rates.

Epidemics such as Measles, Scarlet Fever, Whooping Cough, Chicken Pox and Mumps have significantly impacted the community. However, the implementation of vaccination programs have significantly reduced the prevalence and risk of serious illness and death over time.

The general consensus from international health experts is that there is an ever-increasing risk of pandemics noting the Indo-Pacific region's climate, distributional pattern of species richness, and rapid urbanisation which will propel zoonotic diseases, vectorborne diseases and drug resistant diseases.

This reflects the combined impacts of rapid demographic, environmental, social, technological and other changes in our ways of living. Climate change will also affect infectious disease occurrence (WHO, 2003).

While Australia's relatively low population density and geographic isolation are strong mitigative factors that reduce the prevalence and spread of infectious disease, our ever increasing international connectedness through trade and travel, means that risk cannot be completely removed.

Though the Northern Beaches is relatively well placed to deal with infectious diseases, there are a range of significant cascading effects across social, financial and political impacts that affect the community. These may affect the community disproportionately, with some demographic groups being more affected than others either directly in terms of impacts on health and wellbeing, or indirectly such as in terms of financial impacts. Vulnerable groups include elderly people, children, essential workers, and people from lower socio-economic backgrounds.

Analysis	Rating
Community concern	High (Concerned or very concerned - 36%)
Perceived level of community preparedness	High (Prepared or very well prepared - 43%)
Likelihood	Unlikely
Consequences	Major[4]
Overall risk	High[4]
Risk trend (+ 30 years)	Potential increase driven by climate related changes and increased global populations
Communities at highest risk	Whole of community

[4] Risk assessment undertaken prior to COVID-19 pandemic

Bush fire

Bush fires are an intrinsic part of Australia's environment. Natural ecosystems have evolved with fire, and the landscape, along with its biological diversity, has been shaped by both historic and recent fires. Aboriginal and Torres Strait Islander peoples have long used fire for hunting, cultural ceremony and regeneration.

Many of Australia's native plants are fire prone and very combustible, while numerous species depend on fire to regenerate. Hazard reduction burning continues to be used to clear land for agricultural purposes and to protect properties from intense and uncontrolled fires.

As shown Figure 24, a significant proportion of the Northern Beaches are classified as bush fire prone land within the Northern Beaches. This includes 19,000 properties, National Park, Crown and Council owned land.

The region is at significant threat from bushfire given the large areas of bushland adjoining the urban interface, and the impacts from ember attack on areas well away from the fire front. Areas of high risk are Duffys Forest, Terrey Hills, Ingleside, Narrabeen, Cromer, Cottage Point, Belrose and Oxford Falls and the offshore communities of Pittwater.

While properties in these areas are directly affected by bush fire risks, the wider community are also both directly and indirectly affected in terms of risks to health, critical infrastructure, mobility, and intrinsic values. Bush fires pose significant risk to ecological and natural values, which are considered of fundamental importance to the wellbeing of the community.

Climate change is a key driver for increased bush fire risk, with long-term trends showing a 10-15 percent reduction in rainfall in recent decades in south-eastern Australia, largely driven by a lack of wet years, or wet months, since the mid-1990s (BoM, 2020). This change has been most significant in the cool season (April-October). Projections also indicate that droughts in southern Australia are likely to last longer and be more intense (Ukkola et al, 2018).

The BoM also explained that NSW is seeing an increase in annual mean sea level pressure over time. Higher pressures mean reduced rainfall and cloudiness which lead to increased landscape dryness, and the drying trend is especially strong in spring (Bureau of Meteorology, 2020).

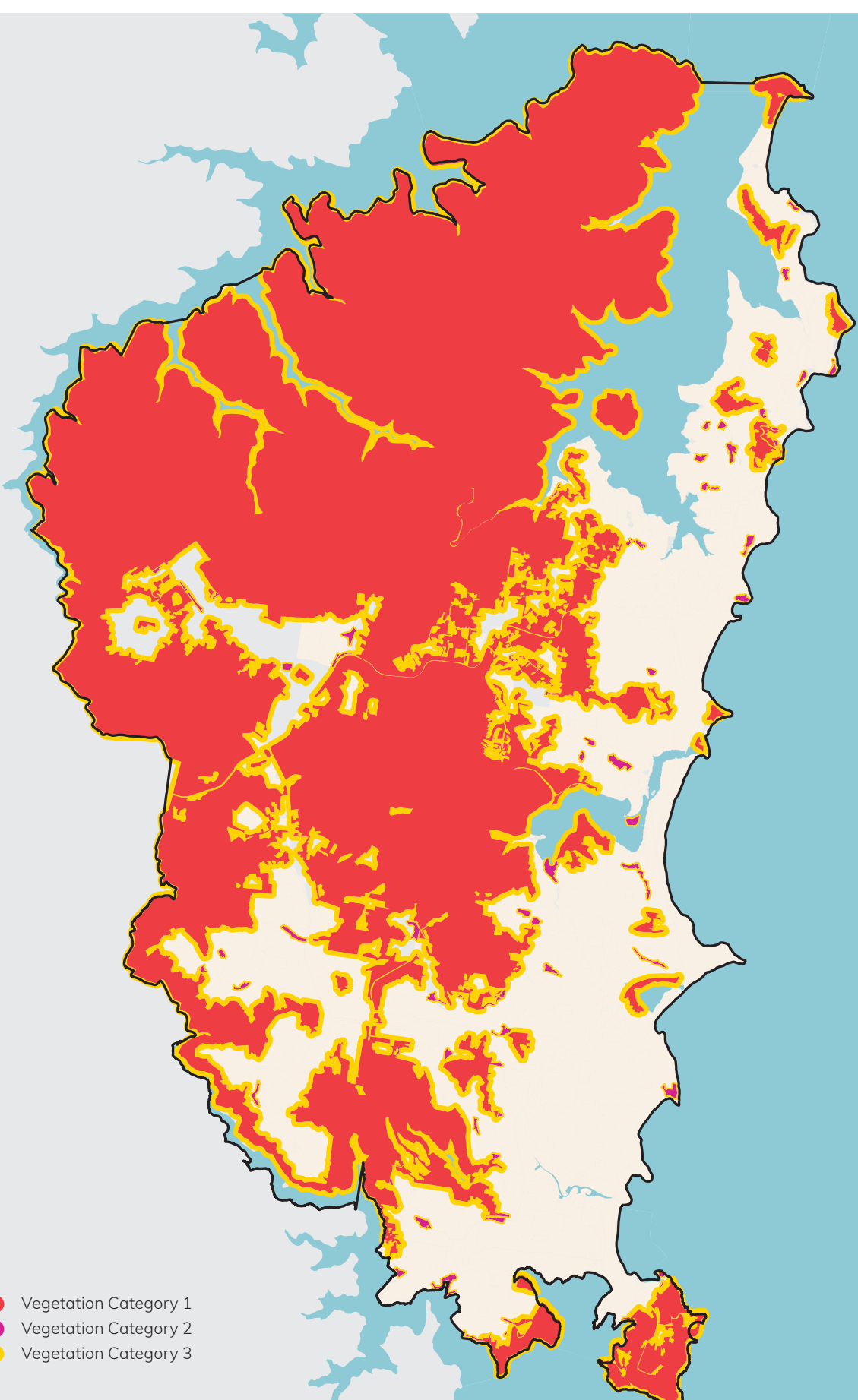| Analysis	Rating
Community concern	High (Concerned or very concerned - 32%)
Perceived level of community preparedness	High (Prepared or very well prepared - 36%)
Likelihood	Likely
Consequences	Major
Overall risk	Extreme
Risk trend (+ 30 years)	Potential increase driven by climate related changes such as increased long term climate temperatures, and increased intensity, duration and frequency of drought and heatwave conditions
Communities at highest risk	Duffys Forest, Terrey Hills, Ingleside, Narrabeen, Cromer, Cottage Point, Belrose and Oxford Falls and the offshore communities of Pittwater.

