READY FOR THE 21ST CENTURY RESILIENCE STRATEGY.
READY FOR THE 21ST CENTURY

CONSULTATION DOCUMENT
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Rotterdam is a city to be proud of – and I am extremely proud of Rotterdam! The tiny settlement of ‘Rotta’ at the Rotte river bank has, over the course of centuries, grown into the major city of today. Rotterdam has its citizens to thank for that, from the early settlers to the current residents. The people of Rotterdam utilized the city’s location and its potential to the fullest, turning the water of the Rotterdam delta from its biggest threat into its greatest opportunity. They seized opportunities presented by trade and fishery. They embraced plans by visionaries such as Pieter Caland, whose ‘Nieuwe Waterweg’ (New Waterway) established the city’s direct connection to the North Sea.

Rotterdam’s history is marked by its residents’ resilience. Challenges were overcome, in water management, trade, fighting cholera epidemics, and in literally re-constructing the city after a devastating bombardment at the start of the Second World War left much of the city in ruins. Rotterdam has always faced difficult situations by looking to the future and finding opportunities for city improvement; ‘stronger through struggle’ is our motto. In May 2013 I met Judith Rodin, the Rockefeller Foundation’s CEO, in New York City. The great importance of resilience, in relation to the economic structure and livability of cities was recognized by her organization. Global developments, such as urbanization, climate change and the increasing complexity of urban society tell us we must look ahead and be prepared. The 100 Resilient Cities initiative was born.

She encouraged me to join the cities at the forefront, exploring the meaning of resilience for Rotterdam, and discovering the ways in which we can continue to build on our historical accomplishments. I embraced the invitation with conviction. Rotterdam has always shown resilience, but innovative cities remain successful by being future-driven, rather than coasting on past successes. The people of Rotterdam are the key to the resiliency of their city. Their agility and resilience are crucial when disaster strikes. The memories of Paris and Brussels are still fresh. Continuing work on an inclusive Rotterdam society will further increase its resilience and provide balance. Developments in technology and society continue to challenge our resilience as well. The knowledge and skills necessary to deal with these new challenges are essential in order to keep moving ahead. The urgency of resilience is displayed in many areas. An example that stresses the urgency, in my opinion, is the growth, interconnectivity of and dependencies on ICT systems. This calls for ‘cyber resilience’: the ability of Rotterdam’s city and port area to keep functioning, despite disruptions that will surely occur.

I am very proud to present to you Rotterdam’s resilience strategy. This is only the beginning, not a blueprint. The strategy provides a new way of thinking, with new insights on how to further expand Rotterdam’s robustness, flexibility and inclusivity.

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I invite you to view your daily activities and your passions through the ‘resilience lens’ this strategy offers. How do your activities contribute to Rotterdam’s resilience? Share your views and experiences with us as city officials, with your colleagues and your fellow-citizens. For only by joining forces, can we make our city even stronger and more beautiful.

AHMED ABOUTALEB
MAYOR OF ROTTERDAM

“THE CITIZENS OF ROTTERDAM ARE THE KEY TO OUR RESILIENT CITY.”
LETTER FROM MICHAEL BERKOWITZ

The release of Rotterdam’s first-ever comprehensive Resilience Strategy is an evolutionary step forward for a city with a rich history of innovation and leadership. From its recovery after the destruction of World War II, to its globally recognized work on climate adaptation and water management, Rotterdam has time and again shown that it never shies away from confronting the most pressing challenges of the day head-on. The release of this strategy builds on this storied legacy.

Through this strategy, Rotterdam is taking on an honest and proactive view of its resilience challenges and opportunities, while laying the groundwork for important work ahead. It recognizes that Rotterdam must become resilient not just by fortifying its defences to a changing climate and rising seas, but also by building a more cohesive and inclusive society.

Of course, none of this could have been possible without the strong support and vision of Mayor Aboutaleb. As one of the first members of 100 Resilient Cities – Pioneered by the Rockefeller Foundation, Mayor Aboutaleb established Rotterdam as a leader in our global network early in our engagement. His keen interest in our partnership catalyzed the energy and political will necessary to turn Rotterdam’s challenges into opportunities. A special thanks should also be extended to Rotterdam’s CRO, Arnoud Molenaar, who hosted 100 Resilient Cities’ first-ever Network Exchange and led an extensive process of research, analysis, and stakeholder engagement over the past few years that resulted in the fantastic work we see today.

Though this strategy represents the end of the strategic planning process in Rotterdam, it is only the beginning of the exciting work to come in the months and years ahead. And 100 Resilient Cities’ partnership with the City of Rotterdam is also just beginning. It is now that we can collectively begin implementing the actions and initiatives contained in the following pages, which will positively impact the lives of all of those who call Rotterdam home.

From its willingness to engage with world-class service providers through the 100 Resilient Cities platform of partners like Microsoft, to its ability to export best practices across the globe, Rotterdam is well positioned to continue leading the global urban resilience revolution. We at 100 Resilient Cities could not be more pleased to be a partner in these efforts.

BEST REGARDS,
MICHAEL BERKOWITZ
PRESIDENT, 100 RESILIENT CITIES — PIONEERED BY THE ROCKEFELLER FOUNDATION

LETTER FROM ARNOUD MOLENAAR

Very few ‘Rotterdammers’ (citizens of Rotterdam) know, but Rotterdam is world-renowned for its adaptation to climate change. International delegations visit the city every week, to see for themselves how we handle management of dykes and levees, water management, rain and use of ground- and drinking water. Their tours include visits to our water squares, underground parking garages with a built-in water storage facilities and a rowing course that doubles as a water buffer, combining sports, recreation and water management. They may also stop to look at multifunctional dykes, experimental floating constructions or the internet system that allows us to monitor the entire city’s groundwater levels.

Rotterdam’s leading position in climate adaptation helped local businesses to receive millions of dollars in commissions in the aftermath of the disastrous hurricanes Katrina in New Orleans and Sandy in New York. Rotterdam may proudly state: we make cities climate proof.

The climate change adaptation program we have been working on for more than a decade, is a good example of how to sustainably handle risks and threats. Of course, we have a long history of Dutch craftsmanship to build upon. Our approach is to keep threats at bay, even using them to Rotterdam’s advantage, increasing quality of life in our city and efficiency in our port. We do so because it is essential that the continuity of our city is preserved. Our efforts on climate change adaptation were a reason for the Rockefeller Foundation to invite us to join their resilience challenge, so that we could share our experiences, expand our horizons and learn from other cities – on climate change, and all the other challenges facing cities today.

This document is Rotterdam’s first Resilience Strategy. Our primary goal is to make resilience-thinking common practice in our city and part of our DNA. We do so for you and with you. Six themes and a wide range of inspiring initiatives, both new and operational, will help increase our city’s resilience.

100 Resilient Cities helped us in our journey to develop this Resilience Strategy and we are very grateful for this support. Participation in the 100 Resilient Cities Network has further strengthened and expanded Rotterdam’s image as a well-prepared, innovative delta city. We look forward to contribute to – and benefitting from – the 100 Resilient Cities network in the forthcoming years. And as Chief Resilience Office [CRO] I am very much looking forward to continuing the exchange on key resilience topics with my fellow CRO’s within the network.

ARNoud MOLENAAR
CHIEF RESILIENCE OFFICER, ROTTERDAM
WHAT IS RESILIENCE.
RESILIENCE IS IN OUR DNA!

“RESILIENCE DOESN’T NEED TO BE EXPLAINED TO THE PEOPLE OF ROTTERDAM. OUR PEOPLE ARE WELL KNOWN FOR THEIR VISION, STRENGTH, COURAGE AND PERSISTENCE. IT IS WHAT MAKES US ROTTERDAMMERS!”

From the laying of the first foundations of the city, the spirit of resilience has been engrained in our psyche. Instead of fighting the water, we used it to our advantage, creating land, establishing a new waterway (Nieuwe Waterweg) and promoting our city and World-class port as the main gateway to Europe. Our city and our people have — throughout history — overcome numerous shocks and stresses. We have adopted the city motto “Stronger through struggle” (“Sterker door strijd”) — this was added to our coat of arms to remember the courage and the strength shown by the people of Rotterdam through World War II. Our city centre was destroyed during World War II, but we have recovered, and in 2015 our city was voted the best city centre in the Netherlands. Rotterdam is now a thriving cosmopolitan city, with a wealth of cultures and ethnicities. Our citizens are among the happiest in the Netherlands. It is well known for its modern architecture and has a vibrant cultural scene with an eclectic variety of shops, attractions, festivals, restaurants and parks. It is home to Europe’s largest and one of the top ten most important ports in the world and from this naval and industrial heritage it is now emerging as an exciting and dynamic entrepreneurial hub. It is well served by top quality internationally renowned knowledge institutions and universities which help to ensure we have a highly skilled and agile workforce. But as we reflect on our past, we also foresee new risks and challenges in the future from, for example; digitization, climate change, the new economy and globalization. We know that we cannot become complacent and that these challenges need to be faced. We have a reputation for designing and engineering robust systems but we acknowledge that future risks might call for a different response — more flexibility and greater inclusiveness — perhaps different governance and funding approaches. Ensuring Rotterdam’s ongoing resilience will be a challenge, but it’s one we are ready for. We know that the technological and societal changes of the 21st century will present new risks and opportunities but we want to fight for a sustainable, safe, united and healthy future for our city.

“READY FOR THE 21ST CENTURY”
WHAT IS RESILIENCE.

RESILIENCE IS MORE THAN CLIMATE ADAPTATION.

Cities and urban environments are becoming increasingly more diverse, dynamic, connected and as such can be unpredictable. Resilient cities have in place the governance, social and financial infrastructure to adequately respond to these sometime unpredictable changes – to recover quickly and to bounce back to become stronger than before. Rotterdam, as a Delta city, contains a vast and successful port and industrial complex, is home to a diverse and growing population and is situated in one of the most open economies in the world. It is therefore exposed to – and needs to be ready to respond to – a number of important global, regional and local transitions.

In the last 10 years Rotterdam has won international acclaim for its work on climate adaptation. Our water squares, underground car parks with huge rain retention basins, multifunctional dykes and floating constructions are often profiled in international press and in the aftermath of Hurricane Katrina in New Orleans and Hurricane Sandy in New York this experience has attracted millions of dollars of revenue for Rotterdam based companies. Our companies have a strong reputation for helping to climate proof cities!

We’re proud of our track record on managing water and climate risks but we recognize this is only one of the stresses that our city is facing. Over the last two years, with the support of 100 Resilient Cities – Pioneered by the Rockefeller Foundation, we have expanded our view of what city resilience means. We have begun to think of resilience in a much more holistic way, considering a broader range of shocks and stresses.

In developing our resilience strategy we’ve used the methodology and many of the tools developed by 100 Resilient Cities, we’ve engaged with hundreds of local stakeholders, spoken to international specialists, held workshops, conducted research and worked hard to zero in on the areas that we believe require the most attention to take Rotterdam’s resilience to the next level. We’ve articulated our resilience challenge, developed a single integrated vision for a Resilient Rotterdam in 2030, defined seven resilience goals and determined 68 actions that we will work to take forward in the coming years. We would like to thank 100 Resilient Cities and all the contributors and supporters that have helped us to develop this document – Rotterdam’s first official Resilience Strategy. This is only the start; we still have a lot of work and further exploration to do, and we will need the engagement and collaboration from numerous city stakeholders to deliver on this vision.

“CITIES THAT HAVE CONSIDERED THEIR RESILIENCE IN A HOLISTIC WAY WILL BE BETTER PREPARED FOR THE FUTURE.”
100 Resilient Cities – Pioneered by the Rockefeller Foundation is dedicated to helping cities around the world become more resilient to the physical, social and economic challenges that are a growing part of the 21st century. 100 Resilient Cities supports the adoption and incorporation of a view of resilience that includes not just the shocks (i.e. earthquakes, fires, floods) but also the stresses that weaken the fabric of a city on a day to day or cyclical basis. www.100resilientcities.org.

The programme was established in honour of Rockefeller’s 100th anniversary; it will ultimately involve 100 cities globally and had initial funding of $100 million although the level of funding support has grown since the programme was launched.

Rotterdam, like other cities in the network, has received support from 100 Resilient Cities in a range or ways, as follows;

- Financial and logistical support to the position of a Chief Resilience Officer (CRO)
- Expertise in guiding the process to develop a robust resilience strategy – Rotterdam has benefitted from input from AECOM as a 100 Resilient Cities strategy partner, as well as advice and guidance from 100 Resilient Cities staff and other network cities
- Access to solutions, service providers and public and private partners and NGOs – Rotterdam has had additional support from Microsoft, TNO and Drift
- Membership of a network of world cities for knowledge exchange and learning – as an example Rotterdam hosted a successful network exchange in 2015 attended by around twenty other CRO’s.

We are proud to have been one of the front running cities in the 100 Resilient Cities network and are pleased with the interactions we’ve already experienced through the network. Already it has been a catalyst for our participation in new resilience projects and has helped to enhance our city brand and identity. Our participation in the 100 Resilient Cities programme has helped to strengthen our growing reputation as a hub for clean tech and as a city taking action on climate change and has allowed us to cement important partnerships within the city and internationally. It has also supported us in helping to promote and export the skills and services of some of our local private sector partners (e.g. private sector companies such as Deltares, Arcadis and TNO are now active in Denmark, India and the US).

Rotterdam has recently signed the 100 Resilient Cities 10% pledge; committing 10% of the municipality annual budget towards spending on resilience projects and initiatives. This commitment means we are eligible for up to $5 million (additional) in platform resources through our association with 100 Resilient Cities. We will draw on this support to support implementation of strategy.

