

## **Guidelines for a “plan request” system to avoid third party damage**

## Table of contents

<b>1</b>	<b>GENERAL INFORMATION.....</b>	<b>4</b>
1.1	DEFINITIONS AND ROLES.....	4
1.2	ROLES IN THE APPLICATION .....	5
1.3	INTRODUCTION AND DOCUMENT PURPOSE.....	6
1.4	GENERAL INFORMATION.....	6
<b>2</b>	<b>FUNCTIONAL REQUIREMENTS.....</b>	<b>8</b>
2.1	BASIC FUNCTIONALITY.....	8
2.2	GENERAL ARCHITECTURE .....	11
2.3	INTERFACE DESCRIPTION .....	11
2.4	INFORMATION TO BE EXCHANGED .....	11
	2.4.1 Requestor.....	11
	2.4.2 Members and OCCP .....	13
2.5	OVERVIEW OF FUNCTIONAL SPECIFICATIONS.....	13
2.6	WEB PORTAL .....	13
	2.6.1 Static page.....	13
	2.6.2 Registration .....	13
	2.6.3 Disclaimer .....	14
	2.6.4 Plan request.....	14
	2.6.5 Authentication and authorisation.....	14
2.7	GEO PORTAL .....	14
2.8	ADMINISTRATIVE CONSOLE .....	15
	2.8.1 Site administrator .....	15
	2.8.2 Members and OCCPs.....	15
2.9	WORKFLOW MODULE .....	16
2.10	MAILING SYSTEM.....	16
<b>3</b>	<b>NON-FUNCTIONAL REQUIREMENTS .....</b>	<b>18</b>
3.1	SAFETY, STABILITY AND PERFORMANCE.....	18
	3.1.1 Safety and security.....	18
	3.1.2 Stability and performance .....	18
3.2	DOCUMENTATION.....	19
	3.2.1 Project Documentation.....	19
	3.2.2 User manuals.....	19
	3.2.3 Procedures .....	19
<b>4</b>	<b>PLATFORM OPERATION AND SUPPORT.....</b>	<b>20</b>

4.1 INFRASTRUCTURE AND APPLICATION MAINTENANCE.....20

4.2 HELP DESK.....21

4.2.1 *Ticketing system* .....21

4.3 ARCHIVING .....21

# 1 GENERAL INFORMATION

## 1.1 Definitions and roles

For this specification the following definitions shall apply:

Term	Meaning
<b>GIS - Geographic Information System</b>	An electronic data management system for storing, editing, analysing and displaying all information associated with a geographical location.
<b>Excavation activities</b>	Any operation using non-mechanical or mechanical equipment in the movement of earth, rock or other material below existing grade. This includes, but is not limited to, augering, boring, digging, ditching, dredging, drilling, driving-in, trenching and tunnelling.
<b>Assets</b>	Buried or aboveground pipelines, cables or installations.
<b>Asset operator</b>	Any person, utility, or other person or entity who operates or controls the operation of a pipeline/cable/installation.
<b>Third-party damage</b>	Third-party damage includes outside force damage to underground assets that can occur during excavation activities and is caused by someone other than the asset operator or its contractors.
<b>PRS - Plan Request System</b>	An application, a tool, that supports the exchange of information between a plan requestor and asset operator (or one call contact person). The PRS can be used to make an inquiry on the presence of assets (information request) and/or the announcement to start a construction site (work announcement).
<b>Plan requestor</b>	Any individual or legal entity, public or private using the PRS to make an inquiry on the presence of assets and/or to announce the start of a construction site.
<b>Plan request</b>	A communication between a plan requestor and the plan request system in which a notice of planned construction activities or an inquiry on the presence of assets is processed.

<b>OCCP - “One Call” Contact Person</b>	Person replying to plan requests by providing information on assets, generally in commission of one or more members.
<b>Members</b>	Asset operators participating in the PRS by providing specific information on their assets, e.g. the zones of interest, and assigning an OCCP.
<b>Actor</b>	Organisation or person that is registered at the PRS portal. There are multiple profiles: <ul style="list-style-type: none"> <li>• Member</li> <li>• OCCP</li> <li>• Plan requestor</li> </ul>
<b>Work zone</b>	Geographic polygon defined by plan requestor in the plan request that contains the zone in which he is interested.
<b>Zone of interest</b>	Geographic polygon (perimeter) defined by an asset owner within which he wants to be informed of scheduled works. The zone of interest is meant to initiate a dialogue between the asset owner(s) and the plan requestor before construction activities in the vicinity of assets start (e.g. 100m for gas installations, 50m for cables / fibres).

