12 TRANSPORT

12.1 Introduction

12.1.1 This section of the ES describes the existing environment in relation to Traffic and Transport and the potential impacts of the construction, operation and decommissioning phases of the Harbour facilities (as described in **Section 3 Project Description**).

12.1.2 In assessing the potential Traffic and Transport impacts consideration has been given to the cumulative impact of other programmes and projects in the local study area.

12.1.3 Figures that form part of this section are included in **Appendix 12.1**. The section is underpinned by a Transport Assessment (TA) which is included as **Appendix 12.2**. The TA contains the detailed access strategy, derivation and distribution of the traffic demand and highway operation assessments for the defined study area.

12.1.4 The section is also supported by a framework Construction Traffic Management Plan (CTMP), included as **Appendix 12.3**. The CTMP provide details of how HGV and workforce movements would be managed during construction; including details of proposed monitoring, enforcement and control measures bounded by the same study area as the TA.

12.1.5 Traffic-borne noise, vibration and air quality effects are assessed separately in **Section 14 Noise and Vibration** and **Section 13 Air Quality** and the predicted impact of increases in traffic upon recreation and access are assessed in **Section 21 Recreation and access.** The cumulative traffic and transport impacts for the entire YPP are considered in the CIA (**Part 2**, **Section 6**, **Traffic and Transport**).

12.2 Legislation, Policy and Guidance

12.2.1 This sub-section sets out the policy framework which has guided and influenced the development of the transport strategy for the construction, operational and decommissioning periods of the Harbour facilities.

National planning policy

National Planning Policy Statements

12.2.2 The assessment of potential traffic and transport impacts has been made with specific reference to the Government's NPSs. NPSs set out policies or circumstances that Ministers consider should be taken into account in decisions on NSIPs.

12.2.3 The NPS for Ports (2012) considers the potential traffic and transport impacts relating to port developments and the specific requirements are set out in **Table 12-1** together with a commentary of how the application has complied.

Table 12-1 NPS Traffic and Transport requirements

NPS requirement	ES compliance
If a project is likely to have significant transport implications, the applicant's ES should include a transport assessment, using the WebTAG methodology stipulated in Department for Transport guidance. The assessment should distinguish between the construction, operation and decommissioning project stages as appropriate.	**Section 12, Traffic and Transport** is underpinned by a Web TAG compliant TA which is included in **Appendix 12.2.**
Applicants should consult the Highways Agency and/or the relevant highway authority, as appropriate, on the assessment and mitigation.	**Sub-section 3** sets out pre-application consultation.
Where appropriate, the applicant should prepare a travel plan, including demand management measures to mitigate transport impacts. The applicant should also provide details of proposed measures to improve access by public transport, walking and cycling, to reduce the need for parking associated with the proposal and to mitigate transport impacts.	The supporting CTMP (**Appendix 12.3**) provides details for the construction phase; the CIA (**Part 2 Section 6**) sets out low traffic demand for the operational phase and, therefore, development of a travel plan is not necessary.

National Planning Policy Framework

12.2.4 Section four of the NPPF considers 'Promoting Sustainable Transport' and opens with the statement that "Transport policies have an important role to play in facilitating sustainable development but also contributing to wider sustainability and health objectives". In respect of transport, paragraph 32 of the NPFF states that:

> *"All developments that generate significant amounts of movement should be supported by a Transport Statement or Transport Assessment. Plans and decisions should take account of whether:*
>
> - *The opportunities for sustainable transport modes have been taken up depending on the nature and location of the site, to reduce the need for major transport infrastructure;*
> - *Safe and suitable access to the site can be achieved for all people; and*
> - *Improvements can be undertaken within the transport network that cost effectively limits the significant impacts of the development. Development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe."*

12.2.5 The NPPF clearly sets out the need for a TA where significant vehicle movements are anticipated. The NPPF requirements for sustainable transport modes and improvements to the transport network are less applicable due to the nature of this application and its limited operational requirements, as set out in detail within this section.

Local planning policy

Introduction

12.2.6 This sub-section sets out the local transport policy for the authorities within the application study area (para 12.3.6 defines in detail). The relevant authorities are:

- Redcar and Cleveland Borough Council (Highways and Planning);
- Middlesbrough Council (Highways); and
- Highways Agency (Highways)

Redcar and Cleveland, Local Development Framework

12.2.7 The RCBC Core Strategy was adopted on the 19 July 2007. This set the context for the subsequent development of the third Redcar and Cleveland Local Transport Plan, of particular relevance to this application and transport are the following policies:

- Policy CS26 Managing Travel Demand - notes that development proposals will be supported that, improve transport choice, reduce the distance people need to travel, contribute towards a demand management strategy and encourage park and ride at public transport interchanges. The policy notes that the Council will support the implementation of Travel Plans to encourage sustainable transport.
- Policy CS27 Improving Accessibility - focuses on improving accessibility within and beyond the Borough, focusing on improving bus and rail services, integration between various modes, improvements to the A66 and A174 road links to the A19 and beyond to the A1(M), measures to reduce congestion and enhancing freight access and interchange within Teesport.
- Policy CS28 Sustainable Transport Networks - supports the development of pedestrian, cycling and equestrians networks including routes between urban and rural areas.

12.2.8 In response to the NPPF's change of direction to a Local Plan approach, a Local Plan scoping document was published by RCBC in November 2012 which reviewed current LDF policies. The document concluded that the transport policies are consistent with the NPPF and therefore will be retained for the emerging Local Plan.

12.2.9 The Publication Local Plan was considered by Borough Council on the 31st July 2014 but was not approved. At time of application The Council is considering its options and will set out a new timetable for preparing the Local Plan in due course.

Middlesbrough Council, Local Development Framework

12.2.10 The Middlesbrough Council Core Strategy was adopted in February 2008. This set the context for the subsequent development of the third Middlesbrough Local Transport Plan, of particular relevance to this application and transport are the following policies:

- Policy CS17 Transport Strategy - focuses on delivering a sustainable transport network with partner organisations, including the improvement of reliability within the A19, A66, A172, and East Middlesbrough transport corridors through both highway and public transport projects.
- Policy CS18 Demand Management - notes that for development proposals it is necessary to include measures which look to improve mode share. The policy prioritises the use of a balanced car parking strategy, the promotion of car sharing, the exploration of Park and Ride feasibility, the promotion of cycling and walking, advancements in the accuracy of journey time prediction and the use of travel plans and transport assessments for all major developments.

- Policy CS19 Road Safety - seeks to improve road safety and environmental quality with partner organisations in both residential and commercial areas. This includes the use of work-place travel plans at new developments.
- Policy CS20 Green Infrastructure - aims to create a connected green infrastructure network within and beyond the council's jurisdiction.

Tees Valley Unlimited, Economic and Regeneration Statement of Ambition

12.2.11 'Tees Valley Unlimited' is the local LEP with a mandate to deliver jobs and economic growth across the Tees Valley.

12.2.12 Their Statement of Ambition focusses on delivering the benefits of the joined up and connected polycentric city region as the drive for economic growth and prosperity, making the best use of the asset of each town and district. Leading city region stakeholders have identified the following key challenges as being most important:

- Improve the journey experience of transport users of urban, regional and local networks, including interfaces with national and international networks.
- Improve the connectivity and access to labour markets of key business centres.
- Deliver quantified reductions in greenhouse gas emissions within cities and regional networks, taking account of cross-network policy measures.

Local Transport Plans

Redcar and Cleveland, Local Transport Plan

12.2.13 The Redcar and Cleveland third Local Transport Plan, 2011-2021 (LTP3) was adopted by RCBC in March 2011 and builds upon the core strategy and the LEP Statement of Ambition by setting five main goals for city and regional networks, namely:

- Reduce carbon emissions.
- Support economic growth.
- Promote quality of opportunity.
- Contribute to better safety, security and health.
- Improve quality of life and a healthy natural environment.

12.2.14 The following five policies have been identified as being critical in achieving the goals of the LTP3 and are considered to be of particular relevance to the Harbour facilities:

- PEG2 – Manage the demand for travel, in particular during peak periods. The package of measures will include car parking restraint and enforcement; providing informed travel choices; considerate land use planning.
- PEG3 – Make best use of the existing highway network, using the powers of the Traffic Management Act, under the control of the Traffic Manager.
- PEG4 – Address localised congestion issues, in particular through the development of Workplace Travel Plans and through localised traffic management schemes.
- PEG5 – Manage freight transport in the borough to provide reliability of journey times and minimise adverse environmental impacts.

- SSH1 – Improve Road Safety in the borough through a combination of education, encouragement, engineering and enforcement initiatives.

12.2.15 The application has acknowledged these five key policies through the development of a Harbour facilities embedded mitigation to mitigate the project's potential traffic impact.

Middlesbrough Council, Local Transport Plan

12.2.16 The Middlesbrough Council third Local Transport Plan, 2011-2016 builds upon the core strategy by identifying seven ambitions:

- Highways Maintenance – the Council will prioritise road safety work over network improvements.
- Network Management – the Council will actively promote and improve the public transport system as well as improving the car users' experience.
- Active Travel – the Council will reduce the obstructions to walking and cycling infrastructure.
- Road Safety – the Council will aim to reduce road casualties in line with government advice.
- Public Transport – the Council will engage with franchise holders and the government to provide investment in infrastructure projects.
- Sustainable Living – the Council will look to support employment premises located in areas of good public transport.
- New Development – the Council will seek to add value to the town through development without detrimental traffic effects.

Other legislation, standards and guidance

The traffic impact assessment has also been guided by the following documents.

