the community for risk management & assessment



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City of Stavanger

Deliverable 1 - 4



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1. Introduction

1.1 Background¹

The City of Stavanger became partner in the EU-project CRISMAS (Community for risk management and risk assessment). The projects started January 1st 2016 and will end December 31st 2017.

The aim of this by the European Commission funded project is to:

- Support regions and cities implementing all hazard risk management and assessment methodologies, including the cross sectorial and cross border dimension
- Build a European wide community for government professionals working on risk management and assessment to encourage cooperation and knowledge exchange within the EU
- Improve links between relevant actors and policies throughout the disaster management cycle (prevention-preparedness-response-recovery)

The project has a project budget of € 782.953,-. The European Commission (DG ECHO) contributes 75%: € 587.215,-.

Partners in this project are the Safety Region South-Holland South (VRZHZ) and ITINERIS Health & safety, from the Netherlands, the City of Stavanger (Norway), Ungheni District Council (Moldova), Prijedor Regional Economic Development Agency (Bosnia and Herzegovina) and the Province of Forlì-Cesena (Italy)



¹ <u>http://ec.europa.eu/echo/funding-evaluations/financing-civil-protection-europe/selected-projects/community-risk-management_en</u>



The last four partners will start with the implementation of risk assessment and the translation of the results in risk management strategies in their own areas with the support of VRZHZ and ITINERIS and in an environment in which the partners can learn from each other. This will be based upon principles and experiences, derived from earlier projects: MiSRaR and PRISMA, the "EU guidelines for risk assessment and risk management capability planning" and the Dutch methodologies for national and regional risk assessment.

CRISMAS is also meant to be the starting point of a structural community within the EU. It is the aim to start a EU community of public experts on the subject of risk assessment and risk management, supporting each other and other public bodies with further developing their risk assessment and risk management capacities (also after the closing of the project).

The City of Stavanger arranged a local kick-off for the local stakeholders on Februry 29th 2016, giving them information about the project, and what expectations we had for their deliveries into the project.

1.2 Objective

Using existent local and national information sources, historical research and expert judgement on potential future risk developments an all hazard overview has been made of all relevant risks. This document will serve as deliverable 1-4 in the CRISMAS-project; **Risk identification, self-assessment, risk analysis and risk evaluation.** Expected result of this deliverable is to illustrate an overview of risk sources and vulnerabilities, presented as a risk list before presenting a risk evaluation.

1.3 Scope and limitations

The risk list has been created as part of an overall risk- and vulnerability analysis for the area defined as the City of Stavanger. The scope of this analysis includes all events/incidents that are specific for the City of Stavanger. It also includes incidents that may affect the whole



Stavangerregion simultaneously, as well as incidents that the municipalities in the region have in common. The incidents identified in this risk- and vulnerability analysis are risks that potentially can threathen one/several of our social values/consequense categories, see chapter 3.3. Security policy crisis and war are not included in this analysis.

1.4 Overall risk- and vulnerability analysis for the City of Stavanger

The Civil Protection Act encourages cooperation across municipal borders, and in 2013, the four municipalities (Randaberg, Sandnes, Sola and Stavanger) conducted an overall risk- and vulnerability analysis together as partners. The emergency response functions in the region's municipalities prepared a project proposal, which received endorsement of councilors in each municipality. The proposal from the emergency response functions suggested that the region prepared a project with a clear mandate that intended to establish a common risk understanding, and the need for a joint emergency response in the region.

A large scale of stakeholders was invited to join the project. Over 200 people (from both private and public sector) contributed with information into this project. The purpose of the analysis in 2013 was to get an updated list over risks that could occure in the Stavanger region, that again would form the base of a systematic approach to dealing with risk in the region. The result from this work ended up in two reports; *The overall risk- and vulnerability analysis for the Stavanger region 2013* (ORVAR 2013) and *The overall risk- and vulnerability analysis for City of Stavanger 2013 (ORVAS 2013)*.

This kind of work had never been carried out in Norway before, and it was an instructive, but still a very demanding project.

