Great Yarmouth Third River Crossing

OUTLINE BUSINESS CASE

MARCH 2017

Supporting Document 16 – Modelled Year Sensitivity Test Note

Norfolk County Council

Great Yarmouth Borough Council

NEWANGLIA Local Enterprise Partnership for Norfolk and Suffolk

Great Yarmouth Third River Crossing

Modelled Year Sensitivity Test Note

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1 Study Overview

1.1 Introduction

This report summarises the economic appraisal process for the Great Yarmouth Third River Crossing (GYTRC) proposals and evaluates the impact of a variant to the appraisal process removing the furthest forecast horizon, as requested by DfT .

The proposed scheme will provide a third crossing over the River Yare, creating a new, more direct link between the western and eastern parts of Great Yarmouth. Specifically it will provide a connection between the Strategic Road Network (A47) and the South Denes Business Park, Enterprise Zone, Great Yarmouth Energy Park and the Outer Harbour, all of which are located on the South Denes peninsula.

The purpose of this report is to outline the evidence used and the key assumptions made in preparing the Outline Business Case (OBC) in line with DfT WebTAG guidance. The report also assesses the Value for Money (VfM) of the scheme and details how the effects of the scheme have been monetised and combined with the construction and maintenance costs to give an indication of the economic value of the scheme over a 60 year appraisal period.

The economic appraisal of the scheme follows the guidance outlined by the relevant WebTAG modules to ensure that a robust assessment is made. The cost benefit analysis was undertaken on the following categories:

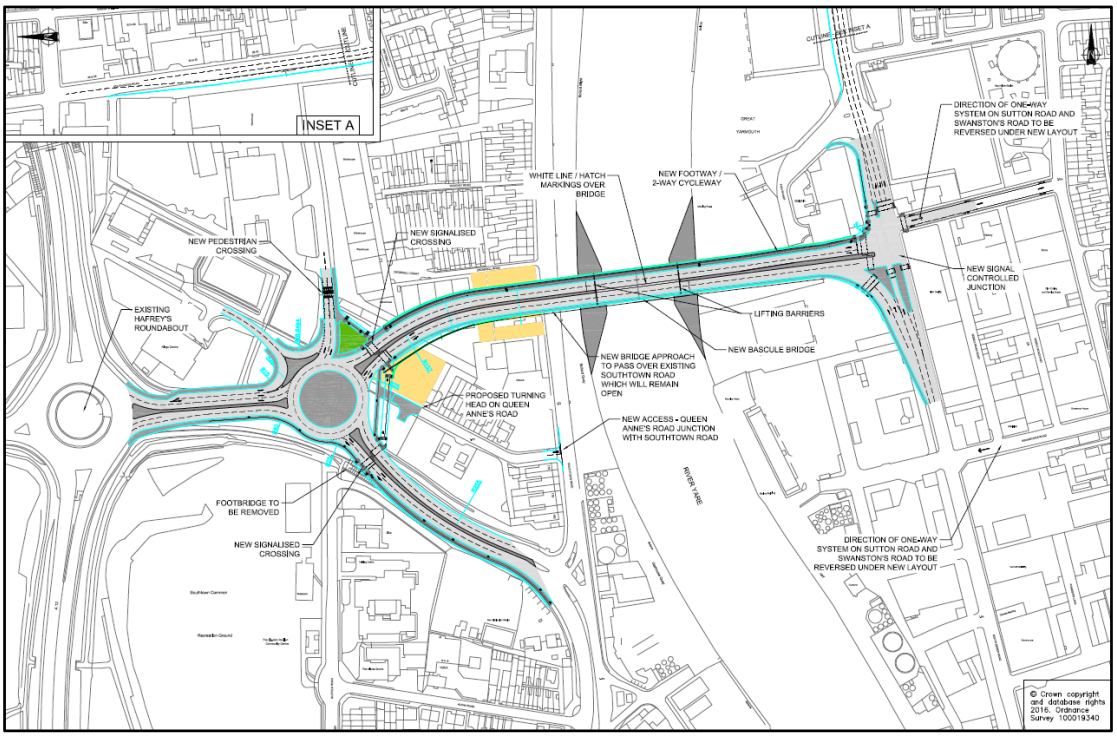
- Transport User Benefits;
- Accident Benefits;
- Reliability Benefits;
- Wider Benefits and
- Active Mode Benefits

1.2 Scheme Detail

A new bascule bridge will be provided to carry a dual carriageway road across the River Yare, opening when required to allow shipping to pass through. Traffic will be controlled by lifting barriers at either end of the bridge, and queueing space will be provided.

