DevHU0163 Phillips 66 and VPI

Prepared for:	Simon Geoghegan
Prepared by:	Alan Philp
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Introduction

In March 2023, Phillips 66 Limited submitted a planning application [ref. PA/2023/422] for:

> *"… the construction and operation of a post-combustion carbon capture plant, including carbon dioxide compression and metering, cooling equipment, stacks, substations, new and modified services, connections, internal roads, new access onto Eastfield Road, and maintenance and laydown areas (EIA development)".*

Further, in March 2023, VPI Immingham LLP submitted a planning application [ref. PA/2023/421] for:

> *"… the construction and operation of a post-combustion carbon capture plant, including carbon dioxide compressor and metering, cooling equipment, stacks, substations, internal roads, partial ditch realignment, new and modified services, connections, accesses, maintenance and laydown areas".*

We note that both proposals comprise the portions of the Humber Zero development. For context, the application sites are located respectively at Phillips 66 Ltd, Eastfield Road, South Killingholme, and VPI Power Station, Rosper Road, South Killingholme. The Local Planning Authority [LPA] and Local Highway Authority [LHA] is North Lincolnshire Council [NLC]. Further, the applicant's planning consultant is AECOM.

The Jacobs SYSTRA Joint Venture [JSJV] reviewed the planning applications on behalf of National Highways and identified that further information was required, as set out in the respective correspondence [AA.23.19.26 TM and AA.23.19.25 TM].

Subsequently, a meeting was held with AECOM, National Highways, and the JSJV on 16th January 2024 to the discuss the responses.

In February 2024, AECOM submitted a memorandum [memo] entitled 'National Highways Response 1' [16th February 2024]; the JSJV review of the information highlighted [TM 003] the need for further information. Subsequently, in March 2024, AECOM submitted a memo (National Highways Response 2), dated 27th March 2024, and our review [TM 004], again, highlighted that further information was required.

In May 2024, AECOM submitted a series of soft copy modelling files and a memo entitled 'National Highways Response 3' [dated 13/05/2024] and our review [TM 005] highlighted that further information was required.

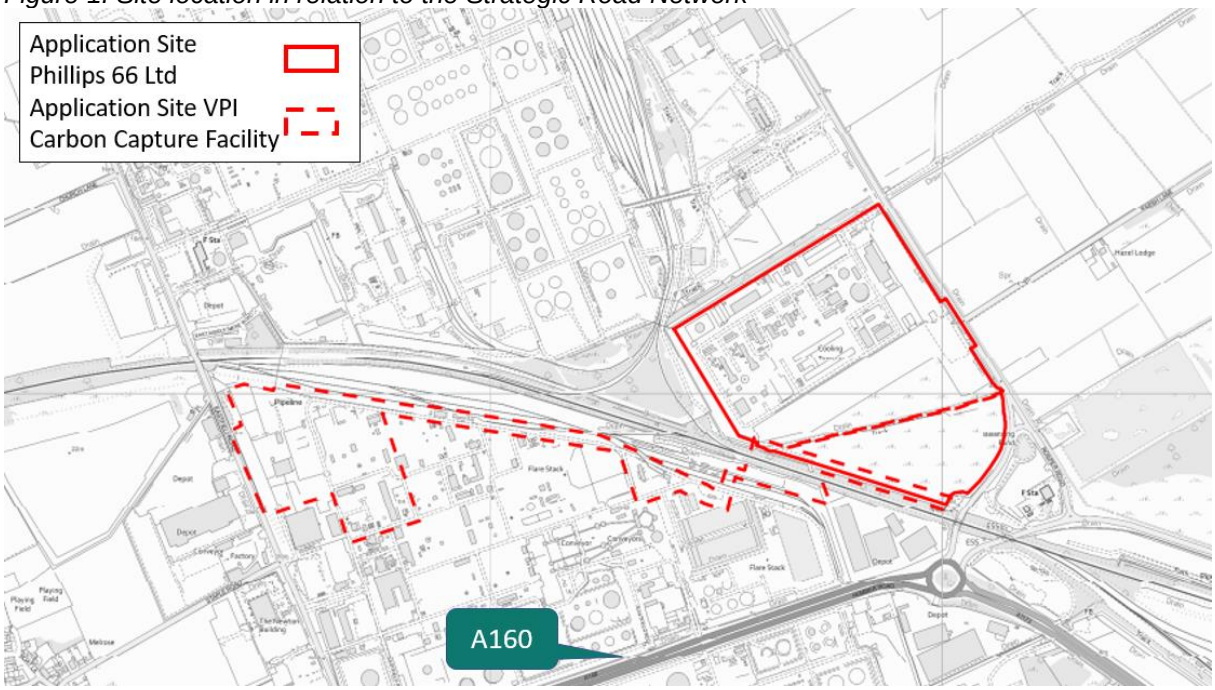
In June 2024, AECOM submitted a memo entitled 'National Highways Response 4' [dated 17/06/2024] together with soft copy modelling files, traffic survey videos and traffic signal information. Our review highlighted that additional information was required and this was set out in a meeting with AECOM [05/07/2024]. Subsequently, AECOM submitted a memo entitled 'National Highways Response 5' [dated 09/07/2024] together with soft copy modelling files.