Vegetation Category 1
Vegetation Category 2
Vegetation Category 3

Figure 24 - Northern Beaches bush fire prone areas

Storms (inc. coastal erosion and inundation)

Severe storms can happen anywhere and generally occur more often than other natural hazard events. These range from localised storms that affect only a small area, to powerful low-pressure systems such as East Coast Lows that can affect an area spanning thousands of square kilometres.

Severe storms can produce hail, strong winds, heavy rainfall, flash floods and storm tides. Climate change is associated with potential large increases for short-duration rainfall extremes, with larger uncertainties for extreme winds, tornadoes, hail and lightning.

Storms in New South Wales cause greater losses to local communities than any other single hazard. Storms can happen anywhere at any time of the year and be any combination of strong winds, heavy rain, hail and lightning.

As a result, storms can pose a significant safety risk to people and animals. Potential hazards include flying debris, falling trees, large hailstones, lightning strikes and fast-moving floodwaters.

Severe storms can remove roofs from buildings, break windows, damage vehicles, bring down powerlines disrupting electricity supply and cause flash flooding.

Storms may also restrict people or vehicles from moving around safely during and after the event.

Coastal erosion is a significant risk along the entire eastern shoreline and especially in known erosion hot spots including Collaroy-Narrabeen Beach, Bilgola Beach, Basin Beach at Mona Vale and Great Mackerel Beach.

Under climate change scenarios, it is expected that this risk will intensify both in frequency and magnitude and will affect the whole of the Northern Beaches community (e.g. through compounding risks such as infrastructure, utilities and communications failure).

Despite the recent lived experiences of coastal erosion, community concerns with storms, floods and coastal inundation were relatively moderate, at 30 percent concerned or very concerned, - only 8 percent were very concerned and similar perceived levels of preparedness (30%).

Council undertakes a number of operations in order to reduce the effects of erosion including maintaining the protective vegetation on sand dunes, constructing and maintaining properly designed seawalls, as well as undertaking beach scraping and nourishment.

Analysis	Rating
Community concern	High (Concerned or very concerned - 30%)
Perceived level of community preparedness	High (Prepared or very well prepared - 29%)
Likelihood	Likely
Consequences	Moderate
Overall risk	High
Risk trend (+ 30 years)	Potential increase driven by climate related changes such as increased storm intensity and frequency
Communities at highest risk	Whole of community

Floods

Flooding occurs most commonly from heavy rainfall when natural watercourses and the stormwater system do not have the capacity to carry excess water. Flooding can also be caused or exacerbated by storm surge as a result of an east coast low, tropical cyclone or a high tide coinciding with higher than normal river levels (Geosciences Australia, 2021).

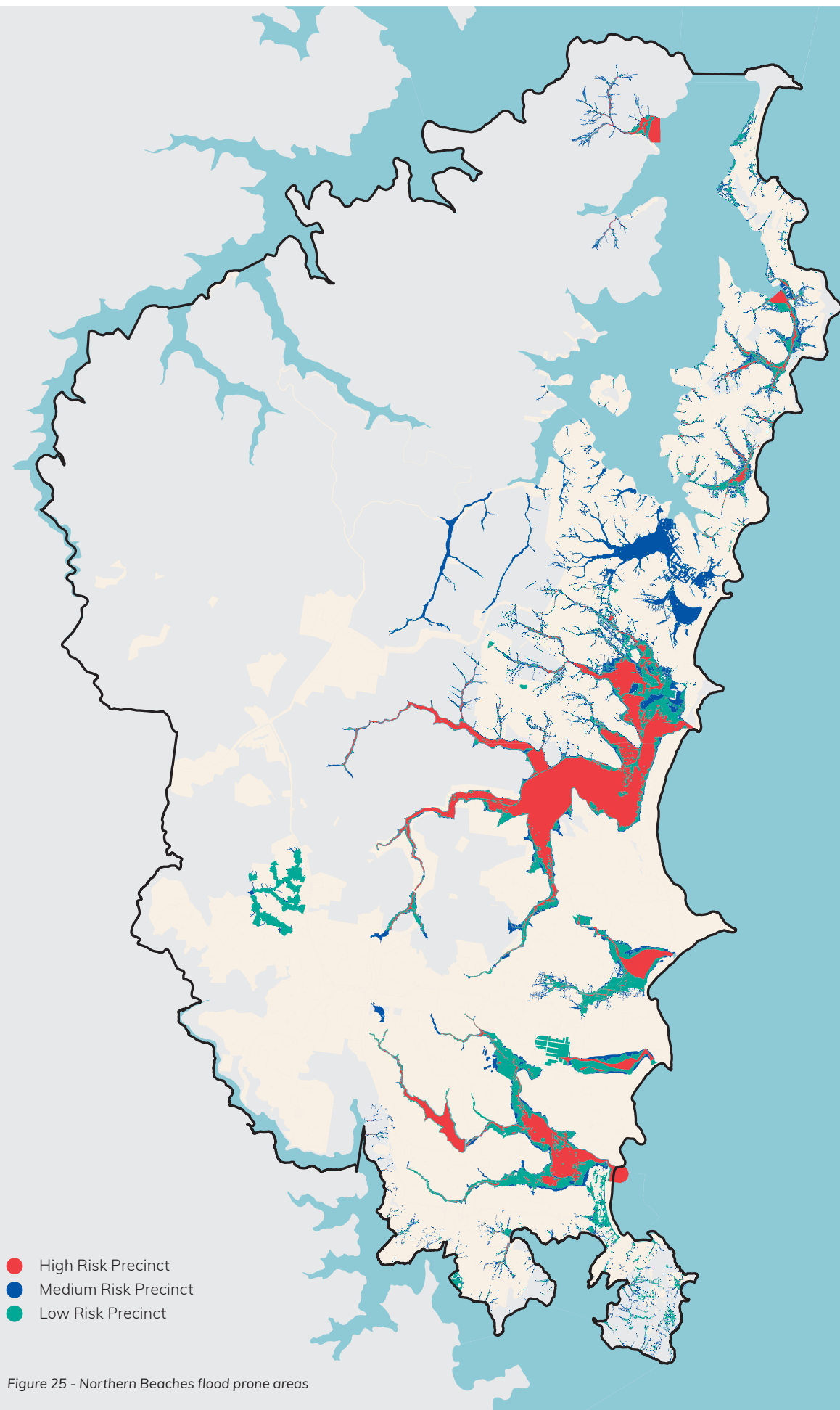Other factors which can contribute to flooding include:

- volume, spatial distribution, intensity and duration of rainfall over a catchment
- the capacity of the watercourse or stream network to carry runoff
- catchment and weather conditions before rainfall
- ground cover
- topography
- tidal influences.

Over 22,000, or one in five properties have some degree of flood risk in the LGA (Refer Figure 25). There are three main types of flood risk, varying by location type, which may require emergency evacuation and road closures, including:

- Overland flow (flash flooding) risk from large rain events is present in urbanised areas with high impervious surfaces and steeper terrain which concentrate water flows, such as Mona Vale, Avalon, Newport, Brookvale, Beacon Hill, Forestville, Davidson and Belrose.

- Mainstream creek and lagoon flood risk from large rain events is present in low lying (floodplain) suburbs, often in areas associated with coastal lagoons and wetlands, such as Warriewood, Narrabeen Lagoon, South Creek (including Cromer), Dee Why Lagoon, Curl Curl Lagoon, and Manly Lagoon. A number of key arterial roads including Wakehurst Parkway, Condamine Street and Pittwater Road are flood affected and require specific consideration regarding closure and traffic diversion.

- Tidal inundation risk from increased ocean levels is possible within open waterways such as Pittwater and Middle Harbour, potentially affecting foreshore properties.

