Proposed Anaerobic Digestion Facility
Spring Grove, Horseheath

Transport Addendum

For

Acorn Bioenergy Limited

motion

Document Control Sheet

Proposed Anaerobic Digestion Facility

Spring Grove, Horseheath

Acorn Bioenergy Limited

This document has been issued and amended as follows:

Date	Issue	Prepared by	Approved by
11/03/2024	Draft	CA	JR
21/03/2024	Issue	CA	JR
13/12/2024	Final	JNR	JNR

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Contents

Appendices

1.0 Introduction

Overview

1.1 This addendum transport report ('Report') is prepared in relation to planning application SCC/0045/23SE (the 'Planning Application'), which seeks permission for the *"construction and operation of an anaerobic digestion facility, associated infrastructure and new access road, connecting pipeline and covered digestate lagoons"* (the 'Proposed Development') on land north of Spring Grove Farm, Cambridge Road, Withersfield, Suffolk (the 'Application Site'). The new anaerobic digester (AD) would be fuelled by a combination of animal and agricultural waste to deliver "green gas" to the gas network.

1.2 The Planning Application is supported by a Transport Assessment Report (TAR) which, in response to the National Planning Policy Framework (NPPF) considers if:

- appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location.
- safe and suitable access to the Application Site can be achieved for all users.
- any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree.

1.3 The NPPF continues that planning permission should only be withheld or refused if:

- there would be an unacceptable impact on highway safety.
- the residual cumulative impacts on the road network would be severe.

1.4 The conclusion of the TAR is that the Proposed Development would be in alignment with the NPPF and in accordance with paragraph 115 and that there are no reasons why planning permission should be withheld or refused.

Highway Authority Responses

1.5 At this stage, neither the Highway Authority (Suffolk County Council – SCC) nor the adjacent highway authority (Cambridgeshire County Council – CCC), raise any objections.

1.6 Nonetheless, as set out in correspondence dated 21st November 2023 in the form of a request for 'further environmental information' under Regulation 25 of the EIA Regulations, SCC and CCC raise several requests for further information / clarification with regards to transport impacts. These are summarised below:

Suffolk County Council (SCC)

4a) Clarification is sought to the calculation of how 5600 trips of the proposed 9786 trips are existing.

4b) Include non-HGV movements within the calculation of the construction traffic movements.

4c) Demonstrate how the proposed gas flare will not distract users of the highway when in operation.

4d) Further information to evidence that the proposed number of operational trips will not detrimentally affect the highway is required.

4e) Assessment of queue length for vehicles waiting to turn right into the site with consideration of highways safety is required.

4f) Investigation into the appropriateness of a right turn lane into the site is required.

4g) Modelling of peak traffic flows is required.

4h) Clarification on the space provided for parking, waiting and manoeuvring areas is required.

4i) Track plans, specifically for HGV and tractor movements within the site is required.

4j) Formal pedestrian and cycle crossing of the proposed access junction is required as the improved junction cross existing segregated pedestrian and cycleway.

4k) The stage 1 safety audit has not addressed the risk of queueing on the carriageway.

Cambridgeshire County Council (CCC)

3a) Data from Cambridgeshire County Council's accident data portal needs to be included within the transport assessment.

3b) Full trip generation assessment is required.

3c) Outline the daily AM and PM peak generation figures for the busiest period (e.g. the harvest period). Include trip generation from employees.

3d) Details of the distribution pf trips to and from the site to understand the levels of trips on the A1307 within Cambridgeshire.

1.7 This Report provides the 'further environmental information' and / or clarification sought.

Scope of Report

1.8 Following this introduction, this report considers the following:

- Section 2 reviews the trip generation and associated traffic impacts;
- Section 3 reviews the access design;
- Section 4 provides junction capacity analysis for the site access;
- Section 5 address the queries related to the internal layout of the development;
- Section 6 provides further information with regards to the road safety audit;
- Section 7 refers to elements such as gas flaring and accident data; and
- Section 8 provides a summary and conclusion of the findings present in this report.

2.0 Trip Generation and Traffic Impact

2.1 This section addresses the comments from CCC: 3b, 3c, 3d, and from SCC: 4a, 4b.

"4a: Clarification is sought to the calculation of how 5600 trips of the proposed 9786 trips are existing."

2.2 Expectant AD suppliers (local farmers) currently generate a number of vehicle trips of which, a proportion of which these existing trips would involve the disposal of agricultural products and waste which would be redirected to the AD plant. Therefore, these movements would already exist on the local highway network, of which, depending upon the locations of the farms and end destinations, would already be using the A1307.

2.3 Determining these existing proportions of traffic already using the A1307 at this stage is difficult to predict accurately but in order to provide a particularly robust assessment, the junction capacity assessment of the proposed site access (detailed in Section 4) has not accounted for any 'netting off' of vehicle trips – i.e. the assumption is of all trips being new notwithstanding, it is important to recognise the relationship between the proposed development and the existing vehicular trips on the local highway network.

"4b: Include non-HGV movements within the calculation of the construction traffic movements."

2.4 Section 9.3 of the TAR identifies that the construction period would generate 22 HGV trip per day (i.e. 11 arrivals and 11 departures). The TAR also acknowledges that up to 50 people will be on site during the peak of construction activity. On the assumption that all staff would travel to the site by vehicle, the staff element could generate 100 trips per day (i.e. 50 non-HGV arrivals and 50 non-HGV departures). Combined, the construction period could generate a peak of 61 vehicle arrivals and 61 vehicle departures per day.

2.5 The TAR identifies that construction activities would be limited to the hours of 7am to 7pm on weekday and therefore, it is expected that all staff trips i.e. in non-HGV vehicles would take place before the AM peak period and after the PM peak period.

