Appendix A6.3
Junction Design Report

Contents

1 Introduction

1.1 Introduction

This report has been prepared to document the evolution of the design of key junctions along the Ringsend to City Centre Core Bus Corridor (CBC) Scheme (hereafter referred the Proposed Scheme) and is illustrated in Figure 1. In addition, the report presents the junction assessment results for the final scheme design which demonstrates the expected operation of the junction. Finally, a theoretical assessment has been carried out to demonstrate the theoretical capacity of the junctions for all modes. The methodology adopted is elaborated upon in the following sections.

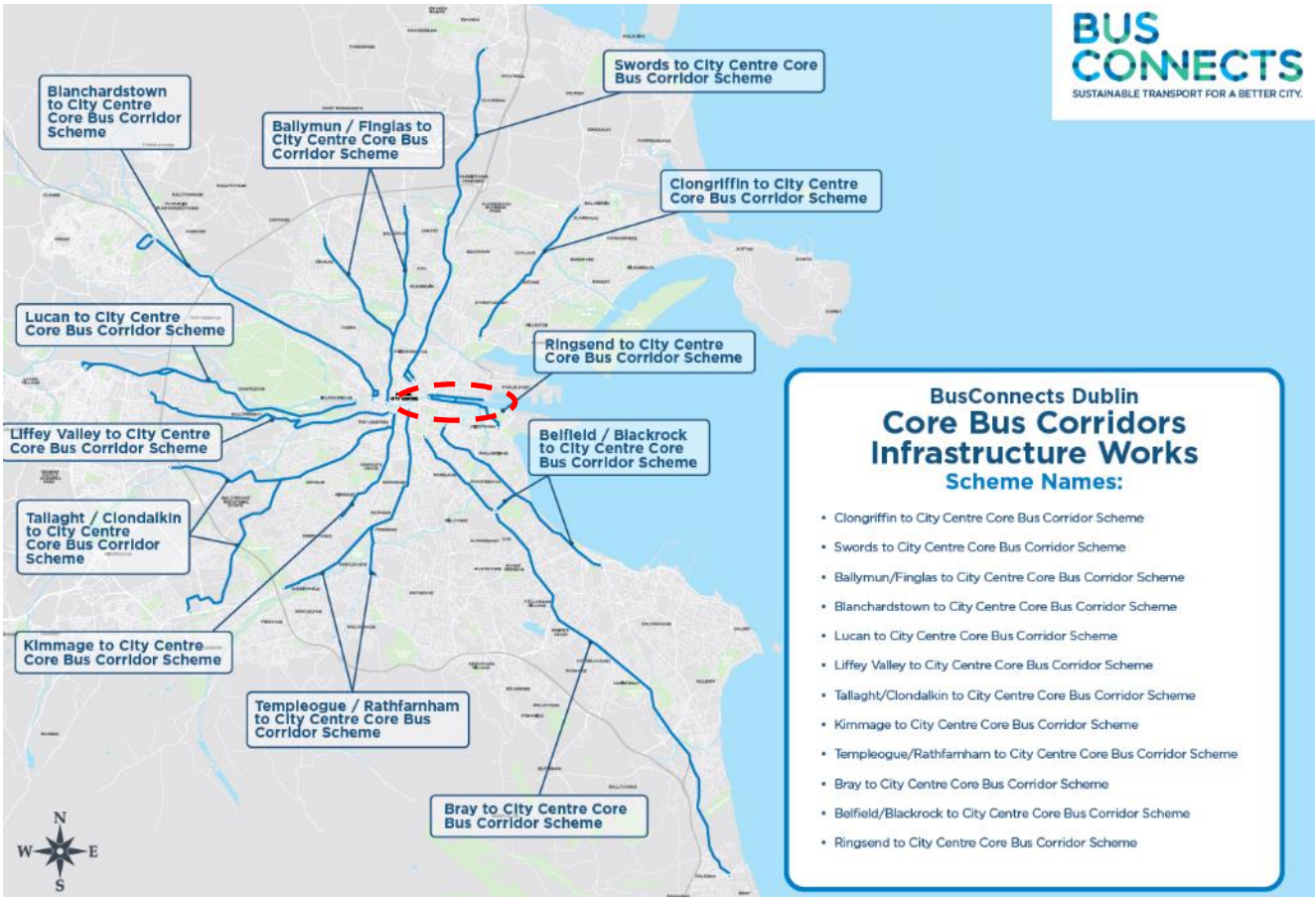


Figure 1-1: Proposed Scheme Route Overview

2 Methodology

2.1 Junction Design Evolution

The Proposed Scheme has been designed over the course of a number of years, and during this period the design principles have evolved to improve the movements of people through the junctions for all modes. The final design principles which guided the junction design are documented in the BusConnects Preliminary Design Guidance Booklet [BCODG] document. The design guidance document sets out four typical junctions arrangements that could be adopted to achieve bus priority - referred to in order of preference as Junction Types 1-4. Only Junction Type 1 is proposed on the Ringsend CBC scheme and the other options are therefore not discussed herein.

2.1.1.1 Junction Type 1

Junction Type 1 comprises dedicated bus lanes up to the junction stop line and general traffic travelling both straight ahead and turning left is restricted to one lane.

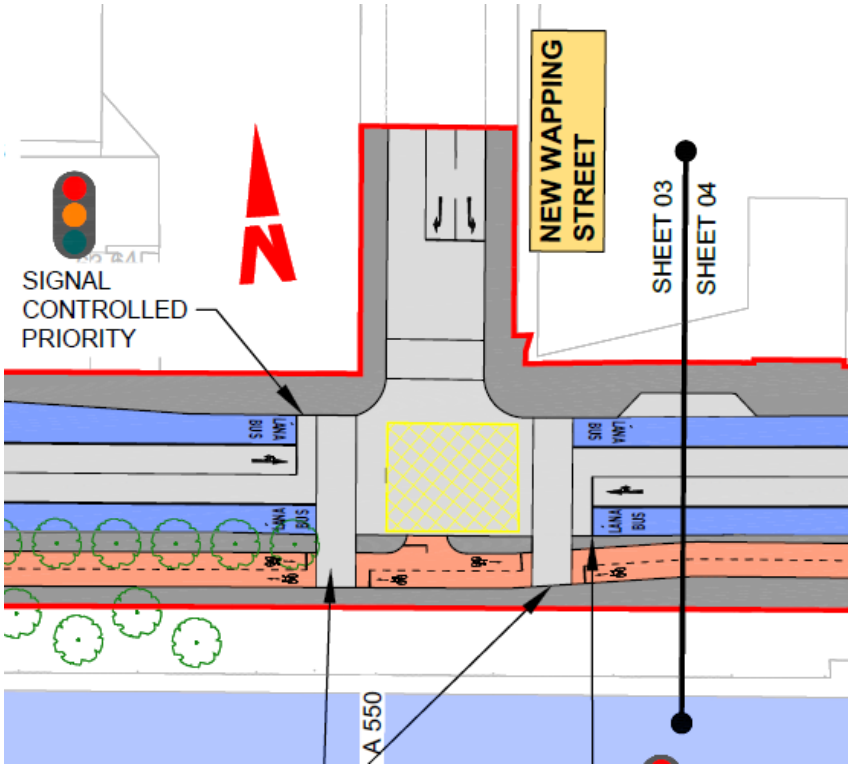


Figure 2-1: Junction Type

In addition to the evolution of the design principles, the design has been positively influenced through engagement with the public at various points in the process. The evolution of the design is documented in this report with a clear rationale provided for the changes at key points in the project as follows:

- Emerging Preferred Routes (EPR);
- Second Public Consultation (PC2);
- Third Public Consultation (PC3); and
- Final Proposed Scheme.

2.2 Transport Modelling

Transport modelling has been a key input to the scheme design throughout the project. Given the complexity of the scheme proposals and changes to existing traffic regimes, the design went through an iterative process which was incorporated in the multi-tiered transport modelling approach consisting of strategic, local, and microsimulation modelling. The overall modelling methodology and information flow is summarised in *Figure 2-2*.

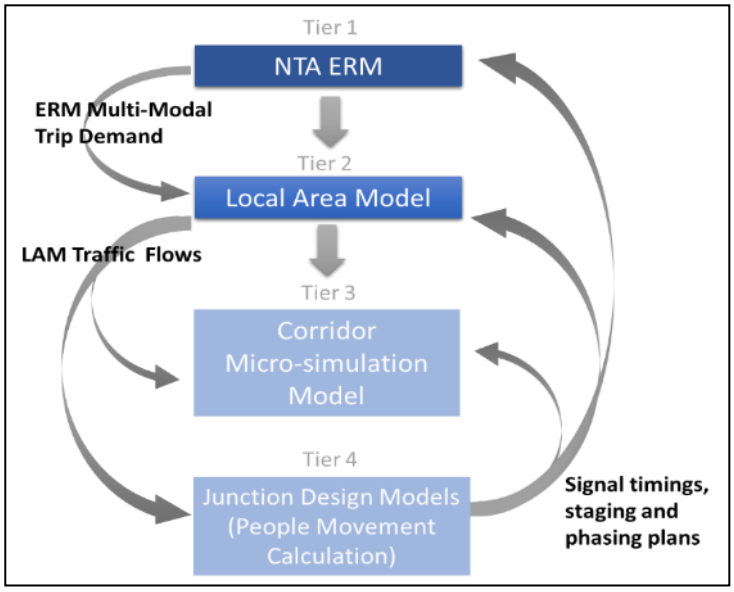


Figure 2-2: Proposed Scheme Traffic Modelling Hierarchy

As shown in *Figure 2-2*, there are four tiers in the transport modelling hierarchy that were used for the purposes of assessing the Proposed Scheme:

- East Regional Model (ERM): the primary tool that provides the strategic multi-modal demand outputs for the proposed forecast.
- Local Area Model (LAM): a more refined road network model used to provide consistent road-based outputs to inform the TIA, EIAR, microsimulation model, junction design models and traffic management plan testing.
- Microsimulation Model: represents the end-to-end corridor model Proposed Scheme to assist in the operational validation of proposed designs with the visualisation of the potential Proposed Scheme impacts and benefits.
- Local Junction Models: each junction along the Proposed Scheme were developed to support local junction design development.

For the purposes of the Junction Design Report (JDR), results from the local junction models were extracted, which used LinSig, an industry-standard software that provides comprehensive assessment and design of a junction or a network of junctions.

The local junction models were used to inform junction design considerations and 'proof of concept' demonstration of the Proposed Scheme. The signal staging, timing and phasing from LinSig were incorporated into the three tiers of transport modelling hierarchy and it should be noted that this was an iterative approach throughout the design process.

This report presents the results of the local junction modelling which was the primary tool used by the design team to design and refine junction layouts. The 2028 scenario modelling results are presented in this report which represent an assessment of the junction designs for the opening year.

Figure 2-3 presents an example of the local junction modelling results from LinSig presented in this report. A description of the images follows.

A shows the junction layout in LinSig and the results per lane, which are the following:

- Average Delay per PCU (sec) – this is the number located at the back of the lane in Figure 3 and is the average delay for each PCU per lane;
- Degree of Saturation (%) – this is the number located in the middle of the lane in Figure 3 and is the ratio of Flow to Capacity per lane. The theoretical capacity of a junction is 90% and anything less than this assumes that the junction is within capacity; and
- Mean Max Queue (PCU) – this is the number located at the front of the lane in Figure 3 and is maximum queue (per lane) within a typical cycle.

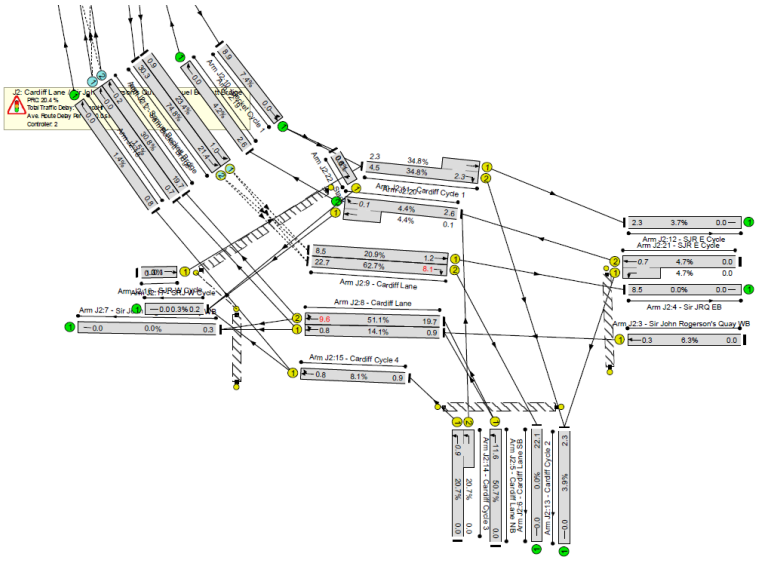
B is the Timing Dial that shows an overview of signal times for all Stage Streams.

C is the Stage Diagram that shows the staging, phasing and timings of the junction.

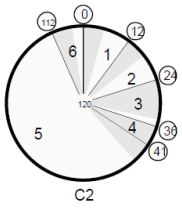
D shows the following Network Summary Results:

- Cycle (seconds) – Cycle time in seconds;
- PRC (%) – Practical Reserve Capacity, which is the available spare capacity at a junction (i.e. negative PRC = over-capacity; positive PRC = spare capacity);
- Delay (PCUhr) – the total aggregate delay on all lanes controlled by each Stage Stream; and
- Bus delay (PCUhr) – the average bus delay per direction on the Proposed Scheme per junction.

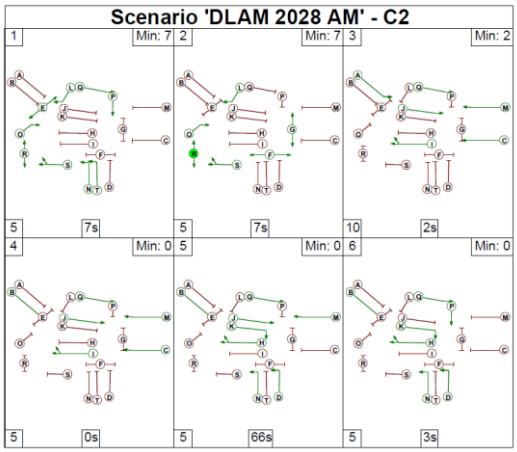
A



B



C



D

Cycle = 120secs	Bus Delay
PRC = -2.3%	Inbound =68s
Delay = 19pcuHr	Outbound = 73s

Figure 2-3 Example of the local junction modelling results in the JDR

It should be noted that modelling bus priority signals is not possible in LinSig due to its dynamic nature. However, this was modelled in the microsimulation model and is reported in the Transport Impact Assessment Report and Transport Modelling Report.

