

Thornton Corridor
Edgemoor Drive
Vol 2 Final Monitoring Study
June 2018



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1. Background and Introduction

Background

The opening of Broom's Cross Road in August 2015, brought changes to traffic and travel patterns in the Thornton area. Since the road opened residents have been getting in contact and telling us about the issues they are experiencing. Some of the issues we are hearing about are long standing issues and some appear to be due to recent changes in travel patterns.

In response to this the Council has undertaken an extensive assessment of the traffic conditions within the A565 area in order to address the issues raised. The outcome of this work is the Thornton Corridor Study. From this corridor study a short term action plan has been developed. This short term action plan included the options to alleviate the problems which residents from Edgemoor Drive, Thornfield Road and Ronaldsway have been telling The Council about.

In the summer of 2017 the Council asked the residents of Edgemoor Drive, Thornfield Road and Ronaldsway their views on a range of options one of which was the closure of Edgemoor Drive. Of the options presented, the closure of Edgemoor Drive was favoured the most by the residents. Based on the results of this initial consultation a trial closure went into place in February 2018.

The closure was implemented on a trial basis so that the impact to both the Thornton estate as a whole and the wider network could be assessed.

The assessment of the impacts of the trial closure was based on results from the following

- A traffic monitoring plan to ensure that sufficient data was collected to allow the impact on the wider road network to be adequately assessed. Monitoring was undertaken using a variety of different methods.
- A wider public consultation, which expanded on the initial consultation area of Edgemoor Drive, Thornfield Road and Ronaldsway and included all the roads between Edgemoor Drive and Edge Lane, as well as a section of Moor Lane.

The results of the monitoring and public consultation exercises have been separated into two documents; Volume 2 reports the recorded and observed monitoring results of the trial closure of Edgemoor Drive, whilst Volume 3 reports the results of the public consultation exercise. A combined summary and recommendations are contained in Volume 1.

Scheme Objectives

The objectives of the traffic management scheme in Thornton were;

- Improve journey time reliability along the A565
- Decrease journey times along the A565
- Reduce rat-running through the Thornton Estate link roads (primarily Thornfield Road and Ronaldsway)
- Decrease peak time queueing on Edgemoor Drive
- Decrease speeds through the Thornton Estate
- Decrease overall traffic numbers within the Thornton Estate

The monitoring plan was developed to be able to assess the extent to which the trial closure met the scheme objectives

Introduction

For a trial scheme of this nature public feedback is an invaluable asset and gives a first-hand insight into the issues and practicalities experienced by the end users. However public perception of the same issues can vary, for example experiencing the same issue but at different times of the day can produce differing responses.

For this reason the Council not only sought public feedback to the trial in terms of a public consultation exercise but also put a monitoring plan in place to ensure that sufficient data was collected to allow the impact on the wider road network to be adequately assessed. Monitoring was undertaken using a variety of different methods, outlined in Section 2.

For ease of reference the monitoring results discussed in this document will be separated into five areas;

Edge Lane
A565 (Quarry Road) Southbound
A565 (Moor Lane) Northbound
The Crescent
The Estate

For this report 'The Estate' is taken as being all roads between Edge Lane and Edgemoor Drive, including Edgemoor Drive itself.

Each of the identified areas contain a brief overall summary outlining the principal impact the trial closure has had on that area, along with the monitoring results from that area. Further monitoring data is contained in the appendices.

2. Monitoring

Monitoring Methods

The methods that the Council used to monitor the impact on the wider network were

- Automatic Traffic Counters (ATC)
- Manual Turning Counts (MTC)
- Traffic Camera Monitoring
- Queue length monitoring
- Journey Time data
- Traffic signal operation data
- Google Map Traffic data

In addition, comments received from both residents and stakeholders have been collated and form part of the assessment.

The monitoring plan included areas of specific interest which the Council anticipated that the closure will affect most during the peak times. These include Edge Lane, The Crescent, Quarry Road / Moor Lane southbound and the Moor Lane northbound right turn lane (into Edge Lane).

Details of the different monitoring methods are as follows.

Traffic Counts (ATC and MTC)

Automatic Traffic Counters (ATCs) (tubes across the road) were in the following locations and recorded 6 weeks' worth of data.

- Hartdale Road
- Edge Lane
- The Crescent
- Thornfield Road
- Ronaldsway
- Edgemoor Drive (close to Moor Lane junction)
- Edgemoor Drive (south of Ronaldsway)
- Link Avenue
- Larchfield Road
- St William Road
- Water Street

The ATC data provides a measure of the average number of vehicles per day and the 85th percentile speed – the speed that 85% of vehicles are travelling at or below.

The data has been compared to the pre-closure data, which was collected at the same sites in December 2017, to provide an overview of the changes in numbers of vehicles and speeds.

In addition to the ATCs the Council has undertaken pre-closure Manual Turning Counts (MTC) at both the Edge Lane junction and the Edgemoor Drive junctions. The data obtained by the Manual Turning Counts gives the number of turning vehicles for each arm of the junction in question i.e. how many vehicles are either turning left or right or going straight on. The turning counts were collected during the morning and evening peak hours. This type of count differs from the ATCs which only record how many vehicles pass over the tubes across a road.

The data from MTC's can be used in computer software (called LINSIG) which can show how well a signal junction is performing in terms of capacity.

Traffic Camera Monitoring

There are 4 traffic cameras which were monitored:

- Edge Lane / Moor Lane signal junction (Camera 32)
- Broom's Cross Road Roundabout (Camera 36)
- Fleetwoods Lane / Edge Lane junction (Camera 18)
- Crosby Village (Camera 22)

The cameras were observed and recorded in the AM and PM peaks for the duration of the closure, concentrating on Tuesdays and Thursdays which are considered 'neutral' days for monitoring – days on which traffic flows are expected to be heaviest. The cameras provide an overview of traffic patterns, queues and driver behaviours. They can also be used to investigate the reasons for anomalies in the traffic count data, e.g. if there is a vehicle breakdown or if roadworks are taking place.

Queue Length Measurement

This involved measuring the lengths of queues waiting at the signal junction of Edge Lane / Moor Lane / Virgins Lane during the morning and afternoon peak periods. Surveys were undertaken prior to the closure and near the end of the closure period on a Tuesday (during term time) and covered all arms of the junction.

Journey Time Data

Journey time data was recorded on three specific routes

- Edge Lane westbound (travelling towards the A565) – the full length from the Buckley Hill junction to A565 junction.
- Moor Lane northbound (travelling towards Formby) – From the roundabout at Crosby Village through the Edge Lane junction
- Moor Lane southbound (travelling towards Crosby) – Through the Edge Lane junction to the roundabout at Crosby Village.

Traffic cameras were used to record the time vehicles passed from one camera to another.

Traffic Signal Operation Data

Traffic signals in Sefton mostly operate using the SCOOT software system (Split Cycle Offset Optimisation Technique) which allows the traffic signals to be co-ordinated to maximise traffic flows through the signals and manage queues. The SCOOT system also collects a variety of technical data such as traffic flow rate and congestion.

This data can be extracted for any specific day both before and during the closure for any of the signal controlled junctions / crossings along Moor Lane, to provide a before and after comparison across the data fields for morning and afternoon peak periods.

Refer to Appendix F for an explanation of how a SCOOT system detects congestion.

Google Traffic

Google Traffic is a feature available through Google Maps and works by analysing the GPS locations transmitted to Google by a large number of mobile phone users. By calculating the speed of users along a length of road, Google is able to generate a live traffic map.

The live traffic map is represented by a range of colours (green, orange, red and dark red). The colours indicate the speed of traffic, green representing normal to dark red representing slow moving traffic. The slower the traffic indicated (red or dark red overlay) the greater the potential for congestion to occur.

A screenshot picture of the Google traffic map for the area was taken on Tuesdays and Thursdays in the morning peak hour, mid-afternoon and in the afternoon peak hour, for the duration of the closure.

3. Summary

A brief summary of the results of the monitoring survey for each of the five individual areas is as follows.

Edge Lane

The peak time queue length surveys suggest an increase of up to 2 to 3 fold compared to the 'pre-closure' figures; with observed queues frequently stretching back up to and beyond the Water Street junction and towards Drummond Road. This increase in queue lengths translates to a recorded average peak hour journey time along the length of Edge Lane of 6 min 40 secs, which is an increase of 1 min 20 secs from the 'pre-closure' figures.

A565 Southbound

The monitoring results indicate the trial closure has had a positive effect on southbound flows, improving the consistency of the flow and reducing the average journey time between the Edge Lane signal junction and the Moor Lane roundabout from 3 min 30 secs to 1 min 30 secs.

A565 Northbound

The monitoring results indicate the trial closure has had a negative effect on northbound flows, increasing queue lengths and journey times, whilst decreasing the consistency of the flow rate. Interestingly the smaller range of recorded journey times would suggest an improvement in journey time predictability, albeit with a longer journey time.

The closure has also had a negative effect on the capacity of the Edge Lane junction both as a whole and in relation to the two northbound lanes.

The Crescent

The closure of Edgemoor Drive has significantly increased the amount of traffic using The Crescent, which has become the main rat-running alternative to avoid the Edge Lane / A565 signals.

The Estate

The monitoring results indicate a marked reduction in the amount of traffic entering and exiting the Estate as a whole, with the greater benefits seen in the roads further west. The results however showed that there wasn't a similar overall impact in the reduction of the 85th percentile speed throughout the Estate, with post -closure speeds staying similar to the pre-closure figures, with only a couple of notable exceptions.



Edge Lane

4. Edge Lane

4.1 Summary

Edge Lane Summary

The trial closure has seen the following principal impact on Edge Lane

- **Longer westbound, peak time queue lengths**

All traffic that previously used Edgemoor Drive to gain access onto Moor Lane (made up of local traffic – both Thornton area and estate, rat-running through traffic and school traffic) must now use Edge Lane. As a result traffic volumes on Edge Lane initially rose following the start of the trial closure with the most noticeable impact being the westbound (towards the A565 signal junction) queue lengths.

The peak time queue length surveys suggest an increase of up to 2 to 3 fold compared to the 'pre-closure' figures; with observed peak time queues frequently stretching back up to and beyond the Water Street junction and towards Drummond Road. This increase in queue lengths translates to a recorded average peak hour journey time along the length of Edge Lane of approximately 6 min 40 secs, which is an increase of 1 min 20 secs from the 'pre-closure' figures.

Increased queue lengths and an increase in the westbound journey time along Edge Lane have resulted in a number of associated issues that have been observed and reported during the trial period.

- Rat-running through The Crescent – Monitoring Data / camera observations
- An increase in secondary rat-running through the Thornton Estate via St William Road and Thornfield Road also on the Edge Lane service road – suggested by the Monitoring Data / public feedback
- Difficulty in exiting the Estate onto Edge Lane especially for roads without a 'Keep Clear' marking with the Edge Lane junction – suggested by camera observations
- Increase in noise and air pollution – non-recorded.
- Difficulty in accessing properties – public feedback
- Increase in taxi costs – public feedback

The following list are potential workable mitigating measures to address some of the negative aspects the trial closure causes on Edge Lane;

- Improvement works to the Buckley Hill Lane route.
- Reconfigure of the signals sequence at the Edge Lane / A565 junction.
- 'Keep Clear' markings on the junctions of Edge Lane and Ronaldsway / Larchfield Road
- Edge Lane service road traffic calming

4.2 Pre-closure Data

Google Map 'typical traffic' data was recorded prior to the closure and showed a similar pattern for both the AM and PM peak times indicating that historically westbound traffic was typically slowing down after Drummond Road and slowing even further after Larchfield Road. The greater the length of red overlay or dark red overlay suggests an increased likelihood of queuing traffic.



A 'pre-closure' queue survey was undertaken in the week prior to the closure and showed that the westbound queues were within the boundaries of the red overlay indicated by the Google Map 'typical traffic' data, for the day of the survey.

Table 4.1 below shows the recorded average queue lengths on the approach to the signals at the A565 junction.

