

# **Oxford Flood Alleviation Scheme BENEFITS REALISATION PLAN**

**Release Status:** Official

**Author:** Emily Mills

**Date:** 17 February 2017

**Filename & Version:** ENVIMSE500177\_BenefitsRealisationPlan\_V1.0

**Project ID:** ENVIMSE500177

# 1 Document History

## 1.1 Location

This document is stored in the following location:

<b>Filename</b>	ENVIMSE500177_BenefitsRealisationPlan_V1.0
<b>Location</b>	N:\WT_FCRM\Environment Management\New Projects\Oxford\x--06 Quality\6.13 Benefits Management\Benefits Realisation Plan

## 1.2 Revision History

This document has been through the following revisions:

<b>Version No.</b>	<b>Revision Date</b>	<b>Filename/Location stored:</b>	<b>Brief Summary of Changes</b>
V0.1	21/11/16	ENVIMSE500177_BenefitsRealisationPlan_V0.1a	First draft circulated for comments
V0.2	5/12/16	ENVIMSE500177_BenefitsRealisationPlan_V0.2a	Comments from Programme Board and project team incorporated
V0.3	1/2/17	ENVIMSE500177_BenefitsRealisationPlan_V0.3	Comments from Laura Brock and Janet Brellisford incorporated
V1.0	17/2/17	ENVIMSE500177_BenefitsRealisationPlan_V1.0	Profiles agreed with benefit owners

## 1.3 Authorisation

This document requires the following approvals:

<b>AUTHORISATION</b>	<b>Name</b>	<b>Signature</b>	<b>Date</b>
<b>Funding &amp; Benefits Realisation Manager</b>	Emma Formoy	Emma Formoy	17/2/17

## 1.4 Distribution

This document has been distributed to:

Name	Title	Version Issued	Date of Issue
Programme Board		V0.1a	23/11/16
Project team		V0.1a	23/11/16
Laura Brock	Benefits & Savings lead, IPA	V0.2a	14/12/16
Janet Brellisford	Benefits lead, Environment Agency	V0.2	19/1/17
Heather Taylor	Project Manager, Benefit Owner	V0.3	2/2/17
Penny Burt	NEAS lead, Benefit owner	V0.3	2/2/17

## 1.5 Related Documents

Summary of filenames and locations of related documents:

Document Type	Filename/Location stored:
<b>Benefits Management Strategy</b>	N:\WT_FCRM\Environment Management\New Projects\Oxford\x--06 Quality\6.13 Benefits Management\Strategy\ENVIMSE500177_BenefitsManagementStrategy_V3.0
<b>Benefits Register</b>	N:\WT_FCRM\Environment Management\New Projects\Oxford\x--06 Quality\6.13 Benefits Management\Benefits Register\ENVIMSE500177_BenefitsRegister_V0.3
<b>Benefits Dependency Map</b>	N:\WT_FCRM\Environment Management\New Projects\Oxford\x--06 Quality\6.13 Benefits Management\Benefits Map\ENVIMSE500177 Benefits Dependency Map v13

## 2 Contents

1	Document History .....	2
1.1	Location .....	2
1.2	Revision History.....	2
1.3	Authorisation.....	2
1.4	Distribution.....	3
1.5	Related Documents .....	3
2	Contents .....	4
3	Introduction .....	5
3.1	Purpose of Document.....	5
3.2	Project Overview .....	5
3.3	Governance .....	6
4	Benefits Management Approach .....	6
4.1	Hierarchy of Benefits .....	6
4.1.1	Primary Benefits .....	7
4.1.2	Secondary Benefits .....	7
4.1.3	Tertiary Benefits .....	7
4.2	Disbenefits.....	8
4.3	Benefits Categorisation .....	8
4.4	Benefits Measurement.....	9
4.5	Tracking Benefits during the Project Lifecycle.....	9
4.6	Monitoring Benefit Realisation after Project Closure .....	9
5	Benefit Profiles.....	9
5.1	Primary Benefits .....	9
Description .....		14
5.2	Secondary Benefits .....	19
5.3	Disbenefits.....	23

## 3 Introduction

### 3.1 Purpose of Document

The Benefits Realisation Plan is a document describing the arrangements for the tracking and realisation of the project benefits. Whereas the Benefits Management Strategy described the framework through which benefits will be realised, the purpose of the plan is to provide a detailed series of actions assigned to the responsible person to be carried out at specific time points throughout the project. This will ensure that the project remains focused on its key goals throughout the delivery process, and that at project closure, the strategic objectives will have been achieved.

This plan contains a description of the approach to managing benefits that has been taken by the project, the benefits register, and a series of profiles containing detailed information on the description, measurement and progress of each benefit and the actions required in order to achieve realisation. This is intended to provide a plan of action for the Benefit Owner to carry out during scheme delivery.

This plan will be integrated into the project programme as an intrinsic part of the project management process.

### 3.2 Project Overview

The Oxford Flood Alleviation Scheme aims to reduce the risk of flooding in Oxford, which has suffered from floods several times in recent years. The strategic objectives of the scheme were developed for the Strategic Outline Case (SOC) in collaboration with the partnership Sponsoring Group to ensure that they met the partners' vision for the scheme. These were made SMARTer during development of the Outline Business Case (OBC) by creating a number of sub-objectives.

The strategic objectives and sub-objectives of the scheme are as follows:

- 1. Reduce flood damages to at least 1000 homes and businesses currently at risk in Oxford.**
  - 1a) By July 2022, move at least 1000 homes to a lower National Flood Risk Assessment (NaFRA) risk category (noting all properties will see a reduced likelihood of flooding).
  - 1b) By July 2022, reduce the number of commercial properties that suffer damages in the 1% flood outline by at least 100.
  - 1c) By July 2022, ensure that temporary defence deployment plans are in place, where suitable, for areas of residual risk after the scheme is completed.
  
- 2. Reduce flood impacts on transport infrastructure and utilities in Oxford, particularly to Botley and Abingdon Roads, the railway line and the sewerage system.**
  - 2a) By July 2022, the Botley Road, Abingdon Road, sewerage service and railway line will not be at risk from a river flood up to the size of that seen in 2007.
  
- 3. Safeguard Oxford's reputation as a thriving centre of commerce that is open for business.**
  - 3a) By July 2022, reduce the risk of flooding to at least 40 utility infrastructure assets at risk of flooding.

- 3b) By July 2022, improve the potential for growth by reducing the flood risk to 5 hectares of industrial land with redevelopment potential.

#### **4. Create and maintain new recreational amenities, wildlife habitat, and naturalised watercourses accessible from the centre of Oxford.**

- 4a) By July 2022, create a net increase of at least 5 hectares of water-dependent habitat that meets the objectives of the Water Framework Directive.
- 4b) By July 2022, create at least 2km of naturalised watercourses.
- 4c) By July 2022, improve at least 2km of accessible paths within the scheme area.

