

18 Disruption Due to Construction

18.1 Introduction

- 18.1.1 This Chapter describes the effect of construction of the Scheme on people and the natural environment. The construction period will include construction of the works, which is estimated to be over approximately 24 months, utility diversions and the 12 month contract maintenance period, where any faults that were found will be repaired. Thus the total period will be approximately 36 months.
- 18.1.2 The construction of the works are likely to be undertaken via a traditional civil engineering contract for highway works with the works being won in competitive tender and constructed by the successful Contractor to the Roads Service specification. The programme and method of construction of the works and the plant and equipment needed for construction will be determined by the Contractor, subject to any contractual requirements placed upon the Contractor regarding, for example, restrictions on working hours.
- 18.1.3 The arrangements for any utility diversions will be agreed with the Roads Service prior to start of works. The Contractor is responsible for liaison with utilities organisations during the construction for protection and co-operation during diversions. It is normal for the Contractor to carry out the civil part of the works, e.g. duct laying and chamber construction. It is anticipated that any diversion works will be restricted to the vicinity of the A2 carriageways and that associated disruption to services, disruption to traffic and noise effects will be kept to a minimum in accordance with normal procedures for works in and around the public highway.
- 18.1.4 In the expectation that the works are undertaken in accordance with the specification, any defective works that might arise after completion of the works will be relatively small scale. The tendency is to undertake any such works at the end of the 12 months maintenance period and they will be for a short time only.
- 18.1.5 Thus the comments in this chapter relate primarily to the construction period.

18.2 Approach and Methods

- 18.2.1 Disruption due to construction is assessed in accordance with Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 3. Effects of operation of the Scheme are not considered in this Chapter, which deals only with construction effects
- 18.2.2 Although the construction of the Scheme will include requirements and restraints to minimise construction impacts, some adverse effects are unavoidable. Assessment of these impacts is not precise because their extent, severity and duration will depend on the Contractor's programme and methods of working and external factors such as weather conditions that cannot be predicted with certainty and commercial factors such as sources of material that limit the Contractor's choice of supply.

18.3 Consultations

- 18.3.1 Where quantities of material are sourced off-site from borrow pits, consultation with the relevant authority will be required. It may be the case that material is sourced from established quarries with established planning permission. It is anticipated that no

material will be taken from the site and in that case arrangements and consultations for off-site disposal will not be required. It is envisaged that material excavated during construction will be used for new construction works but any surplus material will be used for landscaping works associated with the Scheme.

- 18.3.2 Should it be necessary to remove material from the site, following advice from the Department of Agriculture and Rural Development, no spoil from excavations shall be disposed on farmland without prior permission from relevant government organisations.
- 18.3.3 To control the potential nuisance associated with construction noise and vibration, the Contract will include restrictions on noise and vibration levels and working hours where applicable. These restrictions will be agreed with the local authority and monitored throughout the construction period.
- 18.3.4 Traffic management requirements will be detailed in the contract documentation. The Contractor is responsible for the site during construction but consultations will be required with Roads Service and the Police Service of Northern Ireland.

18.4 Baseline Conditions

- 18.4.1 The baseline conditions are largely those described in other environmental topic chapters.
- 18.4.2 The proposed construction works will cover the widening of the A2 Shore Road as far north as Station Road and from there, a new road inland of the A2 Shore Road between Station Road and Seapark where it would rejoin the A2 at the existing dual carriageway. It will include areas of agricultural land used for the grazing of sheep and cattle as well as private residential properties, as well as some commercial and community facilities. The construction area includes a number of watercourses including Silver Stream. It will also include parts of the former A2 road.
- 18.4.3 Table 5.1 outlines the main receptors located within 100m of the Scheme. The corridor in which construction disruption may be experienced is outlined in Figure 18.1.