2.3 People Movement at Signals Calculator

The prioritisation of people movement and maximising the throughput of sustainable modes (i.e. walking, cycling and bus modes) in advance of the consideration and management of general vehicular traffic (private car) movements at junctions were the policy led approach to the junction design for the Proposed Scheme. Therefore, in order to quantify this for the purposes of supporting this policy led approach, the People Movement at Signals (PMS) Calculator was developed. The PMS Calculator was used to validate the design and the assertion that the proposal would result in greater throughput of people.

The PMS Calculator provided an initial estimate of green time allocation for all movements at a 'typical' junction on the basis that sustainable mode movements should be accommodated foremost to maximise people movement, with the remaining green time allocated to general traffic movements. The PMS calculator was also set up to cater for the four junction types as proposed in the BusConnects Preliminary Design Guidance Booklet.

The information used for the purposes of PMS Calculator include the following:

- Number of buses required to be accommodated along the corridor (informed from the network re-design proposals);
- Estimated cycling demand (from early stage runs of the ERM);
- Pedestrian crossing width and resultant crossing timing requirements; and
- Vehicular capacity at each junction (derived by LinSig).

The bus demand and vehicular capacity per hour were converted to number of persons in order to calculate the total number of people (including pedestrians and cyclists) that can be accommodated at each junction in the Proposed Scheme per hour.

It should be noted that the PMS Calculator is based on theoretical capacity of the design and would generally be different from the local junction modelling results in LinSig, which is based on operational capacity or Practical Reserve Capacity (PRC) and future transport demands. Therefore the PMS Calculator results are shown in the JDR, in tandem with the LinSig results, to display both the movement of people (relative to the available capacity) and vehicles along the Proposed Scheme.

Additionally, the vehicular capacity per arm for each junction (as marked in the image below) is the capacity calculated in LinSig, which factors in parameters such as geometry and red time. Therefore, the vehicular capacity is dependent on each junction design. These vehicular capacities were directly extracted from LinSig for each traffic lane of all junctions and applied in the PMS Calculator.

The vehicular capacities were then converted to number of people using an assumed occupancy factor of 1.2 per vehicle.

Therefore, the percentage displayed in the Junction Design Report for General Traffic is the volume/capacity of people per junction. It should be noted that the capacity used for general traffic is based on the total volume and capacity for the junction overall (i.e. total of all arms) and therefore does not directly reflect the PRC results in LinSig, which reflects the maximum degree of saturation on the worst lane.

Below is an example image of PMS Calculator results, which shows the capacity used by mode (**blue**), as well as the combined capacity used for all modes (**black**).

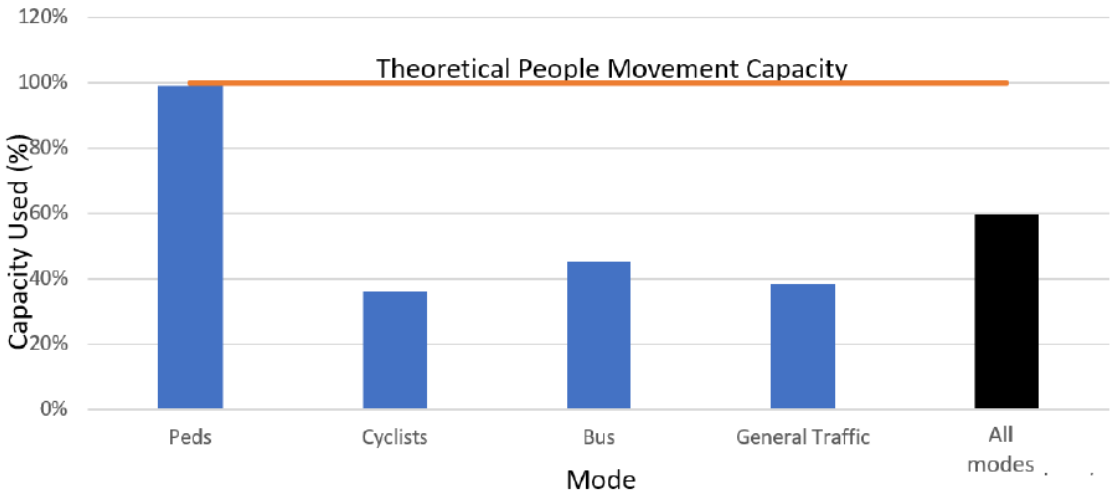


Figure 2-4 Example image of People Movement at Signals Calculator results

Each junction has a certain theoretical capacity for each mode based on green time and has been examined as to how this green time can cater for the anticipated demand through the junction. In the scenario described within Figure 2-4, due to high pedestrian volumes the junction has reached its theoretical capacity for pedestrians, as no additional green time can be applied to pedestrian phases. However, it is also the case in this example scenario that the volumes of cyclists, buses, and general traffic are below the theoretical capacity. As such, if there were an increased demand for any or all of these modes the junction could continue to cater for such a demand (up to the theoretical capacity for the relevant mode and/or the overall theoretical capacity for all modes).

3 Junctions Assessed

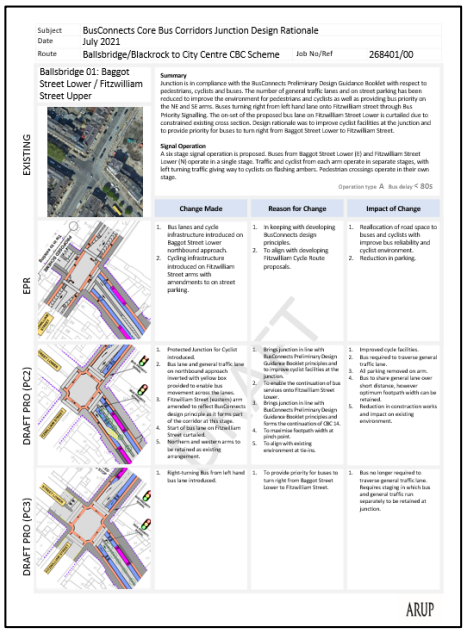
A total number of 12 junctions in the Proposed Scheme are presented in this report, which are as follows:

- Commons Street / Custom House Quay
- Guild Street / North Wall Quay / Beckett Bridge
- Park Lane / North Wall Quay
- New Wapping St / North Wall Quay
- Castleforbes Road / North Wall Quay
- North Wall Avenue / North Wall Quay
- Lombard Street / City Quay
- Cardiff Lane / Sir John Rogerson's Quay / Beckett Bridge
- Forbes Street / Sir John Rogerson's Quay
- Blood Stoney Road / Sir John Rogerson's Quay
- Dodder PT Bridge / East Link Road
- Memorial road / Custom House / Talbot Bridge

The junctions design and modelling commentary and results are presented in similar order as above in the next section.

4 Junction Design and Modelling Results

Contents


Subject BusConnects Core Bus Corridors Junction Design Rationale
Date July 2021
Route Ballsbridge/Blackrock to City Centre CBC Scheme Job No/Ref 268401/00

Ballsbridge 01: Baggot Street Lower / Fitzwilliam Street Upper

EXISTING

EPR

DRAFT PRO (PC2)

DRAFT PRO (PC3)

Summary

Junction is in compliance with the BusConnects Preliminary Design Guidance Booklet with respect to pedestrians, cyclists and buses. The number of general traffic lanes and on street parking has been reduced to improve the environment for pedestrians and cyclists as well as providing bus priority on the NE and SE arms. Buses turning right from left hand lane onto Fitzwilliam street through Bus Priority Signalling. The on-set of the proposed bus lane on Fitzwilliam Street Lower is curtailed due to constrained existing cross section. Design rationale was to improve cyclist facilities at the junction and to provide priority for buses to turn right from Baggot Street Lower to Fitzwilliam Street.

Signal Operation

A six stage signal operation is proposed. Buses from Baggot Street Lower (E) and Fitzwilliam Street Lower (N) operate in a single stage. Traffic and cyclist from each arm operate in separate stages, with left turning traffic giving way to cyclists on flashing ambers. Pedestrian crossings operate in their own stage.

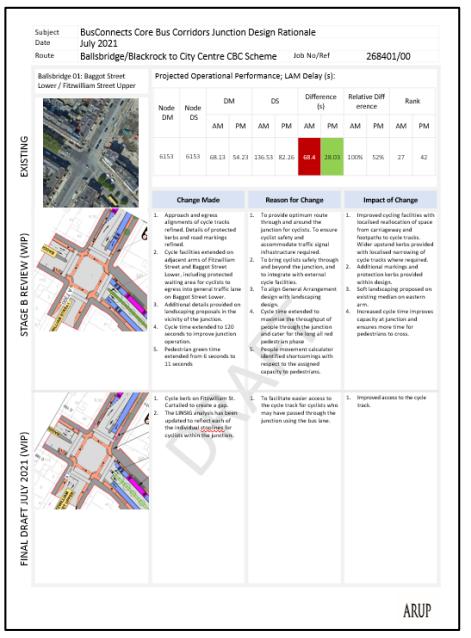
Operation type A Bus delay < 80s

	Change Made	Reason for Change	Impact of Change
EPR	1. Bus lanes and cycle infrastructure introduced on Baggot Street Lower northbound approach. 2. Cycling infrastructure introduced on Fitzwilliam Street arms with amendments to on street parking.	1. In keeping with developing BusConnects design principles. 2. To align with developing Fitzwilliam Cycle Route proposals.	1. Reallocation of road space to buses and cyclists with improve bus reliability and cyclist environment. 2. Reduction in parking.
DRAFT PRO (PC2)	1. Protected Junction for Cyclist introduced. 2. Bus lane and general traffic lane on northbound approach inverted with yellow box provided to enable bus movement across the lanes. 3. Fitzwilliam Street (eastern) arm amended to reflect BusConnects design principle as it forms part of the corridor at this stage. 4. Start of bus lane on Fitzwilliam Street curtailed. 5. Northern and western arms to be retained as existing arrangement.	1. Brings junction in line with BusConnects Preliminary Design Guidance Booklet principles and to improve cyclist facilities at the junction. 2. To enable the continuation of bus services onto Fitzwilliam Street Lower. 3. Brings junction in line with BusConnects Preliminary Design Guidance Booklet principles and forms the continuation of CBC 14. 4. To maximise footpath widths at pinch point. 5. To align with existing environment at tie-ins.	1. Improved cycle facilities. 2. Bus required to traverse general traffic lane. 3. All parking removed on arm. 4. Bus to share general lane over short distance, however optimum footpath width can be retained. 5. Reduction in construction works and impact on existing environment.
DRAFT PRO (PC3)	1. Right-turning Bus from left hand bus lane introduced.	1. To provide priority for buses to turn right from Baggot Street Lower to Fitzwilliam Street.	1. Bus no longer required to traverse general traffic lane. Requires staging in which bus and general traffic run separately to be retained at junction.

ARUP

Description of Options

- Summary
- EPR
- Draft PRO PC2
- Draft PRO PC3


Subject BusConnects Core Bus Corridors Junction Design Rationale
Date July 2021
Route Ballsbridge/Blackrock to City Centre CBC Scheme Job No/Ref 268401/00

Ballsbridge 01: Baggot Street Lower / Fitzwilliam Street Upper

Projected Operational Performance; LAM Delay (s):

Node DM	Node DS	DM AM	DM PM	DS AM	DS PM	Difference (s) AM	Difference (s) PM	Relative Difference AM	Relative Difference PM	Rank AM	Rank PM
6153	6153	68.13	54.23	136.53	82.26	68.4	28.03	100%	52%	27	42

EXISTING

STAGE B REVIEW (WIP)

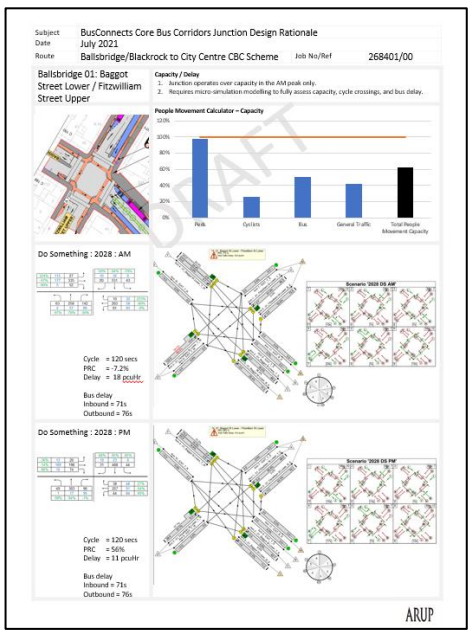
FINAL DRAFT JULY 2021 (WIP)

	Change Made	Reason for Change	Impact of Change
STAGE B REVIEW (WIP)	1. Approach and egress alignments of cycle tracks refined. Details of protected kerbs and road markings refined. 2. Cycle facilities extended on adjacent arms of Fitzwilliam Street and Baggot Street Lower, including protected waiting area for cyclists to egress into general traffic lane on Baggot Street Lower. 3. Additional details provided on landscaping proposals in the vicinity of the junction. 4. Cycle time extended to 120 seconds to improve junction operation. 5. Pedestrian green time extended from 6 seconds to 11 seconds.	1. To provide optimum route through and around the junction for cyclists. To ensure cyclist safety and accommodate traffic signal infrastructure required. 2. To bring cyclists safely through and beyond the junction, and to integrate with external cycle facilities. 3. To align General Arrangement design with landscaping design. 4. Cycle time extended to maximise the throughput of people through the junction and cater for the long all red pedestrian phase 5. People movement calculator identified shortcomings with respect to the assigned capacity to pedestrians.	1. Improved cycling facilities with localised reallocation of space from carriageway and footpaths to cycle tracks. Wider upstand kerbs provided with localised narrowing of cycle tracks where required. 2. Additional markings and protection kerbs provided within design. 3. Soft landscaping proposed on existing median on eastern arm. 4. Increased cycle time improves capacity at junction and ensures more time for pedestrians to cross.
FINAL DRAFT JULY 2021 (WIP)	1. Cycle kerb on Fitzwilliam St. Curtailed to create a gap. 2. The LINSIG analysis has been updated to reflect each of the individual crossings for cyclists within the junction.	1. To facilitate easier access to the cycle track for cyclists who may have passed through the junction using the bus lane.	1. Improved access to the cycle track.

ARUP

Description of Options cond.

- Interim Design Development (where relevant)
- Stage B Review
- Final Draft (Work In Progress)


Subject BusConnects Core Bus Corridors Junction Design Rationale
Date July 2021
Route Ballsbridge/Blackrock to City Centre CBC Scheme Job No/Ref 268401/00

Ballsbridge 01: Baggot Street Lower / Fitzwilliam Street Upper

Capacity / Delay

1. Junction operates over capacity in the AM peak only.
2. Requires micro-simulation modelling to fully assess capacity, cycle crossings, and bus delay.

