

RED BANK OUTLINE PLANNING APPLICATION, AND NT02-04 NEW TOWN FULL PLANNING APPLICATION

Environmental Statement Volume 4: ES Addendum

July 2023



Far East
Consortium



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For and on behalf of Avison Young

1. Introduction

- 1.1 Avison Young, acting on behalf of FEC Northern Gateway Development Limited and Northern Gateway (FEC) No.11 Limited, together referred to in this ES as Far East Consortium Ltd. (FEC) (the Applicant) is seeking planning permission for a residential-led, mixed-use development for the Red Bank Neighbourhood and part of the New Town Neighbourhood. This includes, but is not limited to, residential dwellings, commercial / retail uses, cafes, restaurants, community uses, employment uses, and social infrastructure (including a primary school and health centre) (hereafter referred to as 'the Proposed Development').
- 1.2 Planning permission for the Proposed Development is sought through two planning applications (application Refs: 136812/OO/2023 and 136814/FO/2023). These two planning applications together form the "Development Project" for Environmental Impact Assessment (EIA) purposes. A single Environmental Statement (ES), prepared in accordance with the Town and Country Planning (Environmental Impact Assessment) (England) Regulations 2017 (2017 No. 571) (the EIA Regulations), was submitted with these applications. The two applications are referred to in the ES as 'Application 4 – Red Bank Neighbourhood Outline' (Application 4) and 'Application 5 – Plots NT02-NT04 Full' (Application 5).
- 1.3 The full description of development on Application 4's planning application form is:
- 'Part full planning application proposing the demolition of existing buildings and structures and part outline planning application (with all matters reserved) for the erection of a phased residential led mixed use development across severable plots comprising residential (Use Classes C3 and C2); non-residential floorspace comprising commercial, business, service and community uses (Use Classes E, F and Sui Generis); residents amenity space including within clubhouse buildings; health centre (Use Class E); land for a primary school (Use Class F); the final surface finish of the highway and footpath consented under HIF permission ref: 133143/VO/2022; creation of new public realm and associated landscaping, car parking provision, cycle storage, and other associated works'.*
- 1.4 The full description of development on Application 5's planning application form is:
- 'Full planning application proposing the demolition of existing buildings and structures and erection of a phased residential led mixed use development comprising residential (use class C3 and C2), flexible non-residential floorspace comprising commercial, business, service and community uses (Use Classes E, F and Sui Generis); residential amenity space including within a clubhouse building, with associated car and cycle parking, hard and soft landscaping, improvement works to Dantzic Street, drainage infrastructure and associated engineering works'.*
- 1.5 The following Chapter describes the reason for this ES Addendum.

2. Reason for this ES Addendum

- 2.1 Following feedback from Manchester City Council (MCC) and other consultees, the Applicant is now submitting further information to address the comments made. This ES Addendum therefore comprises responses to comments made as regards the April 2023 ES in relation to the Ground Conditions, Transport and Access, Air Quality and Dust and Noise and Vibration assessments. The comments made have been responded to in the form of a series of Technical Notes that are appended to this document and are summarised below along with a comment regarding the ecology assessment. These should be read in conjunction with the April 2023 ES.
- 2.2 In addition, the Flood Risk Assessment and Drainage Strategy (FRA) document appended to the April 2023 ES has been updated to address comments received from the Environment Agency (EA). The updated FRA document is appended to this ES Addendum and replaces the FRA submitted with the April 2023 ES.
- 2.3 No comments have been received that require a response in the ES in relation to the Townscape and Visual, Cultural Heritage, Daylight, sunlight and overshadowing, Health and Wellbeing and Climate Change assessments. The authors of these assessments have reviewed the information and documents comprised in this document and have confirmed that there is nothing in them that would cause them to change the contents of their assessments, given that they result in no material changes to the impacts assessed, they give rise to no different or new significant impacts, and the mitigation measures identified in their assessment chapters remain unchanged.
- 2.4 In responding to the questions raised by MCC and the other consultees, some minor changes are being made to the proposed development. The ES Addendum firstly highlights the changes proposed to be made to the proposed development through identifying changes to submitted drawings. It then confirms the effect of these changes on the assessments of effect significance and associated mitigation measures contained in the April 2023 ES.
- 2.5 No new cumulative schemes have been identified by the assessment team or by MCC or other consultees.

Non-Technical Summary

- 2.6 A separate Non-Technical Summary (NTS) document was submitted as part of the April 2023 ES (the '2023 NTS'). The 2023 NTS has been updated to reflect the changes made to Application 5 although the impacts reported, and mitigation measures proposed in the April 2023 ES have not been changed as a result of the responses to the comments made by consultees.
- 2.7 The following chapter describes the amendments to the proposed development.

3. Description of Proposed Amendments

- 3.1 Table 3.1 sets out the changes made to the Proposed Development drawings. The reasons for these changes and the implications for the assessments reported in the April 2023 ES are set out below.

Table 3.1 Drawing revision Table

Drawing Title	Submitted Drawing	Replacement Drawing
Application 4		
Proposed Junction Layout Lord Street/Red Bank/Roger Street	70079268-WSP-XX-XX-DR-TP-022 Rev A	70079268-WSP-XX-XX-DR-TP-022 Rev B
Application 5		
Dantzie Street Highway Improvements General Arrangement	RDB-WSP-XX-XX-DR-TP-018 rev P02	RDB-WSP-XX-XX-DR-TP-018 rev P03
General Arrangement Site Wide Landscape Plan	RDB-OPN-00-ZZ-DR-LA-210000 P01	RDB-OPN-00-ZZ-DR-LA-210000 P02
General Arrangement Site Wide Public Realm Plan	RDB-OPN-00-ZZ-DR-LA-210001 P01	RDB-OPN-00-ZZ-DR-LA-210001 P02
Levels Strategy Site Wide Public Realm Plan	RDB-OPN-00-ZZ-DR-LA-210100 P01	RDB-OPN-00-ZZ-DR-LA-210100 P02
General Arrangement NT02 – 03 Public Realm	RDB-OPN-2B-00-DR-LA-310001 P01	RDB-OPN-2B-00-DR-LA-310001 P02
General Arrangement For plot NT04 Public Realm Plan	RDB-OPN-2D-00-DR-LA-310000 P01	RDB-OPN-2D-00-DR-LA-310000 P02
Proposed Level 01 Floor Plan	RDB-HBA-2X-01-DR-AR-080101 P04	RDB-HBA-2X-01-DR-AR-080101 P05
Proposed Level 02 Floor Plan	RDB-HBA-2X-02-DR-AR-080102 P04	RDB-HBA-2X-02-DR-AR-080102 P05

Drawing Title	Submitted Drawing	Replacement Drawing
Proposed Level 03 Floor Plan	RDB-HBA-2X-03-DR-AR-080103 P04	RDB-HBA-2X-03-DR-AR-080103 P05
Proposed Level 04 Floor Plan	RDB-HBA-2X-04-DR-AR-080104 P04	RDB-HBA-2X-04-DR-AR-080104 P05
Proposed Level 05-06 Floor Plan	RDB-HBA-2X-05-DR-AR-080105 P04	RDB-HBA-2X-05-DR-AR-080105 P05
Proposed Level 07 Floor Plan	RDB-HBA-2X-07-DR-AR-080107 P04	RDB-HBA-2X-07-DR-AR-080107 P05
Proposed Level 08-18 Floor Plan	RDB-HBA-2X-08-DR-AR-080108 P03	RDB-HBA-2X-08-DR-AR-080108 P04
Proposed Level 19-27 Floor Plan	RDB-HBA-2X-19-DR-AR-080119 P03	RDB-HBA-2X-19-DR-AR-080119 P04
Proposed Level 28-29 Floor Plan	RDB-HBA-2X-28-DR-AR-080128 P04	RDB-HBA-2X-28-DR-AR-080128 P05
Proposed Level 30 Floor Plan	RDB-HBA-2X-30-DR-AR-080130 P04	RDB-HBA-2X-30-DR-AR-080130 P05
Proposed Level 31-32 Floor Plan	RDB-HBA-2X-31-DR-AR-080131 P04	RDB-HBA-2X-31-DR-AR-080131 P05
Proposed Intermediate Floor Plan	RDB-HBA-2X-IT-DR-AR-080099 P05	RDB-HBA-2X-IT-DR-AR-080099 P06
Proposed Lower Ground Floor Plan	RDB-HBA-2X-LG-DR-AR-080098 P06	RDB-HBA-2X-LG-DR-AR-080098 P07
Proposed Upper Ground Floor Plan	RDB-HBA-2X-UG-DR-AR-080100 P05	RDB-HBA-2X-UG-DR-AR-080100 P06
Applications 4 and 5		
Demolition Plan	RDB-MLM-00-RF-DR-AR-111003- Rev 1	RDB-MLM-00-RF-DR-AR-111003- Rev P2

Application 4

Demolition Plan

3.2 The EA has confirmed that demolition of some of the existing building and structures to ground level is acceptable and can be undertaken prior to the discharge of some of the pre-commencement conditions. This does not extend to any demolition works which could materially affect flood risk management. The EA also noted that there could be a contamination risk with demolition below ground and a need to manage the disposal of any contaminated materials and therefore further information may need to be submitted to discharge conditions prior to below ground demolition. As a result the demolition plan has been amended to:

- clarify that 'demolition' which is permitted without the need for further flood assessment is defined as the demolition of above ground structures, but this excludes above-ground demolition works could affect flood risk management.
- identify where based on the agreed flood model the removal of structures would impact flood modelling output and could result in potential flood risk impacts in the wider development area.
- note that the demolition of certain existing walls will have a potential impact on flood risk, and that these will require additional assessment of flood risk prior to demolition to ground level. This will be controlled through the discharge of an appropriately worded planning condition prior to demolition taking place. As part of this assessment the design, specification and programme of implementation for the replacement structure / mitigation measure would also be agreed.
- Note where controlled demolition is acceptable subject to confirmation of no impact on structural integrity of walls to river bank with potential for impact on flood risk.
- identify where the demolition of walls would have no impact on flood risk and so the demolition does not impact on the outputs of the flood modelling.

Proposed Off site Highway Works

3.3 Figure 5.12: Proposed Junction Layout Lord Street / Red Bank / Roger Street included in the April 2023 ES is replaced by Drawing 70079268-WSP-XX-XX-DR-TP-022 Rev 2 entitled Proposed Junction Layout Lord Street / Red Bank / Roger Street. The change to the drawing is to remove the suggested curb realignment and to introduce a crossing over Red Bank to the South of the Roger Street and Lord Street junction.

Dantzig Street Widening

- 3.4 The vehicle carriageway width along Dantzig Street has been widened to 6.5m in line with the request from TfGM. Access was reserved as part of Application 4 however there were design principles set out in the Application 4 submission. This amendment has consequential changes for Chapter 5 Proposed Development- paragraph 5.34 and the Non-technical summary- Paragraph 5.30 of the April 2023 ES where reference to 6.2m is replaced with 6.5m.

Application 5

- 3.5 The following changes are proposed to the Proposed Development at NT02 to NT04:

Materials

- 3.6 Discussions are on-going with the LPA regarding the proposed detailed finish of elements of the building façade. If changes are required to the submitted information, it is envisaged that the materials to be used will not result in any new or different significant impacts to those which have already been assessed. If there are any such new or different impacts, then a further addendum ES will be submitted. However, this is not expected.
- 3.7 The landscape plans have also been updated to show the proposed architectural treatment of the new retaining wall along Dulwich Street which has been changed from gabion baskets to masonry brick. FEC are engaged in technical discussions with Network Rail and this reflects feedback received from Network Rail's structure engineers in connection with the new retaining wall abutting the retaining wall behind Plot NT03. This change to the materials make no change to the assessments reported in the April 2023 ES.

Demolition Plan

- 3.8 The EA has confirmed that demolition of some of the existing building and structures to ground level is acceptable and can be undertaken prior to the discharge of some of the pre-commencement conditions. This does not extend to any demolition works which could materially affect flood risk management. The EA also noted that there could be a contamination risk with demolition below ground and a need to manage the disposal of any contaminated materials and therefore further information may need to be submitted to discharge conditions prior to below ground demolition. As a result the demolition plan has been amended to refer to:
- clarify that 'demolition' which is permitted without the need for further flood assessment is defined as the demolition of above ground structures, but this excludes above-ground demolition works could affect flood risk management.
 - identify where the removal of structures would impact flood modelling output and could result in potential flood risk impacts in the wider development area.

- note that the demolition of certain existing walls will have a potential impact on flood risk, and that these will require additional assessment of flood risk prior to demolition to ground level.
- note where controlled demolition would be acceptable subject to confirmation of no impact on structural integrity of walls to riverbank with potential for impact on flood risk.
- identify where the demolition of walls would have no impact on flood risk and so the demolition does not impact on the outputs of the flood modelling.

Dantzic Street Widening

- 3.9 The vehicle carriageway width along Dantzic Street adjacent to plots NT02-04 has been widened to 6.5m in line with the request from TfGM. This amended design is shown in drawing RDB-WSP-XX-XX-DR-TP-018 rev P03 included at Appendix 2 of this ES Addendum. This replacement drawing has consequential changes for Chapter 5 Proposed Development- paragraph 5.34 and the Non-technical summary- Paragraph 5.30 of the April 2023 ES where reference to 6.2m is replaced with 6.5m.

Removal of waste refuse chute

- 3.10 Following consultation with MCC it is proposed to removal of waste refuse shoots from Application 5. This will not affect the external appearance of the buildings proposed. This change will not affect the number of residential units provided.

Future Drawing Changes

- 3.11 The changes to the drawings assessed in this addendum do not result in the reporting of any new or different effects or conclusions to those reported in the April 2023 ES. It is anticipated that there may be further detailed design changes to the proposed development to respond to address technical matters raised by subsequent consultation responses in connection with Application 5. It is considered unlikely that the changes (if any) will give rise to any new or different significant effects from those reported in the April 2023 ES and this ES Addendum. However, in the unlikely event it is found that they do give rise to new or different significant effects, these would be reported in a further ES Addendum to the April 2023 ES and this ES Addendum prior to the determination of Application 5, in line with the EIA Regulations. Whether new or different significant effects from those reported in the April 2023 ES and this ES Addendum arise will be clarified at the time of the submission of any revised drawings so that it is absolutely clear. If there are any new or different significant effects, then those would need to be re-advertised prior to determination.
- 3.12 As noted above, this ES Addendum comprises responses to comments made as regards the April 2023 ES in relation to the Ground Conditions, Transport and Access, Air Quality and Dust and Noise and Vibration assessments. The comments made have been responded to in the form of a series of Technical Notes that are

appended to this document and are summarised below along with a comment regarding the ecology assessment. These should be read in conjunction with the April 2023 ES.

4. Review of ES Technical Assessments

Ground Conditions

- 4.1 The following summarises the content of the Ground Conditions technical note prepared in response to consultation comments. The technical note can be found at Appendix 1 to this document.
- 4.2 The EA has noted that the LK Consult Pre-Development Remediation Strategy, which is referenced and used within the Ground Conditions chapter (Chapter 9) and Appendix 9.14 of the April 2023 ES has not been deemed acceptable by the EA following review. This is due to per- and polyfluoroalkyl substances PFAS being found to be present within part of the Application 4 site during the ground remediation works being undertaken by MCC for the Housing Infrastructure Fund (HIF) works (as part of Application 2). As a result, this LK Consult Pre-Development Remediation Strategy is no longer part of the ES and Appendix 9.14 is withdrawn from the April 2023 ES.
- 4.3 There are ongoing discussions between the EA and MCC's HIF team to consider the impact of the PFAS contamination identified on the Plateau area of the Application 4 site (ie. RB01-RB05), including potential further investigation, assessment, and remedial works.
- 4.4 Pre-development remedial works will be undertaken within the Application 2 area by MCC, in accordance with a Remediation Strategy approved by the Local Planning Authority (LPA) and the EA. The Remediation Strategy for this site is not yet approved; however, discussions for remedial proposals are underway with the EA. It is understood that in order for any remedial proposal to be accepted (potentially including further investigation activities), this will need to address the identified presence of PFAS in the Plateau area of the site as well as its interaction with previously identified contaminants. It is therefore assumed for the purposes of the assessment of ground conditions in this ES Addendum that the approved strategy will meet the requirements of legislation and industry best practice at the time of approval.
- 4.5 There will be ongoing communication between FEC and MCC regarding the HIF remediation works to understand the detailed remediation requirements and how they relate to Application 4. The proposed phasing of works allows retention of flexibility in the programme considering the presence of PFAS in Application 2 area and ongoing liaison with the EA will ensure all measures are suitable in light of contemporary legislation and industry best practice.
- 4.6 Subsequent to any remedial works delivered as part of Application 2, outstanding remedial works within the Travis Island area and Viaduct area will be undertaken by FEC as part of Application 4. Ground investigations to characterise soil and groundwater conditions and associated risks are ongoing in this area are being undertaken under the auspices of Application 2. When site characterisation works are complete, any Remediation Strategies

(inclusive of verification plans and cognisant of any remedial works undertaken as part of Application 2) will be prepared according to anticipated phasing of work. Documents will outline remedial measures necessary to enable the development to achieve compliance with relevant policy/legislation. Remediation Strategies and subsequent Verification Reports will be subject to approval by the LPA and the EA. For the purposes of the assessment of ground conditions in this ES Addendum, it will be assumed that the remediation works pursuant to Application 2 will meet the requirements of legislative and industry best practice.

- 4.7 While the site investigations work to inform the remediation strategy for Application 2 are ongoing it is expected that final agreed remediation strategy for Application 2 will be controlled by planning conditions to be attached to the Application 2 permission. It is also anticipated that appropriate conditions will be attached to the permission for Application 4 so that it is ensured that appropriate works are undertaken prior to the development of the Plots to the intended use.
- 4.8 The proposed remediation measures for areas outside of the Application 2 area, but within the Application 4 area will also be controlled by conditions attached to permission for Application 4 requiring remediation works to be agreed with and have been completed to the satisfaction of MCC.
- 4.9 In relation to Application 5 (NT02-04) pre-development remedial works will be undertaken by FEC. Ground investigations to characterise soil and groundwater conditions and associated risks are ongoing in this area. The following assessment has been completed to support design and planning requirements for the Application 5 redevelopment and these were appended to the April 2023 ES:
- RoC Consulting, Plots NT02, NT03 & NT04 Dantzic Street, Phase 2 Site Investigation Report, reference 4328-ROC-ZZ-XX-RP-ES-P2-101, dated 21 October 2022.
 - Hydrock Consultants Limited, Dantzic Street – Phase 2, Manchester: Ground Conditions Desk Study Report, reference R/151819/G001, dated 7 December 2015.
 - Roc Consulting, Addendum Note, Preliminary Ground Investigation Technical Note: Plots NT02, NT03, NT04 Dantzic Street, reference 4328-ROC-ZZ-XX-TN-ES-P2TN, dated 27 September 2022.
 - Roc Consulting, Phase 1 Desktop Study: Plots NT02, NT03 & NT04 Dantzic Street, reference 4328-ROC-ZZ-XX-RP-ES-PH1DTS, 12 January 2023.
- 4.10 These site investigation works were undertaken to establish ground conditions beneath the site and target known or suspected sources of contamination. They are considered sufficient to enable a robust assessment of the likely significant effects of Application 4 and allow in combination assessments and cumulative assessments as presented in the April 2023 ES. While further site investigation work is ongoing to monitor site conditions these works are expected to further confirm the findings of the assessments that have been undertaken.

- 4.11 When site characterisation works are complete, a Remediation Strategy for the relevant area will be prepared in accordance with the phasing plan, which will describe the phased remedial measures that will be undertaken during redevelopment of the Application 5 area. Any Remediation Strategies produced, and their counterpart verification reports will be subject to approval by the LPA and the EA.
- 4.12 Any necessary post-development remedial works will be incorporated into the FEC development (e.g. provision of clean soil cover in landscaped areas). A regulator-approved Remediation Strategy will describe the measures required and validation reporting will demonstrate works have been undertaken in accordance with the strategy, which will also need approval by the appropriate regulators. These measures will be controlled by conditions attached to the planning permission.
- 4.13 With the conditions described above in place, the residual effects reported in Chapter 9 of the April 2023 ES will be unchanged.

Transport and Access

- 4.14 The following summarises the content of the Transport and Access technical note prepared in response to consultation comments. The technical note can be found at Appendix 2 to this document.

Applications 4 and 5

- 4.15 Traffic surveys were conducted by MHC Traffic on 20th June 2023 between 0700-1000 and 1600-1900 at the two junctions of Cheetham Hill Road / Lord Street and Red Bank / Roger Street / Lord Street. These surveys confirmed that the peak hours were between 8am and 9am and between 5pm and 6pm. The survey data demonstrated that most of the turning movements in 2023 are lower than the same movements in 2018. On this basis the baseline flows used in the transport assessment are robust and so no change is required to the baseline used in the assessment reported in the April 2023 ES.
- 4.16 The trip generation presented in the Transport Assessment (TA) scoping note was updated in the submitted TA because of the increased quantum of residential units and an increased in the size of the primary school floorspace in the applications compared with that assumed at the scoping stage.
- 4.17 The development trips traffic flow diagrams in Appendix G of the TA cover the same junctions as those presented within the TA scoping but with the addition of Dantzic Street access points in more detail. The TA provides the Application 4 and Application 5 development flows separately to be able to assess the development flows associated with two applications independently.
- 4.18 TfGM has suggested additional measures to support the 10% parking provision, the delivery of these will be sought through the detailed design process and the Full Travel Plan process as each individual Application 4 plot is brought forward. This can be controlled through a condition attached to the Application 4 planning

permission. Such measures may include the design of streets that restricts opportunities for or deters unauthorised roadside / pavement car parking and also the promoting the advantages of a low car dependent development through the marketing and sale of the apartments and the Full Travel Plan.

- 4.19 The details of proposed Traffic Regulation Orders (TROs) to be made under the Road Traffic Regulation Act 1984 would be agreed through discussions with the local highway authority regarding the works to be carried out under agreement(s) under Section 278 of the Highways Act 1980, however as a general principle it is proposed that a no parking TRO would be implemented along the section of Dantzic Street adjacent to plots NT02-04, to ensure safe and efficient passage of both cyclists and vehicles (including buses) along the Dantzic Street carriageway. This can be controlled through a condition attached to the Application 5 planning permission.
- 4.20 As requested by TfGM a 5 minute bus stop catchment plan from stops on Rochdale Road and Cheetham Hill Road is included in Figure 5 in Appendix 2 to this ES Addendum. This demonstrates that sections of the site will fall within a 5 minute walk even without diversion of buses onto Dantzic Street. All of the Application 4 and Application 5 would be likely to fall well within a 10 minute catchment from existing bus stops. In the event that bus services are diverted onto Dantzic Street, bus stops would be provided on-street, and this would further reduce the walk distance from Application 4 and Application 5 to public transport services. This does not alter the assessment of impacts or the mitigation measures identified in the April 2023 ES.
- 4.21 As requested by TfGM an update of the existing bus service tables has been undertaken. While there have been some changes these are unlikely to deter individuals from travelling by bus in the early morning or evening given the extensive bus network across the local vicinity as identified in the table in Appendix 2 to this ES Addendum.
- 4.22 The review of bus stops in the local vicinity indicates that local bus stops are of a high quality with a significant majority having timetables, seating, lighting and a shelter present. There are long term plans for an additional Metrolink stop at Sandhills, located circa 600m-800m walk distance from the Application 5 site. Whilst it is not considered this stop is essential for public transport accessibility to both Application 4 and Application 5, it would clearly be an additional destination for public transport users, and this movement would be catered for through the use of Dalton Street, which provides a suitable walking route for pedestrians wishing to access the new Metrolink stop. These assets would facilitate additional non car borne trips and thus the assessment of transportation effects presented in the April 2023 ES remains robust.
- 4.23 Application 5 provides on-road cycling infrastructure such as a fully segregated route for cyclists along Dantzic Street, and clearly marked cycle lanes. This will also encourage cyclists to use the highway, reducing the potential for conflict with pedestrians. This will be supported by a speed limit reduction to 20mph on Dantzic Street and TROs restricting on-street parking. Application 4 could also provide a coherent cycling and walking network with appropriate signage, with the details of signage being agreed with the highway authority at the detailed design stage. Application 4 and Application 5 could contribute to adequate lighting throughout the sections of road

under the railway. The Greater Manchester Accessibility Level (GMAL) rating for the local area indicates that Red Bank and Dantzic Street are in highly accessible locations in terms of availability of public transport.

- 4.24 The current cycle parking provision at 1 space per apartment accords with the current relevant MCC standards. In the event of demand exceeding provision at in the future due to further shifts in travel patterns, potential additional cycle parking spaces could be identified, for example through reduction in car parking provision if modal shift from car to cycling occurs. However, at the present time 1 space per apartment is proposed in line with the above standards. Cycle stores will be located within buildings (for long-stay cycle parking for residents) and this will only be accessible to building occupiers. The stores themselves will be locked, lit and covered by CCTV. The shift in travel mode envisaged above would result in the assessment reported in the April 2023 ES reporting impact greater than would result and so therefore no change to the assessment is required to account for this potential mode shift.
- 4.25 The suggestions from TfGM in relation to inclusions in the Full Travel Plan document are noted and agreed. As set out in the Interim Travel Plan submitted, a Full Travel Plan for each individual development plot can be secured by condition and will be produced prior to the occupation of each phase as and when each individual development plot comes forward.
- 4.26 The Transport Assessment confirms the intention to provide 20% of car parking spaces with full provision for EV charging initially, with passive provision (e.g. cable ducting, capacity in electric supply) for the remaining 80% to be enabled in the future when demand dictates this. This is across the resident and visitor parking provision within both Applications 4 and 5.

Application 4

- 4.27 TfGM commented that for both peak periods, to better represent the current and likely future appearance of the pedestrian stage, the pedestrian stage would be included one in every two cycles. The LinSig modelling of Cheetham Hill Road / Lord Street has been updated to include assumption in the AM peak. The output of the modelling is included in **Appendix 2** to this ES Addendum. This revised modelling shows that with the proposed mitigation included in the modelling, the junction is forecast to operate better than the Do-Minimum scenarios in the AM peak, suggesting an overall improvement in the operation of this junction. There is a reduction in the forecast queues and delay, suggesting that the proposed mitigation would be beneficial to the operation of this local junction.
- 4.28 Based on the proposals for Dantzic Street and the significant pedestrian and cycle priority being provided along this route, including a reduction to 20mph speed limit and several priority basis crossings, it is not considered that a signal crossing on Dantzic Street is necessary or in keeping with the pedestrian priority design philosophy of this street. An amended design for the junction at Redbank / Roger Street / Lord Street which is included in Appendix 2 as 70079268-WSP-XX-XX-DR-TP-022 rev P02. This includes for a signalled pedestrian crossing of

Redbank and retains the existing kerb lines as per TfGM request, provision of right turn arrow for vehicles turning into Lord Street from Cheetham Hill Road along with highway improvements to Dantzic Street and Dalton Street as shown on drawing RDB-WSP-XX-XX-DRTP- 026 rev P01 in Appendix 2. These changes do not materially affect the assessment of impacts reported in the April 2023 ES.

Application 5

- 4.29 The vehicle carriageway width along Dantzic Street adjacent to plots NT02-04 has been widened to 6.5m in line with the request from TfGM. This amended design is shown in drawing RDB-WSP-XX-XX-DR-TP-018 rev P03 included in Appendix 2 to this ES Addendum. To achieve this, the width of the footway south of Dantzic Street has been reduced though its width remains above 3.0m at all points. This replacement drawing relates to Application 5 and has consequential changes for Chapter 5 Proposed Development- paragraph 5.34 and the Non Technical summary- Paragraph 5.30 of the April 2023 ES where reference to 6.2m is replaced with 6.5m. These changes do not change the assessment of effects reported in the April 2023 ES.