Table 18.1: Main receptors located within 100m of the Scheme

Receptor	Issues
Residential properties	Impacts relating to air quality and noise and vibration intrusion during construction
Residential properties	Potential impacts relating to access/severance
Residential properties	Impacts relating to visual amenity
Agricultural land	Land take will be required of agricultural land currently used for grazing
Cultural heritage	Possible impacts on historic monuments and archaeological sites (built heritage)
Landscape	Potential impacts the landscape
Watercourses	Potential for pollution due to contamination run-off.
Breeding bird habitat- Special Protection	Potential removal of trees and scrub

Area (SPA)	which may form part of the local breeding bird habitat
Statutory designation – Area of Special Scientific Interest (ASSI).	Sensitive in relation to dust disturbance and potential construction activity
Non-statutory designation – Site of Local Nature Conservation Importance (SLNCI).	Sensitive in relation to dust disturbance and potential construction activity
Pedestrians, cyclists, equestrians and vehicular travellers	Potential impacts on movement along A2
Geology and Soils	Potential impacts on geology and soils through excavation, exposure, altering the hydrology, stripping and storage of topsoil, loss of seed banks and pollution.
Protected species	Potential impacts on various protected species at specific locations

18.5 Environmental Effects

Construction Activities

18.5.1 The main construction activities that will be required are:

- Site clearance – house demolition, tree clearance
- Provision of temporary site compound(s)
- Topsoil strip and storage
- Bulk earthworks
- Drainage and utilities
- Roadworks including pavement construction and street furniture
- Retaining wall construction
- Site reinstatement and landscape planting
- Accommodation bridge with ramps

18.5.2 The effects of these activities are temporary but potentially significant as they are likely to cause considerable disruption.

18.5.3 It is anticipated that around 16,000 m³ of topsoil could be stripped from the site and in that event it will be returned to landscaped areas. Bulk earthworks will be a construction activity as sections of the proposed road are to be built on embankments.

18.5.4 It is estimated that 85,000 m³ of material will have to be imported onto the site for embankments plus another 45,000 m³ of pavement construction material. The imported/exported material will therefore be in excess of 130,000 m³ or 78,000 tonnes. It is anticipated that there will be no onsite borrow pits and therefore all this material will be imported/exported by lorry, approximately 5-6,000 lorry loads, and placed using standard earthworks construction plant and pavement laying machines. Although this

activity might be concentrated during the Spring to Autumn period, it could be undertaken all year round depending on the type of material used.

- 18.5.5 Finally, on completion of the Scheme, areas of the works will have tree and shrub planting as appropriate. Further information relating to this activity are reported in Chapter 12 – Landscape and Visual Effects.

Effects of Construction

- 18.5.6 A summary of construction impacts specific to environmental topics is given below. Further details of these impacts are given in the following individual chapters;

- Land Use;
- Geology and Soils
- Water Quality and Drainage
- Ecology and Nature Conservation
- Landscape Effects
- Cultural Heritage
- Air Quality
- Traffic Noise and Vibration
- Pedestrians, Cyclists, Equestrians and Community Effects
- Vehicle Travellers

Land use

- 18.5.7 Site clearance will be required over approximately 11 hectares. It will be situated in largely agricultural land, with some trees and scrub adjacent to the road. There will also be 47 houses with gardens reduced (though some are multiple sites through development), 8 areas of other more communal land (e.g.) Belfast High School and 8 sites where access drives or private roads affected.
- 18.5.8 Construction compound(s) will be required; the location(s) will be for the Contractor to determine. Planning approval will be required, and approval of any new access, from a compound, would have to be gained from Roads Service if it is on to the strategic A2 road.
- 18.5.9 Temporary construction compounds will have an impact primarily where they are located. This is likely to include loss of agricultural land, additional traffic at the locality, localised construction noise due to vehicle and plant movements, surface water run off into local watercourses and leaching of fuel stores, and possibly litter and other nuisances. There could be severe to moderate adverse impacts if a site is badly chosen and not operated and managed in a sympathetic manner in accordance with best practice.
- 18.5.10 Site compounds can be a highly sensitive issue of severe to moderate adverse significance. Accordingly the location and operation of site compounds will be subject to the approval of the Roads Service and planning authority.