People Movement Calculator – Capacity

Peds Cyclists Bus General Traffic Total People Movement Capacity

Do Something : 2028 : AM

Cycle = 120 secs
PRC = -7.2%
Delay = 18 pcu/hr

Bus delay
Inbound = 71s
Outbound = 76s

Do Something : 2028 : PM

Cycle = 120 secs
PRC = 56%
Delay = 11 pcu/hr

Bus delay
Inbound = 71s
Outbound = 76s

ARUP

LinSig Outputs and People Movement Calculator

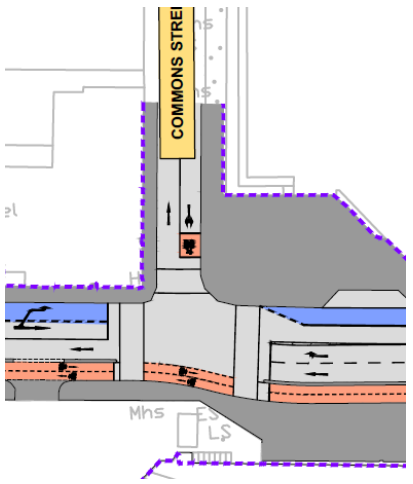
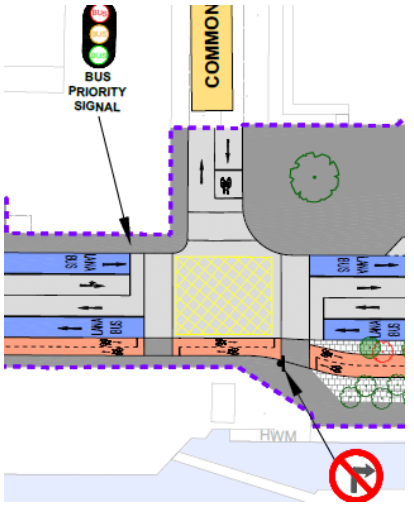
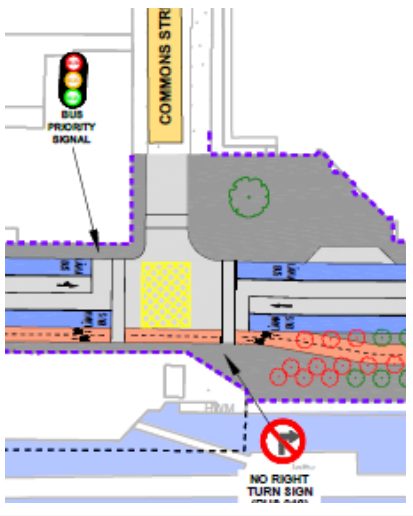
- People Movement Calculator
- Flow Diagrams
- LinSig Results

Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

Commons Street/Custom House Quay

Summary
Junction is in compliance with the BusConnects Preliminary Design Guidance Booklet with respect to pedestrians, cyclists and buses.
Layout of junction updated introducing protected cycle infrastructure and new Bus lane infrastructure in the eastbound and westbound direction.
The design rationale is to provide more priority to buses, enable bus priority signalling, and to improve pedestrian and cyclist safety.

Signal Operation
A five stage signal operation is proposed.
Bus priority signal for right turning buses and Signal controlled priority.
Pedestrian crossings operate in their own stage.

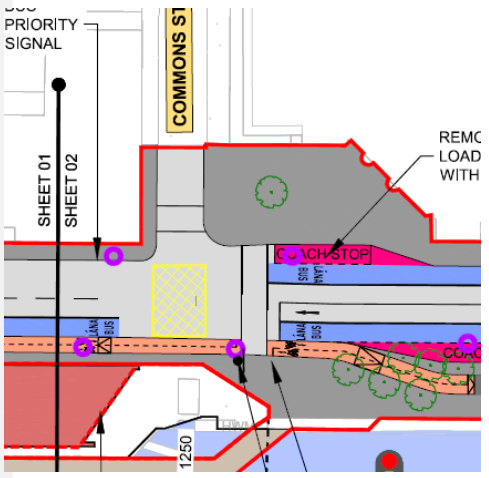
	Change Made	Reason for Change	Impact of Change
EXISTING 	1. Two-way cycle track introduced on the quay side. 2. Removal of outbound advisory cycle lane 3. ASL provided on Commons Street 4. Widened pedestrian crossings	1. To provide continuous cycle infrastructure. 2. Allows outbound bus lane to develop 3. To provide a stacking space for cyclists from Commons Street. 4. To improve pedestrian crossing capacity.	1. Improved cycle infrastructure along the north quays in both directions 2. Improved bus priority in the outbound direction 3. Improved cycle infrastructure. 4. Improved pedestrian facilities
EPR 			
DRAFT PRO (PC2) 	1. Inbound bus lanes introduced. 2. Right turn lane removed and right turn general traffic ban introduced 3. Left turn manoeuvres to be made from the general traffic lane	1. To provide inbound bus infrastructure on the north quays 2. To provide dedicated bus lane infrastructure 3. To provide dedicated bus lane infrastructure.	1. Footpath narrowed on south side 2. Improved bus priority in the inbound direction 3. Improved bus priority in the outbound direction
DRAFT PRO (PC3) 	1. Commons Street stop line reverted to existing location	1. Left turning buses require the stop line to be set back to accommodate the overswing	1. Facilitates left turning buses

Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

Commons Street/Custom House Quay

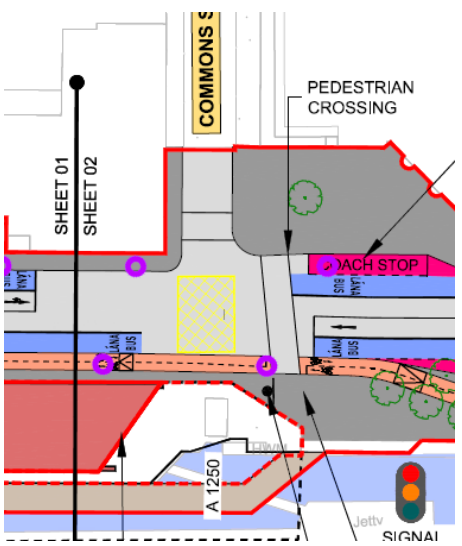
EXISTING

STAGE B REVIEW



Change Made	Reason for Change	Impact of Change
1. Coach stop added in both directions 2. Boardwalk provided around existing building 3. Outbound bus and general traffic stop lines set back 4. Western arm pedestrian crossing removed	1. To continue to accommodate services as existing 2. To overcome the pedestrian footpath constraint created adjacent to the building 3. To better accommodate left turning buses from the bus lane 4. Insufficient room for waiting pedestrians who may overflow onto the cycle track	1. Coach services retained 2. Improved pedestrian facilities 3. Improved priority and for left turning buses 4. Removal of potential conflict between cyclists and pedestrian

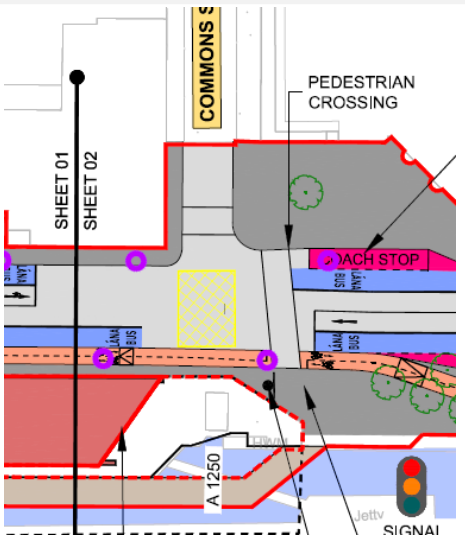
FINAL DRAFT (WIP)



1. Eastern arm north-south pedestrian crossing realigned 2. Eastbound stop line adjusted closer to the junction	1. To provide sufficient set back from coach stop 2. Staging plan modified to accommodate better left turning manoeuvres.	1. Improved intervisibility for pedestrians. 2. Decreased intergreen time to accommodate the manoeuvre.

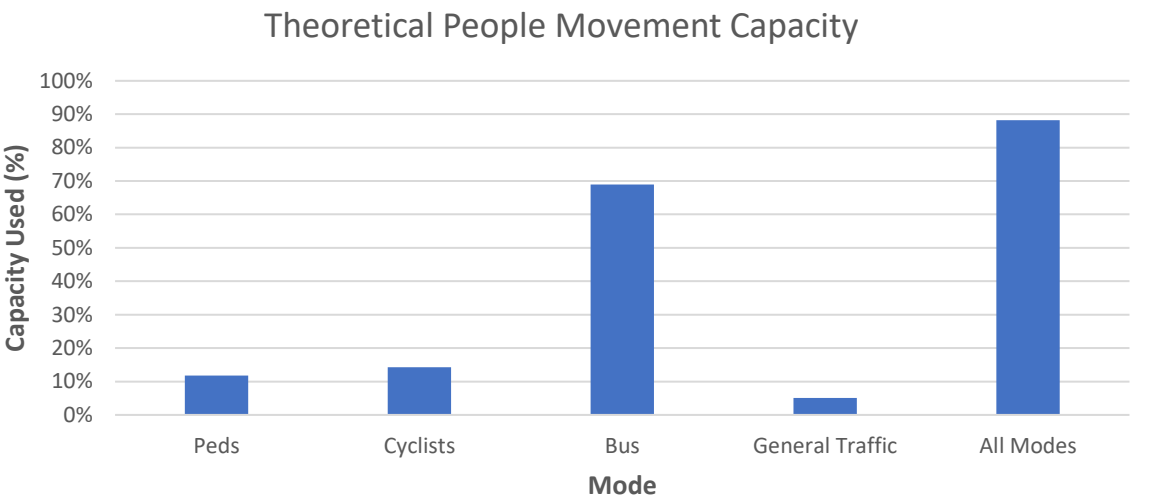
Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