Analysis	Rating
Community concern	High (Concerned or very concerned - 30% based on storm)
Perceived level of community preparedness	High (Prepared or very well prepared - 29% based on storm)
Likelihood	Possible
Consequences	Major
Overall risk	High
Risk trend (+ 30 years)	Potential increase driven by climate related changes such as increased storm intensity and frequency
Communities at highest risk	Mona Vale, Avalon, Newport, Brookvale, Beacon Hill, Forestville, Davidson and Belrose
	Narrabeen Lagoon, South Creek (including Cromer), Dee Why Lagoon, Curl Curl Lagoon, and Manly Lagoon

Figure 25 - Northern Beaches flood prone areas

Legend:
- 🔴 High Risk Precinct
- 🔵 Medium Risk Precinct
- 🟢 Low Risk Precinct

Utilities and infrastructure failure

Utilities and infrastructure such as water, sewer, energy and communications services are critical in our everyday lives. The consequences of infrastructure failure can be severe, particularly if compounded with other risk factors. For example, energy failure during heatwaves may have significant health repercussions through loss of opportunity to cool homes, and this may especially affect vulnerable groups such as the aged.

For the Northern Beaches, there are particular infrastructure vulnerabilities relating to chronic stresses that may affect some areas more than others. Areas such as the northern part of the LGA and offshore communities are especially vulnerable to cascading impacts of utilities and infrastructure failure due to the combination of restricted transport routes, relatively limited access to hospitals, and an ageing population.

The community expressed a relatively high level of concern with potential infrastructure failure, with 52 percent of online survey respondents stating concern or very high concern (the phone survey showed lower perceived levels of concern, at 30%). Preparedness levels were similar across the two surveys, at 16 percent and 19 percent respectively.

Analysis	Rating
Community concern	High (Concerned or very concerned - 30%)
Perceived level of community preparedness	Low (Prepared or very well prepared - 19%)
Likelihood	Possible
Consequences	Moderate
Overall risk	High
Risk trend (+ 30 years)	Potential increase driven by climate related changes such as increased intensity and frequency of storm and bushfire events
Communities at highest risk	Whole of community

Digital Network Failure

All cities are becoming increasingly dependent on information and communications technology (ICT). This ranges from the daily use of emails, smart phones and online retail trade through to the running of systems for critical services such as air traffic control and banking transactions.

Failure of ICT backbone systems would significantly compromise Sydney's economy. Such an event was experienced in Sydney in February 2016 when Telstra, Australia's largest telecommunications provider, suffered a mass service disruption to millions of customers. The impact included significant loss of productivity for businesses (Resilient Sydney, 2016).

Analysis	Rating
Community concern	High (Concerned or very concerned - 30%)
Perceived level of community preparedness	Low (Prepared or very well prepared - 18%)
Likelihood	Possible
Consequences	Moderate
Overall risk	High
Risk trend (+ 30 years)	Potential increase with increased reliance and interdependency on digital networks
Communities at highest risk	Whole of community

Cyber attack

Cyber attack is the deliberate act through cyberspace to manipulate, disrupt, deny, degrade or destroy computers or networks, or the information resident on them, with the effect of seriously compromising national security, stability or economic prosperity (ACSC, 2021).

Cyber attack may include:

- Ransomware - malicious software that makes data or systems unusable until the victim makes a payment.

- Phishing - untargeted, mass emails sent to many people asking for sensitive information (such as bank details), encouraging them to open a malicious attachment, or visit a fake website that will ask the user to provide sensitive information or download malicious content.

- Data breach - the unauthorised movement or disclosure of sensitive private or business information.

- Hacking - the unauthorised exploitation of weaknesses in a computer system or network.

- Insider threat - is a security risk that originates within the targeted organization

Examples of recent cyber attacks include:

- Australian National University in 2018 involving the access of sensitive information of over 200,000 students,

- Service NSW in 2020 where 47 staff email accounts were hacked and led to 50 million documents being accessed containing sensitive data. This event impacted 104,000 people.

- Bureau of Meteorology in 2015 where foreign entities installed malicious malware resulting in the release of sensitive information. It was estimated cost to rectify ran into the hundreds of millions of dollars.

The threat of cyber attack is increasing across all levels of our community including individuals and families, small and medium business, large organisations and infrastructure and government. Revenue for the online shopping industry surging by 21.8% in March 2020, highlighting the trend of a strong transition to digital markets accelerated due to the COVID-19 pandemic (Department of Home Affairs, 2020).

Cyber attack targeting small, medium and large Australian businesses has been estimated to cost the economy up to $29 billion per year, or 1.9% of Australia's gross domestic product (Department of Home Affairs, 2020).

Analysis	Rating
Community concern	High (Concerned or very concerned - 29%)
Perceived level of community preparedness	Low (Prepared or very well prepared - 16%)
Likelihood	Variable
Consequences	Variable
Overall risk	Variable
Risk trend (+ 30 years)	Likely increase with increased reliance on digital systems
Communities at highest risk	Whole of community

Financial institution failure

Financial institution failure is characterised as the failure of core financial mechanisms or institutions (such as a big four bank or major insurer) has the potential to seriously degrade the functionality of Sydney's economy.

Sydney has demonstrated resilience to global financial crises such as the 2007 Global Financial Crises, but the likelihood and consequence of another crisis remains high.

In 2001, Australia's second largest insurance company HIH collapsed. This was the largest corporate collapse in Australia's history with liquidators estimating losses totalling of $5.3 billion (Resilient Sydney, 2016).

The introduction of cryptocurrencies has also increased risk uncertainties particularly given that digital markets may not be regulated by the Australian Securities and Investments Commission.

Analysis	Rating
Community concern	Low (Concerned or very concerned - 23%)
Perceived level of community preparedness	Moderate (Prepared or very well prepared - 21%)
Likelihood	Variable
Consequences	Variable
Overall risk	Variable
Risk trend (+ 30 years)	Variable
Communities at highest risk	Whole of community

Heatwaves

A heatwave occurs when the maximum and the minimum temperatures are unusually hot over a three-day period.

Heatwaves are a significant hazard in Australia for people and the environment and have been responsible for more human deaths than any other natural hazard, including bushfires, storms, tropical cyclones and floods (DPIE, 2021).

Heatwaves can be dangerous because they pose health risks to the most vulnerable, such as elderly people and very young children.

While direct risks to health and wellbeing may be moderate, high temperatures may have broader community effects and compounding risks through impacts on transport, energy and associated infrastructure and may cause a range of cascading effects including blackouts. It may also accelerate the ageing of infrastructure.

The Northern Beaches is projected to experience 11 additional hot days (over 35°C) per year by 2070.

- The number of extreme heat days in Sydney are set to rise from an average of 3 to 11 per year

- By 2030, there is projected up to 10 more heatwave days per year and by 2070 up to 33 more in the north of NSW. In the south, there is projected up to 7 more days.

While the climate is heating and increases in frequency and duration of heatwaves projected to increase, the Northern Beaches is better placed in comparison to other parts of Sydney to handle the effects of a heatwave, as a result of a proximity to the ocean both in terms of accessibility and the cooling effects of the ocean breeze.

Furthermore, our region has a high level of green cover which can assist to mitigate the effects of urban heat. Compared to other areas of the LGA, Figure 26 illustrates areas within the Northern Beaches that have areas such as Dee Why and Brookvale are at relatively higher risk to the effects of heatwaves due to higher density and urban development. People most at risk include elderly people, infants and children, and people living with chronic illnesses such as respiratory illnesses or heart conditions.

Analysis	Rating
Community concern	Low (Concerned or very concerned - 22%)
Perceived level of community preparedness	Low (Prepared or very well prepared - 20%)
Likelihood	Likely
Consequences	Major
Overall risk	Extreme
Risk trend (+ 30 years)	Potential increase driven by climate related changes such as increased intensity and frequency of heatwave conditions.
Communities at highest risk	Whole of community, particularly the elderly and young children.

Cooler than reference
0 - 3 degrees warmer
3 - 6 degrees warmer
6 - 9 degrees warmer
Warmer than 9 degrees

Note: Shows the deviation of temperature to a non-urban vegetated reference within the study area (for example a heavily wooded area of a national park in Sydney).