This Technical Memorandum [TM 006] will set out our review of the information submitted.

Existing Situation

The location of the application site is presented in **Figure 1**. As indicated, the application site is situated 500m to the north of the A160 / Eastfield Road Junction. At this location, the A160 forms a section of the SRN.

Figure 1. Site location in relation to the Strategic Road Network[1]



Technical Review

Existing Traffic Data

JSJV previously reviewed Response 4 and noted that the presented queue data was per lane and not per arm. As Junctions 10 model results are per arm, we requested that this was revised.

Response 5 has been reviewed and we note that updated queue data has been provided for Junction D and Junction F, showing the queue on each junction arm rather than each lane. The JSJV confirms this to be acceptable.

[1] Extract from 'Sites Location Plan', produced by AECOM. 7th February 2023. Annotated by the JSJV.

Junctions Assessment

Junction A – A160 / Eastfield Road junction (signalised junction, LinSig modelling)

The previous JSJV review concluded that the assessment and conclusions were satisfactory subject to:

- Clarification of the observed queue data query as noted earlier in this TM; and
- The feasibility of modifying the traffic signal timings being confirmed by National Highways.

We have subsequently concluded that, as the LinSig results are per lane, the queue data presented per lane for Junction A in Response 3 is satisfactory.

The only matter outstanding therefore is for National Highways to confirm the feasibility of undertaking the modification to signal timings.

Junction B – A160 / Habrough Road / Ulceby Road / East Halton Road junction (Habrough Roundabout, Junctions 10 modelling)

The previous review by JSJV of the submitted Junctions 10 model noted the following:

- The results are slightly modified from those in the previous submission; and
- The junction is shown to operate satisfactorily in 2025 following the addition of the development traffic.

Junction C – A180 / A160 junction (Brocklesby Interchange, Junctions 10 modelling)

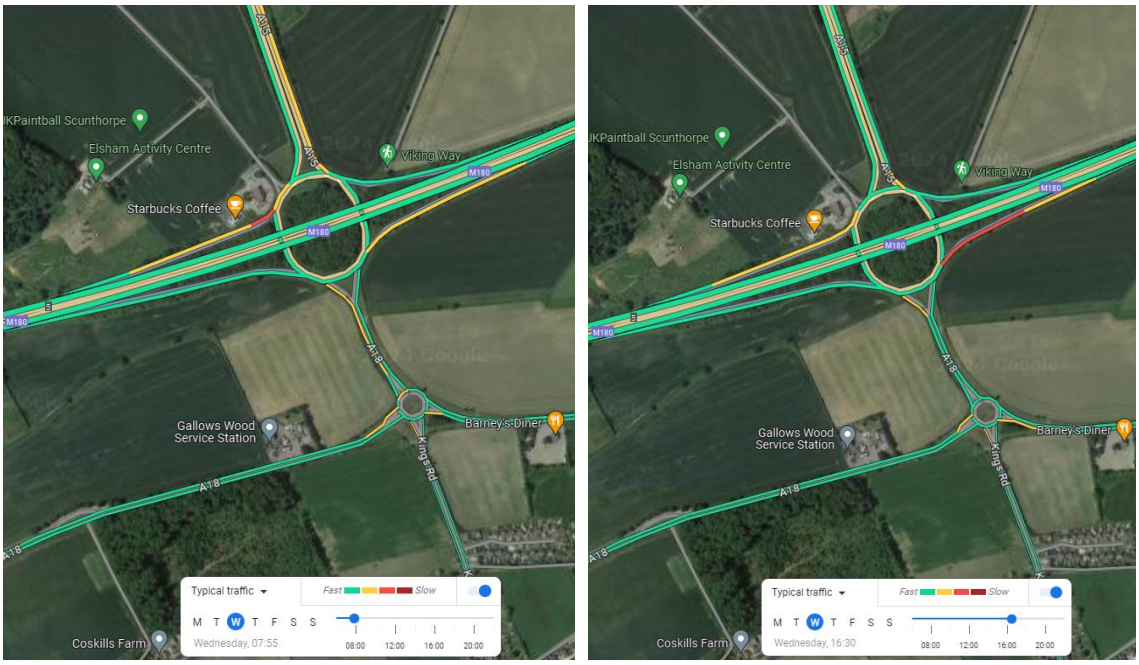
The previous review by JSJV of the submitted Junctions 10 model noted the following:

