NEW ECONOMICS FOUNDATION

THE SOCIAL CASE FOR NATURE

A CASE STUDY FROM BENACRE-KESSINGLAND, SUFFOLK

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EXECUTIVE SUMMARY

The UK government has issued new guidance on project design and appraisal to capture a more rounded picture of the impacts of public projects on social inequity. In doing so, the government hopes to ensure that public investment maximises its contribution to its 'levelling-up'[1] and climate change mitigation agendas. Both of these agendas are of particular relevance to the UK's coastal communities.

To date, socioeconomic assessments of nature-based flood protection and coastal habitat creation projects have often struggled to measure and integrate social impacts and their distributional makeup. This has been driven by a lack of evidence, underemphasis in guidance documentation, and challenges presented by the location-specific nature of each restoration scheme. As a result, national studies have sometimes suggested coastal nature restoration offers low rates of social return on investment (SROI), despite evidence to the contrary in many project-level assessments.

Flood defences just south of Kessingland village in Suffolk are only a few years from critical failure. Without action a number of private residential properties, businesses, and a significant area of agricultural land are at risk of flooding. This report assesses the socioeconomic impacts of a proposed flood and coastal erosion risk management (FCERM) and habitat creation scheme. It utilises techniques recently added to the government's *Green Book* appraisal guidance including welfare weighting and distributional analysis to paint a more complete picture of the scheme's potential value to the local community and to demonstrate how a nature-based intervention can deliver on the government's levelling-up agenda.

This analysis is informed by engagement with local residents and project partners which inspired the creation of a new intervention scenario, herein the 'enhanced scenario'. The designation refers to a project design which aims to maximise local social value by providing high-quality public access, amenities, educational provision, and new income generation opportunities in the local area.

The socioeconomic impact of the enhanced scenario is then assessed across four new outcome areas: (i) increased local spending, (ii) health and wellbeing benefits and (iii)

[1] The government has committed to 'levelling-up' to ensure no community is left behind, and all communities share in our future prosperity. This includes focusing on changing the way local economic growth is supported, regenerating town centres, supporting employment, investing in culture, and improving transport links.

educational benefits derived from increased access to nature and green space, and (iv)increased tourism revenue generation potential.

Analysis by the New Economics Foundation (NEF) shows that households in the immediate vicinity of the proposed intervention are well below the national and regional average across multiple determinants of wellbeing, including income, health, and the provision of green space. As such, welfare weighting is applied to reflect the proportionately higher marginal utility of improvements under three of the outcomes assessed: (i) increased local spending, (ii) health and wellbeing benefits, and (iii) educational benefits.

The net present value (NPV) of the scheme across all four socioeconomic outcome areas is estimated (over a 20-year period) at £6.0m–£9.5m after welfare weighting. The welfare weighting component of these estimates equates to £0.87m–£1.6m (≈15%) of the socioeconomic value created. This might be regarded as the scheme's levelling-up potential.

Our modelling implies a new NPV of the overall scheme benefits (pre-displacement) of £37.6m–£41.1m, up from the figure of £31.6m established by Jacobs in their more traditional FCERM assessment.[1] If 100% displacement is assumed on spending and tourism flows (a worst-case assumption), the total scheme benefits are estimated at £35.3m–£36.7m.

When factoring in the other local benefits of the scheme in outcome areas established by previous studies (primarily flood protection of property), the total socioeconomic benefit to the local public and local businesses is estimated to be equivalent to around 38.6% of the total scheme benefits. A further 52.9% of the scheme benefits are estimated to accrue at the regional level, with the remainder (8.5%) accruing at the national study level.

This distributional breakdown can support project stakeholders in determining an appropriate allocation and sourcing of the scheme's investment finance. The report also discusses how the scheme's local socioeconomic value might be further enhanced by exploring ways to increase the local economic multiplier from the scheme's expenditure. For example, pursuing local social value in procurement terms and conditions, fixing ownership of the site in the local community, and setting local social value and ownership as an objective in long-term funding arrangements, such as endowments, and enabling development.

Through our case study in Kessingland we demonstrate that nature-based flood defences should be seen as broader economic assets, with the potential to impact

outcomes in areas such as health, local economic development, inequality and social deprivation. We also show that a wider social impact assessment of nature-based interventions might significantly improve the performance of such schemes under appraisal, thereby improving their ability to attract capital, and boosting their contribution to the UK's decarbonisation agenda. Our research highlights that new developments in HM Treasury appraisal guidance, if rigorously applied at the local planning and departmental levels, have the potential to shine new light on the levelling-up potential of government investments.

1. INTRODUCTION

Flood defences just south of Kessingland village in Suffolk are only a few years from critical failure. Without action a number of private residential properties, businesses, and a significant area of agricultural land are at risk of flooding. Works have been proposed to alter and enhance the flood defence and coastal habitat on land located at the northern edge of the Benacre Estate and just to the south of Kessingland village. Previous assessments have looked at the potential ecosystem service and flood prevention benefits of the different scheme options. This report details supplementary analysis of the local socioeconomic impacts of the proposed schemes. The assessment methodology follows official UK government guidance on the appraisal of flood and coastal erosion risk management (FCERM) schemes, except where such guidance is superseded by recent amendments made to the government's *Green Book*, which was updated at the end of November 2020. This report looks at the extent to which the proposed FCERM can deliver local social impact and support the UK government's strategic objective to level-up Britain's left-behind communities.

2. CONTEXT

Britain's most deprived communities are disproportionately found on its coastline. Analysis suggests, before the tumultuous impacts of the Covid-19 pandemic, households in coastal communities were earning on average £1,600 less than inland communities.[2] Coastal towns in particular have been identified as facing disadvantages in areas of health, education, employment, and ultimately wellbeing.[3] These features put coastal towns front and centre of the UK government's levelling-up agenda, aimed at driving prosperity in areas of the UK which are suffering poor economic and social outcomes.[4]

Nature-based interventions, including flood and coastal erosion risk management (FCERM) schemes, interact with this agenda. In some cases flood defence schemes operate in the close vicinity of some of the UK's most deprived communities. The most direct social impact of these schemes is to protect residential and commercial properties from flooding. However, the government recognises that interventions can also interact with broader ecosystem services, including but not limited to biodiversity (the social value placed on the existence of species and ecosystems), recreation (and associated health and wellbeing), education, and tourism. Broadly speaking, where interventions are more nature-based, for example when intertidal habitat is created to form a natural flood buffer, they interact with a wider range of social outcomes than traditional physical infrastructure solutions.[5]

National studies assessing the relative socioeconomic value of intertidal habitats have often struggled to effectively incorporate impacts on these outcomes. This may be a contributing factor in the relatively low benefit-to-cost ratios estimated for intertidal/salt marsh restoration in recent national studies when compared to other habitats found in the UK. Examples include Cambridge Econometrics (2020), who estimated a ratio of 0.24–1.31,[6] and Eftec (2015) who estimated a ratio of 1.70.[7] Both studies underline significant limitations and uncertainties to these estimates. Nonetheless, these estimates compare to ratios of 3 or above identified by the same authors for restoration of habitats such as peatland and woodland.

Many other project-specific assessments of intertidal restoration have shown significantly higher rates of return, often driven by social outcomes not incorporated in these high-level assessments – these studies are cited throughout this report. **Yet broader social impacts are typically a secondary consideration in the design and appraisal of FCERM schemes, potentially disadvantaging schemes with**

proportionately greater socioeconomic benefits. This underscores the value of undertaking a local economic impact assessment.

2.1 RECENT DEVELOPMENTS IN OFFICIAL GUIDANCE

A number of recent government publications have elevated the prominence of consideration of local social impacts in FCERM schemes. The government's *Green Book* underpins all FCERM appraisals with FCERM appraisal guidance:

> The appraisal must be in line with the requirements of the Treasury Green Book. The Green Book sets out the process you must follow and the issues to consider.[8]

In 2020, the government undertook a review of the *Green Book*. The objective was to "make sure that government investment spreads opportunity across the UK".[9]

The key findings of the review are summarised in Box 1.

Box 1: Findings of the 2020 *Green Book* review[10]

"One of the fundamental issues that the review has identified is the common failure of those writing appraisals to engage properly with the strategic context in which their proposal sits. Specifically, business cases frequently do not demonstrate the necessary understanding of:

· the proposal's specific contribution to the delivery of the government's intended strategic goals (such as levelling up or net zero); and

· the specific social and economic features of different places and how the intervention may affect them;

· other strategies, programmes or projects with which the intervention may interact, including in a particular geographical area."

These review findings led to a number of material changes to the *Green Book* guidance, which underpins all government investment appraisal guidance, including in relation to FCERM. In particular, modules on distributional analysis and place-based analysis were elevated in importance. Since 2018, the *Green Book* has also promoted the concept of welfare weighting which encourages assessors to quantitatively reflect the greater marginal value of a change in outcomes experienced by a community which is proportionately deprived in a certain outcome area.