2.6 The TAR presented ATC data for the A1307 which identified that over a 12-hour period (7am to 7pm), the average 5-day two-way traffic flow was 13,981 vehicles per day.

2.7 The number of daily construction trips (all vehicle types) therefore equates to 0.4% of the total daily traffic flow along the A1307 which is considered to be negligible and would have an imperceptible impact on the operation of the local highway network, noting that the construction period will be temporary.

"3b: Full trip generation assessment is required".

"3c: Outline the daily AM and PM peak generation figures for the busiest period (e.g. the harvest period). Include trip generation from employees".

2.8 The specific nature of the development proposal means that a traditional TRICS assessment is not possible due to lack of similar surveyed sites and therefore a first principles approach has been applied based on the processing and export volumes that are expected to be achieved.

2.9 The TAR clearly details a full daily breakdown of the number of HGVs expected to be generated by the development for each month of the year (see Figure 6-1) which is related to feedstock harvesting and seasonal patterns.

2.10 The TAR identifies that typically, the forecasted traffic generation would be 50 – 58 daily two-way HGV/ tractor movements over a 10-month period. The peak periods of movement, generating 148 two-way daily HGV/tractor movements would take place for only 2 weeks during each of the months of June, July, September and October.

2.11 Information provided by the Applicant identifies that the development would be operational from 7am to 6pm Monday – Sunday.

2.12 On the basis of a 10-hour working day, at peak, the development would generate 7-8 HGV/tractor trips per hour, equivalent to 1 HGV/tractor movement every 4 minutes on average, which is not considered to be significant.

2.13 The operation of the Application Site would be supported by 5 full-time equivalent (FTE) staff. Based on the operational hours, staff would be travelling to and from the Application Site outside of the AM and PM peak periods.

2.14 When specifically considering the AM and PM peak hourly periods, during the peak harvest period, the development could generate up to 12-13 vehicles movements per peak hour. As noted above, staff would be travelling to/from the Application Site outside of the AM and PM peak hours. This low number of vehicle trips would have a negligible impact on the operation of the local highway network.

2.15 The ATC data provided in the TAR identifies the follow weekday average peak flows:

- 07:00-08:00: 1,511
- 08:00-09:00: 1,402
- 17:00-18:00: 1,549

2.16 The anticipated number of development-related peak hourly trips is equivalent to circa. 0.8-0.9% of traffic during the peak periods. This would have an imperceptible impact on the operation of the local highway network.

3.0 Access Appraisal

3.1 This section addresses the comments from SCC: 4e, 4f, and 4j.

"4e: Assessment of queue length for vehicles waiting to turn right into the site with consideration of highways safety is required."

"4f: Investigation into the appropriateness of a right turn lane into the site is required."

3.2 The junction capacity modelling undertaken in Section 4.0 that concludes that queue lengths for vehicles waiting to turn right into the site would be less than 1 vehicle during the peak periods based on a peak development assessment. The delay to vehicles seeking to turn right would be minimal. On the basis that the junction modelling identifies there is no capacity constraint, that would have a significant impact upon highway safety.

3.3 Based on the peak operational period, the TAR identifies that the development would generate 148 two-way HGV/tractor trips, plus 10 two-way staff trips, equating to a **daily** total of 158 vehicle trips during the busiest operational times of the year.

3.4 DMRB (CD 123) identifies that ghosted right turn lanes should be considered when:

- the minor road flow exceeds 300 two-way AADT (Annual Average Daily Traffic); and
- the major road flow exceeds 13,000 two-way AADT.

3.5 The trip generation for the proposed development is forecast to be significantly less than the minor arm threshold of 300 AADT set out in DMRB.

3.6 The ATC data identifies that the 7-day average 24-hour average two-way flow on the A1307 is 16,295 which sits above the threshold for the major arm flow. However, having regard to the extremely low minor arm flow, and the assessment of the potential for vehicles waiting to turn right into the site and associated queueing in the junction capacity modelling as undertaken in Section 4.0 concludes that queue lengths of any significance would be unlikely. It is considered unnecessary for a ghost right turn lane to be provided. On the basis that the junction modelling identifies there is no capacity constraint, it is considered that no provision of a right turn lane is acceptable.

"4j: Formal pedestrian and cycle crossing of the proposed access junction is required as the improved junction cross existing segregated pedestrian and cycleway".

3.7 A revised access design is included at **Appendix A** which has given consideration to its interaction with the cycleway. It is proposed to provide a 'Copenhagen' style crossing at the access to prioritise pedestrian and cycle movement across the access. This includes setting back and realigning of the cycleway which allows for a 16.5m articulated vehicle to give way to pedestrian/cycle movements without blocking the mainline carriageway of the A1307.

4.0 Junction Assessment

4.1 This section addresses the comments from SCC: 4d, 4e, 4f and 4g and has informed the responses at Section 3.0 above.

"4d: Further information to evidence that the proposed number of operational trips will not detrimentally affect the highway is required."

4.2 Junction capacity modelling has been undertaken for the site access. This is based on the peak trip generation presented in the TAR and the ATC data.

4.3 The distribution of development trips has been based on the information presented in the TAR (Table 6-2) whereby 75% of trips have been assigned to the west and 25% of trips have been assign to the east.

4.4 Figure 4.1 and 4.2 shows the junction diagrams for the '2022 Base + Development' and the '2029 Base + Development' for the AM (07:00-08:00) and PM (17:00-18:00) peaks. The future year 2029 has been selected to reflect 5-years post the preparation of this report and the 2022 ATC data has been growthed using TEMPro (v.8).