The strategic objectives of the scheme were used to inform the criteria on which scheme options were assessed. The multi-criteria analysis indicates that a medium channel with additional defences is the best fit option to deliver the partnership objectives, and as such is presented as the preferred option in the Outline Business Case. Details of the preferred option are described in the document 'Oxford Flood Alleviation Scheme: Multi-Criteria Options Assessment'. The flood channel and defences are the enablers by which the benefits of the scheme will be realised.

### **3.3 Governance**

Progress updates and benefits risk escalation will be delivered as described in the Benefits Management Strategy.

Roles and responsibilities for benefits management will be implemented as described in the Benefits Management Strategy.

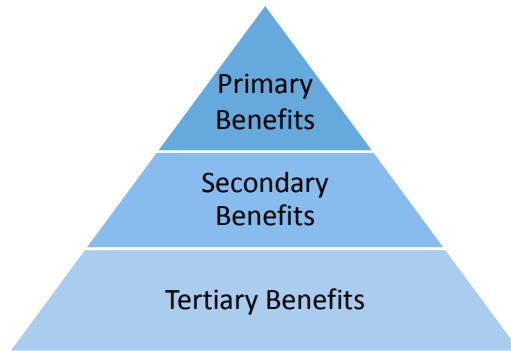
## **4 Benefits Management Approach**

The benefits management approach for the Oxford FAS will be carried out as described in the Benefits Management Strategy.

The benefits profiles will be updated to include a more detailed plan of action and any changes in baseline or target values or risk. This will take place by May 2018, after the end of detailed design, by the Funding and Benefits Realisation Manager in collaboration with the Benefit Owner. The identification of emergent benefits will be an ongoing process and will be re-evaluated at key checkpoints (see section 4.5).

### **4.1 Hierarchy of Benefits**

The direct benefits of the scheme have been prioritised as primary, secondary and tertiary. Primary benefits are those most important to the purpose of the scheme, and are measured using a metric directly linked to scheme outcomes such as reduced flood risk. Secondary benefits are important to the partnership but do not have such clear measures. Primary and secondary benefits are assigned to members of the core project team for monitoring and realisation. Direct benefits which cannot be feasibly measured are labelled tertiary benefits.



The prioritisation strategy was endorsed by the Sponsoring Group and applied by the Funding and Benefits Realisation Manager to prioritise the identified benefits.

#### **4.1.1 Primary Benefits**

The primary benefits of the Oxford FAS are as follows:

- P1: Residential properties suffer less flood damages
- P2: Commercial properties suffer less flood damages
- P3: Lower frequency of flooding to Abingdon and Botley roads
- P4: Fewer electricity disruptions as a result of flooding
- P5: Improved resilience of high-speed broadband network
- P6: Lower frequency of flooding to railway lines
- P7: Less likelihood of subsequent sewer flooding
- P8: Opportunity to improve biodiversity

The Benefit Owners of the primary and secondary benefits will be within the core project team and will actively track these benefits during the delivery process.

#### **4.1.2 Secondary Benefits**

The secondary benefits of the Oxford FAS are as follows:

- S1: New river environment between North Hinksey and South Hinksey
- S2: Increased number of people walking and cycling in the area
- S3: Lower frequency of flooding to existing sites with redevelopment potential

#### **4.1.3 Tertiary Benefits**

The tertiary benefits of the Oxford FAS are as follows:

- T1: Lower impact of floods on economic output

The tertiary benefits will not be tracked by the project, as described in the Benefits Management Strategy. As these will not be actively monitored they are not assigned Benefit Owners. However, the metrics for these benefits are recorded in the Benefits Register to allow the evaluation of these benefits by external interested groups. The project aims to form relationships with local universities and environmental groups to facilitate research projects that could involve tracking these benefits.

## 4.2 Disbenefits

Disbenefits are outcomes of the scheme that could be perceived as negative by one or more stakeholders.

The disbenefits of the scheme have been identified by the Funding and Benefits Realisation Manager and agreed with the NEAS lead and Project Manager. These are as follows:

- D1: Scheme damages existing flood-dependent habitats
- D2: Change in landscape adversely affects farming and current recreational use

Detailed descriptions of the disbenefit, measurement process and actions for its mitigation are described in the disbenefit profiles (see section 5).

The disbenefits will be actively monitored in order to identify if they are likely to have worse effects than predicted. Each of these is assigned to an Owner who is responsible for the tracking and measurement of the disbenefit. The definition of disbenefit risk and reporting structure are described in the Benefits Management Strategy.

Two additional disbenefits have been identified as temporary disbenefits during construction:

- D3: Disturbance of in-situ archaeology, SSSI and existing cycleways and footpaths during construction.
- D4: Construction causes traffic disruption and an increase in carbon emissions.

These will be managed as risks to allow active control during construction. These are not included on the benefits register and are linked to risks 60, 76 and 162 on the risk register.

## 4.3 Benefits Categorisation

As well as prioritisation, the identified benefits and disbenefits will be classified by type and by category. The benefits types are as follows:

- **Non-cash releasing** benefits are financial savings due to cost avoidance, ie. compared to what would have taken place if the scheme was not implemented.
- **Quantitative** benefits can be quantified but not by a financial measure.
- **Qualitative** benefits cannot be quantified.

No cash-releasing benefits have been identified for the scheme and so this type is not present in the Benefits Register.

The benefits categories are as follows:

- **Economic** benefits are positive economic outcomes for local or national businesses and government.
- **Social** benefits are outcomes with a positive social impact on the public or community.
- **Environmental** benefits are positive ecological or recreational outcomes for the environment.

No major organisational benefits have been identified for the scheme and so this category is not present in the Benefits Register.



## 4.4 Benefits Measurement

Details of the choice of metric, the measurement methodology, the baseline and target values, and the cost of the measurement exercise is included in the benefit profile. The baseline measurements and target values were agreed by the Benefit Owner in collaboration with the Funding and Benefits Realisation Manager.

## 4.5 Tracking Benefits during the Project Lifecycle

As well as the monthly reporting undertaken by the Benefit Owners (see the Benefits Management Strategy for more details), all relevant benefits and disbenefits will be re-evaluated at several key project checkpoints:

1. End of detailed design (July 2017)
2. CPO submission (November 2017)
3. Final design (June 2018)
4. Full Business Case (July 2018)

The relevant benefits and disbenefits are defined as those impacted by the design of the scheme. If the scheme design has been changed at these checkpoints, the relevant benefits and disbenefits will be re-measured to assess whether the benefits are still likely to be realised and whether the disbenefits will be worse than predicted. Any change in benefit or disbenefit progress will be assessed and reported as described in the Benefits Management Strategy.

A full review of all benefits and disbenefits, including emergent ones, will be taken before Full Business Case submission by the Benefit Owner and Funding and Benefits Manager.

## 4.6 Monitoring Benefit Realisation after Project Closure

Several of the benefits will not be realised by project closure and so will continue to be monitored until the end of the realisation timescale, as defined in the benefit profile (see section 5). Monitoring during Business As Usual operations will be carried out as described in the Benefits Management Strategy.