The welfare weighting approach was first applied to the economic appraisal of ecosystem services related to public green space by Watt, Lawton, and Fujiwara.[11] Such

approaches have also been mainstreamed in recent years in the assessment of flood and natural hazard risk by the World Bank.[12] However, in the UK, welfare weighting of scheme benefits is commonly only applied to the flood protection outcomes of a scheme, excluding other socioeconomic outcomes which may be significant in terms of the government's levelling-up agenda.

While FCERM appraisal guidance has always advocated that "all benefits and costs need to be included in the project appraisal",[13] some social impacts are often removed from the detailed assessment. This may result when appraisers are forced to make decisions about the materiality of outcomes and/or when there are concerns about the weak evidence base surrounding a social wellbeing outcome. However, the evidence base on the materiality of social outcomes from nature-based interventions on the coast has been growing rapidly and offers new ways to quantify and value outcomes.

For example, in a 2019 review of public health on Britain's coast Public Health England noted the following:

> "Consideration could be given to greater provision of interventions which increase physical activity in older people in rural and coastal areas. There may be potential for areas to use their natural assets to promote activity or reduce isolation."[14]

In addition to the materiality of health and wellbeing benefits of green space provision, another recent government publication promoted the benefits of education outcomes linked to nature. The *Dasgupta Review*, published in February 2021, states in its headline messages:

> "Interventions to enable people to understand and connect with Nature would not only improve our health and well-being […] The development and design of environmental education programmes can help to achieve tangible impact, for example by focusing on local issues, and collaborating with scientists and community organisations."[15]

In combination, these publications encourage taking a new look at FCERM initiatives and their social benefits at different scales, in particular the thus far under-explored intersection between nature-based interventions, social outcomes, and the government's levelling-up agenda.

3. VALUING SOCIAL IMPACTS OF FCERM INTERVENTIONS

A prior assessment conducted by Jacobs (2020) examines the costs and benefits of the Benacre-Kessingland scheme in a flood and coastal erosion risk management (FCERM) assessment.[16] This assessment estimates the up-front cost of the scheme at £26m, broken down between appraisal (£3.2m), construction (£16.5m), and contingency (£6.3m). Some limited long-term costs of maintaining the site are also estimated, with a net present value (NPV) of £1.3m. The scheme benefits which are within the scope of Jacobs' FCERM assessment are estimated to have an NPV of £31.6m, producing a relatively low benefit-cost ratio of 1.16. Current government appraisal guidance describes a project as "unlikely to succeed" unless the ratio is "significantly" greater than 1.[17] However, a limited set of socioeconomic outcomes are considered in this assessment; no distributional impact assessment is conducted, nor is welfare weighting applied to any outcomes other than flood protection.

Guidance on the appraisal of flood management interventions, including the multi-coloured manual, supplies fixed benefit or 'default' transfer values to support appraisers in measuring some social outcomes. These are pre-defined, non-context-specific values usually applied on a per-km or per-hectare of changed environment basis. However, in the measurement of local social impact, it is more relevant to develop locally appropriate values as social context can vary significantly across different sites. This also applies to the ecosystem service categories associated with a nature-based intervention. Official guidance specifies a set of services associated with converting areas from one habitat to another.[18] However, assessments should not be bound by these categorisations. The primary task set out in the *Green Book* is to identify material outcomes associated with an intervention.

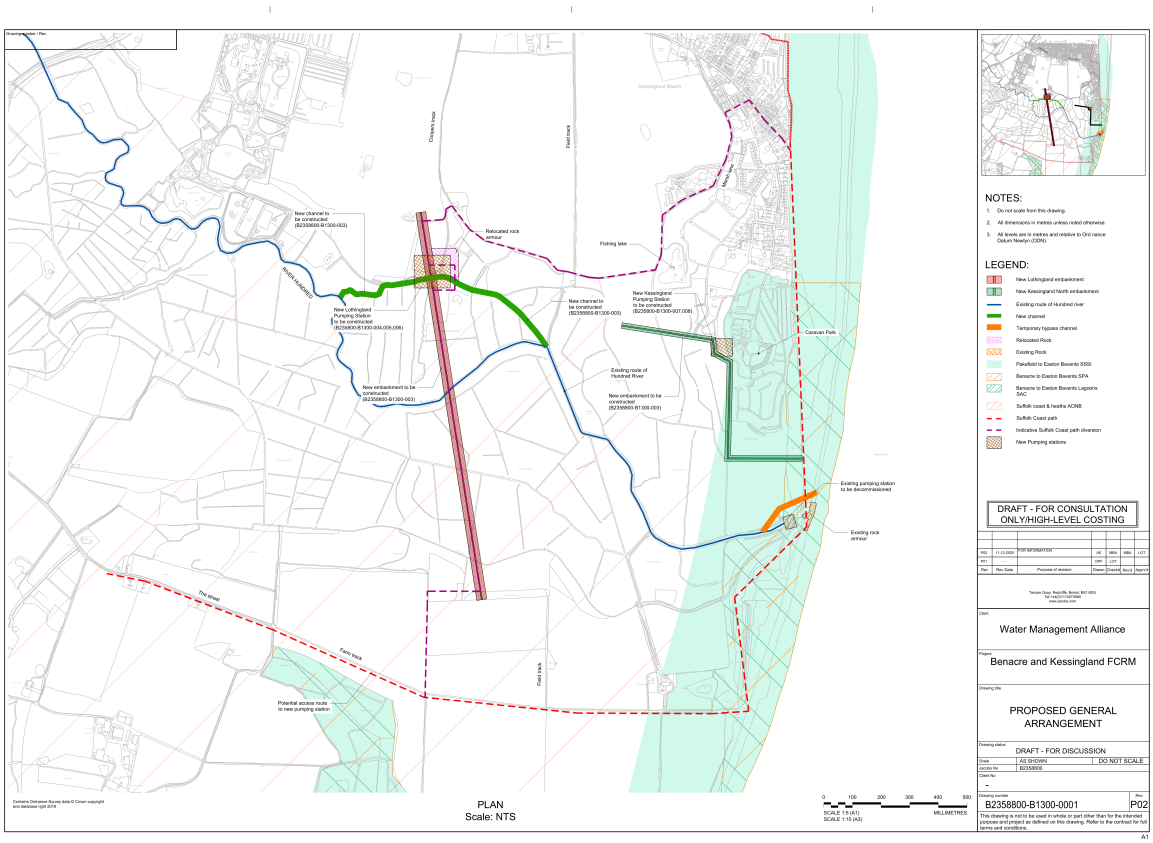
4. STUDY AREA

The proposed area of direct intervention is shown in Figure 1. For the purposes of this local socioeconomic impact assessment, three study areas are defined as follows:

- **Local area:** defined as the four Lower Super Output Areas (LSOAs) within 1,000m of the intervention area.
- **The region:** defined as the area ecompassing Suffolk and Norfolk county councils.
- **National:** defined as the territory of the United Kingdom.

As set out in the government's *Green Book*, analysing place-based impacts at localised geographies requires the careful consideration of factors including displacement, substitution, and leakage – all of which must be analysed to understand what level of impact is additional in the chosen study area, as opposed to being relocated from one location to another.

Figure 1: The proposed intervention area, the two proposed embankment alignments, and potential area of new intertidal wetland[19]

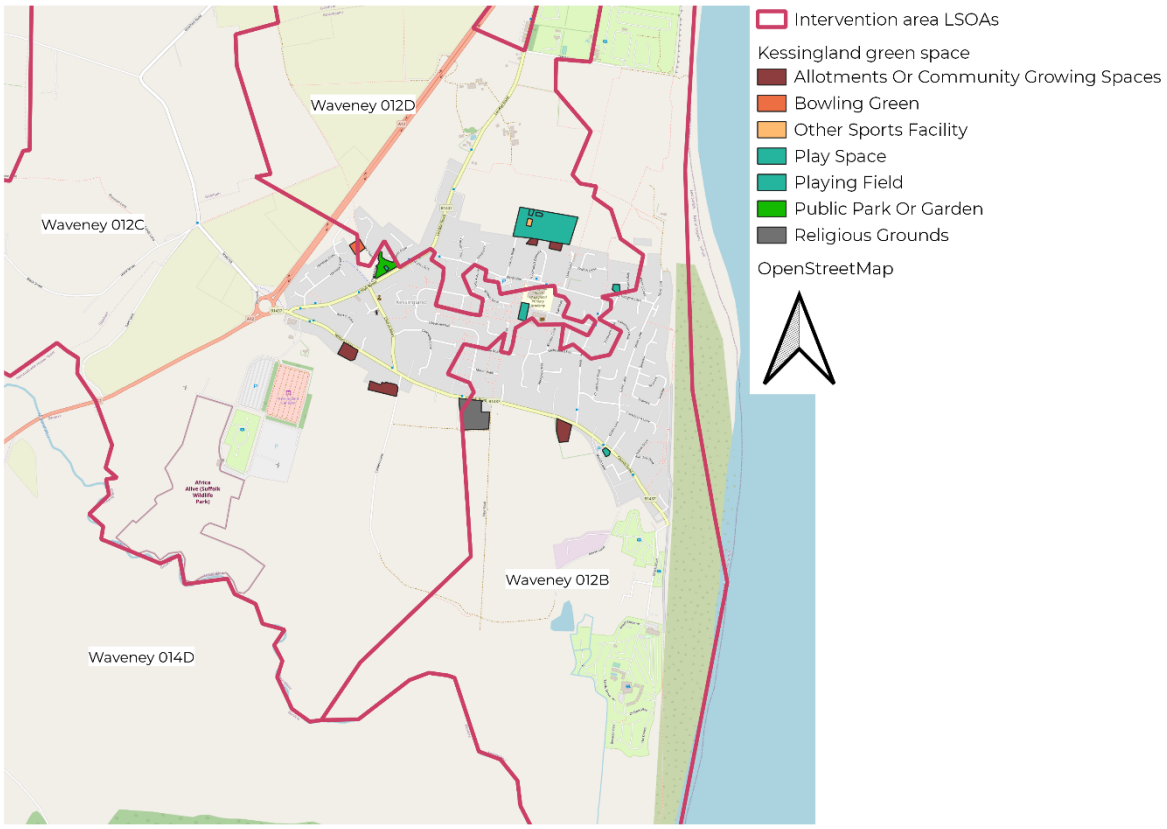


Source: Jacobs (2020) used with the permission of the Water Management Alliance Eastern Drainage Boards

