**Annex 2\_Tenders Tasks, Timeline and Deliverables:** **Establishment of a Monitoring System and Enforcement of Penalties for Illegal Waste Disposal and Environmental Pollution in the Municipality of Banovići**

1. **DESCRIPTION OF THE CURRENT SITUATION**

In the Municipality of Banovići, there is no systematic solution in place for monitoring illegal activities related to waste disposal at the Stražbenica illegal dumpsite and into river streams. Consequently, the enforcement of penalties defined by the Decision on Communal Order (Official Gazette of the Municipality of Banovići, No. 7/18) is severely hindered and almost impossible.

In addition, the municipality faces frequent occurrences of improper municipal waste disposal in containers (e.g. disposal of ash, which qualifies as bulky waste and requires a separate collection fee) and the emergence of illegal dumpsites.

Ultimately, the inability to monitor illegal activities prevents the local self-government unit from applying the polluter pays principle effectively. It also hampers strategic planning and the effective implementation of activities aimed at improving the waste management system, resulting in increased greenhouse gas emissions from the decomposition of organic matter, degradation of natural resources within the municipality’s territory, and loss of the resource value of waste that could otherwise be utilized for energy generation or to create new/additional economic value in the local economy.

1. **PROJECT ASSIGNMENT DESCRIPTION**

Due to the frequent occurrence of improper municipal waste disposal in containers (e.g., disposal of ash, which qualifies as bulky waste and requires a separate removal fee), illegal waste dumping at the Stražbenica illegal dumpsite and into river streams, as well as the emergence of other illegal dumpsites, it is necessary to develop a system for monitoring and enforcing penalties for illegal waste disposal and environmental pollution. This system will, for the first time, enable the reporting of illegal activities.

The new monitoring and enforcement system for illegal waste disposal and environmental pollution should apply a collaborative approach, involving cooperation between municipal and communal services and citizens, and integrate the use of field data collected via sensors and cameras to identify illegal activities in the area of waste management, with a primary focus on identifying illegal dumpsites and improper waste disposal.

The system will collect input data from citizens (through manual input into a web tool and/or mobile application) and data collected by equipment (directly integrated into the application), analyse this data, and provide recommendations and guidance for further actions by the competent authority for penalty enforcement, as well as future strategic planning activities based on verified data and further measures to prevent illegal activities in the waste management system.

The project to develop the system must be implemented through the following steps, ensuring it incorporates the characteristics and functionalities described below:

1. **Development of a digital web tool and mobile application**

The web tool and mobile application are the fundamental elements of the monitoring and enforcement system. They should include the following modules:

* **Module for anonymous reporting and citizen communication**

A simple, functional digital form allowing citizens to report illegal activities such as illegal dumpsites, improper waste disposal, or other forms of pollution. The form should include:

* + Short description of the illegal activity (up to 500 characters)
  + Type of illegal activity (e.g., illegal dumpsite, improper disposal of municipal waste in rural/urban areas, improper disposal of industrial waste, etc.)
  + Location of the activity
  + Photo evidence
  + Date and time of submission

The module must confirm receipt of the report to the user and also allow citizens to submit comments and concerns about the waste management system. A database must store all reports, notify system administrators, and link to the analysis and decision-making module.

* **Module for sensor data collection and storage**

This module enables automated monitoring of detected anomalies (e.g., increased VOC levels or video footage of activity) and displays real-time data, including:

* + Sensor/camera location
  + Current VOC level (ppm)
  + Live image from the site
  + Status of illegal activity (exists/does not exist/under review)

The module must notify the administrator whenever an illegal activity is detected and feed into the analysis and decision-making module.

* **GIS spatial display module**

An interactive GIS map showing reported activities, sensors, cameras, and identified problems. It must highlight critical zones, allow searches by keywords (location name/coordinates or activity type), and display:

* + Data source (citizen report, sensor, or camera)
  + Summary data collected
  + Results and recommendations from the analysis module
  + Actions taken and current status (resolved/in progress/pending/inactive)
* **Analysis and decision-making module**

This module provides cross-analysis of data, compares it to thresholds, generates recommendations, and produces monthly, semi-annual, and annual reports at the location and municipal levels, in line with legal and regulatory frameworks.

* **Admin module**

Allows administrators to modify, manage, and maintain the system, assign roles (super-admin, admins by dataset), and ensure security and functionality.

Development of the web and mobile applications includes:

* Domain and hosting acquisition
* Draft design development in collaboration with municipal representatives
* Application development and testing
* Finalization and integration with existing municipal or utility web services, where possible
* Presentation to key stakeholders

The contractor must provide 12 months of maintenance after completing contractual obligations.

