**1. Why the system is needed and an overview of the system itself.**

- The system is needed to sense, predict and help prevent the issues of flooding.
- The system is needed to collect data on water levels over time in our particular chosen area.

**4. The different classes of user, including operators, maintainers, supporters and their different skills and limitations.**

- The installers.
    - Limited technical knowledge beyond installation instructions/manual.
    - Limited virtual visibility of the device (Requires physical feedback such as LEDs)
- The maintainers.
    - Physical maintenance as well as virtual maintenance?
- The data analysts.
    - No Physical access to the device
    - Will just be using data that is sent from the device(s)
    - Much more technical and skilled at managing and maintaining data.
- Possibly the people the system may assist with flooding (Supporter/Stakeholder).

**5. The environments in which the system is used and supported.**

- Building/street level to help data gather for very localised spots as well as detecting flooding on the fly to help warn. Also to capture data for large areas in places such as lakes.

**6. The boundaries of the system and its interfaces and relationships with other systems and its environments.**

- The individual sensing devices will need wireless communication to connect to a central server which will store and process the gathered data.
- How often will batteries need to be changed/charged?
- Waterproofing of the individual devices/sensors
- Needs to send data in a timely manner
- Difficult to tell if there are external factors affecting the data (anomaly detection required)

**7. When the system will be used, and under what circumstances.**

- The system will be set up in locations and activate on a timely manner to data gather and then also activate when the certain conditions are picked up to indicate flooding.

**8. How and how well the needed capability is currently being met (typically by existing systems)**

- A company called ‘Environmental Monitoring Solutions’ use :
    - velocity field mapping using ultrasonic flow meters/electromagnetic flow sensors for capturing velocity
    - gauges/probes for capturing levels/temperature

**9. How the system will be used, including operations, maintenance and support**

- Installed and maintained physically monthly?
    - Check placement
    - Replace battery
- Alerts sent by devices when levels are rising to be actioned by data analysts.
- Data is maintained by the analysts and used to predict flooding issues in certain areas.

**10. Scenarios illustrating specific operational activities involving the use of the system.**

- **The water sensor:**
    - Maintenance person X is assigned to attach a water level monitoring sensor near a river. Perhaps a bridge or against some other form of concrete wall quite close to where the river is flowing.
    - **Testing:**
      The velocity/level is taken and recorded (manually by X). The device is prompted to do the same via the sensor and expected to send the same figures that person X recorded to where the data is being recorded. Person X expects confirmation of the figures received at the main data center and in turn confirms that they are the same ones he recorded.

- **The device:**
    - Maintenance person X is assigned to attach device and ensure it is fully functioning. One device is stored in appropriate waterproof case, it is attached near the sensor, but perhaps at a higher height. A light should signal that it has been turned on, and a test should be made to ensure it is sending data.
    - **Testing:**
        - Button is pressed and received at data center as being pressed.
        - Make the device send an initial data entry when first started up i.e. some data matching the location it has just been set up at if possible? With time and date.
        - Manually prompt the device to measure an initial reading from the sensor (if we configure it to only do so at intervals). Person X remains on site and expects confirmation from data center with the figures received.