4.1 BENACRE-KESSINGLAND

The proposed intervention area sits just south of the village of Kessingland. Four local administrative units or LSOAs (the smallest local area unit designated in the UK census) are located within easy walking distance of the site (Figure 2).

Figure 2: The intervention area, LSOAs, and existing recognised green space



Source: NEF

Of these four LSOAs, all are ranked in the bottom 50% of local areas in the government's Index of Multiple Deprivation (IMD). One, Waveney 012D, which covers the north side of Kessingland village, is ranked in the bottom 30% of local areas in the IMD. Regarding the sub-components which make up the IMD, the three LSOAs covering Kessingland (012B/C/D) perform well below average on measures of health deprivation and disability. As shown in Table 1, a key characteristic of all four areas is also a notably high proportion of residents over the age of 65. These characteristics identify Kessingland as archetypal of the challenges described in Public Health England (PHE) report looking at health and inequality on Britain's coast.

The current profile of Kessingland's green space supports the case for considering health and wellbeing benefits derived from additional recreation in newly created green areas. NEF analysis of Ordnance Survey and Office for National Statistics (ONS) data released

in 2019 suggests all three Kessingland LSOAs are in the bottom 20% of areas by total provision of green space within 1,000m of a household, two Kessingland LSOAs are also in the bottom 30% of areas when ranked on "green space per person within 1,000m" (Table 2).[20] When combining this spatial data with demographic data, we estimate that Waveney 012B (Kessingland) is in the bottom 5% of areas when assessing provision of green space to people over the age of 65.

A key caveat to this analysis is that Kessingland's seafront is not considered to be public green space in the underlying Ordnance Survey map. The seafront at Kessingland is not green, is not particularly biodiverse, and provides different amenities to those typically associated with green space. However, the seafront does provide some of its own wellbeing benefits – benefits which might be considered to partially offset some of the deprivation experienced due to local green space inadequacy. If Kessingland's seafront were considered a green space this would significantly improve Kessingland's rankings in Table 2; however, it is also important to note that the seafront is, unlike many urban green spaces, a space shared with a significant number of tourists, a feature which might increase the net population pressure on local green spaces and reduce its amenity value during the tourist season.

Table 1: Basic socioeconomic data on the four LSOAs neighbouring the intervention area

	LSOA population 2018	Proportion of population under 18 years of age	Decile (under 18)	Proportion of population over 65 years of age	Decile (65+)	IMD rank (out of 34,484)	IMD decile	Health deprivation and disability decile	Living environment deprivation decile	Children living in low-income families
Waveney 012B (Kessingland)	1,589	16%	9	30%	1	10,157	4	3	3	25.5%
Waveney 012C (Kessingland)	1,697	14%	10	39%	1	13,675	5	4	5	16.4%
Waveney 012D (Kessingland)	1,850	21%	6	23%	4	8,381	3	3	8	25.3%
Waveney 014D (Benacre)	2,146	17%	9	29%	2	11,464	4	7	2	12.0%
Sum:	7,282								England:	17.0%

Source: Suffolk Observatory data explorer[21]

Table 2: Characteristics of green space provision in the four LSOAs neighbouring the intervention area

	Average size of parks and playing fields within a 1,000m radius (m2)	Rank (out of 34,484)	Decile (average size of parks and playing fields within 1,000m radius)	Proportion of postcodes within 300m of a park or playing field	Decile (proportion within 300m)	Parks and playing field space per person within 1,000m radius (m2)	Decile (parks and playing field space per person)	Index of IMD and population pressure on green space (from 2 to 20)	Index of 65+ population and 300m from parks and playing fields (from 2 to 20)
Waveney 012B (Kessingland)	29,842	3,181	1	2%	1	14	3	7	2
Waveney 012C (Kessingland)	32,112	3,469	2	56%	6	15	3	8	7
Waveney 012D (Kessingland)	45,099	5,234	2	57%	6	21	5	8	10
Waveney 014D (Benacre)	440,388	26,735	8	43%	5	1,846	10	14	7

Source: NEF analysis of ONS, Access to Gardens and Public Green Space in Great Britain, 2020[22]

4.2 LOCAL PERSPECTIVES

NEF conducted a workshop with project stakeholders including local and institutional partners and held four in-depth interviews with local residents. This research provides useful qualitative evidence on the current challenges and needs in the intervention area. Respondents characterised Kessingland as a village with a relatively active community life. A number of community groups operate in the area, including groups formed to meet the social and physical activity needs of different demographic cohorts, particularly children and the area's significant elderly population. The local economy has many features common to coastal towns across the UK. Population levels and economic activity are highly seasonal, tied strongly to occupancy at local chalets and caravans. However, local people described Kessingland as lacking the facilities and amenities of many of its fellow coastal towns, meaning it is less attractive to tourists and has a less vibrant economy.

In relation to the local environment and connections with nature there were mixed and somewhat negative perspectives. Respondents describe local walking routes and green spaces as well used but relatively limited. Some routes around the wider area are valued, although these were also described as offering poor access for people less mobile or those with disabilities. The relatively low provision of green space was conspicuous for local people. One participant described a deterioration in levels of green space provision over recent decades caused by residential developments and green space provision failing to keep up. Multiple respondents described a relative lack of natural features and attractions as contributing to Kessingland's low attraction as a tourist destination. However, residents also described potential increases in tourist activity as a double-edged sword, as the local services (parking in particular) do not have the capacity to support increased activity and some residents prize the relative absence of outsiders in public spaces.

5. DEFINING INTERVENTION OPTIONS

As with all local economic impact assessments, this study is constrained by the number and nature of the scenarios considered. In accordance with government guidance on appraisal of flood and coastal erosion risk management (FCERM) schemes, our baseline scenario is 'do nothing'. Under this scenario existing flood defences are allowed to fail, leading to the creation of new, but low-quality intertidal habitat, loss of agricultural land, loss of the existing coastal path, and significantly increased flood risk to a number of residences and private businesses.

We consider three scenarios of intervention: one scenario (i) 'hold the line' in which existing defences are reinforced, and two scenarios in which existing defences are deliberately breached and new Kessingland and Lothingland embankments are constructed further inland. In one scenario (ii) there is very limited investment in the public accessibility and amenity of the newly created intertidal site and in the other, our 'enhanced' scenario (iii), there is greater investment in accessibility and the amenity value of the site. These options are described in Table 3.

The concept of an enhanced intervention scenario is newly introduced in this report. The basis of this local economic impact assessment, this scenario was designed based on discussions with local and project stakeholders. The enhanced scenario involves development above and beyond just the flood management and habitat creation elements of the core project. We assume creation of a continuous coastal path which circumnavigates the edge of the intertidal wetland.[2] This path is high quality, accessible to both disabled visitors and cyclists, and well-connected to the village of Kessingland.

For the purposes of this exercise, we assume a fully segregated pedestrian and cycleway connection to the centre of Kessingland via Coopers Lane, and that a connection to a new coastal path to the north of the site is accessible through or around the Kessingland Beach Holiday Park. We also assume that a new public car park is developed providing access to the site for visitors travelling from further afield, with a visitors centre providing public amenities and environmental education. The precise placement of these features is not pre-determined, but concerns raised by local residents about the limited traffic capacity and parking space in the village would need to be considered.

[2] The UK government has a commitment to create an England Coast Path. The stretch of coastal path passing Kessingland and Benacre has yet to be completed and how the future path may be routed through the intervention site remains uncertain.

