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| **Task 3.1a Asset Management: Template Questionnaire** |
| **WP3 Investment Planning and Asset Management** |
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# Report information

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# Summary

FAIR (Flood infrastructure: Asset management and Investment in Resilience, adaptation and maintenance), is funded by the EU INTERREG North Sea Region (NSR) Programme and led by the Rijkswaterstaat, FAIR focuses on providing improved, more resilient, more multi-functional and adaptive approaches to providing flood infrastructure. Asset owners and academic colleagues from the Netherlands, Sweden, Germany, Belgium, UK and Denmark will be comparing approaches to asset management and investment planning to share good practice and support new developments.

This report is provided under Work Package 3 (WP3 Investment Planning and Asset Management) and sets out a questionnaire to be completed by the asset owners and science partners within the FAIR consortium. The aim of the template is to guide the Asset Owners in identifying the challenges, barriers and gaps they face in developing more adaptive Asset Management. The science team will then summarise the findings and incorporate elements in international practice and tools.

**Glossary of terms**

|  |  |
| --- | --- |
| Asset | Item, thing or entity that has potential or actual value to an *organization*[[1]](#footnote-1)*.* In the context of flood management this is generally a physical asset (e.g. a gate), but it can also be the data that is used to manage the gate (i.e. if the data is gone, the performance will drop). |
| Asset function | Function related to an organizational objective that the asset fulfills, an asset can fulfill multiple functions. E.g. a sluice will contribute to shipping (a function), but also to flood risk reduction (a different function). |
| Asset management | Enables an organization to realize value from assets in the achievement of its  organizational objectives1. Asset management can be done on different levels, strategic, tactical and operational are the generally distinguished levels. An example of strategic asset management is that safety standards of flood defences are changed due to new societal developments (e.g. economic growth), an example of asset management on a tactical level is the planning of reinforcement of dikes over a longer period of time, an example of a decision on an operational level is how often a dike should be inspected in order to ensure its reliability meets the standard. |
| Asset performance | Measurable result1 Measure for the extent to which the asset performs, to be compared with the required performance. E.g. the reliability of a dike or the availability of a sluice. |
| Availability | Ability of a system to be kept in a functioning state[[2]](#footnote-2). E.g. the percentage of time that a pump is functioning. |
| Consequence | Represents an impact such as economic, social or environmental damage or improvement, and may be expressed quantitatively (e.g. monetary value), by category (e.g. High, Medium, Low) or descriptively.[[3]](#footnote-3) For instance the casualties and damage in a flood. |
| Cost | **Capital**: Initial investment required to provide a significant change to the performance of an asset or provide a new asset (e.g. reinforcement costs, cost of building a sluice)  **Revenue**: On-going investment needed to maintain the performance of asset / asset system  **Operating**: costs for keeping an asset (e.g. the sluice) operational (i.e. satisfying the performance criterion). For instance, cost for energy, maintenance, painting the doors.  Whole life: see life-cycle cost |
| Life-cycle cost (LCC) | Or: Whole Life-cycle Cost or: Total Cost of Ownership (TCO). The total of all costs and revenues over the life cycle. Enables comparison of e.g. construction, maintenance and removal costs. Generally expressed as Present Value, where all future investments are expressed in current day value using discounting. |
| Probability | Measure of our strength of belief that an event will occur. 3 For more details on different interpretations and views on the concept of probability see3. |
| Reliability | Ability to perform a certain defined task, often expressed as probability of failure. E.g. the reliability of a flood defence is its ability to prevent a flood. Generally expressed in terms of probability |
| Resilience | Ability of a system to react and recover from a damaging hazard3 |
| Risk | Function of hazard, exposure and vulnerability3  For a flood that would be:  Hazard: the probability that a flood occurs (to given depth, velocity, duration) at a given location.  Exposure: the people, businesses, infrastructure, habitats etc that may experience harm if a given flood occurs.  Vulnerability: the degree of harm (loss of well-being) suffered by those exposed to a given flood.  Please note: This definition supports the more general definition of risk as a function of probability and consequences; where consequences are described by exposure and vulnerability. |
| Risk attribution | Decomposition of risk to individual assets/objects |
| Safety | The requirement not to harm people, the environment, or any other assets during a system's life cycle[[4]](#footnote-4) |
| Scenario | A plausible description of a situation, based on a coherent and internally consistent set of  assumptions.3 For instance a description of the development of climate or economic growth in the next decades. |
| Standard | Of protection:  Performance    Safety  Ultimate limit state  Serviceability limit state |
| (Investment) strategy | A strategy is a combination of long-term goals, aims, specific targets, technical measures, policy instruments, and process which are continuously aligned with the societal context. 3 |
| Performance criteria | Required: Levels that performance indicators need to meet. E.g. safety standards defined by law.  Desired: Levels of performance indicators that might be met, if benefits for organizational objectives (broadly) outweigh costs. E.g. if an organization has as objective to generate more economic activity on and around a dike, they can make it multifunctional, if it is not too expensive. |

