



## Preface

The Department for Infrastructure (DfI) Northern Ireland is proposing to extend the existing Black's Road Park and Ride carpark in Dunmurry. This Environmental Statement (ES) reports the findings of the environmental assessments undertaken during the development of the Park and Ride facility.

Information relating to the Environmental Statement and supporting documentation is available in three volumes:

- Volume 1 – Non-Technical Summary
- Volume 2 – Environmental Statement
- Volume 3 - Figures

Copies of the Environmental Statement, along with the additional volumes outlining the information provided in the ES, will be made available for review or purchase at the following address:

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The documents are also available to download at:

<https://www.infrastructure-ni.gov.uk/topics/road-improvement-schemes>

**Document Control Sheet**

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## List of Abbreviations

<b>AADT</b>	Average Annual Daily Traffic
<b>AAWT</b>	Average Annual Weekday Traffic
<b>AOD</b>	Above Ordnance Datum
<b>AQMA</b>	Air Quality Management Area
<b>AQO</b>	Air Quality Objective
<b>ASSI</b>	Area of Special Scientific Interest
<b>bgl</b>	Below ground level
<b>Ch</b>	Chainage
<b>CRTN</b>	Calculation of Road Traffic Noise
<b>DAERA</b>	Department of Agriculture, Environment and Rural Affairs
<b>DCAL</b>	Department of Culture, Arts and Leisure
<b>Defra</b>	Department of Environment, Food and Rural Affairs
<b>DfI</b>	Department for Infrastructure
<b>DMRB</b>	Design Manual for Roads and Bridges
<b>EIA</b>	Environmental Impact Assessment
<b>ES</b>	Environmental Statement
<b>EU</b>	European Union
<b>GSNI</b>	Geological Survey of Northern Ireland
<b>ha</b>	hectares
<b>HGV</b>	Heavy Goods Vehicles
<b>IAN</b>	Interim Advice Note
<b>IHR</b>	Industrial Heritage Record
<b>JNCC</b>	Joint Nature Conservation Committee
<b>km</b>	kilometres
<b>LA10, 18hr</b>	A-weighted sound level in dB that is exceeded 10% of the time in an 18 hour period
<b>LAeq, T</b>	continuous A-weighted sound pressure
<b>LCA</b>	Landscape Character Area
<b>m</b>	metres
<b>NIEA</b>	Northern Ireland Environment Agency
<b>NNR</b>	National Nature Reserve
<b>OSNI</b>	Ordnance Survey of Northern Ireland
<b>PM10</b>	Particulate Matter of 10 microns or less

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<b>PPG</b>	Pollution Prevention Guideline
<b>PPS</b>	Planning Policy Statement
<b>SAC</b>	Special Area for Conservation
<b>SLNCI</b>	Site of Local Nature Conservation Importance
<b>SPA</b>	Special Protection Area
<b>SUDS</b>	Sustainable Urban Drainage System
<b>WFD</b>	Water Framework Directive
<b>µg</b>	micro-grams



## **1 Introduction**

### **1.1 Background to the Scheme**

- 1.1.1 The Department for Infrastructure (DfI), Transport NI Eastern Division, has commissioned Amey to undertake an Environmental Statement (ES) to support the planning application for an extension to the existing Black's Road Park and Ride carpark in Dunmurry (hereafter referred to as the scheme).
- 1.1.2 The existing car park was originally constructed in July 2006 on land owned by DfI Transport NI, which had previously been used to store materials during the construction of the M1 Motorway. The adjacent M1 Motorway and supporting side slopes limit the area available for car park construction.
- 1.1.3 A feasibility report (Ref 1.2) was produced by Transport NI exploring three different options for the proposed layout to extend the car park. The design chosen was the option which resulted in the culverting of most of the drainage ditch present on site with an additional 307 parking spaces. The proposed scheme is located adjacent to the existing Black's Road Park and Ride facility in Dunmurry.
- 1.1.4 An Environmental Study Report was undertaken in April 2016 to identify any environmental constraints and ascertain if any significant effects on the environment were likely to result from the scheme. The Environmental Study Report was to provide information during the pre-application discussions between TNI and Belfast City Council Planning Department. The assessment was undertaken in accordance with the Design Manual for Roads and Bridges (DMRB) Volume 11 Section 2 Part 4 (Ref 1.1).
- 1.1.5 At present buses travel from the Black's Road Park and Ride carpark directly to Belfast City Centre Europa Bus Station and return using the same route.
- 1.1.6 Currently this service runs Monday to Friday; however it is not operational on Saturdays or Sundays (Ref 1.3).

## **1.2 Scheme Location**

1.2.1 The scheme is located in a primarily urban landscape approximately 6.4km south west of Belfast City Centre alongside the M1 Motorway at Blacks Road, Dunmurry. Black's Road is an arterial road for travellers moving from greater Belfast and commuters travelling in and out of Belfast via the M1. Neighbouring areas which can also avail of the carpark include Dunmurry, Finaghy, Andersonstown and Balmoral. **Figure 1.1** in **Volume 3** shows the location of the scheme in its regional context in Belfast, with an aerial view presented as **Figure 1.2**.



**Photograph 1:1: Black's Road Park and Ride Entrance**

## **1.3 Environmental Statement (ES) Structure**

1.3.1 This ES has been prepared in order to support the planning application for the proposed car park, planning application reference LA04/2016/1419/F. The document provides a detailed description of the present environment and scheme proposals and a comprehensive assessment of the potential effects of the scheme proposals and agreed mitigation measures. It builds on information gained from previous reports and addresses any issues raised.

1.3.2 The ES comprises the following volumes:

- Volume 1 – Non Technical Summary
- Volume 2 – Main Text
- Volume 3 – Figures.

**1.4 ES Availability and Comments**

1.4.1 The ES will be made publicly available for review or to purchase at the following location. Opening hours for Hydebank are Monday to Friday 09.00 to 16.00.

<b>Address</b>	<b>Contact</b>
Transport NI	Ken Orr
Eastern Division	Tel: 028 9025 3023
Network Traffic & Transportation	Email: <a href="mailto:ken.orr@infrastructure-ni.gov.uk">ken.orr@infrastructure-ni.gov.uk</a>
Hydebank	
4 Hospital Road	
Belfast	
BT8 8JL	

1.4.2 The documents are also available to download at:

<https://www.infrastructure-ni.gov.uk/topics/road-improvement-schemes>

**1.5 What happens next?**

1.5.1 Construction of the extension of Black's Road Park and Ride facility will be dependent on approval from Belfast City Council Planning Service. This Environmental Statement will be considered by the Council in making their decision on whether or not to approve the extension to the existing Park and Ride facility.

## **2 Environmental Impact Assessment**

### **2.1 EIA Legislation and Guidance**

- 2.1.1 The Environmental Impact Assessment (EIA) Directive 85/337/EC has been in force since 1985 and applies to a wide range of defined public and private projects within the European Union member states. Under this legislation, the national authorities can decide whether or not an EIA is needed should the scheme fall under Annex I, II or III of the legislation.
- 2.1.2 The original EIA Directive has been amended three times and these amendments were codified by Directive 2011/92/EU. A review of the EIA Directive in 2014 led to an amended EIA Directive 2014/52/EU in 2014. The amended Directive is transposed into national legislation through the Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 2015. The aim of the amended Directive is to make environmental assessment proportionate to the scheme and ensure significant effects are fully considered.
- 2.1.3 The scheme is located in the Belfast City Council area which is responsible for planning and development within the council boundary. Under the Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 2015, the council is required to make a determination on planning applications as to whether or not an environmental impact assessment is required. This can be done either as part of a pre-application procedure by the developer or following submission of a planning application.

### **2.2 EIA Screening and Determination**

- 2.2.1 As the scheme falls within Category 10(b) of Schedule 2 of the Planning (Environmental Impact Assessment) Regulations (NI) 2015, the Council is obliged under Regulation 10 to make a determination as to whether the planning application should be accompanied by an Environmental Statement.
- 2.2.2 Following submission of the planning application to Belfast City Council, the council decided that the proposed development would be likely to have significant effects on the environment and therefore determined that the planning application must be accompanied by an Environmental Statement.

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2.2.3 The determination letter states *'the reason for this determination is the impact of the proposal when considered cumulatively with the adjoining Park and Ride facility, and its location alongside the M1 transportation corridor in close proximity to an Air Quality Management Area is likely to have a significant impact on the environment'.*

## **3 EIA Scoping**

### **3.1 Introduction**

3.1.1 Paragraph 30 of Directive 2014/52/EU states *'in order to improve the quality of an environmental impact assessment, to simplify the procedures and to streamline the decision-making process, the competent authority should ...issue an opinion on the scope and level of detail of the environmental information to be submitted in the form of an environmental impact assessment report ('scoping')*.

3.1.2 An Environmental Study Report was produced in April 2016 to identify any potential environmental constraints. The purpose of this report was to identify the issues of greatest potential significance so that impacts could be identified and appropriate mitigation measures selected.

3.1.3 The Environmental Study Report considered the following topics: Cultural Heritage, Landscape and Visual, Ecology and Nature Conservation, Geology and Soils, Materials, Air Quality, Noise and Vibration, Water Environment, and People and Communities. The report was produced in accordance with the environmental topics contained within the Design Manual for Roads and Bridges Volume 11, Section 3. The report concluded that there would be no significant effects on all topics except for nature conservation and recommended that the Environmental Health Department be consulted due to the proximity of the Belfast Air Quality Management Area No. 01.

3.1.4 Transport NI subsequently submitted the proposed scheme to the formal Pre Application Discussion Process. As part of this process Belfast City Council Planning Service consulted a number of statutory authorities. The main comments from these consultations are as follows:

- The application site is unlikely to have an impact on any sites of local/national/international importance for natural heritage and conservation areas.
- City and Neighbourhood Services; Environmental Health requested a Detailed Air Quality Assessment to be undertaken due to the close proximity of an Air Quality Management Area.
- A Transport Assessment is required to detail the effect additional/diverted traffic will have on the road network utilising the site.

- A Drainage Assessment, in accordance with PPS 15, is required due to “additional hard-surfacing over 1000m<sup>2</sup>”.

3.1.5 Following submission of the planning application, Belfast City Council made the determination that an ES was required due to the potential air quality impacts. This ES addresses the responses received during the Pre Application Discussion process.

### **Scoping**

3.1.6 A summary of the Environmental Study Report is presented below. Air Quality and Ecology and Nature Conservation were assessed in further detail in accordance with DMRB Volume 11, Section 3 (Ref 3.1). Environmental constraints in close proximity to the scheme are shown on **Figure 3.1** in **Volume 3**.

## **3.2 Cultural Heritage**

### **Baseline Conditions**

3.2.1 This section seeks to identify known and potential cultural heritage resources within the footprint of, or adjacent to, the scheme, and to define and comment on the likely impact of works resulting from the scheme on those cultural heritage resources. The section has been prepared in accordance with the Design Manual for Roads and Bridges (DMRB), Volume 11, Section 3, Part 2 HA208/07: Cultural Heritage (Ref 3.2).

3.2.2 A study area was established extending 500m from the scheme outline for all cultural heritage remains; an additional 1km study area was used to consider effects on the settings of designated resources, i.e. Scheduled Monuments and Listed Buildings.

3.2.3 A desk top study utilising the Department of the Environment's Historic Environment Division (HED) online Monuments and Buildings Record (MBR) (Ref. 3.3) was undertaken to identify constraints.

3.2.4 Within the DMRB cultural heritage assets are sub-divided into three topics. These are:

- Archaeological remains
- Historic buildings
- Historic landscape

3.2.5 For the purposes of this assessment, however, the relevant assets will be considered by character and designation.

***Scheduled Monuments***

3.2.6 There are two Scheduled Monuments within 1km of the scheme. They are the motte and the rath in Dunmurry, 800m and 1km respectively to the south west of the scheme (see Table 3.1).

**Table 3.1: Scheduled Monuments within 1km of the scheme**

<b>SMR No.</b>	<b>Type</b>	<b>Townland</b>	<b>Grid Ref</b>
ANT064:003	Rath	Dunmurry	J2869 6900
ANT064:004	Motte	Dunmurry	J28850 69110

***Listed Buildings***

3.2.7 There are 15 Listed Buildings within 1km of the scheme. The nearest resources include the gate lodge at Hunterhouse College, located approximately 240m east of the proposed scheme, and Colinmore Hunterhouse College, 350m east of the proposed scheme (see Table 3.2) (Ref. 3.3).

**Table3.2: Listed Buildings within 1km of the scheme**

<b>Ref No.</b>	<b>Address</b>	<b>Type</b>	<b>Grade</b>
HB19/20/007	Presbyterian Church, Ashley Park, Dunmurry	Church	B
HB19/20/006	Former Manse, The Glebe, Dunmurry, Belfast BT17 0PN	Hall	B2
HB19/20/005	First Presbyterian Church Non Subscribing, Glebe Road, Dunmurry, BT17 0PN	Church	A
HB19/20/003	Railway Bridge over Glen River, Upper Dunmurry Lane, Dunmurry	Bridge	B1
HB19/20/002	Railway Bridge Upper, Dunmurry Lane, Dunmurry	Bridge	B1
HB19/20/001	Manor Lodge Care Home, 5 The Manor Blacks Road, Dunmurry BT10 0NB	Residential home	B1
HB26/15/009	Finaghy Presbyterian Church Lowe Memorial, Upper Lisburn Road, Belfast	Church	B
HB26/15/002	Faith House, 25 Orpen Park Finaghy	House	B
HB26/15/003	Colinmore Hunterhouse College, Upper Lisburn Road, Finaghy	School	B1



Ref No.	Address	Type	Grade
HB26/15/004	Gate lodge & gatescreen at Hunterhouse College, Upper Lisburn Road, Finaghy	Lodge	B
HB19/20/008	Belfast Bible College, Glenburn House, Glenburn Road South, Dunmurry BT17 9JP	Office	B1
HB26/16/008	Oakhill, Lower Dunmurry Lane	House	B1
HB26/15/005	Rathmore Convent of the Sacred Heart of Mary, Kingsway, Finaghy	School	B1
HB19/20/011	St Colman's Church of Ireland, Church Avenue, Dunmurry	Church	B2
HB26/15/009	Finaghy Presbyterian Church Lowe Memorial, Upper Lisburn Road, Belfast	Church	B

***Recorded Archaeological Sites***

3.2.8 There are two further recorded sites and monuments within 1km of the scheme. The nearest resource is a flint findspot located approximately 74m southwest of the scheme, and the other is the site of an enclosure in the grounds of Rathmore School, 530m to the southeast (see Table 3.3) (Ref. 3.3).

**Table 3.3: Recorded archaeological sites within 1km of the scheme**

SMR No.	Type	Townland	Grid Ref
ANT 064:080	Findspot	Dunmurry	J2962 6923
ANT 064:037	Enclosure	Dunmurry	J2995 6877

***Registered Parks, Gardens and Demesnes***

3.2.9 There are no registered parks, gardens and demesnes within 300m of the scheme. The nearest resource comprises the gardens at Oak Hill (AN162), over 720m to the southwest of the scheme (Ref. 3.3).

***Defence Heritage Sites***

3.2.10 There is one defence heritage site within 500m of the scheme, consisting of a forward defended locality in the Belfast Defence Scheme, approximately 125m to the east of the scheme (see Table 3.4) (Ref. 3.3).

**Table 3.4: Defence Heritage resources within 500m of the scheme**

<b>DHP No.</b>	<b>Type</b>	<b>Grid Ref</b>
579	Forward defended locality	J2995 6938

***Industrial Heritage Sites***

3.2.11 There is one industrial heritage resource within 300m of the scheme; this is Farmhill Bridge which is located 160m north of the scheme (Ref. 3.3). A further three industrial heritage sites are located within 500m; they consist of two former gasworks and a former flax mill (see Table 3.5).

**Table 3.5: Industrial heritage resources within 500m of the scheme**

<b>IHR No.</b>	<b>Type</b>	<b>Grid Ref</b>
00062:160:00	Bridge	J2968 6963
07426:000:00	Flax spinning mill	J2935 6910
07433:000:00	Gasworks	J2928 6904
10394:000:00	Gasworks	J3014 6898

**Areas of Archaeological Potential**

3.2.12 There are no relevant Areas of Archaeological Potential (AAPs) within 300m of the scheme. The nearest resource identified in the Belfast Metropolitan Plan Area 2015 (Ref 3.4) is an area of Belfast City, approximately 7km north east of the scheme.

**Areas of Townscape Character**

3.2.13 There are no relevant Areas of Townscape Character (ATCs) within 300m of the scheme (Ref. 3.5).

**Potential Impacts**

3.2.14 There would be no direct or indirect impacts upon the Scheduled Monuments or Listed Buildings mentioned above.

3.2.15 As they are outside the footprint of the scheme, there would be no direct effect on any other recorded cultural heritage resource.

3.2.16 The construction phase of the scheme has the potential to disturb previously unrecorded remains. Taking into account the nature, condition and density of the recorded resources in the area, and the limited nature and scope of the scheme, it is considered unlikely that any such unrecorded resources would be encountered. In addition, the site would have probably been previously disturbed during development of the M1 and existing carpark.

### **Mitigation**

- 3.2.17 The proposed scheme will result in minor excavations during the construction phase, but they would have no discernible impacts upon the known cultural heritage resources. It is recommended that no archaeological mitigation is required for this scheme.
- 3.2.18 This recommendation does not preclude the possibility that HED may require mitigation measures for the scheme, and discussions should be held with their Historic Monuments Unit (HMU) to determine whether this would be the case.

### **Significant Effects**

- 3.2.19 None of the scheduled monuments or listed buildings will be affected, directly or indirectly, by the scheme; no other cultural heritage resources would be directly affected by the scheme.
- 3.2.20 There is a possibility of unknown subsurface archaeological remains, of uncertain value, surviving within the footprint of the scheme; if so, the construction phase of the scheme could have a major impact upon them. Due to the land being bordered by the M1 motorway, A1 Kingsway, Blacks Road and a carpark, the construction of each of which would have caused disturbance to this 1ha site, it is considered that the likelihood of such remains surviving within the footprint of the scheme would be slight to negligible.

## **3.3 Landscape and Visual**

### **Baseline Conditions**

- 3.3.1 This section considers the effects the scheme may have on the landscape of the surrounding area.
- 3.3.2 The assessment was undertaken in accordance with Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 5 *Landscape Effects*. A review of the Landscape Character Areas by NIEA (Ref 3.6) was undertaken to determine the landscape type of the wider area.
- 3.3.3 The Belfast Metropolitan Area Plan 2015 (Ref 3.7) was also reviewed for information on Local Landscape Designations.
- 3.3.4 Potential visual receptors were identified through aerial imagery (Ref. 3.8).
- 3.3.5 The study area includes the scheme footprint plus a 500m buffer. The scheme lies within County Antrim and is under the remit of Belfast City Council.

## **Landscape**

- 3.3.6 The Lagan Valley Area of Outstanding Natural Beauty (AONB) is located within the study area (Ref. 3.9). The area includes the Lagan riverbanks, meadows, woods and a rich heritage, with grand monuments like the Giant's Ring, remnants of fine estates, industrial archaeological features (related to linen production) and the old Lagan Canal.
- 3.3.7 The boundary of the AONB is located approximately 50m south of the proposed park and ride site.

## **Landscape Character Area**

- 3.3.8 The scheme lies within Landscape Character Area (LCA) 97: Belfast/Lisburn (Ref 3.10).
- 3.3.9 The key characteristics of the LCA are:
- Defined by steep ridges and escarpments which enclose the Lagan Valley at the head of Belfast Lough.
  - Belfast is mostly contained within the valley, although urban development has spread along narrow coastal strips to the north and south of the Lough and inland along the Lagan and Enler Valleys.
  - The town of Lisburn is also sited on the River Lagan but is further upstream and is enclosed by slightly lower slopes.
  - There are long views over both urban areas from the surrounding upland landscapes.
  - Belfast's principle industrial areas are concentrated along the banks of the Lagan and the docks are prominent at the head of Belfast.
  - The steep escarpments and ridges on the margins of the city provide a series of landmarks that include the Belfast Basalt Escarpment, Carnmoney Hill, the Craigtlet Escarpment and the Castlereagh Escarpment.
- 3.3.10 The NIEA description of the LCA states the quality of the environment within the urban districts is increasingly degraded by traffic congestion, pollution, waste management problems and a lack of accessible public open spaces. Belfast also has a relatively high proportion of derelict land and there is much scope for continued regeneration.

## **Local Landscape Policy Areas**

3.3.11 According to the Planning Service (Ref. 3.11), the proposed scheme does not lie within a Local Landscape Policy Area (LLPA). The closest LLPA is Hunterhouse /Wedderburn / Rathmore LLPA which is located approximately 940m north of the proposed scheme. The site is described in the area plan as follows:

- an area of cultural heritage interest containing three listed buildings;

an area of local amenity importance containing a sizable and important green open space and amenity area, of landscape and visual importance within a densely populated area.

### **Local Landscape**

3.3.12 According to the Department of Environment (Ref. 3.12) the scheme is situated on the periphery of the Belfast urban area in a primarily residential landscape approximately 6.4km south west of Belfast City Centre. The scheme is adjacent to Black's Road which is a major route for travellers moving between west Belfast and south Belfast.

3.3.13 The scheme is situated close to the residential areas of Dunmurry, Finaghy, Andersonstown and Balmoral.

3.3.14 The wider landscape is described as a gently undulating urban landscape, sloping slightly downhill to the west.

3.3.15 The surrounding landscape in the vicinity of the scheme is mainly residential to the north. The road network is a key landscape feature along with the school buildings to the west. The land adjacent to the proposed scheme is dominated by maintained grassed areas, groups of trees, hedges and shrubs.

3.3.16 The buildings in the vicinity of the scheme are generally one or two storey community buildings of red brick or white render.

