East Suffolk Council and Suffolk County Council

KIRKLEY WATERFRONT

Transport Access Study Technical Note

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CONTENTS

FIGURES

APPENDICES

Executive Summary

WSP has been commissioned by ESC via SCC to undertake a transport access study to investigate the predicted impact of proposed development on a development area known as Kirkley Waterfront, Lowestoft, on the surrounding highway network. It should be noted that Policy WLP2.4 of the Waveney Local Plan identifies Kirkley Waterfront as a Sustainable Urban Neighbourhood (SUN) which is allocated for mixed use development including residential, employment, primary school, playing fields and a local retail centre. It is recognised that over the last 10 years proposed development on Kirkley Waterfront has largely not come forward, and as such ESC are preparing a Position Statement in relation to the site to outline their current position, with the information outlined in this transport access study technical note supporting this Position Statement.

This assessment work is intended to feed into the Position Statement and investigates the predicted impact of proposed development on the site on the adjacent highway network to the south focusing primarily on Victoria Road and its junctions with Crompton Road, Stanley Road, Nelson Wharf, School Road and Heath Road.

Traffic flow and queue length data obtained at the junctions of Victoria Road with Crompton Road, Stanley Road, Nelson Wharf, School Road and Heath Road showed that Victoria Road is moderately trafficked, and the access roads that connect to Victoria Road are lightly trafficked in the AM and PM peak hours. The queue length data showed that there were no significant queues recorded at any of the surveyed junctions in the AM and PM peak hours.

The operation of all of the surveyed junctions on Victoria Road in the AM and PM peak hours were tested for the 2024 base assessment and the 2034 future baseline assessment years, and the junction capacity results show that all of the assessed junctions operate within capacity. In addition, the operation of the surveyed junctions on Victoria Road and the new junction on Waveney Drive in the AM and PM peak hours were tested for the 2034 future with development assessment, and the junction capacity results show that the majority of the junctions operate within capacity in the AM and PM peak hours. The only exceptions are at Site 5 Victoria Road / Heath Road which operates over capacity when the vehicle trips are assigned through the Victoria Road junctions, and Site 6 Waveney Drive / New Access which operates over capacity when the vehicle trips are assigned through this junction. However, when the development trips were redistributed between Site 4 Victoria Road / School Road, Site 5 Victoria Road / Heath Road, and Site 6 Waveney Drive / New Access, and the junction capacity results show that all of the junctions operate within capacity.

There will need to be a focus on implementing sustainable mitigation measures that all proposed development will be required to provide, as there is limited scope to provide improvements at the junctions on Victoria Road due to existing constraints, with only minor junction improvements being possible. This could have a significant potential to reduce the number of vehicular trips generated by the proposed development by providing appropriate sustainable infrastructure to encourage a modal shift away from the private car, thus reducing the impact on the junctions on Victoria Road.

Overall, it can be concluded that the proposed development at Kirkley Waterfront will have a significant impact on the surrounding highway network. It has been demonstrated that it is possible to redistribute the development trips across the surrounding highway network to mitigate the impact of these development trips where possible. However, the surrounding highway network is constrained and there is limited scope to provide improvements, and as such there will need to be a

strong focus on providing appropriate sustainable infrastructure to encourage a modal shift away from the private car e.g. improvements to walking and cycling connections to local services and facilities, safe and secure cycle parking and improvements to local bus services, and as such reduce the impact on the junction on Victoria Road and the new access junction on Waveney Drive.

1 INTRODUCTION

1.1 OVERVIEW

1.1.1. WSP has been commissioned by East Suffolk Council (ESC) via Suffolk County Council (SCC) to undertake a transport access study to investigate the predicted impact of proposed development on a development area known as Kirkley Waterfront, Lowestoft, on the surrounding highway network.

1.2 BACKGROUND

1.2.1. The development area of Kirkley Waterfront covers an area of 59.8 hectares from Lake Lothing in the north to Victoria Road and Waveney Drive in the south. It is currently occupied by predominately underutilised or unoccupied brownfield land, and as such offers a significant opportunity to regenerate the south side of Lake Lothing as a new residential and employment area.

1.2.2. It should be noted that Policy WLP2.4 of the Waveney Local Plan, that was adopted in March 2019 and covers the area previously covered Waveney District Council (WDC), identifies Kirkley Waterfront as a Sustainable Urban Neighbourhood (SUN) which is allocated for mixed use development including residential, employment, primary school, playing fields and a local retail centre.

1.2.3. It is recognised that proposed development on the development area of Kirkley Waterfront has not come forward as expected over the last 10 years, and as such ESC (as the local planning authority) are in the process of preparing a Position Statement in relation to the site to outline their current position, with the information outlined in this transport access study technical note supporting this Position Statement.

1.3 STUDY SCOPE

1.3.1. The scope of work was discussed and agreed with officers at ESC and SCC in May and June 2024 and is intended to feed into the Position Statement that is being prepared by ESC. It will investigate the predicted impact of proposed development on the site on the adjacent highway network to the south focusing primarily on Victoria Road and its junctions with Crompton Road, Stanley Road, Nelson Wharf, School Road and Heath Road. The assessment work that was agreed with ESC and SCC to be undertaken will provide detailed information in relation to the following elements:

- The existing traffic flows and queue lengths at the junctions of Victoria Road with Crompton Road, Stanley Road, Nelson Wharf, School Road and Heath Road, and on Waveney Drive;
- The existing and proposed land use nature and extent and the predicted vehicular trip generation;
- The existing and predicted capacity and operation of the junctions of Victoria Road with Crompton Road, Stanley Road, Nelson Wharf, School Road and Heath Road and at the new access junction on Waveney Drive based on the outputs of a number of different modelling scenarios; and
- The existing operation of the junctions of Victoria Road with Crompton Road, Stanley Road, Nelson Wharf, School Road and Heath Road, as well as at the new access junction on Waveney Drive based on the largest size vehicle that can access and egress these junctions by undertaking swept path analysis; and

- The junction improvement measures to mitigate impact of quantum of development at the junctions Victoria Road with Crompton Road, Stanley Road, Nelson Wharf, School Road and Heath Road, as well as at the new access junction on Waveney Drive.

1.3.2. It is important to note that the Gull Wing Bridge, providing another strategic transport connection across Lake Lothing, was opened at the beginning of September 2024, will have a significant impact on the distribution of vehicles on the surrounding highway network across the town. This was discussed with officers at ESC and SCC, and it was agreed that any traffic surveys required should be delayed by a month to allow for the distribution of vehicles to settle down as much as possible, and as such they were undertaken in the middle of October 2024. Although the distribution of vehicles is likely to take longer than a month to settle down this is not anticipated to have a significant impact on Victoria Road and Waveney Drive, and as such the assessment that has been undertaken is considered to be robust for the required purposes.

2 EXISTING CONDITIONS

2.1 OVERVIEW

2.1.1. This section of the transport access study technical note outlines the context of the study area of Kirkley Waterfront in relation to the town as a whole, as well as specific details in relation to the existing conditions including traffic flows and queue lengths, highway capacity and road safety along Victoria Road and Waveney Drive adjacent to the development area of Kirkley Waterfront.

2.2 SITE LOCATION AND DESCRIPTION

2.2.1. The study area is located approximately 2km south west of Lowestoft Town Centre and is bordered to the north by Lake Lothing, to the east by the A12 Riverside Road and an existing industrial estate, to the south by Victoria Road and Waveney Drive, and to the west by Crompton Road. It covers an area of 59.8 hectares and is currently occupied by predominately underutilised or unoccupied brownfield land. A location plan is shown in Figure 2.1, and a wider site location plan is shown in Figure 2.2.