A schematic layout of the proposal is provided below.

Figure 1-1 - Scheme Proposals



1.3 Structure of Report

The reportis structured as follows

- Core assessment;
- Test Variant Results
- Test Variant Commentary; and
- Conclusions.

2 Core Assessment

2.1 Transport Model

The "Forecasting Report" and "Economic Assessment Report" associated with the scheme have been submitted in early April. This work has been based on provision of traffic forecasts for the scheme Opening year (2023), Design year (2038) and Horizon year (2051). Future travel demands take into account the existing traffic flows together with the effects of traffic growth and the additional traffic that is expected to arise from new development activity in the town.

2.2 Economic Assessment Process

The process of economic assessment for the scheme consists of several steps, as follows.

2.2.1 *User Benefits (TUBA)*

User benefits including time savings, fuel-related vehicle operating costs (VOC), non-fuel VOC, and operator and Government revenues typically form the major element of benefit attributable to highway schemes. The assessment reported here uses the Department for Transport's (DfT) Transport Users Benefit Appraisal tool (TUBA) Version 1.9.8.

2.2.2 *Accident Benefits (COBA-LT)*

Benefits associated with accident savings were calculated using the DfT's Cost and Benefit to Accidents – Light Touch Programme (COBA-LT) which assesses the safety impacts of schemes using detailed inputs of link and junction accident rates and traffic flow forecasts from the traffic model.

2.2.3 *Annualisation of Benefits*

Benefits of the scheme have been converted from the weekday traffic model period outputs to annual totals over a 60 year appraisal period. Annualisation factors for conversion of period model outputs are explained in Appendix G of the OBC.

The headlines of the factors used in this analysis are included in Table 2.1 below.

Table 2-1 - Annualisation Factors

No	Time Slice	Duration (min)	Traffic Model	Annualisation Factor
1	Weekday AM Period	60	AM Peak Hour Model	1.51 x 253 = 383
2	Weekday Inter-Peak Period	60	Inter-Peak Hour Model	7.23 x 253 = 1,828
3	Weekday PM Period	60	PM Peak Hour model	2.20 x 253 = 556
4	Weekday Off-Peak period	60	Inter-Peak hour model	0.00 x 253 = 0
5	Weekend	60	Inter-Peak hour model	8.06 x 52 = 419
Total Annual Hours				**3,186 hours**

2.2.4 *Appraisal Period*

The economic appraisal was carried out for a 60-year period, from 2023 (Opening Year), in accordance with DfT guidance.

2.2.5 *Cost Benefit Assessment*

A full cost benefit assessment was undertaken to assess the scheme's value for money. The results from TUBA and COBA-LT were combined to calculate the overall economic benefits of the scheme. By comparing the construction and maintenance costs with the traffic benefits of the scheme over a 60 year assessment period, a Benefit Cost Ratio (BCR) was calculated, which represents the value for money afforded by the scheme.

2.3 Core Assessment Results

Table 2.2 shows the main parameters that have been used in the TUBA scheme file.

Table 2-2 - Scheme Parameters

Parameter	Option – Do-Something
TUBA Version	v1.9.8
Opening Year	2023
Design Year	2038
Horizon Year	2051
Final Appraisal Year	2082
Modelled Years	2023, 2038 and 2051

The results of the Economic Appraisal using three modelled years are provided below.

Table 2-3 - TUBA Benefits

Cost and Benefits	Core Scenario
Consumer User (Commute)	62,370
Consumer User (Other)	144,040
Business User and Provider	122,632
Indirect Tax Revenue	-3,485
Carbon Benefits	1,827
Present Value of Benefits (PVB)	**327,384**
Number of warnings	115,488

Note: All values are in £000 at 2010 prices and values and are as abstracted from TUBA outputs.

2.4 Safety Benefit Assessment

Table 2-4 summarises the accident benefits generated by the scheme over the 60 year assessment period, discounted to 2010 prices. It can be seen that the scheme is forecast to save 83 accidents with a resultant benefit of **£12.5 million**.

