

Darwen East Development Corridor

Appraisal Specification Report
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1. Introduction

1.1 Purpose of the Report

This report discusses the overall methodology that is to be followed to appraise the Darwen East Development Corridor scheme. In line with the requirements of Transport for Lancashire in their assurance role the proposed methodology is based on the Department for Transport (DfT)'s Transport Appraisal Guidance (TAG).

'The Transport Appraisal Process' as stated in Section 2.12.2 of the Department for Transport (DfT)'s Transport Appraisal Guidance (TAG) states that and Appraisal Specification Report (ASR) should be submitted to set out how appraisal will be undertaken. It should detail the:

- Proposed approach to modelling and forecasting;
- Proposed methodology for assessing each of the sub-impacts presented in the AST;
- Proposed level of design or specification which will inform the cost estimation, and how better cost information will be obtained; and
- Evidence that views on the appraisal methodology have been sought from the statutory environmental bodies and other.

1.2 Scheme Summary

Darwen is located to the south of Blackburn, and is the second largest settlement in the borough.

Darwen is part of the Blackburn with Darwen Unitary Authority, overseen by Blackburn with Darwen Borough Council (BwDBC). In order to accommodate the requirement for further housing in the borough, a number of sites have been identified within Darwen for potential development.

Part of the process in determining the suitability of the various identified sites involves an assessment of the surrounding highways network and the potential for connectivity, ensuring that there is sufficient capacity to accommodate the expected level of development.

The conclusions drawn from the Transport Implications on the Local Highway Network (2013) report identified that the existing highway network in the borough suffers from congestion on key routes, particularly during the peak periods.

Access to five of these allocated sites—encompassing a potential 1,154 dwellings and the majority of the allocation for Darwen— from the main highway network is via a limited number of access points across the existing Blackburn–Darwen–Bolton–Manchester railway line. The

current crossing points each have their own unique constraints, and the existing local highway network has a number of junctions that have been identified as requiring improvement in order to facilitate access to the proposed development sites. The options proposed have also considered the existing constraints of the A666 and Blacksnape Road, as well as their interconnectivity.

In order to mitigate the impacts of the proposed development sites on the highway network, a package of measures is presented as the ‘Darwen East Development Corridor’ (DEDC). The DEDC will ensure that any transport implications arising from the allocated development sites will be mitigated as far as possible, providing high-quality links to the M65 and the wider network as well as relieving local congestion. Through this, the DEDC will enable high-quality houses with strong connections to employment sites, boosting the region’s economy.

Table 1.1 below presents the package of DEDC improvements with pre-tendered cost estimates. Scheme cost estimates were provided by Capita in May 2017. In line with WebTAG requirements, a 10% allowance for risk has been applied to base construction cost estimates. A 5% allowance for risk has been added to preparation and supervision base cost estimates. All costs are presented in 2017 resource prices and no allowance for optimism bias has been included at this stage.

Table 1.1 – Base Cost Estimates

No.	Intervention Location	Preparation Cost	Supervision Cost	Construction Cost	Total maintenance Cost	Risk Adjusted Total Cost (Preparation, Supervision & Construction)*
J1	A666/ Watery Lane	£859	£253	£2,992	-	£4,459
J13	A666/ Grimshaw Street	£859	£253	£2,992	-	£4,459
J5	Sough Road / Grimshaw Street / Pole Lane	£91,391	£26,937	£488,399	-	£661,482
J6	Pole Lane / Priory Drive	£5,154	£1,519	£17,955	-	£26,757
J7	Marsh House Lane / Priory Drive	£25,425	£7,494	£159,077	-	£209,549
-	Link Road	£386,865	£114,025	£1,353,308	£655,500	£2,014,573
J7a	Ivinson Road/ Oak Grove/ Holden Fold	£25,425	£7,494	£183,577	-	£236,499
					TOTAL	£3,157,778

* Includes additional risk adjustment outlined above

1.3 Objectives of the Scheme

The scheme will open up the land required to deliver a new housing development site which cannot be directly accessed off the existing highway network. It will also mitigate traffic delay that would otherwise be generated by the delivery of 1,154 dwellings across the Darwen allocations in the Local Development Plan.

The scheme will also make better use of the existing network by enhancing the connectivity from the M65 to East Darwen. The scheme will help mitigate traffic impacts associated with new residential developments to the east of Darwen and complement potential future schemes to allow further development within Darwen beyond the Local Plan.

The issues that are intended to be addressed by the scheme can be summarised as follows:

- A lack of quality affordable housing stock in Darwen;
- A requirement to meet housing delivery targets;
- Access to the development areas from A666 is via a limited number of railway crossings, each with unique constraints;
- Congestion on the A666 is expected to increase due to LDP allocations of 1,154 dwellings; and
- There are AQMA sites on the A666 in the vicinity of the town centre and at Earcroft close to Junction 4 of the M65.

In considering the local policy context and the issues the scheme is intended to address, it is considered that the following objectives will sufficiently address these issues:

- Assist the delivery of committed and allocated housing developments within East Darwen by the end of the current plan period (2026);
- Reduce the number of casualties on the local road network each year by the end of the current plan period;
- Prevent a worsening of congestion on the local highway network as a consequence of new housing delivery to the end of the current plan period (2026); and
- Prevent a worsening of air quality at the AQMA sites in Darwen as a consequence of new housing delivery to the end of the current plan period (2026).

Through the achievement of these objectives, the DEDC will facilitate the wider aims of the LEP and the BwD Local Development Plan by delivering growth and helping to meet housing targets by acting as a catalyst to the delivery of much-needed high-quality housing at preferred sites and by improving access to local employment opportunities.

1.4 Project Programme

- Business case submission: October 2017
- Procurement process for the works will be in Q2 2017/2018
- Business case approval from TfL: November 2017
- Construction work begin: January 2018
- Completion of works: January 2019

2. Challenges and Issues

2.1 Strategic Fit

The proposed DEDC scheme is critical to unlocking economic and housing growth opportunities. This closely aligns with all current national and local government objectives and was a key factor in identifying the schemes included in Lancashire's Strategic Economic plan.

2.2 Key Issues

A shortage of housing is not a localised issue. It is recognised nationally that there is a dire need for more housing to accommodate the growing population. To this end each Local Authority assesses their area in order to determine the most appropriate locations for further housing and employment. Their findings are published and adopted in the form of a Site Allocations and Development Management Policies DPD, as part of the statutory Local Development Plan.

In Blackburn with Darwen, it is expected that there will be a net increase of 9,300 homes required to cover the current housing need by 2026. 291 potential sites have been identified across the region to accommodate the required development. The majority of these potential development sites are located in inner urban areas, or urban areas with high levels of accessibility. Of the identified sites, 7 are identified as being in the urban areas of Darwen. It is expected that this land will be able to accommodate approximately 1,154 dwellings, creating essential housing for the future of Darwen and the region.

The DEDC scheme will accelerate the delivery of new housing in Darwen by unlocking sites for development by installing the right infrastructure to enable local partners/developers to bring forward the delivery of new homes included in the local plan without them having to meet the cost of providing this infrastructure directly. This improves scheme viability for developers and will help to bring several housing developments forward in the current economic climate.

In addition to helping unlock sites for development it is anticipated that delivery of the new housing sites (and associated economic growth) will increase the amount of traffic on the existing local road network. As such, the DEDC scheme also includes a package of measures to improve the local road network largely comprising junction capacity improvements.

