

Hornsea 4



Hornsea Project Four: Preliminary Environmental Information Report (PEIR)

Volume 6, Annex 7.1: Traffic and Transport Technical Report

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A6.7.1
Version A

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Glossary

Term	Definition
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Projects (NSIP).
Effect	Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of the impact with the importance, or sensitivity, of the receptor or resource in accordance with defined significance criteria.
Hornsea Project Four	The proposed Hornsea Four offshore wind farm project; the term covers all elements within the Development Consent Order (i.e. both the offshore and onshore components).
Two-way movement	A movement is the process of transporting goods from a source location to a predefined destination. A two-way movement represents the inbound (laden trip from source) and the outbound unladen trip (back to source). For example, 20 two-way movements comprise 10 laden trips from source and 10 outbound unladen trips back to source.

Acronyms

Acronym	Definition
AADT	Annual Average Daily Traffic
AAWT	Annual Average Weekday Traffic
ATC	Automated Traffic Count
DCO	Development Consent Order
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
ERYC	East Riding of Yorkshire Council
GEART	Guidelines for the Environmental Assessment of Road Traffic
HGV	Heavy Goods Vehicle
LCV	Light Commercial Vehicle
PEIR	Preliminary Environmental Information Report

1 Introduction

- 1.1.1.1 This Technical Report has been produced by Royal HaskoningDHV on behalf of Ørsted Hornsea Project Four Ltd (“the Applicant”) and provides detail of the derivation and distribution of construction traffic and access strategy that has informed the assessment of potential transport impacts associated Hornsea Project Four offshore wind farm (hereafter referred to as Hornsea Four).
- 1.1.1.2 This Technical Report is provided as Annex 7.1 of the Preliminary Environmental Information Report (PEIR) Traffic and Transport Chapter 7 ([Volume 3, Chapter 7: Traffic and Transport](#)).
- 1.1.1.3 This Technical Report is structured as follows:
- [Section 2](#) provides a detail of the derivation of baseline and future year traffic flows;
 - [Section 3](#) provides details of the derivation of construction traffic demand and the assignment of this demand to the traffic and transport study area; and
 - [Section 4](#) provides details of the proposed access strategy including the design of new temporary points of access to the highway network.

2 Baseline Traffic Flows

2.1 Introduction

- 2.1.1.1 The Traffic and Transport PEIR Chapter is underpinned by the Guidelines of the Environmental Assessment of Road Traffic (GEART) for establishing the potential impacts associated with changes in traffic from Hornsea Four. GEART sets out broad thresholds for where changes in total daily traffic flows and HGVs may be considered significant for the effects of severance, pedestrian delay and amenity and accidents and road safety.
- 2.1.1.2 In the context of the GEART thresholds, it is necessary to establish annual average daily traffic flows (AADT) and annual average weekday traffic flows (AAWT) including Heavy Good Vehicle (HGV) component for all links within the transport study area (depicted graphically within [Figure 1](#)). The extent of the traffic and transport study area is defined within [Volume 3, Chapter 7: Traffic and Transport](#).

2.2 Data Collection

- 2.2.1.1 The traffic and transport study area comprise 90 links, which are shown within [Figure 1](#).

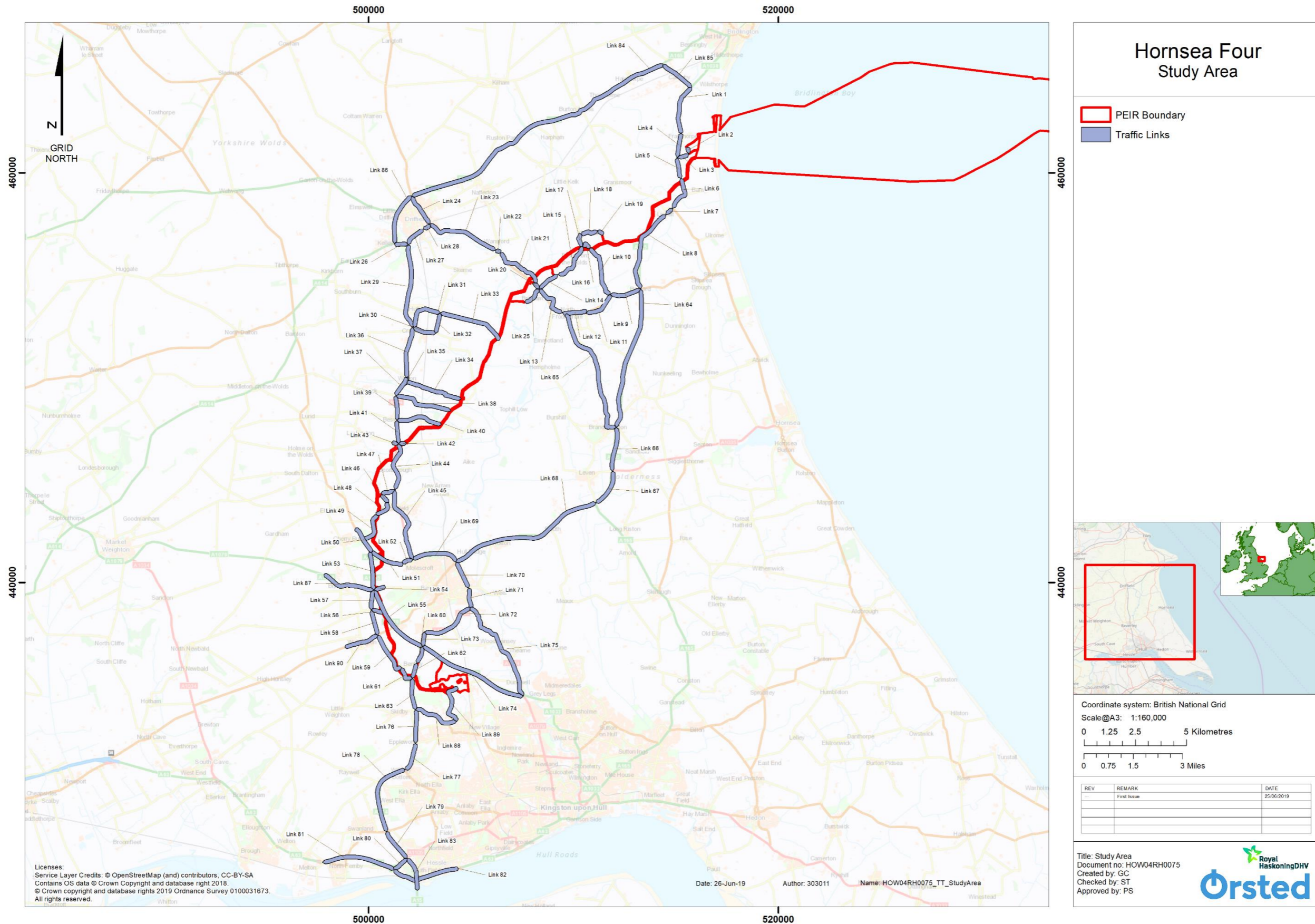


Figure 1: Traffic and Transport Study Area (not to scale).

- 2.2.1.2 To understand the baseline traffic flows along each of the 90 links within the traffic and transport study area, an extensive data review has been undertaken. This established the availability of public data from two sources, namely, the East Riding of Yorkshire Council (ERYC) traffic counts and Department for Transport (DfT) traffic counts.
- 2.2.1.3 The ERYC data provides details of total traffic flows for nine of the main A road links within the traffic and transport study area. The data includes total daily traffic flows for every day in 2018. The data does not however, include detail of vehicle classification, i.e. what percentage of the number of total vehicles are cars, vans, buses, etc.
- 2.2.1.4 The DfT counts provide AADT flows (from 2017) for 18 of the main A road links within the traffic and transport study area. The DfT counts also provide vehicle classification (in accordance with the DfT classification system).
- 2.2.1.5 The location of the ERYC and DfT counts are highlighted on [Figure 2](#) to [Figure 8](#). It can be noted from these figures that these data sources do not provide coverage for all links within the traffic and transport study area. As such, additional traffic counts were commissioned by the Applicant.
- 2.2.1.6 An additional 28 traffic counts were commissioned. These counts comprise of Automatic Traffic Counts (ATCs) at the locations shown on [Figure 2](#) to [Figure 8](#). The ATCs were undertaken in March 2019 and captured data for 24 hours over a seven-day period. The ATCs also capture classified traffic count data using the DfT classification system.

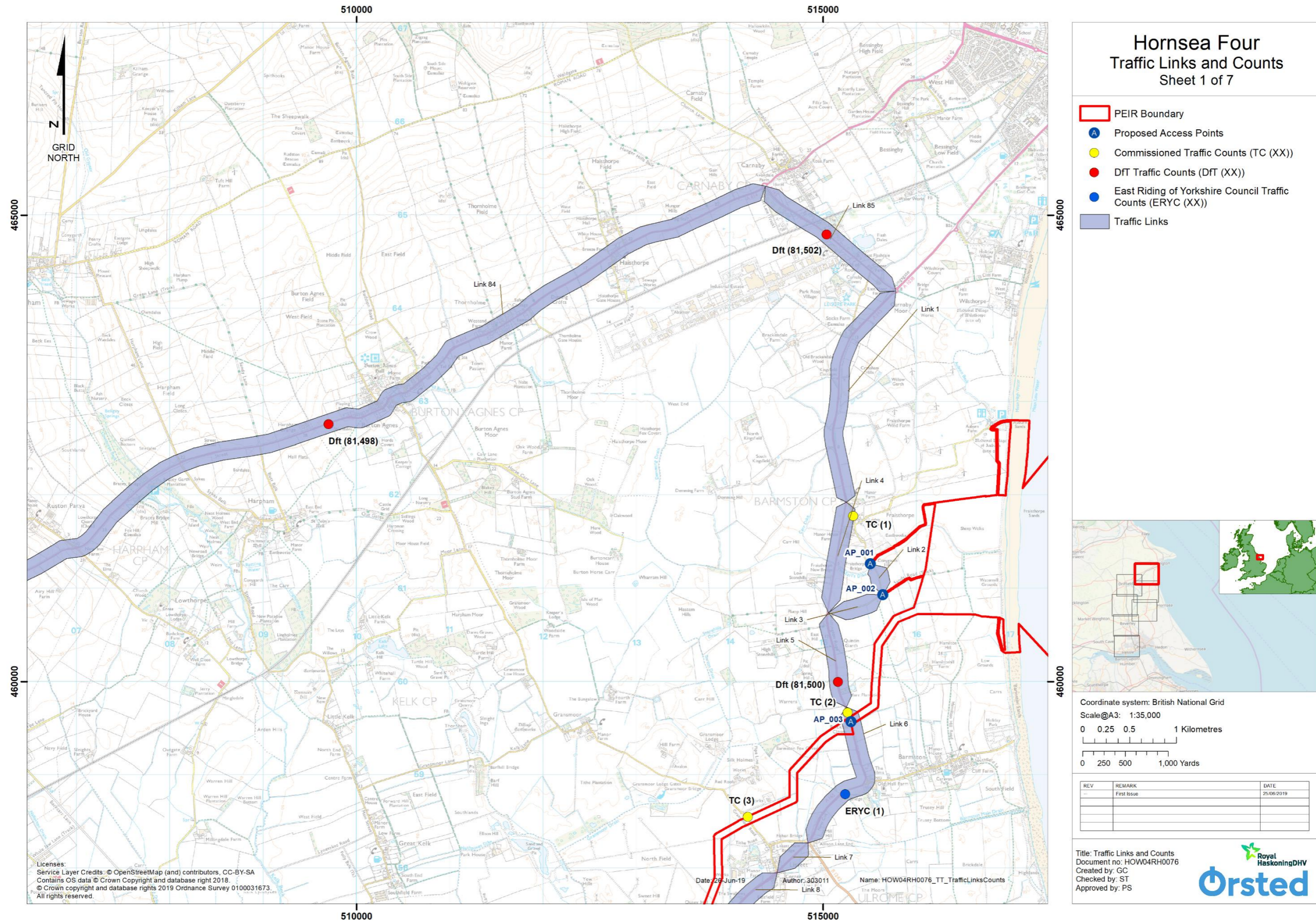
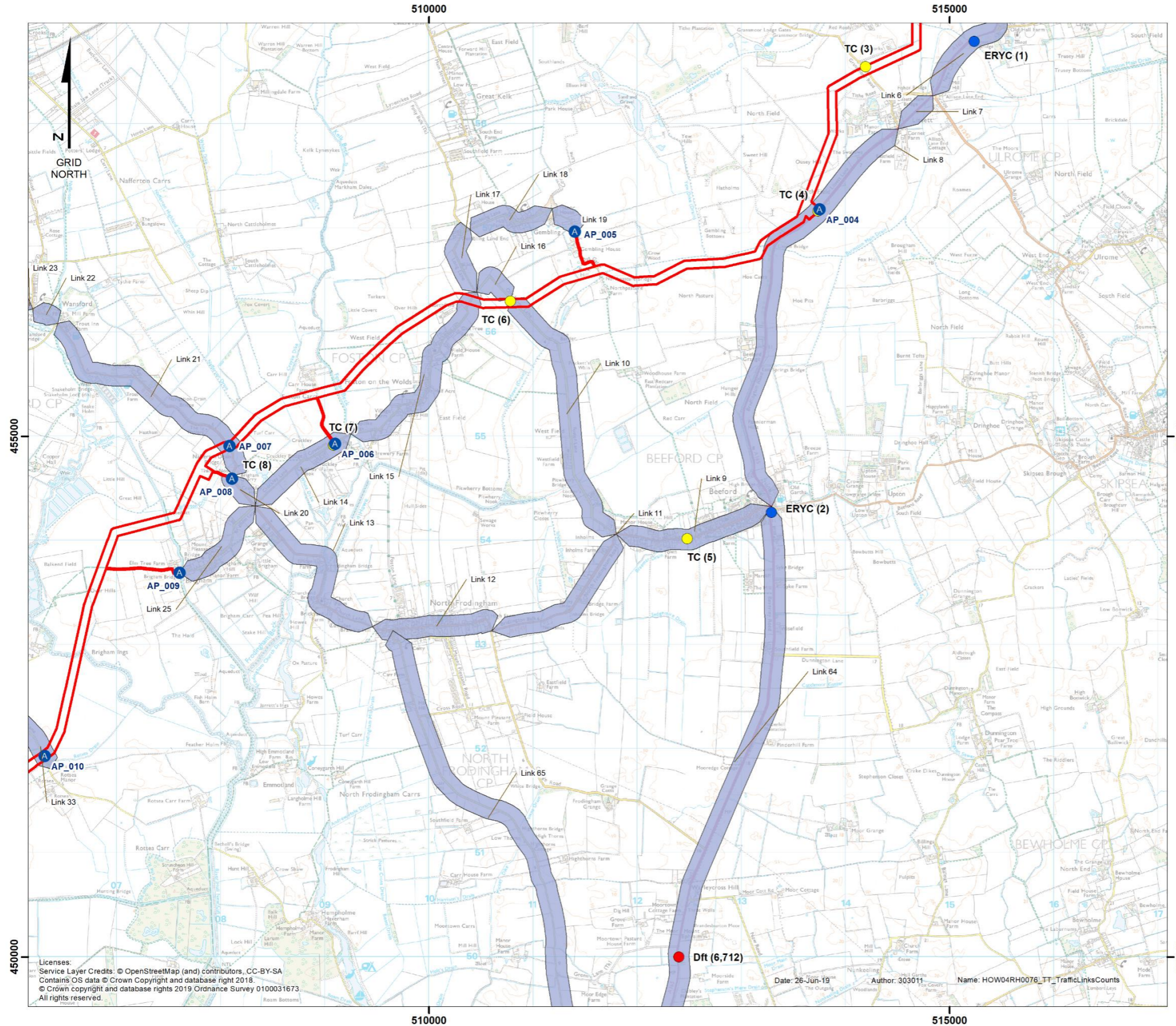
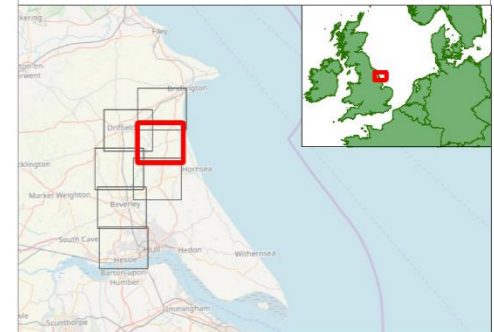


Figure 2: Traffic Links and Counts (Sheet 1 of 7) (not to scale).