### **Visual Receptors**

3.3.17 Although the scheme is located in an urban environment, due to the topography of the land immediately surrounding the site and surrounding trees the scheme is relatively obscured from nearby residential areas (Ref. 3.8). However potential visual receptors of the scheme include:

- Some residents at The Hawthorns area (views may be slightly obstructed by screening vegetation).
- Vehicle travellers on the Black's Road and users of the pedestrian footpath adjacent to both sides of the carriageway.

- Vehicle travellers on the M1.
- Finaghy Baptist Church.

### ***Potential Impacts***

#### **Temporary**

- 3.3.18 The works are relatively small in scale and will not have an effect on the Lagan Valley AONB, Belfast/Lisburn Landscape Character Area or the Hunterhouse /Wedderburn/ Rathmore LLPA. The impact on the wider landscape character area is no change.
- 3.3.19 During construction there will be adverse temporary effects on the local landscape from construction works. There may also be an area used for a site compound and storage area, which is likely to be visible to visual receptors close to the scheme. These will be of short duration and not significant.
- 3.3.20 During construction there will be visual intrusion from machinery and works impacting on visual receptors of the scheme.

#### **Permanent**

- 3.3.21 There is potential that should vegetation screening along the site boundary be lost during the construction phase, the development of a larger car park and a possible terminal building will have adverse impacts on the views of vehicle travellers on the Black's Road and the M1, users of the pedestrian footpath adjacent to both sides of the carriageway, certain residents within the Hawthorns area and users of the Finaghy Baptist Church.

#### **Mitigation**

- 3.3.22 It is recommended that where possible, existing vegetation along the site boundary be retained to minimise impacts on the local landscape and visual receptors.
- 3.3.23 During construction, retained trees and hedgerows will be protected in accordance with BS5837:2012 Trees in relation to design, demolition and construction - Recommendations.
- 3.3.24 In addition any accidental damage beyond the works area to grass, hedges or trees will be repaired and replaced by the contractor.
- 3.3.25 Tree planting will be undertaken along the south western and north western boundaries of the proposed scheme. An indicative landscape planting plan is presented in **Appendix C**.

### **Significant Effects**

- 3.3.26 Overall, the scheme is not considered to result in significant effects on the landscape or on visual receptors.

## **3.4 Geology and Soils**

### **Baseline Conditions**

- 3.4.1 This assessment considers the impact of the proposed scheme on geological resources in accordance with the Design Manual for Roads and Bridges (DMRB) Volume 11 Section 3 Part 11 Geology and Soil (Ref 3.13).
- 3.4.2 A desk top study was carried out which involved a review of the Geological Survey of Northern Ireland's (GSNI) online database (Ref 3.14) to determine the underlying bedrock and drift geology.
- 3.4.3 A review of the GSNI mapping revealed the bedrock geology of the area consists of Sherwood Sandstone Group.
- 3.4.4 The GSNI database shows the superficial geology to be mainly alluvium. This typically consists of soft to firm consolidated, compressible silty clay, but may contain layers of silt, sand, peat and gravel which are also associated with river deposits.
- 3.4.5 A study of GSNI borehole logs indicates that the study area comprises varying depths of made ground; between 5-8m within the western extents of the scheme footprint (M1 eastern embankment) and between 0.15-0.9m along the eastern extents of the scheme footprint (banks of the drainage ditch). The borehole logs also record depths of silty clay (alluvium) up to 9.65m and small layers of silt, sand, peat and gravel within the study area.
- 3.4.6 A review of historic maps (Ref 3.15) indicates that there is no evidence of potential historic sources of contamination in close vicinity to the site. However, given that the site is located in an urban and residential environment with a high level of development, it is likely that shallow made ground is present on the site as a result of this previous development. The proposed scheme will be located on a man-made embankment comprising previously worked clay deposits and fill material.
- 3.4.7 According to NIEA (Ref. 3.9) there are no designated sites for geological features within 500m of the scheme.

### ***Potential Impacts***

- 3.4.8 The underlying solid and superficial geology are both common in the general area. Thus the scheme is not expected to have an adverse impact on any geologically important stratum.
- 3.4.9 The construction activities will involve disturbance of the ground during earthworks, however excavations are unlikely to encounter bedrock.
- 3.4.10 There is potential for the works to result in contamination of the underlying soils from machinery fuel and oils.
- 3.4.11 The scheme could result in the disturbance of in situ contaminants given the presence of made ground within the study area.
- 3.4.12 The works are anticipated to import approximately 12,000m<sup>3</sup> of fill material. It is assumed that all suitable material will be reused and that all unsuitable materials will be disposed off site.

### ***Mitigation***

- 3.4.13 The contractor will adhere to the good practice advice contained within the Pollution Prevention Guidelines (PPGs) and NIEA standing advice.
- Pollution Prevention Guidelines PPG1: Understanding Your Environmental Responsibilities – Good Environmental Practices;
  - PPG2: Above ground oil storage tanks;
  - PPG5: Works and maintenance in or near water;
  - PPG6: Working at construction and demolition sites;
  - PPG21: Incident Response Planning; and
  - PPG22: Dealing with spillages on highways;
- 3.4.14 Where possible, works should endeavour to reuse excavated materials on site rather than disposing of them, to reduce the amount of material imported and disposed off site.
- 3.4.15 The contractor will ensure that all material imported to site will be suitable for use and not contaminated.



- 3.4.16 Materials will be contained on site in designated areas that are suitable for storage. Construction vehicles and storage compounds must not be left in areas where the road verge, soils or vegetation will be damaged. The size and extent of storage areas should be limited, and where possible, materials delivered to site immediately prior to use to reduce the need for stockpiling.
- 3.4.17 Drainage systems will be installed to prevent the infiltration of contaminants into soils and the migration of contaminants into surface water.
- 3.4.18 The contractor will ensure that any topsoil or subsoils imported to site for the creation of embankments or for landscaping will be suitable for use and not contaminated.

***Significant Effects***

- 3.4.19 With mitigation measures implemented, there will be no significant effect on soils from construction impacts.
- 3.4.20 Although once operational the scheme will result in the loss of a small amount of soils, this is not considered to be significant.
- 3.4.21 The scheme will not result in significant effects on underlying geology or soils.

**3.5 Materials**

**Baseline Conditions**

- 3.5.1 According to information provided by TNI, the area for the extension was used as a materials storage area during the construction of the M1. It is therefore likely that the existing embankment that will be excavated during construction is made up of fill material of an unknown composition.
- 3.5.2 The proposed scheme consists of the extension of an existing park and ride carpark. For the duration of the scheme a temporary compound area for site storage and the storage of materials and plant may be required.

**Potential Impacts**

- 3.5.3 Virgin materials will be used in the form of concrete, bitmac road surfacing, paving materials, metal and signs.
- 3.5.4 Approximately 12,000m<sup>3</sup> of fill material will be imported to the site. This is likely to be composed of granular aggregates.

3.5.5 At time of writing the amount of waste likely to be produced as a result of the scheme was not known. Waste likely to be produced includes organic waste from site clearance, excavated soils, bitmac, aggregates and drainage infrastructure.

3.5.6 It is assumed that the majority of waste produced as a result of the scheme will be inert waste and can be sent to waste recovery facilities or landfill. There is some potential for contamination of excavated spoil from road runoff. Where waste has to be disposed to landfill this will have an adverse impact due to limited landfill space and cost of disposal.

#### **Mitigation**

3.5.7 Waste produced will be reused or recycled where possible and all remaining waste will be separated into the correct waste streams and disposed of in an authorised landfill site.

3.5.8 Best practice measures will be followed at all times in order to reduce wastage and reduce the quantity of raw materials needed for the construction process. Imported materials will be ordered as and when required to minimise storage times on site and wastage of materials. Materials will be sourced from local suppliers to reduce associated transport costs.

3.5.9 In order to maximise the reuse of existing materials on site, it is recommended that consideration be given to sourcing recycled aggregates for road construction to reduce costs and improve sustainability of the scheme.

3.5.10 Waste streams will be segregated and stored appropriately. Disposal of waste will adhere to duty of care protocols and waste will only be removed off site by licensed waste disposal carriers.

3.5.11 It is recommended that the contractor develops a site waste management plan and a materials management plan to maximise use of existing resources and reduce waste.

#### **Significant Effects**

3.5.12 The extension of the Black's Road Park and Ride will result in the use and import of materials. However given the minor scale of the proposed scheme, the amount of materials required for it is not considered to be significant.

3.5.13 Although materials will be sourced locally where possible, wastage through transport/oversupply of materials will likely occur. Not all materials will be able to be reused or recycled and will therefore be considered as waste. Through the utilisation of a site waste management plan and recycling of waste materials, the impact on waste production will be reduced. Given the scale of the works, it is considered that effects on materials will not be significant.

3.5.14 Due to the small scale of the works it is considered that the scheme will not have significant effects on materials.

### **3.6 Noise and Vibration**

#### **Baseline Conditions**

3.6.1 This assessment considers the impact of the proposed scheme on local receptors with regards to noise and vibration effects in accordance with the Design Manual for Roads and Bridges (DMRB) HD 213/11 Noise and Vibration (Ref. 3.16). In particular, consideration focuses on whether significant noise and vibration effects are likely and, therefore, whether further assessment is necessary. Significant effects are usually expected when there is likely to be:

- A change in noise level of 1 dB  $L_{A10,18h}$  or more in the short-term, or 3 dB  $L_{A10,18h}$  in the long-term at any sensitive receptor within the study area.
- A change in noise level of 3 dB  $L_{night,outside}$  or more in the long term at any sensitive receptor within the study area (where an  $L_{night,outside}$  greater than 55 dB is predicted).
- An increase in the Peak Particle Velocity (PPV) level of groundborne vibration at any sensitive receptors within the study area to above a level of 0.3 mm/s, or where there is a predicted increase to a level already above 0.3 mm/s.

3.6.2 Receptors within 300m of the scheme were identified using aerial imagery (Ref 3.8).

3.6.3 The study area is composed of mostly urban residential areas for which the Black's Road acts as an arterial route for commuters. There are no heavy industry or commercial noise sources within the study area, it is likely that traffic noise is the main contributor to noise levels in the area (particularly the M1).

3.6.4 Road traffic noise levels are dependent on (among other things) the number of vehicles, the percentage of Heavy Goods Vehicles (%HGVs) and the average speed.

- 3.6.5 According to the Department of Agriculture, Environment and Rural Affairs (Ref 3.17) the proposed scheme is not located in a candidate noise management area.
- 3.6.6 The majority of receptors within 300m of the proposed scheme are residential - located north east (The Hawthorns, Larkfield Avenue and William Alexander Park), south (Beechlawn Avenue) and south west (Beechlawn Park) with the closest residential receptor found approximately 70m north east at The Hawthorns.
- 3.6.7 Other sensitive receptors within 350m of the proposed scheme include St. Anne's Primary School (approximately 130m south), Hunter House College (approximately 310m east), Finaghy Baptist Church (approximately 270m north east) and Rascals Day Nursery (approximately 290m north east).
- 3.6.8 The M1 is the primarily source of noise within the study area. According to the Transport Northern Ireland Traffic and Travel Information 2014 (Ref. 3.18), the traffic flow along the M1 near the proposed site is 70,050 Average Annual Weekday Traffic (AAWT) 24hr (Stockman's Lane Junction (above roundabout)).
- 3.6.9 Following guidance within the Calculation of Road Traffic Noise (Ref. 3.18), it was possible to determine the basic noise level  $L_{10}$  (18-Hour) dB(A) within 10m of the M1 using the total traffic flow over an 18 hour period. In order to obtain the traffic flow over an 18 hour period it was assumed that 95% of the traffic flow in a 24 hour period travel between 6am and 12am (AAWT 18 hour period equal to 66,548 vehicles). Using equation 1 it was possible to determine that the basic noise level  $L_{10}$  (18 – hour) in terms of 18- hour flow is 77.3dB(A).

Equation 1:

$$\text{Basic noise level } L_{10} (18 - \text{hour}) = 29.1 + 10 \text{ Log}_{10} Q \text{ dB(A)}$$

- 3.6.10 Equation 1 is based on the assumptions that the mean traffic speed (V) is 75km/h and that the percentage of heavy vehicles is 0%. To account for the variations along the M1, a correction formula (Equation 2) was applied based on the assumptions that the mean traffic speed along the M1 is 80km/h (V) and that the percentage of heavy vehicles is 5.6% (p). The correction value is 1.84dB (A).

Equation 2:

$$\text{Correction} = 33 \text{ Log}_{10} (V + 40 + 500/V) + 10 \text{ Log}_{10} (1 + 5p/V) - 68.8 \text{ dB(A)}$$

- 3.6.11 The correction value (1.84dB (A)) was added to the basic noise level (77.33dB (A)) to predict noise levels within 10m of the M1 (79.17dB (A)).

### **Potential Impacts**

- 3.6.12 During construction of the park and ride there will be short term increases to the existing noise environment from plant and machinery.
- 3.6.13 No night time works are expected.
- 3.6.14 The speed limit for the Black's Road is 30mph and this is not expected to change.
- 3.6.15 The proposed scheme will create an additional 307 spaces, thus in the worst case scenario the proposed scheme would result in increased local noise levels as a result of increased traffic movements to and from the park and ride (614 vehicles) as well as the increased bus services (including the additional noise from idling buses).
- 3.6.16 Nonetheless, the noise emissions from the M1 will remain the primary source of noise within the study area.
- 3.6.17 As this scheme is to improve public transport, it is anticipated that it will lead to a reduction in traffic levels and noise levels in Belfast City Centre area.

### **Mitigation**

- 3.6.18 BS 5228-1 and BS 5228-2 are the codes of practice approved as being suitable for giving guidance on appropriate methods for minimising noise. They should be used to demonstrate the use of 'Best practicable means' as defined in Section 52 of the Pollution Control and Local Government (Northern Ireland) Order 1978.
- 3.6.19 Construction works will be limited to normal working hours between the hours of 07:00 to 19:00 in order to minimise the likelihood of complaints.
- 3.6.20 The contractor will engage with local residents for the duration of the works and use best practice measures to reduce noise impacts.

### **Significant Effects**

- 3.6.21 Following the implementation of the above measures, there will be no significant adverse noise impacts during the construction phase.
- 3.6.22 It is considered unlikely that the proposed scheme will result in any significant adverse impacts once operational.

## **3.7 Water Environment**

### **Baseline Conditions**

- 3.7.1 This chapter will consider the effects the scheme will have on the water environment in the vicinity of the scheme. The assessment is undertaken in accordance with DMRB 11.3.10 (Ref. 3.19).
- 3.7.2 The study area is taken to be the scheme footprint plus a 500m buffer to identify any watercourses that may be affected by the works.

### **Surface Water**

- 3.7.3 The Glen River is the closest surface water body to the scheme and is located approximately 0.5km south west of the scheme. According to NIEA (Ref. 3.20), the overall status of the Colin Glen River (Water Body ID UKGBNI1NE050503117) is moderate.
- 3.7.4 According to Northern Ireland Environment Agency (NIEA) and Department for Infrastructure (DfI) interactive maps (Ref 3.20 and 3.21), a drain flows in a north to south direction at the base of an embankment along the western edge of the existing Black's Road Park and Ride. Discussions with Rivers Agency indicate that the water body flows under the M1 Motorway and down through the site.
- 3.7.5 A site walkover indicates that the water level within the drain is shallow (approximately 10-15cm in depth) and that the flow is minimal and intermittent. The width of the drainage ditch fluctuates along its course, but on average it measures between 1-2m wide.
- 3.7.6 Whilst there is no water quality classification for the water body, the site walkover indicates that water within the drainage ditch has a high turbidity. Furthermore, it is considered likely that the watercourse receives drainage runoff from the surrounding road network due to the visible presence of oil on the water surface (noted during the site walkover). In light of the visual indicators, the ecological quality of the drain is considered low. It is considered likely that the drain has been modified and realigned in the past, as a result of the construction of the M1 and surrounding infrastructure.

### **Groundwater**

- 3.7.7 The groundwater body underlying the scheme is the Belfast Mid groundwater body and currently has poor water quality status (Ref. 3.20).

- 3.7.8 The bedrock is composed of Sherwood Sandstone Group, which is classed as a Bh(l-f) aquifer, i.e. an aquifer which has high productivity with intergranular flow (Ref. 3.14).
- 3.7.9 The proposed scheme is underlain by superficial deposits of alluvium which have the potential to contain groundwater and act as a superficial aquifer (Ref. 3.14).
- 3.7.10 According to Geological Survey Northern Ireland (GSNI), the groundwater vulnerability of the study area is classified as 4e. This groundwater vulnerability classification indicates that the study area is located in an area underlain by 3-10m of highly permeable superficial deposits which are capable of supporting superficial aquifers (Ref. 3.14).

### ***Flooding***

- 3.7.11 According to DfI flood maps (Ref 3.21), the study area is not located within a river flood plain. However there is a 1 in 200 chance of surface water flooding in any given year in the vicinity of the drainage ditch located within the study area.

### **Potential Impacts**

#### ***Surface Water***

- 3.7.12 During construction, earthworks have the potential to result in sediment being washed into the drainage ditch as well as drains and drainage systems. Spillages or leakages from machinery have potential to be washed into drains and drainage systems, as well as leaching into the stream.
- 3.7.13 During the operational phase of the proposed scheme, there is a potential that Road Traffic Collisions (RTCs) and vehicles in disrepair may lead to discharges of hydrocarbons, oils and de-icing agents. However given that new drainage, likely to be in the form of gullies and manholes, will be installed as part of the extension works, it is considered unlikely that the discharge from the car park would have any adverse impacts on the receiving water course.
- 3.7.14 The only waterbody within the study area is the drainage ditch which is to be culverted as a result of the proposed scheme. The culverting of the drainage ditch will potentially remove aquatic habitats, disrupt interactions and transfers between surface water and groundwater and impact on the risk of flooding both within the Glen River and down gradient of the car park.

### ***Groundwater***

3.7.15 The permeable and shallow superficial deposits within the study area form a highly susceptible pathway for pollutants to enter groundwater. Thus it is considered likely that any surface water discharges will adversely impact the water quality of the groundwater aquifer. There is also potential that the excavations for the culvert works may encounter perched groundwater.

### ***Flooding***

3.7.16 The proposed scheme will increase the area of impermeable ground within the study area. Thus it is considered likely that the risk of surface water flooding will increase.

3.7.17 Given that the flow within the drainage drain was recorded as shallow and intermittent during a site walkover in one of the wettest winters (December-February 2015/16) on record (Ref 3.22), it is considered unlikely that any modification of the drainage ditch would result in an adverse impact on the flood potential either upstream or downstream. Discussions have also been undertaken between TNI and Rivers Agency regarding the design of the culvert in order to minimise flood risk elsewhere in the local catchment area.

### **Mitigation**

3.7.18 All measures must be taken to ensure that any liquid of a hazardous nature is controlled in accordance with Control of Substances Hazardous to Health (COSHH) Regulations. Fuel, oil and chemicals stored on site can impact greatly on the water environment, therefore proper storage is required to minimise pollution risk. All contractors COSHH materials must be secured when not in use and positioned in such a way that liquid will not flow into any nearby drainage systems.

3.7.19 In order to mitigate the potential adverse effects to surface and groundwater during the construction phase, the following measures are recommended:

- All construction workers will be briefed on the importance of water quality, location of the surface water features and drains and the location and use of the accidental spill kits as part of the site induction.
- Any areas where there is an increased risk of hydrocarbon/chemical spillage and/or hazardous substance stores, additional precautions will be taken. These will include bunding, impermeable bases, suitable drainage systems and sited away from any open drainage channels.



- All plant and machinery will be maintained in a good condition and any maintenance required will be undertaken within safe areas.
- If fresh concrete and cement is used, mixing and washing areas should be as far from watercourses and drainage points as possible, ideally on areas of hard standing and be sited 10m from the drainage ditch to minimise the risk of run-off entering the watercourse.

### ***Significant Effects***

3.7.20 With adherence to mitigation measures, there will be no significant effects during the construction phase or the operational phase.

## **3.8 People and Communities**

### **Baseline Conditions**

- 3.8.1 This assessment considers the impact of the proposed scheme on local receptors with regards to people and communities in accordance with the Design Manual for Roads and Bridges (DMRB) Volume 11 Section 3.
- 3.8.2 This chapter utilises guidance from Part 8 Pedestrians, Cyclists, Equestrians and Community Effects and Part 9 Vehicle Travellers (Ref 3.23 and 3.24) and combines them into one chapter titled People & Communities as per Interim Advice Note 125/15.
- 3.8.3 In order to determine the effect the scheme will have on people and communities a desk top study was undertaken using aerial imagery (Ref 3.8).
- 3.8.4 Land use within the vicinity of the scheme is predominantly residential, with local residential receptors concentrated in the nearby neighbourhoods of Dunmurry, Finaghy, Andersonstown and Balmoral.
- 3.8.5 The Black's Road serves as a key access route into Belfast and the M1. It is a 30mph, 2 lane single carriageway road from which vehicular access is provided to the park and ride site.
- 3.8.6 There are Non-Motorised User (NMU) facilities along the Black's Road with footpaths adjacent to both sides of the carriageway. These footpaths are lit by street lighting. There are a number of controlled pedestrian crossing facilities located along the road. The footways also provide access into local residential areas.

- 3.8.7 Views along the Black's Road are generally restricted by the topography of the land adjacent to the carriageway and by trees located along the side of the carriageway. Views along the road are extensive and unobstructed due to the relatively straight alignment of the road. Traveller stress is considered to be low due to the quality of views and numerous pedestrian crossing facilities located along Black's Road.
- 3.8.8 Given that the original car park was constructed on land owned by DRD, it is considered likely that the proposed development will not require any private land take.
- 3.8.9 There are a number of community facilities located within a 500m radius of the proposed scheme. These include:
- St. Anne's Primary School (approximately 130m south);
  - Hunter House College (approximately 310m east);
  - Finaghy Baptist Church (approximately 270m northeast); and
  - Rascals Day Nursery (approximately 290m northeast).