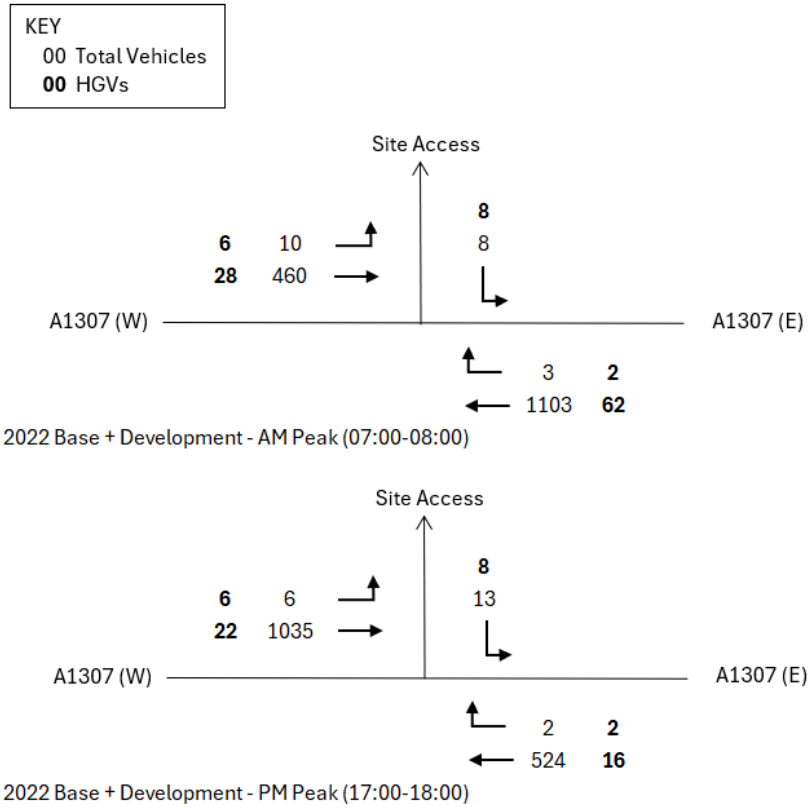


Figure 4.1 – 2022 Base + Development AM & PM Peaks

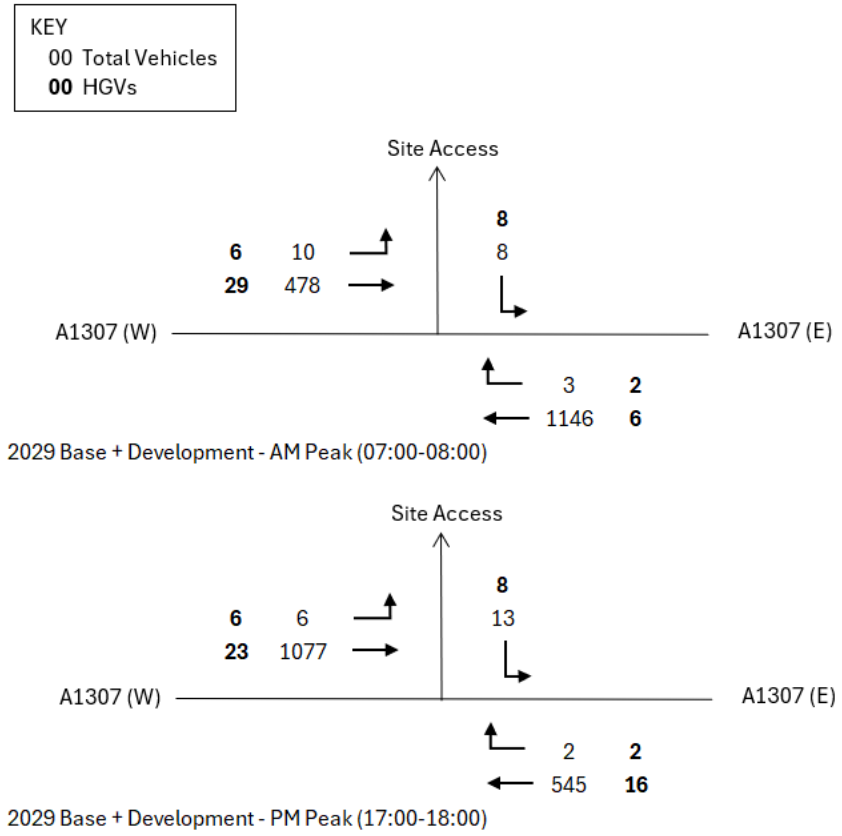


Figure 4.2 – 2029 Base + Development AM & PM Peaks

4.5 The operation of the site access has been modelled using PICADY based on the weekday AM peak (07:00-08:00) and PM peak (17:00-18:00) hourly periods for the years 2022 and 2029. The results are summarised in Table 4.1 and 4.2. The full output is included as **Appendix B**.

Arm	AM Peak (07:00-08:00)			PM Peak (17:00-18:00)		
	RFC	Queue (veh)	Delay (s)	RFC	Queue (veh)	Delay (s)
Site Access	0.03	0.0	12.26	0.05	0.1	14.48
A1307	0.04	0.0	3.61	0.02	0.0	6.34

Table 4.1 – Site Access – 2022 Base + Development

Arm	AM Peak (07:00-08:00)			PM Peak (17:00-18:00)		
	RFC	Queue (veh)	Delay (s)	RFC	Queue (veh)	Delay (s)
Site Access	0.03	0.0	12.39	0.06	0.1	14.99
A1307	0.04	0.0	3.50	0.02	0.0	6.22

Table 4.2 – Site Access – 2029 Base + Development

4.6 Table 4.2 demonstrates that the site access will operate well within capacity during the future scenario 2029 as identified by low RFC values and queues during the AM and PM peaks. The junction modelling identifies that there will be less than 1 vehicle queuing to turn right into the site access and therefore the proposed access arrangement design will have a negligible impact on the operation of the local highway network.

"4e: Assessment of queue length for vehicles waiting to turn right into the site with consideration of highways safety is required."

