D4RUNOFF

Data driven implementation of hybrid nature-based solutions for preventing and managing diffuse pollution from urban water runoff

D7.2 Risk Breakdown Report

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D7.2 Risk Breakdown Report	
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0.1	14.11.2022	UC send it VCS for internal revision as project coordinators
0.2	21.11.2022	VCS send it to UC for final review
1.0	28.11.2022	UC send final version to deliver
2.0	31.05.2024	The new version incorporates the changes requested by the project manager during the first monitoring period, mainly the removal of duplicated risks, the inclusion of new technical risks associated with Work Package 2, as well as the expansion of the high-risk mitigation measures (Tables 1, 3, 4 & 5 Pages 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18), the clarification of the difference between unforeseen and foreseen risks and finally the prevalence of the participant portal Risk Matrix as more updated Risk evolution (Page 17).

R=Document, report; **DEM**=Demonstrator, pilot, prototype; **DEC**=website, patent fillings, videos, etc.; **OTHER**=other
PU=Public, **SEN**=Sensitive, limited under the conditions of the GA

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Executive Summary

This deliverable constitutes the guide document for managing the risks associated with the D4RUNOFF project. The document describes the foreseen risks, the chain of responsibility in risk management and the times and protocols for the required actions. A protocol is defined in the event of the appearance of unforeseen risks and also, the access to the live document that constitutes the true risk matrix of the project, is facilitated.

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1 INTRODUCTION

1.1 Purpose of the document

This deliverable sets up routines for D4RUNOFF project risk management which are needed to guarantee successful outcomes of the project.
The main aim of the active management of risks is to monitor their development and to be ready for needed actions. Risk may be associated with the scientific level of the work, implementation risks connected to the ability to implement what has been foreseen, exploitation and/or dissemination risks and managerial risk connected to internal accomplishment of work.
Risk at several levels may threaten D4RUNOFF. The objective of this deliverable is to describe the risk management procedure for the project. The different steps of the review procedure are described and review responsibilities are defined. That is, it describes how risks will be identified and assessed, what tools and techniques can be used, the evaluation scales and tolerances and the relevant roles and responsibilities. The main aim of the active management of risks is to monitor their development and to be ready for needed actions.
This document defines the risk monitoring and escalation process as well as the structure of the Risk Register, which is used to document and communicate the risks and their response actions.

The purpose of this Risk Breakdown Report is:

- To outline the risk approach and process to be used for the project.
- To identify the roles and responsibilities related to risk management.
- To specify the methodology, standards, tools and techniques used to support risk management.

1.1.1 Scope of the document

The initial Risk Breakdown Report describes the factors that have been recognised as posing a potential risk for the implementation of D4RUNOFF activities. This plan also defines the estimated impact of the risk and the means of mitigation.
The risk management plan identifies the risks specific to operational organisation, defines the mitigation, adaptation and contingency measures as well as actions to be taken. The monitoring plan of the risks is based on good communications between the different actors and timely reporting of potential risks.
Risk management brings visibility to risks and accountability as to how they are handled and ensures that project risks are proactively dealt with and regularly monitored and controlled.
The main objectives of project risk management are:

- Project risks are identified, assessed and reported throughout the project.
- All major risks are reported to the Steering Committee.
- Risk response strategies are in line with stakeholders' risk appetite and approved risk level thresholds.
- All risks are monitored and under control.
- Risk response actions are implemented effectively.

1.1.1.1 Structure of the document

The structure of this report consists of a general overview on the risk management of the D4RUNOFF project as a whole. A successful outcome of the project depends on efficient management and continuous surveillance of risks.
The focus of the risk management process in D4RUNOFF will be the identification and management of the true risks (both foreseen and unforeseen) and their root causes. The aim will always be to lower the risk to a manageable level.

1.2 Identification of general risks for D4RUNOFF

For the D4RUNOFF project, risk factors and risk probabilities of the work plan will be analysed periodically, once a month by the Steering Committee (SC) and twice a year during the General Assembly (GA). The PC supported by the UC in their role of Risk and Data Manager (RDM), in close cooperation with the WP & Task Leaders, will monitor the identified risks by applying risk management procedures (systematic understanding of relevant risks, an assessment of their relative priority and a rigorous approach for monitoring and controlling). The process seeks to maximize the chances of achieving the objectives. Also, this may ensure that the partners are aware of, and could contribute to find solutions for the identified risks.

Every task Leader will manage, monitor and supervise the risks associated to their tasks. Depending on the impact, the WP leaders, the Steering Committee and the RDM will be the final management part if risks require to make decisions. The potential risks (who are related to the WPs and linked to the tasks most likely to manifest the risk) have been identified and represented in a table (see Table 1). This table will be updated after the reports from WP Leaders in the WP meetings, if required. This will ensure that the risks are identified and the contingencies that are developed as soon as possible. In addition, the identified risk table will be incorporated into the overall project reporting on the EC portal for every Reporting Period (RP).

Table 1 gather the identified risks. These risks are clustered in the following categories:

- **Consortium Management Related risks**: Include operational (Effective and efficient use of the resources), and financial (Budget and cost aspects and reliability of reporting) risks.
- **Technical**: Interfaces, performance, feasibility of reporting.
- **Dissemination & Communication, IPR & Exploitation risks:** Related with project impacts.