Air Quality and Dust

- 4.30 The following summarises the content of the Air Quality and Dust technical note prepared in response to consultation comments. The technical note can be found at Appendix 3 to this document.
- 4.31 MCC Environmental Health commented that Paragraph 12.99 and Table 12.6 of the ES suggests that there will be an exceedance of the NO₂ criteria at 34 of the receptor locations and suggest that there is a possibility that the 1 hour mean objective for NO₂ will be exceeded. It is assumed these are at the southern side of the application site (taken to mean Application 4 and Application 5) within the AQMA and suggests these locations should be identified in the report.
- 4.32 These exceedances are only predicted in the 2019 baseline scenario and are due to the existing pollutant concentrations. No exceedances of the annual mean NO₂ objective are predicted at the assessed receptors in the future assessment scenarios, either with or without the Proposed Development in operation. Due to the number of receptors the 34 receptors were not explicitly reported within the main chapter however the location of the receptors with concentrations close to or in exceedance of the objective are illustrated on Figure 12.15. This figure shows that all exceedances are predicted outside of Applications 4 and 5. No exceedances of the NO₂ objectives were predicted within the immediate vicinity of Applications 4 and 5 and the Proposed Development does not cause any new exceedances at the existing receptors. As a result it is considered that additional environmental information is not required to update the ES in this regard and the assessment reported remains unchanged.
- 4.33 MCC Environmental Health comments that mitigation measures have been provided with regard to the construction and demolition phase which will need to be directly included within the contractors CMP. It is

considered that this can be controlled by a suitably worded planning condition or section 106 obligation on Applications 4 and 5.

- 4.34 MCC notes that paragraph 12.139 recommends the placement of properties in areas where elevated concentrations of pollutants can be minimised. It states that the consultant will need to make these recommendations with regard to the ideal location / orientation of the properties to allow the developer to meet this requirement and that these recommendations should be included in the report.
- 4.35 The results of the detailed modelling, as reported within the Chapter 12 of the ES, show that pollutant concentrations within the Application 4 Site are predicted to be below the respective air quality objectives. Generally areas to the south experience higher concentrations than those in the north of the Application 4 Site but none of the predictions are high enough to cause concern with respect to the current objectives. Given the outline nature of Application 4, mitigation within Paragraph 12.139 will be reviewed / developed as part of the design process at the detailed application stage.
- 4.36 None of the comments made regarding air quality and responded to above require further information to be submitted and can be controlled through planning conditions or section 106 obligation on both Applications 4 and 5 and through the design of the detailed proposals in due course and so the assessment of the effects reported in the April 2023 ES are unchanged.

Noise and Vibration

- 4.37 The following summarises the content of the Noise and Vibration technical note prepared in response to consultation comments. The technical note can be found at Appendix 4 to this document.

Applications 4 and 5

- 4.38 MCC Environmental Health comments that details of:
- Glazing specification and façade construction may need to be updated as the design develops.
 - The proposed means of alternative ventilation will be required for the residential properties.
 - Assessment of any penetrations to the residential building facades for ductwork /louvres associated with ventilation services will be required.
 - The ventilation in the properties that will need to be selected and where necessary, insulated to ensure that when in full use the ventilation system will not lead to an exceedance of the internal noise condition criteria.

- Any penetrations to the residential building facades for ductwork /louvres associated with ventilation services will be required to ensure that any penetrations do not impact the acoustic integrity of the façade and are suitably insulated to prevent areas for noise to break in.
 - noise transfer from building risers and lift shafts that travel next to habitable rooms.
- 4.39 All of the above can be controlled by condition on Application 5 and can be supplied at the detailed application stage for Application 4 and therefore no new information is required in respect of these comments at this time and so the assessment of the effects reported in the April 2023 ES are unchanged.
- 4.40 MCC also comments that there was limited survey around the areas of receptors NSR 8, 9, 16 and 17 and requests an explanation as to why these areas were not included as part of the background noise modelling.
- 4.41 Noise Sensitive Receptors NSR8 and NSR9 are considered to be representative of future residential developments located to the south and southwest of the Application 5 site respectively. At the time of the baseline noise survey there was not considered to be a secure location to leave equipment unattended. In addition, due to restricted access to the development sites, there was not considered to be a location for attended measurements which was representative of the sensitive areas of the proposed developments and suitable from a health and safety perspective for the Engineer undertaking the measurements i.e. allowing them to stand at a sufficient distance from the road. Whilst baseline noise survey measurements in this area could have been used to inform the significant criteria adopted for the construction phase noise assessment, it should be noted that the most stringent assessment criteria of ABC Category A was adopted for these receptors. Adopting Category A criteria is therefore considered to be a worst-case and a robust approach to the assessment for these future noise sensitive receptors should they be constructed prior to the Application 5 development.
- 4.42 NSR16 and NSR17 are considered to be representative of Phase 1 (i.e. Application 5) and Phase 2 (i.e. Plots RB06, RB07, RB10, RB16 and RB17 of Application 4) of the Proposed Development. Due to the safety of equipment and operatives it was determined that it was not possible to obtain further monitoring data. In addition, existing structures (existing brick wall, site hoardings and parked vehicles) mean that reliable data on which to establish the baseline for future development could not be achieved. However, with existing commercial premises and caravan site ceasing to operate it is considered that the future baseline environment for these sensitive areas identified by NSR16 (Application 5) and NSR17 (Application 4) will be dominated by road traffic noise on Dantzic Street. In light of these limitations, Measurement Location 1 to the northeast of the Site was adopted and is considered to be representative of existing road traffic noise on Dantzic Street. Also, the Proposed Development has the potential to change the future road traffic noise, not least due to the change in the speed limit on Dantzic Street, i.e. a reduction from 30mph to 20mph. It is therefore considered robust to base the site suitability assessment on the predicted future road traffic noise levels, taking account of future composition of road traffic on Dantzic Street i.e. total traffic flows and speed.

- 4.43 Therefore, additional monitoring data is not required, and the existing assessment can be relied upon. No new information is submitted and so the assessment of the effects reported in the April 2023 ES are unchanged.

Application 5

- 4.44 All mechanical ventilation ductwork will be sized to limiting velocities at supply and extract grilles and ductwork will be lagged. In line duct attenuation will be provided to the fresh air intake, exhaust, extract and main supply ducts. The internal noise criteria will be met when the MVHR system is selected for each plot and ducting requirements can be calculated. This could be controlled through a planning condition to be attached to the Application 5 permission which would be a standard tried and tested approach that can be relied upon to be effective.
- 4.45 MCC Environmental Health has requested the thermal modelling along with commentary to demonstrate how this outcome has been determined in the AVO assessment submitted. This is to include how many days and during which months the panels may need to be open. This information is provided in an Appendix to the Technical Note in **Appendix 4** to this ES Addendum.
- 4.46 Background ventilation is provided by Mechanical Ventilation and Heat Recovery (MVHR) units to continuously supply the living/kitchen spaces and bedrooms with fresh air as required by Building Regulations and CIBSE document TM59. Purge ventilation will be provided by either glazed purge panels behind a perforated screen openable balcony door or top hung window to bedrooms and living/kitchen spaces. The overheating assessment has identified that each of the residential units considered requires the MVHR to run at full capacity during the warmer summer months to mitigate against the risk of overheating. There may be apartments will also require an additional purge fan to the living / kitchen spaces to meet the overheating criterion set as out in TM59. Further information on the proposed ventilation strategy and basis for the thermal modelling are included in Appendix 4. Confirmation that the internal noise criteria will be met once the final MVHR system has been selected for each plot could be incorporated into a condition to be attached to the planning permission prior to the construction of the relevant plot/phase of the Application 4 and 5 sites commencing.
- 4.47 MCC Environmental Health comments that the SOAL at Tower 1 NT02 up to floor 11 will be unsuitable for these dwellings when the ventilation panels are open during the overheating period and the ventilation panels. MCC Environmental Health also suggests that additional measures and alternative scheme of ventilation will be required for these properties to ensure they are able to ventilate the property and not exceed the SOAL for overheating purposes.
- 4.48 The noise assessment has been based on the information available at the time of the planning application submission and a daytime assessment of the internal noise levels with the purge vents open in a 'typical' living room, and while the Significant Observed Adverse Effect Level (SOAEL) is raised by up to 1dB it should be noted that the internal noise level would still achieve 50 dB LAeq, 16hour i.e. the upper SOAEL for the daytime period as

set out in the Acoustics Ventilation and Overheating Residential Design Guide (the AVO Guide) and presented in Figure 13.3 of the April 2023 ES. The ventilation strategy will continue to be refined for the Application 5 development at the detailed design stages. As the noise level set out in the AVO Guide can be achieved it is considered that final design can be controlled by condition on Application 5 and therefore no new information is required in respect of these comments at this time and so the assessment of the effects reported in the April 2023 ES are unchanged.

- 4.49 MCC Environmental Health comments that Table 13.7 includes the cumulative proposed plant noise limit at each of the receptors 36dB daytime and 34dB at night-time which are accepted. The particular plant to achieve these levels has not yet been identified but the achievement of these levels can be controlled through a standard planning condition to be attached to the Application 5 permission using tried and tested mechanical plant that can be relied upon to be effective. Therefore, there is no change to the assessment or mitigation measures identified in the April 2023 ES.

Ecology

- 4.50 The EA commented that it is unclear as to whether any in-channel ecological survey has been undertaken and requested information to confirm the situation. It is confirmed that a fish habitat survey and detailed fish survey were undertaken in May 2021 by Arup and September 2021 by RSK respectively. This is detailed in paragraphs 7.45, 7.46, 7.34, 7.35, 7.65, 7.98 of the ES. Fish were scoped in to the ES as sensitive receptors and potential effects mitigated through the timing of works to avoid spawning season and the inclusion of pollution prevention measures in a CEMP. No otter or water vole surveys were undertaken due to the lack of records locally and sub-optimal nature of the riverbank for these species as it comprises engineered banks, and the river has limited food sources and high disturbance levels. These species were therefore scoped out of the ES with the agreement of the Greater Manchester Ecological Unit. On this basis it is unlikely that there would be significant effects with the mitigation implemented. The mitigation can be taken into account in this way as it takes into account mitigation which is tried and tested and can be relied upon to be effective and so there does not appear to be a need for further survey effort prior to determination of the applications.
- 4.51 The EA also queried whether any survey work had been undertaken on the western part of the Travis Island area of Application 4. No further survey work has been completed on the western portion of Travis Island since submission of the applications. As set out in paragraph 2.3 and 2.20 of the BNG report the inaccessible area (due to health and safety concerns) of Travis Island is largely comprised of hardstanding (as viewed from the perimeter wall adjacent to this area and aerial imagery) such that the habitats are considered to be of negligible ecological value and further access to this area is unlikely to change the conclusions of the BNG calculations.
- 4.52 As each detailed planning application comes forward within the Application 4 site in due course it is anticipated update surveys and BNG calculations will be undertaken and submitted, and this will allow the prevailing

conditions on the site to be taken into account. These future surveys are expected to confirm the results of the assessment in the April 2023 ES. It is expected that this requirement will be controlled through a condition attached to the Application 4 planning permission.

Drainage and Flood Risk

- 4.53 The following summarises the content of the Flood Risk Assessment (FRA) updated in response to comments received from the EA. The FRA can be found at Appendix 5 to this document.

General Comments

- 4.54 The EA has advised that flood model for Application 4 is satisfactory. The EA has also confirmed that the Application 5 flood model will be considered fit for purpose once uniformity of plans included in the Flood Model Report and planning application is achieved. The EA also commented that submissions associated directly with the model report (e.g. model extent flood impact mapping) should be included in the FRA. Therefore the Model Extent Flood mapping is included in the Flood Modelling Report Appendix of the Updated FRA provided as part of revised FRA which can be found at Appendix 5 to this ES Addendum.

Application 4

- 4.55 The modelling undertaken in relation to Application 4 has been undertaken with extensive liaison with the EA and the model itself and outputs of the modelling of Application 4 have been agreed with the EA. Notwithstanding this, the EA has stated that it is likely that detailed flood modelling will be required at the detailed application stage for plots affected by flooding. This detailed application flood modelling is likely to confirm and refine the results of the modelling that has been undertaken in relation to Application 4. It is proposed that a phasing plan condition is imposed to the Application 4 planning permission but it will need to be clear which conditions relate to each plot. It is proposed that FEC, EA and MCC agree suitably worded phased planning conditions including a condition securing the submission of a Detailed Phasing Plan.
- 4.56 The EA has requested that part of the section 6.1.3 of the FRA or an alternative section, acknowledges that, if required, conformity to the requirements of the NPPF (paragraph 167) will be achieved by the final development, and that where appropriate if shown to be necessary via subsequent detailed design flood modelling, suitable compensatory storage encompassing a design flood event will be provided. This is addressed in the FRA.
- 4.57 Where potentially frequent flood inundation is possible, the EA has advised that the placement of vulnerable development in such areas is avoided in the first instance. This is accepted and the FRA states that at the detailed design stage, vulnerable development uses will not be located within the functional floodplain and if necessary, at the detailed design stage, compensatory storage will be included as part of the proposed development.

- 4.58 Finally, to address concerns over the timing of demolition works, a revised Demolition Plan is submitted that identifies the existing structures that perform a flood control function to ensure these structures are not removed until the detailed proposals for replacement buildings and structures on these development plots have been granted permission. This will be controlled through a condition requiring the submission of a construction management plan that would include details of temporary flood defences to protect up to the 1 in 25 year event.

Application 5

- 4.59 The EA noted a discrepancy between values stated within the written text of the FRA itself and associated drawings and that there are no details of levels on Dantzic Street or details of the proposed concrete upstand. This has been addressed through a revision to drawing RDB-HBA-2X-ZZ-DR-AR-080313 which now identifies the lowest ground floor finished floor level, drawing RDB-WSP-XX-XX-DR-TP-018 which identifies levels on Dantzic Street and drawing RDB-MLA-2D-XX-AR-21720001 'External Wall Detail – Flood Upstand' which are now included in the FRA. In addition, an updated version of drawing RDB-OPN-00-ZZ-DR-LA-210100 P01 that correlates with drawing RDB-WSP-XX-XX-DR-TP-018 has been submitted for completeness and both are in Appendix 6 to this ES Addendum.
- 4.60 The above information does not alter the assessment of flood risk and drainage included in the April 2023 ES and the measures set out can be controlled through conditions attached to the Application 5 planning permission.

Effect Interactions

- 4.61 The Proposed Amendments would not materially alter the overall programme of the demolition and construction works. Nor would the Proposed Amendments alter the likely demolition or construction significant environmental effects anticipated from these works (as concluded in the sections above). Therefore, it is concluded that the Proposed Amendments would not alter the 'Type 1' effect (the combined effect of individual impacts arising from the Proposed Development on a single receptor) conclusions presented in the Consented Scheme ES.
- 4.62 As outlined in Section 2 no new cumulative schemes have been identified. In addition, as outlined above the Proposed Amendments do not alter the conclusions as reported in the April 2023 ES. Therefore, it is concluded that the Proposed Amendments would not alter the 'Type 2' effect (the combined effect of several schemes) conclusions presented in the April 2023 ES.

Residual Effects

- 4.63 On the basis of the above, it is concluded that the Proposed Amendments do not alter the likely residual effects and conclusions presented in the April 2023 ES.

Appendix I

Ground Conditions Technical Note

136812/00/2023 - Red Bank, Manchester

DATE:	10 July 2023	CONFIDENTIALITY:	Public
SUBJECT:	Response to Consultee Comments – Environment Agency		
PROJECT:	Red Bank	AUTHOR:	B. Fagan (WSP)
CHECKED:	P Duffy (Avison Young)	APPROVED:	P Gallagher (WSP)

Victoria North Environmental Impact Assessment – Chapter 9, Ground Conditions Application 4 – Red Bank Outline Application and Application 5 – NT02-04 New Town Full Application – (Planning References 136812/00/2023 and 136814/FO/2023)

Addendum Technical Note to address Environment Agency (EA) feedback

1.0 INTRODUCTION

WSP has prepared this note in conjunction with Avison Young and Far East Consortium (FEC). It has been prepared in response to comments received by the EA on Chapter 9, (Ground Conditions) within the Environmental Statement (ES) for Application 4 and Application 5 (ES dated April 2023). This note is relevant to the parts of Chapter 9 that cover the Application 4 area; sections of Chapter 9 that cover the Application 5 area are not affected.

The FEC Application 4 site includes the area covered by Homes Infrastructure Fund (HIF) Application 2 (Plots RB01, RB02, RB03, RB04, RB05a, RB05b, RB05c and RB12b) along with additional plots RB06, RB07, RB10, RB16 and RB17 (the latter two Plots form an area known as Travis Island). The enabling works covered by MCC's Application 2 include the formation of a new spine road on Red Bank Plateau, and the creation of new public realm areas at the southern-most extent of the Application 2 Site.

Infrastructure and the construction of development platforms will be developed under FEC Application 4 (excluding Travis Island). MCC's Application 2 works will involve some remedial works in relation to contamination (e.g. removal of grossly contaminated soils during earthworks). Additional remedial works will be undertaken by FEC during redevelopment (e.g. provision of clean soil cover systems and gas membranes in buildings if required).

Planning permission for MCC's Application 2 (Permission ref: 133143/VO/2022) was granted on 14 July 2022. This application was accompanied by an Environment Statement (ES) which set out an assessment of the likely significant effects of the proposed development along with a series of mitigation measures.

Extensive assessment of soil and groundwater conditions within the Application 4 area has taken place and various additional characterisation works are ongoing. In late 2022, an area of emerging water was identified within the site (Application 2 area), which sampling and analysis found to contain contaminants known as per- and polyfluoroalkyl substances (PFAS). A series of site investigation works and sampling was undertaken, which demonstrated that the incoming flow was discharging PFAS onto the site from an off-site source. There are ongoing discussions between the EA and the HIF team to consider the impact of the PFAS contamination identified at this site, including potential further investigation, assessment, and remedial works. Matters relating to PFAS are only affecting Application Area 2 at this time. As such, a detailed description of all of the remedial works that will be undertaken during the HIF Application 2 enabling works has not yet been finalised.

As a result of this identified PFAS contamination the LK Consult Remediation Strategy, which is referenced and used within the Ground Conditions chapter (Chapter 9) and Appendix 9.14 of the April 2023 ES is no

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longer able to be relied upon and at the request of the EA this LK Consult Remediation Strategy has been withdrawn from the 2023 ES. This withdrawal impacts reference to the LK Consult Remediation Strategy as mentioned in paragraphs 9.14, 9.19, 9.54 and Appendix 9.14 of the April 2023 ES Chapter.

In relation to the Ground Conditions chapter, the EA has requested the following amendments:

1. The chapter considers baseline ground conditions for assessment purposes to comprise the ground and groundwater conditions that are known to exist prior to any remediation works that will be undertaken under HIF Application 2. Further comment on this is provided in Section 4.0 below.
2. Any references within the chapter to the LK Consult Remediation Strategy (prepared for HIF Application 2) are to be disregarded. We agree that all reference to, and mention of, the LK Consult Remediation Strategy in Chapter 9 shall be disregarded.

Rather than revising Chapter 9, it was agreed with the EA that, subject to approval by the MCC planning department, a technical note could be prepared to address the above two items. The information presented herein constitutes the technical note and supersedes the baseline ground conditions assumption in the April 2023 ES Chapter as mentioned in paragraphs 9.19, 9.21 and Table 9.5.

2.0 CONTAMINATED LAND AND PLANNING REGIME

In the interests of clarity and context, below is a description of how potential risks from contaminated soil and groundwater are dealt with during any redevelopment project that is regulated through the local authority planning system.

The UK planning system provides a robust, well-developed and widely understood mechanism to ensure that risks associated with ground contamination are adequately assessed and mitigated through the development process.

Planning conditions assigned by local planning authority and other regulators (e.g. EA) confer obligations on developers to demonstrate certain works have been undertaken to adequately characterise ground and groundwater conditions and mitigate risks to receptors in order to discharge the various planning conditions. The system is intended to prevent construction sites and finished developed sites from presenting unacceptable risks in the future to sensitive receptors from contamination in soil and groundwater.

In the case of using EIA to assess the environmental impacts from contaminated soil and groundwater, the EIA operates concurrently alongside the robust mechanisms that are already in place within the planning system (outside of EIA). The EIA process itself does not serve to enhance or refine the mitigation of risk that is achieved by existing planning controls but presents the same information in a different format. The value of EIA in relation to assessing impacts from residential-led developments where contamination is the only relevant ground-related issue, is therefore limited.

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Given the proposed development is residential led, it is considered that the operational phase of the development will not introduce contemporary contamination sources that could impact ground conditions in the future and as such the operational phase has been scoped out of the assessment. Therefore, the current EIA only considers the environmental impacts of the redevelopment during the construction phase.

3.0 REMEDIATION REQUIREMENTS ON APPLICATION 4 AND 5

The potential risks from contaminated soil and groundwater in the Application 4 and 5 areas will be dealt with via planning conditions, as described above. The provision of planning conditions will ensure remediation takes place in each area as described below.

Application 4 (Application 2 area plus Travis Island):

- Pre-development remedial works (e.g. removal of grossly contaminated soils during earthworks) will be undertaken within the Application 2 area by HIF, in accordance with a Remediation Strategy approved by MCC and the EA. The Remediation Strategy for this site is not yet approved; however, discussions for remedial proposals are underway with the EA. It is understood that in order for any remedial proposal to be accepted (potentially including further investigation activities), this will need to address the identified presence of PFAS as well as its interaction with previously identified contaminants. It is assumed the accepted strategy will be considered sufficient in the context of contemporary legislation and industry best practice at the time of approval.
- The HIF works are anticipated to be undertaken in accordance with the proposals submitted to MCC in planning Application (Planning Reference 133143/VO/2022). A Section 73 Application (ref: 137079/JO/2023) has been submitted by MCC seeking to introduce phasing to the permission, in order to facilitate the phased discharge of conditions, including conditions relating to ground conditions and remediation. An Earthworks Delivery Strategy and Outline Phasing Strategy note (dated May 2023) were also submitted with the Section 73 application, which are anticipated to be controlled through planning condition. There will be ongoing communication between FEC and MCC regarding the HIF remediation works to understand the detailed remediation requirements and how they relate to Application 4. The proposed phasing of works allows retention of flexibility in the programme considering the presence of PFAS in Application 2 area and ongoing liaison with the EA will ensure all measures are suitable in light of contemporary legislation and industry best practice.
- It is understood that the remediation approach identified in relation to the HIF works application is being discussed with the EA and detailed planning conditions have been proposed to control the remediation process and ensure appropriate remediation works are completed. It is anticipated that discussions will be undertaken to agree appropriate conditions to be attached to the permission for Application 4 so that it is ensured that these works are undertaken prior to the development of the Plots to the intended use.

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- Subsequent to any remedial works delivered as part of Application 2, outstanding remedial works within the Travis Island area will be undertaken by FEC as part of Application 4. Ground investigations to characterise soil and groundwater conditions and associated risks are ongoing in this area. When site characterisation works are complete, any Remediation Strategies (inclusive of verification plans and cognisant of any remedial works undertaken as part of Application 2) will be prepared according to anticipated phasing of work. Documents will outline remedial measures necessary to enable the development to achieve compliance with relevant policy/legislation. Remediation Strategies and subsequent Verification Reports will be subject to approval by MCC Planning and the EA.

Application 5 (NT02 -04):

- Pre-development remedial works will be undertaken by FEC. Ground investigations to characterise soil and groundwater conditions and associated risks are ongoing in this area. When site characterisation works are complete, a Remediation Strategy for the relevant area will be prepared in accordance with the phasing plan, which will describe remedial measures that will be undertaken during redevelopment of the Application 5 area. Any Remediation Strategies produced, and their counterpart verification reports will be subject to approval by MCC Planning and the EA.
- Any necessary post-development remedial works will be incorporated into the FEC development (e.g. provision of clean soil cover in landscaped areas). A regulator-approved Remediation Strategy will describe the measures required and validation reporting will demonstrate works have been undertaken in accordance with the strategy, which will also need approval by the appropriate regulators. These measures will be controlled by conditions attached to the planning permission.

4.0 IMPLICATIONS FOR CHAPTER 9 OF THE APRIL 2023 ES

While the site investigations work to inform the remediation strategy for the HIF Application area are ongoing it is expected that final agreed remediation strategy for Application 2 will be controlled by planning conditions to be attached to the HIF permission. It is also anticipated that appropriate conditions will be attached to the permission for Application 4 so that it is ensured that appropriate works are undertaken prior to the development of the Plots to the intended use.

The proposed remediation measures for areas outside of MCC's Application 2 area, but within the Application 4 area will also be controlled by conditions attached to permission for Application 4 requiring remediation works to be agreed with and have been completed to the satisfaction of MCC.

With these conditions in place the residual effects reported in Chapter 9 of the April 2023 ES will be unchanged.



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5.0 CONCLUSION

The proposed approach to addressing the remediation of the Application 4 and Application 5 sites would ensure they are remediated to the necessary standard to protect construction personnel, future occupiers and the environment such that the residual effects of the development and their significance reported in the April 2023 ES would be unchanged (including cumulative effects with other developments).

END

Appendix II

Transport and Access Technical Note

Redbank and Dantzic Street – Transport Addendum

DATE: 13 July 2023

1. INTRODUCTION

This Transport Addendum is written as an addendum to the TA and Interim Travel Plan submitted within the Redbank and Dantzic Street outline and detailed planning applications.

Specifically the addendum is written to address the following:

- Section 2: Comments received from Transport for Greater Manchester
- Section 3: Comments received from the MCC Environmental Health Officer relating to Electric Vehicle Charging
- Section 4: Amendments relating to the change of vehicle carriageway width within Dantzic Street to 6.5m, from the 6.2m proposed in the Transport Assessment.

The majority of the comments above relate to both application 4 (outline) and application 5 (detailed). The specific applications which the comments and responses relate to are identified in each section.

2. RESPONSE TO TFGM

This section is set out using the same headings as within the TfGM response, for ease of reference.

Comments relating to both application 4 (outline) and application 5 (detailed)

Section II Traffic Counts

To address this comment, additional Manual Classified turning counts and queue surveys were collected between 0700-1000 and 1600-1900 at two junctions. The surveys were conducted by MHC Traffic on 20th June 2023. The following junctions were included in the surveys.

- Cheetham Hill Road / Lord Street; and
- Red Bank / Roger Street / Lord Street.

The data has been converted to PCU's and the local peak hours identified as 08:00-09:00 in the morning and 17:00-18:00 in evening. A traffic flow diagram of these peak hour survey flows is included in Figure 9 and Figure 10.