The law requires the analysis to be updated every four years, preferably parallell to the updating of the municipal master plan. In 2016 it has soon been four years since the last reports were finished, and the reports were therefore ready for a review/upgrade.



The preparation of the overall risk- and vulnerability analysis for the City of Stavanger in 2016 has been lead by a project group, as part of the CRISMAS- project. In 2013 the analysis had a regional focus. Now, the City of Stavanger has ownership of the analysis, and an improved ability to update and maintain it, and to carry out additional risk analyses in the future.

As part of the updating of the overall risk- and vulnerability analysis it has been chosen to simplify the content of the two previous reports (*ORVAR 2013* and *ORVAS 2013*) in order to improve readability for both stakeholders and decisionmakers. The City of Stavanger decided therefore during the updating process, to merge these two documents into one; *Overall risk- and vulnerability analysis for the City of Stavanger 2016.* The risk list presented in this report is a result of the updating of the overall risk- and vulnerability analysis for the City of Stavanger.



1.5 Presentation of Stavanger²

The total graphical area, which constitutes the City of Stavanger is displayed in figure 1. Stavanger municipality consists of the mainland and the inhabited islands Hundvåg/Buøy, Austre Åmøy, Langøy, Bjørnøy, Roaldsøy, Omrøy, Steinsøy, Engøy, Sølyst, Grasholmen, Vasy, Lindøy, Hellesøy and Kalvøy.

The City of Stavanger is divided into the districts:

- Hundvåg
- Tasta
- Eiganes/Våland
- Madla
- Storhaug
- Hillevåg
- Hinna



Figure 1: The City of Stavanger

The administration in the City of Stavanger consists of City Manager and the following departments and municipal enterprises (KF):

- Urban Environment and Development
- Communication
- Culture and Urban Development
- Political Secretariat
- Industry
- Sølvberget KF

² <u>www.stavanger.kommune.no</u>



- Education, health and welfare
- Human Recourses
- Economy
- Municipal Attorneys

- Stavanger Parking KF
- Nature and Sport Services KF
- Stavanger Building Operations KF



2. Our approach to risk management

Norway has a long-standing tradition of protecting its citizens from a range of threats from natural disasters, infectious diseases, industrial accidents, critical infrastructure failure, to terrorist attacks.

The Norwegian civil protection system is based on the principles³:

Responsibility: The entity that is responsible for a discipline or service in a normal situation is also responsible for necessary emergency preparations and the handling of extraordinary events. The responsibility also applies to information within your own discipline.

Subsidiarity: A crisis shall be handled at the lowest possible level.

Equivalency: The organisation established during crises must be as equivalent as possible to the organisation with which you normally operate, cf. principle of responsibility.

Collaboration: All entities have an independent responsibility to ensure the best possible collaboration with relevant parties in the work on prevention, preparedness and crisis management.



Figure 2: Illustration of the Norwegian civil protection system

³

https://www.regjeringen.no/contentassets/261879a38c3e438d82ab4729e0661cf1/hod_national_health_preparedness_plan_eng.pdf



The major reforms of the Norwegian civil security system occurred in the 1990s when it gradually widened its focus from preparing for war – based on the 'Total Defence' doctrine – to also include societal security and safety ("samfunnssikkerhet"). The Civil Protection Act was established in 2010, and section 14 refers to statutory requirements for (all) the municipalitites in Norway to conduct an all risk (assessment, probability and vulnerability) analysis. The results from this work shall found the basis for a systematic approach to civil protection and emergency preparedness in the municipality.



3. Method and process

3.1 Risk management process

The figure below illustrates the risk management process followed by the City of Stavanger. To ensure a good result, it is necessary to plan the whole process ahead (**establishing the context**) before conducting the risk identification (**risk identification**) and the risk- and vulnerability analysis (**risk analysis**).



Figure 3: The risk management process

It is important to do a risk evaluation (**risk evaluation**), before planning for risk management/followup actions (**risk treatment**). During the whole process, communicating and consulting (**communcatiun and consulting**) with local stakeholders is essential. Monitoring and reviewing, in order to identify significant changes that could affect our analysis, must be conducted regularly (**monitoring and review**).