# 5 Benefit Profiles

Benefits profiles have been created for each primary and secondary direct benefit and disbenefit to describe the effects, dependencies and measurement process for the benefit and a plan of action for its realisation. These will be further refined by July 2018, after the detailed design is complete.

## 5.1 Primary Benefits

### P1: Residential properties suffer less flood damages

Ref	P1	Benefit owner	Heather Taylor
Profile agreement date	27/01/17	Profile last reviewed	27/01/17
Benefit overview	Residential properties suffer less flood damages		
Strategic objective	Reduce flood damages to at least 1000 homes and businesses currently at risk in Oxford.		
Benefit category	Economic/Social	Realisation date	Readiness for service
Baseline value	1928	Metric	

Target value	928		Properties moving from top 3 NaFRA flood risk bands
Measurement Dates	After design changes, during first incident.		
Stakeholders	Residents, local businesses, Environment Agency		
Progress	0%	RAG	

### Description

During previous flood events in 2007 and 2013/14, more than 150 properties were internally flooded during each event. The scheme will lower the risk of flooding to residential properties in the scheme area of interest and therefore they will flood less frequently. This means that costs of damage, evacuation and repair during a flood event are avoided, and the property has lower insurance premiums due to its lower risk category. Clean up times and cost are reduced, which avoids the loss of productivity when affected people can't work. Reducing the risk of flooding to residential properties has positive effects on the stress and mental health of the residents. Less frequent flooding has benefits for the Environment Agency by reducing the resource cost of flood warnings and response.

Benefit P1 is valued as Outcome Measure 2, which values the reduced risk of flooding to properties at £28,453,813.

### Measurement

Currently, 1928 properties are at moderate to very significant risk of flooding in the scheme area of interest, as calculated by NaFRA (National Flood Risk Assessment) category. These categories have been superseded but are used here for consistency with the partnership funding calculator. The target value is that by July 2022, 1000 of these properties will be in a lower flood risk category. This is calculated based on flood modelling data produced by CH2M on behalf of the scheme, and assumes that flood modelling is accurate.

The predicted benefit value will be re-measured based on the detailed design in July 2017 to assess whether the benefit will still be realised. The cost of the modelling exercise is approximately £110,000, shared between benefits P1-P6 and S3. After project closure the benefit will be transferred to a new Owner with a Business As Usual role who will be responsible for measurement and monitoring going forward. The assumptions made during modelling will be tested during the first incident when the channel is at full flow. Spot flow gaugings will be taken at agreed points in the scheme during low and high flow conditions. These measurements will be used by the Hydrometry & Telemetry department of the Environment Agency to assess the accuracy of the modelling and assess whether the target value will be realised.

### Progress & Risks

Realisation of this benefit is dependent on the successful completion of the whole scheme. Various localised defences provide protection to specific groups of properties, but are only protected as a result of the scheme as a whole.

The key risks to realisation of this benefit are currently the key risks to the project overall (see risk register).

Progress will begin to be made on this benefit when construction starts in autumn 2018.

### Actions

In order to realise this benefit, the key actions that must be taken are:

- Re-measure the value of the benefit at appropriate checkpoints.
- Communicate requirements to employer’s *consultants* to ensure that design changes meet this target.

**P2: Commercial properties suffer less flood damages**

Ref	P2	Benefit owner	Heather Taylor
Profile agreement date	27/01/17	Profile last reviewed	27/01/17
Benefit overview	Commercial properties suffer less flood damages		
Strategic objective	Reduce flood damages to at least 1000 homes and businesses currently at risk in Oxford.		
Benefit category	Economic	Realisation date	Readiness for service
Baseline value	213	Metric	Number of properties damaged in a 1% AEP event
Target value	113		
Measurement dates	After design changes, during first incident.		
Stakeholders	Local and national businesses, Councils, Universities, Environment Agency		
Progress	0%	RAG	

**Description**

An outcome of the scheme is that commercial properties in the scheme area of interest will suffer reduced damages. This means that costs of damage and repair during a flood event are avoided, and the property has lower insurance premiums due to its lower risk. Clean up times and cost are reduced, which avoids the loss of productivity when businesses can’t open. Less frequent flooding has benefits for the Environment Agency by reducing the resource cost of flood warnings and response.

This benefit is part of the Outcome Measure 1 alongside benefits P3 – P6, which together are valued at £1,112,388,394 to the local economy over 100 years.

**Measurement**

Currently, 213 commercial properties in the scheme area of interest suffer damages in a 1% AEP flood event. This is defined as properties where flood water passes the property threshold. This metric was chosen because NaFRA flood risk categories are not applied to commercial properties. The target value is that by July 2022, 100 properties will no longer suffer damages in an event of this magnitude. This is calculated based on flood modelling data produced by CH2M on behalf of the scheme, and assumes that flood modelling is accurate.

The predicted benefit value will be re-measured based on the detailed design in July 2017 to assess whether the benefit will still be realised. The cost of the modelling exercise is approximately £110,000, shared between benefits P1-P6 and S3. After project closure the benefit will be transferred to a new Owner with a Business As Usual role who will be responsible for measurement and monitoring going forward. The assumptions made during modelling will be tested during the first incident when the channel is at full flow. Spot flow gaugings will be taken at agreed points in the scheme during low and high flow conditions. These measurements will be used by the Hydrometry & Telemetry department of the Environment Agency to assess the accuracy of the modelling and assess whether the target value will be realised.

**Progress & Risks**

Realisation of this benefit is dependent on the successful completion of the whole scheme. Various localised defences provide protection to specific groups of properties, but are only protected as a result of the scheme as a whole.

The key risks to realisation of this benefit are currently the key risks to the project overall (see risk register).

Progress will begin to be made on this benefit when construction starts in autumn 2018.

#### Actions

In order to realise this benefit, the key actions that must be taken are:

- Re-measure the value of the benefit at appropriate checkpoints.
- Communicate requirements to employer's *consultants* to ensure that design changes meet this target.

### P3: Lower frequency of flooding to Abingdon and Botley roads

Ref	P3	Benefit owner	Heather Taylor
Profile agreement date	27/01/17	Profile last reviewed	27/01/17
Benefit overview	Lower frequency of flooding to Abingdon and Botley roads		
Strategic objective	Reduce flood impacts on transport infrastructure and utilities in Oxford, particularly to Botley and Abingdon Roads, the railway line and the sewerage system. Safeguard Oxford's reputation as a thriving centre of commerce that is open for business.		
Benefit category	Economic/Social	Realisation date	Readiness for service
Baseline value	20% AEP	Metric	Level of flood event in which roads are protected
Target value	5% AEP		
Measurement Dates	After design changes, during first incident.		
Stakeholders	Commuters, residents, local businesses		
Progress	0%	RAG	

#### Description

Abingdon and Botley roads are two of the major arterial roads into the city, and traffic disruption caused by road closures has been a significant problem during previous flood events in 2007 and 2012. Reducing the frequency of flooding at the Abingdon and Botley roads will allow access to Oxford to be maintained during floods, allowing commuters to access their workplace and allowing residents to access shops and businesses in the city. This reduces the economic cost of flood events to local businesses, as staff can get to work and customers are still able to shop. Protection of the Abingdon and Botley roads means that traffic circulation in the city is not affected, reducing disruption to the commercial supply chain, and commuters are able to access the city, improving safety and allowing access to visitors.