### ***Potential Impacts***

- 3.8.10 The proposed scheme will not impact the journey length/local travel patterns of NMUs or community severance within the area.
- 3.8.11 Visual intrusion from plant and machinery will have an adverse impact on vehicle traveller's views and on the journey pleasantness of NMUs during construction.
- 3.8.12 There could be temporary disruptions to users of the existing Black's Road Park and Ride during construction from site compounds and construction machinery access.
- 3.8.13 The proposed scheme will not impact on driver stress as the views and numerous pedestrian crossing facilities located along the Black's Road will not be affected.
- 3.8.14 Given that the proposed scheme will provide a further 307 spaces at the Black's Road park and ride, it is considered likely that there will be a slight beneficial impact, as not only will it relieve stress for those drivers who opt to use the park and ride but it will also help reduce congestion levels and subsequently driver stress within the Belfast area.

### **Mitigation**

- 3.8.15 NMUs using the footways in the vicinity of the scheme will be informed well in advance of the works of any potential footway disruption or closures during the works.
- 3.8.16 Vehicle travellers will be informed well in advance of the works to give warning of any possible disruption on the Black's Road during the work.

- 3.8.17 Users of Black's Road Park and Ride will be informed well in advance of the works about any possible disruptions during the work.
- 3.8.18 Best practicable means will be employed to avoid adverse impacts associated with noise, dust and air pollution for pedestrians.
- 3.8.19 Reasonable precautions will be taken to reduce the visual impact of the construction works where practicable.

**Significant Effects**

- 3.8.20 The scheme will not result in any significant effects on people and communities within the study area.

## **4 Planning Policy**

### **4.1 Introduction**

4.1.1 This chapter sets out relevant planning policy at the national and local level.

### **4.2 Planning History**

4.2.1 Belfast Metropolitan Area Plan 2015 (BMAP) makes provision for strategic Park and Ride sites to encourage a shift from car use to other forms of transport, especially in peak periods. The M1 was widened from two lanes to three in each direction from Blacks Road to Broadway in 2003 as this section of road suffered from 65,000 vehicles per day (Ref 4.1).

4.2.2 The BMAP seeks to reduce reliance on the car by a closer integration of transportation and land use, by promoting a significant improvement in public transport and by management measures to influence the choice of travel mode. The Plan Proposals seek to enhance accessibility for those without access to the use of a car.

### **4.3 Planning Policy**

#### **Strategic Planning Policy Statement**

4.3.1 The Strategic Planning Policy Statement (SPPS) has a statutory basis under Part 1 of the Planning Act (Northern Ireland) 2011 (Ref 4.2). The SPPS is a statement of the Department's policy on important planning matters that should be addressed across the whole of Northern Ireland. The policy provisions relevant to the scheme include:

- Planning Policy Statement 2 (PPS2): Natural Heritage
- Planning Policy Statement 3 (PPS3): Access, Movement and Parking
- Planning Policy Statement 4 (PPS4): Planning and Economic Development
- Planning Policy Statement 13 (PPS13): Transportation and Land Use

#### **Regional Development Strategy**

4.3.2 Regional planning strategies are set out in the Regional Development Strategy (RDS) 2035, published 5th March 2012 (Ref 4.3). The Strategy aims to strengthen local decision making and reinforce the importance of up-to-date plans. The aims of the RDS relevant to the scheme include:

- Supporting strong, sustainable growth for the benefit of all parts of Northern Ireland;
- Supporting our towns, villages and rural communities to maximize their potential;
- Improving connectivity to enhance the movement of people, goods, energy and information between places; and
- Protecting and enhancing the environment for its own sake.

4.3.3 The spatial framework outlined within the RDS, highlights the need for a balanced transport infrastructure that will improve connectivity, social inclusion and access to settlements in order to achieve greater economic prosperity.

RG2: Deliver a balanced approach to transport infrastructure

4.3.4 Use road space and railways more efficiently- Continued investment in public transport and in infrastructure such as the development of quality multi-modal facilities and park and ride sites will encourage motorists to take the bus or train for the main part of their journey and reduce the volume of traffic on the network.

4.3.5 The RDS 2035 highlights that Belfast has benefited from significant public transportation investment with the introduction of Park and Ride facilities as well as other public transport measures.

#### **Belfast Metropolitan Area Plan (BMAP) 2015**

4.3.6 The Belfast Metropolitan Area Plan 2015 is a development plan prepared under the provision of Part 3 of the Planning (Northern Ireland) Order 1991 by the Department of the Environment (DOE). This remains the extant plan until such time as Belfast City Council prepare a new development plan.

4.3.7 The Plan Proposals seek to reduce reliance on the car by a closer integration of transportation and land use, by promoting a significant improvement in public transport and by management measures to influence the choice of travel mode.

4.3.8 It seeks to manage integrated transportation with benefits to the environment and human health, and to enhance accessibility to employment, community and other facilities for those without access to the use of a car (Ref 4.4)

## 5 Consultation

### 5.1 Consultation Process

5.1.1 Consultation is an important part of the assessment process and has the purpose of enabling relevant stakeholders to comment on a proposed scheme.

5.1.2 As part of the formal Pre-Application Discussion Process, the following bodies were consulted by Belfast City Council. A summary of the responses is given in Table 5.1.

**Table 5.1: Pre- Application Discussion responses.**

Consultation Body	Response Received	Summary of Response
Northern Ireland Environment Agency	06/06/2016	<p><u>Drainage and Water</u> Water Management Unit would refer the application to DOE Standing Advice Note No. 24 – Pre-Application Discussion Advice (Oct 2015)</p> <p><u>Natural Heritage and Conservation Areas</u> The application site is unlikely to have an impact on any sites of local/national/international importance. Please refer to the NI Biodiversity Checklist and Standing Advice.</p>
City and Neighbourhood Services Department- Environmental Health.	15/06/2016	<p>The consultant concluded that the development won't have any significant environmental effects, however as the proposed scheme is located close to sensitive receptors and in proximity of AQMA, the Service requests that a Detailed Air Quality Assessment is undertaken to the satisfaction of this Service.</p> <p>Should any unforeseen ground contamination be encountered during the development, all works on site should immediately cease.</p>
Rivers Agency	21/06/2016	<p>There are no watercourses which are designated within this site. The site is traversed by an undesignated watercourse. The scheme does not lie within the 1 in 100 year fluvial flood plain. In accordance with revised PPS 15, Planning and Flood Risk FLD 3, a Drainage Assessment is required due to "additional hard-surfacing over 1000m<sup>2</sup>".</p>
Transport NI	02/06/2016	<p>As part of the proposed Environmental Impact Assessment Report, a section is required on Transportation to detail the effect additional/diverted traffic will have on the road network utilising the site.</p>

## 6 The Proposed Scheme

### 6.1 Existing Environment

- 6.1.1 The scheme will extend the existing Black's Road Park and Ride facility. The current facility contains 247 parking spaces, 13 disabled spaces and 4 bicycle spaces.
- 6.1.2 The existing car park was originally constructed in July 2006 on land owned by DRD Roads Service, which had previously been used to store materials during the construction of the M1 motorway. The adjacent M1 motorway and supporting side slopes limit the area available for car park construction. Due to the success of the Park and Ride scheme, an additional 28 spaces were constructed on a small plot of land adjacent to Black's Road in March 2014.



**Photograph 6:1: M1 overpass at Black's Road**

- 6.1.3 The Black's Road Park and Ride is located in the suburbs of south-west Belfast between Dunmurry and Finaghy. There are residential dwellings located east of the existing carpark along The Hawthorns which is parallel to the Black's Road. There is a line of trees separating The Hawthorns from the Blacks Road. To the south of the proposed scheme along the A1 Kingsway is St. Anne's Primary School as shown in Photograph 6.2 below.



**Photograph 6:2: St. Anne's Primary School, Kingsway**

6.1.4 South east of the Black's Road Park and Ride are Finaghy Baptist Church and adjacent to this, Rascals Nursery along Kingsway



**Photograph 6:3: Finaghy Baptist Church, Kingsway**





**Photograph 6:4: Rascals Day Sursery, Kingsway**

- 6.1.5 Traffic travelling from Belfast along the M1 can access the Black's Road using the Black's Road offslip, located north of the existing car park. The off slip is shown in Photograph 6.5.



**Photograph 6:5: Traffic moving from the M1 Off-slip onto Blacks Road with view of M1 Bridge**



**Photograph 6:6: View of Blacks Road with M1 Flyover in the distance**

## **6.2 Need for Scheme**

- 6.2.1 On average a total of 205 Park and Ride spaces are utilised per day out of the 247 available, with a total of 15 drop off trips. Due to the success of the Park and Ride, the extension will bring an additional 307 car parking spaces and promote the use of public transport, rather than independent car travel in an already congested city.
- 6.2.2 In an attempt to promote sustainable transportation in the area, an additional 22 bicycle spaces will also be accommodated within the scheme.
- 6.2.3 The Park and Ride site is being extended as it is also one of the mitigation measures to reduce traffic volumes in Belfast City Centre for the duration of the York Street Interchange upgrade works.

## **6.3 Study Area and Sensitive Receptors**

- 6.3.1 The Environmental Statement uses a study area of 350m from the scheme to identify sensitive receptors which are considered to be dwellings, schools, hospitals or care homes.
- 6.3.2 The main sensitive receptors are listed in Table 6.1 below:

**Table 6.1: Sensitive Receptors**

<b>Sensitive Receptor</b>	<b>Distance from existing Blacks Road Park and Ride</b>
Residential dwellings along The Hawthorns	60m north east
St Anne's Primary School	141m south
Hunter House College;	270m east
Rascals Day Nursery	80m east

## 6.4 Scheme Description

- 6.4.1 The scheme will provide an additional 307 parking spaces to the existing Park and Ride facility.
- 6.4.2 The proposed extension will require a drainage ditch to be culverted over a length of 125m, with open stream either side of the culvert, which will connect to an existing pipe flowing under the motorway. The culvert will be a precast 1200mm concrete pipe and headwall positioned along the alignment of the existing open drain at present. Following discussions with Rivers Agency the culvert will have a central chamber with a manhole for access and a trash screen at the inlet.
- 6.4.3 A Preliminary Drainage Review is included as **Appendix D**.
- 6.4.4 To the north and south of the proposed car park this ditch is already significantly culverted under the M1 and surrounding infrastructure.
- 6.4.5 The new car park is proposed to be at the same level as existing and therefore will require approximately 12,000m<sup>3</sup> of fill material to be imported to the site. Localised re-grading of the motorway embankments will be carried out if necessary.
- 6.4.6 Surface water will be collected by gullies and storm pipe which will be directed into a Sustainable Drainage System with attenuation.
- 6.4.7 LED Street lighting with no back lights at reduced heights are proposed for this scheme due to its location near the M1 motorway.

6.4.8 The scheme includes provision for a potential future terminal building, should it be required. The location, size and type of any building have not yet been decided. Similarly space will be made available to accommodate 22 bicycle spaces.

6.4.9 The scheme design is shown on **Figure 6.1** of **Volume 3**.

## **6.5 Indicative Construction Methodology**

6.5.1 The final method of construction will be determined by the contractor once appointed. This assessment is based on the following indicative construction methodology.

6.5.2 Site works are expected to take approximately 12 weeks to complete.

### **Vegetation Clearance**

6.5.3 An element of site clearance was undertaken in September to allow for the ground investigation to proceed. The first stage of the main construction contract will be the full clearance of the all the vegetation within the scheme footprint and this is expected to take approximately 5 days. Cleared vegetation will be removed off site for disposal. Once the vegetation is cleared, it is likely that there will be some re-grading of the side slopes to facilitate access to the drainage ditch.

### **Drainage**

6.5.4 Once the site is cleared, the 1200mm diameter pipe for the culverting of the drainage ditch will be laid. As there is water in the ditch, it is likely this will be done in stages with sections of the ditch dammed and the water overpumped to allow placement of the culvert in the dry. The water flow will be redirected into the pipe once each section is laid. The placement of the culvert is expected to take approximately 5 days. Bedding material will be laid at formation level and the pipe placed over it. A headwall will be constructed at each end of the pipe and will be composed of in-situ concrete. Mesh reinforcement will be placed at each face of the headwall with a 50mm cover and minimum top length of 450mm. All external concrete surfaces shall have 25mm chamfer on exposed surfaces. Unexposed sections of headwall will be waterproofed using 2 coats of bitumen emulsion paint.

### **Imported Fill**

6.5.5 Once the culvert has been placed and water flowing through it, the levels on the site will be raised through the importation of granular fill. This is expected to take approximately 30 days with the fill being placed and then compacted in layers. Once the level is raised to formation level, the construction of the car park will be undertaken.

6.5.6 Geotextile will be placed on top of the granular fill at formation level. This will be overlaid with 225mm of Type 3 granular fill for the sub-base, taking approximately 10 days. The binder course will then be laid using 80mm close graded 40/60 binder course material. The car park surface course layer will be 40mm of close graded 100/150 surface course bitumen. Laying of the binder and surface layers will take approximately another 10 days.

6.5.7 A 150mm diameter filter drain will be laid along the car park boundary where required. This will collect the drainage from the car park which will be discharged into the ditch at the open ends.

**Topsoil Verges**

6.5.8 The verges to the west of the carpark will be topsoiled to a maximum depth of 150mm. This is expected to take approximately 5 days.

**White Lines**

6.5.9 The car parking bays will be laid out and the white lines painted. The final stage will be landscaping within the car park at the end of the bays.

## **7 Alternatives**

### **7.1 Introduction**

7.1.1 It is a requirement under the EIA Regulations that alternatives for a project should be considered in the environmental assessment process, be it alternative location, design or technology. By looking at alternative options, the aim is for the project to evolve sustainably by taking account of all constraints throughout the lifetime of the project.

### **7.2 No Development Alternative**

7.2.1 This is essentially a do nothing alternative and would involve leaving the existing Park and Ride facility as it is and not extending it. However, as additional park and ride sites are one of the mitigation measures to reduce traffic volumes in Belfast City Centre for the duration of the York Street Interchange upgrade works, a no development alternative is not considered feasible.

### **7.3 Alternative Designs**

7.3.1 Three options were considered by TNI for the design of the car park. The adjacent M1 motorway and the supporting side slopes, the site topography and the ditch through the centre of the site posed constraints to the design process. The designs therefore had to consider the feasibility of culverting the ditch to maximise the use of the available land. Discussions between TNI and Rivers Agency were undertaken with regard to the culvert design and requirements.

#### **Option 1**

7.3.2 Option one consisted of a 6m wide road access to the north of the existing car park in order to gain access to the newly proposed car park.

7.3.3 Approximately 32m of the water course would be culverted under the access road. This culvert would have required a headwall at each end, formed 2:1 side slopes for stability and a trash screen placed at the inlet structure with an appropriate maintenance regime.

7.3.4 Option one allowed for the construction of 133 extra spaces at a cost of approximately £285,000.

7.3.5 Option 1 is shown in **Figure 7.1**.

## **Option 2**

- 7.3.6 This option required the ditch to be culverted for approximately 140m to allow the car park to be constructed over the top of the culvert. Headwalls and 2:1 side slopes were required as well as a trash screen at the inlet structure with an appropriate maintenance regime.
- 7.3.7 With this option Rivers Agency requested that a chamber be built at the midpoint of the proposed culvert and that a trash screen placed at the inlet.
- 7.3.8 A significant amount of fill was required to gain the level necessary to construct a useable running surface with effective drainage.
- 7.3.9 Option two allowed for the construction of 308 spaces at a cost of approximately £674,000.
- 7.3.10 Option 2 is shown in **Figure 7.2**.

## **Option 3**

- 7.3.11 Option three required the construction of 225m of culvert essentially eliminating any constraints imposed on the site by the water course. The culvert would connect to an existing pipe flowing under the motorway therefore only one headwall would be required at the downstream end of the water course.
- 7.3.12 Extensive fill would be required to level the land to construct the car park with effective drainage. At least three chambers would be required. This option created 408 spaces at an approximate cost of £889,000.
- 7.3.13 However, Rivers Agency deemed this option as not feasible due to flooding issues on the Glen River.
- 7.3.14 Option 3 is shown in **Figure 7.3**.

## **7.4 Issues During the Design Process**

- 7.4.1 The Rivers Agency recommended options one and two with their suggestions to be incorporated into the design. Option 3 was deemed not feasible due to flooding issues on the Glen River.
- 7.4.2 The Rivers Agency recommended that for the chosen design, a chamber would need to be built at the midpoint of the proposed culvert and also a trash screen be placed at the inlet structure with an appropriate maintenance regime.

7.4.3 The final design of the scheme is a revision of option 2. The inclusion of additional storm drains and filter drains for the car park were included to cope with the additional area of hard surfacing.



## 8 Transport Assessment

### 8.1 Introduction and Methodology

8.1.1 This section of the Environmental Statement examines the potential highway impacts arising from the proposed extension of Black's Road Park and Ride from 247 parking spaces to 554 spaces, an additional 307 spaces.

8.1.2 A detailed Transport Assessment Form (TAF) has been prepared as part of the planning application submission which contains all trip information that forms the basis of this assessment. The TAF is included within **Appendix A**.

8.1.3 A scoping exercise was undertaken by Amey to ascertain the extent of the study area for this Transport Assessment and to agree the methodology to be used in the assessment.

8.1.4 The scoping study meeting was held on Monday 25<sup>th</sup> July 2016 between Amey and Transport NI. The meeting discussed the approach to the study and identified the potential impact that the scheme is likely to have on the surrounding highway network. A summary scoping note highlighting the agreed points was sent to TNI following this meeting and this is available in Annex G of the TAF.

8.1.5 The key points agreed with Transport NI included:

- Transport Assessment Form with modelling appropriate for application and assessment;
- The additional trips associated with the Park and Ride extension will be generated from existing commuter trips being diverted to the Park and Ride, not new trips on network;
- The generated vehicles associated with the extension will be derived from existing Park and Ride usage figures;
- Acknowledged that the P&R site is unlikely to generate new traffic on the network. The additional P&R traffic will be generated from diverted existing commuter trips already using the local network.
- 2013 traffic count data for neighbouring junctions will be extracted from the Visteon Site application - Z/2013/1434/F; and
- Junction modelling of the Park and Ride Site access, the M1 off slip/ Blacks Road junction and the Old Golf Course Road junction are to be included in assessment.

- 8.1.6 To test the impact arising from the proposed Park and Ride extension it is necessary to compare the traffic likely to be generated with that travelling along the existing base highway network. An assessment has been carried out for the projected year of opening and then for future years. These future years normally consider the adequacy of the highway network 10 years and 15 years after opening. In order to predict traffic flows for these years it is necessary to look at traffic trends to obtain the growth in traffic. National Road Traffic Forecast (NRTF) forecasts outline the growth figures for high, central and low growth. NRTF low growth rates are considered to be representative of the area and have been applied to the existing traffic data.
- 8.1.7 It was agreed during the scoping study that a planning search would be undertaken on the EPIC Planning portal to determine committed developments. The Visteon site application planning reference; Z/2013/1434/ has been identified as a committed development and the traffic flows associated with this development are considered as committed traffic within this assessment.
- 8.1.8 The main objective of the Park and Ride is to encourage and reduce the number of existing car trips travelling into Belfast City Centre through modal shift. The existing Blacks Road Park and Ride site is currently very popular with commuters during the weekday and it is expected that this site will become more attractive as delay increase on routes into the City Centres, long stay parking spaces are at a premium and bus priority infrastructure improves.
- 8.1.9 For this assessment it has been assumed that all trips to the extended Park and Ride will be diverted trips that already exist on the network. This methodology has been agreed with TNI during the scoping discussions.
- 8.1.10 Traffic flow diagrams illustrating the AM and PM traffic survey data and the diverted traffic is presented in Annex C of the TAF within Appendix A.
- 8.1.11 Computer analysis has been carried out to determine the effect the traffic associated with the proposed Park and Ride extension will have on the neighbouring junctions.

## **8.2 Baseline Conditions**

- 8.2.1 The existing road network is located in a primarily urban landscape approximately 6.4km south west of Belfast City Centre. Black's Road is an arterial road for travellers moving from greater Belfast and commuters travelling in and out of Belfast via the M1.

8.2.2 As agreed with Transport NI during the Scoping Study meeting, base line 2013 traffic flow information has been used. The surveys were undertaken on Thursday 30<sup>th</sup> May 2013 during the hours of 0700 – 1000 and 1600 – 1900 at the following junctions:

- Blacks Road / Visteon Access;
- Blacks Road / M1 On Slip / Old Golf Course Road;
- Blacks Road / M1 Off Slip; and
- Blacks Road / Stewartstown Road.

8.2.3 Following on-site monitoring by TNI, Black's Road Park and Ride usage figures were received and identify that on average a total of 205 Park and Ride spaces are utilised per day with a total of 15 drop off trips.

8.2.4 To profile this existing usage and apply to the Park and Ride extension, a survey was conducted at Blacks Road Park and Ride site access on Wednesday 27<sup>th</sup> July 2016 during the hours of 0730-0930 and 1630-1830. This was agreed at the scoping stage.

### **8.3 Existing Public Transport Facilities**

8.3.1 Currently, a Park and Ride bus departs the site every 10 to 15 minutes during the commuter peaks. This is a circular service between Black's Road Park and Ride and the Europa bus station. Details of this Park and Ride bus service and route are contained within the TAF in Appendix A.

### **8.4 Existing Cycling Links**

8.4.1 Currently, there is limited cycling infrastructure within the vicinity of Black's Road Park and Ride site. There is a designated on carriageway cycle lane located on the Upper Lisburn Road approximately 0.3km from Black's Road Park and Ride. The cycle lane extends from the Black's Road/ A1 junction to the Ormonde Park junction in both the city bound and country bound directions.

8.4.2 Advanced Stop Lines (ASLs) are currently provided at the M1 Off Slip / Black's Road junction.

8.4.3 The Park and Ride site currently offers parking facilities for up to four bicycles and these are in the form of Sheffield bicycle stands.