Figure 2.1 – Site Location Plan

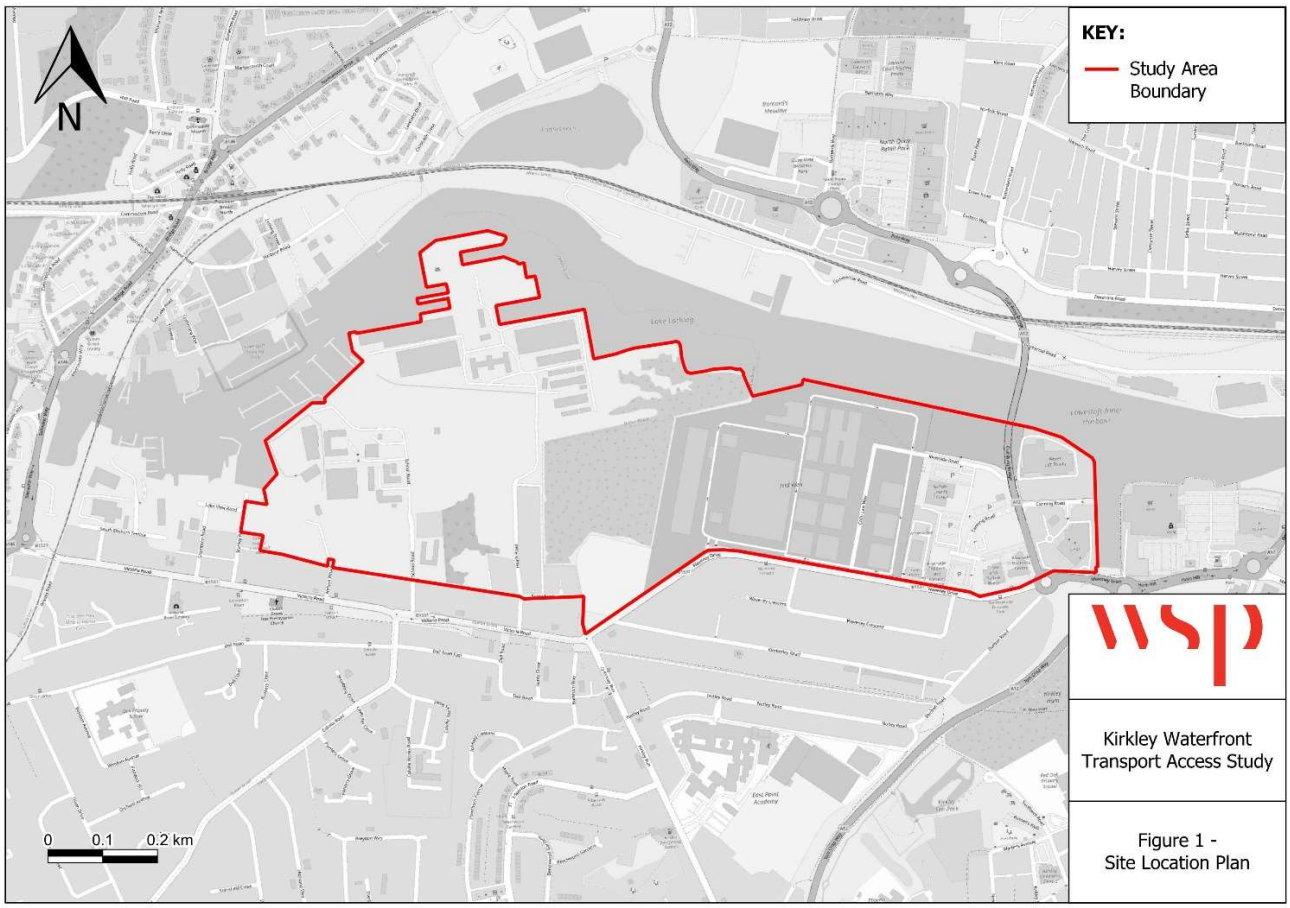
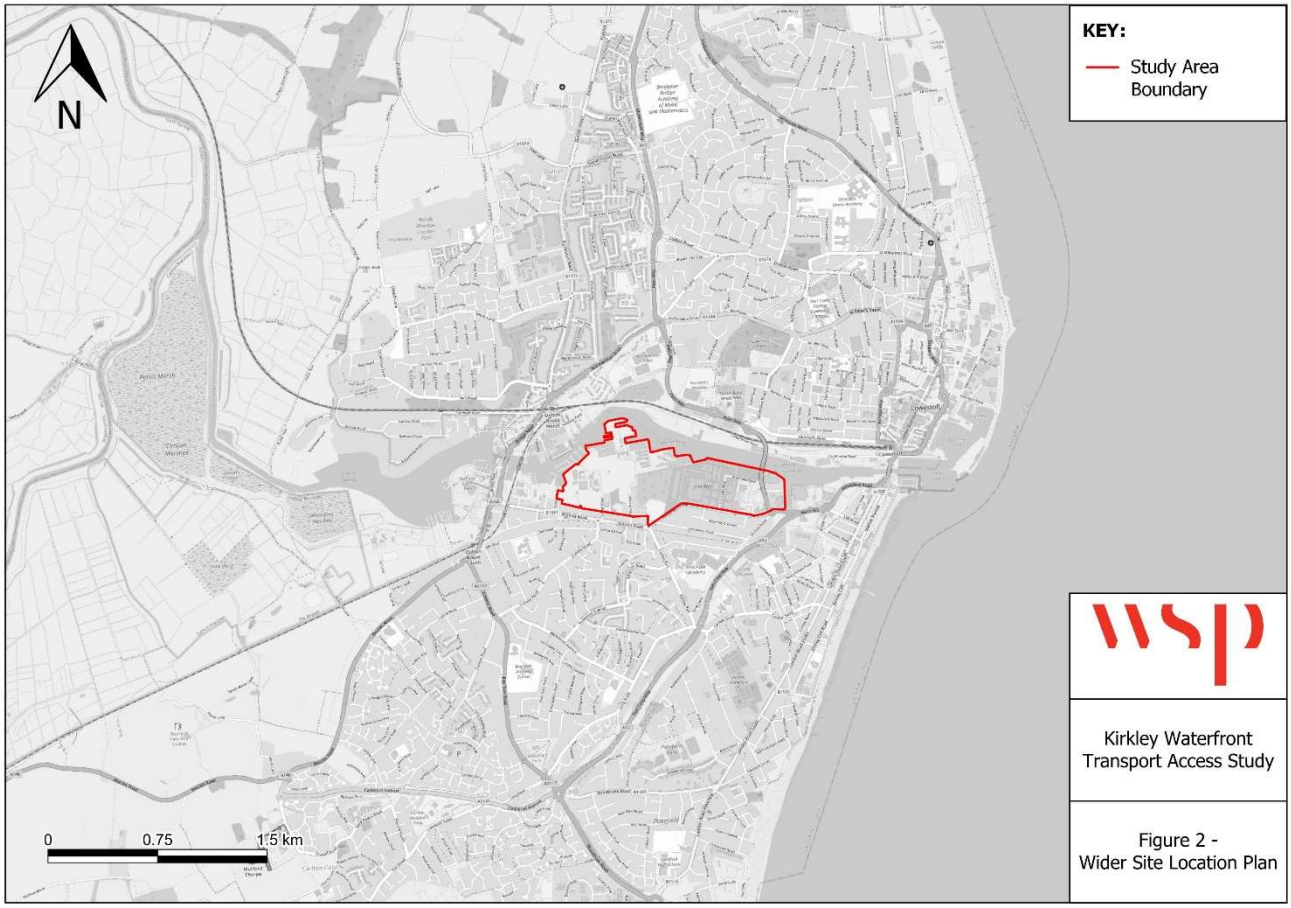


Figure 2.2 – Wider Site Location Plan



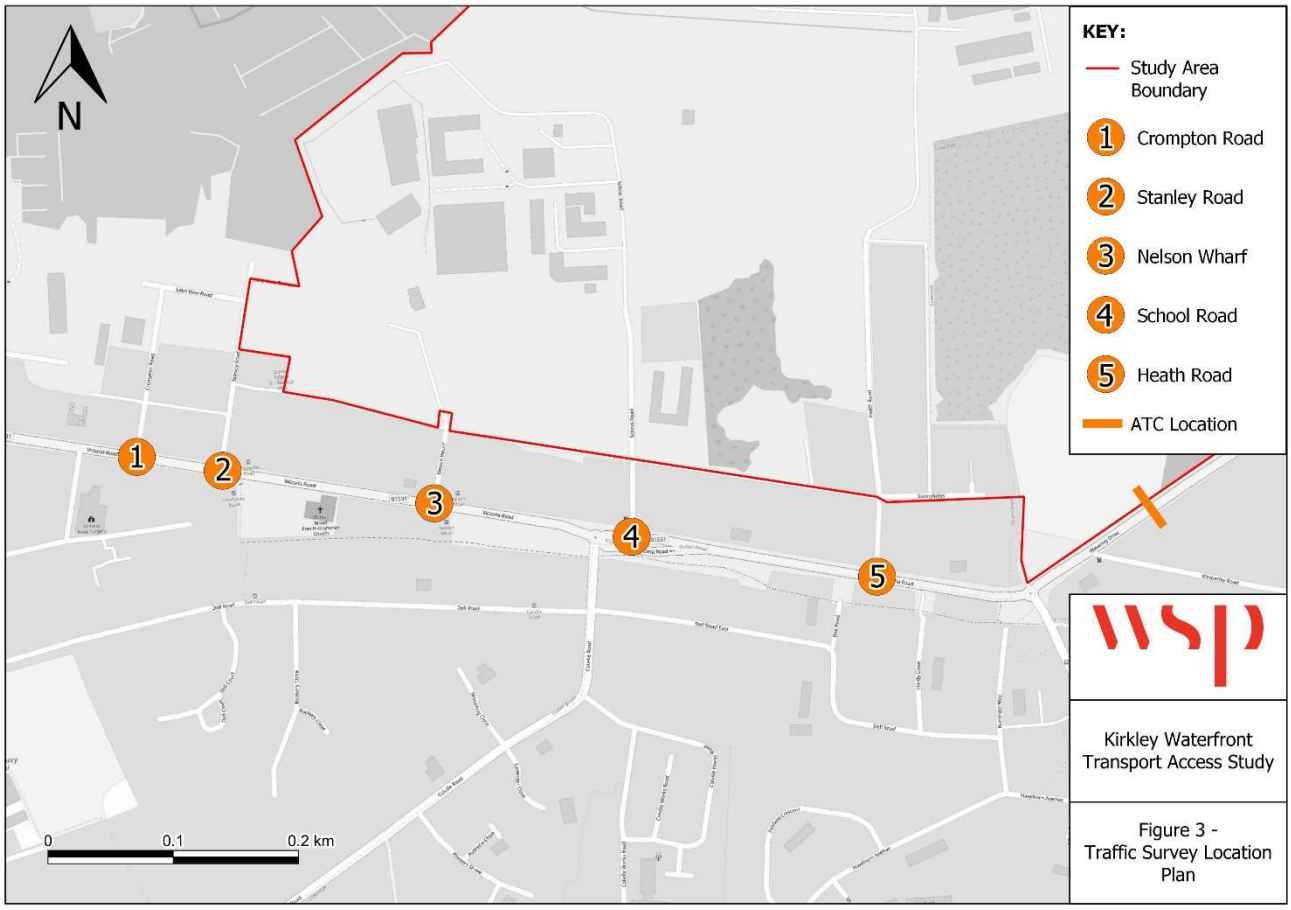
2.3 HIGHWAY NETWORK

2.3.1. This section of the transport access study technical note provides information in relation to the existing traffic flows and queue lengths, highway capacity and road safety along Victoria Road and Waveney Drive adjacent to the development area of Kirkley Waterfront.

TRAFFIC FLOWS AND QUEUE LENGTHS

2.3.2. A number of traffic surveys were undertaken as part of the assessment work for this transport access study with traffic flows and queue length data collected on Tuesday 15th October 2024 in the AM peak period (07:00 – 10:00) and in the PM peak period (16:00 – 19:00) at the junctions of Victoria Road with Crompton Road, Stanley Road, Nelson Wharf, School Road and Heath Road. In addition, traffic flow data was also obtained from a SCC count site on Waveney Drive located between Colin Law Way and Kimberley Road where traffic flow data was collected in July 2023, which was part of an Automatic Traffic Count (ATC) that was undertaken The location of these traffic surveys where traffic flows and queue length data was collected are shown in Figure 2.3 below.

Figure 2.3 – Traffic Survey Location Plan



PEAK HOUR TRAFFIC FLOWS ON VICTORIA ROAD

2.3.3. The traffic flow data that was collected as part the traffic surveys at the junction locations on Victoria Road is enclosed in Appendix A, and network flow diagrams of the traffic flow data for the AM peak hour (08:15 – 09:15 and PM peak hour (16:30 – 17:30) showing all of the surveyed junctions are enclosed in Appendix B. A summary of the two-way link flows at each of the surveyed junctions in the AM and PM peak hours is shown in Table 1 below.

Table 1 – Junction Traffic Flows AM and PM Peak Hours (Two-Way Link Flows)

Site	Arm	AM Peak Hour	PM Peak Hour
1	Victoria Road (W)	544	558
	Crompton Road	20	31
	Victoria Road (E)	544	547

Site	Arm	AM Peak Hour	PM Peak Hour
2	Victoria Road (W)	546	550
	Stanley Road	25	31
	Victoria Road (E)	565	543
3	Victoria Road (W)	561	546
	Nelson Wharf	25	30
	Victoria Road (E)	572	570
4	Victoria Road (W)	774	807
	School Road	71	127
	Victoria Road (E)	741	794
5	Victoria Road (W)	738	780
	Heath Road	36	35
	Victoria Road (E)	742	781

Source: Intelligent Data Collection (October 2024)

2.3.4. As can be seen in Table 1 above Victoria Road is moderately trafficked in the AM peak hour ranging from 544 two-way traffic flows at Site 1 Victoria Road / Crompton Road to 774 two-way flows at Site 4 Victoria Road / School Road. The two-way traffic flows on Victoria Road in the AM peak hour are higher to the east of Colville Road which connects to the residential areas to the south of Victoria Road. In addition, Victoria Road is moderately trafficked in the PM peak hour ranging from 543 two-way traffic flows at Site 2 Victoria Road / Stanley Road to 807 two-way traffic flows at Site 4 Victoria Road / School Road. The two-way traffic flows on Victoria Road are higher to the east of Colville Road which connects to the residential areas to the south of Victoria Road.