Table 1. Foreseen & Unforeseen Risks

RISK NUMBER	FORESEEN RISK
Consortium Management Related Risks	
1	Partners show weak commitment or leave the consortium
2	Delay in preparation deliverable
3	International travel restrictions
Technical risk	
4	The LC-HRMS analytical protocol for combined target, suspect and non-target screening of CECs is not able to detect a great variety of PMOCs
5	Low representativeness of stormwater samples for instance with respect to peak flows

6	Poor retention of Contaminants of Emerging Concern in the Nature-based Solutions
7	Low sensitivity of sensors for CECs and metals
8	High interference of wastewater (i.e. runoff water) on the sensors signals
9	Incorrect integration of the different criteria considered in the MCDA for Hybrid solutions
10	Fail in the stakeholder engagement
11	Identifying closed communications protocols that make harder data access
12	Not enough data to perform properly the simulations
13	Difficulty in collecting raw/treated water samples from the implemented NBS, due to the unpredictability of rainfall events
14	Failures in the validation of the MCDA for hybrid solution in the case studies
Dissemination & Communication, IPR & Exploitation Risk	
15	Lack of participation in the serious games
16	Low interest on project outputs by targeted stakeholders & policy makers
17	Low dissemination impact
18	Low engagement of actors
RISK NUMBER	**UNFORESEEN RISK**
U1	Limited Scalability of Suspect Screening and NTS workflows
U2	SERS detection of triazines and 6PPD-Quinone as well as Raman detection of microplastics using a chip fails
U3	Loss of analyte concentration by non-specific adsorption in the monitoring system
U4	Communication with AI platform (WP4) fails
U5	BIM could not be applicable to the parametrization process in this moment
U6	System broken during transport or use
U7	Personnel in leave (sick, parental, change of job)

The risks have been already associated to the WP and also to the tasks, therefore, the task members involved will monitor the risks that can already be foreseen and the tasks in which each risk could potentially materialize. WPs & tasks related to the risk are shown in Table 3.

During each monthly meeting, the work package leaders will review the updated Risk Matrix table (see section 2.3) with the RDM, highlighting critical risks, new risks and their respective mitigation strategies.

2 Risk management & responsibilities at project level

As part of the overall management plan for the project, this document describes the Risk Breakdown Report. It identifies conditions that may put the project at risk and provides guidance for managing these. It also provides methods and establishes roles and responsibilities of all participants in the risk management process.

2.1 Risk management process

The project risk management process defines the activities to identify, assess, prioritise, manage, and control risks that may affect the execution of the project and the achievement of its objectives.

The proposed process, applicable for all D4FUNOFF activities (management, research, development, etc.), is presented below (Figure 1).

Figure 1 Risk management process

Main stages of Risk Monitoring are:

- **RISK IDENTIFICATION**: The purpose is to facilitate the identification and documentation of risks that can impact the project objectives. Risks are continuously identified throughout the project life cycle and all the consortium partners are responsible for that, nevertheless (see section 3.2) task leaders are the first step in the identification process.
- **RISK ASSESSMENT:** The purpose is to assess the likelihood and impact of the identified risks in terms of their influence to the project objectives. This assessment is necessary before any risk response planning can be done. As shown in Table 2 Risk Assessment Matrix to weigh risk level or category, risks are assessed based on their likelihood of occurrence and the severity in project objectives. The product of their likelihood and severity defines the Risk Level which is then used as a reference for their prioritization and risk response development. This risk assessment will be performed by the Risk Owner designated at this step, supported by PC and RDM and is included in each "Risk Matrix" prepared during the project execution.
- **RISK RESPONSE DEVELOPMENT**: At proposal stage, Risk Owners had defined some mitigation responses to the foreseen risk. In the case of unforeseen risk, the Risk Owner, the PC and the RDM, are in charge of the selection of the risk response strategy based on the results of the risk assessment (risk level), the type of risk, on the effects on the overall project objectives (e.g. schedule and costs), as well as on the cost of the strategy and its benefits (cost/benefit analysis).
- **RISK MONITORING AND CONTROL**: The purpose is to monitor and control the implementation of the risk response activities while continuously monitoring the project environment for new risks or changes in the risks already identified. As defined in section 4, responsible are defined according risk level impact.
- **RISK REPORTING**: During the project, several tools will be used in order to follow the defined risks and include new identified risks: Risk register (RISK MATRIX), Intermediate activity progress internal reports, different progress reports and the Funding and Tender in each Reporting Period.

Certain, regular communications between the TL, the WP leaders, the Steering Committee and the RDM, are of utmost importance for anticipating the risks throughout the project life (see section 4). Besides, the involvement of the Consortium partners is needed for the identification of new potential risks.

3 Risk Matrix: foreseen risk identified in the description of the action

3.1 Risk assessment

In order to classify the risk level or category of the risk, a risk assessment matrix is proposed (Table 2) to understand the relationship between "likelihood" and "severity". Thanks to this criteria, D4RUNOFF Consortium could set up a scale to distinguish and focus on the critical

risks, which are mandatory according to the "Standard Application Form (HE RIA, IA) from Horizon Europe programme version 5.0 8 September 2022". Nevertheless, any obvious and manifested risk will be evaluated and monitored, in order to accomplish all the D4RUNOFF objectives, outcomes and deliverables.

Risk is evaluated in terms of probability of occurrence and consequence if the risk takes shape and the importance of a risk is typically calculated as the product of the probability and the consequence. In Table 2 this relationship is showed.