Table 2-4 – Scheme Accident Benefits

Component	DM	DS	Saving
Number of Accidents	7,698	7,615	83
Cost of Accidents (£000)	428,918	416,379	12,539

Table 2-5 summarises the savings in casualties. The scheme is forecast to result in a saving of 269 casualties over the 60 year appraisal period.

Table 2-5 – Scheme Casualty Benefit

Severity	DM	DS	Saving
Fatal	115	109	6
Serious	1,019	975	43
Slight	10,460	10,241	220
Total	**11,594**	**11,325**	**269**

Accident savings are broken down by links and junctions in Table 2-6. It can be seen that the accident savings are largely associated with savings at junctions. This can be attributed to the removal of trips from a number of junctions, resulting in a reduction in collisions, due to the reassignment of trips.

Table 2-6 – Accident Savings (£000) over 60 years

Location	DM
Links Only	-201
Junction Only	12,741
Total	**12,539**

Over the 60 year appraisal period, the overall impact of accident cost savings is £12.5m, with accidents making up approximately 4% of total scheme benefit

3 Modelled Year Sensitivity Test Results

3.1 Introduction

On 11/04/17 Mouchel received the following email from DfT.

The DfT team are currently reviewing the GYTC economic case and note that the modelled years are 2023, 2038, 2051. We will look at the appraisal results including 2051 forecast but this will be treated as an alternative growth scenario. We expect you to re-run TUBA (capping long term demand and benefits in 2038) and submit the appraisal results to us by Thursday 20th April.

Guidance on the large major scheme bid application

Promoters are expected to provide at least two forecast years and ensure than the profiles of benefits and costs over time are robust. DfT expects that in most cases the final forecast year will be no later than 2041 and the demand forecasts are capped after the 2nd modelled year which expects to be 10-15 years after the scheme opening year. This ensures DfT are appraising schemes on a fair and consistent basis in the competition of funding.

The guidance was not available at the outset of the process. Whilst the original model specification detail quoted to DfT by Mouchel mentioned only two forecast years, this was subsequently extended to three years in line with WebTAG guidance[1] on the benefits of later forecast years.

Mouchel have conducted the test as requested in the email.

3.2 Modelled Year Sensitivity Assessment

Table 3.1 shows the main parameters that have been used in the TUBA scheme file. This differs from the core scenario in that growth is curtailed beyond 2038 and traffic change is assumed to have a flat profile.

Table 3-1 - Scheme Parameters

Parameter	Option – Do-Something
TUBA Version	v1.9.8
Opening Year	2023
Design Year	2038
Final Appraisal Year	2082
Modelled Years	2023 and 2038

[1] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/427130/TAG_Unit_M4_Forecasting_and_Uncertainty_November2014.pdf

Results of the Economic Appraisal using three modelled years are provided below.

Table 3-2 - TUBA Benefits

Cost and Benefits	Core Scenario
Consumer User (Commute)	50,424
Consumer User (Other)	104,791
Business User and Provider	87,639
Indirect Tax Revenue	-2,921
Carbon Benefits	1,397
Present Value of Benefits (PVB)	**241,330**
Number of warnings	17,885

Note: All values are in £000 at 2010 prices and values and are as abstracted from TUBA outputs.

In terms of magnitude of time savings the following tabulation provides an indication of saving by size of saving. The largest benefit gain is in the 2 to 5 minute category, with significant savings in excess of 5 minutes.

Table 3-3 – Travel Time Saving by Size of Benefit (£'000)

Purpose	< -5min	-5 to -2min	-2 to 0min	0 to 2min	2 to 5min	> 5min	Total
Business	-66	-39	-5,356	25,242	30,586	24,995	**75,362**
Commuting	-1	-5	-3,012	12,715	24,948	14,539	**49,184**
Other	-5	-5	-7,550	40,421	40,112	27,158	**100,131**
Sum	**-72**	**-49**	**-15,918**	**78,378**	**95,646**	**66,692**	**224,677**

3.3 Modelled Year Sensitivity Safety Benefit Assessment

Table 3.4 summarises the accident benefits generated by the scheme over the 60 year assessment period, discounted to 2010 prices. It can be seen that the scheme is forecast to save 158 accidents with a resultant benefit of **£15.476 million**.

Table 3-4 – Scheme Accident Benefits

	DM	DS	Saving
Number of Accidents	7,321	7,163	158
Cost of Accidents (£000)	409,346	393,869	15,477

Table 3.5 summarises the savings in casualties. The scheme is forecast to result in a saving of 373 casualties over the 60 year appraisal period.