- The results are slightly modified from those in the previous submission; and
- The junction is shown to operate satisfactorily in 2025 following the addition of the development traffic.

Junction D – A180 off-slip / A18 / M180 off-slip / A15 junction (M180 Junction 5, Junctions 10 modelling)

The typical traffic conditions from Google Maps suggests that M180 Junction 5 experiences queueing during the PM peak hour, as shown in **Figure 2**.

Figure 2. Traffic Conditions - M180 Junction 5[2]



Wednesday 07:55 **Wednesday 16:30**

The Junctions 10 model for M180 Junction 5 has been resubmitted following our previous comments. We have reviewed the submitted Junctions 10 model, comprising the Junctions 10 input file together with the output PDF.

The traffic demand input within the submitted model has been reviewed and we note the following:

- The Junctions 10 model matrix movement between M180 west and A18 for the 2025 With Development scenario has been corrected following our earlier comment.

We previously highlighted the need for the model to be calibrated and validated against observed queue data, considering the queue on each arm rather than per lane. The model is confirmed to have been calibrated by the inclusion of 'direct intercept adjustments' on each arm. The alignment between the observed queues and modelled queues during each assessment period is confirmed to now be acceptable.

The results within the submitted Junctions 10 model have been reviewed and we note the following:

- The results have changed from those in the previous submission;
- The junction is shown to operate over capacity in 2025 following the addition of the committed development traffic; and

[2] © Google 2024

- The proposed development traffic results in increases in queueing on all arms except Barnetby Top, with the most significant increase occurring on the M180 east arm.

The forecast Junction 10 output at M180 Junction 5 is shown in **Figure 3**. It should be noted that the Junctions 10 results are the average within the peak 15-minutes on each arm.

Figure 3. Forecast Operation - M180 Junction 5

Table 3. Junction D – M180 / A15 / A18 Model Results

Scenario	Junction Arm	AM			PM		
		Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
Base 2025	M180 East	1.4	8.82	0.57	51.7	203.43	1.14
	A18	16.6	64.88	0.98	3.3	16.90	0.77
	M180 West	28.9	104.31	1.03	25.2	87.10	1.01
	Barnetby Top	7.0	117.45	0.95	1.9	45.48	0.65
	A15	12.8	30.78	0.94	7.3	18.06	0.88
Base 2025 + Committed Development	M180 East	1.6	10.07	0.60	78.4	294.01	1.23
	A18	50.9	169.61	1.10	3.3	17.12	0.77
	M180 West	60.4	211.72	1.13	27.1	116.32	1.01
	Barnetby Top	15.2	226.69	1.09	1.7	41.70	0.63
	A15	32.2	66.77	1.01	7.9	19.35	0.89
Base 2025 + Committed + Proposed Developments	M180 East	1.5	9.01	0.57	119.9	424.20	1.35
	A18	39.6	135.82	1.07	3.8	20.71	0.80
	M180 West	66.5	230.79	1.15	42.1	176.42	1.05
	Barnetby Top	14.8	225.22	1.08	1.9	45.06	0.65
	A15	65.5	118.37	1.06	7.7	18.79	0.89

Response 5 contains assessment of the expected queue lengths on each lane of the approaches, as shown in **Figure 4**, forecast based on observed lane split. It can be seen that on the A180 off-slip the queue is forecast to increase to 56 PCU in lane 1 and 64 PCU in lane 2. The length of the two-lane section is 60 PCU therefore the forecast queue in lane 2 extends 4 vehicles into the one-lane section of the off-slip.