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# 1 Introduction

This template sets outs the questions to be reviewed and completed by the Asset Owners. The responses will then form the basis of a comparison of methods across the North Sea Region and, importantly, common challenges identified and best practice shared. The results from the questionnaire will be taken forward in WP3 and WP5.

The questionnaire is structured in two main parts. This first part of the questionnaire explores the context within which asset management policy is made, strategies development and plans delivered. The aim is to provide a rich understanding of the approaches in each partner country that forms the background to the case studies. The second part of the questionnaire focuses on the specific challenges and approaches at the case study site. By including these two strands an in-depth understanding of the reasons why different approaches are used will be developed and, in doing so, enable best practice to be shared in the most meaningful way.

**Note:** The responses to the questionnaire should be provided as a standalone report and set out using the question headings given here.

# 2. Part A National context - Sweden

## Question 2.1: Context within which asset management takes place

### 2.1a – Roles and responsibilities

We would like to understand the organizations with an interest in AM, their role and responsibilities for delivering AM (funding, programming and permitting etc). This includes both private and public sector organizations, as well as the role of communities and NGOs. We would also like to explore how third party assets treated/managed.

|  |  |  |  |
| --- | --- | --- | --- |
| **Organization** | **Interest** | **Role** | **Responsibility** |
| **National government** |  |  |  |
| MSB – Swedish civil contingencies agency | MSB works:  •via knowledge enhancement, support, training, exercises, regulation, supervision and their own operations  •in close cooperation with the municipalities, county councils, other authorities, the private sector and various organisations  •to achieve greater security and safety at all levels of society, from local to global | The MSB is responsible for issues concerning civil protection, public safety, emergency management and civil defence as long as no other authority has responsibility. Responsibility refers to measures taken before, during and after an emergency or crisis. | The Swedish Government steers the MSB via a body of instructions and an annual appropriation. The instructions specify the MSB's responsibilities and tasks. The appropriation specifies the objectives and reporting requirements, as well as the resources allocated for MSB administration and MSB activities. |
| County administrative board of Skåne | Coordinate the local municipalities. | The function of the County Administrative Boards is to be a representative of the state in their respective counties, and serve as a link between the inhabitants, the municipal authorities, the Central Government, the Swedish Parliament and the central state authorities. | Provide good service with open accountability that is based on the rule of law. |
| **Reginal government** |  |  |  |
| Region of Skåne | No responsibilities regarding flooding. | Region Skåne has a permanent commission from the state to coordinate regional development issues and lead the work with creating a Regional Development Strategy, RUS. | No responsibilities regarding flooding. |
| **Local government** |  |  |  |
| Municipalities | A safe community. | Municipalities in Sweden are responsible for providing a significant proportion of all public services. They have a considerable degree of autonomy and have independent powers of taxation. Local self-government and the right to levy taxes are stipulated in the Instrument of Government, one of the four pillars of the Swedish Constitution. | Responsible for spatial planning on a local scale.  *Municipalities are not responsible of protecting private properties over all*. |
| **Operating authorities** |  |  |  |
| Municipalities | See above | See above | See above |
| **Private owners** |  |  |  |
| Land owners | *To protect their property* | *Owner of their private property* | *Responsible of protection of their private property such as houses from flooding.* |
| **NGOs** |  |  |  |