Table 2 Risk Assessment Matrix to weigh risk level or category

		LIKELIHOOD		
		Low	Medium	high
SEVERITY		2	4	6
Low	2	4	8	12
Medium	4	8	16	24
High	6	12	24	36

COLOR	RISK LEVEL / CATEGORY
From 0to 8	Low
From 12 to 16	Moderate
From 24 to 36	High

The risk shall be categorized by severity according to the following indications:

- **Low severity**: Inefficiency or time delays can occur. The risk is insignificant and can be managed with routine procedures.
- **Medium severity**: The risk is significant, medium impact of a risk is considered to have major impact on cost, schedule or quality. The risk is still manageable with additional controls or mitigations.
- **High severity**: In case of occurrence of such a risk in the worst case the entire project could fail.

The following levels of impact of occurring risks on the project D4RUNOFF have been defined. Depending on the identified level of the likelihood of a risk, measures should be taken consequently:

- **Low Risk Level:** Despite the foreseen impact is low for the project outcomes, the Task Leaders shall follow established procedures according to quality assurance on deliverables. Task Leaders shall report to the WP Leaders during Work Package meetings. The final step of escalation for decision making is to the Work Package Leaders.
- **Medium Risk Level**: Once risks occur, WP Leaders shall report to the project coordinator in the monthly Project meetings and to the Risk and Data Manger (RDM) during General Assembly meetings. The final step of escalation for decision-making is to the Project Coordinator.
- **High Risk Level**: Once such risks occur, work package leaders shall report to project coordinator and RDM as soon as possible. The Risk is severe and requires immediate attention and action.

To sum up, the expected consequences or level of impact of the risk, according to its category is summarised below:

- **Low Risk Level** → CONSEQUENCE: Easily recoverable
- **Medium Risk Level** → CONSEQUENCE: Significant impact on cost, schedule or quality
- **High Risk Level** → CONSEQUENCE: Threatens the objectives of the project

From D4RUNOFF perspective, all kind of risk (low, medium & high) are relevant and the consortium must monitor them and provide the best and the quick mitigation measure, nevertheless if the risk level is high, it requires immediate attention and action and emergency meetings can be proposed in order to start mitigation actions as soon as possible.

3.2 Foreseen risk list and proposed mitigation measurement

Risk Breakdown Report will be monitored continuously throughout the project by Work Package and Task Leaders. Risk Breakdown Report will be updated once a month by the Steering Committee (SC) and yearly to General Assembly (GA), as stated in section 1.2.

For the risks that have been identified, measures that reduce the risk have been also identified and planned. Several risks will remain threats throughout the project, which is unavoidable. The main aim of the active management of risks is to monitor their development and to be prepared for response actions.

Table 3, presents a set of foreseen risks and proposed mitigation measures identified at proposal level, as Table 4 presents a list of unforeseen risks identified at grant agreement level, at the kick-off meeting and also during this first project period. The list of unforeseen risks is continuously updated in accordance with section 3.3 and section 6. High level risks are highlighted in red and an extension of the contingency plan has been developed for these risks.

Table 3 Foreseen risks and mitigation measures.

RISK NUMB.	IDENTIFIED RISK (level of likelihood/Severity: low, medium, high).	WP	TASKs	RISK LEVEL	PROPOSED RISK-MITIGATION MEASURE
Consortium Management Related Risks					
1	Partners show weak commitment or leave the consortium (L, H)	all	all	12 - M	Partner replacement: an external partner will be proposed.
2	Delay in preparation deliverable (M, M)	all	all	16 - M	Regular follow-up within WPs and consortium meeting; workload adjustment.
3	International travel restrictions (M, L)	all	all	8 - L	Online meetings and events
Technical risk					
4	The LC-HRMS analytical protocol for combined target, suspect and non-target screening of CECs is not able to detect a great variety of PMOCs (M, H)	1	T1.2, T1.3, T1.4	24 - H	Shift of attention to alternative analytical protocols such as SFC-HRMS better suited for very polar compound.
	EXPANSION OF THE CONTINGENCY PLAN FOR RISK 4:				

	- Prevention: Particular attention to the issue during development of HRMS analytical protocols (task 1.1), including method validation that will enable early assessment of the ability of the LC-HRMS method to detect relevant groups of PMOCs. Test of alternative methods (ST1.1.2) will give thorough assessment of the possibilities and limitations of alternative instruments and platforms. Samples will be stored to enable later re-analysis. - Monitoring and correction: Ongoing monitoring of the performance of LC-HRMS method. If the LC-HRMS method is found to provide inadequate coverage of PMOCs, implementation of alternative methods from ST1.1.2 will be considered. - Compensation: If necessary, the impact of the risk will be compensated by implementing alternative analytical protocol during task 1.3 and re-analysing stored samples.				
5	Low representativeness of stormwater samples for instance with respect to peak flows (M, H)	1	T1.1, T1.2, T1.3	24 - H	Development of a common sampling strategy (T 1.3.1)
	EXPANSION OF THE CONTINGENCY PLAN FOR RISK 5: - Prevention: Test of preliminary sampling strategy during task 1.1, including estimation of stormwater variability and uncertainty introduced through sampling, which will enable early assessment of sample representativeness and ensure development of a suitable sampling strategy. - Monitoring and correction: Ongoing monitoring of results will provide early indication of issues with sample representativeness. If necessary, the sampling strategy will be revised to increase representativeness during task 1.3. - Compensation: The impacts of the risk are difficult to compensate post-sampling. Therefore, particular attention is needed to validate sampling strategy before the main sampling campaign (task 1.3). If necessary, additional samples will be collected.				
6	Poor retention of Contaminants of Emerging Concern in the Nature-based Solutions (M, L)	5	T5.6	12 - M	In the WP5, if the performance of the NBS is poor, the application of the MCDA will produce as a result the need of including more NBS and/or other systems in the proposed treatment trains (theoretical proposal) until that the needed retentions will be achieved.
7	Low sensitivity of sensors for CECs and metals (M, H)	2	T2.3,	24 - H	Pre-concentration steps will be re-designed to process higher volume of water to attain the system LoD/LoQ.
	EXPANSION OF THE CONTINGENCY PLAN FOR RISK 7: The contingency plan will depend on the source of the low sensitivity: - Not identification/discrimination or low SERS signal of Triazines and 6PPD-Quinone by selected COF/AuNPs substrate: 1. Tuning functionalization on COF pore surfaces enhance their affinity for selected CECs pre- or post-synthetically (possible change in vibration spectra); 2. Design of new structure as SERS substrate with higher enhancing performance (e.g., explore new strategies of COF growth to modify				