Commons Street/Custom House Quay



Capacity / Delay

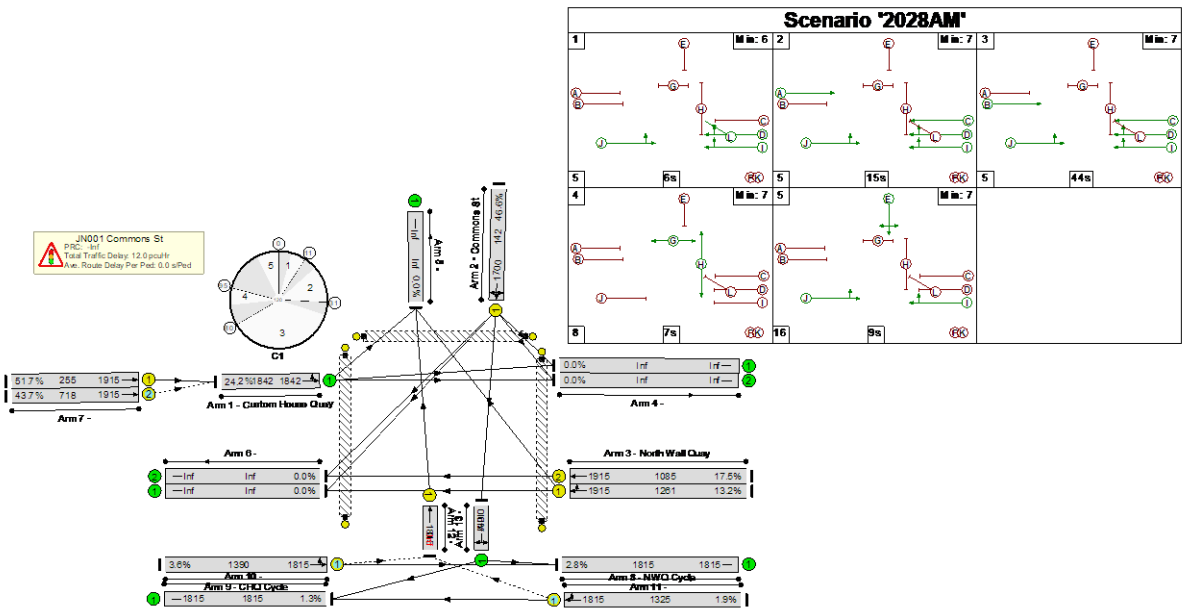
People Movement Calculator – Capacity



Do Something : 2028 : AM

Cycle = 120secs
PRC = 74.1%
Delay = 8pcuHr

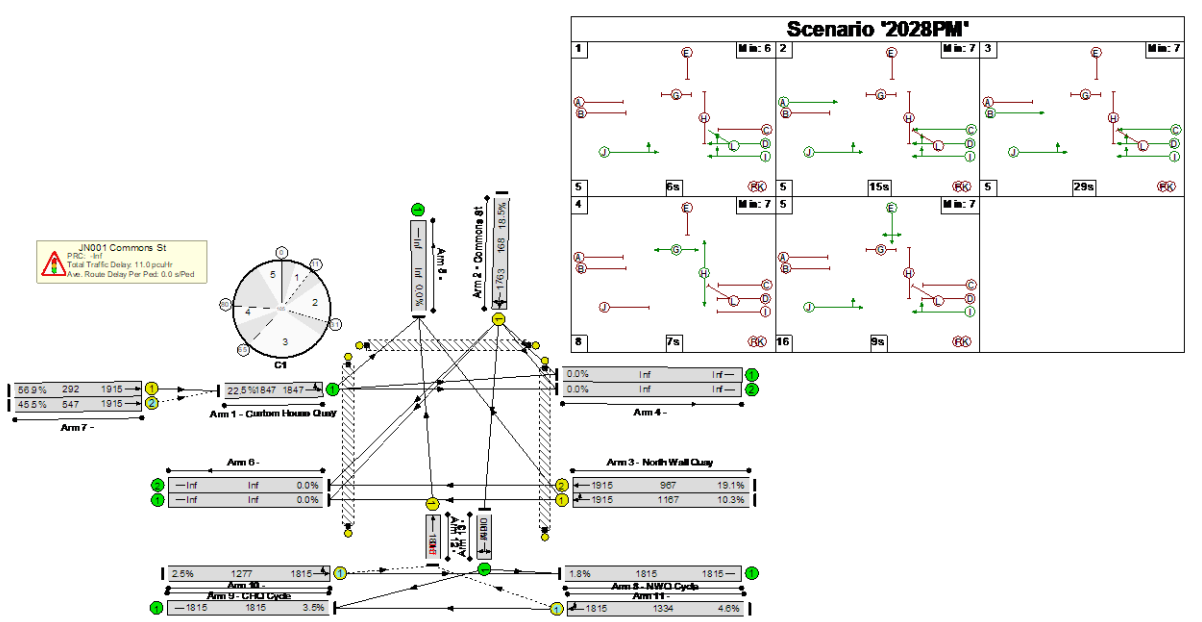
Bus Delay
Inbound = 9s
Outbound = 63s



Do Something : 2028 : PM

Cycle = 105secs
PRC = 58.2%
Delay = 7pcuHr

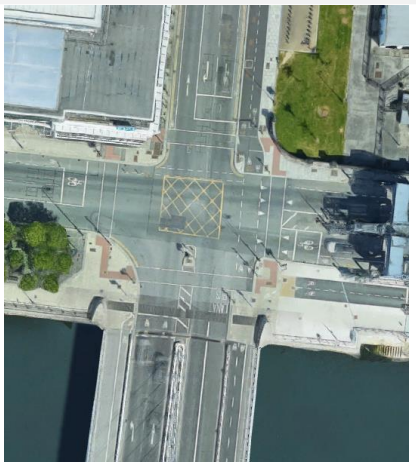
Bus Delay
Inbound = 10s
Outbound = 56s



Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

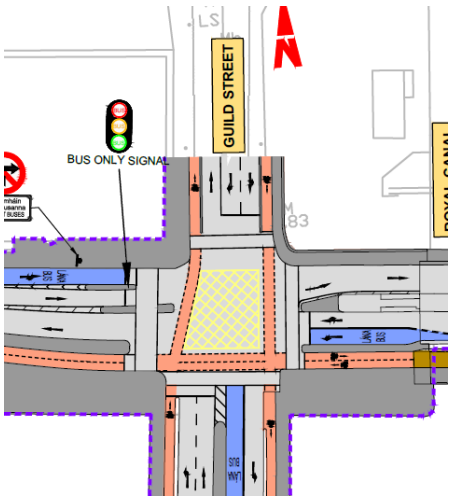
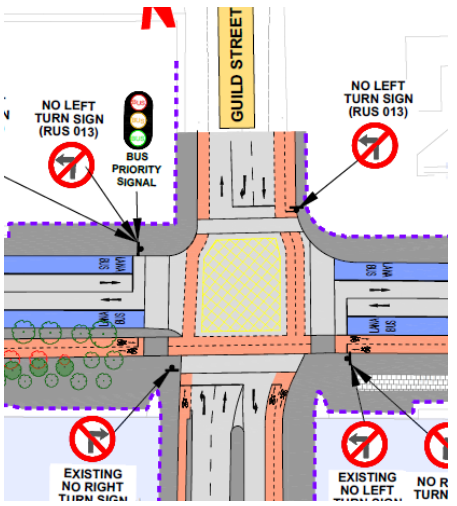
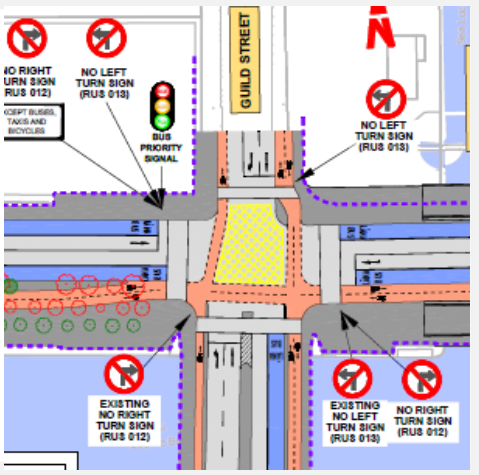
EXISTING

Guild Street/North Wall Quay



Summary
Junction is in compliance with the BusConnects Preliminary Design Guidance Booklet with respect to pedestrians, cyclists and buses.
Layout of junction updated introducing protected cycle infrastructure and new Bus lane infrastructure in the eastbound and westbound direction and improving approach and egress alignments.
The design rationale is to provide more priority to buses, enable bus priority signalling, and to improve pedestrian and cyclist safety.

Signal Operation
A seven stage signal operation.
Bus Priority Signal for right turning buses
Pedestrian crossings operate in their own stage.

	Change Made	Reason for Change	Impact of Change
EPR	 1. Two-way cycle track continued in the east west direction. 2. Bus gate introduced for outbound buses 3. Left turning Bus lane developed on eastern arm 4. Southbound lane reorientation on Samuel Beckett Bridge 5. Northbound cycle track removed from eastern north-south movement	1. To provide continuous cycle infrastructure. 2. To improve bus priority. 3. To improve bus priority. 4. To accommodate bus oversweeping movements 5. To provide wider footpaths.	1. Improved cycle facilities along the north quays in both directions 2. Improved outbound bus provision. 3. Improved southbound bus provision but cycle lane and ASL removed. 4. Improved southbound bus provision. 5. Reduced quality of cycle infrastructure along Royal Canal Greenway route
DRAFT PRO (PC2)	 1. Scherzer bridges relocated and two-way bus lanes introduced 2. Two-way north-south cycle track reinstated 3. Left turn bans introduced on three arms. 4. Southbound arm of Samuel Beckett Bridge reduced to one lane 5. No shared bus lanes 6. Widened pedestrian crossings	1. To increase the road carriageway width and provide uninterrupted bus infrastructure. 2. To maintain a high quality cycle along the Royal Canal Greenway 3. To maintain capacity of this critical junction 4. To improve the pedestrian facilities on the east side of the bridge 5. To improve bus priority. 6. To improve pedestrian facilities	1. Improved bus provision along the north quays and improve capacity at the junction 2. Existing high quality cycle infrastructure maintained 3. Sufficient volumes of traffic can be accommodated by the new staging plans 4. Reduced southbound capacity across the bridge 5. Dedicated bus stop to the stop line provided 6. Improve pedestrian facilities
DRAFT PRO (PC3)	 1. Protected cycle infrastructure introduced 2. Bus lane reintroduced southbound across the bridge	1. To improve the safety and segregation of the cyclists through the junction 2. Bus infrastructure required to maintain priority for west to south bus route	1. Improved cycle safety and segregation through the junction 2. Bus infrastructure reinstated and capacity restored across the bridge

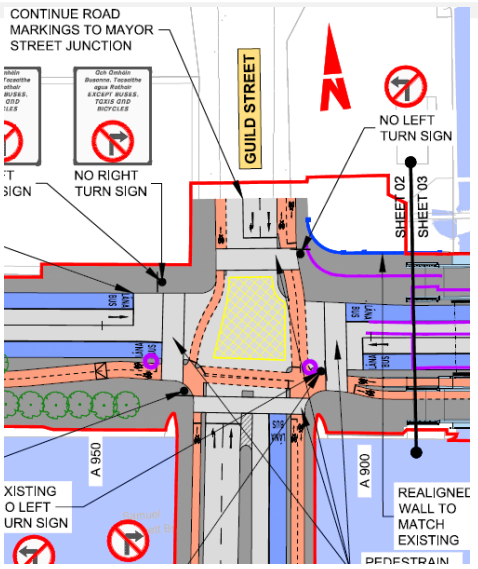
Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

Guild Street/North Wall Quay

	Change Made	Reason for Change	Impact of Change
EXISTING			
STAGE B REVIEW	1. Improved protected cycle infrastructure 2. Pedestrian crossings further widened where possible 3. Two-way cycle track alignment modified	1. To improve the safety and segregation of the cyclists through the junction 2. To improve pedestrian provision 3. A better understanding of the space requirements for the relocated Scherzer bridges	1. Improved cycle safety and segregation through the junction 2. Improved pedestrian provision 3. Improved space for Scherzer bridges in their new locations
FINAL DRAFT	1. None	1. None	1. None

Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

Guild Street/North Wall Quay



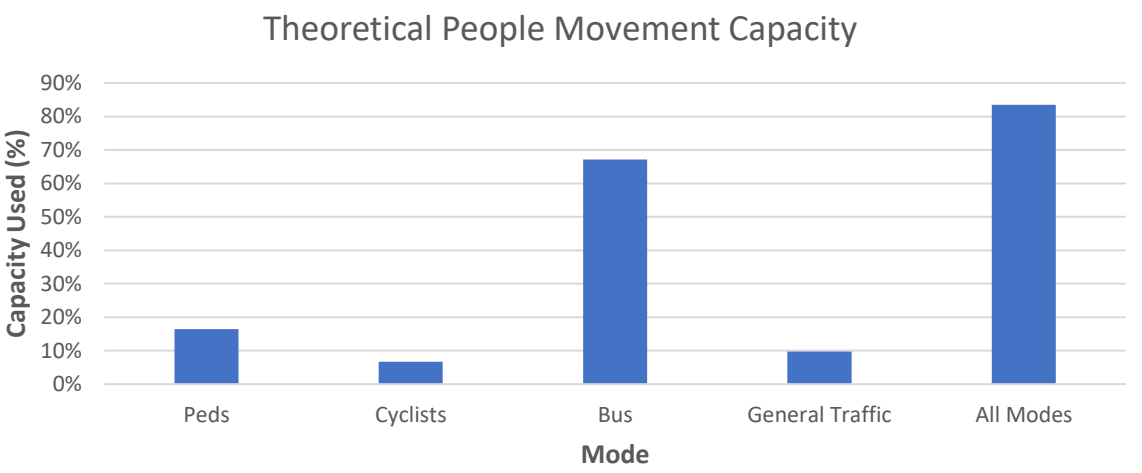
Do Something : 2028 : AM

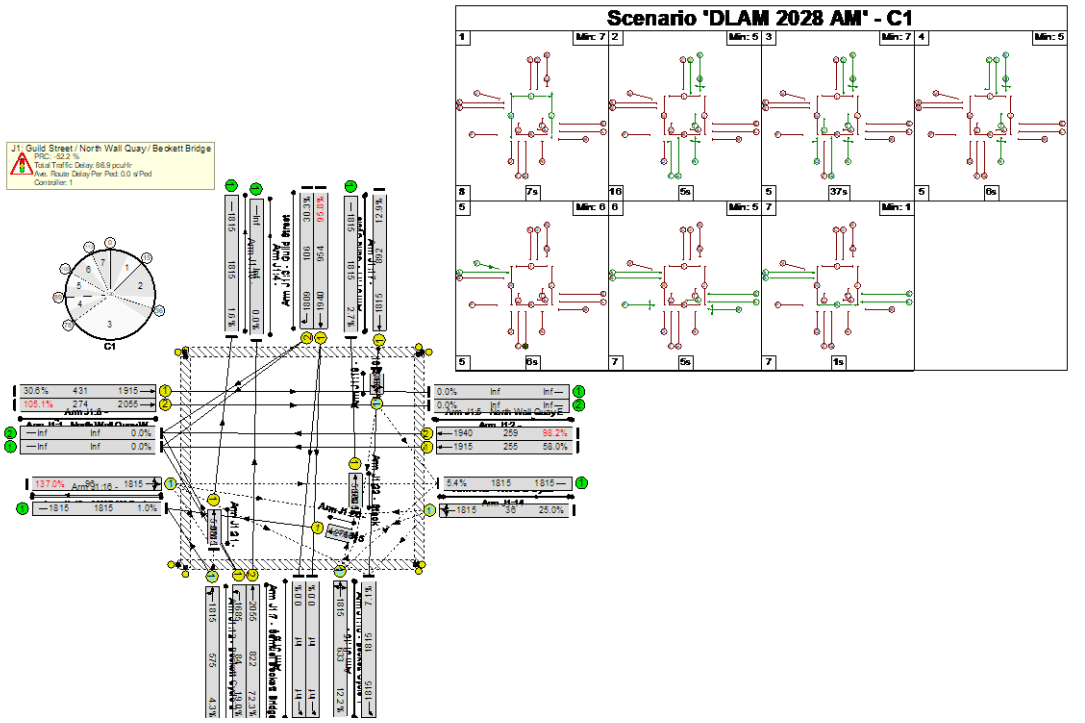
Cycle = 120secs
PRC = -52.2%
Delay = 87pcuHr