Figure 26 - Northern Beaches urban heat mapping

Avalon
Newport
Mona Vale
Warriewood
Narrabeen
Cromer industrial area
Dee Why Town Centre
Brookvale
Manly Vale
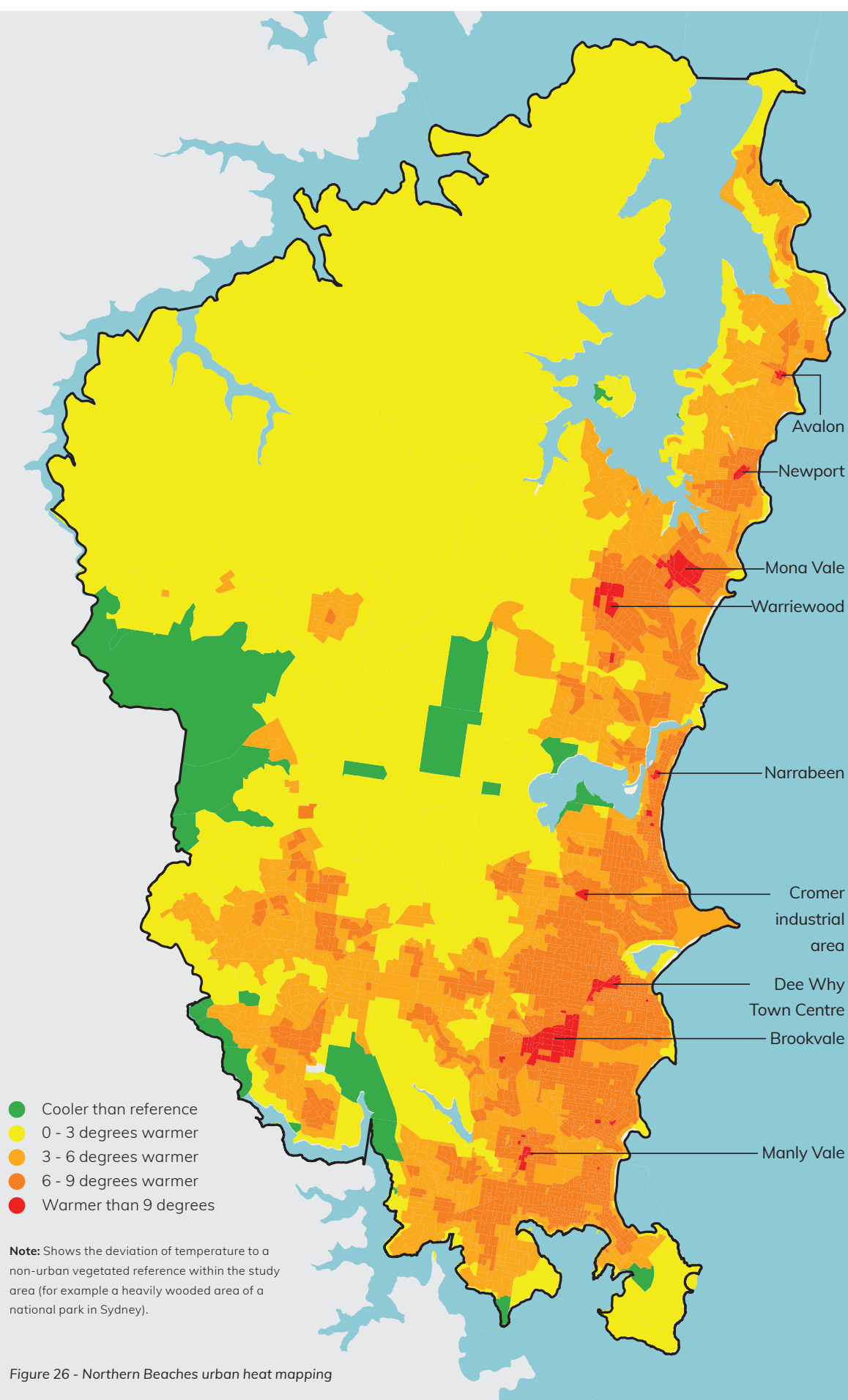
Water Crisis

Water crisis can be attributed to a number of causes including:

- Drought - a prolonged, abnormally dry period when the amount of available water is insufficient to meet our normal use.

- Contamination - due to the introduction of chemical or biological matter that renders the supply not fit for consumption.

The Sydney Water giardia outbreak in 1998 resulted in a week of Sydney-wide "boil water" alerts affecting up to three million residents. This led to the establishment of Sydney Catchment Authority to manage bulk water supply.

Over the coming decades, Sydney can expect lower average rainfall and higher temperatures, which will result in less runoff and lower drinking water yields (Resilient Sydney, 2016).

Drought conditions reduce the amount of available water, however as a secondary impact water quality can also be significantly impacted.

A desalination plant located at Kurnell was completed in 2010 that aims to meet water demand during prolonged drought. Whilst this plant does not supply water to the Northern Beaches, it supplements existing water supply across the metropolitan area.

Analysis	Rating
Community concern	Low (Concerned or very concerned - 21%)
Perceived level of community preparedness	Moderate (Prepared or very well prepared - 26%)
Likelihood	Possible
Consequences	Moderate
Overall risk	High
Risk trend (+ 30 years)	Potential increase driven by climate related changes increasing the potential for extended drought conditions.
Communities at highest risk	Whole of community

Landslides/Rockfall

A landslide is the movement of a mass of rock, debris or earth down a slope

Landslides have two things in common - they are the result of failure of the soil and rock materials that make up the hill slope and they are driven by gravity. They can vary in size from a single boulder in a rockfall or topple to tens of millions of cubic metres of material in a debris avalanche.

The Northern Beaches area has significant landslip areas that exist on both public and private lands with approximately 63,000 properties are tagged as being of moderate to high-risk landslip potential.

Risk of landslip is generally greater during and after significant rainfall and is further increased after extended dry periods. Other site specific or isolated failures may occur due to root jacking or soil saturation.

Landslides can be triggered by natural causes or by human activity.

Natural causes include:

- saturation of slope material from rainfall or seepage;

- root jacking caused by roots of trees growing on rock cut batters grow into defects and joints within the rock mass;

- vibrations caused by earthquakes, volcanic eruptions;

- undercutting of cliffs and banks by waves or rivers etc.

Human activity may include:

- the removal of vegetation;

- interference with or changes to natural drainage;

- leaking pipes (water, sewer);

- the modification of slopes by the construction of roads, railways or buildings;

- mining activities;

- vibrations from heavy traffic or blasting; or the displacement of rocks etc (Geosciences Australia, 2003)

Analysis	Rating
Community concern	Not rated
Perceived level of community preparedness	Not rated
Likelihood	Possible
Consequences	Moderate
Overall risk	High
Risk trend (+ 30 years)	Potential increase driven by climate related changes such as increased storm intensity and frequency.
Communities at highest risk	Communities located in geotechnical risk areas.

Tsunami

Tsunami is a Japanese word that translates as 'harbour wave' and is characterised as a large flooding body of water typically in the form of a series of waves that can significantly impact structures and people through the direct contact and continue to rush into land for an extended period of time (AIDR, 2014).

Tsunamis are usually associated with earthquakes, volcanic eruptions and landslides, which can cause a sudden movement of the water column in the ocean, and create fast-moving waves.

While the likelihood of a land-threat tsunami on the east coast of Australia is low, estimates that a large tsunami impacting the entire NSW coast would directly threaten between 250,000 and 1.5 million people, depending on the magnitude of the tsunami, time of day and season (State Emergency Management Committee, 2018). There is no record of a land-threat tsunami in Australia since European settlement (NSW SES).

Marine-threat tsunamis occur once about every six years, however are usually only dangerous to swimmers and boaters because of the dangerous currents they create.

As illustrated on the NSW SES Tsunami Evacuation map (Figure 27) low-lying areas around coast and waterway on the Northern Beaches are at risk. The Manly central business district is one of the highest risk areas as it is subject to inundation from both directly from the ocean and harbour (Wilson, K.M et al, 2018).

The 1960 Chilean tsunami caused by a magnitude-9.2 earthquake, damaged marine infrastructure such as boats, moorings, wharves and aquaculture structures along the NSW coast from Evans Head, Newcastle, Sydney and Eden. The Fort Denison tide gauge in Sydney Harbour recorded wave heights up to 84cm (Goff et al, 2016) and resulted in extensive erosion at Clontarf Beach.

