OneAquaHealth

PROTECTING URBAN AQUATIC ECOSYSTEMS TO PROMOTE ONE HEALTH

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D6.1 OneAquaHealth Open Information Hub vs1

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0.4	22.12.2023	EFMI	Review of the deliverable
1.0	27.12.2023	SYNYO	Final version of the deliverable

Executive Summary

Departing from the outcomes of the ecosystem assessment and the insights, which are continuously collected through the knowledge exchange with relevant stakeholders in the field, the project created an Open Information Hub to showcase the results using smart infographics and data visualisation tools including Citizen Science app, connected Community module and City dashboards. The later will be designed, developed and implemented into the Hub to allow citizens, national and international policy makers and authorities to access and manage earth observation analytics, statistics and early warning preventive services. The OneAquaHealth Open Information Hub constitutes a lively space where stakeholders can gain an overview of the ecosystem and present user stories, analysis results and all other knowledge materials to the project's main audience.

Through the Hub OneAquaHealth seeks to enables knowledge sharing and collaboration among stakeholders and other interested groups in the large domain of One Health in Europe to influence policy initiatives and guidelines beyond the project funding. As the project's main communication channel, it aims to target citizens, policy makers and authorities, researchers, civil society organisations, standardization bodies, investors, industry representatives and business partners and other stakeholders such as related projects and initiatives.

The deliverable D6.1 describes the current state of the OneAquaHealth Open Information Hub and contains statements about future developments that are based on the collected knowledge and feedback from the consortium organisations. Further developments will be reported in the next versions of the document.

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Acronyms & Abbreviations

Term	Description
AI	Artificial Intelligence
API	Application Programming Interface
AWS	Amazon Web Service
CI/CD	Continuous Integration/ Continuous delivery
CMS	Content Management System CMS
CSS	Cascading Style Sheets
DoA	Description of Action
GDPR	General Data Protection Regulation
HTTP	Hypertext Transfer Protocol
IEEE	Institute of Electrical and Electronics Engineers
MVC	Model-View-Controller
OIH	Open Information Hub
PHP	Hypertext Preprocessor
SQL	Structured Query Language
UI	User Interface

1 Introduction

1.1 Overview

This document informs on the creation of the OneAquaHealth Open Information Hub (OIH), including the design of the front end with appealing visualisation targeting all project stakeholders. It represents a centralized, searchable online space that stores multiple types of knowledge sources, aiming to make the connected smart infographics and data visualisation tools including the City dashboards and Citizen Science app and their benefits more visible and understandable to their potential end users.

While the consortium seeks to retain the Hub's structure as highlighted in the Description of Action (DoA) , its individual sections will grow in terms of scope of available qualitative and quantitative data. The Hub will be continuously optimised to be findable via search engines as well as linked via backlinks or third-party platform framework pages. It will include several modules to present to the project's main audience user stories, analysis results and all other knowledge materials, which are generated through the activities in each of the five research cities in Europe, and other actions such as webinars, workshops and conferences, etc. The information of the project will support the uptake of the created City Dashboards and project's outcomes by policy makers and implement them in municipalities and regions for further use. The dashboards will represent web applications that will help citizens and public institutions to access and interpret the data and their statistics through an improved search graph and a graphical visualisation. They will also let the end users control the datasets that offer earth observation analytics/map-interactive visualisations, AI alerts and early warning preventive services for policy makers and health operators.

To ensure the sustainable growth of the connected knowledge base with relevant insights on existing capability gaps and innovation needs in the field of One Health [1], the project designs and plans to implement a Community module as a part of the technical infrastructure of the Open Information Hub. As such the module will allow through the availability of communication features and functionalities the networking and knowledge exchange between experts of various scientific disciplines. Moreover, the registered members of the Community will have access to dissemination of relevant and up-to-date information and resources on One Health topics, expertise, challenges, and best practices, and provide feedback and support to each other. Additionally, the module will enhance the visibility and impact of OneAquaHealth project's research and outcomes, by showcasing the developed digital tools and fostering their application and feedback by the members of the Community.

1.2 Methodological approach

This part of the report elaborates the methodology, which was applied by the project consortium to create the Open Information Hub available via www.oneaquahealth.eu including the design of the front end.

The fulfilment of Task 6.1 "Open Information Hub and City dashboards" builds upon the conceptualization of the OneAquaHealth Open Information Hub. The online space includes multifunctional modules and channels, which will be featured by several information and collaborative services. The main content, which is fed into the different directories of the Hub is based on the outcomes of the analysis of the interconnectedness between the health of freshwater ecosystems and human health in urban contexts, and the activities, which aim the design of requirements and

development of digital tools that actively contribute for the establishment of a OneHealth approach in aquatic urban ecosystem. Hence, the Hub constitutes a repository of user stories, analysis results and all other knowledge materials, which is openly accessible for citizens, policy makers and authorities, researchers, civil society organisations, standardization bodies, investors, industry representatives and business partners and other stakeholders such as related projects and initiatives.

1.2.1 Used methods

Based on the current stage of the project implementation and related activities, the following methods contribute to the extension of the Open Information Hub database and infrastructure.

Project workshops

As a part of the work in WP4 a series of reflection workshops are organised at local levels through iterative feedback between the stakeholders, technological developments and intervention model definition. To this aim, Local Alliances will be created in the 5 Research sites to support needs assessment and co-creation, as well as build the ground for the citizen science groups execution. Insights of these events will be showcased on the Open Information Hub to support the establishment of a better common understanding of pressing issues and barriers faced by stakeholders across Europe.

Webinars

Webinars are planned with experts on wellbeing and mental health and urban ecology and restoration of aquatic ecosystems with relevant researchers and stakeholders and members of the Advisory Board. These events will allow the consortium to identify new relevant projects, solutions, best practices and lessons learned that can be added to the knowledge base of the Open Information Hub.

Other consultations

Consultations and online meetings will be continuously carried out with relevant stakeholders in the field such as researchers, standardization bodies, investors, Industry and business partners, related projects and initiatives. These target groups will be engaged to gather additional insights for the establishment of a complete picture of the OneAquaHealth ecosystem and thus lay the ground for the future exploitation of the project's results.

External events

OneAquaHealth is promoted in different project related events, workshops and webinars. Current activities and results are presented to address international audience of researchers, civil society organisations, standardization bodies, industry and business partners and other stakeholders in the field. These events allow the consortium to identify new relevant projects and solutions that can be added to the knowledge base of the Open Information Hub.

Research Cities activities

Five research cities (old: research sites) across Europe are chosen, where tests on ecosystem health indicators, biological indicators of health risk and human/public health indicators will be conducted to close information gaps, and perform citizen science activities. All outcomes will be showcased on the dedicated pages on the Open Information Hub to facilitate knowledge exchange and foster future development activities.

News

Latest updates and information on the project activities, results, and events are presented on the dedicated page on the Open Information Hub. The page aims to inform and engage the visitors and stakeholders of OneAquaHealth, and to showcase the achievements and outcomes of the project consortium.

1.2.2 Relation to other tasks and deliverables

This deliverable is related to the following other OneAquaHealth tasks and deliverables:

D6.1 receives inputs from:

Table 1: Inputs from other tasks and deliverables

Deliverable	Due Date	Input to D6.1
D6.6	30 June 2023	List of exploitable results to be generate throughout its duration as well as identified comparable / complementary solutions, initiatives and projects.
D7.1	30 June 2023	Produced promotional materials, collected knowledge and insights, engaged project stakeholders and conducted project events and activities.

D6.1 provides outputs to:

Table 2: Output to other tasks and deliverables

Deliverable	Due Date	Output from D6.1
D6.2	31 Dec 2025	Update on the Open Information Hub and related technical infrastructure, connected database, modules and tools.
D7.2	30 Jun 2024	Update on promotional materials, collected knowledge and insights, which are published on the Hub.
D6.7	30 Jun 2024	Update on exploitable project's results, which are showcased on the Hub or part of its technical infrastructure (Community module, City Dashboards, etc.)

1.3 Structure of the deliverable

The structure of the deliverable is organised along the following chapters.

Chapter 1 serves as an introduction to the report. It highlights the work, which has been conducted within the OneAquaHealth and the methodology applied by the project to establish the technical infrastructure of the Hub and its connected awareness modules. To make the process more transparent the document informs on the current inputs implemented into the Hub, thus highlighting

the interdependence of the report with the previous and upcoming tasks. In **chapter 2**, the aims, the target groups and their benefits from engaging with the Open Information Hub are outlined as well as the current state of the Hub by presenting snapshots of the different parts of its infrastructure. **Chapter 3** provides information on the technical infrastructure of the multi-layered system, which is connected to the OneAquaHealth Open Information Hub, as well as the selected Content Management System (CMS) and the technologies, which are applied to maintain the Hub up and running. In **chapter 4**, the consortium provides information on the planned extensions of the Hub, including the implementation of the City Dashboards, Citizen Science App and Community module. The design and envisioned functionalities of the latter are presented through mock-ups. **Chapter 5** informs on the approaches to be applied for the validation and further adaptation of the content and components of the tools, which are connected to the Open Information Hub. **Section 6** provides information on the design, communication, and strategies that the project utilize to promote the Open Information Hub.

While the OneAquaHealth Open Information Hub represents the actual deliverable, this document is an additional report intended to explain basic decisions and steps of its development.

2 OneAquaHealth Open Information Hub

2.1 Overview and aims

The Open Information Hub is implemented by the project consortium to enhance the sustainability and resilience of urban freshwater ecosystems and human health. Moreover, the Hub will:

- Facilitate the project's engagement with citizens and other stakeholders by allowing them to upload and share their own content, such as photos, videos, stories, or feedback, related to the urban streams that they care about.
- Induce scientists to contribute environmental data by providing them with dashboards and map-interactive visualisations, where they can access, analyse, and display various data sources and indicators on the ecological and hydrological status of the urban streams.
- Provide health information and metrics relevant to the aquatic health prediction model [2], which uses artificial intelligence and earth observation to forecast the future conditions and risks of the urban streams, and their impact on human well-being and disease transmission.
- Establish decision support services relevant to the OneAquaHealth prediction model, by creating a framework that helps decision-makers and practitioners to identify and implement the best measures and actions to restore and protect the urban streams, and to prevent and mitigate the negative effects of water-related hazards and diseases.
- Offer early warning services based on the OneAquaHealth predictions, which are alerts and notifications that inform the stakeholders about the potential threats and opportunities of the urban streams, and provide them with recommendations and guidance on how to respond and adapt.
- Disseminate the project outcomes and consult the relevant policy actors and institutions, to influence and shape the policy agenda and initiatives on water and health issues.
- Present user stories, analysis results, and other knowledge materials to the project's main audience.
- Facilitate knowledge exchange cycle and synergies among stakeholders within a dedicated Community module, where registered members can share their insights, experiences, and ideas, and learn from each other.

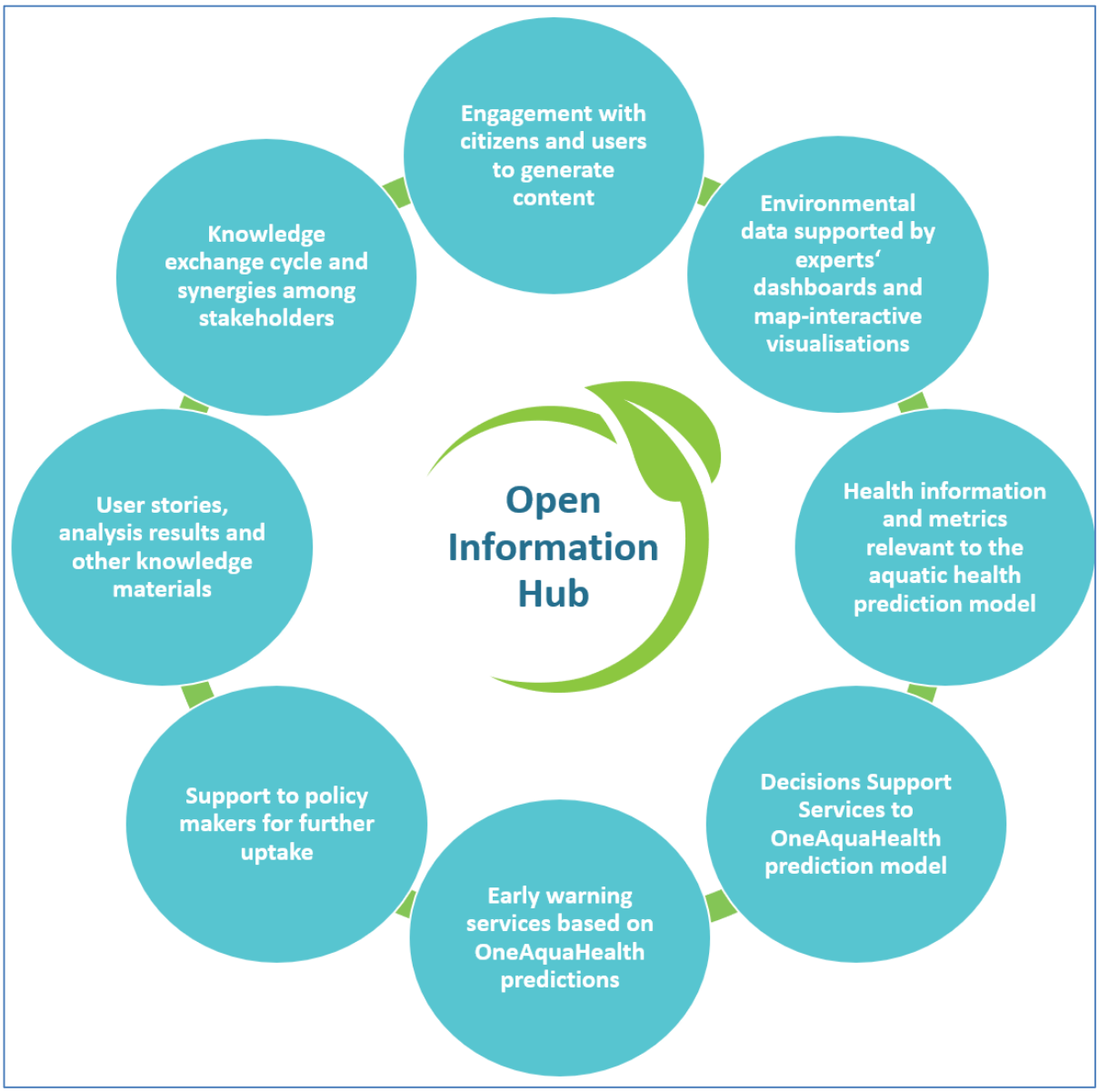

Figure 1: Overview of Open Information Hub's aims

2.2 Target groups and benefits

To ensure that the OneAquaHealth Open Information Hub meets the needs and expectations of the project stakeholders, and it creates value and impact for them also beyond the end of the project, the consortium identified in deliverable D7.1. Communication and Dissemination Plan vs1 the main groups, which will be engaged continuously through the project.