The Guidelines for the Environmental Assessment of Road Traffic

12.2.17 The Guidelines for the Environmental Assessment of Road Traffic (GEART) (Published January 1993 by the Institute of Environmental Assessment) are guidelines for the assessment of the environmental impacts of road traffic associated with new developments, irrespective of whether the developments are to be subject to formal EIAs.

12.2.18 The purpose of the guidelines is to provide the basis for systematic, consistent and comprehensive coverage for the appraisal of traffic impacts arising from development projects.

12.2.19 GEART is the principal guidance that informs this assessment and **Sub-section 12.3** of this report contains full details of how the guidance has been applied.

The Strategic Road Network and the Delivery of Sustainable Development

12.2.20 The Department for Transport Circular 02/2013 entitled 'The Strategic Road Network and the Delivery of Sustainable Development' was published in September 2013, replacing circular 02/2007 'Planning and the Strategic Road Network', and sets out the ways in which the Highways Agency will engage with communities and developers to deliver sustainable development, and thus economic growth, whilst safeguarding the primary function and purpose of the strategic road network.

12.2.21 Under the heading of Environmental Impact, 02/2013 notes that:

> *"…developers must ensure all environmental implications associated with their proposals, are adequately assessed and reported so as to ensure that the mitigation of any impact is compliant with prevailing policies and standards. This requirement applies in respect of the environmental impacts arising from the temporary construction works and the permanent transport solution associated with the development, as well as the environmental impact of the existing trunk road upon the development itself."*

The Design Manual for Roads and Bridges

12.2.22 The Design Manual for Roads and Bridges (DMRB) was introduced in 1992. It provides a comprehensive manual system which accommodates current standards, advice notes and other published documents relating to the trunk road network. It is also considered applicable to other (non-trunk road) high speed roads.

12.3 Methodology and Consultation

Introduction

12.3.1 This sub-section describes the assessment methodology, including data collection, impacts and impact assessment criteria that were used in the traffic and access assessment.

12.3.2 The baseline environmental studies, surveys and impact assessment for transport have been conducted in accordance with the relevant best practice and standard methodologies, as follows:

- ***Consultation*** DMRB (Volume 13, Part 4, 2004).
- GEART

12.3.3 A Preliminary Environmental Report has been the subject of widespread consultation. **Table 12-2** provides a summary of the responses received that are relevant to Traffic and Transport and indicates where they have been addressed.

Table 12-2 Summary of responses to the PER

Consultee	Comment	Sub-section in which the issue is addressed
Highways Agency (HA)	The HA expressed concern with the impact on the A1053 and A1053/A174 Greystones junction.	**Sub-section 12.5** provides an assessment of impacts.
	The HA advised on locations to be avoided during peak network hours.	The supporting CTMP (**Appendix 12.3**) provides details.
	The HA advised on locations to be avoided due to road works.	
	The HA advised that peak construction traffic demand should not coincide with other development peak flows (e.g. Dogger Bank).	

Consultee	Comment	Sub-section in which the issue is addressed
Redcar and Cleveland Borough Council	RCBC expressed concern with regards to the impacts of additional construction and operational traffic on the structural integrity of the A1085 or the safe flow of traffic.	The supporting CTMP (**Appendix 12.3**) provides details with regards to the proposed measures to monitor and rectify issues.
North York Moors National Parks Authority	NYMNPA advised of the potential for cumulative transport impacts during the construction period for the whole YPP.	**Part 2 Section 6** of the CIA contains an in-combination impact assessment of the YPP

12.3.4 In preparing this section a series of pre-application meetings have been undertaken with transport stakeholders. **Table 12-3** provides a summary of the meetings held and technical notes produced, as well as indicating where responses have been received from stakeholders

Table 12-3 Summary of consultation meetings and technical notes

	Date	Summary of consultation	Issued to / meeting with
1.	27 February 2014	Technical note (ref: N008) issued detailing the proposed methodology for the derivation of assessment traffic flows, to inform the TA and EIA.	Highways Agency
2.	24 April 2014	Meeting with the Highways Agency to outline the project and understand the elements of the assessment that will be of particular interest.	Highways Agency
3.	24 April 2014	Meeting to provide preliminary information on the project and discuss scope of assessment.	RCBC
4.	7 August 2014	Meeting with the Highways Agency to update on traffic demand and confirm the level of assessment required.	Highways Agency
5.	27 August 2014	Traffic flow information forwarded to obtain comments/concerns of traffic impact in the Middlesbrough area	Middlesbrough Council

12.3.5 During this consultation process a number of key issues with respect to Traffic and Transport have been identified. **Table 12-4** provides a broad summary of these issues and how they have been addressed.

Table 12-4 Summary of key consultation issues

	Key Issues	Summary of issue	Where the issue is addressed
1	Study area	The extent of the local study area within the RCBC and HA administration areas agreed.	**Figure 12.2 (Appendix 12.1)** details.
2	Hours of assessment	The Highways Agency requested that an assessment of the traffic impact should be carried out for a traditional weekday peak hour.	An assessment of a weekday evening peak hour has been assessed and the results summarised in **Sub-section 12.5** and **Sub-section 12.6**.
3	Socio economics	The Highways Agency requested details of the application of socio-economic work to derive the trip distribution of construction workers.	Details are provided in **Sub-section 12.5.**

	Key Issues	Summary of issue	Where the issue is addressed
4	Mitigation measures	RCBC and the Highways Agency requested details of travel planning measures to mitigate the traffic impact.	A CTMP is included as **Appendix 12.3**.
5	Dogger Bank Wind Farm	RCBC and the Highway Agency requested details of how the construction of the Dogger Bank Offshore Wind Farm would affect the YPP proposals.	CTMP (**Appendix 12.3)** details.

Study areas

12.3.6 The study area has been informed by the most probable routes for traffic, for both the movement of materials and employees, during both construction and operational phases of the proposed scheme. A wider study area has been developed for the YPP (in combination) traffic effects and primarily informs the CIA. Within the wider study area, a local study area has been developed to assess the traffic effects specific to the Harbour facilities and therefore inform this section. For consistency and ease of reference, both study areas contain the same highway link and junction notation. A plan of the wider and local study areas can be found as **Figure 12.1** and **12.2 (Appendix 12.1)** respectively.

Characterisation of the existing environment

12.3.7 Characterisation of the existing environment has been informed by a number of sources, including:

- Traffic count data from the Department for Transport.
- Traffic count data sourced from highway authorities.
- Traffic count data from AECOM (for the withdrawn Mine application).
- Desktop studies and site visits.
- Personal injury collision data sourced from NYCC and RCBC.
- Traffic surveys commissioned by YPL.

Methodology for identifying sensitive highway links

Sensitive receptors

12.3.8 GEART identifies that it is useful to identify particular groups or locations which may be sensitive to changes in traffic conditions and provides a checklist of sensitive locations and groups; however the list is not exhaustive and can be added to by the assessor. Sensitive locations include:

- Hospitals.
- Churches.
- Schools.
- Tourist attractions, including historical buildings.
- Open spaces and recreational sites.
- Shopping areas.
- Residential areas.
- Sites of ecological/nature conservation value.

12.3.9 Sensitive groups include:

- Children.
- The elderly.
- The disabled.
- People walking and cycling.

Receptor susceptibility to changes in traffic

12.3.10 GEART notes "The perception of changes in traffic by humans, and the impact of traffic changes on various ecological systems will also vary according to such factors as:

- Existing traffic levels;
- The location of traffic movements;
- The time of day;
- Temporal and seasonal variation of traffic;
- Design and layout of the road;
- Land-use activities adjacent to the route; and
- Ambient conditions of adjacent land-uses."

12.3.11 GEART further notes "The same type of development with the same traffic generation may, however, produce a different environmental impact in one location from another, dependent upon traffic levels on the affected route and the adjacent land uses".

12.3.12 The premise for this statement is that different locations have different sensitivity to changes in traffic flow depending on the spatial environment. The methodology outlined below captures this guidance.

12.3.13 A desktop exercise augmented by site visits has been undertaken in this case to identify the main sensitive receptors in the local study area. These are illustrated graphically in **Figure 12.3 (Appendix 12.1)**.

12.3.14 The highway network within the study area has then been divided up in to discrete lengths (links) reflecting the highway/spatial character.

12.3.15 The sensitive receptors within the study area have been assigned to the nearest highway link, and the relationship with the highway environment has been examined to understand the sensitivity of those receptors to change.

12.3.16 The link sensitivity has been determined by the concentration of sensitive receptors and the highway environment. For example, pedestrians are less sensitive to changes in traffic if there are adequate footways, and crossing facilities. However, links where there will be high concentrations of sensitive locations (such as Hospitals, Schools and Tourist Attractions) are likely to be highly sensitive to changes in traffic flow unless there is separation from traffic.

12.3.17 **Table 12-5** sets out the parameters that have informed the assignment of link sensitivity.

Table 12-5 Link characteristics

Link sensitivity	Link characteristics
Low	Few sensitive receptors and / or highway environment can accommodate changes in volumes of traffic.
Medium	A low concentration of sensitive receptors (e.g. residential dwellings, pedestrian desire lines, etc.) and limited separation from traffic provided by the highway environment.
High	High concentrations of sensitive receptors (e.g. hospitals, schools, areas with high tourist footfall etc.) and limited separation provided by the highway environment.

12.3.18 All routes within the local study area have been assessed and assigned link sensitivity. **Table 12-6** provides an overview of each of the links and the rationale for the determined link sensitivity, further detail with regard to the existing baseline conditions for all of the links within the local study area is provided within **Sub-section 12.4**.