Analysis	Rating
Community concern	Not rated
Perceived level of community preparedness	Not rated
Likelihood	Unlikely
Consequences	Major
Overall risk	Medium
Risk trend (+ 30 years)	Limited change
Communities at highest risk	Whole of community, particularly low-lying areas along the coastline under 10m AHD.

● SES Tsunami Evacuation Areas

Figure 27 - NSW SES Tsunami Evacuation Area
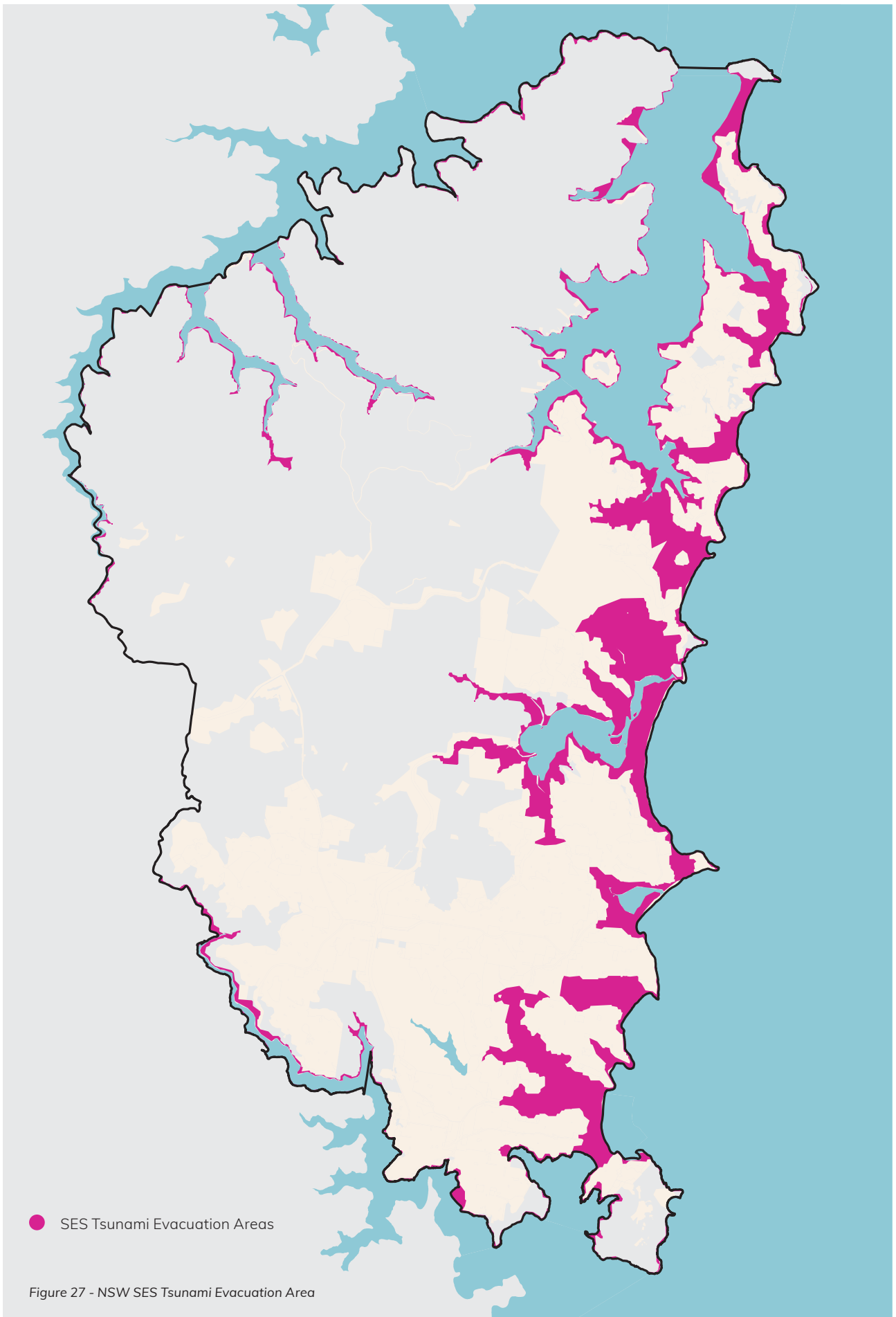
Earthquake

Earthquakes are the vibrations of the Earth caused by the passage of seismic waves radiating from some source of elastic energy (AIDR Glossary).

Since Australia is situated on the Indian-Australian tectonic plate, it does not experience earthquakes as severe as those occurring at tectonic plate boundaries. The main hazard is the resulting ground shaking that can damage or destroy infrastructure and threaten lives (Geoscience Australia 2019).

Australia's largest recorded earthquake was in 1988 at Tennant Creek in the Northern Territory, with an estimated magnitude of 6.6. It occurred in a sparsely populated area and resulted in damage to a major gas pipeline. A magnitude 6.5 earthquake at Meckering in 1968 caused extensive damage to buildings and was felt over most of southern Western Australia. These earthquakes are two of the eleven that are recorded to have produced surface rupture in historical times, forming fault scarps (Geosciences Australia, 2021).

In December 1989, Newcastle was devastated by an ML 5.6 (Richter magnitude) earthquake. This was one of the most serious natural disasters in Australia's history.

The earthquake claimed 13 lives: 9 people died at the Newcastle Workers Club, 3 people were killed in Beaumont Street Hamilton, and one person died of shock.

This event resulting a range of significant impacts including:

- 160 people were hospitalised

- 50,000 buildings were damaged (approximately 40,000 of these were homes)

- 300 buildings were demolished

- 300,000 people were affected and 1,000 were made homeless

- It left a damage bill estimated to be about $4 billion

- Damage to buildings and facilities occurred within a 9000 sq. km region

- The effects were felt over an area of about 200,000 sq. km, with isolated reports of movement up to 800km from Newcastle (Newcastle Council, 2021).

Analysis	Rating
Community concern	Not rated
Perceived level of community preparedness	Not rated
Likelihood	Possible
Consequences	Moderate
Overall risk	High
Risk trend (+ 30 years)	Limited change
Communities at highest risk	Whole of community

Terror attack

Terror attacks have emerged over the past decade as a significant risk for cities and their communities. The 16-hour siege of the Lindt café in Martin Place in December 2014 showed Sydney is not immune.

This incident resulted in 3 deaths and the closure and lock down of the financial district. Losses of over $1.2 million were recorded.

Since the siege there have been a number of police arrests over terror plots to attack Sydney landmarks, as well as one executed terror attack in the Parramatta CBD that resulted in the loss of life of a NSW Police worker.

Analysis	Rating
Community concern	Low (Concerned or very concerned - 10%)
Perceived level of community preparedness	Moderate (Prepared or very well prepared - 23%)
Likelihood	N/A
Consequences	N/A
Overall risk	Probable[5]
Risk trend (+ 30 years)	Potential increase
Communities at highest risk	Whole of community

[5] Current Terror Alert Level as of December 2021 (Source: NSW Police)

Housing affordability

Housing affordability relates to house prices in relation to incomes. A common measure of affordable housing is spending less than 30% of a person's income per week on repayments or rent. With median LGA house prices of $1.73 million in 2018 with reports of this rising to $2.2 million in 2021, many incomes are now not keeping pace with house price increases, leading to mortgage and rental stress. Housing affordability seems to be at a crisis point, with three Northern Beaches suburbs ranked in the top ten most at risk of a mortgage default in Sydney. Northern Beaches currently has a shortage of over 8,100 dwellings for social and affordable housing across the LGA, and this figure is predicted to increase to almost 10,000 by 2036.

The associated issue of limited housing choice across the LGA place similar burdens on the elderly for whom options for 'ageing in place' are restricted as housing stock predominantly is separate dwellings and apartment living - there is a 'missing middle' of dwellings such as townhouses which has been identified in Council's draft Housing Strategy (2021c).