Peak	Lane	Average Queue Length	Indicative location of back of queue
AM	Left Turn Lane	89m	Between Thornfield Road and Ronaldsway
AM	Right / Ahead	38m	Before Thornfield Road
PM	Left Turn Lane	55m	Thornfield Road
PM	Right / Ahead	34m	Before Thornfield Road

Table 4.1 Queue length survey

An example of the queue lengths is depicted in the image below, taken on 23rd January at 4.45pm from Camera 32. Showing queuing traffic for the left hand lane between Thornfield Road and Ronaldsway.



In the 2 weeks prior to the closure journey time data was recorded for westbound vehicles. Table 4.2 below indicates the average recorded peak journey time, from the Buckley Hill Lane junction to exiting the signals at the A565.

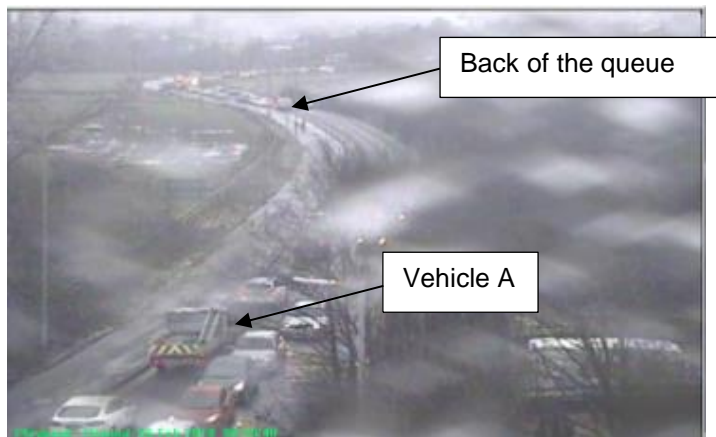
Pre-Closure Journey Time Data			
Route	Minimum Recorded Time	Maximum Recorded Time	Average Recorded Time
Edge Lane (from the Buckley Hill Lane junction) before exiting the signals at the A565	4 mins 50 secs	6 mins 13 secs	5 mins 19 secs

Table 4.2 Pre-closure journey time data

4.3 Post-Closure Data

Initial Monitoring Stage

In the initial period following the start of the trial closure, westbound queues were frequently observed stretching as far back as the Buckley Hill junction. These westbound queues resulted in journey times along the length of Edge Lane in excess of 15 minutes, as shown in the example below.



Example A

Vehicle A was recorded on 6th February at 8.30am from Camera 18 (looking from Buckley Hill towards Drummond Road) and joined the back of the queue, which was approximately 250m from the Buckley Hill junction. The vehicle took just over 15 minutes to travel the length of Edge Lane before it exited the signals at the A565.

Over the duration of the trial closure the observed queue lengths generally decreased in length as motorists used alternative routes; such as Buckley Hill Lane.

Later Monitoring Stages

For the final two weeks of monitoring (weeks commencing 16th April and 23rd April) peak time queues were frequently observed up to and beyond Water Street (the extents of camera 32), however free moving traffic was observed from Camera 18 (with the exception of the PM peak on the 19th) indicating the queues did not extend past Drummond Road.

A queue survey taken on the 17th April recorded the following average queue lengths (refer to table 4.3 below)

Peak	Lane	Average Queue Length	Indicative location of back of queue	Difference from pre-closure survey
AM	Left Turn Lane	176m	Approaching Water Street	+87m
AM	Right / Ahead	60m	Thornfield Road	+22m
PM	Left Turn Lane	149m	After Ronaldsway	+94m
PM	Right / Ahead	28m	Before Thornfield Road	-6m

Table 4.3 Queue survey comparison

The queue survey also confirmed the camera observation that although queues have decreased since the initial post closure period there is a general increase in queue lengths when compared to the pre-closure figures.

These observations and recordings appear to be corroborated by the Google Map ‘traffic’ data which indicated traffic starting to slow on the approach Drummond Road with a dark red overlay after Larchfield Road suggesting increased congestion – the image below is taken during the PM peak during April. For comparison of pre and post closure Google Map images refer to Appendix A.



For the final two weeks of monitoring (weeks commencing 16th April and 23rd April) the average AM and PM peak journey time was recorded as **6 min 39 secs**. Included in this average figure was the unexpected delays observed in the PM peak of 19th, which alone recorded an average journey time of 12 minutes for the length of Edge Lane. An example from the final two weeks is shown below.



Example B

Vehicle B: recorded on 17th April at approximately 8.30am. Free moving traffic was observed from the Buckley Hill junction; however the queue extended past the extents of Camera 32 – indicating the end of the queue was between Water Street and Drummond Road. The vehicle took 5 minutes to travel the length of Edge Lane and exit the signals at the A565.

Table 4.4 Post-closure journey time

Post-Closure Journey Time Data			
Route	Minimum Recorded Time	Maximum Recorded Time	Average Recorded Time
Edge Lane (from the Buckley Hill Lane junction) before exiting the signals at the A565	2 mins 41 secs	13 mins 36 secs*	6 mins 39 secs

* This was recorded on the 19th in the PM peak; the next highest maximum recorded time outside of the 19th PM peak was 8 min 43 secs

The average journey time from the final two weeks of monitoring when compared to the pre-closure data shows an **increase of 1 minute 20 secs**. For comparison of pre and post closure Journey Time data tables refer to Appendix A; Table A1

An analysis of the traffic data taken pre and post closure does not show any significant change in either traffic flow rates or the 85th percentile speed. Refer to Appendix A; Table A2

4.4 The impact of the longer queue lengths on Edge Lane?

Increased queue lengths and an increase in the westbound journey time along Edge Lane have resulted in a number of associated issues that have been observed and reported during the trial period.

- Increased journey times along Edge Lane – Monitoring Data
- Rat-running through The Crescent – Monitoring Data / cameras observations
- An increase in secondary rat-running through the Thornton Estate via St William Road and Thornfield Road also on the Edge Lane service road – suggested by the Monitoring Data / public feedback
- Difficulty in exiting the Estate onto Edge Lane especially for roads without a ‘Keep Clear’ marking with the Edge Lane junction – suggested by camera observations
- Increase in noise and air pollution – non-recorded.
- Difficulty in accessing properties – public feedback
- Increase in taxi costs – public feedback

4.5 Potential mitigating measures

The list of potential workable mitigating measures to address the longer queue lengths on Edge Lane and/or the associated issues these queues cause is as follows;

- **Improvement works to the Buckley Hill Lane route.**

These works are intended to provide an improved alternative route than Edge Lane for access to / from Brooms Cross Road, with the intention of reducing the number of westbound vehicles who travel the length of Edge Lane and turn right at the A565 / Edge Lane signals to gain access to the Brooms Cross roundabout.

The Council hope to commence works on site during the 2018/19 financial year.

- **Reconfigure the signals sequence at the Edge Lane / A565 junction.**

The current signal sequence allows for a green filter arrow on the southbound Quarry Road left turn lane. A reconfigure of the signal sequences would look to remove this arrow and instead introduce a new left arrow on Edge Lane, which would allow a longer green time for the Edge Lane left turn traffic and would be on green whilst the A565 northbound right turn arrow is on green as well.

The number of current Quarry Road left turning vehicles however suggests instigating such a scheme now could potentially have a detrimental effect on the flow of the A565 (Key Route Network).

One of the aims of the improvement works to the Buckley Hill Lane route would also be to reduce the amount of Edge Lane eastbound traffic, and hence the amount of traffic turning left into Edge Lane from Quarry Road. A reduction in traffic in this direction may make the reconfiguration of the signal sequences a viable option.

Removing the left arrow on Quarry Road removes the early start that the Quarry Road left lane enjoys and therefore also reduces the attractiveness that this lane gives southbound rat-runners.

Any reconfiguration of the signals would only be considered after the effectiveness of the Buckley Hill Lane improvements works has been determined. In addition the A565 southbound flow rates would also need to be taken into consideration.

- **'Keep Clear' markings**

'Keep Clear' markings on the junctions of Edge Lane and Ronaldsway / Larchfield Road would assist in vehicles exiting and entering the side roads during peak times.

- **Edge Lane service road traffic calming**

Drivers are reportedly looking to queue jump by using the Edge Lane service road. Traffic calming in the form of humps or cushions could be used to reduce speed along the service road.

A565 Southbound



5. A565 (Quarry Road / Moor Lane) Southbound

5.1 Summary

A565 (Quarry Road / Moor Lane) Southbound Summary

The trial closure has seen the following principal impact to the A565 southbound traffic

- **Significant reduction in the peak time 'rippling effect' of slowing traffic after the Edge Lane junction.**

The 'ripple effect' was the main observed pre-closure issue causing disruption to the flow and speed of southbound traffic and increasing congestion back through the signals at the Edge Lane junction.

A significant reduction in the peak time 'rippling effect' of slowing traffic after the Edge Lane junction has been observed from camera 32. The benefit of this is a decrease in congestion in and around the Edge Lane signal junction with the following effects

- An improvement in the overall consistency of the flow rate (i.e. traffic not at a standstill), through the Edge Lane signal junction and towards the Chesterfield Road junction.
- An increase in the flow rate and hence southbound traffic through the signal junction from Quarry Road, resulting in a 7.5% and 12.5% increase in the amount of southbound AM and PM peak traffic respectively, moving through the junction, when comparing the Manual Turning Counts from January and April.
- An improvement in the southbound peak journey time between the Edge Lane junction and the Moor Lane roundabout; from an average of 3 min 30 secs recorded in January to an average of 1 min 30 secs in April.

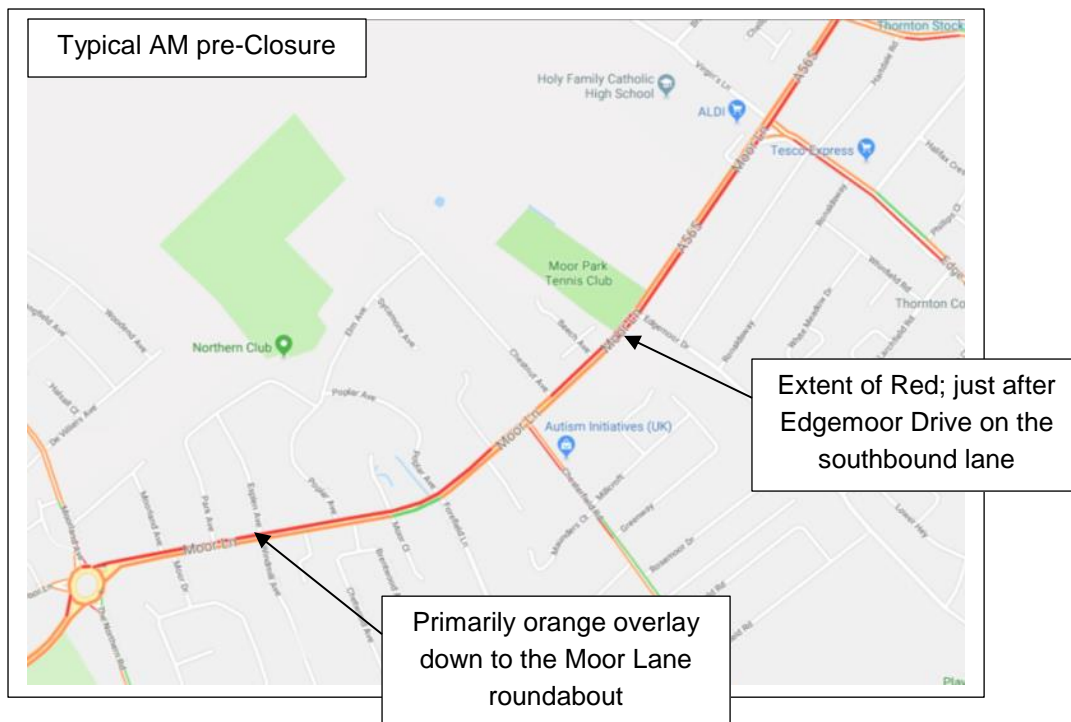
5.2 Pre Closure A565 Southbound

The main observed pre-closure issue associated with the southbound traffic was the following.