Geology and Soils

- 18.5.11 Construction of the Scheme will involve excavating minor cuttings and structures foundations in the superficial deposits and forming embankments of and on the superficial deposits. Excavation of rock is not likely to be required.
- 18.5.12 Temporary excavations will be required during the construction stages to permit construction of the retaining walls along the online section of the Scheme. This will involve excavating the land behind the walls to accommodate this installation. Following construction of these walls, the excavations will be backfilled and reinstated as required.
- 18.5.13 Should any potentially contaminated ground be encountered during the construction stages of the Scheme, the Contractor will be required to investigate the area and then assess whether there is a need for containment or disposal of the material. The Contractor will also be required to assess whether additional health and safety measures require to be implemented. Any such investigations will be required to be undertaken in consultation with the appropriate consultees including Environment & Heritage Service (EHS).

Water Quality and Drainage

Water Quality

- 18.5.14 Given the nature of the project there will be significant earth moving activities during construction. This presents a significant risk of surface water run off eroding bare slopes or material stockpiles, which can lead to increased suspended solids in watercourses.
- 18.5.15 The construction phase also presents the potential for fuels, oils, and other chemicals to be spilled via an accident, improper usage, or poor storage. These could reach the receptors directly via discharge of polluted run off or via seepage into the shallow groundwater.
- 18.5.16 Discharge of construction workforce sewerage and washing effluent into watercourses should not be permitted and this potential impact is therefore not considered further.
- 18.5.17 The main receptors are urban areas, residential properties, and other infrastructure located upstream of new watercourse crossings.
- 18.5.18 During the construction of watercourse crossings there will be some form of land take around each watercourse with a potential for temporary reduction in waterway capacity during the works. In most locations there are residential properties or other infrastructure immediately (within 50m) upstream of the new crossings.
- 18.5.19 There may be times where construction operations around watercourses mean that there is a reduction in waterway capacity for a short period, but these can be planned to take place during low flow periods.

Geomorphology, Oceanography, and Hydrology

- 18.5.20 There are potential effects from the construction works required to provide new / extended watercourse crossings on the structure of the bed and bank of each watercourse and the flow conveyance of each watercourse.
- 18.5.21 During the construction / extension of pipe or box culvert watercourse crossings there will be significant disturbance to the physical features of the channel and bank in the locality of each crossing. This will be caused by the excavations required to position

each culvert and any associated headwall structures, and from the construction vehicles required for this operation.

- 18.5.22 No details have been provided at this stage regarding how the excess surface water run off from the construction site will be dealt with. For the purposes of this assessment it has been assumed that the Contractor would wish to discharge excess run off to the nearest watercourse.

Groundwater - Movement

- 18.5.23 There are potential effects from the construction works required to create the new road on the movement of the groundwater.

- 18.5.24 The new road alignment will be largely at the existing ground level, there will however be areas of local cut where the road is widened to landward and local fill where the road is widened to seaward. There are understood not to be any areas of significant rock cutting involved.

- 18.5.25 The majority of the site is underlain by impermeable bedrock and these generally contain no significant groundwater except at shallow depth in the fissured and weathered interface with the overlying Glacial Till.

- 18.5.26 Groundwater movement (flow and natural direction) in the drift deposits will be disrupted over the length of each cut. However, areas of cut are understood to be short and interspersed with sections of road that are on low embankments. It is understood that the road construction will not go into the bedrock and therefore only the ground water within the drift deposits will be affected by the works. Therefore, there will not be a continuous barrier to groundwater movement created during the works.

Groundwater - Quality

- 18.5.27 There are potential effects from the construction works required to create the new road on the quality of the groundwater.

- 18.5.28 The construction works will involve earth moving plant and other machinery, and this presents a risk of spillage of fuels, oils, and other chemicals, which can seep into the shallow groundwater and potentially any fractures in the underlying bedrock. The linear nature of the project will also likely require a number of construction compounds, providing welfare facilities for the Contractor, along the length of the Scheme and each of these may retain a store of fuels, oils, and other chemicals.