8.4.4 A 4km cycle isochrones has been developed and presented in the TAF. This isochrones illustrates the 4km catchment.

**8.5 Existing Pedestrian Facilities**

8.5.1 Pedestrian facilities within the vicinity of the site are considered to be of a good standard with direct pedestrian access onto the Black's Road available. Pedestrian footways and street lighting are provided along both sides of Black's Road which connect to the existing network of footways. These footways branch off Black's Road providing pedestrian access to the surrounding residential areas of Suffolk, Finaghy and Dunmurry which are located within 1km distance of Black's Road Park and Ride site. A 1km walking isochrone is presented within the detailed TAF.

**8.6 Road Safety**

8.6.1 A review of the existing collision statistics has been undertaken over a three year period in order to identify any road safety problems within the vicinity of Black's Road Park and Ride.

8.6.2 Accident statistics, relating to junctions surrounding the development site, have been extracted from the Road Traffic Collisions Interactive Maps (2007-2013) available on the Northern Ireland Statistics and Research Agency's website. The Police Service for Northern Ireland (PSNI) Central Statistics Unit no longer completes requests for collision histories as they place all their reported injury data on this archive system.

8.6.3 Table 8.1 outlines the total number of collisions recorded at each junction between 2011 and 2013.

**Table 8.1: Summary of Collision Statistics**

<b>Junction / Road stretch</b>	<b>Number of Collisions 2011 -2013</b>
Old Golf Course Road / Black's Road / M1 on-slip junction	10
Black's Road / M1 off-slip junction	3
Black's Road carriageway	2
Black's Road / A1 junction	5

8.6.4 Detailed information regarding number of collisions and severity per year at each junction is outlined in the TAF included in Appendix A.

## 8.7 Calculating Base Traffic Flows

8.7.1 As stated previously, base line 2013 traffic flow information has been used in this assessment and has been supplemented with a 2016 traffic survey at the Park and Ride access to determine distribution.

8.7.2 Details of the traffic surveys have been included within Table 8.2.

**Table 8.2: Traffic Survey Dates**

Junction	Date	Time
Blacks Road / Visteon Access.	Thursday 30th May 2013	0700 – 1000 1600 – 1900
Blacks Road / M1 On Slip / Old Golf Course Road	Thursday 30th May 2013	0700 – 1000 1600 – 1900
Blacks Road / M1 Off Slip.	Thursday 30th May 2013	0700 – 1000 1600 – 1900
Blacks Road / Stewartstown Road.	Thursday 30th May 2013	0700 – 1000 1600 – 1900
Blacks Road Park and Ride Access	Wednesday 27th July 2016	0730 – 0930 1630 – 1830

8.7.3 In order to remain consistent with local committed development planning applications the peak hour periods that have been assessed are;

- AM Peak – 0800 – 0900; and
- PM Peak – 1700 – 1800.

8.7.4 The 2016 Park and Ride turning proportions have been applied to the daily average parking usage figures received from Transport NI monitoring (205 parking spaces per day with 15 drop offs) to work out the proportions exiting the Park & Ride site during the AM and PM peak hours. The proposed traffic for the extended Park and Ride has been generated by calculating a parking usage factor for the existing Park and Ride and applying this factor to the additional extended spaces.

8.7.5 This assessment assumes that the same parking demand for the current Park and Ride facility, which is not currently operating at capacity (83%) on a daily basis, will apply to the additional P&R spaces. This is considered a robust method of trip generation.

8.7.6 For purposes of this assessment a year of opening has been assumed to be 2017. In order to remain consistent with local committed developments, low growth rates have been applied to the traffic to calculate the opening year and 2027 and 2032 future design years.

- 8.7.7 Traffic flow diagrams illustrating the AM and PM peak design year scenarios are available in Annex C of the TAF in Appendix A. These flow diagrams illustrate the existing, base, diverted and proposed traffic scenarios.
- 8.7.8 As stated previously the main objective of the Park and Ride is to encourage and reduce the number of existing car trips travelling into Belfast City Centre through offering an attractive alternative method of travel. The Blacks Road Park and Ride site offers free parking and a reliable journey time to and from the City Centre during the AM and PM peaks. This is particularly attractive to commuters working in the City Centre. Therefore to demonstrate this attraction, the new traffic associated with the Park and Ride extension has been generated by diverting existing vehicle trips to the site. Traffic Flow diagrams illustrating these diverted trips are provided in Annex C of the TAF in Appendix A.
- 8.7.9 In this assessment no traffic has been discounted from the network, only existing traffic has been diverted. In summary these diversions include the following routes;

**AM Peak**

- 5% of traffic currently travelling from Black's Road (north) to the city centre via the M1 is now diverted to the Park and Ride site;
- 16% of traffic currently travelling from Black's Road (south) to the city centre via the M1 is now diverted to the Park and Ride site;
- 4% of traffic currently travelling from Old Golf Course Road to the city centre via the M1 is now diverted to the Park and Ride site.

**PM Peak**

- 5% of traffic currently travelling from the city centre to Black's Road (south) via the M1 is now diverted from the Park and Ride site;
- 11% of traffic currently travelling from the city centre to Black's Road North / Old Golf Course Road via the M1 is now diverted from the Park and Ride site.

**8.8 Mitigation**

**Encouraging Public Transport Patronage**

- 8.8.1 Park and Ride travel offers an alternative method of travel which is both sustainable and readily accessible. This is in line with the Belfast Metropolitan Area Plan which advocated increased investment in public transport as a major strategy for the future.

8.8.2 At this stage no changes to the Park and Ride bus frequency has been proposed to service the extended Park and Ride as it is assumed that the capacity on the service is adequate to cope with demand. It is proposed that bus services will be monitored to assess the need for an increased number of buses and the time table will be adjusted accordingly if required.

### 8.9 Pedestrian and Cycling Infrastructure

8.9.1 As part of the proposed extension of the Park and Ride site it is proposed to provide accommodation for up to 22 bicycle spaces in the form of Sheffield bicycle stands. This would bring bicycle provision in line with the Cairnshill Park and Ride and accommodate any future cycling demand.

### 8.10 Network Impact and Junction Summary

8.10.1 Table 8.3 summarises the impact of the traffic associated with the Park and Ride extension. The Base 2017 and Proposed 2017 two-way traffic flows have been compared on approaches along the study network.

8.10.2 As highlighted previously no new trips have been added to the network and no traffic has been discounted from the network. This assessment only considers the diversion of existing commuter traffic that previously were travelling via the M1 into the City Centre and now are using the Park and Ride parking and shuttle service.

**Table 8.3: Network Impact**

Network Approach	Flow			Percentage Impact	
		AM	PM	AM	PM
A512 Old Golf Course Road.	Base 2017 Flow	2135	2867	No impact	No impact
	Proposed 2017 Flow	2135	2867		
Black's Road (north) at M1 On slip junction.	Base 2017 Flow	1468	1621	No impact	No impact
	Proposed 2017 Flow	1468	1621		
M1 On slip.	Base 2017 Flow	2298	1374	- 7%	+ 1%
	Proposed 2017 Flow	2147	1382		
M1 Off Slip.	Base 2017 Flow	924	2058	+ 1%	- 9%
	Proposed 2017 Flow	932	1878		

Network Approach	Flow			Percentage Impact	
	Black's Road at Park and Ride Access.	Base 2017 Flow	1872	2089	No impact
Proposed 2017 Flow		1880	2251		

8.10.4 The percentage impacts in Table 8.3 suggest that the Park & Ride extension will not have an impact on the surrounding Blacks Road junctions.

8.10.5 To demonstrate the impact of the diverted traffic on the surrounding road network, capacity junction modelling has been presented in the TAF. Junction modelling results, displaying the practical reserve capacity (across all lanes) and delay (across all lanes) for each junction and the Base/ Proposed scenarios the have been presented in the TAF. The junctions modelled include;

- Blacks Road Park and Ride Site Access;
- Blacks Road / M1 Off Slip; and
- Blacks Road / M1 On Slip / Old Golf Course Road.

8.10.6 Each signalised junction has been assessed as a standalone junction using the industry recognised modelling software package LinSig V3. LinSig is a computer software package for the assessment and design of traffic signal junctions, either individually or as a network comprised of a number of junctions. The performance of the junction is measured in terms of the Degree of Saturation (DoS) and the Mean Maximum Queue (MMQ) of each lane. Where any lane of the junction exceeds 90% saturation, then the layout is considered to be approaching the end of its design life. Furthermore as the degree of saturation approaches 90%, the MMQ becomes more critical on that particular link. In this chapter the maximum DoS and MMQ have been quoted whilst the full model results are presented in the TAF.

**8.11 Existing Park and Ride Access**

8.11.1 The existing Park and Ride / Blacks Road signalised three arm junction currently operates via a three stage sequence which incorporates a controlled pedestrian crossing across the Park and Ride entry and exit lanes. There is a dedicated give way exit from the Park & Ride site, reserved for buses only on which drop-kerb facilities are provided for pedestrians. The junction has been modelled on a single 90 second cycle time during the AM peak and PM peak, with all movements and stages being called per cycle.

8.11.2 A summary of the Park and Ride Access LinSig results is presented in Table 8.4.



8.11.3 To demonstrate the impact of the diverted traffic a comparison of the Base and Proposed traffic scenarios is presented in Table 8.4. For comparison the maximum RFC and MMQ for each scenario is presented. A full set of the modelling results and outputs for the Park and Ride access are available in Annex D of the TAF in Appendix A.

**Table 8.4: Existing Park and Ride Access LinSig Results Summary**

Peak Hour	Base 2017		Proposed 2017		Base 2032		Proposed 2032	
	Max Dos	MMQ	Max Dos	MMQ	Max Dos	MMQ	Max Dos	MMQ
AM	38.2	6.0	57.8	8.9	39.9	6.5	62.6	10.5
PM	48.6	9.0	62.4	11.6	51.3	9.7	65.6	12.8
Comments	The modelling results suggest that the Blacks Road Park and Ride access junction will continue to operate within capacity in the AM and PM peaks future design years even with the additional P&R extension traffic.							

8.11.4 The LinSig results indicate that the proposed Park and Ride extension will not have a detrimental impact on the Park and Ride access junction during the AM and PM peaks and future years 2017 and 2032. The results indicate that queuing will increase on some approaches as a result of the additional Park and Ride diverted traffic on the Blacks Road, however these increases are not to the detriment of the junctions overall performance. Therefore no improvement is proposed at this junction or its staging.

**8.12 M1 Off Slip / Black's Road Junction**

8.12.1 The existing M1 Off Slip / Black's Road three arm signalised junction currently operates via a two stage sequence which incorporates a controlled pedestrian crossing across the M1 Off Slip approach.

8.12.2 A summary of the M1 Off Slip / Black's Road Junction LinSig results is presented in Table 8.5.

8.12.3 Again, to demonstrate the impact of the diverted traffic a comparison of the Base and Proposed traffic scenarios is presented in Table 8.5.

**Table 8.5: M1 Off Slip / Black's Road Junction LinSig Results Summary**

Peak Hour	Base 2017		Proposed 2017		Base 2032		Proposed 2032	
	Max Dos	MMQ	Max Dos	MMQ	Max Dos	MMQ	Max Dos	MMQ
AM	51.6	6.6	49.8	7.7	55.5	7.0	53.6	8.3
PM	84.8	16.4	84.9	15.0	90.0	21.0	89.4	19.4
Comments	<p>The modelling results suggest that the M1 Off Slip / Black's Road signalised junction will continue to operate within capacity in the AM and PM peaks future design years even with the additional P&amp;R extension traffic.</p> <p>In both the AM and PM peaks the difference in overall junction performance between the base and proposed scenarios is minimal. As a result of the diverted trips – more vehicles are travelling along the Blacks Road in the AM and PM peaks but less traffic is coming from the M1 off-slip as the diverted commuters are now using the bus to travel to/from the City Centre rather than via the M1.</p>							

- 8.12.4 The LinSig results indicate that the proposed Park and Ride extension will not have a detrimental impact on the M1 Off Slip junction during the AM and PM peaks.
- 8.12.5 The maximum average queue recorded in the proposed 2032 AM peak was recorded on Black's Road north approach with queuing of 8.3 pcu's over the straight ahead southbound movement. This is an increase of 1.3 pcu's compared to the base scenario.
- 8.12.6 The maximum average queue recorded in the proposed 2032 PM peak was recorded on the M1 Off Slip approach with queuing of 19.4 pcu's over the left and left right movements. When compared to the Base scenario this was a reduction of 1.6 vehicles.
- 8.12.7 No improvements are proposed for the existing M1 off-slip / Blacks Road junction. The staging will remain the same and only the signal timings may change.

**8.13 Blacks Road / M1 On Slip / Old Golf Course Road.**

- 8.13.1 The existing M1 On Slip / Black's Road / Old Golf Course junction four arm signalised junction currently operates via a three stage sequence which incorporates signal controlled pedestrian crossing across each junction approach.
- 8.13.2 A summary of the M1 Off Slip / Black's Road Junction LinSig results is presented in Table 8.6.

**Table 8.6: M1 On Slip / Black's Road Junction LinSig Results Summary**

Peak Hour	Base 2017		Proposed 2017		Base 2032		Proposed 2032	
	Max Dos	MMQ	Max Dos	MMQ	Max Dos	MMQ	Max Dos	MMQ
AM	107.4	44.7	103.3	34.5	116.5	80.0	111.4	65.2
PM	107.2	56.2	107.2	56.2	115.4	87.5	115.4	87.5
Comments	<p>The modelling results indicate that the M1 On Slip / Black's Road / Old Golf Course Road Junction will operate at capacity in the AM and PM Base years 2017 , 2027 and 2032.</p> <p>The results for the proposed 2017, 2027 and 2032 scenarios suggest that as a result of the diverted traffic to the P&amp;R site the junction will operate better than the base scenario in the AM peak and much the same in the PM peak. This capacity trend is a result of the city bound commuter traffic in the AM peak diverting to the P&amp;R site instead of via the M1.</p>							

- 8.13.5 The LinSig results indicate that as a result of the diverted Park and Ride traffic the junction is expected to perform better in the AM peak and no worse in the PM peak.
- 8.13.6 For example in the AM peak 2032 Base scenario, maximum MMQ for the junction is 44.7 whilst in the Proposed scenario this maximum MMQ reduces to 34.5. In the PM peak Base 2032 scenario, the maximum MMQ for the junction is 87.5 and in the proposed scenario this maximum MMQ remains the same.
- 8.13.7 The main reason for the performance benefit being demonstrated mainly in the AM peak is that the M1 on-slip arm of this junction accommodates city bound traffic and for this assessment it has been assumed that a proportion of these vehicles will divert to the P&R site in the AM peak. In the PM peak there is minimal diverted traffic through this junction as the returning traffic in the evening will still have to arrive via the Blacks Road approach (used the M1 off-slip junction); same as existing.
- 8.13.8 No improvements are proposed for the existing M1 on-slip / Blacks Road / Old Golf Course Road junction. The staging will remain the same and only the signal timings may change.
- 8.13.9 In conclusion the assessment demonstrates that the Park and Ride extension at Black's Road is not likely to have an adverse impact on the surrounding road network.

## **9 Air Quality**

### **9.1 Introduction**

9.1.1 The Environmental Study Report (Ref 9.1) identified that the Blacks Road Park and Ride extension could potentially affect an Air Quality Management Area (AQMA). This extension would result in more vehicles using Black's Road which is adjacent to the M1-Westlink AQMA. The additional traffic may extend the existing AQMA to a number of sensitive receptors along the Black's Road area.

#### **Scope of the Study**

9.1.2 The scope of this chapter includes the potential temporary and permanent effects of the proposed scheme on local air quality during the operational phase as well as the temporary nuisance effects during the construction phase.

### **9.2 Statutory and Planning Context**

#### ***European Directive 2008/50/EC on ambient air quality and cleaner air for Europe***

9.2.1 The 2008 ambient air quality directive (Ref 9.2) sets legally binding limits for concentrations in outdoor air of major air pollutants that impact public health such as particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) and nitrogen dioxide (NO<sub>2</sub>). As well as having direct effects, these pollutants can combine in the atmosphere to form ozone (O<sub>3</sub>), a harmful air pollutant (and potent greenhouse gas) which can be transported great distances by weather systems. The 2008 directive is currently transcribed into UK legislation by the Air Quality Standards Regulations (Northern Ireland) 2010.

#### ***Environment (NI) Order 2002***

9.2.2 Under the Environment (NI) Order 2002 (Ref 9.3) it is a requirement to publish an Air Quality Strategy and establish a system of local air quality management. Local authorities are required to review air quality in their area and to designate Air Quality Management Areas (AQMA) where air quality objectives are unlikely to be met. Where an AQMA has been declared an Air Quality Action Plan, aimed at reducing pollutant levels to meet the objectives, needs to be produced.

***Land-Use Planning & Development Control: Planning for Air Quality***

9.2.3 The Institute of Air Quality Management and Environmental Protection UK produced guidance (Ref 9.4) to ensure that air quality is adequately considered in the land-use planning and development control processes. Table 6.2 in the guidance provides indicative criteria for requiring an air quality assessment. One criterion is if there is a change in light vehicle flow of more than 100 AADT within or adjacent to an AQMA, an air quality assessment is required.

***Regional Development Strategy 2025***

9.2.4 The Regional Development Strategy (Ref 9.5) was agreed by the Northern Ireland Assembly in September 2001. This strategy sets out a planning framework which includes Strategic Planning Guideline 6 "To create healthier living environments and to support healthy lifestyles". Measures addressing air quality include;

- improve air quality through implementation of the National Air Quality Strategy;
- introduce a Local Air Quality Management (LAQM) system to identify and address air pollution problems;
- promote the use of sustainable energy sources, diversify fuel supplies and minimise industrial emissions; and
- reduce traffic growth by changing travel patterns.

**Local Policy Framework**

***Belfast Air Quality Action Plan 2015 - 2020***

9.2.5 The Belfast Air Quality Action Plan 2015 – 2020 (Ref 9.7) aims to address areas of air quality concern where there have been exceedances of Nitrogen Dioxide (NO<sub>2</sub>) pollution. In 2004 the council identified and declared four Air Quality Management Areas (AQMAs) within Belfast City Council area where there were exceedances.

9.2.6 In response to these exceedances Belfast City Council launched an Air Quality Action Plan in 2006 with a deadline set for 2010 to achieve EU air quality objective limit values. This was achieved for Particulate Matter; however Nitrogen Dioxide continued to exceed these limits in some areas. The council has predicted that based on the existing situation, these areas will be compliant with the EU limit values by 2020 for Nitrogen Dioxide.

9.2.7 The Belfast Air Quality Action Plan states that 62.6% of the oxides of nitrogen are a result of transport with the remaining 37.4% attributed to industrial and commercial sources. With transport being the biggest contributor of air quality pollution it was calculated that a 30% reduction in traffic will reduce background oxides of nitrogen by 35% to 40%.

The Department for Infrastructure, Transport NI who are responsible for managing the public road network proposed a range of measures to reduce emissions and promote sustainable transport measures (Ref 9.7). One such proposal is the Strategic Park & Ride Delivery Programme 2013-15 (Ref 9.7) to create additional parking spaces throughout Park & Ride sites in Northern Ireland, including the Blacks Road Park & Ride site in Belfast.

***Belfast City Council's Air Quality and Land Use Planning Guidance***

9.2.8 This guidance note for developers and air quality consultants by Belfast City Council (Ref 9.8) aims to assist developers in considering air quality in advance of submitting a planning application.

9.2.9 Appendix 1. In the guidance, lists developments that may require an air quality assessment. Relevant types of developments include;

- Developments located in, or which may have an effect on sensitive areas e.g. Air Quality Management Areas (AQMA);
- Developments that introduce new exposure close to existing sources defined as areas where residents of a proposed development could be exposed to air quality in excess of National or European standards
- Developments that have the potential to increase traffic flows or congestion in an area. A 5% increase in traffic flows in an area where traffic flows are in excess of 10,000 annual average daily traffic (AADT) would be considered significant
- Proposals that include large car parks or where a significant increase in the existing car parking provision is proposed. A large car park is defined as having 300 spaces or more. A significant increase is defined as a 25% increase in car park spaces in excess of 300 spaces.
- Developments that lead to an increase on vehicle movements is greater than 60 vehicle movements in an hour.

- Developments that have a particularly sensitive end use e.g. crèches, hospitals and care homes.
- Developments where the construction work has the potential to impact upon nearby residents.
- Any development that has the potential to adversely impact upon the Air Quality Action Plan (AQAP) or its implementation.

### **9.3 Methodology**

9.3.1 The methodology for assessing the impact on local air quality was agreed in consultation with the Environmental Protection, Public Health & Housing division of Belfast City Council in July 2016. The full methodology is detailed in Appendix B and is summarised below.

#### **Temporary (construction) effects**

9.3.2 The assessment of temporary nuisance effects of dust during construction follows the Institute of Air Quality Management (IAQM) Guidance on the assessment of dust from demolition and construction (Ref 9.9).

9.3.3 Construction sites can give rise to annoyance due to the soiling of surfaces by dust. Very high levels of soiling can also damage plants and affect the diversity of ecosystems. Additionally, there is evidence of major construction sites increasing long term particulate matter (PM<sub>10</sub>) concentrations and the number of days when PM<sub>10</sub> concentrations exceed 50µg/m<sup>3</sup>, the daily limit value for this pollutant. Exposure to PM<sub>10</sub> has long been associated with a range of health effects.

9.3.4 The main effect of any dust emissions, if not mitigated, could be annoyance due to soiling of surfaces, particularly windows, cars and laundry. However, it is normally possible, by implementation of proper control, to ensure that dust deposition does not give rise to significant adverse effects.