## 1.2 Roles in the application

Role	Actions
<b>Plan requestors</b>	<ul style="list-style-type: none"> <li>• Use the applications in the language of their choice</li> <li>• Obtain information on the PRS and on the operation of the application (online manual)</li> <li>• Register themselves</li> <li>• Navigate within a GIS portal</li> <li>• Consult a list of members that are concerned in the plan request</li> <li>• Create a plan request within the GIS portal</li> <li>• Send the plan request by e-mail to the concerned OCCPs</li> <li>• Receive a user copy of the e-mail, confirming the successful creation of a plan request</li> </ul>

	<ul style="list-style-type: none"> <li>• Review a list of uploaded and available documents in the "library" and download these documents</li> <li>• Upload documents (ex. plans) from their own IT system</li> </ul>
<b>Members</b>	<ul style="list-style-type: none"> <li>• Register their zones of interest in the application (e.g. 100m for gas installations, 50m for cables / fibres)</li> <li>• Verify their zones of interest in a GIS viewer</li> <li>• Define the contact information (mail, telephone)</li> <li>• Assign one or more OCCPs to handle plan request mails.</li> </ul>
<b>OCCP - "One Call" Contact Person</b>	<ul style="list-style-type: none"> <li>• Receive plan request e-mails in which they are concerned i.e. of which the work zone intersects with a zone of interest defined by the member.</li> <li>• Send receipt information for these e-mails to the PRS</li> <li>• Reply to plan requests</li> <li>• Upload documents in digital format to the "library"</li> <li>• Verify their zones of interest in a GIS viewer</li> </ul>
<b>Main administrator</b>	<ul style="list-style-type: none"> <li>• View the main account details</li> <li>• Modify the account attributes</li> <li>• Add, delete and modify accounts tied to the main account</li> <li>• Manage the zones of interest</li> </ul>
<b>Site administrator</b>	<ul style="list-style-type: none"> <li>• Administer a list of actors and code tables</li> <li>• Calculate statistics of numbers and types of plan requests</li> <li>• Visualize zones of interest in a GIS viewer</li> </ul>
<b>Technical manager</b>	<ul style="list-style-type: none"> <li>• Responsible for the technical management tasks of the application such as infrastructure, backup, licensing, updates, ...</li> </ul>

### 1.3 Introduction and document purpose

This document defines characteristics and functionalities of an internet-based plan request system (PRS) and supplies minimal requirements for functionalities, documentation, installation and support.

### 1.4 General information

The "plan request system" shall be an internet application that is used by plan requestors to generate interactive plan requests. These requests are sent by the application to the concerned OCCPs.

The three main objectives of the PRS are:

- **Safety**: warrant the safety during working activities in the vicinity of cables/pipelines and installations
- **Information**: supply the required information to warrant the safety
- **Facilitation**: facilitate the exchange of plans/information between the plan requestor and the concerned asset operators

The “plan request system” shall also allow information requests to be submitted to obtain geographical data on cables and pipelines in preparation of working activities.