- 18.5.29 Provided mitigation measures are put into place for water quality, the overall impact will be slight/negligible adverse.

Ecology and Nature Conservation

- 18.5.30 There will be a loss of trees and scrub associated with construction, which may currently afford nesting habitat to birds as well as other forms of wildlife. Effects related to site preparation and construction include site clearance, demolition of houses, break-up of areas of hardstanding, tree felling, and clearance of other semi-natural habitats. A range of impacts, with potential adverse ecological effects, are associated with demolition and construction works. These will be impacts relating to noise and vibration associated with construction and dust deposition that may damage vegetation and air and water quality. Construction traffic may also lead to the spread of alien, invasive species.

- 18.5.31 Provided best practice measures are put in place the overall effect on Ecology is likely to be negligible adverse.

Landscape Effects

18.5.32 The construction process is temporary and therefore many of the effects specifically related to construction are expected to be temporary. The following activities during the construction period will cause temporary landscape and visual effects:

- The movement of construction vehicles, machinery etc.;
- General site clearance and topsoil strip of the site;
- Siting of the Contractor's main offices and works compound areas;
- Fencing, signage etc.;
- Security lighting at night;
- Temporary access roads;
- Transfer and storage of cut and fill material;
- Storage of construction equipment and materials.

18.5.33 There will be visual effects as a result of the clearance of the site including the removal of mature trees, hedges, stone walls for the online section of the proposed route. These effects are likely to be substantial adverse for a significant number of receptors who directly overlook the Scheme. Again the most significant temporary visual effects will be associated with and the stripping of topsoil from the agricultural fields for the offline section of the route. There will also be a general increase in activity on the site and movement of vehicles as viewed by receptors living close to the works.

Cultural Heritage

18.5.34 The construction period may result in impacts to a number of cultural heritage sites along the route of the Scheme. There could be possible effects on known sites including Sites and Monument Record sites, Historic Building sites and other Environment & Heritage Service sites, particularly at Castle Lug. There could also be effects on extra sites identified during this assessment.

18.5.35 Impacts during the construction stage are temporary and include arrangements for features and facilities such as topsoiling, bunds, work compounds and plant access. Provided that these temporary works do not include groundbreaking works on identified sites of cultural heritage interest, it is likely that the significance of impact on cultural heritage features will be negligible.

Air Quality

18.5.36 There are a number of houses and community facilities fronting onto the A2. Even if the sensitivity of these receptors, and the village of Greenisland as a whole were high, the overall significance of the impact will be moderate/substantial adverse. The route of any haul roads outside the study area is unknown at this time.

18.5.37 The construction works will not significantly affect regional air quality. Local air quality may be temporarily reduced as a result of the operation of construction machinery and subsequent vehicle emissions. The areas most likely to be affected by emissions are those immediately adjacent to the proposed works and access roads. Hence properties likely to experience a temporary reduction in air quality will be those adjacent to the works on the Shore Road between Jordanstown and Station Road, and

those near the offline stretch of works, for example Whinfield Lane. The effects of vehicle emissions from construction traffic are considered to be slightly adverse.

18.5.38 In addition, during prolonged dry periods, higher than normal airborne dust levels may pose a problem. This is typical on any project which involves movement of large quantities of material for earthwork and road construction. The excavation, movement and placing of materials will generate dust. The dispersal profile of small particles shows that significant impacts above background levels are confined to a zone extending no more than 30-50 metres from the works. With reference to Figure 18.1, approximately 260 properties lie within 50 metres of the proposed works, including Loughshore Park. Properties within this zone will therefore be most affected. Dust can have several undesirable impacts:

- Health and safety - airborne dust can irritate the eyes and respiratory system;
- Road safety - reduced visibility if dust blows across roads;
- Nuisance -settling on washing, windows and ledges of surrounding property etc.;
- Ecology - adverse effect on vegetation by reducing photosynthesis.