Figure 4. Queues Per Lane - M180 Junction 5

Table 4. AM Observed Queue Lane Distribution

Arm	Lane 1 Observed Percentage Split	Lane 2 Observed Percentage Split	Lane 1 Applied to Model (PCU)	Lane 2 Applied to Model (PCU)
A15 (2,500m)	51%	49%	33	32
M180 West (465m)	66%	34%	44	23
A18 (475m)	57%	43%	23	17

We have considered the LinSig assessment undertaken in association with the proposed Barnetby Lorry Park [BLP] mitigation scheme, the key points were noted are

that the mean maximum queue [MMQ] on A180 off-slip is forecast to be 60 PCU/lane, which equates to 345m. The length of the two-lane section of the off slip is approximately 345m. We discussed the forecast operation of M180 Junction 5 at the meeting on 5th July 2024, when we noted the following:

- We acknowledged there is concern with queueing at M180 Junction 5 which is forecast to worsen as a result of the construction of the proposed development;
- We noted the BLP mitigation scheme does improve performance of the junction, however, there is no guarantee that this mitigation scheme will be in place at the time of the construction traffic impact;
- We noted that even with the BLP mitigation there is concern over the forecast MMQ at the junction; albeit we acknowledged that the development impact is during the construction phase. Hence, the impact at this junction should be addressed within the Construction Traffic Management Plan (CTMP) required as a condition of any consent; and
- The CTMP should consider issues, including but not limited to, actual on-site queueing, forward visibility to the back of the queue (as documented) and the need for mitigation measures to address safety concerns before they arise. This will likely require constant monitoring of impacts.

Junction E – A160 / Humber Road / A1173 Manby Road junction (Manby Roundabout, Junctions 10 modelling)

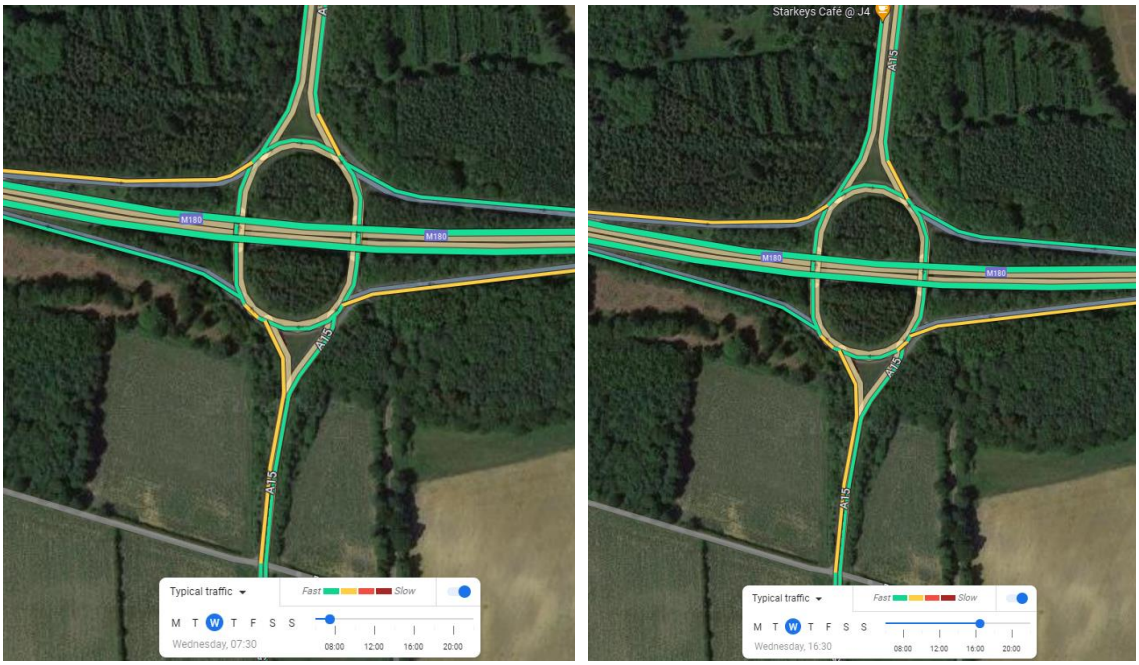
The previous review by JSJV of the submitted Junctions 10 model noted the following:

- The results are slightly modified from those in the previous submission; and
- The junction is shown to operate satisfactorily in 2025 following the addition of the development traffic.

Junction F – M180 off-slips / A15 junction (M180 Junction 4, Junctions 10 modelling)

The typical traffic conditions from Google Maps suggest that M180 Junction 4 does not currently experience significant delays during the AM and PM peak hours, as shown in **Figure 5**.

Figure 5. Traffic Conditions - M180 Junction 4[3]



Wednesday 07:30 **Wednesday 16:30**

The Junctions 10 model for M180 Junction 4 has been resubmitted following our previous comments. We have reviewed the submitted Junctions 10 model, comprising the Junctions 10 input file together with the output PDF.

We previously highlighted the need for the model to be calibrated and validated against observed queue data, considering the queue on each arm rather than per lane. The model is confirmed to have been calibrated by the inclusion of 'direct intercept adjustments' on each arm. The alignment between the observed queues and modelled queues during each assessment period is confirmed by the JSJV to be acceptable.

The results within the submitted Junctions 10 model have been reviewed and we note the following:

- The results have changed from those in the previous submission;
- The junction is shown to operate over capacity in 2025 following the addition of the committed development traffic;
- The proposed development traffic results in increases in queueing on all arms except M180 west, with the most significant increase occurring on the M180 east arm; and
- The ratio of flow to capacity (RFC) on M180 east is seen to increase from 1.20 to 1.24 following the addition of the development traffic.

The forecast Junction 10 output at M180 Junction 4 is shown in **Figure 6**. It should be noted that the Junctions 10 results are the average within the peak 15-minutes on each arm. Of particular note is the increase in queueing on M180 east arm during the PM peak, rising from 141 PCU Without Development to 166 PCU with Development.

[3] © Google 2024

Figure 6. Forecast Operation - M180 Junction 4

Table 7. Junction F - M180 Junction 4 Model Results

Scenario	Junction Arm	AM			PM		
		Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
Base 2025	M180 East	9.3	30.25	0.90	20.1	57.87	0.98
	A15 South	13.2	53.12	0.95	22.5	87.41	1.01
	M180 West	2.1	15.29	0.66	23.7	120.15	1.05
	A15 North	9.8	25.57	0.91	3.4	10.08	0.77
Base 2025 + Committed Development	M180 East	6.3	20.22	0.85	140.9	298.61	1.20
	A15 South	50.7	149.57	1.08	37.4	137.84	1.05
	M180 West	4.0	29.61	0.80	30.1	191.10	1.07
	A15 North	101.7	222.91	1.13	3.8	11.30	0.79
Base 2025 + Committed + Proposed Developments	M180 East	5.9	18.84	0.84	165.6	368.89	1.24
	A15 South	57.8	165.54	1.09	35.9	133.32	1.05
	M180 West	4.5	32.99	0.81	29.8	188.73	1.07
	A15 North	122.9	299.62	1.16	3.9	11.40	0.79

Response 5 contains further assessment of the expected queue lengths on each lane of the approaches, as shown in **Figure 7**. It can be seen that on the M180 east off-slip the queue is forecast to increase to 37 PCU in lane 1 and 130 PCU in lane 2. The two-lane section of the M180 east off-slip is 465m long. The forecast queue of 130 PCU equates to 748m, which is prior to the diverge nose and onto the motorway mainline carriageway. We acknowledge that there is a full lane drop at this location and also that visibility appears to be good.