Hornsea Four Traffic Links and Counts Sheet 2 of 7

- PEIR Boundary
- A Proposed Access Points
- Commissioned Traffic Counts (TC (XX))
- DfT Traffic Counts (DfT (XX))
- East Riding of Yorkshire Council Traffic Counts (ERYC (XX))
- Traffic Links



Coordinate system: British National Grid
 Scale@A3: 1:35,000
 0 0.25 0.5 1 Kilometres
 0 250 500 1,000 Yards

REV	REMARK	DATE
	First Issue	25-06-2019

Title: Traffic Links and Counts
 Document no: HOW04RH0076
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 Approved by: PS



Figure 3: Traffic Links and Counts (Sheet 2 of 7) (not to scale).

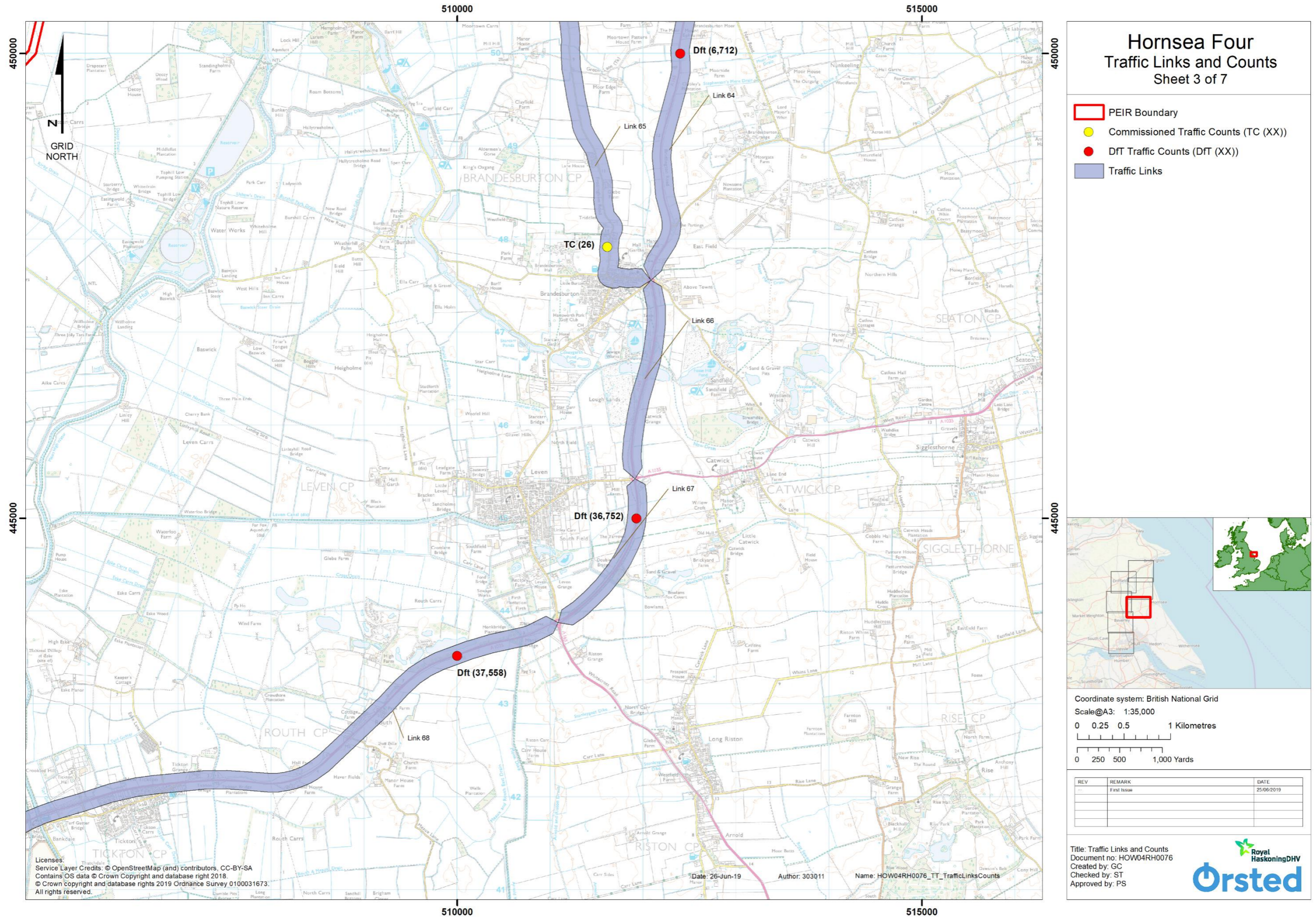


Figure 4: Traffic Links and Counts (Sheet 3 of 7) (not to scale).

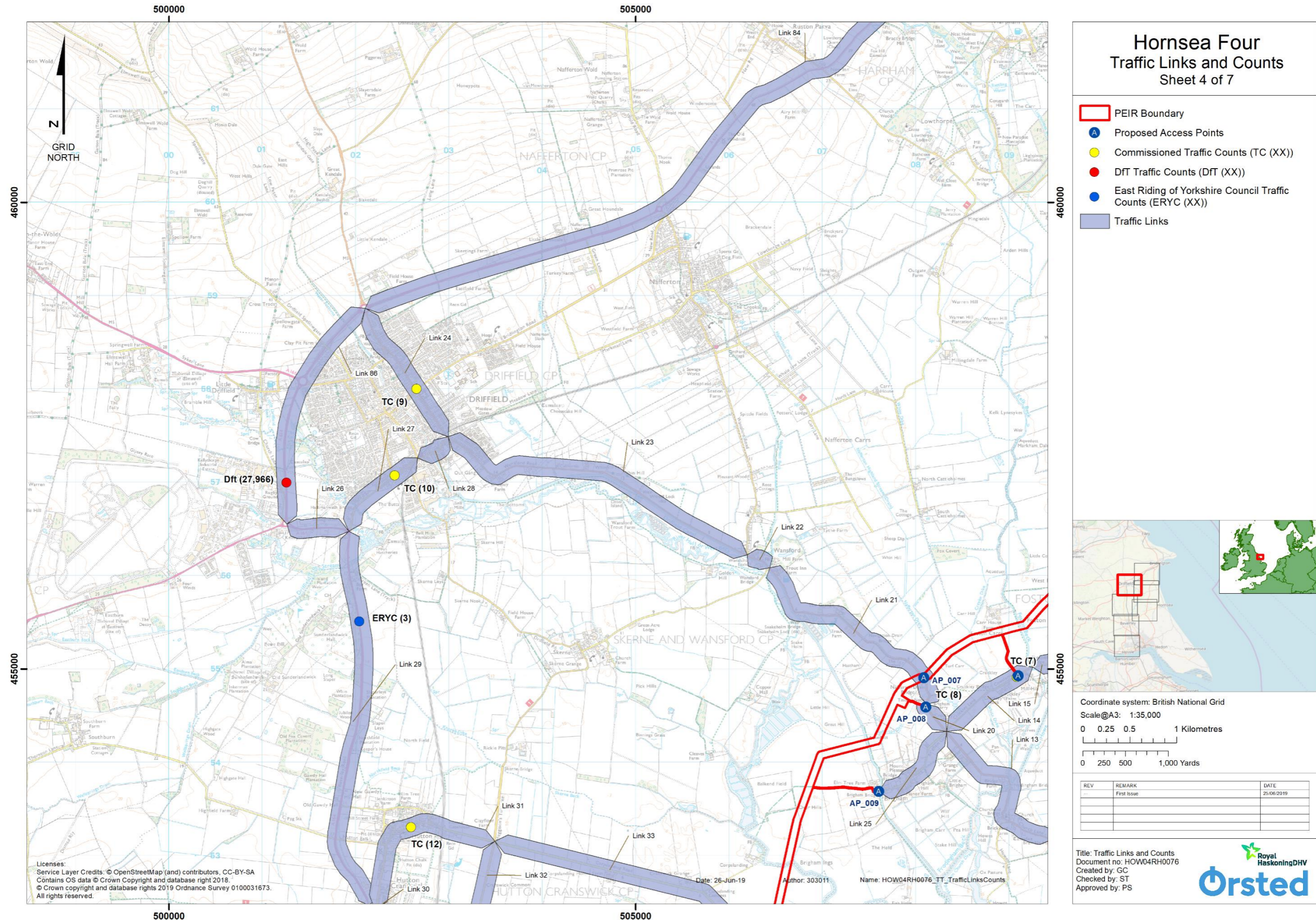


Figure 5: Traffic Links and Counts (Sheet 4 of 7) (not to scale).

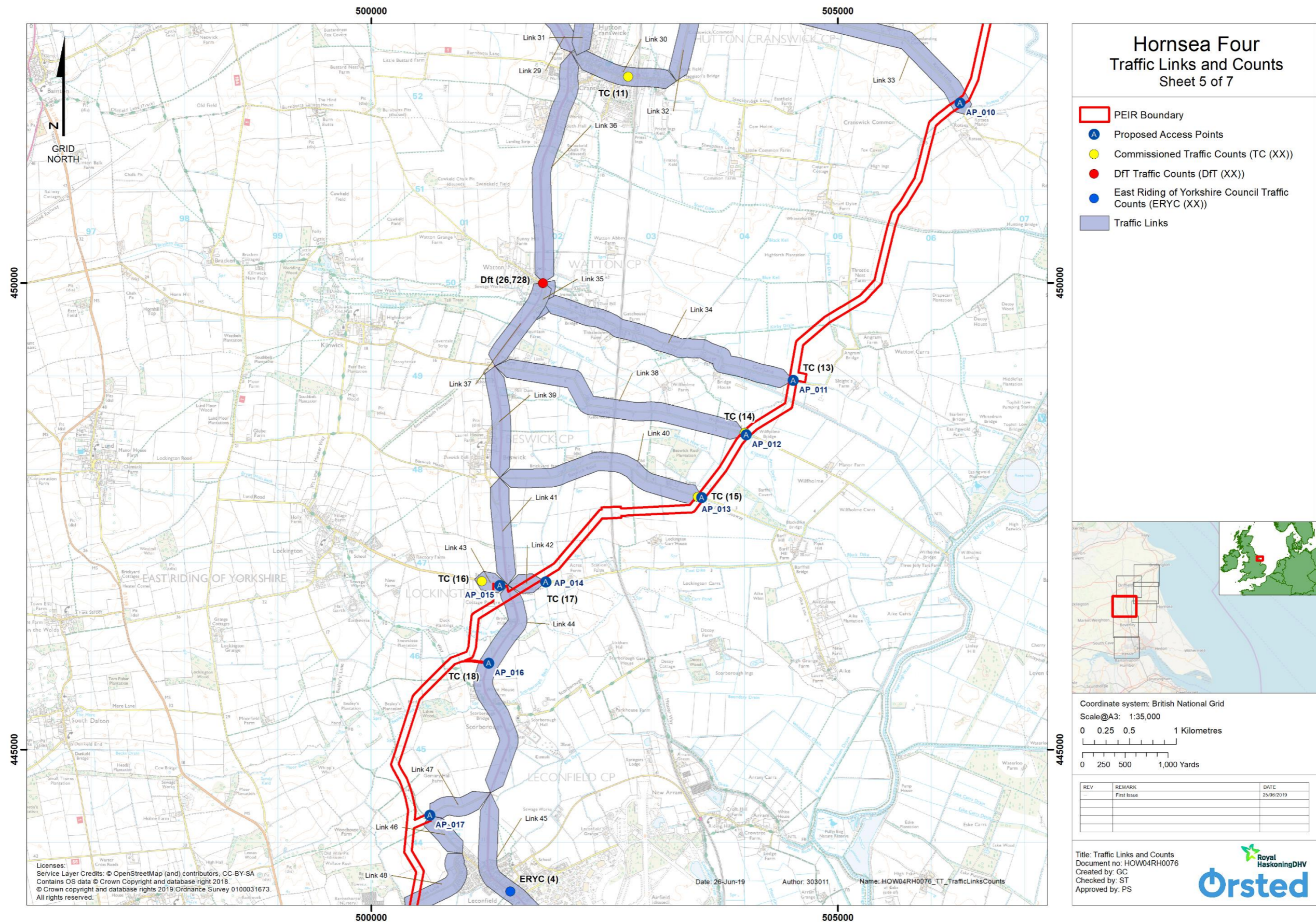
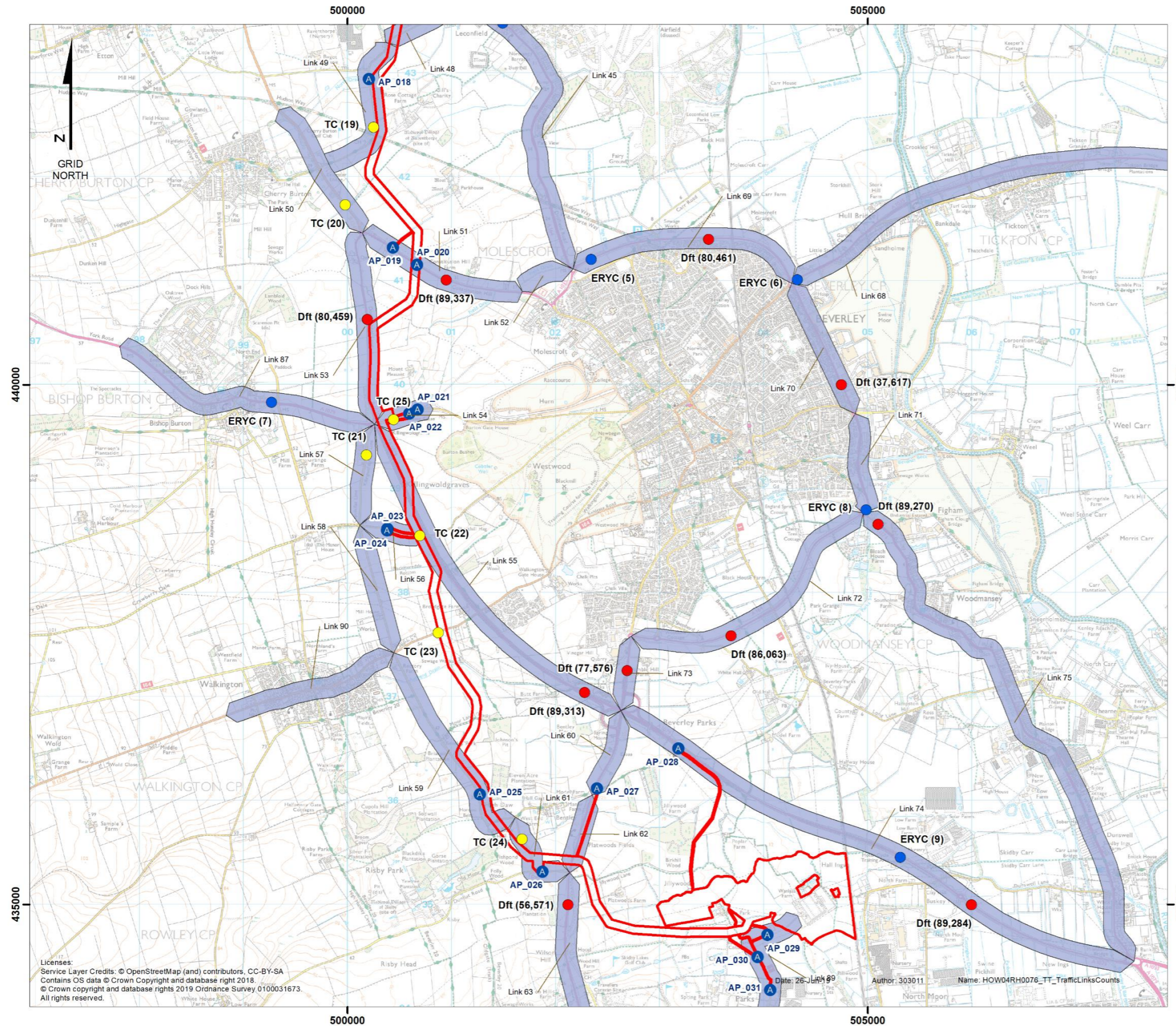


Figure 6: Traffic Links and Counts (Sheet 5 of 7) (not to scale).