WHAT IS RESILIENCE.
The 100 Resilient Cities programme defines urban resilience as: “The capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience.”

In developing our resilience strategy we drew heavily on the 100 Resilient Cities established methodology and supporting tools. The City Resilience Framework (CRF) helped us to identify the relevant domains of city resilience. Our stage 2 diagnostic tasks helped us to identify the key shocks and stresses (and transitions) that Rotterdam may face in the future and the resilience and reality lenses, together with the seven resilience qualities helped us to develop and refine our action list.

**MORE THAN ROBUSTNESS.**

**WHAT IS RESILIENCE.**

**SEVEN QUALITIES OF RESILIENCE**

- **REFLECTIVE**
  - Using past experience to inform future decisions

- **RESOURCEFUL**
  - Recognizing alternative ways to use resources

- **ROBUST**
  - Well–conceived, constructed, and managed systems

- **REDUNDANT**
  - Spare capacity purposely created to accommodate disruption

- **FLEXIBLE**
  - Willingness and ability to adopt alternative strategies in response to changing circumstances

- **INCLUSIVE**
  - Prioritize broad consultation to create a sense of shared ownership in decision making

- **INTEGRATED**
  - Bring together a range of distinct systems and institutions

**METHODOLOGY: THE CITY RESILIENCE FRAMEWORK**

City Resilience Framework (figure A).

Resilience status perception (figure B).

General inventory of actions contributing to resilience (figure C).

An assessment of the current situation, using the overview of the 12 most important aspects of the city as a system, as shown in the City Resilience Framework wheel (fig A). A first rough inventory of actions and programs contributing to these aspects showed us the richness of initiatives in Rotterdam contributing to resilience (fig B). Yet, this does not match the professional’s perception on the state of resilience (fig C).

“ROTTERTDAM IS ROBUST: WE CAN HANDLE ADVERSITY.”
WHAT IS RESILIENCE.

ROTTERDAM: ‘SELFIES’

We were clear from the beginning that our resilience strategy should both reflect on the past and establish a vision for the future that is relevant across a range of spatial scales – local, district and city-wide. We have taken three ‘selfies’ of the city to support this.

ROTTERDAM THEN
From humble beginnings as a small fishing village we have developed into a 21st Century World Port City. We have overcome all types of crises and change having experienced flooding, wars and welcoming our many new residents from all over the world – we are now a city with 170 nationalities. We’ve learned by reflecting on our past that our people can pull together to overcome challenges by creating and planning robust systems and organizations, and that we have a generally inclusive society.

ROTTERDAM NOW
We are now at a moment in time where we have come together to consider – in a holistic way – some of the challenges and transitions we will face in the future and to agree between ourselves on a suite of actions that can enhance our city resilience going forward. We foresee a number of transitions on the horizon, these include:

- A changing economy driven more by sharing and technological innovation (“Next Economy”),
- A different climate resulting from predicted climate change,
- Changes in society and democracy driven by a move away from top-down hierarchy, to a more bottom up approach with much greater levels of community and citizen involvement.

We recognise that we don’t know everything – there will be other unknown transitions and we have to be prepared for these.

ROTTERDAM TOMORROW
We must also have a vision for Rotterdam in the future, for a resilient city. This needs to be understood by a range of stakeholders. Our visions and goals – set out later in this document – begin to paint a picture for a Resilient Rotterdam. Our identified projects and initiatives support and build on this picture. The selfie we envisage for 2030!
We believe we have a strong track record on resilience, but we want to build on this platform and take our city resilience to the next level. Our challenge is to respond to a number of transitions happening in parallel that are potentially disruptive if not dealt with properly and to work hard to realize policies and actions that provide benefits in each – or many – of these areas.

Using the 100 Resilient Cities methodology we defined six focus areas which represent our main resilience challenges. These are:

1. Social cohesion and education
2. Energy transition
3. Climate adaptation
4. Cyber use and security
5. Critical infrastructure
6. Changing urban governance

Based on our discoveries when focusing on these challenge areas we were able to develop a vision for a resilient Rotterdam together with a range of actions and initiatives aimed at specifically responding to the challenges identified. Our actions or initiatives are often cross cutting and address a number or all of the challenge areas.

"MOVING FROM ROBUST TO RESILIENT."
IN 2030 ROTTERDAM WILL BE A CITY WHERE:

• strong citizens respect each other and are continuously developing themselves
• the energy infrastructure provides for an efficient and sustainable energy supply in port and city
• climate adaptation has penetrated into mainstream of city operations and water has added value for the city and our water management system is cyber-proof
• the underground is being used in such a way that it supports the growth and development of the city
• we have embraced digitization without making us dependent, and we have ensured a best practice level of cyber security
• self-organization in the city gets enough room and a flexible local government supports if really needed
• resilience is part of our daily thinking and acting.
The 21st century will see significant city growth for Rotterdam. We have a track record of dealing with challenges, and have proven on numerous occasions that we can overcome crisis and profit from new opportunities offered by adapting to a changing environment and context. Often these challenges have served to make us more robust and efficient. We are certain that in the future we will also need to become more flexible – seeking greater participation from citizens and stakeholders. By working together, we can harness the energy that exists in our society to let ideas grow, giving space and facilitating connection between people and the establishment of resilience networks.

In order to realize the vision we have established 7 resilience goals:
1. Rotterdam: a balanced society
2. World Port City built on clean and reliable energy
3. Rotterdam Cyber Port City
4. Climate Adaptive city to a new level
5. Infrastructure ready for the 21st century
6. Rotterdam network – Truly our city
7. Anchoring resilience in the city

Each goal is accompanied by fly wheel actions and additional actions. Fly wheel actions are our bigger actions which will make big leaps towards Rotterdam reaching a citywide state of resilience, while the additional actions contribute with lesser impact. Our resilience thinking has resulted in the identification of many new actions, as well as where appropriate, framing ongoing projects or initiatives to deliver a resilience dividend.
The resilience strategy is not meant as a blueprint or end product, but as a starting point to show:

- which activities, projects and programs already contribute to resilience;
- how we can connect and enhance the existing instruments and initiatives;
- how new activities can enhance city resilience.

Resilience thinking is being incorporated in the policymaking and initiatives across all domains of city government, including across social, physical and economic programmes. These elements come together in “The Story of the City”. The resilience strategy and “The Story of the City” are complementary. The latter sets out the kind of city we want Rotterdam to be, the Resilience Strategy shows how we can achieve this in a resilient way.

We have developed our own Resilience Compass, intended as a point of reference to help us to frame our actions and to guide the transition from a robust present towards a resilient future. Moving from a robust Rotterdam our actions need to respond to one or more resilience themes (see City Resilience Framework), they must deliver a resilience dividend, set a clear goal and involve key stakeholders, including potential partners, funders and agencies. Our strategy articulates flywheel actions (i.e. the headline actions) and additional supporting actions. Some of the resilience actions seek to build on and enhance existing projects and initiatives, others are new.
OUR RESILIENCE GOALS.

Rotterdam aims to become a city in which resilience thinking has been anchored in daily life, as well as in the actions taken by companies, institutions, government and citizens. Specifically we are working towards the following goals:

1. Rotterdam: A balanced society
2. World port city built on clean and reliable energy
3. Rotterdam Cyber Port City
4. Climate resilient Rotterdam to the next level
5. Infrastructure ready for the 21st century
6. Rotterdam Networkcity – truly our city
7. Anchoring resilience in the city
“Skilled and healthy citizens in a balanced society”

We seek to build and strengthen resilience at the individual and the societal level. Knowledge, skills, education, health and wellbeing and mutual understanding and respect are central pillars of a balanced society. We will support and enhance a number of ongoing processes and initiatives to support the resilience of Rotterdam’s citizens and society working alongside the existing Social Perspectives program (Foresight Social).

21st CENTURY SKILLS

At the individual level, we need to provide learning skills and suitable education for life and work in the 21st century, including leadership skills. We want our young people to be ready to work in the ‘Next Economy’, to contribute and benefit from the digital revolution and to take ownership of their own future and responsibility for fellow citizens and their communities.

HEALTH

We will focus on the health of the individual citizen, implementing a suite of tools and actions focused on specific groups and problems. Before summer 2016 we will launch our policy document focused on Public Health.

WE–SOCIETY

Global and local trends or sudden events can “unbalance” the Rotterdam society. For example the growth of migration which causes a greater diversity of norms and values. Also the crises beyond the Netherlands and Europe (wars and terrorist attacks) are of concern for the people of Rotterdam, with the attacks in Paris and Brussels still fresh in our minds we are endeavouring to prevent these tensions from disrupting our lives and the city. Recently all national and regional response and action planning has been reviewed and updated. It is crucial that the city invests in monitoring tensions in society and in social cohesion and resilience. The program WE–Society builds openness and mutual understanding [nothing to be unspoken] between people and is essential for maintaining the connections between different groups of people in Rotterdam. We will support and work to enhance and develop this programme to deliver positive resilience outcomes.

STRONG SHOULDERS

The program Strong Shoulders, reinforced by measures from the Woonvisie (vision for housing and living), is working to support a balanced population demographic in Rotterdam and specifically to attract highly educated people to the city. The resilience programme will support this initiative.

21st CENTURY SKILLS

- Computational thinking
- Critical thinking
- Creative thinking
- Problem solving
- Informative skills
- Basic IT skills
- Media wisdom
- Communication
- Collaboration
- Social & cultural skills
- Self regulation
- Entrepreneurship
- Sustainability
WORLD PORT CITY BUILT ON CLEAN AND RELIABLE ENERGY

GOAL 2:

RESILIENCE GOALS.

“Towards a flexible energy infrastructure for an efficient and sustainable energy mix in Port and City.”

Rotterdam wants to be the front runner in the clean energy transition and support recent political agreements through COP21 in Paris. The appetite for and evolution of sustainable energy technologies will have a great influence on the city and the port of Rotterdam. We are striving for a diversification of energy sources and to make the urban energy infrastructure more flexible, in order to successfully deliver this clean energy. Delivering this transition is a large and complex task, but it provides the opportunity for Rotterdam to strengthen its economy and reputation. The current and planned activities of the

port of Rotterdam (Bioport), the roadmap Next Economy for ‘a zero carbon’ future (Smart Energy Delta) and the measures of the Rotterdam’s sustainability program focused on renewable energy and energy conservation support this agenda. New actions are underway to underline the urgency of this transition. The Rotterdam energy infrastructure plan will give direction to the strategy for energy diversification at a district level, each with a roadmap for implementation. The port-industrial cluster will make and carry out an action plan in a joint effort with industries, government and the Rotterdam Port Authority. The Rotterdam sustainability program will be reinforced with new actions as follow up from COP21.
The digitization of society offers many opportunities (Digital Gateway Rotterdam, Smart City), but risks of disruption of essential processes for production, logistics and services also increase. While the investments in Cyber increase at a rate of 27% per year, the investments in cyber security only increase at a rate of 4%. The necessity of a cyber resilient port of Rotterdam was recognized by the Mayor, chief prosecutor and Chief of Police in 2014. Together with the Rotterdam Port Authority and Daltalinqs (representing 700 companies) they have ordered a strategy on cyber resilience. Individual companies and organizations can have their own security in order, but they are also dependent on other companies, organizations and government services. The resilience of Rotterdam to cyber threats will be increased by enhancing awareness, sharing knowledge and experience and joining forces to improve responsiveness and ICT products. Both the port and city are taking cyber security seriously, they share experiences and have worked with Microsoft to develop comparable strategies and actions comprising 15 building blocks including a Cyber Resilience Platform, Cyber Resilience Desk, Cyber Resilience Co-op and a Port Cyber Resilience Officer. Rotterdam needs a Delta plan for Cyber Resilience. Rotterdam will have implemented its cyber resilience strategy within 5 years and will have significantly enhanced its cyber resilience.

“Rotterdam aims to be a cyber resilient city and port; an important condition required to attract new business and investment”
The approach and practice established in Rotterdam’s climate adaptation strategy (2013) serves as an example to many other cities in the world. Implemented projects such as Water Sensitive Rotterdam – the construction of small and larger water storage combined with greening often initiated by citizens – is contributing to the resilience of Rotterdam. We need to build on this, to scale up the benefits. Clever water management approaches can deliver financial benefits. We will work to better understand cascading impacts and to factor these in to our cost benefit decision making (e.g. prolonged power outage or cyber threat). We will also strengthen our crisis management approaches based on increased knowledge of flood risks. Based on research conducted by TNO we have agreed that we must enhance our climate resilience strategy by taking action on cyber resilience. All stakeholders must start collaborating on this agenda that can help us to further climate proof the city.
Much of Rotterdam’s underground infrastructure is crucial for the city to function. Today, our underground infrastructure is robust but lacks flexibility to respond to emergencies, new technological developments and overground development growth is limited. This brings some risks related to repair capacity, delivery of sub-optimal solutions and poor integration of above and belowground services. We want to increase resilience by enhancing the awareness of risk, developing a policy for more robust decision making; more integrated planning practice both underground and overground, relating to infrastructural interventions.

This requires a reinforcement of cooperation among all infrastructure managers, including the city as a platform to share plans and [often confidential] knowledge and information. We are going to create more specific databases and information on the location of infrastructure and functions and interdependencies of the subsurface. We will also explore how innovative SMART technology can be integrated into the “Street of the Future”. Our resilience strategy commits to action in each of these areas.
Our society is well organized. The city is being created by the Rotterdammers, therefore it is truly our city. The local government is one amongst many other stakeholders. How do we manage to become resilient? The way the Rotterdam society operates has many characteristics of resilience including self-organization, strong networks and various coalitions of citizens and businesses and a government offering customised services and a facilitating role with programs like the Right to Challenge and CityLab010.