2.3.5. In relation to the access roads that connect to Victoria Road as can be seen in Table 1 above they are lightly trafficked in the AM peak hour ranging from 20 two-way traffic flows at Site 1 Victoria Road / Crompton Road to 71 two-way traffic flows at Site 4 Victoria Road / School Road. In addition, the access roads that connect to Victoria Road are lightly trafficked in the PM peak hour ranging from 31 two-way traffic flows at Site 1 Victoria Road / Crompton Road to 127 two-way traffic flows at Site 4 Victoria Road / School Road.

PEAK HOUR AVERAGE QUEUE LENGTHS ON VICTORIA ROAD

2.3.6. The queue length data that was collected as part the traffic surveys at the junctions on Victoria Road is enclosed in Appendix A and shows that there were not significant queues recorded at any of the surveyed junctions in the AM and PM peak hours.

AVERAGE PEAK HOUR TRAFFIC FLOWS ON WAVENEY DRIVE

2.3.7. The traffic flow data that was obtained from the SCC count site on Waveney Drive is enclosed in Appendix A, and a summary of the average two-way link flows on Waveney Drive in the AM peak hour (08:00 – 09:00 and PM peak hour (17:00 – 18:00) is shown in Table 2 below.

Table 2 – Waveney Drive Average Traffic Flows AM and PM Peak Hours (Two-Way Link Flows)

Site	Direction	AM Peak Hour	PM Peak Hour
218	Eastbound	358	204
	Westbound	166	303

Source: SCC Count Site (July 2023)

2.3.8. As can be seen in Table 2 above Waveney Drive is moderately trafficked in the AM peak hour with a traffic flow of 358 eastbound and a traffic flow of 166 westbound (or 524 two-way traffic flow). In addition, Waveney Drive is moderately trafficked in the PM peak hour with a traffic flow of 204 eastbound and a traffic flow of 303 westbound (or 507 two-way traffic flow).

2.3.9. It should be noted that the traffic flow data obtained from the SCC count site on Waveney Drive is very similar to the traffic flow data that was collected as part of the traffic surveys at the junction locations on Victoria Road. This demonstrates that there has been no significant change in the traffic flows on Victoria Road and Waveney Drive following the opening of the Gull Wing Bridge as outlined above (i.e. the traffic flows have remained consistent), and as such the traffic data is considered to be robust for the required purposes.

2.3.10. Overall, the traffic flow data along Victoria Road and Waveney Drive demonstrates that both roads are moderately trafficked in the AM and PM peak hours, and that the access roads that connect to Victoria Road are lightly trafficked in the AM and PM peak hours. In addition, there were only small queues recorded at the junctions on Victoria Road.

HIGHWAY CAPACITY ASSESSMENT

2.3.11. Capacity assessments have been undertaken for the AM and PM peak hour for the 2024 base assessment year, with the traffic flows entered in PCU's at 15-minute intervals using the direct profile setting in Junctions 10 software. The 2024 base junction models have been calibrated using the observed queue length data from the traffic surveys and validated by reviewing the video footage of the junctions in operation during to ensure that the models are robust and fit for purpose.

2.3.12. Each junction model has been set up using geometric inputs obtained from Ordnance Survey mapping and on site observations. The full Junctions 10 outputs are enclosed in Appendix C, and a summary of the junction capacity results are provided below.

MAXIMUM RATIO FLOW CAPACITY

2.3.13. The maximum Ratio Flow Capacity (RFC) that were obtained for each arm of the surveyed junctions on Victoria Road in the AM and PM peak hours are summarised in Table 3 below. It should be noted that an RFC over 0.85 but under 1.00 indicates that the arm is becoming unstable and an RFC of over 1.00 indicates that the arm has gone over capacity.

Table 3 – 2024 Base Capacity Results – Maximum RFC

Site	Arm	AM Peak Hour	PM Peak Hour
1	Victoria Road (W)	NA	NA
	Crompton Road	0.02	0.02
	Victoria Road (E)	0.02	0.02
2	Victoria Road (W)	NA	NA
	Stanley Road	0.03	0.05
	Victoria Road (E)	0.04	0.02
3	Victoria Road (W)	NA	NA
	Nelson Wharf	0.04	0.05
	Victoria Road (E)	0.02	0.03
4	Victoria Road (W)	NA	NA
	School Road	0.07	0.13
	Victoria Road (E)	0.03	0.06
5	Victoria Road (W)	NA	NA
	Heath Road	0.03	0.03
	Victoria Road (E)	0.04	0.04

2.3.14. As can be seen in Table 3 the junction capacity results show that all of the assessed junctions operate within capacity in the AM and PM peak hours, as reflected in the traffic survey data that was collected. The largest RFC of 0.07 was recorded at Site 4 Victoria Road / School Road in the AM peak hour, and the largest RFC of 0.13 was recorded at Site 4 Victoria Road / School Road in the PM peak hour, which demonstrates that there are no existing capacity issues at any of the surveyed junctions on Victoria Road in the AM and PM peak hours.

ROAD SAFETY

2.3.15. Road safety data was obtained from Crashmap for the latest 5-year period (2018 – 2022) along Victoria Road and Waveney Drive adjacent to the development area of Kirkley Waterfront. The results are summarised in Table 4 below and enclosed in Appendix D.

Table 4 – Accidents by Location and Severity

Road	Accident Severity			
	Slight	Serious	Fatal	Total
Waveney Drive	2	1	0	3
Victoria Road	2	0	0	2
Nelson Wharf	1	0	0	1
School Road	1	0	0	1
Total	**6**	**1**	**0**	**7**

Source: Crashmap (October 2024)

2.3.16. As can be seen in Table 4 from the road safety data obtained along Victoria Road and Waveney Drive adjacent to the development area of Kirkley Waterfront there were 2 slight accidents recorded on Victoria Road, and 3 accidents recorded on Waveney Drive (2 slight and 1 serious). In addition, there was 1 slight accident recorded on Nelson Wharf and 1 slight accident recorded on School Road. Overall, there were 7 accidents recorded (6 slight and 1 serious) on Victoria Road and Waveney Drive which demonstrates that there are no significant road safety issues adjacent to the development area of Kirkley Waterfront.

3 FUTURE BASELINE CONDITIONS

3.1 OVERVIEW

3.1.1. This section of the transport access study technical note sets out the predicted future baseline conditions (i.e. without the proposed development on the site) for the 2034 future baseline assessment year, taking into account the impact of background growth on the surrounding highway network.

3.2 TEMPRO GROWTH

3.2.1. In order to take account of background growth on the surrounding highway network the 2024 traffic flows have been factored by car driver growth factors obtained from TEMPro 8.1 National Transport Model (NTM) dataset for MSOA Waveney 005 and adjusted to local growth factors for a period of 10 years between 2024 and 2034. The car driver growth factors are shown in Table 5 below.

Table 5 – TEMPro Car Driver Growth Factors

Period	AM Peak	PM Peak
Weekday (2024 – 2034)	10.99%	10.97%

Source: TEMPro 8.1 (October 2024)

3.2.2. As can be seen in Table 5 the application of background growth car driver growth factors would result in an increase of 10.99% growth in traffic flows between 2024 and 2034 in the AM peak hour, and an increase of 10.97% growth in traffic flows between 2024 and 2034 in the PM peak hour. These growth factors have been used to factor the existing traffic flows and have been added to the 2024 traffic flows to generate the 2034 future baseline traffic flows. It should be noted that for the future baseline assessment year it has been assumed that any committed development trips are already included in the TEMPro growth factors, and in order to prevent double counting have not been included separately as part of the future baseline assessment.

3.3 HIGHWAY NETWORK

3.3.1. The impact of background growth on the operation of the surveyed junctions has been assessed in the AM and PM peak hours for the future baseline assessment year of 2034. The vehicle trips generated by background growth has been assigned to the network by applying the TEMPro growth factors to the traffic survey data collected at each of the surveyed junctions. These traffic flows have been added to the 2024 traffic flows to generate the 2034 future baseline traffic flows. Network flows diagrams showing the 2034 future baseline traffic flows are enclosed in Appendix B.

NETWORK LINK FLOW IMPACT

3.3.2. In order to determine the impact of background growth on the operation of the surveyed junctions in the AM and PM peak hours the 2034 future baseline traffic flows have been compared against the 2024 base traffic flows. This comparative analysis is summarised in Table 6 below.

Table 6 – Comparative AM and PM Peak Hour Flow Analysis Two-Way Link Flow Analysis

Site	Arm	AM Peak Hour		PM Peak Hour	
		2024 Base	2034 Baseline	2024 Base	2034 Baseline
1	Victoria Road (W)	544	598	558	612
	Crompton Road	20	22	31	34
	Victoria Road (E)	544	598	547	600
2	Victoria Road (W)	546	600	550	603
	Stanley Road	25	27	31	34
	Victoria Road (E)	565	621	543	596
3	Victoria Road (W)	561	616	546	599
	Nelson Wharf	25	27	30	33
	Victoria Road (E)	572	628	570	625
4	Victoria Road (W)	774	850	807	885
	School Road	71	78	127	139
	Victoria Road (E)	741	814	794	871
5	Victoria Road (W)	738	811	780	856
	Heath Road	36	40	35	38
	Victoria Road (E)	742	815	781	857

3.3.3. As can be seen in Table 6 the vehicle trips generated by background growth would result in a moderate increase in traffic flows on Victoria Road in the AM peak hour ranging from 54 two-way traffic flows at Site 2 Victoria Road / Stanley Road to 73 two-way flows at Site 5 Victoria Road / Heath Road. In addition, there is a moderate increase in traffic flows on Victoria Road in the PM peak hour ranging from 53 two-way traffic flows at Site 2 Victoria Road / Stanley Road to 78 two-way flows at Site 4 Victoria Road / School Road.

3.3.4. In relation to the access roads that connect to Victoria Road as can be seen in Table 6 above the vehicle trips generated by background growth would result in a small increase in traffic flows in the

AM peak hour ranging from 2 two-way traffic flows at Site 2 Victoria Road / Stanley Road to 7 two-way flows at Site 4 Victoria Road / School Road. In addition, in relation to the access roads that connect to Victoria Road the vehicle trips generated by background growth would result in a small increase in traffic flows in the PM peak hour ranging from 3 two-way traffic flows at Site 2 Victoria Road / Stanley Road to 12 two-way flows at Site 4 Victoria Road / School Road.