Table 3-5 – Scheme Casualty Benefit

Severity	DM	DS	Saving
Fatal	109	103	6
Serious	966	916	50
Slight	9,961	9,644	317
Total	11,036	10,663	373

Accident savings are broken down by links and junctions in Table 3.6. It can be seen that the accident savings are largely associated with savings at junctions. This can be attributed to the removal of trips from a number of junctions, resulting in a reduction in collisions, due to the reassignment of trips.

Table 3-6 – Accident Savings (£000) over 60 years

Location	£ '000
Links Only	121
Junction Only	15,354
Total	**15,477**

Over the 60 year appraisal period, the overall impact of accident cost savings is £15.476 million.

3.4 Modelled Year Additional Benefits

Other benefits (wider impacts, reliability and active mode) have been evaluated in this test.

Wider impacts are calculated as 10% of business user benefits and sum to £8.76 million.

Reliability benefits are calculated in the same manner as reported in the main EAR and the components are reported as below.

Table 3-7 – Reliability Benefits (£000) over 60 years

Reliability Benefits	£ '000
Business	1,634
Non-business	19,945
Total	**21,579**

Active mode appraisal benefits are specified as £5.6 million for Journey Quality and £3.7 million for Physical Activity. They are calculated in the same manner as reported in the main EAR.

3.5 Appraisal Tables

The TEE associated with the test is included in **Appendix A**. This records a TEE benefit of £242.854 million

The Public Accounts Table is shown in **Appendix B**.

The Analysis of Monetised Costs and Benefits associated with the scheme is included in **Appendix C**. The BCR is 2.4, categorised as high value for money.

The Appraisal Summary Table is included in **Appendix D**.

3.6 Adjusted BCR

The full adjusted BCR is provided in Table 3.8 below. This indicates an NPV of £185 million and a BCR of 2.7.

Table 3-8 – Summary Table - Adjusted BCR (£000) over 60 years

Benefit Summary	Value £'000
Transport Efficiency	
Consumer User (Commute)	50,424
Consumer User (Other)	104,791
Business User and Provider	87,639
Indirect Tax Revenue	-2,921
Greenhouse Gas	1,397
Accident Benefits	15,477
Journey Quality	5,653
Physical Activity	3,700
Reliability Benefits	21,579
Wider Impact Benefits	8,764
Present Value of Benefits (PVB)	**296,503**
Broad Transport Budget	
Investment Costs	107,391
Operating Costs	4,172
Present Value of Costs (PVC)	**111,563**
Overall Impacts	
Net Present Value (NPV)	**184,940**
Benefit to Cost Ratio (BCR)	**2.658**

4 Sensitivity Test Commentary

4.1 Benefit Changes

With reference to Chapters 2 and 3, when removing the 2051 modelled year and limiting benefits to 2038 the overall PVB declines by 26%. The impact on the trip purpose components of benefit is as follows:

- Commute -19%
- Other -27%
- Business -29%

4.2 Growth beyond 2038

The DfT email has indicated that the scheme should not be analysed beyond 2041. The forecast year of 2038 could be extended by a further 3 years to provide benefits on a common basis to the other schemes in the competition.

Using a pro-rata approach where the growth trajectory to 2051 is capped at 2041 would result in a PVB of **£265.875 million**. This additional 3 years implicitly results in a 9% increase over the position reliant on a 2038 cap.

It is clear that the scheme is sensitive to later year benefits. The levels of congestion in the town in future are significantly relieved by the additional pressure valve of an additional bridged crossing. This gives strength to the argument that the proposed bridge is a valuable long term addition to the local transport network and that its effect on future traffic should be duly considered within the economics of the project.

5 Summary & Conclusions

5.1 Summary

In summary the Core test has been re-evaluated in light of a request to limit the forecast year growth to a cap of 2038. This compares against the earlier test, referenced in the EAR which projects to a 2051 horizon year.

WebTAG guidance states:

For economic appraisal it is best if the final forecast year is as far into the future as possible. This may be restricted to how far into the future standard forecasting datasets will allow (including NTEM, items on the uncertainty log, and data used to calculate economic impacts and environmental impacts that may be monetised)[2]; and

the magnitude of impacts should be interpolated and extrapolated over the appraisal period drawing on forecasts for at least two future years[3]

Although the guidance within WebTAG advocates the use of a long term future year, the change has been made at the request of DfT to enable all projects within the funding competition to be evaluated on a common basis.