The DEDC will improve local accessibility through the guaranteed provision of a link road through the Bailey's Field site. There would be no guarantee that the route would be delivered as a through route if delivered by developers who would be likely to develop in a cul-de-sac approach leaving ransom strips to achieve wider site connectivity.

The provision of the through route created by the new link road would deliver journey time savings to some residents of the new housing developments and existing local residents by

providing a quicker alternative route for traveling north towards Blackburn and south towards Bolton and the Manchester City Region.

2.3 Options Considered

2.3.1 *The Impact of Not Progressing*

A large proportion of the new dwellings to be delivered are intended for development by 2018/19. It is therefore critical to have adequate infrastructure in place to unlock the land required for development and to mitigate the impacts of this vital development on the local highway network.

If the allocated sites were all developed without the DEDC scheme in place; the impact of the trips associated with over 1,000 new dwellings on the local network would result in severe congestion and peak spreading, resulting in economic losses, increased emissions and social consequences from a lack of connectivity to business, leisure and community facilities.

Any requirement for the DEDC scheme costs to be fully met by developers would undermine the viability of housing developments and deter housing developers from delivering new housing within the borough. Ongoing engagement with housing developers indicates that infrastructure costs and requirements for significant offsite improvements to transport networks are key factors in the continuing year on year shortfall of housing completions against Core Strategy requirements due to the challenging local housing market conditions in Darwen.

Without the link road and junction improvements included in the DEDC scheme the impact of the traffic generated by new housing developments would have a significant detrimental impact on the safe and efficient operation of the local highway network.

2.4 Partner Organisations

The partner organisations involved in and committed to supporting the Darwen East Development Corridor are:

- Lancashire Local Enterprise Partnership
- Blackburn with Darwen Borough Council
- Prospective developers

The original submission to the LEP had funding from the Growth Deal (£2.5m) and the Council (£0.5m) - no third party contributions were identified at this point. What was then envisaged was a calculated s106 contribution based on the numbers of housing netted off against the value of the land which wasn't known at the time. The Council has agreed in principle to buy the land required to build the road, from the landowners for a £1.

Blackburn with Darwen Borough Council will seek appropriate levels of developer contribution towards further highways improvement works via section 106 and section 278 agreements when future housing developments come to fruition. Linkages between future and existing housing developments in the vicinity will be explored further to ensure any housing development is sustainable and accessible by walking, cycling and local public transport. This will be negotiated at a suitable point in the planning process.”

2.5 Expected Outcomes

This project will support the development of 8.35 hectares of employment land and over one thousand dwellings within Darwen. It is also anticipated that the scheme will help to prevent a worsening of air quality at two local AQMA sites at Darwen Town Centre and Earcroft.

2.6 Deliverability and Risks

All of the land required for scheme delivery is already in Blackburn with Darwen ownership. All planning approvals required are currently being sought or are already approved.

Risks to the project have been fully explored through risk workshops with key stakeholders. A full risk register shall be provided within the management case of the business case.

2.7 Key Project Milestones

The key milestones for the project are as follows:

- Business case submission: October 2017
- Procurement process for the works will be in Q2 2017/2018
- Business case approval from TfL: November 2017
- Construction work begin: January 2018
- Completion of works: January 2019

2.8 Principal Risks and Mitigation Actions

Risks are limited by the fact that most of the works will take place on existing highway land. Works on 3rd party land are likely to be undertaken by developers own contractors. The risks identified and their mitigation measures are described overleaf in Table 2.1.

Table 2.1 – Project Risks and Mitigating Actions

No.	Risk	Likelihood (H/M/L)	Severity (H/M/L)	Mitigating Actions
1	Unforeseen ground conditions on the road alignment in Baileys Field e.g. Mineshafts. The survey strategy has not been confirmed and there is a reliance on information provided by Miller.	L	H	Detailed site investigations have been undertaken. One mineshaft has been identified a further two could be on the alignment of the new road. Capping details have been costs and there has been an allowance for two mineshafts in the bill of quantities. An appropriate risk allowance has been made.
2	Phasing and timing of site works and statutory undertakers works.	M	M	Liaise with street works manager as to planned works for statutory undertakers and programme accordingly. Responsibility for statutory undertakers defined in Z9 of the contract documents.
3	Protection to any statutory services during or in advance of the works.	M	M	Undertake surveys to quantify the extent and nature of statutory services affected by the works. Consult with statutory undertakers and agree protection measures to be put in place. The timing of this should be in the detailed design so this can be costed and the programme implications and constrains can be quantified. Awaiting final C4's.
4	Inadequate capacity of power supply across the new road. Additional costs associated with upgrading the electrical network.	M	M	Undertake capacity checks with United Utilities during detailed design. Make programme and cost allowances for any upgrades.
5	Residual life of existing pavements and upgrading if required.	H	L	Undertake a survey of the condition of existing pavements. Where these need replacing consider alternative maintenance funding streams.

3. Transport Modelling

3.1 Proportionality of Modelling Approach

Section 3.2 of WebTAG (Unit T) discusses the concept of proportionality in model design. Below is a summary of the salient points in that section that need to be considered.

The WebTAG Unit suggests that the most appropriate modelling approach will depend on the type of scheme, the circumstances, its objectives and the stage of the appraisal and decision making process. In the early stages when the best transport options to solve the identified problems are examined, more light-touch methods may be appropriate. That said, one must ensure that the indications from such models do not give rise to unrealistic expectations of benefits that are unlikely to result from a full modelling approach.

For highway schemes, WebTAG recommends that ‘the potential impact of induced traffic should be recognised and it is highly recommended to scope the need for a demand model at an early stage’. WebTAG discusses the trade-offs between model complexity and constraints on resource, data requirements and expertise. In general, the model design will depend on the nature of the problem and their likely solution, the size of the study area, the number of options to be tested, data availability and the need to update models and conduct new surveys, timescale for model development; and finally the required accuracy of the recommendations.

The WebTAG Unit states that the scheme scope may not necessitate a “full” modelling specification in some circumstances. For example, ‘a bus priority scheme aimed primarily at providing a better level of service for existing bus passengers with no effect on other modes may require only a public transport supply (assignment) model to provide the necessary inputs to a relatively simple appraisal...’

In view of the WebTAG guidance, a spreadsheet based fixed highway assignment model is proposed for the Darwen East Development Corridor. This will be supported by local junction models of the ‘with’ and ‘without’ scheme scenarios in order to derive journey time benefits. We consider this to be an appropriate and proportionate approach to scheme appraisal based on the following evidence or findings:

- A strategic variable demand model would take considerable time to set up and operate and require extensive road side interviews (RSIs) or Automatic Number Plate Recognition (ANPR) surveys which would be expensive to undertake;
- At present there are only a small number of local bus services which would be directly impacted by the DEDC proposals and as such the journey time saving benefits to bus passengers related to the Darwen East Development Corridor scheme are likely to be insignificant;

- While it is envisaged that the Darwen East Development Corridor proposals will have a significant impact on travel time savings, the overall cost changes are likely to be marginal based on the fact that:
 - o Darwen is a relatively compact area and the A666 is a regional distributor which attracts long distance (through) traffic. When applying cost damping function for these movements the overall journey time cost saving is smaller;
 - o There is a significant number of journey to work movements within Blackburn with Darwen with many of these commute journeys likely to be under 15 minutes. The overall journey time saving of the scheme is unlikely to exceed 2 minutes and as such it is considered that the modal shift impact is likely to be insignificant, as described in WebTAG M2 para. 2.3.8.
 - o The scheme proposals are primarily intended to facilitate access to local residential and employment sites. The scheme proposals are not intended to result in a transfer of existing traffic from the A666 or other routes onto the DEDC.
- It is considered that the use of a fixed highway assignment model would be unable to capture any decongestion benefits on the A666 arising from the scheme proposals and therefore the proposed methodology may be underselling these potential benefits. As such the derived BCR is likely to be underselling the full benefits of the scheme. However, a sensitivity test which includes benefits attributable to the link road based on journey time savings offered by providing a through route for local traffic shall be presented.