	the pore orientation with respect to Au surface, taking surface selection rules into consideration). - Insufficient Raman signal for small microplastics: 1. Modification of the Raman system: a) Explore the reduction of spot size, also working distance, to reduce background and improve the spatial resolution (e.g. integrating Aspheric Lens into the Raman probe); b) modify the slit of the Raman spectrometer. - Spectral overlap between peaks associated with the vibrational changes of the COF upon interaction with CECs as well as spectral overlap between peaks associated with the matrix components and the characteristic peaks of plastics (medium): 1. Expand the spectral region of study; 2. Modification of slit of the Raman spectrometer to improve the spectral sensitivity; 3. Explore different AI-models to improve the data analysis (e.g. better algorithm to remove background peaks). - Low electrochemical signal for metal detection: Change sample processing and increase the concentration of the metals in the buffer.				
8	High interference of wastewater (i.e. runoff water) on the sensors signal (M, H)	2	T2.3, 2.4 and 2.5	24 - H	Clean-up steps will be reinforced to remove organic material and specific interferents identified in the waters from WP5 (analysed in WP1).
	EXPANSION OF THE CONTINGENCY PLAN FOR RISK 8: Specific interferents identified in the wastewaters from WP5 (analysed in WP2), which will allow deciding in the better strategy to reduce matrix interference: 1. Clean-up steps will be reinforced to remove organic and particulate matter: a) Explore the modification of filtration module by including extra membranes/mesh with higher porous size; b) Explore the integration of gravitational sedimentation device to reduce the presence of particulate matter (i.e. suspended sediments) in the case of CECs (triazines and 6PPD-Quinone) and metals). 2. Sample processing could be changed to allow the dilution of the matrix (for metal detection). 3. In the case of microplastic, modification of the tubing lengths and flow rate will be explored to enhance the size separation due to the shear-enhanced dispersion of particulate matter subjected to a steady laminar flow.				
9	Incorrect integration of the different criteria considered in the MCDA for Hybrid solutions (M, H).	3	T 3.3	24 -H	The number of criteria can be easily changed during the methodology design, learning how to do it in-process for future applications.
	EXPANSION OF THE CONTINGENCY PLAN FOR RISK 9: Before - Prevention: During the task 3.2, the selection of the criteria will be checked also from the point of view of the needed conditions for the correct integration in the decision-making process. - During - Measurement and correction: If the needed conditions change or are not feasible, the criteria will be combined and considered in different ways, looking for the best possible integration.				

	- After - Compensation: If needed, the impact of this risk will be compensated during the task 3.4, taking advantage of the GIS to look for different combinations of criteria.				
10	Fail in the stakeholder engagement (M, L)	4/6	T 4.1 T 6.3 T 6.5	8 – L	Definition of an engagement strategy, including dialogue with main target actors and develop an additional list of stakeholders to contact.
11	Identifying closed communications protocols that make harder data access (L, H)	4	T4.2	12 - M	Development of open communication APIs for specific suppliers. Selecting other equivalent device with open communication protocols.
12	Not enough data to perform properly the simulations (M, H)	5	T5.4	24 - H	Close collaboration with demo sites leaders to define the data structure needed along all the development & leverage readily available datasets.
	EXPANSION OF THE CONTINGENCY PLAN FOR RISK 12: - Before - Prevention: during the AI-Assisted platform design phase, data that will be available for the development of the simulations will be identified working together with the partners in charge of the demo-sites. The models/simulations to be proposed for development in the project will consider the available data. - During - Measurement and correction: If data scarcity is detected, the data gathering and calculation engine modules of the AI platform will be designed and developed in such a way as to allow hosting different types of data from previous packages (WP1, WP2 and WP3) and external sources. In this way, a wide variety of data will be accessible to perform different simulations that meet the objectives of the project. - After - Compensation: if needed, the models under development in WP4 will be adapted to achieve the objectives of the project in terms of simulations using the data available at each demo-site. In addition, the models will be developed so that they can be improved as the amount of available data increases.				
13	Difficulty in collecting raw/treated water samples from the implemented NBS, due to the unpredictability of rainfall events (L, M).	5	T5.1, T5.3	8 - L	It will be possible to implement automatic sampling methods of raw/treated waters guided by events, refining the sampling methods following the first occurred events.
14	Failures in the validation of the MCDA for hybrid solution in the case studies (M, M)	5	T5.5	16 - M	The lessons learnt will be applied to improve it and try to validate the new version in the replication sites.
Dissemination & Communication, IPR & Exploitation Risk					
15	Lack of participation in the serious games (L, M)	6	T6.1 T6.3	8 - L	Local engagement actions are coordinated in a dedicated task and there is a budget provision with prizes to boost participation through challenges.
16	Low interest on project outputs by targeted stakeholders & policy makers (L, M)	6	T6.2, T6.3, T6.5	8 - L	End users have been included in the project to ensure solutions are adapted to real problems. The co-design will