- Slowing of southbound A565 traffic to allow vehicles to enter and exit Edgemoor Drive

This slowing down on the approach to the Edgemoor Drive junction has a ripple effect on the queue behind, disrupting the flow and speed of traffic and increasing the congestion through the signals at the Edge Lane junction.

These observations are supported by Google Map 'typical traffic' data which for the AM peak time (shown below) highlights a red overlay on the southbound lane from the Green Lane junction to past the Edgemoor Drive junction - the greater the length of red overlay suggests an increased likelihood of queueing traffic. The data also shows a similar pattern for the PM peak.



A Pre-closure turning count survey (see table overleaf) indicates the number of vehicles using the Edgemoor Drive junction during the AM and PM peaks. Whilst the data in the table includes all traffic (including estate and rat-running), both types have the same detrimental effect on the southbound flows.

The table combines both the right and left turning figures for vehicles in and out of Edgemoor Drive. The actual turning counts indicate the left turn out of Edgemoor Drive (travelling southbound) and the northbound right turn into Edgemoor Drive account for the majority of traffic using Edgemoor Drive. Refer to Appendix B for the full junction turning counts.

	Turning INTO Edgemoor Drive	Turning OUT OF Edgemoor Drive	Peak Total
3 hour AM Peak	308	408	716
3 hour PM Peak	365	775	1140
Turning Manoeuvre Total	673	1183	

Table 5.1 Edgemoor Drive junction turning count

The southbound congestion leads to a number of associated issues on both the A565 on the surrounding network

- There is an increased likelihood of rat-running from traffic approaching the back of the southbound queue from Quarry Road and using the left hand lane and the left 'green signal arrow' to gain access onto Edge Lane via Quarry Road, and re-joining the southbound Moor Lane traffic via Thornfield Road and Edgemoor Drive. This means that some vehicles exiting Edgemoor Drive are actually contributing to the queue they are trying to avoid.
- Increased likelihood of the yellow box junction becoming blocked inhibiting the flow of the side roads; Edge Lane and Virgins Lane.
- Increased noise and air pollution from slow / stationary traffic.

In the 2 weeks prior to the closure journey time data was recorded along Moor Lane for southbound vehicles, between the signals at the A565 / Edge Lane junction and the roundabout at Crosby Village. Table 5.2 below indicates the average recorded peak journey time.

Pre-Closure Journey Time Data			
Route	Minimum Recorded Time	Maximum Recorded Time	Average Recorded Time
Edge Lane signals to the roundabout at Crosby Village	1 min 59 secs	4 mins 10 secs	3 mins 35 secs

Table 5.2 Pre-closure journey time

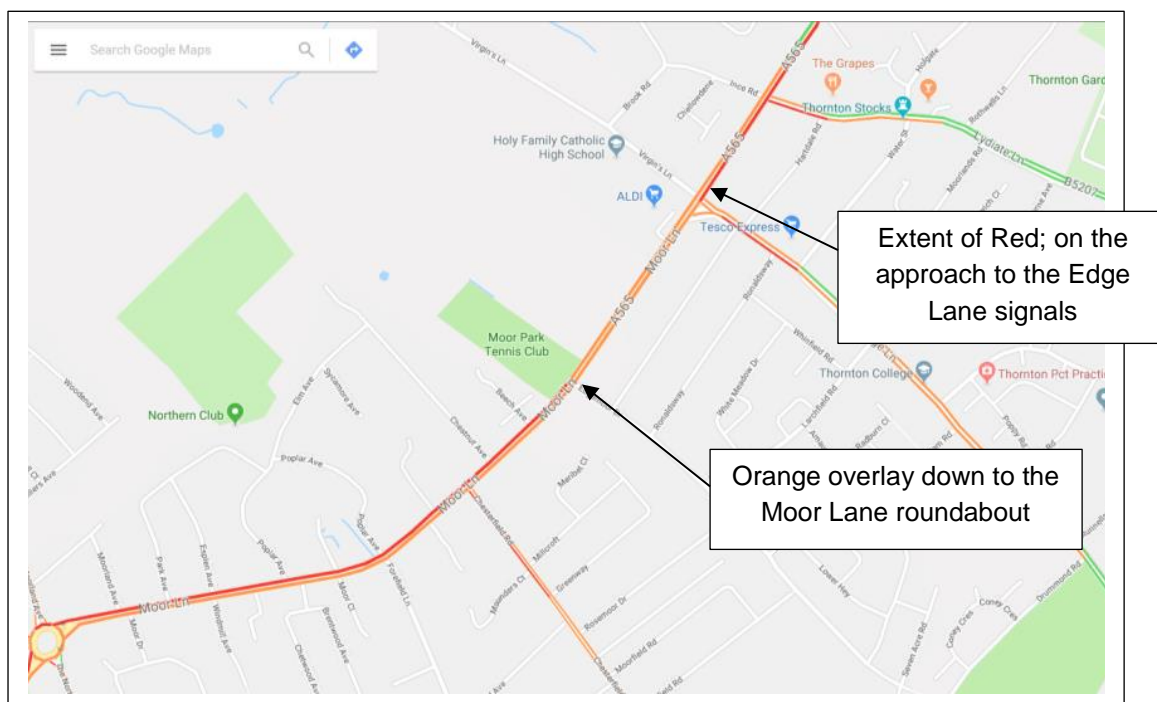
5.3 Post-Closure A565 Southbound

A significant reduction in the peak time 'rippling effect' of slowing traffic after the Edge Lane junction has been observed from camera 32.

The benefit of this is a decrease in congestion in and around the Edge Lane signal junction and this is summarised as follows

- An improvement in the overall consistency of the flow rate (i.e. traffic not at a standstill), through the Edge Lane signal junction and towards the Chesterfield Road junction.
- An increase in the flow rate and hence southbound traffic through the signal junction from Quarry Road.
- An improvement in the southbound peak journey time between the Edge Lane junction and the Moor Lane roundabout

These observations are supported by Google Map 'typical traffic' data, taken in May, which for the AM peak time (shown below) highlights a shorter length of red overlay, stopping before the Edge Lane junction. The previous length of red overlay stretching from Edge Lane to Edgemoor Drive is replaced by an orange overlay. The orange overlay suggests less of a likelihood of queuing traffic than the red overlay. The data also shows a similar pattern for the PM peak.



The improvement in flow rate is substantiated in part by the Councils traffic signal SCOOT. Data recorded on the southbound approach to the pedestrian crossing, just after Edgemoor Drive, shows a narrower variation between the flow trend lines for 'April 18' than for 'Nov 17' and 'Jan 18'. This indicates a more consistent flow rate. In terms of maximum flows there is a small increase in the 'April 18' AM peak.

The extent of this improvement can be analysed using SCOOT again and looking at the signal junctions immediately north and south of the pedestrian crossing (Edge Lane signals and Chesterfield Road signals).

At both signal junctions the profile of the flow graphs are similar, suggesting that the greater improvements are actually seen southbound from the Edge Lane signals to Edgemoor Drive. There is however an improvement in the mean flow rate at the Edge Lane signals suggesting a greater number of vehicles passing through the junction. This would be expected if there was a reduction in the congestion ahead. Refer to Appendix B for the comparison SCOOT flow graphs for the A565 / Edge Lane junction, the pedestrian crossing south of Edgemoor Drive and the Chesterfield Road junction.

The improvement in the flow rate through the A565 / Edge Lane junction can be seen in the MTC turning count showing a southbound increase of between 12-13% of vehicles passing southbound through the junction from Quarry Road – as highlighted in Table 5.3.

	January 2018 Count	April 2018 Count	Increase	Expressed as a %
AM Peak	1401	1587	+186	13%
PM Peak	1627	1831	+204	12%

Table 5.3 southbound traffic count through signal junction

An improved flow rate through the Edge Lane junction and down towards Edgemoor Drive also has a positive effect on the southbound peak journey time. The recorded data between the Edge Lane junction and the Moor Lane roundabout shows a significant improvement from an average of 3 min 35 secs recorded in January to an average of 1 min 35 secs in April.

Post-Closure Journey Time Data			
Route	Minimum Recorded Time	Maximum Recorded Time	Average Recorded Time
Edge Lane signals to the roundabout at Crosby Village	0 mins 35 secs	3 mins 13 secs	1 min 35 secs
Difference between Pre and Post Data			-2 min 0 secs

Table 5.4 post-closure journey time data

A565 Northbound



6. A565 (Moor Lane) Northbound

6.1 Summary

A565 (Moor Lane) Northbound Summary

The trial closure has seen the following principal impact to the northbound traffic

- **A marked increase in the usage of the right turn lane at the Edge Lane signals**

The northbound vehicles that previously turned right into Edgemoor Drive (both estate and rat-running traffic) now use the next available right turn, which is the signal junction at Edge Lane. This has increased the number of vehicles making a right turn at this junction, as confirmed by the MTC surveys.

The increase in usage of the right turn lane has had a number of detrimental impacts to both the junction and northbound traffic

- Signal junction and lane capacity, junction modelling results, from the LINSIG software, indicate that congestion has become worse both on the approach lanes and as a junction overall, especially during the AM peak. During the AM peak the efficiency of both northbound lanes has decreased over the duration of the closure, leading to increased congestion, whilst the PM peak has retained an amount of spare capacity
- Queue length surveys indicate an AM and PM increase in the northbound straight ahead / left lane and the right turn lane.
- A recorded average northbound journey time of 7 min 57 secs which represents an increase of 1 min 40 secs compared to the pre-closure figures.
- A marked decrease in the consistency of the northbound flow increasing the likelihood of congestion.
- The AM / PM peak periods lasting longer.

The list of potential workable mitigating measures to address some of the negative aspects that the trial closure causes on the A565 northbound traffic;

- Extending the right turn lane.
- Allow traffic to turn into Edgemoor Drive from Moor Lane.

6.2 Pre closure Northbound Traffic

Edgemoor Drive Influence

The disruption to the northbound flow caused by Edgemoor Drive appears to be less than the southbound flow. Before the trial the northbound traffic on Moor Lane was only disrupted by vehicles waiting to turn into Edgemoor Drive. The number of vehicles recorded turning right out of Edgemoor Drive was negligible.



Whilst the number of vehicles turning into Edgemoor Drive was recorded, the frequency that the northbound lane was disrupted was difficult to assess as the location of the adjacent bus lay-by provided some additional width for motorists to negotiate around a vehicle waiting to turn, depending upon the position of the stationary vehicle.

Any larger vehicle however, such as a bus would not be able to use this space to negotiate the vehicle waiting to turn into Edgemoor Drive.

Other Northbound Influences

It is also observed that the entrance to Aldi does at times have a detrimental effect on both northbound and southbound traffic flows. In terms of northbound flows the proximity to the junction can affect the efficiency of the junction, especially the straight ahead lane.

Signal Junction Capacity

Prior to the closure a Manual Turning Count (MTC) was undertaken at the Edge Lane / A565 signal junction in March 2016 and January 2018. The data collected was used in a computer software package (called LINSIG) which enabled the current performance of the two northbound lanes to be assessed.

There were some fluctuations in the calculated values between the two surveys, although the latest survey (Jan 2018) results indicated the PM peak as having spare capacity on both lanes whilst the AM peak has less capacity and is in the 'working inefficiently' category. (See Table 6.3), suggesting that there were already some issues with congestion in the PM Peak prior to the closure.

The analysis also shows that when comparing efficiency with the other arms of the A565 / Edge Lane junction the two northbound lanes were the worst in the AM peak but not as bad as Virgins Lane and the left turn out of Edge Lane.

A 'pre-closure' queue survey was undertaken in the week prior to the closure and indicated that the right turn lane had on average between 7 and 11 vehicle lengths of spare capacity before the right turn lane started blocking the straight ahead lane. The variation in vehicle lengths of spare capacity depends on whether the 'Keep Clear' markings for the Aldi entrance (approximately 21m in length) are adhered to.

Journey Time Data

In the 2 weeks prior to the closure, journey time data was recorded for northbound vehicles. The distribution of recorded journey times ranged from less than 4 mins to just under 11 mins. The table below indicates the average recorded peak journey time.

