Purpose
The purpose of this standard procedure is to establish a systematic and immediate response for water disturbances and repair works, maintain the quality and the efficiency of the network, enhance the level of service and operation, and finally to reduce water losses.

Scope
This SOP includes the responsibilities and activities of corrective maintenance in the water supply network in especially the response to disturbances and complaints in the water supply network, and its documentation.

Overall Responsibility
The Water Services Manager is responsible for the performance of the whole process within the scope of this SOP. He is the connection between all involved departments and units and therefore responsible that the workflow is smooth, and everybody is supporting the process.

The Senior Supervisor is responsible for implementation of the process, i.e. organizing and managing the resources and the delivered quality.

The staff in various capacities is responsible for implementing the process as described in this SOP.

Activities
The activities in the SOP are described below and schematically presented in the flowchart in figure 1 below.

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The Control room will receive all notifications and complaints related to water disturbances from various sources, externally as well as internally.</td>
<td>Control Room attendant</td>
</tr>
<tr>
<td>2</td>
<td>The Control Room Attendant verifies the received information through the identification of the location in the map (GIS - viewer), identifies existing notes/reports in the database (such as closure of valves, failure history) and checks with other ongoing activities.</td>
<td>Control Room Attendant</td>
</tr>
<tr>
<td>3</td>
<td>The technical assistant enters the information in the database (see Manual Database M 0x): 1. Enters a new complaint and create a complaint number 2. Fills in information received and available in a map 3. Inform directly the Senior Technician responsible for the zone (or to the crew supervisor at night- or weekend crew)</td>
<td>Control Room Attendant</td>
</tr>
</tbody>
</table>
4. If a crew needs to be instructed – generate WOF forward to the Planning Assistant
5. In special cases, give pre- information to the Communication Officer

<table>
<thead>
<tr>
<th>Number</th>
<th>Task Description</th>
<th>Responsible Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>The planning assistant will prepare the WOF, including:</td>
<td>Planning Assistant</td>
</tr>
<tr>
<td></td>
<td>- propose priority of the work based on set criteria,</td>
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<tr>
<td></td>
<td>- collect information from the GIS,</td>
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<tr>
<td></td>
<td>- assess the need for materials</td>
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<tr>
<td></td>
<td>- propose to order from the store if needed and if so prepare the SS requisition form and the Store Request Form,</td>
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<td></td>
<td>- assess the need to call in the LDU and if so, prepare the LD form</td>
<td></td>
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<tr>
<td></td>
<td>- assess the need to request support from the communication officer and if so prepare the PR request</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The WOF will be submitted to the Senior Technician for approval.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>The Senior Technician will approve the WOF, add any additional information or guidance and forward the WOF to the crew.</td>
<td>Senior Technician</td>
</tr>
<tr>
<td>6</td>
<td>The Crew will review the WOF and check if all equipment and materials are in/on the vehicle</td>
<td>Crew</td>
</tr>
<tr>
<td>7</td>
<td>The Crew will travel to and inspect the site.</td>
<td>Crew</td>
</tr>
<tr>
<td>8</td>
<td>In case valves need to be closed, the Crew will inform and coordinate with the Control room</td>
<td>Crew</td>
</tr>
<tr>
<td>9</td>
<td>The Crew will carry out the repair works. After the works have been completed, the Crew will again coordinate with the control room about opening the valves</td>
<td>Crew</td>
</tr>
<tr>
<td>10</td>
<td>The Crew will inform customer(s) (in consultation with the Control Room when needed), that the repairs have been carried out and complete the WOF and the logsheet, and return these to the Senior Technician.</td>
<td>Crew</td>
</tr>
<tr>
<td>11</td>
<td>When needed, the senior technician may carry out a site visit and provide technical advice during the repair works. Upon completion of the works (s)he will approve the WOF and the logsheet.</td>
<td>Senior technician</td>
</tr>
<tr>
<td>12</td>
<td>The WOF will be submitted to the Network Administrator for final approval and forwarding to the GIS Coordinator.</td>
<td>Network Administrator</td>
</tr>
<tr>
<td>13</td>
<td>The WOF and any relevant data will be entered into the GIS</td>
<td>GIS Coordinator</td>
</tr>
<tr>
<td>14</td>
<td>The Planning Assistant will carry out a quality check of the data entered into the GIS and complete the M&amp;E report.</td>
<td>Planning Assistant</td>
</tr>
<tr>
<td>15</td>
<td>The Planning Assistant will submit the M&amp;E report to the Network Administrator for approval.</td>
<td>Network Administrator</td>
</tr>
</tbody>
</table>