					ensure that the outputs are in line with existing needs.
17	Low dissemination impact (M, M)	6	T6.2, T6.5	16 - M	Periodical monitoring of dissemination indicators and fast implementation of corrective actions
18	Low engagement of actors (L, M)	6	T6.3	8 - L	Each of the responsible partners has significant experience working with the water pollution sector, and will build on their existing initiatives and strong local networks to identify and recruit actors for the co-design. The robust methods for recruitment, will ensure sufficient actors are engaged. Where there proves to be local difficulties in recruiting, in the first instance, this will be overcome through assistance and advice from other partners. However, in the event recruitment challenges cannot be overcome, the targets of other partners will be increased (with appropriate reallocation of budget as required). This will ensure that the overall number remains sufficient.

Table 4 Unforeseen risks and mitigation measures.

RISK NUMB.	IDENTIFIED RISK (level of likelihood/Severity: low, medium, high).	WP	TASKs	RISK LEVEL	PROPOSED RISK-MITIGATION MEASURE
Technical risk					
U1	Limited Scalability of Suspect Screening and NTS workflows (M, H)	1	T1.1, T1.2	24 - H	Implementation of SoA workflows on well-established Suspect lists of CECs'.
	EXPANSION OF THE CONTINGENCY PLAN FOR RISK U1: - Prevention: Scalability will be assessed during task 1.1 to ensure that workflows are suitable for upscaling and high-throughput applications. Samples will be stored to enable later re-analysis. - Monitoring and correction: Ongoing monitoring of the performance of the suspect screening and NTS workflows. If necessary, workflows will be adjusted to ensure scalability, e.g. by adhering to established workflows for relevant CECs. - Compensation: Impact of the risk can be compensated by implementing alternative workflows, which is also an applicable for re-analysis of stored samples.				

U2	SERS detection of triazines and 6PPD-Quinone as well as Raman detection of microplastics using a chip fails (M, M)	2	T2.3, T2.4	16-M	1. Interactive process for the readjustment of the chip designs; 2. Modification of the Raman system: a) Explore the reduction of spot size, also working distance, to reduce background and improve the spatial resolution (e.g. integrating Aspheric Lens into the Raman probe); b) modify the slit of the Raman spectrometer.
U3	Loss of analyte concentration by non-specific adsorption in the monitoring system (H, H)	2	T2.3, T2.4	24-H	Localization of the component/step/module that is provoking the poor performance. Then, the mitigation plan will be according to the component/step/module: a) Non-specific adsorption reduction by coating the sample preparation module with polymers such as polyvinyl alcohol (PVA) or hydroxypropyl methyl cellulose (HPMC); b) Integrate an adsorption cartridge involving COF in the sample preparation module to reduce the time of the analytes into the system; c) Explore alternative to enhance the sensitivity of the sensor taking in account the loss of non-specific adsorption: i) Modification of Raman system to improve spatial resolution (change slit or/and reduce spot size of the Raman probe) to improve limit of detection and limit of quantification of the SERS-based and Raman-based sensors; d) Modification of the operational strategy (e.g. time of sample collection, sample injection time for each sensor, the residence time of samples into the reservoir, etc), which would lead to a better design and operational guidelines for the specific type of runoff water.
U4	Communication with AI platform (WP4) fails (M, M)	2,4,5	T2.4, 2.5	16-M	The prototype will be placed in a cabinet adequate to environmental conditions and with safe locker. When possible, the cabinet will be placed in a closed housing close to the sample collection point. External pieces will be minimized and add-ons like solar panels will be avoided when possible (when access to the power network is granted).
U5	BIM could not be applicable to the parametrization process in this moment (M, L)	4	T3.2	8-L	BIM is not needed for GIS implementation and consequently, the parametrization could be done in an easier alternative way.
U6	System broken during transport or use(L/H)	5	T5.3	12-M	Insurance for shipping.

Consortium Management Related Risks					
U7	Personnel in leave (sick, parental, change of job) (M, M)	all	all	16-M	If possible, new position released (at least 3-4 months delay).

3.3 Risk matrix as a living document

During the project, main internal tool to follow the defined risks and include new identified risks is the Risk Matrix as Living Document. This constitutes a Risk Register that will contain the risk identifier, risk name and short description, the category and owner, as well as strategies, actions and timing to facilitate the monitoring and control during the project.

This active “Risk Matrix” is uploaded as a living document in an internal SharePoint in the following domain: D4RUNOFF RISK MATRIX AS LIVING DOCUMENT. It contains the following tabs, (a) Foreseen risk registers, (b) Unforeseen risk register, (c) a file for each risk, to be completed with extra information. A snapshot is showed in Annexe A.

The content of this internal control matrix will be periodically uploaded into the SyGMa ("System for Grant Management") application of the Participant Portal in the "Critical risks" section. For the correct management of risks and in case of doubt, the information in SyGMa will be taken as the most updated and reliable. A snapshot is showed in Annexe B.