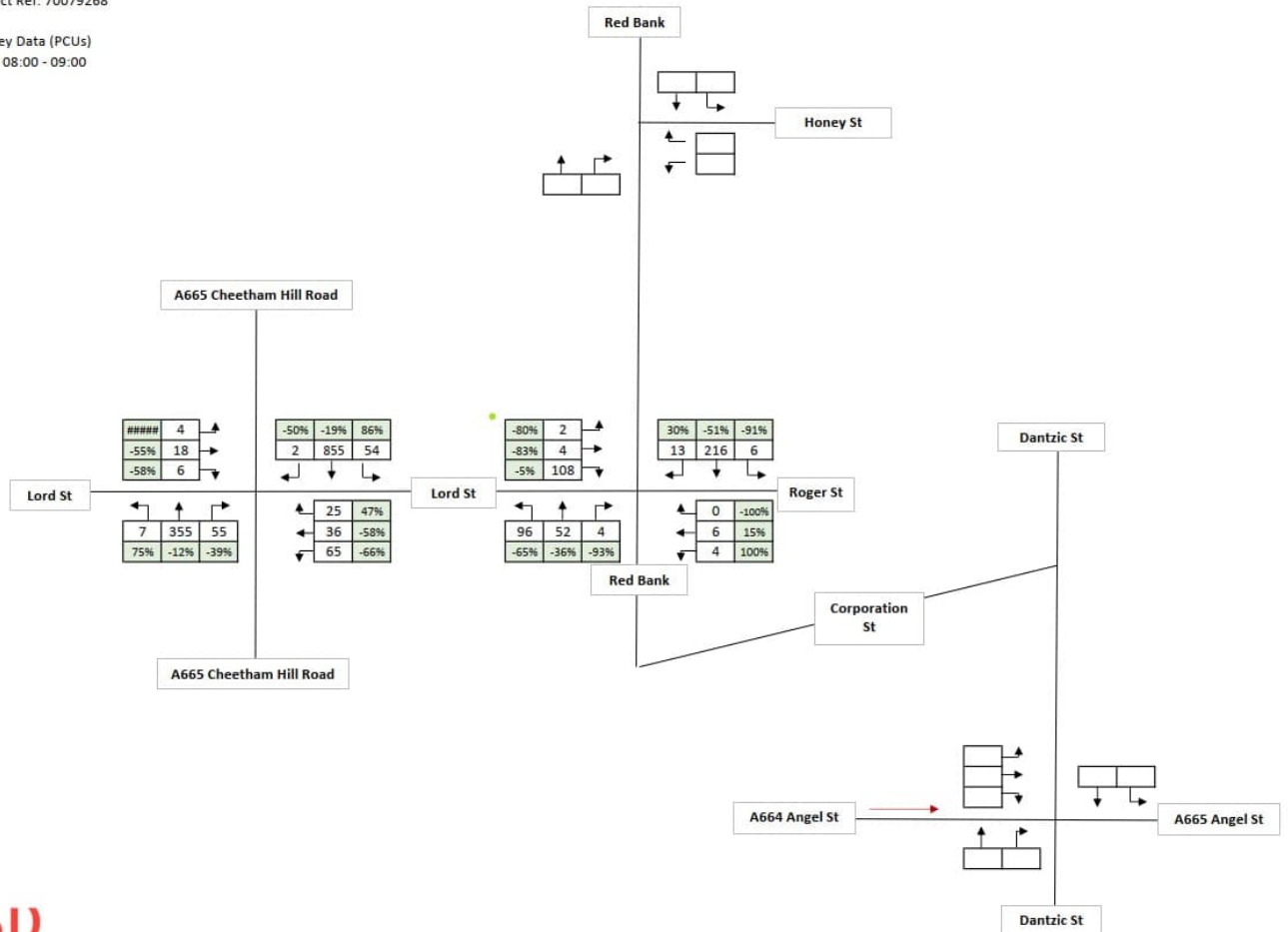
Redbank and Dantzic Street – Transport Addendum

DATE: 13 July 2023

Figure 1: Traffic Flows in AM peak hour – 2023

Red Bank and Dantzic Street
WSP Project Ref: 70079268

2023 Survey Data (PCUs)
AM Peak - 08:00 - 09:00

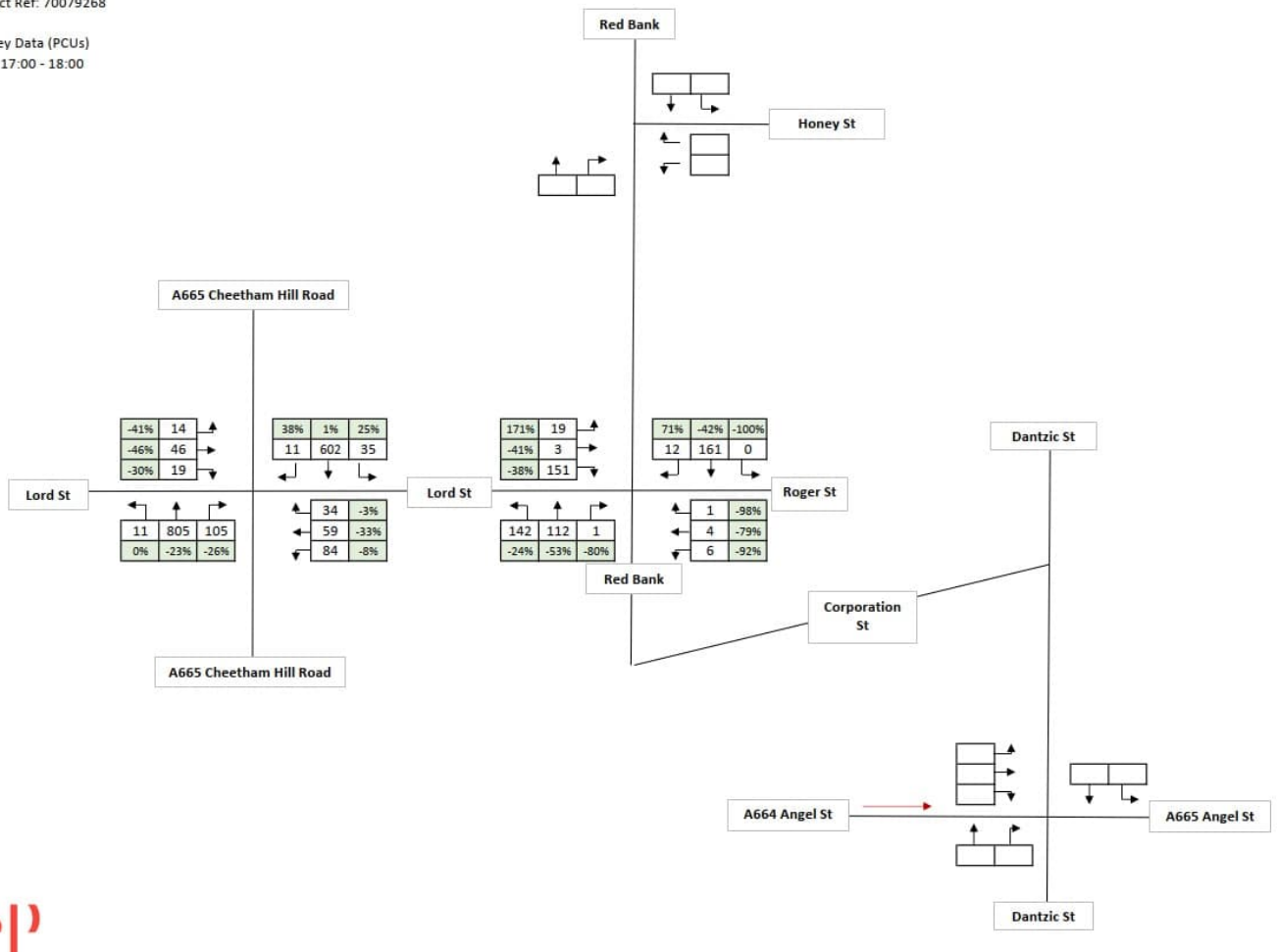


Redbank and Dantzic Street – Transport Addendum

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Figure 2: Traffic Flows in PM peak hour – 2023

Red Bank and Dantzic Street
WSP Project Ref: 70079268
2023 Survey Data (PCUs)
PM Peak - 17:00 - 18:00



The baseline traffic counts in the Transport Assessment report were undertaken in December 2018. The data in the additional baseline traffic surveys from June 2023 have been used to compare the baseline traffic data collected in 2018. The percentage difference for each turning movement at these two junctions have been shown in the traffic flow diagram in Figure 1 and Figure 2. It indicates that most of the turning movements in 2023 are lower than the same movements in 2018 (a negative percentage represents a decrease between 2018 and 2023). It can therefore be concluded that the baseline traffic flow in 2018 in the Transport Assessment report remains appropriate.

Section III Trip Generation

The trip generation presented in the TA scoping note was updated for the submitted TA due to changes in the quantum of proposed land use as the proposed development plans were refined by the project team in the time between TA scoping and TA submission. The difference between the quantum of residential development and the GFA of the primary school, the two external trip generating land uses, are outlined

Redbank and Dantzic Street – Transport Addendum

DATE: 13 July 2023

below for clarity. The trip generation in the TA is higher than that in the scoping due to the increased level of residential units and the increased size of the proposed primary school.

	TA Scoping (App 4+5)	TA Report (App 4+5)
Residential	4,387 units	4,801 units
Primary School	1,824 sqm	2,750 sqm

The development trips traffic flow diagrams in Appendix G of the TA cover the same junctions as those presented with the TA scoping but with the addition of Dantzic Street access points in more detail. The TA provides the outline and detailed development flows separately to be able to assess the development flows associated with two applications independently.

Section VIII Car Parking Provision

In relation to the additional measures suggested by TfGM to support the 10% parking provision, we agree with the suggestions made and will seek to deliver these through the detailed design process and the Full Travel Plan process as each individual plot is brought forward.

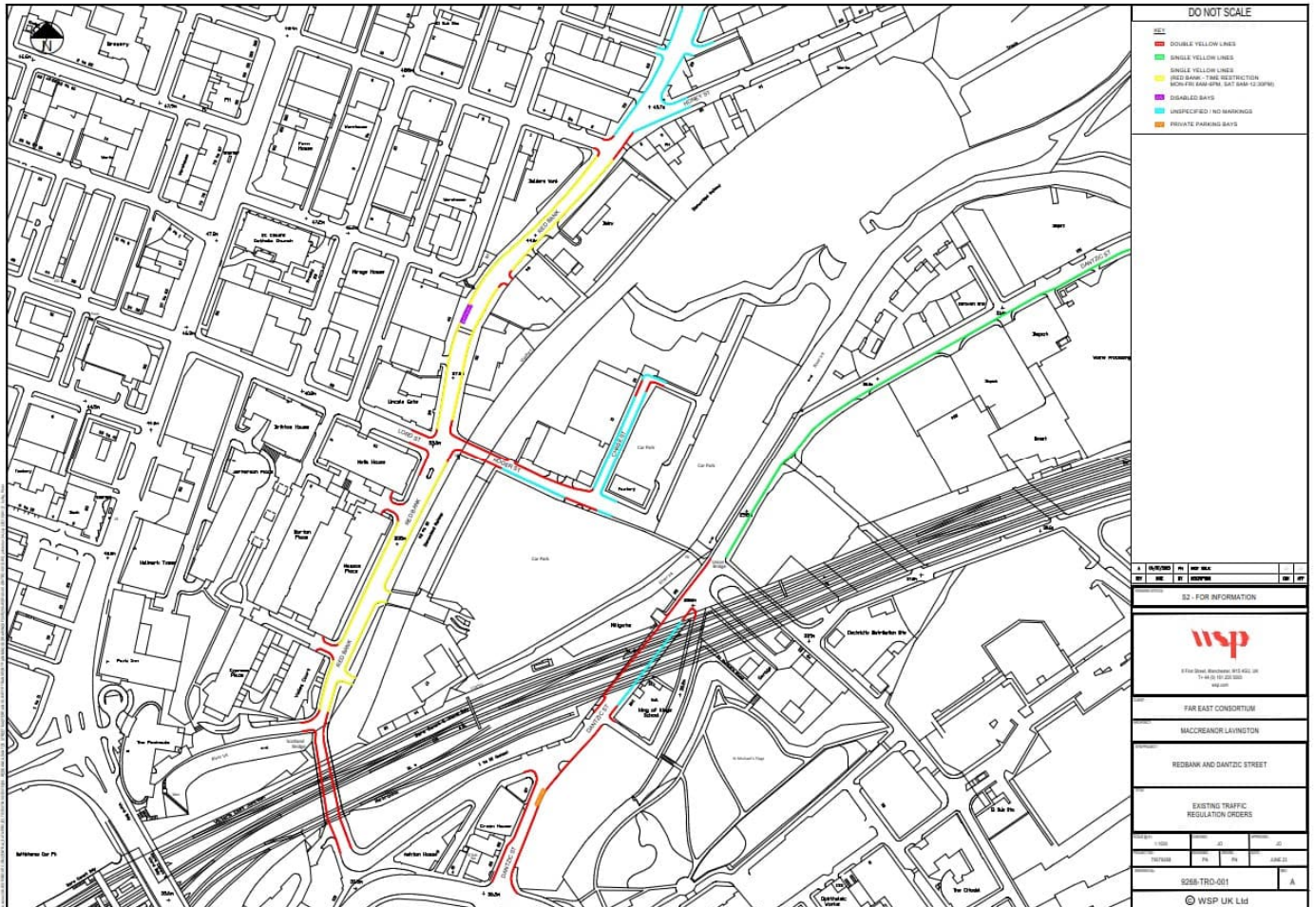
Section IX Traffic Regulation Orders

The existing Traffic Regulation Orders in the vicinity of Redbank and Dantzic Street development are shown in Figure 3 and Figure 4.

Redbank and Dantzic Street – Transport Addendum

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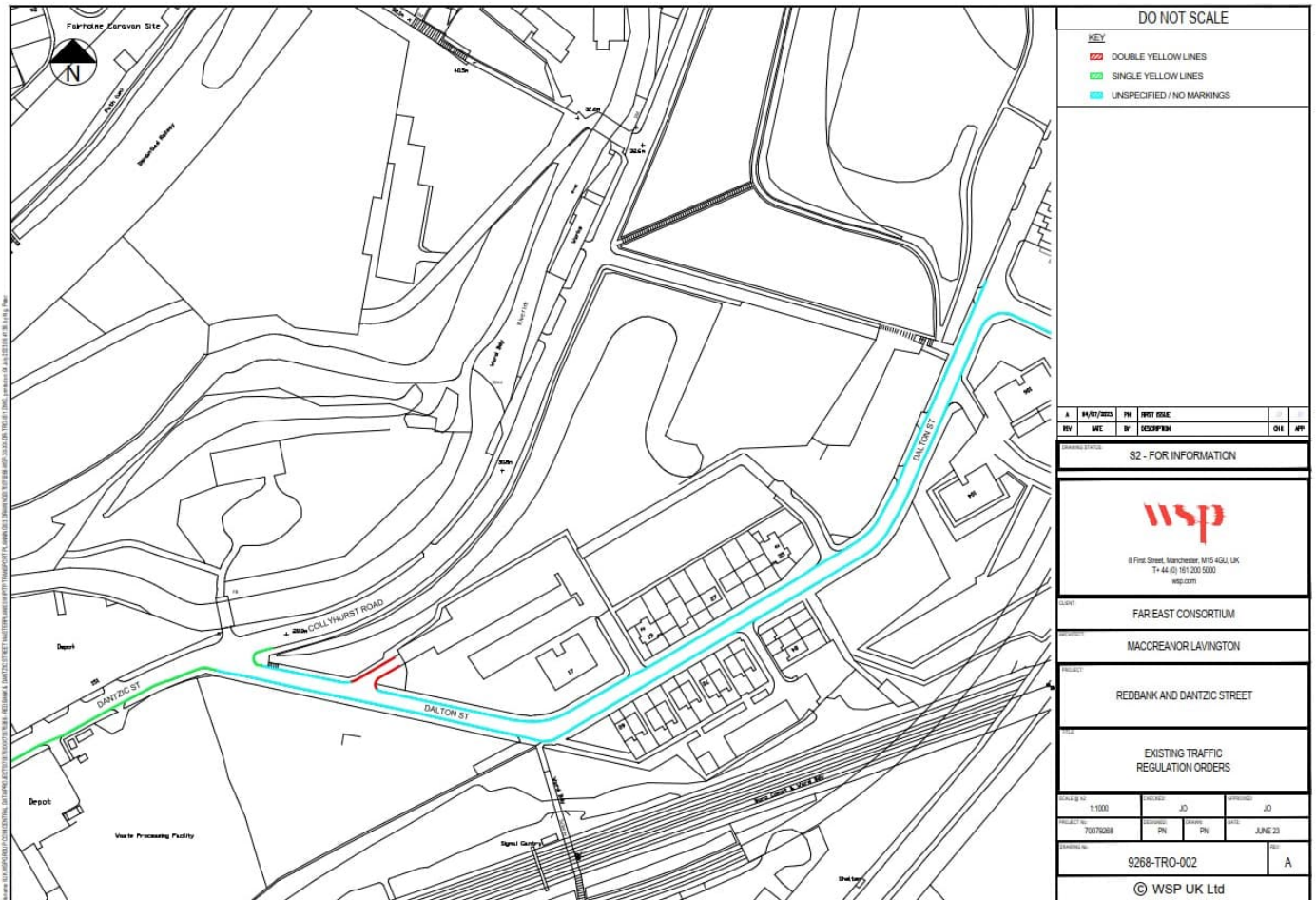
Figure 3: Traffic Regulation Order in Red Bank and Dantzic Street



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Figure 4: Traffic Regulation Order in Dantzic Street, Collyhurst Road and Dalton Street



The details of proposed TROs would be agreed in parallel with the Section 278 process, however as a general principle it is proposed that a no parking TRO would be implemented along the section of Dantzic Street adjacent to plots NT02-04, to ensure safe and efficient passage of both cyclists and vehicles (including buses) along the Dantzic Street carriageway.

Section X Other

A 1:500 drawing of the Dantzic Street highway improvements is included in this note as drawing RDB-WSP-XX-XX-DR-TP-026 rev P01. The revised mitigation scheme at Redbank / Roger Street / Lord Street is included in this note as 70079268-WSP-XX-XX-DR-TP-022 rev P02

Section I Public Transport

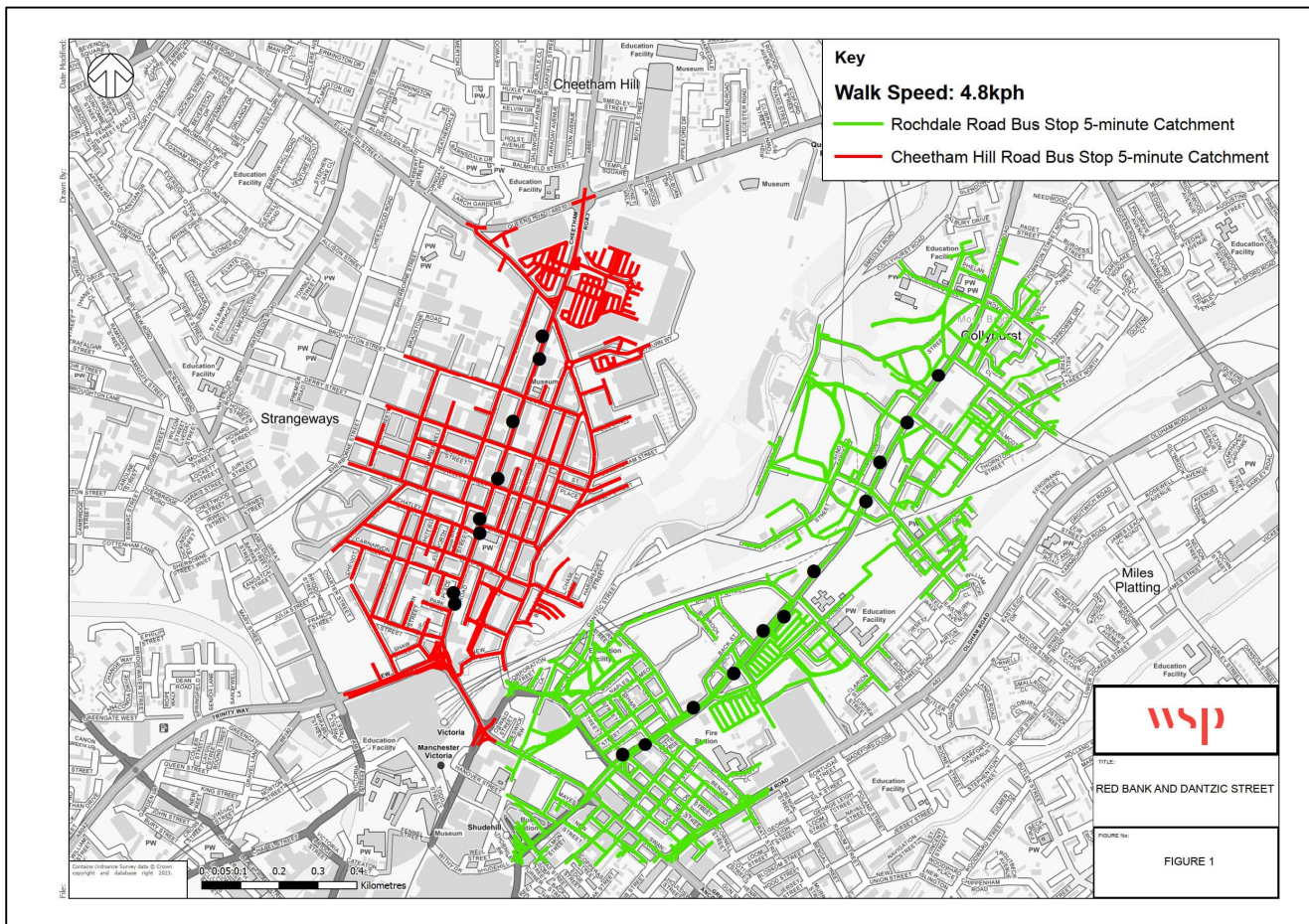
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As requested a 5 minute bus stop catchment plan from stops on Rochdale Road and Cheetham Hill Road is included in Figure 5 below. This demonstrates that sections of the site will fall within a 5 minute walk even without diversion of buses onto Dantzic Street. All of the site would be likely to fall well within a 10 minute catchment from existing bus stops.

As and when bus services are diverted onto Dantzic Street, bus stops would be provided on-street (rather than dedicated lay-bys) and this would further reduce the walk distance from the development proposals to public transport services.

Figure 5: Bus Stop 5-Minute Catchment Area



As requested an update of the existing bus service tables has been undertaken. The frequencies of services between Monday – Friday and Saturday are based on daytime frequencies, while early morning

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and evening services have a slightly lower frequency. This is unlikely to deter individuals from travelling by bus at these times given the extensive bus network across the local vicinity as identified in the table below.

Updated Table 2.5

No.	Operator	Route	Frequency (Mon – Fri)	Frequency (Saturday)	Frequency (Sunday)
Cheetham Hill Road					
41	Go North West	Sale - Middleton	1 per hour	1 per hour	1 per hour
		Middleton - Sale	1 per hour	1 per hour	1 per hour
		North Manchester General Hospital – Sale	3 per hour	3 per hour	2 per hour
		Sale – North Manchester General Hospital	3 per hour	3 per hour	2 per hour
135	Go North West	Manchester - Bury	6 per hour	6 per hour	6 per hour
		Bury - Manchester	6 per hour	6 per hour	6 per hour
Rochdale Road					
17/17a	Go North West	Manchester – Rochdale	6 per hour	4 per hour	4 per hour
		Rochdale - Manchester	6 per hour	4 per hour	4 per hour
18	Go North West	Manchester – Middleton	6 per hour	5 per hour	4 per hour
		Middleton - Manchester	6 per hour	5 per hour	4 per hour
56	Stagecoach	Manchester – North Manchester General Hospital – Higher Blackley Circular	2 per hour	2 per hour	-
156	Stagecoach	Manchester - Middleton	2 per hour	2 per hour	2 per hour to North Manchester General Hospital, 1 per hour to Middleton
		Middleton - Manchester	2 per hour	2 per hour	2 per hour from North Manchester General Hospital, 1 per hour from Middleton
81	First Manchester	Manchester – Oldham	2 per hour	1 per hour	1 per hour
		Oldham - Manchester	2 per hour	1 per hour	1 per hour
112/113	Stagecoach	Manchester – Middleton	4 per hour	3 per hour	2 per hour

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No.	Operator	Route	Frequency (Mon – Fri)	Frequency (Saturday)	Frequency (Sunday)
		Middleton - Manchester	4 per hour	3 per hour	2 per hour
117	Stagecoach	Manchester – Middleton	2 per hour	2 per hour	1 per hour
		Middleton - Manchester	2 per hour	2 per hour	1 per hour
118	Stagecoach	Manchester – North Manchester General Hospital via White Moss	4 per hour	4 per hour	2 per hour
		North Manchester General Hospital – Manchester via White Moss	4 per hour	4 per hour	2 per hour
119	Stagecoach	Manchester – Dam Head via White Moss	2 per hour	2 per hour	1 per hour
		Dam Head – Manchester via White Moss	2 per hour	2 per hour	1 per hour
163	Diamond	Manchester – Bury	5 per hour	5 per hour	4 per hour
		Bury - Manchester	5 per hour	5 per hour	4 per hour

Existing Bus Stop Review

As part of the sustainable transport assessment a review of existing bus stops has been undertaken in the local vicinity. This is based on the bus stops in Tables 2-3 and 2-4 of the Transport Assessment. The review has taken into account if each bus stop has the following:

- Timetable;
- Seating;
- Lighting;
- Shelter; and
- Overall quality

Bus Stop Review: Cheetham Hill Road and Rochdale Road

Bus Stop	Direction	Timetable	Seating	Lighting	Shelter	Overall Features / Quality
Cheetham Hill Road Bus Stops						
Park Place	Northbound	✓	-	✓	✓	
	Southbound	-	-	-	-	
St Chad's Church	Northbound	✓	-	✓	✓	

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Bus Stop	Direction	Timetable	Seating	Lighting	Shelter	Overall Features / Quality
	Southbound	✓	-	-	-	
Derby Street	Northbound Only	✓	✓	✓	✓	
Elizabeth Street	Northbound	✓	✓	✓	✓	
	Southbound	✓	✓	✓	✓	
Rochdale Road Bus Stops						
Rochdale Road / Angel Street	Northbound	✓	✓	✓	✓	
	Southbound	✓	-	✓	✓	
Gould Street	Northbound Only	✓	✓	✓	✓	
Moorhead Street	Southbound Only	✓	✓	✓	✓	
Peary Street / Livezey Street	Northbound	✓	✓	✓	✓	
	Southbound	✓	✓	✓	✓	
Osborne Street	Northbound	✓	-	✓	✓	
	Southbound	✓	✓	✓	✓	
Whitley Road	Southbound Only	✓	✓	✓	✓	

The review of bus stops in the local vicinity indicates that local bus stops are of a high quality with a significant majority having timetables, seating, lighting and a shelter present. Bus stops that should be prioritised for upgrading include St Chad's Church Southbound and Park Place Southbound.

In relation to Metrolink accessibility, we are aware of the longer term proposals for an additional Metrolink stop at Sandhills, which would be located circa 600m-800m walk distance from the application 5 site via Dalton Street. Whilst it is not considered this stop is essential for public transport accessibility to the development proposals, it would clearly be an additional destination for public transport users, and this movement would be catered for through the use of Dalton Street, which provides a suitable walking route for pedestrians wishing to access the new Metrolink stop.

Section II Active Travel

AUDIT OF ACTIVE TRAVEL FACILITIES

Lack of on-road cycling facilities

It is evident there is a lack of on-street cycling infrastructure across both Red Bank and Dantzic Street. This reduces the safety of cyclist movement and encourages cyclists to use the pavement, increasing the likelihood of conflict with pedestrians.

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The development proposals aim to mitigate the impact of this by providing on-road cycling infrastructure such as a fully segregated route for cyclists along Dantzic Street, and clearly marked cycle lanes to provide clarity and awareness of all road users to cyclists. This will also encourage cyclists to use the highway, reducing the potential for conflict with pedestrians. This will be further supported by a speed limit reduction to 20mph on Dantzic Street and TROs restricting on-street parking to avoid cyclists having to move around parked vehicles.

Limited cycling signage across local area

There is currently no signage that is specifically aimed for cyclists across either Red Bank or Dantzic Street, despite the introduction of the Bee Network and that National Cycle Routes that pass through the city centre of Manchester including routes 86,66 and 60. This lack of information is likely to negatively impact the propensity of new cyclists to utilise the existing cycling routes in the local vicinity.

As can be seen in Figure , much of the signage is centred towards HGVs due to the railway, with no indication for cyclists to nearest cycle route or other cycling facilities.

Figure 6: Lack of Cycling-related Signage, Red Bank



The development proposals could mitigate the impact of this by introducing a coherent cycling and walking network with appropriate signage that details nearby walking and cycling routes, with the details of signage being agreed with the highway authority at the detailed design stage.

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Pedestrian and cycle environment through underpass of rail bridges

As Red Bank and Dantzic Street pass under the railways, the enclosed environment presents a potential constraint to walking and cycling. This is exacerbated on Dantzic Street by on-street parking on both sides of the carriageway which will increase the likelihood of conflict between cyclists and passing vehicles due to a reduction in carriageway space. The Redbank and Dantzic Street bridges can be seen in Figure 7 and Figure respectively.

Figure 7: Red Bank under Rail Bridge



Figure 8: Dantzic Street under Rail Bridge



The development proposals could potentially improve the pedestrian and cycle environment beneath Dantzic Street by introducing new TROs that limit on-street parking and provide a safer environment for cyclists using the carriageway.

GREATER MANCHESTER ACCESSIBILITY LEVEL

We have examined the Greater Manchester Accessibility Level (GMAL) rating for the local area. This is a detailed and accurate measure of the accessibility of a point to both the conventional public transport network (i.e. bus, metrolink and rail) and Greater Manchester's Local Link (flexible transport service), taking into account walk access time and service availability.

The following text has been referenced from TfGM's GMAL Calculation Guide to provide a background to the methodology of the GMAL:

"The GMAL methodology is derived from the Public Transport Accessibility Level (PTAL) approach developed by the London Borough of Hammersmith and Fulham but modified to consider flexible transport service provision (Local Link) and to reflect local service provision levels (different accessibility levels) within Greater Manchester.