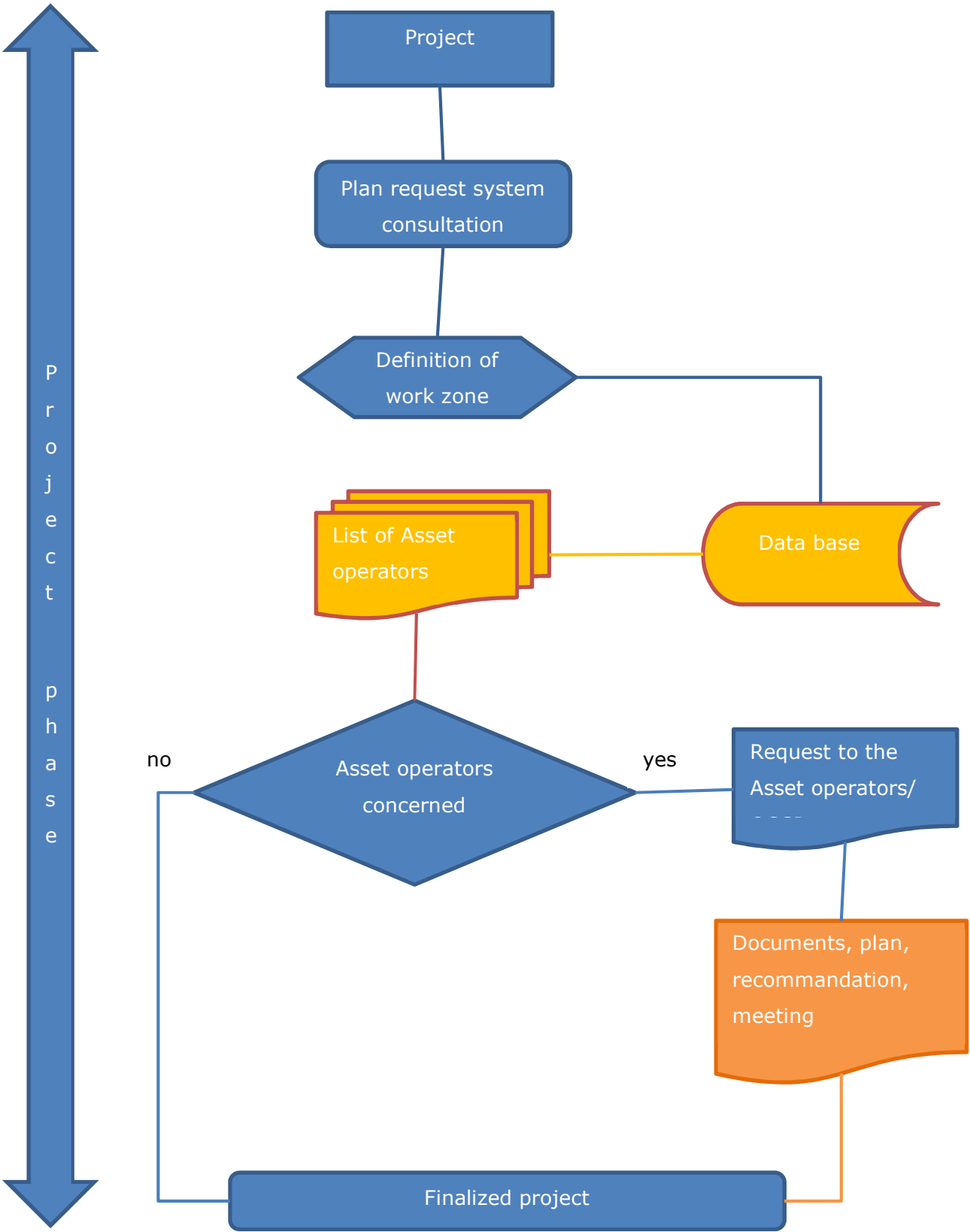
The application is designed to be easy and intuitive to use by all user profiles.

## 2 FUNCTIONAL REQUIREMENTS

### 2.1 Basic functionality

The critical business process in the application is the initiation and processing of a plan request. The schematics below shows the different steps:

1. Initiation: A plan request will be submitted in the portal by the plan requestor
  - a. Input of administrative data of the plan request
  - b. Interactively draw and modify the work zone on a map background
  - c. Validate the data entered
  - d. Search for concerned OCCPs. Each search is registered in the database
  - e. The plan requestor can cancel or send the plan request. Upon sending, this is registered in the database. Every plan request will receive a unique ID
2. The perimeter of the work zone will be intersected with the zones of interest of the assets to determine the concerned assets, asset owners and OCCP
3. The OCCPs that are concerned receive a mail with an \*.xml attachment. A similar mail is sent to the plan requestor
4. The OCCP are required to confirm the receipt of this mail
5. Subsequently the OCCPs are required to answer the request
6. As soon as the request is handled by the OCCPs, the plan requestor will receive 1 or more e-mails containing a download link and can download individual files from the "library"