This benefit is part of the Outcome Measure 1 alongside benefits P2 – P6, which together are valued at £1,112,388,394 to the local economy over 100 years.

The realisation of this benefit will be valuable to businesses including local public transport companies. Two bus companies currently operate in Oxford, the Oxford Bus Company and Stagecoach. As part of the Funding Strategy, these businesses have been approached to explore the possibility of making an investment in the scheme based on the realisation of this benefit. It is also valuable to retail stores by

allowing continued access for shoppers during floods. Land Securities Ltd., who are landlords of the new Westgate shopping centre, and John Lewis, who operate a flagship store, have been approached to facilitate an investment.

#### Measurement

The metric for this benefit is the scale of flood event in which the road is protected. Currently the Botley road starts to flood in a 20% AEP event, and the target is that by July 2022 the roads are protected in a 5% AEP event. This is calculated based on flood modelling data produced by CH2M on behalf of the scheme, and assumes that flood modelling is accurate.

The predicted benefit value will be re-measured based on the detailed design in July 2017 to assess whether the benefit will still be realised. The cost of the modelling exercise is approximately £110,000, shared between benefits P1-P6 and S3. After project closure the benefit will be transferred to a new Owner with a Business As Usual role who will be responsible for measurement and monitoring going forward. The assumptions made during modelling will be tested during the first incident when the channel is at full flow. Spot flow gaugings will be taken at agreed points in the scheme during low and high flow conditions. These measurements will be used by the Hydrometry & Telemetry department of the Environment Agency to assess the accuracy of the modelling and assess whether the target value will be realised.

#### Progress & Risks

Realisation of this benefit is dependent on the successful completion of the Botley road defences and the scheme as a whole.

The key risks to realisation of this benefit are currently the key risks to the project overall (see risk register).

Progress will begin to be made on this benefit when construction starts in autumn 2018.

#### Actions

In order to realise this benefit, the key actions that must be taken are:

- Re-measure the value of the benefit at appropriate checkpoints.
- Communicate requirements to employer's *consultants* to ensure that design changes meet this target.

#### P4: Fewer electricity disruptions as a result of flooding

Ref	P4	Benefit owner	Heather Taylor
Profile agreement date	27/01/17	Profile last reviewed	27/01/17
Benefit overview	Fewer electricity disruptions as a result of flooding		
Strategic objective	Reduce flood impacts on transport infrastructure and utilities in Oxford, particularly to Botley and Abingdon Roads, the railway line and the sewerage system. Safeguard Oxford's reputation as a thriving centre of commerce that is open for business.		
Benefit category	Economic/Social	Realisation date	Readiness for service
Baseline value	0	Metric	Number substations no longer at risk in 1% AEP event.
Target value	30		
Measurement Dates	After design changes, at end project review, during first incident.		
Stakeholders	Scottish & Southern Energy, residents, local businesses.		

Progress		RAG	
----------	--	-----	--

### Description

Protection of the electricity network from flooding means that during a flood event the city does not suffer from loss of power and SSE (Scottish and Southern Electric) do not suffer damages to their assets or compensation costs. This allows residents to remain safe and comfortable and allows businesses to continue trading and avoid damage to stock as a result of a loss of power. Greater business resilience allows redevelopment and relocation of businesses to the city.

This benefit is part of the Outcome Measure 1 alongside benefits P2 – P6, which together are valued at £1,112,388,394 to the local economy over 100 years.

This outcome benefits SSE and they have been approached to discuss making an investment in the scheme.

### Measurement

The benefit target is to lower the flood risk to 30 electrical substations by readiness for service in 2022 by removing the substations from the 1% AEP flood outline. This is calculated based on flood modelling data produced by CH2M on behalf of the scheme and asset data provided by Scottish & Southern Electric, and assumes that this data is accurate.

The predicted benefit value will be re-measured based on the detailed design in July 2017 to assess whether the benefit will still be realised. The cost of the modelling exercise is approximately £110,000, shared between benefits P1-P6 and S3. After project closure the benefit will be transferred to a new Owner with a Business As Usual role who will be responsible for measurement and monitoring going forward. The assumptions made during modelling will be tested during the first incident when the channel is at full flow. Spot flow gaugings will be taken at agreed points in the scheme during low and high flow conditions. These measurements will be used by the Hydrometry & Telemetry department of the Environment Agency to assess the accuracy of the modelling and assess whether the target value will be realised.

### Progress & Risks

Realisation of this benefit is dependent on the successful completion of the whole scheme. A bund at Osney Mead would allow protection of an additional, larger substation, but this is only protected as a result of the scheme as a whole.

The key risks to realisation of this benefit are currently the key risks to the project overall (see risk register).

Progress will begin to be made on this benefit when construction starts in autumn 2018.

### Actions

In order to realise this benefit, the key actions that must be taken are:

- Re-measure the value of the benefit at appropriate checkpoints.
- Communicate requirements to employer's *consultants* to ensure that design changes meet this target.
- Explore the possibility of a bund at Osney Mead bund by pursuing funding contributions.
- Collaboration with SSE to ensure that the designs are sufficient to provide the benefit.

- Engagement with SSE to ensure that the benefits and limitations of the scheme are understood.

### P5: Improved resilience of high-speed broadband network

Ref	P5	Benefit owner	Heather Taylor
Profile agreement date	27/01/17	Profile last reviewed	27/01/17
Benefit overview	Improved resilience of high-speed broadband network		
Strategic objective	Reduce flood impacts on transport infrastructure and utilities in Oxford, particularly to Botley and Abingdon Roads, the railway line and the sewerage system. Safeguard Oxford's reputation as a thriving centre of commerce that is open for business.		
Benefit category	Economic/Social	Realisation date	Readiness for service
Baseline Value	23	Metric	Number of assets at risk in a 1% AEP event
Target Value	7		
Measurement Dates	After design changes, at end project review, during first incident.		
Stakeholders	BT Openreach, Virgin Media, BskyB, residents, local businesses.		
Progress	0%	RAG	

#### Description

The high-speed broadband network has been affected by previous flood events. Protection of the broadband network means that utility companies have reduced repair and compensation costs and businesses have greater resilience.

This benefit is part of the Outcome Measure 1 alongside benefits P2 – P6, which together are valued at £1,112,388,394 to the local economy over 100 years.

This benefit has value to BT Openreach, who supply broadband internet in the scheme area. We are working with BT to assess the value of this benefit to the business in order to facilitate an investment.

#### Measurement

There are currently 23 broadband assets within the scheme area of interest that are at risk in a 1% AEP flood event. The benefit target is that 16 assets will be protected in a 1% AEP flood event by readiness for service in 2022. This is calculated based on flood modelling data produced by CH2M on behalf of the scheme and asset data provided by BT Openreach, and assumes that this data is accurate.