9.3.5 This dust risk impact assessment compares the difference in the air quality climate between a baseline year prior to the start of the works (2015) and a future year during the period of construction works (2017). The assessment is only undertaken if there are sensitive receptors which could be potentially affected by construction dust. Table 9.1 shows the screening criteria to determine if these sensitive receptors exist.

**Table 9.1: Construction dust screening criteria**

Receptor type	Screening criteria
A 'human receptor' within	350m of the boundary of the site; or 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s)
An 'ecological receptor' within	50m of the boundary of the site; or 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s)

9.3.6 The assessment of the risk of dust effects is made separately for each potentially adverse construction stage and takes account of:

- i. the sensitivity of the area (determined from the sensitivity of receptors and the number of receptors); and
- ii. the scale and nature of the works (waste processing stage), which determines the potential dust emission magnitude at that construction stage.

9.3.7 These two factors (i. sensitivity of the area and ii. scale and nature of the works) are combined to give the risk of dust effects. These dust effects are split for each construction stage into:

- dust soiling effects;
- effects on human health of PM<sub>10</sub>; and
- ecological effects.

**Permanent (operational) effects**

9.3.8 In line with DMRB 11.3.1 HA207/07, a buffer 200m either side of the centre line of affected roads was used to define the study area for permanent air quality effects. To predict air quality impacts, selected receptors were chosen from areas most likely to be impacted inside this buffer. These are some of the most proximate receptors to the M1, including on-slip and off-slip roads, Old Golf Course Road and Black's Road. Receptors adjacent to Kingsway/Upper Lisburn Road were not included because no impact on road traffic is anticipated as a result of the scheme.



### ***Assessment scenarios***

- 9.3.9 This assessment of air quality assesses the following operational scenarios:
- With the scheme, referred to as the Do-Something scenarios; and
  - Without the scheme, referred to as the Do-Nothing scenarios.
- 9.3.10 In order to forecast the magnitude of possible impacts these scenarios are assessed for a baseline year and also a future year. The baseline and future years for the assessment of permanent air quality effects (i.e. from operation of the project) are as follows:
- The existing baseline year (2015)
  - The future baseline year for the opening year of the scheme (2017)
  - The opening year of the scheme (2017)
  - The future baseline year for the opening year of the scheme (2027)
  - Ten years after opening year of the scheme (2027)
- 9.3.11 In consultation with Belfast City Council, the existing baseline traffic data, the Black's Road diffusion tube and local meteorological data were used to verify the model predictions. All datasets used in the verification process were representative of existing baseline year 2015.

### ***Pollutants***

- 9.3.12 For road traffic sources, the pollutants of particular concern are oxides of nitrogen ( $\text{NO}_x$  and  $\text{NO}_2$ ) and particulate matter ( $\text{PM}_{10}$ ), which are the most likely pollutants to exceed or approach Air Quality Strategy objectives (i.e. UK AQS objectives) and the EU limit values. Nitrogen dioxide ( $\text{NO}_2$ ) and particulate matter ( $\text{PM}_{10}$ ) are of concern in relation to human health, whereas oxides of nitrogen ( $\text{NO}_x$ ) are of concern in relation to vegetation and ecosystems. Particulate matter ( $\text{PM}_{2.5}$ ) does not have an air quality strategy objective. However, legislative instruments under the Europe Directive 2008/50/EC aim to reduce the overall exposure of the population to  $\text{PM}_{2.5}$ . Furthermore, Local Authorities in England now have a flexible role in the control of  $\text{PM}_{2.5}$  levels through the Public Health Outcomes Framework in the absence of any regulatory role.  $\text{PM}_{2.5}$  has therefore been included in the impact assessment but not in the judgement of the significance of the scheme.
- 9.3.13 Table 9.2 lists the air quality thresholds applied in the assessment.

**Table 9.2: Objectives for key traffic related pollutants**

<b>Pollutant</b>	<b>Air Quality threshold</b>	<b>Measured as</b>
Nitrogen Dioxide (NO <sub>2</sub> )	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Oxides of Nitrogen (NO <sub>x</sub> )	30 µg/m <sup>3</sup>	Annual mean
Particles (PM <sub>10</sub> ) (gravimetric)	50 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	Daily mean
	40 µg/m <sup>3</sup>	Annual mean

9.3.14 The oxides of nitrogen annual mean objective is not applied in the assessment because it applies for the protection of ecosystems. There are no sensitive ecosystems in the study area.

***Short Term NO<sub>2</sub> objective***

9.3.15 The diurnal profile of traffic flows on the network and the park and ride were unavailable. As a result, estimates of 1-hour mean NO<sub>2</sub> concentrations at the sensitive receptors were not assessed against the objective because peaks in the release of air emissions are likely to have been underestimated.

***Traffic Data***

9.3.16 The key sources of emissions from the scheme are vehicle exhaust gases which are produced by vehicles using the surrounding road network and the park and ride. Some of the vehicles in the park and ride are sources of 'cold start' emissions which are excess emissions from the ignition of vehicles after prolonged periods of parking.

9.3.17 The data used to represent vehicle flows on the road network, and required by the ADMS-Roads model, are Annual Average Daily Traffic (AADT) flows and the heavy to light goods vehicle ratio. These were generated from the 2013 peak traffic counts extracted from the Committed Visteon Development application. As there were no other committed developments that impacted on traffic flows on the local network before 2015, AADTs derived from the 2013 peak traffic counts have been approved by Transport Northern Ireland to represent flows for 2015. More information about the traffic data used in the air quality assessment can be found in Appendix B Section 2.

9.3.18 The traffic data used in the model are AADTs, emissions from which were applied at a constant rate. The diurnal profiling of traffic flows on the network and into the park and ride was not possible because this level of detail for the data was unavailable.

### ***Modelling***

9.3.19 Pollutant concentrations were predicted using the ADMS-Roads Air Dispersion Modelling Software (Version 4.0.1.0) (Ref 9.12). This is a formally validated modelling software used extensively in the UK and internationally for regulatory purposes. Dispersion models combine meteorological data with estimations of emissions from road traffic sources to calculate pollutant concentrations at specified receptor points, alongside roads and the wider road network. To assign pollutant emissions, the road network is broken down into 'links' or sections which allows variable traffic flows, speeds and elevations to be assigned. The link configuration is shown in Figure 3.1 of **Appendix B**.

9.3.20 Pollutant emission factors are applied to estimates of road traffic flow to estimate the rate of pollutant emissions. The emission factors applied in this assessment are version 6.4.1 (2 VC) (Ref 9.13) of Defra's Emissions Factors Toolkit. These are latest heavy duty and light duty vehicle factors built into the ADMS-Roads model.

9.3.21 The most representative meteorological data for the study area has been considered to be from Belfast Aldergrove Airport for the year 2015 which is located approximately 18km north west of the study area. A surface roughness length of 0.5m was applied in the analysis of the meteorological data and a roughness length of 1m was applied in the dispersion analysis. The prevailing wind direction in the study area is south-westerly. A wind-rose which illustrates this can be found in Figure 4.3 of **Appendix B**.

9.3.22 For all modelling scenarios, concentrations were predicted at 18 discrete sensitive receptors located around the road network and adjacent to the AQMA.

9.3.23 Concentrations were also made at the vertices of 20m resolution grid over the study area to allow the assessment of impacts across the surrounding road network. This is shown in Appendix B Figure 3.1.

**Verification**

9.3.24 Estimated modelled concentrations are subject to uncertainty and therefore on occasion need to be adjusted to obtain representative results. Model verification investigates the discrepancies between modelled and measured concentrations, which can arise due to the presence of inaccuracies and/or uncertainties in model input data, modelling and monitoring data assumptions. The verification method followed the process detailed in LAQM TG (16) and involved the correction of model road-NO<sub>x</sub> estimates to match those monitored at the Black's Road diffusion tube. The verification process is described in further detail in Appendix B Section 4.

**Assessment of Significance**

9.3.25 The IAQM Guidance provides an approach to determining the air quality impacts resulting from a proposed development and the overall significance of local air quality effects arising from a proposed development.

9.3.26 Impact descriptors are based on the magnitude of incremental change as a proportion of the relative assessment levels. The change is then examined in relation to the predicted total pollutant concentrations in the assessment year and its relationship with the objective.

9.3.27 The descriptors used to describe air quality impacts at the sensitive receptors are shown in Table 9.3.

**Table 9.3 Impact descriptors for individual receptors**

Long term average concentration at receptor in assessment year	Change in concentration relative to Air Quality Assessment Level (%)*			
	1	2–5	6–10	>10
≤ 75% of AQAL	Negligible	Negligible	Slight	Moderate
76–94% of AQAL	Negligible	Slight	Moderate	Moderate
95–102% of AQAL	Slight	Moderate	Moderate	Substantial
103–109% of AQAL	Moderate	Moderate	Substantial	Substantial
≥ 100% of AQAL	Moderate	Substantial	Substantial	Substantial

\* changes in pollutant concentrations of less than 0% i.e. <0.5% would be described as negligible

9.3.28 The impact descriptors at each of the assessed receptors can then be used as a starting point in making a judgement on the overall significance level of a development. Other factors to be considered include:

- The existing and future air quality in the absence of the development
- The extent of the current and future population exposure to impacts
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts

9.3.29 Professional judgement is used to determine the overall significance of effect of the proposed development. However, in circumstances where the proposed development can be judged in isolation, it is likely that a 'moderate' or 'substantial' impact will produce a significant effect and a 'negligible' or 'slight' impact will not result in a significance effect.

## **9.4 Baseline Conditions**

9.4.1 To define the baseline conditions, the local air quality management reports were reviewed, specifically the 2014 Air Quality Progress Report for Belfast City Council (Ref 9.14).

9.4.2 The main source of air pollutants in the study area of the scheme is from vehicular traffic. In the study area of the scheme, emissions are primarily associated with traffic using the M1 – Westlink motorway, Blacks Road and surrounding road network.

9.4.3 The M1 - Westlink is an arterial route providing access to and from the centre of Belfast as well as providing indirect access to the docks area of the city. The Blacks Road is a busy road allowing traffic to move between west and south Belfast with an on-slip and off slip lane onto the overhead M1-Westlink. It is intersected by a number of junctions and pedestrian crossings that during peak times can be subject to congestion and increased emissions associated with slow moving and idling traffic.

9.4.4 Belfast City Council declared 4 AQMAs in 2004 which are still active. These are;

- M1-Westlink AQMA
- Cromac Street and Albertbridge Street AQMA;
- Upper Newtownards Road AQMA
- Ormeau Road AQMA

- 9.4.5 The M1-Westlink AQMA was declared for predicted exceedances of both nitrogen dioxide (NO<sub>2</sub>) and particulate matter (PM<sub>10</sub>) annual mean air quality strategy objectives as well as exceedances of the particulate matter 24-hour mean objective and the nitrogen dioxide 1-hour mean objective. This AQMA is located approximately 15m north of the scheme footprint (refer **Figure 9.2**).
- 9.4.6 The Cromac Street and Albertbridge Street AQMA was declared for predicted exceedances of nitrogen dioxide annual mean air quality strategy objective. It is located 6km north east of the scheme.
- 9.4.7 The Upper Newtownards Road AQMA was declared for predicted exceedances of the nitrogen dioxide annual mean air quality strategy objective. It is located approximately 8.7km north east of the scheme.
- 9.4.8 The Ormeau Road AQMA was declared for predicted exceedances of the nitrogen dioxide annual mean air quality strategy objective. It is located approximately 5.3km north east from the scheme.
- 9.4.9 In 2010, Belfast City Council conducted a detailed air quality assessment which considered the potential for exceedances of the nitrogen dioxide objectives at several locations across the city. It concluded that there was no need to declare additional AQMAs or to expand or revoke the existing AQMAs.

**Baseline conditions relevant to dust**

- 9.4.10 There is one continuous monitoring station, Belfast Centre on Lombard Street, which is located 6.4km north east of the scheme. As an urban background site, data from Lombard Street is considered to be representative of the ambient levels of PM<sub>10</sub> in the study area. There have not been any exceedances of the annual mean air quality objective for PM<sub>10</sub> at Lombard Street in since 2011. For the daily mean, the permitted number of exceedances of the air quality objective for PM<sub>10</sub> (35 days a year) has not been surpassed since 2011. The number of exceedances is shown in Table 9.4.

**Table 9.4: Measured PM<sub>10</sub> at Belfast Centre**

Site ID	Site Type	Within AQMA	Number Annual exceedances daily mean				
			2011	2012	2013	2014	2015
Lombard Street	Urban background	N	10	7	6	8	5

**Baseline conditions relevant to local air quality**

9.4.11 The closest continuous automatic monitoring station, known as Belfast Stockman's Lane, is located at grid reference X331010 Y371252, on Stockman's Lane and is within the M1-Westlink AQMA. However, as a roadside site this cannot be used to represent background air quality at the application site.

9.4.12 The Belfast Centre continuous automatic monitoring station is located at grid reference X333898 Y374358, on Lombard Street and is not within an AQMA. This station is an urban background station and is therefore suitable to represent background. Lombard Street monitors for NO<sub>2</sub> and NO<sub>x</sub> by chemiluminescence, and PM<sub>10</sub> and PM<sub>2.5</sub> by Filter Dynamics Measurement System (FDMS) and equipped Tapered Element Oscillating Microbalances (TEOMs). The results for the years 2011 to 2015 are shown in Table 9.5.

**Table 9.5: Results of Automatic monitoring of PM<sub>10</sub>, PM<sub>2.5</sub>, NO<sub>2</sub> and NO<sub>x</sub> at Lombard Street, Belfast Centre (urban background)**

Pollutant	Location	Within AQMA	Data capture for 2015 (%)	Annual mean concentration (µg/m <sup>3</sup> )				
				2011	2012	2013	2014	2015
PM <sub>10</sub>	Lombard Street	N	95.9	18	15	18	16	14
PM <sub>2.5</sub>	Lombard Street	N	96.6	14	10	12	11	9
NO <sub>2</sub>	Lombard Street	N	94.0	28	29	31	28	29
NO <sub>x</sub>	Lombard Street	N	94.0	48	50	49	42	48

9.4.13 Belfast City Council monitors NO<sub>2</sub> by diffusion tube on Black's Road inside the M1-Westlink AQMA. The results for this tube are shown in Table 9.6 which shows that the annual average NO<sub>2</sub> objective has been exceeded at the kerbside from 2011 to 2015.

**Table 9.6: Diffusion tube monitoring (Black's Road)**

ID	Location	Within AQMA	Data capture for 2015 (%)	Annual mean concentration (µg/m <sup>3</sup> )				
				2011	2012	2013	2014	2015
2	Black's Road	Y	100	40	40	43	42	43

9.4.14 Defra pollutant background maps for PM<sub>10</sub>, PM<sub>2.5</sub>, NO<sub>2</sub> and NO<sub>x</sub> are shown in Table 9.7. Background concentrations are anticipated to fall year on year as a result of UK Government and EU policies to reduce pollutant emissions (Ref 9.15).

**Table 9.7: Background concentrations for NO<sub>x</sub>, NO<sub>2</sub> and PM<sub>10</sub> and PM<sub>2.5</sub> in different years from Defra's background maps (base year 2013) for grid ref X329795 Y369402 (square 329500, 369500)**

Year	NO <sub>x</sub> (µg/m <sup>3</sup> )	NO <sub>2</sub> (µg/m <sup>3</sup> )	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )
2015	18.8	13.8	14.5	9.7
2017	17.2	12.7	14.3	9.5
2027	13.6	10.2	13.9	8.8

9.4.15 Table 9.5 and Table 9.7 show that monitored PM<sub>10</sub> and PM<sub>2.5</sub> from the urban background site (Lombard Street) and the Defra background map estimates are in close agreement. As the Defra background map estimates are slightly higher, these were used to represent PM<sub>10</sub> and PM<sub>2.5</sub> background at the application site which represents a conservative approach.

9.4.16 For NO<sub>2</sub> and NO<sub>x</sub>, Table 9.5 and Table 9.7 show that the urban background site (Lombard Street) and the Defra background map estimates are not in close agreement. The urban background site is higher and so this data was used to represent background. Projections for 2017 and 2027 were made using ratios derived from the background map concentration estimates.

9.4.17 A summary of the background concentrations used in the assessment is provided in Table 9.8.



**Table 9.8: Background concentrations for NO<sub>x</sub>, NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> used in the assessment**

Pollutant	Source	Within AQMA	Data capture for 2015 (%)	Annual mean concentration (µg/m <sup>3</sup> )		
				2015	2017	2027
PM <sub>10</sub>	Background maps	--	--	14.5	14.3	13.9
PM <sub>2.5</sub>	Background maps	--	--	9.7	9.5	8.8
NO <sub>2</sub>	Lombard Street	N	94.0	29.0	26.7	21.4
NO <sub>x</sub>	Lombard Street	N	94.0	48.0	43.9	34.7

## 9.5 Evaluation of Receptors

### Temporary (construction) effects

9.5.1 In line with the IAQM Guidance on dust, the study area for temporary air quality effects was defined by a 350m boundary from the scheme for human receptors and 50m boundary from the scheme for ecological receptors. **Figure 9.1** in Volume 3 shows the location of receptors within the study area.

9.5.2 The area immediately surrounding the scheme is suburban in nature with the majority of receptors being residential, though there are some commercial and community receptors in close proximity. A review of the Northern Ireland Environment Agency's Designated Areas Viewer (Ref 9.16) confirms that there are no relevant designated sites within 50m of the proposed scheme.

9.5.3 The total receptor counts are shown in Table 9.9.

**Table 9.9: Sensitive receptors within the study area for temporary effects**

Cumulative distance bands (m)	Number of receptors		
	Residential	Community	Commercial
0-20	0	0	0
0-50	0	0	0

Cumulative distance bands (m)	Number of receptors		
	Residential	Community	Commercial
0-100	6	1	0
0-150	18	2	0
0-200	48	2	2
0-350	249	3	9

9.5.1 Table 9.10 shows the sensitivity of receptors within the study area for temporary effects. For dust soiling, the sensitivity of receptors is medium due to there being 1-10 residential receptors being within 350m as shown in Table 2.4 of Appendix B.

9.5.2 The sensitivity of receptors to PM<sub>10</sub> is assessed as being high as there is a possibility that members of the public could be exposed over a time period relevant to the air quality objective for PM<sub>10</sub> (in the case of the 24-hour objectives, a relevant location is one where individuals may be exposed for eight hours or more in a day such as a residential property). There are no ecological receptors within 50m, and as such these impacts have been screened out.

**Table 9.10: Determination of the sensitivity of receptors**

Dust effect	Relevant definition	Sensitivity of receptors
Dust soiling effects	Residential dwellings	Medium
Human health effects of PM <sub>10</sub>	Location where individuals can be exposed for 8 hours or more in a day	High
Ecological effects	No designated sites within 50m of the scheme boundary	N/A

9.5.3 Table 9.11 shows the sensitivity of the area to dust soiling and to health effects of PM<sub>10</sub>, for each phase of works which was calculated from the number of receptors as detailed in Table 9.9 The methodology is described Appendix B. The background ambient concentration of PM<sub>10</sub> used to determine the sensitivity for human health of PM<sub>10</sub> is 14.3 µg/m<sup>3</sup> for 2017.

**Table 9.11: Determination of the sensitivity of the area**

<b>Dust Sensitivity</b>	<b>Effect</b>	<b>Relevant definition</b>	<b>Sensitivity of the area</b>
Dust soiling		1-10 receptors within 50m	Low
Human health of PM <sub>10</sub>		14.26µg/m <sup>3</sup> PM <sub>10</sub> (background concentration 2017) 1-10 receptors within 50m	Low

**Permanent (operational) effects**

9.5.4 For the purpose of the modelling assessment, 18 sensitive receptors across the road network were chosen to represent human exposure. The Air Quality Objectives only apply where members of the public are likely to be regularly present for the averaging time of the objective i.e. where people will be exposed to the pollutants. The annual mean objectives apply to all locations where people may be regularly exposed including building facades of residential properties, schools, hospitals and care homes. Therefore, for the assessment of permanent effects from the scheme, all sensitive receptors are considered to be of equal sensitivity. The study area is shown in **Figure 9.2**.

**9.6 Predicted Impacts/Impact Assessment**

**Temporary (construction) effects**

9.6.1 The construction phase programme is yet to be finalised. The level of detail, sequence and durations will be developed further in the construction-phase programme following completion of detailed design and appointment of the successful contractor. However, this report is based on a robust initial assessment of the construction phase programme using the best-available knowledge at the time of preparation. This assessment has taken a 350m boundary from the scheme area.

9.6.2 Overall, the following activities on this site are considered to have the potential to generate dust emissions.

- Earthworks: including the removal of topsoil, handling on site and deposition, construction of cuttings and embankments, stockpiling and handling of loose materials (including loading and unloading of materials).
- Track out: vehicle movements, causing re-suspension of road dust, particularly on unmade roads.

9.6.3 The potential dust emission magnitude is based on the scale and nature of the anticipated works and is classified as small, medium or large. Table 9.12 shows the potential dust emission magnitude for each of the activities expected during the works.

**Table 9.12: Determination of the potential dust emission magnitude**

<b>Construction stage</b>	<b>Relevant definition</b>	<b>Potential dust emission magnitude</b>
Earthworks	> 20,000 tonnes – 100,000 tonnes of material moved  5-10 heavy earth moving vehicles active at any one time,  formation of bunds required 4m - 8m in height	Medium
Track out	<10 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release (Clay),with no unpaved road.	Small

9.6.1 The risk of dust impacts to both dust soiling and human health effects for each stage of the construction and for each phase was calculated from the combination of the sensitivity of the area to both dust soiling and human health impacts (and the dust emission magnitude for each phase of the construction (The results are summarised below in Table 9.13).