Hornsea Four Traffic Links and Counts Sheet 6 of 7

- PEIR Boundary
- A Proposed Access Points
- Commissioned Traffic Counts (TC (XX))
- DfT Traffic Counts (DfT (XX))
- East Riding of Yorkshire Council Traffic Counts (ERYC (XX))
- Traffic Links

Coordinate system: British National Grid
 Scale@A3: 1:35,000
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Figure 7: Traffic Links and Counts (Sheet 6 of 7) (not to scale).

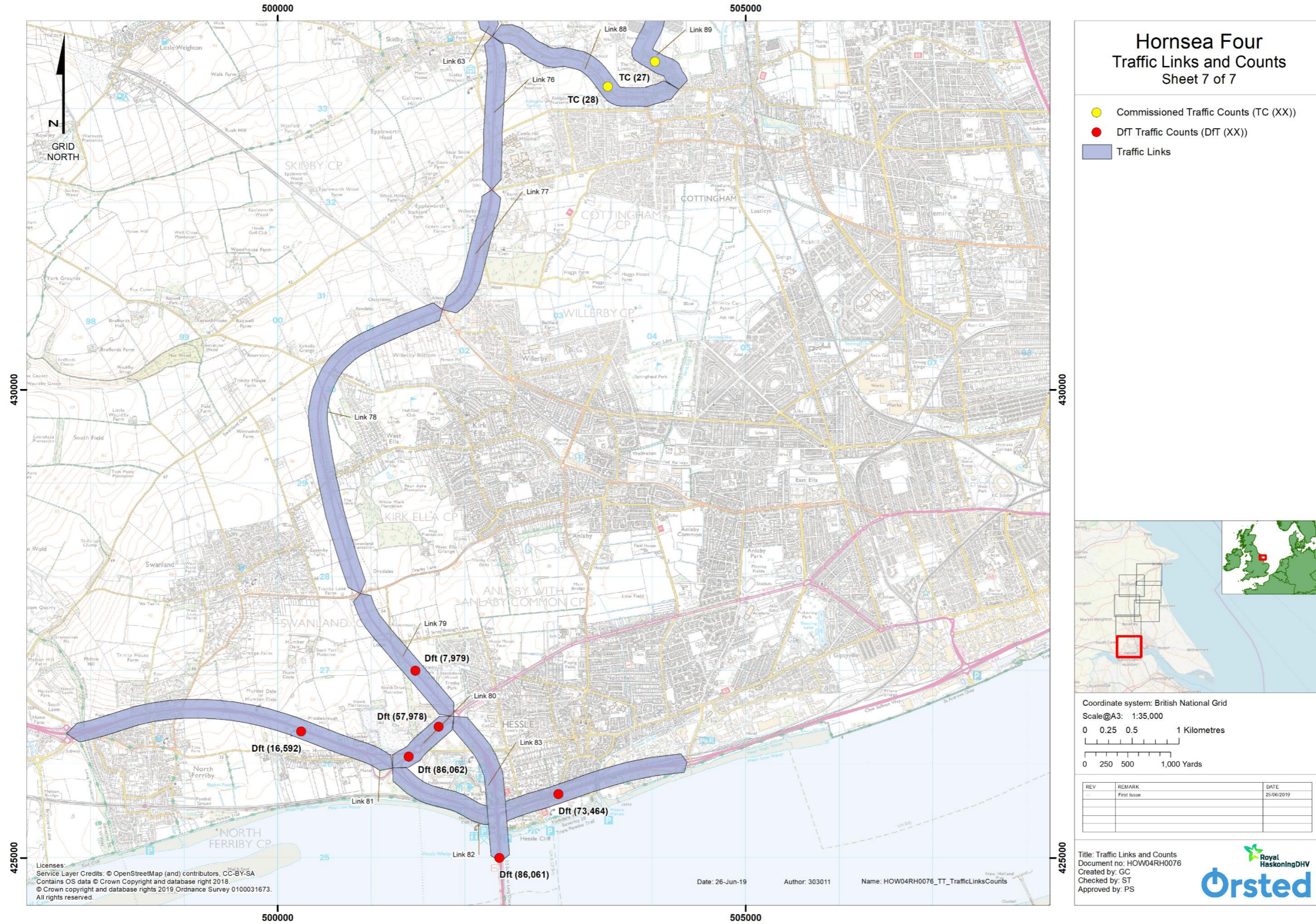


Figure 8: Traffic Links and Counts (Sheet 7 of 7) (not to scale).

2.3 Standardisation of Baseline Data

- 2.3.1.1 In total, 55 traffic counts have been acquired/ commissioned. It is considered that the counts provide a comprehensive coverage for all 90 links. Details of the count that will be used for each link are detailed within [Appendix A](#).
- 2.3.1.2 The traffic counts capture data over different durations, each dataset has been converted to a standard AADT/ AAWT with HGV classification. [Table 1](#) sets out available data for each dataset and the proposed methodology to convert data to a standard AADT/ AAWT with HGV classification.

Table 1: Available data for each dataset and proposed conversion methodology.

Data Source	Available Data	Conversion Methodology
DfT Counts	2017 AADT flows with full vehicle classification	No requirement to convert
ERYC Counts	2018 AADT and AAWT flows	HGV classification to be derived from averages of HGV flows taken from nearby DfT counts
Hornsea Four ATCs	2019 daily traffic flows, with full vehicle classification	March traffic flows to be converted to an annual average using factors derived from the ERYC counts

2.4 Future Year Traffic Flows

- 2.4.1.1 Having established a standard AADT/ AAWT (with HGV classification) for each link, it is necessary to factor background traffic from the respective survey years (2017, 2018 and 2019) to a future reference year. It is currently considered that the earliest date that construction could commence would be 2023; as such a reference year for background traffic of 2023 has been derived.
- 2.4.1.2 To take account of sub-regional growth in housing and employment, a proportionate approach to forecasting future traffic growth has been discussed and agreed with the ERYC. It has been agreed that the baseline 2017, 2018 and 2019 flows are factored to the future year baseline using TEMPro for the East Riding of Yorkshire Area and factoring the growth rate using the National Traffic Model Dataset AF15 all areas (a combination of urban and rural area types). Details of the growth factors that have been applied are provided within [Appendix B](#).

2.5 Summary of Baseline Traffic Flows

- 2.5.1.1 [Appendix C](#) provides a summary of the forecast AAWT and AADT traffic flows (including HGV composition) for each of the 90 links within the traffic and transport study area.

3 Trip Generation and Assignment

3.1 Introduction

- 3.1.1.1 To inform derivation and distribution of construction traffic demand, a realistic worst-case traffic demand scenario has been developed by examining:

- The likely minimum construction programme;

- Demand for materials and personnel;
- Likely mode share; and
- The assignment of traffic.

3.1.1.2 The assumptions that underpin the worst-case scenario are discussed below and have been developed with the input from the Applicant's engineering team and are augmented with experience gained through the construction of previous projects.

3.2 Material and Personnel Demand

3.2.1.1 The traffic generation that will inform the assessment of traffic and transport impacts will be derived and undertaken by way of a 'first principles' approach. The first principles approach generates traffic volumes from an understanding of material quantities and personnel numbers required for Hornsea Four and converts these metrics into vehicle movements.

3.2.1.2 [Appendix D](#) details the derivation of material movements that could be expected for each of the construction activities.

3.2.1.3 [Appendix E](#) details the expected quantity of materials, plant and personnel movements that could be expected for all onshore construction, and for each of the major construction activities. [Table 2](#) to [Table 4](#) provide 'snap shot' summaries of the peak daily material, plant and personnel movements per activity respectively. The 12 months 'snap shot' accounts for a worst-case period of the wider construction programme.

Table 2: Daily two-way HGV material movements per month.

Activity	0	1	2	3	4	5	6	7	8	9	10	11	12
1. Primary and Secondary Compounds	103	103	103	103									
2. Landfall HDD Compound		52	52										
3. Haul Road			95	95	95	95	95						
4. Backfill Material				26	26	26	26	26	26				
5. Tape / Tile				0.1	0.1	0.1	0.1	0.1	0.1				
6. Ducts				4	4	4	4	4	4				
7. Cables								2	2	2	2	2	2
8. HDD installation				38	38	38	38	38	38	38	38	38	38
9. Drainage Ducts			1	1	1	1	1						
10. Joint Bays								14	14				
11. Temporary access roads	26	26	26										
12. Onshore substation access road	18	18	18										
13. Onshore substation	12	15	15	15	15	100	100	100	100	100	25	25	25
Total monthly daily HGV movements	159	214	310	281	179	264	264	184	184	140	65	65	65
Total month daily HGV movements + 10% contingency	175	236	341	310	197	290	290	202	202	154	72	72	72
Total monthly daily two-way HGV movements	349	471	682	619	393	580	580	405	405	308	143	143	143

Key

	Months where traffic flows occur for discrete construction activities
	Peak traffic flows per activity

Table 3: Daily two-way HGV plant movements per month.

Activity	0	1	2	3	4	5	6	7	8	9	10	11	12
1. Primary, Secondary and Landfall Compounds	10	10											
2. Vegetation Removal	2												
3. Setting Out /Right of Way		2	2	2									
4. Drainage			2	2	2	2	2						
5. Top Soil Strip / Haul Road			6	6	6	6	6						
6. Trenching / Ducting				6	6	6	6	6	6				
8. Cable Installation										4	4	4	4
9. Joint Bays Excavate / Reinstale								4	4				
10. HDD				6	6	6	6	6	6	6	6	6	
11. Jointing											2	2	2
12. Post Construction Drainage													
13. Reinstatement													
14. Testing													
15. Contractor Management / Office													
Total monthly daily HGV movements	12	12	10	22	20	20	20	16	16	10	12	12	6
Total monthly daily two-way HGV movements	24	24	20	44	40	40	40	32	32	20	24	24	12

Key

	Months where traffic flows occur for discrete construction activities
	Peak traffic flows per activity

Table 4: Daily two-way personnel movements per month.

Activity	No. of teams	No. of persons per team	0	1	2	3	4	5	6	7	8	9	10	11	12
1. Primary, Secondary and Landfall Compounds	1	8	8	8											
2. Vegetation Removal	4	3	3												
3. Setting Out /Right of Way	3	8		8	8	8									
4. Drainage	1	8			8	8	8	8	8						
5. Top Soil Strip / Haul Road	1	8			8	8	8	8	8						
6. Trenching / Ducting	3	10				10	10	10	10	10	10				
8. Cable Installation	2	8										8	8	8	8
9. Joint Bays Excavate / Reinstate	3	6								6	6				
10. HDD	2	6				6	6	6	6	6	6	6	6	6	
11. Jointing	4	3											3	3	3
12. Post Construction Drainage	1	8													
13. Reinstatement	4	6													
14. Testing	1	4													
Total monthly daily LCV movements			11	16	24	40	32	32	32	22	22	14	17	17	11
Total monthly daily two-way LCV movements			22	32	48	80	64	64	64	44	44	28	34	34	22

- 3.2.1.4 It can be noted from **Table 2** to **Table 4** that the construction traffic demand fluctuates according to the intensity of activities that are occurring at any point in the programme and that overall the most intense period of construction activity would be during month two.
- 3.2.1.5 **Table 2** highlights that during month two there could be a combined peak of 310 HGV deliveries per day (640 two-way HGV movements). The worst case daily HGV movements have been also been increased further by 10% to account for incidental deliveries, resulting in a peak of 704 two-way HGV movements per day (i.e. 352 HGVs arrive and 352 depart).
- 3.2.1.6 The selection of this peak month however would not include a tolerance for 'real-time' programme changes (e.g. slippage/acceleration). Therefore, in order to take account of any potential acceleration or slippage of construction activities a theoretical worst case month has been derived by examining the potential for individual construction activities to move relative to each other (selecting orange highlighted cells in **Table 2** and **Table 3**). The use of a theoretical worst-case month results in a peak of 1,097 two-way HGV movements per day (compared to the peak 704 two-way HGV movements per day in month two).
- 3.2.1.7 **Table 4** identifies that each construction activity would be completed by 'teams', with the number of teams reflecting the intensity of activity required. For example, there would be a requirement for three teams of 10 personnel to undertake the trenching and ducting activities (30 persons). Similar to the approach adopted for HGVs in order to consider the potential for slippage/ acceleration, a theoretical worst-case demand for personnel movements has been selected (highlighted orange in **Table 4**). This approach results in a peak of 49 persons per day that could travel to each of the 31 points of access.
- 3.2.1.8 It can be calculated from **Table 4** that if all construction activities were to overlap there could be up to 184 persons working on the construction of Hornsea Four at a given time.
- 3.2.1.9 It is typical for construction projects that employees will travel to work together and in contractor provided vehicles. However, for the purposes of considering a worst-case no reduction for car-sharing has been applied.

3.3 Construction Traffic Assignment

- 3.3.1.1 At the time of Development Consent Order (DCO) submission, the supply chain for materials and workforce cannot be informed by early contractor involvement as the procurement process has not commenced. Therefore, for the purpose of the assessment, traffic distribution is based upon worst case assumptions HGVs distributions and refined socio economics data for employees.

3.3.2 HGV Assignment

- 3.3.2.1 For the purpose of a worst-case HGV assessment, it has been agreed with the ERYC (at the second Human and Environment Technical Panel on the 1 May 2019) that HGVs should be

distributed to the A164 and then east towards Hull on the A63 (100%) and west on the A63 towards the M62 (100%) to an origin/ destination outside the study area.

- 3.3.2.2 It has also been agreed with the ERYC (at the second Human and Environment Technical Panel on the 1 May 2019) that movements from any local suppliers (such as quarries) within the traffic and transport study area would be captured within the existing permissions and therefore do not need to be assessed.
- 3.3.2.3 To identify how the 1,097 two-way HGV movements would assign to the across the traffic and transport study area, the entire onshore construction footprint has been divided in to 29 sections based upon the maximum length of cable route that can be served by each of the 31 points of access, taking into account watercourse/ rail segregation, available access points and the number of HDD sites. The proposed access locations are depicted graphically in [Figure 9](#), whilst the assignment of the 1,097 two-way HGV movements to these accesses is detailed within [Appendix F](#).
- 3.3.2.4 The distribution of the HGVs from each of these 31 accesses on to the wider highway network towards the A63 via the A164 is detailed within [Appendix G](#).