"Residents, public and private organizations, businesses and knowledge institutions together determine the resilience of the city”

Our resilience increases as more alternative organisations arise, but more effort is needed to incorporate resilience thinking into the DNA of the government and to use and strengthen the energy of Rotterdam’s society. The resilience strategy will focus on increasing government flexibility and will facilitate connecting several networks of locals, individuals and businesses, as a catalyst for more bottom-up community and business initiatives, to share knowledge and experiences to the advantage of Rotterdam’s people and businesses. Our future government will handle new ideas better and work to harness and augment the energy that derives from our communities and will accept more redundancy providing more alternatives during outing of services and operations. We have committed to actions including developing the cities desk for new democracy and participation and providing support to existing networks, citywide and at district level because they directly contribute to the resilience of our city’s governance.
We will develop an innovation and integration agenda on the back of this resilience strategy. We want to identify co-benefits and synergies. For example, strengthening the cyber resilience in Rotterdam strengthens the security of critical infrastructure. Working on 21st century skills of Rotterdam, including ICT skills, contributes to the cyber resilience. We think these synergies are very important to our strategy and will seek to explore these further. One way we will do this is within district pilot areas. A number of actions and themes can come together physically at the neighbourhood or building level.

Our resilience strategy names three pilot districts. These are Feijenoord, Delfshaven and the City Centre. We have initiatives that relate to a number of different scales, as follows:

1. Building (example: Resilient Peperklip)
2. Neighbourhood (example: Resilient Delfshaven)
3. City (example: Nationaal Programma Rotterdam Zuid)
4. Metropolitan Area (example: Roadmap Next economy together with The Hague)
5. National (example: Citydeal Climate Adaptation)
6. European (example: resilient Europe, URBACT)
7. Worldwide (example: 100 Resilient Cities)

Innovation will also be encouraged through comprehensive integrated research with public and private stakeholders at different scales. This includes knowledge development and knowledge exchange between 100 Resilient Cities cities, like the Rotterdam hosted exchange in October 2015. In the short term we will use the International Architecture Biennale (2018 and 2020) and The International Advisory Board (2017) to address resilience as their main topics.
It is recognised that delivering the Rotterdam resilience strategy will need to be a collaborative effort between the City of Rotterdam, businesses, citizens and other organizations, but that the city government has a key role to facilitate and initiate projects, and to provide leadership and the necessary strategic framework. The development of the Rotterdam Resilience Strategy has benefitted greatly from the executive sponsorship of Mayor Aboutaleb and the city has made a top level commitment to continue work to implement its resilience strategy in an integrated way up to 2020 at least.

This document has been released for consultation. The process and organizational structure to realize the resilience strategy will be further defined based. Feedback will be organized by using, for example, an e-panel, a jury of citizens and district commissions. Following consultation further links will be made to connect the resilience strategy into the broader Story of the City. This strategy document is accompanied by a website. More detailed information can be found on www.resilientrotterdam.nl.
RESILIENCE LAB: ACTIONS.
TO IMPROVE AND SECURE OUR CITY’S RESILIENCE WE WANT ALL STAKEHOLDERS TO CONSIDER THE RESILIENCE PERSPECTIVE IN THEIR DAILY LIVES – IN THEIR THOUGHTS AND ACTIONS. THE ACTIONS PROMOTED THROUGH THIS STRATEGY – COMPRISING 5 WHICH ARE ONGOING, 19 THAT ARE JUST BEGINNING AND 44 THAT ARE COMPLETELY NEW – SHOW SOME OF THE WAYS THAT ROTTERDAM CAN IMPROVE ITS RESILIENCE. OUR CHIEF RESILIENCE OFFICER SUPPORTS AND PROMOTES THESE ACTIONS.

Our action plan includes 5 ongoing, 44 new, and 19 starting initiatives and actions. The ongoing initiatives, like Roadmap Next Economy, Water Sensitive Rotterdam and the program WE–Society, are included because they are identified as essential for a resilient Rotterdam. Where necessary these initiatives will be enhanced and developed with resilience thinking and linked to the resilience strategy to deliver positive resilience outcomes, to accelerate upscaling and to allow for lessons learnt and wider dissemination through the resilience office.

There are some new actions that are already in start-up phase, partly due to the Resilience program, which will be supported where necessary by the resilience office and other new actions that will serve as examples of how resilience thinking and interventions can be applied at a practical level at the scale of the neighbourhood, street and building. It is expected that further new initiatives will arise, to enhance the resilience of Rotterdam. The resilience office will focus on connecting, enriching and accelerating these where they are feasible, viable and deliver clear resilience dividends.

Our actions are distinguished into two types: flywheel actions and additional actions. The flywheel actions are the headline actions that deliver the greatest resilience benefit for Rotterdam or which serve as an umbrella for a cluster of supporting actions. The supporting actions are considered to have less impact individually. We have included a key to help navigation through the actions, letters (i.e. A, B, C) signpost the flywheel actions where numbers (i.e. 1, 2, 3) are used for the supporting actions. Synergies and overlaps are shown under ‘related actions’ and icons are used to relate the actions back the resilience challenge areas, to highlight the resilience qualities within the specified action and to show the scale at which the action is applicable.
THE DEVELOPMENT OF AN EDUCATION PROGRAM ON (DIGITAL) SKILLS AND PERSONAL LEADERSHIP FOR YOUNG PEOPLE

We will develop a program for 21st century skills to teach young people the skills they need in a rapidly changing society. The transitions we foresee will impact on the societal skills required of an individual; placing more emphasis on flexibility, collaboration, personal leadership and IT skills. There are a number of supporting actions that underpin this programme.

RESILIENCE VALUE

Development of 21st century skills can enhance personal resilience and support our goal to create a more balanced society. It supports flexibility, creativity and individual learning empowering people to take responsibility for their own future and to play a part in their local community. Training and skills development through this programme will also support our goals related to increased cyber security and new modes of governance. Digitally literate citizens can contribute to the cyber resilient city and personal leadership is important as the government retreats and the importance of participation in community networks grows.

LENS

SCALE

OWNER
Municipality / Social Department

PARTNERS
Schools, Businesses and Social Organizations

FINANCE (POSSIBLE)
Municipality and partners

STATUS
New

RESULT
Short-term

RELATED ACTIONS
1 2 3 4 25

GOAL 1:
ROTTERDAM: A BALANCED SOCIETY
RESILIENCE LAB: ACTIONS.

RELATED ACTIONS

1 CENTRE OF EXCELLENCE FOR 21ST CENTURY SKILLS

This is the establishment of a new physical hub, a central point for learning 21st-century skills in Rotterdam. It will accelerate education and establish a visible, and approachable, innovation hub in the city. The Centre of Expertise will undertake initiatives in education and business, working in collaboration with Rotterdam businesses, schools, the government and private stakeholders.

RESILIENCE VALUE

- Supporting the development of training programs to increase knowledge and enable the monitoring and evaluation of experiences
- Supports collaboration between public and private sector
- Supports awareness, learning and innovation

LENS

SCALE

OWNER Municipality / Social Department

PARTNERS Businesses, Welfare Organizations, schools

FINANCE (POSSIBLE) Municipality / Municipality and partners

STATUS New

RESULT Short-term

RELATED

2 BUILDING A COALITION FOR YOUNG LEADERSHIP

Building on and supporting the growing coalition of businesses, civil society and schools to support the 21st-century skills program. Progress so far has been bottom up and self-starting. The aim of this action is to provide additional resource and support as needed to help the existing coalition deliver on its goals.

RESILIENCE VALUE

- Supports bottom up – community-led initiatives and builds cohesion
- Embeds resilience thinking amongst Rotterdam’s youth
- Supports knowledge sharing and networking

LENS

SCALE

OWNER Municipality / Social Department

PARTNERS Businesses, Welfare Organizations, schools

FINANCE (POSSIBLE) Municipality / Social Department, partners

STATUS New

RESULT Short-term

RELATED

3 21ST CENTURY SKILLS AGENDA

The 21st century skills programme and the Centre of Excellence will need an agreed curriculum. A 21st century skills’ agenda will be prepared by the municipality and Rotterdam’s leading educationalists as part of the Citydeal for Education (collaboration with some other Dutch cities and the national government). The curriculum will ensure resilience is on the agenda for the main educational establishments across the city.

RESILIENCE VALUE

- The curriculum provides transparency and clarity as to what the demands of the 21st century are
- It provides a method for embedding resilience thinking into key city educational curriculums (integration into our regular educational program)

LENS

SCALE

OWNER Municipality / Social Department

PARTNERS Schools, Welfare Organizations

FINANCE (POSSIBLE) Municipality / Social Department, partners

STATUS New

RESULT Short-term

RELATED

4 DEVELOPING PROFESSIONAL NETWORKS

Starting professional networks that teach 21st-century skills and young leadership within schools and colleges.

RESILIENCE VALUE

- Establish clear educational relationships between the professionals, municipality and schools in relation to resilience – to share learning experiences, to enhance the network and to allow it to adjust to changing circumstances based on feedback.

LENS

SCALE

OWNER Municipality / Social Department

PARTNERS Businesses, Welfare Organizations, schools

FINANCE (POSSIBLE) Municipality / Social Department, partners

STATUS New

RESULT Short-term

RELATED
BUILDING ON THE PUBLIC HEALTH ACT 2016–2019

Rotterdam is drafting the Public Health Act 2016–2019 in order to make its public health goals more concrete. The Act redefines health not as the absence of disease but as the state of resilience and being able to shape your own life no matter what happens. The Act is an inspirational guide which aims to promote Rotterdam’s ambition to connect inhabitants and important stakeholders focussing on public health. The Act touches on actions that can be taken by Rotterdammers, as well as by community groups working in neighbourhoods and by government and healthcare and welfare institutions. The Act will be discussed and enriched through a number of productive dialogue sessions, many of which will touch on important aspects of resilience. The municipality will work to build on this dialogue and support key actions arising which contribute to city resilience.

RESILIENCE VALUE

Public health dialogue sessions and resulting actions can directly contribute to many of the city resilience goals. The sessions bring people together to discuss ideas and issues, share best practice and to seed projects that can contribute to a more healthy and balanced society. The resilience office will support this ongoing initiative.

LENS

SCALE

OWNER
Municipality / Social Department

PARTNERS
Central Government, Welfare Organizations, General Practitioners, Mental Healthcare, etc.

FINANCE (POSSIBLE)
Municipality, Central Government, Insurers, etc.

STATUS
New

RESULT
Short-term

RELATED ACTIONS

5 ‘NUDGING’ HEALTHY BEHAVIOUR

Our city has already begun research and creating an agenda to identify what motivates goal groups to make behavioural changes to have a healthier lifestyle. We will develop and help disseminate this research to nudge our citizens (and organizations) towards healthier lifestyles, working in collaboration with the Erasmus University Medical Centre.

RESILIENCE VALUE

- Embeds the notions of healthy behaviour and the required behavioural changes across society, targeted at specific audiences/target groups
- Supports the self-sufficiency and resilience of citizens (and indirectly organisations and the economy)
- Understanding behaviour and the mechanisms that can drive behavioural change can drive efficiencies and cost saving in delivering numerous programmes/initiatives together. This understanding will support delivery of initiatives that can deliver co-benefits (e.g. disseminating information on safe driving that also delivered fuel efficiency benefit)

LENS

SCALE

OWNER
Municipality / Social Department

PARTNERS
SO, Private Partners, Erasmus University College, Rotterdam University, Het Dak, Rotterdam Public Transport, Veldacademie, Medical Delta

FINANCE (POSSIBLE)
Municipality / Social Department, partners

STATUS
New

RESULT
Short-term

RELATED ACTIONS

56
The program WE–Society is a citywide program which aims to support the current connections between population groups, facilitate further connections, promote dialogue and to stand up for one another. The programme includes a number of activities and forums that support these aims and will work with both new and existing groups and networks. It is the intention that the Mayor will share all dialogue and meeting records through the G1000 Citizens’ Summit in 2017. The resilience programme will support the aims and activities of the WE–society programme and will look for opportunities to connect groups with wider city initiatives and to upscale the resilience benefits.

**Resilience Value**

The WE–Society program is explicitly designed to increase the resiliency of society by joining citizens together to discuss and share common challenges and solutions and create a better understanding of cultural differences. It can directly contribute to our resilience goals ‘vital citizens in a balanced society’ and ‘network city Rotterdam: truly our city.’ The program strengthens existing networks in the city and contributes to the emergence of new community level networks.

<table>
<thead>
<tr>
<th>LENS</th>
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<th>OWNER</th>
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<td>Municipality</td>
<td>Welfare Organizations</td>
<td>Municipality / Central Management Department</td>
<td>In development</td>
<td>Short-term / Medium-term</td>
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**Program: WE–Society**

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7 THE G1000 CITIZEN’S SUMMIT

Foundation LOCAL is organizing a citizen’s summit for 2017. It will bring together citizens and civil society and share the results of numerous recent city dialogues (see Action WE–society) that have focussed on key city issues from the citizen perspective. The resilience office will ensure the summit has slots to promote the city’s work on resilience and to further education, raise awareness and promote the actions citizens can take to promote resilience. It brings together 1000 citizens that are randomly selected, seeking to provide a broad representation of the diversity in Rotterdam.

RESILIENCE VALUE

- Reinforces the good work and dialogues that have already taken place.
- Supports knowledge sharing and networking.
- Can be a catalyst for local level / community resilience projects.

LENS  
SCALE  
OWNER  WeSociety  
PARTNERS  WeSociety, Foundation LOCAL, Schools  
FINANCE (POSSIBLE)  Program WeSociety  
STATUS  New  
RESULT  Short-term (2017)  
RELATED  

6 INTEGRATION TOURS

Talks and events aimed at encouraging cooperation and dialogue between the city government, citizens and other stakeholders (e.g. private sector, NGO’s). This action will make citizens aware of their own roles in society and how they can better contribute to city resilience. Talks will cover social and cultural integration issues and seek to break down barriers to effective dialogue.