The GMAL measure reflects:

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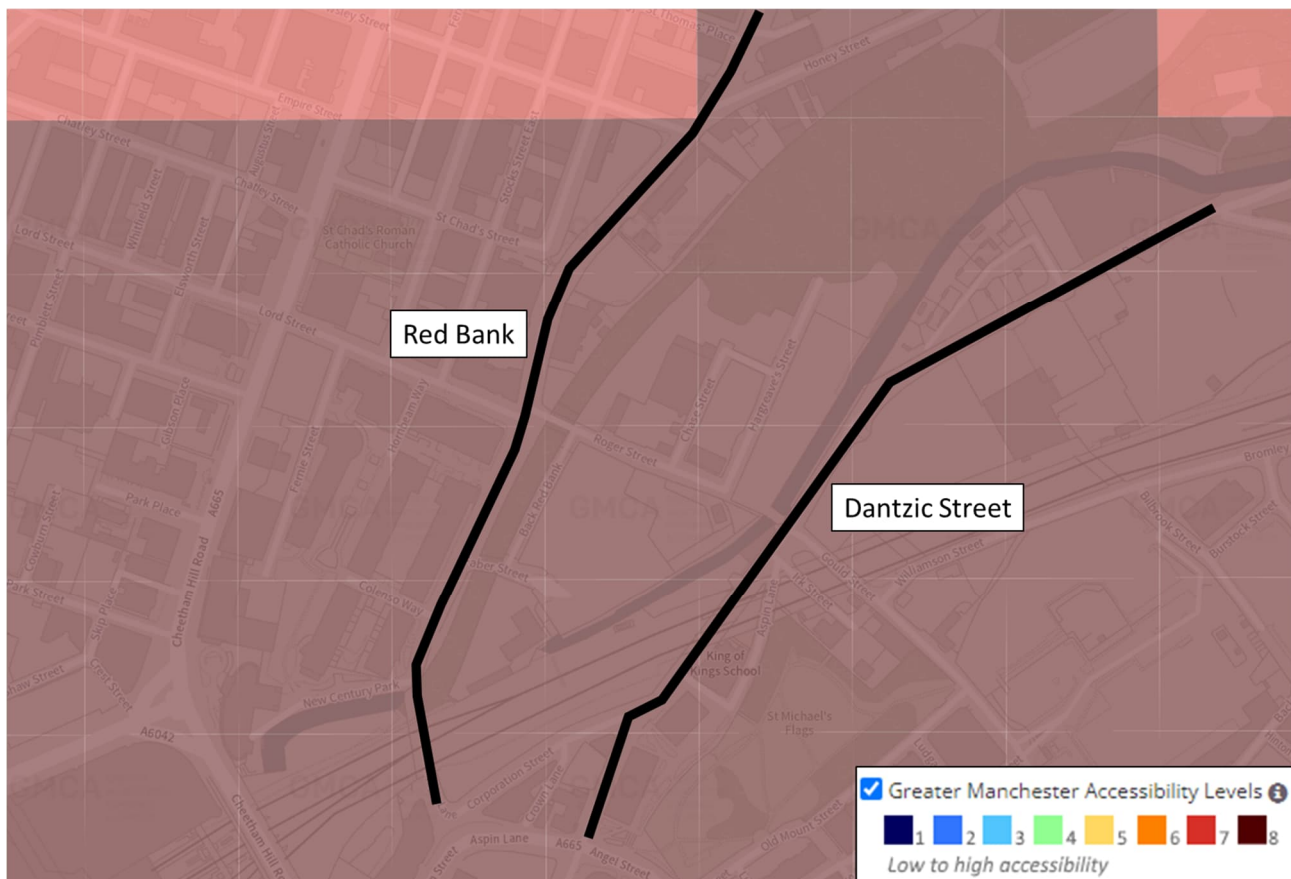
- Walking time from the point-of interest to the public transport access points;
- The number of services (bus, Metrolink and Rail) available within the catchment;
- The level of service at the public transport access points - i.e. average waiting time; and
- The operating areas of Local Link (flexible transport) services”

The accessibility index score is categorized into eight levels, 1 to 8, where level 8 represents a high level of accessibility and level 1 a low level of accessibility.

Figure 9 indicates that Red Bank and Dantzic Street are in highly accessible locations in terms of availability of public transport. Section 2.4.9 Sustainable Transport Network of the Transport Assessment states that there are various sustainable modes of transport that are accessible between a 5-10 minute walk including:

- Victoria Rail and Metrolink Station;
- Exchange Square, Shudehill and Market Street Tram stops;
- Shudehill Bus Station and;
- Bus connections to the wider Greater Manchester region from Rochdale Road and Cheetham Hill Road.

Figure 9: Red Bank and Dantzic Street GMAL (taken from MappingGM)



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Section III Cycle Parking Provision

We can confirm the current cycle parking provision at 1 space per apartment accords with the current relevant MCC standards. In the event of demand exceeding provision at some time in the future due to further shifts in travel patterns, potential additional cycle parking spaces could be identified, for example through reduction in car parking provision if modal shift from car to cycling occurs. However at the present time 1 space per apartment is proposed in line with the above standards.

Cycle stores will be located within buildings (for long-stay cycle parking for residents) and this will only be accessible to building occupiers. The stores themselves will be locked, lit and covered by CCTV.

Section IV Travel Plan

The suggestions from TfGM in relation to inclusions in the Full Travel Plan document are noted and agreed. As set out in the Interim Travel Plan submitted, a Full Travel Plan for each individual development plot can be secured by condition and will be produced pre-occupation as and when each individual development plot is brought forward.

Comments relating to application 4 (outline) only

Section V Junction Modelling

A cycle time in the LinSig model of Cheetham Hill Road / Lord Street mitigation scheme of 288 seconds in the AM peak and 192 seconds in the PM peak was used to obtain the results presented in Table 8-11 of the TA. In the AM peak, the model assumed demand for the pedestrian stage was one in every three cycles, resulting in a modelled 'cycle time' of 288 seconds which included three cycles of 96 seconds. In the AM peak, the model assumed demand for the pedestrian stage was one in two cycles, resulting in modelled cycle time of 192 seconds, which includes two cycles of 96 seconds.

TfGM commented that for both peak periods, to better represent the current and likely future appearance of the pedestrian stage, the pedestrian stage would be included one in every two cycles.

The LinSig modelling of Cheetham Hill Road / Lord Street has been updated to assume that the pedestrian stage would be called one in two cycles in the AM peak. Table 1 summarises the revised modelling results for Cheetham Hill Road / Lord Street in the 2034 and 2037 Do-Something scenarios. The results for the PM peak are as per Table 8-11 in the TA, as pedestrians were included every other cycle in the TA modelling of this junction in the PM peak. The modelling report is provided in **Appendix A** of this note.

Table 1 – Cheetham Hill Road / Lord Street Mitigation: Do-Something scenarios

Arm/Movement	AM Peak (0800 - 0900)		PM Peak (1700 - 1800)	
	Queue	DoS	Queue	DoS
2034 Do-Something (App 5 Only)				

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PRC / Cycle Time	12.2% / 192 s		26.7% / 192 s	
1/1 Cheetham Hill Road (North) – Left and Ahead	16	79.0%	5	31.8%
1/2 Cheetham Hill Road (North) – Ahead and Right	18	80.2%	6	33.8%
2/1 Lord Street (East)	13	80.1%	8	69.9%
3/1 Cheetham Hill Road (South) – Left and Ahead	9	50.3%	17	71.0%
3/2 Cheetham Hill Road (South) – Right and Ahead	2	42.8%	13	62.9%
4/1 Lord Street (West)	1	11.1%	4	36.6%
2037 Do-Something (App 4 Only)				
PRC / Cycle Time	1.1% / 192 s		3.5% / 192 s	
1/1 Cheetham Hill Road (North) – Left and Ahead	19	87.7%	5	32.1%
1/2 Cheetham Hill Road (North) – Ahead and Right	21	88.6%	6	34.0%
2/1 Lord Street (East)	17	89.0%	12	86.6%
3/1 Cheetham Hill Road (South) – Left and Ahead	10	54.8%	26	87.0%
3/2 Cheetham Hill Road (South) – Right and Ahead	5	76.3%	14	78.9%
4/1 Lord Street (West)	1	10.2%	4	39.2%
2037 Do-Something (App 4 plus App 5 Development)				
PRC / Cycle Time	-4.1 % / 192 s		3.5 % / 192 s	
1/1 Cheetham Hill Road (North) – Left and Ahead	22	92.9%	6	33.1%
1/2 Cheetham Hill Road (North) – Ahead and Right	24	93.5%	6	35.2%
2/1 Lord Street (East)	20	93.7%	13	88.4%
3/1 Cheetham Hill Road (South) – Left and Ahead	11	57.2%	29	89.9%
3/2 Cheetham Hill Road (South) – Right and Ahead	5	76.3%	15	82.3%
4/1 Lord Street (West)	1	9.6%	4	36.0%

In agreement with the results and conclusions provided within the TA, the revised results show that with the proposed mitigation included in the modelling, the junction is forecast to operate better than the Do-Minimum scenarios in the AM peak, suggesting an overall improvement in the operation of this junction. There is a reduction in the forecast queues and delay, suggesting that the proposed mitigation would be beneficial to the operation of this local junction.

Section VI Mitigation

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We have prepared an amended design for the junction at Redbank / Roger Street / Lord Street which is included in this note as 70079268-WSP-XX-XX-DR-TP-022 rev P02. This includes for a signalled pedestrian crossing of Redbank, and retains the existing kerblines as per TfGM request. This junction would still offer capacity benefits over the existing layout (in a similar way to the previously proposed scheme) as the parking restriction would allow traffic on Lord Street to use two lanes on the approach to the stopline, as per the capacity assessment in the original Transport Assessment.

Based on the proposals for Dantzic Street and the significant pedestrian and cycle priority being provided along this route, including a reduction to 20mph speed limit and several priority basis crossings, we do not consider a signal crossing on Dantzic Street is necessary or in keeping with the pedestrian priority design philosophy of this street.

For clarity, the proposed highway mitigation is as follows:

- Cheetham Hill Road / Lord Street – provision of right turn arrow for vehicles turning into Lord Street (see 8.3.23 onwards of TA)
- Redbank / Roger Street / Lord Street – provision of improvements as per drawing as 70079268-WSP-XX-XX-DR-TP-022 rev P02 attached to this note.
- Dantzic Street and Dalton Street – highway improvements as per drawing RDB-WSP-XX-XX-DR-TP-026 rev P01 attached to this note.

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3. RESPONSE TO ENVIRONMENTAL HEALTH OFFICER

Comments relating to both application 4 (outline) and application 5 (detailed)

The Transport Assessment confirms the intention to provide 20% of parking spaces with full provision for EV charging initially, with passive provision (e.g. cable ducting, capacity in electric supply) for the remaining 80% to be enabled in the future when demand from residents and visitors dictates this. This is across the resident and visitor parking provision within both the detailed and outline applications.

Confirmation of this, and further details where relevant, are provided in the following sections of the Transport Assessment:

- 3.2.9
- 3.2.15
- 3.3.11
- 6.5.3

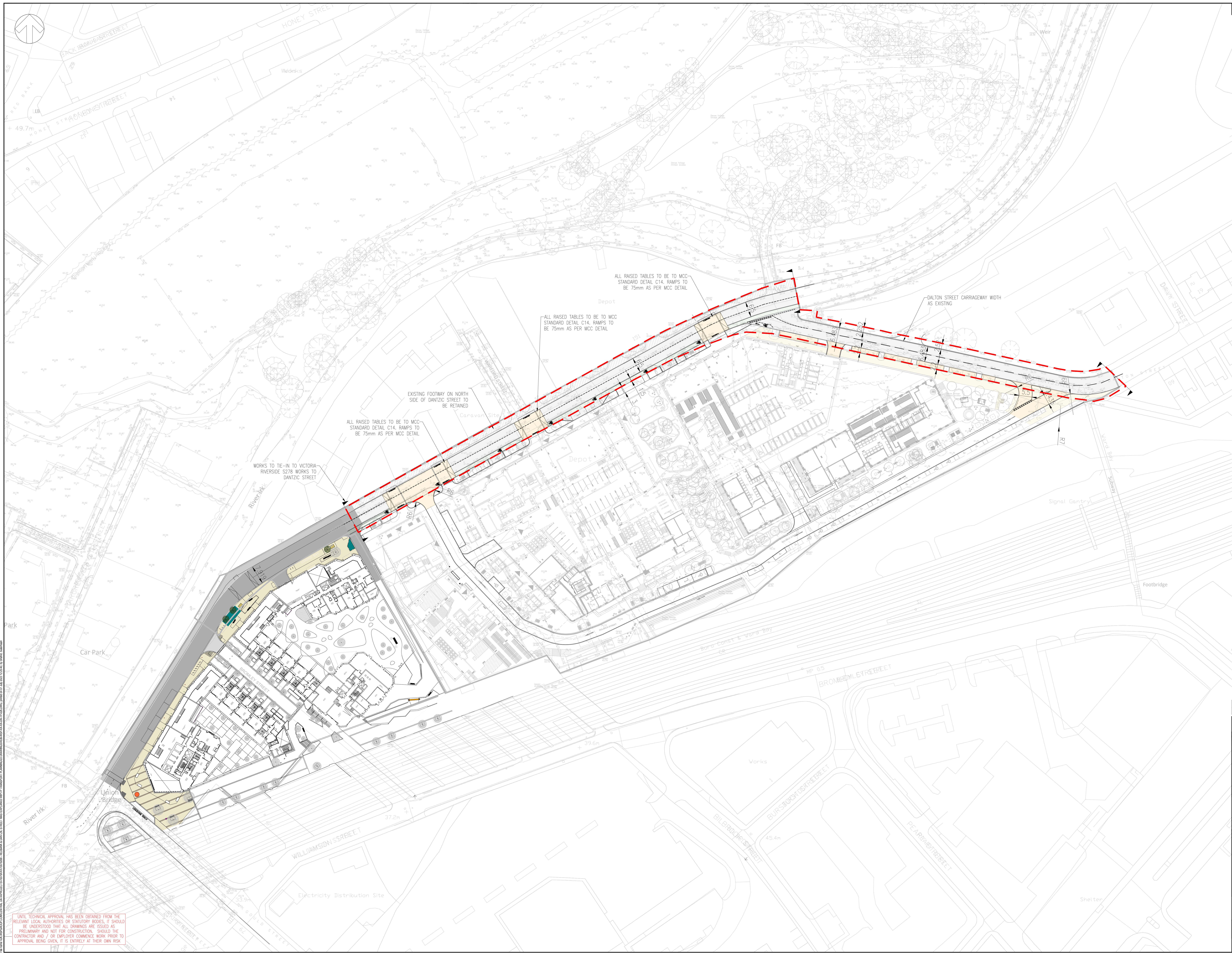
4. DANTZIC STREET WIDTH

Comments relating to application 5 (detailed) only

Following a meeting between WSP, TfGM and MCC highways on 5.7.23, the vehicle carriageway width along Dantzic Street adjacent to plots NT02-04 has been widened to 6.5m in line with the request from TfGM. This amended design is shown in drawing RDB-WSP-XX-XX-DR-TP-026 rev P01 attached.

To achieve this, the width of the footway south of Dantzic Street has been reduced although it remains above 3.0m at all points.

Where reference is made in the Transport Assessment to the width of the Dantzic Street vehicle carriageway being 6.2m (para 6.4.3) this is now superseded by this note which confirms the width will be 6.5m.



DO NOT SCALE

NOTES:

1. DO NOT SCALE FROM THIS DRAWING.
2. DRAWING TO BE PRINTED IN COLOUR.
3. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SPECIFIED.
4. THE TOPOGRAPHICAL SURVEY UPON WHICH THIS DESIGN IS BASED HAS BEEN PROVIDED BY THIRD PARTY AND SHOULD BE CHECKED ON SITE FOR ACCURACY.

KEY:

 HIGHWAY BOUNDARY
 PROPOSED CARRIAGEWAY
 PROPOSED FOOTWAY
 PROPOSED CYCLEWAY
 PROPOSED CROSSING
 SITE EXTENTS MARKER

NO1	06/07/2023	SS	FIRST ISSUE	IV	IV
REV	DATE	BY	DESCRIPTION	CHK	APP

DRAWING STATUS: S3 - FOR REVIEW



Street, Manchester, M15 4GU, UK
T+ 44 (0) 161 200 5000
wsp.com

FEC

CHTECT: MLM

PROJECT:

RED BANK AND DANTZIC STREET

FILE: _____

DANTZIC STREET HIGHWAY
IMPROVEMENTS

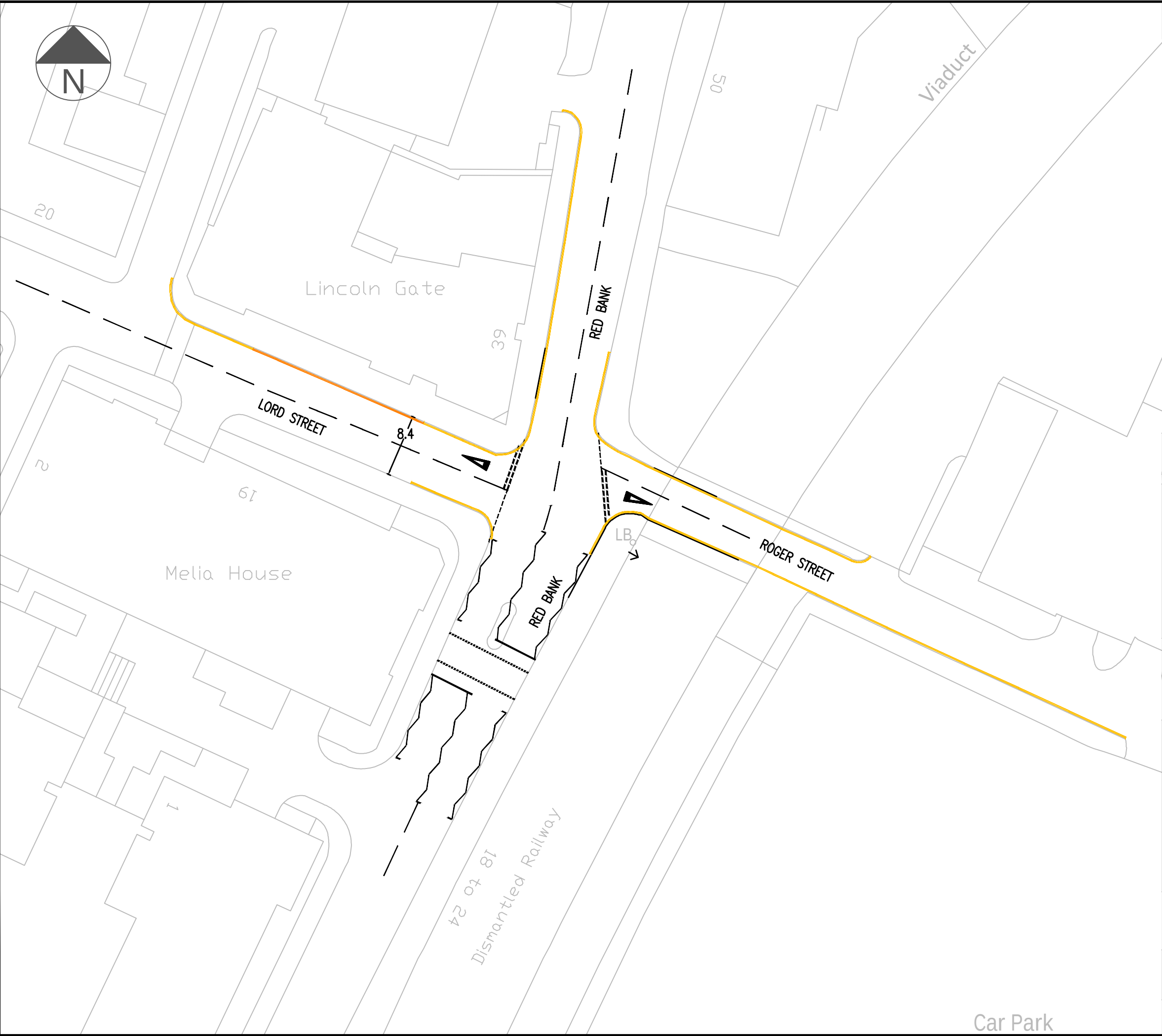
GENERAL ARRANGEMENT

SCALE (1/4")	CHECKED:		APPROVED:
1:500	RV		RV
PROJECT No:	DESIGNED:	DRAWING:	DATE:
70070269	SS	SS	July 22

RDB-WSP-XX-XX-DR-TP-026

WSP UK Ltd

File name \\UK.WSPGROUP.COM\CENTRAL DATA\PROJECTS\70079268 -REDBANK & DANTZIC STREET MASTERPLAN\03 WIP\TP TRANSPORT PLANNING\03 DRAWINGS\70079268-WSP-XX-XX-DR-TP-022 DWG, printed on 13 June 2023 14:13:45, by Ramm, Declan



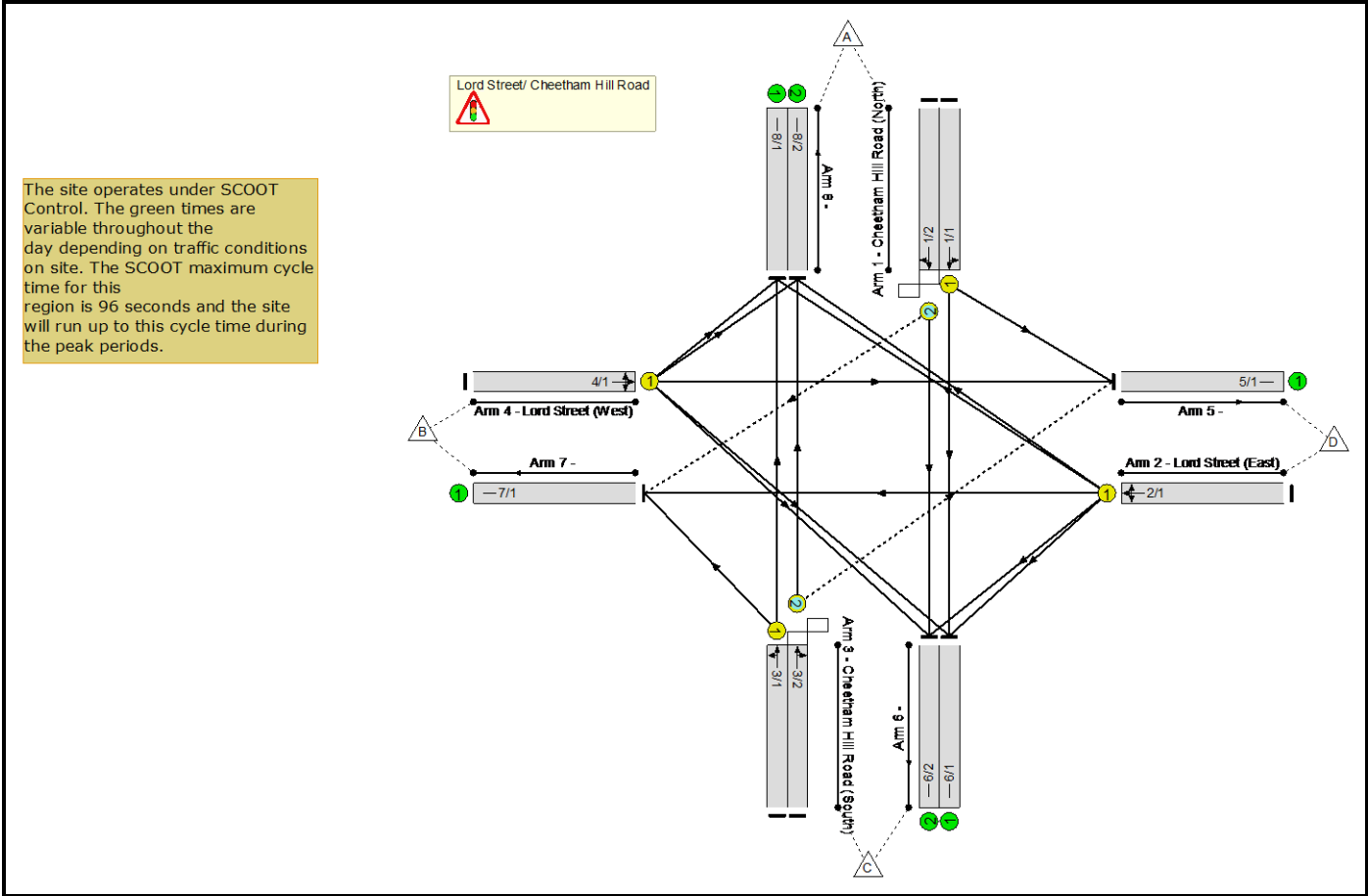
Full Input Data And Results

Full Input Data And Results

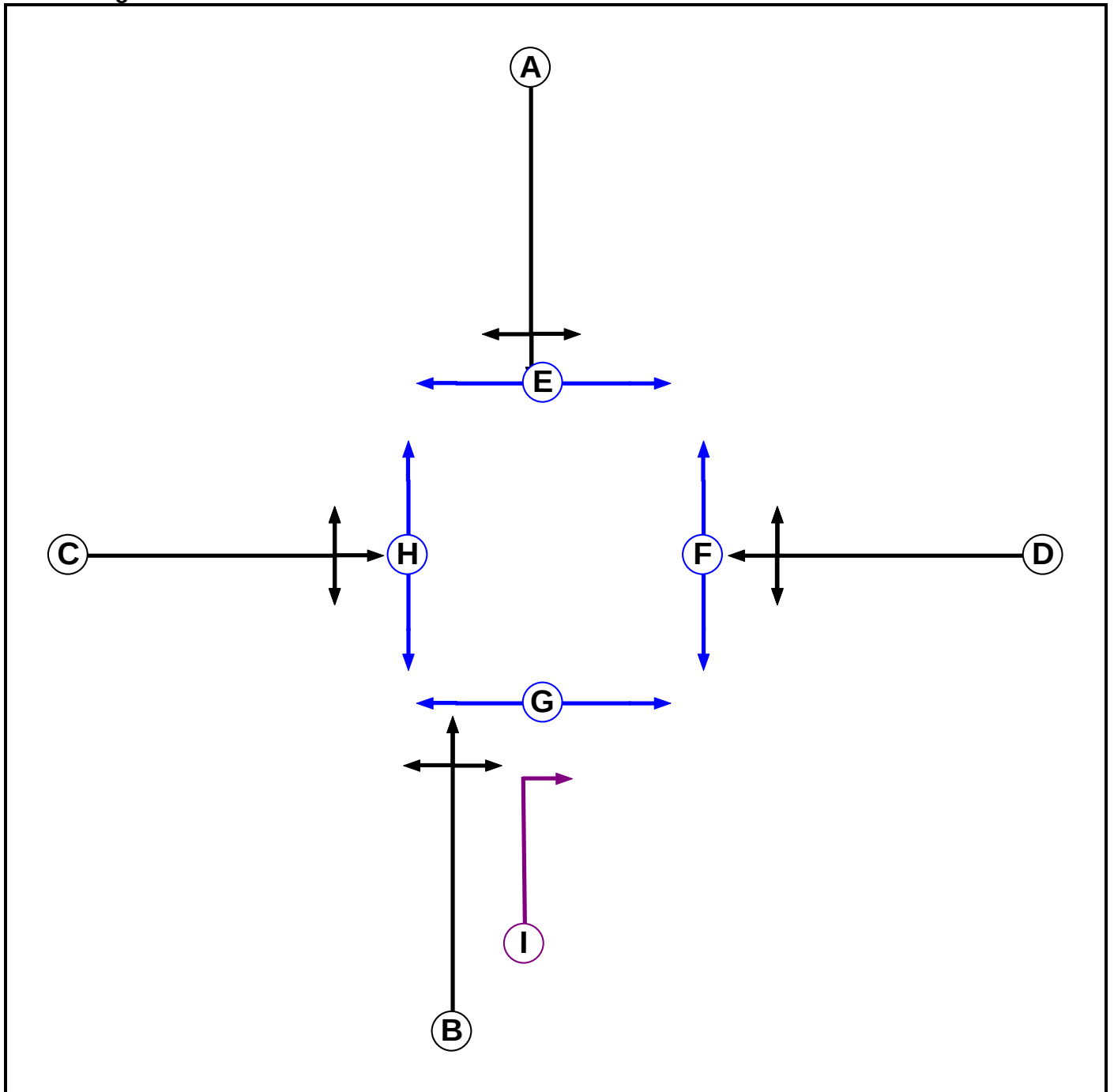
User and Project Details

Project:	Northern Gateway
Title:	
Location:	
Client:	FEC
Site Ref(s):	Lord Street/ Cheetham Hill Road
Additional detail:	With Mitigation - Indicative Right Turn Arrow in AM peak
File name:	Lord Street_Cheetham Hill Road - Mitigation - v2.lsg3x
Author:	
Company:	
Address:	