Bus Delay
Inbound = 65s
Outbound = 45s

Capacity / Delay

People Movement Calculator – Capacity

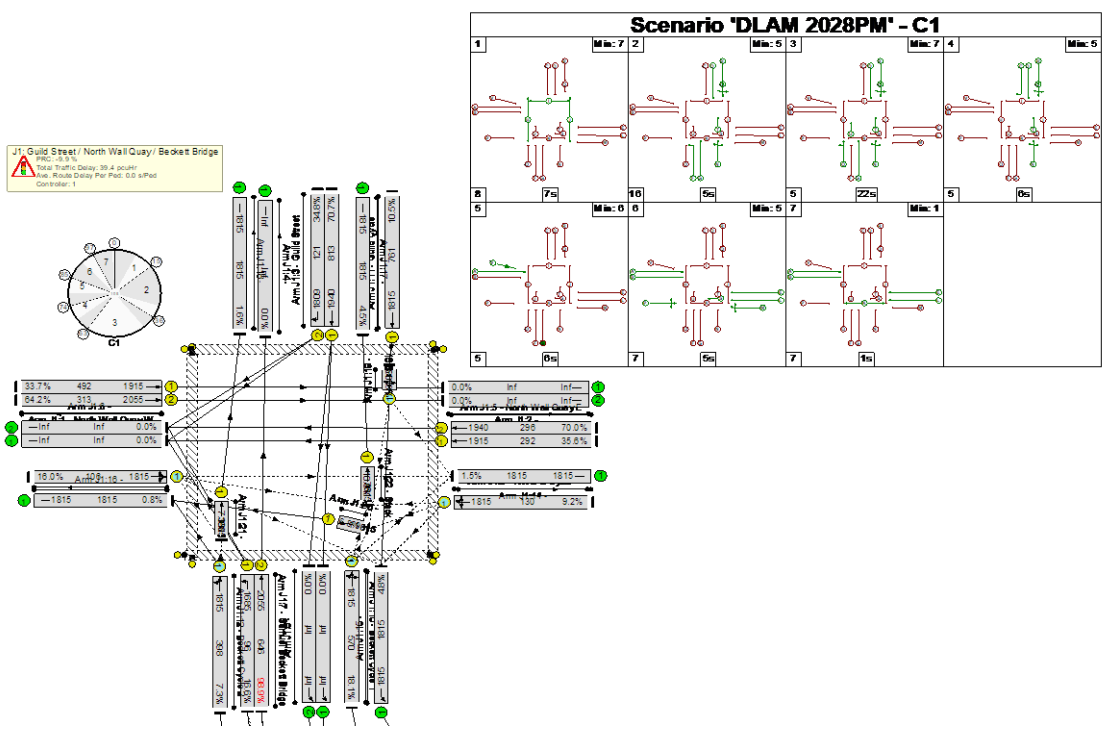




Do Something : 2028 : PM

Cycle = 105secs
PRC = -9.9%
Delay = 39pcuHr

Bus Delay
Inbound = 37s
Outbound = 49s

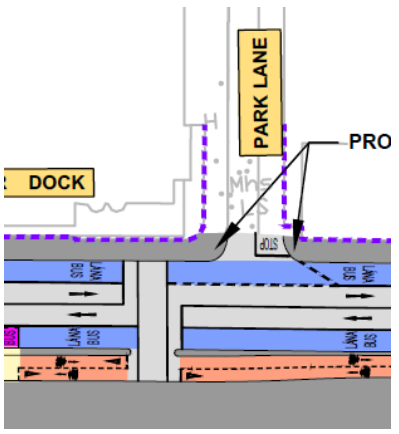
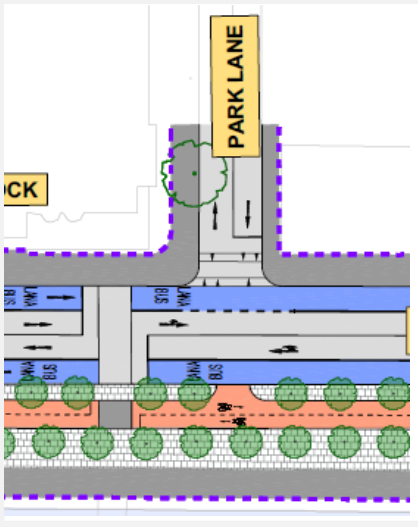
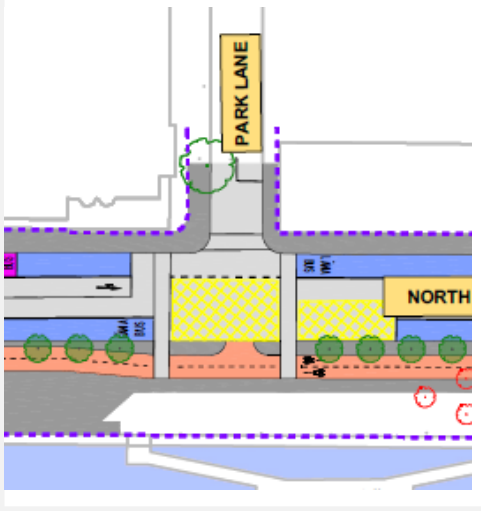


Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

Park Lane/North Wall Quay

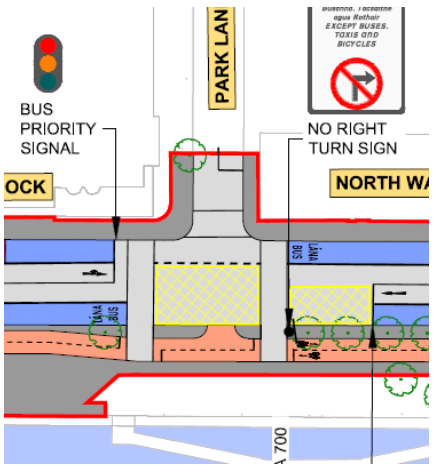
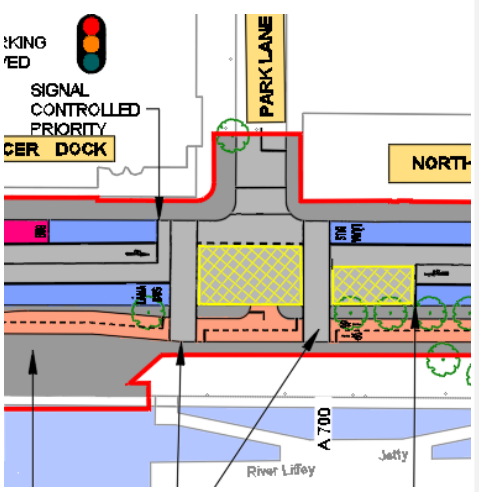
Summary
Junction is in compliance with the BusConnects Preliminary Design Guidance Booklet with respect to pedestrians, cyclists and buses.
Layout of junction updated introducing protected cycle infrastructure and removing on street parking to include new Bus lane infrastructure.
The design rationale is to provide more priority to buses, enable bus priority signalling, and to improve pedestrian and cyclist safety.

Signal Operation
A six stage signal operation.
Bus priority signal for right turning buses
Pedestrian crossings operate in their own stage.

	Change Made	Reason for Change	Impact of Change
EXISTING 			
EPR 	1. Two-way continuous cycle track introduced on the southern side. 2. Outbound bus lane infrastructure introduced 3. Signalised junction removed 4. Pedestrian crossing provided	1. To provide continuous cycle infrastructure. 2. To improve the bus priority infrastructure along the bus corridor 3. To improve traffic throughput along the north quays 4. To ensure pedestrian crossing ability is maintained	1. Improved cycle facilities along the north quays 2. Outbound cycle lane and on-street parking removed. 3. Controlled pedestrian crossing removed and junction capacity impacted 4. Ensures continuation of pedestrian crossing opportunity
DRAFT PRO (PC2) 	1. Raised pedestrian platform provided across Park Lane arm 2. Access provided for cyclists on the two-way cycle track to and from Park Lane 3. Tree landscaping included	1. To improve pedestrian crossing priority across the Park Lane arm 2. To improve interconnectivity between radial and orbital cycle infrastructure 3. To ensure segregation between cyclists and pedestrians	1. Better pedestrian safety and priority across the junction 2. Direct access provided for cyclists to and from Park Lane 3. Improved visual amenity and character of the campshires
DRAFT PRO (PC3) 	1. Reduced landscaping 2. Junction control reintroduced 3. Controlled crossings across cycle track	1. Taking into consideration separate plans for the Liffey Campshires 2. To ensure safe movements for cyclists to and from Park Lane 3. To ensure pedestrian priority across the cycle tracks	1. Reduced landscaping and footpath adjacent to the cycle track 2. Dedicated crossing phase introduced for radial cyclists and controlled pedestrian crossing across all arms of the junction 3. Increased pedestrian intergreen times and reduced operational capacity of the junction

Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

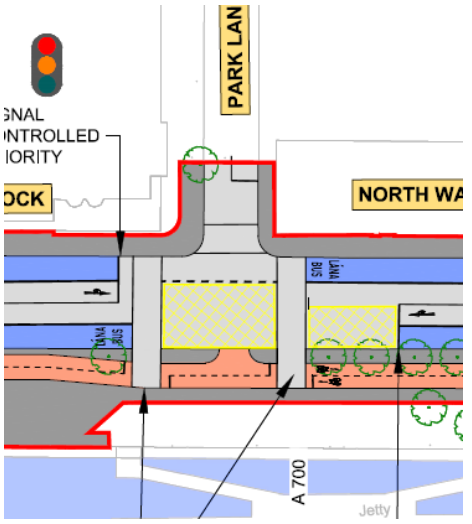
Park Lane/North Wall Quay

	Change Made	Reason for Change	Impact of Change
EXISTING 			
STAGE B REVIEW 	1. Pedestrian crossings widened 2. Right turn ban eastern arm.	1. To improve the pedestrian facilities at the junction 2. To improve the capacity of the junction	1. Improved pedestrian infrastructure 2. Restricted access for Park Lane residents
FINAL DRAFT 	1. Right turn provision reinstated	1. Impact to access for Park Lane residents	1. Access for Park Lane residents reinstated

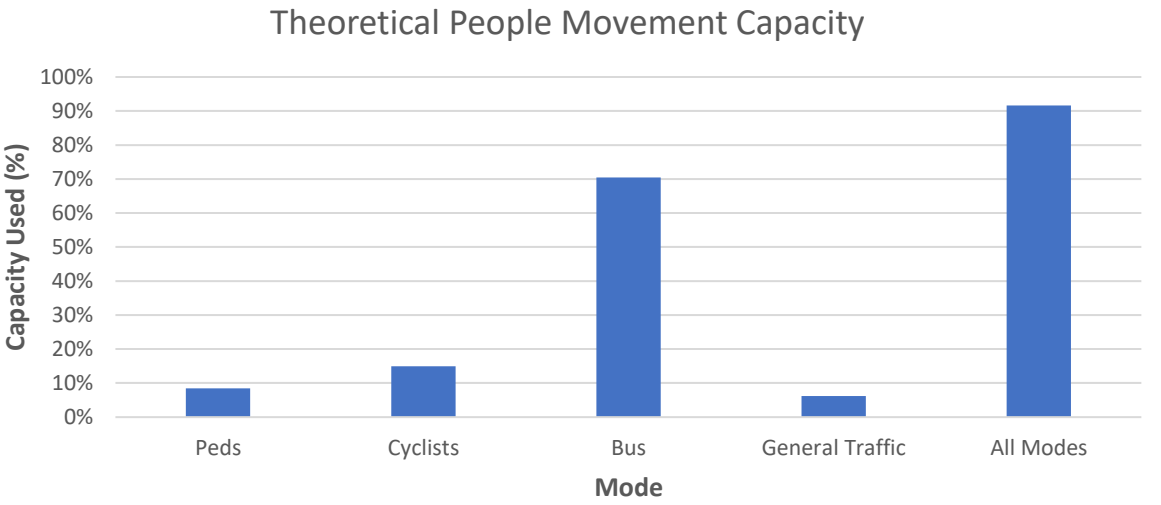
Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