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Responsibilities within the process

Control room:
The Control Room is the focal point at WASCO, where all complaints from external and internal sources are received and processed. The Control Room is the official call center.

The Control Room Attendant receives notices of water disturbances from
- Phone calls from customers or public
- Walk-in customers
- Notes from other departments
- Information from Crew
- Information from social media

The Control Room Attendant verifies the received information through the identification of the location in the map (GIS - viewer), identifies existing notes/reports in the database (such as closure of valves, failure history) and checks with other ongoing activities.

After receiving the notification of complaint, the control room attendant enters the information in the database (see Manual Database M 0x):

1. Enter the new complaint and create a complaint number
2. Fill in information received and available in a map
3. Inform directly the Senior Technician responsible for the zone (or to the crew supervisor at night- or weekend crew)
4. If a crew needs to be instructed – generate WOF with all available information and submit to the Senior Technician for approval
5. In special cases, give pre-information to the Communication Officer

Upon completion of the repair work, the Control Room Attendant receives feedback of the crew and confirms with the customer. The response or the accomplished work orders will be entered into the database.

The Control and Data Section in the Control Room:

- Upon completion of the repair works receives approved WOFs from Senior Technician to enter information into database

Technical Assistant:
The Technical Assistant is overlooking the tasks and workflow in the Control Room:

- Responsible that the Database is functioning
- Evaluation of the data from database –daily:
  - Work done per day (per crew,..)
  - Type of failure/condition
  - Leakages and estimation of water loss
  - Duration of valve closure and No of affected customers
  - No. of WOF done/planned
- Developing monthly Monitoring reports
Feedback findings of missing data / wrong entries to
  o Senior Technician
  o or Control room

Planning Technician:
The Planning Technician will carry out technical preparation on the work order and prepare the WOF for approval by the Senior Technician and subsequent implementation by the Crew. This will involve:

- Receive the WOF from the Control Room Attendant and any verbal information
- Collect information (using sources of GIS, LDU, database with previous damages, illegal connections, etc)
- Prioritize the work according to the following criteria:
  - Location (area, main road or side), diameter, material
  - Network -function, location of next valve to close, check effect on pumps
  - Connected customers
  - Estimated duration of repair work
- Order to secure site/inspection by emergency or available crew (criteria: location of leakage, equipment needed)

The Planning Assistant will

<table>
<thead>
<tr>
<th>Activity</th>
<th>Relevant forms</th>
</tr>
</thead>
</table>
| Request Leak Detection Unit if: | ➢ Complete and submit a Leak detection request Memo  
  • Location Leak is not visible  
  • Information about the DMA can be useful  
| Request Communication Officer if: | ➢ Complete and submit the PR request Memo  
  ➢ > 25 customers are affected  
  ➢ Hospitals, schools, etc. are affected  
| Request Store if: | ➢ Issue the Store Requisition Form  
  ➢ Required material is not in standard car equipment  
| Request Support Service if | ➢ Issue Support Service Request Form  
  ➢ Additional equipment is needed  
  ➢ Backhoe, excavator,  
| Check if any other department will be affected | ➢ Communication with Support Service, Network Administrator, as required  
  ➢ Approval if pumps will be affected  
  ➢ Water supply of many customers is affected |

Senior Technician:
The Senior Technician is responsible to organize and order the crew and to guarantee the quality and efficiency of the work done:

- S(h)e instructs the crew
- Responsible for final resource planning
- Supervision of crew on site visit (Sample supervision)
- Approval of feasibility of drawing and material used
Approval of feasibility of total time needed, and time of valve closure? Collect example cases to use for team feedback and analyze potential for improvement

Collection and approval of WOF, if incomplete return to Crew- Supervisor, after hand to Senior Supervisor to sign off

Review and analyze crew log sheet

Crew Supervisor:
The crew supervisor is responsible to prepare all documentation needed and to organize the work on site. In preparation, he needs to confirm with the Senior Technician about the work and the tools or communication required.