Network Layout Diagram



Phase Diagram



Full Input Data And Results

Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		7	7
B	Traffic		7	7
C	Traffic		7	7
D	Traffic		7	7
E	Pedestrian		5	5
F	Pedestrian		5	5
G	Pedestrian		5	5
H	Pedestrian		5	5
I	Ind. Arrow	B	4	4

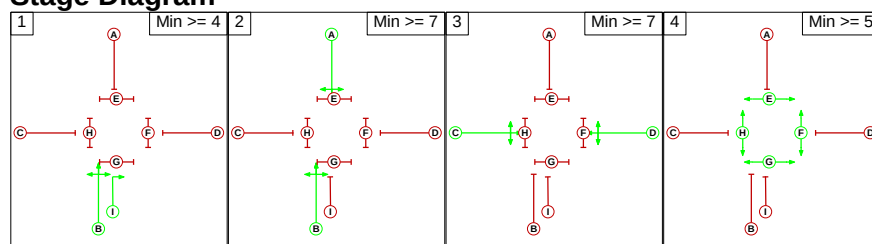
Phase Intergreens Matrix

Terminating Phase	Starting Phase									
		A	B	C	D	E	F	G	H	I
	A		-	6	6	5	7	7	8	6
	B	-		6	6	7	7	5	7	-
	C	6	6		-	7	7	8	5	6
	D	6	6	-		8	5	7	7	6
	E	6	6	6	6		-	-	-	6
	F	6	6	6	6	-		-	-	6
	G	6	6	6	6	-	-		-	6
	H	5	5	5	5	-	-	-		5
	I	6	-	6	6	7	7	5	7	

Phases in Stage

Stage No.	Phases in Stage
1	B I
2	A B
3	C D
4	E F G H

Stage Diagram



Phase Delays

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Prohibited Stage Change

From Stage	To Stage				
		1	2	3	4
	1		6	6	7
	2	6		6	8
	3	6	6		8
	4	6	6	6	

Full Input Data And Results

Give-Way Lane Input Data

Junction: Lord Street/ Cheetham Hill Road											
Lane	Movement	Max Flow when Giving Way (PCU/Hr)	Min Flow when Giving Way (PCU/Hr)	Opposing Lane	Opp. Lane Coeff.	Opp. Mvmnts.	Right Turn Storage (PCU)	Non-Blocking Storage (PCU)	RTF	Right Turn Move up (s)	Max Turns in Intergreen (PCU)
1/2 (Cheetham Hill Road (North))	7/1 (Right)	1439	0	3/1	1.09	All	2.00	1.00	0.50	2	2.00
				3/2	1.09	To 8/2 (Ahead)					
3/2 (Cheetham Hill Road (South))	5/1 (Right)	1439	0	1/1	1.09	All	2.00	1.00	0.50	2	2.00
				1/2	1.09	To 6/2 (Ahead)					

Full Input Data And Results

Lane Input Data

Junction: Lord Street/ Cheetham Hill Road												
Lane	Lane Type	Phases	Start Disp.	End Disp.	Physical Length (PCU)	Sat Flow Type	Def User Saturation Flow (PCU/Hr)	Lane Width (m)	Gradient	Nearside Lane	Turns	Turning Radius (m)
1/1 (Cheetham Hill Road (North))	U	A	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 5 Left	5.00
											Arm 6 Ahead	Inf
1/2 (Cheetham Hill Road (North))	O	A	2	3	60.0	Geom	-	3.00	0.00	N	Arm 6 Ahead	Inf
											Arm 7 Right	12.00
2/1 (Lord Street (East))	U	D	2	3	60.0	Geom	-	3.50	0.00	Y	Arm 6 Left	5.00
											Arm 7 Ahead	Inf
											Arm 8 Right	12.00
3/1 (Cheetham Hill Road (South))	U	B	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 7 Left	5.00
											Arm 8 Ahead	Inf
3/2 (Cheetham Hill Road (South))	O	B I	2	3	60.0	Geom	-	3.00	0.00	N	Arm 5 Right	Inf
											Arm 8 Ahead	12.00
4/1 (Lord Street (West))	U	C	2	3	60.0	Geom	-	3.25	0.00	Y	Arm 5 Ahead	Inf
											Arm 6 Right	12.00
											Arm 8 Left	5.00
5/1	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1	U		2	3	60.0	Inf	-	-	-	-	-	-
6/2	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1	U		2	3	60.0	Inf	-	-	-	-	-	-
8/1	U		2	3	60.0	Inf	-	-	-	-	-	-
8/2	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'Do-Sth (Detailed+Com) 2034 AM'	08:00	09:00	01:00	
2: 'Do-Sth (Detailed+Com) 2034 PM'	17:00	18:00	01:00	
3: 'Do-Sth (Outline+Com) 2037 AM'	08:00	09:00	01:00	
4: 'Do-Sth (Outline+Com) 2037 PM'	17:00	18:00	01:00	
5: 'Do-Sth (Detail+Out+Com) 2037 AM'	08:00	09:00	01:00	
6: 'Do-Sth (Detail+Out+Com) 2037 PM'	17:00	18:00	01:00	

Scenario 1: 'Do-Sth (Detailed+Com) 2034 AM' (FG1: 'Do-Sth (Detailed+Com) 2034 AM', Plan 1: 'AM SSGM')

Traffic Flows, Desired

Desired Flow :

	Destination					
Origin		A	B	C	D	Tot.
	A	0	5	1267	34	1306
	B	0	0	17	47	64
	C	495	5	0	106	606
	D	20	100	278	0	398
	Tot.	515	110	1562	187	2374

Traffic Lane Flows

Lane	Scenario 1: Do-Sth (Detailed+Com) 2034 AM
Junction: Lord Street/ Cheetham Hill Road	
1/1	620
1/2	686
2/1	398
3/1	500
3/2	106
4/1	64
5/1	187
6/1	733
6/2	829
7/1	110
8/1	505
8/2	10

Lane Saturation Flows

Junction: Lord Street/ Cheetham Hill Road								
Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (Cheetham Hill Road (North))	3.00	0.00	Y	Arm 5 Left	5.00	5.5 %	1884	1884
				Arm 6 Ahead	Inf	94.5 %		
1/2 (Cheetham Hill Road (North))	3.00	0.00	N	Arm 6 Ahead	Inf	99.3 %	2053	2053
				Arm 7 Right	12.00	0.7 %		
2/1 (Lord Street (East))	3.50	0.00	Y	Arm 6 Left	5.00	69.8 %	1616	1616
				Arm 7 Ahead	Inf	25.1 %		
				Arm 8 Right	12.00	5.0 %		
3/1 (Cheetham Hill Road (South))	3.00	0.00	Y	Arm 7 Left	5.00	1.0 %	1909	1909
				Arm 8 Ahead	Inf	99.0 %		
3/2 (Cheetham Hill Road (South))	3.00	0.00	N	Arm 5 Right	Inf	100.0 %	2055	2055
				Arm 8 Ahead	12.00	0.0 %		
4/1 (Lord Street (West))	3.25	0.00	Y	Arm 5 Ahead	Inf	73.4 %	1878	1878
				Arm 6 Right	12.00	26.6 %		
				Arm 8 Left	5.00	0.0 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
6/2	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf
8/2	Infinite Saturation Flow						Inf	Inf

Scenario 2: 'Do-Sth (Detailed+Com) 2034 PM' (FG2: 'Do-Sth (Detailed+Com) 2034 PM', Plan 2: 'PM SSGM')

Traffic Flows, Desired

Desired Flow :

Origin	Destination					
		A	B	C	D	Tot.
	A	0	9	708	33	750
	B	28	0	31	99	158
	C	1237	13	0	165	1415
	D	41	102	139	0	282
	Tot.	1306	124	878	297	2605

Traffic Lane Flows

Lane	Scenario 2: Do-Sth (Detailed+Com) 2034 PM
Junction: Lord Street/ Cheetham Hill Road	
1/1	348
1/2	402
2/1	282
3/1	797
3/2	618
4/1	158
5/1	297
6/1	399
6/2	479
7/1	124
8/1	818
8/2	488

Lane Saturation Flows

Junction: Lord Street/ Cheetham Hill Road								
Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (Cheetham Hill Road (North))	3.00	0.00	Y	Arm 5 Left	5.00	9.5 %	1862	1862
				Arm 6 Ahead	Inf	90.5 %		
1/2 (Cheetham Hill Road (North))	3.00	0.00	N	Arm 6 Ahead	Inf	97.8 %	2049	2049
				Arm 7 Right	12.00	2.2 %		
2/1 (Lord Street (East))	3.50	0.00	Y	Arm 6 Left	5.00	49.3 %	1685	1685
				Arm 7 Ahead	Inf	36.2 %		
				Arm 8 Right	12.00	14.5 %		
3/1 (Cheetham Hill Road (South))	3.00	0.00	Y	Arm 7 Left	5.00	1.6 %	1906	1906
				Arm 8 Ahead	Inf	98.4 %		
3/2 (Cheetham Hill Road (South))	3.00	0.00	N	Arm 5 Right	Inf	26.7 %	1883	1883
				Arm 8 Ahead	12.00	73.3 %		
4/1 (Lord Street (West))	3.25	0.00	Y	Arm 5 Ahead	Inf	62.7 %	1800	1800
				Arm 6 Right	12.00	19.6 %		
				Arm 8 Left	5.00	17.7 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
6/2	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf
8/2	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 3: 'Do-Sth (Outline+Com) 2037 AM' (FG3: 'Do-Sth (Outline+Com) 2037 AM', Plan 1: 'AM SSGM')

Traffic Flows, Desired

Desired Flow :

	Destination					
Origin		A	B	C	D	Tot.
	A	0	5	1298	35	1338
	B	0	0	17	48	65
	C	507	5	0	188	700
	D	20	102	360	0	482
	Tot.	527	112	1675	271	2585

Traffic Lane Flows

Lane	Scenario 3: Do-Sth (Outline+Com) 2037 AM
Junction: Lord Street/ Cheetham Hill Road	
1/1	637
1/2	701
2/1	482
3/1	512
3/2	188
4/1	65
5/1	271
6/1	790
6/2	885
7/1	112
8/1	517
8/2	10

Lane Saturation Flows

Junction: Lord Street/ Cheetham Hill Road								
Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (Cheetham Hill Road (North))	3.00	0.00	Y	Arm 5 Left	5.00	5.5 %	1884	1884
				Arm 6 Ahead	Inf	94.5 %		
1/2 (Cheetham Hill Road (North))	3.00	0.00	N	Arm 6 Ahead	Inf	99.3 %	2053	2053
				Arm 7 Right	12.00	0.7 %		
2/1 (Lord Street (East))	3.50	0.00	Y	Arm 6 Left	5.00	74.7 %	1599	1599
				Arm 7 Ahead	Inf	21.2 %		
				Arm 8 Right	12.00	4.1 %		
3/1 (Cheetham Hill Road (South))	3.00	0.00	Y	Arm 7 Left	5.00	1.0 %	1909	1909
				Arm 8 Ahead	Inf	99.0 %		
3/2 (Cheetham Hill Road (South))	3.00	0.00	N	Arm 5 Right	Inf	100.0 %	2055	2055
				Arm 8 Ahead	12.00	0.0 %		
4/1 (Lord Street (West))	3.25	0.00	Y	Arm 5 Ahead	Inf	73.8 %	1879	1879
				Arm 6 Right	12.00	26.2 %		
				Arm 8 Left	5.00	0.0 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
6/2	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf
8/2	Infinite Saturation Flow						Inf	Inf

Scenario 4: 'Do-Sth (Outline+Com) 2037 PM' (FG4: 'Do-Sth (Outline+Com) 2037 PM', Plan 2: 'PM SSGM')

Traffic Flows, Desired

Desired Flow :

Origin	Destination					
	A	B	C	D	Tot.	
	A	0	10	724	33	767
	B	28	0	32	102	162
	C	1265	13	0	261	1539
	D	42	105	183	0	330
	Tot.	1335	128	939	396	2798

Traffic Lane Flows

Lane	Scenario 4: Do-Sth (Outline+Com) 2037 PM
Junction: Lord Street/ Cheetham Hill Road	
1/1	358
1/2	409
2/1	330
3/1	994
3/2	545
4/1	162
5/1	396
6/1	432
6/2	507
7/1	128
8/1	1016
8/2	319

Lane Saturation Flows

Junction: Lord Street/ Cheetham Hill Road								
Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (Cheetham Hill Road (North))	3.00	0.00	Y	Arm 5 Left	5.00	9.2 %	1863	1863
				Arm 6 Ahead	Inf	90.8 %		
1/2 (Cheetham Hill Road (North))	3.00	0.00	N	Arm 6 Ahead	Inf	97.6 %	2049	2049
				Arm 7 Right	12.00	2.4 %		
2/1 (Lord Street (East))	3.50	0.00	Y	Arm 6 Left	5.00	55.5 %	1662	1662
				Arm 7 Ahead	Inf	31.8 %		
				Arm 8 Right	12.00	12.7 %		
3/1 (Cheetham Hill Road (South))	3.00	0.00	Y	Arm 7 Left	5.00	1.3 %	1908	1908
				Arm 8 Ahead	Inf	98.7 %		
3/2 (Cheetham Hill Road (South))	3.00	0.00	N	Arm 5 Right	Inf	47.9 %	1929	1929
				Arm 8 Ahead	12.00	52.1 %		
4/1 (Lord Street (West))	3.25	0.00	Y	Arm 5 Ahead	Inf	63.0 %	1802	1802
				Arm 6 Right	12.00	19.8 %		
				Arm 8 Left	5.00	17.3 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
6/2	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf
8/2	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 5: 'Do-Sth (Detail+Out+Com) 2037 AM' (FG5: 'Do-Sth (Detail+Out+Com) 2037 AM', Plan 1: 'AM SSGM')
Traffic Flows, Desired
Desired Flow :

	Destination					
Origin		A	B	C	D	Tot.
	A	0	5	1298	35	1338
	B	0	0	17	48	65
	C	507	5	0	188	700
	D	20	102	413	0	535
	Tot.	527	112	1728	271	2638

Traffic Lane Flows

Lane	Scenario 5: Do-Sth (Detail+Out+Com) 2037 AM
Junction: Lord Street/ Cheetham Hill Road	
1/1	638
1/2	700
2/1	535
3/1	512
3/2	188
4/1	65
5/1	271
6/1	817
6/2	911
7/1	112
8/1	517
8/2	10

Lane Saturation Flows

Junction: Lord Street/ Cheetham Hill Road								
Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (Cheetham Hill Road (North))	3.00	0.00	Y	Arm 5 Left	5.00	5.5 %	1884	1884
				Arm 6 Ahead	Inf	94.5 %		
1/2 (Cheetham Hill Road (North))	3.00	0.00	N	Arm 6 Ahead	Inf	99.3 %	2053	2053
				Arm 7 Right	12.00	0.7 %		
2/1 (Lord Street (East))	3.50	0.00	Y	Arm 6 Left	5.00	77.2 %	1589	1589
				Arm 7 Ahead	Inf	19.1 %		
				Arm 8 Right	12.00	3.7 %		
3/1 (Cheetham Hill Road (South))	3.00	0.00	Y	Arm 7 Left	5.00	1.0 %	1909	1909
				Arm 8 Ahead	Inf	99.0 %		
3/2 (Cheetham Hill Road (South))	3.00	0.00	N	Arm 5 Right	Inf	100.0 %	2055	2055
				Arm 8 Ahead	12.00	0.0 %		
4/1 (Lord Street (West))	3.25	0.00	Y	Arm 5 Ahead	Inf	73.8 %	1879	1879
				Arm 6 Right	12.00	26.2 %		
				Arm 8 Left	5.00	0.0 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
6/2	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf
8/2	Infinite Saturation Flow						Inf	Inf

Scenario 6: 'Do-Sth (Detail+Out+Com) 2037 PM' (FG6: 'Do-Sth (Detail+Out+Com) 2037 PM', Plan 2: 'PM SSGM')
Traffic Flows, Desired
Desired Flow :

Origin	Destination					
	A	B	C	D	Tot.	
	A	0	10	724	33	767
	B	28	0	32	102	162
	C	1265	13	0	261	1539
	D	42	105	217	0	364
	Tot.	1335	128	973	396	2832

Full Input Data And Results

Traffic Lane Flows

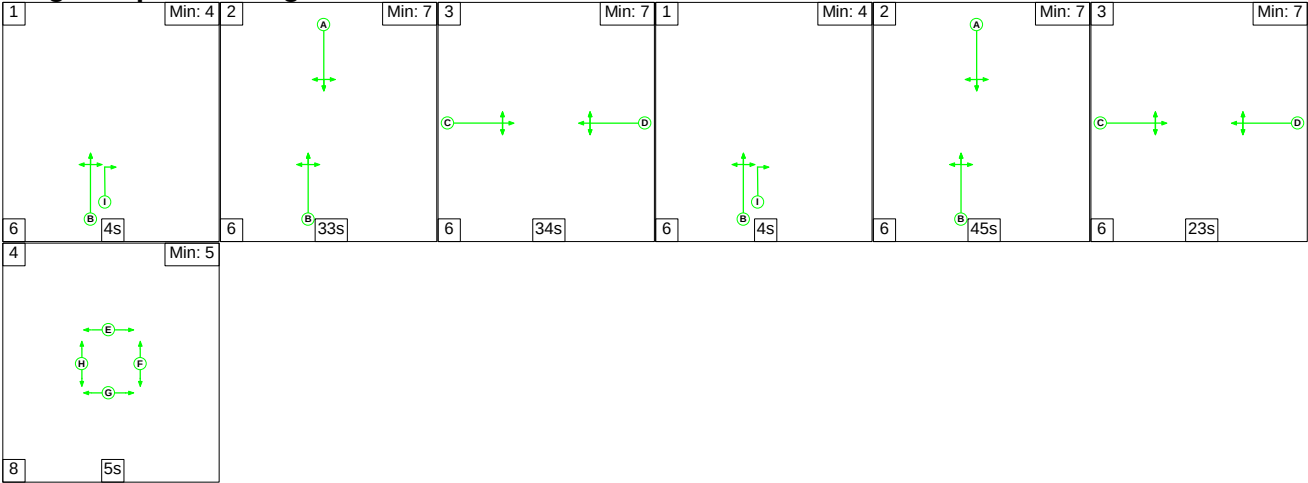
Lane	Scenario 6: Do-Sth (Detail+Out+Com) 2037 PM
Junction: Lord Street/ Cheetham Hill Road	
1/1	357
1/2	410
2/1	364
3/1	991
3/2	548
4/1	162
5/1	396
6/1	448
6/2	525
7/1	128
8/1	1013
8/2	322

Lane Saturation Flows

Junction: Lord Street/ Cheetham Hill Road								
Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (Cheetham Hill Road (North))	3.00	0.00	Y	Arm 5 Left	5.00	9.2 %	1863	1863
				Arm 6 Ahead	Inf	90.8 %		
1/2 (Cheetham Hill Road (North))	3.00	0.00	N	Arm 6 Ahead	Inf	97.6 %	2049	2049
				Arm 7 Right	12.00	2.4 %		
2/1 (Lord Street (East))	3.50	0.00	Y	Arm 6 Left	5.00	59.6 %	1647	1647
				Arm 7 Ahead	Inf	28.8 %		
				Arm 8 Right	12.00	11.5 %		
3/1 (Cheetham Hill Road (South))	3.00	0.00	Y	Arm 7 Left	5.00	1.3 %	1907	1907
				Arm 8 Ahead	Inf	98.7 %		
3/2 (Cheetham Hill Road (South))	3.00	0.00	N	Arm 5 Right	Inf	47.6 %	1929	1929
				Arm 8 Ahead	12.00	52.4 %		
4/1 (Lord Street (West))	3.25	0.00	Y	Arm 5 Ahead	Inf	63.0 %	1802	1802
				Arm 6 Right	12.00	19.8 %		
				Arm 8 Left	5.00	17.3 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
6/2	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf
8/2	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

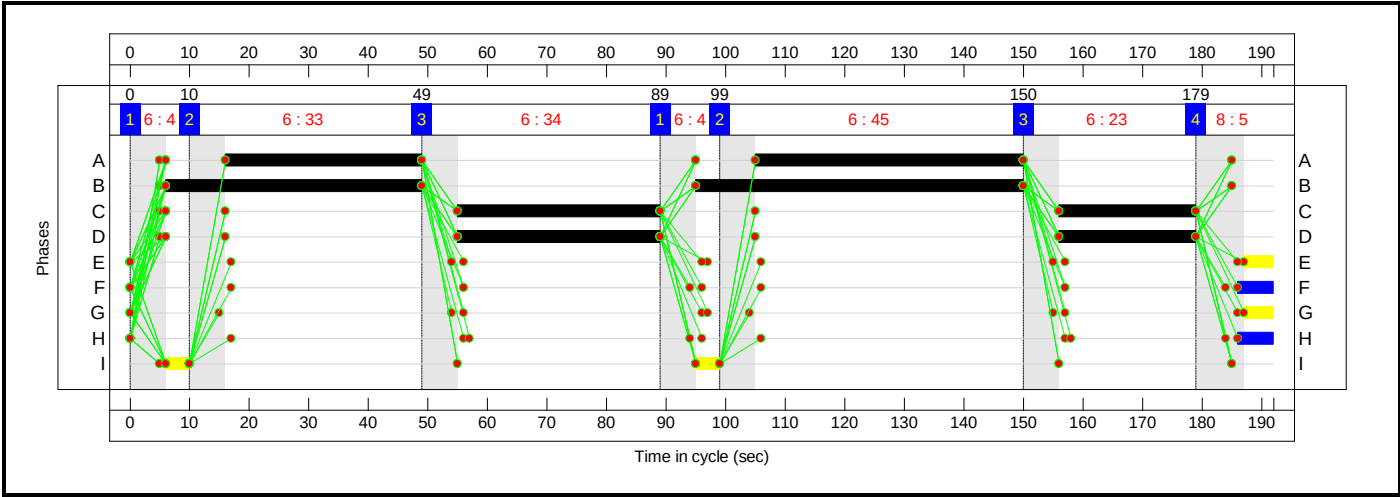
Scenario 1: 'Do-Sth (Detailed+Com) 2034 AM' (FG1: 'Do-Sth (Detailed+Com) 2034 AM', Plan 1: 'AM SSGM')
Stage Sequence Diagram



Stage Timings

Stage	1	2	3	1	2	3	4
Duration	4	33	34	4	45	23	5
Change Point	0	10	49	89	99	150	179

Signal Timings Diagram

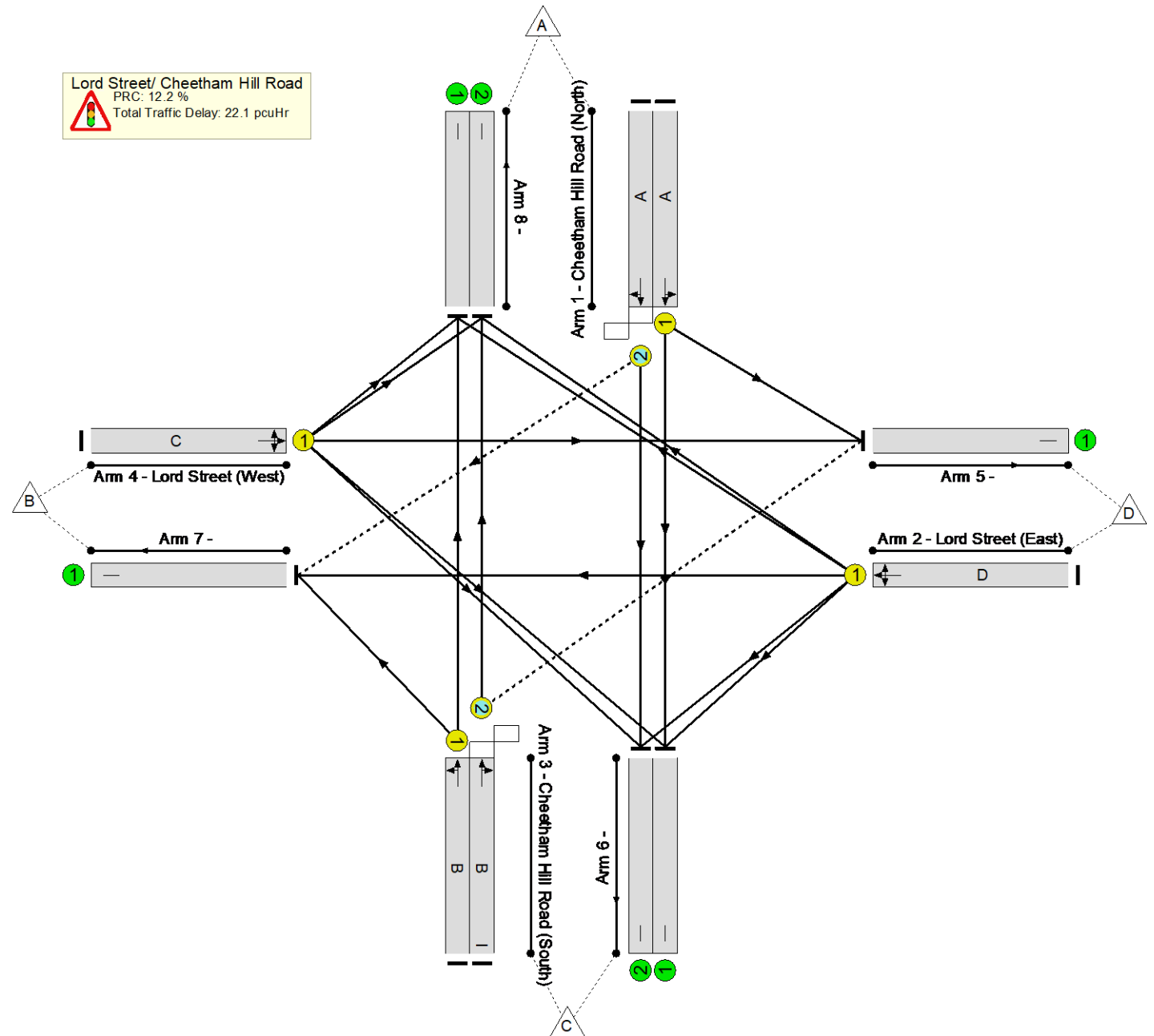


Full Input Data And Results

Network Layout Diagram

Full Input Data And Results

The site operates under SCOOT Control. The green times are variable throughout the day depending on traffic conditions on site. The SCOOT maximum cycle time for this region is 96 seconds and the site will run up to this cycle time during the peak periods.