### 2.1b - Relevant policy, plans and codes

Discuss the policies, plans and codes that specifically influence the delivery of asset management. These should include both flood related and non-flood related (for example, broader development plans). This should be provided as a table as below with supporting text below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Policy or plan** | **Level (international;/European/National)** | **Description** | **Influence on asset management** |
| **Policies and Plans** |  |  |  |
| Floods Directive | European |  | The requirement for a national understanding of areas at significant risk and develop Flood Risk Management Plans for those areas. |
| The municipalities spatial planning | Local | Local process for spatial planning. Planning for protection of the whole city Kristianstad from flooding by building barriers. | Policy documents.  The municipality have problem to finance the whole process. |
| **Plans** |  |  |  |
|  |  |  |  |
| **Codes** |  |  |  |
|  |  |  |  |
| **Guides** |  |  |  |
|  |  |  |  |

### 2.1c Planning timescales of interest

Discuss the timescale over which asset management activities are assessed and planned and how each influences AM decisions. Consider the multiple timescales within which assessments takes place (national policy cycles, regional planning cycles, maintenance cycles, others).

|  |  |  |  |
| --- | --- | --- | --- |
| **Time scale** | **Associated time horizon (in years)** | **What AM decisions take place over this timescale?** | **Who leads these decisions?** |
| **Long term planning** |  |  |  |
| Municipal planning | *The planning started in 1995 and was planned to be finished 2012. The project was much more complicated than expected and now the planning is to be finished in 2027.* | *The municipality have problem to finance the whole project to 2027.* | *It´s the city council who make decisions about time table and finance from investigations from the project leader.* |
| **Medium term planning** |  |  |  |
|  | *This planning extends to 3 years including three building project at a time.* | *How much each project cost and how to finance the project.* | *The city council and the project leader.* |
| **Short term plans** |  |  |  |
|  | *This planning is about how to protect areas that is not planned to protect with new barriers in close future.* | *Planning a budget that allow to rebuilding old barriers until new have being built.* | *The project leader and the city council.* |

*Please feel free to expand below….*

**2.1d - Requirements of performance**

Discuss what kind of performance requirements have to be met, who defines these and how these are determined.

* **Required criteria (i.e.** What criteria must be met regardless of cost)

*Kristianstad city have the same responsibility as hydroelectric power production in Sweden, which means that a barrier must be built in the same manner in safety to protect people from the risk of a barrier flaws. This means that we must choose a height of a barrier that must never be over flooded from the river or lake. We have to choose material that withstand for several 100 years, in first place we have to choose natural material if possible.*

*In Kristianstad is a big area below the sea level and around 14,000 people live on this place (on the bottom of a part of a drained lake) and that is why we have this criteria of safety.*

*Other protected area is over the normal sea level, but mostly not more than one meter over the sea level. The water level in the river and lake rises between one and two meters every year in spring. We have the same criteria of safety in this case.*

* **Desired criteria?** What criteria might be met? If (broad) benefits outweigh (broad) costs

*We must meet the required criteria. The city Kristianstad is classified in the same manner as hydroelectric power production, and are responsible in law for all damage that happens if a barrier flaws.*

### 2.1e Governance and other aspects

#### Funding

* Who pays, the asset management plan to be developed, for maintenance, capital investment and how secure is this funding stream into the future?

*Until now the MSB have funded 60 percent of the total cost of building, not cost for planning and consulting. MSB only have 25 million SEK each year for this, so if Kristianstad shall be funded with 60 percent, the total cost must not exceed 33 million SEK. Most projects further on cost around 50 million SEK to 100 million SEK each one so municipality is expected to have problem to finance this. The total calculated cost for remaining building project is around 550 million SEK and around 100 million SEK for planning and consulting.*

## Question 2.2: Challenges and barriers to be overcome

Questions 2.2a to 2.2d seek to tease out the issues in our understanding of asset performance over time and the availability of supporting data.