Pre-Closure Journey Time Data			
Route	Minimum Recorded Time	Maximum Recorded Time	Average Recorded Time
Entering the roundabout at Moor Lane to exiting the Edge Lane signals	3 mins 26 secs	10 mins 57 secs	6 min 17 secs

Table 6.1 pre-closure journey time

6.3 Post Closure Northbound Traffic

The northbound vehicles that previously turned right into Edgemoor Drive (both estate and rat-running traffic) now use the next available right turn, which is the signal junction at Edge Lane. This has increased the number of vehicles making a right turn at this junction, as confirmed by the MTC surveys and illustrated in the Table 6.2 below.





Peak	Lane	Pre-closure		Post-Closure		Up or Down from Pre-Closure
		March 2016 Flow (pcu)	January 2018 Flow (pcu)	March 2018 Flow (pcu)	April 2018 Flow (pcu)	
AM	Straight Ahead / Left Turn Lane	2382	2483	2417	2625	
AM	Right Turn Lane	602	655	747	851	
PM	Straight Ahead / Left Turn Lane	2359	2193	2280	2235	
PM	Right Turn Lane	695	673	887	869	

Table 6.2 northbound traffic count

For illustrative purposes taking an average of the two pre-closure and two post closure surveys; there is an approximate 28% increase in the right turn traffic. It should also be noted that this increase has also coincided with an increase in the left / straight ahead lane during the AM peak.

Signal Junction Capacity

The data from the post closure Manual Turning Counts (MTC) have been used in the LINSIG modelling software to assess the current performance of the northbound lanes.

Table 6.3 below confirms that during the AM peak the efficiency of both northbound lanes has decreased over the duration of the closure, leading to increased congestion, especially in the AM peak, whilst the PM peak has retained an amount of spare capacity.

The location of the local schools and the concentration of school traffic during the AM peak, which previously would have used Edgemoor Drive, may be a contributing factor to the difference in the AM and PM peaks.

Table 6.3 Linsig results

	PEAK RECORDED TRAFFIC FLOWS							
	March 2016		January 2018		March 2018		April 2018	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Straight ahead / Left turn Flow (pcu)	2382	2359	2483	2192	2417	2281	2625	2235
Right Turn Lane Flow (pcu)	602	695	654	672	747	887	851	869
Combined Northbound Flow (pcu)	2984	3054	3137	2864	3164	3168	3476	3104
Degree of Saturation	90.3%	84.1%	94.7%	78.6%	94.6%	85.5%	103.6%	83.7%

- Flow is the number of vehicles – measured in Passenger Car Units (pcu's) over the 3 hour peak period
- Degree of Saturation is the ratio of demand flow to the maximum northbound flow. Values over 85% are typically regarded as suffering from traffic congestion, with queues of vehicles beginning to form. The junction is assumed to be working inefficiently for a degree of saturation of more than 90% and assumed to be 'over saturated' for figures over 100%.

Refer to Table C1 Appendix C for the performance of the signal junction, as a whole, expressed in terms of Practical Reserve Capacity (PRC).

Camera Observations

Northbound congestion is substantiated by camera observations, which have noted an increase in the frequency that the right turn lane is full and potentially blocks the straight ahead lane from filling up. This can occur in all peak times including what is referred to as the 'mini PM peak', which is associated with the school closing times around 3.30pm.

It is also noted that the entrance to Aldi can have a detrimental effect on traffic flows both northbound and southbound, with traffic on the A565 slowing / stopping to let traffic in and out.

Queue Length Surevys

The post closure queue length survey indicated an increase in both peak hours for both the straight ahead / left and the right turn lane.

Peak	Lane	Average Queue Length pre-closure	Average Queue Length post-closure	Difference
AM	Straight Ahead / Left Turn Lane	31 vehicles	50 vehicles	19 vehicles
AM	Right Turn Lane	3 vehicles	8 vehicles	5 vehicles
PM	Straight Ahead / Left Turn Lane	20 vehicles	27 vehicles	7 vehicles
PM	Right Turn Lane	4 vehicles	8 vehicles	4 vehicles

Table 6.4 queue length surveys

If the conflict point between the two lanes, where the right turn blocks the straight ahead lane, is approximately at the 15 vehicle mark, the average post-closure queue length now offers between 3 to 7 vehicles of spare capacity (depending if the 'Keep Clear' markings are adhered to) before the right turn lane blocks the adjacent lane. This gives weight to the camera observations which highlighted an increase in frequency of the right turn lane reaching capacity.

Refer to Table C2 Appendix C for an alternative table expressed in terms of metres.

6.4 What is the effect on the general flow of northbound traffic?

The right turn lane has a limited capacity (up to the Aldi entrance) which can't be extended, without a major carriageway widening scheme. Once the right turn lane is full it blocks the straight ahead lane – the straight ahead manoeuvre being the predominant traffic flow. This makes the operation of the junction inefficient and leads to longer northbound queues to the approach to the Edge Lane junction

Congestion is identified within the Councils traffic signal SCOOT system as occurring when a SCOOT detector (loop) has been continually occupied by vehicles in a queue. The longer the SCOOT loop is occupied the longer the queue therefore the more congestion.

SCOOT congestion graphs taken over a week in November 2017 and over a week in April 2018, towards the end of the closure, highlight the following

- A marked increase in the peak percentage of congestion in the April (both AM and PM).
- Extended peak periods in both the AM and PM in April.
- No distinguishable gap between the Mini PM Peak (associated with the school closing times around 3.30pm) and the PM peak in April.
- A marked decrease in the consistency of the northbound flow.

Refer to Appendix C for both SCOOT graphs.

An increase in congestion is substantiated by the Google Maps traffic data which indicate a slowing down of northbound traffic along Moor Lane from the roundabout at Crosby Village to the approach to Edgemoor Drive. Refer to Appendix C for a comparison pre and post closure PM peak traffic data maps.

Journey Time Data

For the final two weeks of monitoring (weeks commencing 16th April and 23rd April) the average AM and PM peak journey time was recorded as **7 min 57 secs**. The range of recorded journey times was less than the pre-closure data and ranged from just less than 6 mins to 9 mins 30secs. Interestingly the smaller range of recorded journey times would suggest an improvement in journey predictability, albeit with a longer journey time.

Post-Closure Journey Time Data			
Route	Minimum Recorded Time	Maximum Recorded Time	Average Recorded Time
Entering the roundabout at Moor Lane to exiting the Edge Lane signals	5 mins 51 secs	9 mins 30 secs	7 min 57 secs

Table 6.5 post-closure journey time

This figure represented an increase in the average journey time of 1 min 40 secs between the roundabout at Moor Lane and exiting the Edge Lane signals.

For comparison of pre and post closure Journey Time data tables refer to Appendix C; Table C3.

6.5 Potential mitigating measures

The list of potential workable mitigating measures to address the issues on Edge Lane and/or the associated issues these queues cause is as follows;

- **Extending the right turn lane.**

This option would increase the capacity of the right turn lane (by up to 50m) and therefore improve the general northbound flow rates on the approach to the A565 / Edge Lane signal junction. This option would require land acquisition and diversion of some existing stats which would be expensive and time consuming and may make funding difficult to obtain.

- **Allow traffic to turn into Edgemoor Drive from Moor lane.**

This option would allow access into Edgemoor Drive from Moor Lane but still prevents vehicles from turning out of Edgemoor Drive. This option is seen as a workable compromise to a permanent closure that addresses one of the main disadvantages of the full closure; the increased usage of the northbound right turn lane whilst maintaining many of the benefits that a permanent closure option offers.

The Crescent



7. The Crescent

7.1 Summary

The Crescent Summary

The trial closure has seen the following principal result to The Crescent

- **Over 30% increase in traffic flows, predominantly westbound**

It is a fair assumption to say that the observed increase is largely down to traffic avoiding queuing at the signals at the A565 / Edge Lane junction (Rat-running). CCTV images indicate the rat-running traffic predominantly accesses The Crescent from 3 different directions.

- From Thornfield Road (left turn into The Crescent)
- From Edge Lane Westbound (via a left turn into Thornfield Road)
- From Quarry Road southbound (via a right turn from Edge Lane from the Quarry Road left lane)

The main issues observed from CCTV images are as follows

- Increased usage of the Thornfield Rd / Edge Lane / Crescent junction.
- An increase in traffic in an area frequented by pedestrians / school children.
- Traffic on the A565 southbound slowing down to let traffic exit The Crescent.

Other issues reported by the general public are

- Increase in parking on Thornfield Road (presumably at the north end closest to Edge Lane)
- Difficulties for refuse and delivery drivers

The list of potential workable mitigating measures to reduce the number of users on The Crescent is as follows;

- Reconfigure the signals sequence at the Edge Lane / A565 junction.
- Making The Crescent One-Way.

7.2 Pre closure The Crescent

The Crescent has always provided rat-running traffic a 'give-way' access, both to and from Moor Lane and the issue of rat-running traffic is not new. Although without destination and origin surveys it is difficult to assess the actual amount of rat-running traffic.

However a snapshot observational survey from the 23rd January PM Peak recorded 20 vehicles in a 30 minute duration using the Crescent as an alternative to the signals. The vast majority of rat-running

traffic observed was Edge Lane west bound traffic avoiding the signals. Although traffic travelling north up Thornfield Road and traffic turning right from Moor Lane have also been observed.

There has also been a long standing aspiration to make The Crescent one-way.

7.3 Post closure The Crescent

Observed CCTV images (Camera 32 located at The Crescent) saw an immediate increase in queuing traffic exiting The Crescent onto Moor Lane. In the first couple of weeks of the trial the length of the queue was quite often the full length of The Crescent, especially in the AM peak. Over the duration of the trial however the observed frequency that the queue was the full length of The Crescent reduced. An observed queue length of 3 or more vehicles is not uncommon.

The following Table illustrates the average daily total of vehicles (in both directions) using The Crescent and highlights the post closure increase.

Table 7.1 ATC Data

Road	PRE-CLOSURE		By Week 5			
	Daily Average	85 th Percentile Speed	Daily Average	% Diff (from pre-closure)	85 th Percentile Speed	% Diff (from pre-closure)
The Crescent	1023	19	1344	31.3%	17.7	-6.8%

Refer to Appendix D and table D1 for a complete table of weeks 1, 3 and 5 ATC data.

It is a fair assumption to say that this increase (321 vehicles by week 5) is largely down to traffic avoiding queuing at the signals at the A565 / Edge Lane junction (Rat-running). CCTV images indicate the rat-running traffic predominantly accesses The Crescent from 3 different directions.

- From Thornfield Road (left turn into The Crescent)
- From Edge Lane Westbound (via a left turn into Thornfield Road)
- From Quarry Road southbound (via a right turn from Edge Lane from the Quarry Road left lane)

Pre-closure the predominant rat-run was Edge Lane westbound. However post closure a further two manoeuvres became common practice. Southbound A565 drivers, who previously used the Quarry Road left turn lane to avoid the signals and re-join the A565 via Thornfield Road / Edgemoor Drive, quickly started using The Crescent in lieu of Edgemoor Drive, to avoid the southbound queues on Quarry Road.

In addition because of the longer queues on Edge Lane itself traffic from the Estate would avoid the queues using Thornfield Road to either jump to the start of the queue or as an alternative to access The Crescent.

It was also observed that drivers would often use The Crescent, almost as default even if the queues ahead were not excessive.

7.4 What issues do rat-running vehicles cause?

The main issues observed from CCTV images are as follows

- Increased usage of the Thornfield Rd / Edge Lane / Crescent junction.
- Disruption to eastbound Edge Lane traffic whilst rat-runners are waiting / queuing to turn right into The Crescent.
- An increase in traffic in an area frequented by school children.
- Traffic on the A565 southbound slowing down to let traffic exit The Crescent.

Other issues reported by the general public are

- Increase in parking on Thornfield Road (presumably at the north end closest to Edge Lane)
- Difficulties for refuse and delivery drivers

7.5 Potential mitigating measures

The list of potential workable mitigating measures to reduce the number of users on The Crescent is as follows;

- **Reconfigure the signals sequence at the Edge Lane / A565 junction.**

The removal of the Quarry Road left arrow, as part of any reconfiguring of the Edge Lane / A565 signals, would reduce the benefits that rat-runners gain by using the Quarry Road left lane. This in turn would be expected to reduce the number of rat-runners and therefore the number of vehicles using The Crescent in this manoeuvre.