HIGHWAY CAPACITY ASSESSMENT

3.3.5. Capacity assessments have been undertaken for the AM and PM peak hour for the 2034 future baseline assessment year, with the vehicle trips assigned through the Victoria Road junctions. The full Junctions 10 outputs are enclosed in Appendix C, and a summary of the junction capacity results are provided below.

MAXIMUM RATIO FLOW CAPACITY

3.3.6. The maximum RFC that were obtained for each arm of the surveyed junctions on Victoria Road in the AM and PM peak hours are summarised in Table 7 below, along with the 2024 base capacity results for comparison purposes. It should be noted that an RFC over 0.85 but under 1.00 indicates that the arm is becoming unstable and an RFC of over 1.00 indicates that the arm has gone over capacity.

Table 7 – Comparative 2024 Base and 2034 Future Baseline Capacity Results – Maximum RFC

Site	Arm	AM Peak Hour		PM Peak Hour	
		2024 Baseline	2034 Baseline	2024 Baseline	2034 Baseline
1	Victoria Road (W)	NA	NA	NA	NA
	Crompton Road	0.02	0.02	0.02	0.02
	Victoria Road (E)	0.02	0.02	0.02	0.02
2	Victoria Road (W)	NA	NA	NA	NA
	Stanley Road	0.03	0.03	0.05	0.05
	Victoria Road (E)	0.04	0.04	0.02	0.02
3	Victoria Road (W)	NA	NA	NA	NA
	Nelson Wharf	0.04	0.04	0.05	0.06
	Victoria Road (E)	0.02	0.03	0.03	0.04
4	Victoria Road (W)	NA	NA	NA	NA

Site	Arm	AM Peak Hour		PM Peak Hour	
		2024 Baseline	2034 Baseline	2024 Baseline	2034 Baseline
	School Road	0.07	0.08	0.13	0.15
	Victoria Road (E)	0.03	0.03	0.06	0.07
5	Victoria Road (W)	NA	NA	NA	NA
	Heath Road	0.03	0.03	0.03	0.04
	Victoria Road (E)	0.04	0.04	0.04	0.05

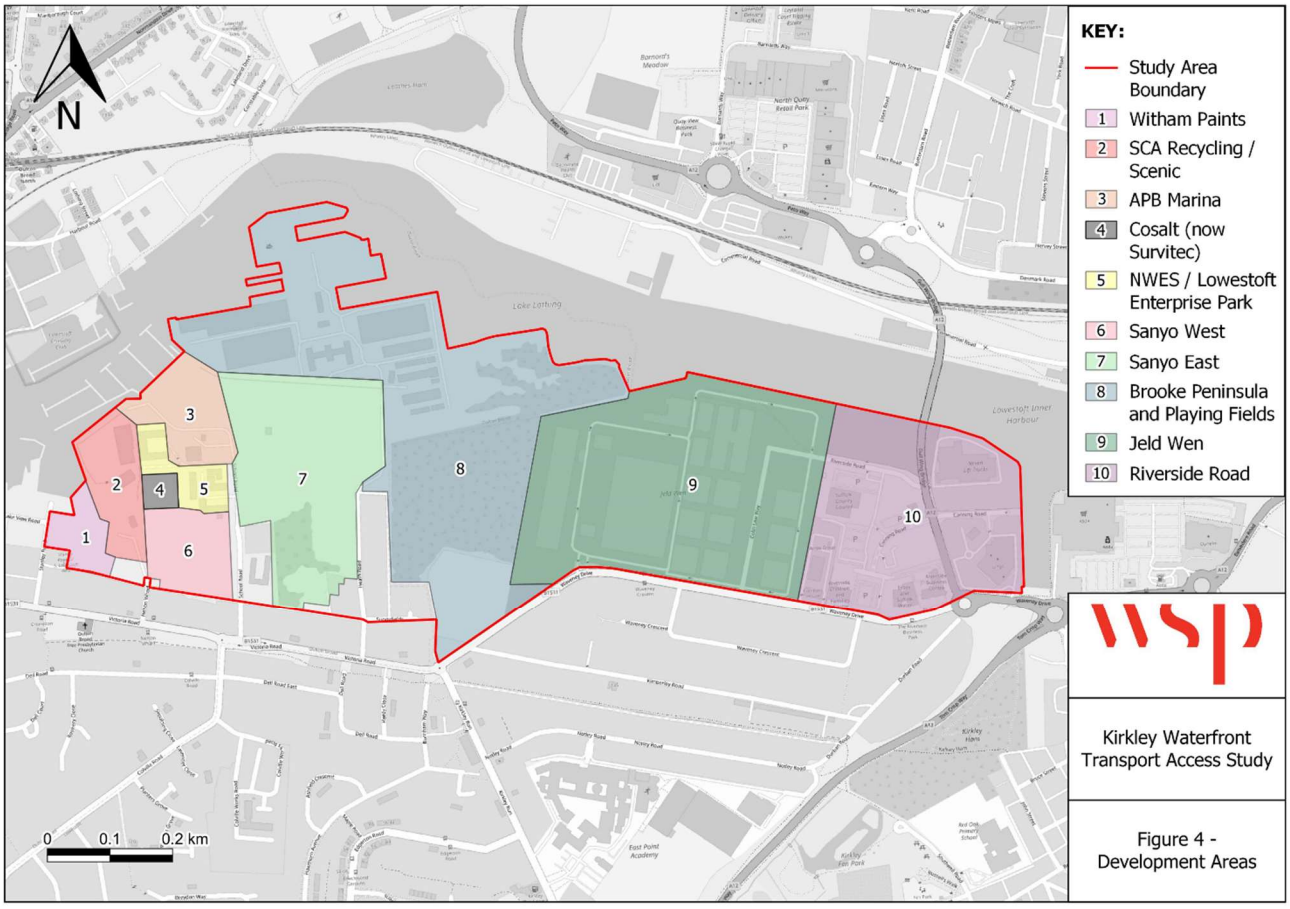
3.3.7. As can be seen in Table 7 the junction capacity results show that with the vehicle trips generated by background growth there is little or no change in the operation of the assessed junctions, with all of them still operating within capacity in the AM and PM peak hours. The largest RFC of 0.08 was recorded at Site 4 Victoria Road / School Road in the AM peak hour, and the largest RFC of 0.15 was recorded at Site 4 Victoria Road / School Road in the PM peak hour, which demonstrates that there are no capacity issues at any of the junctions on Victoria Road in the AM and PM peak hours.

4 DEVELOPMENT TRIPS

4.1 STUDY AREAS

4.1.1. In order to assist in undertaking this assessment the development area of Kirkley Waterfront has been divided into a number of distinct study areas using the individual development sites that are predicted to being coming forward on the site in the next 10 years which are shown in Figure 4.1 below.

Figure 4.1 – Kirkley Waterfront Development Areas



4.1.2. The methodology that has been used to determine the predicted existing and proposed vehicular trip generation for the development area of Kirkley Waterfront is outlined below.

4.2 EXISTING PREDICTED VEHICULAR TRIP GENERATION

4.2.1. In order to determine the existing predicted vehicular trip generation on the site discussions were undertaken with officers at ESC in relation to the nature and extent of the existing land uses on the site based on the distinct areas outlined above. In order to facilitate the comparison between the predicted existing and proposed land uses all land uses have been included in the appropriate tables.

4.2.2. It should be noted that as part of these discussions it was determined that there was limited information available in relation to some of the existing land uses on the site, and as such a number

of assumptions have been made, in agreement with officers at ESC. The different sizes of the existing land uses on the site are summarised as follows:

- Residential – C3(a) Dwellings Houses – 114 dwellings;
- Employment – B2 General Industrial – 19514m^2;
- Employment – B8 Storage – 2710m^2;
- Employment – E(a) Retail – 0m^2;
- Employment – E(b) Restaurant – 1527m^2;
- Employment – E(g)(i) Office – 9415m^2;
- Employment – F1(a) Education – 1166m^2; and
- Sui Generis – Sui Generis – 2864m^2

4.2.3. In order to predict the vehicular trip generation of the existing land uses on the site the Trip Rate Information TRICS® database was used to obtain the vehicular trip rates for the existing C3(a), B2, B8, E(a), E(b), E(g)(i),F1(a) and sui generis land uses of the site using the most appropriate selection criteria. The existing predicted AM and PM peak hour vehicular trip rates that were obtained for the existing land uses on the site are shown in Table 8 below. The full TRICS® outputs of the existing land uses of the site are enclosed in Appendix E, and the details of the trip generation assessment undertaken for the site is enclosed in Appendix F.

Table 8 – Existing AM and PM Peak Hour Vehicular Trip Rates per Dwelling / 100m^2

Land Use			AM Peak Hour			PM Peak Hour		
Class	Type	Category	Arrivals	Departures	Total	Arrivals	Departures	Total
C3(a)	Residential	Dwelling Houses	0.119	0.389	0.508	0.362	0.189	0.551
B2	Employment	General Industrial	0.766	0.399	1.165	0.266	0.666	0.932
B8	Employment	Storage	0.218	0.095	0.313	0.082	0.184	0.266
E(a)	Employment	Retail	0.000	0.000	0.000	0.000	0.000	0.000
E(b)	Employment	Restaurant	0.000	0.000	0.000	1.177	0.546	1.723
E(g)(i)	Employment	Office	0.794	0.140	0.934	0.095	0.621	0.716
F1(a)	Employment	Education	3.475	3.089	6.564	0.202	0.433	0.635
NA	Sui Generis	Sui Generis	1.482	0.480	1.962	0.309	1.226	1.535

Source: TRICS® 2024 v7.11.2 Database (July 2024)

4.2.4. The existing predicted vehicular trip rates in the AM and PM peak hours shown in Table 8 were then applied to the different sizes of the existing land uses on the site as outlined above to determine the existing predicted trip generation of the site and the results are shown in Table 9 below.

Table 9 – Existing Predicted AM and PM Peak Hour Vehicular Trip Generation

Land Use			AM Peak Hour			PM Peak Hour		
Class	Type	Category	Arrivals	Departures	Total	Arrivals	Departures	Total
C3(a)	Residential	Dwelling Houses	14	44	58	41	22	63
B2	Employment	General Industrial	149	78	227	52	130	182
B8	Employment	Storage	6	3	9	2	5	7
E(a)	Employment	Retail	0	0	0	0	0	0
E(b)	Employment	Restaurant	0	0	0	18	8	26
E(g)(i)	Employment	Office	75	13	88	9	58	67
F1(a)	Employment	Education	41	36	77	2	5	7
NA	Sui Generis	Sui Generis	42	14	56	9	35	44
		Total	**327**	**188**	**514**	**134**	**263**	**397**

4.2.5. As can be seen in Table 9 the employment element of the existing land uses on the site (including sui generis) is predicted to generate approximately 313 vehicular arrivals and 144 vehicular departures in the AM peak hour (or 457 two-way vehicular trips) and 92 vehicular arrivals and 241 vehicular departures in the PM peak hour (or 333 two-way vehicular trips). In addition, the residential element of the existing land uses on the site is predicted to generate approximately 14 vehicular arrivals and 44 vehicular departures in the AM peak hour (or 58 two-way vehicular trips) and 41 vehicular arrivals and 22 vehicular departures in the PM peak hour (or 63 two-way vehicular trips).