The available materials will inform *citizens* across Europe about how they can contribute to the balance between freshwater ecosystems, human health and wellbeing in urban context and how innovative technologies can be used by them to monitor and maintain their health.

Insights and evidence will be available on how innovative technologies can support *policy makers* and authorities in their decision making and shed light on existing challenges and gaps, and building best practices in the field.

Researchers will access and share via the Hub the latest research results and data on the interlinkage between freshwater ecosystems, human health and wellbeing, and their balance in urban contexts.

Civil society organisations will be able to engage with the OneAquaHealth community and advocate for integration of urban water security by bringing legitimate and credible information on complex water issues and possible solutions to those informal spaces and creating equal access and understanding.

Standardization bodies will be able to contribute to the harmonization of the standards and guidelines for innovative technologies in the field, and their impact on human health and wellbeing. Hence, the quality, reliability, and interoperability of the data collected and visualised on the Hub will be ensured.

The knowledge database on the Hub will support *investors* in the identification and evaluation of the potential and value of innovative technologies, including the tools and algorithms to be developed by OneAquaHealth. Hence, they will be induced to invest in the development and deployment of these technologies, and scaling up and replication of the best practices and policy recommendations in the field of One Health.

Industry and business partners will have the opportunity to inform about market opportunities and end user needs, and how to develop and offer solutions that meet the environmental and social standards and expectations. They can also collaborate and partner with other stakeholders, such as researchers, policy makers, and civil society organisations, to co-create and co-deliver value-added products and services.

Other stakeholders (related projects, initiatives and networks) can access the knowledge database to access and share the latest research results and align and coordinate with the best practices and policy recommendations in this field.

2.3 Current state

2.3.1 Home page

The landing page of the OneAquaHealth Open Information Hub represents a major gateway to the collection of insights, user stories, analysis results and all other knowledge materials and tools established by the project consortium. In fact, the Hub constitutes the most important connection between OneAquaHealth and all relevant external stakeholders in the field, including citizens, researchers, civil society organisations, standardization bodies, investors, industry and business partners and other stakeholders. It is the digital doorway, news center and promotional tool to be applied to ensure that the project's results and achievements can attain high level of awareness. The main structure consisting of drop-down navigation bar and links to the main categories was extended through some additional elements such as cards and links to external sources.

Cards are small rectangular modules and function as main entry point for the visitors, displaying different kinds of content. The WP7 lead, SYNYO, implemented these elements to make sure that the space available on the home page is used efficiently.

New sub-categories were additionally implemented to provide the external stakeholders with the necessary information to further facilitate the uptake of the project's results. The drop-down navigation bar will be updated through several items, including a link to the registration area for the

City Dashboards and Community module, while still remaining easy to navigate through providing a clean interface to users while not compromising the usability. The central place on the home page is reserved for the slider, comprising project related images, that may either be scrolled automatically or let visitors take charge. The slider organises the message to the target audience and enhances the visual appeal of the home page. Moreover it makes the search process for the visitors easier and keeps the users engaged.

Figure 2: Snapshot of the OneAquaHealth Open Information Hub - Home Page

2.3.2 News

Sharing news from the field ensures that the Hub is up to date. It allows citizens, researchers, civil society organisations, standardization bodies, industry and business partners and other relevant stakeholders to remain engaged and build trust. Moreover, over time the news sub-section plays a fundamental role in driving more visitors to the OneAquaHealth Online Information Hub. In order to gain higher rankings in search engines, the project consortium aims to produce considerable amount of content on a regular basis. As the content on the Hub increases through contributions from consortium members and other stakeholders, it ranks for more search terms, and the organic traffic will also become greater. It reminds all interested parties that the Hub is still providing valuable content. This section has a clean design allowing the visitors to find various content independently from the kind of device in use. Each new item gets automatically published on the project's social media channels, thus helping the consortium to reach out to a broader audience or potential participants in the knowledge exchange.

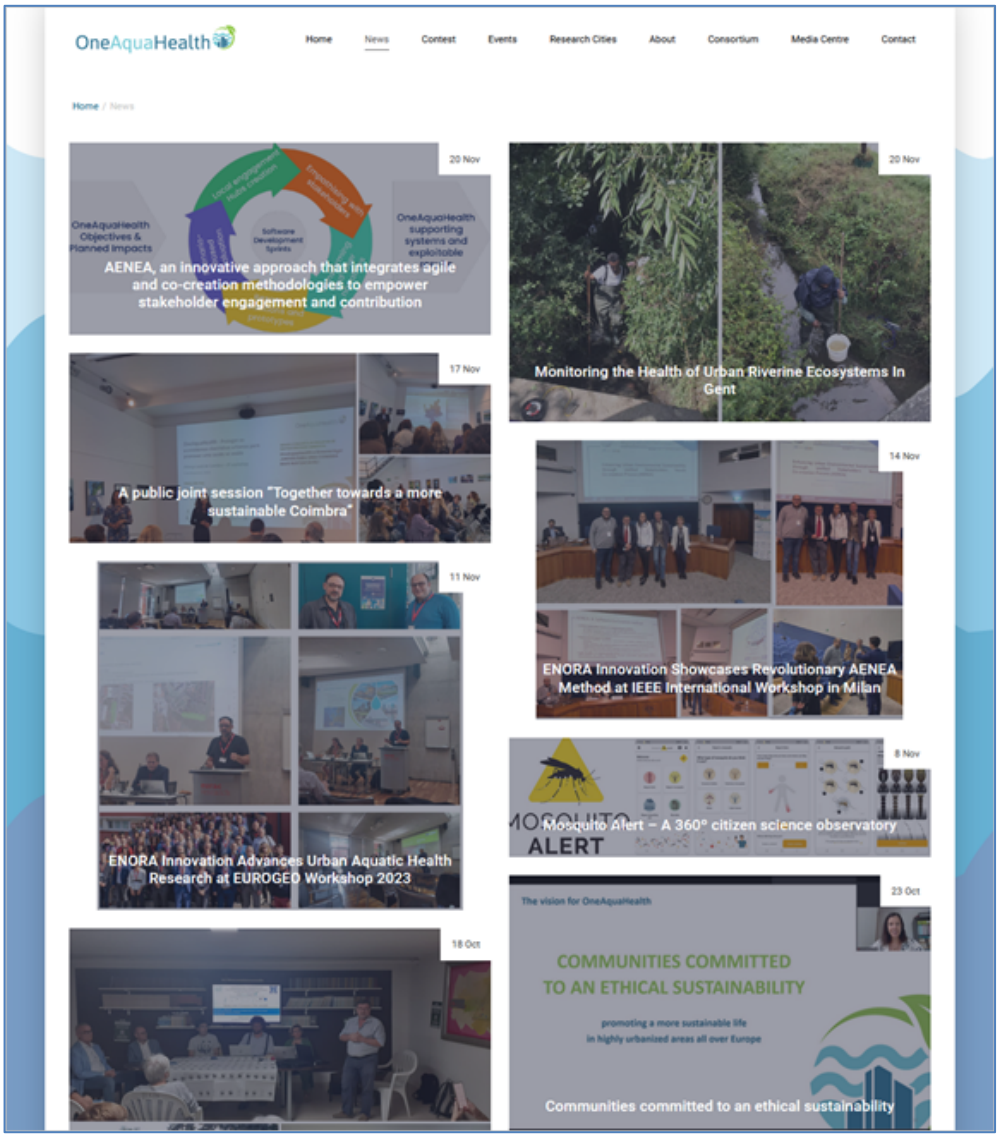

Figure 3: Snapshot of section "News"

2.3.3 Contest

To boost awareness on the OneAquaHealth activities and results and thus engage actively with the project's stakeholders on the Open Information Hub and connected social media channels, the consortium launched a contest. The topic of the latter is urban streams that the participants care about and want to share with other citizens. According to the conditions of the contest, the participants can choose to submit either one single photo or one video with a maximum length of 20 seconds (in horizontal or vertical format). They need to post their photo or video on Twitter or Facebook. The winners will be selected by a combination of online community rating and jury rating. The prizes include participation in project events, award of certificate and other. The page includes information about guidelines and a Q&A section, which aims to ease the process of participation in the contest.

Figure 4: Snapshot of section "News"

2.3.4 Research cities

The project implemented a special overview page and connected subsections that show the activities that will take place in different parts of Europe. These activities include involving citizens in science, testing the project's tools and getting feedback on them, and spreading and using the project's results. OneAquaHealth works in five research sites (research cities) in the urban areas of Coimbra - Portugal, Toulouse - France, Benevento - Italy, Ghent - Belgium, and Oslo - Norway. These sites have different climatic areas and cultural backgrounds, and experiences in protecting and restoring rivers.

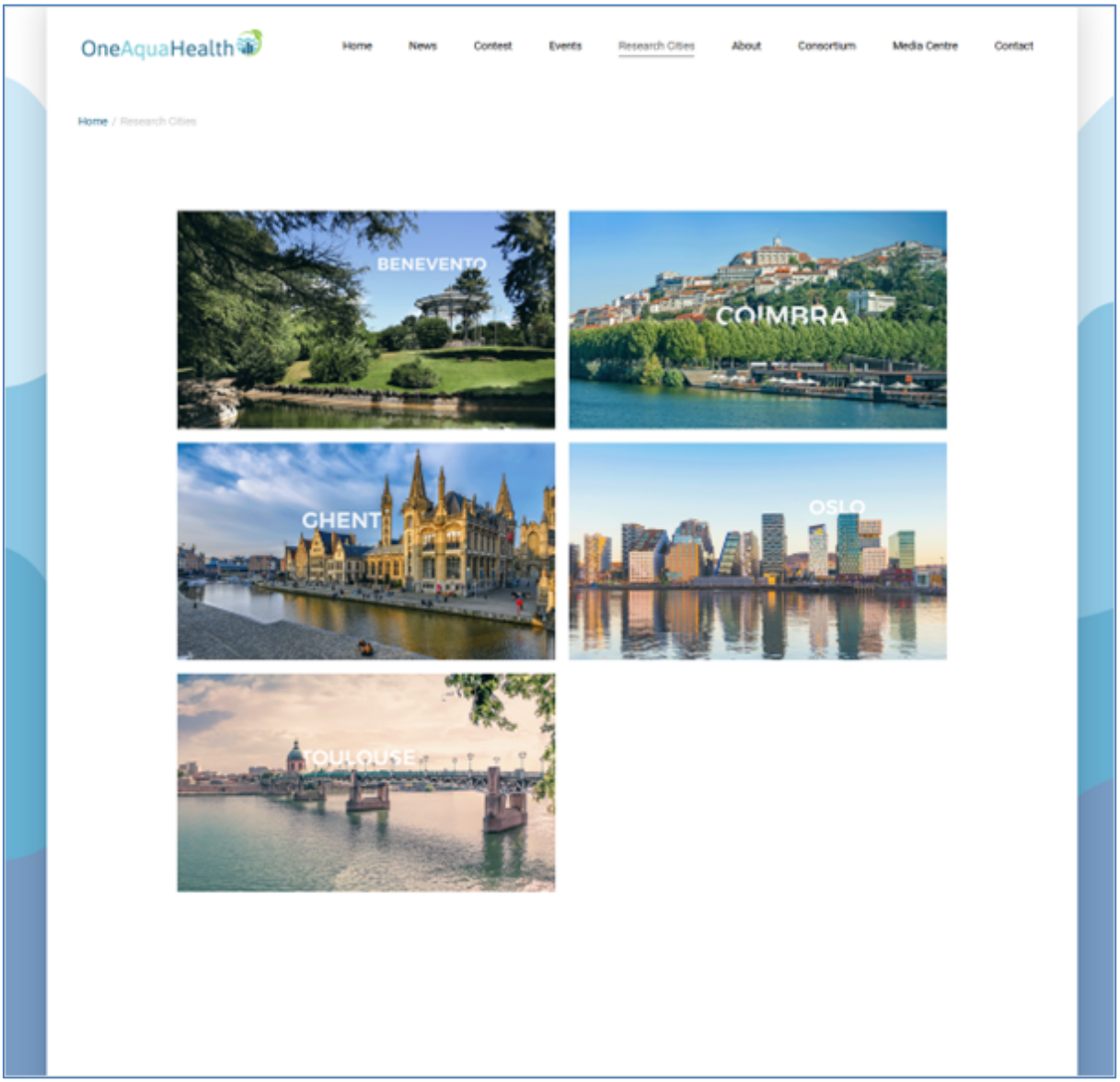

Figure 5: Snapshot of section "Research Cities"

Each of the subsections relates to one of the five research cities and will be updated throughout the project based on the activities and related outcomes. The implemented results will be then broadly promoted via the project communication channels, including the Open Information Hub, social media channels and newsletter. Hence, the project will seek to reach out to stakeholders, who have not been engaged through the activities at the research sites yet and induce them to contribute to the project success.