In addition a new left arrow on Edge Lane would give more green time to the predominant westbound flow, reducing queues and potentially the need to rat-running.

- **Making The Crescent One-Way.**



The Council have future plans to make The Crescent one-way – restricting access from Moor Lane. The 7 day daily average figure of 1344 vehicles (in week 5) comprises of 1127 vehicles travelling westbound and 217 vehicles travelling eastbound. A one-way restriction would prohibit the eastbound manoeuvre – an example is shown in the adjacent photo.



The Estate

8. The Estate

8.1 Summary

The Estate Summary

The trial closure has seen the following principal impact in the Estate

- **A 19% reduction in the traffic entering and exiting the Estate.**

The results also show a definitive East / West split in terms of gains with the roads closest to the A565 showing decreases whilst the two roads furthest east, Larchfield Road and St William Road show increases.

The results also showed that there wasn't a similar overall impact in the reduction of the 85th percentile speed throughout the Estate, with post –closure speeds staying similar to the pre-closure figures, with only a couple of notable exceptions, including Thornfield Road which saw a marked increase.

8.2 Pre closure The Estate

Since the opening of Brooms Cross Road congestion along Moor Lane has increased as a result of Moor Lane becoming a more attractive route to get to Switch Island. This increase in congestion has resulted in a reported increase in traffic through the Estate, which itself has brought with it a number of associated issues including; speeding, rat-running, parking issues, queueing and environmental.

All the roads linking Edgemoor Drive to Edge Lane have reported a general increase in traffic.

8.3 POST CLOSURE THE ESTATE

Automatic traffic counts (tubes across the carriageway) were placed across a number of roads within the Estate for the first few weeks of the closure. These counts recorded traffic numbers and speeds.

An analysis of the count data for the Estate linking roads only (Thornfield Road, Ronaldsway, Link Avenue, Larchfield Road and St William Road) – see table below - suggests by week 5 a fall in the average daily figure of **19% (1065 vehicles)** for traffic entering and exiting the Estate as a whole. The results also show a definitive East / West split in terms of gains with the roads closest to the A565 showing decreases with the two roads furthest east, Larchfield Road and St William Road showing increases.

Road	PRE-CLOSURE		By Week 5			
	Daily Average	85 th Percentile Speed	Daily Average	% Diff (from pre-closure)	85 th Percentile Speed	% Diff (from pre-closure)
Thornfield Road	936	26.6	702	-25%	29.5	10.9%
Ronaldsway	893	29.3	536	-40.0%	28.4	-3.1%
Link Avenue	805	20.1	202	-74.9%	19.9	-1%
Larchfield Road	1264	22.4	1390	10.0%	22.6	0.9%
St William Road	1725	22.8	1728	0.2%	22.4	-1.8%
TOTAL	5623		4558			

Table 8.1 ATC data

In relation to the 85th percentile speed the trial closure has only had a marginal impact in affecting speeds with the exception of Thornfield Road which has actually showed a marked increase.

Data obtained from the remaining Automatic Traffic Counts are summarised in the table below, highlighting the difference between the pre-closure data and data obtained by Week 5.

Road	PRE-CLOSURE		By Week 5			
	Daily Average	85 th Percentile Speed	Daily Average	% Diff (from pre-closure)	85 th Percentile Speed	% Diff (from pre-closure)
Hartdale Road	349	23.7	305	-12.8%	23.3	-1.7%
Edge Lane	12723	26.6	12708	-0.1%	26.8	0.8%
The Crescent	1023	19	1344	31.3%	17.7	-6.8%
Edgemoor Drive (close to Moor Lane junction)**	3171	23.9	39	-98.8%	16.1	-32.6%
Edgemoor Drive (south of Ronaldsway)	2049	29.5	645	-68.5%	30.2	2.4%
Water Street	1236	28.6	1316	6.5%	29.1	1.7%

** Post Closure this length of Edgemoor Drive is effectively a cul-de-sac hence the drastic reduction in both categories.

Table 8.2 ATC data

Refer to Appendix E and table E1 for a complete table of weeks 1, 3 and 5 ATC data.

Within the Estate Edgemoor Drive has also seen a reduction in traffic, whereas outside this area the results are mixed. Hartdale Road has a reduction in traffic, whilst The Crescent and Water Street show an increase. The latter could be a result of traffic travelling westbound on Edge Lane turning right to avoid the queues and using the Green Lane signal junction instead.

A more detailed overview of the surveyed linking roads in the Estate (from West to East) is contained in Appendix F.

Appendices

Appendix A: Edge Lane comparison Images / Tables

Table A1: Pre- and Post-closure average journey time data

Pre-Closure Journey Time Data			
Route	Minimum Recorded Time	Maximum Recorded Time	Average Recorded Time
Edge Lane (from the Buckley Hill Lane junction) before exiting the signals at the A565	4 mins 50 secs	6 mins 13 secs	5 mins 19 secs
Post-Closure Journey Time Data			
Route	Minimum Recorded Time	Maximum Recorded Time	Average Recorded Time
Edge Lane (from the Buckley Hill Lane junction) before exiting the signals at the A565	2 mins 41 secs	13 mins 36 secs*	6 mins 39 secs
Difference between Pre and Post Data			+1 min 20 secs

Table A2: Pre- and Post-closure traffic data

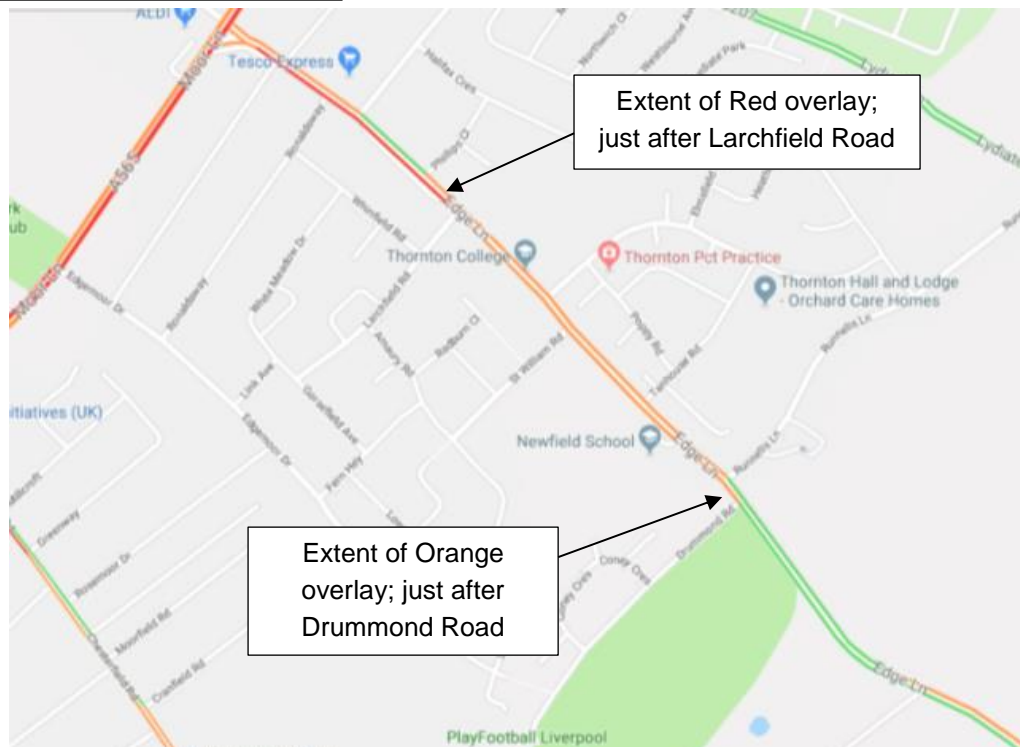
	Daily Av	% Diff (from pre-closure)	85 th Percentile Speed
Pre-Closure	12723	-	26.6
Week 1	13057	2.6%	27.3
Week 3	13170	3.5%	27.3
Week 5	12708	-0.1%	26.8

Edgemoor Drive Monitoring Study

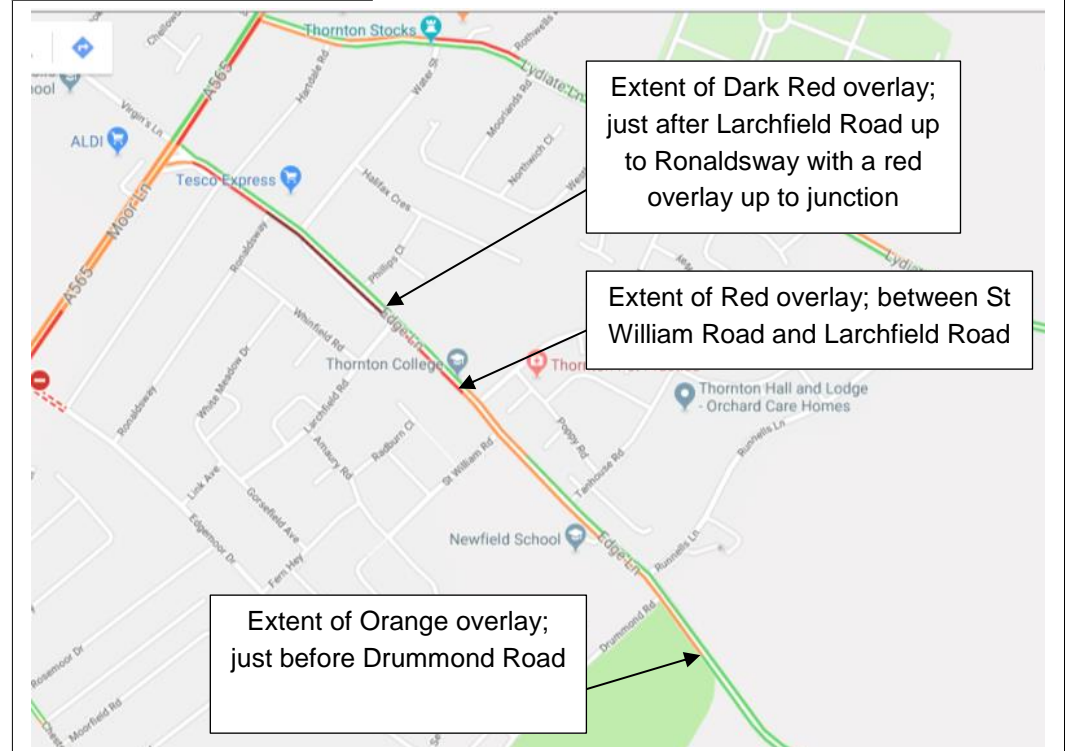


The colour coding (Green, Orange, Red, Dark Red) relates to how fast traffic is moving – with Dark Red indicating the slowest moving traffic. This data can give some indication to queues and congestion.

Pre-Closure: Edge Lane



Post-Closure: Edge Lane



Appendix B: A565 Southbound comparison Images / Tables

Diagram: Edgemoor Drive Pre-closure turning count data.