Supports knowledge sharing, values alignment and education. These tours bring groups from different backgrounds and roles in society together to discuss different issues that are important for Dutch values. The program strengthens mutual understanding of differences in values and stresses what Dutch values stand for.

RESILIENCE VALUE

- Supports knowledge sharing, values alignment and education. These tours bring groups from different backgrounds and roles in society together to discuss different issues that are important for Dutch values. The program strengthens mutual understanding of differences in values and stresses what Dutch values stand for.

LENS  
SCALE  
OWNER  Municipality  
PARTNERS  Community Centres, Schools, Associations  
FINANCE (POSSIBLE)  Program WeSociety  
STATUS  In progress  
RESULT  Short-term (from 2016)  
RELATED  

RESILIENCE LAB: ACTIONS.
9 100 HOMES FOR ASYLUM SEEKERS

The Foundation Verre Bergen has purchased 100 homes for families seeking asylum in Rotterdam. This forms part of their New Home Rotterdam program’s ambition to teach asylum seekers Dutch, assist them to find employment and education and to feel comfortable in their homes and neighbourhoods. This action will be supported and will be connected to wider efforts because it is an excellent example of an initiative contributing to the resilience of Rotterdam. Housing for refugees – and migration more broadly – is an important urban resilience challenge. A number of CRO’s within the 100 Resilient Cities network have started a conversation on migration which may lead to a formal exchange. 100 Resilient Cities member cities actively involved in this conversation include: Montreal, Athens, NYC, Thessaloniki, Vejle, Paris, Amman, Ramallah and Byblos. Rotterdam will consider whether we can contribute to this exchange in the future.

RESILIENCE VALUE

- Supports and promotes an integrated and inclusive society.
- Supports knowledge sharing and networking.
- Demonstration of a private sector led initiative that contributes to a city wide goal.

LENS

SCALE

OWNER Foundation De Verre Bergen

PARTNERS Municipality, the Central Agency for the reception of Asylum Seekers, Refugees Southwest

FINANCE Foundation De Verre Bergen

STATUS In progress

RESULT Short-term (2017)

RELATED

8 BUILDING RESILIENCE THROUGH CULTURAL ACTIVITIES

The Foundation for Arts Education Rotterdam (SKVR) has a program which includes activities with a specific social objective. These activities are offered free of charge or at low rates. One example is to use music to increase resilience at a district level. These activities are developed with social partners in the city and public funds and are co–financed. Aimed at individual citizens the resilience office will work to integrate this activity into its broader resilience programme.

RESILIENCE VALUE

- Supports bottom – up community led initiatives and build cohesion.

LENS

SCALE

OWNER Foundation for Cultural Education

PARTNERS Social partners, Municipality, Funders

FINANCE Funds, Municipality, Social Partners

STATUS In progress

RESULT Short-term

RELATED
The City of Rotterdam is aiming to increase the proportion of highly educated residents in the city in the coming years. Part of making this happen is in understanding the needs of this group of people to stay in Rotterdam or to migrate to Rotterdam. The program ‘Strong Shoulders Strong City’ develops and promotes activities aimed at achieving this goal, and takes energy from a group of successful entrepreneurial Rotterdammers. The program consists of four action lines:

- Inventory of good practices: what makes this group of citizens want to live in Rotterdam?
- Removal of existing barriers.
- Development of new projects following the needs and initiatives from the community.
- Communication and promotional activities.

**RESILIENCE VALUE**

The citywide program Strong Shoulders – Strong City contributes directly to the resilience objective ‘vital citizens in a balanced society’. More highly educated people will strengthen existing networks and the resilience of the local community and economy. It also strengthens the resilience goal Network City since this group of people strengthen the potential for self-organization of the community.

**LENS**

- Program Strong Shoulders

**SCALE**

- District

**OWNER**

Program Strong Shoulders

**PARTNERS**

Municipality, District Committees, City Marketing

**FINANCE (POSSIBLE)**

Program Strong Shoulders, Partners

**STATUS**

In progress

**RESULT**

2016 – 2020

**RELATED ACTIONS**

10 VISION ON HOUSING (WOONVISIE)

The Woonyvisie is Rotterdam’s vision to become an attractive residential city. It promotes attractive living environments, and housing that is future proof. Woonyvisie creates a balance in housing for different groups of residents, improving housing quality. As such it has some cross over with the WE-society programme. The Woonyvisie is the basis for agreements with all housing corporations and offers a framework for city developers and for the policymakers for the housing of specific goal groups.

**RESILIENCE VALUE**

- The Woonyvisie is an important instrument to provide adequate housing for different groups in the city supporting the goals of a balanced society and creates inclusiveness.
- Supports Rotterdam’s brand and ‘pull’ as an attractive cosmopolitan city.

**LENS**

- Urban Planning Department

**SCALE**

- City

**OWNER**

Urban Planning Department

**PARTNERS**

Housing Corporations, District Committees

**FINANCE (POSSIBLE)**

Urban Planning Department, Housing Corporations

**STATUS**

New

**RESULT**

Short-term / Medium-term (2016/2020)

**RELATED**

11 PROMOTING CITIZEN COLLABORATION

Within the Strong Shoulders program – supported by field work and surveys – work has been undertaken to consider how high and low-skilled Rotterdammers could work together in effective and harmonious ways. As a result of this work a range of approaches (’how to’ guides) were developed. Some of the solutions are straightforward and simple whilst others require an intensive effort to seed more effective collaboration. This agenda needs to be developed and experiences learnt from other cities around the world, and specifically from with the 100 Resilient Cities network.

**RESILIENCE VALUE**

- Contributes to a better understanding of conditions that enhance social cohesion and therefore supports a balanced society and inclusiveness.
- Having different groups living in one neighbourhood enhances resourcefulness with more viewpoints and perspectives available to create ideas and solutions.
- Can draw on the 100 Resilient Cities network

**LENS**

- Program Strong Shoulders

**SCALE**

- District

**OWNER**

Program Strong Shoulders

**PARTNERS**

District Committees, Municipality / Urban Planning Department and Urban Maintenance

**FINANCE (POSSIBLE)**

Program Strong Shoulders, Municipality

**STATUS**

New

**RESULT**

Short-term (2016/2017)

**RELATED**

10 VISION ON HOUSING (WOONVISIE)
A transition to efficient and renewable energy requires – in addition to building-related efficiency measures – a supporting and flexible infrastructure. Moving this from ambition to reality is challenging and will require a clear roadmap (or strategy). This roadmap will outline options, costs and benefits and set out a preferred strategy. It will consider technology innovation, phasing, emissions and infrastructure flexibility. This action will support the development of a clean energy road map. It will outline what is possible in terms of a future clean energy mix (considering waste heat e.g. heat roundabout), developments in the port area and renewable energy potential from wind and solar, set out infrastructure implications relating to phasing, potential disruptions, cost and flexibility and address any issues around approvals, regulations, partnerships and funding. This is a flagship action for Rotterdam and we will collaborate on this with other cities in the 100 Resilient Cities network such as London and New York. We have existing energy related collaborations with London through the CELSIUS project.

RESILIENCE VALUE

The renewable energy infrastructure plan (REIP) will set out a roadmap for how Rotterdam can deliver on its clean energy transition. This will reduce our emissions, improve our energy security and ensure we are future proof. It is also a key area of resilience where we will collaborate with the Port authority and a range of other utility stakeholders and technology providers.

Rotterdam wants to be the front runner in the clean energy transition and support recent political agreements through COP21 in Paris. Rotterdam looks to London for knowledge sharing in this area; the two cities are already partners in the EU CELSIUS Smart Cities project. Rotterdam hopes to engage further in this topic through the 100 Resilient Cities network.

As an existing partner city for the CELSIUS project (comprising London, Rotterdam, Gothenburg, Cologne, Genoa), there are obvious synergies between the two cities in terms of focus on district heating infrastructure and also in their wider climate change agendas and targets. Both cities need to use their respective planning policies to promote renewable energy uptake and to support the roll out of infrastructure that can support a low carbon energy transition, whilst also investing in improving energy efficiency in their existing buildings.

100 Resilient Cities member cities involved: Rotterdam, London.

ACHIEVING OUR ENERGY TRANSITION – INSPIRATION FROM LONDON

Rotterdam wants to be the front runner in the clean energy transition and support recent political agreements through COP21 in Paris. Rotterdam looks to London for knowledge sharing in this area; the two cities are already partners in the EU CELSIUS Smart Cities project. Rotterdam hopes to engage further in this topic through the 100 Resilient Cities network.

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100 Resilient Cities member cities involved: Rotterdam, London.
The Rotterdam / Moerdijk chemical cluster is different from other Dutch chemical clusters because of its strong integration with the oil refining sector, utilities and energy suppliers. An action plan will be developed together with the private sector with the aim to reinforce the Rotterdam / Moerdijk industry cluster. The action plan will contain concrete and specific measures to ensure companies stay within the cluster, and to further reinforce collaboration and initiatives within the cluster. The cluster is expected to play an important role in the transition from a linear, fossil economy to a circular, bio–based economy (see Action ‘A transition from a fossil fuel to a bio–energy for our Port’).

RESILIENCE VALUE

The industrial port cluster is of fundamental economic importance for Rotterdam and the Netherlands. The survival of the industrial cluster is vital for the city port region and the Netherlands. This initiative also delivers benefits in terms of the clean energy transition and next economy, including 21st century skills. The action plan must safeguard the leading position of this cluster in Europe.

LENS

SCALE

OWNER
Port Authority, Port business community

PARTNERS
Most companies in the port area

FINANCE (POSSIBLE)
Port Authority, Ministry of Economic Affairs

STATUS
Under development

RESULT
Short-term / Medium-term

RELATED ACTIONS
In order to support the Government’s COP21 climate commitments Rotterdam is required to implement additional emissions saving measures. These include simple, cost-effective provision and installation of solar panels as well as the development of large solar parks, and switching a large portion of the municipal vehicle fleet to more efficient vehicles. The Rotterdam Climate Initiative (RCI) is also working in the port to reduce energy consumption, through: reuse of industrial waste heat, renewable energy generation (using wind, solar and biomass), promoting the use of LNG and hydrogen, and the capture, transport, reuse and storage of CO2 (carbon capture and storage). In rolling out these actions we will integrate resilience thinking to ensure the actions and activities contribute to the city resilience goals set out in this strategy document.

**RESILIENCE VALUE**

By building on the momentum and government support through the climate agreement developed following COP21, this programme of measures will seek to accelerate the energy transition in Rotterdam. It can also provide a platform to integrate resilience thinking into initiatives that already have political support.

**PARIS PLUS (SUSTAINABILITY PROGRAM)**

In order to support the Government’s COP21 climate commitments Rotterdam is required to implement additional emissions saving measures. These include simple, cost-effective provision and installation of solar panels as well as the development of large solar parks, and switching a large portion of the municipal vehicle fleet to more efficient vehicles. The Rotterdam Climate Initiative (RCI) is also working in the port to reduce energy consumption, through: reuse of industrial waste heat, renewable energy generation (using wind, solar and biomass), promoting the use of LNG and hydrogen, and the capture, transport, reuse and storage of CO2 (carbon capture and storage). In rolling out these actions we will integrate resilience thinking to ensure the actions and activities contribute to the city resilience goals set out in this strategy document.

**RESILIENCE VALUE**

By building on the momentum and government support through the climate agreement developed following COP21, this programme of measures will seek to accelerate the energy transition in Rotterdam. It can also provide a platform to integrate resilience thinking into initiatives that already have political support.
The Port Authority along with the Dutch Research Institute for Transitions (DRIFT) is working to establish a bio-based port forum. In addition to established parties in the port, a number of smaller frontrunner parties and external port observers will be included in this, including organizations from the industries of food, logistics and agriculture and recycling. This forum will give rise to a "transition agenda" for the future of the bio-based port. The transition agenda will set out:

- A vision and guiding principles for the bio-based harbour
- Goals and goals
- Practical steps / actions and initiatives to realise the vision
- Commitment by the key parties for immediate follow-up on the identified actions.

The resilience office will support the development of this forum and supporting agenda and will work to ensure the plan and actions respond to Rotterdam’s resilience challenges.

## RESILIENCE VALUE

Making a transition from a fossil fuel-based energy system to a bio-based economy in the Rotterdam will be a challenge, but will build resilience through by creating supply chain networks, reducing emissions and enhancing the area’s brand. A shift towards a sharing economy also supports agendas around the next economy, skills development and smart technology approaches. Taking a lead on this agenda should also give Rotterdam a competitive advantage and allow knowledge share with a number of other port or post-industrial cities. Rotterdam has explored collaboration potential with Glasgow and Bristol through the 100 Resilient Cities network. The forum will be inclusive of a wide range of stakeholders and will build relationships which could lead to collaboration in other areas, for example on the broader clean energy transition (wind and solar) or on climate adaptation.