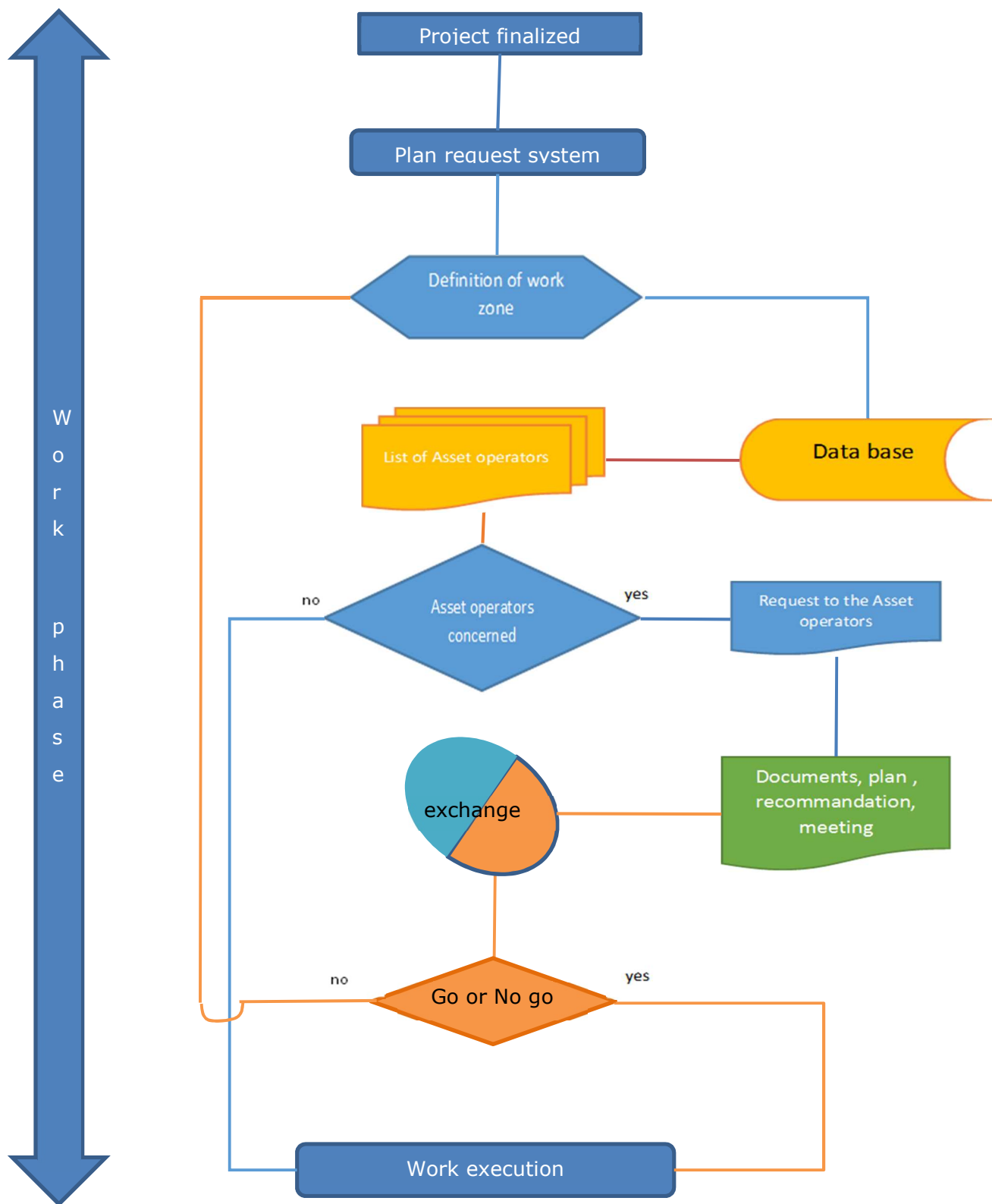


Legend :

Asset operators - OCCP

Plan request system

Plan requestors



## 2.2 General architecture

The portal must be realized to assure the maximum reliability and up-time, easy maintenance and the total operation safety.