3.2 Proposed Methodology

The Darwen East Development Corridor scheme aims to improve traffic conditions on the A666 through Darwen town centre and on the existing roads which will form the Darwen East Development Corridor, as well as improving local access to employment and residential areas. As a result, it is expected that the scheme will generate journey time savings for motorists and that the resulting user benefits will be a key element which will underpin the business case.

The potential impacts of the Darwen East Development Corridor will be analysed using a spread sheet model and individual junction models for each location where the proposed scheme is considered likely to have an impact on journey times (based on latest WebTAG values of time¹). It is assumed that there will be no change to vehicle operating costs and that the benefits of the scheme to public transport users will be neutral.

In order to estimate the user benefits it is proposed that the following methodology be adopted:

¹ Based on TAG databook, March 2017.

- Stage 1 – Data Collection and Analysis
- Stage 2 – Background Traffic Growth
- Stage 3 – Development Trip Generation and Distribution
- Stage 4 – Junction Modelling of Scenarios
- Stage 5 – Identification of Journey Time User Benefits

Each of these stages is described in more detail in the following sections.

3.3 Stage 1 - Data Collection and Analysis

On Tuesday 30th June 2015 an extensive traffic survey was undertaken in the Darwen area comprising Manual Classified Counts (MCCs) and Automatic Traffic Counts (ATCs) at the locations identified in Table 3.1 below. Automatic traffic counts were conducted for a whole week period and complemented other data from Automatic Traffic Counts undertaken as part of the annual cordon count for Darwen town centre.

Table 3.1 – Traffic Count Locations June 2015

No	Traffic Count Location	Survey Type
1	A666 Bolton Road / Watery Lane	MCC
2	Watery Lane / Spring Vale Road	MCC
3	Watery Lane / Thompson Street	MCC
4	Causeway Street / Cranberry Lane / Sough Road	MCC
5	Grimshaw Street / Sough Road / Pole Lane	MCC
6	Pole Lane / Priory Lane	MCC
7	Priory Lane/ Marsh House Lane	MCC
8	Goose House Lane / Chapels / Knowle Lane	MCC
9	Hollins Grove Street / Goose House Lane / Lower Eccleshill Road	MCC
10	Paul Rink Way / Lower Eccleshill Road / Greenbank Terrace	MCC
11	A666 Blackburn Road / Earcroft Way	MCC
12	Roman Road / Marsh Hose Lane / Blacksnape Road	MCC
13	Roman Road / Pot House Lane	MCC
	Earcroft Way between A666 Blackburn Rd and M65 roundabout	ATC
	A666 Bolton Road between Watery Lane and Knowlesly Road	ATC

The suitability of each of the turning counts has been verified through checks of variability in flow from the ATC counts and other permanent monitoring sites.

3.4 Stage 2 – Background Traffic Growth

The highway trip matrices for testing the Darwen East Distributor Corridor scheme in 2019 and 2026 (the end of the plan period) will be produced following guidance in TAG Unit M-4.

3.5 Stage 3 – Development Trip Generation and Distribution

Committed and allocated housing and employment developments will be explicitly modelled. Trip generation and distribution information for these developments will be taken from either Transport Assessments (where available) or determined using the TRICS database and an appropriate gravity model. The TEMPRO development assumptions will be adjusted accordingly in the determination of growth factors. The resulting matrices for each junction will be adjusted to a control total based on an unadjusted TEMPRO growth factor.

3.6 Stage 4 – Junction Modelling of Scenarios

Each intervention has been derived through the modelling of different options and the selection of a preferred option based on an assessment of capacity (as detailed in the Options Modelling Report). Individual junction models have been developed for each of the without scheme and 'preferred' key intervention schemes to be delivered by the Darwen East Development Corridor for assessment. The modelled scenarios for each junction will include:

3.6.1 *Do- Minimum Scenarios*

Forecasts for two years, 2019 (the year of opening) and 2026 (the end of the plan period) will be carried out for three time periods, i.e. AM, IP and PM. The 'Do-Minimum' scenario will include all key committed developments and (highway and public transport) schemes in Darwen that are forecast to be completed by the end of the forecast year.

3.6.2 *Do-Something Scenarios*

For 'Do-Something' tests, a preferred scheme option and a low cost alternative will be considered.

3.6.3 *Sensitivity Tests*

Three sensitivity tests will be carried out in the economic assessment which will demonstrate the sensitivity of the business case to variations in benefits. These will be in line with the Core Scenario but test alternative variables to provide more confidence that the scheme will deliver value for money.

3.7 Stage 5 – Identification of Journey Time User Benefits

3.7.1 *Identification of User Benefits*

Journey time savings for each junction and for the proposed link road across each time period have been derived by comparing the do-minimum and do-something options.

3.7.2 *Annualisation of Benefits*

The benefits will be annualised using appropriate locally derived factors. The factors have been derived from automatic traffic counts undertaken at the following locations in Darwen for a whole week period commencing Sunday 28th June 2015.

- Earcroft Way
- Lower Eccleshill Road
- Roman Road
- A666 Blackburn Road
- Priory Drive
- A666 Bolton Road

The average hourly weekday traffic flows for each of the sites are presented in Table 3.2 overleaf.

The resulting peak hour to peak period conversion factors derived are therefore as follows:

AM	2.64
PM	2.85
IP	6.00

The other factors used in the annualisation process are as follows:

12HR-24HR	1.26
Weekdays Per Year	253

Table 3.2 – ATC Traffic Counts Summary

Hr End	1 WB	1 EB	2 SB	2 NB	3 SB	3 NB	4 SB	4 NB	6 SB	6 NB	7 SB	7 NB
1	64	52	27	19	20	16	81	95	9	7	48	31
2	31	34	14	9	9	9	35	48	3	3	27	21
3	23	21	14	7	6	5	25	27	2	1	15	14
4	18	30	11	8	3	6	22	28	2	1	13	16
5	29	53	7	17	6	10	27	42	2	0	24	23
6	108	234	39	79	28	87	127	185	9	7	62	92
7	251	554	76	196	79	143	290	385	28	19	150	220
8	716	1002	458	614	176	565	658	751	90	46	482	411
9	795	981	477	601	221	633	741	740	130	79	490	397
10	574	597	310	358	180	286	650	615	89	57	312	312
11	522	525	251	290	195	223	636	600	79	64	274	289
12	522	563	269	299	219	216	644	641	84	77	287	325
13	584	599	295	336	246	241	647	686	85	85	322	334
14	603	603	317	321	253	251	679	644	88	77	319	311
15	694	571	382	316	315	230	727	648	80	79	329	331
16	760	732	554	400	356	254	800	661	98	120	390	407
17	978	779	648	546	487	310	806	714	111	139	455	564
18	1026	702	550	663	548	306	809	671	128	149	427	609
19	782	636	420	351	316	244	779	654	109	105	394	384
20	569	442	269	220	211	165	647	569	84	78	315	278
21	450	356	207	153	169	123	529	440	57	72	230	227
22	294	273	146	104	121	90	400	360	46	42	177	148
23	222	168	100	77	97	56	265	251	26	34	127	110
24	134	95	52	39	38	36	175	149	17	15	94	67
12-HR	8557	8290	4932	5095	3509	3760	8574	8025	1170	1078	4481	4674
24-HR	10751	10600	5893	6022	4295	4505	11199	10605	1454	1359	5764	5922
PEAK HOUR												
PEAK PERIOD												

4. Economic Appraisal & Cost Benefit Analysis

4.1 Appraisal Methodology

The economic appraisal will make use of a range of independent assessments. Some of these will be based upon the transport modelling set out in Section 3 of this document, while others will capture factors external to those being modelled. The proposed methodology is outlined in more detail in the following chapter and considers TAG Units A1 and A2 – Cost Benefit Analysis and Economic Impacts.