3.2 Risk assessment

The approach selected for this overall risk- and vulnerability analysis is stated and illustrated in figure below. The figure illustrates the bow-tie diagram, displaying the link between potensial causes, preventative and mitigative controls and consequences of undesirable events. In the middle of the illustrated figure, there is an undesirable events.



Figure 4: Approach to the overall risk- and vulnerability analysis

The risk analysis method used for the overall risk- and vulnerability analysis for the City of Stavanger, is based on hazard identification (hazid) analysis with an extended uncertainty analysis. A HAZID-analysis is often used as the term for qualitative (non-numerical) or, as in this case, semiquantitative (partly quantified) risk analysis method that can be conducted with relatively modest effort. The hazard identification based on a set of defined societal values in order to identify adverse events that may threaten these societal values. This is described further in section 3.3.



3.3 Categories for describing risk

The analysis has in the same ways as the Norwegian national risk scenarios been based on a set of societal values and corresponding consequence types.

The City of Stavanger has taken six societal values into account when conducting the overall riskand vulnerability analysis.

- 1. Life and health
- 2. Nature and the environment
- 3. Economy
- 4. Social stability
- 5. Controllability and territorial control (Considered in the national risk scenarios, but not in this analysis).
- 6. Cultural values (Not considered in the national risk scenarios, but included in this analysis).

The impact assessments is based on the national risk scenarios where each societal value is defined with a set of consequence type and their observable sizes.

Social Values	Consequence type	Observable sizes
1.Life and health	1.1 Deaths	Number of deaths
	1.2 Injuries and illness	Number of injuredNumber of sick
	1.3 Physical strains	The number of affected peopleDuration
	1.4 Psychological damage	 Number of persons in need of supervision
2.Nature and environment	2.1 Long-term damage to the nature and environment	Geographical expansionDuration
3: Economy	3.1 Financial and material damage	 Property damage, financial loss, as well

Table 1: Societal values, associate consequence types, and observable sizes.



Social Values	Consequence type	Observable sizes
		as combating, handling and restoring
4.Social stability	4.1 Social instability	 Number of people with behavioral reactions Duration
	4.2 Disturbance in daily life	Number of people affectedDuration
5.Management	5.1 Weakened national	Number of relevant
capacity and	governance capability*	indicators
territorial control*		Duration
	5.2 Weakened control over	 Area of the
	the territory*	geographical affected
		area
		Duration
6.Cultural values	6.1 Loss over cultural value	Qualitative criteria

*Not assessed in the overall risk- and vulnerability analysis for the City of Stavanger.



4. Identified risks

The risks that have been identified as part of the overall risk assessment for the City of Stavanger are presented below.

Table 2: Identified risks

Number	Event
1	Failure in food supply
2	Distribution of health hazardous food
3	Failure/interruption of the drinking water supplies (prolonged)
4	Distribution of contaminated drinking water
5	Contamination of drinking water due to radioactive downfall
6	Power supply failure (prolonged)
7	Failure in gas distribution (prolonged)
8	Failure in district heating (prolonged)
9	Failure of the ability to provide necessary temporary shelter and public warning and evacuation
10	Failure of regional emergency preparedness and/or crisis management
11	Failure of local emergency preparedness and/or crisis management
12	Failure in communication regarding risk, emergency preparedness and/or crisis
	management
13	Failure of governing bodies (political and administrative)
14	Failure in health care
15	Epidemic/pandemic
16	Hospital fire/ explosion
17	Hospital - sabotage/terror
18	Nursing home/institution – fire
19	Failure of emergency services (in general)
20	Failure of emergency services – Health
21	Failure of emergency services – Fire and rescue
22	Failure of emergency services – Police
23	Major incident- industry
24	Major incident- aviation
25	Major incident- sea
26	Major Incident- road