Figure 7. Queues Per Lane - M180 Junction 4

Table 8. AM Observed Queue Lane Distribution

Arm	Lane 1 Observed Percentage Split	Lane 2 Observed Percentage Split	Lane 1 Applied to Model (PCU)	Lane 2 Applied to Model (PCU)
A15 South (25m two-lane, full arm 220m)	11%	89%	7	52
A15 North (300m)	81%	19%	100	24

Table 9. PM Observed Queue Lane Distribution

Arm	Lane 1 Observed Percentage Split	Lane 2 Observed Percentage Split	Lane 1 Applied to Model (PCU)	Lane 2 Applied to Model (PCU)
M180 East (470m)	22%	78%	37	130
A15 South (25m two-lane, full arm 220m)	14%	86%	5	31
M180 West (230m)	61%	39%	19	12

We discussed the forecast operation of M180 Junction 4 at the meeting on 5th July 2024, when we noted the following:

- We acknowledged that there is concern with queueing at M180 Junction 4 which will be made worse by the proposed development; albeit the development impact is during the construction phase.

- Hence, the impact at this junction should be addressed within the Construction Traffic Management Plan (CTMP) required as a condition of any consent; and
- The CTMP should consider issues, including but not limited to, actual on-site queueing, forward visibility to the back of the queue and the need for remedial measures to address safety concerns.

Construction Traffic Management Plan

As noted, a CTMP should be submitted prior to the commencement of construction of the proposed development. The CTMP should consider mitigation measures for dealing with the forecast queuing. Further, the CTMP should also include but not be limited to the following:

- Construction traffic monitoring;
- Thresholds for construction traffic at junctions on the SRN, based upon forecast impacts;
- Measures to maintain construction traffic flows beneath the threshold; or
- Mitigation measure to address road safety issues before they become manifest;
- A dust management plan;
- A noise management plan;
- Pollution prevention measures;
- Staffing numbers;
- Contractor parking;
- Construction traffic routes;
- Details of delivery arrangements (including for any abnormal loads); and
- Measures to limit and manage transfer of debris on to the highway.

Summary and Conclusions

The Jacobs SYSTRA Joint Venture [JSJV] has reviewed the information accompanying the planning application and, on the basis of our review, the recommendation to National Highways in relation to this development proposals is:

Recommend conditions – conditions required (as identified below)

This review has highlighted the presented information is acceptable subject the clarification by National Highways on the feasibility of altering the traffic signal timings as noted earlier in this TM. We also recommend that the following planning conditions are imposed on any planning consent, should the LPA be minded to approve.

1) Unless otherwise agreed in writing by the local planning authority in consultation with National Highways, construction of the development hereby approved shall not commence unless and until a Construction Traffic Management Plan [CTMP] has been submitted to and agreed in writing by the local planning authority in consultation with National Highways. Thereafter, the construction shall be carried out in accordance with the agreed plan. Informative:

   The CTMP shall include but not be limited to the following:

- Construction traffic monitoring;
- Thresholds for construction traffic at junctions on the SRN, based upon forecast impacts;
- Measures to maintain construction traffic flows beneath the threshold; or
- Mitigation measure to address road safety issues before they become manifest;
- A dust management plan;
- A noise management plan;
- Pollution prevention measures;
- Staffing numbers;
- Contractor parking;
- Construction traffic routes;
- Details of delivery arrangements (including for any abnormal loads); and
- Measures to limit and manage transfer of debris on to the highway.

Reason: To safeguard the free flow of traffic on the Strategic Road Network.

2) Unless otherwise agreed in writing by the Local Planning Authority in consultation with National Highways (or its successors) decommissioning of the development hereby approved shall not commence unless and until a Decommissioning Traffic Management Plan has been submitted to and approved in writing by the Local Planning Authority in consultation with National Highways (or its successors). Thereafter unless otherwise approved in writing decommissioning shall be undertaken in accordance with the approved plan.

We also note that the following points, from our previous reviews, should be addressed in the future, if relevant:

1) Traffic Management proposed on the SRN should be agreed with the relevant National Highways team and be designed in accordance with relevant policies and design guidance;
2) Temporary signage should be agreed with the relevant National Highways team and be designed in accordance with relevant policy; and
3) The National Highways Abnormal Loads Team should be consulted regarding any AIL deliveries well in advance to ensure the suitability of the route(s).