Table 12-6 Link sensitivity

Link	Description	Link sensitivity	Rationale for link sensitivity
1	A19 (west of Middlesbrough)	Low	A modern main (A) road with no frontage development designed to carry high quantities of traffic.
2	A66 (north of Middlesbrough)	Low	A modern main (A) road with no frontage development designed to carry high quantities of traffic.
3	A1053 (east of Middlesbrough)	Low	A modern main (A) road with no frontage development designed to carry high quantities of traffic.
4	A174 (south of Redcar)	Low	A modern main (A) road with no frontage development designed to carry high quantities of traffic.
5	A174 (south of Middlesbrough)	Low	A modern main (A) road with no frontage development designed to carry high quantities of traffic.
6	A171 (Ormesby Bank)	Medium	The link is a main (A) road with footways and crossing facilities but severs a residential area and has properties directly fronting the road.
7	A172 (Dixons Bank)	Medium	The link is a main (A) road with footways and crossing facilities but severs a community with schools, shops and residential properties fronting the road.
8	A172 (towards Stokesley)	Low	A modern main (A) road with no frontage development designed to carry high quantities of traffic.
9	A1043 (south of Middlesbrough)	Low	A modern main (A) road with no frontage development designed to carry high quantities of traffic.
10	A171 (Middlesbrough Road)	Low	A modern main (A) road designed to carry high quantities of traffic, with no frontage development.
11	A173 (Skelton Ellers)	Low	A main (A) road with no frontage development.
12	A171 (between the A173 and Scaling Dam)	Low	The link is a main (A) road with sporadic small settlements.

Link	Description	Link sensitivity	Rationale for link sensitivity
14	A174 (Apple Orchard Bank)	Medium	The link is a main (A) road with no frontage development until edge of Skelton-in-Cleveland settlement where there are residential properties and a community centre that front directly on to the road with narrow footways.
15	A174 (Skelton-in-Cleveland)	Low	A modern main (A) road with no frontage development designed to carry high quantities of traffic.
44	A1085 (Trunk Road)	Low	A modern main (A) road with no frontage development designed to carry high quantities of traffic.

12.3.19 In addition to the highway links, collision clusters and congested junctions have also been assigned a degree of sensitivity. Identified collision clusters and junctions with no reserve capacity have been assigned high sensitivity.

Screening process

12.3.20 The following rules, taken from the GEART, have informed the screening process and thereby defined the extent and scale of this assessment:

- Rule 1: Include highway links where traffic flows are predicted to increase by more than 30% (or where the number of HGVs is predicted to increase by more than 30%).
- Rule 2: Include any other specifically sensitive areas where traffic flows (or HGV component) are predicted to increase by 10% or more.

12.3.21 In justifying these rules, GEART examines the science of traffic forecasting and states:

"It is generally accepted that accuracies greater than 10% are not achievable. It should also be noted that the day to day variation of traffic on a road is frequently at least + or -10%. At a basic level, it should therefore be assumed that projected changes in traffic of less than 10% create no discernible environmental impact.

…a 30% change in traffic flow represents a reasonable threshold for including a highway link within the assessment."

12.3.22 Changes in traffic flows below the GEART Rules (thresholds) are, therefore, assumed to result in no discernible or significant environmental effects and have not, therefore, been assessed further as part of this study.

12.3.23 Adapting GEART screening thresholds to the study area, Rule 1 has been applied to all low and medium sensitivity links and Rule 2 to all high sensitivity links.

Assessment of impacts

12.3.24 Having applied the screening exercise to narrow down the study area to only those links that have the potential to exhibit a significant impact, it is necessary to establish the significance of any impact. The methodology achieves this by examining the 'magnitude of effect' on the sensitive routes.

12.3.25 A magnitude of effect is established by applying GEART, which sets out considerations and, in some cases, thresholds in respect of changes in the volume and composition of traffic to facilitate a subjective judgement of traffic impact and significance.

12.3.26 The following environmental effects have been identified as being susceptible to changes in traffic flow and are appropriate to the local area.

Severance

12.3.27 Severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery. The term is used to describe a complex series of factors that separate people from places and other people. Severance may result from the difficulty of crossing heavily trafficked road or a physical barrier created by the road itself. It can also relate to quite minor traffic flows if they impede pedestrian access to essential facilities. Severance effects could equally be applied to residents, motorists, cyclists or pedestrians.

12.3.28 GEART suggests that changes in total traffic flow of 30%, 60% and 90% are considered to be slight, moderate and substantial respectively.

Pedestrian amenity

12.3.29 Pedestrian amenity is broadly defined as the relative pleasantness of a journey, and is considered to be affected by traffic flow, traffic composition and pavement width and separation from traffic. GEART suggests that a threshold of a doubling of total traffic flow or the HGV component may lead to a negative impact upon pedestrian amenity.

Fear and intimidation

12.3.30 Pedestrians can experience fear and intimidation related to traffic, whereby the volume, speed, HGV composition and the proximity to people can increase the levels of fear and intimidation experienced. Whilst GEART recognises that there is an absence of commonly agreed thresholds, it does suggest that average traffic flows over 18 hours of 600 – 1,200, 1,200 – 1,800 and 1,800 + could result in moderate, great and extreme impacts, although noting other factors such as the proximity to traffic, speed and pavement width need to be considered.

Pedestrian delay

12.3.31 Pedestrians can experience delays and difficulties crossing roads related to changes in traffic, volume, composition and speed. GEART advises that in general increases in traffic will lead to increases in delay, but also notes that delays will also be dependent upon the level of pedestrian activity, visibility and site conditions.

12.3.32 Research undertaken by the Transport and Roads Research Laboratory in supplementary report 356 (TRRL 356) developed formulas for calculating the potential for increases in pedestrian delay related to the volume of traffic at different types of crossings.

Highway safety

12.3.33 The salient GEART guidance on highway safety is as follows:

> *"Where a development is expected to produce a change in the character of traffic (e.g. HGV movements on rural roads), then data on existing accidents levels may not be sufficient. Professional judgement will be needed to assess the implications of local circumstances, or factors which may elevate or lessen the risk of accidents, e.g. junction conflicts."*

12.3.34 In accordance with the guidance, an examination of the existing collisions within the study area has been undertaken to identify any collision clusters with an emerging pattern of collision types. These sites are considered to be sensitive to changes in traffic flows (sensitive receptors) and therefore more detailed analysis of local factors has been undertaken in the context of the proposals.

Driver delay

12.3.35 GEART recommends the use of proprietary software packages to model junction delay and therefore estimate increased vehicle delays. However, it is noted that vehicle delays are only likely to be significant when the surrounding highway network is at, or close to, capacity.

Other impacts

Traffic-borne noise, vibration and air quality effects are assessed separately in Section 14 Noise and Vibration and Section 13 Air Quality and the impact of increases in traffic upon recreation and amenity and ecology are assessed in Section 21 Recreation and access and Section 10 Terrestrial **Ecology**.

Impact evaluation

12.3.36 **Table 12-7** details the assessment framework used herein adapted from GEART. These thresholds are guidance only and provide a starting point from which additional evidence (for example more detailed traffic analysis and site observations) and professional judgement will inform an analysis of the magnitude of effect.

Table 12-7 Traffic and transport assessment framework

Effect	Magnitude of effect			
	Very Low	Low	Medium	High
Severance	Change in total traffic flow of less than 30%	Change in total traffic flows of 30-60%	Change in total traffic flows of 60-90%	Changes in total traffic flows of over 90%
Pedestrian amenity (including cyclists)	Changes in traffic flow (or HGV component) less than 100%	Greater than 100% increase in traffic (or HGV component) and a review based upon the quantum of vehicles, vehicle speed and pedestrian/cycle demand		

Effect	Magnitude of effect			
	Very Low	Low	Medium	High
Fear and intimidation **	Average traffic flows over 18 hours of less than 600 vehicles/hour or 1,000 HGVs over 18 hours		Average traffic flows over 18 hours between 600 –1,200 vehicle/hour or more than 1,000 – 2,000 HGVs over 18 hours	Average traffic flows over 18 hours of more than 1,200 vehicles/hour or more than 2,000 HGVs over 18 hours
	Potential vehicle speeds and pedestrian provision are also a consideration.			
Pedestrian delay	A review of existing crossing facilities, pedestrian demand and calculated delays.			
Highway safety	Analysis of Personal Injury Collision records to identify clusters and/or trends.			
Driver delay	Vehicle delay and queues as forecast using junction modelling software			
Notes: *** Crompton 1981, uses the terminology moderate, great and extreme to describe the magnitude of effect, impacts less than moderate have been interpreted to be very low to low and impacts of moderate are interpreted as medium and great to extreme as high.*				

12.3.37 **Table 12-8** sets out the assessment matrix adopted for routes that meet the screening criteria (Rule 1 and 2). This combines the assessment of the magnitude of effect, derived from on the framework included in **Table 12-7**, with the receptor value presented in **Table 12-6** in order to determine the significance of the predicted impact.

12.3.38 Note that for the purposes of the EIA, major and moderate impacts are deemed to be significant. In addition, whilst minor impacts are not strictly considered to be significant in their own right, it is important to distinguish these from other non-significant impacts, as they may contribute to significant impacts cumulatively or through impact interactions.

Table 12-8 Traffic and transport significance impact assessment matrix

Receptor / Link sensitivity	Magnitude of effect			
	High	Medium	Low	Very low
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible

12.4 Baseline environment

Local highway network

12.4.1 Teesside is the given name for a group of towns situated in the north east of England. It incorporates the towns Middlesbrough, Stockton-On-Tees, Thornaby-on-Tees, Billingham, Cleveland, Redcar and other smaller settlements near the River Tees. Access to the wider strategic highway network is predominantly via the A66 and A19 dual carriageways, which link to the A1(M).