### 2.2a Barriers in the understanding of the current system

#### Physical understanding

*Sources*

* Extreme storms and river discharges (what are of return period storms do you consider, how do you include joint probability issues)

*In the city Kristianstad we use return period of 1,000 year in case of highest flood in the river Helge and at the same time a high water level in sea with return period of 100 year. Together this would be a return period of 100,000 year. We use this very high level of return period of that reason that we live inside the barrier, below the normal sea level. If a barrier flaws it´s a high risk that people inside the pond would be drown.*

*Pathways*

* Accuracy of the floodplain topography data (what level of accuracy is typical and is this good enough?)

*We have very good accuracy over floodplain and the whole city.*

* Accuracy of information on asset location, geometry and construction (what is known and where are the key gaps in knowledge)

*We have good knowledge about location, but not about construction because we have geology with organic material on most locations. Our consultant do not have enough of knowledge needed for this complicated constructions.*

Socio-economic understanding

*Receptors*

* Accuracy of information on floodplain usage (residential properties, people, businesses etc)

*We have good accuracy about usage of floodplain, residential properties, people and budiness.*

### 2.2b Future change

We would like to understand how future change is accounted for. In particular:

#### In climate

What guidance is provided on climate change, including: (change to a table)

* Sea level rise allowances – what estimates of SLR are used for 2025,2050,2080

*When we plan new barriers we plan for a sea level rise of 2.15 meters. In our modelling we can withstand a sea level of 3.50 meter at the same time as a high flow of 100 year return period in the river. When the sea level rise is more than 3 meter have the flow in the river has less influence.*

* River flows – what estimate of change in peak flows are assumed for 2025,2050 and 2080 – if not peak flows how is climate change accounted?

*When we calculate the height of water in Kristianstad we use the highest flow that may come inside 1,000 years return period. The normal flow is around 30 m3/s, and we calculate with 527 m3/s.*

* Rainfall – what change in the estimate of rainfall (30 and 100 year return period hourly, daily, monthly) are assumed for 2025, 2050, 2080s? – if not quantified how is rainfall change accounted for?

*We account for a rain with a return period of 100 year. This rain last for 24 hours and have preceded of a rain with a return period of 10 years. This is what we calculate with when we build pump stations.*

Is any consideration given to the influence of the following climate change related issues on asset management decisions:

* Temperature – Yes/no – if yes how? *No*
* Storm sequencing – Yes/no – if yes how? *No*
* Spatial coherence – Yes/no – if yes how? *Yes, we calculate with a rise of sea level at the same time we have the highest flow in the river.*

#### In socio-economics

* Population growth – Yes/no – If yes, what assumptions are made about population growth (% increase, by 2025, 2050, 2080) *No.*
* Economic development – Yes/no – If yes, what assumptions are made about growth (% increase, in GDP by 2025, 2050, 2080) *No.*

*In land levels*

Localised settlement of the levees – If yes, what assumptions are made

*In some levees, built 2004 we have a lot of problems with settlement. With newer levees we have not those problems.*

Regional soil subsidence (i.e groundwater management related consolidation) – If yes, what assumptions are made *No.*

Isostatic rebound – If yes, what assumptions are made

*We don´t have isostatic rebound in this part of Sweden.*

### 2.2c Funding barriers

Everyone has a finite pot of money – but is the structure of funding or payment a barrier to optimal / best asset management (compensation for example).

*Yes, it is. The municipality must use money to build this protection of barriers that they also would need to build school for instance. It´s not that simple so the solution would be to increase the taxes. Most municipalities must compete so people want to choose that municipality to live in.*

### 2.2d How successful is asset management

Is it known whether the asset management is being delivered successfully? *Yes.*

Consider issues of delivering:

* The required process – assets been managed through the process set out

*We want to calculate the whole process, but it´s difficult to predict the total cost.*

* The performance criteria (see Question 2.1d) – have required and desired performance been met. *Yes and no.*
* The efficiency of achieving these – minimizing whole life costs for the outcomes achieved

*Sometimes it´s not possible to minimize whole life costs.*

If so, how is it measured? (e.g. required and desired performance requirement (if present) is met?