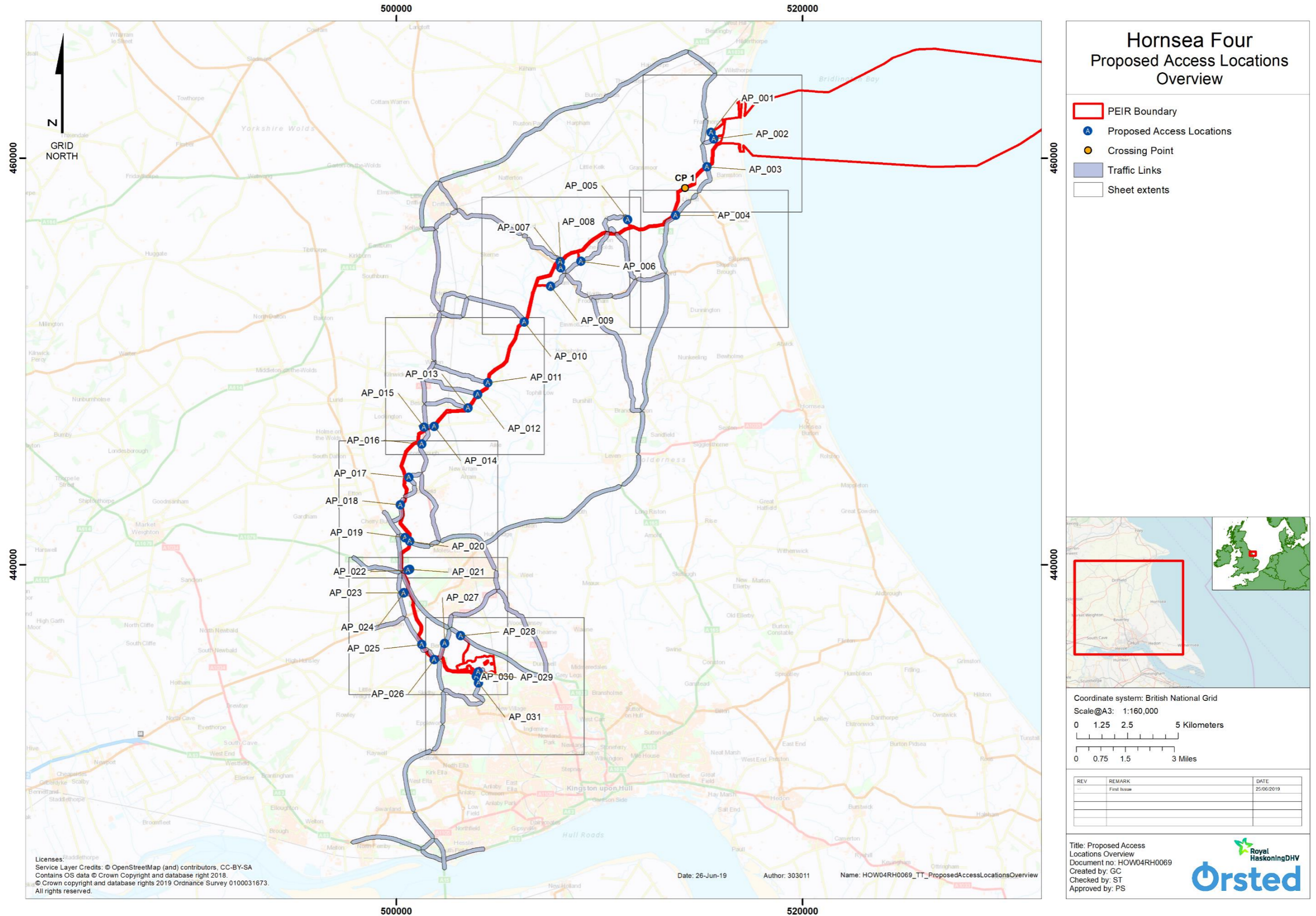


Figure 9: Proposed Access Locations (not to scale).

3.3.3 LCV Assignment

- 3.3.3.1 To inform the potential distribution of construction employees, the availability of local labour and rented accommodation has been reviewed.
- 3.3.3.2 The types of specialist skills required for projects such Hornsea Four means that construction personnel often have to be drawn from across the country and not necessarily from local labour sources. The socio-economic consultant for Hornsea Four (Hatch Regeneris) has estimated that 70% of the workforce would be drawn from the local area (known as 'resident' labour). The remaining (30%) of the workforce would be beyond a daily commute (known as 'in-migrant' labour).
- 3.3.3.3 Those personnel who are not local (in-migrant labour) i.e. beyond a reasonable daily commute (up to a 45-minute drive from Beverley) are likely to base themselves within temporary local accommodation. To inform the distribution of in-migrant labour the availability of local hotel bed spaces within a 45-minute commute of the proposed Hornsea Four project has been captured.
- 3.3.3.4 **Table 5** provides a summary of likely distribution, point of entry into the traffic and transport study area and origin for in-migrant labour. The distribution set out in **Table 5** includes for 'distance decay' i.e. those areas closest to Beverley are likely to be most attractive, even though areas further away may have a greater provision of accommodation.
- 3.3.3.5 The distance decay approach divides the number of bed spaces by the journey time (taken from a route planner) from the centre of the postcode cluster to Beverley. Further details of the distribution of local hotel bed spaces and the application of distance decay are provided within **Appendix H**.

Table 5: Distribution of in-migrant labour.

Point of entry to onshore highway study area	% distribution (in-migrants)	Incorporating the areas of:
Link 63, A164, A164 south of Beverley	5.2%	Cottingham
Link 68 or 67, A1035 north of Beverley	1.2%	Hull
Link 74, A1079 north of Hull	44.2%	Hull
Link 77, A164/ B1232 west of Hull	0.3%	Hessle
Link 83, A15 via the Humber Bridge	0.6%	Barton-upon-Humber, Ulceby
Link 84, A164/ Moor Lane south of Bridlington	1.6%	Bridlington
Link 86, A614 west of Driffield	3.5%	Driffield
Link 87, A1079 west of Beverley	4.0%	Shiptonthorpe, Pocklington, York
Link 90, B1130 west of Beverley	11.1%	Cottingham, Brough, North Ferriby
Beverley, multiple point of access	28.2%	Beverley

- 3.3.3.6 To inform the distribution of the 70% of employees who could potentially be drawn from the local area (resident workers), the distribution of residents within the local area (a 90-minute drive of Beverley) with the relevant skill sets has been examined. The number of

residents working in the construction sector per postcode within the region has been informed by Table LC6602EW (Industry by economic activity) derived from the 2011 Census (ONS,2019).

3.3.3.7 **Table 6** provides a summary of likely distribution, point of entry onto the traffic and transport study area and origin for resident workers. Similar to the distribution of in-migrants, the distribution of resident workers set out in **Table 6** includes for distance decay.

3.3.3.8 Further detail of the distribution of resident workers is provided within **Appendix I**.

Table 6: Distribution of resident workers.

Point of entry to onshore highway study area	% distribution (residents)	Incorporating the areas of
Link 77, A164/ B1232 west of Hull	3.3%	Hull
Link 78, A164/ B1231 west of Hull	0.2%	North Ferriby, Swanland
Link 79, A164/ A1105 south west of Hull	0.5%	Hull
Link 83, A15 via the Humber Bridge	16.1%	Scunthorpe, Barton-upon-Humber, Barrow-upon-Humber, Brigg, Gainsborough, Grimsby, Humberston, Cleethorpes, Barnetby, Immingham, Doncaster, Lincoln, Woodhall Spa, Louth, Market Rasen, Horncastle, Sleaford
Link 87, A1079 west of Beverley	11.2%	Goole, Harrogate, Leeds, Wetherby, York
Link 90, B1230 south west of Beverley	35.6%	Bradford, Cleckheaton, Scunthorpe, Doncaster, Huddersfield, Harrogate, Brough, Leeds, Newark, Sheffield, Chesterfield, Rotherham, Barnsley, Worksop, Dewsbury, Liversedge, Heckmondwike, Normanton, Pontefract
Link 67 or 67, A165 south of Leven	8.5%	Hull, Hornsea
Link 74 or 75, A1079 north of Hull	3.0%	Hull
Link 77 or 78, A164/ B1232 west of Hull	0.5%	Hull
Link 84 or 85, A164/ Moor Lane south of Bridlington	3.9%	Bridlington, Scarborough, Driffield, Filey
Link 87 or 90, A1079 or B1230 west of Beverley	9.9%	Ripon, Knaresborough, Leeds, Mirfield, Batley, Wakefield, Castleford, Knottingley, Ossett, Pontefract,
Beverley, multiple points of access	7.3%	Beverley

3.3.3.9 **Section 3.2** identifies that the number of personnel travelling to each of the 31 accesses would be 49, and assuming a worst case of no car-sharing or use of other sustainable modes of transport (walking, cycling, bus, etc.) there could be 98 two-way LCV movements to each access.

3.3.3.10 It not possible at this stage to confirm how the construction works would be sequenced. Therefore, to inform a worst-case assessment of impacts on the local highway network, all 49 employees have been assigned to each access at the same time (98 two-way LCV

movements per day). However, in order to ensure that the impacts are realistic on the main 'A' roads (where all the access traffic collects), all LCV movements have been capped at 368 two-way LCV movements per day, i.e. the peak number of daily employee movements for the whole of Hornsea Four. The detailed distribution of LCV movements to the highway network is provided as [Appendix J](#).

3.4 Trip Generation and Assignment Summary

3.4.1.1 [Appendix K](#) provides a summary of the forecast worst case peak daily HGV and LCV movements on each of the 90 links within the traffic and transport study area.

4 Access Strategy

4.1.1.1 During the construction phase there would be a requirement for Hornsea Four traffic to access the existing public highway. It is proposed that in total there could be up to 31 points of access.

4.1.1.2 In addition to the 31 points of access, to reduce the impact of construction traffic on the community of Leven, it is also proposed that the haul road would cross the highway at Gransmoor Road rather than taking direct access. The location of these accesses and crossings is depicted on [Figure 9](#).

4.1.1.3 It has been agreed with the ERYC (at the second Human and Environment Technical Panel on the 1 May 2019) that rather than developing bespoke access and crossing designs for each of the accesses, that at this stage it would be reasonable and proportionate to include a series of outline access concepts appropriate to the range of road types within the traffic and transport study area. The four access design concepts include:

- **Type A access:** a fully standard compliant, Design Manual for Roads and Bridges (DMRB) major/ minor road junction. Intended for use on A and major B roads;
- **Type B and C access:** a reduced footprint access suitable for small B roads, minor and unclassified roads;
- **Type D access:** to facilitate the haul road crossing the public highway only. Currently only proposed for the Gransmoor Road west of Lissett; and
- **Type E access:** access from the existing layby on the A1079 to the Onshore substation and National Grid Electricity Transmission substation.

4.1.1.4 Outline access designs for these four access types are provided within [Appendix L](#). As the project design matures, the requirement for works proximal to the highway will be ascertain via consultation with ERYC and Highways England. Any design changes are anticipated to be minor in nature and shall not materially alter the assessment presented at PEIR. All design updates will be assessed as part of the EIA and presented in the ES at application.

4.1.1.5 The visibility splay requirements for each access and crossing would be determined based upon measured speeds and provided in accordance with the requirements of the DMRB. Where the visibility splay requirements could not be fully achieved or may have significant

adverse environmental impacts (e.g. extensive tree/ hedgerow removal) a reduction in the visibility requirement (through temporary speed limit reductions) would be discussed and agreed with the ERYC.

5 References

Department for Transport (DfT) (January 1995). Design Manual for Roads and Bridges, Geometric Design of Major/Minor Priority Junctions (TD42/95). (DfT)

Department for Transport (DfT) (2009). Traffic Signs Manual Chapter 8: Traffic Safety Measures and Signs for Road Works and Temporary Situations. 2nd ed: (DfT)

Institute of Environmental Assessment (IEA) (1993). Guidelines for the Environmental Assessment of Road Traffic, Horncastle: (IEA).

Office for National Statistics (ONS), 2011 Census: Industry by Economic Activity (United Kingdom). UK Data Service Census Support. Downloaded from:
<https://www.nomisweb.co.uk/census/2011/lc6602ew>

Appendix A

List of Traffic Counts Used for Each Link

Link Details

Link	Survey Type	Survey Year	Month	Traffic Count Reference	Road
1	Commissioned ATC	2019	March	TC (2)	A165 from Moor Ln to Fraisthorpe
2	Commissioned ATC	2019	March	TC (1)	Unnamed Road running south of Fraisthorpe
3	Commissioned ATC	2019	March	TC (1)	Unnamed Road from its junction with A165 south of Fraisthorpe
4	Commissioned ATC	2019	March	TC (2)	A165 to the west of Fraisthorpe
5	Commissioned ATC	2019	March	TC (2)	A165 south of Fraisthorpe
6	ERYC TC	2018	N/A	ERYC (1)	A165 west of Barmston
7	Commissioned ATC	2019	March	TC (4)	A165 east of Lissett
8	Commissioned ATC	2019	March	TC (4)	A165 south of Lissett to Beeford
9	Commissioned ATC	2019	March	TC (5)	B1249 through Beeford
10	Commissioned ATC	2019	March	TC (6)	Foston Lane / Old Howe Lane
11	Commissioned ATC	2019	March	TC (8)	B1249 between Beeford and North Frodingham
12	Commissioned ATC	2019	March	TC (8)	B1249 through North Frodingham
13	Commissioned ATC	2019	March	TC (8)	B1249 Church Lane
14	Commissioned ATC	2019	March	TC (7)	Cruckley Lane / Cowslam Lane
15	Commissioned ATC	2019	March	TC (7)	Sheepdike Lane through Foston on the Wolds
16	Commissioned ATC	2019	March	TC (6)	Old Howe Lane
17	Commissioned ATC	2019	March	TC (6)	Long Lane
18	Commissioned ATC	2019	March	TC (6)	Gambling Lane
19	Commissioned ATC	2019	March	TC (6)	Out Gates
20	Commissioned ATC	2019	March	TC (8)	B1249 north of Brigham Lane
21	Commissioned ATC	2019	March	TC (8)	B1249 south of Wansford
22	Commissioned ATC	2019	March	TC (8)	B1249 through Wansford
23	Commissioned ATC	2019	March	TC (9)	B1249 Wansford to Driffield
24	Commissioned ATC	2019	March	TC (9)	B1249 Wansford Road / Scarborough Road
25	Commissioned ATC	2019	March	TC (7)	Brigham Lane
26	ERYC TC	2018	N/A	ERYC (3)	A164 south of Driffield
27	Commissioned ATC	2019	March	TC (10)	Beverley Road from A164 to River Head
28	Commissioned ATC	2019	March	TC (10)	Anderson Street / River Head
29	ERYC TC	2018	N/A	ERYC (3)	A164 between Driffield and Hutton Cranswick
30	Commissioned ATC	2019	March	TC (11)	Station Road / Main Street through Hutton Cranswick
31	Commissioned ATC	2019	March	TC (12)	Corpslanding Road / Howl Lane / Church Street / Hutton Road
32	Commissioned ATC	2019	March	TC (11)	Maeggison's Turnpike
33	Commissioned ATC	2019	March	TC (12)	Corpslanding Road / Rotsea Lane
34	Commissioned ATC	2019	March	TC (13)	Carr Lane / Church Lane east of Watton
35	Commissioned ATC	2019	March	TC (13)	Church Lane east of Watton
36	Dft	2017	N/A	DFT (26728)	A164, Hutton Cranswick to Watton
37	Dft	2017	N/A	DFT (26728)	A614, Watton to Wilfholme Road
38	Commissioned ATC	2019	March	TC (14)	Wilfholme Road
39	Commissioned ATC	2019	March	TC (18)	A164, Wilfholme Road to Beswick
40	Commissioned ATC	2019	March	TC (15)	Beswick Road / Barhill Causeway
41	Commissioned ATC	2019	March	TC (18)	A164, Beswick Road to Station Road
42	Commissioned ATC	2019	March	TC (17)	Station Road east of A164
43	Commissioned ATC	2019	March	TC (16)	Station Road west of A164
44	Commissioned ATC	2019	March	TC (18)	A164 south of Station Road
45	ERYC TC	2018	N/A	ERYC (4)	A164 north of Leconfield
46	Commissioned ATC	2019	March	TC (19)	Old Road west of Leconfield
47	Commissioned ATC	2019	March	TC (19)	Unnamed Road west of junction with A164 to Old Road
48	Commissioned ATC	2019	March	TC (19)	Miles Lane west of Leconfield
49	Commissioned ATC	2019	March	TC (19)	Miles Lane east of B1248
50	Commissioned ATC	2019	March	TC (20)	B1248 north of the A1035
51	Dft	2017	N/A	DFT (89337)	A1035 Constitution Hill
52	Dft	2017	N/A	DFT (89337)	Beverley Northern Bypass
53	Dft	2017	N/A	DFT (80459)	A1035 Dog Kennel Lane
54	Commissioned ATC	2019	March	TC (25)	A1174 east of the A1035
55	Dft	2017	N/A	DFT (89313)	A1079, A1174 and A164
56	Commissioned ATC	2019	March	TC (22)	Newbald Road
57	Commissioned ATC	2019	March	TC (21)	Killingwoldgraves Lane / Copleflat Lane
58	Commissioned ATC	2019	March	TC (21)	Copleflat Lane south of Newbald Road
59	Commissioned ATC	2019	March	TC (21)	Copleflat Lane south of Walkington
60	Dft	2017	N/A	DFT (56571)	A164 south of A1079
61	Commissioned ATC	2019	March	TC (24)	Unnamed Road south of Copleflat Lane to junction with A164
62	Dft	2017	N/A	DFT (56571)	A164 south of Copleflat Lane
63	Dft	2017	N/A	DFT (56571)	A164 north of Skidby
64	ERYC TC	2018	N/A	ERYC (2)	A165 Beeford to Brandesburton
65	Commissioned ATC	2019	March	TC (26)	Main Street / Frodingham Road, Brandesburton to North Frodingham
66	Dft	2017	N/A	DFT (36752)	A165, Brandesburton to Leven
67	Dft	2017	N/A	DFT (36752)	A165, B1244 to A1035
68	ERYC TC	2018	N/A	ERYC (6)	A1035, A165 to A1174
69	ERYC TC	2018	N/A	ERYC (5)	A1035 Grange Way, north of Beverley
70	Dft	2017	N/A	DFT (37617)	A1174 Swinemoor Lane
71	ERYC TC	2018	N/A	ERYC (8)	A1174 Hull Road
72	Dft	2017	N/A	DFT (86063)	A164 Minster Way
73	Dft	2017	N/A	DFT (77576)	A164, Minster Way to A1079
74	ERYC TC	2018	N/A	ERYC (9)	A1079, A164 to A1033
75	Dft	2017	N/A	DFT (89270)	A1174 Beverly Road / Hull Road
76	Dft	2017	N/A	DFT (56571)	A164, B1233 to Castle Road
77	Dft	2017	N/A	DFT (56571)	A164, Castle Road to B1232
78	Dft	2017	N/A	DFT (7979)	A164 south of B1232
79	Dft	2017	N/A	DFT (7979)	A164 south of B1231
80	Dft	2017	N/A	DFT (57978)	A15 Boothferry Road
81	Dft	2017	N/A	DFT (16592)	A63 west of A15
82	Dft	2017	N/A	DFT (73464)	A63 Clive Sullivan Way
83	Dft	2017	N/A	DFT (86061)	A15 Humber Bridge
84	Dft	2017	N/A	DFT (81498)	A614 north of Driffield
85	Dft	2017	N/A	DFT (81502)	Bridlington Bay Road, A614 to A165
86	Dft	2017	N/A	DFT (27966)	A614 east of Driffield
87	ERYC TC	2018	N/A	ERYC (7)	A1079 through Bishop Burton
88	Commissioned ATC	2019	March	TC (28)	B1233 Harland Way / Northgate
89	Commissioned ATC	2019	March	TC (27)	Park Lane
90	Commissioned ATC	2019	March	TC (21)	B1230 through Walkington