These active documents will guarantee a proper evaluation of the risk occurrence and the effectiveness of the proposed mitigation responses and will be updated once a month by the Steering Committee (SC) and yearly to General Assembly (GA), unless the project consortium unmasks some high-level risk. In such as case, the consortium response must to be quick and effective, therefore new meetings and actions could be stablished to deal with. Risk management updates will be incorporate to the Risk Matrix in the course of and ordinary or exceptional meetings.

4 Responsibilities in risk management process

4.1 Responsibilities on task level general approach

The assessment of risks is an integral part of the project management. Each **Task Leader** TL is responsible to identify possible risks and mention them to the responsible WP Leaders in the monthly WP meeting. If the manifested Risk Level is High, TL will communicate the situation to the WP leader (email, phone call or TELCO) within 5 days for an emergency meeting. Due to the task leaders have enough expertise and experience to detect the manifestation of risks that endanger their work and the whole project, they are the first control level in risk management and the risk owners. “Risk owner” is defined as the individual responsible for observing each potential risk related to their tasks and also executing a risk response (together with the PC or the RDM) if a risk event takes place. Risk ownership is a key part of the mitigation plan; it guarantees the implementation and monitoring of mitigation measures.

As mentioned above, in order to carry out a proper monitoring, in form and time, all task leaders have been asked about the relationship between tasks and identified WP´s risk. To sum up,

below there is a list of the D4RUNOFF risk owners, its associated risk numbers (see Table 3 & Table 4 for the whole RISK MATRIX) and tasks according to the partners 'criteria (Table 5).

Table 5 Critical risks, tasks and Risk Owners

RISK NUMBER	RELATED TASKS	RISK OWNER
1	ALL	VCS
2	ALL	VCS
3	ALL	VCS
4	T1.2, T1.3, T1.4 (WP1)	UCPH
5	T1.1, T1.2, T1.3 (WP1)	UCPH
6	T5.6 (WP5)	VCS
7	T2.3, T2.4, T2.5 (WP2)	INL
8	T2.3, T2.4, T2.5, T5.3, T5.4 (WP2 & WP5)	INL
9	T3.3 (WP3)	UC
10	T4.1, T6.3, T6.5 (WP4 & WP6)	3OC
11	T4.2 (WP4)	ITG
12	T5.4 (WP5)	ITG
13	T5.1, T5.3 (WP5)	UCPH (T5.1) & INL (T5.3)
14	T5.5 (WP5)	UC
15	T6.1, T6.3 (WP6)	3OC
16	T6.2, T6.3, T6.5 (WP6)	3OC
17	T6.2, T6.5 (WP6)	3OC
18	T6.3 (WP6)	3OC
U1	T1.1, T1.2. (WP1)	UCPH
U2	T2.3, T2.4 (WP2)	INL
U3	T2.3, T2.4 (WP2)	INL
U4	Task 2.4 and 2.5 (WP2)	INL
U5	T3.2 (WP3)	UC
U6	T5.3 (WP5)	INL
U7	ALL	VCS

4.2 Responsibilities on work package level general approach

WP Leaders assume responsibility for the control of the risks related to the tasks, deliverables and results related to their WP. Task leaders will inform them monthly about the state of the foreseen risk and the evolution of the mitigation measures. While, WP Leaders will share this data monthly with the Steering Committee during the recurring meetings.

As defined in section 2.1, according to the risk level, WP Leaders duties are:

- If the **Risk Level is Low**, the Work Package Leaders are the final step of escalation for decision making. They have to register the incidence in the "Living Document" in the shared folder (D4RUNOFF RISK MATRIX AS LIVING DOCUMENT) in (a) Foreseen risk register or (b) Unforeseen risk register and in SyGMa.
- If the **Risk Level is Medium or High**, their main role is communicators. In the case of a manifested Medium level Risk, they must report to the PC in the monthly Project meetings and to the RDM during General Assembly meetings. If the manifested risk is high, work package leaders shall report urgently to project coordinator and RDM within 5 days.

4.3 Responsibilities on project level general approach.

At project level, D4RUNOFF has set up 2 figures of responsibility, the **PC** and the **RDM.**

4.3.1 PC responsibilities at project level

PC as member of the Steering Committee, must to fix a time to review risk management evolution in every monthly meeting of the Steering Committee. According to the Risk Level, PC´s duties are the following:

- If the **Risk Level is Medium**, PC is the final step of escalation for decision making. They have to register the incidence in the "Living Document" in the shared folder (D4RUNOFF RISK MATRIX AS LIVING DOCUMENT) in (a) Foreseen risk register or (b) Unforeseen risk register and in SyGMa.
- If the Risk Level is High, the PC will contact to the RDM urgently within 5 days to stablish exceptional meetings to a proper and successful mitigation response.

4.3.2 RDM responsibilities at project level

In order to support PC in the management of this three-and-a-half-year project, D4RUNOFF consortium has include the figure of **RDM**. **RDM** brings visibility to risks and accountability as to how they are handled and ensures that project risks are proactively dealt with and regularly monitored and controlled. RDM is not part of the Steering committee but of the GA. Therefore, the responsibility of the RDM in project risk management is as follows:

- If the **Risk level of manifested risk is Low or Medium**, or in any ordinary situation, the PC will inform RDM twice a year, during the GA. RDM must review and control the evolution of foreseen and unforeseen risks and to take actions, if is required. These actions could include, among others: Confirm with the work package leaders the correct

evolution of the mitigation measures, stress the control of high-level risks or correct errors. Comments or notes will be including in the Risk Matrix. and internal technical progress reports.