4.2 Scenario specification

In order to highlight the value of certain assumptions to the value for money of the scheme as a whole and to demonstrate the resilience of the scheme to the potential for inaccuracies in future forecasts a range of scenarios will be tested in the model.

4.2.1 *Do Minimum scenario*

All Do Something scenarios will be assessed relative to the same Do Minimum Scenario. This includes all existing and committed transport infrastructure and services, with demand levels generated in accordance with the details set out in Section 3 above.

4.2.2 *Core scenario*

Similarly to the Do Minimum Scenario, the Core Scenario for the economic case will be based upon the modelled Do Something scenario preferred option which involves the remodelling of the following 'with scheme' modifications:

- Junction improvements at the A666/Watery Lane;
- Junction Improvements at Sough Road/ Grimshaw Street/Pole Lane;
- Junction Improvements at Pole Lane/Priory Drive;
- A new junction at Priory Drive/Marsh House Lane in order to facilitate a new Link Road;
- A new Link Road across the East Darwen Allocation Site between the above junction and Ivinson Road; and
- Junction alterations at Oak Grove / Holden Fold.

4.2.3 *Sensitivity testing*

Three sensitivity tests will be carried out in the economic assessment which will demonstrate the sensitivity of the business case to variations in benefits. These will be in line with the Core

Scenario but test alternative variables to provide more confidence that the scheme will deliver value for money. The three sensitivity tests are as follows:

Sensitivity Test 1 – Zero Growth (beyond 2019 scheme opening year)

Sensitivity Test 2 – 30 year appraisal

Sensitivity Test 3 – VoT Sensitivity

4.2.4 *Alternative scenarios*

An alternative scenario will also be tested in order to consider a less costly option and its potential impacts on user benefits:

Alternative Scenario A – Low Cost Alternative (link road and associated junctions)

4.3 User Benefits

4.3.1 *Time periods*

Benefits will be calculated through modelling for three hours – an AM peak hour, a PM peak hour and an average inter-peak hour. Based on these modelled time periods, traffic flow data will be used to replicate all-day benefits, so far as is reasonable, through use of representative proportions of the modelled hours. The relationship between user benefits and traffic flows in the modelled periods will be used to determine these factors.

4.3.2 *Appraisal period*

The primary aim of the scheme is to deliver a new link road section between Marsh House Lane and Ivinson Road, as well as a number of other interventions at key junctions across Darwen in order to facilitate housing and employment Local Plan site allocations across the town. With adequate maintenance these infrastructure improvements will not be limited to a finite period of operation and costs of renewing assets are included in the appraisal. Therefore the appraisal period will be set at 60 years.

4.3.3 *Additional user time savings*

User time benefits will predominantly be captured using a TUBA based assessment based upon the highway elements of the transport model.

4.3.4 *Revenue*

There is no revenue associated with this scheme.

4.3.5 *Limitations of the modelling*

Mode shift is not considered as there is no public transport alternative on the route.

4.3.6 *Scheme costs*

The costs of scheme implementation will be assessed to capture changes to infrastructure. This has initially been done based on a bill of quantities method and will be updated using tendered prices when available. These costs will include risk (risks determined through a risk workshop with key stakeholders) and be adjusted for real cost inflation and optimism bias as appropriate for a scheme at preliminary design stage. Any additional maintenance or renewal costs which may be required will also be captured but will not be included within the funding request.

4.3.7 *Accidents*

Local accident data will be used to identify current levels of collisions within the study area and this will enable a quantified assessment of the accident reductions forecast as a result of the scheme.

The impact of the scheme on road traffic accidents will be assessed on a combined link and junction basis using the COBALT software package. This will capture the effects of changing link speeds and flows resulting from the scheme.

4.3.8 *Reliability*

The impacts of the scheme on car journey times are expected to show a positive effect resulting from journey time improvements and decongestion at the main junction. It is anticipated that there will be a small improvement to journey time reliability as a consequence of the DEDC scheme although it is not intended to try and capture these benefits.

4.3.9 *Regeneration/Wider economic impacts*

The scheme will support local development and have a positive impact on business and non-business users and transport operators. A GVA assessment shall be undertaken and the results presented in the SOBC.

4.3.10 *Distributional Impacts (DIs)*

Social and Distributional Impact (DI) assessments are used to evaluate a transport intervention's social impacts and how they vary across the different social groups. The proposed methodology considers TAG Unit A4 – Social and Distributional Impacts.

DI appraisal will take place as per the 3 stage process outlined below.

Step 1 is a screening process which identifies the likely impacts for each indicator. The results of this process will be entered into a screening pro-forma.

Step 2 is the assessment process which includes:

- Confirmation of the area impacted by the transport intervention (impact area);
- Identification of social groups in the impact area; and
- Identification of amenities in the impact area.

Step 3 is the appraisal of impacts which completes a full appraisal of the DI and completion of the Appraisal Summary Table (AST).

There are eight indicators to be assessed. These have been outlined below including the results of the initial screening:

- User benefits – yes, proceed to step 2
- Noise – to be assessed following modelling results
- Air quality – to be assessed following modelling results
- Accidents – to be assessed following modelling results
- Personal affordability - to be assessed following modelling results
- Security – No impact
- Severance - to be assessed following modelling results
- Accessibility - No impact

5. Environmental Scoping

Guidance published by the Government for the preparation of Environmental Assessments of road schemes is contained in the Department of Transport's Design Manual for Roads and Bridges (DMRB) Volume 11 Environmental Assessment sections 1, 2 and 3 sets out both the general process and the methods for assessing individual environmental topics. The proposed methodology also considers TAG Unit A3 - Environmental Impact Appraisal.

Prior to the commencement of works on the environmental assessment it is best practice to establish the scope of the environmental assessment (HA 204/08). The objective of this is to identify the environmental topics to be taken into account in respect of the Darwen East Development Corridor Scheme and to set out the methodology for assessment. This appraisal will ascertain which environmental topics are to be examined in greater detail i.e. a simple or detailed assessment, and which can be 'scoped out' (basic assessment). It should be noted that environmental appraisal inputs into an ASR whilst similar to a scoping stage, is not a formal scoping report in accordance with HA 204/08 although principles of this guidance, in terms of determining potential impacts and appropriate level of subsequent assessments i.e. basic, simple and detailed area adopted for the ASR. For each topic the following sections will be considered:

- Baseline conditions and need for further assessment;
- Significance of effects; and
- Scope for mitigation.