Park Lane/North Wall Quay

Capacity / Delay



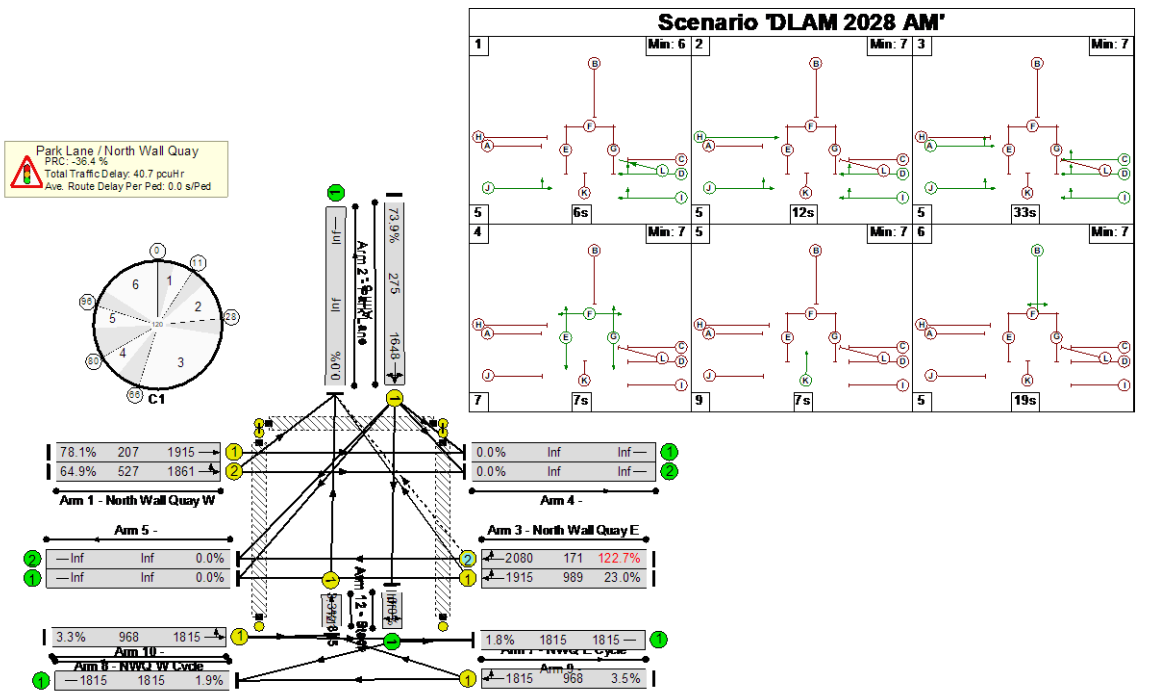
People Movement Calculator – Capacity



Do Something : 2028 : AM

Cycle = 120secs
PRC = -36.4%
Delay = 41pcuHr

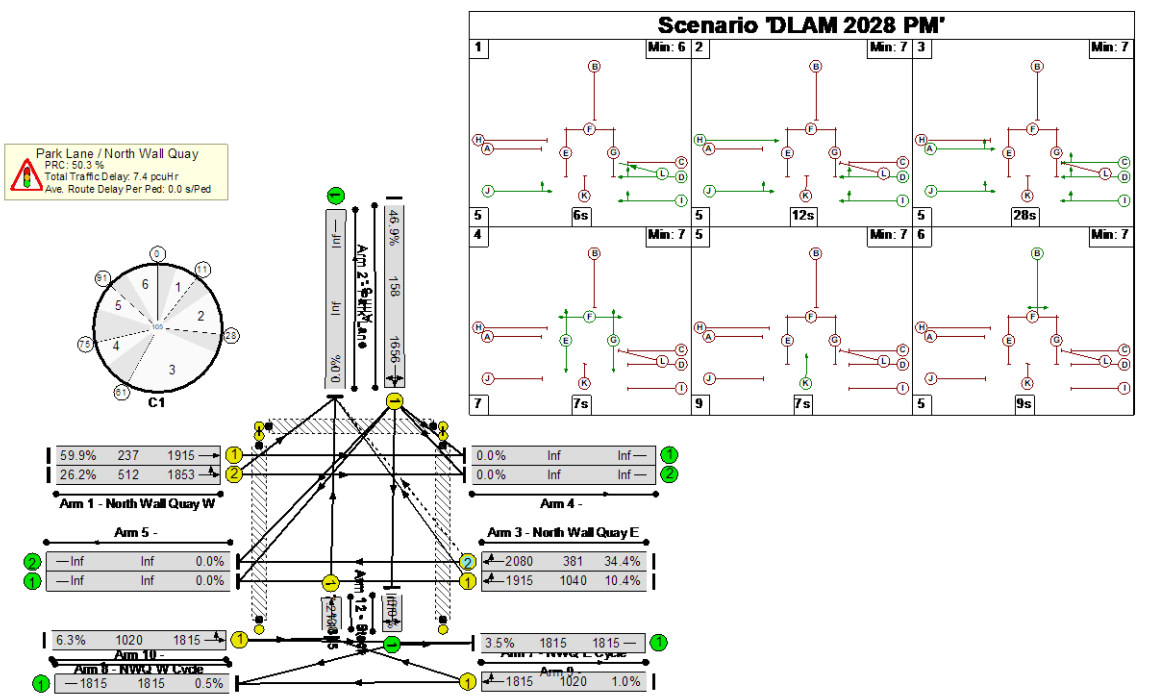
Bus Delay
Inbound = 18s
Outbound = 89s



Do Something : 2028 : PM

Cycle = 105secs
PRC = 50.3%
Delay = 8pcuHr

Bus Delay
Inbound = 14s
Outbound = 62s

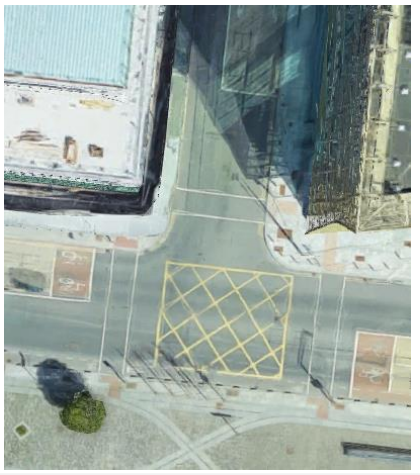
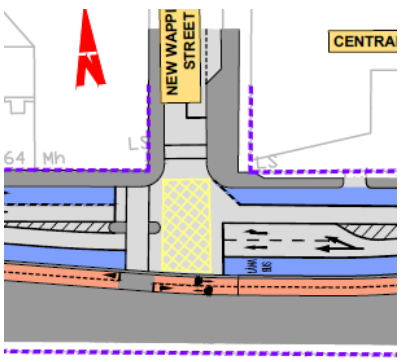
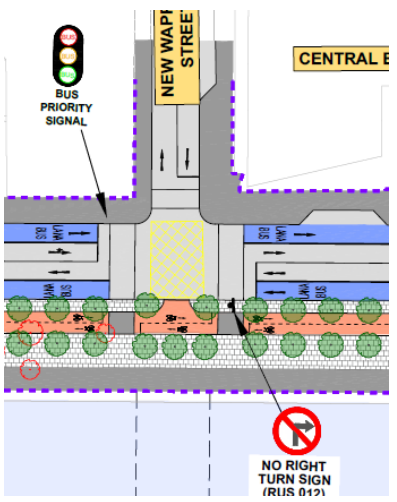
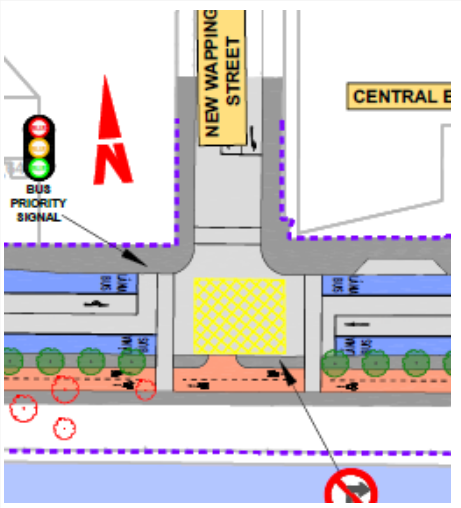


Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

New Wapping Street/North Wall Quay

Summary
Junction is in compliance with the BusConnects Preliminary Design Guidance Booklet with respect to pedestrians, cyclists and buses.
Layout of junction updated introducing protected cycle infrastructure and new Bus lane infrastructure in the eastbound and westbound direction and improving approach and egress alignments.
The design rationale is to provide more priority to buses, enable bus priority signalling, and to improve pedestrian and cyclist safety.

Signal Operation
A five stage signal operation.
Bus Priority Signal for right turning buses.
Pedestrian crossings operate in their own stage.

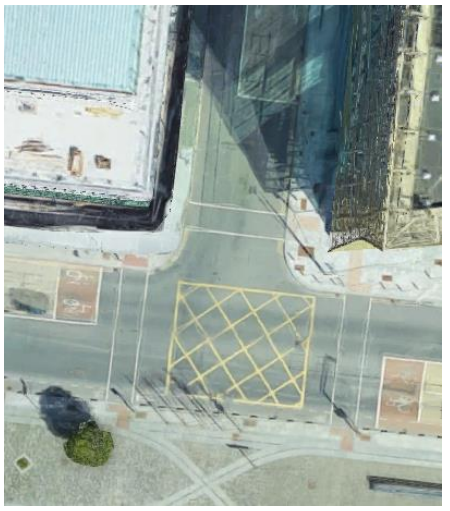
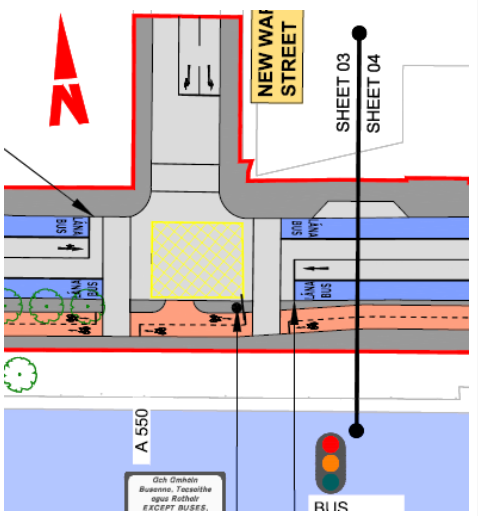
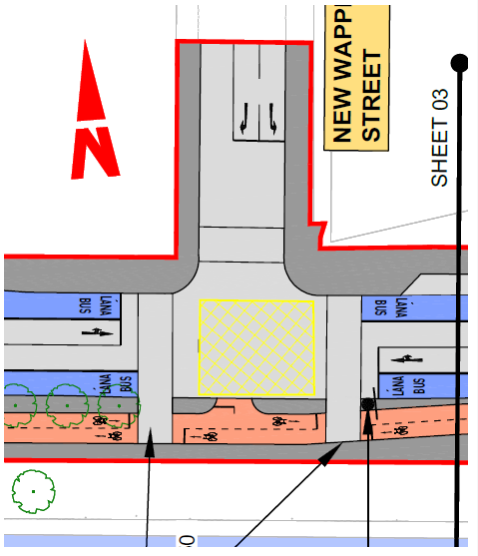
	Change Made	Reason for Change	Impact of Change
EXISTING			
EPR		1. Two-way continuous cycle track introduced on the southern side. 2. Bus lane infrastructure continuous through the junction 3. Reduced pedestrian crossing locations 4. New Wapping Street narrowed to single traffic lane	1. To provide continuous cycle infrastructure. 2. To improve the bus priority along the north quays 3. Reduced pedestrian footpath width on the northern footpath to accommodate both passing and waiting pedestrians 4. Anticipated reduced traffic demand	1. Improved cycle facilities along the north quays 2. Improved bus provision along the north quays. 3. Reduced pedestrian crossing opportunities 4. Improved public realm area
DRAFT PRO (PC2)		1. Pedestrian crossing reinstated 2. Access provided for cyclists on the two-way cycle track to and from New Wapping Street 3. Tree landscaping included 4. Right turn lane removed and right turn ban introduced	1. To reinstate existing crossing opportunities for pedestrians 2. To improve interconnectivity between radial and orbital cycle infrastructure 3. To ensure segregation between cyclists and pedestrians 4. To improve the operational capacity of the junction	1. Pedestrian crossing priority reinstated 2. Direct access provided for cyclists to and from New Wapping Street 3. Improved visual amenity and character of the campshires 4. Reduced impact on the Liffey Campshires and reduced carriageway width
DRAFT PRO (PC3)		1. Reduced landscaping 2. Two lanes on New Wapping Street reinstated 3. Controlled crossings across cycle track	1. Taking into consideration separate plans for the Liffey Campshires 2. Traffic capacity of the junction compromised 3. To provide pedestrian right of way across the cycle track	1. Reduced landscaping and footpath adjacent to the cycle track 2. Improved junction capacity 3. Increased pedestrian intergreen times and reduced junction operational capacity

Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

STAGE B REVIEW

FINAL DRAFT (WIP)

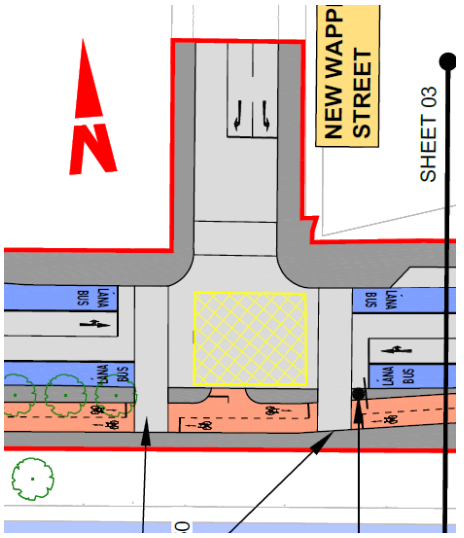
EXISTING

New Wapping Street/North Wall Quay			
			
	Change Made	**Reason for Change**	**Impact of Change**
	1. Further reduced landscaping	1. To improve pedestrian public realm area	1. Narrowed verge and wider pedestrian public realm
	1. Right turn manoeuvre reinstated	1. To maintain sufficient accessibility to East Wall	1. Reduced operational capacity of the junction but accessibility to deprived geographical area maintained

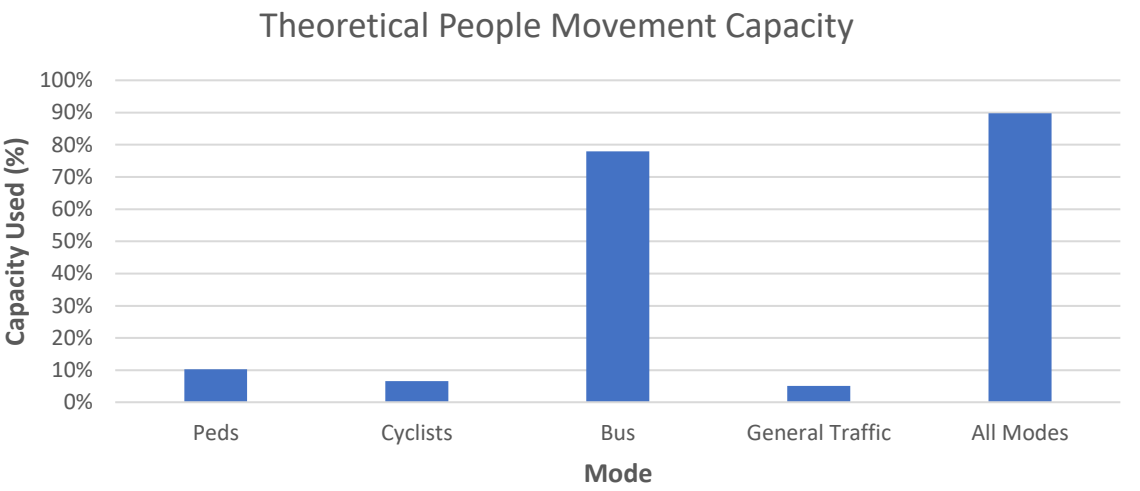
Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