### LENS

### SCALE

### OWNER
Port Authority

### PARTNERS
Drift, stakeholders

### FINANCE (POSSIBLE)
Port Authority

### STATUS
In progress

### RESULT
Medium-term / Long-term

### RELATED ACTIONS

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**PORT TRANSITION FOCUSED ON BIO-BASED ECONOMY**

The Port Authority along with the Dutch Research Institute for Transitions (DRIFT) is working to establish a bio-based port forum. In addition to established parties in the port, a number of smaller frontrunner parties and external port observers will be included in this, including organizations from the industries of food, logistics and agriculture and recycling. This forum will give rise to a "transition agenda" for the future of the bio-based port. The transition agenda will set out:

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The resilience office will support the development of this forum and supporting agenda and will work to ensure the plan and actions respond to Rotterdam’s resilience challenges.
INTEGRAL IMPLEMENTATION OF CYBER RESILIENCE BLOCKS FOR CITY AND PORT

This action will support the further development and implementation of the cyber resilience building blocks. These building blocks – for city and port – have been developed in collaboration between the City of Rotterdam and Microsoft and when taken together form a sub strategy on cyber resilience. Since the Port and City are two different entities – each with specific issues and goal groups – they will be dealt with primarily individually but in a connected way whenever possible.

RESILIENCE VALUE

The implementation of the cyber building blocks for port and city contribute directly to the development of Rotterdam cyberport city. This action is considered as integral to our resilience strategy; smart technology will help to connect many of our initiatives. These underpinning ICT systems need to remain safe and resilient in the face of cyber threats.

LENS

SCALE

OWNER
Cyber Resilient Platform Rotterdam, Business partners connected to the Port Resilience officer, Mayor, Chief Prosecutor, Chief of Police

PARTNERS
Municipality, partners, Businesses

FINANCE (POSSIBLE)
Municipality, port, Businesses, partners, EU

STATUS
New

RESULT
Short-term / Medium-term

RELATED ACTIONS
1 3 4 12 13 14 15 16 17 44
RESILIENCE LAB: ACTIONS.

RELATED ACTIONS

12 CYBER BUILDING BLOCKS: PORT

A Port Cyber Resilience Working Group has been established to develop and implement the key building blocks, as follows:
- Establish a Cyber Co-op to promote cyber products and services, to share learning and encourage private sector engagement
- Set up a Cyber Notification Desk to allow real-time cyber incident notification
- Establish a Cyber Threat Intelligence Watch to monitor cyber threat signals – actual cyber threats and trends
- Put in place a Cyber Response Team as the first response team with the objective to de-escalate cyber incidents
- Establish a Cyber Resilience Community of Practice
- Begin structured communication about cyber threats and incidents

RESILIENCE VALUE
- Creates an approach to detect and deal with the vulnerabilities in the cyber systems that are vital to the functioning of the port and its industries
- Supports knowledge sharing and networking
- Embeds resilience thinking across all port related activities

LENSE  
SCALE
OWNER Cyber Resilience Officer of the port
PARTNERS Deltalings, port, Businesses, municipality
FINANCE (POSSIBLE) Port, municipality, Businesses, EU
STATUS New
RESULT Short-term / Medium-term
RELATED

13 CYBER BUILDING BLOCKS: CITY

For the city a Cyber Resilience Platform will be established to coordinate and start-up actions to implement the cyber resilience building blocks. These actions include:
- Establishing the Cyber Resilience platform
- Developing a programme around Cyber Awareness
- Developing a learning programme around Cyber Competences.
- Establishing a Cyber Co-op to promote cyber products and services, to share learning and encourage private sector engagement
- Developing codes of practice and requirements for cyber products and services
- Collecting learning on Cyber Disruption
- Establishing a Cyber Resilience Community of Practice

RESILIENCE VALUE
- Creates an approach to detect and deal with the vulnerabilities in the cyber systems that are vital to the functioning of the city and stakeholders including the citizens.
- Supports knowledge sharing and networking
- Embeds resilience thinking across all city related activities.

LENSE  
SCALE
OWNER Cyber Resilience Platform
PARTNERS Businesses, Welfare Organizations, municipality, citizens
FINANCE (POSSIBLE) Port, municipality, Businesses, EU
STATUS New
RESULT Short-term / Medium-term
RELATED

14 CYBER COLLABORATION – LONDON AND SINGAPORE

Cyber resilience is a key focus in London and Singapore. This action will further explore opportunities for city to city knowledge transfer within the cyber field, drawing on the 100 Resilient Cities city network and specialists from amongst the 100 Resilient Cities platform partners. Microsoft has already provided support to Rotterdam in relation to cyber security.

RESILIENCE VALUE
- Supports knowledge sharing, innovation and networking
- Creates efficiency through resource and knowledge sharing

LENSE  
SCALE
OWNER Municipality
PARTNERS Municipality London, municipality Singapore
FINANCE (POSSIBLE) 100 RC, City, port
STATUS New
RESULT Short-term
RELATED

COLLABORATING ON CYBER SECURITY – LEARNING FROM LONDON AND SINGAPORE, AND USING 100 RESILIENT CITIES PLATFORM PARTNERS.

Cyber security has been identified as a key resilience challenge for Rotterdam. We have already collaborated with Microsoft – a 100 Resilient Cities platform partner – to consider actions that we can take to increase cyber resilience. We now want to exchange knowledge with other 100 Resilient Cities cities. London and Singapore have been identified as cities that may be able to support us in this area. We have agreed an action within our resilience strategy to exchange knowledge and insights on cyber security with London and Singapore.

100 Resilient Cities member cities involved:
Rotterdam, London, Singapore. Platform partners: Microsoft
15 **CYBER RESILIENCE OF INDUSTRIAL AUTOMATION**

The cyber resilience of all automated infrastructure that is run by the municipality will be evaluated against vulnerabilities to identify cyber threats. Once the threats are understood an action plan will be developed to mitigate risks.

**RESILIENCE VALUE**

- Ensures that cyber resiliency is considered specifically as an important condition to keep the municipal infrastructure running.

**LENS**

**SCALE**

**OWNER** Municipality / Urban Planning Department

**PARTNERS** Maintenance Departments

**FINANCE** Municipality / Urban Planning Department, Partners

**STATUS** New

**RESULT** Short-term

**RELATED**

16 **CYBER RESILIENCE OF SMART CITY INITIATIVES**

Rotterdam is developing a Smart City program and already carrying out different smart initiatives. The cyber resilience of the Rotterdam Smart City Programme initiative will be assessed and related to the development of the cyber resilience building blocks.

**RESILIENCE VALUE**

- Ensures that as new smart technology is deployed for efficiency and sustainability benefits the cyber risk and resilience issues are thoroughly considered; an important element in developing a smart city programme.

**LENS**

**SCALE**

**OWNER** Municipality / Urban Planning Department

**PARTNERS** Municipality and Businesses

**FINANCE** Municipality / Urban Planning Department

**STATUS** New

**RESULT** Short-term

**RELATED**

17 **CYBER COLLABORATION – METROPOLITAN AREA**

This action will facilitate collaboration across the Rotterdam – The Hague Metropolitan Area level, specifically sharing knowledge and resources on the topic of cyber and water management. Research findings and/or actions identified through this collaboration will be integrated within the building blocks of the city and port cyber resilience strategies. Opportunities will be sought to jointly secure grant funding, such as from the EU. We will seek to open up communication channels between our metropolitan collaborators and with our international collaborators (see Action Cyber collaboration – London and Singapore).

**RESILIENCE VALUE**

- Supports knowledge sharing and networking across the region and internationally.

**LENS**

**SCALE**

**OWNER** Municipality

**PARTNERS** Universities, Universities of Applied Science, Innovation Quarter, Metropolitan area Rotterdam – The Hague

**FINANCE** Partners and MRDH

**STATUS** New

**RESULT** Medium-term

**RELATED**
EMBEDDING CLIMATE ADAPTATION INTO THE URBAN FABRIC OF THE CITY

This action will develop and enhance existing programmes aiming to prepare the city for the impacts of climate change. Measures included within this action are in line with projects already completed in Rotterdam such as Benthemplein, and will be designed to support community learning – specifically in respect of understanding the urgency of the need to take action on climate change. Measures will range in their type and scale but we envisage:

- A large number small projects that can be led by citizens and businesses under the motto "many small actions; make a big difference"
- A small selection of key projects specifically designed to inspire and create publicity and profile
- Effective large-scale projects that run quietly in the background to deepen understanding, support research and tools developed (e.g. rigorous cost / benefit analysis).

We specially want to seed a new way of thinking. To not see rain water as a problem or a threat but to recognise it as a valuable raw material that should be utilized as much as possible locally. We want to move further towards fully integrated water cycle management – integrating the water cycle into our urban environment including collection (attenuation), treatment and conveyance. We will seek to related our climate change projects to other resilience actions and to publicise the synergies.

RESILIENCE VALUE

All climate change projects and initiatives will consider how they can contribute to the further development of a liveable city; promote social cohesion whilst also increasing Rotterdam’s resilience to water stresses and shocks. It especially appeals to inclusiveness; involving property owners to participate and integration to use and enrich ongoing developments with water management actions.

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<tr>
<td>SCALE</td>
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<tr>
<td>OWNER</td>
<td>Municipality / Urban Maintenance Department</td>
</tr>
<tr>
<td>PARTNERS</td>
<td>Water boards, county, housing associations, citizens, Market parties. Parties may differ for each initiative.</td>
</tr>
<tr>
<td>FINANCE (POSSIBLE)</td>
<td>Municipality, partners</td>
</tr>
<tr>
<td>STATUS</td>
<td>Under development</td>
</tr>
<tr>
<td>RESULT</td>
<td>Short-term / Medium-term / Long-term</td>
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</tbody>
</table>

RELATED ACTIONS
FLOOD 2.0: DEVELOPING A PLAN FOR MAKING OUR WATER MANAGEMENT SYSTEM CYBER PROOF

A TNO study into the vulnerability of the wastewater and surface water systems in Rotterdam indicates that these systems are generally robust. Climate change and increasing digitalization and automation of the systems will test this, and will likely expose more cascading impacts and vulnerabilities, specifically to ICT disruptions. The TNO study was carried out from the resilience perspective, with particular consideration for ICT, security and emergency response. Operational specialists and policy-oriented professionals from both municipal and water authorities collaborated on the study. A quick scan of risks for critical functions of the water systems (undertaken for the study) highlighted a greater need for tactical awareness regarding the cyber risks of Industrial Control Systems. A deeper assessment and action plan will be developed responding to this risk.

RESILIENCE VALUE

By increasing automation of the City’s water systems it is important to also consider the cyber risks of ICT systems as well as cascading impacts if there is a technology malfunction. Climate cyber resilience and critical infrastructure are closely related; we expect some learning from this action to support other actions relating to critical infrastructure asset management.
Feijenoord is considered to be an area vulnerable to flooding from the river and is also undergoing urban development. In order to balance these – at times – conflicting characteristics it is important to understand the level of flood risk, the implications of this and also the opportunities that may be presented to integrate flood management strategies into the urban design response.

Agreements between the developers and other parties which outline the distribution of costs and benefits to contribute to the design and development of integrated and sustainable development of the district have initially gained support. This could involve the municipality and water board bearing the costs of the construction and management of a flood defence with private parties contributing a proportion to the investment costs in return for direct benefits in terms of reduced flood risk and improved socio-economic conditions within the district. In order to capitalize on these opportunities, it is necessary to work with all stakeholders in the flood-prone areas to develop a water safety plan in conjunction with the development masterplan. The resilience office will support this and help upscale lessons learned from this development.

**RESILIENCE VALUE**

There are opportunities to respond to risk (flooding) in an integrated and inclusive way as part of a development plan and vision. This can also be supported by an alternative funding model where investors can accrue benefit due to reduced flood risk, reduced insurance and higher development values. This approach can serve as a model for integrated climate-resilient waterfront development elsewhere in the Netherlands and internationally.

**LENS**

SCALE

OWNER

Municipality, Water Board

PARTNERS

Housing Corporations, Residents, Property Owners, Developers, Utility Companies

FINANCE (POSSIBLE)

Municipality, partners

STATUS

New

RESULT

Short-term / Medium-term

RELATED ACTIONS

19 20 21 23
RESILIENCE LAB: ACTIONS

19 PLAN FOR CLIMATE RESILIENT CRITICAL INFRASTRUCTURE

An important part of the Delta Program is “spatial adaptation”, such as spatial adjustments to the existing city within the dykes. An important part of this is critical infrastructure. A new spatial plan will be developed based on regional analysis of critical infrastructure resilience to climate change.

RESILIENCE VALUE

• Supports preparedness and embeds considerations for evacuation into all aspects of the city and port.

LENSSCALEOWNERPARTNERSFINANCESTATUSRESULTRELATED

20 VERTICAL EVACUATION PLANNING

An important part of the National Delta Program is the concept of “multi-layer safety”. This involves prevention (1st layer) spatial adaptation (2nd layer) and evacuation (3rd layer). The evacuation layer has yet to be fully planned and developed. The pilot study “crisis management during floods” found that vertical evacuation needs proper consideration as a serious option for layer 3. Specifically, consideration should be given to the fact that the highest areas are located along the river, outside the dykes and the entire port area. We will develop a vertical evacuation plan as part of our resilience strategy implementation.

RESILIENCE VALUE

• Supports preparedness and embeds considerations for evacuation into all aspects of the city and port.

LENSSCALEOWNERPARTNERSFINANCESTATUSRESULTRELATED

21 CLIMATE RESILIENT WATERFRONT AREAS

In 2014 the National Delta Programme was established. In Rotterdam, as part of the Rotterdam Adaptation Strategy, there are a diverse range of pilot studies which focus on climate resilient development in the wider region, looking at both urban and industrial areas. Some include Pilot Noorderland, Pilot Boelek, Pilot Feijenoord, Pilot Crisis management and flooding. The results of these pilots will be collated and translated into overall policy for the area outside the dykes in Rotterdam.

RESILIENCE VALUE

• Supports knowledge sharing and networking.
• Development of new strategies for flood prone areas.
• Embeds climate resilient thinking into all areas of Rotterdam.