The predicted benefit value will be re-measured based on the detailed design in July 2017 to assess whether the benefit will still be realised. The cost of the modelling exercise is approximately £110,000, shared between benefits P1-P6 and S3. After project closure the benefit will be transferred to a new Owner with a Business As Usual role who will be responsible for measurement and monitoring going forward. The assumptions made during modelling will be tested during the first incident when the channel is at full flow. Spot flow gaugings will be taken at agreed points in the scheme during low and high flow conditions. These measurements will be used by the Hydrometry & Telemetry department of the Environment Agency to assess the accuracy of the modelling and assess whether the target value will be realised.

#### Progress & Risks

Realisation of this benefit is dependent on the successful completion of the whole scheme.

The key risks to realisation of this benefit are currently the key risks to the project overall (see risk register).

Progress will begin to be made on this benefit when construction starts in autumn 2018.

### Actions

In order to realise this benefit, the key actions that must be taken are:

- Re-measure the value of the benefit at appropriate checkpoints.
- Communicate requirements to employer's *consultants* to ensure that design changes meet this target.

### P6: Lower frequency of flooding to railway line

Ref	P6	Benefit owner	Heather Taylor
Profile agreement date	27/01/17	Profile last reviewed	27/01/17
Benefit overview	Lower frequency of flooding to railway line		
Strategic objective	Reduce flood impacts on transport infrastructure and utilities in Oxford, particularly to Botley and Abingdon Roads, the railway line and the sewerage system. Safeguard Oxford's reputation as a thriving centre of commerce that is open for business.		
Benefit category	Economic	Realisation date	Readiness for service
Baseline value	5% AEP	Metric	Level of flood event in which trains can continue running
Target value	1.33% AEP		
Measurement dates	After design changes, at end project review, during first incident.		
Stakeholders	Residents, commuters, local and national businesses		
Progress	0%	RAG	

### Description

The railway line in Oxford was closed due to flooding in the 2013/14 flood event. This line is the major line between London and Birmingham and is a key part of the passenger and freight network. Protection of the railway lines during floods will allow the continued use of the railway for commuters travelling to a place of work and visitors accessing the city. It will also allow the continued movement of freight, preventing economic losses to businesses operating in and through Oxford.

This benefit is part of the Outcome Measure 1 alongside benefits P2 – P6, which together are valued at £1,112,388,394 to the local economy over 100 years.

This outcome benefits Network Rail by improving flood resilience of the railway line, as well as businesses that use the railway line for freight. Network Rail and BMW are key beneficiaries and are being approached as part of the Funding Strategy in order to facilitate an investment in the scheme.

### Measurement

This benefit will be measured by the level of flood event in which trains can continue to run on the railway line. Following a recent track raising, this is currently a 5% AEP event. The target value for this benefit is that the track will be protected in a 1.33% AEP event. This is calculated based on flood modelling data produced by CH2M on behalf of the scheme, and assumes that flood modelling is accurate.



The predicted benefit value will be re-measured based on the detailed design in July 2017 to assess whether the benefit will still be realised. The cost of the modelling exercise is approximately £110,000, shared between benefits P1-P6 and S3. After project closure the benefit will be transferred to a new Owner with a Business As Usual role who will be responsible for measurement and monitoring going forward. The assumptions made during modelling will be tested during the first incident when the channel is at full flow. Spot flow gaugings will be taken at agreed points in the scheme during low and high flow conditions. These measurements will be used by the Hydrometry & Telemetry department of the Environment Agency to assess the accuracy of the modelling and assess whether the target value will be realised.

#### Progress & Risks

Realisation of this benefit is dependent on the successful completion of the whole scheme.

The key risks to realisation of this benefit are currently the key risks to the project overall (see risk register).

Progress will begin to be made on this benefit when construction starts in autumn 2018.

#### Actions

In order to realise this benefit, the key actions that must be taken are:

- Re-measure the value of the benefit at appropriate checkpoints.
- Communicate requirements to employer's *consultants* to ensure that design changes meet this target.

#### P7: Less likelihood of subsequent sewer flooding

Ref	P7	Benefit owner	Heather Taylor
Profile agreement date	27/01/17	Profile last reviewed	27/01/17
Benefit overview	Less likelihood of subsequent sewer flooding		
Strategic objective	Reduce flood impacts on transport infrastructure and utilities in Oxford, particularly to Botley and Abingdon Roads, the railway line and the sewerage system.		
Benefit category	Economic/Social	Realisation date	Readiness for service
Baseline value	0	Metric	Number of properties at reduced risk of fluvial sewer flooding
Target value	88		
Measurement dates	End project review, during first incident.		
Stakeholders	Thames Water, residents, local businesses.		
Progress	0%	RAG	

#### Description

Sewer flooding can be caused by both groundwater and fluvial flooding, and so the scheme will be able to reduce the number of properties affected by sewer flooding by reducing the risk of fluvial flooding. This will reduce damage to properties affected by sewer flooding, and reduce the repair and compensation costs for utility companies.

This benefit has been valued by Thames Water as between £1.0m and £3.4m. Thames Water have invested in the scheme to contribute to the realisation of this benefit.

#### Measurement

There are currently 88 properties in the scheme area of interest at risk of fluvial sewer flooding in a 1% AEP event. The benefit target is that all 88 of these properties will be at lower risk by readiness for service in 2022.

This value was calculated by Thames Water based on flood modelling data produced by CH2M on behalf of the scheme, and assumes that flood modelling is accurate. Thames Water will conduct future measurements.

The predicted benefit value will be re-measured based on the detailed design in July 2017 to assess whether the benefit will still be realised. After project closure the benefit will be transferred to a new Owner with a Business As Usual role who will be responsible for measurement and monitoring going forward. The assumptions made during modelling will be tested during the first incident when the channel is at full flow. Spot flow gaugings will be taken at agreed points in the scheme during low and high flow conditions. These measurements will be used by the Hydrometry & Telemetry department of the Environment Agency to assess the accuracy of the modelling and assess whether the target value will be realised.

#### Progress & Risks

Realisation of this benefit is dependent on the successful completion of the whole scheme.

The key risks to realisation of this benefit are currently the key risks to the project overall (see risk register).

Progress will begin to be made on this benefit when construction starts in autumn 2018.

#### Actions

In order to realise this benefit, the key actions that must be taken are:

- Communicate requirements to employer's *consultants* to ensure that design changes meet this target.