18.5.39 Dust may also be perceived to be a minor problem for properties lying within 50-100 metres of construction. Approximately 161 properties lie within this secondary zone but they should not be significantly affected.

18.5.40 Outdoor recreational activities are also sensitive to the impacts of dust. Earthworks are ideally carried out in the drier summer months, however this is the period when outdoor recreational facilities are likely to be used the most. Such areas include the Loughshore Park.

Traffic Noise and Vibration

18.5.41 There is a potential for noise and vibration impact from construction works associated with the proposed Scheme although this is short-term in nature, and a temporary impact at any single property.

18.5.42 There are potential impacts relating to vibration impacts on properties located in proximity to the Scheme. There is a risk that construction activity may affect the structural soundness of these properties.

18.5.43 It will ultimately be the responsibility of the nominated contractor to specify the plant to be used and the most efficient methodology. However, there are types of plant and activities, which are typical for these construction works, and 'worst case' levels have been compiled from BS5228 and presented in Table 18.2. Further, the prediction of noise levels due to combined activities have been calculated for each significant stage of work using the individual plant noise levels, and the resulting impacts at varying distances from the activity are shown in Table 18.3

18.5.44 Due to the linear nature of the road construction, the duration of activity at any property near to the works will only be temporary. There may be occasions where work is extended in one location or it may be the contractor's preference to carry out different stages of works at different times.

Table 18.2: Noise levels for construction plant and activities (ref: BS5228)

Plant / Activity	L _{Aeq} at 10 m
Haulage lorries	70
30 tonne excavator	87
D6 dozer	86
Wheeled dozer	80
2 dump trucks (combined)	81
Pumping/dewatering	81
Demolition (rock breaking)	90
Compacting fill (vibrating roller)	78
Road surfacing (asphalt work)	75-80
Road roller (finishing)	80

Table 18.3: Typical combined construction noise levels (all values in dB)

Activity	L _{Aeq} at 10 m	L _{Aeq} at 50 m	L _{Aeq} at 100 m	L _{Aeq} at 200 m	L _{Aeq} at 400 m
Site clearance and preparation of working width	87 90	73 76	67 70	61 64	55 58
Preparation of access	89	75	69	63	57
Topsoil stripping	85	75	65	59	54
Route excavation and preparation	91 85	77 71	71 65	65 59	59 53
Road works	75	61	55	49	43
Landscaping					
HGV movements (up to 3 units together)	91	77	71	65	59
Pile Driving	90	76	70	64	58
assume driven precast (worst case)					
Sheet Piling (Kring/Ice Hammer)					

NB: No correction for absorbent ground is applied to this data

- 18.5.45 Based on the predicted impact levels, it is anticipated that construction noise levels will exceed the existing ambient noise level at properties closest to the site. The extent of this impact at any property will vary – depending on the specific plant being used, the distance or range of distances to the property, the “on time” of each activity, and any localised screening.
- 18.5.46 However, it is recognised that construction activity is typically temporary in nature, with a requirement to use plant with high noise levels at specific locations. Therefore, the ability to control construction noise levels relates primarily to the duration and time of construction activity in any one day. In this regard, Environmental Health Departments in Northern Ireland typically recommend maximum allowable noise and vibration levels at a construction site, as follows.

Monday to Friday Maximum at Measurement Points	
07:00 - 19:00	75 dB L _{Aeq,12h}
19:00 - 22:00	65 dB L _{Aeq,1h}
22:00 - 07:00	No noise audible
Saturday Maximum at Measurement Points	
08:00 - 13:00	75 dB L _{Aeq,12h}
13:00 - 22:00	65 dB L _{Aeq,1h}

22:00 - 07:00	No noise audible
Sunday	
No Operations	
Vibration Guideline levels	
Maximum continuous PPV	2.5 mm/s

Pedestrians, Cyclists, Equestrians and Community Effects

- 18.5.47 There are extensive areas of the works to be constructed offline, i.e. not on the public highway, but there remains a significant portion of the works involved in changes to the existing A2. These will necessitate disruption to cyclists, pedestrians and equestrians.
- 18.5.48 Pedestrians, equestrians and cyclists will generally experience impacts where access restrictions and/or diversions are imposed as part of traffic management measures. Residences may find some disruption to driveways, however maintaining access to individual properties would be an essential target.
- 18.5.49 There will also be temporary disruption to users of community facilities situated along the A2 such as the University of Ulster and Belfast High School.