LENSSCALEOWNERPARTNERSFINANCESTATUSRESULTRELATED

22 ROTTERDAM–THE HAGUE EMERGENCY AIRPORT (RHEA)

The Rotterdam–The Hague Emergency Airport (RHEA) will create an economic cluster focusing on clean technology and water security in an airport setting. As a ‘safe haven’, the site can be an excellent example of water security in The Netherlands (demonstrating multi-layer security: 3rd Layer). We will establish a knowledge and training centre for service providers, business, research, NGOs and aid organisations that will tap into RHEA companies and scientists specialized in clean technology products in the region.

RESILIENCE VALUE

This centre will serve as a demonstrator for Rotterdam. It will achieve a critical mass of organisations and institutes that will be a catalyst for innovation and research. The cluster will support resilience goals around water, energy transitions and next economy / 21st century skills. It will provide a safe area in case of regional emergencies and a base from which support can be delivered to disaster-prone areas around the world.

LENS

SCALE

OWNER Rotterdam The Hague Airport, Schiphol Real Estate, Municipality of Rotterdam, Municipality of The Hague, Metropolitan Region Rotterdam–The Hague, Ministry of Infrastructure and Environment, Ministry of Economic Affairs, Clean Tech Delta, Deltares, Sweco, Innovation Quarter, UNESCO-IHE, TU Delft

PARTNERS Rotterdam The Hague Airport, Schiphol Real Estate, Municipality of Rotterdam, Municipality of The Hague, Metropolitan Region Rotterdam–The Hague, Ministry of Infrastructure and Environment, Ministry of Economic Affairs, Clean Tech Delta, Deltares, Sweco, Innovation Quarter, UNESCO-IHE, TU Delft

FINANCE Partners

STATUS New

RESULT Medium-term

RELATED

23 FLOATING CITY

The municipality of Rotterdam – through their Climate Proof and Adaptation Strategy – have stated an ambition to explore opportunities presented by building floating developments. The Floating Pavilion was our first move. This was followed by floating houses in the Nassau Harbour, Experimental Zone Aqua Dock and innovative designs for a floating farm and water treatment. Upscaling of these approaches and bringing them into the mainstream is our next step and is an action we will take forward as part of implementing our resilience strategy.

RESILIENCE VALUE

• Supports innovation in climate resilient building and infrastructure provision
• Raises awareness of climate risks

LENS

SCALE

OWNER Municipality

PARTNERS Resilient Delta Cities (RDC)

FINANCE Municipality, Private Partners

STATUS Under development

RESULT Medium-term / Long-term

RELATED

TWINNING NEW ORLEANS AND ROTTERDAM – WATERMANAGEMENT

New Orleans (NOLA) and Rotterdam have been collaborating since 2008, specifically in relation to water management. After hurricane Katrina Dutch experts assisted NOLA by hosting the “Dutch Dialogues”. Learning from this dialogue contributed to the development of NOLA’s Integrated Water Management Plan. Now NOLA participates in the Connecting Delta Cities network and the two cities are further linked by their participation in the 100 Resilient Cities programme. The two cities have both benefited from earlier knowledge sharing and are committed to more collaboration in the future. Future efforts will be directed towards climate resilience, social resilience and the development of business and knowledge.
The subsurface is required for routing multiple infrastructure types and numerous agencies have an interest in how the subsurface is managed. The municipality plays an important role in this management, but there are multiple network providers which operate independently of each other. There is a need for greater organisation and cooperation, especially in times of emergency when a disruption to one type of critical infrastructure can have cascading impacts across infrastructure networks. There is a greater need to ensure that the providers coordinate approaches and share experiences and knowledge. This action seeks to incorporate resilience into the agenda at a strategic level as well as on to the existing platforms for infrastructure / utility providers.

**RESILIENCE VALUE**

This action will facilitate dialogue between different network operators, allowing them to verify their resilience and eventually increase the resilience of the overall system of critical infrastructure. Communication regarding resilience at operational and strategic levels will strengthen and broaden relationships between stakeholders which will lead to benefits in our other resilience goal areas (e.g. energy transition).

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<thead>
<tr>
<th>LENS</th>
<th>SCALE</th>
<th>OWNER</th>
<th>PARTNERS</th>
<th>FINANCE (POSSIBLE)</th>
<th>STATUS</th>
<th>RESULT</th>
<th>RELATED ACTIONS</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Municipality</td>
<td>Stedin, Evides and other Infra providers</td>
<td>To be determined</td>
<td>Under development</td>
<td>Short-term / Medium-term</td>
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DEVELOPING POLICY TO RAISE THE IMPORTANCE OF SUBSURFACE IN PLANNING AND PROJECTS

Consideration and understanding of both above and below ground will allow the city to better realise its ambitions for densification, greening and water storage. Once spatial planning is comprehensive and inclusive, there is more room for flexibility and ingenuity. There is a need to better consider above and below ground development in an integrated manner as currently when making spatial plans for the city there is currently too little consideration given to the subsurface infrastructure. Developing policies goaled at the subsurface planning and management is an integral part of spatial development and allows for appropriate corridor protection and optimal space use. These policies will be developed as an action as part of the implementation of this resilience strategy.

RESILIENCE VALUE

A shared vision and policy for ‘underground in Rotterdam’ will raise awareness of risks and opportunities of the underground systems to both urban planners and infrastructure managers. It will support better planning and asset management and therefore help improve resilience.
24 ANALYTICAL RESEARCH ON INFRASTRUCTURE AND FEATURES IN THE SUBSURFACE

Gaining a better understanding of interdependencies and cascading effects as well as insight into the most fragile assets of the critical underground networks will allow opportunities for increasing resilience to be identified. This will require a full assessment and investigation of the existing networks in Rotterdam. This assessment will be taken forward as an action associated with the implementation of this resilience strategy.

RESILIENCE VALUE
- Embeds resilience thinking across all activities related to critical underground infrastructure.
- Supports knowledge sharing and networking.
- Helps to tease out synergies between critical infrastructure and other resilience goals.

LENS
SCALE
OWNER Municipality
PARTNERS Resilient Delta Cities (RDC), Private parties
FINANCE (POSSIBLE) Municipality, Stakeholders
STATUS New
RESULT Short-term / Medium-term
RELATED

25 QUICK SCAN OF SELF-RELIANCE

This action will provide a scan of the extent to which residents of Rotterdam are or can be self-reliant in terms of disruptions to critical infrastructure (long term power failures, heating, drinking water supply, etc).

RESILIENCE VALUE
- Supports greater understanding of residual vulnerabilities from infrastructure disruptions.
- Provides context on community and business resilience activities and investment.
- Supports understanding of the role government can play in providing back up services during emergencies.

LENS
SCALE
OWNER Municipality / Urban Maintenance Department and Urban Planning Department
PARTNERS Regional Safety Board (VRR)
FINANCE (POSSIBLE) Municipality, Region
STATUS New
RESULT Medium-term
RELATED

26 COST BENEFIT ANALYSIS OF INFRASTRUCTURE DECISION MAKING

Generally, risk management and spatial planning do not consider the costs and benefits of development in the longer term (i.e. the full life cycle considerations), but this can support effective decision making and help make the case for investment in redundancy. This is particularly prevalent in the context of underground critical infrastructure. The action will seek to determine how through cost benefit analysis can support infrastructure decision making, including for example, approaches to take account of the value of the subsurface space taken up by the infrastructure.

RESILIENCE VALUE
- Embeds resilience thinking and proper (lifecycle) cost benefit analysis into critical underground infrastructure decision making and delivery.

LENS
SCALE
OWNER Municipality
PARTNERS Project developers, area developers
FINANCE (POSSIBLE) Municipality
STATUS New
RESULT Medium-term
RELATED

27 THE DEVELOPMENT AND IMPLEMENTATION OF ASSET MANAGEMENT FOR OUR UNDERGROUND INFRASTRUCTURE

The municipality of Rotterdam’s asset management team used to maintain and manage all assets in public spaces as well as manage a risk register. This included for items such as bridges and quay walls and also green spaces and lighting. Asset management not only considers the costs and current status of the assets themselves but also the potential risks that the failure of the assets could have on the functioning of the city. By mapping the risks, decisions can be made as to what measures should and should not be performed based on a balance of performance, risk and cost. Smart investments now can often deliver savings in the future. This action will develop protocols for the asset management of underground infrastructure, intended to support decision making in respect of maintenance and replacement.

RESILIENCE VALUE
- Embeds resilience thinking into the management of current assets as well as future planned and developed.
- Supports knowledge sharing, specifically of infrastructure risks amongst infrastructure providers and developers.

LENS
SCALE
OWNER Municipality, Urban Maintenance Department
PARTNERS Urban Maintenance Department
FINANCE (POSSIBLE) Municipality, Urban Maintenance Department
STATUS Under development
RESULT Medium-term
RELATED
SUBSURFACE INVESTMENT PRIORITIES FOR THE STREET OF THE FUTURE

Rotterdam’s subsurface environment is getting overcrowded, in some areas this is a limitation on new development. There are a growing number of disruption incidents as a result of still insufficiently subsurface mapping and accidental excavation of critical infrastructure, and co-ordination and dialogue between the various utility companies needs to be improved. The city is improving our old degraded infrastructure (e.g. gas networks and around 40km of sewer per year) whilst at the same time investing in new infrastructure that is fit for the future, for example, to support a clean energy transition and the next economy (digital).

As a result of the underground upgrades, investments now could deliver long term pay back though increased flexibility and redundancy to allow greater surface level building development. Ensure appropriate investment relies in part in having a future vision. This action will seek to conceive the street of the future. We imagine new multi-utility service corridors, improved subsurface 3D mapping, enhanced co-ordination and dialogue and thorough market and citizen engagement will help us to determine now what infrastructure investments are needed to ensure sufficient flexibility for the street of the future.

RESILIENCE VALUE

Engagement with utilities will help to better understand the infrastructure required to support key city transitions (e.g. energy and smart city). The physical works will ultimately facilitate development, grow the economy and ensure new infrastructure investments consider resilience. Secondary benefits will come from business and citizen engagement (i.e. participatory design process) and through enhancing knowledge around the impacts of climate change on the subsurface environment.

LENS

SCALE

OWNER
Municipality / Urban Maintenance Department

PARTNERS
Residents, Stedin, Evides, Businesses

FINANCE (POSSIBLE)
To be Determined

STATUS
Under development

RESULT
Medium-term

RELATED ACTIONS

STREET OF THE FUTURE
Rotterdam has already developed a suite of tools to respond to the needs and aspirations of its citizens. The city uses this suite of tools, such as small grants for Residents Initiatives, CityLab010 for innovative actions, Opzoomeren for street activities, the “Right to Challenge” and Citizens Jury, Referendum and Digital opinion research to engage and support community and private sector grass roots initiatives in the city.

The city recognises that in order to further the engagement and mobilization of citizens there is a need for a shift from top–down city level and framework approaches to bottom–up interests and initiatives at the citizen and neighbourhood level. The municipality is continuously seeking to optimise the value gained from its processes and activities and understands that to derive most value from these tools it needs to improve its back office processes around initiative selection, management and funding to provide a smoother interaction for the citizen.

**RESILIENCE VALUE**

The ability for self–organization is a key element for a resilient city. This action will seek to build engagement at citizen and community level by enhancing the user experience associated with existing city funding and support initiatives. Providing greater incentive for citizens to come forward with solutions they can implement at local level can strengthen social cohesion and support a number of our resilience goals. It is expected community initiatives will include local energy production, small–scale water measures and social entrepreneurship.

**LENS**

**SCALE**

**OWNER**

Municipality

**PARTNERS**

Bottom line this action belongs to the Municipality, but it will involve other stakeholders who themselves also need to change. For example housing corporations and infrastructure providers

**FINANCE (POSSIBLE)**

Municipality, District Committees

**STATUS**

Under development

**RESULT**

Short–term

**RELATED ACTIONS**

**ROTTERDAM NETWORK  — TRULY OUR CITY**
CREATING NETWORKS OF GOVERNMENT, CITIZENS, INSTITUTIONS, MARKET AND KNOWLEDGE

There is a changing role for the government, instead of a central guiding policy role, the role is increasingly shifting to frameworks, facilitation and enabling. The community and the market have increasing ambition to tackle social issues and therefore also expect to get more space and support from the government to do so. It is important that the market, community and government facilitate each other and find an effective method for cooperation and collaboration. That is the basis for a resilient system of governance for Rotterdam. Make it happen: the motto for the city encompasses this. This action is intended to ensure that we become more aware, that we recognise the importance of networks and platforms for engagement and that we share our knowledge around key initiatives.

RESILIENCE VALUE

This action contributes to building relationships between citizens, companies and institutions and can deliver benefits across most of the identified resilience goals.

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<th>LENS</th>
<th>SCALE</th>
<th>OWNER</th>
<th>PARTNERS</th>
<th>FINANCE (POSSIBLE)</th>
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<td></td>
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<td>Rabobank, KPMG, EY, Eneco, Royal Haskoning DHV, Van Oord, AVR, ABN AMRO, Robeco, First Dutch, TBI, KPN, TNO, Vopak, VTTI, KLM</td>
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<td>In progress</td>
<td>Short-term</td>
<td>28 29 30</td>
</tr>
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</table>

RESILIENCE LAB: ACTIONS.

28 WORLD EXPO 2025

World Expo 2025 is an initiative led by a group of Rotterdam entrepreneurs. Their plan includes a ten-year economic program that culminates during the Exhibition in 2025. The Expo will last six months and attract an estimated twenty million visitors. Only the Dutch Government can put Rotterdam forward as a candidate for the Expo; a decision has yet to be taken on this. The municipality has approved the plan and agrees that the spatial integration contributes to the necessary infrastructure upgrades. Additionally, proposed is an ‘Expo Works’ authority, which is a special program aimed at creating jobs for young people in Rotterdam. The theme of the World Expo 2025 would be ‘Rotterdam Changing Currents’, with one of the subthemes titled ‘Deltas in Transition’.