Number	Event
27	Major incident- railroad
28	Major accident - offshore
29	Incident in large buildings (fire / explosion / collapse)
30	Violence/terror attacks in city
31	Violence/terror at schools
32	Violence/riots in connection with random accumulation of large crowd
	demonstrations
33	Criminal acts/ other events
34	Failure of information safety/security
35	Damage to cultural heritage
36	Fire in Old town Stavanger
37	Discharge of dangerous goods
38	Discharge of diesel etc. from tank installations or pipelines
39	Acute air pollution
40	Nuclear accident
41	Threats to animal health
42	Dramatic fall in oil prices / phasing out of fossil fuels
43	Loss of social safety
44	Collapse of the money market
45	Failure of critical infrastructure
46	Undesired event that requires evacuation of the Forus area
47	Failure in ICT
48	Failure of drains/ sewerage services
49	Failure in general waste management
50	Failure in the goods and passenger transport
51	Extreme weather condition / climate change
52	Migration ^{*4}
53	Hybrid events*

 $^{^{\}rm 4}$ Event 52 and 53 has not yet been analyzed (March 2017)



5. Selection of maps ⁵

⁵ Uploaded on ViaDesk



6. Self-assessment⁶

The complete self-assessment has been uploaded on ViaDesk December 2016, and is not included in this report. The totalt overview is presented in the figur below.



⁶ Uploaded on ViaDesk



7. Risk analysis⁷

The overall risk analysis has been uploaded on ViaDesk and consists of following documents:

- Main report
- Appendix A J

The analysis is in Norwegian only, but parts of it will be translated into English within the end of the CRISMAS project.

⁷ The report and all appendixes are uploaded on ViaDesk



8. Risk evaluation⁸

The final phase of risk assessment is called risk evaluation. In this phase, the conclusions of the risk identification and risk analysis are submitted to the (political) decision-makers.

Risk and crisis management is not intended to achieve absolute security, but is part of a politicalsocial assessment process, taking into account the public interest of risky activities. For example, modern society can simply not do without hazardous substances. Also, it is irrational to expect areas which are prone to flooding, landslides or volcanic eruptions to be evacuated permanently. Ultimately the aim must to achieve a level of safety which is acceptable for both politicians and citizens. This means that the political and administrative decision-makers always shall have to evaluate the outcome of a risk analysis on basis of their own values and preferences. The aim is transparent and accountable decisionmaking: Assessments are made as objectively as possible, but in the end politicians decide upon the priorities.

8.1 Risk criteria

Risk criteria are terms of reference and are used to evaluate the significance or importance of an organization's risks. They are used to determine whether a specified level of risk is acceptable or tolerable. Risk criteria should reflect the organization's values, policies, and objectives, should be based on its external and internal context, should consider the views of stakeholders, and should be derived from standards, laws, policies, and other requirements.

8.1.1 The Planning and Building Act

In Norway, the Planning and Building Act § 4.3 forms the basis for risk assessments in the land-use part of the municipal master plan. When planning for any major and/or minor changes in the municipal master plan there is a general need for a risk and vulnerability assessment report. Not all changes require detailed assessment of risk and vulnerability, especially where this has already

⁸ MisRaR handbook, chapter 4.3



been adequately assessed on a more detailed level. Areas with danger, risk or vulnerability shall be indicated in the plan as a hazard zone.

8.1.2 The Civil Protection Act (2011)

The Civil Protection Act (2011) gives municipalities a more general order for emergency preparedness and risk assessment. The Act requires the municipality to carry out a risk and vulnerability analysis, including mapping, and evaluate the likelihood of adverse events that may occur in the community and how these may affect the municipality. The overall risk and vulnerability analysis has to be anchored within the local city council.

The analysis shall include as a minimum:

a) existing and future risk and vulnerability factors in the municipality.

- **b)** risk and vulnerability outside the municipality's geographic area that may affect the municipality.
- c) how different risk and vulnerability factors can influence each other.
- d) special challenges related to critical societal functions and loss of critical infrastructure.
- **e)** the municipality's ability to maintain its activity when exposed to an unwanted event and the ability to resume their activities after the event has occurred.
- **f)** the need for population warning and evacuation.