- If the **Risk Level is High**, the PC will contact to the RDM and both will establish an urgent meeting with the involved partners. The RDM have to register the incidence in the "Living Document" in the shared folder (D4RUNOFF RISK MATRIX AS LIVING DOCUMENT) in (a) Foreseen risk register or (b) Unforeseen risk register and in SyGMa. .

5 Risk management on the project level for an unforeseen risk

During the execution of the project it is possible that some other unforeseen risks may arise suddenly. The procedure in these cases is as follows:

- A partner detects how an unforeseen risk manifests itself.
- Partner must communicate this fact to the TL or/and the WP leader within 5 days in order to classify the risk and define a mitigation measure. If the Risk Level is High, they have to involve PC and RDM within other 5 days.

6 Risk monitoring timeline and updates

The initial Risk Breakdown Report have been delivered at M3 as a framework for the Consortium and the responsible partners in the risk management. The *Risk Matrix* is a living document ready to be used to all partners involved in the risk management along with the project duration.

Risk matrix updates will be showed to the Commission in the different Progress reports in the corresponding Periodic Reports in M18, M30 & M42.

7 Conclusions

To sum up, this Risk Management Breakdown report has defined the methodology and already identified the basic risks at overall project as well as work package and task level. TL identified in table 4 are Risk Owners of foreseen risk. They are the main control actor in the risk management. Once a risk is detected, WP, PC and RDM will act to control and mitigate the risk, considering the Risk Level. The risk will be discussed monthly with the steering committee and twice a year during the GA meeting.

The document defines the responsibilities towards the risks within the Consortium. Moreover, the anticipated risks that the project could be confronted to are presented and the corresponding mitigation measures are proposed. After assessing the risk exposure level for each identified risk, it can be concluded that no critical risk was found.

8 Project partners

Table 6 Project partners

NO.	Name	Short name	Type	Country
1	VCS (Coordinator)	VCS	LE	DK
2	Municipality Odense (*Affiliated*)	MDS	PB	DK
3	Aqualia	AQU	LE	ES
4	Hidrotec (*Affiliated*)	HDR	SME	ES
5	Instituto Tecnológico de Galicia	ITG	RTD	ES
6	Laboratorio Iberico Internacional de Nanotecnología	INL	RTD	PT
7	Geological Survey of Denmark and Greenland	GEU	RTD	DK
8	University of Copenhagen	UCPH	RTD	DK
9	University of Cantabria	UC	RTD	ES
10	Three o clock	3OC	SME	FR
11	Ingegnerie Toscane	ITS	LE	IT
12	Mitiga	MTG	SME	ES
13	Klink	KLK	SME	IT

9 Acronyms

Table 7 Acronyms

Acronym	Name
CA	Consortium Agreement
RDM	Risk and Data Manager
EC	European Commission
GA	General Assembly
PC	Project Coordinator
RP	Reporting Period
SC	Steering Committee
TL	Task Leaders
WP	Work Package
WPL	Work Package Leader

ANNEX A SNAPSHOT OF D4RUNOFF RISK MATRIX (IN THE INTERNAL SHARE POINT)