Table 3: Option definition

Feature	**Do nothing/Do minimum**	**Hold the line**	**Lothingland and Kessingland embankments (basic)**	**Lothingland and Kessingland embankments (enhanced)**
Flood defence	Defences breach after 5–10 years.	Investment to reinforce existing hard defences and upgrade pump.	Construction of a new 'Lothing land' embankment set approximately 1,000m inland from the existing defences, and a new perpendicular 'Kessingland' embankment. Conversion of approximately 97ha of grassland into intertidal habitat.	As in the basic scenario.
Recreational access	Existing coastal path lost, English coastal path likely re-routed inland to the A12.	Existing section of coastal path maintained.	New coastal path of approximately 2km encircling the new intertidal area, accessible from Kessingland via Coopers Lane.	New coastal path of approximately 2km encircling the new intertidal area, new access points via coast, caravan park, Africa Alive, and Benacre Estate.
Community facilities	None	None	None	Walking and cycling trails, education centre, public park, playground, toilets and café.

6. MONETISED SCHEME BENEFITS

6.1 SITE VISITS

At the core of the local economic modelling are estimates of the change in the number of visits to green space taking place in the study area. A key consideration is not only the number of visits to the new site, but the proportion of these visits which are additional, as opposed to displaced from another site. It is also material to understanding the local socioeconomic impacts to understand what proportion of any new trips come from the local area, the wider region, and national visitors.

6.1.1 Baseline

National data collection on visits to green space has previously taken place through the Monitor of Engagement with the Natural Environment (MENE) survey, recently replaced by Natural England's People and Nature Survey (PNS). However, the sample size of both surveys is presently inadequate to capture meaningful data on an area as localised as Kessingland and Benacre. In the absence of data derived from official statistics, the best route to quantification would be through a local survey on location. There were two reasons why such a survey could not be completed, both linked to the impact of the Covid-19 crisis. First, any data collected since February 2020 would be heavily biased by the transformational effects of pandemic policy on individual behaviour, and therefore would be unlikely to be reflective of green space use during 'normal' times. Second, surveying green space use is best conducted on-site and in local neighbourhoods; public health restrictions meant on-site engagement with the public was unsafe. In the absence of an alternative, this analysis relies on modelled estimates of green space use.

6.1.2 Forecast

Shown in Table 4 are modelled estimates of the number of trips generated by a new park space comprising predominantly intertidal wetland. These estimates were generated by NEF using the ORVal model,[23] managed by the University of Exeter and recommended for use by the government in its *Green Book*. Model inputs include the size of the intervention area and the breakdown of habitat types proposed for creation.

Of an estimated 46,900 annual trips to the site (129 visits per day) forecast by ORVal to take place in the enhanced scenario, around 53% are estimated to be newly created or additional (Table 4). Of this subset, 28% are estimated to originate from the immediate

local area (ie accessed via walking and cycling) and 72% from further afield (ie accessed via motor vehicle). In the hold-the-line scenario, there are no material changes to the intervention site, the pre-existing section of coastal path is maintained, and therefore there are no changes to the expected number of site visits.

In both the do-nothing scenario, and the basic-intervention scenario, the existing provision of a small section of coastal path is lost. In the latter case, this is because the intervention comes with no provision for public access to the site, and the pre-existing path is lost to the controlled breach of the coastal embankment. Using ORVal we have also estimated the potential number of trips which would be lost in these scenarios. These estimates are shown in Table 4 but should be treated with caution as the ORVal tool is not optimised for modelling usage rates of pre-existing green infrastructure.

Table 4: Estimated change in site visits under different intervention options (ORVal)

	Do nothing	**Hold the line**	**Lothingland and Kessingland embankments (basic)**	**Lothingland and Kessingland embankments (enhanced)**
Change in annual visits	-8,500	0	-8,500	46,900
Change in annual visits (after displacement)	-3,800	0	-3,800	25,300
Change in local visits	-200	0	-200	7,100
Change in non-local visits	-3,600	0	-3,600	18,200

6.2 SPENDING AND EMPLOYMENT

Changes to the recreational attractiveness and amenity of a significant green space, and the new visits which result, can generate new spending in a local area. In an area such as Suffolk this spending can be divided into two categories: spending associated with everyday recreational and exercise activities and spending associated with new tourist visits originating from outside the region.

The spending which accrues in the local area (Kessingland) as a result of the intervention cannot be considered 'new' or 'additional' spending at the regional level, because this money is not newly created and would likely be spent elsewhere in the counterfactual scenario. However, this spending can be considered a new financial flow into the local area and can also be subjected to the process of welfare weighting which

adjusts the benefit's relative value according to the marginal utility of income (ie adjusting for the household income deficit in the local area when compared to the UK as a whole).[24] Welfare weighting is applied here according to the method outlined in the *Green Book* and as applied by Watt, Lawton, and Fujiwara.[25]

We derive upper and lower estimates of spending per person per visit from secondary sources. Our lower estimate is derived from a European Commission (EC) study of average spending on visits to Natura 2000 sites across Europe.[26] Our upper estimate is calculated from Natural England's PNS, waves 1 and 2, 2020.[27] While our upper estimate is more robust in that it relates to recent data on UK visits to green spaces, PNS spending estimates do not explicitly identify spending which takes place in the immediate vicinity of the green space. For example, respondents who report spending on a meal out while on their visit to a green space do not specify where that meal took place. While the EC study relies on data captured across the European Union, the location of spending is more clearly tied to the location of the green space in question.

Table 5: Spending and potential job creation associated with new visits generated to the local area in the enhanced scenario, compared to the hold-the-line scenario

Estimate	Spend per visit	GVA per workforce job	Annual spending linked to new trips from outside area	Equivalent jobs	NPV (20 years) to local area	Welfare weighted NPV
Lower	£4	£51,455	£72,600	1.41	£1,020,146	£1,346,116
Upper	£10	£51,455	£181,500	3.53	£2,550,366	£3,365,291

As shown in Table 5, we estimate potential new local spending worth £72,600–£181,500 per year, or £1.3m–3.4m net present value (NPV) over 20 years (after welfare weighting) when comparing the enhanced scenario with the present conditions (equivalent to the hold-the-line scenario). In a traditional FCERM appraisal, an assessment period of 100 years is typically applied.[28] However, such a period would usually be deemed excessively long in the appraisal of social outcomes. As such, an arbitrary limit has been set at 20 years.

There is an argument, however, that as the do-nothing scenario involves degrading the amenity of the site through the loss of the pre-existing section of coastal path, a decline in local spending might result which must also be factored into the total scheme benefit. An estimate of these losses is shown in Table 6. However, as the difference between the hold-the-line scenario and do-nothing scenario is marginal and speculative due to the previously discussed limitations to the ORVal model, the estimates in Table 6 are not

considered robust for decision-making. In subsequent modelling we focus predominantly on the difference between the hold-the-line and the enhanced scenarios.

Table 6: Spending and potential job losses associated with lost visits to the local area in the do-nothing scenario, compared to the hold-the-line scenario

Spend per visit	GVA per workforce job	Annual tourism value of new trips from outside area	Equivalent jobs	NPV (20 years) to local area
£4	£51,455	-£14,400	-0.28	-£202,328
£10	£51,455	-£36,000	-0.70	-£505,819

6.3 TOURISM

There is a significant tourism economy in the region of the proposed intervention. An earlier report by Mott MacDonald suggested the value of tourism in the Waveney District Council area, within which the proposed intervention would sit, is around £114m per year, supporting 3,475 jobs.[29] A minority of this activity takes place within the direct vicinity of the proposed intervention site. Crude estimates by NEF, using company account data and economic subsector data, suggest the two large tourist businesses (a caravan site and a safari park) which immediately back onto the intervention site may turn over a combined £3.4m in a normal year.

It is well understood that the provision of amenities which generate wellbeing for visiting tourists is a key part of a location's tourist attraction.[30] Indeed, studies have shown that local nature, environment, and landscape is one of the principal components for determining a location's attractiveness to tourists.[31] Following extensive research of the literature base, and consultation of the Ecosystem Service Valuation Database (ESVD) produced by the Ecosystem Services Partnership, we have only been able to identify one study which might provide a viable proxy for the relative tourism value uplift created by the proposed site. This proxy is derived from an Environment Agency study conducted in 2010 which assessed the tourism value of the creation of a riparian buffer zone with some similar properties to the proposed intervention in Benacre-Kessingland.[32] This study applied a 2% uplift to the tourism value of the site within a 1km^2 catchment of the intervention site.

Applying a 2% uplift to tourism revenue generated by the two main attractions in the immediate vicinity of the site would lead to an estimated increase in tourism revenue of £68,800 per year and an NPV over 20 years of £970,000. This value can be considered newly created or additional at the local area level but is likely displaced primarily from

within the wider region, and to a lesser extent from the national study area. This estimate is likely an underestimate as a further uplift would likely accrue to the other businesses which benefit from tourism within Kessingland. These businesses include caravan parks, chalets, and a small number of cafés and B&Bs. They are slightly farther from the intervention site but are still located within 1km of the site as the crow flies. Based on crude analysis of occupancy, these businesses are likely sufficient in number to add at least a further 50% to the tourist-related revenue within 1km of the intervention site. Another consideration is the potential value of new tourism businesses created as a result of the intervention. The local landowner, if they so desired, could likely explore the establishment of new tourism-related business in the vicinity of the intervention area. However, these values, that is both the potential creation of entirely new tourism businesses, and the benefits experienced by multiple smaller businesses farther from the intervention site, are regarded as too speculative for inclusion in the overall assessment findings at this stage.