12.4.2 The A1(M) provides access to the key north south corridor passing close to Newcastle upon Tyne and Leeds. The A1(M) also provides access to the east/west transport corridor of the M62.

12.4.3 **Figure 12.4 (Appendix 12.1)** depicts the local highway network surrounding the study area; a commentary on the link characteristic is set out below.

Link 1

12.4.4 The A19 connects York to the south with Newcastle upon Tyne to the north passing the North York Moors to the east. The A19 is a high speed modern dual carriageway with two lanes in each direction, widening to three and four lanes within the Middlesbrough region. The road is subject to the national speed limit and forms part of the strategic road network.

Link 2

12.4.5 The A66 is the main west to east traffic route connecting Teesside to Workington on the west coast. To the west the A66 passes through Darlington and providing wider links to the A1(M) and M6 and to the east the A66 terminates at A1053/A1085 roundabout. Within the study area, the A66 is a high speed dual carriageway with two lanes in each direction.

Link 3

12.4.6 The A1053 links the A66 to the north with the A174 to the south. The road is a dual carriageway and subject to the national speed limit. The A1053 forms part of the strategic road network.

Link 4

12.4.7 The A174 from its junction with the A1053 heading west is a high speed dual carriageway. The road narrows to a single carriageway after the roundabout for Grewgrass Lane, which is crossed by a PRoW.

Link 5

12.4.8 The A174 from its junction with the A1053 heading east is a modern dual carriageway and connects to the A19 to the west, where it connects to the wider highway network. The road is subject to the national speed limit and forms part of the strategic road network.

Link 6

12.4.9 The A171 south of the A174 travels through a residential area where properties front on to the road. The road is single carriageway with continuous footways on both sides and includes on-road cycle routes in parts. This section of the road is subject to a 30mph a speed limit.

Link 7

12.4.10 From its junction with the A174, the A172 extends south east through a built up urban environment passing sensitive receptors such as a school and residential properties to the junction with the A1043. This section of road is single carriageway and subject to 30 and 40mph speed limits with an on-road cycle lane in parts.

Link 8

12.4.11 From its junction with the A1043, the A172 changes in character to a modern 'A' road with no frontage development and continues south towards Stokesley. This section of the A172 is subject to national speed limit reducing to 40mph upon the approach to Nunthorpe, the road is also crossed by numerous PRoW.

Link 9

12.4.12 The A1043 connects the A172 to the A171 and is a modern single carriageway road subject to the national speed limit and is crossed by an existing PRoW.

Link 10

12.4.13 This section of the A171 is a modern dual carriageway to its junction with Guisborough where the road becomes a modern single carriageway; both sections are subject to the national speed limit. The road is crossed by a number of PRoW including 'Tees Link', a Long Distance Walking Route.

Link 11

12.4.14 The A173 is a single carriageway road subject to the national speed limit linking Guisborough with Skelton in Cleveland to the north. From its junction with the B1268 the route comprises a series of tight bends before entering Skelton in Cleveland.

Link 12

12.4.15 The A171 heads east towards Whitby and is the main east to west link through the NYMNP and is typically subject to the national speed limit apart from where the route passes by small sporadic settlements where the speed limit drops to 50mph. The road is mostly single carriageway; however, a crawler lane is provided in both directions where the road negotiates a series of tight bends and a 10% gradient hill at Birk Brow Bank. Two PRoW cross this section of road, one of which is the 'Cleveland Way', a National Trail.

Link 14

12.4.16 This section of the A174 is a single carriageway road passing some sensitive receptors in Skelton-in-Cleveland, such as residential frontage and a community centre. There are some sharp bends on the road as it passes through Spring Wood. The road is subject to national speed limit before reducing to 30mph within Skelton-in Cleveland.

Link 15

12.4.17 This section of the A174 is modern single carriageway road which bypasses Skelton-in-Cleveland and Brotton. As the road approaches Brotton, a crawler lane is provided for slow moving vehicles up a steep section of road. The road is subject to the national speed limit and crossed by numerous PRoW.

Link 44

12.4.18 The A1085 begins at the junction with the A66 and A1053 and bounds Redcar to the north. The road is a dual carriageway subject to the national speed limit, with segregated cycle routes provided along both sides of the road.

Baseline Traffic Flow

Traffic Count Data

12.4.19 Existing traffic flow data for all the key roads within the local study area has been captured from a number of primary and secondary sources. The datasets used in the assessment are summarised in **Table 12-9** below and shown graphically in **Figure 12.5 (Appendix 12.1)**.

12.4.20 A total of 15 count sites have been employed for the purposes of this assessment. The resultant baseline traffic flow data for the SRN and local highway network is summarised in **Table 12-10.**

12.4.21 It should be noted the technology employed at the permanent ATC sites classifies vehicle type by length, and it is not possible to differentiate HGVs from buses and coaches. Therefore, this assessment uses the term HGV as a proxy for a collective of those vehicle types for both baseline data, development generated traffic and the impact assessment (recognising the similar environment characteristics of the vehicle types). All classified counts have been adjusted to provide the same input data as the ATCs.

Traffic Growth

12.4.22 To derive the future year baseline traffic demand, the observed 2012, 2013 and 2014 traffic flows have been factored up to 2017 (the start of construction) and 2020 (the first year of operation)

12.4.23 To take account of sub-regional growth in housing and employment, light vehicle traffic flows were factored up using the Department for Transport Trip End Model Presentation Programme (TEMPro). TEMPro provides factors for future traffic growth at a local level based on forecast population, employment, households and car ownership

12.4.24 For the purpose of this assessment, TEMPro Version 6.2, with data set 6.2 for Redcar and Cleveland geographical areas has been utilised and HGVs have been factored up with National Trip End Model (NTEM) factors.

12.4.25 The application of TEMPro accounts for emerging Local Plan housing and employment allocations that have not been determined prior to this application.

12.4.26 In addition to TEMPro growth, significant committed developments within the study area have been identified and assigned to the future year baseline scenarios. The supporting TA (**Appendix 12.2**) provides further details with regard to the methodology for factoring baseline traffic demand to future years.

Table 12-9 Traffic count data sources

Source / Commissioned by	Type	Available Data	Date / Period
Department for Transport	Calculated Annual Average Daily Flows (AADF)	Classified AADF	An average day in 2012
Royal HaskoningDHV (RHDHV)	Temporary Automatic Traffic Counts (ATC)	7-day ATCs on selected links.	22 November 2013 – 26 November 2013 8 May 2014 – 15 May 2014
RHDHV	Manual Classified Counts	Classified turning counts at selected junctions within RCBC area	12 March 2014 (07:30 – 09:30, 13:00 – 15:00 and 16:30 – 18:30)
Middlesbrough Council	Permanent ATC	Hourly traffic flows	1 October 2013 – 30 September 2014 Continuous seven day, 24 hour counts

Table 12-10 Existing daily traffic flows

Link	Description	Background 2012/2013/2014 flows (24hr AADT*)	
		Total Vehicles	Total HGVs
1	A19 (west of Middlesbrough)	91,852	6,407
2	A66 (north of Middlesbrough)	26,136	2,208
3	A1053 (east of Middlesbrough)	12,179	1,057
4	A174 (south of Redcar)	30,855	1,286
5	A174 (south of Middlesbrough)	25,520	1,513
6	A171 (Ormesby Bank)	14,836	394
7	A172 (Dixons Bank)	19,732	719
8	A172 (towards Stokesley)	11,196	454
9	A1043 (south of Middlesbrough)	13,044	553
10	A171 (Middlesbrough Road)	20,015	793
11	A173 (Skelton Ellers)	5,344	296
12	A171 (between the A173 and Scaling Dam)	9,683	525
14	A174 (Apple Orchard Bank)	11,601	393
15	A174 (Skelton-in-Cleveland)	10,646	537
44	A1085 – Trunk Road	17,406	839
Key			
*	AADT – Annual Average Daily Traffic		
	2012 traffic flows, sourced from the Department for Transport		
	2013 / 2014 traffic flows, from commissioned traffic counts		

Link	Description	Background 2012/2013/2014 flows (24hr AADT*)	
		Total Vehicles	Total HGVs
	2013/2014 traffic flows, sourced from Middlesbrough Council		

Daily and seasonal variations in background traffic flows

12.4.27 To understand annual fluctuations in traffic within the local study area, data from a permanent Automatic Traffic Counter (ATC) on the A66 has been extracted for a one year period between October 2013 and September 2014. **Chart 1** below demonstrates that monthly traffic profiles are broadly similar throughout the year with the peak of April being just 3,065 vehicles per day (11.1%) greater than January traffic flows.

12.4.28 GEART states "the greatest environmental change will generally be when the development traffic is the largest proportion of the total [traffic] flow". Therefore, for the purpose of the assessment screening exercise, traffic flows have been factored to an average January day when baseline flows are lowest.

12.4.29 **Chart 2** sets out a daily profile from an average of three temporary ATCs commissioned in the RCBC area. It can be observed from **Chart 2** that daily traffic profiles are typical of much of the UK whereby there are two distinct peaks. The first peak (morning peak) occurs between 7am and 9am and the second peak (evening peak) between 4pm and 6pm. The evening peak is, however, greater than the morning peak and has been utilised to assess junction capacity and driver delay effects. In accordance with DMRB, a neutral month period informs these assessments.