A monitoring system will be set up for surveillance. This system is capable of early detection of failures and issues warnings.

## 2.3 Interface Description

The plan requestors' interface will have the following main functionalities:

- Navigate in geographical application
  - Zoom, move, centre, scale, coordinates
- Make queries
  - Street, cadastral plot
- Toggle between background layers
  - Street map, cadastral map, topographic map, aerial view
- Draw the perimeter of the work zone
- Request a list of concerned asset operators
- Preview the plan request prior to sending
- Receive a confirmation e-mail after sending the plan request

After receiving an e-mail containing a download link for the retrieval of information, the plan requestor can interactively download files from the "library". The menu for the upload functionality will contain an overview of all plan requests made by the plan requestor. This overview includes a unique identifier of the request, the request date and the status (confirmation of receipt, information uploaded in the library).

Mobile use shall be possible. The web portal and geoportal support smartphones and tablets (responsive design, support for gesture, and support for position tracking within the geoportal).

## 2.4 Information to be exchanged

### 2.4.1 Requestor

The plan requestor shall provide following information:

- Upon registration: personal information (profile)
- Input data of the plan request
  - Type of requestor
  - Type of request (dropdown)
  - Type of work (dropdown)
  - Work execution method (dropdown)
  - Description of the works

- Start date, planned end date
- Localization: address of the work zone (street, municipality)
- Drawing of the work zone (polygon) in the GIS portal

Type of requestor	Type of request	Type of works		Execution method
Contractor	Consultation for planned work	Construction of cables or pipelines	Punctual openings for cables or pipelines	Mechanical including drilling / pressing
Sub-contractor	Site notification/ work announcement	Building engineering structures	Maintenance of engineering structures	Mechanical, with heavy tools
Study agency	Requesting servitudes	Roadworks	Work on rail infrastructure	Mechanical, with light tools
Architect	List of concerned utility companies	Foundation work	Hydraulic works	Manual, only hand tools
Builder		New building	Modification existing building	Special execution techniques
Municipal administration		Demolition works	Temporary occupation of land	
Notary		Construction of masts, pylons, wind turbines	Construction of underground room	
Private person		Land, garden or forestry activities	Soil research	
Other		Other (above ground)	Other (underground)	

**Table 1**

The plan requestor has the option to upload an attachment (e.g. a plan).

### 2.4.2 Members and OCCP

Members shall register their zones of interest in the application and keep this information up-to-date.

Upon a plan request, the members, through the OCCPs, provide information to be downloaded by the plan requestor from the library.

This information can be:

- Safety guidelines for working in the vicinity of the members assets
- Contact details for further arrangements
- Plans and information about the concerned infrastructure

## 2.5 Overview of functional specifications

The following list contains an overview of all functional parts of the application.

- A [web portal](#)
- A geographic database for the registration of actors, plan requests, status of the requests and zones of interest
- GIS server / services for the hosting of cartographic layers
- A file storage system holding the files of the "library"
- A [geo portal](#), integrated within the web portal [GIS client]
- An administrative console for the site administrator
- An [administrative console](#) for the members and OCCPs
- A portal to view pending and finished plan requests
- Modules for handling [work flows](#) [application server]
- A [mailing system](#) to compose and send mails [mail server]
- A monitoring system that sends out warnings in case of effective or risk of malfunction

## 2.6 Web portal

### 2.6.1 Static page

The web portal can host multiple static web pages. The user manuals shall also be published on these static pages.

The system shall show a list of registered members (name, contact details, web site) and shall allow users to navigate between the different static and dynamic parts of the portal.

### 2.6.2 Registration

- The system shall allow actor to create profile and set his credential at the portal
- Actors of the type "plan requestor" can self-register at the portal.
- Other types of actors (members, OCCP) can only be registered by the main administrator.

- After logon, actors can consult and edit their account details.
- A limited set of data per actor shall be stored at the portal's database. This data is required to auto-generate the mails and for administrative purposes. This includes:
  - Type of actor
  - Company
  - First name and family name of contact person
  - E-mail
  - Address details
  - Phone number
- The system shall authenticate user credentials to view the profile

### *2.6.3 Disclaimer*

The system shall provide a disclaimer. Disclaimer shall specify mutually agreed and arranged terms and conditions as part of registration and each plan request activity.