Increasing housing unaffordability can impact health, education and employability. The pandemic has put further pressure on servicing home loans with many owners experiencing financial stress due to lockdowns. On a wider LGA scale, it means that population diversity may increasingly decline as younger people and families move out of the area in search of cheaper accommodation elsewhere. This has a potential to breakdown important social and family support networks, impacting both younger and older generations alike.

Housing affordability has been rated the most pressing concern for the community and businesses, with 66% of phone survey participants rating this to be of high or very high concern and was a dominating topic of discussion during community focus groups.

Analysis	Rating
Community concern	High (Concerned or very concerned - 66%)
Perceived level of community preparedness	Low (Prepared or very well prepared - 13%)
Trend (+30 years)	Increasing
Communities at highest risk	Whole of community

Climate change

Climate change is a fundamental and underlying challenge affecting all aspects of our lives and being a significant root cause of shocks and natural hazards such as bushfires, floods and erosion. It refers to long term changes in the climate, lasting for several decades or longer. The scientific evidence shows the world's climate is rapidly heating at a rate that is much faster than previous climate changes. The Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (August 2021) states that climate change is widespread, rapid and intensifying and is a result of human activities.

Our LGA is particularly vulnerable to natural hazards such as coastal erosion, storms, flooding, landslip and bushfires. As the climate changes, heatwaves, severe bushfire conditions, storm surges, sea-level rise, heavy rainfall and flooding, which are already more frequent, will increase.

Aside from the clear impacts to our environment, climate change also affects our physical and mental wellbeing, with vulnerable groups being particularly exposed (as discussed above, as related to heatwaves) and 'climate anxiety' exacerbating mental health issues, particularly amongst young people (State of the World's Children, UNICEF 2021).

Climate change is of significant community concern, with 45% of phone survey respondents and 48% of online being concerned or very concerned, with only 20% stating that we are prepared to meet this challenge.

Analysis	Rating
Community concern	High (Concerned or very concerned - 45%)
Perceived level of community preparedness	Moderate (Prepared or very well prepared - 20%)
Trend (+30 years)	Increasing
Communities at highest risk	Whole of community

Environmental degradation

Environmental degradation occurs when the natural environment (such as air, water, soil and native vegetation cover) is compromised, leading to a decline in the health of the environment and reduced biological diversity. These risks are closely related to broader issues of climate change, urban sprawl, and population growth. Specific threats to environmental degradation on the Northern Beaches include land clearing, weed invasion, fauna predation, feral rabbits, altered fire regimes and nutrient enrichment.

The natural environment is key to our values and sense of wellbeing. The Northern Beaches offers an unusually wide variety of environmental values and ecosystem services, including 1460 native plant species, 540 native animal species, 17km2 of bushland, 80km of coastline, 24 ocean beaches, four protected intertidal areas, seven freshwater catchments, wetlands, lagoons, five aquatic reserves, and three National Parks.

The Northern Beaches LGA provides multiple ecosystem services which contribute significant value to the wellbeing and health of local residents and also to the local economy, including the tourism sector.

Local ecosystems that are under particular pressure include Narrabeen Lagoon and Manly Dam which experience run-off pollution, and an increase in feral animals and weed impacts, which have the potential to affect ecosystem services and recreational values. In some cases, there is a trade-off between protection of lives and properties and protection of environmental values and ecosystems (i.e. at Wakehurst Parkway there is a need to manage flood mitigation measures alongside protection of threatened wildlife habitat).

Analysis	Rating
Community concern	High (Concerned or very concerned - 45%)
Perceived level of community preparedness	Moderate (Prepared or very well prepared - 23%)
Trend (+30 years)	Increasing
Communities at highest risk	Whole of community

Mental health

Mental ill-health illness is a growing concern for the Northern Beaches. While it is difficult to quantify the extent of mental health related issues and risks, the Northern Beaches reported a higher rate of mental health related hospitalisations (2,134 per 100,000), compared to NSW average of 1,894 per 100,000 (Sydney North Public Health Network, 2018). Local factors that may contribute to mental ill-health include access and normalisation of drugs and alcohol use, loneliness and social isolation, and the social anxiety that often comes hand-in-hand with social media.

Mental health remains indiscriminate of age, gender or socio-economic backgrounds and is linked to a broad range of societal factors beyond the traditional realms of health.

However, some groups that are particularly exposed include young people, victims of domestic and family violence, and middle-aged men. Social determinants of health such as healthy built environments, access to natural areas and public places and opportunities for arts and creativity are increasingly recognised as being of fundamental importance to mental wellbeing.

Survey responses indicated a very high level of concern with these issues, with 43% of participants citing high or very high concern with a low level of preparedness.

Analysis	Rating
Community concern	High (Concerned or very concerned mental health - 43%)
Perceived level of community preparedness	Low (Prepared or very well prepared - 18%)
Trend (+30 years)	Increasing
Communities at highest risk	Whole of community

Drug and alcohol misuse

The misuse of alcohol and other drugs can have a damaging impact on individuals and their social networks. It can be linked to a number of chronic mental and physical health illnesses, unemployment, family violence and homelessness. Communities are also affected by drug and alcohol misuse through issues such as anti-social behaviour and drug related crime.

In Australia, the percentage of people with an alcohol or drug addiction is almost double the global average, and around 1 in 20 Australians have had an addiction or substance misuse problem (Health Direct, 2020). A national survey conducted in 2019 found that the use of most illicit drugs in Australia had increased between 2016-2019, including cannabis, cocaine, ecstasy, hallucinogens and inhalants (Australian Institute of Health and Welfare, 2020).

Locally, according to 2016 data approximately 22% of the Northern Beaches engaged in high-risk drinking and 11.4% were smokers. Both of these statistics are higher than the Sydney average, being 17.9% and 9.4% respectively.

Statistics from NSW Bureau of Crime Statistics and Research show that Northern Beaches LGA drug offences have generally remained stable over the past two years although this is not necessarily indicative of drug and alcohol use (BOSCAR, 2020).

There is a general long term downward trend in tobacco smoking and alcohol consumption across the broad population (AIHW, 2021), however the consumption of alcohol shows interesting trends, with young adults drinking less while more people in their 50s are consuming 11 or more standard drinks in one drinking session (Australian Government Department of Health, 2019). The COVID-19 pandemic has more recently led to an increase in alcohol consumption, and also of cannabis use (NSW Health, 2020).

Illicit drug use can lead to serious health impacts including overdose, hospitalisation, and death, social impacts including violence, trauma and crime, and economic impacts in the form of healthcare and law enforcement costs (AIHW, 2021).

Analysis	Rating
Community concern	Moderate (Concerned or very concerned drug and alcohol - 37%)
Perceived level of community preparedness	Moderate (Prepared or very well prepared - 19%)
Trend (+30 years)	Alcohol and tobacco consumption - decreasing (with the exception of people in their 50s)
Communities at highest risk	Illicit drug use - stable

Increasing Health Service Demand

The NSW health system is facing significant challenges to meet increasing demand for health services driven by lifestyle diseases, an ageing population and new care technologies. The Northern Beaches experienced 16% demand growth in acute health care activity between 2009-2017 (NSW Health in State Infrastructure Strategy).

Currently the Northern Beaches Hospital at Frenchs Forest, delivers acute and complex care to the whole of the LGA with Mona Vale Hospital providing urgent, rehabilitation, community and palliative care services. In addition, there are three community health centres focused on prevention and early healthcare intervention and plans for upgrades to the existing as well plans for an adolescent and young adults hospice at Manly to offer respite care, symptom management and end of life care.

Compounding risk factors in effectively servicing the health needs of the community, include the significant risks of shocks and stresses described above, responding to the current COVID-19 pandemic; an ageing population; chronic illnesses; and high risk consumption of drugs and alcohol.

Increasing demand for health services was identified as a key concern by focus group participants (this area was not explicitly explored as part of the survey).