1. **Awareness campaign**

To ensure operational functionality of the system and motivate citizens to use the tools:

* Develop a **promotion and awareness plan**, including objectives, messages, target audiences, channels, actions, expected results, and verification methods.
* Create a **visual identity and slogan**, proposing at least two designs.
* Conduct the campaign through:
  + Social media (at least 20 posts with engaging content: brochures, videos, flyers, infographics, etc., with quarterly reach reports)
  + Three **info sessions** in rural and urban areas with live demonstrations
  + One **media conference** for local press at municipal premises

1. **Procurement and installation of sensors and cameras**

Procure and install 12 cameras and 12 VOC sensors with at least the following specifications:

* **Sensors:**
  + Measurement accuracy: ±5% of reading
  + Range: 0–10 ppm VOC
  + Wireless (Wi-Fi/LoRaWAN)
  + EN 14662-1 compliant
  + Power: solar panel (20 W), Li-Ion battery, 7-day autonomy
* **Cameras:**
  + Resolution: 1080p HD, 25 fps
  + Wireless (4G LTE, Wi-Fi)
  + Night vision up to 10 m
  + Power: solar panel (5 W), 6500 mAh battery
  + IP65 waterproof

Devices must be wirelessly connected to the central system, transmit real-time data, support historical data and geolocation, and operate autonomously. Locations and relocation of equipment will be coordinated with municipal representatives.

1. **Training on the web tool and application**

At least three training sessions (minimum 4 hours each) for representatives of the Municipality of Banovići, JP Eko Sep d.o.o. Živinice, and JP Komunalno Banovići, covering:

* Application use: reporting, map and sensor data, notifications
* Equipment maintenance: sensors, cameras, solar modules
* Enforcement: using data to record violations, initiate penalties, strategic planning

A written user manual for the application and its maintenance must also be provided.

1. **EXPECTED RESULTS**

The expected results of the project “Establishment of a Monitoring System and Enforcement of Penalties for Illegal Waste Disposal and Environmental Pollution” include the following key aspects:

1. **Reduction of illegal waste disposal:**

* More efficient monitoring: Installed sensors and cameras will enable timely surveillance of areas known for illegal dumping, allowing faster and more accurate identification and documentation of violations.
* Increased detection: The likelihood of detecting and recording illegal activities will rise, potentially leading to fewer incidents.

1. **Increased community awareness and engagement:**

* Digital tool and mobile application: By using the app to report illegal activities, citizens will have an easy way to submit and track their reports, fostering greater engagement and awareness of the issue.
* Awareness campaign: Activities such as info sessions and social media outreach will enhance public knowledge about the new system and the importance of proper waste disposal.

1. **Improved response to reports:**

* Faster response: The automated reporting and detection system will enable authorities to respond more quickly to reported and observed issues.
* Effective enforcement: Clear documentation and evidence collected via sensors and cameras will allow precise attribution of responsibility and enforcement of penalties in accordance with legal regulations.

1. **Capacity development and training:**

* User training: Training of representatives from the Municipality of Banovići, JP Eko Sep d.o.o. Živinice, and JP Komunalno Banovići will ensure effective use of the new tools and technologies, strengthening local authorities’ capacity to address the problem.

1. **Long-term improvement of waste management:**

* Data analysis: Collected data will help analyse illegal dumping patterns and support planning of future measures to improve waste management.
* Strategies and policies: This project can serve as a basis for developing new local-level strategies and policies for waste management.

1. **Sustainable solutions:**

* Solar power supply: The use of solar panels ensures system sustainability and reduces energy costs, especially in remote areas.

1. **Transparency and trust:**

* Increased transparency: Implementing this system will enhance transparency in monitoring and enforcing penalties, potentially increasing public trust in local authorities.

**Success indicators:**

* Reduction in the number of illegal dumpsites and improper waste disposal incidents.
* Increase in the number of reports submitted through the application.
* Faster and more effective resolution of reports and enforcement of penalties.
* Increased public awareness of the importance of proper waste disposal.

1. **PHASES**

The planned implementation period for all project activities in the Municipality of Banovići is twelve (12) months.

The project should be carried out in the following phases:

* **Phase 1:** Procurement of equipment and installation of sensors/cameras (first 2.5 months).
* **Phase 2:** Development of the application and preparation of the promotion and awareness-raising plan (first 4 months).
* **Phase 3:** System testing and staff training (month 5).
* **Phase 4:** Operational use and continuous system monitoring, as well as implementation of the promotional campaign (from month 5 onwards).
* **Phase 5:** Preparation of the final activity report (month 12).

1. **TIMELINES AND DELIVERABLES**

The Contractor will be required to deliver the services in accordance with the timelines specified below:

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| --- | --- |
| **Task/Deliverable** | **Expected Completion Date** |
| **Task 1:** Procurement and installation of air quality sensors | 20 October 2025 (2.5 months from contract signature) |
| **Task 2:** Development of the digital web tool and mobile application; submitted to SEI and Municipality of Banovići representatives for review and comments | 22 December 2025 (4 months from contract signature) |
| **Task 3:** Delivery of training on the use of the web tool and application | 30 January 2026 (5 months from contract signature) |
| **Task 4:** Implementation of the promotional campaign and submission of a final report to SEI on completed activities | 17 August 2026 (12 months from contract signature) |

The Contractor will be provided with the contact details of representatives from the Municipality of Banovići. Monitoring and evaluation to ensure quality will be carried out by SEI experts.

The Contractor is required to take into account the comments from the representatives of the Municipality of Banovići, SEI, and other relevant parties, and to align their work with the provided suggestions.