Chart 1 Traffic survey annual traffic profile

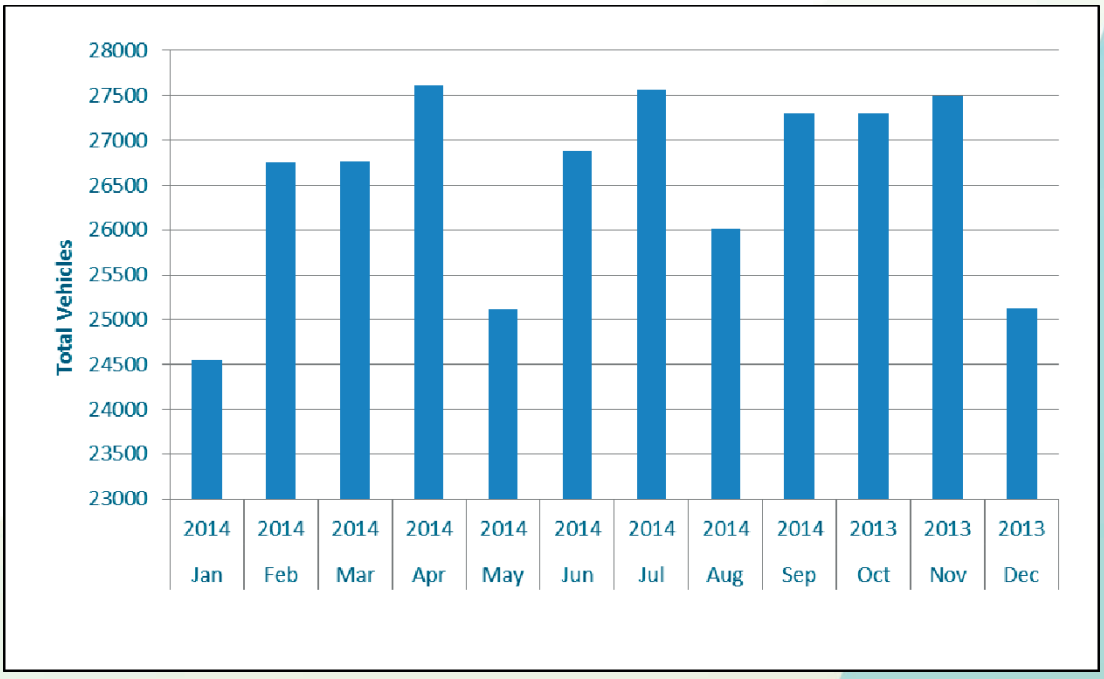
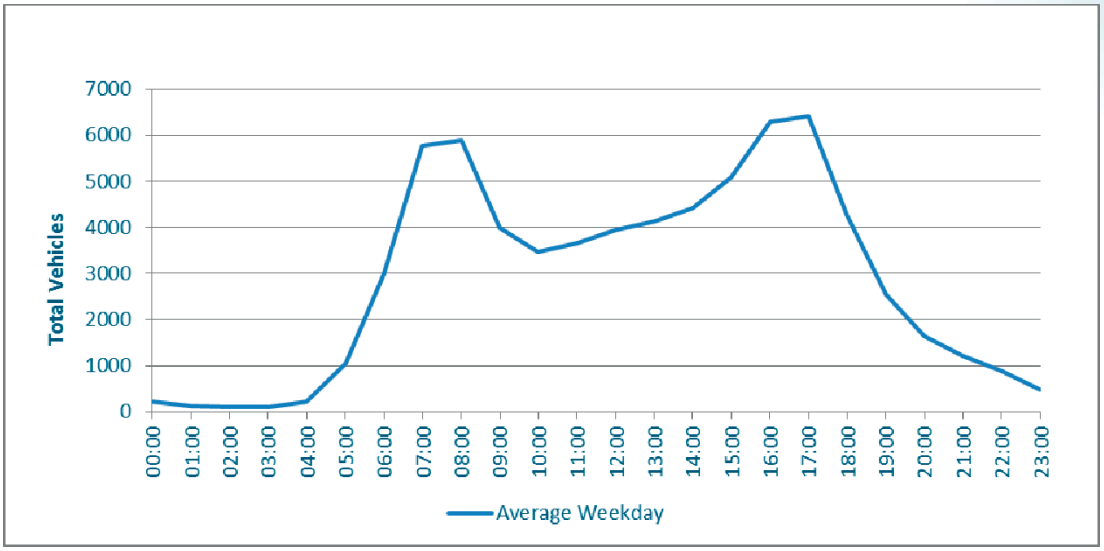


Chart 2 Traffic survey data daily profile



Assessment Traffic flows

12.4.30 **Diagram 12-1** sets out the processes followed to derive traffic flows for a January AADT scenario. **Appendix 12.4** details the derived hourly traffic flows for an average month and a January month (with no growth applied), **Table 12-11** details the 2017 January flows (with applied growth factors) which have informed the screening of traffic effects contained in this section.

Diagram 12.1 Derivation of baseline traffic flows

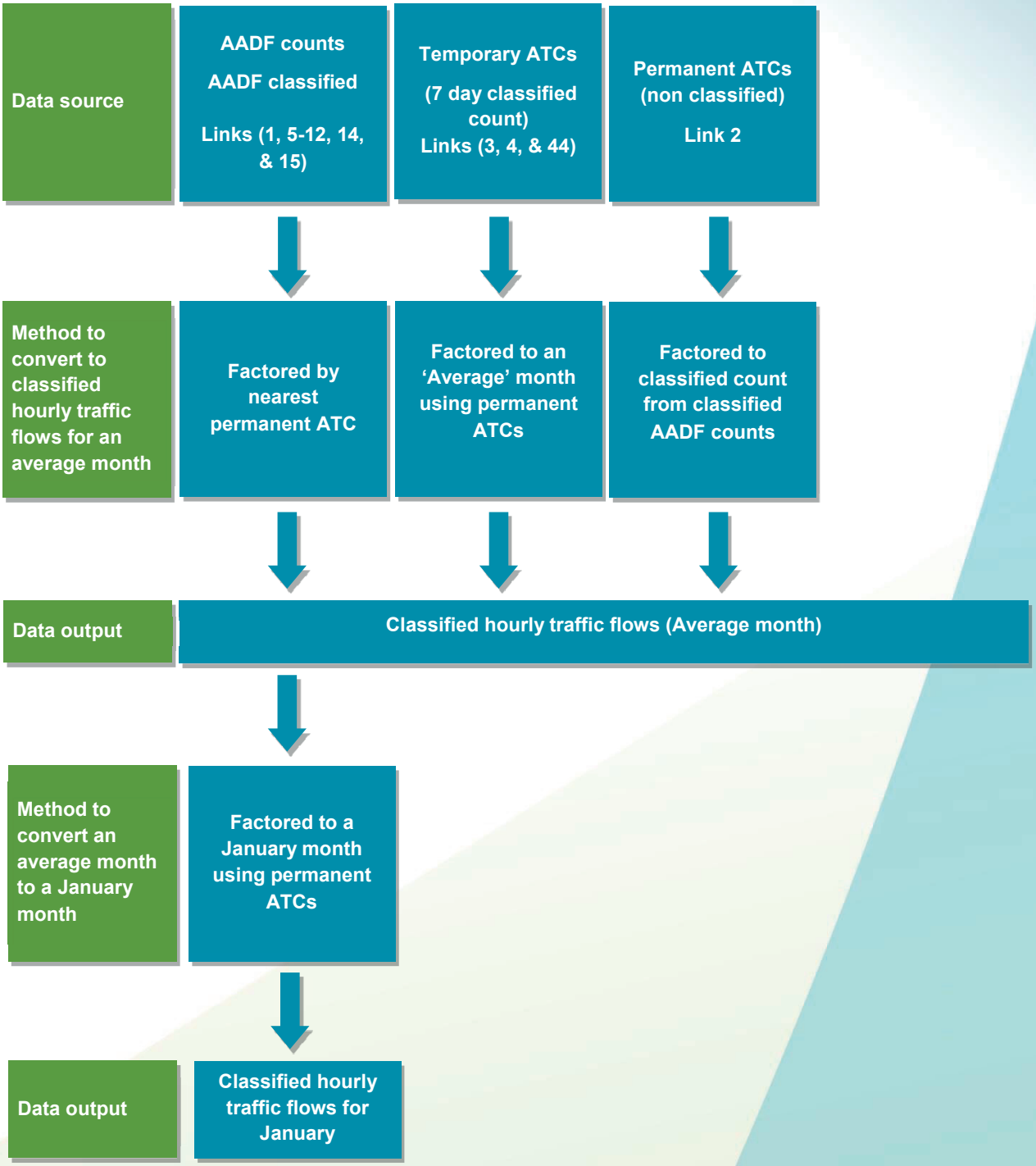


Table 12-11 January 2017 assessment flows

Link	Description	Background January 2017 24hr flows	
		Total Vehicles	Total HGVs
1	A19 (west of Middlesbrough)	89,362	6,126
2	A66 (north of Middlesbrough)	25,289	2,133
3	A1053 (east of Middlesbrough)	12,177	1,024
4	A174 (south of Redcar)	31,163	1,223
5	A174 (south of Middlesbrough)	24,824	1,469
6	A171 (Ormesby Bank)	14,427	377
7	A172 (Dixons Bank)	19,206	709
8	A172 (towards Stokesley)	10,884	434
9	A1043 (south of Middlesbrough)	12,688	536
10	A171 (Middlesbrough Road)	19,517	780
11	A173 (Skelton Ellers)	5,280	283
12	A171 (between the A173 and Scaling Dam)	7,513	419
14	A174 (Apple Orchard Bank)	11,437	376
15	A174 (Skelton-in-Cleveland)	10,419	513
44	A1085 – Trunk Road	17,024	801

Sustainable transport

12.4.31 **Table 12-12** provides a brief summary of the sustainable transport options available for the Harbour facilities. A more detailed review is contained within **Appendix 12.2**.