**Table 9.13: Summary dust risk table to define site-specific mitigation**

Dust effect (sensitivity of the area to the specific dust effect)	Construction Phase (potential dust emission magnitude)	
	Earthworks (Medium)	Track out (Medium)
Dust soiling (Low)	Low Risk	Low Risk
Human health of PM <sub>10</sub> (Low)	Low Risk	Low Risk

**Permanent (operational) effects**

**Opening year of the scheme (2017)**

9.6.2 Predicted concentrations for the opening year of the scheme (2017) at the sensitive receptors are shown in Table 9.14 to Table 9.17. All results are inclusive of background.

**Table 9.14: Predicted annual mean NO<sub>2</sub> concentrations (2017)**

Receptor		NO <sub>2</sub> concentration (µg/m <sup>3</sup> )			
Name	ID	2015	2017 Do-nothing	2017 Do-something	Impact (%)
20 William Alexander Park	1	37.1	33.5	33.5	0.00%
41 Glendale	2	39.9	35.9	35.9	0.00%
50 Glendale	3	34.5	31.3	31.3	0.00%
8 The Manor, Black's Road	4	37.7	34.2	34.1	-0.06%
1 St. Anne's Crescent	5	37.4	33.9	33.9	-0.06%
12 Beechlawn Avenue	6	38.7	34.9	34.8	-0.09%
22 The Hawthorns	7	<b>40.3</b>	36.2	36.1	-0.19%
28 William Alexander Park	8	38.4	34.6	34.5	-0.12%
8 The Hawthorns	9	<b>41.5</b>	37.2	37.2	0.00%
8 St. Anne's Crescent	10	39.6	35.6	35.6	0.06%
20 The Hawthorns	11	36.5	33.0	33.0	0.09%
8 Beechlawn Park	12	38.8	35.0	35.1	0.17%
16 St. Anne's Crescent	13	31.7	28.9	28.9	0.00%
25 Old Golf Course Park	14	31.4	28.6	28.6	-0.07%
10 The Hawthorns	15	31.7	28.9	28.9	-0.03%
97 Makro SSW Kingsway	16	31.8	29.0	29.0	-0.07%
50 St. Anne's P.S. Kingsway	17	37.4	33.7	33.7	-0.12%
Finaghy Baptist Church, The Hawthorns	18	35.1	31.8	31.8	0.06%
<b>Objective</b>		<b>40</b>			

**Table 9.15: Predicted annual mean PM<sub>10</sub> concentrations (2017)**

Receptor		PM <sub>10</sub> concentration (µg/m <sup>3</sup> )			
Name	ID	2015	2017 Do-nothing	2017 Do-something	Impact (%)
20 William Alexander Park	1	31.2	30.9	30.9	-0.06%
41 Glendale	2	34.7	34.5	34.5	-0.03%
50 Glendale	3	25.8	25.6	25.5	-0.06%
8 The Manor, Black's Road	4	30.8	30.8	30.7	-0.15%
1 St. Anne's Crescent	5	30.7	30.6	30.6	-0.22%
12 Beechlawn Avenue	6	33.4	33.3	33.2	-0.26%
22 The Hawthorns	7	38.2	38.0	37.8	-0.51%
28 William Alexander Park	8	30.8	30.4	30.4	-0.25%
8 The Hawthorns	9	35.8	35.4	35.4	0.01%
8 St. Anne's Crescent	10	32.8	32.5	32.5	0.08%
20 The Hawthorns	11	27.6	27.4	27.5	0.16%
8 Beechlawn Park	12	31.5	31.4	31.5	0.31%
16 St. Anne's Crescent	13	19.9	19.7	19.7	-0.08%
25 Old Golf Course Park	14	19.4	19.2	19.2	-0.19%
10 The Hawthorns	15	20.2	20.0	19.9	-0.26%
97 Makro SSW Kingsway	16	20.4	20.2	20.1	-0.20%
50 St. Anne's P.S. Kingsway	17	29.8	29.5	29.4	-0.35%
Finaghy Baptist Church, The Hawthorns	18	25.2	25.0	25.1	0.12%
<b>Objective</b>		<b>40</b>			

**Table 9.16: Predicted exceedances of the PM<sub>10</sub> daily mean objective (2017)**

Receptor		Exceedances of 50 µg/m <sup>3</sup> daily mean PM <sub>10</sub> objective			
Name	ID	2015	2017 Do-nothing	2017 Do-something	Impact
20 William Alexander Park	1	12	11	11	0
41 Glendale	2	<b>37</b>	<b>38</b>	<b>38</b>	0
50 Glendale	3	14	14	14	0
8 The Manor, Black's Road	4	20	20	20	0
1 St. Anne's Crescent	5	8	8	8	0
12 Beechlawn Avenue	6	14	15	14	-1
22 The Hawthorns	7	<b>45</b>	<b>45</b>	<b>43</b>	-2
28 William Alexander Park	8	11	11	11	0
8 The Hawthorns	9	29	29	29	0
8 St. Anne's Crescent	10	21	20	20	0
20 The Hawthorns	11	4	4	4	0
8 Beechlawn Park	12	12	12	12	0
16 St. Anne's Crescent	13	0	0	0	0
25 Old Golf Course Park	14	0	0	0	0
10 The Hawthorns	15	0	0	0	0
97 Makro SSW Kingsway	16	0	0	0	0
50 St. Anne's P.S. Kingsway	17	7	7	5	-2
Finaghy Baptist Church, The Hawthorns	18	2	2	2	0
<b>Objective</b>		<b>35</b>			



**Table 9.17: Predicted annual mean PM<sub>2.5</sub> concentrations (2017)**

Receptor		PM <sub>2.5</sub> concentration (µg/m <sup>3</sup> )			
Name	ID	2015	2017 Do-nothing	2017 Do-something	Impact (%)
20 William Alexander Park	1	19.6	19.0	19.1	0.03%
41 Glendale	2	21.8	21.2	21.2	0.04%
50 Glendale	3	16.4	16.0	16.0	0.04%
8 The Manor, Black's Road	4	19.5	19.1	19.0	-0.09%
1 St. Anne's Crescent	5	19.4	18.9	18.9	-0.14%
12 Beechlawn Avenue	6	21.0	20.5	20.4	-0.17%
22 The Hawthorns	7	23.8	23.1	23.0	-0.42%
28 William Alexander Park	8	19.5	18.9	18.9	-0.04%
8 The Hawthorns	9	22.6	21.8	21.9	0.31%
8 St. Anne's Crescent	10	20.7	20.1	20.2	0.46%
20 The Hawthorns	11	17.6	17.1	17.2	0.73%
8 Beechlawn Park	12	20.0	19.4	19.6	0.97%
16 St. Anne's Crescent	13	12.9	12.6	12.6	0.37%
25 Old Golf Course Park	14	12.6	12.3	12.3	0.00%
10 The Hawthorns	15	13.1	12.7	12.7	-0.13%
97 Makro SSW Kingsway	16	13.2	12.9	12.9	0.10%
50 St. Anne's P.S. Kingsway	17	18.9	18.3	18.2	-0.20%
Finaghy Baptist Church, The Hawthorns	18	16.1	15.7	15.8	0.66%
<b>Target value</b>		<b>25</b>			

- 9.6.3 Table 9.14 and Table 9.17 show that in baseline year 2015, there are no exceedances of either annual mean particulate matter objective at any of the receptors.
- 9.6.4 Table 9.14 shows the annual mean NO<sub>2</sub> objective is exceeded at Site 7 (40.3 µg/m<sup>3</sup>) and Site 9 (41.5 µg/m<sup>3</sup>) which is a result of their proximity to Black's Road and the park and ride and their downwind position of these sources. At Site 2 (39.9 µg/m<sup>3</sup>), the NO<sub>2</sub> objective is almost exceeded as a result of its proximity to the Old Golf Course Road-Black's Road intersection where slow moving traffic occurs.
- 9.6.5 Table 9.15 shows the annual mean PM<sub>10</sub> concentration objective of 40 µg/m<sup>3</sup> was not exceeded at all of the receptors
- 9.6.6 Table 9.14 to Table 9.17 show air quality is predicted to improve in 2017 because the increase in emissions from traffic growth is expected to be offset by the reduction in background and increased penetration of cleaner vehicles into the Belfast vehicle fleet. No exceedances of the annual mean NO<sub>2</sub>, PM<sub>10</sub> or PM<sub>2.5</sub> objectives are predicted at any of the receptors with or without the scheme in place. Minor improvements (<0.6%) in air quality are predicted at receptors R4-R8 and R14-R17 for all pollutants with the scheme in place. A minor reduction (<1%) in air quality is predicted at receptors R9-R12 for all pollutants.
- 9.6.7 Table 9.16 shows that exceedances of the 50µg/m<sup>3</sup> daily mean objective are predicted at most receptors in 2015. At R2 (2) and R7 (10) the number of allowable exceedance days is surpassed. At R2, R7 and R17 the number of exceedance days is reduced with the scheme in place, although at R2 (3) and R7 (8) the number of allowable exceedance days is still surpassed.

### **Ten years after opening year of the scheme (2027)**

- 9.6.8 Predicted concentrations ten years after opening of the scheme (2027) at the sensitive receptors are shown in Table 9.18 to Table 9.21. All results are inclusive of background.

**Table 9.18: Predicted annual mean NO<sub>2</sub> concentrations (2027)**

Receptor		NO <sub>2</sub> concentration (µg/m <sup>3</sup> )			
Name	ID	2015	2027 Do-nothing	2027 Do-something	Impact (%)
20 William Alexander Park	1	37.1	25.1	25.1	0.00%
41 Glendale	2	39.9	26.4	26.4	0.00%
50 Glendale	3	34.5	23.9	23.9	0.00%
8 The Manor, Black's Road	4	37.7	25.4	25.4	0.00%
1 St. Anne's Crescent	5	37.4	25.3	25.3	0.00%
12 Beechlawn Avenue	6	38.7	25.8	25.8	-0.04%
22 The Hawthorns	7	<b>40.3</b>	26.6	26.5	-0.15%
28 William Alexander Park	8	38.4	25.6	25.6	-0.12%
8 The Hawthorns	9	<b>41.5</b>	27.1	27.1	-0.07%
8 St. Anne's Crescent	10	39.6	26.2	26.2	0.00%
20 The Hawthorns	11	36.5	24.8	24.8	0.04%
8 Beechlawn Park	12	38.8	25.9	25.9	0.12%
16 St. Anne's Crescent	13	31.7	22.6	22.6	0.00%
25 Old Golf Course Park	14	31.4	22.4	22.4	-0.04%
10 The Hawthorns	15	31.7	22.6	22.5	-0.04%
97 Makro SSW Kingsway	16	31.8	22.6	22.6	-0.04%
50 St. Anne's P.S. Kingsway	17	37.4	25.2	25.1	-0.12%
Finaghy Baptist Church, The Hawthorns	18	35.1	24.1	24.2	0.04%
<b>Objective</b>		<b>40</b>			

**Table 9.19: Predicted annual mean PM<sub>10</sub> concentrations (2027)**

Receptor		PM <sub>10</sub> concentration (µg/m <sup>3</sup> )			
Name	ID	2015	2027 Do-nothing	2027 Do-something	Impact (%)
20 William Alexander Park	1	31.2	30.1	30.1	-0.07%
41 Glendale	2	34.7	33.5	33.5	-0.05%
50 Glendale	3	25.8	24.9	24.9	-0.06%
8 The Manor, Black's Road	4	30.8	29.8	29.9	0.09%
1 St. Anne's Crescent	5	30.7	29.7	29.7	0.01%
12 Beechlawn Avenue	6	33.4	32.3	32.3	-0.19%
22 The Hawthorns	7	38.2	37.0	36.9	-0.45%
28 William Alexander Park	8	30.8	29.5	29.4	-0.31%
8 The Hawthorns	9	35.8	34.2	34.2	-0.13%
8 St. Anne's Crescent	10	32.8	31.5	31.5	-0.03%
20 The Hawthorns	11	27.6	26.6	26.6	0.10%
8 Beechlawn Park	12	31.5	30.4	30.5	0.25%
16 St. Anne's Crescent	13	19.9	19.2	19.1	-0.08%
25 Old Golf Course Park	14	19.4	18.7	18.7	-0.18%
10 The Hawthorns	15	20.2	19.4	19.4	-0.24%
97 Makro SSW Kingsway	16	20.4	19.6	19.6	-0.19%
50 St. Anne's P.S. Kingsway	17	29.8	28.6	28.5	-0.38%
Finaghy Baptist Church, The Hawthorns	18	25.2	24.3	24.3	0.07%
<b>Objective</b>		<b>40</b>			

**Table 9.20: Predicted exceedances of the PM<sub>10</sub> daily mean objective (2027)**

Receptor		Exceedances of 50 µg/m <sup>3</sup> daily mean PM <sub>10</sub> objective			
Name	ID	2015	2027 Do-nothing	2027 Do-something	Impact
20 William Alexander Park	1	12	9	9	0
41 Glendale	2	<b>37</b>	<b>36</b>	<b>36</b>	0
50 Glendale	3	14	11	11	0
8 The Manor, Black's Road	4	20	19	19	0
1 St. Anne's Crescent	5	8	8	8	0
12 Beechlawn Avenue	6	14	12	11	-1
22 The Hawthorns	7	<b>45</b>	<b>40</b>	<b>39</b>	-1
28 William Alexander Park	8	11	8	8	0
8 The Hawthorns	9	29	26	26	0
8 St. Anne's Crescent	10	21	18	18	0
20 The Hawthorns	11	4	4	4	0
8 Beechlawn Park	12	12	11	11	0
16 St. Anne's Crescent	13	0	0	0	0
25 Old Golf Course Park	14	0	0	0	0
10 The Hawthorns	15	0	0	0	0
97 Makro SSW Kingsway	16	0	0	0	0
50 St. Anne's P.S. Kingsway	17	7	5	5	0
Finaghy Baptist Church, The Hawthorns	18	2	1	1	0
<b>Objective</b>		<b>35</b>			

**Table 9.21: Predicted annual mean PM<sub>2.5</sub> concentrations (2027)**

Receptor		PM <sub>2.5</sub> concentration (µg/m <sup>3</sup> )			
Name	ID	2015	2027 Do-nothing	2027 Do-something	Impact (%)
20 William Alexander Park	1	19.6	17.4	17.4	0.02%
41 Glendale	2	21.8	19.2	19.3	0.03%
50 Glendale	3	16.4	14.7	14.7	0.04%
8 The Manor, Black's Road	4	19.5	17.3	17.3	0.14%
1 St. Anne's Crescent	5	19.4	17.2	17.2	0.07%
12 Beechlawn Avenue	6	21.0	18.6	18.6	-0.10%
22 The Hawthorns	7	23.8	21.1	21.0	-0.36%
28 William Alexander Park	8	19.5	17.1	17.1	-0.10%
8 The Hawthorns	9	22.6	19.6	19.7	0.19%
8 St. Anne's Crescent	10	20.7	18.2	18.2	0.36%
20 The Hawthorns	11	17.6	15.6	15.7	0.68%
8 Beechlawn Park	12	20.0	17.6	17.7	0.93%
16 St. Anne's Crescent	13	12.9	11.6	11.6	0.38%
25 Old Golf Course Park	14	12.6	11.3	11.3	0.01%
10 The Hawthorns	15	13.1	11.7	11.7	-0.11%
97 Makro SSW Kingsway	16	13.2	11.8	11.9	0.11%
50 St. Anne's P.S. Kingsway	17	18.9	16.6	16.6	-0.21%
Finaghy Baptist Church, The Hawthorns	18	16.1	14.3	14.4	0.63%
<b>Target value</b>		<b>25</b>			

- 9.6.9 Table 9.18 to Table 9.21 show air quality is predicted to be better ten years after opening (2027) because the increase in emissions from traffic growth is expected to be further offset by reductions in background and the penetration of cleaner vehicles into the Belfast vehicle fleet. No exceedances of the annual mean  $\text{NO}_{2r}$ ,  $\text{PM}_{10}$  or  $\text{PM}_{2.5}$  objectives are predicted at any of the receptors with or without the scheme in place in 2027. Minor improvements (<0.2%) in air quality are predicted at receptors R6-R9 and R14-R17 for  $\text{NO}_2$  with the scheme in place. It is predicted that reductions in the  $\text{PM}_{10}$  concentration will occur at most receptors (<0.25%) with the scheme in place in 2027. Concentrations of  $\text{PM}_{2.5}$  are predicted to increase by up to 1% with the scheme in place at R12 which is close to the M1. This is 70% of the target value.
- 9.6.10 Table 9.20 shows that the number of days where the  $50\mu\text{g}/\text{m}^3$  daily mean objective is exceeded is above the permitted number (35 days) at most receptors in 2027. However the number of exceedance days at Site 2 and Site 7 are lower in 2027 than 2017 for all scenarios assessed.
- 9.6.11 Figure 9.2 and Figure 9.3 show the predicted opening year (2017) do-something annual mean  $\text{NO}_2$  and  $\text{PM}_{10}$  concentrations across the road network. The figures show elevated concentrations at the junctions of Old Golf Course Road and Black's Road, the M1 at the on-slip and off-slip locations and the park and ride. These areas correspond to slow moving traffic as a result of congestion on the network. Concentrations are at their highest at the centre of the road and they reduce with distance towards the roadside and kerbside. Emissions from the park and ride can be seen to disperse in a north north-easterly direction in line with the prevailing south-easterly wind in the direction of receptors on The Hawthorns. The zone of exceedance of the  $\text{PM}_{10}$  annual mean is confined to the AQMA in 2017 with the scheme in place.
- 9.6.12 Figure 9.4 and Figure 9.5 show the assessment year (2027) with-scheme annual mean  $\text{NO}_2$  and  $\text{PM}_{10}$  concentrations across the road network. The figures show that the pattern of dispersion is the same as 2017 but concentrations are lower. In both 2017 and 2027, the zone of exceedance of the  $\text{NO}_2$  and  $\text{PM}_{10}$  is significantly reduced.

## Discussion

- 9.6.13 Changes in baseline air quality in assessment years 2017 and 2027 are a result of changes to traffic flows. With the scheme in place in 2017, new trips are diverted from the road network to the park and ride. This leads to very small improvements in air quality along the M1 and a very small decline along Black's Road where traffic using old Golf Course Road turns right to the park and ride instead of straight to the M1 on-slip. This means the expanded park and ride is predicted to improve air quality in the M1-Westlink AQMA as traffic is redistributed across the network.
- 9.6.14 Research carried out on behalf of Defra and the Devolved Administrations (Ref 9.17) identified that exceedances of the NO<sub>2</sub> 1-hour mean are unlikely to occur where the annual mean is below 60 µg/m<sup>3</sup>. Table 9.14 and Table 9.18 show that the maximum predicted concentration of annual mean NO<sub>2</sub> is under the 40·g/m<sup>3</sup> objective with and without the scheme in place in 2017 and 2027. It is therefore considered unlikely that exceedances of the NO<sub>2</sub> 1-hour mean will occur as a result of the scheme.
- 9.6.15 Disparities between modelling and monitoring results are likely to be as a result of a combination of:
- traffic data uncertainties, including estimates of speeds, total flows and proportions of vehicle types
  - emission estimates for vehicles and other sources
  - estimates of background concentrations
  - meteorological data uncertainties
  - model input parameters such as roughness length, minimum Monin-Obukhov length
  - assumed NO<sub>x</sub>:NO<sub>2</sub> conversion
  - overall model limitations
  - the precision and accuracy of monitoring methods.



9.6.16 Verification is the process by which uncertainties are investigated and minimised. In this study, the verification method followed the process detailed in LAQM TG (16) and involved the correction of model road-NO<sub>x</sub> estimates to match those monitored at a single diffusion tube on Black's Road which is located at the kerbside on the edge of the AQMA. Using a single kerbside site to correct modelled road-NO<sub>x</sub> means that the correction across the study area may not be as accurate, particularly away from the roadside where the accuracy of modelled road-NO<sub>x</sub> could differ. However, as the main area of concern is the impact of road traffic emissions on concentrations in the M1-Westlink AQMA, this is considered robust.

## 9.7 Proposed Mitigation

### Temporary (construction) effects

9.7.1 There is a low risk of dust nuisance and health impacts associated with PM<sub>10</sub> during construction. Table 9.22 outlines the recommended mitigation to avoid significant adverse effects on air quality during construction for this site.

**Table 9.22: Mitigation Measures**

<b>Mitigation measure</b>
<b>Communications</b>
Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
Display the head or regional office contact information
<b>Dust management plan</b>
Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document.
<b>Site Management</b>
Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
Make the complaints log available to the local authority when asked.
Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.

<b>Mitigation measure</b>
<b>Monitoring</b>
Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary.
Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.
Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
<b>Preparing and maintaining the site</b>
Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
Avoid site run off of water or mud.
Keep site fencing, barriers and scaffolding clean using wet methods.
Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
Cover, seed or fence stockpiles to prevent wind whipping.
<b>Operating vehicle/machinery and sustainable travel</b>
Ensure all vehicles switch off engines when stationary - no idling vehicles.
Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds

<b>Mitigation measure</b>
may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).
<b>Operations</b>
Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
Use enclosed chutes and conveyors and covered skips.
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

**Permanent (operational) effects**

9.7.2 Air emissions from road vehicles are minimised by the incorporation of measures to manage traffic volume and flow across the network into highway design. As permanent air quality effects resulting from changes to road traffic are predicted to be insignificant, it is not considered necessary to mitigate air emissions from road traffic as a result of the scheme.

**9.8 Significance of Effect**

9.8.1 Future air quality is expected to improve as a result of anticipated reductions in background air quality and improvements in the control of emissions from road vehicles. All modelled baseline concentrations in the opening year (2017) and ten years after opening (2027) are under 95% of the objectives. No impact resulting from the scheme is greater than 1% of the objective for each pollutant in each assessment year. Therefore, the permanent impact of the scheme on local air quality is predicted to be negligible at all selected sensitive receptors for all UK Air Quality Strategy air pollutants.

9.8.2 As a result, it is concluded that the scheme will not have a significant impact on air quality.

## **9.9 Summary**

9.9.1 The impact of emissions during construction is expected to be low and with effective mitigation the risk of significant adverse effects will be minimised. It is not considered necessary to mitigate air emissions from road traffic as a result of the scheme.