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	80.2%
Lord Street/ Cheetham Hill Road	-	-	N/A	-	-		-	-	-	-	-	-	80.2%
1/1	Cheetham Hill Road (North) Left Ahead	U	N/A	N/A	A		2	78	-	620	1884	785	79.0%
1/2	Cheetham Hill Road (North) Ahead Right	O	N/A	N/A	A		2	78	-	686	2053	855	80.2%
2/1	Lord Street (East) Left Ahead Right	U	N/A	N/A	D		2	57	-	398	1616	497	80.1%
3/1	Cheetham Hill Road (South) Left Ahead	U	N/A	N/A	B		2	98	-	500	1909	994	50.3%
3/2	Cheetham Hill Road (South) Right Ahead	O	N/A	N/A	B	I	2	98	8	106	2055	248	42.8%
4/1	Lord Street (West) Ahead Right Left	U	N/A	N/A	C		2	57	-	64	1878	577	11.1%
5/1		U	N/A	N/A	-		-	-	-	187	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	733	Inf	Inf	0.0%
6/2		U	N/A	N/A	-		-	-	-	829	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	110	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	505	Inf	Inf	0.0%
8/2		U	N/A	N/A	-		-	-	-	10	Inf	Inf	0.0%

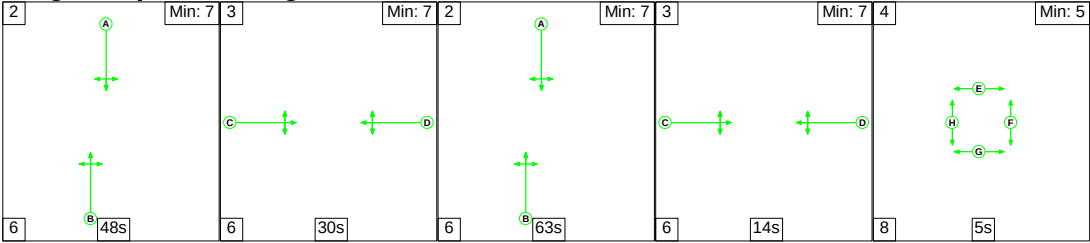
Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	-	-	7	60	44	15.1	6.7	0.3	22.1	-	-	-	-
Lord Street/ Cheetham Hill Road	-	-	7	60	44	15.1	6.7	0.3	22.1	-	-	-	-
1/1	620	620	-	-	-	4.2	1.8	-	6.0	35.0	14.5	1.8	16.3
1/2	686	686	5	0	0	4.7	2.0	0.0	6.7	35.0	16.2	2.0	18.2
2/1	398	398	-	-	-	3.4	1.9	-	5.3	48.1	9.7	1.9	11.7
3/1	500	500	-	-	-	2.1	0.5	-	2.6	18.6	8.8	0.5	9.3
3/2	106	106	2	60	44	0.3	0.4	0.3	1.0	34.0	1.4	0.4	1.8
4/1	64	64	-	-	-	0.4	0.1	-	0.5	27.4	1.2	0.1	1.3
5/1	187	187	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	733	733	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	829	829	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	110	110	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	505	505	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/2	10	10	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
C1 PRC for Signalised Lanes (%): 12.2 Total Delay for Signalised Lanes (pcuHr): 22.09 Cycle Time (s): 192 PRC Over All Lanes (%): 12.2 Total Delay Over All Lanes(pcuHr): 22.09													

Full Input Data And Results

Scenario 2: 'Do-Sth (Detailed+Com) 2034 PM' (FG2: 'Do-Sth (Detailed+Com) 2034 PM', Plan 2: 'PM SSGM')

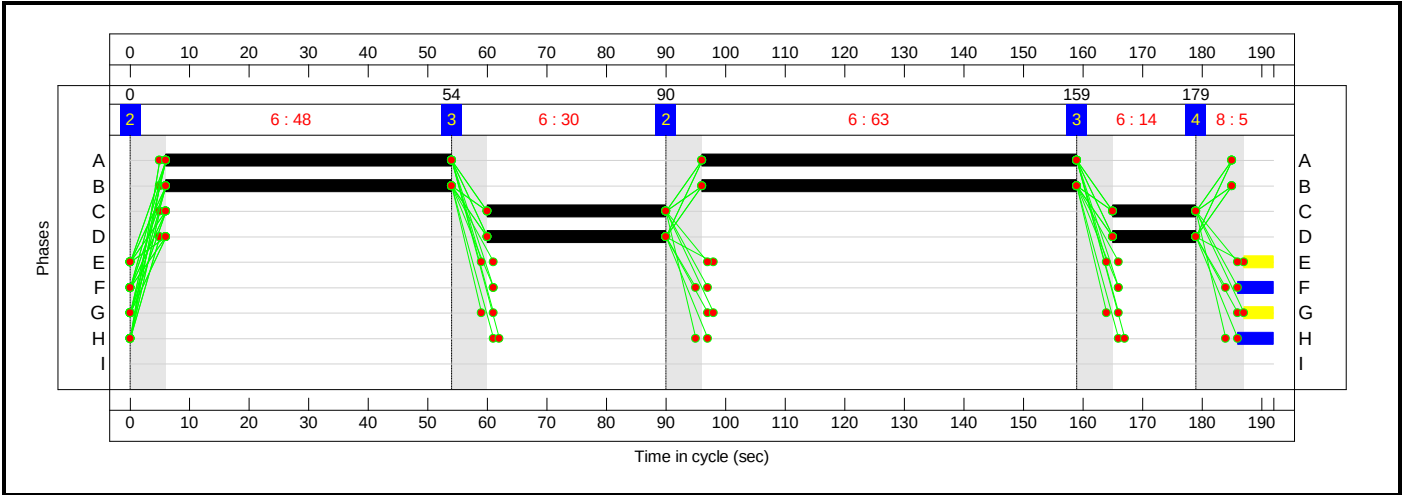
Stage Sequence Diagram



Stage Timings

Stage	2	3	2	3	4
Duration	48	30	63	14	5
Change Point	0	54	90	159	179

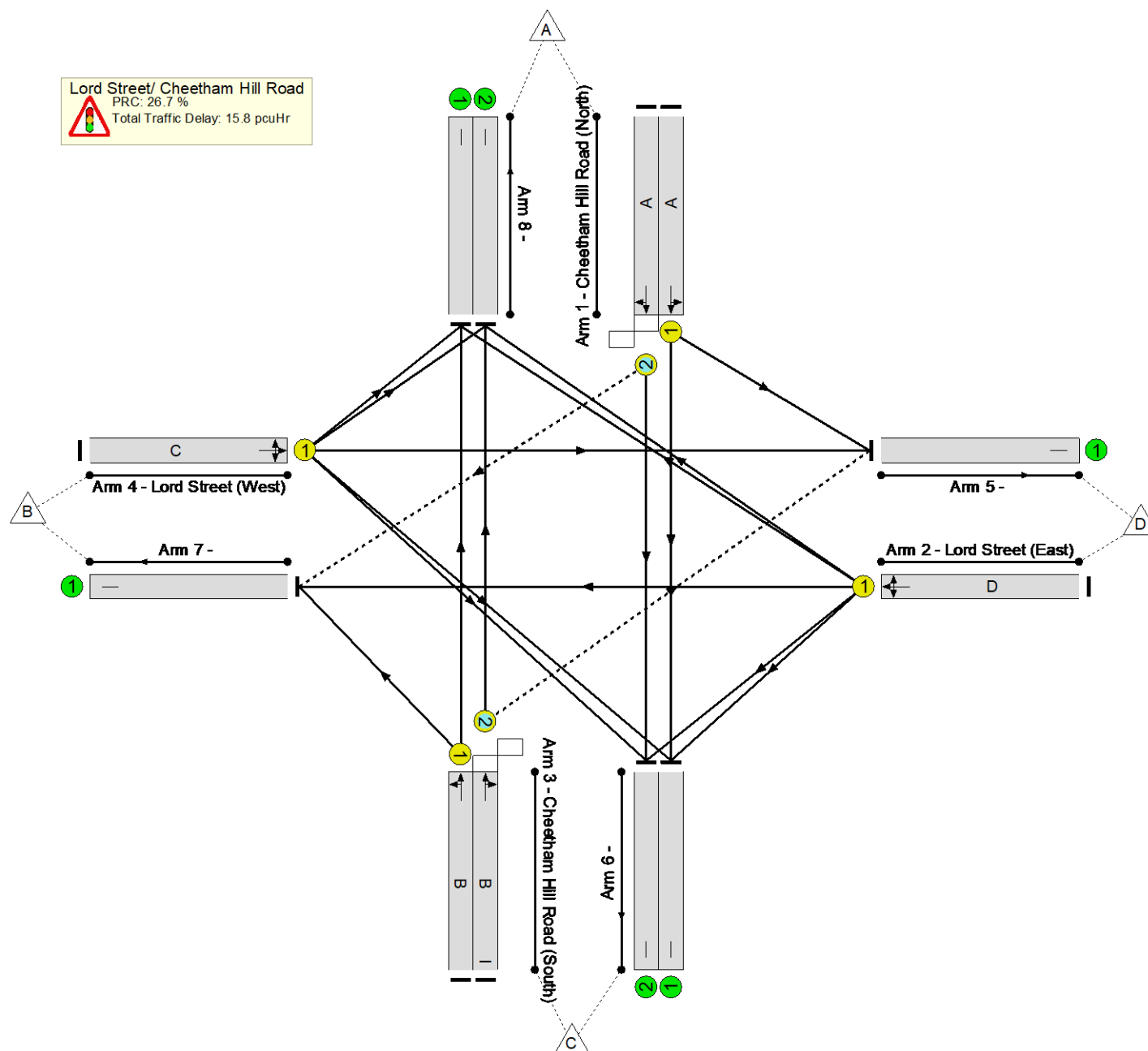
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

The site operates under SCOOT Control. The green times are variable throughout the day depending on traffic conditions on site. The SCOOT maximum cycle time for this region is 96 seconds and the site will run up to this cycle time during the peak periods.



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	71.0%
Lord Street/ Cheetham Hill Road	-	-	N/A	-	-		-	-	-	-	-	-	71.0%
1/1	Cheetham Hill Road (North) Left Ahead	U	N/A	N/A	A		2	111	-	348	1862	1096	31.8%
1/2	Cheetham Hill Road (North) Ahead Right	O	N/A	N/A	A		2	111	-	402	2049	1188	33.8%
2/1	Lord Street (East) Left Ahead Right	U	N/A	N/A	D		2	44	-	282	1685	404	69.9%
3/1	Cheetham Hill Road (South) Left Ahead	U	N/A	N/A	B		2	111	-	797	1906	1122	71.0%
3/2	Cheetham Hill Road (South) Right Ahead	O	N/A	N/A	B	I	2	111	0	618	1883	982	62.9%
4/1	Lord Street (West) Ahead Right Left	U	N/A	N/A	C		2	44	-	158	1800	431	36.6%
5/1		U	N/A	N/A	-		-	-	-	297	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	399	Inf	Inf	0.0%
6/2		U	N/A	N/A	-		-	-	-	479	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	124	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	818	Inf	Inf	0.0%
8/2		U	N/A	N/A	-		-	-	-	488	Inf	Inf	0.0%

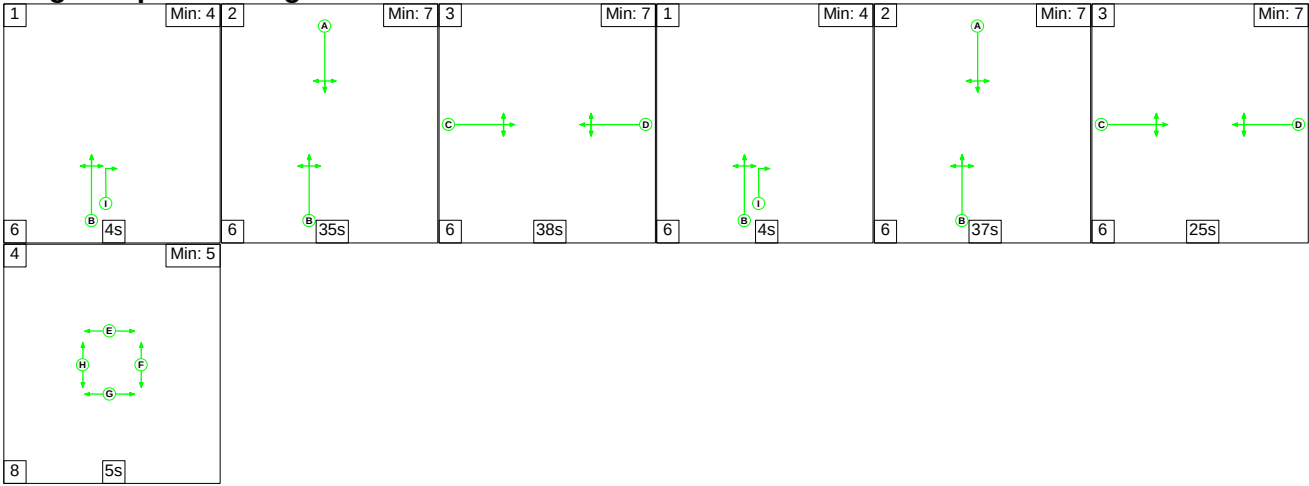
Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	-	-	172	0	2	11.6	4.0	0.2	15.8	-	-	-	-
Lord Street/ Cheetham Hill Road	-	-	172	0	2	11.6	4.0	0.2	15.8	-	-	-	-
1/1	348	348	-	-	-	1.0	0.2	-	1.2	12.4	4.8	0.2	5.1
1/2	402	402	9	0	0	1.1	0.3	0.0	1.4	12.8	5.7	0.3	6.0
2/1	282	282	-	-	-	2.6	1.1	-	3.7	47.9	6.9	1.1	8.0
3/1	797	797	-	-	-	3.1	1.2	-	4.3	19.5	15.5	1.2	16.7
3/2	618	618	163	0	2	2.5	0.8	0.2	3.5	20.5	12.2	0.8	13.0
4/1	158	158	-	-	-	1.3	0.3	-	1.6	37.0	3.6	0.3	3.8
5/1	297	297	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	399	399	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	479	479	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	124	124	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	818	818	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/2	488	488	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
C1 PRC for Signalled Lanes (%): 26.7 Total Delay for Signalled Lanes (pcuHr): 15.85 Cycle Time (s): 192 PRC Over All Lanes (%): 26.7 Total Delay Over All Lanes(pcuHr): 15.85													

Full Input Data And Results

Scenario 3: 'Do-Sth (Outline+Com) 2037 AM' (FG3: 'Do-Sth (Outline+Com) 2037 AM', Plan 1: 'AM SSGM')

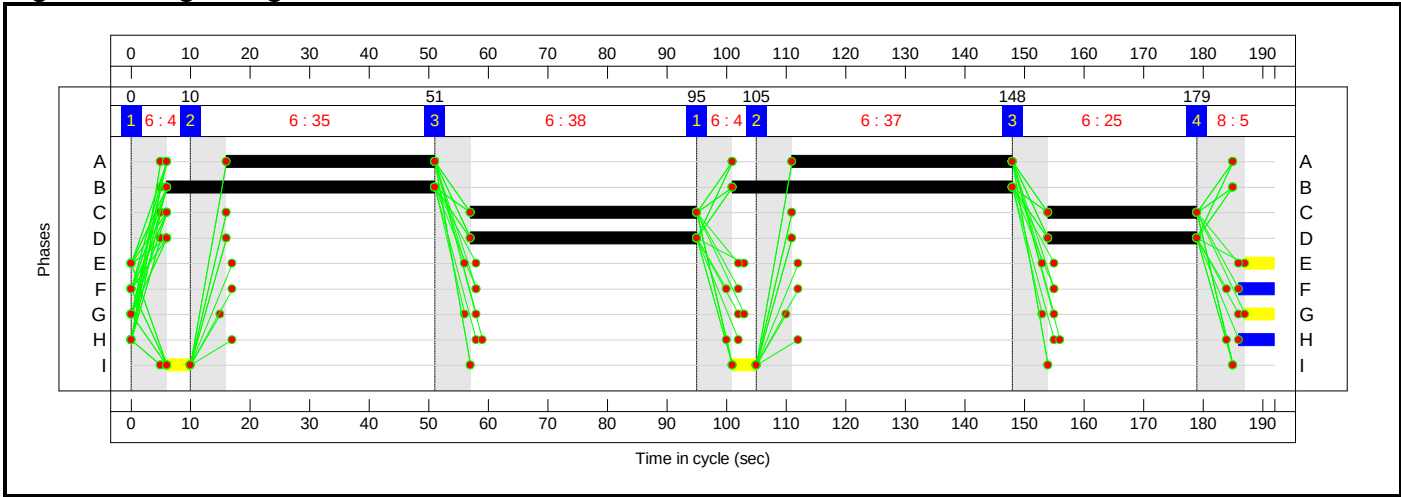
Stage Sequence Diagram



Stage Timings

Stage	1	2	3	1	2	3	4
Duration	4	35	38	4	37	25	5
Change Point	0	10	51	95	105	148	179

Signal Timings Diagram

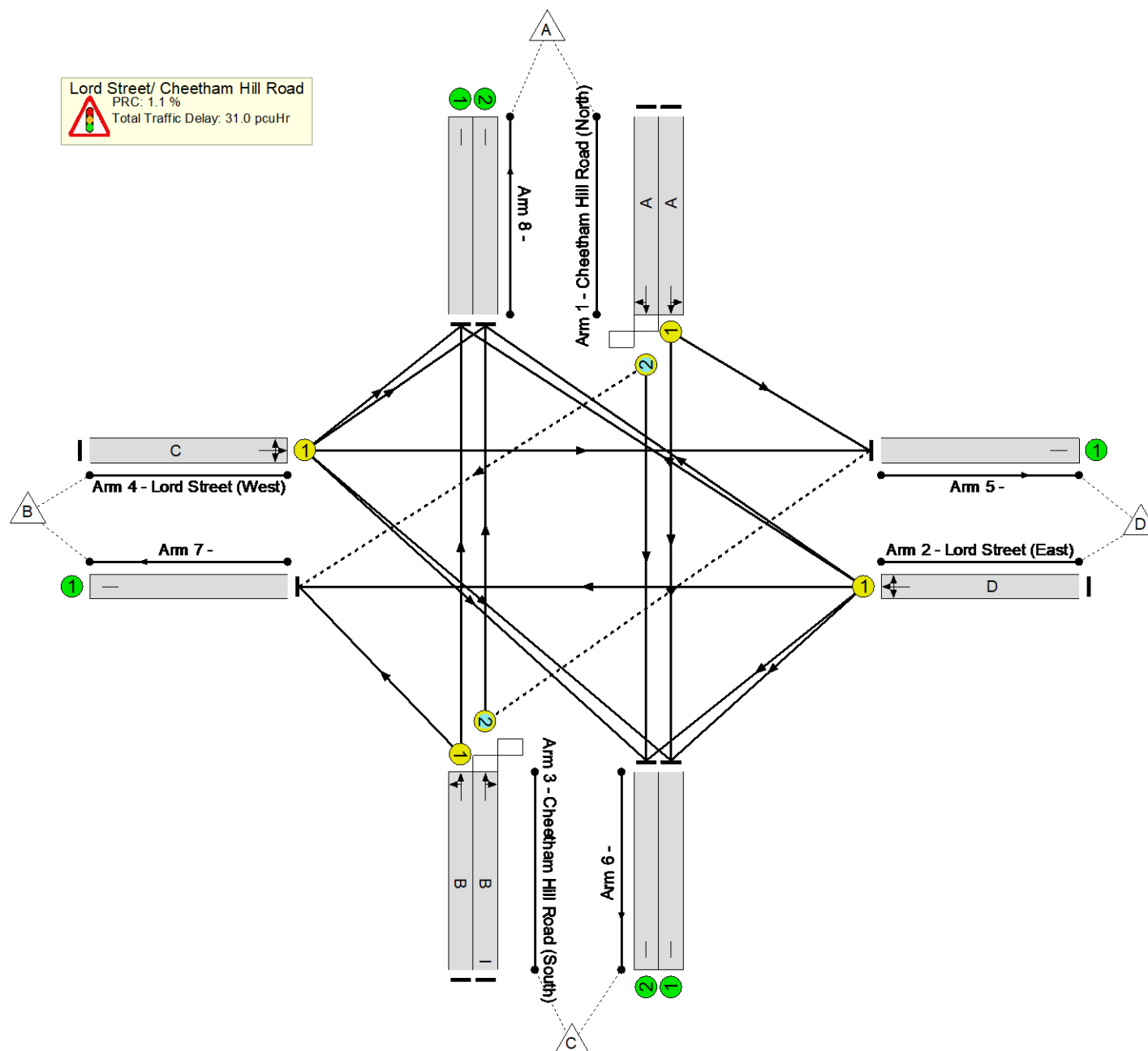


Full Input Data And Results

Network Layout Diagram

Full Input Data And Results

The site operates under SCOOT Control. The green times are variable throughout the day depending on traffic conditions on site. The SCOOT maximum cycle time for this region is 96 seconds and the site will run up to this cycle time during the peak periods.



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	89.0%
Lord Street/ Cheetham Hill Road	-	-	N/A	-	-		-	-	-	-	-	-	89.0%
1/1	Cheetham Hill Road (North) Left Ahead	U	N/A	N/A	A		2	72	-	637	1884	726	87.7%
1/2	Cheetham Hill Road (North) Ahead Right	O	N/A	N/A	A		2	72	-	701	2053	791	88.6%
2/1	Lord Street (East) Left Ahead Right	U	N/A	N/A	D		2	63	-	482	1599	541	89.0%
3/1	Cheetham Hill Road (South) Left Ahead	U	N/A	N/A	B		2	92	-	512	1909	935	54.8%
3/2	Cheetham Hill Road (South) Right Ahead	O	N/A	N/A	B	I	2	92	8	188	2055	246	76.3%
4/1	Lord Street (West) Ahead Right Left	U	N/A	N/A	C		2	63	-	65	1879	636	10.2%
5/1		U	N/A	N/A	-		-	-	-	271	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	790	Inf	Inf	0.0%
6/2		U	N/A	N/A	-		-	-	-	885	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	112	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	517	Inf	Inf	0.0%
8/2		U	N/A	N/A	-		-	-	-	10	Inf	Inf	0.0%

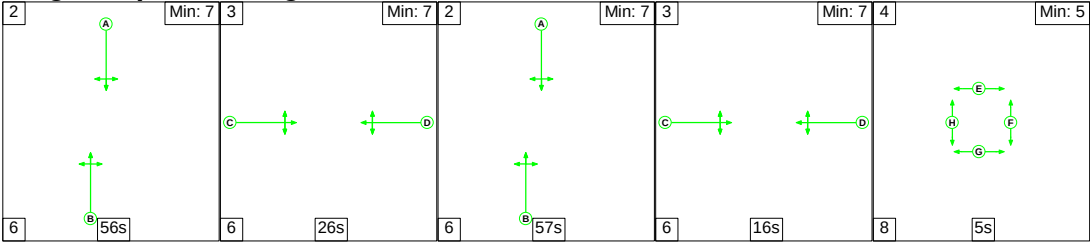
Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	-	-	5	113	75	17.8	12.7	0.5	31.0	-	-	-	-
Lord Street/ Cheetham Hill Road	-	-	5	113	75	17.8	12.7	0.5	31.0	-	-	-	-
1/1	637	637	-	-	-	4.8	3.3	-	8.2	46.2	15.7	3.3	19.1
1/2	701	701	5	0	0	5.4	3.6	0.0	9.0	46.1	17.3	3.6	20.9
2/1	482	482	-	-	-	4.1	3.6	-	7.7	57.3	13.1	3.6	16.7
3/1	512	512	-	-	-	2.4	0.6	-	3.0	21.3	9.4	0.6	10.0
3/2	188	188	0	113	75	0.7	1.5	0.5	2.7	52.2	2.9	1.5	4.4
4/1	65	65	-	-	-	0.4	0.1	-	0.5	25.1	1.3	0.1	1.3
5/1	271	271	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	790	790	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	885	885	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	112	112	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	517	517	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/2	10	10	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
C1 PRC for Signalised Lanes (%): 1.1 Total Delay for Signalised Lanes (pcuHr): 31.04 Cycle Time (s): 192 PRC Over All Lanes (%): 1.1 Total Delay Over All Lanes(pcuHr): 31.04													

Full Input Data And Results

Scenario 4: 'Do-Sth (Outline+Com) 2037 PM' (FG4: 'Do-Sth (Outline+Com) 2037 PM', Plan 2: 'PM SSGM')

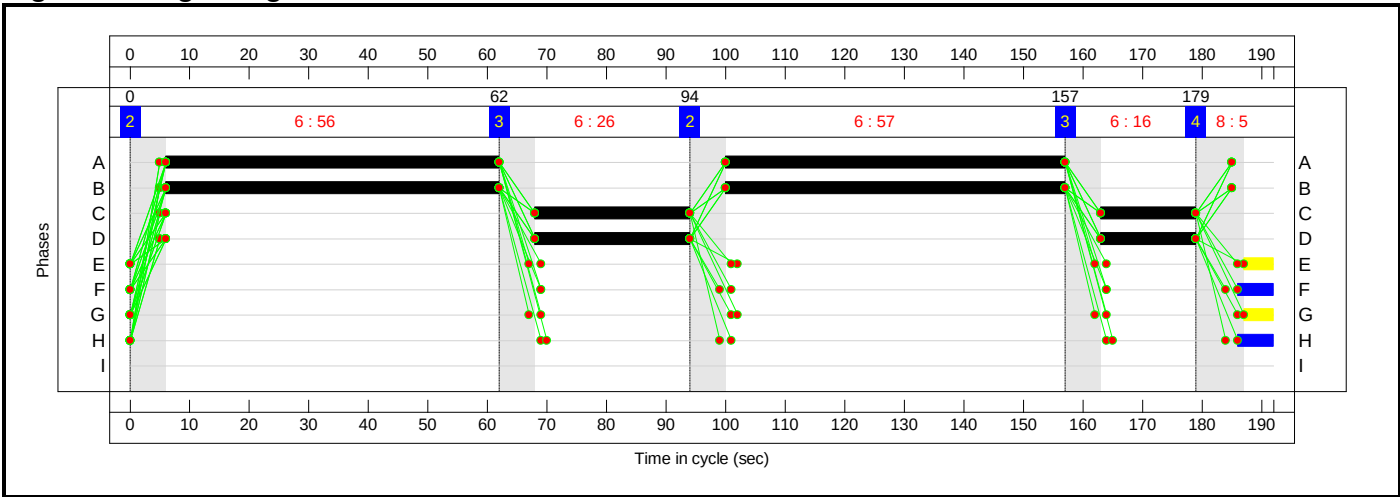
Stage Sequence Diagram



Stage Timings

Stage	2	3	2	3	4
Duration	56	26	57	16	5
Change Point	0	62	94	157	179

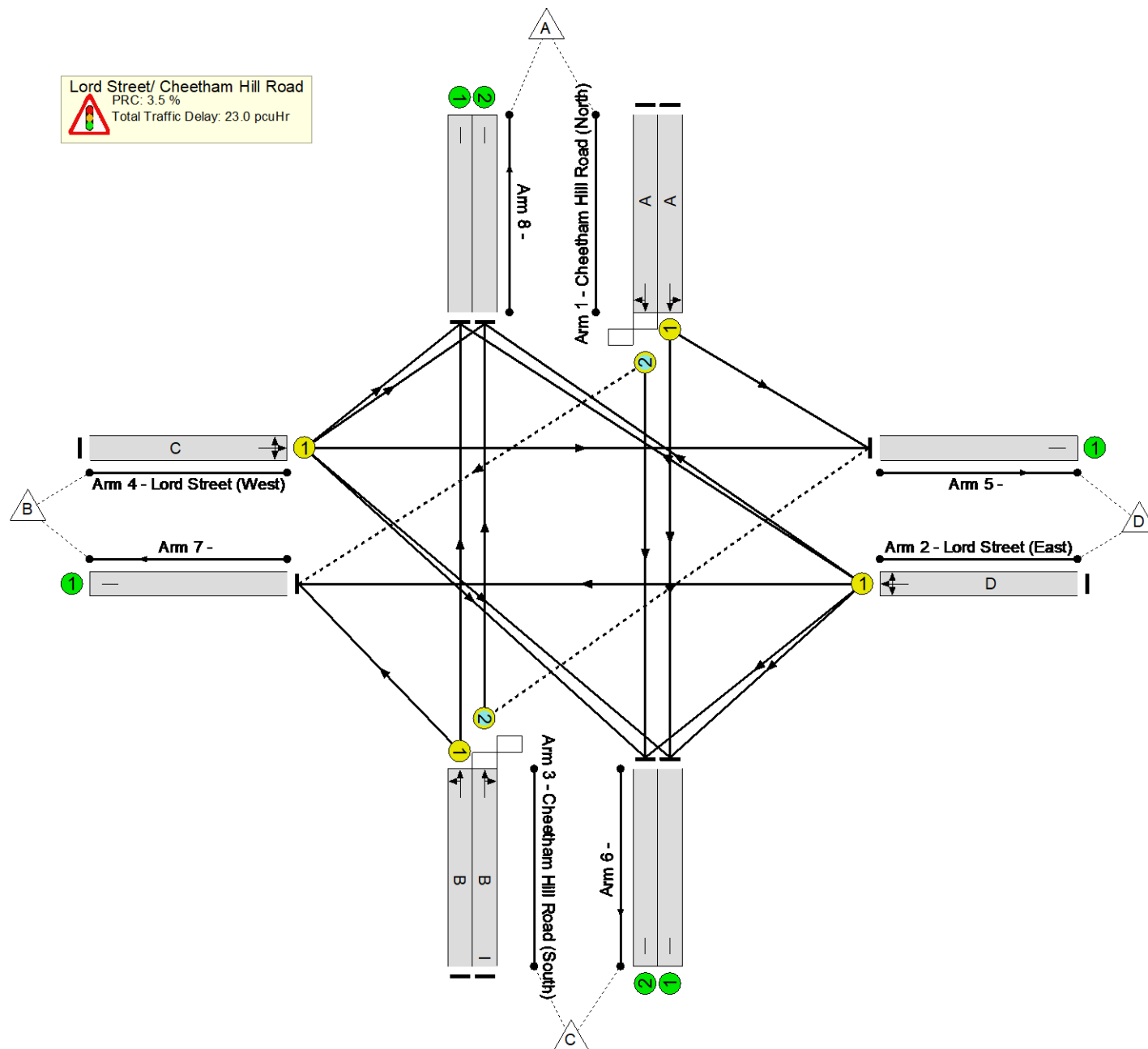
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

The site operates under SCOOT Control. The green times are variable throughout the day depending on traffic conditions on site. The SCOOT maximum cycle time for this region is 96 seconds and the site will run up to this cycle time during the peak periods.