Summary of Sustainable Travel Options

12.4.32 A review of the sustainable travel options demonstrates that the Harbour facilities is highly accessible by cycle, foot and public transport, as the single construction shift of 9.00am to 5.00pm is serviced by the bus and rail timetables.

12.4.33 To restrict unconstrained car travel to the site, parking restrictions would be introduced as embedded mitigation to encourage car share take up (**Appendix 12.3** refers).

12.4.34 Parking provision would be restricted at the Harbour facilities to up to 112 spaces during construction, with visitor and disability parking provided in addition. This proposed parking allocation would act to deter unrestrained employee car trips and encourage the take up of the alternative transport outlined.

Table 12-12 Summary of sustainable transport

Existing Travel Options	Summary
Walking	The only established residential area located within 2km (1) of the entrance to the port is Dormanstown.
Cycling	Redcar, the western parts of Marske-by-the-sea and the eastern parts of Middlesbrough, such as Grangetown, Teesville and Eston, are within 8km (2) of the port entrance.
Bus	The nearest bus stop is on West Coatham Lane and is served by number 22, 64/64a and 747/747 bus services. Regular bus services are provided to the local towns between the hours of 5.15am and 11.30pm (operational hours vary between services).
Rail	The nearest station is Redcar Central railway station (excluding Redcar British Steel) which is located approximately 3.0km from the port entrance. The station is located on the Bishop Auckland to Saltburn line with a service approximately every 30 minutes.
Notes The Chartered Institution of Highways and Transportation (CIHT) document entitled 'Guidelines for Providing for Journeys on Foot', considers 2km as a 'preferred maximum' distance for commuting. The CIHT guidance 'Cycle Friendly Infrastructure, Guidelines for Planning and Design' states that three quarters of journeys by all modes are less than five miles (8km) and that this distance can be cycled comfortably by a fit person, therefore it is concluded that 8km represents a maximum realistic range for cycle trips.	

Highway safety

12.4.36 An examination of the routes within the local study area has been undertaken to identify 'collision clusters'. Collision cluster sites are considered to be sensitive to significant changes in traffic flows and could therefore potentially be impacted by the project.

12.4.37 RCBC do not have a defined definition for what would constitute a collision cluster, therefore, NYCC criteria is adopted for all links within the wider study area to identify potential collision clusters; this ensures consistency across all documents of the YPP.

12.4.38 NYCC criteria for identifying potential collision clusters within the study area for the both urban and rural areas are:

- A rural collision cluster site is one at which there have been four or more personal injury collisions within a 100m radius of each other during a three year period and the speed limit of the road is over 40mph.
- An urban collision cluster site is one at which there have been four or more personal injury collisions within a 50m radius of each other during a three year period and the speed limit of the road is 40mph or less.

12.4.39 Personal Injury Collision (PIC) data was obtained from RCBC for the most recent five year period available and examined using the above criteria (**Appendix 12.5** provides a graphical plot of all the collisions within the study area). This identified 23 clusters of which eight fall within the criteria for further assessment as set out by the criteria. The full list of sites is provided as **Appendix 12.6**.

12.4.40 Where collision clusters are identified, it is also necessary to consider if there is a pattern of collision types which could be exacerbated by the development and if mitigation may be appropriate and effective. **Appendix 12.7** examines the past five years of collision data for each of the collision clusters to understand if there is an emerging pattern or trend to collisions that could be exacerbated by the development proposals.

12.4.41 **Appendix 12.7** identifies that within the Redcar and Cleveland area there were eight potential collision clusters, of which five demonstrate an emerging pattern of collisions that could be adversely impacted by the development proposals. These sites are discussed further below and the locations are presented graphically within **Figure 12.6 (Appendix 12.1).**

Cluster 44: roundabout junction of the A66 and B1513

12.4.42 The junction has experienced 15 collisions within the past five years with an emerging pattern of single vehicle loss of control and rear end shunt type collisions.

Cluster 48: roundabout junction of the A171 and A173

12.4.43 The junction has experienced 12 collisions within the past five years with an emerging pattern of single vehicle loss of control and rear end shunt type collisions.

Cluster 57: roundabout junction of the A1053 and A174

12.4.44 The junction has experienced 22 collisions within the past five years and demonstrates an emerging pattern of rear end shunt, loss of control type collisions.

Cluster 59: roundabout junction of the A174 and Redcar Lane

12.4.45 The junction has experienced 12 collisions within the past five years, of which 10 are attributable to rear end shunt type collisions.

Cluster 61: roundabout junction of the A174 and A1085

12.4.46 The junction has experienced seven collisions within the past five years with an emerging pattern of rear end shunt type collisions.

Highway capacity

12.4.47 Within in the Redcar and Cleveland study area, it has been agreed with RCBC and the Highways Agency that the junctions outlined in **Table 12-13** should be assessed as potentially being sensitive to the development's traffic generation.

Table 12-13 Junctions identified as sensitive to developments traffic generation

Junction notation	Location	Junction type
Junction 9	North west Redcar, junction of the A1085 Trunk Road with the Wilton works	Five arm roundabout
Junction 10	West Redcar, junction of the A1085 Trunk Road with the Freightliner Terminal	Four arm roundabout
Junction 11	North east Middlesbrough, junction of the A1085, A66 and A1053	Five arm partially signalised roundabout
Junction 12	South east Middlesbrough, junction of the A1053, A174 and B1380	Four arm partially signalised roundabout

12.4.48 **Figure 12.7 (Appendix 12.1)** shows the locations of Junctions 9 – 12 in the context of the study area.

12.4.49 The baseline queuing and delays for these identified junctions are considered within **Sub-Section 12.5**, in order to provide a direct comparison with future year traffic scenarios.

12.5 Assessment of impacts during construction

Worst Case Traffic Generation

12.5.1 A suite of assumptions have been developed to enable a realistic worst case traffic generation to be established and inform the impact assessment during the construction phase. **Table 12-14** sets out these assumptions and provides a brief rationale. The detailed application of the assumptions is discussed throughout this sub-section in relation to the proposed Harbour facilities.

Table 12-14 Worst case construction phase assumptions

Parameter	Notes
No allowance for construction material to be imported direct to site by sea.	Distributes construction materials by road only resulting in a higher traffic demand for the purpose of a robust assessment.
Maximum personnel demand is assumed to occur during maximum HGV demand.	Represents the worst case combined HGV and light vehicle traffic demand building tolerance for programme/resource changes.
Earliest start of construction 2017.	2017 is the earliest realistic construction start date for the assessment of traffic impacts. It would result in the greatest impact, compared to a later start date, as background traffic demand would be subject to limited growth and therefore traffic increase more significant.
No allowance for construction workers to be able to travel by non-car modes (bus, rail, walking and cycling) has been applied to the traffic demand.	Distributes construction employee travel to work by car only resulting in a higher traffic demand for the purpose of a robust assessment.
Monthly HGV movements profiled over twenty days per month (i.e. Monday – Friday).	Represents HGV traffic generation profiled over weekdays only resulting in higher daily demand than if weekend deliveries were employed. This provides a robust daily traffic demand profile on which to assess weekday impacts and establish if weekend working is feasible.

Parameter	Notes
All construction employees to depart during the network peak hour (5pm – 6pm).	Represents the worst case combined impact of development and background traffic for the purpose of a robust assessment.
HGV demand profiled of a 20 day month HGV to make deliveries over a 10 hour window.	Robust daily and hourly flows derived with no reduction for weekend working and scope for breaks in delivery during the day.
Embedded car share ratio of 2.5 for worker travelling direct to the Harbour site.	Industry best practice* shows a typical ratio of 3.0 could be achieved on large construction sites. The lesser figure will ensure that the worker traffic demand is robust.

Traffic demand

12.5.2 This sub-section contains a summary of the traffic inputs that have informed the impact assessment. The TA contains full details for the traffic derivation.

12.5.3 Transport Assessments are typically informed by the derivation of trip rates (i.e. to assist with quantifying the development's predicted traffic attraction) from interrogation of established trip rate databases such as TRICS. However, there is no such data in the existing trip rate databases that could confidently quantify the trip attraction associated with the construction of the proposed scheme.

12.5.4 The traffic generation that has informed this assessment has been derived by way of a 'first principles' approach. The first principles approach generates traffic volumes from an understanding of material quantities and personnel numbers. This information has been supplied by the design team for the Harbour facilities (Royal HaskoningDHV).

HGVs

12.5.5 A summary of the monthly HGV traffic demand (derived from material quantities) for construction of Phase 1 and 2 is provided in **Appendix 12.8**.

12.5.6 **Appendix 12.9** identifies monthly HGV peaks and calculates the daily peak (assuming a 20 day month) from which hourly demand is derived by assuming a 10 hour constant profile of deliveries.

12.5.7 The following issues have the potential to change the HGV figures derived:

- Design revisions as the project progresses from planning design to tender design.
- Post application changes in method of working informed by appointed contractor.
- Incidental HGV trips.

12.5.8 It should be noted these issues could collectively reduce or increase overall HGV demand. To ensure the HGV data assessed represents a 'realistic worst case' scenario, a strategy of applying contingencies to the daily traffic demand for each element of the project has been adopted.

12.5.9 These contingencies have been informed by the design workstreams based upon the degree of certainty (confidence threshold) in the design outputs at the application 'freeze'. This feedback has informed a contingency of 20% for the Harbour facilities.

Construction personnel traffic

12.5.10 **Appendix 12.10** identifies that the peak resourcing requirements for the Harbour facilities would be 175 employees.

12.5.11 It is anticipated that the 175 construction workers will typically arrive between 8am and 9am and depart between 5pm and 6pm; however, the nature of construction works typically requires that employees work longer hours in the summer and shorter hours in the winter to take advantage of the available day light. Therefore, as a worst case, it is assumed that employee trips will overlap with the am and pm network peak hours.