New Wapping Street/North Wall Quay

Capacity / Delay



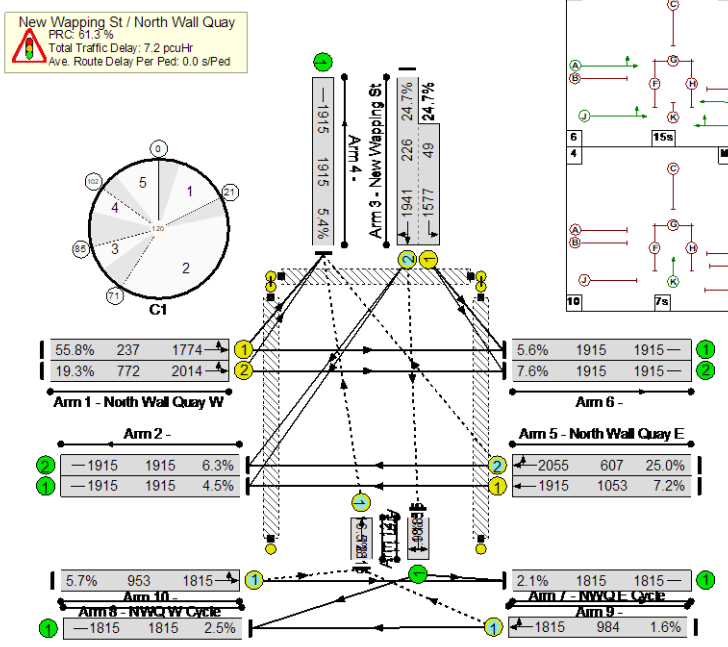
People Movement Calculator – Capacity

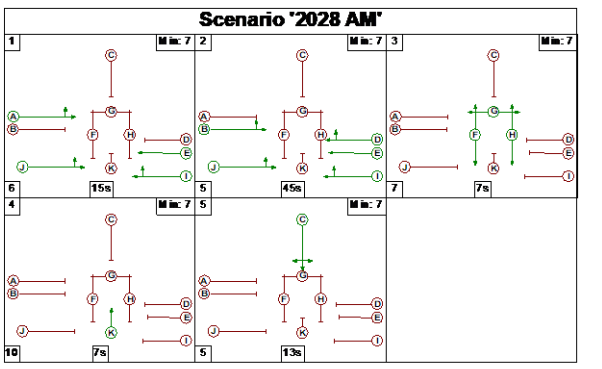


Do Something : 2028 : AM

Cycle = 120secs
PRC = 61.3%
Delay = 7pcuHr

Bus Delay
Inbound = 15s
Outbound = 66s

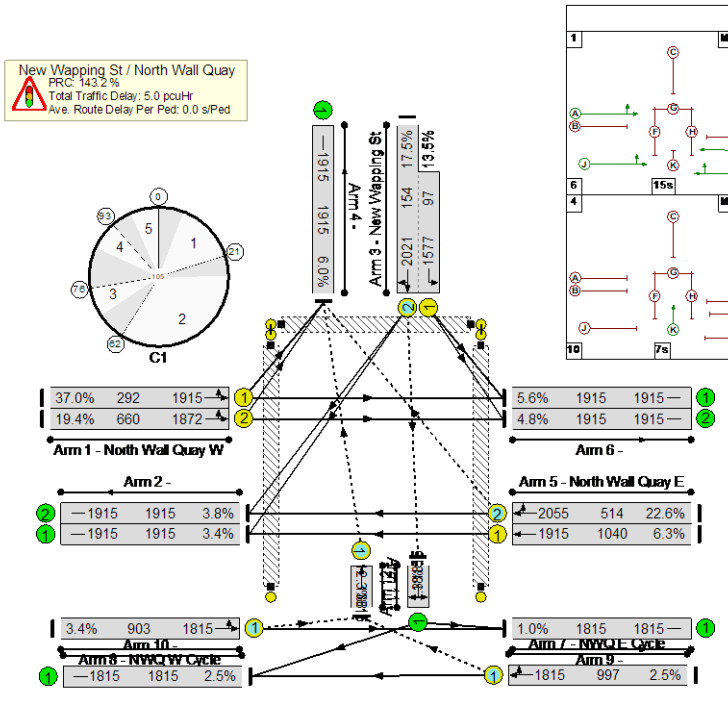


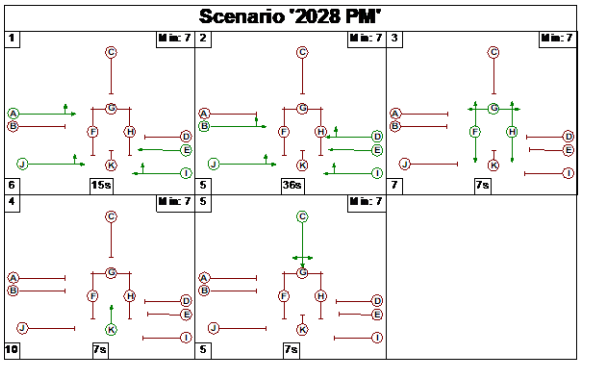


Do Something : 2028 : PM

Cycle = 105secs
PRC = 143.2%
Delay = 4.96pcuHr

Bus Delay
Inbound = 13s
Outbound = 50s



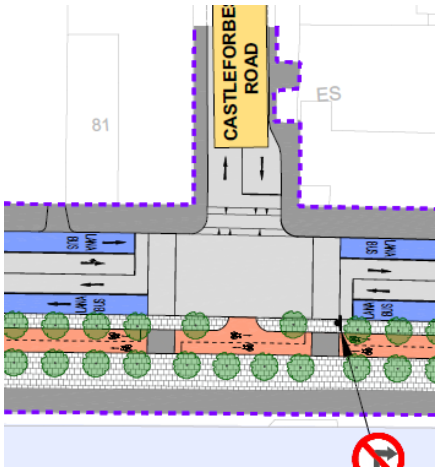
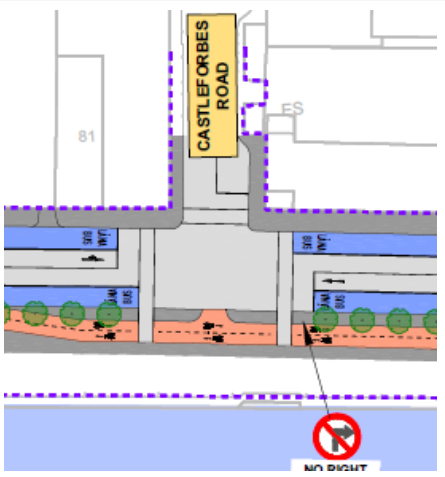


Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

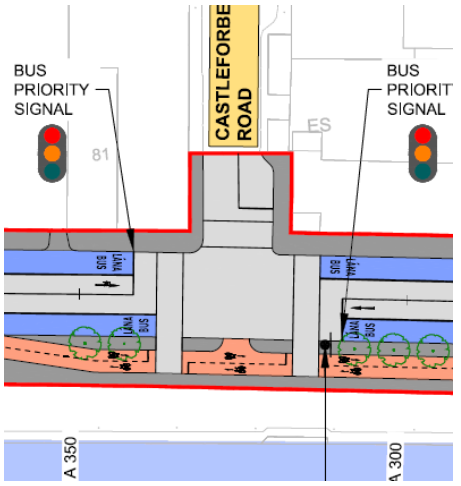
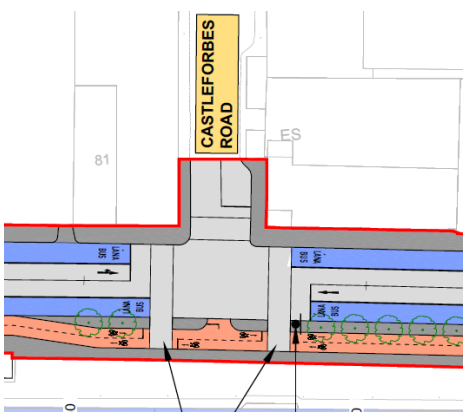
Castleforbes Street/North Wall Quay

Summary
Junction is in compliance with the BusConnects Preliminary Design Guidance Booklet with respect to pedestrians, cyclists and buses.
The Junction has become fully signalised junction with new pedestrian crossings and new protected cycle infrastructure and new Bus lane infrastructure have been introduced.
The design rationale is to provide more priority to buses, enable bus priority signalling, and to improve pedestrian and cyclist safety.

Signal Operation
A five stage signal operation.
Pedestrian crossings operate in their own stage.

		**Change Made**	**Reason for Change**	**Impact of Change**
EXISTING		1. Inbound bus lane introduced	1. To improve bus provision along the north quays	1. All parking removed and improved bus provision.
DRAFT PRO (PC2)		1. Fully signalised junction with complete pedestrian crossing facilities on all arms 2. Right turn ban introduced to Castleforbes Road 3. Access provided for cyclists on the two-way cycle track to and from Castleforbes Road 4. Tree landscaping included	1. To improve pedestrian crossing opportunities 2. To improve the operational capacity of the junction 3. To improve interconnectivity between radial and orbital cycle infrastructure 4. To ensure segregation between cyclists and pedestrians	1. Improved pedestrian facilities 2. Improved operation capacity through the junction 3. Direct access provided for cyclists to and from Castleforbes Road 4. Improved visual amenity and character of the campshires
DRAFT PRO (PC3)		1. Reduced landscaping 2. Fully signalised pedestrian facilities 3. Controlled crossings across cycle track	1. Taking into consideration separate plans for the Liffey Campshires To ensure the safety of pedestrians 2. Ensure priority for pedestrians crossing all arms of the junction 3. To ensure pedestrian right of way across cycle tracks	1. Reduced landscaping, footpath adjacent to the cycle track 2. Fully controlled pedestrian facilities 3. Increased pedestrian intergreen times and reduced operational capacity of the junction

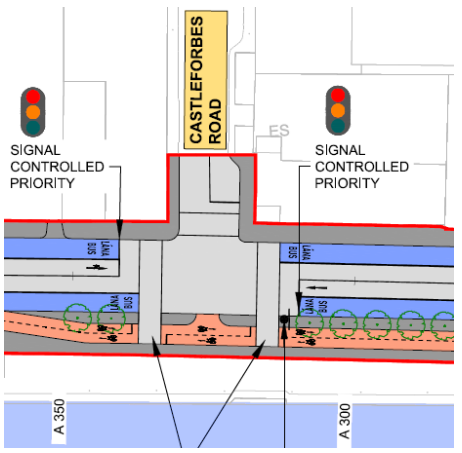
Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

	Castleforbes Street/North Wall Quay		
EXISTING			
		Change Made	**Reason for Change**	**Impact of Change**
STAGE B REVIEW		1. None	1. None	1. None
FINAL DRAFT		1. None	1. None	1. None

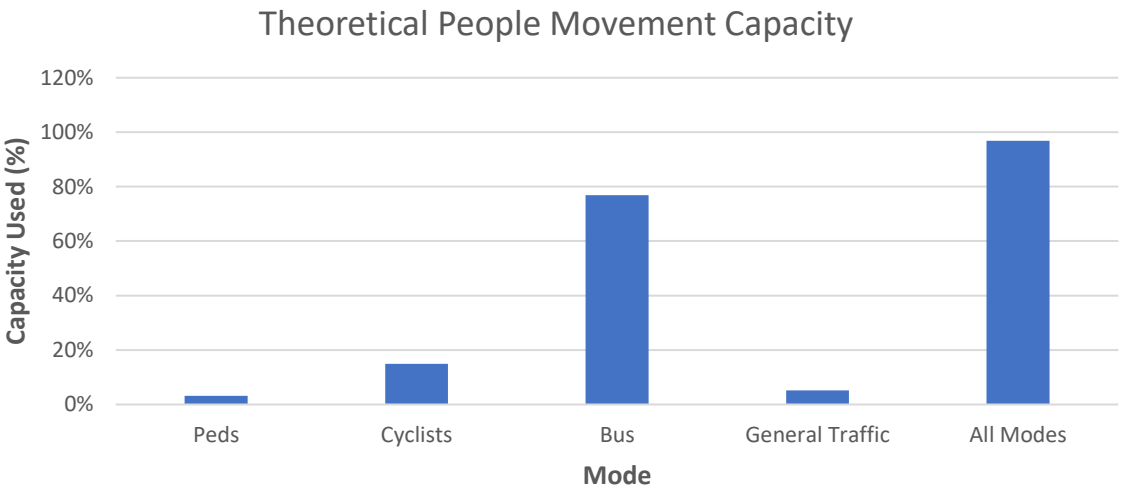
Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

Castleforbes Street/North Wall Quay

Capacity / Delay



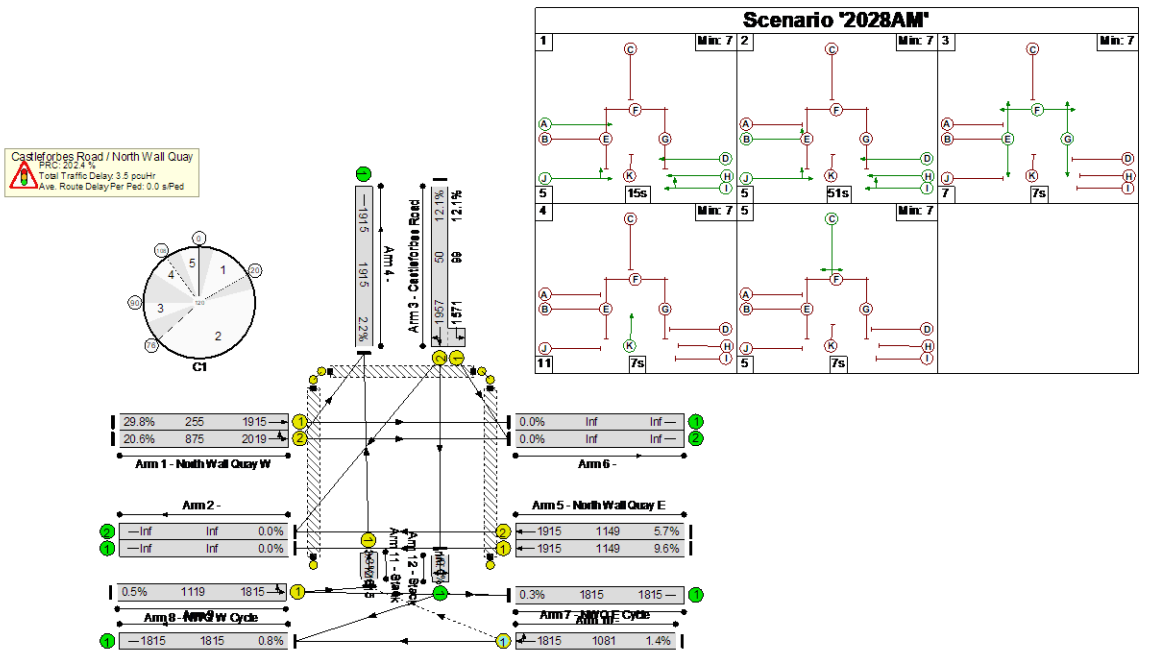
People Movement Calculator – Capacity



Do Something : 2028 : AM

Cycle = 120secs
PRC = 202.4%
Delay = 4pcuHr

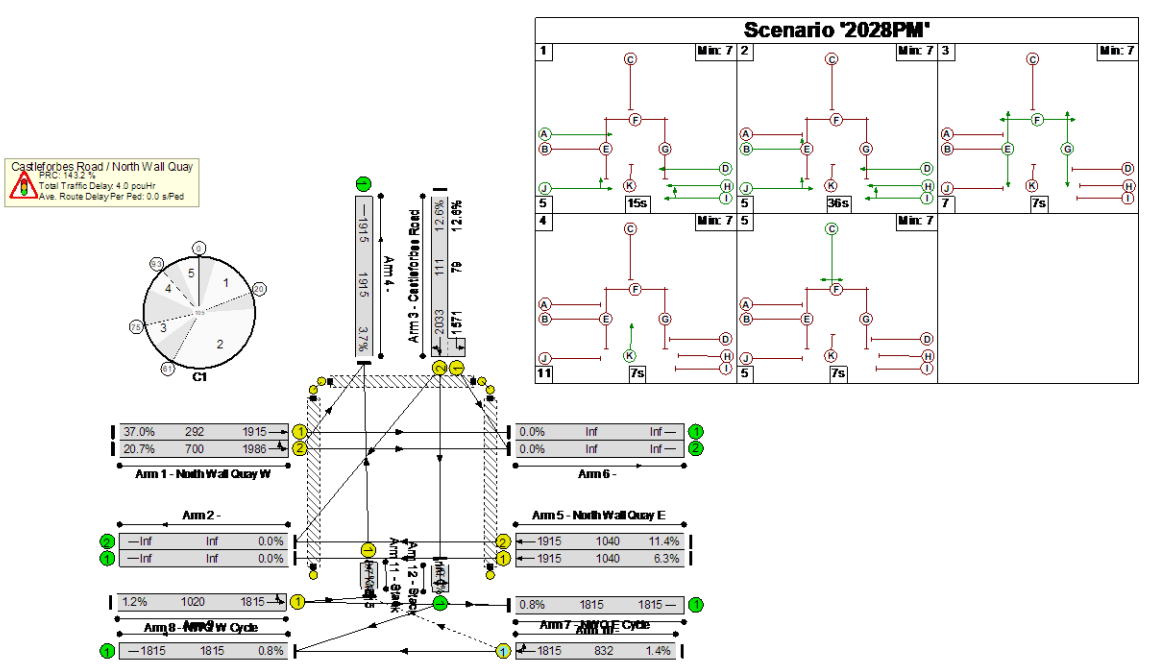
Bus Delay
Inbound = 12s
Outbound = 57s



Do Something : 2028 : PM

Cycle = 105secs
PRC = 143.2%
Delay = 4pcuHr

Bus Delay
Inbound = 13s
Outbound = 50s

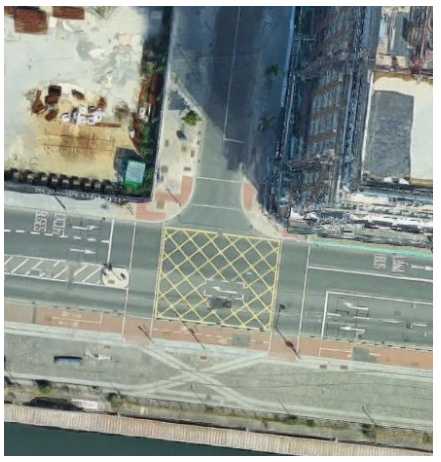
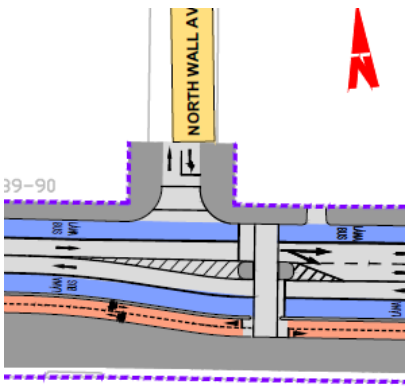
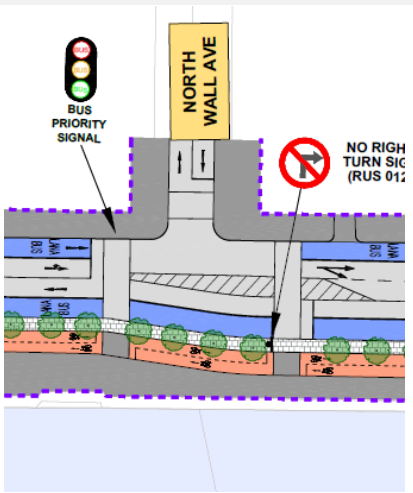
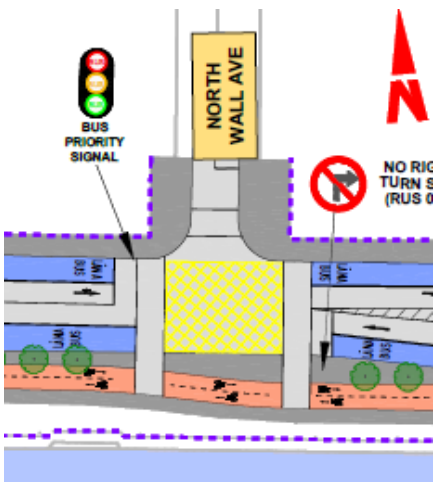


Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

North Wall Avenue/North Wall Quay

Summary
Junction is in compliance with the BusConnects Preliminary Design Guidance Booklet with respect to pedestrians, cyclists and buses.
Layout of junction updated introducing protected cycle infrastructure and new Bus lane infrastructure in the eastbound and westbound direction and improving approach and egress alignments.
The design rationale is to provide more priority to buses, enable bus priority signalling, and to improve pedestrian and cyclist safety.