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	87.0%
Lord Street/ Cheetham Hill Road	-	-	N/A	-	-		-	-	-	-	-	-	87.0%
1/1	Cheetham Hill Road (North) Left Ahead	U	N/A	N/A	A		2	113	-	358	1863	1116	32.1%
1/2	Cheetham Hill Road (North) Ahead Right	O	N/A	N/A	A		2	113	-	409	2049	1202	34.0%
2/1	Lord Street (East) Left Ahead Right	U	N/A	N/A	D		2	42	-	330	1662	381	86.6%
3/1	Cheetham Hill Road (South) Left Ahead	U	N/A	N/A	B		2	113	-	994	1908	1143	87.0%
3/2	Cheetham Hill Road (South) Right Ahead	O	N/A	N/A	B	I	2	113	0	545	1929	690	78.9%
4/1	Lord Street (West) Ahead Right Left	U	N/A	N/A	C		2	42	-	162	1802	413	39.2%
5/1		U	N/A	N/A	-		-	-	-	396	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	432	Inf	Inf	0.0%
6/2		U	N/A	N/A	-		-	-	-	507	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	128	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	1016	Inf	Inf	0.0%
8/2		U	N/A	N/A	-		-	-	-	319	Inf	Inf	0.0%

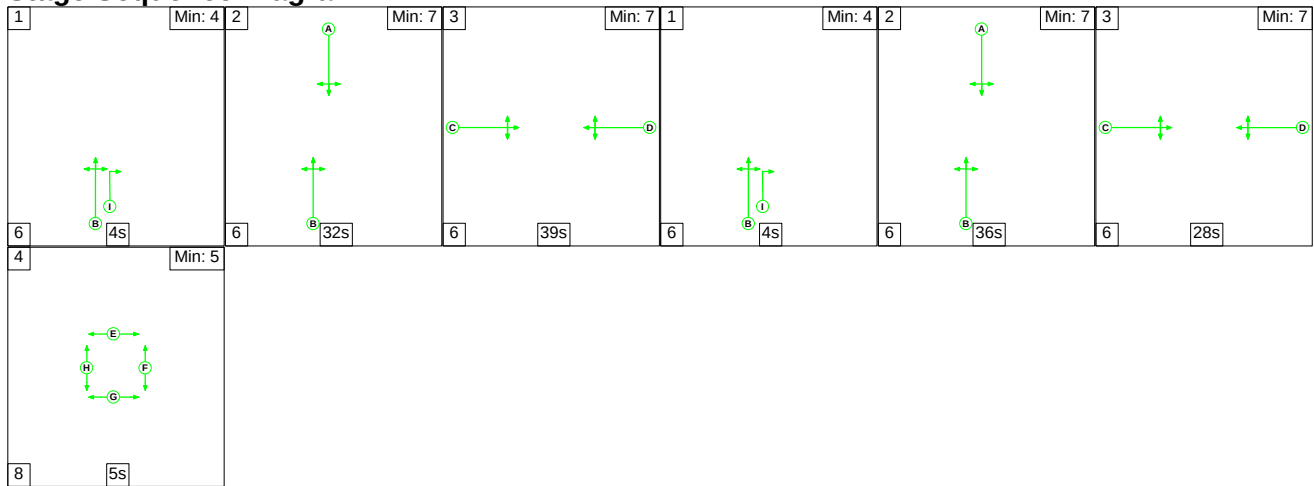
Full Input Data And Results

[illegible]

Full Input Data And Results

Scenario 5: 'Do-Sth (Detail+Out+Com) 2037 AM' (FG5: 'Do-Sth (Detail+Out+Com) 2037 AM', Plan 1: 'AM SSGM')

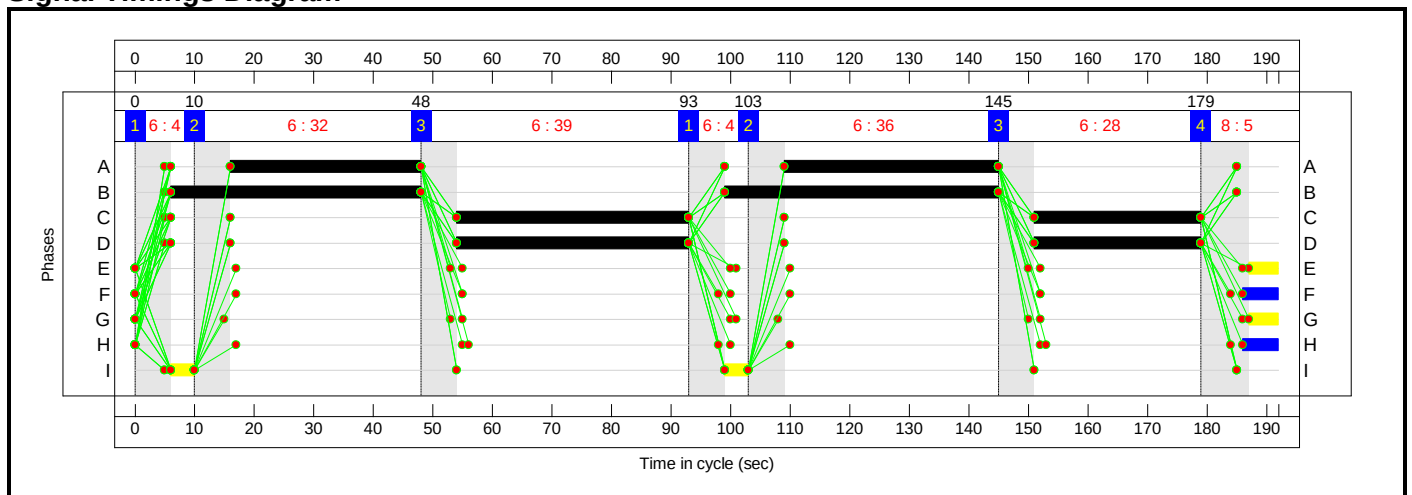
Stage Sequence Diagram



Stage Timings

Stage	1	2	3	1	2	3	4
Duration	4	32	39	4	36	28	5
Change Point	0	10	48	93	103	145	179

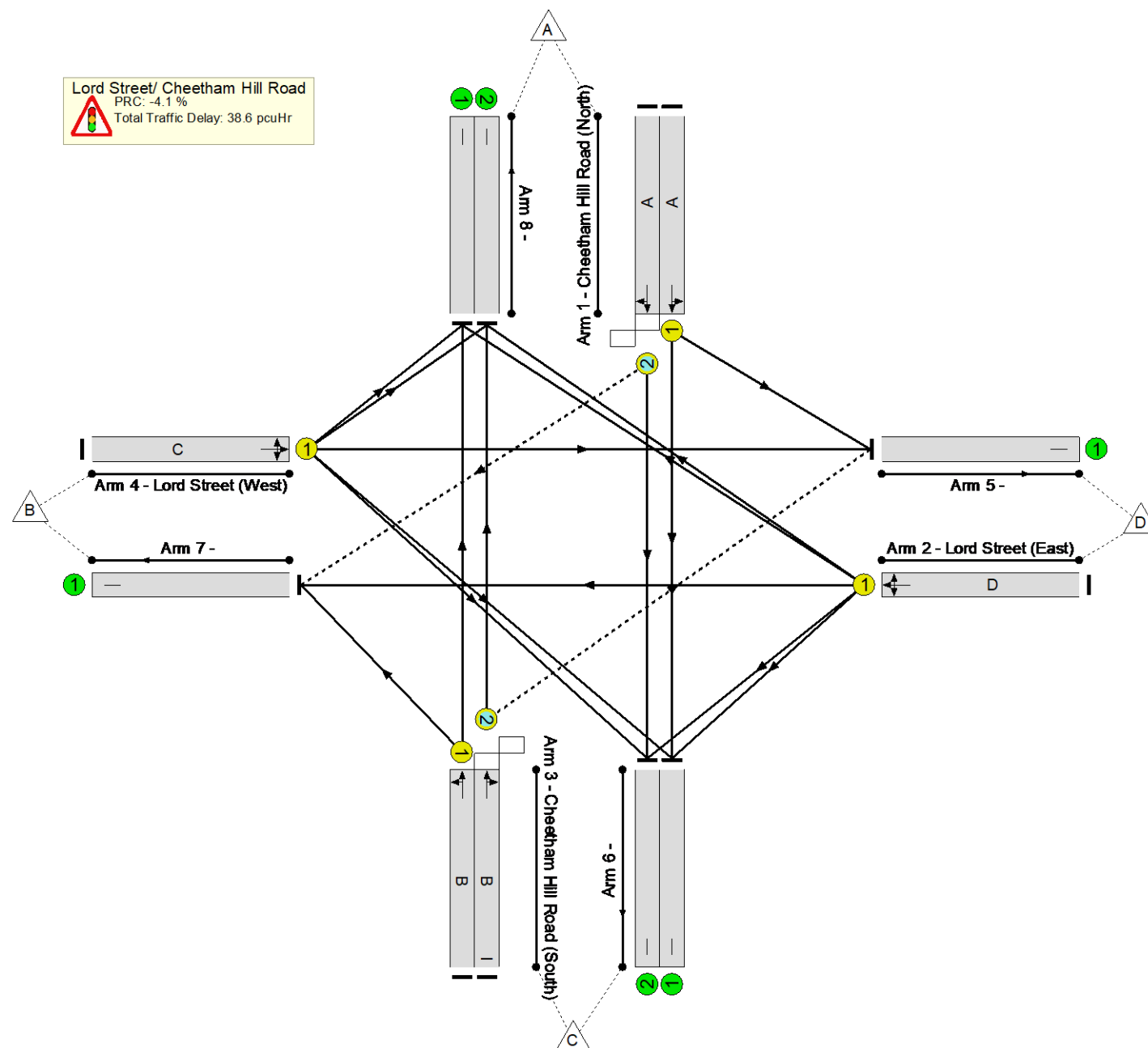
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

The site operates under SCOOT Control. The green times are variable throughout the day depending on traffic conditions on site. The SCOOT maximum cycle time for this region is 96 seconds and the site will run up to this cycle time during the peak periods.



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	93.7%
Lord Street/ Cheetham Hill Road	-	-	N/A	-	-		-	-	-	-	-	-	93.7%
1/1	Cheetham Hill Road (North) Left Ahead	U	N/A	N/A	A		2	68	-	638	1884	687	92.9%
1/2	Cheetham Hill Road (North) Ahead Right	O	N/A	N/A	A		2	68	-	700	2053	748	93.5%
2/1	Lord Street (East) Left Ahead Right	U	N/A	N/A	D		2	67	-	535	1589	571	93.7%
3/1	Cheetham Hill Road (South) Left Ahead	U	N/A	N/A	B		2	88	-	512	1909	895	57.2%
3/2	Cheetham Hill Road (South) Right Ahead	O	N/A	N/A	B	I	2	88	8	188	2055	246	76.3%
4/1	Lord Street (West) Ahead Right Left	U	N/A	N/A	C		2	67	-	65	1879	675	9.6%
5/1		U	N/A	N/A	-		-	-	-	271	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	817	Inf	Inf	0.0%
6/2		U	N/A	N/A	-		-	-	-	911	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	112	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	517	Inf	Inf	0.0%
8/2		U	N/A	N/A	-		-	-	-	10	Inf	Inf	0.0%

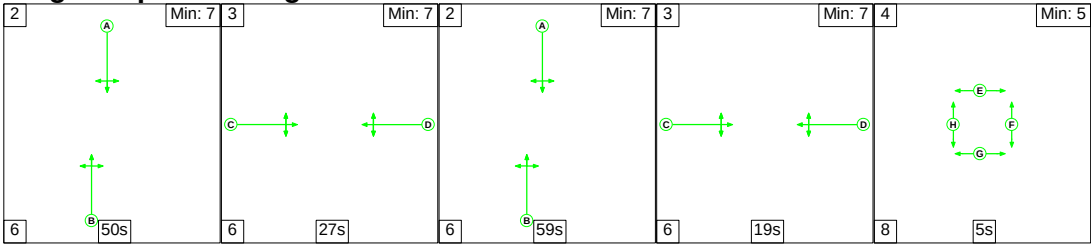
Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	-	-	5	116	72	19.2	19.1	0.4	38.6	-	-	-	-
Lord Street/ Cheetham Hill Road	-	-	5	116	72	19.2	19.1	0.4	38.6	-	-	-	-
1/1	638	638	-	-	-	5.2	5.4	-	10.5	59.5	16.5	5.4	21.8
1/2	700	700	5	0	0	5.7	5.8	0.0	11.5	59.4	18.3	5.8	24.1
2/1	535	535	-	-	-	4.4	5.6	-	10.1	67.9	14.7	5.6	20.4
3/1	512	512	-	-	-	2.6	0.7	-	3.3	23.2	10.1	0.7	10.8
3/2	188	188	0	116	72	0.8	1.5	0.4	2.7	52.3	3.0	1.5	4.5
4/1	65	65	-	-	-	0.4	0.1	-	0.4	23.5	1.2	0.1	1.3
5/1	271	271	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	817	817	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	911	911	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	112	112	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	517	517	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/2	10	10	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
C1 PRC for Signalled Lanes (%): -4.1 Total Delay for Signalled Lanes (pcuHr): 38.64 Cycle Time (s): 192 PRC Over All Lanes (%): -4.1 Total Delay Over All Lanes(pcuHr): 38.64													

Full Input Data And Results

Scenario 6: 'Do-Sth (Detail+Out+Com) 2037 PM' (FG6: 'Do-Sth (Detail+Out+Com) 2037 PM', Plan 2: 'PM SSGM')

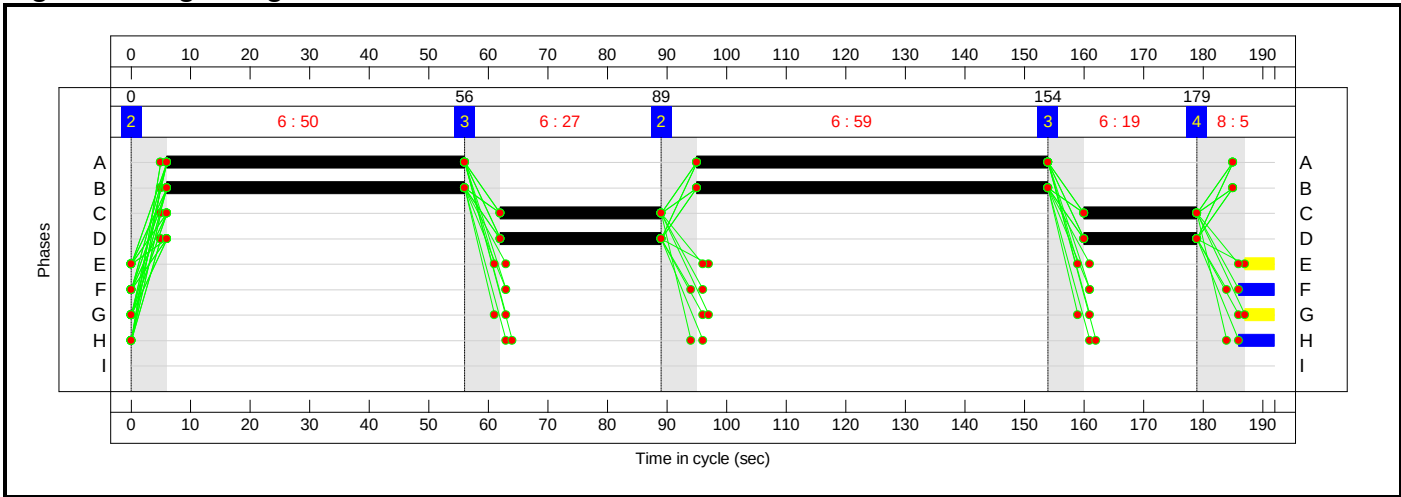
Stage Sequence Diagram



Stage Timings

Stage	2	3	2	3	4
Duration	50	27	59	19	5
Change Point	0	56	89	154	179

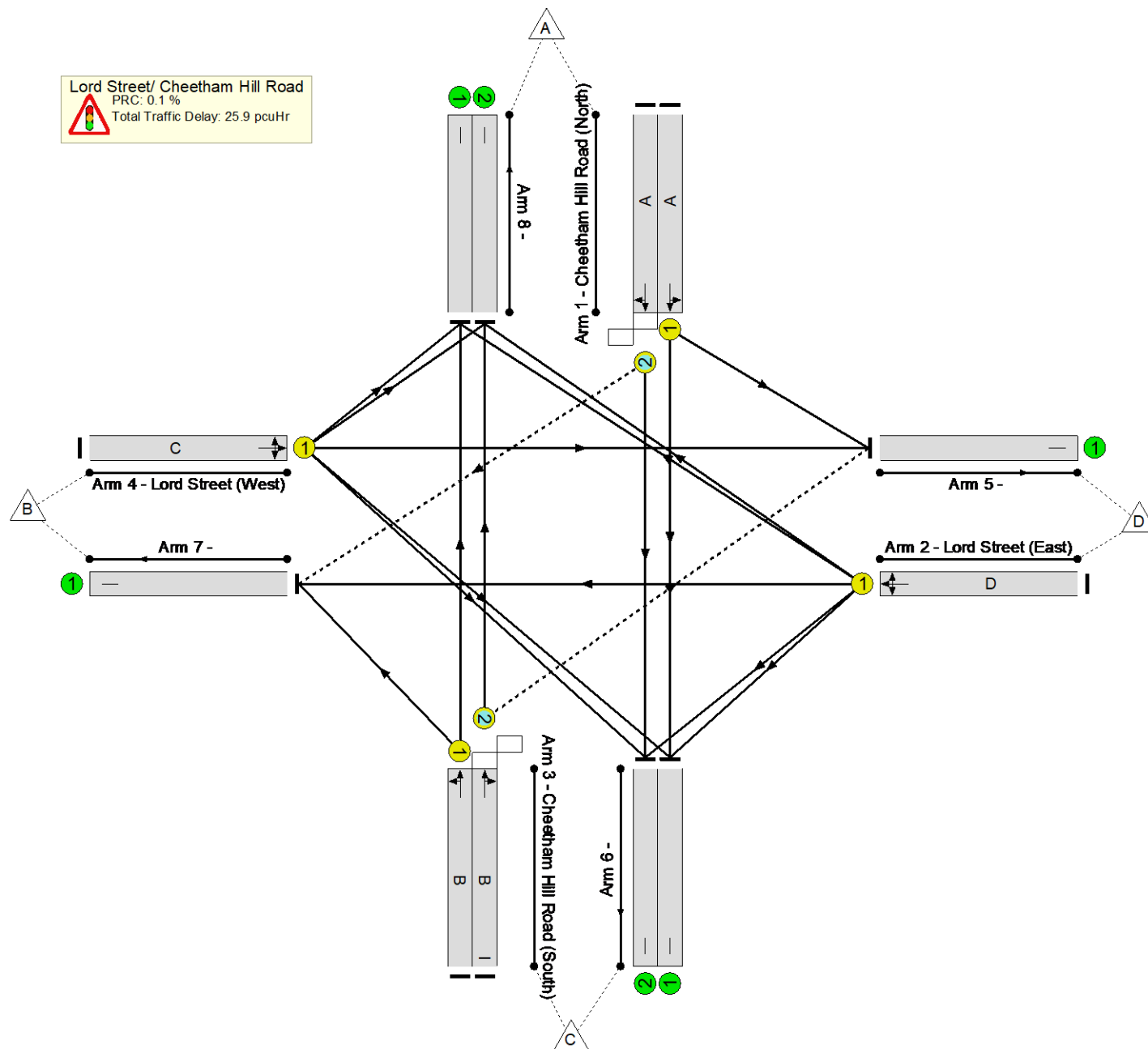
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

The site operates under SCOOT Control. The green times are variable throughout the day depending on traffic conditions on site. The SCOOT maximum cycle time for this region is 96 seconds and the site will run up to this cycle time during the peak periods.



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	89.9%
Lord Street/ Cheetham Hill Road	-	-	N/A	-	-		-	-	-	-	-	-	89.9%
1/1	Cheetham Hill Road (North) Left Ahead	U	N/A	N/A	A		2	109	-	357	1863	1077	33.1%
1/2	Cheetham Hill Road (North) Ahead Right	O	N/A	N/A	A		2	109	-	410	2049	1164	35.2%
2/1	Lord Street (East) Left Ahead Right	U	N/A	N/A	D		2	46	-	364	1647	412	88.4%
3/1	Cheetham Hill Road (South) Left Ahead	U	N/A	N/A	B		2	109	-	991	1907	1102	89.9%
3/2	Cheetham Hill Road (South) Right Ahead	O	N/A	N/A	B	I	2	109	0	548	1929	666	82.3%
4/1	Lord Street (West) Ahead Right Left	U	N/A	N/A	C		2	46	-	162	1802	451	36.0%
5/1		U	N/A	N/A	-		-	-	-	396	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	448	Inf	Inf	0.0%
6/2		U	N/A	N/A	-		-	-	-	525	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	128	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	1013	Inf	Inf	0.0%
8/2		U	N/A	N/A	-		-	-	-	322	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	-	-	258	0	13	14.8	10.5	0.6	25.9	-	-	-	-
Lord Street/ Cheetham Hill Road	-	-	258	0	13	14.8	10.5	0.6	25.9	-	-	-	-
1/1	357	357	-	-	-	1.1	0.2	-	1.3	13.1	5.3	0.2	5.5
1/2	410	410	5	0	5	1.2	0.3	0.1	1.6	13.9	6.0	0.3	6.3
2/1	364	364	-	-	-	3.5	3.3	-	6.9	67.8	9.5	3.3	12.8
3/1	991	991	-	-	-	4.9	4.1	-	9.1	32.9	24.5	4.1	28.6
3/2	548	548	253	0	8	2.8	2.2	0.5	5.5	36.1	13.1	2.2	15.3
4/1	162	162	-	-	-	1.3	0.3	-	1.6	35.9	3.6	0.3	3.9
5/1	396	396	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	448	448	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	525	525	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	128	128	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	1013	1013	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/2	322	322	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
C1 PRC for Signalled Lanes (%): 0.1 Total Delay for Signalled Lanes (pcuHr): 25.91 Cycle Time (s): 192 PRC Over All Lanes (%): 0.1 Total Delay Over All Lanes(pcuHr): 25.91													

Appendix III

Air Quality and Dust Technical Note

136814/FO/2023 - Red Bank, Manchester

DATE:	11 July 2023	CONFIDENTIALITY:	Public
SUBJECT:	Response to Consultee Comments – Environmental Health		
PROJECT:	Red Bank	AUTHOR:	F.C-Carson
CHECKED:	S.Bennett	APPROVED:	S.Bennett

This note has been prepared to provide a response to comments received from Manchester City Council's Environmental Health Officers on Chapter 12 Air Quality of the Environmental Statement submitted in support of the planning application for Red Bank, Manchester (Reference: 136814/FC/2023).

- Para 12.99 and Table 12.6 of the report suggests that there will be an exceedance of the NO₂ criteria at 34 of the receptor locations and suggest that there is a possibility that the 1 hour mean objective for NO₂ will be exceeded. It is assumed these are at the southern side of the application site within the AQMA? These locations should be identified in the report in para 12.99.**

Response: These exceedances are only predicted in the 2019 baseline scenario. Due to the number of receptors they were not explicitly reported within the main chapter text (other than the summary presented in Table 12.6) however the location of the receptors with concentrations close to or in exceedance of the objective are illustrated on Figure 12.15, submitted as part of the Environmental Statement. Figure 12.15 shows that all exceedances are predicted outside of the Site boundary (Applications 4 and 5), at locations south of the Site (Applications 4 and 5) and near to the main ring road / arterial roads. All predicted exceedances are within the existing Air Quality Management Area. No exceedances of the NO₂ objectives were predicted within the immediate vicinity of the Site (Applications 4 and 5) itself.

- Are these exceedances due to the current pollution concentrations or as a result of the development?**

Response: The exceedances are only predicted within the 2019 baseline scenario and are due to the existing pollutant concentrations. No exceedances of the annual mean NO₂ objective (40µg/m³) are predicted at the assessed receptors in the future assessment scenarios, either with or without the Proposed Development (Applications 4 and 5) in operation. As the annual mean concentrations are less than 40µg/m³, in line with guidance published by Defra, it can also be assumed that exceedances of the hourly mean NO₂ objective are also unlikely to occur at the assessment receptors.

The Proposed Development (Applications 4 and 5) does not cause any new exceedances at the existing receptors. Furthermore, concentrations within the Application 4 and Application 5 Sites are compliant with the objectives.

- Mitigation measures have been provided with regard to the construction and demolition phase which will need to be directly included within the contractors CMP.**

Response: We would suggest that this can be controlled by a suitably worded planning condition for each planning application.

- Other forms of mitigation have been included in paras 12.138 to 12.141. Para. 12.139 recommends the placement of properties in areas where elevated concentrations of pollutants can be minimised. The**

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DATE:	11 July 2023	CONFIDENTIALITY:	Public
SUBJECT:	Response to Consultee Comments – Environmental Health		
PROJECT:	Red Bank	AUTHOR:	F.C-Carson
CHECKED:	S.Bennett	APPROVED:	S.Bennett

consultant will need to make these recommendations with regard to the ideal location / orientation of the properties to allow the developer to meet this requirement. These recommendations should be included in the report.

Response: The results of the detailed modelling, as reported within the Chapter 12 of the Environmental Statement, show that pollutant concentrations within the Application 4 Site are predicted to be below the respective air quality objectives. Generally areas to the south experience higher concentrations than those in the north of the Application 4 Site but none of the predictions are high enough to cause concern with respect to the current objectives. Given the outline nature of Application 4, mitigation within Paragraph 12.139 will be reviewed / developed as part of the design process at the detailed application stage.

Appendix IV

Noise and Vibration Technical Note

TECHNICAL NOTE

DATE:	12 July 2023	CONFIDENTIALITY:	Public
SUBJECT:	Technical Note: Response to Manchester City Council's Comments on the Noise Assessment dated 31st May 2023		
PROJECT:	Red Bank Neighbourhood, including the New Town Neighbourhood	AUTHOR:	H Jones
CHECKED:	R Marriner	APPROVED:	R Marriner

In 2023, Far East Consortium Ltd. (FEC) submitted two planning applications for a residential-led, mixed use development for the Red Bank Neighbourhood and part of the New Town Neighbourhood. This technical note has been prepared to address comments raised by the Environmental Health Department of Manchester City Council (MCC) in the email dated 31st May 2023 in relation to WSP's noise and vibration assessment.

1. A baseline noise survey has been undertaken for the entire site¹ which has been used to inform the indicative glazing specification and façade construction in table 13.32. These may be indicative at this stage of development and may require further update as the design develops.

The noise assessment has been based on the information available at the time of the planning submission. It is considered that final design for each plot in the Application 4 and 5 site area could be incorporated into a conditional planning permission prior to the construction of the relevant plot/phase of the development commencing.