9.9.2 Future air quality is expected to improve as a result of anticipated reductions in background air quality and improvements in the control of emissions from road vehicles. Furthermore, atmospheric dispersion modelling has shown that the permanent impact of the scheme on local air quality is predicted to be negligible at selected sensitive receptors proximate to the AQMA.

9.9.3 With the scheme in place, it is predicted that air quality will improve inside the AQMA as a result of the redistribution of traffic from the M1 to Black's Road. This is likely to yield negligible improvements to air quality inside the AQMA and a negligible reduction on the Black's Road. Therefore, there is no evidence to suggest that amending the AQMA boundary should be considered as a result of traffic changes related to the scheme. This applies to both the opening year and ten years after opening.

9.9.4 As a result, it is concluded that the scheme will not have a significant impact on air quality.

## **10 Ecology and Nature Conservation**

### **10.1 Introduction**

10.1.1 This chapter will consider the impacts the proposed scheme will have on the ecology of the site and wider area.

### **10.2 Statutory and Planning Context**

10.2.1 The Conservation (Natural Habitats, etc) Regulations (Northern Ireland) 1995 and Conservation (Natural Habitats, etc) (Amendment) Regulations (Northern Ireland) 2012 transpose the requirements of the EU Habitats and Wild Bird Directives into NI legislation. This provides protection for a wide range of habitats and species through the creation of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

10.2.2 The Wildlife (Northern Ireland) Order 1985 and amendments makes it an offence to disturb or injure certain species of wild animals and plants.

10.2.3 The Wildlife and Natural Environment Act (Northern Ireland) 2011 amends the Wildlife (NI) Order and adds new provisions to protect species. It is an offence under this legislation to recklessly disturb or injure wild birds, certain wild animals and plants. This Act also makes it a duty for public bodies to further the conservation of biodiversity.

10.2.4 Planning Policy Statement 2 (PPS2): Natural Heritage (Ref 10.1) sets out the Executive's commitment to sustainable development and to conserving and where possible enhancing and restoring natural heritage.

10.2.5 The Belfast Metropolitan Area Plan 2015 (BMAP) is the extant development plan for the area. The plan has policies for the protection of the natural environment and identifies Sites of Local Nature Conservation Importance.

10.2.6 The Northern Ireland Environment Agency (NIEA) has published a series of Standing Advice documents which provide advice for planning applications (Ref 10.2). They are a material consideration for planners in the determination of planning developments. The documents include advice on priority species and habitats, pollution prevention and species protected under legislation.

10.2.7 British Standard 42020:2013 Biodiversity – Code of practice for planning and development (Ref 10.3), provides advice on considerations for planning applications and how to integrate biodiversity into the planning and design process.

10.2.8 A Biodiversity Strategy for Northern Ireland to 2020 (Ref 10.4) was produced in response to the Convention on Biological Diversity in 2010 which developed a strategic plan or Aichi Targets, to halt and reduce biodiversity loss as well as maintaining the functionality of ecosystems.

### **10.3 Methodology**

10.3.1 This assessment has been carried out in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) 'Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater and Coastal' published in January 2016 (Ref 10.5).

10.3.2 A desk top study was undertaken to gain baseline information on any designated sites for ecology. The study area for this was taken to be 2km from the site boundary. This allowed for the identification of any European Designated Sites within this area in accordance with the guidance in DMRB Volume 11, Section 4 Assessment of Implications on European Sites (Ref 10.6). This study area was widened to consider if the project is located upstream of or downstream of a watercourse which is designated in part or wholly as a Special Protection Area or Special Area of Conservation, or if an effect pathway exists between the project location and a designated site (e.g. lands outside an SPA boundary but which are used by the qualifying bird species for foraging).

10.3.3 An extended phase 1 habitat survey was carried out in accordance with the Joint Nature Conservation Committee 'Handbook for Phase 1 habitat survey. A technique for environmental audit' (Ref 10.7). The aim of the survey was to identify the habitats present within the site boundary and within a 100m radius of the planning boundary. As well as mapping the habitats present, any signs of protected species were noted. A survey was carried out on 26 February 2016 to inform the initial scoping report for this scheme. As this is outside of the optimal time for surveying, an updated survey was undertaken on 24 August 2016.

10.3.4 A targeted badger survey was carried out following the NIEA survey guidelines available to view on the DAERA website (Ref 10.8). The study area for the badger survey was the scheme footprint with a 25m buffer outside the red line boundary. Evidence of badgers present or utilising the site, such as setts, trail, tracks, latrines or hairs was noted.

10.3.5 Information on protected species was obtained from the Centre for Environmental Data and Recording (CEDaR) as well as from the Northern Ireland Bat Group.

10.3.6 In order to assess the suitability of the study area for bats, the guidelines in Table 4.1 of 'Bat Surveys for Professional Ecologists Good Practice Guidelines' from the Bat Conservation Trust were used (Ref 10.9). The following is a summary to determine the potential suitability for bats in the study area.

**Table 10.1: Bat roost and habitat suitability**

<b>Suitability</b>	<b>Description Roosting habitat</b>	<b>Commuting and foraging habitat</b>
Negligible	Negligible habitat features likely to be used for roosting.	Negligible habitat features likely to be used for foraging and commuting.
Low	<p>A structure with one or more potential roost sites that could be used by individual bats opportunistically. Not likely to be suitable for maternity or hibernation roosts.</p> <p>A tree of sufficient size and age to contain Potential Roost Features but with none seen from the ground or features seen with only limited roost potential.</p>	<p>Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat.</p> <p>Suitable but isolated habitat that could be used by small numbers of foraging bats such as a lone tree or patch of scrub.</p>
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to the size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status.	<p>Continuous habitat connected to the wider landscape that could be used by bats for commuting such as a line of trees and scrub or linked back gardens.</p> <p>Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.</p>
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection,	Continuous, high quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valley, streams, hedgerows, lines of trees and woodland edge.

<b>Suitability</b>	<b>Description</b> <b>Roosting habitat</b>	<b>Commuting and foraging habitat</b>
	conditions and surrounding habitat.	<p>High quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree lined watercourses and grazed parkland.</p> <p>Site is close to and connected to known roosts.</p>

**Assessment Methodology**

10.3.7 In accordance with CIEEM guidelines, only those impacts likely to result in significant impacts on valued ecological receptors should be assessed. Impacts are determined based on a likely zone of influence. For this project the zone of influence was taken to be the scheme footprint and the construction working area.

10.3.8 Valued ecological receptors are determined based on a defined geographical context, e.g. a SAC would be valued at an international level, while improved grassland would have a value at a local or less than local level. For receptors that have a value at more than one level, the highest value should be taken as the overriding value. Only those ecological receptors for sufficient value for impacts to be significant should be considered in the impact assessment.

10.3.9 The value of areas of habitat should be measured against published selection criteria where available, e.g. Annex III of the Habitats Directive sets out the criteria for selection of habitats for protection as a SAC, while at a local level, habitats may be defined as 'priority habitats' within local biodiversity action plans.

10.3.10 Assigning value to species should be based on their biodiversity value. To do this it is necessary to consider their distribution and status. Rarity is also an important consideration because of its relationship with threat and vulnerability. In addition, it is necessary to consider the value of populations where a country holds a significant or large population of a species on a global or European scale.

10.3.11 In order to determine the likelihood of an impact occurring the following scale is used:

- certain/near certain: probability estimated at 95% chance or higher;



- probable: probability estimated above 50% but below 95%;
- unlikely: probability estimated above 5% but less than 50%;
- extremely unlikely: probability estimated at less than 5%.

10.3.12 When assessing impacts on ecosystems, the following parameters are used:

- are impacts positive or negative;
- magnitude – a quantitative impact such as area of habitat loss, numbers of vulnerable species affected etc.;
- extent of impact;
- duration – construction effects are generally temporary, while operational effects can be long term;
- reversibility – a permanent impact is one from which recovery is not possible within a reasonable timescale, or for which there is not reasonable change of action being taken to reverse it. A temporary impact is one from which spontaneous recovery is possible or for which effective mitigation is possible.

10.3.13 Ecologically significant impacts are defined in the CIEEM guidelines as an impact (either positive or negative) on the integrity of a defined site or ecosystem and/or the conservation status of habitats or species within a given geographical area. The guidelines define the integrity of the a site as '*the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified*'. In terms of identifying impacts on the conservation status of habitats or species, the guidelines define these terms as follows:

- *for habitats, conservation status is determined by the sum of influences acting on the habitat and its typical species, that may affect its long-term distribution, structure and functions as well as the long-term survival of its typical species within a given geographical area; and*
- *for species, conservation status is determined by the sum of influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within a given geographical area.*

10.3.14 In summary, an ecologically significant impact is an impact that has a negative or positive effect on the integrity of a site or ecosystem and/or the conservation objectives for habitats or species populations within a given geographical area.

## 10.4 Baseline Conditions

### Designated Sites

10.4.1 There are no European, international or nationally designated sites within 2km of the scheme. There are also no European Designated sites that are hydrologically connected to the project. Although there is an undesignated watercourse that flows through the site, this is essentially a modified drainage ditch at the base of the motorway embankment. Its route is uncertain and may eventually flow into a tributary of the River Lagan. However the distance between this watercourse and the boundary of the closest European site, Belfast Lough Special Protection Area (approximately 10km) is such that no effect pathway is considered likely.

10.4.2 As there are no European or internationally designated sites in close proximity to the scheme and no effect pathways, they will not be considered further in this assessment.

10.4.3 There are locally designated sites in the study area as identified within the BMAP 2015. These Sites of Local Nature Conservation Importance are listed in Table 10.2 and shown on **Figure 10.1** in Volume 3.

**Table 10.2: Sites of Local Nature Conservation Importance**

SLNCI	Distance from development site	Description
Glen River, Dunmurry	0.23km west	Scattered woodland trees set in unimproved grassland, in places with spreading woodland plant species.
Dunmurry Schools	0.1km south	The grounds of St Anne's Primary School, Rathmore Grammar School and Hunterhouse College have a significant cover of mature planted estate trees.
Colin Glen/Hammils Bottom	1.7km north west	Colin Glen linear park follows the Colin River upstream. In the suburbs of West Belfast, the woodland cover is largely planted, including mature stands in a parkland setting. Upstream

<b>SLNCI</b>	<b>Distance from development site</b>	<b>Description</b>
		the cover becomes more natural and abandoned industrial land provides conditions for the establishment of grassland over nutrient poor soils. Further upstream there is important wet grassland and sedge mire communities.
Ladybrook	1km north	This site is composed of a stream and wooded gully between housing, the woodland is comprised of ash, hazel and hawthorn.
Seymour Hill	1.2km south west	This site includes farm lands annexed from the M1 construction. It runs into the Lagan corridor with fens along the river, scrub on steeper banks and open grassland between the Seymour Hill estate and the river. The grassland is not fertilised, resulting in a species rich diversity.
Sir Thomas and Lady Dixon Park	0.5km south	The grasslands alongside the Lagan as it flows past the park, range from unmanaged and rank, probably occasionally flooded coarse grassland to occasionally mown species-rich grassland. There are small wooded areas in the park with mature oak woodland at Oak Hill and younger poplar stands alongside the motorway.
Barnett's Demesne	1.8km south east	This site is a relatively intact demesne estate around a replica of the original Malone House. The estate occupies undulating land that sweeps down to the northern bank of the River Lagan. It comprises mature estate woodlands mainly of beech and pedunculate oak, with more recent plantations becoming established. There are relatively nutrient poor grasslands, with elements of more natural

<b>SLNCI</b>	<b>Distance from development site</b>	<b>Description</b>
		grassland that could become more species rich with more appropriate management. Included in the site is Longhurst wooded glen, which has good ground flora and ornithological interest.
South of M1 roundabout, junction 1	1.8km north east	The site comprises open lands between the Blackstaff River and the road running parallel to the M1 westbound. The main area is an old elevated tip with scattered scrub cover in an unmanaged mature ruderal sward.
Ballydrain Lake	2km south east	A lake with patches of emergent vegetation and occasional surrounding areas with mature broadleaf trees, the site also has ornithological interest.

**Local Biodiversity Action Plan for Belfast**

10.4.4 The objectives of the Belfast LBAP are:

- To conserve national and local priority species and habitats in Belfast,
- To raise awareness of biodiversity in Belfast,
- To get people involved in biodiversity and to develop biodiversity partnerships.

10.4.5 To achieve the first objective the following habitats and species have been selected for priority action in the council area:

- River corridors;
- Lowland meadows;
- Semi-natural broadleaved woodland;
- Gardens;
- Estuaries and mudflats;
- Open water;
- Species rich hedges;
- Built environment;

- Upland heathland;
- Red squirrel;
- Moschatel;
- Leisler's bat;
- Starling;
- House sparrow; and
- Salmon.

10.4.6 Within the development site, open water is present in the form of a ditch. The trees and scrub on site provide potential habitat for Leisler's bat, starling and house sparrow.

### **Biological Records**

10.4.7 Information on protected or priority species was obtained from the Centre for Environmental Data and Recording (CEDaR) within a 1km study area from the development boundary. The closest site with recent records is for a site at Finaghy Park North, approximately 700m north east. This site has numerous records for butterfly species since 2010 of which two species, the wood white *Leptidea sinapis* and holly blue *Celastrina argiolus*, are fully protected under Schedule 5 of the Wildlife (NI) Order.

10.4.8 Information on bat records within 1km of the development site was obtained from the Northern Ireland Bat Group. Within this 1km buffer there are eight records of bats between 1991 and 2010. The species recorded were generally pipistrelles and Leisler's bat and the records are associated with houses and buildings in the area. Of these at least two of the records were confirmed bat roosts. However none of these sites are in close proximity to the proposed park and site, with the closest record to the site located approximately 450m away. The location of the records are shown on **Figure 10.2**.

10.4.9 A review of aerial mapping shows that there is good foraging and commuting potential for bats in the wider Dunmurry area, particularly to the east around Dunmurry golf course and the wooded areas along the verges of the M1. The development site itself is largely scrub and grassland and would provide a suitable foraging corridor connecting sites to the north and south.

**Phase 1 habitat survey**

10.4.10 The initial phase 1 habitat survey was carried out on 26 February 2016 and updated on the 24 August 2014. The habitats mapped are shown on **Figure 10.3** and should be read in conjunction with the target notes in Table 10.3 below. There was little change in the habitats mapped between February and August, although tall ruderal vegetation was dominant in the area to the west of the carpark, which previously had been mapped as semi-improved grassland.

**Table 10.3: Phase 1 habitat survey target notes**

Target note number	Description
1	<p>Area of grassland with occasional stands of tall ruderal vegetation and patches of bramble. Species include buttercup, greater plantain, vetch spp., gorse and horsetail. Steep slope down to watercourse lined with trees, predominantly willow. Young hawthorn and beech hedge has been planted along the car park boundary edge. Birds noted foraging in this area in February included great tit, long-tailed tit, chaffinch and robin.</p> <p>In August this area was reclassified as tall ruderal. Dominant species included horsetail, nettle, bramble, ragwort, thistle and rosebay willowherb.</p>
2	Steep slope covered in ivy and bramble. Crack willows along watercourse.
3	Planted area with Scot's pine, beech with very dense understorey of privet and cherry laurel, ground flora predominantly ivy.
4	Planted area more open with Scot's pine, beech, silver birch, ash with occasional gorse along top of embankment. Ivy cover on tree trunks, however trees are too immature to be suitable for use by roosting bats.
5	Area of dense tree cover along watercourse, with blackthorn, alder, beech. Birds noted in this area in February included robin, bullfinch, chaffinch, blackbirds and mallard on the stream.
6	Area of more open grassland with occasional trees along stream. In August yellow iris and bulrush were noted along the watercourse.
7	Area a mixture of grassland and scrub with gorse and bramble. Occasional semi-mature trees of ash, beech and oak. There are occasional mammal trails through the grass, but considered to be rabbits or foxes.

Target note number	Description
	In August stands of tall ruderal were present, composed of nettle, great willowherb with reed canary grass.
8	Grass verge grades into area of planted woodland. Species include perennial ryegrass, buttercup, rosebay willowherb, soft rush, bramble, beech, alder, dogweed, cherry laurel, ash and Scot's pine.
9	School grounds predominantly planted woodland with an understorey of introduced shrubs, mostly cherry laurel.
10	Area of planted woodland with drainage ditch along eastern edge at the Hawthorns. Hart's tongue fern along ditch. Species include cherry laurel, alder, beech and leylandii, ground flora predominantly ivy. Trees are too immature to have bat roost potential.
11	Steep motorway embankment covered in gorse and bramble scrub with occasional ash trees.

10.4.11 A complete species list for the development site was generated following the updated phase 1 survey in August and the species identified are listed in Table 10.4.

**Table 10.4: Species list**

Common name	Scientific name
bramble	<i>Rubus fruticosus</i>
buttercup	<i>Ranunculus repens</i>
greater plantain	<i>Plantago major</i>
bush vetch	<i>Vicia sepium</i>
gorse	<i>Ulex europaeus</i>
horsetail	<i>Equisetum arvense</i>
hogweed	<i>Heracleum sphondylium</i>
rosebay willowherb	<i>Chamerion angustifolium</i>
broad-leaved willowherb	<i>Epilobium montanum</i>
great willowherb	<i>Epilobium hirsutum</i>

<b>Common name</b>	<b>Scientific name</b>
ragwort	<i>Senecio jacobaea</i>
broad-leaved dock	<i>Rumex obtusifolius</i>
creeping thistle	<i>Cirsium arvense</i>
hedge bindweed	<i>Calystegia sepium</i>
cat's-ear	<i>Hypochaeris radicata</i>
red clover	<i>Trifolium pratense</i>
silverweed	<i>Potentilla anserina</i>
herb robert	<i>Geranium robertianum</i>
common knapweed	<i>Centaurea nigra</i>
butterfly bush	<i>Buddleja davidii</i>
ribwort plantain	<i>Plantago lanceolata</i>
cleaver	<i>Gallium aparine</i>
yellow iris	<i>Iris pseudacorus</i>
marsh woundwort	<i>Stachys palustris</i>
ivy	<i>Hedera helix</i>
reed canary grass	<i>Phalaris arundinacea</i>
bulrush	<i>Typha latifolia</i>
perennial ryegrass	<i>Lolium perenne</i>
soft rush	<i>Juncus effusus</i>
common bent	<i>Agrostis capillaris</i>
meadow foxtail	<i>Alopecurus pratensis</i>
Scot's pine	<i>Pinus sylvestris</i>
alder	<i>Alnus glutinosa</i>
blackthorn	<i>Prunus spinosa</i>



<b>Common name</b>	<b>Scientific name</b>
crack willow	<i>Salix fragilis</i>
dogwood	<i>Cornus sanguinea</i>
hawthorn	<i>Crataegus monogyna</i>
beech	<i>Fagus sylvatica</i>
privet	<i>Ligustrum ovalifolium</i>
cherry laurel	<i>Prunus laurocerasus</i>
silver birch	<i>Betula pendula</i>
ash	<i>Fraxinus excelsior</i>
oak	<i>Quercus</i> spp.
leyland cypress	<i>Cupressus x leylandii</i>
yew	<i>Taxus baccata</i>
holly	<i>Ilex aquifolium</i>
bird cherry	<i>Prunus padus</i>
sycamore	<i>Acer pseudoplatanus</i>
field maple	<i>Acer campestre</i>
Norway maple	<i>Acer platanoides</i>
elf cup fungus	<i>Sarcoscypha coccinea</i>
hart's tongue fern	<i>Asplenium scolopendrium</i>
nettle	<i>Urtica dioica</i>
lime	<i>Tilia cordata</i>
coltsfoot	<i>Tussilago farfara</i>

10.4.12 The habitats remained largely unchanged from the initial phase 1 survey to the updated survey, the habitats recorded were:

- Broad leaved plantation woodland;
- Mixed plantation woodland;

- Dense scrub;
- Scattered scrub;
- Semi-improved neutral grassland;
- Tall ruderal;
- Running water;
- Bare ground (hardstanding); and
- Amenity grassland (gardens).

#### **Broad leaved plantation woodland**

10.4.13 This habitat is comprised of planted broad leaved trees of any age. Within the study area this habitat is found to the north of Black's Road and is comprised of a strip of woodland planting between the road and the houses at The Hawthorns. Typical species in this woodland strip include alder, beech and cherry laurel with some cypress leylandii. The ground flora is dominated by ivy. There is a small drainage ditch located along the northern edge of the habitat with occasional hart's tongue fern along the drain.

#### **Mixed plantation woodland**

10.4.14 This habitat is similar to the broad leaved plantation woodland, but contains a higher proportion of coniferous trees. Within the study area it is found to the south of Kingsway, between the grass verge and the grounds of the schools. Typical tree species include beech, alder, ash, Scot's pine with dogwood, cherry laurel and occasional yew and holly. The grass verges along Kingsway grades into the wooded area. This habitat is shown in Photograph 10.1 below.



**Photograph 10:1: Woodland along Kingsway verge between the carriageway and Dunmurry schools**

**Dense scrub**

10.4.15 Scrub is seral or climax vegetation dominated by locally native shrubs, usually less than 5m tall, occasionally with a few scattered trees. Within the study area this habitat is found on the motorway embankment to the west between the M1 and Makro carpark and is primarily composed of gorse and bramble. Occasional tree species include beech, ash and alder.

**Scattered scrub**

10.4.16 This habitat is common within the development site boundary, being present on the slopes with patches on the flatter area above the drainage ditch. It is primarily composed of stands of gorse or bramble. There are occasional trees throughout the habitat, typical species include alder, blackthorn and Scot's pine. This habitat is shown on Photograph 10.2 below.