*We have not worked with this questions yet in Kristianstad.*

## Question 2.3: Overview of tools and data used (where this is known)

### 2.3a Reliability

#### Overview

* What approaches do you typically use to support policy analysis and design?

*We use a modelling tool (Mike 11) to analyse what height we need for protection. When our consultant work with geotechnics data to choose design. When we need to build a barrier inside the city we have to design it different than barrier outside the city.*

* Do you have data to support these methods? If so, who collects it, who collates it and can access it and is it t openly available, if so where? Is uncertainty in the data considered?

*We have data only for those pump stations and barriers that we plan to build in close future (3 years). It´s our project leader who collect needed information together with consultant. Those who works with the material can access the data. It´s always some part in the data that is considered uncertainty.*

#### Specific challenges and gaps in understanding

What are you particularly grappling with

*It´s a barrier which is not stable against settlement. This barrier was built first time in 1860 of clay, and then 2004 as a filter barrier. This barrier is built on a bottom of a lake. Below the barrier is several meters of clay, mud and organic material. The settlement have being one meter since 2004, and the barrier has moved lateral 0.4 meter. This barrier is 1,200 meters long and is by far the biggest problem for Kristianstad. Inside this barrier lives around 14,000 people below the normal sea level, between level 0 and -2.4. Outside the barrier is a lake with normal water level of +0.3 meter. In the year 2002 the lake rise to +2.0 meter. We calculate with a maximal water level of +3.4 meter and a wave height of 0.5 meter, so this barrier need a height of close to +4.0 meter. Today the lowest point is +2.4 meter.*

*Inside this barrier we plan to build a new pump station with capacity of 10 m3/s, today the capacity is 4.5 m3/s. This pump station serve to pumping out the water from the old part of the lake. It´s also serve to pumping out all the treated waste water from the city Kristianstad and 18 other cities.*

### 2.3b Deterioration

With and without management….

*It´s not an option, with or without management. The city Kristianstad must continue to build protecting barriers to handle rising sea level and high flow in the river. If not they have to consider to leave a big part of the city and tear down all the protecting barriers. This would also affect the highway, which is below the normal sea level through the town.*

## Question 2.4: Decision process

The following question explore the aspects that shape the choices made.

### 2.4a Investment planning and prioritisation

*Expenditure type*

* Total expenditure (whole life cycle costs) – or just capital or revenue?

*We don´t calculate with the whole life cycle costs, just capital and revenue.*

*Prioritisations*

* First in the queue – early bird gets the worm – constraints on permitting for example

*It´s a complicated decision. The municipality knows that we need to build barriers to protect the city Kristianstad so they have priority for this. Unfortunately they can´t offer enough of money to complete the protection as fast as we wish.*

* Given the nature of expenditure, do you seek to identify least cost or max BCR, or other

*We do believe that our calculation of around 500 million SEK is the lowest cost for this.*

* Individual asset versus asset portfolio planning: How is investment optimised across the portfolio of assets that exist?

*The municipality have a budget there they must meet the functions that a municipality is responsible for, such as building school, elderly care, building residential etc. They have only possibility to invest all a small part of their budget for building barriers.*

*Opportunities for enhancing the return on investment*

* Payment for non-FM benefits/functions? i.e broader benefits – is this possible and do they change the investment ranking? *No.*
* Private contributions – does this change the ranking? *No.*
* Opportunities of material reuse and other infrastructure investment synergies – i.e tunneling programme has generated potential source of materials? *Not for this project.*

### 2.4b Social justice

How are the three principles of justice considered:

* Equality – Are all citizens treated equally in the FRM process? If no, why not? If so, how is this ensured?

*The protection with barriers is in first place chosen to protect important function in the society, such as roads, electricity, things that must not fail. I some cases private properties is not protected.*

* Are the most vulnerable members of society prioritized? If no, why not? If so, how is this ensured?