5.2 Conclusions

The previous transport benefits of £327 million are reduced to £241 million. Accident benefits rise slightly from £12.5 to £15.5 million.

The BCR prior to the addition of extra benefits remains high, at 2.4. The adjusted BCR is 2.7.

The difference between the capped and uncapped tests suggest that in addition to the medium to short term there are significant longer term benefits of constructing the bridge.

[2] TAG Unit M4 paragraph 1.2.2
[3] TAG Unit A1.1 section 2.1

Appendix A - TEE Table

Transport Economic Efficiency Table.

Economic Efficiency of the Transport System (TEE)

Non-business: Commuting	**ALL MODES**		**ROAD**		**BUS/COACH**	**RAIL**		**OTHER**
User benefits	**TOTAL**		**Private Cars/LGVs**		**Passengers**	**Passengers**		
Travel Time	49,185		49,185		0	0		0
Vehicle operating costs	1,239		1,239		0	0		0
User charges	0		0		0	0		0
During Construction & Maintenance	0		0		0	0		0
NET NON-BUSINESS BENEFITS: COMMUTING	**50,424**	*(1a)*	**50,424**		**0**	**0**		**0**
Non-business: Other	**ALL MODES**		**ROAD**		**BUS/COACH**	**RAIL**		**OTHER**
User benefits	**TOTAL**		**Private Cars/LGVs**		**Passengers**	**Passengers**		
Travel time	100,131		100,131		0	0		0
Vehicle operating costs	4,660		4,660		0	0		0
User charges	0		0		0	0		0
During Construction & Maintenance	0		0		0	0		0
NET NON-BUSINESS BENEFITS: OTHER	**104,791**	*(1b)*	**104,791**		**0**	**0**		**0**
Business			**ROAD**		**BUS/COACH**	**RAIL**		**OTHER**
User benefits	**TOTAL**		**Good Vehicles**	**Business Cars/LGVs**	**Passengers**	**Freight**	**Passengers**	
Travel time	75,360		59,610	15,750	0	0	0	0
Vehicle operating costs	12,279		10,144	2,135	0	0	0	0
User charges	0		0	0	0	0	0	0
During Construction & Maintenance	0		0	0	0	0	0	0
Subtotal	**87,639**	*(2)*	**69,754**	**17,885**	**0**	**0**	**0**	**0**
Private sector provider impacts						**Freight**	**Passengers**	
Revenue	0							
Operating costs	0							
Investment costs	0							
Grant/subsidy	0							
Subtotal	**0**	*(3)*			**0**	**0**	**0**	**0**
Other business impacts								
Developer contributions	0	*(4)*						
NET BUSINESS IMPACT	**87,639**	*(5) = (2) + (3) + (4)*						
TOTAL								
Present Value of Transport Economic Efficiency Benefits (TEE)	**242,854**	*(6) = (1a) + (1b) + (5)*						

Notes: Benefits appear as positive numbers, while costs appear as negative numbers.
All entries are discounted present values, in 2010 prices and values (£,000s)

Appendix B - Public Accounts Table

Public Accounts for the Appraisal of Major Highway Schemes

	ROAD INFRASTRUCTURE TOTAL	
Local Government Funding		
Operating Costs	4,172	
Investment Costs	21,478	
Developer and Other Contributions	0	
NET IMPACT	**25,650**	*(7)*
Central Government Funding: Transport		
Operating costs	0	
Investment Costs	85,913	
Developer and Other Contributions	0	
NET IMPACT	**85,913**	*(8)*
Central Government Funding: Non-Transport		
Indirect Tax Revenues	2,921	
TOTALS	**2,921**	*(9)*
Broad Transport Budget	**111,563**	*(10) = (7) + (8)*
Wider Public Finances	**2,921**	*(11) = (9)*