2.3.5 About

The “About” page on an Open Information Hub provides information about the OneAquaHealth project, its objectives, impacts, partners, and project structure. It is a way to introduce the project to the visitors of the Hub and explain why the project is important and relevant. As such it highlights the main activities of the project, and how they are aligned with the needs and challenges of the target audience or beneficiaries. To achieve this in more user friendly way, the consortium implemented a clear and engaging language as well as expandable elements in order to fit their contents.

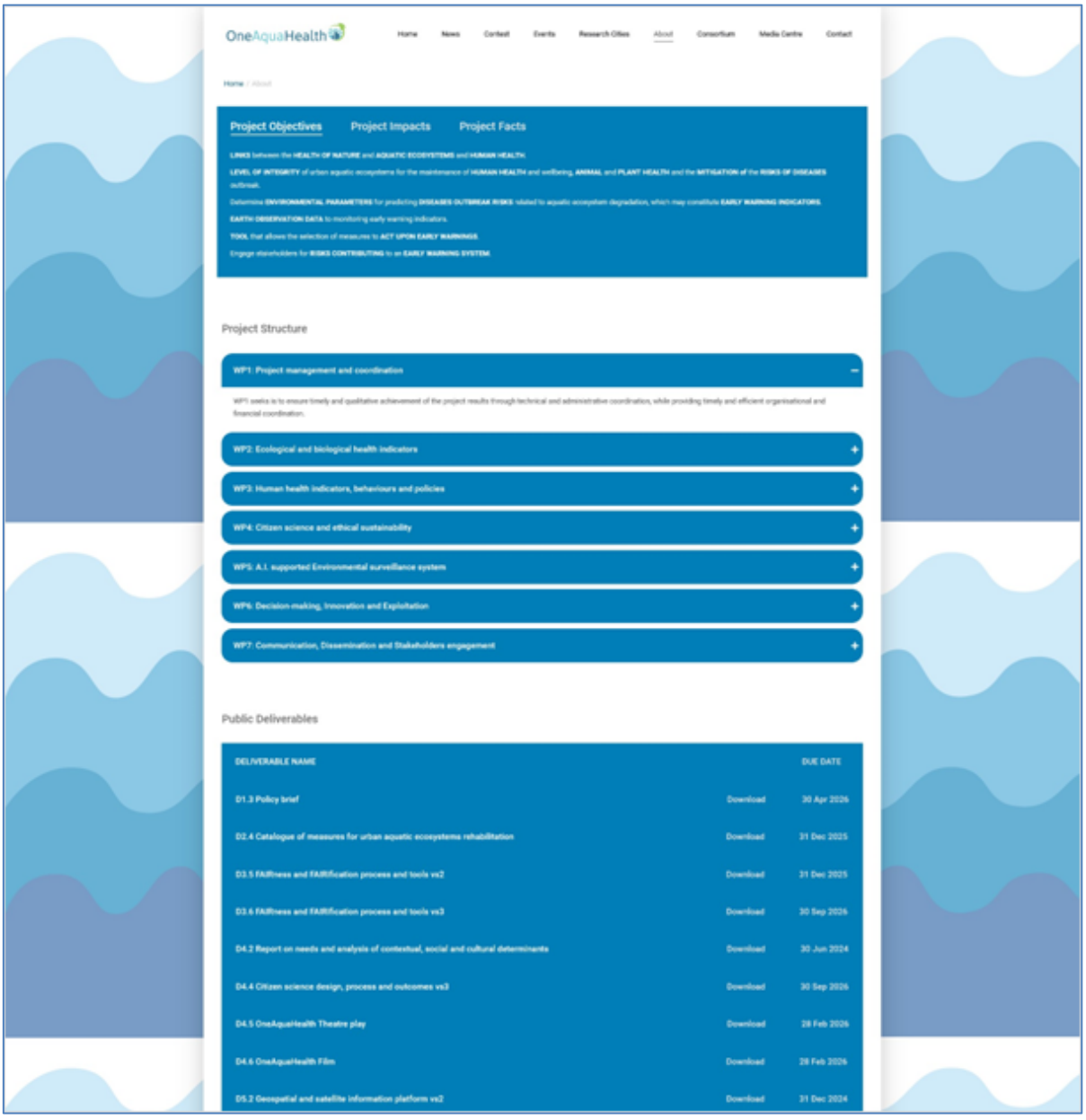

Figure 6: Snapshot of section “News“

2.3.6 Consortium

The “Consortium” page on the Open Information Hub introduces the organisations, which are involved in the project, their expertise and experience. It is a way to showcase the diversity and quality of the project partners and highlight their contribution and added value to the project. As such the section includes a list of the OneAquaHealth project partners, their names, logos, and links to their websites and social media channels.

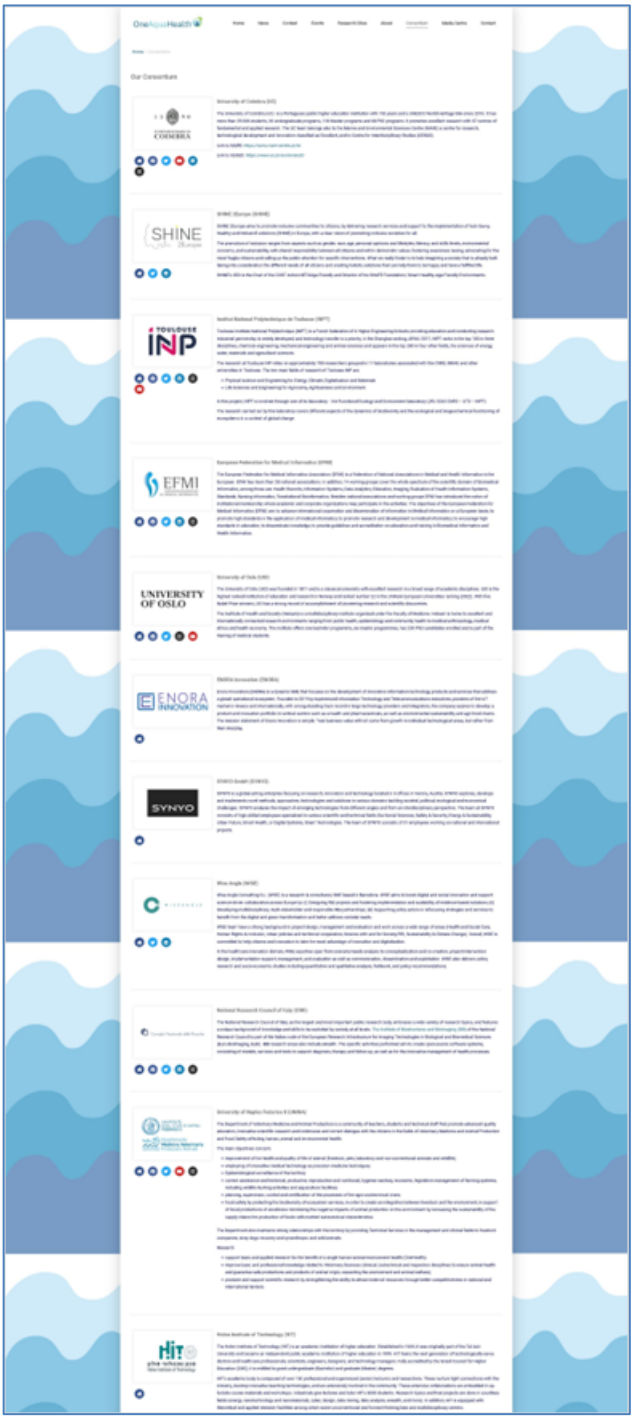

Figure 7: Snapshot of section "Consortium"

2.3.7 Media Center

The consortium created a “Media Center” page, where OneAquaHealth shares its promotional materials, such as the project logo, project leaflet, etc.. As such it invites the visitors to download and use the materials for their own purposes, such as presentations, publications, or social media posts.

The project logo is the visual identity of the project. The logo consists of the name of the project and a graphic element that represents the main idea of the project. The logo is available in different formats and sizes, and can be downloaded by clicking on the link below the logo.

The project leaflet is a printable document that gives an overview of the project, its objectives and its planned activities. The leaflet is designed to attract the attention and interest of the potential audience and beneficiaries of the project’s outcomes and solutions.

Figure 8: Snapshot of section "Consortium"

3 Technical infrastructure

In this section an overview of the multi-layered system, which is connected to the OneAquaHealth Open Information Hub is presented, as well as the selected Content Management System (CMS).

3.1 High level architecture

The following high-level architecture represents the multi-layered technology stack designed for managing, processing, and visualizing data, with a focus on geospatial and environmental information. The architecture is segmented into several layers, each responsible for a different aspect of the system's functionality, and includes security and support mechanisms.

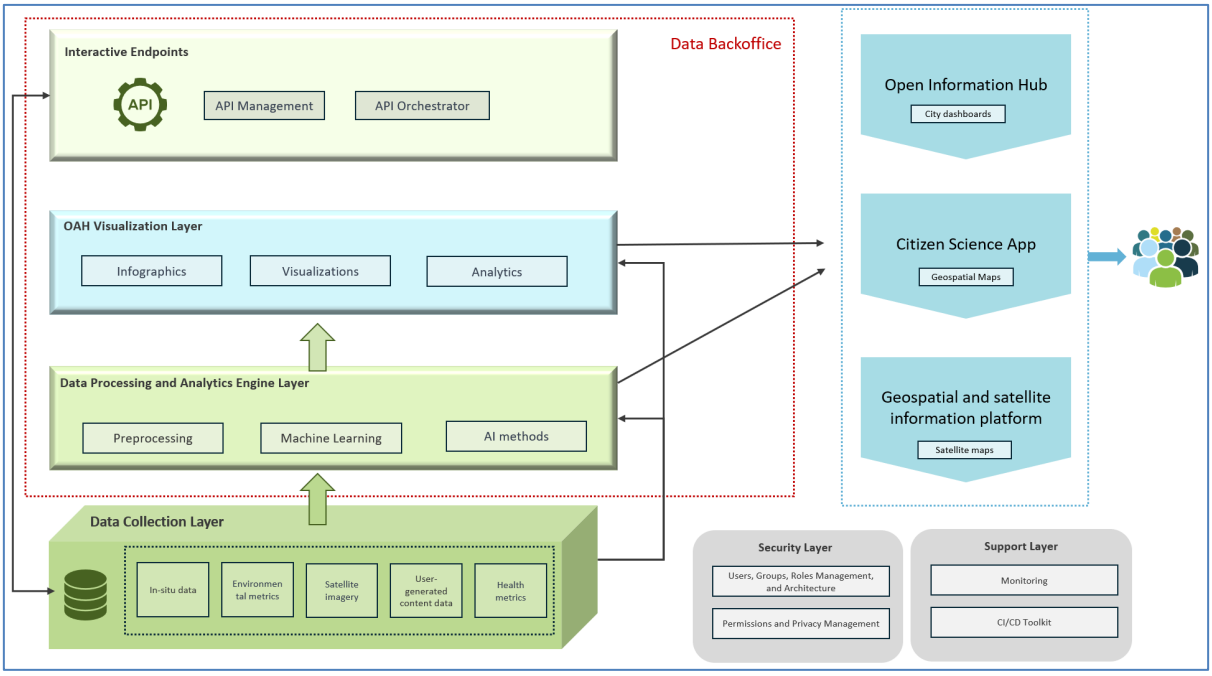

Figure 9: Technical infrastructure

The architecture (Figure 9) presents several interconnected layers, each with a specific focus and function. At the base is the Data Collection Layer, tasked with gathering data from diverse sources such as in-situ measurements, environmental metrics, satellite imagery, user-generated content, and health metrics. Above this lies the Data Processing and Analytics Engine Layer, where the collected data undergoes preprocessing, analysis through machine learning algorithms, and application of various AI methods. The OIH Visualization Layer then takes over, translating the processed data into easily understandable formats like visual analytics, aiding in deriving actionable insights. Interaction with the system is facilitated by the Interactive Endpoints layer, which manages the Application Programming Interface (API) calls through API Management and Orchestrator, enabling user-system interaction. A separate entity, the Data Backoffice is managing the overarching data infrastructure. The Open Information Hub, another distinct component, serves as a public-facing platform, displaying city dashboards and integrating with the Citizen Science App, which encourages public engagement through geospatial maps. Linked to this is the Geospatial and Satellite Information Platform, specifically focused on providing satellite map data, highlighting its emphasis on geospatial data visualization. Ensuring the security and privacy of data and user interactions is the Security Layer,

encompassing management of users, groups, roles, and architecture, along with permissions and privacy controls. Finally, the Support Layer, crucial for the system's sustainability and efficiency, includes monitoring tools and a Continuous Integration/ Continuous delivery (CI/CD) toolkit, ensuring continuous system performance and effective deployment processes. This multi-layered high level architecture collectively forms a comprehensive system of the OIH, which is designed for efficient data handling, processing, visualization, and public engagement, while maintaining stringent security and support protocols.

3.2 Basics

For the development of the Hub's database modules, the WordPress Plugin Framework Herbert was used. It allows a more structured, efficient and standardized development. The development follows the Model-View-Controller (MVC) architecture pattern [3] that is shown in the image below.