RESILIENCE VALUE

- Supports inward investment in development and infrastructure and can leave a legacy (see Lisbon, Milan etc).
- Embeds resilience thinking to wide range of activities.

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<th>LENS</th>
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<th>OWNER</th>
<th>PARTNERS</th>
<th>FINANCE (POSSIBLE)</th>
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<th>RESULT</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Municipality</td>
<td>Rotterdam entrepreneurs</td>
<td>Partners, Central Government</td>
<td>New</td>
<td>Medium-term / Long-term</td>
<td>28 29 30</td>
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</table>
The city of Rotterdam is constantly looking for ways to connect urban interests and the interests of the individual citizen, streets and neighbourhoods. Rotterdam has 14 regions and 42 districts.

The City of Rotterdam recently started working with the district controlled planning program. The aim is to enhance the organization and effectiveness of municipal district level activities, and to promote full involvement from citizens and government in planning and running these districts. Financing and accounting systems will be adapted to allow for more decentralized governance in the future and special district officials are appointed to monitor what is happening in the neighbourhood and to align the service provision for the central municipal departments (clusters).

NEIGHBOURHOOD ORIENTED GOVERNANCE

The city of Rotterdam is constantly looking for ways to connect urban interests and the interests of the individual citizen, streets and neighbourhoods. Rotterdam has 14 regions and 42 districts. The City of Rotterdam recently started working with the district controlled planning program. The aim is to enhance the organization and effectiveness of municipal district level activities, and to promote full involvement from citizens and government in planning and running these districts. Financing and accounting systems will be adapted to allow for more decentralized governance in the future and special district officials are appointed to monitor what is happening in the neighbourhood and to align the service provision for the central municipal departments (clusters).

The neighbourhood action plans are the results and activities at the district level. Citizens are closely involved and their satisfaction and engagement in the process are monitored.

RESILIENCE VALUE

- Supports knowledge sharing, innovation and networking and builds the profile of the Rotterdam Resilience Programme.

INTERNATIONAL ADVISORY BOARD AND RESILIENCE

The International Advisory Board Rotterdam (IAB) is a unique advisory council made up of international leaders in academia and the private and public sectors. The IAB meets once every two years to advise the Municipal Executive of Rotterdam on economic and other aspects of urban development. The IAB serves as a sounding board for the Municipal Executive on issues related to international economic developments. The IAB is currently chaired by Jan Peter Balkenende, former prime minister of the Netherlands. Rotterdam with partners, we will explore the possibilities to address Resilience as main topic for the IAB 2017.

RESILIENCE VALUE

- Supports knowledge sharing, innovation and networking and builds the profile of the Rotterdam Resilience Programme.

CITY MAKERS CONGRESS

An annual congress in which a wide range of interested parties from the city, such as developers, housing corporations, design agencies and interest groups collaborate on design issues in the city. The aim is that through city labs issues are addressed and solutions are devised. The resilience office will support this congress and bring resilience to the table for discussion.

RESILIENCE VALUE

- Supports bottom up – community led initiatives and builds cohesion.
- Embeds resilience thinking to wide range of activities and stakeholders
- Supports knowledge sharing, innovation and networking.
32 GOVERNANCE LAB EUR

The City of Rotterdam together with the Erasmus University will start a Governance Lab, a joint initiative to come through design research to strengthen the organizational capacity of the city. This initiative is organized in line with the Rotterdam Resilience Strategy and is intended for use by design and action research to implement the city’s vision of resilience. Many elements of the resilience strategy relate to the mobilization and utilization of a self-organizing, able society, and the market increasing the resilience of the city. A joint Governance Lab should make it possible to bring together the knowledge questions from Rotterdam and the research interests of the EUR and matching. It is important that the municipality combines knowledge questions and invests in the lab, especially as the university is looking towards current research programs in space, to capitalise on this knowledge. Ultimately, it comes to designing research: the translation of scientific theory and empirical research into useful concepts and designs for the practice of the city (via experimental, designing and action research).

33 DELFSHAVEN CORPORATION

A new type of control and participation at the district level, Delfshaven Cooperative began in 2015 as a foundation; working towards a cooperative where likeminded committed people could work together for Bospolder/Tussendijken. By bringing together large companies and institutions with local residents initiatives can create benefits for all parties involved. The goal is to increase the performance opportunities of the place and for its people in the long term. The Delfshaven Cooperative is an innovation in working and should be monitored in order to draw lessons to be shared with other districts.

RESILIENCE VALUE

- Supports bottom up – community led initiatives and builds cohesion.
- Embeds resilience thinking.
- Supports knowledge sharing and networking.
34 DEVELOPMENT OPEN DATA PLATFORM

Rotterdam has developed an online data log www.rotterdamopendata.nl. From this site it is possible for anyone to open datasets regardless of the content and conditionally use it. Through active sharing of data it is expected that there will be increased economic and innovation activities as well as new forms of cooperation to better develop the economy and Rotterdam as a smart city. The site also encourages greater participation and self-reliance. Although Rotterdam is among one of the frontrunners in Europe, the municipality still wants to further increase close cooperation between the government, citizens, businesses and knowledge institutions in the city and wider region, moving to a relationship whereby these parties can freely share ideas and datasets (open data). This action will ensure the ongoing development and dissemination of learning from the open data portal.

RESILIENCE VALUE

- Supports bottom up – community led initiatives and builds cohesion.
- Supports knowledge sharing and networking

LENS

SCALE

OWNER Municipality

PARTNERS Citizens, Businesses

FINANCE (POSSIBLE) Partners

STATUS New

RESULT Short-term

RELATED

35 FURTHER DEVELOP DIGITAL INFORMATION AND INSPIRATION PLATFORM

Rotterdammers are bursting with great ideas for their city. The municipality works to harness this through various online platforms: www.rotterdam.nl/meedenkenendoen (to find inspiration and information) and www.citylab010.nl (to share innovative plans). It is however recognized that improvements to these could be made to increase customer-usability and consequently to inspire more people. This action will develop and enhance the existing citylab010 platform.

RESILIENCE VALUE

- Supports bottom up – community led initiatives and builds cohesion.
- Embeds resilience thinking
- Supports knowledge sharing and networking
- Builds profile

LENS

SCALE

OWNER Municipality

PARTNERS Citizens

FINANCE (POSSIBLE) To be determined

STATUS New

RESULT Short-term

RELATED
Rotterdam South is different from the rest of Rotterdam and the other three major cities in The Netherlands. Unfortunately, the socio-economic conditions are often worse; the average educational level is lower, there is a higher unemployment rate, the quality of housing is worse and its inhabitants are less optimistic about the future of the district. On top of this, there is a higher percentage of households receiving unemployment benefit in the south (9% in The Netherlands compared to 19% in Rotterdam south). Within Rotterdam south there are 7 focus areas which scored worse still on key socio-economic indicators than average even for Rotterdam south.

The National Programme Rotterdam South (NPRZ) aims to improve the lives of those living in Rotterdam South so that in 2030 it is doing at least as well as the rest of Rotterdam and the three other major cities in The Netherlands. NPRZ has three pillars: school, work and life. The NPRZ wants to ensure that people living in Rotterdam South reach a higher level of education, find more work, have improved housing, and have access to a better more attractive environment. These three pillars are closely connected and influence each other. It is a joint program on which the national government, City of Rotterdam, schools, welfare and housing associations and businesses collaborate. It focuses on the people to ensure that it meets the needs of residents. This is something that the Rotterdam Resilience Strategy Program considers important and supports.

**RESILIENCE VALUE**

NPRZ is a prime example of an integrated approach. The program covers an extensive and active group of stakeholders at different levels together in a collaborative approach to address a large societal problem. The integrated approach focuses on both social and physical (between school, work and environment) to ensure that the outcomes are robust. The program is essential for social resilience in Rotterdam. It strengthens social cohesion in Rotterdam South while also focusing on opportunities for training and work to increase the resilience of individuals.

<table>
<thead>
<tr>
<th>LENS</th>
<th>SCALE</th>
<th>OWNER</th>
<th>PARTNERS</th>
<th>FINANCE (POSSIBLE)</th>
<th>STATUS</th>
<th>RESULT</th>
<th>RELATED ACTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Government, Municipality, Schools and Hospitals, Housing Corporations and Businesses</td>
<td>Municipality, Central Government, Housing Corporation</td>
<td>Under development</td>
<td>Short-term</td>
<td></td>
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</tbody>
</table>
The metropolitan region of Rotterdam – The Hague is working on the development of a Roadmap Next Economy (RNE). There are global economic and technological transitions that require investment projects in the region. The metropolitan region has mandated international economist and political advisor Jeremy Rifkin to the RNE. The RNE will include a strategy and implementation plan to maximize the opportunities presented by the “Next Economy”, including in the areas already identified; digitization of information, energy and mobility / logistics.

These three pillars are included in RNE connected to the major economic clusters in the region, crossovers between the pillars and economic cluster innovations are encouraged. There are established specific working groups for the pillars. Work and lessons learnt from RNE will be supported and integrated to other initiatives.

RESILIENCE VALUE

The integrated approach with numerous stakeholders used in the Roadmap to the Next Economy ensures that it is far reaching. There are concrete projects, results and commitments, which seek to enhance the ingenuity and flexibility of the region. This is necessary if the region is to cope with the exponential changes taking place globally.

ROADMAP TO THE NEXT ECONOMY

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The integrated approach with numerous stakeholders used in the Roadmap to the Next Economy ensures that it is far reaching. There are concrete projects, results and commitments, which seek to enhance the ingenuity and flexibility of the region. This is necessary if the region is to cope with the exponential changes taking place globally.
The aim here is to create a pleasant living environment around the Schouwburgplein for all users, which is also future proof. The square and surrounding area should not only support healthy and active lifestyles but also provide enjoyment for users. Sustainability is an integral component taking into account clean energy, recycling of materials, additional water storage and Smart Grid. This project on street level can function as a catalyst project comparable to the water square. This project will be developed and implemented in cooperation with a wide range of stakeholders, sharing ideas, knowledge and resources. We will connect this project to resilience goals and enrich and facilitate where possible to maximize the resilience dividend. With the Schouwburgplein Rotterdam participates in the international 7 Square Endeavour Initiative, together with 6 other world cities.

**RESILIENCE VALUE**
- Supports bottom up – community led initiatives and builds cohesion.
- Embeds resilience thinking in the areas development and provides opportunities for this to act as a catalyst for resilient thinking.
- Supports knowledge sharing and networking.

**LENS**
- Roof owners in the centre, such as the Municipality of Rotterdam, HOA’s and Housing Corporations
- Users and tenants in the city centre. Some multinational corporate companies have shown interest in this initiative (e.g. Akzo Nobel).

**SCALE**
- Rotterdam City Theatre

**OWNERS**
- Arcadis, De Doelen, Dura Vermeer, Eneco, Municipality of Rotterdam, TNO, Hoogheemraadschap Schieland & Krimpenerwaard (water board), Ministry of Infrastructure and Environment

**FINANCE**
- Subsidies, Real Estate Owners

**STATUS**
- New

**RESULT**
- Short-term / Medium-term

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Rotterdam was the first municipality in the Netherlands to successfully support green roofs, with currently more than 220,000m² of green roofs in Rotterdam. There is even an award winning festival, Rotterdam Rooftops Day 2015. A policy program implemented green roofs as part of the climate adaptation strategy and Rotterdam received a C40 Cities Award in Paris for its work in this area. Challenges for water, greening, renewable energy, air quality and a lack of space can be addressed through an integrated approach to the development of green roofs. Techniques for greening roofs have developed and can now effectively cater to multiuse roofs including urban farming, solar panels, water storage and even sports facilities. These spaces can contribute enormously to the sustainability and viability of the city centre. It contributes to a favourable climate for businesses, tourism and offers an attractive and healthy environment for young families and professionals. This action for a sustainable roofscape brings the enthusiasm of Rotterdam and the policy objectives together to publicize the many opportunities of large scale green roofs retrofit. We are going to double green roofs covering 1,000,000m² across our city centre.

**RESILIENCE VALUE**
- The program offers a distinct added value to Rotterdammers by encouraging a combination of integrated solutions such as solar panels above a green roof, for a higher return. In practice this means more water storage, increased permeability of the urban area, energy generation, greater ecological value, food production, cleaner air, health and social cohesion amongst other benefits. Adding value on this scale will be revolutionary for the city centre. Finally, the program can be deployed at short notice without major issues.

**LENS**
- Rotterdam City Theatre

**SCALE**
- Rotterdam

**OWNERS**
- Roof owners in the centre, such as the Municipality of Rotterdam, HOA’s and Housing Corporations

**PARTNERS**
- Users and tenants in the city centre. Some multinational corporate companies have shown interest in this initiative (e.g. Akzo Nobel).

**FINANCE**
- Subsidies, Real Estate Owners

**STATUS**
- New

**RESULT**
- Short-term

---

**RELATED ACTIONS**

1. **1 KM² SUSTAINABLE ROOFSCAPE CITY CENTRE**

2. **RESILIENCE LAB: ACTIONS.**

3. **36 SMART SCHOUWBURGPLEIN 7 SQUARE ENDEAVOUR**

The aim here is to create a pleasant living environment around the Schouwburgplein for all users, which is also future proof. The square and surrounding area should not only support healthy and active lifestyles but also provide enjoyment for users. Sustainability is an integral component taking into account clean energy, recycling of materials, additional water storage and Smart Grid. This project on street level can function as a catalyst project comparable to the water square. This project will be developed and implemented in cooperation with a wide range of stakeholders, sharing ideas, knowledge and resources. We will connect this project to resilience goals and enrich and facilitate where possible to maximize the resilience dividend. With the Schouwburgplein Rotterdam participates in the international 7 Square Endeavour Initiative, together with 6 other world cities.