12.5.12 The strategy for the Harbour facilities is for construction workers to travel direct with a managed vehicle to employee ratio of at least 2.5.

12.5.13 It is considered that targeting employees at their point of origin would be more appropriate. In this regard the 2.5 employees per vehicle ratio is considered to represent a worst case scenario in the context of:

- The established industry exemplar of Heathrow Terminal 5 (BAA 2003, Terminal 5 Construction Workers Public Transport Strategy 2003/04) established that a car share ratio of 3 employees per vehicle was achievable.
- The ratio does not take into account the propensity for employees to walk, cycle or use public transport.

12.5.14 This strategy is augmented by the supporting CTMP (**Appendix 12.3**) which include detail of the processes for managing, monitoring and enforcing any noncompliance. It should be noted this strategy does not preclude a travel plan being developed by the appointed contractor that exceeds the 2.5 ratio, rather it provides a realistic baseline on which to assess traffic impact.

12.5.15 **Table 12-15** set out how this strategy translates employee movements to vehicle movements and how this has informed the maximum parking provision at each site.

Table 12-15 Harbour facilities construction personnel vehicle and parking demand

Sites	Shift change over times	Employees movements		Vehicle movements			Maximum parking provision *
		Arrivals	Departures	Arrivals	Departures	Total	
Harbour	08:00 – 09:00	175	0	70	0	70	70
	17:00 – 18:00	0	175	0	70	70	
* Excludes provision for visitors and disable parking which will be provided in addition.							

Peak construction traffic demand period

12.5.16 **Table 12-16** provides a summary of the peak periods for traffic demand during construction Phase 1 and 2 for both HGVs and personnel. It is evident that the peak period for construction would occur during Phase 1 and is therefore taken forward for assessment recognising that traffic demand during Phase 2 will be substantially lower.

Table 12-16 Summary of Phase 1 and Phase 2 traffic demand

	Commencement of construction	Total HGV demand	Peak daily (two-way) HGV demand	Peak daily employee demand
Phase 1	2017	6,411	66	175
Phase 2	2022	2416	36	175*
* Assumed to be identical to phase 1				

Traffic distribution - construction

12.5.17 At the time of application, the supply chain for materials and the workforce cannot be informed by contractor involvement. Therefore, the following sub-sections provide the assumptions that have been adopted to inform the distribution of traffic for the construction phase.

12.5.18 The HGV traffic associated with the Harbour facilities is assumed to distribute from the A1085 (Link 44) and then to Teesport or the wider highway network via the A66 (Link 2).

12.5.19 To inform the potential distribution of construction employees, the availability of local labour has been reviewed as part of the socio-economics study (**Section 19**) to inform the potential employee distribution.

12.5.20 The socio-economics study has also advised that types of skills required for the construction of the Harbour facilities could be accommodated from the local labour area.

12.5.21 To inform the distribution of the employees who potentially could be drawn from the local area, the socio-economics study has examined the distribution of residents within the local area (a 60 minute drive) with the relevant skill sets.

12.5.22 The distribution of employees per postcode cluster is outlined within **Appendix 12.11**. This has then been factored using a gravity model approach, whereby the number of employees is divided by the journey time (taken from a route planner) from the centre of the postcode cluster to the Harbour facilities. **Figure 12.8 (Appendix 12.1)** provides a graphical representation of the distribution of employees in the form of a heat map.

12.5.23 **Figure 12.9** and **Figure 12.10 (Appendix 12.1)** provide details of the daily and peak hour distribution of construction trips (both employees and HGVs) on the highway network.

Route screening

12.5.24 In accordance with GEART (Rule 1 and Rule 2), a screening process has been undertaken for the local study area to identify routes that are likely to have sufficient changes in traffic flows and, therefore, require further impact assessment.

12.5.25 **Table 12-17** summarises the total daily movements of all materials, personnel and plant during the peak construction month, distributed across the highway network. The table also provides a comparison of the peak construction flows with the forecast background traffic flows in January 2017. By comparing the peak daily construction traffic flows with background traffic flows for the month with the lowest background traffic, the assessment considers the greatest potential for change, thereby ensuring a robust screening process.

Table 12-17 Existing and proposed daily traffic flows during the Harbour facilities construction phase

Link	Description	Link sensitivity	Background January 2017 24hr flows		2017 construction flows (two-way)		Percentage increase	
			Total vehicles	Total HGVs	Total vehicles	Total HGVs	Total vehicles	Total HGVs
1	A19 (west of Middlesbrough)	Low	89,362	6,126	63	0	0.07%	0.00%
2	A66 (north of Middlesbrough)	Low	25,829	2,133	141	67	0.54%	3.12%
3	A1053 (east of Middlesbrough)	Low	12,177	1,024	66	0	0.54%	0.00%
4	A174 (south of Redcar)	Low	31,163	1,223	26	0	0.08%	0.00%
5	A174 (south of Middlesbrough)	Low	24,824	1,469	27	0	0.11%	0.00%
6	A171 (Ormesby Bank)	Medium	14,427	377	7	0	0.05%	0.00%
7	A172 (Dixons Bank)	Medium	19,206	709	0	0	0.00%	0.00%
8	A172 (towards Stokesley)	Low	10,884	434	1	0	0.01%	0.00%
9	A1043 (south of Middlesbrough)	Low	12,688	536	4	0	0.03%	0.00%
10	A171 (Middlesbrough Road)	Low	19,517	780	3	0	0.02%	0.00%
11	A173 (Skelton Ellers)	Low	5,280	283	0	0	0.00%	0.00%
12	A171 (between the A173 and Scaling Dam)	Low	7,513	419	3	0	0.04%	0.00%
14	A174 (Apple Orchard Bank)	Medium	11,437	376	1	0	0.01%	0.00%
15	A174 (Skelton-in-Cleveland)	Low	10,419	513	1	0	0.01%	0.00%
44	A1085 (Trunk Road)	Low	17,024	801	207	67	1.21%	8.31%
Key								
	Links exceeding GEART screening thresholds.							

Screening summary and impacts

12.5.26 In accordance with GEART, only those sensitive links that show a greater than 10% increase in total traffic flows (or HGV component) or, for all other links, a greater than 30% increase in total traffic or the HGV component are considered when assessing the traffic impact upon receptors.

12.5.27 It is noted from **Table 12-17** all of the links within the local study area fall below the GEART screening thresholds and, therefore, the magnitude of effect on these links can be considered to be very low on Severance, Pedestrian Amenity, Pedestrian Delay and Highway Safety. Therefore the impact resulting from these effects is assessed as **minor adverse** significance.

12.5.28 GEART notes that Driver Delay impacts "are only likely to be significant when the traffic on the network surrounding the development is already at, or close to capacity." It is further recommended that computerised junction assessment packages are utilised to determine these impacts. In compliance with these guidelines the effect of driver delay has been assessed in more detail utilising modelling outputs from the TA (**Appendix 12.2**).

Driver Delay

12.5.29 This sub-section examines in detail the effects of Driver Delay by assessing the impact of Harbour facilities traffic on the sensitive junctions identified in **Sub-section 12.4**.

12.5.30 **Sub-section 12.4** has established that the highest combined network and development traffic flows would occur between 5pm to 6pm for the local study area.

12.5.31 The 5pm to 6pm period covers the period where employees who have been working at the Harbour facilities depart. In addition to the employee traffic movements there would also be HGVs making deliveries.

12.5.32 This time period represents the maximum potential for driver delay impacts within the local study area and has informed the assessment of the effect.

12.5.33 The supporting TA (**Appendix 12.2**) provides full details of the methodology for the junction modelling, including information such as data capture, signal timings and model validation.

12.5.34 The ES provides a summary of the modelled impacts for the peak construction period compared to background traffic flows. When assessing junction capacity, reference has been made to the Ratio of Flow to Capacity (RFC) and Degree of Saturation (DoS). RFC is the standard recognised threshold for priority and roundabout junctions in the UK and DoS is the standard recognised threshold for signalised junctions. When values for RFC and DoS are above 0.85 and 90% respectively, a junction is considered to be operating beyond its desirable capacity and can therefore be considered of high sensitivity. Junctions registering below these values will be assessed as medium to low sensitivity.

12.5.35 Reference is also made in the assessment to Passenger Car Units (PCUs). A PCU is a term used in traffic modelling to translate all vehicles into one common unit. For example, a car is equivalent to one PCU whilst a HGV is typically equivalent to 2.3 PCUs.

Junction 9 - North west Redcar, junction of the A1085 Trunk Road with the Wilton works

12.5.36 **Table 12-18** summarises the modelled RFC, queuing and delay for junction 9 between 5pm to 6pm for 2017 for both with and without development scenarios.

Table 12-18 Junction 9, junction capacity, delay and queuing

	2017 (without development)			2017 (with development)		
Junction arm	**RFC**	**Queue**	**Delay (s)**	**RFC**	**Queue**	**Delay (s)**
A1085 (South)	0.444	0.8	3.36	0.447	0.8	3.36
Proposed Harbour Access	0.000	0.0	0.00	0.068	0.1	3.18
Tata Steel Access	0.200	0.2	2.34	0.206	0.3	2.40
A1085 (North)	0.315	0.5	3.54	0.326	0.5	3.72
West Coatham Lane	0.181	0.2	3.12	0.187	0.2	3.24
Wilton Access	0.030	0.0	2.28	0.031	0.0	2.34

12.5.37 It is observed from **Table 12-18** that, without the development, no arms of the junction exceed 0.85 (the "recognised threshold" for RFC), with queues of less than a single PCU. With the addition of the development traffic of 78 two-way vehicle movements, the junction would continue to operate with spare capacity, with queues no greater a single PCU and delays of less than four seconds.