Preparation before leaving for the site:
- Check WOF if all information is available
- Check if all material and equipment needed is on the truck
- Check if backhoe is contracted and contact for appointment

On site:
- Check situation on site
- Close valve and call Control room. For closure of valves, see recommendations prepared by Planning/Senior Technician. Information about closure of valves or any other activities of the emergency crew must be documented on the WOF, information received verbally needs to be documented on the WOF.

After completion:
- Open valve after repair and call Control room: Information about opening of valves need to be documented on the WOF.
- Fill required information in WOF (Manual WOF M xx) and the log sheet (FM XX log sheet)
- Receive confirmation of customer
- Information to Senior Technician after completion
- WOFs, which could not be finalized, should be handed over to Senior Technician to discuss and to be rescheduled.

Crew:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Applicable forms and standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secure the area</td>
<td>Safety regulations</td>
</tr>
<tr>
<td>Dig trench (manually or by excavator/backhoe)</td>
<td>Technical Standards for trenches</td>
</tr>
<tr>
<td></td>
<td>Standards and guidelines for use of equipment</td>
</tr>
<tr>
<td>Conducting the repair</td>
<td>Technical Standards of material, maintenance, etc</td>
</tr>
<tr>
<td>Backfilling the pipe and the trench</td>
<td>Standards for pipe beddings and compaction</td>
</tr>
</tbody>
</table>

Senior Supervisor/Network Administrator:
- Approve the WOF
- Monitor the performance of the process and evaluate indicators delivered by Control Room –Technical Assistant
Initiate monthly Management Meetings with Senior Technicians, Control Room and Leak Detection Unit to discuss the performance and agree on targets for improvement (to be approved by the Water Services Manager)

Issue final approval and sign off on the WOF (only until monitoring system is in place, later this step may not be necessary)

Hand over to Control and data section

GIS Coordinator
- Receive results of repair through WOF
- Enter data on WOF into GIS
- Maintain data of assets and network
  - Changes in the network or connection
  - Verify location in the map
  - Last service date
  - Manufacturer and specs
  - Condition

Indicators
The manager Water Services will set and regularly update target values for each of the indicators mentioned below.

- To measure if this process is performing well:
  - No. of WOFs received / No. WOFs completed
  - No. of WOFs completed per day
  - No. of outstanding WOFs: > 3 days

- To avoid Water losses:
  - Response time
  - To add: the time until the water loss is stopped, this means to assess another time in WOF

- To measure Quality of repair works:
  - No of repairs that have to be carried out again
  - No. Of satisfied customers

Accompanying FORMS and GUIDELINES:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>F01</td>
<td>WOF (Work Order Form)</td>
</tr>
<tr>
<td>F02</td>
<td>Leak Detection Request Memo</td>
</tr>
<tr>
<td>F03</td>
<td>PR Request Memo</td>
</tr>
<tr>
<td>F04</td>
<td>Store Request Form</td>
</tr>
<tr>
<td>F05</td>
<td>Equipment Request form</td>
</tr>
<tr>
<td>F06</td>
<td>Log Sheet</td>
</tr>
<tr>
<td>G01</td>
<td>Repair of Pipes</td>
</tr>
<tr>
<td>G02</td>
<td>Repair of Valves</td>
</tr>
</tbody>
</table>

Links to other SOPs
- SOP for GIS
- SOP for preventive maintenance
## Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WOF</td>
<td>Work Order Form</td>
</tr>
<tr>
<td>IF</td>
<td>Inspection Form</td>
</tr>
<tr>
<td>LDU</td>
<td>Leak detection Unit</td>
</tr>
<tr>
<td>LD</td>
<td>Leak Detection</td>
</tr>
</tbody>
</table>

## Revision of the SOP

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>What was changed?</td>
<td></td>
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</table>