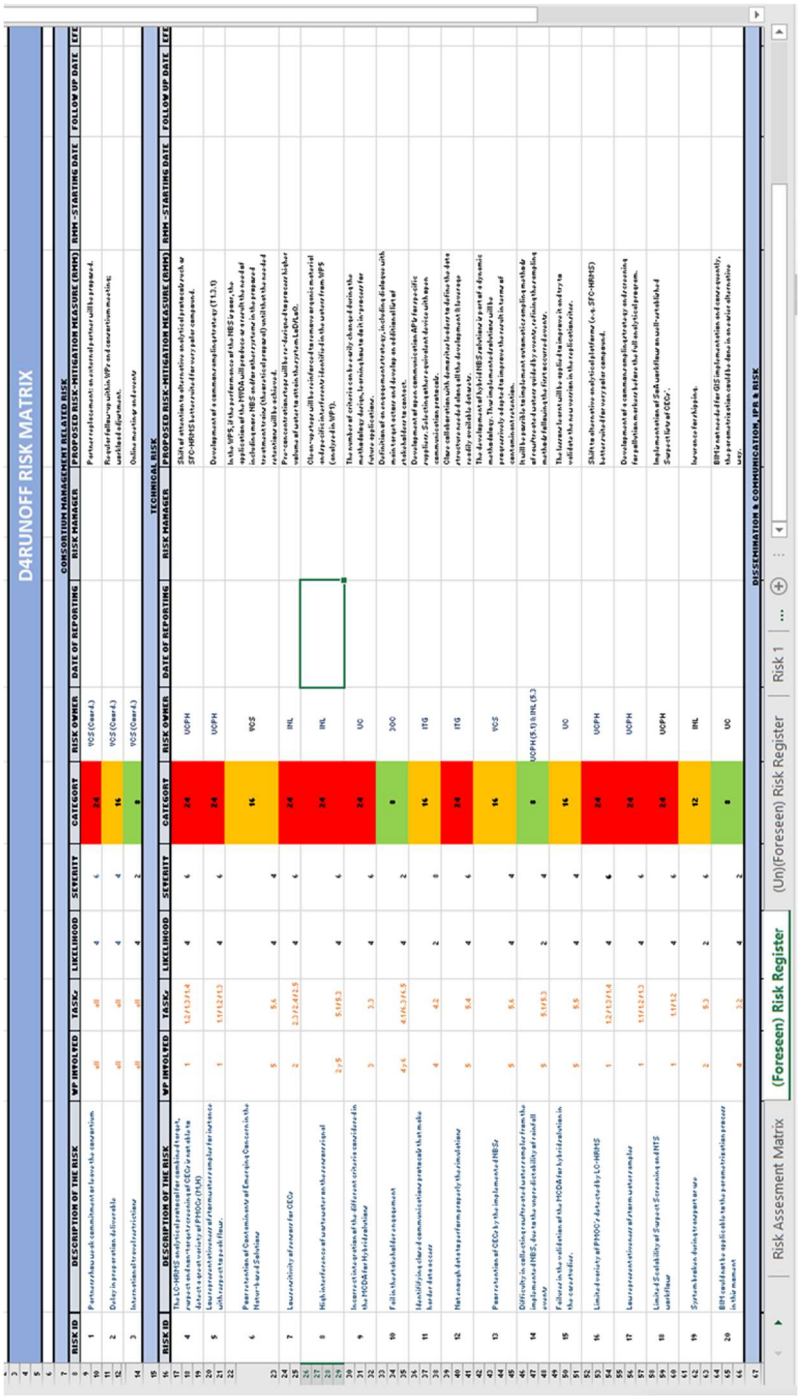

Figure 2 Snapshot of D4RUNOFF Risk Matrix (in the internal share point)

ANNEX B SNAPSHOT OF D4RUNOFF RISK MATRIX (IN THE PARTICIPANT PORTAL)

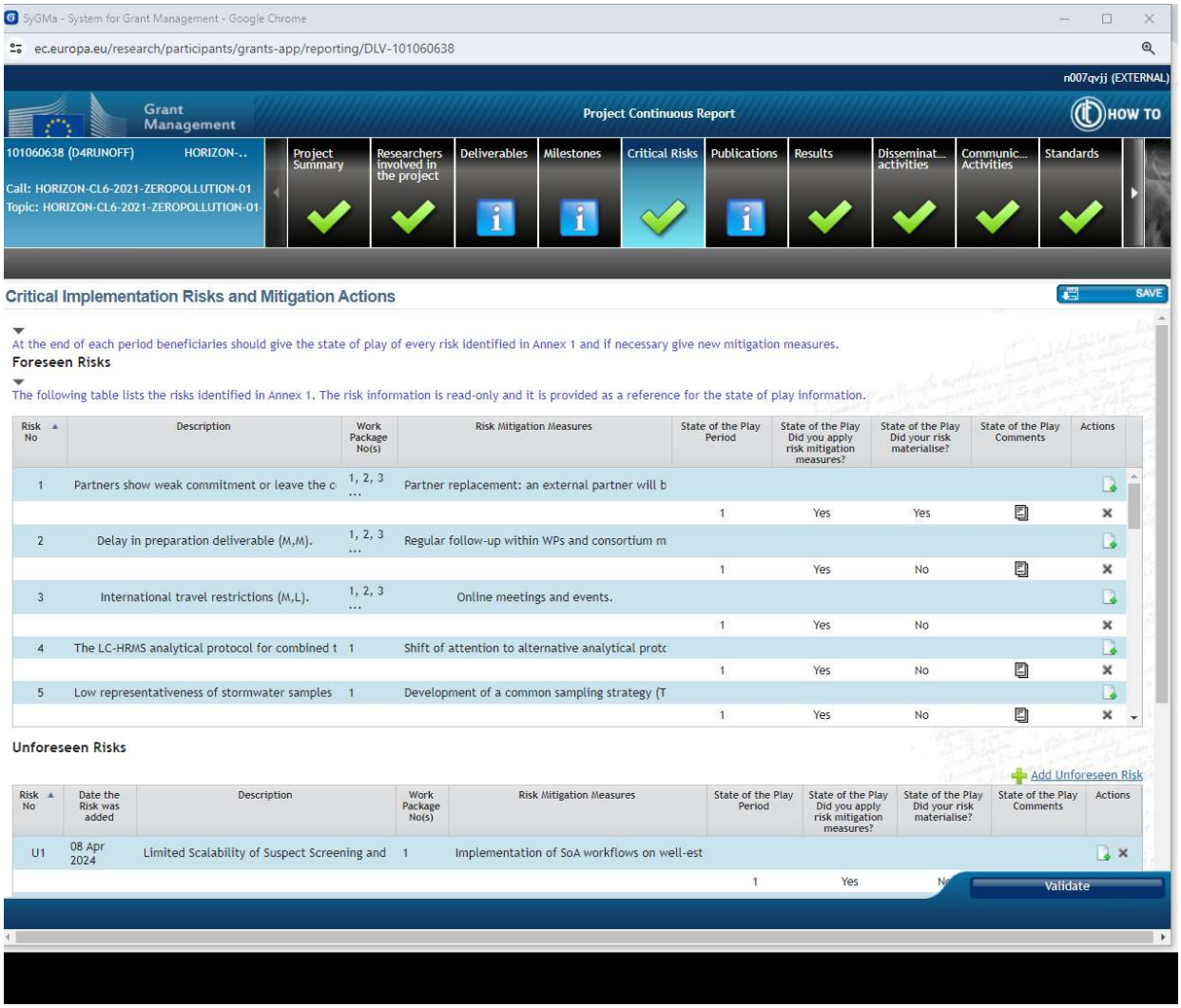

Figure 3 Snapshot of D4RUNOFF Risk Matrix (in the participant portal)