#### P8: Opportunity to improve biodiversity

Ref	P8	Benefit owner	Penny Burt
Profile agreement date	9/2/17	Profile last reviewed	9/2/17
Benefit overview	Opportunity to improve biodiversity		
Strategic objective	Create and maintain new recreational amenities, wildlife habitat, and naturalised watercourses accessible from the centre of Oxford.		
Benefit category	Environmental	Realisation date	2032
Baseline value	0 ha	Metric	Net ha WFD-criteria habitat created
Target value	5 ha		
Measurement dates	After design changes, at end project review, at post implementation reviews until 2037		
Stakeholders	Residents, environmental groups		
Progress	0%	RAG	

#### Description

Creating the opportunity for improved biodiversity through habitat creation has indirect benefits in increasing Oxford's appeal as a green and pleasant place to live. It will contribute to achieving priority habitat targets for the county, and will help to increase public understanding and engagement with

the natural environment. It also improves fishing and improves the opportunities for research and development, contributing to the University's reputation.

This benefit is valued in Outcome Measure 4 at £97,500.

#### Measurement

This benefit is calculated by measuring the Water Framework Directive criteria habitat that is created by the scheme. The areas of habitat included in this assessment are wet woodland, ponds, lowland meadow, wetland, and floodplain grazing marsh.

The figures calculated are based on the best available information from the Landscape Masterplan. Areas of habitat within the red line boundary are assumed to be lost during construction, and areas which are to be created afterwards with a reasonable prospect of success are assumed to be gained.

The predicted benefit value will be re-measured based on the detailed design in July 2017 to assess whether the benefit will still be realised. After project closure the benefit will be transferred to a new Owner with a Business As Usual role who will be responsible for measurement and monitoring going forward. The benefit will be monitored for the first 15 years after Readiness for Service in annual reviews until 2027 and at 5-yearly Post Implementation Reviews until 2037.

#### Progress & Risks

Progress will begin to be made on this benefit towards the end of construction. However, it is likely to take several years for the different habitats to become properly established.

The key risk is that the areas of habitat creation are exposed to very regular flooding in the first few months following completion of the scheme. This will prevent the establishment of vegetation and lead to delays in the realisation of this benefit. Another risk is that the general ground conditions in the second stage of the new channel are not as anticipated and do not allow WFD-criteria habitat to be established and maintained. The creation of WFD-criteria habitat in the second stage channel is dependent on the arrangements made with the landowners.

#### Actions

In order to realise this benefit, the key actions that must be taken are:

- Re-measure the value of the benefit at appropriate checkpoints.
- Communicate requirements to employer's *consultants* to ensure that design changes meet this target.
- Monitoring of trial pits to test the viability of habitat creation.
- Exploration of a range of techniques for different types of habitat creation.
- Develop and implement appropriate landscape drawings, specifications and management plans for the different types of habitat.
- Monitor the establishment of the different habitats and amend and adapt landscape management plans as required to meet targets.

## **5.2 Secondary Benefits**

### S1: New riverside environment between North Hinksey and South Hinksey

Ref	S1	Benefit owner	Penny Burt
Profile agreement date	9/2/17	Profile last reviewed	9/2/17

Benefit overview	New and improved riverside environment		
Strategic objective	Create and maintain new recreational amenities, wildlife habitat, and naturalised watercourses accessible from the centre of Oxford.		
Benefit category	Environmental	Realisation date	Readiness for Service
Baseline value	0 km	Metric	Km new watercourse
Target value	2 km		
Measurement dates	After design changes, at end project review.		
Stakeholders	Residents, environmental groups		
Progress	0%	RAG	

### Description

The scheme will create a new riverside environment between North Hinksey and South Hinksey consisting of a naturalised watercourse.

### Measurement

This benefit will be measured by km new channel created. This excludes those parts of the channel that which follow the existing Bulstake and Hinksey streams. The figures calculated are based on the best available information from the detailed design drawings.

The predicted benefit value will be re-measured based on the detailed design in July 2017 to assess whether the benefit will still be realised. After project closure the benefit will be transferred to a new Owner with a Business As Usual role who will be responsible for measurement and monitoring going forward. The benefit will be monitored for the first 15 years after Readiness for Service in annual reviews until 2027 and at 5-yearly Post Implementation Reviews until 2037.

### Progress & Risks

Progress will begin to be made on this benefit when construction starts in autumn 2018.

### Actions

In order to realise this benefit, the key actions that must be taken are:

- Communicate requirements to employer's *consultants* to ensure that the detailed design:
  - Maximises the ecological potential of new and existing channels by varying bank profiles and channel slopes and by incorporating bays and backwaters.
- Report impact of potential design changes on benefit realisation.
- Review benefit profile before Full Business Case submission to assess the extent of overlap with benefit P8.

### S2: Increased number of people walking and cycling in the area

Ref	S2	Benefit owner	Penny Burt
Profile agreement date	9/2/17	Profile last reviewed	9/2/17
Benefit overview	Increased number of people walking and cycling in the area		
Strategic objective	Create and maintain new recreational amenities, wildlife habitat, and naturalised watercourses accessible from the centre of Oxford.		
Benefit category	Social	Realisation date	Readiness for service
Baseline value	0 km	Metric	Km paths improved
Target value	2 km		
Measurement dates	After design changes, at end project review.		

Stakeholders	Landowners, local planning authorities, parish councils, cycling groups, Sustrans, Oxford Countryside Access Forum, Access for All Focus Group, residents.		
Progress	0%	RAG	

### Description

The scheme area currently includes public footpaths at Willow Walk and the Devil's Backbone. The improvement of existing paths will enable an increased number of people walking and cycling in the area. This will lead to more commuters cycling to work, improving health and reducing the number of journeys made by motor vehicles and therefore improving air quality.

### Measurement

This benefit will be measured by adding together two figures:

- 1) The length of footpaths and cycle routes in the scheme area that are made more easily accessible through:
  - (i) Cutting back overgrown/overhanging vegetation.
  - (ii) Surface repairs/replacement.
  - (iii) New/replacement signage.
- 2) The length of new footpaths/cycle routes that are created by the scheme.

The likely extent of improved paths will be measured in July 2017 to determine a more accurate target value, measured in km improved paths. The baseline value is 0 km.

### Progress & Risks

This benefit will in part be realised by carrying out improvement works to the existing footpaths/cycle routes in the scheme area, as part of the construction and landscape contract.

Proposals to create a new footpath/cycle route from Osney to South Hinksey were presented to landowners at a meeting in December. The landowners do not wish to see an increase in public access to their land. If the project is committed to delivering the scheme through negotiation with landowners, it may not be possible to deliver any new footpaths or cycle routes. This is a key risk to the full realisation of this benefit.

The decision as to whether this is acceptable to the partners will be taken by the Programme Board in January 2017.

### Actions

In order to realise this benefit, the key actions that must be taken are:

- Specification of improvement works to the existing footpaths/cycle routes in the scheme area, as part of the construction and landscape contract. Including:
  - Cutting back overgrown vegetation
  - Surface repairs/replacement
  - New/replacement signage
- Obtain partner decision on acceptability of part-realisation of this benefit.