5.1 Baseline conditions and need for further assessment

The baseline conditions for each of the environmental topics covered by the environmental assessment report will include a review of available information using various methods, including literature research, site surveys/investigations, consultations and desktop review of previous reports and studies. A simplified baseline/existing knowledge and data section is included in this report, which identifies existing conditions and the need to undertake further surveys required to provide a more accurate baseline of existing conditions. This will provide a more robust prediction of the environmental impacts of the Darwen East Development Corridor scheme.

5.2 Significance of effects

The assessment will identify the potential impacts that might occur due to the construction and operation of the Darwen East Development Corridor scheme. Impacts may be adverse/negative or beneficial/positive, direct, indirect, secondary or cumulative, temporary or permanent, short, medium or long term. Impacts can affect the environment in a variety of ways. The differing parts of the environment affected by a scheme are known as receptors, i.e. those things that

receive an impact from a scheme. Receptors can range from individual plants, animals or human beings living in or passing through the area, through to the landscape as a whole and the physical, ecological and cultural elements within it.

The assessment of the impacts of the Darwen East Development Corridor scheme will be based on agreed mitigation measures being designed into the scheme, taking account any change in effectiveness over time, such as growth of planting, the establishment of new habitats or the change in noise generation from older road surfaces.

Chapter of DMRB Volume 11 Section 2 Part 5 introduces the general principle underlying the assessment process, which can be summarised generally, although not necessarily for every topic, as a three-step process:

- The evaluation of the value, importance or sensitivity of the receptors;
- Assessment of the magnitude of the impact of the scheme on the receptor, be it adverse or beneficial; and
- Determination of the significance of the effect resulting from combining the impact (of a certain magnitude) on a receptor (of a particular value).

Significance criteria will be set out for each assessment topic following this three step approach. See the following assessment matrix, to determine value of sensitivity of receptor, the magnitude of impact to determine the significance of effect.

Figure 5.1 - Assessment Matrix

		Magnitude of Impact (Degree of Change)				
		No Change	Negligible	Minor	Moderate	Major
Environmental Value (Sensitivity)	Very High	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large
	High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
	Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
	Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
	Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

5.3 Scope for mitigation

The following list summarises the basic principles which road design should seek to adhere to:

- Biodiversity: avoid key sites; help create new habitats through careful use of trees, hedgerows and ground cover;
- Land use: avoid high grade agricultural land, where possible;
- Noise: use design to avoid noise at sensitive locations, e.g. careful choice of horizontal and vertical alignment; use of low noise surfaces. If problems persist, consider the use of noise fences or bunds, and as a last resort use double glazing to cut down noise levels inside dwellings;
- Water and flooding: in order to avoid rapid discharge of rainwater into watercourses, the use of balancing ponds is proposed. This and other forms of sustainable urban drainage systems (SUDS) could benefit water quality, and in turn foster improvements to biodiversity quality;
- Landscape: use of planting and topography to 'hide' development from public view; and
- Pedestrians, cyclists, equestrians and community effects: use design to ensure that the local network fosters walking, horse-riding and cycling.

6. Environmental Topics

The following topics are considered according to the criteria outlined above:

- Noise;
- Air quality;
- Greenhouse gases;
- Landscape and townscape;
- Heritage and historic resource;
- Ecology and nature conservation; and
- Water environment.

6.1 Noise

The assessment and mitigation of road traffic noise and vibration is carried out according to established prediction and assessment methodologies that are governed or guided by the following key documents:

- DMRB Volume 11, Section 3, Part 7 – Noise and Vibration 2011 HD213/11 Revision 1, which includes guidance on the assessment methods for noise and vibration from new highways;
- The Calculation of Road Traffic Noise 1998 (CRTN);
- Noise Insulation Regulations 1975 (as amended);
- The Highways Noise Payments and Movable Homes (England) Regulations 2000 (as amended); and
- Environmental Protection Act 1990.

Assessment of construction noise and vibration is also carried out according to assessment methodologies that are governed or guided by the following key documents:

- BS 5228 Noise and Vibration Control on Construction and Open Sites 2009; and
- Control of Pollution Act 1974.

6.1.1 *Baseline*

The main receptors, in the vicinity of the proposed Darwen East Development Corridor scheme, are residential receptors located in proximity to the proposed route alignment along existing highway. Based on desk based observations of the area surrounding the proposed scheme, the predominant noise source affecting existing noise sensitive receivers is likely to be the A666.

6.1.2 *Methodology*

The objective of an assessment at this basic (scoping) is to establish an appreciation of the likely noise and vibration consequences associated with the project. DMRB Volume 11, Section 3, Part 7 – Noise and Vibration 2011 HD213/11 Revision 1 provides threshold values against which changes in noise due to the project should be compared, and assessed in both the short-term (on scheme opening) and in the long-term (over the design period, typically 15 years after scheme opening).

The threshold criteria for traffic noise assessment during the day time period is a permanent change in magnitude of at least 1dB(A) LA10, 18hr in the short-term, or of at least 3dB(A) LA10, 18hr in the long-term. Additionally, for night-time noise impacts, a threshold criterion of a change in magnitude of at least 3dB(A) Lnight, outside applies, but only where an Lnight, outside greater than 55dB is predicted in any scenario.

The first step in assessing if an assessment should continue beyond scoping (basic assessment) stage is to identify if the Darwen East Development Corridor scheme will result in any physical changes to the vertical or horizontal alignment of carriageway; if there will be any changes in traffic flow, composition or speed; or if there will be any other changes to infrastructure with the potential to result in changes to noise levels in the vicinity.

The second step in assessing if an assessment should continue beyond scoping (basic assessment) stage is to identify the extent of the study area and establish if any noise sensitive receptors (dwellings, hospitals, schools, community facilities, or designated areas such as AONB, SAC, SPA, SSSI etc.) exist within the study area. The DMRB requires calculations of noise impacts at locations within 600m of both a scheme boundary, and within 600m of any other affected routes within 1km of a scheme boundary – this area is referred to as the detailed calculation area.

For affected routes outside of this area where noise calculations have been undertaken, the study area is defined as 50m either side of the centreline of these routes. A route is affected where a change in noise of more than 1 dB(A) on opening or of more than 3 dB(A) over the design period is predicted – these routes are referred to as the wider road network, and form the wider calculation area. DMRB notes that if any sensitive receptors are identified within the study area then the assessment must continue to at least a simple stage assessment, depending on the expected potential for noise and vibration impacts.

The final step in assessing if an assessment should continue beyond scoping (basic assessment) stage is to identify if the threshold values are likely to be met or exceeded. If it is clearly evident that the threshold values will be exceeded then assessment should progress to a detailed stage assessment.

6.1.3 *Likely scale of impact*

The Darwen East Development Corridor scheme may increase the number of car vehicle journeys due to currently suppressed demand being realised but will also reduce congestion.

In the absence of robust forecast traffic data corresponding to the scheme it is anticipated that the operational phase of the proposed scheme would result in a number of changes to noise sources due to alteration of the alignment of the running lanes and differences in the flow, speed and composition of traffic which could impact upon receptors in proximity of the route.

DMRB requires that traffic flow data be provided as 18-hour annual average weekday traffic flows (AAWT). For an increase in noise level of 1dB LA10,18-hour, the predicted change in traffic flow would have to increase by 25% or decrease by 20%, while a 3dB LA10,18-hour change would correspond to an increase in traffic of at least 100% or a decrease of at least 50%. This results in a need for a detailed noise assessment to be undertaken as set out below. Existing traffic data will be used to predict the change in noise level on the road links represented by the traffic model. The basic noise level expected to be experienced will be calculated in accordance with the methodology as set out in the Department for Transport document 'Calculation of Road Traffic Noise 1988' (CRTN). The difference between the basic noise levels for differing scenarios may then be compared to present the expected noise impacts of the Darwen East Development Corridor scheme.