Appendix C - AMCB Table

Analysis of Monetised Costs and Benefits

Noise		*(12)*
Local Air Quality		*(13)*
Greenhouse Gases	1,397	*(14)*
Journey Quality	5,653	*(15)*
Physical Activity	3,700	
Accidents	15,477	*(16)*
Economic Efficiency: Consumer Users (Commuting)	50,424	*(1a)*
Economic Efficiency: Consumer Users (Other)	104,791	*(1b)*
Economic Efficiency: Business Users and Providers	87,639	*(5)*
Wider Public Finances (Indirect Taxation Revenues)	-2,921	*- (11) - sign changed from PA table, as PA table represents costs, not benefits*
Option Values		*(17)*
Present Value of Benefits (see notes) **(PVB)**	**266,160**	*(PVB) = (12) + (13) + (14) + (15) + (16) + (1a) + (1b) + (5) + (17) - (11)*
Broad Transport Budget	111,563	*(10)*
Present Value of Costs (see notes) **(PVC)**	**111,563**	*(PVC) = (10)*
OVERALL IMPACTS		
Net Present Value (NPV)	**154,597**	*NPV = PVB - PVC*
Benefit to Cost Ratio (BCR)	**2.386**	*BCR = PVB/PVC*

Note : This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used as the sole basis for decisions.

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Appendix D - Appraisal Summary Table

Appraisal Summary Table		Date produced:	19	4	2017	Contact:	
Name of scheme:	**River Yare Third River Crossing, Great Yarmouth**					**Name**	Ian Parkes
Description of scheme:	New River crossing to connect the west and east areas of Great Yarmouth between A47 and the South Denes Peninsula which includes the Outer Harbour and local port activities. The scheme is proposed to be completed by 2023 and involve the construction of a new roundabout and traffic signal junction, approach roads and a lifting bridge able to accommodate four lanes of traffic.					**Organisation**	Norfolk County Council
						Role	Promoter/Official