"4f: Investigation into the appropriateness of a right turn lane into the site is required."

4.7 As identified above, the minor arm flow is significantly less than that which would justify considering a right turn ghost lane. Furthermore, as evidenced above, the junction capacity assessment identifies that there would be less than one vehicle queueing to turn right in to the Application Site during the peak periods, based on a peak development assessment. The delay to vehicles would be minimal. On the basis that the junction modelling identifies there is no capacity constraint, it is concluded that it is not necessary for highway safety or otherwise appropriate to provide a right turn lane.

5.0 Internal Layout

5.1 This section addresses the comments from SCC: 4h, and 4i.

"4h: Clarification on the space provided for parking, waiting and manoeuvring areas is required."

5.2 As identified on the Application Site plan submitted with the planning application, a total of 6 car parking spaces will be provided which will be for staff. As noted in Section 2, a total of 5 staff will be on-site at any one time and therefore the proposed parking provision is sufficient to accommodate the anticipated demand.

5.3 As identified on the site layout plan, a total of 5 trailer bays will be provided for HGVs/tractors with one bay provided as the extraction station. The Application Site will be managed such that the number of vehicles on site at any one time does not exceed the number of trailer bays. As identified in Section 2, the development would generate a peak of 7-8 movements per hour which will be appropriately managed, so they are spread across the hourly period. It is expected that vehicles will be on-site for 15 minutes: which includes entering, loading / unloading and leaving the Application Site.

5.4 Even during peak periods, it could be possible to manage HGV movements such that vehicles are not required to use the trailer bays. However, the provision of 5 trailer bays acknowledges that traffic conditions can be unpredictable and represents an appropriate and sufficient parking allocation in the event that vehicles arrive simultaneously rather than staggered.

"4i: Track plans, specifically for HGV and tractor movements within the site is required."

5.5 Swept path analysis has been undertaken demonstrating that a 16.5m articulated vehicle, the largest expected to require access to the Application Site, can readily access, egress and turn within the Application Site without excessive manoeuvring or safety concerns. This is included as **Appendix C**.

6.0 Road Safety Audit

6.1 This section addresses the comments from SCC at 4k.

"4K: The stage 1 safety audit has not addressed the risk of queueing on the carriageway".

6.2 In accordance with GG119, a road safety audit team are required to raise any road safety matters that they identify. As such, because the issue of queue lengths has not been specifically referred to in the Stage 1 RSA accompanying the planning application, it not evidence that this issue has not been considered, rather that the audit team does not consider it to be a road safety problem.

6.3 It is also important to acknowledge that the information provided in Section 3.0, 4.0 and 5.0 above, comprehensively addresses the potential for queueing and implications for highway safety for which the Highway Authority can conclude there is neither a risk of queueing or associated risks for users of the carriageway.

7.0 Other Matters

Gas Flaring

"4c: Demonstrate how the proposed gas flare will not distract users of the highway when in operation."

7.1 The proposed location of the gas flare is circa. 220m from the highway. Given this distance combined with obstructions caused by existing buildings and vegetation, it is highly unlikely that the gas flare will have an impact to highway users. Furthermore, the gas flare will be used on an infrequent basis and typically only used during an emergency, a breakdown or when routine maintenance is carried out. The Environment Agency have put in place conditions that AD plants must comply with which includes operating the flare for the minimum period of time needed.

Accident Data

"3a: Data from Cambridgeshire County Council's accident data portal needs to be included within the transport assessment."

7.2 CCC have requested that data from their accident portal is reviewed. The locations of Personal Injury Collisions (PICs) are shown in Figure 7.1 reflecting the study area assessed in the TAR within the CCC boundary.

Figure 7.1 – PIC Locations

7.3 One fatal PIC was recorded on the A1307 in the vicinity of the parking layby, approximately 500m west of the site access which involved two vehicles in dark conditions.

7.4 Three serious incidents were recorded in the vicinity of the Silver Street / A1307 priority T junction:

1. Circa. 80m east of the T junction the PIC involved two vehicles in dark conditions.
2. At the junction there was a four-vehicle collision in wet / damp conditions as a vehicle was waiting to turn right.

3. Circa. 70m to the west of the T junction the PIC involved only one vehicle.

7.5 Two slight incidents were recorded at the Silver Street / A1307 priority T junction of which one PIC involved two vehicles as a vehicle was waiting to turn right and the second PIC took place in dark and wet / damp conditions with two vehicles.

7.6 A further slight PIC was recorded circa. 170m to the east of the T junction in the vicinity of the parking layby which involved two vehicles as a vehicle was waiting to turn right.

7.7 From this review no significant patterns or trends have been observed that would be exacerbated by the Proposed Development, in particular as the Proposed Development would change the volume of traffic by less than 1%. It is therefore concluded that the proposed development would not have an adverse impact on highway safety.

8.0 Summary and Conclusions

8.1 This addendum transport report ('Report') is prepared in relation to planning application SCC/0045/23SE for an anaerobic digester and addresses the comments provided by Suffolk County Council (SCC) and Cambridgeshire County Council (CCC). In summary:

- Construction traffic movements will equate to 0.4% of the total daily traffic flow along the A1307 which considered to be negligible and will have an imperceptible impact on the operation of the local highway network.
- The anticipated number of development-related peak hourly trips is equivalent to circa. 0.8-0.9% of traffic during the peak periods which is considered to have an imperceptible impact on the operation of the local highway network.
- Junction capacity assessments of the site access indicates that the site access will operate well within capacity during the AM and PM peaks. The junction modelling identifies that there will be less than 1 vehicle queuing to turn right into the site access. Therefore, the proposed access arrangement design with no right turn is considered to be appropriate combined with DMRB standards which identifies that the annual average daily traffic flow generated by the development would not be high enough to meet the criteria for a right turn lane.
- The design of the site access has been reconsidered to prioritise pedestrian / cycle movements associated with the existing cycleway by incorporating a 'Copenhagen' style crossing into the site access design.
- The operation of the Application Site would be supported by 5 full-time equivalent (FTE) staff of which there are 6 car parking spaces on-site to adequately cater for demand.
- A total of 5 bays for HGVs / tractors will be provided on-site which will suitably cater for demand even during peak periods. The Application Site will be managed so that vehicle arrivals are spread evenly across the day to minimise more HGVs truing to access the Application Site compared with the number of bays available.
- Swept path analysis demonstrates that a 16.5m articulated vehicle, the largest expected to require access to the Application Site, can access, egress and turn within the Application Site.
- The proposed location of the gas flare is set well back from the highway with existing buildings and vegetation impacting upon views. The gas flare will be used on an infrequent basis and typically only used during an emergency, a breakdown or when routine maintenance is carried out.
- A review of the CCC accident portal identifies no significant patterns or trends have been observed demonstrating that there are no significant safety issues on the local highway network. It is therefore considered that the proposed development will have no adverse impact on highway safety.

8.2 The foregoing information provides a comprehensive response to SCC's requirements for 'further environmental information' and other clarification in respect of highways and transport effects. The conclusions affirm the conclusions of the preceding TAR and the Environmental Assessment of effects and there are no residual cumulative impacts in terms of highway safety or the operational capacity of the surrounding highway and transport networks. Planning permission should not be withheld on transport grounds.

Appendix A

Site Access Design

Spring Grove Farm

"CYCLISTS DISMOUNT" sign to TSRGD Diag. 966

Tie-in to existing cycleway

1.22m TkH

Dismantled R

Approximate Top Of Trees Level

Ditch IL=78.22

Ditch IL=79.92

Drain

Track

Vegetation

Ridge=88.68

Ridge=85.18

Ridge=85.33

Ridge=87.57

STAY

EP

LP

MH

RS

RG

Rev:	Description:	Date:	Rev By:	Chk'd:
A	First Issue	08.03.24	RS	CA
B	Minor amendment to cycleway	13.03.24	RS	RS

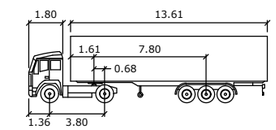
KEY:

Application boundary

Existing highway boundary

north

FORWARD



Artic

	meters
Tractor Width	: 2.55
Trailer Width	: 2.55
Tractor Track	: 2.55
Trailer Track	: 2.55
Lock to Lock Time	: 6.0
Steering Angle	: 42.7
Articulating Angle	: 70.0

scalebar (1:500)

0 metres 20

motion

Guildford - London - Reading

www.motion.co.uk

Project:
Spring Grove Green Power

Title:
Proposed Site Access

Client:
Acorn Bioenergy Ltd

Drawing Status: Draft

Scale: 1:500 (@ A3) Date: 08.03.2024

Drawn: RS Checked: CA Approved: JR

Drawing: 2401110-01

Revision: B

C:\Users\richardstorey\Motion\StaffSite - Acsuff 2401110\Drawings\2401110-01b.dwg

Appendix B

Junction Modelling Output

Junctions 9

PICADY 9 - Priority Intersection Module

Filename: Site Access - A1307.j9
Path: C:\Users\ClaireAshton\Documents
Report generation date: 2/29/2024 11:34:30 AM

Summary of junction performance

	AM				PM			
	Queue (Veh)	Delay (s)	RFC	LOS	Queue (Veh)	Delay (s)	RFC	LOS
	2022 Base + Development							
Stream B-AC	0.0	12.26	0.03	B	0.1	14.48	0.05	B
Stream C-AB	0.0	3.61	0.04	A	0.0	6.34	0.02	A
	2027 Base + Development							
Stream B-AC	0.0	12.39	0.03	B	0.1	14.99	0.06	B
Stream C-AB	0.0	3.50	0.04	A	0.0	6.22	0.02	A

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.

File summary

File Description

Title	
Location	
Site number	
Date	2/29/2024
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	MOTION\cashton
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2022 Base + Development	AM	ONE HOUR	00:00	01:30	15	✓
D2	2022 Base + Development	PM	ONE HOUR	00:00	01:30	15	✓
D3	2027 Base + Development	AM	ONE HOUR	00:00	01:30	15	✓
D4	2027 Base + Development	PM	ONE HOUR	00:00	01:30	15	✓

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

2022 Base + Development, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way		0.19	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm type
A	A1307 (W)		Major
B	Site Access		Minor
C	A1307 (E)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C - A1307 (E)	6.60			150.0	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B - Site Access	One lane	4.60	28	51

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Stream	Intercept (Veh/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
B-A	594	0.105	0.266	0.167	0.380
B-C	761	0.114	0.287	-	-
C-B	661	0.249	0.249	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2022 Base + Development	AM	ONE HOUR	00:00	01:30	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A - A1307 (W)		ONE HOUR	✓	470	100.000
B - Site Access		ONE HOUR	✓	8	100.000
C - A1307 (E)		ONE HOUR	✓	1106	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		A - A1307 (W)	B - Site Access	C - A1307 (E)
From	A - A1307 (W)	0	10	460
	B - Site Access	0	0	8
	C - A1307 (E)	1103	3	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A - A1307 (W)	B - Site Access	C - A1307 (E)
From	A - A1307 (W)	0	62	6
	B - Site Access	0	0	100
	C - A1307 (E)	6	62	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-AC	0.03	12.26	0.0	B	7	11
C-AB	0.04	3.61	0.0	A	27	41
C-A					988	1481
A-B					9	14
A-C					422	633