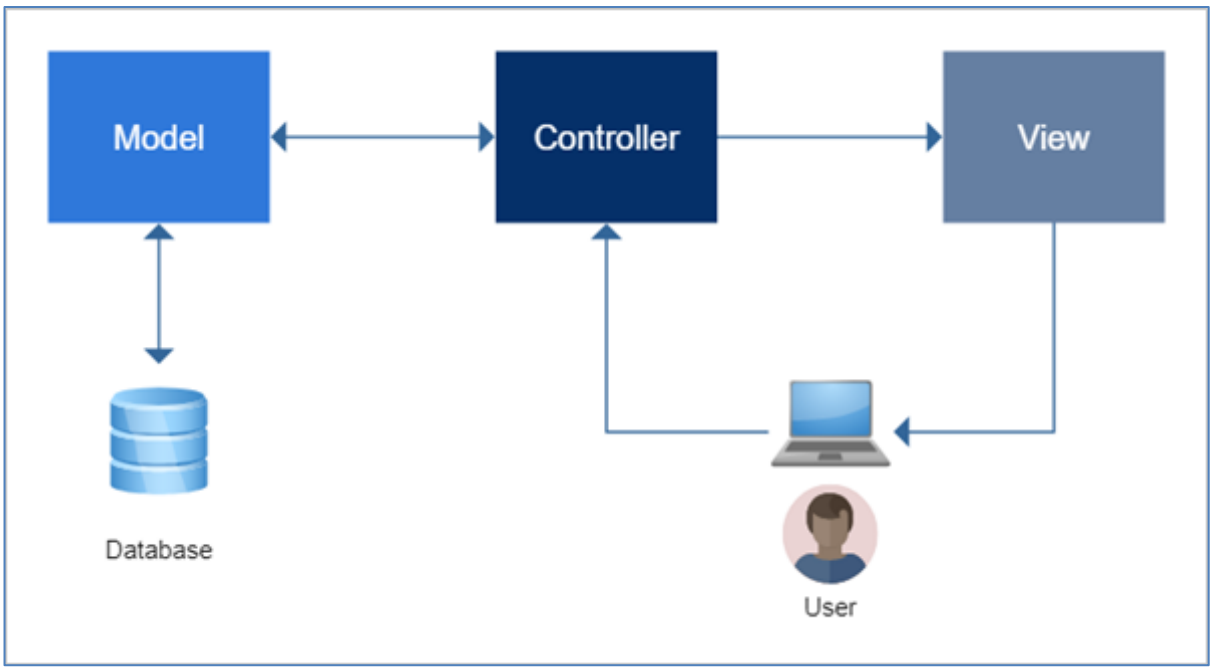

Figure 10: Overview MVC-Pattern

Model–View–Controller (usually known as MVC) is an architecture pattern used for developing user interfaces that divides an application into three interconnected parts, the **Model**, the **View** and **Controller**. The MVC design pattern decouples these major components allowing for code reuse and parallel development.

The **Model** consists of several classes. Each represents a basic unit within the data structure used. They also provide basic data operations that are not part of the basic program logic. Among other things, the connections to other database tables as well as the own table are defined here.

View provides the graphical user interface of the classes. The Model provides the displayed data, but a direct connection between the two parts of the program does not exist. The Controller informs the View components of changes to the Model and adapts the displayed content as needed.

The **Controller** classes act as a link between View and Model components. Actions of the user are forwarded from the View to the Controller. The logic informs individual views, if necessary, about changes to the model in order to enable an appropriate response to them.[1]

3.3 Technologies

The following table provides an overview of the used technologies for the development of the modules.

Table 3: Technologies

Resource Type	Name	Version
HTTP Server	Apache	2.4.6
Programming Language	PHP	7.2.34
PHP CMS	WordPress	5.7.2
HTML, CSS & JS Framework	Bootstrap	4.3.1
WordPress Plugin Framework	Herbert	0.9
PHP Template engine	Twig	1.35
PHP Framework	Symfony Components	4.0
JavaScript Library	jQuery	1.12.4

The main part of the Hub's infrastructure is built on open-source technology using modern and well-established webservers (e.g. Apache 2.4.6), relational database management systems (e.g. MySQL 5.6.x), server-side scripting languages (e.g. PHP 7.2) and Centos Linux-based operating systems and main CMS is WordPress 5.2.3. The Backend stack technology uses Apache server, Centos 7 Unix-based operation system. The Frontend uses PHP, jQuery and Twitter Bootstrap. As content management system, the open-source content management system WordPress is chosen because of its very intuitive and user-friendly interface. Besides its flexibility, WordPress offers vast possibilities to develop complex platforms. The extensibility of WordPress makes it possible to create various plugins as extensions, which can be added directly in the administration interface. In this case, the Collaborative Knowledge Base has been implemented as a plugin. In addition, the CMS features search engine optimized (SEO) URLs without the need to install any third-party extensions.

4 Planed extensions

4.1 Experts' Dashboards

The Experts' Dashboards will empower experts in aquatic ecosystems, to view and manage the following datasets:

- **Ecosystem Data**: This refers to direct measurements and observations obtained from specific locations. In environmental monitoring, this could cover a range of metrics such as temperature, humidity, soil composition, water quality, biodiversity indices, water pollution levels, radiation, noise pollution, and the presence of chemicals or particulates. These data points are crucial for understanding local environmental conditions and trends.
- **Satellite Imagery**: High-resolution images captured by satellites provide a macroscopic view of geographical areas. They are essential for monitoring changes in land use, vegetation cover, urban expansion, and the impacts of natural disasters. When processed with AI, these images can yield insights into climate change effects, deforestation, and resource depletion.

The fundamental purpose of these dashboards is to manage the datasets and give the experts the opportunity to review, update and visualise based on specific criteria(e.g. time, place, data types).

4.1.1 Preliminary data modelling

The Experts' Dashboards will be based on the integrated OIH data model as presented in the Figure 11. The basic entities are identified in the OIH data model and are being developed in collaboration with the consortium of aquatic ecosystem biologists and researchers.

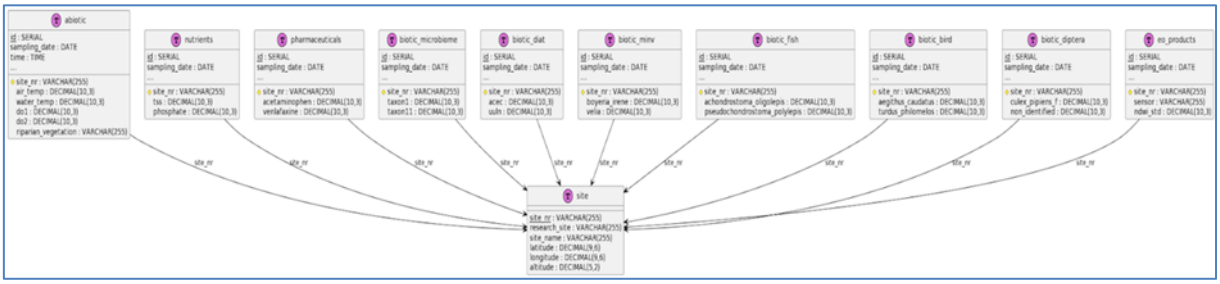

Figure 11: Overview of the integrated OIH data model

The main entity is the Research site and for each site the following entities are identified: Abiotic, Nutrients, Pharmaceuticals, Biotic, Biotic_Diat, Biotic_MINV, Biotic_FISH, Biotic_BIRD, Biotic_DIPTERA, and EO Products.

4.1.2 Experts' dashboard design features

Role-Specific Database Management: One of the pivotal features of the Experts' Dashboards is the incorporation of role-specific database management. This functionality caters to the unique data needs and analysis patterns of different expert groups. Whether it's a climatologist studying weather patterns or a urban planner evaluating land use changes, the dashboard provides tailored data environments. This bespoke approach ensures that each professional can access, manipulate, and analyse the exact datasets relevant to their field, thereby enhancing efficiency and accuracy.

Advanced Data Visualization Services: The crux of these dashboards is the advanced data visualization tools they employ. These tools are not just about presenting data aesthetically; they are about transforming complex datasets into comprehensible, interactive visual formats. Experts can engage with dynamic maps and interactive graphs, making the process of data analysis more intuitive and insightful. Such visualizations are crucial for immediate decision-making and long-term strategic planning.

Integration mechanisms with City Dashboards: The Experts' Dashboards will included integration mechanisms in order to exchange information with the City Dashboards. This integration can also implement remote calls of selected visualisations via APIs or iFrames. In this way, the data visualizations generated on the Experts' Dashboards can be adopted to the City Dashboards, providing a comprehensive view that supports data-driven decision-making at multiple levels.

4.1.3 Experts' Dashboards Wireframes

Following the aforementioned design principles the following wireframes illustrate the key experts' dashboard User Interface (UI) concepts that are been used in the software development process that is part of Task 5.1 Geospatial and satellite information platform.

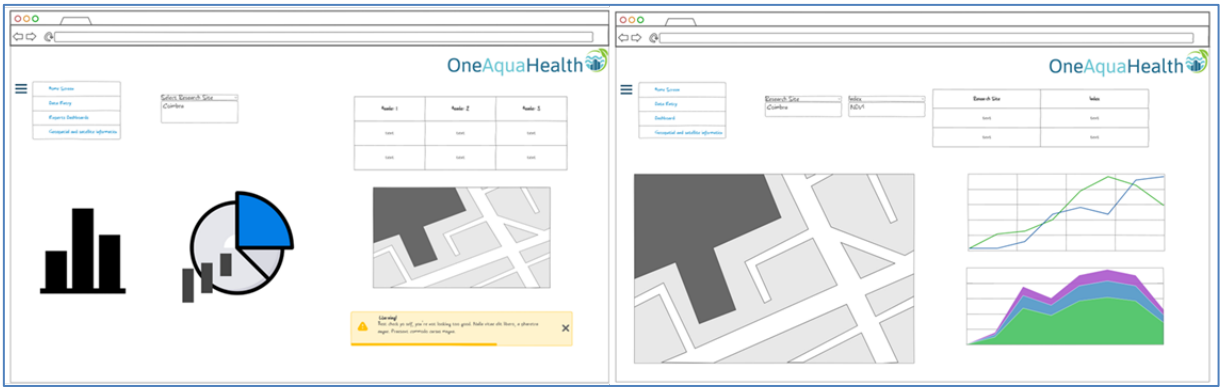

Figure 12: Snapshots of key experts' dashboard UI concepts

4.2 Citizen Science app

Introduction

The Citizen Science app emerges as a tool in bridging the gap between community engagement and environmental stewardship. This app convergence of citizen science, digital innovation, and environmental consciousness, fostering a collaborative space for citizens and stakeholders to contribute actively to environmental preservation and sustainability.

Functionalities

Data Collection and Submission: At its core, the Citizen Science app facilitates the collection and submission of environmental data by its users. This feature empowers individuals to report observations and findings related to hydro morphological characteristics, riparian vegetation, biodiversity and degradation of urban streams. The app's user-friendly interface allows for easy capture and upload of data, which could include photographs, geospatial coordinates, and textual descriptions.

Gamification and Task Assignments: To enhance engagement, the app incorporates elements of gamification. Users can participate in environmental challenges, complete specific tasks (like observing and reporting on local flow conditions, presence of species, degradation of the margins or habitats), and earn badges or points.

Scoring system: The app will feature an educational section detailing what constitutes a healthy stream ecosystem. This will include an explanation of the scoring system used for assessing stream health, supplemented by visual aids and comparisons similar to those found in similar apps. A scoring system ranging from 1 to 3 will quantify stream degradation:

- 1 represents no degradation
- 2 indicates moderate degradation
- 3 signifies high degradation.

Detailed criteria for scoring will be refined in collaboration with stakeholders.

Mapping and Data Visualization: Monitored streams will be displayed on maps, highlighting their health classification and providing georeferenced data. Users can access their own data contributions. Collected user contributions will be available, allowing for the display of data from nearby streams (defined by a geographic buffer zone).

Scientific Literacy and Engagement: The app will provide access to scientific resources, enhancing users' understanding of ecological issues and supporting their involvement in public environmental decision-making.

Information Architecture: The following structure depicts a preliminary representation of the information architecture of the Citizen Science app. This initial design will be refined during the interactions with consortium experts and the stakeholders that participate at the local alliance workshops.

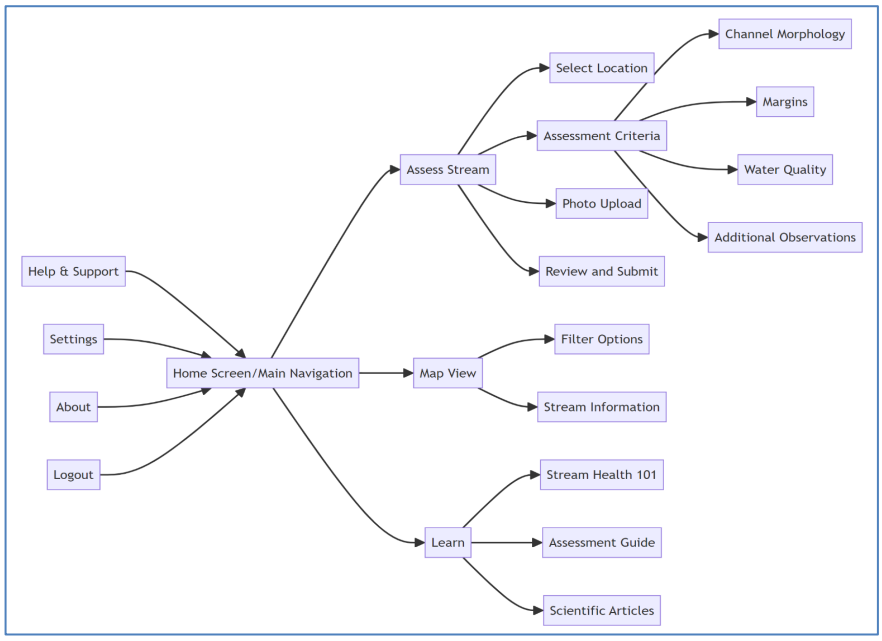

Figure 13: Preliminary Information Architecture of the Citizen Science app

Design principles of the Citizen Science app

The development of the Citizen Science app will be based in the principle of responsive design. This approach ensures that the app is fully functional and aesthetically pleasing across a variety of devices, without the need for special configurations or installation procedures. The app will be uniformly operational across smartphones, tablets, and desktop computers. This approach provide the following benefits:

Universal Accessibility: Every citizen, regardless of the device they own, can access the app allowing the larger possible audience to engage in environmental awareness and prevention.