2. There was limited survey around the areas of receptors NSR8, 9, 16 and 17 looking at the monitoring location map. Further discussion is required to explain why these areas were not included as part of the background noise modelling.

Noise Sensitive Receptors (NSR) NSR8 and NSR9 are considered to be representative of future residential developments located to the south and southwest of the Application 5 site respectively. At the time of the baseline noise survey there was not considered to be a secure location to leave equipment unattended. In addition, due to restricted access to the development sites, there was not considered to be a location for attended measurements which was representative of the sensitive areas of the proposed developments and suitable from a health and safety perspective for the Engineer undertaking the measurements i.e. allowing them to stand at a sufficient distance from the road. Whilst baseline noise survey measurements in this area could have been used to inform the significant criteria adopted for the construction phase noise assessment, it should be noted that the most stringent assessment criteria of ABC Category A was adopted for these receptors. Adopting Category A criteria is therefore considered to be a worst-case and a robust approach to the assessment for these future noise sensitive receptors should they be constructed prior to the Application 5 development.

NSR16 and NSR17 are considered to be representative of Phase 1 (i.e. Application 5) and Phase 2 (i.e. Plots RB06, RB07, RB10, RB16 and RB17 of Application 4) of the Proposed Development. At the time of

¹ Assumed to be referring to Applications 4 and 5 site area.

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CHECKED:	R Marriner	APPROVED:	R Marriner

the baseline noise survey there was not considered to be a secure location to leave equipment unattended or carry out attended measurements at locations representative of these sensitive areas of the Proposed Development. A number of commercial premises were operating within areas of the Application 4 and Application 5 sites. These premises are to be relocated and the associated buildings/infrastructure demolished as part of the redevelopment of the Site.

In the absence of the noise generated by the use of the existing commercial premises and caravan site, it is considered that the future baseline environment for these sensitive areas identified by NSR16 of the Application 5 site and NSR17 of the Application 4 site will be dominated by road traffic noise on Dantzic Street. The Site adjacent to Dantzic Street is bound by a brick wall ranging between approximately 1.2m and 2.4m in height to the north, and solid temporary hoarding of approximately 2m in height to the south. The localised screening therefore prevents a suitable location where a shortened measurement could be carried out in accordance with the Calculation of Road Traffic Noise (CRTN)², i.e. between 4m and 15m from the edge of the carriageway and with an unobstructed angle of view of Dantzic Street. In addition, Dantzic Street is often used for off-street parking and the parked cars further screen vehicle noise on Dantzic Street. In light of these limitations, Measurement Location 1 to the northeast of the Site was adopted and is considered to be representative of existing road traffic noise on Dantzic Street. It should also be noted that the Proposed Development has the potential to change the future road traffic noise, not least due to the change in the speed limit on Dantzic Street, i.e. a reduction from 30mph to 20mph. It is therefore considered robust to base the site suitability assessment on the predicted future road traffic noise levels, taking account of future composition of road traffic on Dantzic Street i.e. total traffic flows and speed.

3. Details of the proposed means of alternative ventilation will be required for the residential properties will need to be recommended and confirmed. It is assumed this will be developed as the design progresses.

The ventilation strategy for each phase of the Application 4 and 5 sites will be developed as the design progresses on a plot-by-plot basis.

The ventilation strategy for Application 5 site has been developed by Futureserv. A mixed mode strategy is proposed to ventilate the buildings and provide thermal comfort to the residents. Background ventilation will be provided by Mechanical Ventilation and Heat Recovery (MVHR) units to continuously supply the living/kitchen spaces and bedrooms with fresh air as required by Building Regulations Part F³ and a

² Department of Transport and Welsh Office, 1988. Calculation of Road Traffic Noise.

³ The Building Regulation 2010 Approved Document F: Ventilation, 2022 Edition.

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CHECKED:	R Marriner	APPROVED:	R Marriner

requirement of the Part L⁴ energy modelling. These units are required to boost the flow rates within each room to meet the overheating criteria in CIBSE document TM59⁵. It is proposed that purge ventilation will be provided by a natural solution via either a glazed purge panel behind a perforated screen, openable balcony door or top hung window to each of the bedrooms and living/kitchen spaces. Further details on the proposed ventilation strategy can be found in the technical note included in Appendix A.

4. The ventilation in the properties will need to be selected and where necessary, insulated to ensure that when in full use, including during any boost function, the ventilation system will not lead to an exceedance of the internal noise condition criteria. This will need to be included in the assessment.

For the Application 5 site, it is anticipated that all mechanical ventilation ductwork will be sized to limiting velocities at supply and extract grilles and ductwork will be lagged. Inline duct attenuation will be provided to the fresh air intake, exhaust duct, main supply ducts, and main extract ducts to meet the acoustic specification.

The noise assessment has been based on the information available at the time of the planning submission. It is considered that demonstration that the internal noise criteria will be met once the final MVHR system has been selected for each plot could be incorporated into a conditional planning permission prior to the construction of the relevant plot/phase of the Application 4 and 5 sites commencing.

5. Assessment of any penetrations to the residential building facades for ductwork /louvres associated with ventilation services for example will be required to ensure that any penetrations do not impact the acoustic integrity of the façade and are suitably insulated to prevent areas for noise to break in.

The noise assessment has been based on the information available at the time of the planning submission. It is considered that the assessment of any penetrations to the residential building facade could be incorporated into a conditional planning permission prior to the construction of the relevant plot/phase of the Application 4 and 5 sites commencing.

⁴ The Building Regulation 2010 Approved Document L: Conservation of Fuel and Power, 2023 Edition.
⁵ CIBSE, 2017. TM59 Design methodology for the assessment of overheating risk in homes.

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6. An AVO assessment has been undertaken and included in the Appendix section. The residential units under application 5 are proposed to include openable purge ventilation glazed panels for ventilation. Purge ventilation should only be associated with rapid ventilation for removal of stale or cooking odours rather than for comfort ventilation purposes. The assessment has found that based on thermal modelling, the vents will not need to be opened during the night at any location during the overheating season and so they comply with the internal noise criteria. We will need the thermal modelling providing along with commentary to demonstrate how this outcome has been determined.

The overheating assessment has identified that each of the residential units considered requires the MVHR to run at full capacity during the warmer summer months to mitigate against the risk of overheating. There may be apartments which will also require an additional purge fan to the living / kitchen spaces to meet the overheating criterion set as out in TM59. As set out in the response to Question 4, demonstration that the internal noise criteria will be met once the final MVHR system has been selected for each plot could be incorporated into a condition to be attached to the planning permission prior to the construction of the relevant plot/phase of the Application 4 and 5 sites commencing.

Further details on the proposed ventilation strategy and basis of the thermal modelling in conjunction with AVO studies carried out at the time of the planning submission can be found in Appendix A.

7. It has been found that the internal noise levels will exceed the SOAL at Tower 1 NT02 up to floor 11 when the ventilation panels are open during the overheating period and the ventilation panels will be unsuitable for these dwellings. Additional measures and alternative scheme of ventilation will be required for these properties to ensure they are able to ventilate the property and not exceed the SOAL for overheating purposes. This will require further design and development and updated assessment to confirm that the proposed measures will ensure these dwellings will not exceed the criteria. The proposals will need to be agreed by MCC.

The noise assessment has been based on the information available at the time of the planning submission and a daytime assessment of the internal noise levels with the purge vents open in a 'typical' living room, which indicated the Significant Observed Adverse Effect Level (SOAEL) would be exceeded by up to 1dB. However, it should be noted that the internal noise level would still achieve 50 dB $L_{Aeq, 16hour, 1}$ i.e. the upper SOAEL for the daytime period as set out in the AVO Guide⁶ and presented in Figure 13.3 of the April 2023 ES.

⁶ The Acoustics Ventilation and Overheating Residential Design Guide, Institute of Acoustics and Association of Noise Consultants, January 2020.

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The ventilation strategy will continue to be refined for the Application 5 development at the detailed design stages. It is therefore considered that final design can be incorporated into a conditional planning permission prior to the construction of the relevant plot/phase of the development commencing.

8. The overheating assessment should also include how many days and during which months the panels may need to be open.

Further details on the AVO studies carried out at the time of the planning submission can be found in Appendix A.

9. Assessment of noise transfer from building risers and lift shafts that travel next to habitable rooms should also be undertaken with recommendations providing for any necessary insulation measures to these risers.

The noise assessment has been based on the information available at the time of the planning submission. It is considered that the assessment of noise transfer from building risers and lift shafts for each plot would be further assessed prior to the construction of the relevant plot/phase of the Application 4 and 5 sites commencing.

Plant

Table 13.7 includes the cumulative proposed plant noise limit at each of the receptors 36dB daytime and 34dB at night time which we can accept. These limits will need to apply to the residential properties associated with the development and commercial properties. The plant has yet to be selected so assessment of the proposed plant will be required as the design develops.

The noise assessment has been based on the information available at the time of the planning submission. It is considered that noise generated by fixed plant associated with the Proposed Development could be incorporated into a conditional planning permission prior to the construction of the relevant plot/phase of the Application 4 and 5 sites commencing.



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APPENDIX A: VENTILATION STRATGEY



DESIGN ENGINEER SUSTAIN

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Redbank, Manchester

NT02

Technical Note – Building Regulations Part O - Overheating Mitigation



Ref: RDB-FUT-2X-RP-XX-ME-70-003

QA

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Name				
Title	Regional Director	Regional Director	Regional Director	
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Executive Summary

This report has been produced to assess the overheating risk for a full floor plate of residential tower 1 on plot NT02 of the Red Bank development.

CIBSE TM59 methodology has been utilised to assess the overheating risk within a relevant selection of units. Compliance with TM59 minimum criteria has been analysed using the Manchester weather Centre data. Current scenario weather files were considered with the possibility of considering future weather files at further stages.

Future understands that some facades of the development are exposed to high noise levels and air quality constraints which may limit the use of natural ventilation for reducing the risk of overheating within the affected dwellings. To account for acoustic requirements, this TM59 study includes profiles on the openable purge ventilation panels to respond to the AVO document.

Plot NT02 Tower passes CIBSE TM59 and Part O of the Building Regulations.

Acoustic proposals

As per advice from the project Acousticians to demonstrate consideration with AVO we are restricting window opening times, which is not a TM59 requirement:

- Bedroom ventilation opening hours profile - Open 8am-11pm
- Living room ventilation opening profile - Open 8am-7pm
- All panels are closed overnight.

Note – 8am is now being used rather 7am as this is described as the compliant profile in Part O of the Building Regulations.

The plot NT02 residential tower development was assessed against the requirements of CIBSE TM59. The report outlines the basis of the proposals and the intended overheating mitigation strategy.

The simulation indicated that all the assessed Living Rooms/Kitchens/Bedrooms passed the TM59 simulation with purge panels open for only 1 hour per day.

Internal blinds are not modelled to ensure Part O Building Regulations compliance. They are only included for the AVO hourly opening analysis check.

Important Notes

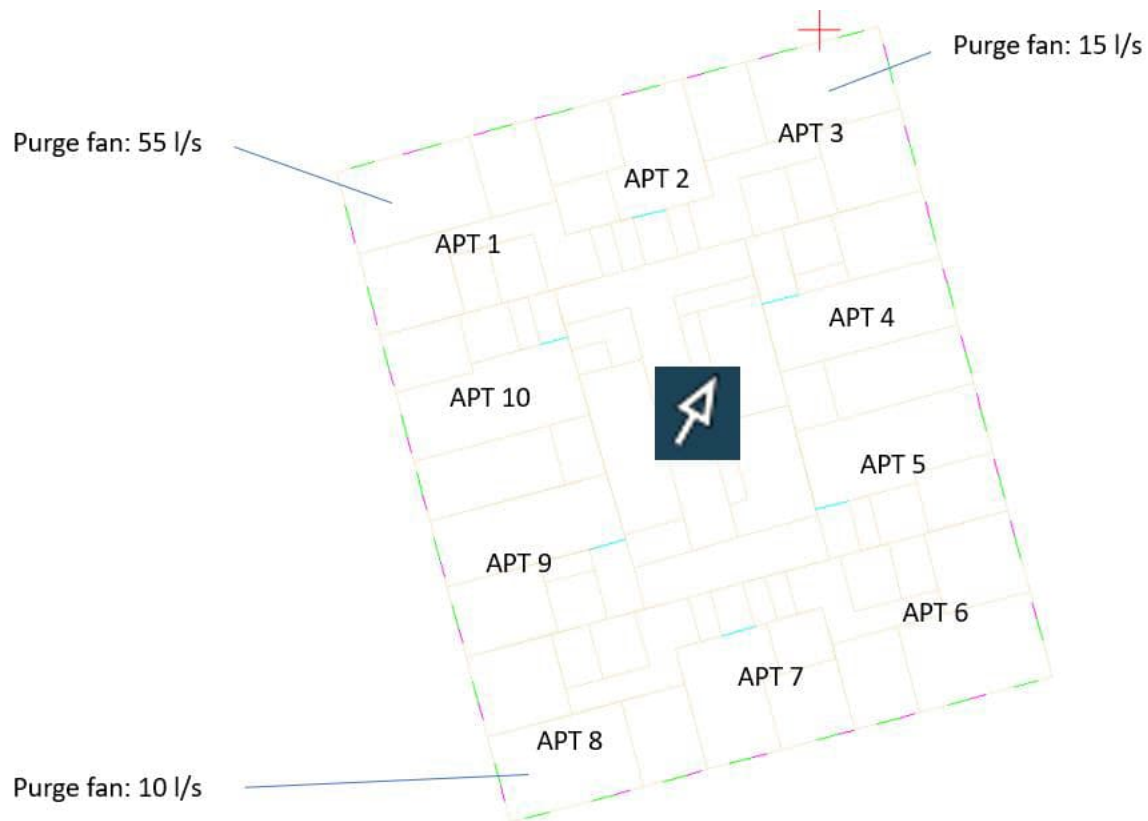
Openable solid panels (purge vent panels) are simulated which can open inwards to 90deg from behind a perforated opaque panel. An estimated 48% free area perforated panel has been simulated achieving 0.8sqm of free area. The free area openings stated are as required for compliance with TM59 overheating only. An assessment of the required free area for purge ventilation in line with Guide F of the building regulations, will be completed to satisfy building control.

Vent panel opening was simulated only between 08:00 to 19:00 for living/kitchen/dining rooms, to respond to acoustic design advice relating to the AVO document.

1.0 Introduction

A thermal model exercise has been undertaken to predict the internal temperatures over a typical year for the proposed residential development known as NT02 Tower 1, Redbank, Manchester.

At this stage the following Key areas for the development were modelled, to represent the various room types, window types and orientations within the building.



Typical NT02 Tower 1 - residential floorplate

Assessing overheating risk in residential developments is a complex issue and is now being assessed by Building Regulations under the new Part O Approved Document. Therefore, CIBSE TM59 is utilised to conduct a dynamic analysis of the residential apartments to assess overheating. This assessment aims to identify whether the proposals meet the requirements of CIBSE TM59. The basis of the assessment is generally for Bedrooms and Living/Kitchen areas, however the communal circulation areas have also been included in this Assessment, following the TM59 approach.

2.0 Modelling Inputs

Occupancy and equipment gains are specified by the TM59 guidance. For clarity, the following assumptions have been used and the proposals for purge vent openings are also detailed below:

Assumptions	Target performance
Windows (W/m ² . K) (including frame and thermal bridging)	1.2
Glazing G-value (all glazing areas excluding purge vents)	0.57
Façade layout	As per floor plans
Weather data	Manchester_DSY1_2020High50.epw
MVHR boost rates – 1 & 2 bed	29l/sec Increased to 79l/sec Boost rate using the Vent Axia Sentinel Kinetic Advance S. Operating 24/7 in boost during peak summer periods.
MVHR boost rates – 3 beds	37l/sec Increased to 79l/sec Boost rate using the Vent Axia Sentinel Kinetic Advance S. Operating 24/7 in boost during peak summer periods.
Vent panel design	Solid Purge Panel doors
Vent panel conditions	'Panel 3' (2.71m*0.685m) 43% openable area with 0.8sqm free area.
Vent panel numbers	1nr purge panels per single aspect LKD and 2nr per dual aspect LKD, and 1nr purge panel per bedroom.
Bedroom ventilation opening hours profile	Open 8am-11pm and when the temperature exceeds 22°C, fully open at 22°C. All panels are closed overnight.
Living room ventilation opening profile	Open 8am-7pm and when the temperature exceeds 22°C, fully open at 22°C. All panels are closed overnight.
Blind shading coefficient	0.28 (only applied for AVO openings, not used in the TM59 Part O compliance).
Blind operational profile	Continuously closed in peak summer months for AVO assessment.
Additional Ventilation	Provide purge fans with extra air volumes to the following LKD's via additional purge fans. Apt 1 LKD = 55l/sec Apt 3 LKD = 15l/sec Apt 8 LKD = 10l/sec

3.0 Results

3.1 Summary of Part O TM59 Overheating assessment Results (no blinds)

COLOUR KEY	LOW RISK	MED RISK	HIGH RISK	OVERHEATING
Criteria 1	<2.4%	2.4 - 2.7%	2.7 - 3.0%	>3.0 %
Criteria 2	<25 hrs	25-27 hrs	28-32 hrs	>32 hrs

The results for the final overheating simulation can be seen in table below.

The results from the Final overheating simulation showed that all the assessed bedrooms and Kitchen/Living/Dining Areas comply with the TM59 overheating criteria.

None of the assessed living/Kitchen/bedroom areas failed criterion 1, whereby the ΔT ($T_{\max} - T_{\text{operative}}$) is $\geq 1K$ for more than 3% of Occupied Summer Hours.

None of the assessed bedrooms failed criterion 2, whereby the $T_{\text{operative}}$ exceeds 26°C for more than 1% of the sleeping hours (11pm till 8am).

COLOUR KEY	LOW RISK	MED RISK	HIGH RISK	OVERHEATING
Criteria 1	<2.4%	2.4 - 2.7%	2.7 - 3.0%	>3.0 %
Criteria 2	<25 hrs	25-27 hrs	28-32 hrs	>32 hrs

Room Name	Criteria 1	Criteria 2	Compliance
08 - APT01 - 2B4P - KLD	2.9	N/A	Pass
08 - APT02 - 1B1P - KLD	0.3	N/A	Pass
08 - APT03 - 2B4P - KLD	2.8	N/A	Pass
08 - APT04 - 1B2P - KLD	0	N/A	Pass
08 - APT05 - 2B4P - KLD	0	N/A	Pass
08 - APT06 - 2B4P - KLD	0.9	N/A	Pass
08 - APT07 - 1B1P - KLD	0	N/A	Pass
08 - APT08 - 2B4P - KLD	2.5	N/A	Pass
08 - APT09 - 1B2P - KLD	0.3	N/A	Pass
08 - APT10 - 2B4P - KLD	1.2	N/A	Pass
08 - APT01 - 2B4P - Bed 01	0.6	3	Pass
08 - APT01 - 2B4P - Bed 02	0.4	0	Pass
08 - APT02 - 1B1P - Bed	0.3	0	Pass
08 - APT03 - 2B4P - Bed 01	0.0	0	Pass
08 - APT03 - 2B4P - Bed 02	0.4	0	Pass
08 - APT04 - 1B2P - Bed	0.0	0	Pass
08 - APT05 - 2B4P - Bed 01	0.0	0	Pass
08 - APT05 - 2B4P - Bed 02	0.0	0	Pass
08 - APT06 - 2B4P - Bed 01	0.0	0	Pass
08 - APT06 - 2B4P - Bed 02	0.1	3	Pass
08 - APT07 - 1B1P - Bed	0.0	0	Pass
08 - APT08 - 2B4P - Bed 01	0.9	11	Pass
08 - APT08 - 2B4P - Bed 02	0.2	5	Pass
08 - APT09 - 1B2P - Bed	0.6	1	Pass
08 - APT10 - 2B4P - Bed 01	0.5	8	Pass
08 - APT10 - 2B4P - Bed 02	1.3	10	Pass

TM59 Assessment Results Table [NT02 Tower 1 - 8th floor Apartments]

3.2 AVO Compliance (with blinds applied)

For AVO compliance we have applied blinds to the analysis. This approach has been successfully adopted on other high rise residential projects in Manchester.

All apartments were tested using the Part O modelling inputs detailed above, and with blinds applied to the fixed windows.

All of the rooms on the typical floor comply with the overheating criteria when purge panels are only open for **1 hour per day** and blinds are closed. This is applied as follows;

- Kitchen, Living, Dining areas – purge panels open between 6-7pm for 1 hour per day only.
- Bedrooms – purge panels open between 10-11pm for 1 hour per day only.

AVO Daily Occurrences (Number of days per month the purge panels are open for 1 hour)

The tables below indicate the daily occurrences where the purge panels need to be open for the 1-hour period.

Apartment Reference	Total Days/mth Purge Panels are open
08 - APT01 - 2B4P - Bed 01	2
08 - APT01 - 2B4P - Bed 02	2
08 - APT02 - 1B1P - Bed	2
08 - APT03 - 2B4P - Bed 01	2
08 - APT03 - 2B4P - Bed 02	2
08 - APT04 - 1B2P - Bed	2
08 - APT05 - 2B4P - Bed 01	2
08 - APT05 - 2B4P - Bed 02	2
08 - APT06 - 2B4P - Bed 01	2
08 - APT06 - 2B4P - Bed 02	2
08 - APT07 - 1B1P - Bed	2
08 - APT08 - 2B4P - Bed 01	2
08 - APT08 - 2B4P - Bed 02	2
08 - APT09 - 1B2P - Bed	2
08 - APT10 - 2B4P - Bed 01	2
08 - APT10 - 2B4P - Bed 02	2
08 - APT01 - 2B4P - KLD	7
08 - APT02 - 1B1P - KLD	2
08 - APT03 - 2B4P - KLD	8
08 - APT04 - 1B2P - KLD	8
08 - APT05 - 2B4P - KLD	2
08 - APT06 - 2B4P - KLD	9
08 - APT07 - 1B1P - KLD	2
08 - APT08 - 2B4P - KLD	9
08 - APT09 - 1B2P - KLD	2
08 - APT10 - 2B4P - KLD	3

AVO Daily Occurrences [NT02 Tower 1 - 8th floor Apartments] – during MAY

Apartment Reference	Total Days/mth Purge Panels are open
08 - APT01 - 2B4P - Bed 01	3
08 - APT01 - 2B4P - Bed 02	2
08 - APT02 - 1B1P - Bed	0
08 - APT03 - 2B4P - Bed 01	0
08 - APT03 - 2B4P - Bed 02	4
08 - APT04 - 1B2P - Bed	0
08 - APT05 - 2B4P - Bed 01	2
08 - APT05 - 2B4P - Bed 02	5
08 - APT06 - 2B4P - Bed 01	6
08 - APT06 - 2B4P - Bed 02	9
08 - APT07 - 1B1P - Bed	0
08 - APT08 - 2B4P - Bed 01	7
08 - APT08 - 2B4P - Bed 02	7
08 - APT09 - 1B2P - Bed	0
08 - APT10 - 2B4P - Bed 01	4
08 - APT10 - 2B4P - Bed 02	7
08 - APT01 - 2B4P - KLD	10
08 - APT02 - 1B1P - KLD	8
08 - APT03 - 2B4P - KLD	13
08 - APT04 - 1B2P - KLD	13
08 - APT05 - 2B4P - KLD	13
08 - APT06 - 2B4P - KLD	15
08 - APT07 - 1B1P - KLD	6
08 - APT08 - 2B4P - KLD	14
08 - APT09 - 1B2P - KLD	8
08 - APT10 - 2B4P - KLD	13

AVO Daily Occurrences

[NT02 Tower 1 - 8th floor Apartments] – JUNE

Apartment Reference	Total Days/mth Purge Panels are open
08 - APT01 - 2B4P - Bed 01	19
08 - APT01 - 2B4P - Bed 02	17
08 - APT02 - 1B1P - Bed	11
08 - APT03 - 2B4P - Bed 01	11
08 - APT03 - 2B4P - Bed 02	19
08 - APT04 - 1B2P - Bed	10
08 - APT05 - 2B4P - Bed 01	18
08 - APT05 - 2B4P - Bed 02	22
08 - APT06 - 2B4P - Bed 01	22
08 - APT06 - 2B4P - Bed 02	22
08 - APT07 - 1B1P - Bed	11
08 - APT08 - 2B4P - Bed 01	22
08 - APT08 - 2B4P - Bed 02	21
08 - APT09 - 1B2P - Bed	11
08 - APT10 - 2B4P - Bed 01	21
08 - APT10 - 2B4P - Bed 02	22
08 - APT01 - 2B4P - KLD	21
08 - APT02 - 1B1P - KLD	20
08 - APT03 - 2B4P - KLD	25
08 - APT04 - 1B2P - KLD	25
08 - APT05 - 2B4P - KLD	25
08 - APT06 - 2B4P - KLD	26
08 - APT07 - 1B1P - KLD	20
08 - APT08 - 2B4P - KLD	26
08 - APT09 - 1B2P - KLD	20
08 - APT10 - 2B4P - KLD	25

AVO Daily Occurrences

[NT02 Tower 1 - 8th floor Apartments] – JULY

Apartment Reference	Total Days/mth Purge Panels are open
08 - APT01 - 2B4P - Bed 01	21
08 - APT01 - 2B4P - Bed 02	18
08 - APT02 - 1B1P - Bed	17
08 - APT03 - 2B4P - Bed 01	17
08 - APT03 - 2B4P - Bed 02	21
08 - APT04 - 1B2P - Bed	18
08 - APT05 - 2B4P - Bed 01	21
08 - APT05 - 2B4P - Bed 02	22
08 - APT06 - 2B4P - Bed 01	22
08 - APT06 - 2B4P - Bed 02	22
08 - APT07 - 1B1P - Bed	18
08 - APT08 - 2B4P - Bed 01	22
08 - APT08 - 2B4P - Bed 02	22
08 - APT09 - 1B2P - Bed	18
08 - APT10 - 2B4P - Bed 01	21
08 - APT10 - 2B4P - Bed 02	22
08 - APT01 - 2B4P - KLD	26
08 - APT02 - 1B1P - KLD	23
08 - APT03 - 2B4P - KLD	30
08 - APT04 - 1B2P - KLD	30
08 - APT05 - 2B4P - KLD	31
08 - APT06 - 2B4P - KLD	31
08 - APT07 - 1B1P - KLD	24
08 - APT08 - 2B4P - KLD	31
08 - APT09 - 1B2P - KLD	25
08 - APT10 - 2B4P - KLD	31

AVO Daily Occurrences

[NT02 Tower 1 - 8th floor Apartments] – AUG

Apartment Reference	Total Days/mth Purge Panels are open
08 - APT01 - 2B4P - Bed 01	0
08 - APT01 - 2B4P - Bed 02	0
08 - APT02 - 1B1P - Bed	0
08 - APT03 - 2B4P - Bed 01	0
08 - APT03 - 2B4P - Bed 02	0
08 - APT04 - 1B2P - Bed	0
08 - APT05 - 2B4P - Bed 01	0
08 - APT05 - 2B4P - Bed 02	0
08 - APT06 - 2B4P - Bed 01	0
08 - APT06 - 2B4P - Bed 02	0
08 - APT07 - 1B1P - Bed	0
08 - APT08 - 2B4P - Bed 01	0
08 - APT08 - 2B4P - Bed 02	0
08 - APT09 - 1B2P - Bed	0
08 - APT10 - 2B4P - Bed 01	0
08 - APT10 - 2B4P - Bed 02	0
08 - APT01 - 2B4P - KLD	2
08 - APT02 - 1B1P - KLD	0
08 - APT03 - 2B4P - KLD	2
08 - APT04 - 1B2P - KLD	2
08 - APT05 - 2B4P - KLD	2
08 - APT06 - 2B4P - KLD	7
08 - APT07 - 1B1P - KLD	0
08 - APT08 - 2B4P - KLD	7
08 - APT09 - 1B2P - KLD	1
08 - APT10 - 2B4P - KLD	7

AVO Daily Occurrences

[NT02 Tower 1 - 8th floor Apartments] – SEPT

Appendix V

Replacement Flood Risk Assessment and Drainage Strategy

Appendix VI

Updated Drawings for Approval

Contact Details

Enquiries

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