Typically the short-term (opening) impact of such a scheme would be presented by comparing the opening year Do something against the opening year Do minimum; and the long-term impact would be presented by comparing the future year Do something against the opening year Do minimum.

It is anticipated that construction of the Darwen East Development Corridor scheme could potentially cause noise and vibration disturbance to receptors proximate to the scheme, for example through construction traffic travelling to and from worksites, ground breaking, aggregate handling etc. associated with improvement works. Such impacts, however, would be limited by the use of best practicable means, which would be set out in a Construction Environmental Management Plan.

6.1.4 *Summary*

It is considered that the Darwen East Development Corridor scheme would result in a number of changes to noise sources which could impact upon receptors in proximity of the proposed route. As a consequence an assessment of the schemes impact on air quality in accordance with the DMRB will be undertaken.

6.2 Air quality

6.2.1 *Existing knowledge and data*

The air quality study area is currently defined as within 200m of the Darwen East Development Corridor (i.e. within 200m of the proposed route) as traffic data in a suitable format was not available at this time to determine changes in traffic, composition and speed due to the Darwen East Development Corridor scheme to enable an air quality affected road network to be identified.

The air quality study area is within the boundaries of Blackburn with Darwen Borough Council and also contains Air Quality Management Areas (AQMA) at Earcroft and Darwen Circus. Blackburn with Darwen Borough Council carry out regular reviews and assessments of local air quality in these areas and these will be considered.

6.2.2 *Likely scale of impact*

The Darwen East Development Corridor scheme may increase the number of vehicles using certain parts of the local highway network. The need for air quality assessment is determined in accordance with traffic change criteria set out in HA207/07 DMRB Volume 11 Section 3 Part 1, based on comparing without scheme (Do Minimum) and with scheme (Do Something) scenarios in the opening year. The traffic change criteria are:

- road alignment will change by 5m or more, or daily traffic flows will change by 1,000 annual average daily traffic (AADT) or more, or
- HDV flows will change by 200 AADT or more, or
- daily average speed will change by 10 km/hr or more, or
- peak hour speed will change by 20 km/hr or more.

The possible increase in road traffic is not expected to exceed the air quality traffic change criteria for HDV flows however this cannot be confirmed at this stage.

Given the possible changes in traffic due to the Darwen East Development Corridor scheme, the absence of robust forecast traffic data corresponding to the scheme and the location of air quality sensitive receptors relative to road widening the effect on air quality at this stage cannot be confirmed until further assessment using forecast traffic data is undertaken.

6.2.3 *Data requirements and survey approach*

Any further air quality assessment would require road traffic flow data for a base year, and without and with the scheme in the opening year. Data for future year traffic scenarios should account for traffic associated with all committed developments in the local authority area and should apply appropriate growth factors. The following data are the minimum required for each road link where traffic is expected to change as a result of the Darwen East Development Corridor scheme in each scenario:

- 24-hour annual average daily traffic (AADT) flow (combined for 2-way roads);
- Percentage heavy duty vehicles (HDVs). An HDV is any vehicle with a gross weight in excess of 3.5t, including heavy goods vehicles and coaches;
- Average daily speed for each road link in km/hour traffic model data for flow, composition and speed.

Ongoing air quality monitoring surveys are being undertaken by Blackburn with Darwen Borough Council. No additional air quality surveys are proposed.

6.2.4 Proposed methodology

Any further air quality assessment will be undertaken principally following the guidance given in DMRB HA207/07. The assessment would focus on operational effects for local air quality. This will be reported in the Strategic Outline Business Case.

6.2.5 Summary of communications

Air quality consultation with the air quality specialist at Blackburn with Darwen Borough Council will be undertaken.

6.2.6 Summary of risks

The primary risk for the air quality assessment is related to the use of the transport model outputs. Table 6.1 below summarises the risks.

Table 6.1 - Risks for Air Quality

No.	Risk	Likelihood (H/M/L)	Severity (H/M/L)	Mitigation	RR
AQ1	A change in traffic forecasts during scheme development which results in a change to air quality assessment affected road network.	Medium	High	<ul style="list-style-type: none"> – Determine the traffic model reliability area and the air quality assessment affected road network (ARN) at the earliest possible opportunity after traffic model forecasts are complete at each stage in the scheme development. – Close communication between traffic forecasting team and air quality specialists throughout the scheme development. 	Medium

6.3 Greenhouse gases

6.3.1 Existing knowledge and data

Baseline greenhouse gas emissions data specifically for the scheme are not currently available.

6.3.2 Constraints

There are not expected to be constraints related to greenhouse gases.

6.3.3 *Likely scale of impact*

The greenhouse gases assessment is concerned with changes in emissions of carbon dioxide (CO₂). The Darwen East Development Corridor scheme may increase the number of vehicles using certain parts of the local highway network and may alter the average speed of vehicles (increasing where congestion currently exists, reducing it if over 30mph in any locations due to new speed limit).

The need for assessment is determined in accordance with traffic change criteria set out in HA207/07 DMRB Volume 11 Section 3 Part 1, based on comparing without Scheme (Do Minimum) and with Scheme (Do Something) scenarios in the opening year. The traffic change criteria are:

- road alignment will change by 5m or more, or
- daily traffic flows will change by 1,000 annual average daily traffic (AADT) or more, or
- HDV flows will change by 200 AADT or more, or
- daily average speed will change by 10 km/hr or more, or
- peak hour speed will change by 20 km/hr or more.

The possible increase in road traffic is not expected to exceed the traffic change criteria for HDV flows and on this basis the changes in greenhouse gas emissions are expected to be scoped out once robust forecast traffic data corresponding to the Darwen East Development Corridor scheme is available.

6.3.4 *Data requirements and survey approach*

Any further air quality assessment would require road traffic flow data for a base year, and without and with the scheme in the opening year. Data for future year traffic scenarios should account for traffic associated with all committed developments in the local authority area and should apply appropriate growth factors. The following data are the minimum required for each road link where traffic is expected to change as a result of the Darwen East Development Corridor scheme in each scenario:

- 24-hour annual average daily traffic (AADT) flow (combined for 2-way roads);
- Percentage heavy duty vehicles (HDVs). An HDV is any vehicle with a gross weight in excess of 3.5t, including heavy goods vehicles and coaches;
- Average daily speed for each road link in km/hour traffic model data for flow, composition and speed.

No surveys are proposed for greenhouse gases.

6.3.5 *Proposed methodology*

Any further greenhouse assessment will be undertaken principally following the guidance given in DMRB HA207/07. The assessment would focus on operational effects for greenhouse gases and would be reported in the Business Case.

6.3.6 *Summary of communications*

No consultation is proposed for greenhouse gases.

6.3.7 *Summary of risks*

The primary risk for the greenhouse gas assessment is related to the use of the transport model outputs. Table 6.2 overleaf summarises the risks.