Seamless User Experience: A responsive design provides a consistent experience for users, regardless of the device they use. This consistency is crucial for maintaining user engagement and satisfaction. Moreover, a responsive web application eliminates the need for multiple native applications for different operating systems.

Future-Proofing: As technology evolves, new devices and screen sizes emerge. A responsive web application is more adaptable to future technological developments, ensuring longevity and relevance.

The Citizen Science app will be developed on web technologies, it will be built once and will be accessible on any device regardless the operating system (no need for separate Android and iOS implementations). Furthermore, easier updates and maintenance to the app can be rolled out universally and immediately visible to all users, unlike native apps which require users to download updates.

Implementation tools

The implementation tools for the Citizen Science app are proposed to ensure a robust, scalable, and user-friendly application. At the core of the front-end development are HTML5, CSS3, and JavaScript, which are the foundational technologies for any web application. Frameworks like Bootstrap or Tailwind will expedite the development of a responsive design, which is crucial for accessibility across various devices.

The following table is present a proposed suite of tools and technologies is designed to create an efficient, secure, and user-friendly Citizen Science app, aligning with the project's goals of engaging a wide audience in environmental awareness and action.

Table 4: Tools and technologies used for the Citizen Science app

Category	Tools/Technologies	Purpose/Usage
Front-End Development	HTML5, CSS3, JavaScript	Fundamental technologies for building the interactive user interface.
Front-End Development	Bootstrap or Tailwind or other modern framework	Frameworks for developing responsive designs efficiently.
Front-End Development	Vue.js or Angular	JavaScript frameworks for building a dynamic and interactive single-page application.

Back-End Development	Node.js	Provides a scalable and efficient server-side solution.
Back-End Development	Express.js	Web application framework for building robust API endpoints.
Database	Postgres SQL	A SQL database suitable for handling diverse and complex data types.
Cloud Services	AWS	For hosting the application, ensuring scalability, reliability, and security.
Integration	RESTful APIs	Facilitates seamless integration with the Data Backoffice for real-time data exchange.
User Authentication	Oauth 2.0 or other standard token-based authentication	Secure authentication method, crucial for user-generated content and personalized data feeds.

Connecting the App to the Open Information Hub

The integration of the Citizen Science app with the Open Information Hub is pivotal for the success of this initiative. This connection facilitates a two-way flow of information, where data collected through the app enriches the Hub's repository, and, conversely, insights and analytics from the Hub inform and guide app users.

- User and Data Synchronization: The app is designed to automatically sync data collected by them with the Hub's central database. This integration ensures that the data are readily available for analysis, visualization, and dissemination through the Hub's various tools and dashboards.
- Participatory Decision-Making: By contributing data through the app, users become active participants in the decision-making processes facilitated by the Hub. The app serves as a conduit for public opinion and observation, influencing policy initiatives and environmental guidelines.
- User Stories and Showcasing Results: The app gathering user stories and experiences, which are then showcased on the Hub. This narrative approach not only adds a human dimension to the environmental data but also serves as a powerful tool for advocacy and awareness.
- API Integration and Customization: Advanced users of the app can utilize the provided APIs for more sophisticated data contributions, including custom per-pixel processing and multi-temporal analysis. This feature ensures that the platform caters not only to casual users but also to more technically adept citizen scientists.

4.3 City Dashboards

The City dashboards of the Open Information Hub are gateways tailored to the needs of both citizens and public institutions. As such they served the following purposes:

- To aid decision makers at municipal and regional levels to use ecosystem, health and user-generated data, as well as, OAH predictions in a local and regional level
- To aid citizens and interested other parties to access statistical analyses of data that is maintain in the research areas of the project. Interactive maps will form the basis for the presentation of OIH predictions that will form the basis for alerts and early warning where applicable.
- To support the users of Citizen Science app with basic registration, profile management, and management of user generated content they provide to the system.

The OneAquaHealth project employs a comprehensive data collection strategy to enhance its analytics and visualization capabilities, utilizing a variety of data types:

- Ecosystem Metrics: Broad indicators of environmental and biological health of urban streams and of the status of their ecosystem services. These metrics are critical for ensuring the ecological health of the urban stream ecosystems and the maintenance of ecosystem services essential for urban population (e.g., water, air and soil quality, flood mitigation and protection against climate changes), regulatory compliance, and to signal potential risks for human health.
- Health Metrics: Data points related to public health, including disease incidence, population health trends, and conditions linked to environmental factors associated to urban stream ecosystems. These metrics are important for correlating public health variables with environmental data.
- User-generated Content Data: Diverse contributions from users, such as local environmental condition reports, photographs of flora and fauna, or crowd-sourced pollution information. This data adds ground-truth references and community-reported incidents to the system.

The further development of the City Dashboards, including their requirements, data sources and analysis, and integration into the Hub will be undertaken in the following months and presented in the next version of the deliverable.

4.4 Common user authentication mechanism

To effectively manage user access and ensure security across the Open Information Hub and planned City Dashboards and Citizen Science app, a common user authentication mechanism is crucial. This section will outline how this mechanism functions, highlighting its key features and benefits.

Unified Login Interface

At the core of user authentication system is a unified login interface. Users will access the Open Information Hub portal through a centralized login page.

Authentication Process

Upon entering their credentials, users are authenticated against a secure user database. The authentication process involves verifying the user's identity through a combination of username and

password. After successful verification, the system issues an authentication token, typically a secure, random alphanumeric string.

Token-Based Authentication

This token plays a pivotal role in our system. It serves as a digital key, allowing the user to access various parts of the planned digital tools. The token is designed to be both secure and convenient, allowing apps other than the Hub to authenticate users against the centralized user database and provide a universal user experience throughout different sections of the platform.

Access Control and Permissions

The token also carries information about the user's role and permissions. Different users, such as citizens, researchers, or administrators, have varying levels of access and capabilities within the platform. For instance, administrators might have access to all data and functionalities, while citizens might have access limited to data visualization and citizen science features. The system dynamically adjusts the available features based on the user's role, as identified by the token.

Security and Compliance

Security is a top priority in our authentication mechanism. The system utilizes robust frameworks that offer security compliance and are designed to establish a layer of protection against unauthorized access and data breaches. Additionally, it complies with relevant data protection regulations, ensuring that user data is handled responsibly and ethically.

Integration and Flexibility

The common user authentication mechanism is integrated into every component of the project. It offers flexibility, allowing for future expansions or modifications as the needs of the project evolve. This adaptability ensures that the system remains effective and user-friendly, regardless of how the Open Information Hub and connected digital tools develop over time.

4.5 Community module

The "Community" module acts as a central gateway that enables via set of communication tools the sharing of knowledge and the creation of synergies among stakeholders and other interested groups in the field in Europe and beyond. The established cooperation between various stakeholders can be continuously used for needs analysis, monitoring of innovation outputs also beyond the funding period. It also helps to shape policy initiatives and guidelines that go beyond the duration of the project.

4.5.1 Mock-ups

The implemented modular design gives the OneAquaHealth Open Information Hub the flexibility to easily grow and evolve over time. In the following section the consortium demonstrates different stages of the planned Hub evolution using initial mock-ups that were created in period one. Mock-ups are informative and close to reality representations of what the Open Information Hub was intended to look like. The mock-ups served following major creation goals:

- They show the information structure and main functionalities helping the consortium to visualize the future appearance.

- Mock-ups help developers catch interaction design errors early, thus allowing them to iterate on the design until a visual hierarchy between the different elements is achieved.

The mock-ups and related designs were done using Figma tool [4]. There were several iterations per screen that allowed to evaluate the user interfaces and the improvement of the mockups. The final mockups of each screen were then heuristically evaluated and turned into the final screens, which are presented in the following sections of this document.

4.5.2 Registration

Next, a short description of the initially designed registration process (Figure 14) is provided including a mock-up of the planned registration page. The registration process is an important part of the user experience, as it will allow users to access and use the Community module as a part of the Open Information Hub infrastructure. As such it will be simple, fast, and seamless, while collecting the relevant data from the users. Hence, the project consortium will have an overview of the registered users, their activity and the possibility to also extend the functionalities of the module based on the expected knowledge exchange and collected inputs for the project's research and development activities. In the following there is short description of the planned registration process.

- **Login page:** The user will land on a login page, where he/she can either enter his/her email address and password if he/she already has an account, or click on the link that says "Register" if he/she does not have an account yet.
- **Registration form:** If the user chooses to register, he/she will be redirected to a registration form, where he/she has to fill in the following fields: email address, password, user ID, first name, last name, organisation name (optional), position (optional), and stakeholder group to which he/she belongs. The stakeholder group will be chosen via a drop down, which will include all target groups and stakeholders, which were defined in deliverable D7.1. The form will have clear labels, validations, and error messages, and indicate which fields are required and which are optional. By submitting via a click on the button that says "Create account", the user will agree to the terms and conditions of the Open Information Hub.
- **Confirmation message**: After submitting the form, the user will receive a confirmation message on the screen that says "We're almost there. Before you login, you need to confirm your email address via the email we just sent to you."
- **Activation email**: The user will receive an activation email in his/her inbox, which contains a link and an activation key that he/she has to enter to activate his/her account. The email will have a clear subject line "Activate your account", and a friendly and informative body, such as for example "Welcome to the OneAquaHealth Community. To complete your registration, please enter the activation key in the activation page. If you have any questions or issues, please contact us at."
- **Activation page**: If the user enters the activation key in the activation page and clicks on the button that says "Activate", his/her account will be activated. As a consequence, he/she will see a message that will say "Your account is now active".

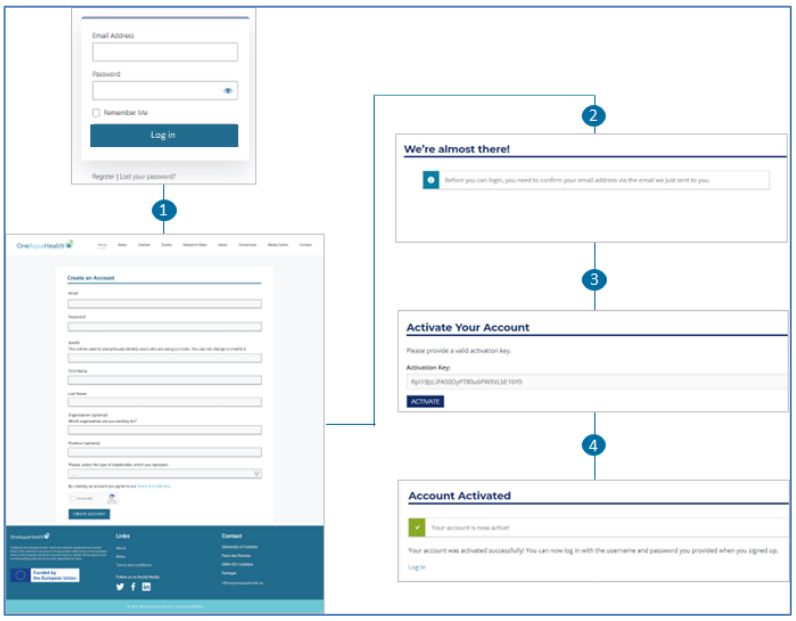

Figure 14: Registration process

The abovementioned registration process and its different steps and notifications will be adapted according to the ongoing project activities and collected feedback from the users.

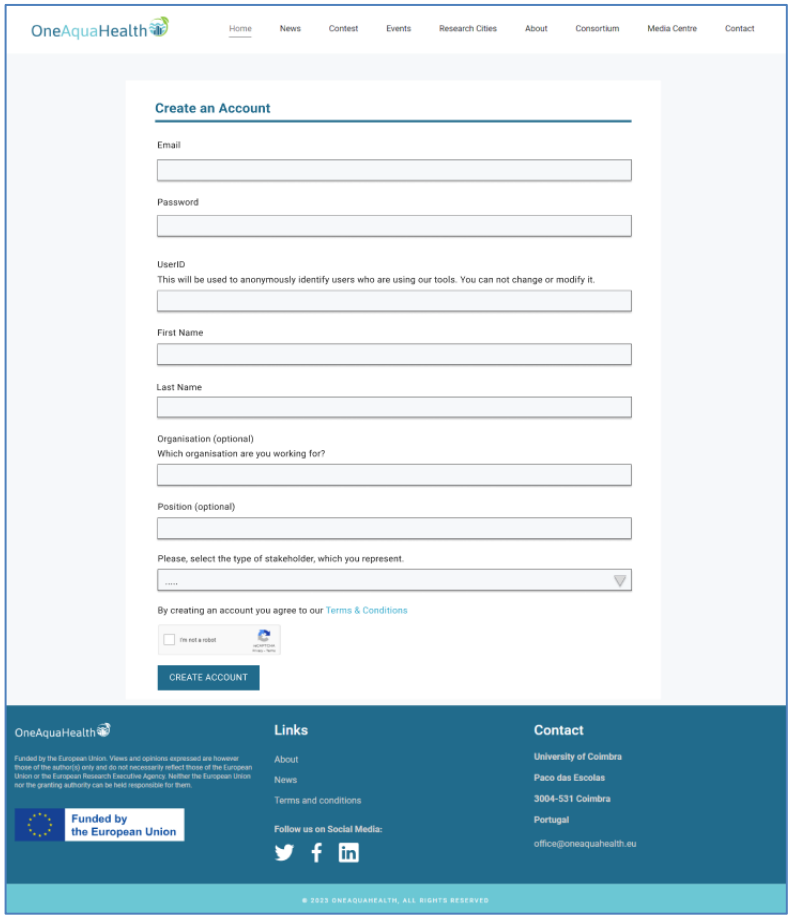

Figure 15: Mock-up of the designed registration form

4.5.3 Overview page

After the user has successfully logged in or registered and activated his/her account, he/she will be forwarded to an overview page, where he/she can see two clickable cards: one connected and leading to the City Dashboards and one connected and leading to the OneAquaHealth Community. The first will aim to enable citizens and public institutions to access and manage earth observation analytics, statistics and early warning preventive services. The later fulfills the role as an entry point to the collaborative tools and mechanisms, which will facilitate knowledge exchange cycle and synergies among stakeholders and other interest groups in the domain to shape policy initiatives and guidelines beyond the project funding. Optional beneath each card the consortium can implement a brief description of the connected City Dashboards or Community module and the connected benefits from their use.