4.2.6. Overall, the existing land uses on the site are predicted to generate 327 vehicular arrivals and 188 vehicular departures in the AM peak hour (or 514 two-way vehicular trips) and 134 vehicular arrivals and 263 vehicular departures in the PM peak hour (or 397 two-way vehicular trips).

4.3 PROPOSED PREDICTED VEHICULAR TRIP GENERATION

4.3.1. In order to determine the proposed predicted vehicular trip generation on the site discussions were undertaken with officers at ESC in relation to the nature and extent of the proposed land uses on the site based on the distinct areas outlined above. In order to facilitate the comparison between the predicted existing and proposed land uses all land uses have been included in the appropriate tables.

4.3.2. It should be noted that as part of the discussions it was determined that there was limited information available in relation to some of the proposed land uses on the site, and as such a number of assumptions have been made, in agreement with officers at ESC. The different sizes of the proposed land uses on the site are summarised as follows:

- Residential – C3(a) Dwellings Houses – 1795 dwellings;
- Employment – B2 General Industrial – 26720m^2;

- Employment – B8 Storage – 18327m^2;
- Employment – E(a) Retail – 1189m^2;
- Employment – E(b) Restaurant – 804m^2;
- Employment – E(g)(i) Office – 20882m^2;
- Employment – F1(a) Education – 3666m^2; and
- Sui Generis – Sui Generis – 2864m^2

4.3.3. In order to predict the vehicular trip generation of the proposed land uses on the site the Trip Rate Information TRICS® database was used to obtain the vehicular trip rates for the proposed C3(a), B2, B8, E(a), E(b), E(g)(i),F1(a) and sui generis land uses of the site using the most appropriate selection criteria. The proposed predicted AM and PM peak hour vehicular trip rates that were obtained for the proposed land uses on the site are shown in Table 10 below. The full TRICS® outputs of the proposed land uses of the site are enclosed in Appendix E, and the details of the trip generation assessment undertaken for the site in enclosed in Appendix F.

Table 10 – Proposed AM and PM Peak Hour Vehicular Trip Rates per Dwelling / 100m^2

Land Use			AM Peak Hour			PM Peak Hour		
Class	Type	Category	Arrivals	Departures	Total	Arrivals	Departures	Total
C3(a)	Residential	Dwelling Houses	0.119	0.389	0.508	0.362	0.189	0.551
B2	Employment	General Industrial	0.766	0.399	1.165	0.266	0.666	0.932
B8	Employment	Storage	0.218	0.095	0.313	0.082	0.184	0.266
E(a)	Employment	Retail	1.039	0.742	1.781	2.395	2.288	4.683
E(b)	Employment	Restaurant	0.000	0.000	0.000	1.177	0.546	1.723
E(g)(i)	Employment	Office	0.794	0.140	0.934	0.095	0.621	0.716
F1(a)	Employment	Education	3.475	3.089	6.564	0.202	0.433	0.635
NA	Sui Generis	Sui Generis	1.482	0.480	1.962	0.309	1.226	1.535

Source: TRICS® 2024 v7.11.2 Database (July 2024)

4.3.4. The proposed predicted vehicular trip rates in the AM and PM peak hours shown in Table 10 were then applied to the different sizes of the proposed land uses on the site as outlined above to determine the proposed predicted trip generation of the site and the results are shown in Table 11 below.

Table 11 – Proposed Predicted AM and PM Peak Hour Vehicular Trip Generation

Land Use			AM Peak Hour			PM Peak Hour		
Class	**Type**	**Category**	**Arrivals**	**Departures**	**Total**	**Arrivals**	**Departures**	**Total**
C3(a)	Residential	Dwelling Houses	219	704	923	655	344	999
B2	Employment	General Industrial	207	110	317	75	182	257
B8	Employment	Storage	42	19	61	16	35	51
E(a)	Employment	Retail	13	9	22	29	28	57
E(b)	Employment	Restaurant	0	0	0	10	6	16
E(g)(i)	Employment	Office	167	31	198	22	133	155
F1(a)	Employment	Education	128	115	243	9	17	26
NA	Sui Generis	Sui Generis	43	14	57	9	36	45
		Total	**819**	**1002**	**1821**	**841**	**789**	**1630**

4.3.5. As can be seen in Table 11 the employment element of the proposed land uses on the site (including sui generis) is predicted to generate approximately 600 vehicular arrivals and 298 vehicular departures in the AM peak hour (or 98 two-way vehicular trips) and 186 vehicular arrivals and 445 vehicular departures in the PM peak hour (or 631 two-way vehicular trips). In addition, the residential element of the proposed land uses on the site is predicted to generate approximately 219 vehicular arrivals and 704 vehicular departures in the AM peak hour (or 923 two-way vehicular trips) and 655 vehicular arrivals and 344 vehicular departures in the PM peak hour (or 999 two-way vehicular trips).

4.3.6. Overall, the proposed land uses on the site are predicted to generate 819 vehicular arrivals and 1002 vehicular departures in the AM peak hour (or 1821 two-way vehicular trips) and 841 vehicular arrivals and 789 vehicular departures in the PM peak hour (or 1630 two-way vehicular trips).

4.4 EXISTING AND PROPOSED PREDICTED VEHICULAR TRIP GENERATION

4.4.1. It should be noted that the existing predicted vehicular trip generation outlined in Table 9 was compared with the existing vehicular trip generation that was recorded as part of the traffic surveys that were undertaken at the junctions on Victoria Road as outlined Table 1. This comparison showed that the existing predicted vehicular trip generation was significantly higher than the existing vehicular trip generation that was recorded as part of the traffic surveys. As such in order to undertake a robust assessment the existing predicted vehicular trip generation was used for the land uses remaining on the site, and the proposed predicted vehicular trip generation was used for the new land uses on the site, to determine the overall impact of the proposed development trips on the operation of the surrounding highway network.

4.5 HIGHWAY NETWORK

4.5.1. The impact of the proposed development trips on the operation of the surveyed junctions on Victoria Road and the new junction on Waveney Drive has been assessed in the AM and PM peak hours for the future with development assessment year of 2034. It should be noted that the impact of sustainable mitigation measures that all proposed development on the development area of Kirkley Waterfront will be required to provide i.e. modal shift away from the private car to walking, cycling and public transport, has not been taken account as part of this assessment work. As such this assessment represents a worst case scenario, with a likely significant potential to reduce the number of vehicular trips generated by the proposed development.

4.5.2. The vehicle trips generated by the proposed development have been assigned to the network based on the traffic flows proportions determined from the traffic surveys undertaken at the junctions on Victoria Road, and the traffic flow proportions determined from the traffic flow data on Waveney Drive obtained from SCC. The vehicle trips were assigned through the Victoria Road junctions and through the new junction on Waveney Drive. It should be noted that the junction design that was produced by AECOM as part of the original assessment that was undertaken for the site was used to undertake the assessment of the new junction on Waveney Drive. These traffic flows have been added to the 2034 future baseline traffic flows to generate the 2034 future with development traffic flows. Network flows diagrams showing the 2034 future with development traffic flows are enclosed in Appendix B.

4.5.3. It should be noted that due to the methodology that has been used to distribute the development trips onto the surrounding highway network (as outlined above) there has been a small decrease in traffic flows on some of the access roads that connect to Victoria Road and Waveney Road.

NETWORK LINK FLOW IMPACT – VEHICLE TRIPS ASSIGNED THROUGH VICTORIA ROAD JUNCTIONS

4.5.4. In order to determine the impact of proposed development trips on the operation of the surveyed junctions, the junction of Waveney Drive / Colin Law Way and the junction of Waveney Drive / New Access in the AM and PM peak hours the 2034 future with the development traffic flows assigned through the Victoria Road junctions have been compared to the 2034 future baseline traffic flows. This comparative analysis is summarised in Table 12 below. It should be noted the traffic flows at the junction of Waveney Drive / Colin Law Way and at the junction of Waveney Drive / New Access have also been included in Table 12 below.

Table 12 – Comparative AM and PM Peak Hour Flow Analysis Two-Way Link Flow Analysis (Victoria Road junctions)

Site	Arm	AM Peak Hour		PM Peak Hour	
		2034 Baseline	2034 + Devlp	2034 Baseline	2034 + Devlp
1	Victoria Road (W)	598	1478	612	1349
	Crompton Road	22	13	34	14

Site	Arm	AM Peak Hour		PM Peak Hour	
		2034 Baseline	2034 + Devlp	2034 Baseline	2034 + Devlp
	Victoria Road (E)	598	1478	600	1344
2	Victoria Road (W)	600	1495	603	1338
	Stanley Road	27	22	34	25
	Victoria Road (E)	621	1511	596	1331
3	Victoria Road (W)	616	1514	599	1344
	Nelson Wharf	27	54	33	53
	Victoria Road (E)	628	1539	625	1387
4	Victoria Road (W)	850	1735	885	1600
	School Road	78	197	139	148
	Victoria Road (E)	814	1633	871	1583
5	Victoria Road (W)	811	1630	856	1612
	Heath Road	40	691	38	654
	Victoria Road (E)	815	1757	857	1643
6	Waveney Drive (W)	815	1863	857	1776
	New Access	0	0	0	0
	Waveney Drive (E)	815	1863	857	1776
7	Waveney Drive (W)	815	1863	857	1573
	Colin Law Way	228	844	166	736
	Waveney Drive (E)	769	1810	831	1637

4.5.5. As can be seen in Table 12 with the vehicle trips generated by the proposed development would result in a significant increase in traffic flows on Victoria Road and Waveney Drive in the AM peak hour ranging from 691 two-way traffic flows at Site 5 Victoria Road / Heath Road to 844 two-way flows at Site 7 Waveney Drive / Colin Law Way. In addition, there is a significant increase in traffic flows on Victoria Road and Waveney Drive in the PM peak hour ranging from 197 two-way traffic flows at Site 4 Victoria Road / School Road to 844 two-way flows at Site 7 Waveney Drive / Colin Law Way.

4.5.6. In relation to the access roads that connect to Victoria Road as can be seen in Table 12 above the vehicle trips generated by the proposed development would result in a significant increase in traffic flows in the AM peak hour on some of these roads ranging from 54 two-way traffic flows at Site 3 Victoria Road / Nelson Wharf to 691 two-way flows at Site 5 Victoria Road / Heath Road. In addition, in relation to the access roads that connect to Victoria Road the vehicle trips generated by the proposed development would result in a significant increase in traffic flows in the PM peak hour at some of these roads ranging from 148 two-way traffic flows at Site 4 Victoria Road / School Road to 654 two-way flows at Site 5 Victoria Road / Heath Road.