Table 6.2 - Risks for Greenhouse Gases

No.	Risk	Likelihood (H/M/L)	Severity (H/M/L)	Mitigation	RR
GHG1	A change in traffic forecasts during scheme development which results in a change to air quality assessment affected road network.	Medium	High	Determine the traffic model reliability area and the air quality assessment affected road network (ARN) at the earliest possible opportunity after traffic model forecasts are complete at each stage in the scheme development.	Medium

6.4 Landscape and Townscape

6.4.1 *Baseline*

The Countryside Character Initiative, overseen by Natural England, is concerned with the character of England’s countryside at the end of the 20th Century and has mapped the country into 159 separate, distinctive character areas. These National Character Areas (NCA) are intended to contribute towards policy development and local planning, action and development. The proposed Darwen East Development Corridor scheme lies within National Character Area (NCA) 36 South Pennines. The key characteristics relevant to the study area are:

- part of the Pennine ridge of hills, lying between the Peak District National Park and Yorkshire Dales National Park.
- a landscape of large-scale sweeping moorlands, pastures enclosed by drystone walls, and gritstone settlements contained within narrow valleys.
- area contains internationally important mosaics of moorland habitats which support rare birds such as merlin, short-eared owl and twite.

The proposed Darwen East Development Corridor scheme location has no statutory landscape designation in the study area.

6.4.2 *Methodology*

The methodology for the assessment will involve undertaking a desk based scoping study including an assessment of properties and local views potentially affected by the Darwen East Development Corridor scheme.

If the scoping determines a need for further assessment, this will be based on DMRB IAN 135/10 Landscape and Visual Effects Assessment that aligns the landscape, townscape and visual assessments with the generic guidance provided in IAN 81/06. The DMRB approach requires an appreciation of the landscape context, as a basis to evaluate the sensitivity of the surroundings to visual change and the constraints placed upon the design of the highway scheme and its environmental measures. Work includes identification of landscape character areas and detailed assessment of the visual impact of the proposals on public visual receptors including residential property, public rights of way and public open space in the area. This analysis is carried out concurrently with the scheme design and forms part of a continuing process of design refinement, ensuring that the landscape proposals are developed as an integral part of the project.

The Countryside Agency (now part of Natural England) produced detailed guidance on the systematic identification and evaluation of landscape character, of which the current edition was published in April 2002. This includes the idea of a sequential depiction of the landscape character, from regional down to local level, with the level of detail amended to suit the scale of the study.

6.4.3 *Likely scale of impact*

Whilst the majority of the Darwen East Development Corridor scheme's proposals are alterations to the existing road environment, the scheme could have adverse effects, including:

- Loss of habitat through loss of trees;
- Loss of habitat through loss of Greenfield land;
- Impact on visual amenity by tree and Greenfield land removal on route; and
- Impact from the new layouts, associated signage and highways design on visual amenity.

6.4.4 *Summary*

Further consideration of the potential loss of trees and Greenfield land is needed and an environmental appraisal will inform the design process and assist in formulating the detailed design proposals. It is therefore proposed that simple assessment should be used due to the potential significant landscape and visual effect that is anticipated through tree removal.

6.5 Heritage of Historic Resources

6.5.1 *Baseline*

There are 26 listed buildings in Darwen. Within the scheme corridor there are no historic resources.

6.5.2 Methodology

The historic environment resource encompasses designated and undesignated assets including Scheduled Monuments, Listed Buildings (statutorily listed and locally listed), Conservation Areas, World Heritage Sites, Registered Parks and Gardens, Registered Historic Battlefields, historic buildings (unlisted), known archaeological sites and areas of archaeological potential. The methodology for the assessment will involve undertaking a desk based scoping study considering the character and quality of the study area.

If the scoping study deems it necessary an assessment will be undertaken as part of the environmental assessment for the three sub-topics as identified in DMRB as follows:

- Archaeology: the potential effects on known and as-yet unknown archaeological remains;
- Built heritage: potential physical impact on designated and un-designated built heritage assets and changes to the setting of designated heritage assets in the landscape (including long views); and
- Historic landscape character: potential visual alterations of the integrity of the historic landscape character within which the proposal site is situated.

If the full assessment is required, baseline information would be collected from a number of sources, including (but not limited to):

- Lancashire Historic Environment Record (HER);
- National Heritage List for England maintained by English Heritage;
- Cartographic (including superseded Ordnance Survey maps and other relevant historic mapping);
- Aerial photographic data held by Blackburn with Darwen Borough Council (if available);
- Historic Landscape Characterisation data; and
- Relevant secondary sources to inform the archaeological and historic background of the assessment.

In addition following the initial data collection, a walkover survey would be carried out in relation to relevant scheme elements as part of the environmental assessment process, with the aim to identify known constraints and their condition, to assess the potential for survival of constraints as yet unidentified (i.e. buried archaeological remains), and to assess the setting and sensitivity of any visual receptors identified.

Blackburn with Darwen Borough Council's Historic Environment Service and Conservation Officer (or equivalent) will be consulted further on any issues identified and the need for further field-based assessment and/or mitigation in relation to them.

Within the environmental assessment process, the significance of effect would be determined through assessing the magnitude of predicted change and the importance of the affected resource. The scale of impact of the proposed scheme on the heritage resource will be described qualitatively in the assessment, in terms of impairment or loss of significance. Incremental, secondary or cumulative impacts will be considered. This methodology is based on that set out in the DMRB Volume 11, Section 3, Part 2, Cultural Heritage, paragraphs 5.13.1

(Archaeological Remains); 6.13.1 (Historic Buildings); 7.13.1 (Historic Landscapes). This is the standard methodology used for quantifying impacts on the historic environment resource.

The value (or significance) of each element of the historic environment resource would be determined using methodologies broadly reflecting the Secretary of State's criteria for Scheduling Monuments. The value of the built heritage would also take into consideration whether features or sites are statutorily designated or not.

By combining the magnitude of the impact (or change) as a result of the Darwen East Development Corridor scheme and the significance of each resource, and based on professional judgement, an assessment will be made of the significance of effect, taking into account the possibility and nature of mitigation.

6.5.3 *Likely scale of impact*

The types of impacts that can occur include physical impacts such as destruction or truncation of assets, and setting impacts, which occur when a new structure impacts negatively on the surroundings in which a heritage asset is experienced. Both of these types of impact can diminish the significance of heritage assets.

There should be no physical impacts to above ground heritage assets, such as Listed Buildings, arising from the Darwen East Development Corridor scheme. Ground works associated with the proposed local highway improvements would have the potential to truncate or destroy any as yet unknown archaeological remains buried within the scheme's land take however this is very unlikely due to the extent of the scheme.

6.5.4 *Summary*

In light of the limited extent of the scheme, any such anticipated impact is anticipated to be minor; so in that regard further historic assessment should be scoped out.

6.6 Ecology and Nature Conservation

6.6.1 *Baseline*

There are no Wetlands of International Importance (Ramsar), Special Protection Areas (SPA), Special Area of Conservation (SAC), Sites of Special Scientific Interest (SSSI) within 2 km of the proposed works.

6.6.2 *Methodology*

Due to the small scale and localised nature of the Darwen East Development Corridor scheme it is not considered that the impacts would extend beyond the footprint of the road construction and its immediate surroundings. Therefore a maximum zone of 2km is appropriate for the search area for statutory designated sites and 1km is appropriate for the desk study search area for non-statutory sites and notable and protected species. The scoping study will consider the nature of the scheme and decide on an appropriate area to survey (this will consider the

scheme footprint itself - the road plus construction area, access routes and storage areas – plus a given distance around this).

The assessment and characterisation of impacts for the purposes of an environmental assessment, if required according to the scoping study, would be carried out following the approach set out in DMRB Volume 11, Section 2 Part 5 and IAN 130/10. As set out in section 2.5 of the IAN, the valuation of receptors and characterisation of ecological impacts would be considered to in order to determine the significance of impacts of the proposed works.