Main Results for each time segment

00:00 - 00:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	6	2	327	0.018	6	0.0	0.0	11.205	B
C-AB	13	3	1009	0.013	13	0.0	0.0	3.612	A
C-A	820	205			820				
A-B	8	2			8				
A-C	346	87			346				

00:15 - 00:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	7	2	317	0.023	7	0.0	0.0	11.627	B
C-AB	22	5	1132	0.019	22	0.0	0.0	3.272	A
C-A	972	243			972				
A-B	9	2			9				
A-C	414	103			414				

00:30 - 00:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	9	2	302	0.029	9	0.0	0.0	12.258	B
C-AB	47	12	1306	0.036	47	0.0	0.0	2.883	A
C-A	1171	293			1171				
A-B	11	3			11				
A-C	506	127			506				

00:45 - 01:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	9	2	302	0.029	9	0.0	0.0	12.258	B
C-AB	47	12	1307	0.036	47	0.0	0.0	2.858	A
C-A	1171	293			1171				
A-B	11	3			11				
A-C	506	127			506				

01:00 - 01:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	7	2	317	0.023	7	0.0	0.0	11.631	B
C-AB	22	5	1133	0.019	22	0.0	0.0	3.182	A
C-A	972	243			972				
A-B	9	2			9				
A-C	414	103			414				

01:15 - 01:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	6	2	327	0.018	6	0.0	0.0	11.213	B
C-AB	13	3	1010	0.013	13	0.0	0.0	3.555	A
C-A	820	205			820				
A-B	8	2			8				
A-C	346	87			346				

2022 Base + Development, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way		0.23	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	2022 Base + Development	PM	ONE HOUR	00:00	01:30	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A - A1307 (W)		ONE HOUR	✓	1041	100.000
B - Site Access		ONE HOUR	✓	13	100.000
C - A1307 (E)		ONE HOUR	✓	526	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		A - A1307 (W)	B - Site Access	C - A1307 (E)
From	A - A1307 (W)	0	6	1035
	B - Site Access	0	0	13
	C - A1307 (E)	524	2	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A - A1307 (W)	B - Site Access	C - A1307 (E)
From	A - A1307 (W)	0	100	2
	B - Site Access	0	0	62
	C - A1307 (E)	3	100	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-AC	0.05	14.48	0.1	B	12	18
C-AB	0.02	6.34	0.0	A	8	12
C-A					474	712
A-B					6	8
A-C					950	1425

Main Results for each time segment

00:00 - 00:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	10	2	328	0.030	10	0.0	0.0	11.295	B
C-AB	5	1	573	0.008	5	0.0	0.0	6.338	A
C-A	391	98			391				
A-B	5	1			5				
A-C	779	195			779				

00:15 - 00:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	12	3	301	0.039	12	0.0	0.0	12.447	B
C-AB	7	2	625	0.012	7	0.0	0.0	5.940	A
C-A	466	116			466				
A-B	5	1			5				
A-C	930	233			930				

00:30 - 00:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	14	4	263	0.054	14	0.0	0.1	14.478	B
C-AB	13	3	700	0.018	13	0.0	0.0	5.343	A
C-A	567	142			567				
A-B	7	2			7				
A-C	1140	285			1140				

00:45 - 01:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	14	4	263	0.054	14	0.1	0.1	14.484	B
C-AB	13	3	701	0.018	13	0.0	0.0	5.231	A
C-A	567	142			567				
A-B	7	2			7				
A-C	1140	285			1140				

01:00 - 01:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	12	3	301	0.039	12	0.1	0.0	12.455	B
C-AB	7	2	626	0.012	7	0.0	0.0	5.624	A
C-A	466	116			466				
A-B	5	1			5				
A-C	930	233			930				

01:15 - 01:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	10	2	328	0.030	10	0.0	0.0	11.304	B
C-AB	5	1	574	0.008	5	0.0	0.0	6.152	A
C-A	391	98			391				
A-B	5	1			5				
A-C	779	195			779				

2027 Base + Development, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way		0.18	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D3	2027 Base + Development	AM	ONE HOUR	00:00	01:30	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A - A1307 (W)		ONE HOUR	✓	488	100.000
B - Site Access		ONE HOUR	✓	8	100.000
C - A1307 (E)		ONE HOUR	✓	1149	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		A - A1307 (W)	B - Site Access	C - A1307 (E)
From	A - A1307 (W)	0	10	478
	B - Site Access	0	0	8
	C - A1307 (E)	1146	3	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A - A1307 (W)	B - Site Access	C - A1307 (E)
From	A - A1307 (W)	0	62	6
	B - Site Access	0	0	100
	C - A1307 (E)	1	62	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-AC	0.03	12.39	0.0	B	7	11
C-AB	0.04	3.50	0.0	A	28	42
C-A					1026	1540
A-B					9	14
A-C					439	658

Main Results for each time segment

00:00 - 00:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	6	2	325	0.019	6	0.0	0.0	11.277	B
C-AB	13	3	1042	0.013	13	0.0	0.0	3.498	A
C-A	852	213			852				
A-B	8	2			8				
A-C	360	90			360				

00:15 - 00:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	7	2	314	0.023	7	0.0	0.0	11.720	B
C-AB	22	6	1172	0.019	22	0.0	0.0	3.164	A
C-A	1011	253			1011				
A-B	9	2			9				
A-C	430	107			430				

00:30 - 00:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	9	2	299	0.029	9	0.0	0.0	12.386	B
C-AB	48	12	1355	0.036	48	0.0	0.0	2.780	A
C-A	1217	304			1217				
A-B	11	3			11				
A-C	526	132			526				

00:45 - 01:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	9	2	299	0.029	9	0.0	0.0	12.386	B
C-AB	48	12	1355	0.036	48	0.0	0.0	2.753	A
C-A	1217	304			1217				
A-B	11	3			11				
A-C	526	132			526				