The municipality shall ensure that relevant (public and private) stakeholders are invited to work together with the preparation of a risk and vulnerability analysis.

Where it is identified a need for further detailed analyzes, municipality shall undertake further analyzes, or encourage other relevant stakeholders to implement these. The municipality should encourage relevant stakeholders to implement prevention and mitigation measures.



8.2 Risk evaluation – City of Stavanger

Risks should be evaluated according to various political perspectives, as listed below. These are quite general and not very detailed. It is up to the City Council to decide on risk evaluation/prioritization, but all decisions must be made according to:

- National legislation (acts and regulations)
- Local strategic plan (Master plan 2014-2029)

	National level	Regional level	Local level
Autority	Ministry of Justice and Public Security The Norwegian Directorate for Civil Protection	<u>County Governor of</u> <u>Rogaland</u>	<u>City Council of Stavanger</u>
Legislation	Lov om kommunal beredskapsplikt (The Civil protection Act) Forskrift om kommunal beredskapsplikt (Regulation about municipal emergency preparedness) The Planning and Building Act	<u>County of Rogaland</u> <u>Risk Evaluation</u>	<u>City of Stavanger Master plan</u> <u>City of Stavanger Annual Action Plan</u> <u>Local Governments in Norway</u>
Control mechanism	Compliance and Performance Audits conducted by County Governor of Rogaland		Compliance and Performance Audits conducted by <u>Rogaland Revisjon</u>



Risks can have different priority and be seen from different perspectives. Risk management (and governance) is a vital, but only one part, of the total of political perspectives that must be taken info account before a decision is made. It is also about cost/benefit analyzes, risk perception and the always changing agenda presented in media.

As an example: School shooting in City of Stavanger has a very low probability, so low that we maybe should not bother to put much effort into it. Still the expectations from the public and the politicians are so high that we use many resources to work with this case, both prevention and preparedness.

In the City of Stavanger our risk matrix's ("risk picture") are "grey", we do not color them green, yellow and red. "Coloring" should be made by the City Council. The City administration want the City Council to decide what is acceptable and what is not. We believe that such a decision will be far better that way.

What we do though, is to identify where we have uncertainties. This could be because of lack of knowledge or the uncertainty of the outcome of an accident/crisis. We also stress that this risk picture is our best professional judgment. Other professionals could come up with a different result.



8.3 Examples of how to use the outcome of the risk analysis

Types of risks	Examples of events retrieved	Risk owner ¹⁰
	TROM THE OVERALL FISK analysis	
Highest combined risk (matrix) ¹¹	Event 15 Pandemic/epidemic	Event 15 Local risk owner
		The health department in the City of
		Stavanger has the legal responsibility to
		plan for/prepare for pandemic/epidemic events.
		All other departments within the City of
		Stavanger must include
		pandemic/epidemic as part of their own
		risk management plan.
		All plans must be coordinated with
		relevant external stakeholders
	Event 14 Failure in health care	Event 14 Local risk owner
		The health department in the City of
		Stavanger has the legal responsibility for
		a redundant and robust health care
		system, but also to develop emergency
		preparedness plans if any events should
		occure.
		All plans must be coordinated with
	Event 27	This rick belongs to the railway company
	Maior incident – railroad	or national railway authorities. It is a
		national political responsibility to follow
		up on railroad safety.
Highest impact (worst	1. Major incidents –	,
case) for each impact	including terror	

⁹ Chapter 4, identified risks. Page 14 – 15

¹⁰ ISO 31000 - A risk owner is a person or entity that has been given the authority to manage a particular risk and is accountable for doing so.