NETWORK LINK FLOW IMPACT – VEHICLE TRIPS ASSIGNED THROUGH NEW ACCESS JUNCTION ON WAVENEY DRIVE

4.5.7. In order to determine the impact of proposed development trips on the operation of the surveyed junctions, the junction of Waveney Drive / Colin Law Way and the junction of Waveney Drive / New Access in the AM and PM peak hours the 2034 future with the development traffic flows assigned through a new access on Waveney Drive have been compared to the 2034 future baseline traffic flows. This comparative analysis is summarised in Table 13 below. It should be noted the traffic flows at the junction of Waveney Drive / Colin Law Way have also been included in Table 13 below.

Table 13 – Comparative AM and PM Peak Hour Flow Analysis Two-Way Link Flow Analysis (New Access on Waveney Drive)

Site	Arm	AM Peak Hour		PM Peak Hour	
		2034 Baseline	2034 + Devlp	2034 Baseline	2034 + Devlp
1	Victoria Road (W)	598	1466	612	1415
	Crompton Road	22	13	34	14
	Victoria Road (E)	598	1466	600	1410
2	Victoria Road (W)	600	1482	603	1404
	Stanley Road	27	16	34	19
	Victoria Road (E)	621	1494	596	1399
3	Victoria Road (W)	616	1497	599	1412

Site	Arm	AM Peak Hour		PM Peak Hour	
		2034 Baseline	2034 + Devlp	2034 Baseline	2034 + Devlp
	Nelson Wharf	27	12	33	10
	Victoria Road (E)	628	1502	625	1420
4	Victoria Road (W)	850	1697	885	1633
	School Road	78	111	139	55
	Victoria Road (E)	814	1644	871	1627
5	Victoria Road (W)	811	1641	856	1656
	Heath Road	40	28	38	53
	Victoria Road (E)	815	1647	857	1659
6	Waveney Drive (W)	815	1673	857	1679
	New Access	0	1429	0	1323
	Waveney Drive (E)	815	1785	857	1623
7	Waveney Drive (W)	815	1648	857	1527
	Colin Law Way	228	212	166	156
	Waveney Drive (E)	769	1606	831	1565

4.5.8. As can be seen in Table 13 with the vehicle trips generated by the proposed development would result in a significant increase in traffic flows on Victoria Road and Waveney Drive in the AM peak hour ranging from 212 two-way traffic flows at Site 7 Waveney Road / Colin Law Way to 1429 at Site 6 Waveney Drive / New Access. In addition, there is a significant increase in traffic flows on Victoria Road and Waveney Drive in the PM peak hour ranging from 156 two-way traffic flows at Site 7 Waveney Road / Colin Law Way to 1323 at Site 6 Waveney Drive / New Access.

4.5.9. In relation to the access roads that connect to Victoria Road as can be seen in Table 13 above the vehicle trips generated by the proposed development would result in a small increase in traffic flows in the AM peak hour of 111 two-way traffic flows at Site 4 Victoria Road / School Road. In addition, in relation to the access roads that connect to Victoria Road the vehicle trips generated by the

proposed development would result in a small increase in traffic flows in the PM peak hour of 53 two-way traffic flows at Site 5 Victoria Road / Heath Road.

HIGHWAY CAPACITY ASSESSMENT

4.5.10. Capacity assessments have been undertaken for the AM and PM peak hours for the 2034 future with development assessment year, with the vehicle trips assigned through the Victoria Road junctions and through the new junction on Waveney Drive. The full Junctions 10 outputs are enclosed in Appendix C, and a summary of the junction capacity results are provided below.

MAXIMUM RATIO FLOW CAPACITY – VEHICLE TRIPS ASSIGNED THROUGH VICTORIA ROAD JUNCTIONS

4.5.11. The maximum RFC that were obtained for each arm of the surveyed junctions on Victoria Road and at the junction of Waveney Drive / New Access in the AM and PM peak hours the development traffic flows assigned through the Victoria Road junctions are summarised in Table 14 below, along with the 2034 future baseline capacity results for comparison purposes. It should be noted that an RFC over 0.85 but under 1.00 indicates that the arm is becoming unstable and an RFC of over 1.00 indicates that the arm has gone over capacity. The junction of Waveney Drive / Colin Law Way and the junction of Waveney Drive / New Access have also been included in Table 14 below. It should be noted that there are no modelling results for Site 6 Waveney Drive / New Access, and Site 7 Waveney Drive / Colin Law Way as they have not been modelling as part of this work.

Table 14 – Comparative 2034 Future Baseline and 2024 Future with Development – Maximum RFC (Victoria Road junctions)

Site	Arm	AM Peak Hour		PM Peak Hour	
		2034 Baseline	2034 + Devlp	2034 Baseline	2034 + Devlp
1	Victoria Road (W)	NA	NA	NA	NA
	Crompton Road	0.02	0.02	0.02	0.02
	Victoria Road (E)	0.02	0.00	0.02	0.01
2	Victoria Road (W)	NA	NA	NA	NA
	Stanley Road	0.03	0.03	0.05	0.02
	Victoria Road (E)	0.04	0.02	0.02	0.02
3	Victoria Road (W)	NA	NA	NA	NA
	Nelson Wharf	0.04	0.10	0.06	0.06
	Victoria Road (E)	0.03	0.04	0.04	0.09

Site	Arm	AM Peak Hour		PM Peak Hour	
		2034 Baseline	2034 + Devlp	2034 Baseline	2034 + Devlp
4	Victoria Road (W)	NA	NA	NA	NA
	School Road	0.08	0.45	0.15	0.16
	Victoria Road (E)	0.03	0.05	0.07	0.06
5	Victoria Road (W)	NA	NA	NA	NA
	Heath Road	0.03	1.28	0.04	1.01
	Victoria Road (E)	0.04	0.32	0.05	0.92
6	Waveney Drive (W)	NA	NA	NA	NA
	New Access	NA	NA	NA	NA
	Waveney Drive (E)	NA	NA	NA	NA

4.5.12. As can be seen in Table 14 the junction capacity results show that with the vehicle trips generated by the proposed development there is little change in the operation of the assessed junctions, with the majority of them still operating within capacity in the AM and PM peak hours. At the junctions that still operate within capacity the largest RFC of 0.45 was recorded at Site 4 Victoria Road / School Road in the AM peak hour, and the largest RFC of 0.16 was recorded at Site 4 Victoria Road / School Road in the PM peak hour, which demonstrates that there are no capacity issues at these junctions on Victoria Road in the AM and PM peak hours. The only junction that now operates over capacity is Site 5 Victoria Road / Heath Road with an RFC of 1.28 in the AM peak hour and an RFC of 1.01 in the PM peak hour, which demonstrates that there are significant capacity issues at this junction in the AM and PM peak hours.

MAXIMUM RATIO FLOW CAPACITY – VEHICLE TRIPS ASSIGNED THROUGH NEW ACCESS ON WAVENEY DRIVE

4.5.13. The maximum RFC that were obtained for each arm of the surveyed junctions on Victoria Road and at the junction of Waveney Drive / New Access in the AM and PM peak hours with the development traffic flows assigned through the new access on Waveney Drive are summarised in Table 15 below, along with the 2034 future baseline capacity results for comparison purposes. It should be noted that an RFC over 0.85 but under 1.00 indicates that the arm is becoming unstable and an RFC of over 1.00 indicates that the arm has gone over capacity. It should be noted that Site 7 Waveney Drive / Colin Law Way has not been modelling as part of this work.

Table 15 – Comparative 2034 Future Baseline and 2024 Future with Development – Maximum RFC (New Access on Waveney Drive)

Site	Arm	AM Peak Hour		PM Peak Hour	
		2034 Baseline	2034 + Devlp	2034 Baseline	2034 + Devlp
1	Victoria Road (W)	NA	NA	NA	NA
	Crompton Road	0.02	0.03	0.02	0.02
	Victoria Road (E)	0.02	0.00	0.02	0.01
2	Victoria Road (W)	NA	NA	NA	NA
	Stanley Road	0.03	0.02	0.05	0.02
	Victoria Road (E)	0.04	0.01	0.02	0.01
3	Victoria Road (W)	NA	NA	NA	NA
	Nelson Wharf	0.04	0.01	0.06	0.02
	Victoria Road (E)	0.03	0.02	0.04	0.01
4	Victoria Road (W)	NA	NA	NA	NA
	School Road	0.08	0.19	0.15	0.09
	Victoria Road (E)	0.03	0.04	0.07	0.01
5	Victoria Road (W)	NA	NA	NA	NA
	Heath Road	0.03	0.03	0.04	0.06
	Victoria Road (E)	0.04	0.01	0.05	0.08
6	Waveney Drive (W)	NA	NA	NA	NA
	New Access	NA	2.06	NA	1.36
	Waveney Drive (E)	NA	0.47	NA	0.54

4.5.14. As can be seen in Table 15 the junction capacity results show that with the vehicle trips generated by the proposed development there is little change in the operation of the assessed junctions, with the majority of them still operating within capacity in the AM and PM peak hours. At the junctions that still operate within capacity the largest RFC of 0.18 was recorded at Site 4 Victoria Road / School Road in the AM peak hour, and the largest RFC of 0.09 was recorded at Site 4 Victoria Road / School Road in the PM peak hour, which demonstrates that there are no capacity issues at these junctions on Victoria Road in the AM and PM peak hours. The only junction that now operates over capacity is Site 6 Waveney Drive / New Access with an RFC of 2.06 in the AM peak hour and an RFC of 1.36 in the PM peak hour, which demonstrates that there are significant capacity issues at this junction in the AM and PM peak hours.

SENSITIVITY TESTING

4.5.15. As outlined above, in the modelling results for the two scenarios undertaken looking at the impact of the proposed developments trips, it can be seen that both 5 Victoria Road / Heath Road (see Table 14), and Site 6 Waveney Drive / New Access (see Table 15) operate over capacity. In order to improve the operation of these junctions two sensitivity test were undertaken which redistributed the development trips to determine the level of development trips that they can accommodate without going over capacity, which are outlined as follows:

- **Sensitivity Test 1 –** Development trips redistributed between Site 4 Victoria Road / School Road and Site 5 Victoria Road / Heath Road, to determine the level of development trips that these junctions can accommodate without going over capacity when vehicle trips were assigned through the Victoria Road junctions;
- **Sensitivity Test 2 –** Development trips redistributed between Site 4 Victoria Road / School Road, Site 5 Victoria Road / Heath Road and Site 6 Waveney Drive / New Access, to determine the level of development trips that these junctions can accommodate without going over capacity when vehicle trips were assigned through the new access on Waveney Drive

4.5.16. Network flows diagrams showing the redistributed 2034 future with development traffic flows for the two sensitivity tests outlined above are enclosed in Appendix B.