*They are when we plan evacuate.*

* Utility – Is it a required to ensure the best return for each euro spent? If no, why not? If so, how is this ensured?

*Yes it is and that´s is way we want to participate in this project FAIR. We do not have enough experience and knowledge from our consultants to be sure on that we chose the best construction to build.*

# 3. Part B Case study – Helsingborg

The following questions focus on the specific approaches taken at the case study sites. The responses here follow on from those in Part A and will help provide an understanding of how the approaches nationally influence and are taken up locally.

## Question 3.1: Setting the scene of the case study

Please describe (in no more the two pages including figures) the context of your case study. This should include:

#### Name of the case study and a map

#### Add map

#### Focus/objective of the case

*Decision focus:*

*Objective:*

#### The physical setting

*Nature and topography:*

*Sources of flooding:*

*Existing flood defence infrastructure:*

#### The socio-economic setting

State if rural, semi-urban, dense urban

What is the nature of the communities to be protected, residential and non-residential activities, important infrastructure services (hospitals, transport hubs etc) that may be in the floodplain and how these might be impacted by a flood.

#### Have there been past floods in the area? If so, how was it caused and what impact did it have?

## Question 3.2: Specific challenges and barriers to be overcome

### 3.2a What is the asset management challenge

what is the driver for the case study and what makes AM difficult:

Subsidence?

Flood plain development?

Funding/political momentum/support?

Are there any constraints on the solutions? {environmental, technical feasibility}

### 3.2bUnderstanding of the current system

#### Physical understanding

* **Vertical accuracy and source of the floodplain topography data**

The vertical accuracy of the topography is:

The horizontal resolution of the topography is:

* **What flood defence assets are important to the case study**

A basic typology of the flood and coastal erosion risk management infrastructure is provided in the table below (Sayers et al, 2015). Which asset types exist in the pilot study area and what role do they play?

*Asset types to be considered in the pilot (asset typology after Sayers et al, 2015)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Type of asset** | | **Example activities** | **Considered in pilot (yes/no)** | **Why?** |
| **Local scale infrastructure** | | |  |  |
| **Private homes and businesses** | Avoidance | Raising properties above flood levels (actively, floating homes, or passively, raised thresholds) or some other way to avoid flooding. |  |  |
| Resistance | The use of flood products and construction detailing to prevent water entering a property. |  |  |
| Recovery | Use of building materials and practice that such that although flood water may enter the building no permanent damage is caused, structural integrity is maintained and drying, cleaning and minor repairs are facilitated. |  |  |
| **Critical service nodes** | Avoidance | Raising critical functions / building above flood levels. Deployment of property scale ‘ring dykes’. |  |  |
| Resistance | The use of flood products and construction detailing to prevent water entering a property. |  |  |
| Recovery | The use of function specific building designs and network redundancy to avoid loss of function if flooded (i.e. continued power or communication distribution). |  |  |
| **System scale infrastructure** | | |  |  |
| ***Hard path infrastructure – Planning, design and management of built infrastructure*** | | |  |  |
| **Linear and network assets** | Active | Barriers that can be deployed as temporary and demountable defences. |  |  |
| Passive - Above ground | Raised defences and shore parallel structures (i.e. embankments, levee or dyke, breakwaters) through to storm water storage ponds. |  |  |
| Passive - Below ground | Individual pipes, CSO’s and the drainage network they compose. |  |  |
| **Point assets** | Active | Pumps, floodgates and sluices. |  |  |
| Passive | Fixed trash screen, groynes as well as interface assets (that link above and below ground linear systems) such as manholes and gullies. |  |  |
| ***Soft path infrastructure – Utilizing natural infrastructure systems*** | | |  |  |
| **Watercourse** | Channel | The management of vegetation (e.g. weed cutting) and sediment (e.g. shoal removal and dredging). |  |  |
| Floodplain | The management of floodplain roughness and debris recruitment. |  |  |
| **Coast** | Foreshore and backshore | The management of dunes and beaches through active (e.g. recycling and profiling) and passive (e.g. sand fencing, marram grass planting) management as well as natural wetlands and soft cliffs. |  |  |
| **Urban landscape** | Urban land use | The engineering of urban green space, managing surface permeability (e.g. through SuDs) and debris recruitment. |  |  |
| **Rural catchment** | Rural land use | The management of rural run-off, sediment yields as and debris recruitment. |  |  |