Vehicle Travellers

- 18.5.50 There will be disruption to vehicular travellers along the A2 between Shore Avenue and Seapark throughout the construction period. The A2 Shore Road typically experiences a daily two-way traffic flow of some 26,000 vehicles north of Greenisland rising to 35,000 vehicles south of Greenisland. This can give rise to significant periods of congestion at peak times.

18.6 Mitigation

- 18.6.1 The following mitigation measures relate directly to construction impacts, further mitigation measures are given in relevant chapters.
- 18.6.2 Mitigation for construction impacts is described in the following comments though reference should also be made to other relevant chapters as noted above.
- 18.6.3 Approval for site compounds will only be granted through discussions with the planning authority and Roads Service.
- 18.6.4 It is expected that measures will be taken to source material as close as possible to the site to minimise construction traffic, as it will be within the Contractor's financial interest to minimise costs. Consultations will be required with the Planning Service if a source of new material has to be found.
- 18.6.5 Effects on soil resources will be mitigated by employing high standards of soil handling and management during the construction and by avoiding the creation of bare areas of permanently exposed soil that would be vulnerable to erosion. The contractor will be required to undertake pollution control measures to deal with any contaminated land encountered during the site operations. Provided these measures are carried out the impact should be negligible adverse.
- 18.6.6 Traffic management measures will be put in place to reduce the disruption to the main A2 traffic during service connections and reconstruction activities. It is anticipated that the contractor will maintain 2 lanes of traffic for the majority of the working day. There

will be some degree of disruption through the reconstruction of property boundaries and driveways, however access to individual properties will be maintained. It is expected that with such measures the delays will be reduced to minor- negligible adverse significance.

- 18.6.7 Wet weather creates problems of mud being dispersed onto the public road network by vehicles entering or exiting the site. Instructions will be included within the contract documents to require the Contractor to install appropriate wheel washing facilities and other measures as necessary to avoid deposit of mud on the road as far as it is reasonably possible and to remove any deposits that do occasionally arise. Site traffic will only be able to access public roads at designated points, thus increasing the control over the washing of mud from construction vehicles. With these mitigation measures it is expected that such measures will be reduced to minor - negligible adverse significance.
- 18.6.8 There are a number of mitigation measures which are considered appropriate and of good working practice for all construction contracts. These measures are detailed in BS5228 (1997), *Noise and Vibration Control on Construction and Open Sites*, and are summarised below. These guidelines should form the basis of control and limiting of potential impact to noise sensitive locations.
- 18.6.9 The Contractor should take note of the control measures for relevant plant listed in BS5228 and apply the appropriate measures where practicable. These measures should include:
- Positioning of static plant as far as possible from residential properties, and utilising available screening by temporary structures, stock piles, etc.
 - Use of well maintained plant, and where possible new plant manufactured under more strict EC guidelines for manufacturers.
 - Substitution of unsuitable plant.
 - Maintenance of silencers and moving components.
- 18.6.10 Temporary screening using sandbags, 20mm plywood sheeting or similar dense boarding may be required to reduce impact of static machinery or extensive works close to noise sensitive locations. Such measures can be best assessed during the contract by monitoring.
- 18.6.11 It would be appropriate to conduct noise monitoring of construction during noisy or extensive works at locations close to residential properties. Noise levels presented in Tables 18.2 and 18.3 should be used as a guide in this regard. Measurements should be conducted using a Type 2 or better sound level meter to check on the continuing impact of the works. With regard to vibration, it may be beneficial to monitor vibration levels at the beginning of the pile driving process to ensure that levels at the most proximate properties do not cause damage.
- 18.6.12 It is not anticipated that the contract will require any construction works to take place outside normal hours, though some overnight paving work, for example, would ease traffic restrictions during the working day. However, there may be items of plant (e.g. dewatering pumps and similar) in use during night-time hours. They should be chosen, sited and enclosed such that levels at the nearest properties do not exceed 45 dB L_{Aeq} . This level is based on the World Health Organisation criteria for undisturbed sleep, and assumes a resident may have a partially open window.