### *2.6.4 Plan request*

The system shall allow user to create a plan request.

- The system shall enable user to indicate border of the work zone
- The system shall enable to search for relevant asset owners within the work zone
- The system shall enable to intersect between work zone and all zone of interests
- The system shall provide a unique identification number for every information request
- The system shall provide a preview of the plan request mail before sending
- The system shall immediately provide a list of asset operators within the work zone
- The system shall send a notification to concerned OCCPs and requester in copy

### *2.6.5 Authentication and authorisation*

The portal shall discern different security levels:

- No authentication
- All authenticated users
- Members
- Main administrators
- "One call" contact person (OCCP)
- Plan requestors
- Site administrator

## **2.7 Geo portal**

- The system shall allow actor to navigate in the geographical application

- The user side of the geo portal shall have the following functional specifications:
  - Being only accessible to authenticated users
  - Within the geo portal, only authorized users can show their zones of interest
  - Being integrated within the web portal, hosted on the same web site, re-uses the same authentication
- The geo portal shall consist of:
  - An interactive cartographic representation with GIS functionalities
  - A legend component
  - A search module
- Within the geo portal, a module shall allow plan requestors to create a plan request with the following user actions:
  - Enter the required administrative data
  - Interactive delineation of a polyline or polygon on a map
  - The creation of a plan request is orchestrated by a workflow module

## 2.8 Administrative console

### 2.8.1 Site administrator

The administrative console is only accessible to the site administrator. The site administrator can consult the state of the application and the underlying data as well as perform management actions and execute routine maintenance tasks of the application, such as updates of zones of interest or updates of static information pages.

This console contains the following functionalities:

- Display of individual requests: a search function allows finding individual requests using the unique plan request identifier (ID) or a combination of filter criteria
- Management of static webpages
- Usage statistics and logs (ex. Number of requests, number of mails, reminder mails, number of up- and downloads, logs by the monitoring application)
- Consult and modify database records
- Edit configurable messages (screen messages and mails)

### 2.8.2 Members and OCCPs

Members and OCCPs have additional functionalities in their portal for the display and management of zones of interest, for the management of their main administrators and OCCP users and for the upload of replies to the "library".

- Show zones of interest (active and historical) and their perimeters in the geo portal
  - This functionality is restricted to the zones of interest associated with the respective member

- Manage zones of interest, thereby replacing and archiving the active zones of interest.
- Edit the contents of all configurable messages
- Respond to the “library” by interactively uploading information.
- Manage OCCPs
  - A main administrator will dispose of a user interface to add, modify and delete OCCPs.

Each main administrator and OCCP can review a list of open and answered plan requests and can manually respond to the “library” by interactively uploading one or multiple files.

## 2.9 Workflow module

The main workflows that need to be configured are:

- Interactive generation of a plan request
  - This workflow will be initiated from the plan request user interface within the geo portal.
- The processing of zones of interest
  - Create, edit, approve and remove zones of interest
  - The application will keep an history of the zones of interest
- Time triggered workflows like the sending of reminder mails
  - For all unconfirmed plan requests older than X days, a reminder mail needs to be sent to the concerned OCCP
  - All documents in the “library” older than Y months need to be removed or archived.
  - For all documents in the “library” older than Z months that have not been downloaded, a reminder mail needs to be sent to the plan requestor
- The logging of all digital interactions between the involved parties

## 2.10 Mailing system

The mailing application is responsible for sending mails to different actors. This includes:

- Plan request mails to OCCPs
- Reminder mails to OCCP
- User copy mails to plan requestors
- Mails with download link to “library” files to the plan requestors
- Reminder mail to plan requestors that a file in the library is about to be deleted

The mailing system uses the result of an evaluation process to format a mail based on a template and configurable messages. The contents of the mails are saved in the database.

The plan request mail to OCCP contains at least:

- A hyperlink to confirm receipt

- PRS request ID
- A situation plan of the work
- Contact details of the plan requestor
- Administrative data of the plan request
- Contact details of all concerned members
- A hyperlink to the attachments if uploaded by the plan requestor

The user copy mail to plan requestor contains the same contents as the mail to the OCCP, except for the hyperlink.