01:00 - 01:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	7	2	314	0.023	7	0.0	0.0	11.724	B
C-AB	22	6	1173	0.019	23	0.0	0.0	3.067	A
C-A	1011	253			1011				
A-B	9	2			9				
A-C	430	107			430				

01:15 - 01:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	6	2	325	0.019	6	0.0	0.0	11.285	B
C-AB	13	3	1043	0.013	13	0.0	0.0	3.437	A
C-A	852	213			852				
A-B	8	2			8				
A-C	360	90			360				

2027 Base + Development, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way		0.23	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D4	2027 Base + Development	PM	ONE HOUR	00:00	01:30	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A - A1307 (W)		ONE HOUR	✓	1083	100.000
B - Site Access		ONE HOUR	✓	13	100.000
C - A1307 (E)		ONE HOUR	✓	547	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		A - A1307 (W)	B - Site Access	C - A1307 (E)
From	A - A1307 (W)	0	6	1077
	B - Site Access	0	0	13
	C - A1307 (E)	545	2	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A - A1307 (W)	B - Site Access	C - A1307 (E)
From	A - A1307 (W)	0	100	2
	B - Site Access	0	0	62
	C - A1307 (E)	3	100	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-AC	0.06	14.99	0.1	B	12	18
C-AB	0.02	6.22	0.0	A	9	13
C-A					493	740
A-B					6	8
A-C					988	1482

Main Results for each time segment

00:00 - 00:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	10	2	323	0.030	10	0.0	0.0	11.505	B
C-AB	5	1	583	0.009	5	0.0	0.0	6.224	A
C-A	407	102			407				
A-B	5	1			5				
A-C	811	203			811				

00:15 - 00:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	12	3	294	0.040	12	0.0	0.0	12.748	B
C-AB	8	2	639	0.012	8	0.0	0.0	5.820	A
C-A	484	121			484				
A-B	5	1			5				
A-C	968	242			968				

00:30 - 00:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	14	4	254	0.056	14	0.0	0.1	14.980	B
C-AB	14	3	717	0.019	14	0.0	0.0	5.221	A
C-A	589	147			589				
A-B	7	2			7				
A-C	1186	296			1186				

00:45 - 01:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	14	4	254	0.056	14	0.1	0.1	14.988	B
C-AB	14	3	718	0.019	14	0.0	0.0	5.114	A
C-A	589	147			589				
A-B	7	2			7				
A-C	1186	296			1186				

01:00 - 01:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	12	3	294	0.040	12	0.1	0.0	12.757	B
C-AB	8	2	639	0.012	8	0.0	0.0	5.511	A
C-A	484	121			484				
A-B	5	1			5				
A-C	968	242			968				

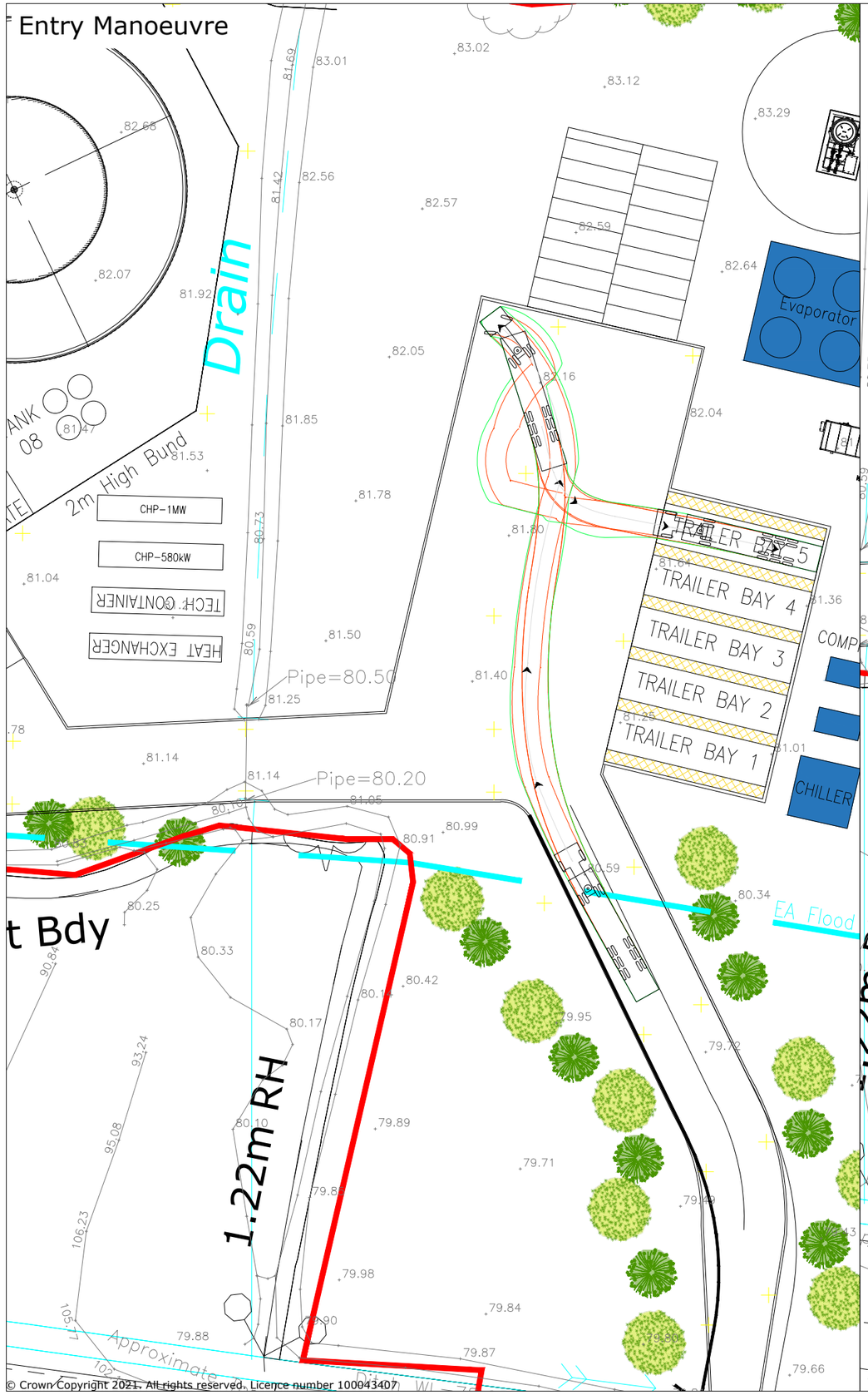
01:15 - 01:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	10	2	323	0.030	10	0.0	0.0	11.513	B
C-AB	5	1	584	0.009	5	0.0	0.0	6.037	A
C-A	407	102			407				
A-B	5	1			5				
A-C	811	203			811				