← 2385 The number of vehicles over a 3 hour peak period

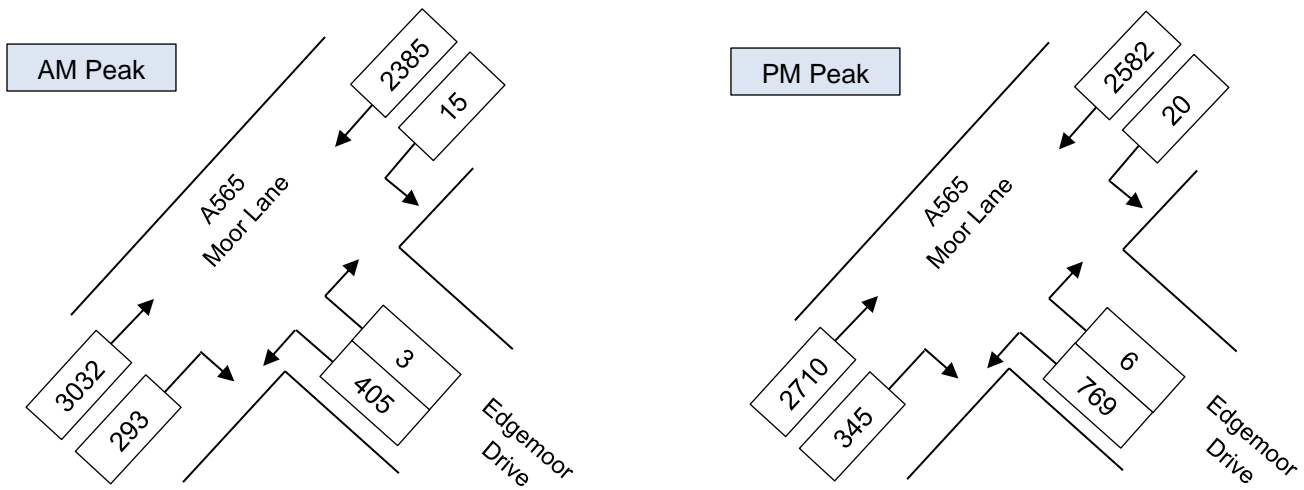


Table B1: Pre- and Post-closure average journey time data southbound along Moor Lane

Pre-Closure Journey Time Data			
Route	Minimum Recorded Time	Maximum Recorded Time	Average Recorded Time
Edge Lane signals to the roundabout at Crosby Village	1 min 59 secs	4 mins 10 secs	3 mins 35 secs
Post-Closure Journey Time Data			
Route	Minimum Recorded Time	Maximum Recorded Time	Average Recorded Time
Edge Lane signals to the roundabout at Crosby Village	0 mins 35 secs	3 mins 13 secs	1 min 35 secs
Difference between Pre and Post Data			-2 min 0 secs



The colour coding (Green, Orange, Red, Dark Red) relates to how fast traffic is moving – with Dark Red indicating the slowest moving traffic. This data can give some indication to queues and congestion.

Pre-Closure: A565 Southbound

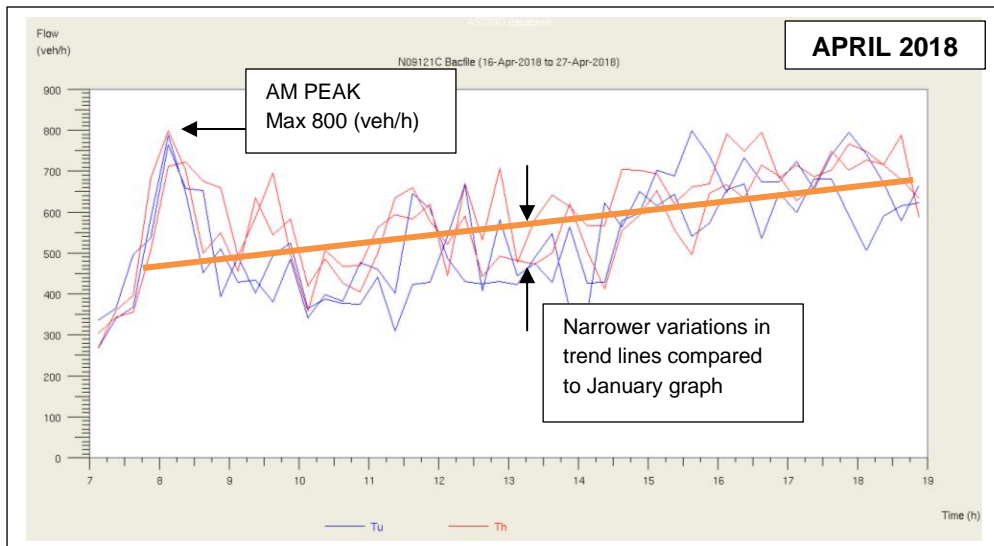
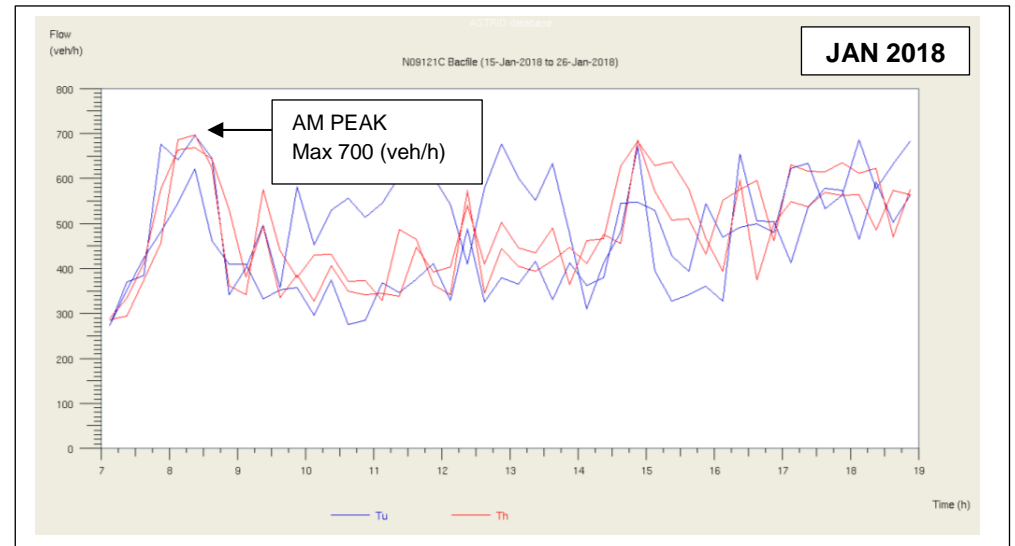
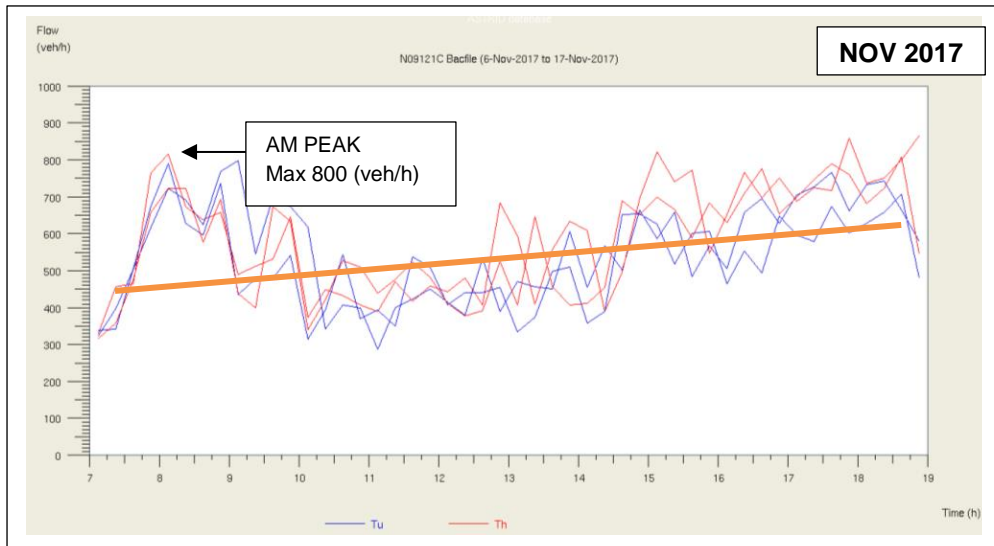


Post-Closure: A565 Southbound



Comparison of pre and post closure google traffic maps

Scoot graphs for the 3 southbound signals; Edge Lane junction, pedestrian crossing and Chesterfield Road junction

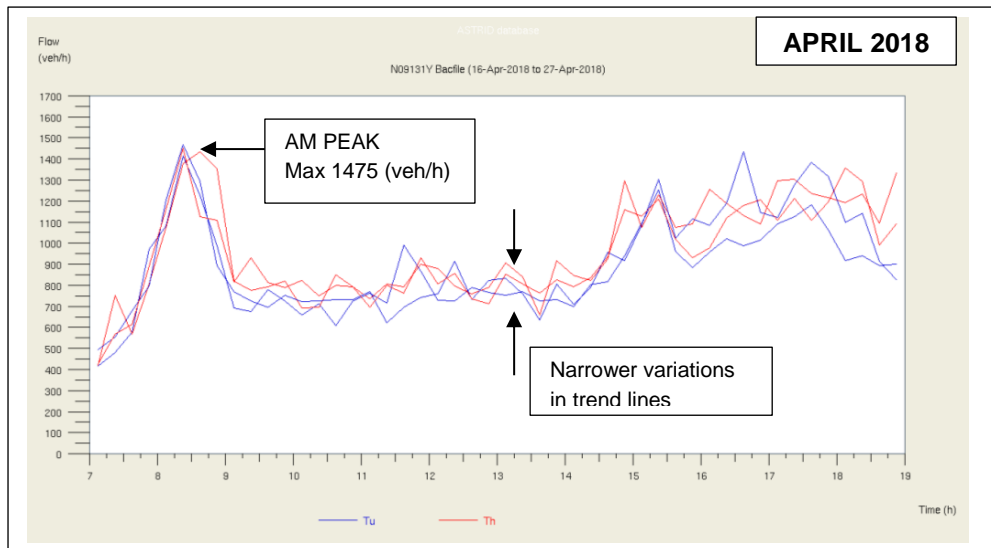
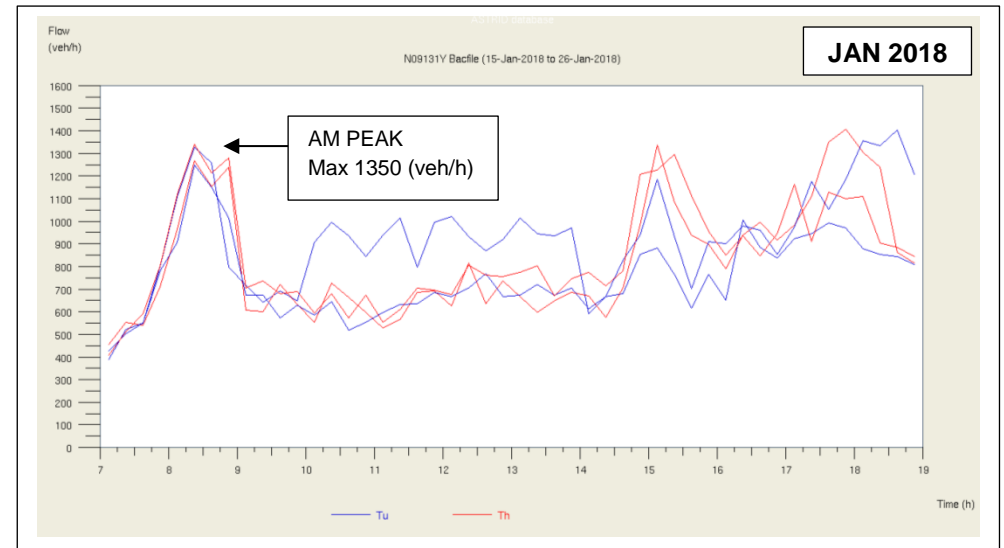
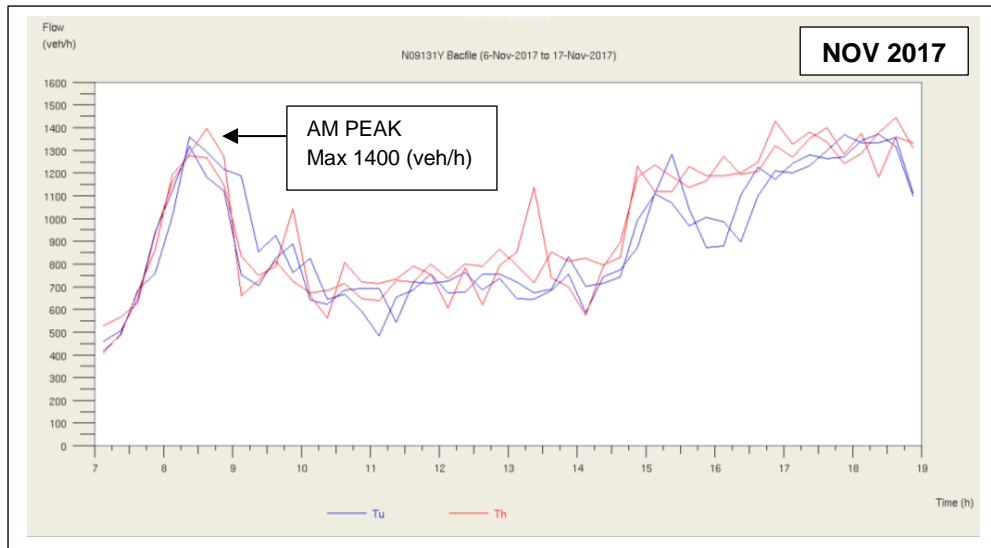


QUARRY SOUTHBOUND APPROACH TO THE EDGE LANE SIGNAL CROSSING

SCOOT ANALYSIS

There is a noted improvement between the January and April graphs, both in the consistency of the flow rate and the maximum peak figures. The April and November graphs however are similar, with only a small difference between the maximum and minimum peak figures and a similar flow consistency.