## 3 NON-FUNCTIONAL REQUIREMENTS

### 3.1 Safety, stability and performance

#### 3.1.1 Safety and security

All plan requests are handled safely (no lost request, information provided by plan requestor is correctly processed and transferred to administrators) and swiftly. OCCPs are guaranteed to have the information they provide to be integrally presented to the plan requestor. Loss of data and erroneous dispatching of plan requests cannot be tolerated.

The application is protected against (all) security risks such as hacking, viruses and phishing and complying to present data standards for internet security requirements can be different for the production environment, the failover environment and for the test platform.

#### 3.1.2 Stability and performance

The application has a high degree of stability and availability. The application is expected to run 24/7, with an emphasis on availability during business hours.

The plan requestor is guaranteed to have the plan request arrive on time. Almost immediately after submission, the OCCPs dispose of the necessary information.

The following specifications are expected [note: the times mentioned are only indicative]

- The average response time of page loads in the interactive web site is 0.2 s under average load and maximum 1 s under peak load.
- The average response time for the interactive navigation on the map of the geo portal is 0.1 s under average load and maximum 0.3 s under peak load.
- The interactive calculation of the concerned members takes less than 1 s on average with a maximum of 5 s.
- The average response time between the submission of a plan request and the sending of an e-mail to the concerned OCCPs is below 3 s, with a maximum of 60 s.
- Multiple simultaneous requests should be queued and processed in FIFO<sup>1</sup> order. Excessive load should not destabilize the system, but only induce delays in response time.
- All sent mails and plan requests need to stay on-line for at least 5 years, after which they can be archived.

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<sup>1</sup> FIFO = First In, First Out

## **3.2 Documentation**

### *3.2.1 Project Documentation*

The project documentation includes:

- A documented architecture schema
- An overview of the security context, firewall rules, authorisation
- A flow diagram for each implemented work flow
- Documented database schema
- Installation instructions for each component

### *3.2.2 User manuals*

User manuals shall be generated as documents including screen shots and detailed procedures.

The following manuals are required:

- A manual for the plan requestor
- A manual for the members and OCCPs
- A technical manual
- An administrator manual

### *3.2.3 Procedures*

The supplier shall generate procedural documentation for the maintenance of the portal. At least following items need to be covered:

- Operational tasks
- Incident management
- How to manage requests for functional changes
- Release management, from development environment to production
- Testing procedures

## 4 PLATFORM OPERATION AND SUPPORT

### 4.1 Infrastructure and application maintenance

The infrastructure minimally includes:

- A production platform
- A test platform
- Backup system
- Mail boxes
- A collaboration site
- A failover platform

The infrastructure can be hosted on dedicated servers (in a data centre) or cloud based.

The production platform's dimensioning on bandwidth, data storage, database capacity and processor capacity shall be adequate to meet the functional and non-functional requirements.

In case the infrastructure is hosted in a data centre, the following requirements apply:

- Redundant internet lines
- Reliable power source

All components of the production platform are part of a backup schedule. In case of system failure, the backup system ensures that no data is lost.

The test platform is to be used to test new developments and major configuration changes prior to go-live.

The failover platform shall be capable of handling the full load to the portal for a prolonged time. The conditions for switchover from production to failover platform shall be described: delay time (time to live, manual or automated failover, actions for switch back from failover to production. A failover test shall be executed periodically [1/year].

The technical manager is responsible for the operational management of the infrastructure and the application. This includes:

- Maintenance and backup of mail boxes
- Maintenance and backup of collaboration site
- Create and verify backups
- Monitor the application logs
- Incident handling
- Timely testing and application of updates and patches
- Anticipate on security issues
- Anticipate functional issues

## **4.2 Help desk**

The help desk is responsible for answering all telephone calls and incoming mails to the support mail address. The help desk responds to all actors (requestors, members, OCCPs).

### *4.2.1 Ticketing system*

The help desk shall install a ticketing system. In this system all incidents, questions and linked communication are preserved.

## **4.3 Archiving**

To avoid excessive growth of the database, an archiving strategy is to be defined in which all data from mails and / or requests older than a certain age can be archived.

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