### S3: Lower frequency of flooding to existing sites with redevelopment potential

Ref	S3	Benefit owner	Heather Taylor
Profile agreement date	27/01/17	Profile last reviewed	27/01/17
Benefit overview	Lower frequency of flooding to existing sites with redevelopment potential		
Strategic objective	Safeguard Oxford's reputation as a thriving centre of commerce that is open for business.		
Benefit category	Economic	Realisation date	Readiness for service
Baseline value	8.8 ha	Metric	Ha of land at Osney Mead industrial site at risk in 1% AEP event
Target value	3.8 ha		
Measurement dates	After design changes, at end project review, during first incident.		
Stakeholders	Local and national businesses, Councils, Universities.		
Progress	0%	RAG	

### Description

Lowering the frequency of flooding to existing industrial sites is crucial to allow redevelopment to support economic growth in the city. Improving economic growth to the city is the justification for the investment OxLEP (Oxford Local Enterprise Partnership) have made to the scheme and is of concern to Oxford City Council and Oxfordshire County Council, who have also made investments. The Osney Mead industrial site is the location of the University of Oxford's planned innovation quarter. In 2017 we will be working to finalise the value of this benefit to the University.

### Measurement

Currently, 8.8 ha of industrial land at Osney Mead is at risk of flooding in a 1% AEP event. The target value is to reduce the area of land at risk by 5 ha by Readiness for Service in July 2022. This is calculated based on flood modelling data produced by CH2M on behalf of the scheme, and assumes that flood modelling is accurate.

The predicted benefit value will be re-measured based on the detailed design in July 2017 to assess whether the benefit will still be realised. The cost of the modelling exercise is approximately £110,000, shared between benefits P1-P6 and S3. After project closure the benefit will be transferred to a new Owner with a Business As Usual role who will be responsible for measurement and monitoring going forward. The assumptions made during modelling will be tested during the first incident when the channel is at full flow. Spot flow gaugings will be taken at agreed points in the scheme during low and high flow conditions. These measurements will be used by the Hydrometry & Telemetry department of the Environment Agency to assess the accuracy of the modelling and assess whether the target value will be realised.

### Progress & Risks

Realisation of this benefit is dependent on the successful completion of the whole scheme. A bund at Osney Mead would allow greater protection of the site, but this is only protected as a result of the scheme as a whole.

The key risks to realisation of this benefit are currently the key risks to the project overall (see risk register).

Progress will begin to be made on this benefit when construction starts in autumn 2018.

### Actions

In order to realise this benefit, the key actions that must be taken are:

- Re-measure the value of the benefit at appropriate checkpoints.
- Communicate requirements to employer's *consultants* to ensure that design changes meet this target.
- Explore the possibility of a bund at Osney Mead by pursuing funding contributions from University of Oxford.

### 5.3 Disbenefits

#### D1: Scheme damages existing flood-dependent habitats

Ref	D1	Disbenefit owner	Penny Burt
Profile agreement date	9/2/17	Profile last reviewed	9/2/17
Disbenefit overview	Scheme damages existing flood-dependent habitats		
Disbenefit category	Environmental	Timescale	100 years
Baseline value	0 ha	Metric	Ha loss of flood-dependent habitat
Target value	<2.5 ha		
Measurement dates	At final design stage, at construction contract award, at post implementation reviews.		
Stakeholders	Residents, environmental groups		
% likelihood of achieving target	50%	RAG	

#### Description

Hinksey Meadow is a Site of Local Importance for Nature Conservation and a Local Wildlife Site. It is a species-rich meadow with a nationally rare grassland community (NVC classification MG4a) and the protected plant species snakes-head fritillary. The scheme will result in the loss of MG4a grassland which cannot be recreated in the scheme area, as the ground will be significantly wetter.

Iffley Meadows Site of Special Scientific Interest (SSSI) has the potential to be negatively affected by the scheme by direct damage from construction activities to plants or soils, by changes to the wetness of the soil, and/or by changes to the annual flooding regime. Early modelling does not predict that the scheme will affect the groundwater regime at Port Meadow SSSI, which is part of the Oxford Meadows Special Area of Conservation.

This disbenefit will be realised over the lifetime of the scheme, 100 years. However, several methods of mitigation will be investigated to replace this habitat and are predicted to lead to a net gain in flood-dependent habitat within 15 years from Readiness for Service.

This disbenefit is of concern to environmental stakeholders in the scheme, including environmental groups and statutory consultees.

#### Measurement

This disbenefit is measured by hectares existing flood-dependent habitat lost, not including any replanting that might lead to a net gain in flood-dependent habitat. This is predicted to be 2.5 ha lowland meadow which will be lost from Hinksey Meadow. This figure is calculated based on the best available information from the Landscape Masterplan. Areas of habitat within the red line boundary are assumed to be lost during construction.

The predicted disbenefit value will be re-measured based on the detailed design in July 2017 to assess whether the disbenefit will be worse than predicted. After project closure the disbenefit will be transferred to a new Owner with a Business As Usual role who will be responsible for measurement and monitoring going forward. The benefit will be monitored for the first 15 years after Readiness for Service in annual reviews until 2027 and at 5-yearly Post Implementation Reviews until 2037.

#### Progress & Risks

This disbenefit will begin to be realised during early site works including archaeological investigations from May 2017.

#### Mitigating Actions

In order to mitigate the effect of this disbenefit, the key actions that must be taken are:

- Collaborate with employer's *consultants*, including the Floodplain Meadows Partnership, to:
  - Minimise area of MG4a grassland lost.
  - Avoid direct impacts on existing wildlife sites, habitats and protected species during the development of the scheme, wherever possible.
  - Enhance and buffer existing habitats through the improvement of adjacent sites that already have potential.
  - Create new areas of species-rich lowland meadow (including floodplain grazing marsh) in areas of existing poor, semi-improved grassland.
  - Create large blocks of a small range of habitats rather than an over-complex mosaic of different habitats.
- Create new areas of habitat with maintenance regimes that could support populations of creeping marshwort.
- Use local seed and planting stock or natural regeneration where appropriate to re-vegetate the site.
- Examine feasibility of attempting to translocate turf from the excavated area of Hinksey Meadow.
- Engage with environmental stakeholders to manage expectations.

### D2: Change in landscape adversely affects farming and current recreational use

Ref	D2	Disbenefit owner	Penny Burt
Profile agreement date	9/2/17	Profile last reviewed	9/2/17
Disbenefit overview	Changes in landscape affects farming and current recreational use		
Disbenefit category	Environmental	Timescale	100 years
Baseline value	0 ha	Metric	Ha land where the change in land management regime is undesirable to the landowner or tenant farmer
Target value	15 ha		
Measurement dates	At final design stage, at post implementation reviews		
Stakeholders	Landowners, tenant farmers, residents		
% likelihood of achieving target	75%	RAG	

#### Description



The scheme is designed to allow low –density cattle grazing in the second stage of the channel. Some of the scheme is currently managed in this way but some of it is grazed more intensively by sheep and horses. The area is also informally used for exercising horses (hacking). A number of fields are currently cut for hay meadow but it is likely that areas in the second stage of the channel will be too wet for hay-making after the scheme is implemented.

This change is of concern to landowners and their tenants, particularly farmers who may not be able to continue current farming regimes on the land.