HIGHWAY CAPACITY ASSESSMENT

4.5.17. Capacity assessments have been undertaken for the AM and PM peak hour for the 2034 future with development assessment year, with the vehicle trips redistributed between Site 4 Victoria Road / School Road and Site 5 Victoria Road / Heath Road (Sensitivity Test 1) and between Site 4 Victoria Road / School Road, Site 5 Victoria Road / Heath Road and Site 6 Waveney Drive / New Access (Sensitivity Test 2). The full Junctions 10 outputs are enclosed in Appendix C, and a summary of the junction capacity results are provided below.

MAXIMUM RATIO FLOW CAPACITY – VEHICLE TRIPS REDISTRIBUTED BETWEEN SITES 4 AND 5 (SENSITIVITY TEST 1)

4.5.18. The maximum RFC that were obtained for each arm of the surveyed junctions on Victoria Road, and the other junctions in the study area, in the AM and PM peak hours with the development traffic flows redistributed between the Site 4 Victoria Road / School Road and Site 5 Victoria Road / Heath Road are summarised in Table 16 below, along with the 2034 future baseline capacity results for comparison purposes. It should be noted that an RFC over 0.85 but under 1.00 indicates that the arm is becoming unstable and an RFC over 1.00 indicates that the arm has gone over capacity. It

should be noted that there are no modelling results for Site 6 Waveney Drive / New Access, and Site 7 Waveney Drive / Colin Law Way as they have not been modelling as part of this work.

Table 16 – Comparative 2034 Future Baseline and 2024 Future with Development – Maximum RFC (Redistributed between Sites 4 and 5)

Site	Arm	AM Peak Hour		PM Peak Hour	
		2034 Baseline	2034 + Devlp	2034 Baseline	2034 + Devlp
1	Victoria Road (W)	NA	NA	NA	NA
	Crompton Road	0.02	0.02	0.02	0.02
	Victoria Road (E)	0.03	0.00	0.02	0.01
2	Victoria Road (W)	NA	NA	NA	NA
	Stanley Road	0.03	0.03	0.05	0.02
	Victoria Road (E)	0.04	0.02	0.02	0.02
3	Victoria Road (W)	NA	NA	NA	NA
	Nelson Wharf	0.04	0.01	0.06	0.06
	Victoria Road (E)	0.03	0.04	0.04	0.09
4	Victoria Road (W)	NA	NA	NA	NA
	School Road	0.08	0.81	0.15	0.28
	Victoria Road (E)	0.03	0.07	0.07	0.12
5	Victoria Road (W)	NA	NA	NA	NA
	Heath Road	0.07	0.97	0.04	0.22
	Victoria Road (E)	0.05	0.26	0.05	0.75
6	Waveney Drive (W)	NA	NA	NA	NA
	New Access	NA	NA	NA	NA

Site	Arm	AM Peak Hour		PM Peak Hour	
		2034 Baseline	2034 + Devlp	2034 Baseline	2034 + Devlp
	Waveney Drive (E)	NA	NA	NA	NA

4.5.19. As can be seen in Table 16 the junction capacity results show that, with the vehicle trips generated by the proposed development redistributed between Site 4 Victoria Road / School Road and Site 5 Victoria Road / Heath Road, all of the junctions now operate within capacity, including Site 5 Victoria Road / Heath Road which as outlined Table 14 previously operated significantly over capacity. In order to achieve this improvement in the operation of Site 5 Victoria Road / Heath Road the development trips were distributed between Site 4 Victoria Road / School Road and Site 5 Victoria Road / Heath Road using the following proportions and distributions of development trips:

- Site 4 Victoria Road / School Road – 20% of development trips which represents 175 inbound and 378 outbound development trips in the AM peak hour, and 333 inbound and 190 outbound development trips in the PM peak hour; and
- Site 5 Victoria Road / Heath Road – 80% of development trips which represents 127 inbound and 208 outbound development trips in the AM peak hour, and 164 inbound and 115 outbound development trips in the PM peak hour

4.5.20. As previously noted, for the modelling work that was undertaken within the study area, the development trips that will access and egress Colin Law Way have been included to ensure a robust assessment. However, it should be noted the junction of Waveney Drive / Colin Law Way has not been modelled to determine the impact of the development trips on its operation. This could have an impact on the distribution of development trips across the study area, and impact on the operation of the junctions modelled, but this cannot be determined until Colin Law Way is modelled.

4.5.21. It should be also noted that these sensitivity tests outline the results of those that were agreed with ESC as part of this assessment work and provide an indication of the level of development trips that these junctions can be accommodate without going over capacity. However, it should be noted that there is the potential to undertake additional sensitivity tests to look at the impact of additional distribution of development trips if required.

MAXIMUM RATIO FLOW CAPACITY – VEHICLE TRIPS REDISTRIBUTED BETWEEN SITES 4, 5 AND 6 (SENSITIVITY TEST 2)

4.5.22. The maximum RFC that were obtained for each arm of the surveyed junctions on Victoria Road and at the junction of Waveney Drive / New Access in the AM and PM peak hours with the development traffic flows redistributed between Site 4 Victoria Road / School Road, Site 5 Victoria Road / Heath Road and Site 6 Waveney Drive / New Access are summarised in Table 17 below, along with the 2034 future baseline capacity results for comparison purposes. It should be noted that an RFC over 0.85 but under 1.00 indicates that the arm is becoming unstable and an RFC over 1.00 indicates that the arm has gone over capacity. It should be noted that there are no modelling results for Site 7 Waveney Drive / Colin Law Way as they have not been modelling as part of this work.

Table 17 – Comparative 2034 Future Baseline and 2024 Future with Development – Maximum RFC (Redistributed between Sites 4, 5 and 6)

Site	Arm	AM Peak Hour		PM Peak Hour	
		2034 Baseline	2034 + Devlp	2034 Baseline	2034 + Devlp
1	Victoria Road (W)	NA	NA	NA	NA
	Crompton Road	0.02	0.03	0.02	0.02
	Victoria Road (E)	0.03	0.00	0.02	0.01
2	Victoria Road (W)	NA	NA	NA	NA
	Stanley Road	0.03	0.02	0.05	0.02
	Victoria Road (E)	0.04	0.01	0.02	0.01
3	Victoria Road (W)	NA	NA	NA	NA
	Nelson Wharf	0.04	0.01	0.06	0.02
	Victoria Road (E)	0.03	0.02	0.04	0.01
4	Victoria Road (W)	NA	NA	NA	NA
	School Road	0.08	0.49	0.14	0.28
	Victoria Road (E)	0.03	0.12	0.07	0.11
5	Victoria Road (W)	NA	NA	NA	NA
	Heath Road	0.07	0.90	0.04	0.42
	Victoria Road (E)	0.05	0.24	0.06	0.40
6	Waveney Drive (W)	NA	NA	NA	NA
	New Access	NA	0.84	NA	0.33
	Waveney Drive (E)	NA	0.18	NA	0.18

4.5.23. As can be seen in Table 17 the junction capacity results show that, with the vehicle trips generated by the proposed development redistributed between Site 4 Victoria Road / School Road and Site 5 Victoria Road / Heath Road and Site 6 Waveney Drive / New Access, all of the junctions now operate within capacity, including Site 6 Waveney Drive / New Access which as outlined Table 15 previously operated significantly over capacity. In order to achieve this improvement in the operation of Site 6 Waveney Drive / New Access the development trips were distributed between Site 4 Victoria Road / School Road and Site 5 Victoria Road / Heath Road using the following proportions and distributions of development trips:

- Site 4 Victoria Road / School Road – 25% of development trips which represents 210 inbound and 261 outbound development trips in the AM peak hour, and 203 inbound and 183 outbound development trips in the PM peak hour;
- Site 5 Victoria Road / Heath Road – 40% of development trips which represents 237 inbound and 362 outbound development trips in the AM peak hour, and 327 inbound and 255 outbound development trips in the PM peak hour; and
- Site 6 Waveney Drive / New Access – 35% development trips which represents 202 inbound and 299 outbound development trips in the AM peak hour, and 256 inbound and 208 outbound development trips in the PM peak hour.

4.5.24. As previously noted, for the modelling work that was undertaken within the study area the development trips that will access, and egress Colin Law Way have been included to ensure a robust assessment. However, it should be noted the junction of Waveney Drive / Colin Law Way has not been modelled to determine the impact of the development trips on its operation. This could have an impact on the distribution of development trips across the study area, and impact on the operation of the junctions modelled, but this cannot be determined until Colin Law Way is modelled.

4.5.25. It should be also noted that these sensitivity tests outline the results of those that were agreed with ESC as part of this assessment work and provide an indication of the level of development trips that these junctions can be accommodate without going over capacity. However, it should be noted that there is the potential to undertake additional sensitivity tests to look at the impact of additional distribution of development trips if required.

5 JUNCTION ASSESSMENT

5.1 OVERVIEW

5.1.1. This section of the transport access study technical note sets the results of the swept path analysis that was undertaken at the junctions of Victoria Road with Crompton Road, Stanley Road, Nelson Wharf, School Road and Heath Road, and at the new access junction on Waveney Drive. It also sets out the results of the assessment that was undertaken of potential junction improvement measures that could be implemented to mitigate impact of quantum of development at the junctions Victoria Road with Crompton Road, Stanley Road, Nelson Wharf, School Road and Heath Road, and at the new access junction on Waveney Drive.

5.2 SWEPT PATH ANALYSIS

5.2.1. The swept path analysis showed that all of the junctions on Victoria Road can satisfactorily accommodate the movement of an 8.0m box van, and that School Road and Nelson Wharf can also satisfactorily accommodate the movement of a 16.5m articulated vehicle. In addition, the swept path analysis showed that all of the junctions on Victoria Road can satisfactorily accommodate the movement of a 10.2m refuse vehicle. The swept path analysis that was undertaken is shown in Drawings 0029363-WSP-ZZ-ZZ-SK-TP-0001-P01, 0029363-WSP-ZZ-ZZ-SK-TP-0002-P01, 0029363-WSP-ZZ-ZZ-SK-TP-0003-P01, and 0029363-WSP-ZZ-ZZ-SK-TP-0004-P01 enclosed in Appendix G. In addition, a plan has been provided to show the visibility splays that are required and achievable at each of the surveyed junctions on Victoria Road, which is shown in Drawing 0029363-WSP-ZZ-ZZ-SK-TP-0006-P01 enclosed in Appendix G.

5.3 POTENTIAL JUNCTION IMPROVEMENTS MEASURES

5.3.1. The assessment that was undertaken of potential junction improvement measures that could be implemented showed that there is limited scope to provide improvements at the junctions on Victoria Road. The main reason for this is that these roads are generally narrow in nature ranging from approximately 4.1m to 5.0m, and as Victoria Road is predominately a residential area within the vicinity of these junctions (with houses and gardens located on both sides of all of the junctions), there is limited space to provide improvement measures, without removing these houses and gardens, which is likely to be problematic. Having said that there are a number of potential minor junction improvements measures that could be implemented to improve the movements of vehicles at these junctions on Victoria Road including the following.