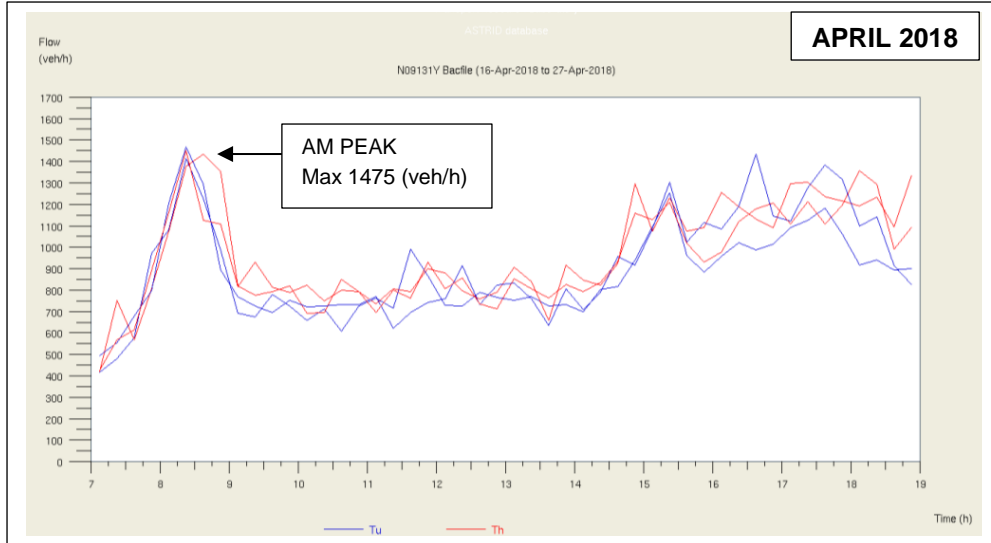
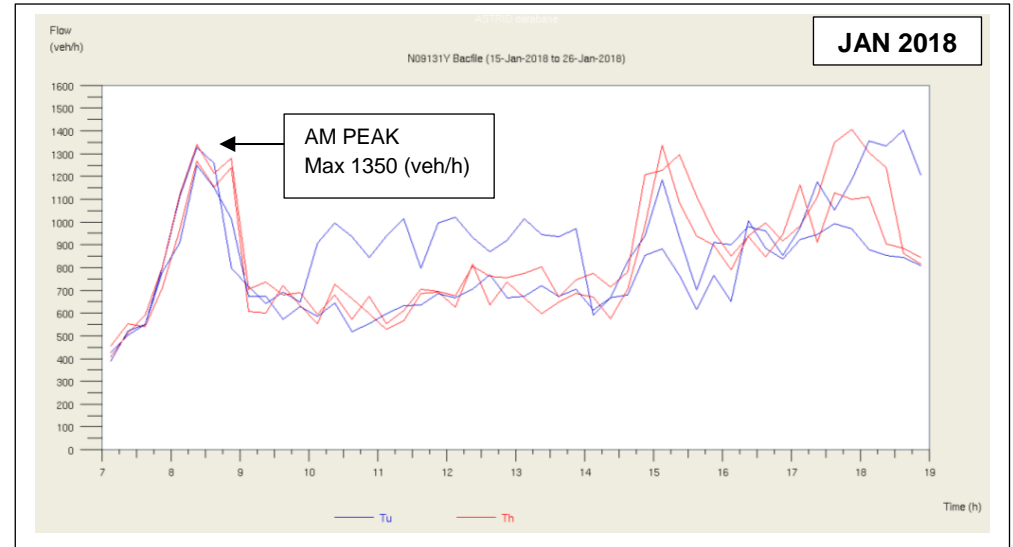
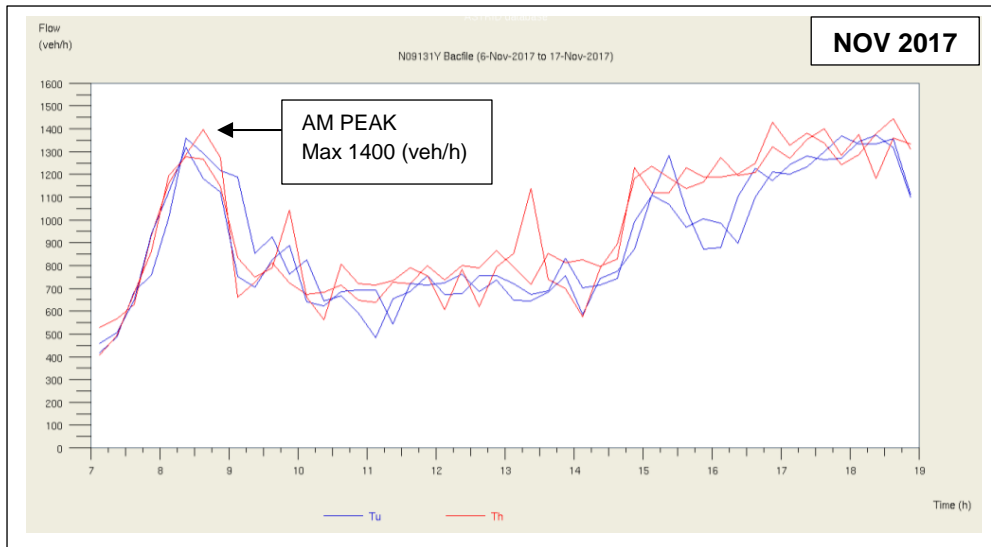
The April graph does however suggest a slight increase in the mean average flow rate suggesting more vehicles passing through the junction.



MOOR LANE SOUTHBOUND APPROACH TO THE PEDESTRIAN CROSSING (CLOSE TO EDGEMOOR DRIVE)

SCOOT ANALYSIS

The profiles for the pre-closure and post closure flow rates are similar, however the April graph indicates a narrower variation in the trend line values suggesting a more consistent flow rate. In terms of any increases in the flow rates there is a marginal increase in the maximum April AM peak, with only a slight increase in the maximum PM peak figure.



MOOR LANE SOUTHBOUND APPROACH TO THE CHESTERFIELD ROAD JUNCTION

SCOOT ANALYSIS

There is an apparent difference between the April and January graphs in both the consistency of the flow rate and to a lesser extent the maximum peak figures. The April and November graphs however are similar, with little difference between the maximum and minimum peak figures, with a slight increase in the flow consistency in April PM peak only.

Appendix C: A565 Northbound

The performance of a signal junction as a whole can be expressed in LINSIG in terms of Practical Reserve Capacity (PRC). A positive PRC indicates that a junction has spare capacity and may be able to accept more traffic. A negative PRC indicates that the junction is over capacity and is suffering from traffic congestion.

Table C1: The PRC results for the Edge Lane / A565 junction.

YEAR	PEAK	A565 / Edge Lane Junction PRC
March 2016	AM PEAK	-0.3%
	PM PEAK	-5.1%
January 2018	AM PEAK	-5.2%
	PM PEAK	7.8%
March 2018	AM PEAK	-5.1%
	PM PEAK	-4.3%
April 2018	AM PEAK	-15.1%
	PM PEAK	-5.1%

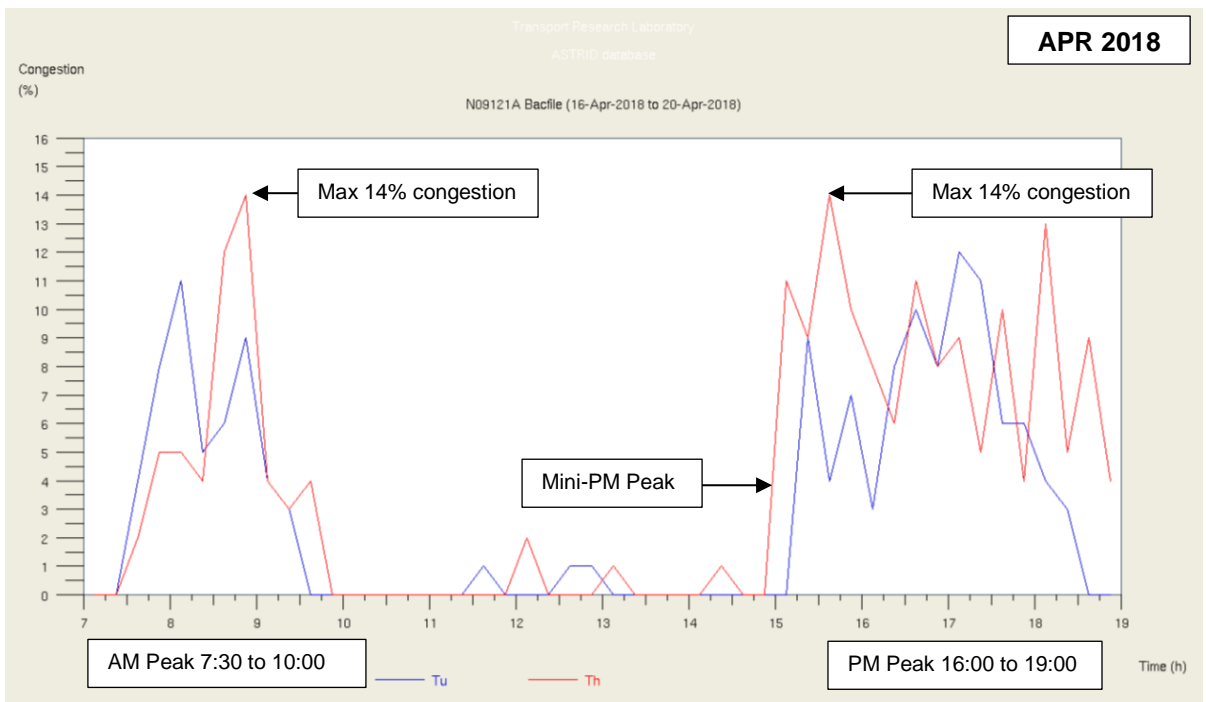
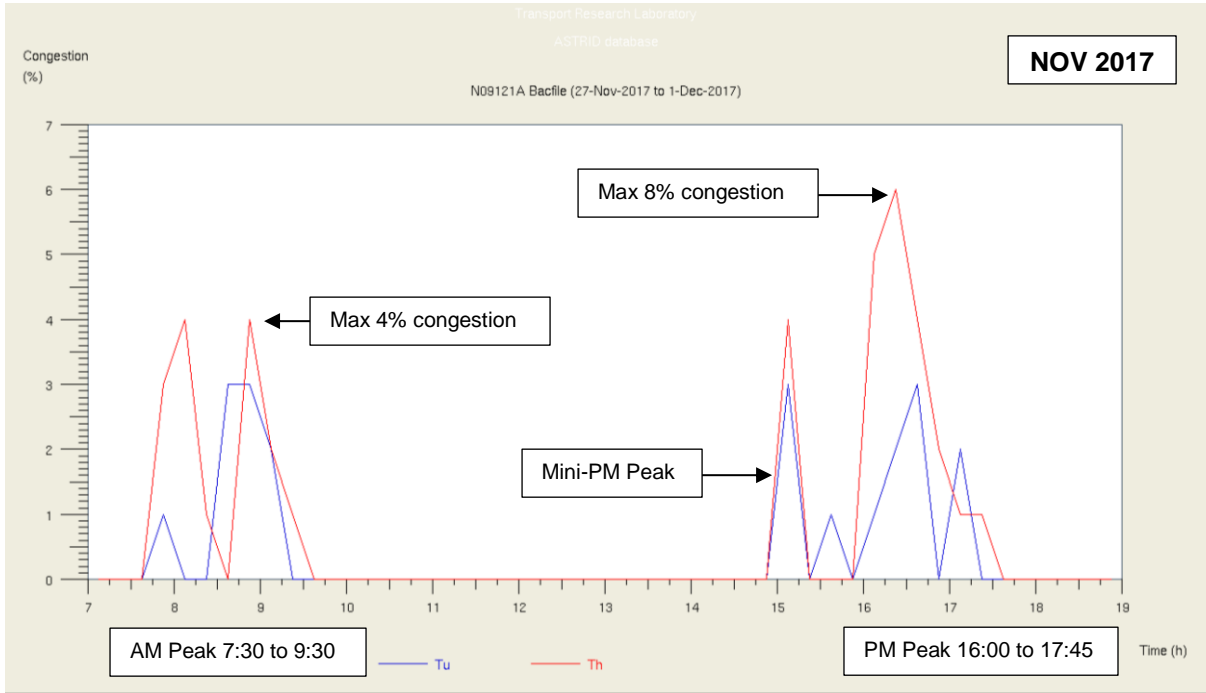
Table C2: The pre and post queue survey expressed in metres,