**Photograph 10:2: Scrub habitat on the development site**

**Semi-improved neutral grassland**

10.4.17 Semi-improved grassland is a transition category made up of grassland which have been modified by artificial fertilisers, slurry, intensive grazing, herbicides or drainage, and consequently has a range of species less diverse than unimproved grassland. Within the study area this habitat is found on the flatter areas of the site and on the periphery of the site close to the roads. As the survey was done early in the year, much of the flowering species could not be identified, but typical species noted included creeping buttercup, greater plantain, horsetail, vetches and rosebay willowherb. The sward is dominated by perennial ryegrass but other grasses present include reed canary grass and common bent. This habitat is shown on Photograph 10.3 below.



**Photograph 10:3: Grassland habitat on the development site (February)**

### **Tall Ruderal**

10.4.18 This habitat comprises stands of tall perennial or biennial plants, usually more than 25cm high of species such as willowherb and nettle. On the development site, this habitat dominates the area of semi-improved grassland over the summer months and grades into the scrub on the slopes. Dominant species include rosebay willowherb, great willowherb, nettle, horsetail and thistle.



**Photograph 10:4: Tall ruderal and scrub vegetation on the development site (August)**

### **Running water**

10.4.19 A drainage ditch runs through the development site, at the base of the embankments. On the day of the survey in February, the water level was shallow with little observable flow. The width of the ditch varies along its length but is on average between 1-2m wide. The substrate was silty with high turbidity in the water. It is likely that the watercourse receives drainage runoff from the surrounding road network. It is of low ecological quality, however 2 mallards were observed on the stream on the day of the survey in February. The banks are heavily vegetated in places, with willow being the most common species observed. The ditch is shown on Photograph 10.5 below and is likely to have been modified and realigned in the past, as a result of the construction of the M1 and surrounding infrastructure.

10.4.20 During the resurvey visit in August, the ditch was dry in places, with other areas of standing water. Yellow iris and bulrush were noted along the ditch in the southern part of the site.



**Photograph 10:5: Ditch that flows through the development site**

**Bare ground**

10.4.21 This is common throughout the study area and is mainly composed of areas of hardstanding such as roads, carparks and footpaths.

**Amenity grassland**

10.4.22 This habitat is described as intensively managed and regularly mown grasslands typical of lawns, playing fields and urban parks. Within the study area this habitat is found within gardens to the north of Black's Road.

**Badger survey**

10.4.23 A badger survey was undertaken on 26 February 2016 within the development site and resurveyed on 24 August 2016. Where possible, areas of the development site that could be easily or safely accessed were searched for evidence of badgers. The slopes to the east and west of the site were too steep to easily access. Mammal trails were noted through the flatter areas of grassland and scrub, although these were considered likely to be made by rabbits rather than badger, as they were not as clearly defined as badger trails usually are. No evidence of setts was found on the site or any firm evidence of presence as no latrines were noted.

- 10.4.24 The August resurvey also found no evidence of badgers utilising the site, although at this time of year the vegetation was dense and high, making it difficult to easily spot trails.
- 10.4.25 However, there were areas of the site that could not be safely accessed due to steepness of the slopes or density of gorse scrub.
- 10.4.26 Overall, the potential for badgers to be found in the area is low, given the lack of suitable foraging habitats in the wider vicinity. In addition, the site is bounded by busy roads, with the M1 to the west, Black's Road to the north and Kingsway to the south and east. These provide a barrier to movement even if there was suitable foraging habitat nearby. There may be potential for the grounds of the schools to provide more suitable habitat for setts and for foraging, however these were outside of the study area and not surveyed.

### **Habitat Suitability for Other Fauna**

#### **Otter**

- 10.4.27 The watercourse running through the development site is not considered suitable to be used by otters. The water quality is poor and the ditch is not likely to support a fish population that could be used by otters. In addition, water levels in the ditch appear to be variable with areas drying out over the summer months. No evidence of otters was observed during the habitat survey, either in February or August.

#### **Bats**

- 10.4.28 There are numerous trees located throughout the study area. Some of these trees have some ivy cover on the trunks. Most of the trees are semi-mature with narrow trunks and spindly branches. No cracks or splits suitable for use by roosting bats were noted.
- 10.4.29 Information from the NI Bat Group indicates that bats have been recorded in the wider area, usually in roosts in houses. It is highly likely therefore that the trees along the motorway embankments and along the road verges are used by bats commuting between roosts and foraging areas. There is also potential for bats to use the scrub and trees on the development site for foraging as well as using them as part of a wider commuting route.

#### **Birds**

- 10.4.30 On the day of the survey in February a number of common bird species were identified in the trees and scrub in and around the development site: great tit *Parus major*, long-tailed tit *Aegithalos caedatus*, chaffinch *Fringilla coelebs*, robin *Erithacus rubecula*, bullfinch *Pyrrhula pyrrhula*, blackbird *Turdus merula*, mallard *Anas platyrhynchos* and

Hooded crow *Corvus cornix*. Although no signs of nesting was observed, the survey was early in the year and the birds appeared to be using the area for foraging. In addition, none of the trees showed evidence of old nests.

- 10.4.31 The resurvey in August also found no evidence of nesting in the trees on site. Few birds were noted, but this is late in the breeding season, when birds typically are less vocal. Wren *Troglodytes troglodytes* and robin were both recorded on the site at this time.
- 10.4.32 Given the high level of ambient noise on the development site from traffic along the road network, particularly on the M1, the likelihood of birds nesting on the site is considered to be low.

### **Reptiles and Amphibians**

- 10.4.33 The site is not considered suitable to support the common lizard *Lacerta vivipara* or smooth newt *Lissotriton vulgaris*. The common lizard is generally found in open woods, heaths and grassland and favours sandy or rocky areas. Although the scrub habitat provides suitable terrestrial habitat, the site is surrounded by areas of hard standing and roads which provide a barrier to movement. Overall, there is a general lack of habitat connectivity for lizards. Smooth newts are generally found in areas with ponds in areas of suitable terrestrial habitat such as scrub and grassland. The watercourse on site is not considered suitable for newts due to lack of emergent vegetation along the banks for egg deposition and the poor water quality.

## **10.5 Evaluation of Receptors**

- 10.5.1 The CIEEM guidelines provide guidance on how to determine the importance of ecological features. Important features include designated sites, priority habitats and species as well as rare or legally protected species. The guidelines also state that importance should be considered in a geographical context, i.e. International or European, National, Regional, Council or Local.
- 10.5.2 None of the habitats identified in the study area meet the criteria to be considered as Annex I habitats under the Habitats Directive or to be classified as Northern Ireland Priority Habitats. Although rivers and streams are priority habitats, the watercourse running through the site is essentially a ditch of low ecological quality and not considered to meet the criteria for a priority habitat. The scrub and grassland habitats provide foraging habitat for a number of species.



- 10.5.3 Under European legislation, European Protected Species include otter and bats. The watercourse is not considered suitable for use by foraging otters and no otter signs were found during the survey, therefore otter is not considered further in this assessment.
- 10.5.4 The scrub habitat and tree lines along the watercourse have potential to provide commuting and foraging habitat for bats. The trees on the development site are not considered suitable for use as roosts due to their immaturity and lack of suitable cracks or crevices. Using the criteria in Table 10.1, the trees on the site are assessed to have a negligible suitability for roosts. The habitats however, are assigned a moderate suitability for commuting and foraging as they are connected to other suitable habitats in the wider area. In addition, the records of bats from houses in the wider area suggests that the habitats are of some value to the local population.
- 10.5.5 Not all the receptors identified in the baseline section are likely to be affected by the scheme, either because there is no effect pathway between the scheme and the receptor or because there are no suitable habitats for the species.
- 10.5.6 Using these criteria, the ecological receptors likely to be affected are evaluated in Table 10.5 along with a justification for their inclusion.

**Table 10.5: Ecological Receptors**

Receptor	Evaluation	Justification
Dunmurry Schools SLNCI	Council level	This SLNCI is the closest site to the scheme and has potential for indirect effects during construction
Grassland/tall ruderal	Locally important for wildlife	Direct effects are likely from the scheme and the grassland provides foraging habitat for a variety of species
Scrub/trees	Locally important for wildlife	Direct effects are likely from the scheme and the scrub provides potential resting habitat for badger. The scrub and trees provide nesting and foraging habitat for birds as well as acting as commuter route for bats
Open water	Locally important for wildlife	Direct effects are likely and provides habitat for aquatic species
Badger	Local importance and legally protected from disturbance/loss of setts	Potential for indirect and direct effects

Receptor	Evaluation	Justification
Birds	Local importance and nests protected from damage/disturbance during the breeding season	Potential for indirect and direct effects
Bats	Local importance and roosting sites legally protected from damage	Potential for indirect and direct effects

**10.6 Predicted Impacts/Impact Assessment**

10.6.1 The CIEEM guidelines recommend that only those impacts that are likely to be significant on important ecological receptors should be described in detail. In order to determine impacts on ecological receptors, the following are considered: is the impact positive or negative, extent, magnitude, duration, timing, frequency and reversibility of impact. Significant ecological impacts are those that would impact on the structure and function of ecosystems or undermine or support the conservation objectives for a site or species.

**Temporary Impacts – Construction**

**Designated Sites – Dunmurry Schools SLNCI**

10.6.2 This SLNCI is primarily designated for its mature parkland trees, which are located within the school grounds. The construction works have potential to affect the vegetation of the site through dust deposition, which can reduce photosynthesis and productivity. These impacts will be short term, temporary and reversible.

**Habitats**

10.6.3 Site clearance works and construction have potential to indirectly affect surrounding vegetation through dust deposition, having a short term, temporary, reversible impact.

10.6.4 In order to culvert the watercourse that flows through the site, the ditch will be dammed in sections and water pumped out to allow the culvert to be placed in the dry. This has potential to adversely affect any aquatic invertebrates within the stream. However given that the water quality in the stream is poor and that the water levels are variable, it is considered likely that only pollution tolerant species would be found in the ditch. It is anticipated that the culvert works will last for approximately 5 days, having a temporary impact.

10.6.5 There is potential for contamination of water in the open sections of the ditch from construction machinery and earthworks, having an adverse impact on water quality.

### **Species**

10.6.6 The construction works will result in noise from plant and machinery. The works are expected to last approximately 70 days in total. Noise and human activity from the works have potential to result in disturbance to local wildlife, particularly birds, causing them to move away from the site to quieter foraging areas. This will have a temporary, but reversible impact.

10.6.7 Should any night time working be undertaken, there is potential for lighting to adversely affect bat commuting routes, by discouraging bats from using the site to connect to foraging routes to the north and south.

### **Permanent Impacts – Operational**

#### **Designated Sites – Dunmurry Schools SLNCI**

10.6.8 There will be no operational impact on the SLNCI. Although the scheme will result in a change in traffic flows, with traffic diverted from the M1 to the park and ride site, the level of change in emissions from the traffic is not assessed to be significant and there will be no impact on the vegetation in the site.

### **Habitats**

10.6.9 The works will result in the permanent loss of scrub, ruderal and grassland habitat as well as the loss of trees within the development site. This is calculated to be in the region of 0.79ha of habitat loss. This is a long term, irreversible impact as the area will become hardstanding with limited opportunity to recreate new habitats.

10.6.10 The car park construction will result in the ditch being culverted over most of its length, in total 125m. Although the ditch is of low ecological value, culverting it will further reduce its ecological potential. This is a long term, irreversible impact.

### **Species**

10.6.11 The loss of the scrub, trees and grassland/ruderal habitats will reduce the available foraging habitat for birds, badger and bats. This will result in the displacement of these species to find suitable foraging habitats elsewhere. This will increase competition for resources, having a long term impact.

10.6.12 The loss of the scrub and trees will reduce the amount of available nesting habitat for small birds, resulting in increased competition for nest sites elsewhere. This is assessed to be a long term impact.

10.6.13 The new section of car park will be lit, providing additional light sources to an already lit urban area. Combined with the habitat loss, this has potential to adversely affect commuting routes for bats, causing them to find alternative routes. The vegetation along the motorway embankment and along the boundary of the car park will be retained, providing some degree of connectivity. However, considering that the site is already lit and given the availability of better quality foraging habitat to the east of the site, the impact of the additional lighting is considered to be insignificant.

## **10.7 Proposed Mitigation**

### **Construction**

10.7.1 The contractor will be required to adhere to standard pollution prevention guidelines, NIEA standing advice and best practice measures to minimise pollution of the water in the ditch.

10.7.2 The contractor will be required to produce a dust management plan and utilise best practice measures to reduce dust production during construction works.

10.7.3 Site clearance works will be undertaken outside of the bird nesting season (taken to run from 1 March to 31 August inclusive).

10.7.4 Although no definite signs of badgers being present on the site were identified during the surveys, some of the scrub areas were too dense and slopes too steep to access. There is potential that a sett may be located within the development site boundary. In addition, badgers are highly mobile animals and could create a sett prior to works commencing. It is recommended that an additional check is carried out prior to the main site clearance works commencing to ensure no setts have been excavated. The optimum time to survey for badgers is between November and April when vegetation has died back and it is easier to identify field signs.

10.7.5 Given the density of willow and gorse over parts of the site, it is recommended that the main site clearance works in these areas be undertaken under an Ecological Method Statement and be overseen by an ecologist. Should an active sett be discovered during the site works, an exclusion zone of 25m will be erected around the sett entrance. An application will then be made to DAERA to close the sett under licence. It should be

noted that licensed activities cannot take place during the breeding season, which is between 30 November and 1 July.

### **Operation**

- 10.7.6 An indicative planting plan has been developed for the landscaping of the scheme and this is included in **Appendix C**. The planting scheme utilises native species such as hawthorn, holly, oak, willow, hazel, alder and blackthorn. The proposed hedge around the boundary of the site contains holly, hazel, hawthorn and red currant. The planted areas at the end of the car parking bays are proposed to be planted with a mixture of trees with low growing ground cover shrubs such as *Hebe* spp. and cotoneaster. Although of benefit to local wildlife, the extent of the replanting is small in relation to the habitat loss, and is not considered to replace the lost habitats.

## **10.8 Significance of Effect**

### **Construction**

#### **Designated Sites**

- 10.8.1 With adherence to dust management practices, the impact of dust deposition on the SLNCI will be reduced to negligible. There will be no significant effect on Dunmurry SLNCI.

#### **Habitats**

- 10.8.2 Following best practice measures and adherence to pollution prevention guidelines, impacts on the water quality of the ditch will be reduced to negligible. There will be no significant effect on water quality.
- 10.8.3 Implementation of dust control measures will reduce impacts on surrounding habitats to negligible. There will be no significant effect on surrounding habitats from dust.

#### **Species**

- 10.8.4 Site clearance will result in a lack of suitable habitat on the site for foraging birds and other fauna. There is potential for construction noise to result in a degree of disturbance to wildlife foraging along the verges of Black's Road and Kingsway. However, given the existing level of noise and human activity from the roads and car park, disturbance from construction noise is not considered to be significant. Those birds that forage in the area are likely habituated to the existing noise environment.

10.8.5 Although the exact timings of the construction programme are not known, it is likely that the majority of the site clearance and construction works will take place over the winter months. This avoids the main bat activity season, as bats hibernate over the winter. Any impacts from night time lighting will therefore not affect commuting bats, having no significant effect.

## **Operation**

### **Designated Sites**

10.8.6 There will be no significant effect on Dunmurry SLNCI from operation of the park and ride site.

### **Habitats**

10.8.7 The loss of the scrub, grassland and trees will have a likely significant negative effect at a local scale. The habitats are common in the wider area, but the loss of an area of such habitat in an urban area results in a net loss of biodiversity. The replanting within the car park area is too small in relation to the amount of new hardstanding to compensate for the habitat loss.

10.8.8 Culverting the ditch and reducing the area of open water will also have a likely significant effect on local biodiversity. Although the ditch is of low quality, the length of the culvert reduces opportunity for biodiversity improvements.

### **Species**

10.8.9 The loss of foraging habitat for local wildlife will have a negative significant effect at a local level, particularly for birds.

10.8.10 It is considered that the habitats within the development site are likely to be used by only a small proportion of the local bat population for foraging, given the existing level of disturbance and lighting in the car park and surrounding road network. The loss of the vegetation is likely to affect only a small number of bats, and it is unlikely that the increase in competition for resources elsewhere will significantly affect the conservation status of the species. Therefore it is assessed that the effects on bats are not significant.

10.8.11 Effects on the local badger population from habitat loss are considered to be not significant. Although the habitats in the development site provide suitable habitat for setts and foraging, the site is surrounded by roads which provide a barrier to movement.

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## **10.9 Indications of Difficulties or Limitations**

10.9.1 Access to all of the development site was not possible, on either of the site visits, due to the steepness of the existing slopes and density of vegetation. Therefore it is possible that some floral species were missed during the survey.

## **10.10 Summary**

10.10.1 The scheme will result in the culverting of an open ditch and loss of areas of scrub/grassland and ruderal habitat. The habitat loss is likely to have a long term impact on the local population of birds through loss of foraging and nesting habitats.

## **11 Cumulative Impacts**

### **11.1 Introduction**

11.1.1 There are two types of cumulative impacts that can arise from a project or development.

- Type 1 – impacts resulting from the combined effects of individual impacts resulting from the development programme, e.g. noise, dust and visual impacts, from the proposed development on a particular receptor.
- Type 2 – impacts from several developments, which individually might be insignificant, but when considered together could amount to a significant cumulative impact.

11.1.2 DMRB suggests that cumulative impacts on factors of moderate significance may influence decision-making if they lead to an increase in the overall adverse effect on a particular resource or receptor.

### **11.2 Cumulative Impacts**

#### **Type 1**

11.2.1 There are a number of potential Type 1 impacts which could result from the proposed scheme including:

- The construction of the car park extension will result in habitat disruption and the operational use of the extended car park will have an ongoing impact on foraging potential for birds.
- Noise and dust impacts from machinery and plant during the construction phase could have a combined nuisance and air quality impact on local receptors and wildlife.
- Noise disturbance during construction will have an impact on local residents and wildlife
- The use of noise barriers and machinery during the construction of the car park will impact visual receptors.

Due to the relatively minor and contained nature of the scheme it is considered that the potential for any Type 1 cumulative impacts to occur and have a significant effect is negligible.



**Type 2**

- 11.2.2 There is one committed development in the vicinity of the scheme. At the former Visteon factory site, regeneration plans aim to develop 244 social, private and affordable residential units with dedicated community space. It is located approximately 745m north of the proposed Park and Ride extension.
- 11.2.3 The Transport Assessment recognised this as a committed development and therefore traffic flows for the new development were considered within the traffic assessment. The conclusion was that there would be no adverse effects on the surrounding road network.

## 12 Assessment Summary Table

### 12.1 Schedule of Effects

12.1.1 This chapter presents the Environmental Impacts Table for the scheme. The purpose of the table is to present the main predicted impacts, taking into account mitigation, in summarised form. The table includes a summary of potential impacts in the absence of mitigation, mitigation measures to be employed and the resulting residual effects that would be expected from the development.

Discipline	Potential impact description	Impact	Mitigation where necessary	Residual effect
Air Quality	Dust soiling effects on amenity and human health	Temporary	Adherence to dust mitigation measures.	Not significant
	Impact on human health through increased NO <sup>2</sup> from additional cars.	Permanent	Manage traffic volume and flow across the network.	Negligible
Nature Conservation	Dust deposition on vegetation during site works	Temporary	Adherence to best practice measures by contractor	Not significant
	Adverse impact on water quality during culvert works to ditch	Temporary	Adherence to pollution prevention guidelines and best practice measures	Not significant
	Disturbance to fauna from construction noise	Temporary	n/a	Not significant

Discipline	Potential impact description	Impact	Mitigation where necessary	Residual effect
	Habitat loss due to removal of scrub, grassland/ruderal and trees on site	Long term, adverse, irreversible	Replanting will be undertaken post construction, however the amount of habitat creation is small in relation to the amount of habitat lost.	Significant on a local scale

**12.2 Conclusions**

- 12.2.1 With adherence to pollution prevention measures and the mitigation measures as set out in the Schedule of Environmental Commitments, construction effects from the extension of the existing Park and Ride facility will be reduced to not significant.
- 12.2.2 Habitat loss due to the removal of scrub, grassland/ruderal and trees on site will remain significant on a local scale as the habitat creation is small in relation to the amount of habitat that will be lost.

### 13 Schedule of Environmental Commitments

13.1.1 All mitigation measures identified in the technical chapters (chapters 9 and 10) necessary to protect the environment during construction and on completion of the car park will be incorporated into the Contract Documents as a Schedule of Environmental Commitments. This will provide a mechanism to ensure compliance with environmental commitments during construction and on completion. In addition, the appointed contractor will be obliged to consider and incorporate as far as appropriate the construction techniques and proposals outlined in Chapter 6 of this ES.

13.1.2 Table 13.1 below presents the Schedule of Environmental Commitments.

**Table 13.1: Schedule of Environmental Commitments**

Reference number	Mitigation measure	Implementation of mitigation	Monitoring requirements
Air Quality			
A1	Develop a dust management plan with measures commensurate to the anticipated risk	During site clearance and construction	Appointed Environmental Advisor should conduct daily checks
A2	Dust suppression techniques and daily site inspection	During site clearance and construction	Appointed Environmental Advisor should conduct daily checks for build-up of dust
A3	Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible	During site clearance and construction	Appointed Environmental Advisor should conduct daily checks
Nature Conservation			
E1	Adherence to pollution prevention guidelines	During construction	n/a

<b>Reference number</b>	<b>Mitigation measure</b>	<b>Implementation of mitigation</b>	<b>Monitoring requirements</b>
E2	Site clearance works will be undertaken outside of the bird nesting season	During construction	If site clearance is to be undertaken during the bird nesting season, it will be overseen by an ecologist
E3	Additional survey for badgers	Prior to site clearance	n/a
E4	Site clearance works in areas of dense scrub be overseen by an ecologist under an Ecological Method Statement	During site clearance	Ecologist supervision
E5	Replanting as per indicative landscaping plan	During and post construction	n/a

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