**RESILIENCE VALUE**
- Supports bottom up – community led initiatives and builds cohesion.
- Embeds resilience thinking in the areas development and provides opportunities for this to act as a catalyst for resilient thinking.
- Supports knowledge sharing and networking. 
RESILIENCE LAB: ACTIONS.

RESILIENT DELFSHAVEN

EXPERIMENTING WITH COOPERATIVE AREA DEVELOPMENT

Merwede4havens (M4H) is a dynamic area with high levels of economic innovation, with new industries settling in the port area where existing port activities interact with innovative manufacturing and creative entrepreneurs. However, in the surrounding areas there are social issues with up to 25% unemployment, 80% of people are immigrants, there are rising debt problems and a struggle against drug trafficking and use and other nuisance behaviour. This is one of the most difficult urban environments in the Netherlands. However, at the same time, exciting and innovative initiatives are happening, such as syrups and Reading West that make neighbourhoods more vibrant and dynamic. A growing number of partners in both areas have forged a coalition around the Rotterdam Renaissance, where a connection is made between knowledge harbour M4H (economic innovation), and the manufacturing districts in West (social innovation). Through these actions, steps are being taken to help people to shape their own future.

RESILIENCE VALUE

By relating economic and social innovation robust networks have developed. It generates a shared ownership of the neighbourhood. This plan reinforces social cohesion and promotes social entrepreneurship. This increases the self-organizing capacity of the area.

LENSES

SCALE

OWNER
Municipality

PARTNERS
Delfshaven Cooperative, residents, businesses, Urban Innovative Actions Framework

FINANCE (POSSIBLE)
Municipality, Delfshaven Cooperative, additional funding is needed (e.g. through European Union)

STATUS
New

RESULT
Medium-term

RELATED ACTIONS

37 BOSPOLDER TUSSENDIJKEN/PARK 1943

The Implementation Plan for the development of Park 1943 area seeks to act as a catalyst for strengthening the resilience of Bospolder/Tussendijken. Opportunity mapping and stakeholder analysis carried out for the area will enable the development to mobilize ideas of residents, boost health and encourage exercise, to better use open space and to create a water asset. Connection with development possibilities are given for Great Visserijplein and surrounding residential buildings such as green roofs and better use of the gardens.

RESILIENCE VALUE

- Embeds resilience thinking in the development of Bospolder/Tussendijken
- Supports knowledge sharing and networking
- Supports holistic approaches to redevelopment targeted at improving the lives of the residents and users.

LENSES

SCALE

OWNER
Delfshaven Cooperative

PARTNERS
Municipality, District Committees, Havensteder, Citizens

FINANCE (POSSIBLE)
Municipality

STATUS
New

RESULT
Short-term / Medium-term

RELATED ACTIONS

37
IMPROVING SOCIAL RESILIENCE, ATTRACTIVENESS, QUALITY OF LIFE AND FUTURE-PROOFING OF AN ICONIC BUILDING

The Peperklip was designed by architect Carel Weeber and built in the 1980s; the residential building occupies a small area, with a length of 500 meters; containing 605 homes. In recent years there has been considerable investment in improving the social issues in and around the development; unfortunately the investment has not been sufficient enough to bring about real change.

The building is about to undergo a major physical renovation project, which can be used to jointly tackle the social and physical problems. The renovation includes 11,500m² roof and semi-public courtyard which creates space for 'place making' as well as a combination of power, buffering and re-use of water, public spaces and gardens. There is also a unique opportunity to establish a related with the municipal contribution program for residents and the labor market. This will tackle the resilience of both the physical and social. The aspiration is for Peperklip to become an example of social resilience, in combination with physical climate resilience. The project has the potential to have the largest collective roof gardens in Europe. The project is supported and should seek to share knowledge and lessons as well as learn from other initiatives in this strategy.

RESILIENCE VALUE

A resilient system of governance is the foundation for a resilient city. The establishment of the resilient system of governance is situationally determined, and requires room for experimentation, improvisation and learning in developments such as the Peperklip. This action provides the opportunity for a large scale combined effort tackling multiple important issues.

LENS

SCALE

OWNER
Housing Corporation Vestia

PARTNERS
Residents and users of the Peperklip, Municipality of Rotterdam

FINANCE (POSSIBLE)
Vestia, Municipality of Rotterdam, water boards, energy corporations, investors, European Union

STATUS
New

RESULT
Medium-term / Long-term

RELATED ACTIONS

RESILIENT PEPERKLIP

RESILIENCE LAB: ACTIONS.
In January 2016 a letter of intent for cooperation on Resilient Cities was signed between the International Architectuur Bienale (IABR) and the Municipality of Rotterdam, for the period 2016–2020. Both parties will use this time to focus on resilience, with content and financial support from the Rotterdam Resilience Program. The biennales will include collaboration with the government of the Netherlands, notably; Henk Ovink (Water Ambassador for the Netherlands) and will promote the UN’s Sustainable Development and Climate Goals (COP21) both fully endorsed and supported by the City of Rotterdam and the IABR.

In 2018, the focus of the IABR ‘resilience + cities’ production will be on the physical aspects of resilience (adaptation to climate change, infrastructure energy, water issues, etc.), whereas in 2020, social and softer aspects will be the focus (social resilience, cyber resilience and resilience as a “new culture”). The question surrounding the resilience of ‘governance’ and what new financial development models can be developed; will be included in both editions.

We will develop a joint research program about resilience by design stretching over the full four year period.

RESILIENCE VALUE

This long term partnership will not only contribute to knowledge development and sharing, but also to network development and ideas creation. Moving resilience into the design space facilitates innovation and creative thinking as noted recently at the Designing City Resilience forum hosted by RIBA in London.
38 ROTTERDAM CENTRE FOR RESILIENT DELTA CITIES (RDC)

RDC is a public–private network organization which aims to accelerate the transition towards safe and sustainable delta cities around the world. Together RDC members develop strategies for integrated solutions which enhance safety and add value in terms of spatial and ecological quality, social outcomes and economic potential. RDC will strengthen and enhance the knowledge sharing and innovation ecosystem to better capitalise on the Rotterdam leadership position on resilience.

RESILIENCE VALUE
- Supports knowledge sharing, innovation and networking
- Embeds resilience thinking amongst Rotterdam’s leaders

LENS

SCALE

OWNER  RDC–partners

PARTNERS  RDC–partners

FINANCE  (POSSIBLE)  RDC–partners

STATUS  Under development

RESULT  Short-term

RELATED

39 NATIONAL CITYDEAL CLIMATE ADAPTATION

Nine public partners signed on March 9th 2016 along with seven (semi) private partners called an agreement called Citydeal climate adaptation. The partners will collaborate on national and international levels in order to strengthen their approach to climate–proof design in the urban environment. The Citydeal will work with the partners over the next four years, to ensure a practical learning environment and breeding ground for innovation, which will be supported and shared across initiatives within the Rotterdam resilience strategy.

RESILIENCE VALUE
- Supports knowledge sharing and networking

LENS

SCALE

OWNER  City Deal partners

PARTNERS  City Deal partners

FINANCE  (POSSIBLE)  City Deal partners

STATUS  New

RESULT  Short-term

RELATED

40 RESILIENT EUROPE

RESILIENT EUROPE is the title of an EU URBACT partnership of 12 cities. These cities all invest in the development of a resilience strategy and its implementation. Emphasis is on an integrated approach, especially social and climate resilience. Funding is secured for the second tranche of the project partnership.

RESILIENCE VALUE
- Supports knowledge sharing and networking, specifically in this case to overcome implementation barriers.

LENS

SCALE

OWNER  Municipality

PARTNERS  Eleven European cities, including Glasgow, Vejle, Bristol, Thessaloniki

FINANCE  (POSSIBLE)  EU, partners

STATUS  Under development

RESULT  Short-term

RELATED

41 NATIONAL INNOVATION CHALLENGES: MAKE ROTTERDAM MORE RESILIENT

The City Challenge contest provided 150 ideas for the City of the Future in 2016. There were 10 finalists, and the winner was announced in mid–April 2016. An idea has emerged for an “11th project” – an expansion of the final 10 ideas for an area development. Selected parties will now investigate in the designated pilot areas of focus feasible and viable approaches to integrate Resilience.

RESILIENCE VALUE
- Supports bottom up – community led initiatives and builds cohesion.
- Demonstrates innovation applied practically in a development context
42 RESILIENT CITIES NETWORK: CITY EXCHANGE

Rotterdam has participated in the ambitious cities network 100 Resilient Cities from 2014. Therefore, Rotterdam has access to a wealth of knowledge gained through discussions with other cities and professionals in the 100 Resilient Cities network. Developing and sharing knowledge plays an important part in contributing to building resilience in other cities. There is scope for Rotterdam and its knowledge partners to use bilateral relationships to support other cities. As an example, we hosted a successful network sharing session in October 2015. We will look for other opportunities to utilise the 100 Resilient Cities network.

RESILIENCE VALUE

- Supports knowledge sharing and networking across the 100 Resilient Cities network

LENS

SCALE

OWNER Municipalities, 100 Resilient Cities

PARTNERS RDC partners

FINANCE (POSSIBLE) Cities, RDC, 100 Resilient Cities

STATUS New

RESULT Short-term

RELATED All flywheel actions

43 RESILIENT ROTTERDAM: GETTING IT ORGANISED

Since 2014, Rotterdam has participated in the ambitious urban network 100 Resilient Cities. This strategy presents the actions developed through that process. There is now a need to implement the actions identified, requiring the formalisation of the role and resources of the resilience office and Chief Resilience Officer and the agreement of partnering arrangements.

RESILIENCE VALUE

- Supports knowledge sharing and networking across the 100 Resilient Cities network
- Embeds resilience thinking
- Supports effective delivery of all other resilience actions

LENS

SCALE

OWNER Municipality

PARTNERS Stakeholders

FINANCE (POSSIBLE) Municipality, 100 Resilient Cities

STATUS New

RESULT Short-term

RELATED All flywheel actions

44 RESILIENT ROTTERDAM—THE HAGUE METROPOLITAN AREA

Rotterdam—The Hague Metropolitan Area (MRDH) is a consortium of 23 municipalities. These municipalities have jointly invested in the Next Economy Roadmap (RNE). Many resilience issues extend beyond municipal boundaries. MRDH with interested municipalities, particularly The Hague, is cooperating to deliver concrete actions and results for resilience for the wider region. Rotterdam is sharing its learning from the 100 Resilient Cities process into this consortium, and the selection of The Hague by 100 Resilient Cities as a third wave city could give a further boost to the metropolitan region in terms of how it considers its future resilience across key areas such as water, climate and cyber.

RESILIENCE VALUE

- Supports knowledge sharing and networking
- Supports tackling of cross municipality issues and challenges

LENS

SCALE

OWNER Municipality Rotterdam, municipality Den Haag

PARTNERS MRDH—municipalities, InnovationQuarter

FINANCE (POSSIBLE) MRDH—municipalities, subsidies

STATUS New

RESULT Short-term

RELATED Short-term

In October 2015, 28 Chief Resilience Officers and resilience team members from 9 cities convened in Rotterdam for a Network Exchange on integrated water management. Through site visits, expert presentations, and multi-disciplinary workshops involving more than 30 water experts from Rotterdam and the Netherlands, participants grappled with common challenges facing cities today – from flooding and sea level rise to water scarcity – and proactively shared knowledge and insights about each other’s successes and failures. The Rotterdam exchange catalyzed some concrete actions, and attendees returned to their cities to act upon the lessons learned.

100 Resilient Cities member cities involved: Bangkok, Berkeley, Mexico City, New Orleans, Norfolk, Rome, Rotterdam, Surat and Vejle.
FACTSHEET
RESILIENCE STRATEGY.

7 RESILIENCE GOALS
• Rotterdam: A balanced society
• World port city built on clean and reliable energy
• Rotterdam cyber port city
• Climate adaptive city to a new level
• Infrastructure ready for the 21st century
• Rotterdam network – truly our city
• Anchoring resilience in the city

12 METHODOLOGIES
• Student Challenges
•EU funds
• Research
• City Resilience Framework
• Interviews
• Pilot districts
• Collaboration between cities
• Visualisation (film)
• Collecting data
• Resilience by design
• Back casting
• Harvesting

7 RESILIENCE SCALES
• Building
• District
• Rotterdam
• Metropolitan area
• The Netherlands
• Europe
• Worldwide

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ROTTERDAM RESILIENCE STRATEGY

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ACKNOWLEDGEMENTS.

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Microsoft
TNO
DRIFT
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Urbanisten
Erasmus University Rotterdam
DELTARES

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Resilient Delta Cities (RDC)
Urbanisten
Erasmus University Rotterdam
DELTARES

17 STAKEHOLDERS SO FAR
• Utility companies (2)
• Municipality organizations (6)
• Housing associations (3)
• Waterboards (3)
• Port Authority Rotterdam (1)
• Civilian platforms (1)
• DCMR Environmental Agency (1)
PHOTOGRAPHY
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We have made all possible effort to credit all photographers for their work. If you feel that, despite our efforts, your work has not been duly credited, please contact us via resilience@rotterdam.nl.

CONCEPT AND DESIGN
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ILLUSTRATIONS
IN10, AECOM and others

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Veenman+, Rotterdam

Gemeente Rotterdam

100 RESILIENT CITIES

SUPPORTED BY THE ROCKEFELLER FOUNDATION

ROTTERDAM CLIMATE INITIATIVE

ROTTERDAM MAKE IT HAPPEN.