In total, the combined benefits in terms of direct spending and additional tourism revenue are valued at £141,400–£250,300 per annum. This compares to £300,840–£469,310 per annum estimated in a comparable study of a wetland creation project at the Steart Peninsula, which created habitat approximately twice the size of that proposed at Benacre-Kessingland.[33] Another managed re-alignment scheme at Medmerry, which created habitat similar in size to that proposed at Benacre-Kessingland, was estimated to create £210,000 per annum of recreation and tourism spending.[34]

6.4 HEALTH AND WELLBEING

The health and wellbeing benefits of increased exposure and recreation in green space are now well established. These benefits include some directly realisable benefits such as avoided healthcare costs and increased worker productivity, but a number of less realisable, yet highly valued, benefits are also present, notably life satisfaction and mental wellbeing impacts.

The need to measure and value collective health and wellbeing benefits in the appraisal process is identified in the government's *Green Book*. The ORVal tool cited in the *Green Book* provides its own valuation system. In the scenario tested here, the tool estimates a value of around £5.80 per visit. The implications of this value are shown in Table 7. The NPV of the enhanced intervention is estimated at £2m, rising to £2.2m when a welfare weight is applied to account for the below-average household incomes among some of the scheme beneficiaries.

Table 7: Calculating the social value derived from newly created recreational activity in the intervention area. Travel-cost method (ORVal)

	ORVal default value
Number of trips estimated	46,894
Per trip value	£5.80
Annual value	£272,213
Weight	1.32
Pre-weighting NPV (20 years)	£3,824,737
Pre-weighting NPV (20 years) after displacement	£2,060,564
Weighted NPV (20 years) Kessingland	£765,515
NPV (20 years) regional	£1,480,438
Weighted NPV (20 years) total	£2,245,953

There are multiple methods, tools, and datasets for calculating such values, and there are reasons to regard the ORVal approach, grounded in a travel-cost method, as limited. For further discussion of the weaknesses of the travel-cost method see Ricardo Energy and Environment (2016).[35] One recent study by authors at the forefront of wellbeing valuation estimates that each additional trip to a park or green space in England could in fact be worth around £8.47–£15.77 in wellbeing benefit.[36] As shown in Table 8, the lower of these two estimates would lead to a welfare weighted NPV of £3.3m.

Table 8: Calculating the social value derived from newly created recreational activity in the intervention area using the wellbeing valuation method[37]

	Wellbeing value
Number of trips estimated	46,894
Per trip value	£8.47
Annual value	£397,192
Weight	1.32
Pre-weighting NPV (20 years)	£5,580,761
Pre-weighting NPV (20 years) after displacement	£3,006,616
Weighted NPV (20 years) Kessingland	£1,119,827
NPV (20 years) regional	£2,160,141
Weighted NPV (20 years) total	£3,279,968

For information, we provide one further estimate of the health and wellbeing value of the scheme. The results shown in Table 9 are calculated from the outputs of the World Health Organization (WHO) Health Economics Assessment Tool (HEAT) designed to

help value schemes which encourage walking and cycling. This indicative assessment, again reliant on some crude assumptions around the number and nature of the trips which would be created, suggests a scheme NPV of £5.6m in health and wellbeing benefits.

Table 9: Calculating the social value derived from newly created recreational activity in the intervention area using the Health Economic Assessment Tool (HEAT) method

	HEAT value
Number of trips estimated	46,894
Per trip value	£14.44
Annual value	£676,930
Weight	1.32
Pre-weighting NPV (20 years)	£9,511,226
Pre-weighting NPV (20 years) after displacement	£5,124,140
Weighted NPV (20 years) Kessingland	£1,903,656
NPV (20 years) regional	£3,681,504
Weighted NPV (20 years) total	£5,585,160

6.5 EDUCATION

There is scope within the enhanced intervention for development of an educational offer at the newly created site. However, as other facilities for in situ environmental education are within reach of local schools, it would be difficult to evidence the additionality of any resulting education outcomes without having greater detail on the functions such a facility would undertake. Further analysis could be commissioned at a later stage in the scheme's development to better understand the value this might create.

However, outside of direct education provision there are now well-established relationships between local green space exposure and measures of cognitive development and educational attainment. Research demonstrates that increased provision of residential green space can increase children's spatial working memory[38] and attention,[39] and enhance their cognitive development.[40] Putting a proxy financial value on these outcomes is a complex process. Routes to valuation exist but resulting estimates should be treated with caution. Two routes are explored here.

A recent study has suggested that a doubling in the proportionate green space cover (excluding agricultural land) could increase the IQ level of children between 7 and 15 years old by 2.6 points (approximately 2.5%).[41] This affect is shown to be stronger in urban areas, weaker in suburban areas, and almost absent in rural areas. As the study

had a longitudinal design spanning seven years, it was able to evidence sustained benefits of green space provision during childhood on cognitive development. It is worth noting however, that IQ is controversial as a measure of cognitive development[42] and is used here only as a route to monetising the improvements in cognitive development in children associated with green space enhancement.

Studies are available which connect increased IQ levels to increased economic productivity. Hafer (2017) estimates that at the macroeconomic level, each additional point of average IQ increases GDP growth by around 0.1%.[43] At this rate, each additional IQ point could be valued at around £30 of additional annual economic productivity. A doubling in Kessingland's green space provision could therefore be worth around £75 per year per child. Applied to the population of under-18-yearolds living local to the intervention area of around 1,200 children, and assuming the cognitive development benefits carry forward into adulthood (declining each year at the discount rate of 3.5%), this would produce a scheme value of around £80,000 per year or £1.1m NPV over 20 years.

Another route to monetising the educational benefits of enhanced green space is provided by those studies which connect green space cover and school exam performance.[44] One study for example, associates a 64% increase in the tree and shrub cover within 1,000m of a school with a 3% increase in test scores.[45] As the UK government provides a figure for the estimated uplift in lifetime earnings associated with achieving at least five GCSEs graded A*–C, compared with achieving lesser qualifications,[46] there is a route to monetisation. For example, if the proposed scheme delivered a 3% increase in the probability of local students achieving five GCSEs graded A*–C in any given year, the equivalent annual value created would be £104,000 and the NPV over 20 years would be £1.5m.

The lower and upper value estimates derived from these two methods implemented can be subjected to welfare weighting as the monetised educational impacts are assumed to accrue to children residing in areas experiencing above-average levels of deprivation. After weighting, the range in the NPV over 20 years increases from £1.1m–£1.5m to £1.5m–£1.9m, as shown in Table 10.

There are two major assumptions implicit in these calculations. First, they assume that a new green space based around an intertidal wetland can provide the same level of educational benefit as a more traditional urban green space; and second, that the village of Kessingland is comparable with a typical peri-urban area, as opposed to a rural area. A more conservative assumption would be that the values discussed can only be accessed if deliberate efforts are made to establish the intervention site as both attractive

to local young people, and as providing an educational offer, such as through signage, educational play facilities, and community educational outreach.

The values estimated here are at a similar level to the values estimated for the educational benefits of other similar wetland projects. For example, the appraisal of the creation of wetland habitat at the Steart Peninsula in Somerset estimated educational benefits worth £87,000–£132,000 per annum, using a different, travel-cost-based, methodology.[47]

Table 10: Two different estimates of the potential value of the cognitive development benefits of local green space enahancement

Estimate	Methodology	Cohort	Financial proxy	Annual value	NPV – 20 years	Weighted NPV – 20 years
Lower	IQ-based estimation	1,200 residents under 18 years old	£30 annual GVA per capita uplift per additional IQ point	£80,000	£1.1m	£1.5m
Upper	Qualification attainment estimation	67 annual GCSE entrants	£100,000 per successful achievement of five GCSEs graded A*-C	£104,000	£1.5m	£1.9m

6.6 SUMMARY OF LOCAL IMPACTS

A summary of local economic and monetised social impacts is shown in Table 11. Decision-makers are right to be cautious when considering monetised social outcomes. Indeed a fundamental principle of the social return on investment (SROI) methodology pioneered by NEF over the past decade is 'Do not overclaim'. Overclaiming ultimately undermines the credibility of methodologies which can otherwise be helpful in encouraging decisions to consider often-overlooked social outcomes. With this in mind we have taken a number of decisions to ensure a conservative estimate of benefits:

- We do not factor in the lost socioeconomic value resulting from changes in social outcomes between the pre-exisiting site conditions (hold the line) and the do-nothing scenario in which the site is degraded (note this is not the case for other outcomes assessed by Jacobs[48]). While this value is highly material on other matters, such as flood protection of residential properties, its materiality to the socioeconomic value of the site is unclear. Our best estimate suggests that

including these losses could increase the socioeconomic value of the proposed intervention by up to 20%.