#### Measurement

This disbenefit is measured by hectares of land where the change in land management that arises as a result of the scheme is seen by the landowner or tenant farmer as an undesirable alternative to the existing land management regime. It is difficult to predict the area that will be affected at this stage in the landowner negotiations. The worst-case scenario is that all of the second stage is included in this description (33 ha), but we are hopeful that some, if not all, of the landowners and farmers will accept low-density grazing as an alternative land-use and that the final figure will be much lower.

#### Progress & Risks

Landowner meetings have been taking place since October 2016 in order to engage with landowners and understand their priorities to inform the design process. A key concern raised in these meetings is that boundary separation is maintained by fencing. This must be facilitated without affecting the functioning of the channel, and this will be taken into account during design of the scheme. The landowners have generally been supportive of the proposals to create a wildlife corridor in the second stage of the channel.

#### Mitigating Actions

In order to mitigate the effect of this disbenefit, the key actions that must be taken are:

- Engage with landowners and tenant farmers to either agree that a change in farming use is acceptable in light of the environmental benefits that it would enable, or to ensure that the scheme design minimises the effect on current farming use
- Collaborate with landowners and employer's *consultants* to design boundary separation that does not affect the working of the scheme.

Ref	Type	Category	Description	Strategic Objective	Service Feature	Associated Disbenefits	Activities Required	Metric	Baseline	Target Value	Value of Benefit	Realisation timescale (from 2016)	Benefit Owner	RAG status	Responsibilities of Owner
<b>Primary benefits</b>															
P1	Non-cash releasing	Economic/Social	Residential properties suffer less flood damages	1	Whole scheme	n/a	n/a	Properties moving from top 3 NaFRA flood risk bands	1928	928	OM2 £28,453,813	Readiness for Service (2021)	Heather Taylor		Communicate requirements to consultants to ensure design changes meet this target. Re-measure the benefit in July 2017.
P2	Non-cash releasing	Economic	Commercial properties suffer less flood damages	1	Whole scheme	n/a	n/a	Number properties damaged in a 1% AEP event	213	113	n/a	Readiness for Service (2021)	Heather Taylor		Communicate requirements to consultants to ensure design changes meet this target. Re-measure the benefit in July 2017.
P3	Non-cash releasing	Economic/Social	Lower frequency of flooding to Abingdon and Botley roads	2 & 3	Botley Road defences	n/a	n/a	Level of flood event in which roads are protected	20% AEP	5% AEP	OM1 £1,112,388,394	Readiness for Service (2021)	Heather Taylor		Communicate requirements to consultants to ensure design changes meet this target. Re-measure the benefit in July 2017.
P4	Non-cash releasing	Economic/Social	Fewer electricity disruptions as a result of flooding	2 & 3	Whole scheme	n/a	n/a	Number assets no longer at risk in a 1% AEP event	0	30		Readiness for Service (2021)	Heather Taylor		Communicate requirements to consultants to ensure design changes meet this target. Re-measure the benefit in July 2017.
P5	Non-cash releasing	Economic/Social	Improved resilience of high-speed broadband network	2 & 3	Whole scheme	n/a	n/a	Number assets at risk in 1% AEP event	23	7		Readiness for Service (2021)	Heather Taylor		Communicate requirements to consultants to ensure design changes meet this target. Re-measure the benefit in July 2017.
P6	Non-cash releasing	Economic	Lower frequency of flooding to railway line	2 & 3	Whole scheme	n/a	n/a	Level of flood event in which trains can run	5% AEP	1.33% AEP		Readiness for Service (2021)	Heather Taylor		Communicate requirements to consultants to ensure design changes meet this target. Re-measure the benefit in July 2017.
P7	Non-cash releasing	Economic/Social	Less likelihood of subsequent sewer flooding	2	Whole scheme	n/a	n/a	Number of properties at reduced risk of fluvial sewer flooding	0	88		£2,200,000	Readiness for Service (2021)	Heather Taylor	
P8	Quantitative	Environmental	Opportunity to improve biodiversity	4	Habitat creation	Damage to existing flood-dependent habitat. Change in use of land.	Trial pit investigations. Monitor habitat establishment.	Net ha WFD-criteria habitat created	0 ha	5 ha	OM4 £97,500	20 years	Penny Burt		Develop and implement landscape drawings, specifications and management plans for different habitats. Ensure preparatory works eg. trial pits are carried out. Communicate requirements to consultants to ensure design changes meet this target. Re-measure the benefit in July 2017.
<b>Secondary benefits</b>															
S1	Qualitative	Environmental	New riverside environment between North Hinksey and South Hinksey	4	Channel and backwater/ditch and new scrapes and related habitat enhancement.	Change in landscape affects farming and current recreational use	n/a	km new channel	0	2 km	n/a	Readiness for Service (2021)	Penny Burt		Communicate requirements to consultants to ensure design changes include suitable wetland features and maximises the ecological potential of new and existing channels. Re-measure the benefit in July 2017.
S2	Qualitative	Social/Environmental	Increased number of people walking and cycling in the area	4	Channel	n/a	Maintain access for public to scheme area	km paths improved	0	2km	n/a	Readiness for Service (2021)	Penny Burt		Communicate requirements to consultants to specify improvement works to existing paths in the scheme area as part of the construction and landscape contract. Obtain partner decision on acceptability of part-realisation of this benefit.
S3	Non-cash releasing	Economic	Lower frequency of flooding to existing sites with redevelopment potential	3	Whole scheme	Promotes perception that land will be opened up for development	Explore possibility of investment from University of Oxford.	Ha industrial sites at risk in 1% AEP event	8.8 ha	3.8 ha	n/a	Readiness for Service (2021)	Heather Taylor		Communicate requirements to consultants to ensure design changes meet this target. Re-measure the benefit in July 2017. Collaborate with funding team to explore further investment.
<b>Tertiary benefits</b>															
T1	Non-cash releasing	Economic	Lower impact of floods on economic output	1, 2 & 3	Whole scheme	n/a	n/a	Economic output	n/a	n/a	£29,751,000	10 years	n/a		
<b>Expected disbenefits</b>															
D1	Qualitative	Environmental	Scheme damages existing flood-dependent habitats	n/a	Channel	n/a	n/a	Ha flood-dependent habitat lost	0	<2.5 ha	n/a	100 years	Penny Burt		Communicate requirements to consultants to minimise area of MG4 lost and avoid direct impacts on habitats where possible. Examine feasibility of turf translocation. Re-measure the disbenefit in July 2017. Engage with environmental stakeholders to manage expectations.

D2	Qualitative	Environmental	Change in landscape adversely affects farming and current recreational use	n/a	Channel	n/a	n/a	Ha land with undesirable change in land management	0	<15 ha	n/a	100 years	Penny Burt	Engagement with landowners to agree an acceptable change in land use. Collaborate with landowners and consultants to design suitable boundary separation.
----	-------------	---------------	--	-----	---------	-----	-----	--	---	--------	-----	-----------	------------	---