*Note: FCERMi includes any feature that is actively managed to reduce the chance of flooding or erosion (Sayers et al., 2010). Dams and associated ancillary structures are excluded from this paper*

* **Accuracy and source of information on asset geometry and their performance**

### Socio-economic understanding

* Accuracy and source of information on floodplain usage (receptor etc)

#### Existing plans and policies

How do existing plans and policy influence the approach to asset management in the case study site

|  |  |  |
| --- | --- | --- |
| **Policy or plan** | **Description** | **Influences on asset management at case study location**  **<Impact?>** |
| **European policy** |  |  |
|  |  |  |
| **National policy** |  |  |
|  |  |  |
| **Regional strategies** |  |  |
|  |  |  |
|  |  |  |
| **Local plans** |  |  |
|  |  |  |

### 3.2b Future change

We would like to understand how future change is accounted for. In particular:

#### In climate – repeat by the Part A questions here but answer for the specifics of the case study

What guidance is provided on climate change, including:

* Sea level rise allowances
* River flows
* Temperature?
* Storm sequencing?
* Spatial coherence?

#### In socio-economics

### 3.2b Governance and other aspects - move to be consistent with Part A

#### Funding

* Who pays, the asset management plan to be developed, for maintenance, capital investment and how secure is this funding stream into the future?
* Are there other funding or payment barriers (compensation for example)

#### How successful is asset management – review Part A question

* Is it known whether the asset management is being delivered successfully? If so, how is it measured? (e.g. required and desired performance requirement (if present) is met?)

## Question 3.3: Overview of tools and data to be used (where this is known)

### 3.3a Reliability

#### Overview

* What approaches are you planning to apply?
* What are minimum data requirements for this approach(es)?
* Will the analysis be undertaken by a specialist engineer? If yes, is this in-house or external?

#### Specific challenges and gaps in understanding

What are you particularly issues are you grappling with

* Gaps in physical process knowledge:
* Gaps in analysis capability:

### 2.3b Deterioration

Why is deterioration of assets important at the pilot? Are the deterioration rates known, if so, what is the evidence that is used? Is deterioration managed, and how is value for money of the associated expenditure evaluated?

#### Specific challenges and gaps in understanding

What are you particularly grappling with – transitions, piping, on-demand M+E, peat, exceedance?

## Question 3.4: Decision process

### 3.4a Social justice

How are the three principles of justice considered:

* Equality
* The most vulnerable are prioritized
* Utility (best return)

3.4b Robustness under conditions of future change

What are the specific values of future change that have been considered in the pilot site:

* How is climate change factored in?
* How is development in the floodplain factored in?
* How is uncertainty over future funding factored in?

### 3.4c Investment planning

What funding constraints exist at the pilot site?

How is long term funding secured?

Is additional funding for multi-benefits being sought - if so, where from and is this likely to be successful?

## Question 3.5: The relationship of AM to board planning issues

Within the pilot location, do flood defence activities and funding link with broader planning policies and plans, if so how?

As a minimum consider the relationship of the flood defence approach to:

* Spatial planning
* Environmental regulation (such as the Water Framework Directive)
* Promotion of redevelopment or tourism
* Evacuation planning?

1. ISO55000 [↑](#footnote-ref-1)
2. http://www.ntnu.edu/c/document\_library/get\_file?uuid=ae1f2570-1191-4d7c-b4c3-9686aaeccaf8&groupId=151572 [↑](#footnote-ref-2)
3. FLOODsite: The Language of Risk [↑](#footnote-ref-3)
4. http://www.ntnu.edu/c/document\_library/get\_file?uuid=ae1f2570-1191-4d7c-b4c3-9686aaeccaf8&groupId=151572 [↑](#footnote-ref-4)