



# Pilot Sloe area

FRAMES-project

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Final report

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# Summary

This study contains an assessment of the suitability of the Sloe area as a temporary shelter location for residents of the 'bathtub Ritthem' in the event of a (imminent) flooding. To determine the suitability of the harbour area, flood scenarios have been investigated, evacuation options were analysed and a communication plan was developed. In addition, the consequences of flooding of the Sloe areas have been investigated, companies active in the Sloe area (Vlissingen East) were interviewed, as were managers of some shelter locations in Vlissingen and Middelburg.

The suitability of the Sloe area as a temporary shelter location for residents of bathtub Ritthem is limited. The relatively high altitude is an advantage, but the capacity, facilities and distance are less favourable. In contrast, the parts of Middelburg and Vlissingen to the west of the Canal through Walcheren are better suited. These are in fact close to the densely populated parts of the Ritthem bathtub, and contain several shelter locations with a large capacity and good facilities. These of these areas also remain dry due to the high surface level.

The possibilities for reducing the vulnerability of the Ritthem bathtub in the event of a flood must be sought primarily in a flexible evacuation and communication strategy. In the event of a threat of Zeeland flooding, it is virtually impossible to distinguish whether only the bathtub is threatened or the entire Zeeland coast. As the combination of road capacity and predictive horizon is sometimes limited, not everyone can always leave the island. In the bathtub people are more vulnerable compared to the nearby surroundings of Vlissingen and Middelburg. By emphasizing (partial) vertical evacuation, space is created to preventively evacuate risk areas. People within an endangered area (such as the bathtub) can also evacuate to less vulnerable parts (like parts of Middelburg and Vlissingen). A communication plan based on predefined scenarios can save valuable time in a crisis situation so more time is available to implement measures. Clear communication increases the support base and thus the effectiveness of an evacuation. In addition, designating and preparing shelters in and around the Ritthem bathtub is an effective measure to prevent casualties. This also contributes to speeding up any rescue operation.

Based on this study, the most important recommendation is to prepare risk and crisis communication well. By elaborating different scenarios with choices to be made in advance, the time during which effective action can be taken is increased. The strategy of vertical evacuation (and shelters) in combination with shelter locations in and around the Ritthem bathtub is in many cases the best starting point for limiting casualties and damage. But if it is possible that these people (or specific zones) leave the entire threatened area in time, is of course the preference. To this end, it is important to prepare for flexible

evacuation strategies, identify and prepare shelter locations to be designated to use the coordination structure to define the best mix between preventive and vertical evacuation. Therefore it is important to estimate how many people can leave the threatened area and how much (and where) these people can best hide. Although leaving the threatened area is of course the most desirable strategy, we recommend preparing vertical evacuation as a basic strategy. This is a strategy that works in case of little time. If more time is available, the regular crisis organization can map out whether areas can still evacuate in the event of a threat. If these decisions are better prepared, the decision-making process will also result in less time (and headaches), making more execution time available.

# Conclusions and recommendations

The aim of this study is to investigate the suitability of the Sloe area as a temporary shelter location for residents of 'bathtub Ritthem' in the event of an (imminent) flood. To this end, flood scenarios have been investigated, evacuation options were analysed and a communication plan is developed. The following conclusions can be drawn from this:

## Flood scenarios

With regard to flood scenarios, a distinction can be made between less extreme situations (up to once every 1,000 years) in which only flooding occurs in the Sloe area, and more extreme situations in which there is a real risk of flooding of the bathtub Ritthem. In particular, these more extreme situations are relevant for the preparation and implementation of crisis management. In these situations the Sloe area is also flooded.

## Accessibility and access during the threat phase

Due to uncertainty in the forecast of a storm, it is not possible to determine where a possible flood will occur during the threat phase. Residents of Walcheren or North and South Beveland will therefore not decide to move to a safe place within Zeeland, but will decide to leave the province. The road capacity is not sufficient to evacuate the whole region within 1 to 3 days. The accessibility of the area west of the Canal through Walcheren is good enough to evacuate the inhabitants of the bathtub in half a day in case of an acute evacuation.

## Perception of the flood risk and support for evacuation

The population of Zeeland feels safe behind the flood defense structures and has confidence in the government. In relation to other threats, people are not worried about flooding. In case of a threat for flooding in principle there is more support for preventive evacuation from for shelter in one's own home or shelter. However, it is not the case that there is no support for these vertical strategies. The support base for an evacuation strategy is not so much determined by the perception of floodrisk but mainly by the combination of the fear and confidence of an evacuation strategy. The fear and confidence for a strategy can be influenced by governments through information. This means that an important key is in the hands of the government to help people choose the best action perspective. Part of this is that the authorities also explain the consequences of choices such that it is not always possible to leave the area, but that vertical evacuation is followed by rescue and is not without risk. Finally, there will always be a group that exhibits deviant behaviour for a variety of reasons.

### Suitability Sloe area as a temporary shelter location

The Sloe area is only suitable as a temporary shelter location for residents of the bathtub Ritthem. The high location is an advantage, but the capacity, facilities and distance are less favourable. The parts of Middelburg and Vlissingen to the west of the Canal through Walcheren offer more opportunities as a temporary shelter location due to the proximity and the number of suitable shelter locations.

### Opportunities to reduce vulnerability and damage

The possibilities for reducing vulnerability must be sought primarily in a communication strategy aimed at vertical evacuation. A communication plan based on predefined scenarios can save valuable time in a crisis situation. Clear communication increases the support for, and thus the effectiveness of an evacuation. In addition, designating and preparing shelters in and around the bathtub Ritthem is an effective measure to prevent casualties. This also contributes to speeding up a possible rescue operation.

### Recommendations

Three recommendations follow from the conclusions:

1. Prepare the communication for a crisis situation well and work it out for different scenarios. By preparing decision making you increase the time in which you can act.
2. The purpose of evacuation is to move all people to safety outside of the flood prone area. Given the uncertainty in the available time (based on forecasts of water levels) and the implementation of measures (as evacuation), we recommend a flexible evacuation strategy that can respond to possible events. As a basic strategy, we propose vertical evacuation consisting of a combination of shelter in place and moving people from the hardest hit areas (as the bathtub) to shelters or dry places nearby (like areas in Middelburg a Vlissingen). If the road capacity is available for this, sub-areas can evacuate preventively. The zones for vertical and preventive evacuation can be determined after a threat is detected.
3. Assign shelter locations in Middelburg and Vlissingen west of the Canal through Walcheren, on short distance from the densely populated areas in bathtub Ritthem. Coordinate possible sheltering options with the location managers and work out how a large group of people can be accommodated within a short time.



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