12.5.38 For junction 9 the magnitude of the effect is assessed as very low on a low value receptor and, therefore, the impact is predicted to be of **negligible** significance.

Junction 10 - West Redcar, junction of the A1085 Trunk Road with the Freightliner Terminal

12.5.39 **Table 12-19** summarises the modelled RFC, queuing and delay for junction 10 between 5pm to 6pm for 2017 for both with and without development scenarios.

Table 12-19 Junction 10, junction capacity, delay and queuing

	2017 (without development)			2017 (with development)		
Junction arm	**RFC**	**Queue**	**Delay (s)**	**RFC**	**Queue**	**Delay (s)**
A1085 (South)	0.370	0.6	2.46	0.372	0.6	2.46
Tata Steel Access	0.170	0.2	3.96	0.170	0.2	3.96
A1085 (North)	0.402	0.7	2.64	0.436	0.8	2.82
Wilton Access	0.021	0.0	4.08	0.021	0.0	4.20

12.5.40 It is observed from **Table 12-19** that without the development no arms of the junction exceeds 0.85 (the "recognised threshold" for RFC), with queues of less than a single PCU. With the addition of the development traffic of 78 two-way vehicle movements the junction would continue to operate with spare capacity, with queues no greater a single PCU and delays of less than five seconds.

12.5.41 For junction 10 the magnitude of the effect is assessed as very low on a low value receptor and, therefore, the impact is predicted to be of **negligible** significance.

Junction 11 - North east Middlesbrough, junction of the A1085, A66 and A1053

12.5.42 **Table 12-20** summarises the modelled DoS, queuing and delay for junction 11 between 5pm to 6pm for 2017 for both with and without development scenarios.

Table 12-20 Junction 11, junction capacity, delay and queuing

	2017 (without development)			2017 (with development)		
Junction arm	**DoS**	**Queue**	**Delay (s)**	**DoS**	**Queue**	**Delay (s)**
A1085 (North) Lane 1&2	64.8%	5.8	19.3	69.6%	6.8	20.5
A1085 (North) Lane 3	56.6%	6.3	20.0	61.3%	7.0	21.0
Wilton Works Access Lane 1	40.2%	2.1	16.6	43.1%	2.2	18.1
Wilton Works Access Lane 2	19.2%	0.5	18.0	21.9%	0.5	20.0
A1053 - Greystone Road Lane 1	37.1%	2.8	25.3	37.1%	2.8	25.3
A1053 - Greystone Road Lane 2	35.4%	2.6	25.0	35.4%	2.6	25.0
A1053 - Greystone Road Lane 3	8.1%	0.5	22.1	8.1%	0.5	22.1
A1085 (South) Lane 1	24.9%	1.3	6.7	25.4%	1.3	6.9
A1085 (South) Lane 2	21.8%	1.1	6.8	22.2%	1.1	7.0
A1053 - Tees Dock Road - Lane 1	45.7%	5.1	7.8	46.3%	5.4	7.9
A1053 - Tees Dock Road - Lane 2	66.4%	10.1	10.3	66.4%	10.0	10.3
PRC	35.5%			29.4%		

12.5.43 It is observed from **Table 12-20** that without the development the junction has a positive PRC with no arms exceeding 90% (the “recognised threshold” for DoS), with the largest queue of 10 PCUs on the A1053 Tees Dock Road approach. With the addition of the proposed development traffic of 78 two-way vehicle movements, there would be a slight deterioration in DoS for some arms; however, the junction would continue to operate with spare capacity, with queues only predicted to increase by up to one PCU and delays by two seconds, which is considered to be indiscernible.

12.5.44 For junction 11 the magnitude of the effect is assessed as very low on a low value receptor and, therefore, the impact is predicted to be of **negligible** significance.

Junction 12 - South east Middlesbrough, junction of the A1053, A174 and B1380

12.5.45 **Table 12-21** summarises the modelled DoS, queuing and delay for junction 12 between 5pm to 6pm for 2017 for both with and without development scenarios.

Table 12-21 Junction 12, junction capacity, delay and queuing

	2017 (without development)			2017 (with development)		
Junction arm	**DoS**	**Queue**	**Delay (s)**	**DoS**	**Queue**	**Delay (s)**
A1053 - Greystone Road Lane 1	86.0%	8.0	29.7	87.9%	9.2	33.3
A1053 - Greystone Road Lane 2	86.0%	8.0	29.7	88.1%	9.3	33.8
A1053 - Greystone Road Lane 3	88.5%	9.5	34.7	90.3%	10.3	38.9
A174 (East) Lane 1	58.3%	0.7	2.1	58.3%	0.7	2.1
A174 (East) Lane 2	37.6%	3.7	17.2	37.6%	3.7	17.2
A174 (East) Lane 3	25.4%	2.4	15.6	25.4%	2.4	15.6
A174 (West) Lane 1	26.2%	2.5	8.3	26.2%	2.5	8.3
A174 (West) Lane 2 & 3	69.2%	7.1	10.7	69.3%	7.1	10.7
High Street Lane 1 & 2	80.1%	5.9	30.2	80.1%	5.9	30.2
PRC	1.6%			-0.3%		

12.5.46 It is observed from **Table 12-21** that without the development the junction has a positive PRC, with the largest queue of ten PCUs. With the addition of the proposed development traffic of 27 two-way vehicle movements, there would be a slight deterioration in DoS for some arms, resulting in a negative PRC being registered. However, with queues only predicted to increase by up to two PCUs and delays by five seconds, the reduction in junction performance is considered to be indiscernible.

12.5.47 For junction 12 the magnitude of the effect is assessed as very low on a medium value receptor and, therefore, the impact is predicted to be of **negligible** significance.

12.6 Assessment of impacts during operation

12.6.1 During the operation of the Harbour facilities, there would only be an occasional requirement for HGV maintenance vehicles to access the site and limited daily staffing requirements. No product would be exported by road from the Harbour facilities.

12.6.2 Access to the Harbour facilities for the operational phase would be taken from the existing A1085 (Trunk Road) West Coatham Lane roundabout junction; via the southern arm of the roundabout which currently serves the Wilton Complex. Within the Wilton Complex, traffic would travel along an existing private service road that runs under the A1085 (Trunk Road) to the Harbour.

12.6.3 During the operational phase, the Harbour facilities would generate low traffic movements requiring 26 employees during Phase 1 increasing to 36 employees by Phase 2, of which only 18 would be required on any one day. The 18 employees would then be further disaggregated into three shifts resulting in a peak daily demand of 10 employees working on site at any one time.

12.6.4 During the operational phase, it is not proposed that there would be any routine HGV movements from the Harbour facilities, with only incidental deliveries such as maintenance and refuse collection. Consequently, traffic impact associated with the operational phase is considered of **negligible** significance.

12.7 Assessment of impacts during decommissioning

12.7.1 The proposed port terminal is a long term infrastructure proposal, with no plans for decommissioning. Therefore, this aspect of the Harbour facilities is not considered further.

12.7.2 The complete removal of the conveyor belt system is planned for the decommissioning phase of the Harbour facilities. This would include the removal of all infrastructure including site wide utilities, concrete / steel structures, platforms, foundations and drainage systems. Remedial works would also be required to enable the site surfaces to blend into the surrounding environment. Where possible, all materials would be kept on site for use with the restoration works; any materials transported off site would be recycled where suitable. As the port terminal would be left in place during decommissioning, it may be possible to utilise this asset as a means for transporting material off site by barge.

12.7.3 Predicted conveyor system decommissioning activities are summarised in **Table 12-22**.

Table 12-22 Predicted decommissioning works for the conveyor system

Element of conveyor system	Decommissioning works
Conveyors	Making safe power supplies to the mechanical conveyors. Removal of any potential contaminants (e.g. gearbox oil) from site. Disconnecting and removing electrical and control cables and removing from site. Dismantling of mechanical conveyor motors and components and removal from site.
Conveyor platform and structure	Removal of the conveyor belt. De-connect walkways, conveyor bridges and support and lift by crane onto HGVs for recycling off-site. Breaking and crushing of concrete superstructure elements for re-use on or offsite or recycling.
Conveyor foundations	Excavating the ground surface to expose the foundations. Breaking foundations using a mechanical prior to crushing for either on or offsite re-use or recycling.
Earthworks	Filling voids from the conveyor platform foundations with appropriate backfill material. Reinstatement of the ground surface to its previous condition.
Ancillary buildings	Removing all buildings and foundations up to 2m below ground level or to rock head. Reinstatement of the ground surface to its previous condition.
Utilities	Removing all utility apparatus and utility service trenches. Reinstating service trenches.
Fencing	Removing security fencing and transporting off-site for potential re-use. Agricultural boundary fencing demarking the site boundary would be maintained.

12.7.4 Intuitively, the fact that the port terminal would not be decommissioned and the envisaged re-use of material on-site would lead to a substantially reduced demand for HGV deliveries and workforce compared to that assessed as a worst case scenario for the construction phase, with no significant impact envisaged.

12.8 In-combination assessment

12.8.1 It is recognised that all elements of the YPP will generate traffic that will cumulate on the links within the defined study area for the Harbour facilities. Therefore, an assessment of the project wide in-combination Traffic and Transport effects has been undertaken and is contained in **Part 2 Section 6** of the CIA.

12.9 Summary

12.9.1 This section of the ES has assessed the Traffic and Transport impacts of the Harbour facilities on the baseline highway environment within the identified local study area. The assessment also takes into account committed developments within the study area.

12.9.2 Residual impacts in relation to traffic and transport during the construction and operational phase are forecast as a worst case of minor adverse and negligible significance respectively.

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