- Our estimates of new trips to the intervention site, corresponding to an average of 128 daily visits and 69 new or additional daily trips to a green space is likely a conservative estimate of the number of trips which could be achieved if the site were developed to its full potential as a public green space and nature conservation area adjoining two pre-existing moderately sized tourist attractions (the safari park and the caravan park) and one site with significant potential for tourism development (Benacre Estate).
- We have not modelled an upper-end tourism value creation estimate due to data limitations. However, crude analysis of the number and size of tourist-linked businesses outside of the two modelled in our lower-end estimate suggest there could be potential for an upper-end tourism value creation estimate up to 50% higher than our lower estimate.

Our conservative estimate of the local socioeconomic value accrued in the enhanced scenario is £322,600–£573,300 per year, and £6.0m–£9.5m in NPV over 20 years (Table 11). These benefits are additional to a number of benefits identified by Jacobs in their assessment of the flood and coastal erosion risk management (FCERM) business case.[49] This included £4.7m of local public benefits already established by Jacobs in the areas of flood protection, mental wellbeing (flood-impact related), and avoided temporary accommodation costs, as well as £5.2m in benefit to local businesses in the areas of property, facilities, and agricultural land protected from flooding.[50]

Table 11: Summary of the different local area impacts modelled and their estimated annual and NPVs for decision-making in the enhanced scenario, compared with the hold-the-line Scenario. Figures may not sum due to rounding, welfare-weighted values are labelled *(w.w)*

Impact	Descriptor	Annual value (lower)	Annual value (upper)	NPV – 20 years (lower)	NPV – 20 years (upper)	Displaced?
Local spending/job creation	Lower estimate	£72,600	£181,500	£1.3m *(w.w)*	£3.4m *(w.w.)*	Yes
Health and wellbeing	Lower estimate	£160,000	£233,000	£2.2m *(w.w.)*	£3.3m *(w.w)*	No
Education	Tentative estimate	£80,000	£104,000	£1.5m *(w.w.)*	£1.9m *(w.w.)*	No
Tourism	Tentative estimate	£68,800	£68,800	£1.0m	£1.0m	Yes
Sum		£322,600	£573,300	£6.0m *(w.w)*	£9.5m *(w.w)*	

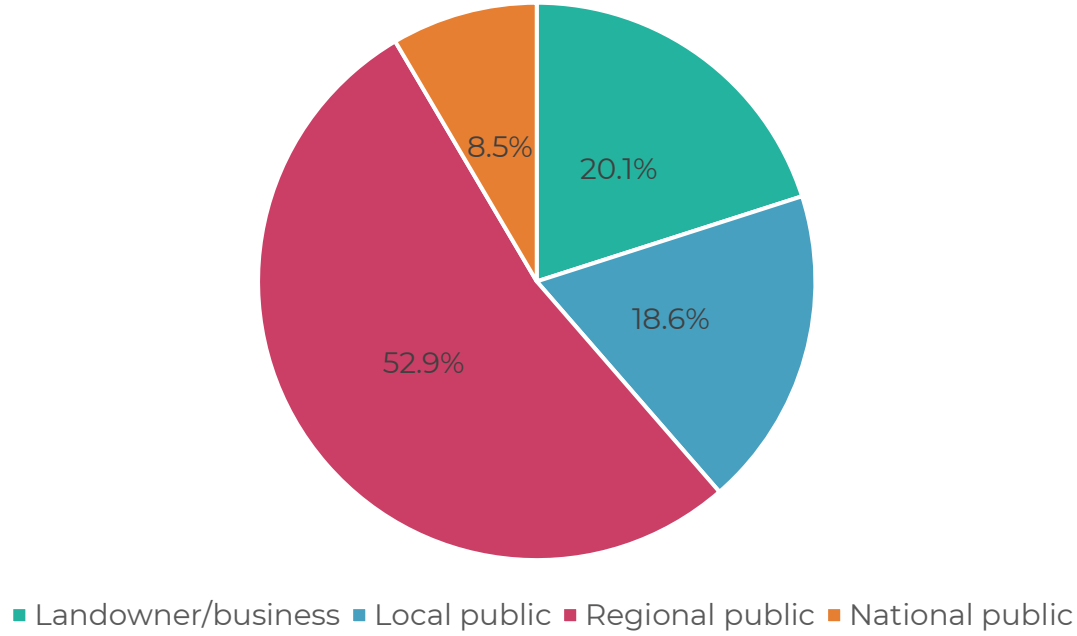
For the purposes of comparison, the implied net per-visit socioeconomic value of the space is estimated to be in the range of £16 to £25. Comparison with other recent studies (using different methodologies) suggests this is a relatively conservative estimate of the value of a visit to a 'blue' (ie water-linked) piece of green infrastructure. One study placed the value of a visit to a "blue space site" in the United Kingdom at €51 (£44) and at €41 (£35) when averaged across the 14 European countries studied.[51] The discrepancy between these values links primarily to the relatively conservative estimate of the potential tourism value uplift resulting from the proposed scheme.

7. DISTRIBUTIONAL ANALYSIS

Scheme costs and benefits are distributed across four stakeholder groups: the local, regional, and national public, and local private landowners and businesses. The final group – local private landowners and businesses – might in some assessments be included in the 'local public' grouping. Revenue generated for local businesses has knock-on effects on local employment and local welfare. However, as ownership of businesses in the local area is in many cases not local, and not all revenue accrued by businesses translates into employment, the benefits in this category are likely to be split across three regional groupings. As this distribution is uncertain, this group is distinguished in the results presentation. An estimate of the distributional breakdown of value accruing to local businesses might be established through a local multiplier or LM3 assessment if desired.[52]

Our analysis, which should be treated as indicative and not an exact prediction of the ultimate impacts of the scheme, suggests the division of benefits shown in Figure 3. This division is arrived at by assigning a beneficiary stakeholder grouping to every scheme benefit, as shown in Table 12, or where necessary and possible splitting scheme benefits between groups. For example, health and wellbeing benefits accrue in part to local residents who will utilise the site, and in part to regional residents who reside outside the local study area (defined earlier in this report) but within Norfolk or Suffolk who will also travel to the site for everyday use. In most cases the grouping assigned is self-explanatory and relates to geographic proximity to the scheme or the nature of the benefit itself. The regional public represents the largest beneficiary group. This comes as a result of the significant benefits derived from protecting the A12 road. Benefits derived from protecting the A12 road are perhaps the most difficult to assign to a stakeholder group. Arguably, they accrue to a mix of road users who reside in the national, regional, and local study areas. However, as the A12 is under the stewardship of the county council, it is this regional stakeholder to whom the avoided costs of protecting the road from flooding accrue directly. A full breakdown of all of the scheme benefits by stakeholder group is shown in Table 12.

Figure 3: breakdown of scheme benefits by stakeholder group



Source: NEF

Table 12: Estimated distribution of the potential scheme benefits in NPV terms over 20 years

Stakeholder		**Benefit (compared to do nothing)**	**Benefit value lower**	**Benefit value upper**	**Source**
Local landowners and businesses	Estate	Agricultural land protected	£1,671,215	£1,671,215	Jacobs
		Tourism benefit	Potential only	Potential only	NEF
	Caravan park	Facilities protected from flood	£2,291,541	£2,291,541	Jacobs
		Tourism benefit	£379,364	£379,364	NEF
	Other private businesses	Commercial property protected	£1,260,384	£1,260,384	Jacobs
		Tourism benefit to other businesses	£587,653	£587,653	NEF
		Increased local spending	£1,346,116	£3,365,291	NEF
Local public	Local residents	Homes protected from flooding	£3,888,400	£3,888,400	Jacobs
		Mental wellbeing protected (flood related)	£716,875	£716,875	Jacobs
		Temporary accommodation costs avoided	£120,883	£120,883	Jacobs
	Kessingland community	Health and wellbeing and educational benefits	£2,248,726	£3,055,419	NEF
Regional public	County council and public sector	A12 road protected	£17,373,516	£17,373,516	Jacobs
		Emergency service access route	£225,964	£225,964	Jacobs
	Regional community	Health and wellbeing benefits	£1,480,438	£2,160,141	NEF

		Environmental benefits	£796,631	£796,631	Jacobs (apportioned according to NEF analysis of Mott MacDonald)
National public	National community	Environmental benefits	£3,186,524	£3,186,524	
Sum:			£37,574,231	£41,079,802	
Sum excluding potentially internally displaced value:			£35,261,097	£36,747,493	

8. ENHANCING LOCAL VALUE

Concern about the rise of regional and social inequality in the UK, and so-called left-behind communities, has led to renewed focus on the implementation of economic development approaches which can embed local wealth. Sometimes called 'community economic development' or 'community wealth building' these approaches focus particularly on the role of local institutions, ownership structures, and procurement principles in ensuring value creation stays local and is fairly distributed.[53] The potential of such approaches is increasingly well-evidenced[54] and some principles of community economic development can be found in the UK government's Social Value Act of 2013.[55]

Flood and coastal erosion risk management (FCERM) investments can not only represent a new flow of money into areas which have historically been deprived of investment, but also a coming together of a variety of local anchor institutions (eg community groups, local councils, health authorities, local enterprise partnerships, educational institutions, business groups). As a collective, these institutions have an opportunity to influence not only whether investment takes place, but also how and who benefits. Through these routes there are opportunities to significantly enhance the local value created, above and beyond the values discussed, and to deliver on the government's levelling-up objective. For example, not covered are the potential benefits deriving from the spending on the infrastructure itself (estimated at £16.5m in construction costs), which, through careful procurement, might deliver jobs and training, and money inflows into the local economy.