Appendix B

Future Year Growth Factors

TEMPro Growth Factors (Vehicles)	AADT	AAWT
2017 – 2018	1.0138	1.0138
2018 – 2017	0.9864	0.9864
2018 – 2019	1.0136	1.0136
2019 – 2018	0.9866	0.9866
2019 – 2023	1.0568	1.0566
2019 – 2026	1.0959	1.0952

Note:

Used – car driver only, East Riding of Yorkshire region only, NTEM urban trunk road dataset af15

Appendix C

Summary of 2023 Background Traffic Flows

Link Details

Link	Road
1	A165 from Moor Ln to Fraisthorpe
2	Unnamed Road running south of Fraisthorpe
3	Unnamed Road from its junction with A165 south of Fraisthorpe
4	A165 to the west of Fraisthorpe
5	A165 south of Fraisthorpe
6	A165 west of Barmston
7	A165 east of Lissett
8	A165 south of Lissett to Beeford
9	B1249 through Beeford
10	Foston Lane / Old Howe Lane
11	B1249 between Beeford and North Frodingham
12	B1249 through North Frodingham
13	B1249 Church Lane
14	Cruckley Lane / Cowslam Lane
15	Sheepdike Lane through Foston on the Wolds
16	Old Howe Lane
17	Long Lane
18	Gambling Lane
19	Out Gates
20	B1249 north of Brigham Lane
21	B1249 south of Wansford
22	B1249 through Wansford
23	B1249 Wansford to Driffield
24	B1249 Wansford Road / Scarborough Road
25	Brigham Lane
26	A164 south of Driffield
27	Beverley Road from A164 to River Head
28	Anderson Street / River Head
29	A164 between Driffield and Hutton Cranswick
30	Station Road / Main Street through Hutton Cranswick
31	Corpstanding Road / Howl Lane / Church Street / Hutton Road
32	Maeggison's Turnpike
33	Corpstanding Road / Rotsea Lane
34	Carr Lane / Church Lane east of Watton
35	Church Lane east of Watton
36	A164, Hutton Cranswick to Watton
37	A614, Watton to Wilholme Road
38	Wilholme Road
39	A164, Wilholme Road to Beswick
40	Beswick Road / Barfhill Causeway
41	A164, Beswick Road to Station Road
42	Station Road east of A164
43	Station Road west of A164
44	A164 south of Station Road
45	A164 north of Leconfield
46	Old Road west of Leconfield
47	Unnamed Road west of junction with A164 to Old Road
48	Miles Lane west of Leconfield
49	Miles Lane east of B1248
50	B1248 north of the A1035
51	A1035 Constitution Hill
52	Beverley Northern Bypass
53	A1035 Dog Kennel Lane
54	A1174 east of the A1035
55	A1079, A1174 and A164
56	Newbald Road
57	Killingwoldgraves Lane / Copleflat Lane
58	Copleflat Lane south of Newbald Road
59	Copleflat Lane south of Walkington
60	A164 south of A1079
61	Unnamed Road south of Copleflat Lane to junction with A164
62	A164 south of Copleflat Lane
63	A164 north of Skidby
64	A165 Beeford to Brandesburton
65	Main Street / Froddingham Road, Brandesburton to North Frodingham
66	A165, Brandesburton to Leven
67	A165, B1244 to A1035
68	A1035, A165 to A1174
69	A1035 Grange Way, north of Beverley
70	A1174 Swinemoor Lane
71	A1174 Hull Road
72	A164 Minster Way
73	A164, Minster Way to A1079
74	A1079, A164 to A1033
75	A1174 Beverly Road / Hull Road
76	A164, B1233 to Castle Road
77	A164, Castle Road to B1232
78	A164 south of B1232
79	A164 south of B1231
80	A15 Boothferry Road
81	A63 west of A15
82	A63 Clive Sullivan Way
83	A15 Humber Bridge
84	A614 north of Driffield
85	Bridlington Bay Road, A614 to A165
86	A614 east of Driffield
87	A1079 through Bishop Burton
88	B1233 Harland Way / Northgate
89	Park Lane
90	B1230 through Walkington

2023 Factored Base Flows

Base 24HR AADT			Base 18HR AAWT		
Total Veh	HGVs*	HGV%	Total Veh	HGVs*	HGV %
12,329	231	1.9%	12,136	298	2.5%
667	3	0.5%	501	3	0.7%
667	3	0.5%	501	3	0.7%
12,329	231	1.9%	12,136	298	2.5%
12,329	231	1.9%	12,136	298	2.5%
11,483	446	3.9%	11,446	444	3.9%
9,522	238	2.5%	9,725	308	3.2%
9,522	238	2.5%	9,725	308	3.2%
2,397	46	1.9%	2,555	53	2.1%
295	7	2.3%	316	9	2.9%
4,072	66	1.6%	4,384	82	1.9%
4,072	66	1.6%	4,384	82	1.9%
4,072	66	1.6%	4,384	82	1.9%
509	7	1.3%	547	8	1.4%
509	7	1.3%	547	8	1.4%
295	7	2.3%	316	9	2.9%
295	7	2.3%	316	9	2.9%
295	7	2.3%	316	9	2.9%
295	7	2.3%	316	9	2.9%
4,072	66	1.6%	4,384	82	1.9%
4,072	66	1.6%	4,384	82	1.9%
4,072	66	1.6%	4,384	82	1.9%
5,309	74	1.4%	5,832	92	1.6%
5,309	74	1.4%	5,832	92	1.6%
509	7	1.3%	547	8	1.4%
10,236	497	4.9%	11,087	539	4.9%
10,571	170	1.6%	11,384	206	1.8%
10,571	170	1.6%	11,384	206	1.8%
10,236	497	4.9%	11,087	539	4.9%
2,312	30	1.3%	2,498	35	1.4%
522	8	1.5%	555	8	1.4%
2,312	30	1.3%	2,498	35	1.4%
522	8	1.5%	555	8	1.4%
259	13	5.2%	308	18	5.9%
259	13	5.2%	308	18	5.9%
10,371	504	4.9%	11,234	546	4.9%
10,371	504	4.9%	11,234	546	4.9%
73	0	0.0%	80	0	0.0%
9,240	186	2.0%	10,205	251	2.5%
37	0	0.0%	37	0	0.0%
9,240	186	2.0%	10,205	251	2.5%
284	8	2.8%	313	9	2.9%
607	3	0.6%	677	5	0.7%
9,240	186	2.0%	10,205	251	2.5%
7,869	382	4.9%	8,438	410	4.9%
3,724	17	0.5%	3,936	19	0.5%
3,724	17	0.5%	3,936	19	0.5%
3,724	17	0.5%	3,936	19	0.5%
12,498	234	1.9%	13,735	310	2.3%
10,862	1,018	9.4%	11,741	1,100	9.4%
10,862	1,018	9.4%	11,741	1,100	9.4%
15,226	1,000	6.6%	16,462	1,081	6.6%
6,150	48	0.8%	6,586	58	0.9%
21,091	1,222	5.8%	22,803	1,321	5.8%
1,638	2	0.1%	1,750	1	0.1%
3,011	55	1.8%	3,291	75	2.3%
3,011	55	1.8%	3,291	75	2.3%
3,011	55	1.8%	3,291	75	2.3%
33,898	1,349	4.0%	36,649	1,458	4.0%
2,234	19	0.9%	2,513	25	1.0%
33,898	1,349	4.0%	36,649	1,458	4.0%
33,898	1,349	4.0%	35,220	1,401	4.0%
9,408	599	6.4%	9,519	607	6.4%
1,936	16	0.8%	2,098	18	0.9%
18,178	1,090	6.0%	19,147	1,148	6.0%
18,178	1,090	6.0%	19,147	1,148	6.0%
21,459	1,287	6.0%	22,295	1,337	6.0%
12,136	1,137	9.4%	13,118	1,229	9.4%
16,982	877	5.2%	17,887	924	5.2%
15,338	793	5.2%	16,156	835	5.2%
10,357	496	4.8%	10,761	516	4.8%
22,712	904	4.0%	24,555	977	4.0%
19,883	1,107	5.6%	21,496	1,197	5.6%
15,923	858	5.4%	16,772	904	5.4%
33,898	1,349	4.0%	36,649	1,458	4.0%
33,898	1,349	4.0%	36,649	1,458	4.0%
18,005	964	5.4%	19,466	1,043	5.4%
18,005	964	5.4%	19,466	1,043	5.4%
28,258	2,242	7.9%	30,551	2,424	7.9%
52,553	6,814	13.0%	56,817	7,367	13.0%
67,221	7,039	10.5%	72,675	7,610	10.5%
24,578	1,815	7.4%	26,573	1,962	7.4%
11,331	593	5.2%	12,274	642	5.2%
9,197	813	8.8%	9,167	811	8.8%
12,289	928	7.6%	13,311	1,006	7.6%
10,897	716	6.6%	11,681	767	6.6%
11,703	128	1.1%	12,932	151	1.2%
1,220	21	1.7%	1,254	24	1.9%
3,011	55	1.8%	3,291	75	2.3%

Appendix D

Derivation of Construction Material Quantities and Associated HGV Demand

Derivation of HGV deliverers

1. Logistics Compound	
No. of Compounds	8
Length (m)	140
Width (m)	140
Depth (m)	0.5
Volume (m ³)	78400
Tonnes (assume density of 2.2tonnes per cubic meter)	172480
HGV payload (tonnes)	20
Total HGV deliveries	8624
Duration of deliveries, months	4
Monthly HGV deliveries	2156
2. Landfall HDD Compound	
No. of Compounds	1
Length (m)	200
Width (m)	200
Depth (m)	0.5
Volume (m ³)	20000
Tonnes (assume density of 2.2tonnes per cubic meter)	44000
HGV payload (tonnes)	20
Total HGV deliveries	2200
Duration of deliveries, months	2
Monthly HGV deliveries	1100
3. Haul Road	
No. of Haul Roads	1
Length (m)	37000
Width (m)	6
Depth (m)	0.5
Volume (m ³)	111000
Tonnes (assume density of 1.8tonnes per cubic meter)	199800
HGV payload (tonnes)	20
Total HGV deliveries	9990
Duration of deliveries, months	5
Monthly HGV deliveries	1998
4. Backfill Material	
Route Length (m)	40000
HDD Route Length (m)	8840
Total Length (m)	31160
Trench Volume 0.5m ³ / m	0.5
Duct Space (m ³)	0.05
Total Volume of Backfill (m ³)	0.45
No. of Circuits	6
Total Volume (m ³)	84132
Tonnes (assume density of 1.53tonnes per cubic meter)	1.53
Total Tonnes	128722
HGV payload (tonnes)	20
Total HGV deliveries	6436
Duration of deliveries, months	12
Monthly HGV deliveries	536
5. Tape / Tile	
Route Length (m)	40000
HDD Length (m)	8840
Total Length (m)	31160
No. of Circuits	6
No. of Tapes / Circuit	2
Total Length of Tape (m)	373920
Tape Roll Length (m)	400
No. of Rolls	935
HGV payload (Rolls / HGV)	50
Total HGV deliveries	19
Duration of deliveries, months	12
Monthly HGV deliveries	1.6
6. Ducts	
Route Length (m)	40000
HDD Length (m)	3575
Total Length (m)	36425
No. of Circuits	6
No. of Ducts / Circuit	3
Total Length of Ducts (m)	655650
Fibre duct Length (m)	218550
HGV payload (Ducts / HGV)	750
HGV payload (Fibre Ducts / HGV)	1000
Total HGV duct deliveries	874
Total HGV fibre ducts deliveries	219
Total HGV deliveries	1093
Duration of deliveries, months	12
Monthly HGV deliveries	91
7. Cables	
Route Length (m)	40000
No. of Circuits	6
Total Length (m)	720000
Drum Length (m)	1650
No. of Cable Deliveries	432
Fibre optic length (m)	240000
Fibre optic drum length (m)	3000
No. of fibre optic drums	80
HGV payload (Fibre optic drums / HGV)	6
Total HGV fibre ducts deliveries	13
Total HGV deliveries	445
Duration of deliveries, months	10
Monthly HGV deliveries	45