Analysis	Rating
Community concern	Moderate (Concerned or very concerned 38%)
Perceived level of community preparedness	High (Prepared or very well prepared - 29%)
Trend (+30 years)	Increasing due to ageing population and increasing chronic illness
Communities at highest risk	Whole of community

Lack of transport diversity

Limited transport options and access routes is an increasing resilience risk as population growth and urban development will increase demand on road infrastructure. Congestion, based on current trends, is predicted to increase in major urban areas, which will limit productivity, hinder emergency evacuations and is estimated to almost double the net social costs over the next 15 years. It also poses indirect risks to health and wellbeing, especially for young people and people with limited mobility and who may be vulnerable to social isolation.

The compounding effects of limited transport options have long term effect on the ability for the Northern Beaches to attract key workers (many of whom cannot afford to live in the area) as well as retain young people (e.g. by lack of access to education and employment).

This is an area that consistently has been raised throughout Council engagement across a number of strategies plans and remains high on the list of community concerns. Specifically, for this project, 36% of phone survey participants rated transport diversity to be of moderate concern.

Analysis	Rating
Community concern	Moderate (Concerned or very concerned- 36%)
Perceived level of community preparedness	Moderate (Prepared or very well prepared - 23%)
Trend (+30 years)	Increasing due to population growth
Communities at highest risk	Whole of community

Inequity

Inequity within society means a lack of fairness or justice. Uneven allocation of resources to different social groups or prejudice towards specific social groups can manifest unequal social, economic and environmental conditions (NCBI, 2017).

Linked to the fundamental importance of diversity to build resilience, four global megatrends have been identified that will continue to affect the economic, social and environmental forces on inequality and inequity:

1. technological change, which is displacing workers and exacerbating wage inequality;

2. urbanisation offers exceptional opportunities, yet cities find wealth and poverty in close proximity, making increasing levels of inequality all the more glaring;

3. international migration offers millions of people new opportunities but only if managed in a safe and equitable way; and

4. climate change impacts are being experienced around the world, yet the poorest countries and groups are disproportionately affected (United Nations, 2020).

In Sydney, inequity is increasing and is a contributing factor to the increase in health service demand across Sydney, unequal access to infrastructure and rising income disparity (Resilient Sydney, 2016). A prime example is housing affordability, particularly with our younger generation increasingly being 'locked out' of the rental and buyer housing market due to rising house prices, particularly on the Northern Beaches.

Inequity was an area of moderate community concern with a low level of community preparedness.

Analysis	Rating
Community concern	Moderate (Concerned or very concerned - 35%)
Perceived level of community preparedness	Low (Prepared or very well prepared - 16%)
Trend (+30 years)	Increasing
Communities at highest risk	Whole of community with higher impacts on younger generations, those from lower socio-economic and culturally diverse backgrounds

Employment diversity

Employment diversity is an important factor in building resilience, as it minimises interdependencies and exposure to industry and supply chain volatility. Job containment is particularly important for the Northern Beaches, given the transport limitations of the area.

In 2019/20, there were 43,986 less jobs than employed residents (.idcommunities, 2020) suggesting the region is not generating enough jobs to support its residence base, or that neighbouring regions provide more opportunities. This jobs 'deficit' - the difference between jobs and residents - has grown by 2,910 over the last ten years, however has shown signs of shrinking in the last three years. The share of residents working outside the LGA increased between 2011 and 2016. In 2016, 43.4% of Northern Beaches residents worked outside the LGA, with the majority of those travelling to the main central business districts of Sydney and North Sydney.

With a mismatch between existing jobs and resident workers skills/qualifications, limited career opportunities and higher salaries in the city, many residents end up working outside the LGA. Conversely, many of the workers needed to fill local jobs need to travel in from surrounding areas, further impacting travel demand and skills shortages. Resulting impacts include additional pressure on the transport infrastructure and long commutes that can affect mental and physical wellbeing.

Longer-term impacts on resilience include the ability to attract and retain skilled workers and key workers to the area and as such is an issue strongly related to housing affordability.

Prior to COVID-19, the Northern Beaches was showing strong local job growth especially the health and tourism sectors. With an ageing population is likely to see the health sector is likely to see continued growth. However, modelling has shown Covid-19 has had a significant impact on local jobs in some sectors, with overall jobs in the Northern Beaches falling by 5.2% in the June 2020 Quarter (5,800 jobs).

Government stimulus 'saved' many jobs and supported the rebound the following September. In March 2021, local jobs were 2.3% below pre-Covid levels and jobs had recovered to pre-Covid levels in 8 out of 19 industries (.idcommunity, 2021). However, this modelling was undertaken prior to the June 2021 lockdown. This will impact the recovery that was underway and highlights ongoing economic uncertainty.

The community expressed low levels of concern with employment diversity, with 24% saying they were either very concerned or concerned.

Analysis	Rating
Community concern	Low (Concerned or very concerned - 24%)
Perceived level of community preparedness	Moderate (Prepared or very well prepared - 17%)
Trend (+30 years)	Increasing
Communities at highest risk	Whole of community

Social cohesion

Social cohesion is critical to resilience, particularly at a neighbourhood and individual level. Globally, a decline in social cohesion has been identified as a key stress leading to social unrest. Social cohesion is being impacted by rising inequity across Sydney and is influenced by a range of stresses, such as housing unaffordability, drug and alcohol misuse and inequitable access to transport. Declining social cohesion can lead to isolation and exacerbate mental health issues, especially for vulnerable groups in the community.

One of the core values consistently expressed by Northern Beaches residents is having connected, vibrant communities. The Northern Beaches has many strengths that contribute to social sustainability and cohesion, including high levels of community safety, access to open space, thriving social, recreational and sporting opportunities, high rates of volunteering, self-sufficient economy, safe ways to participate and a strong not-for-profit presence.

However, the engagement showed that there is scope for improvement, especially at a neighbourhood level.

Although the Northern Beaches is a socio-economically advantaged area with a highly educated resident population and relatively low unemployment, the underlying issues around mental health and wellbeing suggest that more can be done to create and maintain a more socially sustainable and inclusive community for all.

Analysis	Rating
Community concern	Low (Concerned or very concerned - 21%)
Perceived level of community preparedness	Moderate (Prepared or very well prepared - 23%)
Trend (+30 years)	Limited change however other stresses may influence this trend.
Communities at highest risk	Whole of community

Appendix B
Behavioural influences to achieving resilience outcomes

	Influence	Response
	Attachment and connection - refers to the extent to which residents and business owners feel attached to the community. To respond to threats that impact our wellbeing, residents must feel personally invested in the area and its continued growth and success.	Reinforce and improve connection with our area and community. A resilient community requires people to feel personally invested and connected to our community.
	Framing - refer to how residents and business owners currently frame 'resilience' and how it differs between the different types of situations.	Use everyday language to describe resilience actions i.e., prepare, plan etc and explain them in ways that are relevant and relatable for each audience.
	Salience - refers to how easily something can be brought to mind. Each challenge or event occupies a degree of mental space consistent with the mental availability (of that particular challenge). Each challenge will influence the extent to which the community believe there is a risk of each type of challenge, both to them as individuals and the wider community.	Because their effects are encountered daily, stresses remain more front of mind. Therefore, it is essential to maintain awareness of shocks utilising a range of methods to ensure people are consistently taking action in response to them.
	Acceptance - refers to the acknowledgement of the existence of, or inevitability of a challenge. The most common behavioural response to 'stresses' is to protest their existence.	Acceptance is a necessary precondition for preparation and adaptation. Stresses are things that can be prepared for and adapted to, rather than problems to be solved. It is necessary to communicate the risks, preparation and adaptation options to individuals and the broader community.
	Anchoring - people "anchor" or rely on a specific piece of information or a memory from the distant past and then adjust from this point. Anchors may be based on price, past experience, occasions, or social norms, among other things.	The threat of shocks and their likely effect must be continuously communicated, both to individuals and the wider community.
	Availability bias - people predict the probability of an event based on how easily an example can be recalled.	Continually communicate the present and ongoing threat posed by shocks to the LGA to combat the tendency to believe it's something more applicable to times gone by. Only communicate the threat alongside the behavioural response required to prepare for i.
	Optimism bias - refers to the tendency to be over-optimistic about the outcome of an adverse situation. Examples include: "it won't be so bad" or "it won't happen to me".	Enlist locals to provide testimonials of surviving shocks (e.g., floods / fires) to dial up the sense of threat to others. Include these locals' responses in testimonials to communicate effective preparatory action is within everyone's power .
	Overconfidence bias - people may overestimate in their ability to deal with an adverse outcome if they are unfortunate enough to experience one.	Encourage locals to do scenario planning, in which specific scenarios are considered along with the specific preparatory action required to respond to it.
	Status quo bias - we suffer from inertia and prefer to avoid change. Manly locals believe there is nothing they can do to mitigate the threat posed by stresses.	Empower residents to build resilience around 'stresses' by outlining simple steps that will mitigate the effects of the stress, rather than its existence (e.g., downloading a podcast to prepare for the commute); benchmark and communicate continual improvements to local services.