- Remove existing on-street parking bays where appropriate on all of the side roads;
- Extend the parking controls i.e. double yellow lines on all of the side roads;
- Redo the double yellow line markings on all of the side roads;
- Improve enforcement of parking controls on all of the side roads; and
- Redo white line markings at all of the junctions with Victoria Road.

5.3.2. In relation to the new access junction on Waveney Drive there is limited scope to provide improvements as we used the junction design that was produced by AECOM as part of the original assessment that was undertaken for the site, and as such it has been assumed that the junction has been designed to cater for a similar level of vehicular trips to what we have used in relation to the development area of Kirkley Waterfront.

5.3.3. Although there are only potential minor junction improvement measures that could be implemented at the junctions on the surrounding highway network as outlined above it should be noted that the sustainable mitigation measures that all proposed development on the development area of Kirkley Waterfront will be required to provide are likely to have significant potential to reduce the number of vehicular trips generated by the proposed development by providing appropriate sustainable infrastructure to encourage a modal shift away from the private car to walking, cycling and public transport e.g. improvements to walking and cycling connections to local services and facilities, safe and secure cycle parking and improvements to local bus services, and as such reduce the impact on the junction on Victoria Road and the new access junction on Waveney Drive.

6 SUMMARY AND CONCLUSION

6.1 OVERVIEW

6.1.1. This section of the transport access study technical note sets out a summary and conclusion of the assessment work undertaken to investigate the predicted impact of proposed development on a development area known as Kirkley Waterfront, Lowestoft, on the surrounding highway network.

6.2 BACKGROUND

6.2.1. WSP has been commissioned by ESC via SCC to undertake a transport access study to investigate the predicted impact of proposed development on a development area known as Kirkley Waterfront, Lowestoft, on the surrounding highway network.

6.2.2. It should be noted that Policy WLP2.4 of the Waveney Local Plan identifies Kirkley Waterfront as a Sustainable Urban Neighbourhood (SUN) which is allocated for mixed use development including residential, employment, primary school, playing fields and a local retail centre. It is recognised that over the last 10 years proposed development on Kirkley Waterfront has largely not come forward, and as such ESC are preparing a Position Statement in relation to the site to outline their current position, with the information outlined in this transport access study technical note supporting this Position Statement.

6.2.3. The scope of work was discussed and agreed with officers at ESC and SCC and is intended to feed into the Position Statement that is being prepared by ESC. It will investigate the predicted impact of proposed development on the site on the adjacent highway network to the south focusing primarily on Victoria Road and its junctions with Crompton Road, Stanley Road, Nelson Wharf, School Road and Heath Road.

6.3 EXISTING CONDITIONS

6.3.1. The study area is located approximately 2km south west of Lowestoft Town Centre and is bordered to the north by Lake Lothing, to the east by the A12 Riverside Road and an existing industrial estate, to the south by Victoria Road and Waveney Drive, and to the west by Crompton Road. It covers an area of 59.8 hectares, and is currently occupied by predominately underutilised or unoccupied brownfield land, and as such offers a significant opportunity to regeneration the south side of Lake Lothing as a new residential and employment area.

TRAFFIC FLOWS AND QUEUE LENGTHS

6.3.2. Traffic flow and queue length data was obtained from traffic surveys undertaken at the junctions of Victoria Road with Crompton Road, Stanley Road, Nelson Wharf, School Road and Heath Road. The traffic flow data showed that Victoria Road is moderately trafficked in the AM and PM peak hours, and the access roads that connect to Victoria Road are lightly trafficked in the AM and PM peak hours. In addition, the queue length data showed that there were no significant queues recorded at any of the surveyed junctions in the AM and PM peak hours.

6.3.3. Traffic flow data was also obtained from a SCC count site on Waveney Drive, which showed that Waveney Drive is moderately trafficked in the AM and PM peak hours, and that this traffic flow data is very similar to the traffic flow data that was collected as part of the traffic surveys at the junction

locations on Victoria Road, which demonstrates that there has been no significant change in the traffic flows on Victoria Road and Waveney Drive following the opening of the Gull Wing Bridge.

HIGHWAY CAPACITY ASSESSMENT

6.3.4. Capacity assessments were undertaken for the 2024 base assessment year for all of the surveyed junctions on Victoria Road in the AM and PM peak hours, and the junction capacity results show that all of the assessed junctions operate within capacity in the AM and PM peak hours, as reflected in the traffic survey data that was collected.

ROAD SAFETY

6.3.5. Road Safety data was obtained the latest 5-year period (2018 – 2022) along Victoria Road and Waveney Drive and showed that there were no significant road safety issues adjacent to the development area of Kirkley Waterfront.

6.4 FUTURE BASELINE CONDITIONS

6.4.1. As assessment was undertaken to determine the future baseline conditions (i.e. without the proposed development on the site) for the 2034 future baseline assessment year, taking into account the impact of background growth on the surrounding highway network. In order to take account of background the 2024 traffic flows were factored by car driver growth factors obtained from TEMPro 8.1 National Transport Model (NTM) dataset and adjusted to local growth factors for a period of 10 years between 2024 and 2034.

NETWORK LINK FLOW IMPACT

6.4.2. The vehicle trips generated by background growth results in a moderate increase in traffic flows on Victoria Road, and a small increase in traffic flows on the access roads that connect to Victoria Road in the AM and PM peak hours.

HIGHWAY CAPACITY ASSESSMENT

6.4.3. Capacity assessments were undertaken for the 2034 future baseline assessment year for all of the surveyed junctions on Victoria Road in the AM and PM peak hours, and the junction capacity results show that there is little or no change in the operation of the assessed junctions, with all of them still operating within capacity in the AM and PM peak hours.

6.5 DEVELOPMENT TRIPS

6.5.1. An assessment was undertaken to determine the predicted existing and proposed vehicular trip generation for the development area of Kirkley Waterfront, with the study area being divided into a number of distinct study areas using the individual development sites that are predicted to being coming forward on the site.

EXISTING AND PROPOSED PREDICTED VEHICULAR TRIP GENERATION

6.5.2. The Trip Rate Information TRICS® database was used to obtain the vehicular trip rates for the existing and proposed land uses for the site using the TRICS® database. These existing and proposed predicted vehicular trip rates in the AM and PM peak hours were applied to the different sizes of the existing and proposed land uses on the site to determine the existing and proposed predicted trip generation of the site. The existing predicted vehicular trip generation was used for the land uses remaining on the site, and the proposed predicted vehicular trip generation was used for

the new land uses on the site, to determine the overall impact of the proposed development trips on the operation of the surrounding highway network.

NETWORK LINK FLOW IMPACT

6.5.3. The vehicle trips generated by the proposed development would result in a significant increase in traffic flows on Victoria Road and Waveney Drive, and on some of the access roads that connect to Victoria Road, when the vehicle trips are assigned through the Victoria Road junctions in the AM and PM peak hours. There would also be a significant increase in traffic flows on Victoria Road and Waveney Drive, and a small increase in traffic flows on the access roads that connect to Victoria Road when the vehicle trips are assigned through the new junction on Waveney Drive in the AM and PM peak hours.

HIGHWAY CAPACITY ASSESSMENT

6.5.4. Capacity assessments were undertaken for the 2034 future with development assessment year for all of the surveyed junctions on Victoria Road, and at the new junction on Waveney Drive in the AM and PM peak hours, and the junction capacity results show that there is little change in the operation of the assessed junctions, with the majority of them still operating within capacity in the AM and PM peak hours. The only exceptions are at Site 5 Victoria Road / Heath Road which operates over capacity in the AM and PM peak hours when the vehicle trips are assigned through the Victoria Road junctions, and Site 6 Waveney Drive / New Access which operates over capacity in the AM and PM peak hours when the vehicle trips are assigned through this junction.

SENSITIVITY TESTS

6.5.5. The capacity assessments were undertaken for the 2034 future with development assessment year based on the development trips being redistributed between Site 4 Victoria Road / School Road and Site 5 Victoria Road / Heath Road, and between Site 4 Victoria Road / School Road, Site 5 Victoria Road / Heath Road and Site 6 Waveney Drive / New Access, and the junction capacity results show that all of the junctions now operate within capacity.

6.6 CONCLUSION

6.6.1. It can be concluded that the traffic flows collected across the study area show that Victoria Road and Waveney Drive are currently moderately trafficked, and that the access roads on Victoria Road are lightly trafficked. In addition, the capacity assessments show that all of the surveyed junctions on Victoria Road currently operate within capacity, and that there that there are no road safety issues adjacent to the development area of Kirkley Waterfront.

6.6.2. The vehicle trips generated by background growth result in a moderate increase in traffic flows on Victoria Road and Waveney Drive, and a small increase in traffic flows on the access roads that connect to Victoria Road. In addition, the capacity assessments show that the assessed junctions on Victoria Road operate within capacity.

6.6.3. There will be a significant increase in the traffic flows on Vicotria Road and Waveney Drive, and on some of the access roads on Victoria Road, when the development trips are assigned through the Victoria Road junctions, as well as a significant increase in traffic flows on Victoria Road and Waveney Drive, and a small increase in traffic flows on the access roads on Victoria Road when the vehicle trips are assigned through the new junction on Waveney Drive. In addition, the capacity assessments show that all of the assessed junctions operate within capacity, apart from Site 5

Victoria Road / Heath Road when the development trips are assigned through the Victoria Road junctions, and Site 6 Waveney Drive / New Access when the vehicle trips are assigned through this junction.

6.6.4. The development trips were redistributed between Site 4 Victoria Road / School Road and Site 5 Victoria Road / Heath Road and Site 6 Waveney Drive / New Access to improve the operation of these junctions, and to determine the level of development trips that they can accommodate without going over capacity, with these junctions now operating within capacity.

6.6.5. There will need to be a focus on implementing sustainable mitigation measures that all proposed development will be required to provide, as there is limited scope to provide improvements at the junctions on Victoria Road due to existing constraints, with only minor junction improvements being possible. This could have a significant potential to reduce the number of vehicular trips generated by the proposed development by providing appropriate sustainable infrastructure to encourage a modal shift away from the private car, this reducing the impact on the junctions on Victoria Road.

6.6.6. Overall, it can be concluded that the proposed development at Kirkley Waterfront will have a significant impact on the surrounding highway network. It has been demonstrated that it is possible to redistribute the development trips across the surrounding highway network to mitigate the impact of these development trips where possible However, the surrounding highway network is constrained and there is limited scope to provide improvements, and as such there will need to be as strong focus on providing appropriate sustainable infrastructure to encourage a modal shift away from the private car e.g. improvements to walking and cycling connections to local services and facilities, safe and secure cycle parking and improvements to local bus services, and as such reduce the impact on the junction on Victoria Road and the new access junction on Waveney Drive.

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