The nature conservation value or potential value of an ecological feature (or receptor) is determined within a defined geographic context:

- International importance (e.g. Special Areas of Conservation, Special Protection Areas, Ramsar sites);
- National importance (e.g. Sites of Special Scientific Interest in England, Scotland and Wales and Areas of Special Scientific Interest in N Ireland);
- County importance (e.g. Sites of Importance for Nature Conservation);
- Important within the District/ Borough;
- Local (parish) importance (e.g. significant ecological features such as old hedges, woodlands, ponds);
- Important within the site and immediate environs e.g. habitat mosaic of grassland and scrub (i.e. within the zone of influence only); and
- Negligible importance would usually be applied to areas such as built development or areas of intensive agricultural land.

It should be noted that it is usual to consider habitats and species together when ascribing a value to a feature using this geographic context. However, there are circumstances where an ecologist may feel it necessary to assign a value to a particularly valuable species. In assigning value to species it is necessary to consider the species distribution and status including a consideration of trends based on available historical records and to make use of any relevant published evaluation criteria. For instance, the presence of a significant population of European protected species such as bats may be worth separate consideration.

If required as per the scoping study an assessment of the potential impacts of the Darwen East Development Corridor scheme would need to take into account both on-site impacts and those that may occur to adjacent and more distant ecological features. Impacts can be positive or negative.

Negative impacts can include:

- Direct loss of wildlife habitats;
- Fragmentation and isolation of habitats;
- Disturbance to species from noise, light or other visual stimuli;
- Changes to key habitat features; and
- Changes to the local hydrology, water quality and/or air quality.

Negative and positive impacts on nature conservation features have been characterised based on predicted changes as a result of the proposed activities. In order to characterise the impacts on each feature, the following parameters are taken account of:

- The magnitude of the impact;
- The spatial extent over which the impact would occur;
- The temporal duration of the impact;
- Whether the impact is reversible and over what timeframe; and
- The timing and frequency of the impact.

The assessment would identify those positive and negative impacts which would be 'significant', based on the integrity and the conservation status of the ecological feature. Impacts are unlikely to be significant where features of local value or sensitivity are subject to small scale or short term impacts. However, where there are a number of small scale impacts that are not significant alone, it may be that, cumulatively, these may result in an overall significant impact.

Assessment would consider ecological mitigation that would then be incorporated into the detailed design of the Darwen East Development Corridor scheme and the programme and methods for site works, particularly any works involving vegetation clearance. Mitigation will be designed to take account of legal requirements regarding protected species as well as any significant impacts indicated by the environmental assessment.

6.6.3 *Likely scale of impact*

The likely impacts during construction and operational phases are listed in Table 6.3 below.

Table 6.3 - Likely Ecology Impacts of the Scheme in Construction and Operation

Ecological Feature	Description of likely construction and operational impact
Trees	<p>Construction: The number of trees to be affected by the proposed works can only be confirmed following a landscape/arboricultural survey and once the final design is confirmed.</p> <p>Operation: There could be impacts on remaining non-felled trees and relocated trees (i.e. to their root zones) adjacent to the Darwen East Development Corridor. Mitigation will need to be advised by an arboriculturalist.</p>
Hedges	<p>Construction: Potential for severance and loss of hedgerow and associated ground flora would be confirmed upon ecology survey if deemed necessary. Operation: No impact on hedgerows is anticipated during the operation of the Darwen East Development Corridor scheme. New hedges could be planted to mitigate for lost hedgerow to ensure there is no net loss of this habitat if any is required.</p>
Bats	<p>Construction: Potential loss of habitat in trees and fragmentation of tree line canopy and hedge lines features which may be used as commuting routes.</p> <p>Operation: No impacts are anticipated during the operation of the scheme following implementation of mitigation advised as a result of ecology survey.</p>
Birds	<p>Construction: Potential loss of breeding bird habitat in the form of hedges, scrub, shrubs and trees.</p> <p>Operation: No impacts are anticipated during the operation of the scheme following implementation of mitigation advised as a result of ecology survey.</p>
Reptiles	<p>Construction: Potential loss of habitat; hedgerows, grass verges and scrub used as basking, foraging and shelter sites.</p> <p>Operation: No impacts are anticipated during the operation of the scheme following implementation of mitigation advised as a result of ecology survey.</p>
Amphibians (great crested newts)	<p>Construction: Potential loss of terrestrial habitat; hedgerows, grass verges and scrub used as basking, foraging and shelter sites.</p> <p>Operation: No impacts are anticipated during the operation of the scheme following implementation of mitigation advised as a result of ecology survey.</p>

6.6.4 *Summary*

Whilst the majority of works proposed are within the existing road boundary and much of the work is relatively superficial, at this stage construction sites are not known and along with vegetation removal for widening there could be minor loss of habitat. Furthermore, the loss and relocation of trees could lead to adverse effects on species such as bats and birds. The key adverse impacts are therefore:

- The permanent loss and/or fragmentation of habitats (trees and potentially hedges);
- The potential loss of bat roosts;
- The potential fragmentation of bat flight lines and potential loss of foraging habitat;
- The loss of breeding bird habitats; and
- The potential loss of habitat suitable for reptiles.

The scoping study will consider the potential for protected species/nesting birds to be present in trees proposed for felling and may therefore recommend a further simple assessment due to the potential presence of protected species, if so this would be undertaken.

6.7 Water Environment

6.7.1 *Baseline*

Whilst the majority of the scheme is an urban environment, several drains either bisect or are adjacent to the proposed Darwen East Development Corridor scheme's route.

6.7.2 *Methodology*

At the scoping stage, identification of likely significance of effects is qualitative and follows the requirements of the DMRB process as set out in the DMRB HD45/09. The study area for the water environment is defined as 1km from the centre line of the scheme and includes all water bodies, watercourses and associated assets (abstraction points, discharges etc.).

The likely impacts of the Darwen East Development Corridor scheme will be considered in the scoping study and used to answer a set of questions written into the DMRB HD45/09. If any of the answers to the following questions is 'yes' then further simple assessment may need to be undertaken:

- Will the scheme affect an existing watercourse or floodplain?
- Will the scheme change either the road drainage or natural land drainage catchments?
- Will the scheme lead to an increase in traffic flow of more than 20%?
- Will the scheme change the number or type of junctions?
- Is any of the scheme located within an indicative floodplain or a Source Protection Zone (SPZ)?
- Will earthworks result in sediment being carried to watercourses?
- Will the scheme allow drainage discharges to the ground?

This assessment should also include consideration of whether there is to be any culverting (or extensions to culverting), river re-alignment or impact on aquatic ecology to meet any

requirements for Water Framework Directive (WFD) 2000/60/EC compliance assessments that may be requested by the Environment Agency.

6.7.3 *Likely scale of impact*

Potential impacts from the Darwen East Development Corridor scheme during construction include transfer of silt, spillages, working in floodplains, storage of materials and temporary impermeable areas at site compounds.

The proposed drainage is likely to be kerbs and gullies with some retention built in with oversize carrier pipes. Drainage during operation has the potential to impact on water quality due to increased traffic flows and the increased potential this has on pollutant loading from road runoff. By extending hard surface area of the carriageway, increased volumes of water are collected that can exacerbate flooding.

6.7.4 *Summary*

The scoping study will assess the main water receptor. If required further assessment will be undertaken to determine if there will be an adverse impact on the surface or groundwater receptors.

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