8. HDD installation	
HDD Route Length (m)	8840
No. of Circuits	6
No. of HDD Ducts	3
Total number of HDD ducts	159120
HGV payload (Ducts / HGV)	500
No. of HGV Loads	318
Fibre Ducting Length (m)	53040
No. Fibre ducting HGV Loads	30
No. of HDD Compounds	56
HDD Compound Length (m)	50
HDD Compound Width (m)	50
HDD Compound Depth (m)	0.3
HDD compound volume of stone (m ³)	42000
HDD compound stone volume and removal (m ³)	84000
Tonnes (assume density of 2.2tonnes per cubic meter)	184800
HGV payload (tonnes)	20
Total HDD compound deliveries	9240
Total HGV deliveries	9588
Duration of deliveries, months	12
Monthly HGV deliveries	799
9. Drainage Ducts	
Route Length (m)	40000
HDD Length (m)	8840
Total Length (m)	31160
No. of Drainage Pipes	2
Total Length of Pipes (m)	62320
HGV payload (pipes / HGV)	1000
Total HGV deliveries	62
Duration of deliveries, months	5
Monthly HGV deliveries	12
10. Joint Bays	
No. of Joint Bays	240
Concrete slab length (m)	20
Concrete slab width (m)	4
Concrete slab depth (m)	0.3
Concrete volume (m ³)	5760
HGV payload (concrete / HGV)	6
Total HGV concrete deliveries	960
Aggregate stone base length (m)	25
Aggregate stone base width (m)	5
Aggregate stone base depth (m)	0.1
Aggregate stone base volume (m ³)	3000
HGV Load	20
Total HGV aggregate stone base deliveries	150
No. of joint bay compounds	23
Compound length (m)	40
Compound width (m)	40
Compound depth (m)	0.3
Compound stone Volume (m ³)	11040
Tonnes (assume density of 2.2tonnes per cubic meter)	24288
HGV payload (tonnes)	20
Total HGV aggregate compound deliveries	1214
Total HGV deliveries	2324
Duration of deliveries, months	8
Monthly HGV deliveries	291
11. Temporary access roads	
Length (m)	5000
Width (m)	6
Depth (m)	0.5
Volume (m ³)	15000
Tonnes (assume density of 2.2tonnes per cubic meter)	33000
HGV payload (tonnes)	20
Total HGV deliveries	1650
Duration of deliveries, months	3
Monthly HGV deliveries	550
12. Onshore substation access road	
Length (m)	1600
Width (m)	8
Depth (m)	0.4
Volume (m ³)	5120
Export of spoil (m ³)	5120
Total Volume of import/export	10240
Tonnes (assume density of 2.2tonnes per cubic meter)	22528
HGV payload (tonnes)	20
Total HGV deliveries	1126.4
Duration of deliveries, months	3
Monthly HGV deliveries	375
13. Onshore substation	
	Daily HGV deliveries
Month 0 - 1 (12 HGVs per day)	12
Month 1 - 4 (15 HGVs per day)	15
Month 5 - 9 (100 HGVs per day)	100
Month 10 - 25 (25 HGVs per day)	25
Month 25 - 36 (8 HGVs per day)	8

Appendix E

HGV and LCV Demand Assigned to the Construction Programme

Appendix F

HGV Distribution per Access

Peak HGV movements per access

Accesses	Logistics compounds			Landfall compounds			Cable route			Onshore substations			Total two-way daily HGV movements per access
	No. of compounds per access	Daily HGV movements per access	Two-way daily HGV movements per access	No. of compounds per access	Daily HGV movements per access	Two-way daily HGV movements per access	Length of cable route per access (km)	Daily HGV movements per access	Two-way daily HGV movements per access	No. of substations per access	Daily HGV movements per access	Two-way daily HGV movements per access	
Access 1				1	58	115							115
Access 2							2.7	18	36				36
Access 3	1	16	32				1.4	9	19				51
Access 4							3.4	23	46				46
Access 5							1.4	9	19				19
Access 6							2.7	18	36				36
Access 7							0.5	3	7				7
Access 8	1	16	32				0.5	3	7				39
Access 9							1.6	11	21				21
Access 10							3.4	23	46				46
Access 11	1	16	32				1.3	9	17				50
Access 12							0.6	4	8				8
Access 13							0.8	5	11				11
Access 14							2.4	16	32				32
Access 15	1	16	32				0.6	4	8				40
Access 16							1.0	7	13				13
Access 17	1	16	32				2.1	14	28				60
Access 18							1.0	7	13				13
Access 19							1.3	9	17				17
Access 20							1.0	7	13				13
Access 21	1	16	32				0.7	5	9				42
Access 22							0.7	5	9				9
Access 23							0.3	2	4				4
Access 24							1.7	11	23				23
Access 25							1.5	10	20				20
Access 26	1	16	32				0.3	2	4				36
Access 27							1.9	13	26				26
Access 28										1	130	259	259
Access 29, 30, 31							0.2	1	3				3
Total	7	113	226	1	58	115	37	248	497	1	130	259	1097

Appendix G

Assignment of HGV Traffic to the Highway Network

Appendix H
In-migrant Labour Distribution

In-migrant Labour Distribution

Postcode	No. of rooms per post code	Journey time (mins) *	No. of rooms factored by journey time **	Percentage distribution	Point of entry to study area	Percentage distribution of rooms by point of entry
HU17	116	10	11.6	28.2%	Beverley	28.2%
HU16	43	20	2.2	5.2%	Link 63	5.2%
HU20	16	18	0.9	2.2%	Link 90	11.1%
HU15	16	30	0.5	1.3%		
HU14	95	30	3.2	7.7%		
HU6	15	30	0.5	1.2%	Link 74	44.2%
HU5	63	45	1.4	3.4%		
HU3	23	45	0.5	1.2%		
HU2	370	45	8.2	20.0%		
HU4	14	45	0.3	0.8%		
HU1	224	45	5.0	12.1%		
HU9	103	45	2.3	5.6%		
YO25	65	45	1.4	3.5%		
HU11	14	28	0.5	1.2%	Link 68 or 67	1.2%
HU13	6	45	0.1	0.3%	Link 77	0.3%
YO43	23	26	0.9	2.1%	Link 87	4.0%
YO42	24	40	0.6	1.5%		
YO19	7	45	0.2	0.4%		
DN18	4	45	0.1	0.2%	Link 83	0.6%
DN39	3	45	0.1	0.2%		
DN39	5	45	0.1	0.3%		
YO16	30	45	0.7	1.6%		
Total	1279		41	100%	0	100%

Notes:

* journey time from centre of post code to Beverley (capped at 45 minutes)

** number of rooms divided by the journey time

Appendix I

Resident Labour Distribution

Resident Labour Distribution

Postcode	No. of workers per post code	Journey time (mins) *	No. of workers factored by journey time **	Percentage distribution	Point of entry to study area	Percentage distribution of workers by point of entry
HU1	2,048	40	51	2.2%	Link 77	3.3%
HU10	876	35	25	1.1%		
HU14	204	40	5	0.2%		
HU13	453	40	11	0.5%	Link 78	0.2%
DN15	1,605	60	27	1.2%	Link 79	0.5%
DN16	1,185	65	18	0.8%		
DN17	1,082	75	14	0.6%		
DN18	815	50	16	0.7%		
DN19	311	55	6	0.2%		
DN20	497	55	9	0.4%		
DN21	1,357	80	17	0.7%		
DN31	1,029	65	16	0.7%		
DN32	844	75	11	0.5%		
DN33	239	85	3	0.1%		
DN34	264	70	4	0.2%		
DN35	888	80	11	0.5%		
DN36	377	80	5	0.2%		
DN36	360	80	5	0.2%		
DN37	1,275	70	18	0.8%		
DN38	681	60	11	0.5%		
DN40	517	65	8	0.3%		
DN9	565	80	7	0.3%		
LN1	1,974	90	22	1.0%		
LN10	210	90	2	0.1%		
LN11	1,242	90	14	0.6%		
LN2	1,794	85	21	0.9%		
LN3	269	90	3	0.1%		
LN4	1,013	90	11	0.5%		
LN5	3,426	85	40	1.8%		
LN6	2,545	90	28	1.2%		
LN8	313	80	4	0.2%		
LN9	238	85	3	0.1%		
NG34	1,306	90	15	0.6%		
DN14	1,235	40	31	1.3%		
HG1	1,657	90	18	0.8%		
HG2	436	90	5	0.2%		
LS14	1,817	80	23	1.0%		
LS17	92	90	1	0.0%		
LS22	384	85	5	0.2%		
LS8	742	90	8	0.4%		
YO30	232	80	3	0.1%		
YO1	3,154	65	49	2.1%		
YO2	2,177	70	31	1.4%		
YO3	2,678	60	45	1.9%		
YO4	1,143	35	33	1.4%		
YO6	358	80	4	0.2%		
YO7	251	90	3	0.1%		
BD11	530	90	6	0.3%		
BD19	1,103	85	13	0.6%		
DN1	1,553	70	22	1.0%		
DN10	1,139	80	14	0.6%		
DN11	1,094	85	13	0.6%		
DN12	792	85	9	0.4%		
DN2	633	70	9	0.4%		
DN3	1,425	75	19	0.8%		
DN4	2,751	60	46	2.0%		
DN5	1,390	80	17	0.8%		
DN6	1,052	70	15	0.7%		
DN7	749	65	12	0.5%		
DN8	521	70	7	0.3%		
HD2	283	90	3	0.1%		
HD3	115	90	1	0.1%		
HD5	194	90	2	0.1%		
HD8	1,061	90	12	0.5%		
HG3	702	90	8	0.3%		
HU15	884	30	29	1.3%		
LS1	1,807	90	20	0.9%		
LS10	2,125	80	27	1.2%		
LS11	3,002	85	35	1.5%		
LS12	1,931	90	21	0.9%		
LS25	1,726	85	20	0.9%		
LS26	832	75	11	0.5%		
LS27	2,014	90	22	1.0%		
NG23	250	90	3	0.1%		
S12	204	90	2	0.1%		
S13	1,260	90	14	0.6%		
S19	1,206	90	13	0.6%		
S2	240	90	3	0.1%		

Link 83

16.1%

Link 87

11.2%

Postcode	No. of workers per post code	Journey time (mins) *	No. of workers factored by journey time **	Percentage distribution	Point of entry to study area	Percentage distribution of workers by point of entry
S21	764	90	8	0.4%	Link 90	35.6%
S25	1,085	90	12	0.5%		
S26	858	90	10	0.4%		
S30	1,517	90	17	0.7%		
S35	203	90	2	0.1%		
S36	161	90	2	0.1%		
S42	404	90	4	0.2%		
S43	1,441	90	16	0.7%		
S44	585	90	7	0.3%		
S5	326	90	4	0.2%		
S60	2,943	90	33	1.4%		
S61	940	90	10	0.5%		
S62	642	90	7	0.3%		
S63	1,376	90	15	0.7%		
S63	763	90	8	0.4%		
S64	1,102	90	12	0.5%		
S65	803	90	9	0.4%		
S66	1,522	90	17	0.7%		
S70	2,983	90	33	1.4%		
S71	1,812	90	20	0.9%		
S72	907	85	11	0.5%		
S73	1,054	90	12	0.5%		
S74	306	90	3	0.1%		
S75	809	90	9	0.4%		
S80	499	90	6	0.2%		
S81	763	90	8	0.4%		
S9	1,411	90	16	0.7%		
WF12	1,261	90	14	0.6%		
WF13	550	90	6	0.3%		
WF15	552	90	6	0.3%		
WF16	205	90	2	0.1%		
WF6	576	75	8	0.3%		
WF7	542	80	7	0.3%		
WF9	1,054	80	13	0.6%		
HU5	1,099	35	31	1.4%	Link 67 or 68	8.5%
HU6	475	22	22	0.9%		
HU11	2,373	35	68	2.9%		
HU12	1,513	55	28	1.2%		
HU18	236	35	7	0.3%		
HU8	559	40	14	0.6%		
HU9	1,081	40	27	1.2%		
HU2	286	35	8	0.4%	Link 74 or 75	3.0%
HU3	1,387	45	31	1.3%		
HU7	1,039	35	30	1.3%		
HU4	509	45	11	0.5%	Link 77 or 78	0.5%
YO15	1,136	55	21	0.9%	Link 84 or 85	3.9%
YO16	262	55	5	0.2%		
YO11	849	55	15	0.7%		
YO12	1,260	55	23	1.0%		
YO25	729	35	21	0.9%		
YO14	337	60	6	0.2%	Link 87 or 90	9.9%
HG4	1,094	90	12	0.5%		
HG5	672	90	7	0.3%		
LS15	1,441	90	16	0.7%		
LS2	515	90	6	0.2%		
LS4	280	90	3	0.1%		
LS6	399	90	4	0.2%		
LS7	200	90	2	0.1%		
LS9	1,328	85	16	0.7%		
WF14	546	90	6	0.3%		
WF17	1,215	90	14	0.6%		
WF1	1,683	80	21	0.9%		
WF10	2,576	70	37	1.6%		
WF11	419	70	6	0.3%		
WF2	1,689	90	19	0.8%		
WF3	959	80	12	0.5%		
WF4	2,323	90	26	1.1%		
WF5	866	90	10	0.4%		
WF8	692	65	11	0.5%		
HU16	451	16	28	1.2%	Beverley	7.3%
HU17	1,406	10	141	6.1%		

Notes:

* journey time from centre of post code to centre of Beverley

** number of workers divided by the journey time

Appendix J

Assignment of LCV Traffic to the Highway Network

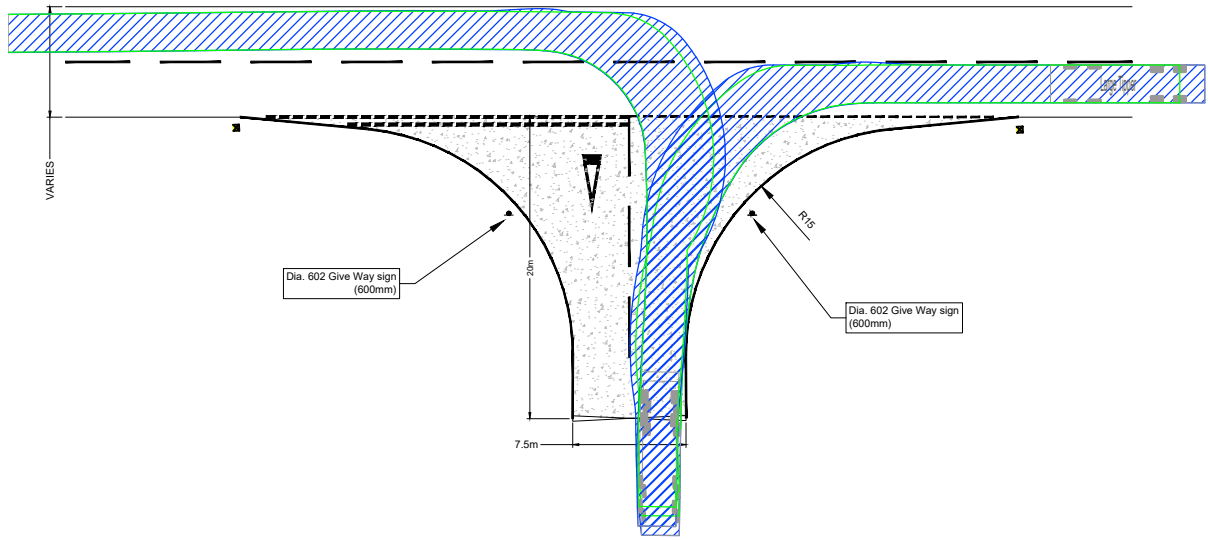
Appendix K

Summary of HGV and LCVs per Link

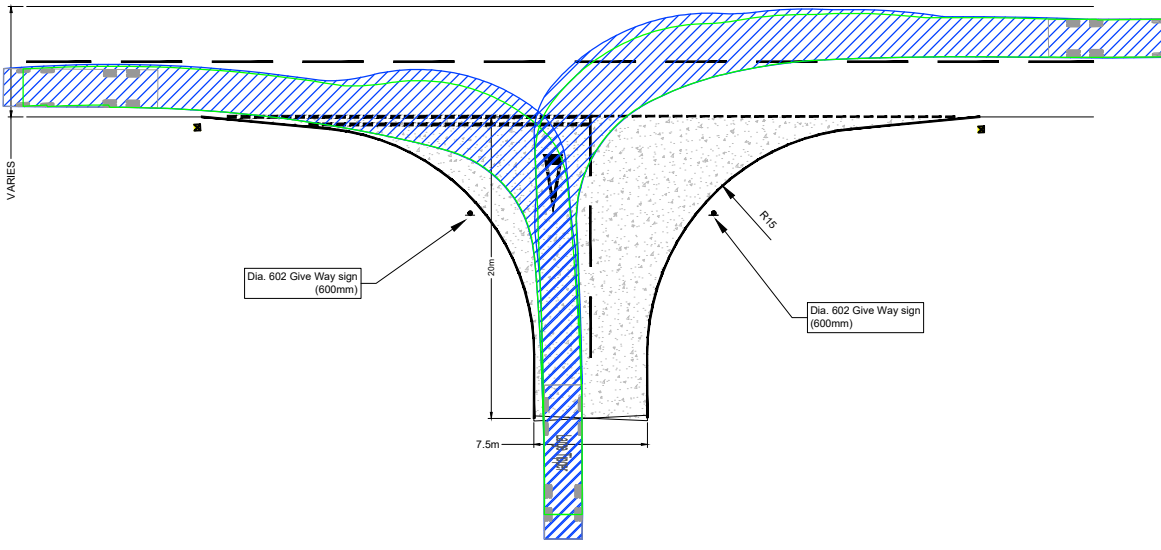
Link Details		Construction Flows (peak)					
Link	Road	Base 24HR AADT			Base 18Hr AAWT		
		Total Veh	LCVs	HGVs*	Total Veh	LCVs	HGVs*
1	A165 from Moor Ln to Fraisthorpe	42	42	0	48	48	0
2	Unnamed Road running south of Fraisthorpe	267	168	99	311	196	115
3	Unnamed Road from its junction with A165 south of Fraisthorpe	291	161	130	339	188	151
4	A165 to the west of Fraisthorpe	42	42	0	48	48	0
5	A165 south of Fraisthorpe	325	195	130	379	228	151
6	A165 west of Barmston	449	276	174	524	321	203
7	A165 east of Lissett	446	272	174	520	317	203
8	A165 south of Lissett to Beeford	528	315	213	616	368	248
9	B1249 through Beeford	420	315	105	490	368	122
10	Foston Lane / Old Howe Lane	332	315	16	387	368	19
11	B1249 between Beeford and North Frodingham	89	0	89	103	0	103
12	B1249 through North Frodingham	89	0	89	103	0	103
13	B1249 Church Lane	89	0	89	103	0	103
14	Cruckley Lane / Cowslam Lane	346	315	31	404	368	36
15	Sheepdike Lane through Foston on the Wolds	315	315	0	368	368	0
16	Old Howe Lane	332	315	16	387	368	19
17	Long Lane	100	84	16	117	98	19
18	Gambling Lane	100	84	16	117	98	19
19	Out Gates	100	84	16	117	98	19
20	B1249 north of Brigham Lane	258	170	89	301	198	103
21	B1249 south of Wansford	176	88	89	206	102	103
22	B1249 through Wansford	93	4	89	109	5	103
23	B1249 Wansford to Driffield	93	4	89	109	5	103
24	B1249 Wansford Road / Scarborough Road	93	4	89	109	5	103
25	Brigham Lane	102	84	18	119	98	21
26	A164 south of Driffield	154	66	89	180	77	103
27	Beverley Road from A164 to River Head	0	0	0	0	0	0
28	Anderson Street / River Head	0	0	0	0	0	0
29	A164 between Driffield and Hutton Cranswick	154	66	89	180	77	103
30	Station Road / Main Street through Hutton Cranswick	123	84	39	144	98	46
31	Corpslanding Road / Howl Lane / Church Street / Hutton Road	0	0	0	0	0	0
32	Maeggison's Turnpike	123	84	39	144	98	46
33	Corpslanding Road / Rotsea Lane	123	84	39	144	98	46
34	Carr Lane / Church Lane east of Watton	127	84	43	148	98	50
35	Church Lane east of Watton	127	84	43	148	98	50
36	A164, Hutton Cranswick to Watton	431	303	128	503	354	149
37	A614, Watton to Wilfholme Road	390	219	170	454	256	199
38	Wilfholme Road	91	84	7	106	98	8
39	A164, Wilfholme Road to Beswick	473	296	177	552	345	207
40	Beswick Road / Barfill Causeway	93	84	9	109	98	11
41	A164, Beswick Road to Station Road	468	282	186	546	329	218
42	Station Road east of A164	112	84	28	130	98	32
43	Station Road west of A164	119	84	35	138	98	40
44	A164 south of Station Road	576	315	260	672	368	304
45	A164 north of Leconfield	446	134	312	520	156	364
46	Old Road west of Leconfield	315	315	0	368	368	0
47	Unnamed Road west of junction with A164 to Old Road	367	315	52	428	368	60
48	Miles Lane west of Leconfield	315	315	0	368	368	0
49	Miles Lane east of B1248	327	315	12	381	368	13
50	B1248 north of the A1035	327	315	12	381	368	13
51	A1035 Constitution Hill	654	315	338	763	368	395
52	Beverley Northern Bypass	627	315	312	732	368	364
53	A1035 Dog Kennel Lane	665	315	350	776	368	408
54	A1174 east of the A1035	235	191	44	274	223	51
55	A1079, A1174 and A164	732	315	417	854	368	486
56	Newbald Road	191	168	23	223	196	27
57	Killingwoldgraves Lane / Coppelflat Lane	338	315	23	395	368	27
58	Coppelflat Lane south of Newbald Road	315	315	0	368	368	0
59	Coppelflat Lane south of Walkington	258	241	17	301	281	20
60	A164 south of A1079	1,205	315	890	1,406	368	1,038
61	Unnamed Road south of Coppelflat Lane to junction with A164	303	255	48	354	298	56
62	A164 south of Coppelflat Lane	1,205	315	890	1,406	368	1,038
63	A164 north of Skidby	1,254	315	938	1,462	368	1,094
64	A165 Beeford to Brandesburton	633	315	317	738	368	370
65	Main Street / Frodingham Road, Brandesburton to North Frodingham	0	0	0	0	0	0
66	A165, Brandesburton to Leven	633	315	317	738	368	370
67	A165, B1244 to A1035	633	315	317	738	368	370
68	A1035, A165 to A1174	633	315	317	738	368	370
69	A1035 Grange Way, north of Beverley	315	315	0	368	368	0
70	A1174 Swinemoor Lane	599	282	317	699	328	370
71	A1174 Hull Road	599	282	317	699	328	370
72	A164 Minster Way	481	163	317	561	190	370
73	A164, Minster Way to A1079	837	298	540	977	347	630
74	A1079, A164 to A1033	538	315	222	627	368	259
75	A1174 Beverley Road / Hull Road	16	16	0	18	18	0
76	A164, B1233 to Castle Road	1,163	222	940	1,356	259	1,097
77	A164, Castle Road to B1232	1,256	315	940	1,465	368	1,097
78	A164 south of B1232	1,251	311	940	1,460	362	1,097
79	A164 south of B1231	1,247	307	940	1,455	358	1,097
80	A15 Boothferry Road	940	0	940	1,097	0	1,097
81	A63 west of A15	940	0	940	1,097	0	1,097
82	A63 Clive Sullivan Way	940	0	940	1,097	0	1,097
83	A15 Humber Bridge	298	298	0	347	347	0
84	A614 north of Driffield	88	88	0	102	102	0
85	Bridlington Bay Road, A614 to A165	42	42	0	48	48	0
86	A614 east of Driffield	187	98	89	218	114	103
87	A1079 through Bishop Burton	259	259	0	302	302	0
88	B1233 Harland Way / Northgate	254	252	2	297	294	3
89	Park Lane	254	252	2	297	294	3
90	B1230 through Walkington	315	315	0	368	368	0

Appendix L
Outline Access Design Concepts

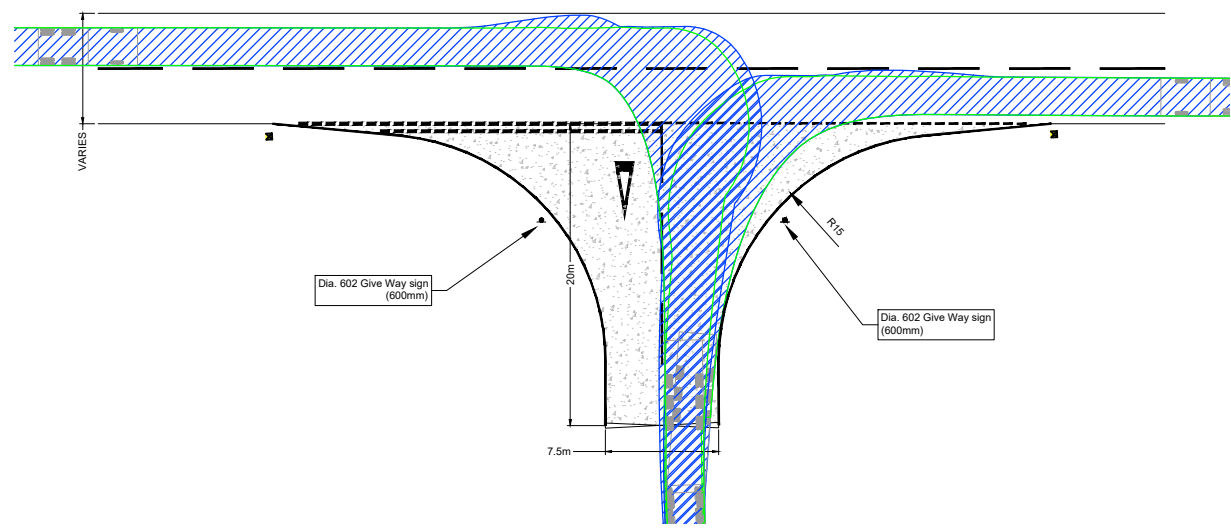
LARGE TIPPER IN



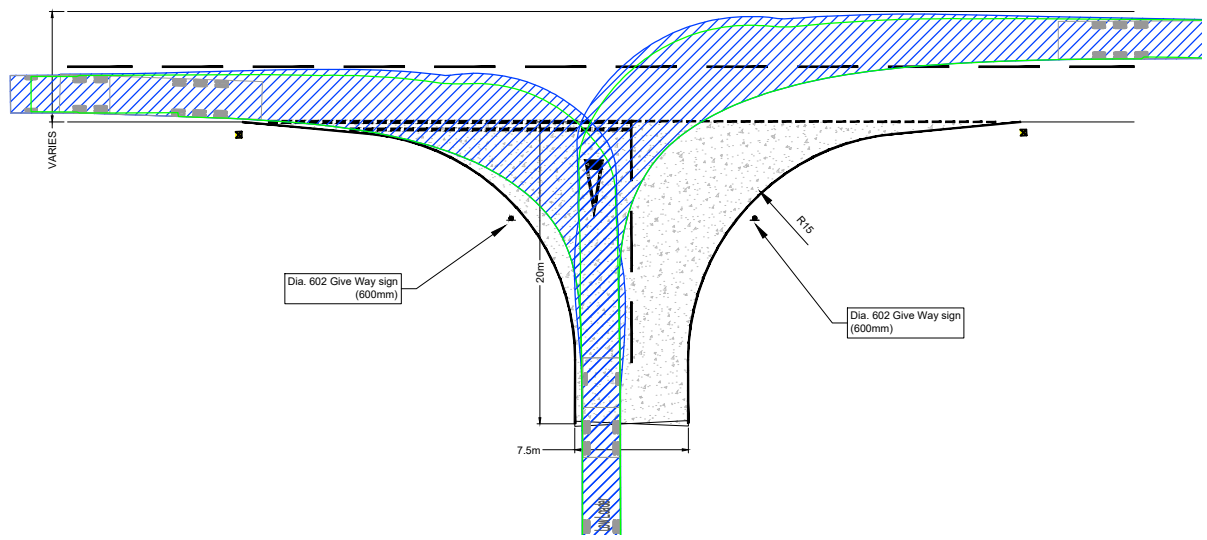
LARGE TIPPER OUT



LOW LOADER IN



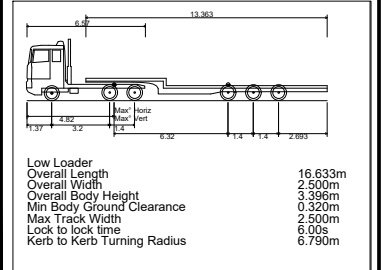
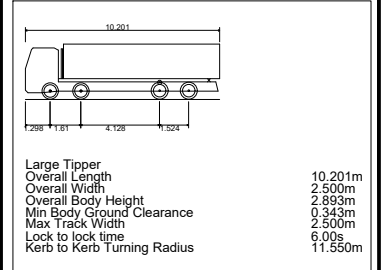
LOW LOADER OUT



- NOTES**
- Do not scale from this drawing, all dimensions are in metres unless noted otherwise.
 - Exact junction types and geometry to be determined from relevant section of Design Manual for Roads & Bridges (TD 42/95).
 - All road markings and signs to conform with the Traffic Signs Regulation and General Directions 2016 and Chapter 8.

- KEY**
- EXISTING METELED ROAD BOUNDARY
 - PROPOSED ACCESS BOUNDARY/ROAD MARKINGS
 - PROPOSED GATE
 - PROPOSED PLASTIC DEMARCATION BOLLARD
 - PROPOSED POST MOUNTED TRAFFIC SIGN
 - PROPOSED ACCESS CONSTRUCTION

VEHICLE TRACKING



- VEHICLE BODY SWEEP PATH (FORWARD GEAR)
- VEHICLE CHASSIS SWEEP PATH

DRAFT - NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	BY	CHK	APP
REVISIONS					
CLIENT					



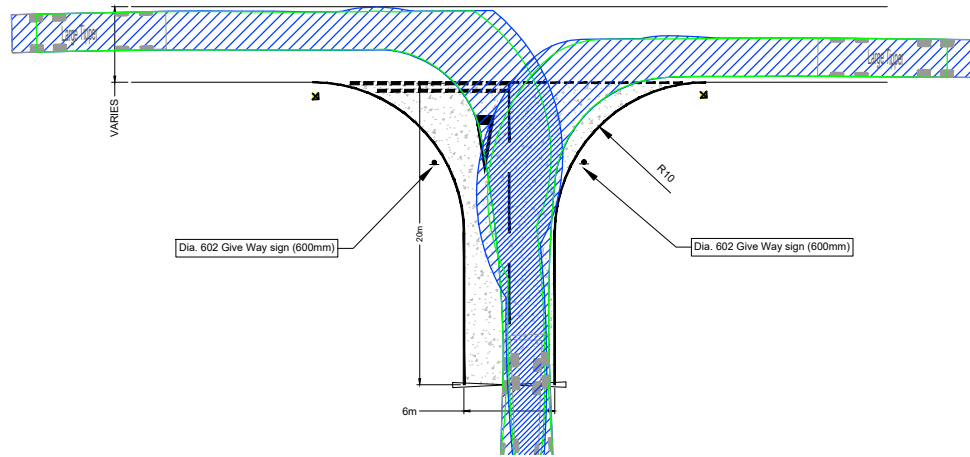
PROJECT
HORNSEA PROJECT FOUR
OFFSHORE WIND FARM

TITLE
TYPE A ACCESS
DMRB A/B ROAD JUNCTION
20t TIPPER & LARGE LOW LOADER

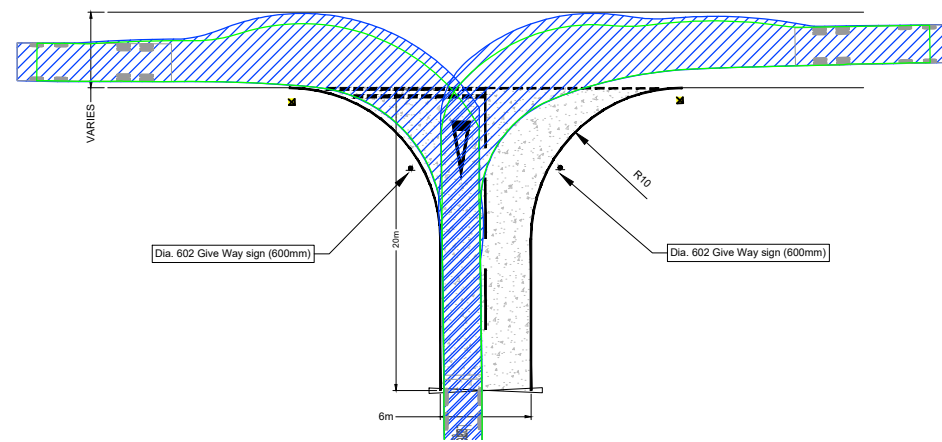


DRAWN	JI	CHECKED	SKT	APPROVED	ADR
DATE	MAY 2019	SCALE AT AS	1:500	CLIENTS REF.	
DRAWING No.	TP-PB8783-DR-001				REVISION
CLIENT DWG No.					D0.1