To access the Community module the user needs to click on the related card. The user will be taken then to the Community module, where she/he can edit his/her profile, search for other professionals and send private messages or post information in the Activity feed. These functionalities and features will be adapted at a later stage based on the established needs of the registered users and ongoing analysis activities in the project.

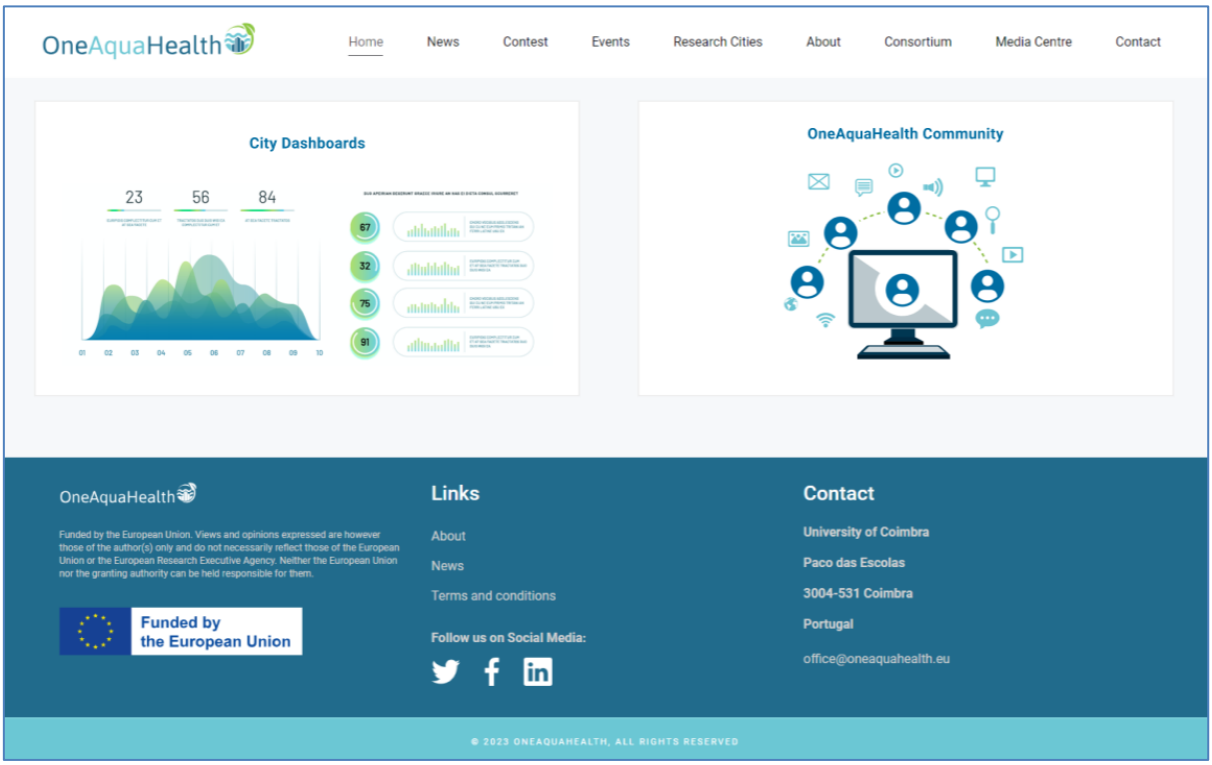

Figure 16: Mock-up of the designed overview page

4.5.4 User profile

Each member of the OneAquaHealth Open Information Hub Community will have a user profile. In the user profile area, the user will have an overview of a set of functionalities he/she can access through linked menus. The menu “PROFILE” will allow the user to edit his/her own profile by adding a profile photo, a cover image and other related information. “ACCOUNT” will allow the member of the Community to update his/her login information such as among other password, email address, email

or delete his/her account. The “TIMELINE” will provide an overview of user’s activities. The menu “CONNECTIONS” will show with which other members of the Community the user is connected. This demonstrates his/her credibility as active member and induce other users to contribute to the knowledge exchange. The menu “DOCS” will allow the user to upload different types of files and media. Members of the Community can send private messages via the menu “MESSAGES” to other users of the module. Only the sender and the receiver will have access to the content of the message. All person related data will be handled in accordance with the General Data Protection Regulation (GDPR).[5]

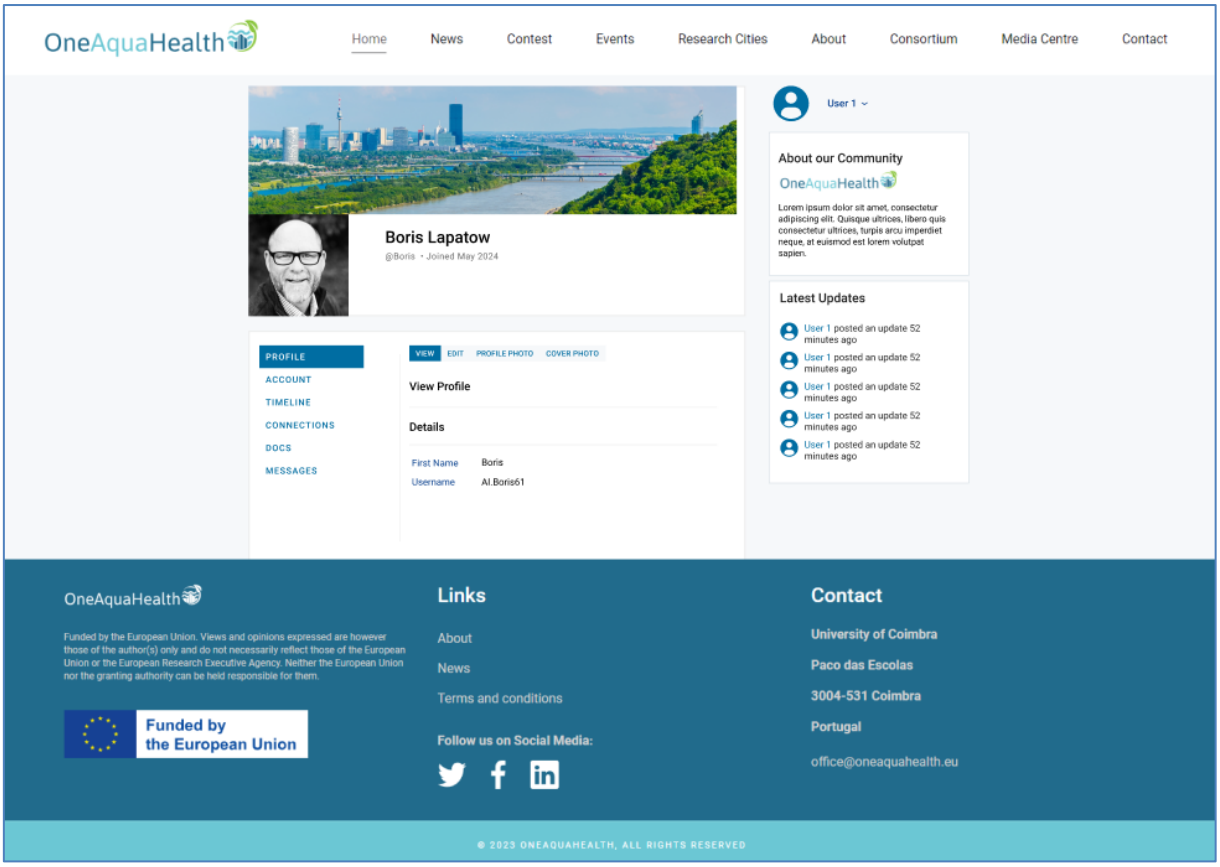

Figure 17: Mock-up of the designed profile screen

4.5.5 Members

The OneAquaHealth Community aims to foster a friendly and supportive environment for its members, where they can learn from each other and contribute to the advancement of urban aquatic and human health issues. Members will be all registered users of the OneAquaHealth Community and listed in the member area. They can access the member area, where they can see the profiles of other members, including their names and user IDs. The member area will also offer a search function, which will allow members to filter and find specific members based on various criteria. This feature facilitates interaction and knowledge exchange among members who share common goals or challenges. Moreover, registered users will have the option to establish new connections with other members of the Community. By adding a friend, they will be able to see their friend's posts, comments, and activities on the platform, and also send them private messages.

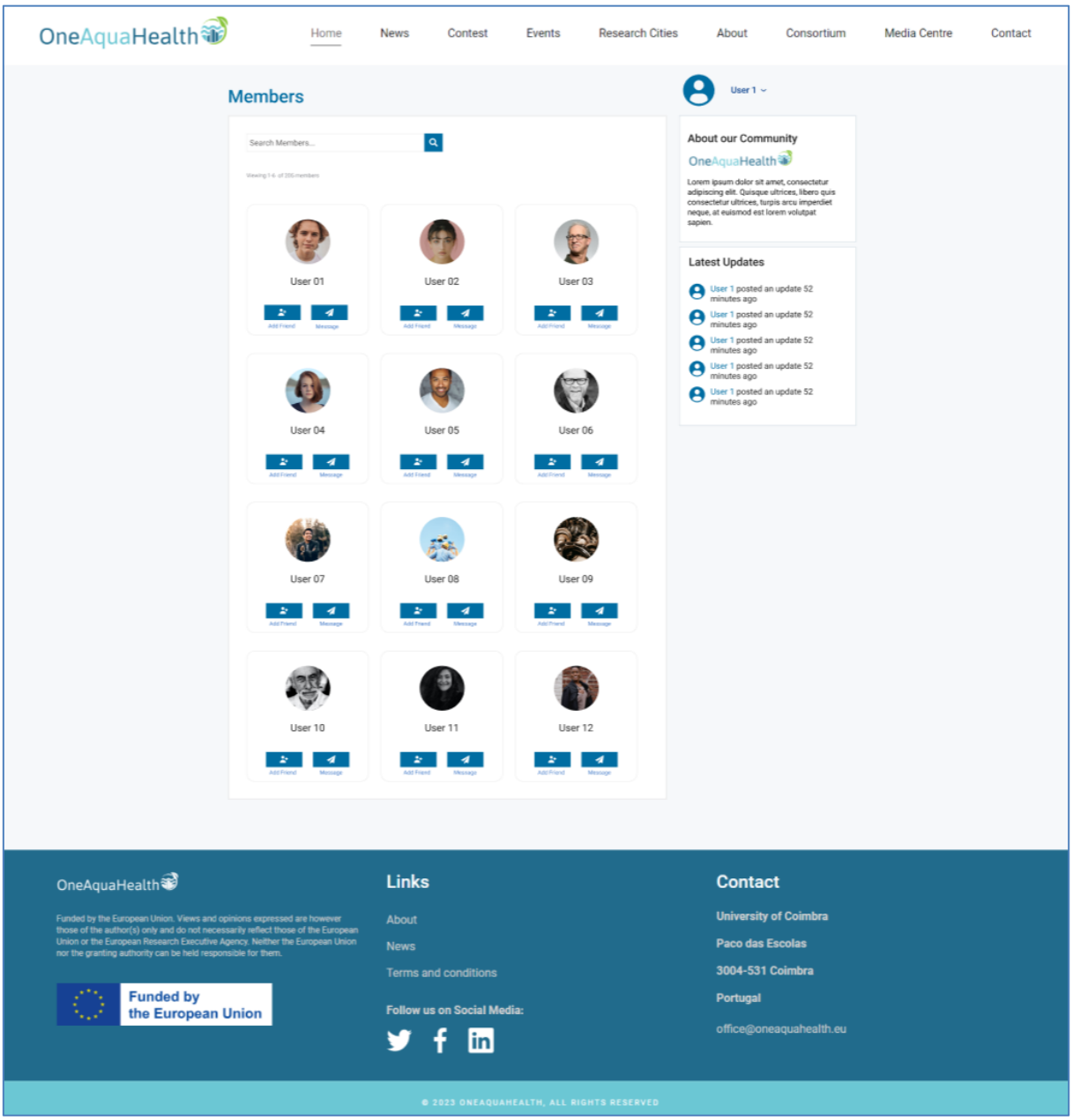

Figure 18: Mock-up of the designed members' areas screen

4.5.6 Activity

The Activity stream provides an overview of current activities, such as new comments or discussions. It is a common way to present aggregated information to the users and update them on various topics or discussions. This area will be freely accessible to members of the Community. Having an activity stream is advantageous because it has a strong networking effect, making the OneAquaHealth Open Information Hub Community more resilient throughout and beyond the project implementation. It will be driven by the increasing activities of an expanding member base and encourage participation, by highlighting where and what other users are doing. Through this, it will also support the networking aim of the module. Hence, the larger the Community gets, the more valuable it becomes.