8.1 LOCAL OWNERSHIP

Looking beyond the initial investment and a key parameter which might enhance the local value creation of the proposed scheme is the ultimate ownership vehicle, and associated operations such as site maintenance and operation of facilities. The creation of a local charitable Trust to operate a site such as the proposed intertidal wetland has significant precedent and was an idea floated by local residents and the stakeholders engaged. A well-designed Trust can focus on the delivery of local value through the representation and active participation of local communities on its board. Trusts can also benefit from a degree of independence from institutional bureaucracy and prioritise the pursuit of additional local value creation.

At present, the Wildlife Trusts and the Royal Society for the Protection of Birds (RSPB) own or manage a number of sites with similar characteristics to the proposed development along England's east coast. This type of arrangement might be possible in

Kessingland, and if so, there could be several advantages including the potential creation of new local economic activity from new tourism, and the capable stewardship of local biodiversity. However, such a model does not always engender a sense of local ownership of a site. A key question to consider might be whether such a model would meet the needs of the local community in Benacre-Kessingland, which includes an identified need for better public green space provision.

A similar, but more locally grounded model is that of The Parks Trust, as pioneered in Milton Keynes, and more recently in Newcastle. Parks Trusts are typically a newly created charity, entirely locally grounded in their board makeup and charitable objectives. A further differentiation is that Parks Trusts are typically almost exclusively funded by endowments, rather than donations or membership fees.[56] Trusts usually enshrine a level of democratic and civil service oversight on their boards in their constitutions, but also prioritise representation from local residents. An advantage is that the endowment model is potentially well-suited to the current funding environment. In its post-pandemic spending decisions thus far, the government has signalled that significant capital investment will be available, but little respite appears forthcoming for the revenue squeeze on local authorities and government departments. The endowment model therefore offers an opportunity to secure the long-term future of a public amenity without saddling the stretched revenue budgets of the stakeholder institutions.

8.2 ENABLING DEVELOPMENT

No firm proposals for what is sometimes termed 'enabling development', that is additional development with a more specifically commercial purpose designed to raise funds for the scheme, have been put forward. However, enabling development is a commonly pursued means of delivering a natural or heritage public amenity project which is struggling to source full funding from traditional public sources and has been identified as an option worth exploring in the stakeholder engagement process. The extent to which enabling might enhance or degrade the social value created through the development should be a material consideration in the appraisal process. Some guidance is provided by Historic England to decision-makers in making this judgment.[57] In addition to Historic England's guidance on assessing the extent to which enabling development might detract from the heritage value of the site, decision-makers can also assess its contribution to other forms of social value. For example, looking at the extent to which the development might meet local needs (eg for social housing), ensuring ownership remains local, and ensuring any development is designed to the highest environmental sustainability standards.

9. CONCLUSION

9.1 LOCAL SIGNIFICANCE

This report assesses the local socioeconomic impacts of an enhanced flood protection scheme at Benacre-Kessingland in Suffolk. The assessment examines social outcomes not included in the more traditional flood and coastal erosion risk management (FCERM) business cases put forward previously by Jacobs[58] and Mott MacDonald.[59] Four core outcomes are identified: (i) increased local spending, (ii) health and wellbeing benefits derived from increased access to nature and green space, (iii) education benefits to the aforementioned access, and (iv) increased tourism revenue generation potential. The net present value (NPV) of these benefits is estimated (over a 20-year period) at £6.0m–£9.5m, split between the local public and local businesses. Our upper estimate of the local socioeconomic benefit is equivalent to the value of the flood protection benefits accruing at the local level from the scheme, estimated by Jacobs at £9.1m.[60] (This assumes the protection of the A12 road represents a regional rather than local benefit.)

Our modelling implies a new NPV of the scheme benefits (pre-displacement) of £37.6m–£41.1m, up from the figure of £31.6m established by Jacobs.[61] If 100% displacement is assumed on spending and tourism flows (a worst-case assumption), the total scheme benefits are estimated at £35.3m–£36.7m. These values incorporate welfare weighting, which amplifies three out of four of the outcomes modelled as a result of the above-average levels of deprivation and below-average household incomes experienced in the immediate vicinity of the proposed intervention. The impact of welfare weighting is to increase the pre-displacement NPV of the scheme by £0.87m–£1.6m as shown in Table 13.

Table 13: The net impact of welfare weighting on the scheme's social outcomes

	Lower	**Upper**
Spending	£325,970	£814,925
Tourism	n/a	n/a
Health and wellbeing	£185,389	£273,353
Education	£359,168	£468,715
Sum	**£870,528**	**£1,556,993**

We conducted a distributional impact analysis, at this stage only looking at the benefit side of the scheme's business case. When factoring in the other local benefits of the

scheme in other outcome areas, established by previous studies, the total socioeconomic benefit to the local public and local businesses is estimated to be equivalent to around 38.6% of the total scheme benefits. A further 52.9% of the scheme benefits are estimated to accrue at the regional level, with the remainder (8.5%) accruing at the national study level.

Over half of the estimated local benefit accrues to local businesses and landowners. This, along with the significant proportion of the scheme benefits accruing to the regional public, can be considered by project stakeholders when determining the appropriate distribution of the scheme investment costs. The scheme's local socioeconomic value can further be enhanced by seeking added value from the scheme's investments. For example, pursuing local social value in procurement terms and conditions, fixing ownership of the site in the local community, and setting local social value and ownership as an objective in long-term funding arrangements such as endowments and enabling development.

9.2 NATIONAL SIGNIFICANCE

Through this case study in Suffolk, we demonstrate that nature-based flood defences should be seen as broader economic assets, with the potential to impact outcomes in areas such as health, local economic development, inequality and social deprivation. While this is already reasonably well established in academia, this appreciation is not reflected in the appraisal guidance documents which guide investment decision making.

We also show that a broader social impact assessment of nature-based interventions might significantly improve the performance of such schemes under appraisal, thereby improving their ability to attract capital, and boosting their contribution to the UK's decarbonisation agenda. Despite a number of national natural capital and other similar assessments, the poor performance of nature-based schemes at appraisal continues to hold back investment in addressing the climate crisis, restoring the UK's ecosystems, and re-connecting UK societies with their natural environment.

Looking more broadly, our research highlights that new developments in HM Treasury appraisal guidance, if rigorously applied at the local and departmental levels, have the potential to shine light on the levelling-up potential of government investments. Techniques such as welfare weighting, distributional analysis, and place-based analysis have yet to be integrated into standard departmental investment appraisal practice. Such concepts have also yet to be adequately integrated into local planning decisions and the public appraisal of privately financed schemes.

ENDNOTES

[1] Jacobs. (unpublished). *Economic assessment report: Benacre and Kessingland flood risk management scheme.* Water Management Alliance Eastern Drainage Boards
[2] BBC News. (2019, 9 October). Coastal communities: Residents earn £1,600 less than people inland. Retrieved from https://www.bbc.co.uk/news/uk-england-49890749
[3] SMF. (2017). *Living on the edge: Britain's coastal communities*. Social Market Foundation. Retrieved from https://www.smf.co.uk/publications/living-edge-britains-coastal-communities/
[4] Gov.UK. (2020). £10 billion package to build more homes and level up communities. Retrieved from https://www.gov.uk/government/news/10-billion-package-to-build-more-homes-and-level-up-communities
[5] MacDonald, M. A., de Ruyck, C., Field, R. H., Bedford, A., & Bradbury, R. B. (2020). Benefits of coastal managed realignment for society: Evidence from ecosystem service assessments in two UK regions. *Estuarine, Coastal and Shelf Science*, *244*, 105609.
[6] Cambridge Econometrics. (2020). *Economic costs and benefits of nature-based solutions to mitigate climate change.* Royal Society for the Protection of Birds. Retrieved from https://www.rspb.org.uk/our-work/our-positions-and-casework/our-positions/wildlife-and-the-economy/
[7] Eftec. (2015). *The economic case for investment in natural capital in England*. Natural Capital Coalition. Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/517008/ncc-research-invest-natural-capital-land-use-appendix.pdf
[8] Gov.UK. (2020). *Flood and coastal erosion risk management appraisal guidance*. Retrieved from https://www.gov.uk/guidance/flood-and-coastal-erosion-risk-management-appraisal-guidance/2-about-the-fcerm-appraisal#complex-change
[9] HM Treasury (2020) Green Book Review 2020: Findings and Response. Retrieved from: https://www.gov.uk/government/publications/final-report-of-the-2020-green-book-review
[10] Ibid
[11] Watt, W., Lawton, R., & Fujiwara, D. (2018). Revaluing parks and green space. *Fields in Trust.* Retrieved from http://www.fieldsintrust.org/revaluing
[12] Hallegatte, S., Vogt-Schlib, A., Bangalore, M., & Rozenberg, J. (2017). *Unbreakable: Building the resilience of the poor in the face of natural disasters.* Climate Change and Development Series. Washington, DC: World Bank
[13] Environment Agency. (2010). *Flood and coastal erosion risk management appraisal guidance*. p. 189. Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/481768/LIT_4909.pdf
[14] PHE. (2019). *An evidence summary of health inequalities in older populations in coastal and rural areas.* Public Health England. Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/824723/Health_Inequalities_in_Ageing_in_Rural_and_Coastal_Areas-Full_report.pdf
[15] Gov.UK. (2021). *The economics of biodiversity: The Dasgupta Review.* Headline Messages. Retrieved from https://www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review
[16] Jacobs. (unpublished). *Economic assessment report: Benacre and Kessingland flood risk management scheme.* Water Management Alliance Eastern Drainage Boards
[17] Defra. (2020), *Flood and coastal erosion risk management appraisal guidance: Compare and select the preferred option*. Department for Environment Food and Rural Affairs. Retrieved from https://www.gov.uk/guidance/flood-and-coastal-erosion-risk-management-appraisal-guidance/8-compare-and-select-the-preferred-option
[18] Defra. (2020). *Value environmental improvements that deliver environmental benefits and outcome measure 4 (OM4).* Department for Environment Food and Rural Affairs. Retrieved from https://www.gov.uk/government/publications/appraisal-guidance-supporting-documents/value-environmental-improvements-that-deliver-environmental-benefits-and-outcome-measure-4-om4
[19] Jacobs. (unpublished). *Economic assessment report: Benacre and Kessingland flood risk management scheme.* Water Management Alliance Eastern Drainage Boards