Table 2 - Response to behavioural influences to achieving resilience outcomes

Appendix C
Risk assessment for adaptation/mitigation priorities

Table 3 and Table 4 provides the risk assessment matrix and adaption/mitigation priority descriptions based on the risk classification.

Likelihood	Rare (1)					Unlikely (2)					Possible (3)					Likely 4)					Almost Certain (5)				
Vulnerability	Very Low (1)	Low (2)	Moderate (3)	High (4)	Extreme (5)	Very Low (1)	Low (2)	Moderate (3)	High (4)	Extreme (5)	Very Low (1)	Low (2)	Moderate (3)	High (4)	Extreme (5)	Very Low (1)	Low (2)	Moderate (3)	High (4)	Extreme (5)	Very Low (1)	Low (2)	Moderate (3)	High (4)	Extreme (5)
Very Low (1)	VL1	VL2	VL3	L4	L5	VL2	VL3	L4	L5	L6	VL3	L4	L5	L6	M7	L4	L5	L6	M7	M8	L5	L6	M7	M8	H9
Low (2)	VL2	VL3	L4	L5	L6	VL3	L4	L5	L6	M7	L4	L5	L6	M7	M8	L5	L6	M7	M8	H9	L6	M7	M8	H9	H10
Moderate (3)	VL3	L4	L5	L6	M7	L4	L5	L6	M7	M8	L5	L6	M7	M8	H9	L6	M7	M8	H9	H10	M7	M8	H9	H10	H11
High (4)	L4	L5	L6	M7	M8	L5	L6	M7	M8	H9	L6	M7	M8	H9	H10	M7	M8	H9	H10	H11	M8	H9	H10	H11	E12
Extreme (5)	L5	L6	M7	M8	H9	L6	M7	M8	H9	H10	M7	M8	H9	H10	H11	M8	H9	H10	H11	E12	H9	H10	H11	E12	E13

(Criticality labels the rows: Very Low (1), Low (2), Moderate (3), High (4), Extreme (5))

Table 3 - Asset and Infrastructure risk assessment (adapted from QIC)

Risk Classification	Score	Adaptation and Mitigation Priority
Very low	VL1 - VL3	Broadly acceptable risk. No action required beyond monitoring of risk level and priority during monitoring and review phase
Low	L4 - L46	Low priority for further investigation and/or treatment. Actions regarding investigation and risk treatment should be delegated to appropriate level of organisation, and further investigations and treatment plans may be developed.
Moderate	M7 - M8	Medium priority for further investigation and/or treatment. Actions regarding investigation and risk treatment should be delegated to appropriate level of organisation, and further investigations and treatment plans may be developed.
High	H9 - H11	High priority for further investigation and/or treatment, and the highest authority relevant to context of risk assessment should be formally informed of risks. Further investigations and treatment plans should be developed.
Extreme	E12 - E13	Highest priority for further investigation and/or treatment, and the highest authority relevant to context of risk assessment must be formally informed of risks. Each risk must be examined, and any actions for further investigation and/ or risk treatment are to be documented, reported to, and approved by that highest authority.

Table 4 - Adaptation and mitigation priority descriptions (adapted from QIC)

Appendix D
Community Concern, preparedness and risk assessment summary - shocks and stresses

The following tables indicate levels of community concern and preparedness, based on the outcomes from the surveys for this Strategy, in addition to a risk assessment of key shocks of particular priority for the Northern Beaches community. The overall risk ratings are based on an assessment of likelihood and consequence of each risk and informed by the Local Emergency Management Plan (2021) and Council's planning and risk management framework. The tables also provides a link to the relevant Strategic Direction that responds to the shock and stress.

Shocks	Community Concern	Community Preparedness	Overall Risk	Connection to Strategic Directions
Disease Pandemic	High	High	High	Direction 1: Get Ready Northern Beaches Direction 5: Adaptive Services, Assets & Infrastructure Direction 6: A Resilient Natural and Built Environment
Bush Fire	High	High	Extreme	Direction 1: Planning for our Future Direction 2: Get Ready Northern Beaches Direction 6: A Resilient Natural and Built Environment
Digital Network Failure	Moderate	Low	High	Direction 2: Get Ready Northern Beaches Direction 5: Adaptive Services, Assets & Infrastructure
Infrastructure Failure	Moderate	Low	High	Direction 1: Planning for our Future Direction 2: Get Ready Northern Beaches Direction 5: Adaptive Services, Assets & Infrastructure
Storm (inc. flood and coastal inundation)	Moderate	High	High	Direction 1: Planning for our Future Direction 2: Get Ready Northern Beaches Direction 6: A Resilient Natural and Built Environment
Cyber Attack	Moderate	Low	Variable	Direction 1: Get Ready Northern Beaches
Financial Institution Failure	Low	Moderate	Variable	Direction 1: Get Ready Northern Beaches
Heatwave	Low	Low	Extreme	Direction 1: Planning for our Future Direction 2: Get Ready Northern Beaches Direction 6: A Resilient Natural and Built Environment
Water Crisis	Low	Moderate	High	Direction 1: Planning for our Future Direction 2: Get Ready Northern Beaches Direction 5: Adaptive Services, Assets & Infrastructure
Terror Attack	Low	Moderate	Probable	Direction 1: Get Ready Northern Beaches
Tsunami	N/A	N/A	Medium	Direction 1: Get Ready Northern Beaches
Earthquake	N/A	N/A	High	Direction 1: Get Ready Northern Beaches
Landslide/Rockfall	N/A	N/A	High	Direction 1: Get Ready Northern Beaches Direction 6: A Resilient Natural and Built Environment

Table 5 - Community Concern, perceived preparedness and risk assessment of shocks and links to Strategic Directions

Stresses	Community Concern	Community Preparedness	Connection to Strategic Directions
Housing affordability	High	Low	Direction 1: Planning for our Future
Climate Change	High	Moderate	Direction 1: Planning for our Future Direction 5: Adaptive Services, Assets & Infrastructure Direction 6: A Resilient Natural and Built Environment
Environmental Degradation	High	Moderate	Direction 1: Planning for our Future Direction Direction 6: A Resilient Natural and Built Environment
Mental Health	High	Low	Direction 3: Connect for Strength Direction 5: Adaptive Services, Assets & Infrastructure Direction 7: Activated Places and Spaces
Increase Health Service Demand	Moderate	High	Direction 1: Planning for our Future Direction 5: Adaptive Services, Assets & Infrastructure
Increase drug and alcohol misuse	Moderate	Moderate	Direction 3: Connect for Strength Direction 5: Adaptive Services, Assets & Infrastructure Direction 7: Activated Places and Spaces
Lack of transport diversity	Moderate	Moderate	Direction 1: Planning for our Future Direction 5: Adaptive Services, Assets & Infrastructure
Inequity	Moderate	Low	Direction 1: Planning for our Future Direction 3: Connect for Strength
Chronic illness	Low	Moderate	Direction 5: Adaptive Services, Assets & Infrastructure Direction 7: Activated Places and Spaces
Employment diversity	Low	Low	Direction 1: Planning for our Future
Social Cohesion	Low	Moderate	Direction 3: Connect for Strength Direction 7: Activated Places and Spaces

Table 6 - Community Concern, perceived preparedness and risk assessment of stresses and links to Strategic Directions

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