Peak	Lane	Average Queue Length pre-closure	Average Queue Length post-closure	Difference
AM	Straight Ahead / Left Turn Lane	176m	270m	+94m
AM	Right Turn Lane	18m	42m	+24m
PM	Straight Ahead / Left Turn Lane	112m	155m	+43m
PM	Right Turn Lane	22m	45m	+23m

Table C3: Pre- and Post-closure average journey time data

Pre-Closure Journey Time Data			
Route	Minimum Recorded Time	Maximum Recorded Time	Average Recorded Time
Entering the roundabout at Moor Lane to exiting the Edge Lane signals	3 mins 26 secs	10 mins 57 secs	6 min 17 secs
Post-Closure Journey Time Data			
Route	Minimum Recorded Time	Maximum Recorded Time	Average Recorded Time
Entering the roundabout at Moor Lane to exiting the Edge Lane signals	5 mins 51 secs	9 mins 30 secs	7 min 57 secs
Difference between Pre and Post Data			+1 min 40 secs

The following graphs (on the following page) are a comparison of the SCOOT congestion graphs for the northbound approach to the Edge Lane junction; the first taken over a week in November 2017 and the second over a week in April 2018, towards the end of the closure.

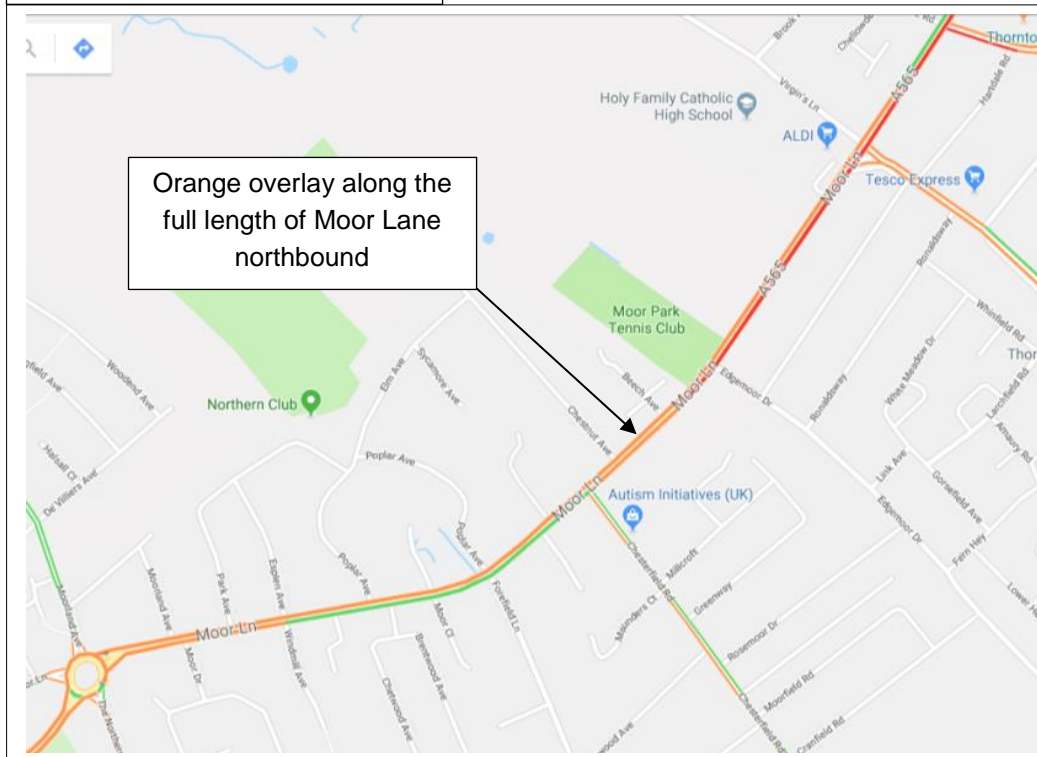


Edgemoor Drive Monitoring Study



The colour coding (Green, Orange, Red, Dark Red) relates to how fast traffic is moving – with Dark Red indicating the slowest moving traffic. This data can give some indication to queues and congestion.

Pre-Closure: A565 Northbound



Post-Closure: A565 Northbound



Comparison of pre and post closure google traffic maps, taken in the PM peak

Appendix D: The Crescent

Table D1: ATC Traffic Data for weeks 1 to 5

Road	Pre-Closure		Post-Closure								
	Daily Average	85 th Percentile Speed	Week 1			Week 3			Week 5		
			Daily Average	% Diff (from pre-closure)	85 th Percentile Speed	Daily Average	% Diff (from pre-closure)	85 th Percentile Speed	Daily Average	% Diff (from pre-closure)	85 th Percentile Speed
The Crescent	1023	19	1306	27.6%	17.4	1253	22.4%	17.9	1344	31.3%	17.7

Appendix E: The Estate

Table E1: ATC Traffic Data for weeks 1 to 5



Positive difference



Negative difference

Road	Pre-Closure		Post-Closure								
	Daily Average	85 th Percentile Speed	Week 1			Week 3			Week 5		
			Daily Average	% Diff (from pre-closure)	85 th Percentile Speed	Daily Average	% Diff (from pre-closure)	85 th Percentile Speed	Daily Average	% Diff (from pre-closure)	85 th Percentile Speed
Hartdale Road	349	23.7	318	-9.1%	23.7	293	-16.2%	24.2	305	-12.8%	23.3
Edge Lane	12723	26.6	13057	2.6%	27.3	13170	3.5%	27.3	12708	-0.1%	26.8
The Crescent	1023	19	1306	27.6%	17.4	1253	22.4%	17.9	1344	31.3%	17.7
Thornfield Road	936	26.6	750	-19.9%	29.1	656	-29.9%	29.8	702	-25%	29.5
Ronaldsway	893	29.3	635	-29.0%	29.8	550	-38.5%	28.9	536	-40.0%	28.4
Edgemoor Drive (close to Moor Lane junction)	3171	23.9	2103	-33.7%	23	52	-98.3%	15.7	39	-98.8%	16.1
Edgemoor Drive (south of Ronaldsway)	2049	29.5	1217	-40.6%	29.3	641	-68.7%	30.4	645	-68.5%	30.2

Edgemoor Drive Monitoring Study

Table E1 continued

Link Avenue	805	20.1	458	-43.1%	20.4	222	-72.4%	20.1	202	-74.9%	19.9
Larchfield Road	1264	22.4	1378	9.0%	22.8	1378	9.0%	22.8	1390	10.0%	22.6
St William Road	1725	22.8	1676	-2.9%	22.4	1555	-9.9%	23	1728	0.2%	22.4
Water Street	1236	28.6	1388	12.3%	28.6	1301	5.2%	28.9	1316	6.5%	29.1

The '85% percentile speed' is defined as "*The speed at or below which 85% of all vehicles are observed to travel under free-flowing conditions past a nominated point.*"

A detailed overview of the results from the surveyed linking roads within the Estate is as follows;

Thornfield Road

As one of the three roads included in the original consultation; along with Ronaldsway and Edgemoor Drive, the count data shows the closure as having a positive effect in terms of an overall reduction in traffic volume. By 'week 5' there is overall reduction in traffic volume of 25%, equating to a reduction in the vehicle daily average figure of 234.

Interestingly however Thornfield Road has seen the greatest increase of the 85th percentile speed in the whole Estate, from 26.6 mph to 29.5 mph, an increase of over 10%.

The count data shows a significant reduction in the southbound traffic – which was expected as there is no access onto Moor Lane from that direction. The data however highlights a marked increase in the northbound traffic (towards Edge Lane), suggesting that traffic (assumed to be Estate traffic) is using Thornfield Road as a route to the front of the Edge Lane queue or access to The Crescent – again this was envisaged as traffic tries to avoid the Edge Lane queues. Although it should be noted this is not as heavy as the previous pre-closure southbound rat-run.

Ronaldsway

By 'week 5' there is an overall reduction in traffic volumes of 40%, evident in both directions. This equates to a reduction in the vehicle daily average figure of 357.

The 85th percentile speed has seen a marginal reduction.

Pre-closure the traffic volumes of Ronaldsway and Thornfield Road were similar however the closure has resulted in a bigger improvement on Ronaldsway.

Edgemoor Drive

The third road in the original consultation has seen a significant reduction in traffic volumes. By week 5 there is an overall reduction in traffic volumes of 69%, evident in both directions. This equates to a reduction in the vehicle daily average figure of 1404 vehicles. The 85th percentile speed has however seen a marginal increase.

The length of Edgemoor Drive between Moor Lane and Thornfield Road is now effectively a cul-de-sac.

Link Avenue

Link Avenue was previously an important outlet onto Edgemoor Drive for a large proportion of the Estate. With the closure in place Link Avenue has seen a significant reduction in traffic, 75%, equating to a reduction in the daily average figure of 603, with traffic now travelling north onto Edge Lane instead.

However with less traffic using the road the 85th percentile speed has risen slightly.

Larchfield Road

With the exception of The Crescent, Larchfield Road has seen the biggest increase in traffic volumes, 10%, equating to an average daily increase of 126 vehicles. This increase is predominately in the northbound direction (towards Edge Lane), suggesting that the use of Larchfield Road to gain access onto Edge Lane has increased.

The 85th percentile speed has seen a marginal increase.

St William Road

The count data shows there has been little change in terms of the average daily traffic flow and the 85th percentile, with marginal differences recorded for both.

What the data does not show is any change in driver behaviour. Comments from the St William of York Catholic Primary School suggest that the stopping of the rat-run from Edge Lane to Moor Lane has seen a positive difference in terms of traffic on the road, however comments from the 'Friends of Edgemoor Drive' suggests a secondary rat-run using St William Road to avoid the Edge Lane queues.

It should be noted that during the half term break the average daily traffic flow only fell to 1572 vehicles, a fall of less than 10% from the week 5 figures. This suggests St William Road is primarily used by non-school traffic.

Appendix F: SCOOT example

Congestion is identified within the Councils traffic signal SCOOT system as occurring when a SCOOT detector (loop) has been continually occupied by vehicles in a queue. The longer the SCOOT loop is occupied the longer the queue therefore the more congestion.

A simplistic example, based on 4 cycles of a traffic signal, with a decreasing queue length is as follows;