[20] ONS. (2020). *Access to gardens and public green space in Great Britain*. Office for National Statistics. Retrieved from https://www.ons.gov.uk/releases/accesstogardensandpublicgreenspaceingreatbritain
[21] Suffolk Observatory (2020) Data Explorer. Retrieved from: https://www.suffolkobservatory.info/data-catalog-explorer/
[22] Ibid.
[23] LEEP. (2021). Outdoor Recreation and Valuation Tool (ORVal) Version 2.0. Developed by the Land, Environment, Economics and Policy Institute (LEEP) at The University of Exeter. Available at https://www.leep.exeter.ac.uk/orval/
[24] HM Treasury. (2020). *The Green Book: Central Government Guidance on Appraisal and Evaluation.*
[25] Watt, W., Lawton, R., & Fujiwara, D. (2018). Revaluing parks and green space. *Fields in Trust.* Retrieved from http://www.fieldsintrust.org/revaluing
[26] European Commission. (2011). *Estimating the economic value of the benefits provided by the tourism/recreation and Employment supported by Natura 2000.* Retrieved from https://ec.europa.eu/environment/nature/natura2000/financing/docs/Estimating_economic_value.pdf
[27] Natural England (2021) The People and Nature Survey. Retrieved from: https://www.gov.uk/government/collections/people-and-nature-survey-for-england
[28] Environment Agency. (2010). *Flood and coastal erosion risk management appraisal guidance*. Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/481768/LIT_4909.pdf
[29] Mott MacDonald. (unpublished). *Benacre coastal flood defences: Wider economics benefits study*. July 2018. Water Management Alliance Eastern Drainage Boards
[30] Reitsamer, B. F., & Brunner-Sperdin, A. (2017). Tourist destination perception and well-being: What makes a destination attractive? *Journal of Vacation Marketing, 23(1),* 55–72.
[31] Cracolici, M. F., & Nijkamp, P. (2009). The attractiveness and competitiveness of tourist destinations: A study of Southern Italian regions. *Tourism Management, 30(3),* 336–344.
[32] Environment Agency. (2010). Ecosystem service assessment of buffer zone installation on the upper Bristol Avon, Wiltshire. Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/291658/scho0210brxw-e-e.pdf
[33] Vieira da Silva, L., Everard, M., & Shore, R. G. (2014). Ecosystem services assessment at Steart Peninsula, Somerset, UK. *Ecosystem Services, 10*, 19–34.
[34] Environment Agency. (n.d.). *Medmerry managed realignment scheme: An ecosystem services valuation.* Retrieved from https://valuing-nature.net/sites/default/files/documents/AnnualConf/Wainwright%2C%20Wansbury%20%26%20Atkins%2C%20Claire.pdf [accessed 26 April 2021].
[35] Ricardo Energy and Environment. (2016). *Reviewing cultural services valuation methodology for inclusion in aggregate UK natural capital estimates*. Report for the Office for National Statistics. Retrieved from https://www.researchgate.net/publication/311510536_Reviewing_cultural_services_valuation_methodology_for_inclusion_in_aggregate_UK_natural_capital_estimates
[36] Watt, W., Lawton, R., & Fujiwara, D. (2018). Revaluing parks and green space. *Fields in Trust.* Retrieved from Retrieved from http://www.fieldsintrust.org/revaluing
[37] Ibid.
[38] Flouri, E., Papachristou, E., & Midouhas, E. (2019). The role of neighbourhood greenspace in children's spatial working memory. *British Journal of Educational Psychology, 89(2),* 359–373.
[39] Dadvand, P., Tischer, C., Estarlich, M., Llop, S., Dalmau-Bueno, A., … Sunyer, J. (2017). Lifelong residential exposure to green space and attention: A population-based prospective study. *Environmental Health Perspectives, 125(9),* 97016.
[40] Dadvand, P., Nieuwenhuijsen, M. J., Esnaola, M., Forns, J., Basagaña, X., … Sunyer, J. (2015). Green spaces and cognitive development in primary schoolchildren. *Proceedings of the National Academy of Sciences, 112(26)*, 7937–7942.
[41] Bijnens, E. M., Derom, C., Thiery, E., Weyers, S., & Nawrot, T. S. (2020). Residential green space and child intelligence and behavior across urban, suburban, and rural areas in Belgium: A longitudinal birth cohort study of twins. *PLOS Medicine, 17(8),* 1–20.
[42] Martschenko, D. (2018) The IQ test wars: why screening for intelligence is still so controversial. *The Conversation*.
[43] Hafer, R. W. (2017). New estimates on the relationship between IQ, economic growth and welfare. *Intelligence, 61*, 92–101.

[44] Wu, C.-D., McNeely, E., Cedeño-Laurent, J. G., Pan, W.-C., Adamkiewicz, G., … Spengler, J. D. (2014). Linking student performance in massachusetts elementary schools with the "greenness" of school surroundings using remote sensing. *PLOS ONE, 9(10),* 1–9.
[45] Tallis, H., Bratman, G. N., Samhouri, J. F., & Fargione, J. (2018). Are California elementary school test scores more strongly associated with urban trees than poverty? *Frontiers in Psychology, 9,* 2074.
[46] DfE. (2014). The economic value of key intermediate qualifications: estimating the returns and lifetime productivity gains to GCSEs, A levels and apprenticeships. Department for Education
[47] Vieira da Silva, L., Everard, M., & Shore, R. G. (2014). Ecosystem services assessment at Steart Peninsula, Somerset, UK. *Ecosystem Services, 10*, 19–34.
[48] Jacobs. (unpublished). *Economic assessment report: Benacre and Kessingland flood risk management scheme.* Water Management Alliance Eastern Drainage Boards
[49] Ibid.
[50] Ibid.
[51] Börger, T., Campbell, D., White, M. P., Elliott, L. R., Fleming, L. E., … Taylor, T. (2021). The value of blue-space recreation and perceived water quality across Europe : A contingent behaviour study. *Science of the Total Environment*, 145597.
[52] NEF Consulting (2021) Local Multiplier 3 (LM3). Retrieved from: https://www.nefconsulting.com/our-services/evaluation-impact-assessment/local-multiplier-3/
[53] CLES. (2020). *Owning the economy: Community wealth building 2020*. Centre for Local Economics Strategies.
[54] Sensier, M. & Uyarra, E. (2020). *Investigating the governance mechanisms that sustain regional economic resilience and inclusive growth.* Economics Discussion Paper. Retrieved from https://documents.manchester.ac.uk/display.aspx?DocID=49248
[55] Cabinet Office. (2015). Social Value Act Review. February 2015.
[56] Lock, D. (2020). Stewardship of public green space – using land values for endowments. *Town and Country Planning* April/May 2020.
[57] Historic England. (2020). *Enabling development and heritage assets*. Historic England Good Practice Advice in Planning Note 4.
[58] Jacobs. (unpublished). *Economic assessment report: Benacre and Kessingland flood risk management scheme.* Water Management Alliance Eastern Drainage Boards
[59] Mott MacDonald. (2018). *Benacre coastal flood defences: Wider economics benefits study. July 2018.*
[60] Jacobs. (unpublished). *Economic assessment report: Benacre and Kessingland flood risk management scheme.* Water Management Alliance Eastern Drainage Boards
[61] Ibid.