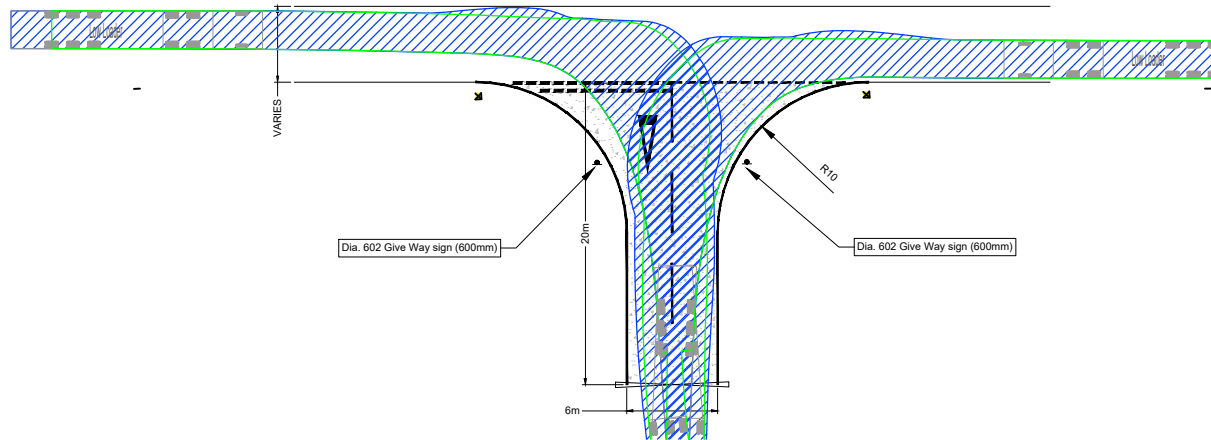
TYPE B ACCESS - LARGE TIPPER IN



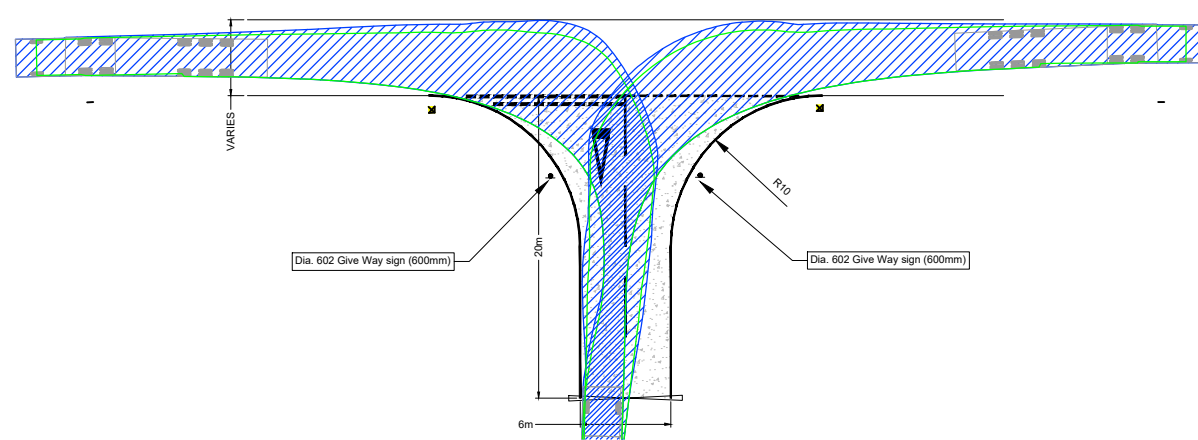
TYPE B ACCESS - LARGE TIPPER OUT



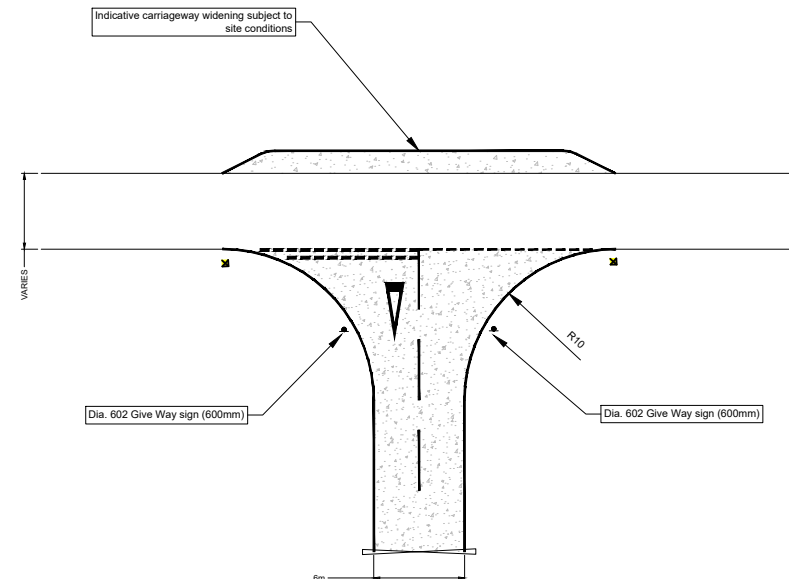
TYPE B ACCESS - LOW LOADER IN



TYPE B ACCESS - LOW LOADER OUT



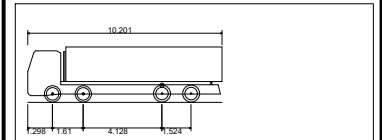
TYPE C ACCESS WITH OPPOSITE VERGE WIDENING



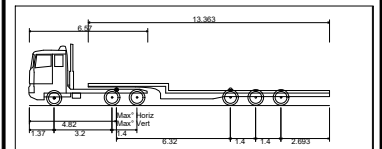
- NOTES**
- Do not scale from this drawing, all dimensions are in metres unless noted otherwise.
 - Exact junction types and geometry to be determined from relevant section of Design Manual for Roads & Bridges (TD 42/95).
 - All road markings and signs to conform with the Traffic Signs Regulation and General Directions 2016 and Chapter 8.

- KEY**
- EXISTING METELED ROAD BOUNDARY
 - PROPOSED ACCESS BOUNDARY/ROAD MARKINGS
 - PROPOSED GATE
 - PROPOSED PLASTIC DEMARCATION BOLLARD
 - PROPOSED POST MOUNTED TRAFFIC SIGN
 - PROPOSED ACCESS CONSTRUCTION

VEHICLE TRACKING



Large Tipper	
Overall Length	10.201m
Overall Width	2.500m
Overall Body Height	2.893m
Min Body Ground Clearance	0.343m
Max Track Width	2.500m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	11.550m



Low Loader	
Overall Length	16.633m
Overall Width	3.396m
Overall Body Height	3.396m
Min Body Ground Clearance	0.320m
Max Track Width	2.500m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	6.790m

- VEHICLE BODY SWEEP PATH (FORWARD GEAR)
- VEHICLE CHASSIS SWEEP PATH

DRAFT - NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	BY	CHK	APP
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REVISIONS

CLIENT



PROJECT
HORNSEA PROJECT FOUR
OFFSHORE WINDFARM

TITLE
TYPE B & C ACCESS
REDUCED JUNCTION WITH 20t
TIPPER & LARGE LOW LOADER



DRAWN	JI	CHECKED	SKT	APPROVED	ADR
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DATE	MAY 2019	SCALE AT A3	1:500	CLIENTS REF.	
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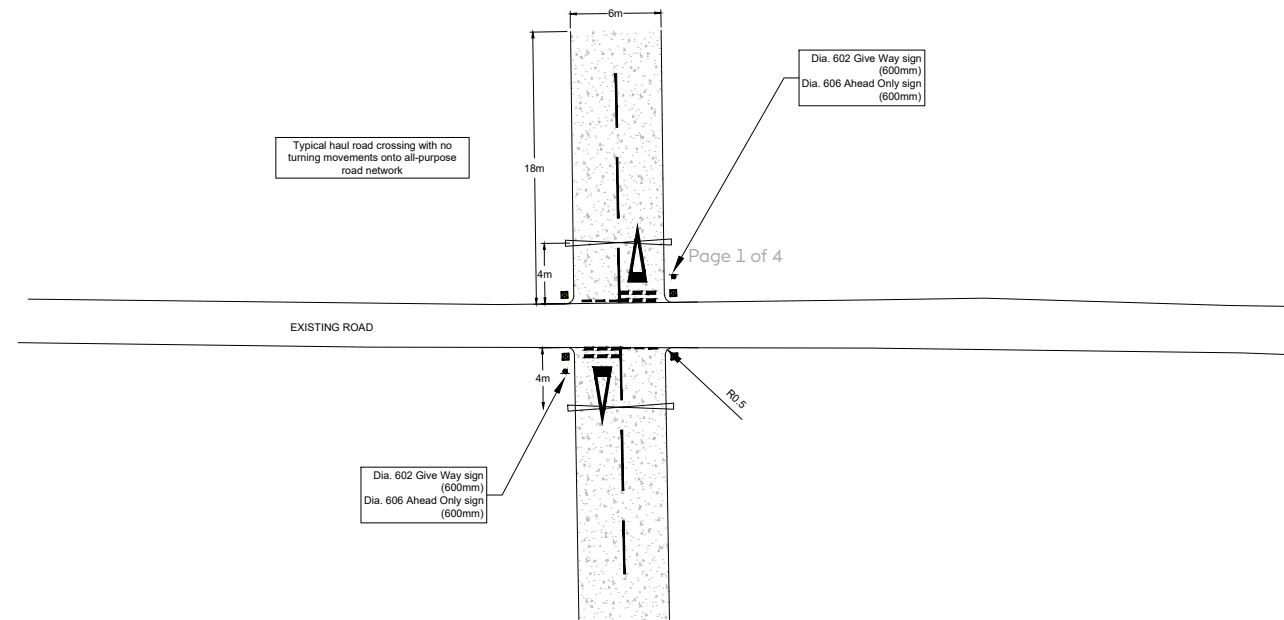
DRAWING No.	TP-PB8783-DR-002	REVISION	
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CLIENT DWG No.			D0.1
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NOTES
 1. Do not scale from this drawing, all dimensions are in metres unless noted otherwise.
 2. Exact junction types and geometry to be determined from relevant section of Design Manual for Roads & Bridges (TD 42/95).
 3. All road markings and signs to conform with the Traffic Signs Regulation and General Directions 2016 and Chapter 8.

- KEY**
- EXISTING METEALED ROAD BOUNDARY
 - PROPOSED ACCESS BOUNDARY/ROAD MARKINGS
 - PROPOSED GATE
 - PROPOSED PLASTIC DEMARCATION BOLLARD
 - ▲ PROPOSED POST MOUNTED TRAFFIC SIGN
 - PROPOSED ACCESS CONSTRUCTION

TYPICAL HAUL ROAD CROSSING WITH NO TURNING MOVEMENTS ONTO ALL-PURPOSE ROAD NETWORK



DRAFT - NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	BY	CHK	APP
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REVISIONS

CLIENT



PROJECT
HORNSEA PROJECT FOUR
OFFSHORE WIND FARM

TITLE
TYPE D ACCESS
TYPICAL ROAD CROSSINGS

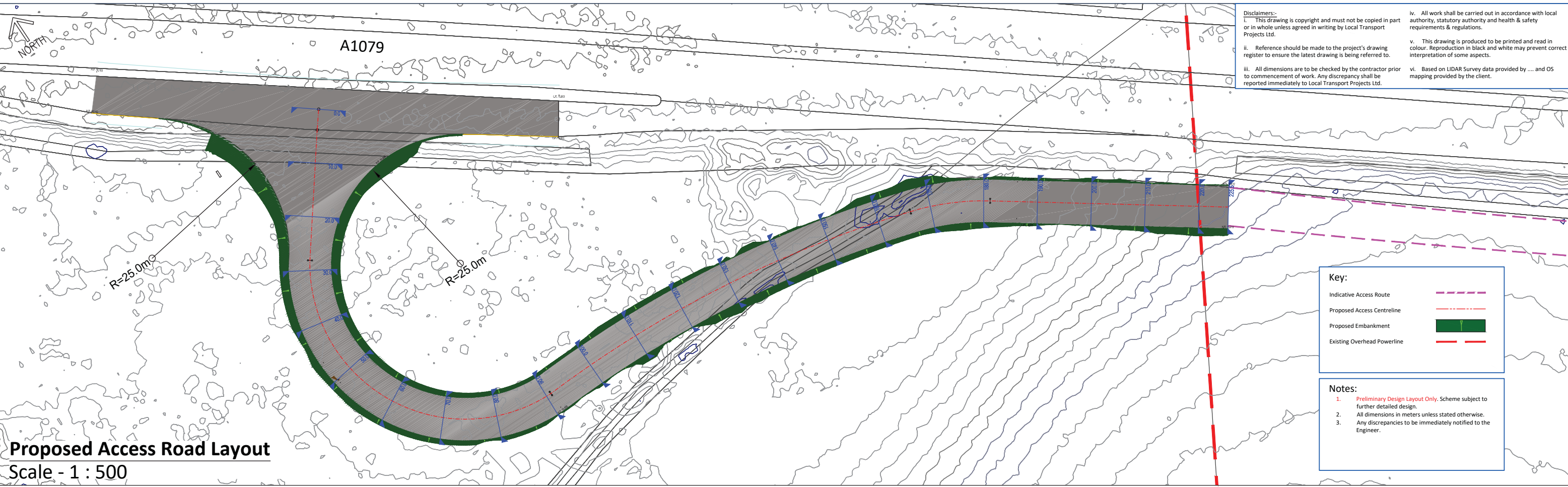


DRAWN	CHECKED	APPROVED
JL	SKT	ADR

DATE	SCALE AT A3	CLIENTS REF.
MAY 2019	1:500	

DRAWING No.	REVISION
TP-PB8783-DR-003	

CLIENT DWG No.	REVISION
	D0.1



Proposed Access Road Layout
Scale - 1 : 500

Proposed Access Track - Longitudinal Section		Proposed Access Track - Longitudinal Section																													
		0+00	0+38.72	10+00	20+00	30+00	40+00	50+00	60+00	70+00	80+00	90+00	100+00	110+00	120+00	130+00	140+00	150+00	160+00	170+00	175+886	180+000	186+886	188+886	190+000	193+700	200+000	210+000	220+000	225+475	
Datum: 9.000M AOD																															
CHAINAGE ON CENTRELINE (m)																															
LEVELS ON CENTRELINE OF CARRIAGEWAY (m)																															
LEVELS ON LEFT HAND CHANNEL (m)																															
LEVELS ON RIGHT HAND CHANNEL (m)																															
VERTICAL DESIGN ON CARRIAGEWAY CENTRELINE																															
HORIZONTAL DESIGN ON CARRIAGEWAY CENTRELINE																															
EXISTING LEVELS (m)																															

Client Ørsted	Title Proposed On-Shore sub-station site access via the A1079 Northbound layby - Preliminary Design Layout	Drawing number					Rev.	Date	By	Chk	Description
		Project	Job	Drawing	Sheet	Revision					
Project Hornsea Project Four Offshore Wind Farm	Status <input type="checkbox"/> INTERNAL DRAFT <input checked="" type="checkbox"/> DRAFT <input type="checkbox"/> APPROVED <input checked="" type="checkbox"/> PRELIMINARY <input type="checkbox"/> CONSTRUCTION <input type="checkbox"/> AS BUILT	Drawn	Date								
		MH	24 05 19								
		Scale	Checked								
		As Shown	RL								

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traffic engineering and transport planning

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