¹¹ Risk matrix, Main report Overall risk and vulnerability analysis, page 57



Types of risks	Examples of events retrieved	Risk owner ¹⁰
	from the overall risk analysis ⁹	
field: indication of preparedness priorities for disasters (versus most frequent:	 Major incidents – outside the borders of the City o Stavanger, but that involving "our" residents 	These risks may be the concerns of both our inhabitants and politicians.
indication for preparedness of daily	3. Acute pollution (includin radioactive downfall)	The City of Stavanger has a special focus on these 11 events.
emergency management)	 Power supply failure (prolonged) 	Emergency preparedness plans have been developed in order to prepare the
	5. Failure in ICT (prolonged) city for these worst case events.
	 Failure/interruption of the drinking water supplies (prolonged) 	The plans have been developed in close cooperation with our neighbouring municipalities, emergency services and
	 Contamination of drinking water due contamination or radioactive downfall 	other private/public stakeholders.
	 Loss of governing bodies (political and administrative 	
	9. Epidemic/pandemic 10. Contagious animal	
	disease (which blocks large areas)	
	11. Evacuation (large scale)	
Trends: most increased risks, new emerging risks	 Challenges related to migration Challenges related to hybrid events Terror (worldwide) Technology (the vulnerability within the 	The City of Stavanger in close collaboration with neighbouring municipalities, the emergency services and other private/public stakeholders. We also co-operate with the biggest
	 field of technology) Trust (It is vital that the inhabitants can trust the politicians, administratio and/or the emergency services) Health (Issues related to 	cities in Norway and the Directorate for Civil protection (DSB) n
	 health services in the future) Climate/climate change Security (Espionage, secure buildings etc) 	



Types of risks	Examples of events retrieved	Risk owner ¹⁰
	from the overall risk analysis ⁹	
Uncertainty: risks that require additional research and/or continuous monitoring in the coming period	 Challenges related to migration Challenges related to hybrid events Terror (worldwide) Technology (the vulnerability within the field of technology) Trust (It is vital that the inhabitants trust the politicians, administration and/or the emergency services) Health (Issues related to health services in the future) Climate/climate change Security (Espionage, secure buildings etc) 	The City of Stavanger in close collaboration with neighbouring municipalities, the emergency services and other private/public stakeholders. We also co-operate with the biggest cities in Norway and the Directorate for Civil protection (DSB)
In debth analysis	 In debth analysis in the fields of: Climate change Use of technology Ex: Will Smart cities make us more vulnerable? 	The results of the analysis must be presented for the politicians in order to be implemented (cost/effect). The results should also be taken into account within spatial planning.
Collaboration Cross sectorial and cross municipal	Collaboration between sectors, agencies, municipalities and emergency services must be strenghtened in the future. Risk analysis must also be developed on different levels within the City of Stavanger, not only on overall level.	 According to the Public Safety Act the City of Stavanger must ensure that the relevant public and private actors are invited to work together with the preparation of a risk and vulnerability analysis. Key words are: Simplify communication Standard report format Must be easy to read and understand Clearify roles and responsibility An example of good collaboration is the regional strategic forum for social safety



Types of risks	Examples of events retrieved	Risk owner ¹⁰
	from the overall risk analysis ⁹	
		and emergency preparedness (Regionalt samfunnssikkerhetsråd).
		Members are:
		Mayors (Randaberg, Sandnes,
		Sola og Stavanger)
		City managers and one director from each municipalities
		County governor
		Chief of police, regional
		• Chief of fire and rescue,
		regional
		Chief of Civil protection,
		regional
		Chief of army, regional
		• Director of the University
		hospital
		• Directors from companies
		delivering critical infrastructure
		Heads of emergency
		management in the
		municipalities



9. Monitor and review

As with communication and consultation, monitoring and review is an ongoing part of risk management that is integral to every step of the process. It is also the part of risk management that is most often given inadequate focus, and as a result the risk management programs of many organisations become irrelevant and ineffective over time. Monitoring and review ensure that the important information generated by the risk management process is captured, used and maintained.

Few risks remain static. Factors that may affect the likelihood and consequences of an outcome may change, as may the factors that affect the suitability or cost of the various treatment options. Review is an integral part of the risk management treatment plan.

Risk management should be fully incorporated into the operational and management processes at every level of the organisation and should be driven from the top down.

Risk policy

A *policy* statement defines a general commitment, direction, or intention. A *risk management policy* statement expresses an organization's commitment to risk management and clarifies its general direction or intention.