- 18.6.13 It is proposed that pre-construction structural surveys will be undertaken at those properties thought to be at risk from adverse impacts as a result of construction activity.
- 18.6.14 There will be a requirement on the Contractor to take measures to minimise the amount of dust. Such measures might include, for example, dampening haul roads and stockpiles, keeping roads clean and using covers to minimise dust blow from lorries.
- 18.6.15 As part of the traffic management measures the Contractor should ensure that access, or alternative access, for vehicle drivers, pedestrians, cyclists and equestrians is maintained at all times during construction along the A2 Shore Road. This will ensure that the impact is kept to substantial/moderate significance.
- 18.6.16 During the construction period a qualified archaeologist will be appointed to advise on relevant issues, particularly during topsoil stripping. It is recommended that where topsoil stripping takes place, it is observed by a qualified archaeologist and should any features of archaeological interest be found, these should be recorded. In the event of a significant archaeological find, a programme will be agreed for the further investigation/excavation of the relevant area of the site, including where appropriate the completion of a licensed excavation and recording of remains before roadworks proceed. The appropriate level of post-excavation analysis and publication should be agreed with (E&HS) (Built Heritage) following completion of the fieldwork.
- 18.6.17 In terms of any ancillary activity outside the confines of the proposed road corridor, such as at site compounds and stockpile locations, it is recommended that an archaeological survey is undertaken prior to mobilisation on that area of the site.
- 18.6.18 For large-scale projects, many Contractors will create a mechanism for dialogue with the local community. It is expected that the Contractor would put in place some liaison measures to communicate with local people and organisations.

18.7 Residual Impacts

- 18.7.1 It will not be possible to construct this Scheme without adverse impact arising temporarily during the construction of the works. With the proposed mitigation measures, those adverse impacts may be reduced but not necessarily to acceptable levels. The residual impacts will include:
- The provision of site compounds, minor to negligible adverse;
 - The transport of materials and equipment to the site, moderate adverse;
 - The possibility of mud on the roads during wet weather, minor to negligible adverse;
 - The disruption to traffic on the existing A2, substantial adverse; and
 - The disruption to cyclists, equestrians and pedestrians, substantial adverse.

18.8 Summary

- 18.8.1 The realignment of the A2 will result in a number of impacts as a result of construction activity.

- 18.8.2 The impacts will relate to the provision and operation of construction compounds during the entire construction period. There will be disruption to traffic on the A2 due to traffic management measures necessary to ensure the safety and operation of works on these roads. The construction of embankments will lead to noise intrusion and the risk of dust in the air and mud on the road will be present. There is a potential for construction operations to cause damage to localised soils and water, if appropriate mitigation measures are not adhered to.

However measures can be put in place to limit the impacts and it is considered that with careful management the significance of impacts can be reduced but are still likely to be substantial/moderate adverse. To achieve this, discussions with the planning authority and Roads Service will be essential in order to ensure acceptable levels are agreed and implemented. These will be reinforced by requirements in the contract for construction of the works.

18.9 References

- Design Manual for Roads and Bridges, Volume 11, Environmental Assessment. Department of the Environment for Northern Ireland et al (August 1994, as amended up to August 2006).
- The Planning service, Development Control Advice Note 10 (DCAN 10) Environmental Impact Assessment (revised) (DoE 1999).
- Noise and Vibration Control on Construction and Open Sites. British Standard, BS5228 1997.