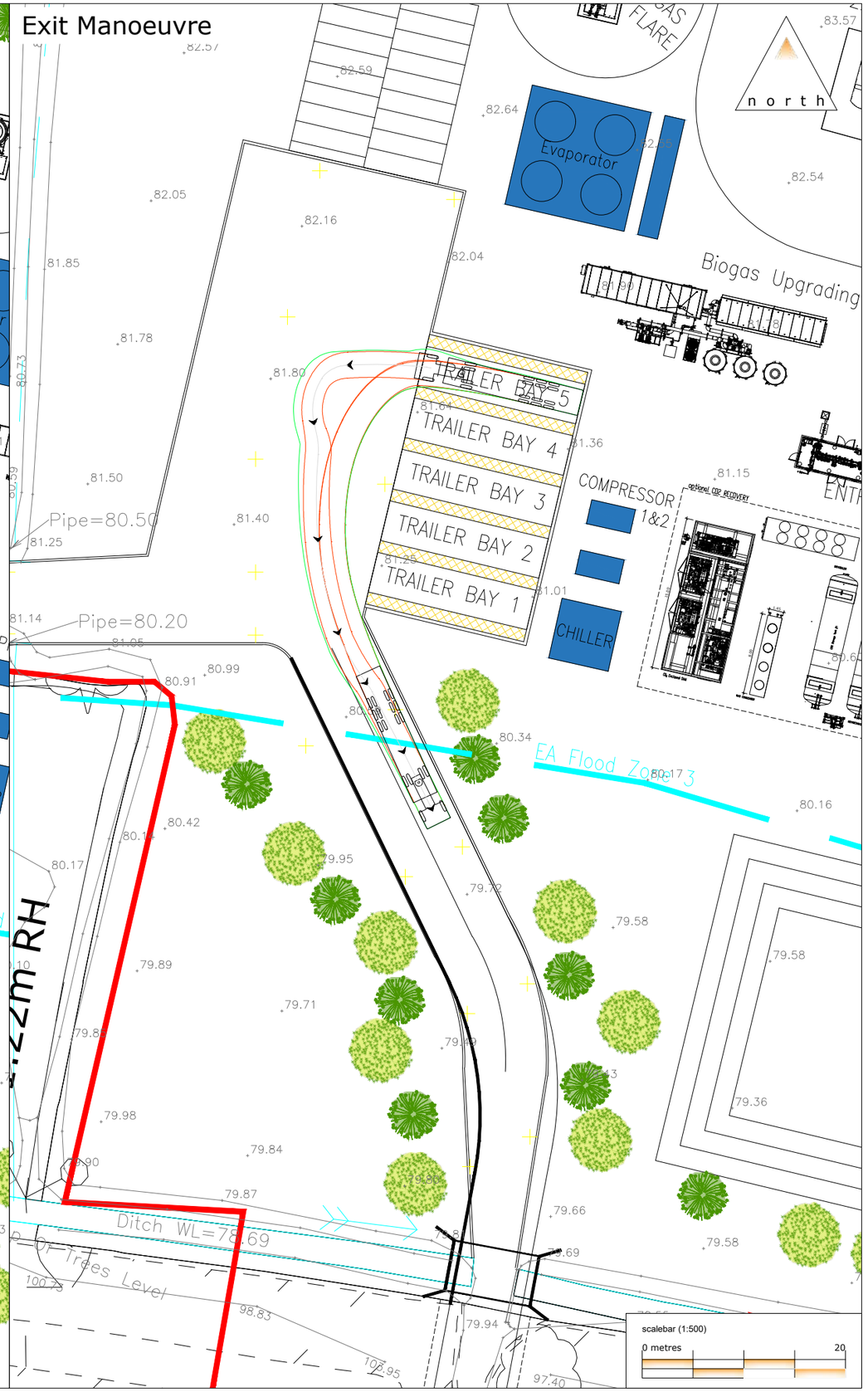
Appendix C

Swept Path Analysis

Entry Manoeuvre



Exit Manoeuvre



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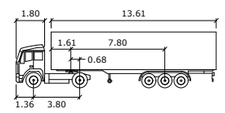
Rev:	Description:	Date:	Rev By:	Chk'd:



Artic

	meters		
Tractor Width	: 2.55	Lock to Lock Time	
Trailer Width	: 2.55	Steering Angle	
Tractor Track	: 2.55	Articulating Angle	
Trailer Track	: 2.55		

motion

Guildford - London - Reading
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Project:
Spring Grove Green Power

Title:
Swept Path Analysis
16.5 m Artic

Client:
Acorn Bioenergy Ltd

Drawing Status:

Scale: 1:500 (@ A3) Date: 11/03/24

Drawn: DR Checked: CA Approved: JR

Drawing: Revision:
2401110-TK01