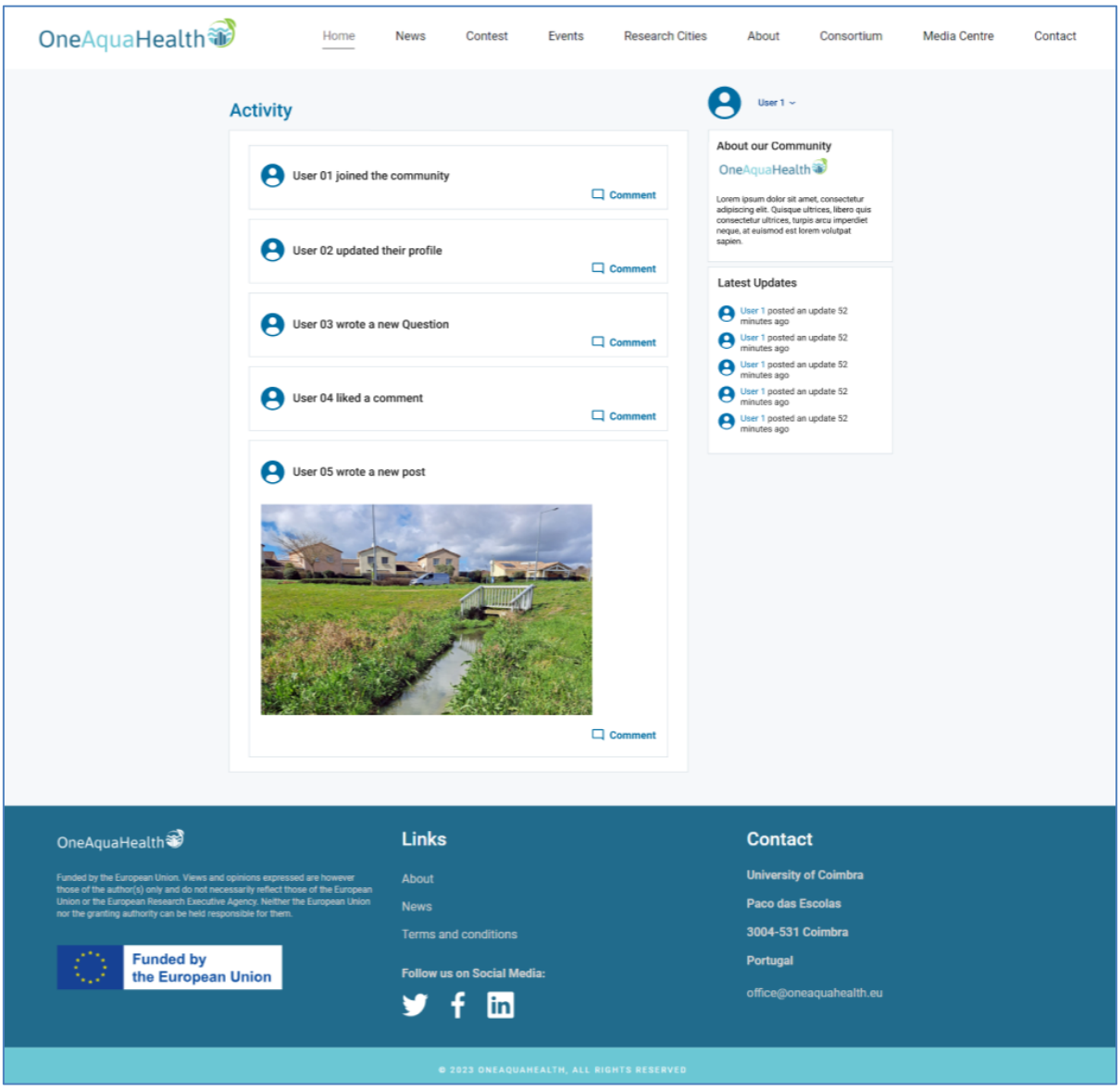

Figure 19: Mock-up of the designed Activity's screen

4.5.7 Connection to other related projects and initiatives

OneAquaHealth is a project that aims to improve the quality and resilience of urban streams health through the development of innovative digital tools and systems and foster a community of stakeholders and experts in the domain. To achieve its goals, the project needs to establish collaboration with other projects and initiatives that share its vision and interests. The process of establishing collaboration involves various steps such as identification of potential collaboration partners, communication campaigns, implementation and exploitation of the established collaborations, etc. To ensure that the community profits and builds upon the collected knowledge, OneAquaHealth will seek to promote the collaboration with other projects and initiatives on its Hub, by using various strategies, such as:

- **News articles on joint events**: OneAquaHealth will publish news articles on the Hub that highlight the joint events that it organises or participates in with other projects and initiatives, such as workshops, webinars, conferences, or exhibitions. The news articles can include the

objectives, agenda, speakers, participants, and outcomes of the events, as well as photos, videos, or links to the recordings or presentations.

- **Creation of dedicated events pages**: The project will create dedicated pages on the Open Information Hub for each joint (virtual) event that it organises or participates in with other projects and initiatives, where it can provide more details and information about the event, such as the date, time, location, registration, agenda, speakers, etc. An example for such event is the webinar, which was organised by OneAquaHealth and the Institute of Electrical and Electronics Engineers (IEEE) on 07.12.2023
- **Listing of projects and initiatives with their details**: The project plans to create a section on its Hub where it can list the projects and initiatives that it collaborates with, and provide their details, such as the name, logo, website, description, objectives, etc.. The listing can potentially include links to the joint events, publications, or campaigns that the projects and the partners have produced or participated in.

5 Stakeholder alignment

The OneAquaHealth project aims to involve relevant stakeholders in all aspects of the project. The Open Information Hub is no different. In the context of WP4, efforts have been made to identify all major project outcomes, and to see where stakeholder input is required (see Figure 20 below).

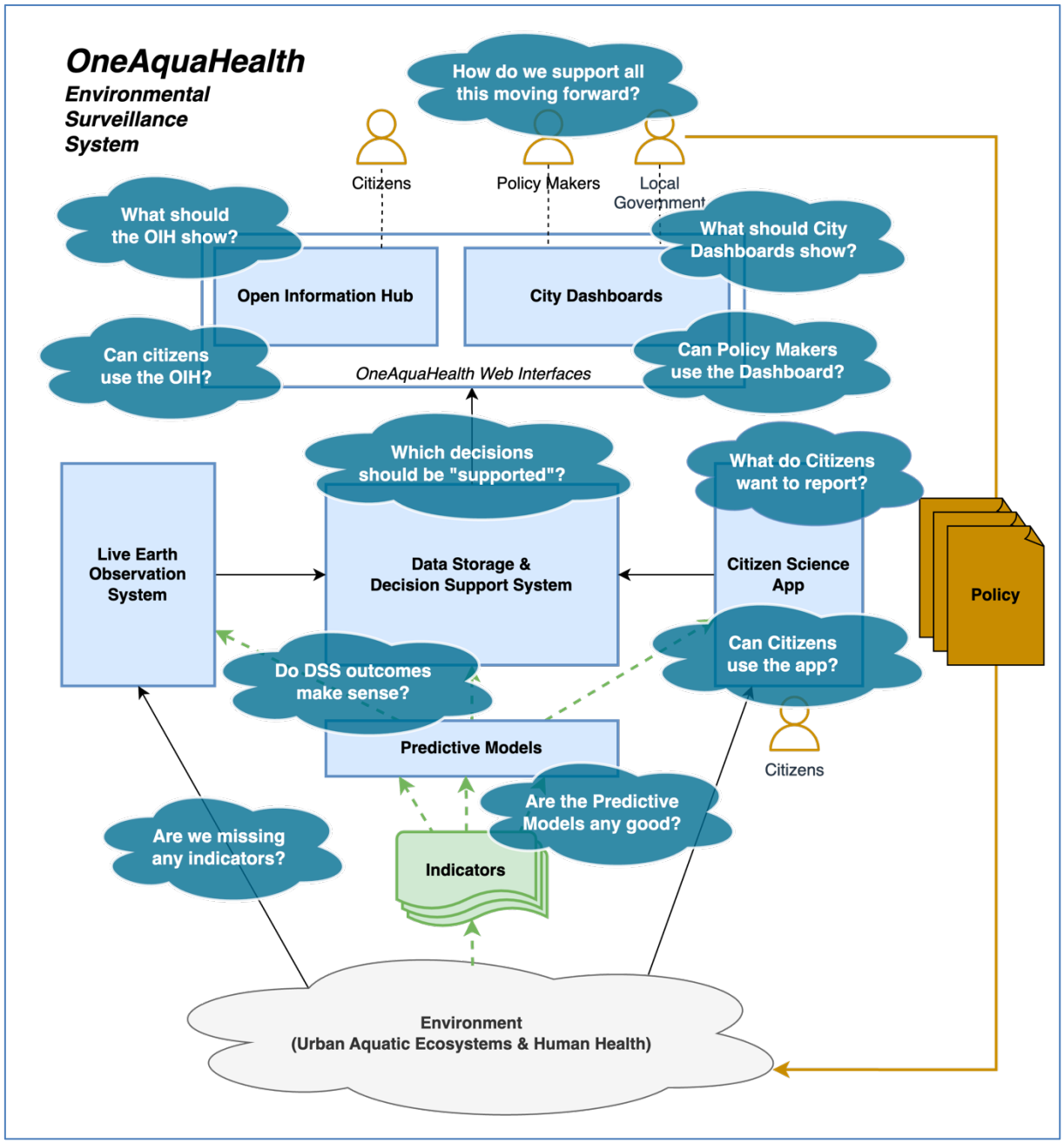

Figure 20: Planned OneAquaHealth project outcomes foreseen stakeholder engagement

As can be seen from Figure 20, the Open Information Hub and City Dashboards are two such project outcomes where stakeholder engagement is required. In both cases, stakeholder input may be acquired in order to inform the design and content of the components; and stakeholders are needed to test whether our “final” prototypes are usable.

At the current phase of the project, Stakeholder Engagement activities – including those related to the Open Information Hub, City Dashboards and Citizen Science app – are being planned across the different research regions and the partners involved.

For this planning, and to inform about the potential stakeholder engagement activities in the context of this deliverable, we describe below a series of six potential Workshops. These tables are used to communicate possible interactions with the "Local Alliances" (groups of stakeholder organisations in the different regions) or Citizens in general (i.e. "Citizen Science"), between the consortium members.

5.1 Co-designing public information for the Open Information Hub

In Table 5, the proposal for a workshop is described, in which regional professional stakeholder organisations can help co-design the contents of the Open Information Hub.

Table 5: Template for workshop "Co-designing public information for the Open Information Hub"

Title:	Co-designing public information for the Open Information Hub
Aim:	The OneAquaHealth Open Information Hub (OIH) is an online space that will contain information – targeted to the general public – on urban aquatic ecosystems and human health. This will include information at the 'global' level, as well as information tailored specifically to each of the five regions. The 'global' information may well be provided by the OneAquaHealth Consortium members, and the regional information by the Consortium's regional representative. However, in order to amplify the quality and quantity of the available content – especially at regional level – this workshop entices local stakeholders to give their input on what type of information may be relevant to provide through the OIH.
Target Participants:	Any regional stakeholder organisation is welcome to participate. It is expected that in particular Civil Society, Academic and Environmental organisations may be interested in shaping the contents of the OIH – as communicating about their work is a part of their organisation's missions.
Workshop Format:	Interactive Brainstorming session
When:	M13 (Jan 2024) - M20 (August 2024). At M24 the OIH is "delivered", so M13-M20 is the ideal timeframe in which to design content (giving time to implement the content before the deadline).

5.2 Evaluation of the Open Information Hub

In Table 6 , the proposal for a workshop is described, in which citizens can help evaluate the final version of the Open Information Hub.

Table 6: Template for workshop "Evaluation of the Open Information Hub.

Title:	Evaluation of the Open Information Hub
Aim:	A core objective of the Open Information Hub is to inform the public on relevant topics related to urban aquatic ecosystem- and public health. The objective of this workshop is to evaluate how well people can find information on the Hub, and whether they can find all the information they need.
Target Participants:	Citizens, potential users of the Open Information Hub
Workshop Format:	Partly a formal, task-based evaluation to evaluate the usability and findability of information. Partly an open format in which potentially additional content for the OIH can be discussed.
When:	Towards the end of the project, after the 'final' release of the Open Information Hub

5.3 City Dashboard – first prototype evaluation and co-designing

In Table 7, the proposal for a workshop is described, in which policy makers and local government organisations can help evaluate a first City Dashboard prototype and help shape feature design for next versions of the tool.

Table 7: Template for workshop "City Dashboard – First Prototype Evaluation and Co-Designing"

Title:	City Dashboard – first prototype evaluation and co-designing
Aim:	The City Dashboard is meant to inform e.g. policy makers on local data trends that may be helpful in their decision-making processes. As this is a very novel type of application, engaging stakeholders is likely to be more effective once initial prototypes are in place. So, the purpose of this workshop will be to collect feedback on the initial City Dashboard prototypes – and based on this launch a discussion on additional design and feature wishes from the stakeholders.
Target Participants:	Potential users of the City Dashboards: policy makers, local government organisation
Workshop Format:	Ideally face-to-face workshop
When:	After release of the initial City Dashboard prototype

5.4 Evaluation of City Dashboards

In Table 8, the proposal for a workshop is described, in which policy makers and local government organisations can help evaluate the City Dashboards.

Table 8: Template for workshop "Evaluation of City Dashboards"

Title:	Evaluation of City Dashboards
Aim:	The aim of this Workshop is to evaluate the usability and effectiveness of the City Dashboards. How does this new tool fit into the workflow of its end-users? How, and how quickly can they find the information they need?
Target Participants:	Potential users of the City Dashboards: policy makers, local government
Workshop Format:	Structured workshop – or potentially online + questionnaire
When:	Towards the end of the project, after the 'final' release of the City Dashboards

5.5 Co-Design of the Citizen Science app

In Table 9 we describe a proposed Focus Group with citizens to assess their needs with regards to their experiences living or commuting near urban aquatic ecosystems.

Table 9: Template for Workshop "Co-Design of the Citizen Science app"

Title:	Co-Design of the Citizen Science app
Aim:	The aim of this Workshop is to assess the needs of Citizens living or commuting near urban aquatic ecosystems. What are some of the issues they encounter? What are some of the problems – or positive aspects – they would like to report?
Target Participants:	Citizens living, or commuting near urban aquatic ecosystems
Workshop Format:	Focus Group (see T4.2)
When:	Between January – March 2024

5.6 Evaluation of the Citizen Science app

In Table 10 we describe the workshop – or series of activities – that will take place in order to evaluate the effectiveness and usability of the Citizen Science app.