Impacts		Summary of key impacts	Assessment: Quantitative	Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp
Economy	Business users & transport providers	Scheme primarily impacts on short journey times of less than 5 minutes within the study area but also benefits longer distance travel. Access to the peninsula to the south of the town centre is improved and this reduces the amount of congestion at key junctions to the north and critically allows traffic to use an alternative river crossing between the port and the business areas to the east and the A47 to the west.	**Value of journey time changes(£)** £75.36m; **Net journey time changes (£)**: 0 to 2min £19.89m; 2 to 5min £30.54m; > 5min £24.9m	large beneficial	£87.6m	
	Reliability impact on Business users	The proposed scheme produces small benefits in terms of reliability for private travel (business users) as the proportion of car business users is low relative to total car travel		slight beneficial	£1.6m	
	Regeneration	Regeneris Report considers the GVA impacts of the scheme and assesses the attributable impacts to be of the order of 330 FTE jobs and £24m GVA by 2030.	GVA to £24m by 2030	slight beneficial		
	Wider Impacts	Wider impact assumes 10% from the Business User benefits produced from TUBA		slight beneficial	£8.7m	
Environmental	Noise	The scheme is likely to cause some increases in noise level at the dwellings and other noise sensitive receptors in the immediate vicinity of the both the new and improved sections of carriageway due to increases in road traffic generated noise. Preliminary traffic data indicates that there are road links in the immediate area of the scheme which will experience significant changes in traffic flow and hence noise level as a result of the introduction of this option.	There are 663 sensitive receptor buildings and no Defra Noise Important Areas within the 300m study area.	slight adverse	not calculated	not assessed
	Air Quality	There are no designated AQMAs within 200m of the scheme. There are also no ecologically designated sites considered sensitive to air pollution situated within 200m of the scheme. An overall neutral local air quality impact is likely given the traffic data provided (AM, IP & PM flows). A beneficial impact on regional emissions can be expected given the likelihood of the new bridge to reduce the distance travelled to cross the River Yare.	There are 252 potentially sensitive receptors within 200m of this option. Background mapped air pollutant concentrations are well below national objective values. Max roadside PCM concentrations, 2015: 29.4µg/m3 , 2020: 23µg/m3. This is well below the threshold of 40µg/m3 for the Annual Mean level and unlikely to be exceeded by the proposed scheme.	slight adverse	not calculated	not assessed
	Greenhouse gases	Redistributional effects of traffic are likely to result in an insignificant change in the traded carbon equivalent - scoped out by environment team	Change in non-traded carbon over 60y (CO_2e) -30,918; Change in traded carbon over 60y (CO_2e) (tonnes) 51	slight beneficial to neutral	£1.4m	
	Landscape	Scoped out by environment team		neutral	not calculated	
	Townscape	The loss of some existing residential townscape although not of particularly strong or defined townscape value. Existing vistas along the river corridor may be interrupted or fore-shortened by the structure, although the bridge would not appear out of context in respect of existing townscape.	The density and mix of development will not substantially differ. The bascule bridge would be in scale with the river environment	neutral	not calculated	
	Historic Environment	The setting of at least 2 Grade II Listed Buildings and two conservation areas may be indirectly impacted upon by this Option. Four non-designated heritage assets, including a railway line, a bomb crater and WWII defensive features may be directly impacted. There is potential to impact upon currently unknown below ground heritage assets.	Two Grade II Listed Buildings and two conservation areas may be indirectly impacted upon by this Option. Four non-designated heritage assets, including a railway line, a bomb crater and WWII defensive features may be directly impacted.	moderate adverse	not calculated	
	Biodiversity	No adverse effects expected to any international or national designated nature conservation sites. Potential to impact bat roosts, breeding birds, water voles, black redstarts and hedgehogs due to the loss of suitable habitat for these species associated with land take.	The Outer Thames Estuary Special Protection Area is within 2km of the proposed bridge crossing point. This site is designated because it supports 38% of the Great British population of red throated diver. There are no non-statutory designated sites within 2km.	slight adverse	not calculated	
	Water Environment	Water environment impacts include increased discharge into water bodies (surface and groundwater), which may cause a slight decrease in water quality. Increased potential for accidental spillage contaminating surface water or groundwater.	Potential adverse impact to local aquifers during construction. Increase in flood risk along the watercourse due to increased run-off and reduction of floodplain.	moderate adverse	not calculated	
Social	Commuting and Other users	Scheme primarily impacts on short journey times of less than 5 minutes within the study area but also benefits longer distance travel.. Access to the peninsula to the south of the town centre is improved and this reduces the amount of congestion at key junctions to the north and critically allows traffic to use an alternative river crossing between the port and the business areas to the east and the A47 to the west.	**Value of journey time changes(£)** £149.3m; **Net journey time changes (£)**: 0 to 2min £42.6m; 2 to 5min £65.1m; > 5min £41.7m	large beneficial	£155.2m	
	Reliability impact on Commuting and Other users	The proposed bridge would produce modest benefits in terms of reliability benefits as reduction in delays and congestion on the existing A47 at the Gapton and Harfreys roundabouts while providing faster and shorter travel time and distance to the Peninsula	Moderate flows reported in traffic modelling	Beneficial	£19.9m	
	Physical activity	The proposed scheme assists walking/cycling/physical activity	Pedestrians and cyclists counted as part of the assessment	slight beneficial	£3.7m	
	Journey quality	The scheme promotes walking/cycling, and improves journey quality for all users	Reduction in traveller stress from fewer queues and shorter journeys	slight beneficial	£5.7m	
	Accidents	The proposed scheme produces benefits in terms of accident savings, with total number of accidents saved over the appraisal period is 6 fatal, 43 serious and 220 slight accidents	269 accidents saved over 60 years - from COBALT	large beneficial	£15.4m	
	Security	No change is predicted	no assessment required	neutral	not calculated	not assessed
	Access to services	Bus, pedestrian and cycle journeys improved in addition to major benefits for commercial traffic. Produces town centre traffic relief and therefore improves travel throughout the town.	Existing bus services will benefit from improved journey times	large beneficial	not calculated	not assessed
	Affordability	Reduced travel times produces fuel savings and operating costs for all income groups	The scheme leads to commute benefits in excess £60m	slight beneficial	not calculated	not assessed
	Severance	Severance is reduced by the provision of a new crossing in a location that involves transfer distances of up to around 3km to be saved for the same journey	Scheme produces network wide lower levels of veh kms travelled and significantly reduces some journey distances to/from the peninsula	moderate beneficial	not calculated	not assessed
	Option and non-use values	Not assessed	not assessed	neutral	not calculated	
Public Accounts	Cost to Broad Transport Budget	The scheme has been costed at 2016 risk adjusted prices. Sunk costs have been removed and all costs converted to a 2010 price-base year and discounted to 2010, giving a present value of cost of just under £112m when 21% Optimism Bias is added.	Delivery period over 5 years to 2023 opening	Cost Note	£111.6m	
	Indirect Tax Revenues	Assessed in TUBA over 60 years. Indirect tax income reduces as the efficiency of the road network improves	60 year assessment period	TUBA benefits	-£2.9m	