Table 10: Template for Workshop "Evaluation of the Citizen Science app"

Title:	Evaluation of the Citizen Science app
Aim:	The aim of this Workshop, or series of events is to evaluate the effectiveness and usability of the Citizen Science app. The exact methodology for this process is currently being designed in the context of T4.3: Citizen Science: design and conception.
Target Participants:	Citizens living, or commuting near urban aquatic ecosystems
Workshop Format:	Various
When:	During the execution of T4.4: Citizen Science in practice (M18-M45)

6 Promotion of Open Information Hub

OneAquaHealth engages with a number of different target groups from the field of protecting urban aquatic ecosystems to promote One Health. Therefore, to ensure that the Hub is established as a main reference point for further developments in the field, the consortium applied in the design process visual content, which directly addresses the contextual expectations of the project's main audience. The latter includes among others, citizens, policy makers and authorities, researchers and the research community, civil society organisations, standardization bodies, investors, industry and business partners, and other stakeholders such as related projects and initiatives. To motivate the abovementioned target groups to engage with the Hub and contribute to the growth of its knowledge base, the consortium applies various communication channels and means including the OneAquaHealth social media channels and newsletter as well as the consortium organisations' websites. Such activities include posts (Figure 21), which inform the project's stakeholders on any extensions of the Hub's infrastructure and its connected knowledge database. Focus during the first months after the official launch of the OneAquaHealth Open Information Hub was also put on the introduction of the consortium members. Hence, the OneAquaHealth sought to demonstrate the broad expertise and experience, which are available within the consortium and provide networking opportunities for interested organisations.

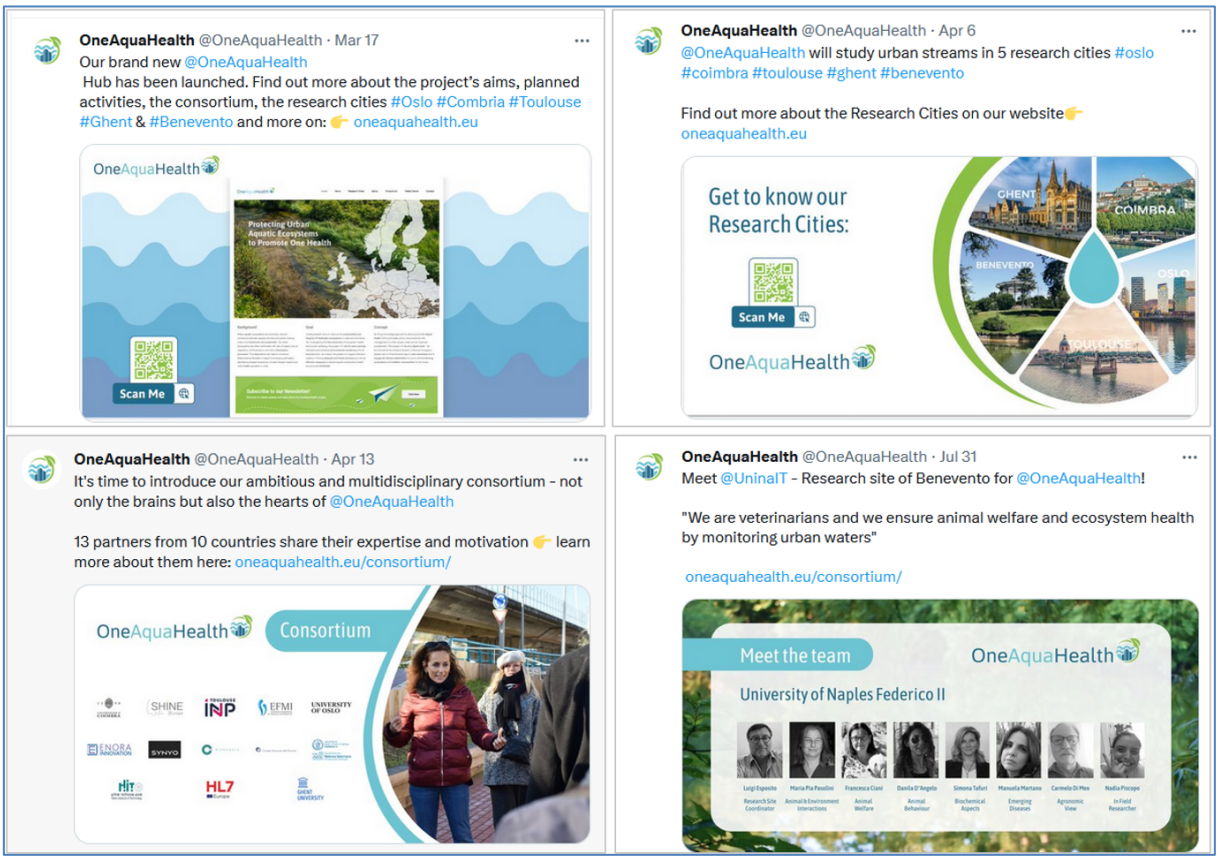

Figure 21: Posts on social media promoting information available on the Open Information Hub

The project seeks to also inform the community on related news and insights, which are produced in the project. It achieves this by publishing news articles on the Open Information Hub, which are then posted on social media to reach a broader audience.

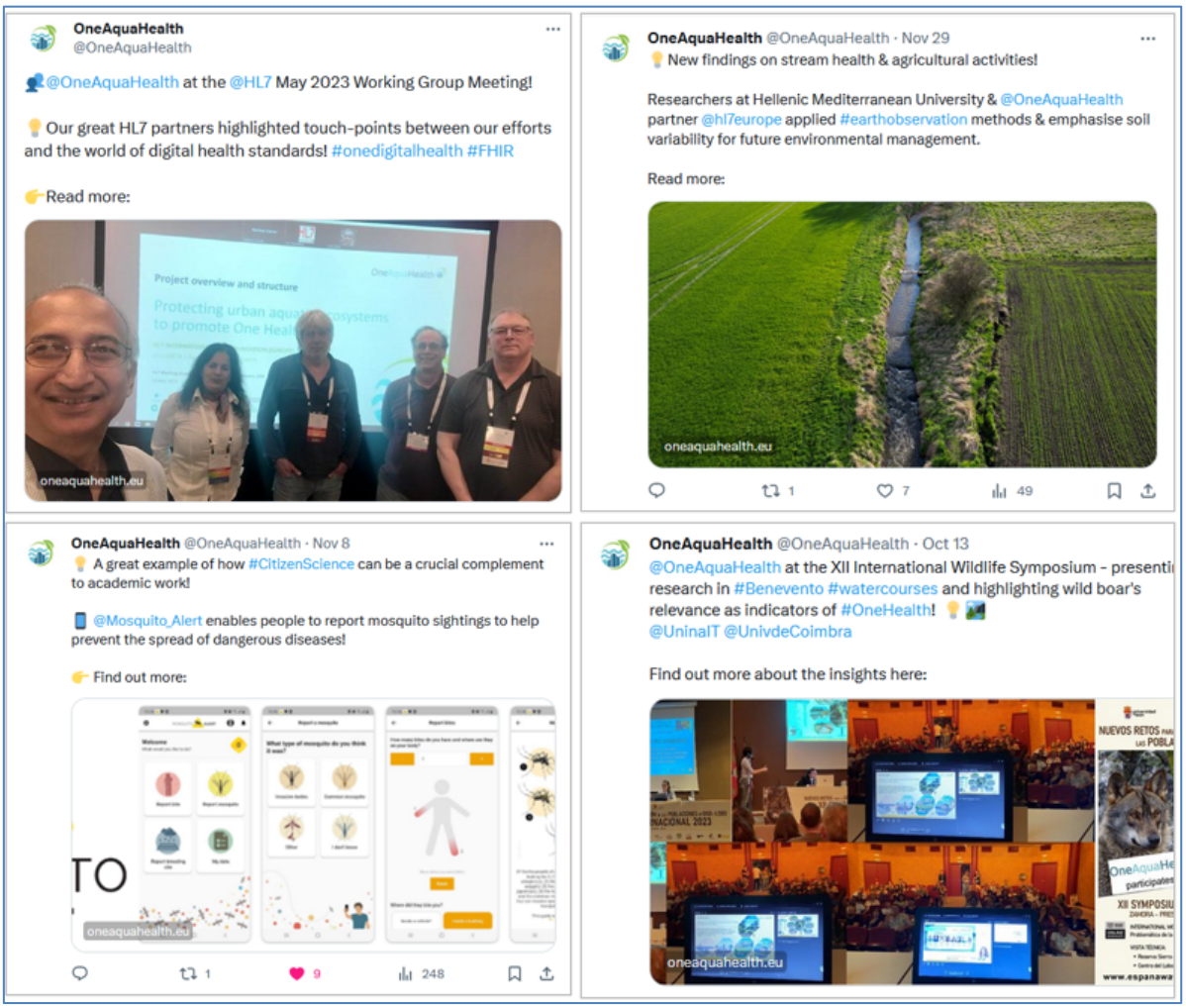

Figure 22: Social media posts on news articles available on the Hub

Additionally, OneAquaHealth organizes promotional campaigns, which have the goal to motivate external stakeholders engage with the Hub and consortium and provide inputs to the ongoing analysis. Such initiative represents the "OneAquaHealth Urban Stream Photo/Video Contest", which offers the opportunity to students, engaged citizens, teenagers and members of Local Alliences to showcase their passion and concern for urban streams. To participate in the contest they are expected to submit a photo or a video of an urban stream that they care about, whether it is in a good or a bad condition, and share it with the world. They can achieve this by submitting a photo or video on social media. In order to inform about the conditions for participation in the context, all interested individuals are forwarded to the Hub, where they can find further details as a part of a dedicated Q&A section.

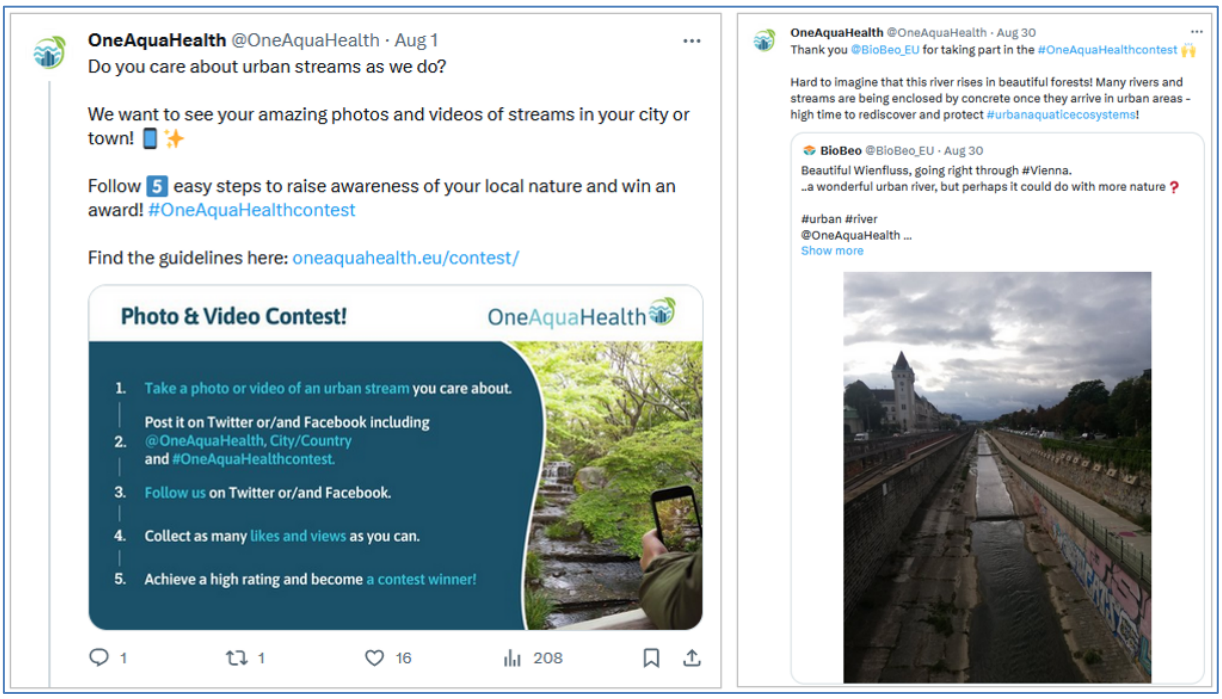

Figure 23: Social media posts promoting the OneAquaHealth Urban Stream Photo/Video Contest

Conclusion

The deliverable D6.1 presents an overview of the current state of the different functionalities of the OneAquaHealth Open Information Hub, as well as its technical framework. Using open access software, a flexible and scalable architecture has been developed to guarantee long-term sustainable usage of its knowledge resources and features. Furthermore, the consortium partners and external authors are able to contribute to its ongoing development, which will be then continuously revised and updated during the lifetime of the project and beyond. Screenshots of all current modules and sections of the Hub indicate its status at the time of the delivery of this report.

The content will be further extended by the consortium with support from the established community, involving citizens, policy makers, researchers, civil society organisations, standardization bodies, investors, industry and business partners and other stakeholders (related projects, initiatives and networks). Additional sections, modules and tools such as among others but not limited to, solutions and network directories, City Dashboards, a Citizen Science app and a Community module will be added.

The design and development of the City Dashboards, Citizen Science app and the Community module have been already initiated, including the creation of mock-ups for the different screens. The City Dashboards and Citizen Science app, addressed to policy makers and citizens, will be linked with the Open Information Hub so that they are easily accessible by the Hub users, who will be able to populate them with real life data as well as retrieve and visualise the latest and historic information available.

The Open Information Hub will be maintained by SYNYO beyond the project end and used as an instrument to support the establishment of further development activities in the field. Upcoming extensions of its infrastructure will be reported in the next version of this deliverable.

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