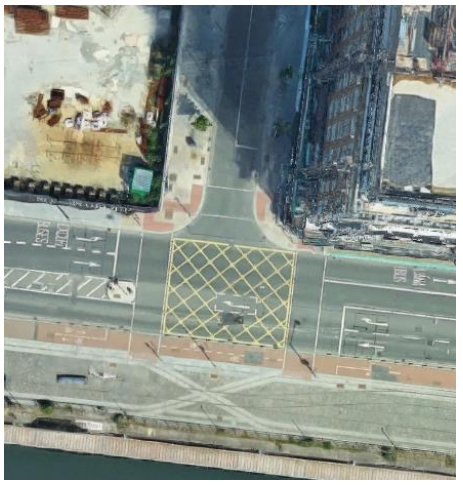
Signal Operation
A five stage signal operation.
Pedestrian crossings operate in their own stage.

	Change Made	Reason for Change	Impact of Change
EXISTING			
EPR		1. Removal of right turn lane to North Wall Avenue 2. Bus lane infrastructure introduced in the inbound direction 3. Removed pedestrian crossing at west of junction 4. North Wall Avenue left turn only	1. To provide for bus lane infrastructure 2. To improve bus priority along the north quays. 3. To align with junction layout modifications. 4. Traffic restrictions required due to geometic changes to the junction	1. Improved bus infrastructure along the north quays. 2. Improved bus infrastructure along the north quays. 3. Reduced pedestrian infrastructure provision. 4. Local traffic redistribution on the surrounding road network
DRAFT PRO (PC2)		1. Pedestrian crossing reinstated 2. Tree landscaping included 3. Right turn ban to North Wall Avenue 4. North Wall Avenue right turn reinstated	1. To provided a minimum level of service pedestrians 2. To improve the visual amenity and character of the Liffey Camshires 3. To improve the operational capacity of the junction 4. To minimise traffic redistribution on the surrounding corridor	1. Better pedestrian crossing opportunities 2. Improved visual amenity and character of the Liffey Campshires 3. Improved operational capacity of the junction
DRAFT PRO (PC3)		1. Updated lane alignment east of junction 2. Controlled crossings across cycle track 3. Removal of hatched central island 4. North Wall Avenue stop line set back	1. Increased footpath island on the southern side. 2. To ensure pedestrian priority across the cycle tracks 3. To align with the single lane exit outbound 4. To facilitate over-sweep by buses	1. Improved cycling and pedestrian facilities 2. Increased pedestrian intergreen times and reduced operational capacity of the junction 3. Reduced junction footprint 4. Safer turning manoeuvres onto North Wall Avenue

Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

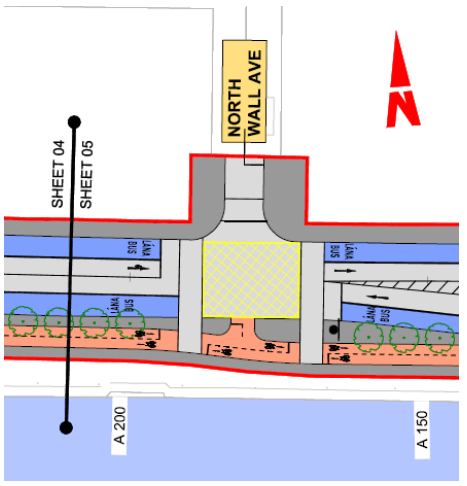
North Wall Avenue/North Wall Quay

EXISTING



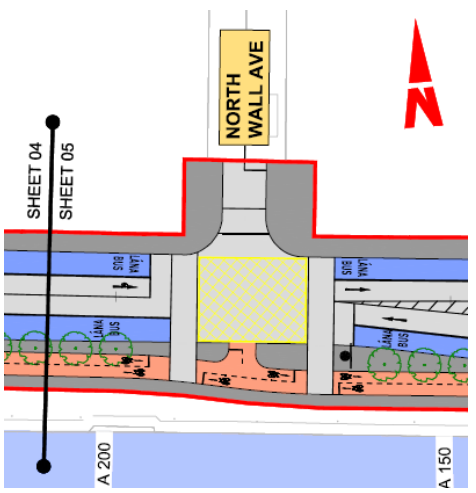
Change Made	Reason for Change	Impact of Change
1. Access provided for cyclists on the two-way cycle track to and from North Wall Avenue	1. To improve interconnectivity between radial and orbital cycle infrastructure	1. Direct access provided for cyclists to and from North Wall Avenue

STAGE B REVIEW



1. None	1. None	1. None

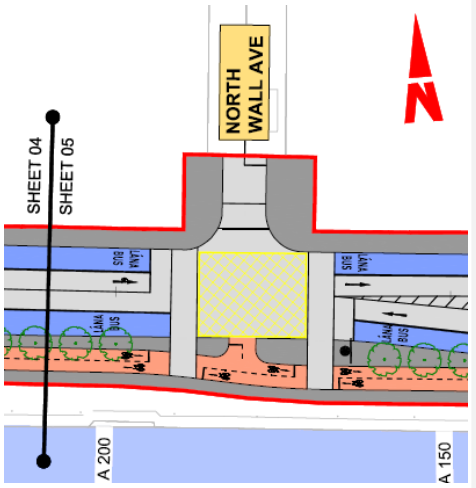
FINAL DRAFT



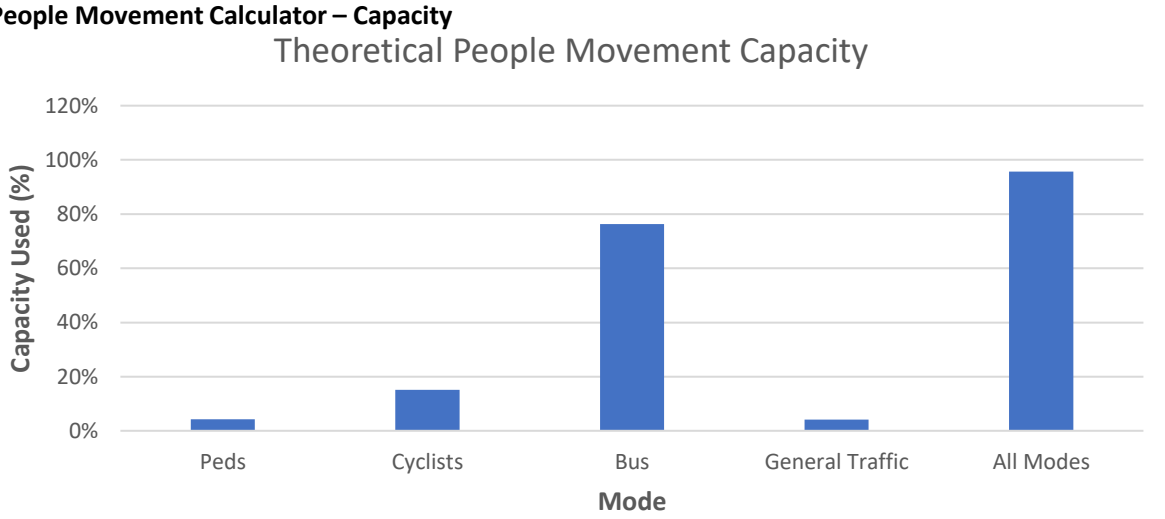
Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

North Wall Avenue/North Wall Quay

Capacity / Delay



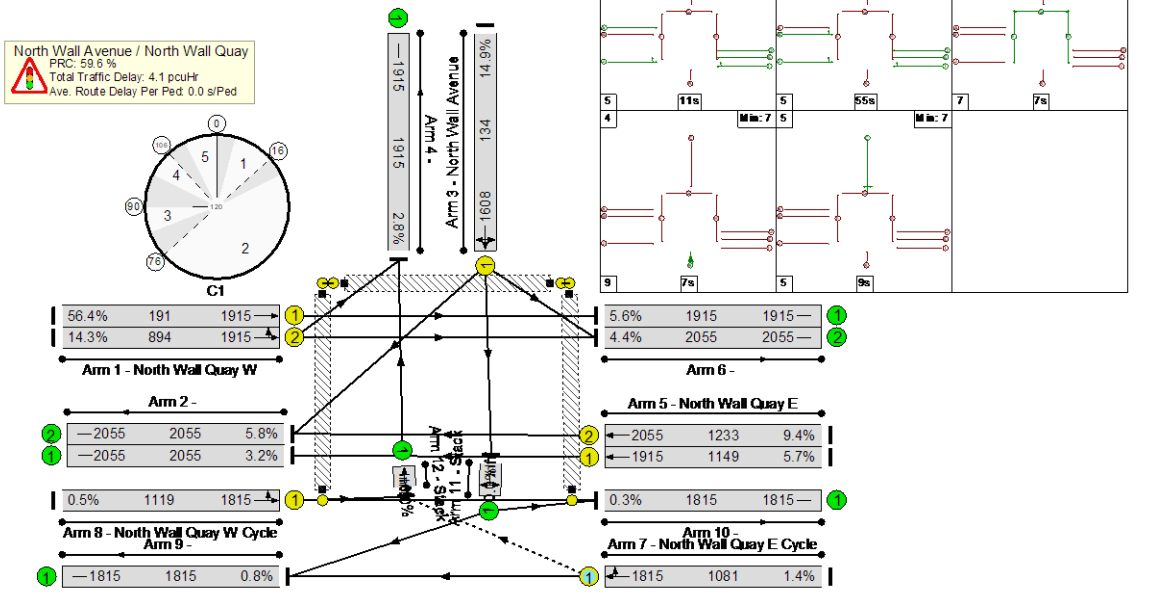
People Movement Calculator – Capacity



Do Something : 2028 : AM

Cycle = 120secs
PRC = 59.6%
Delay = 4pcuHr

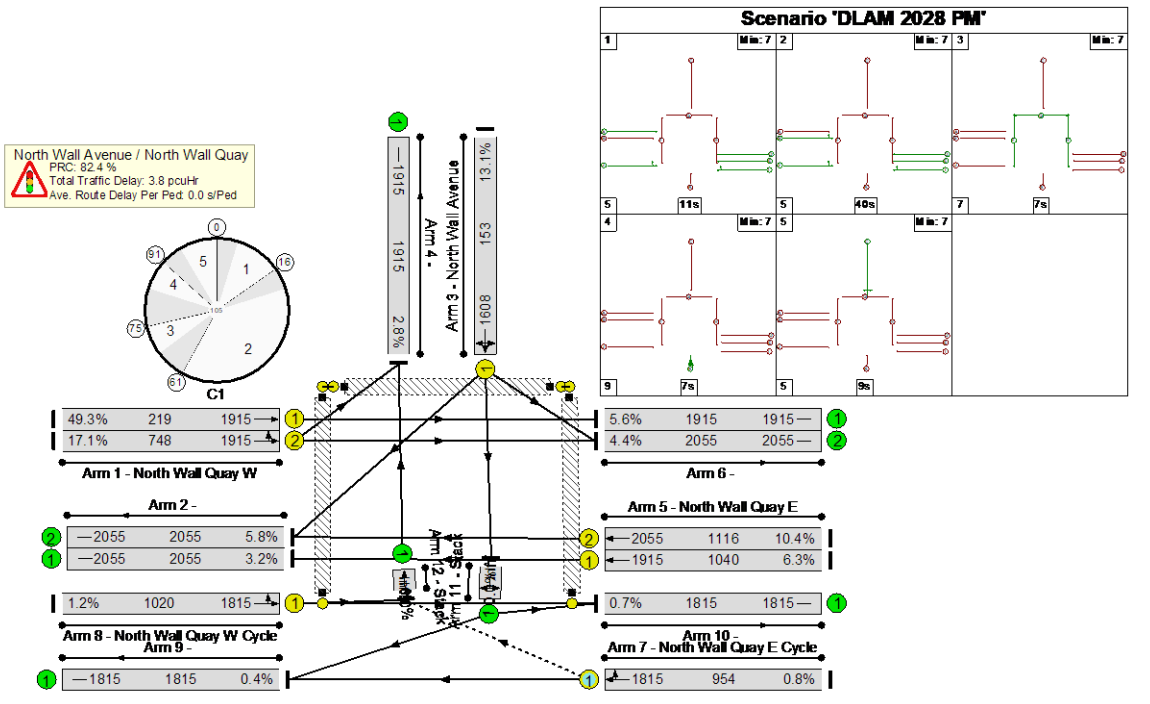
Bus Delay
Inbound = 12s
Outbound = 73s



Do Something : 2028 : PM

Cycle = 105secs
PRC = 82.4%
Delay = 4pcuHr

Bus Delay
Inbound = 13s
Outbound = 60s

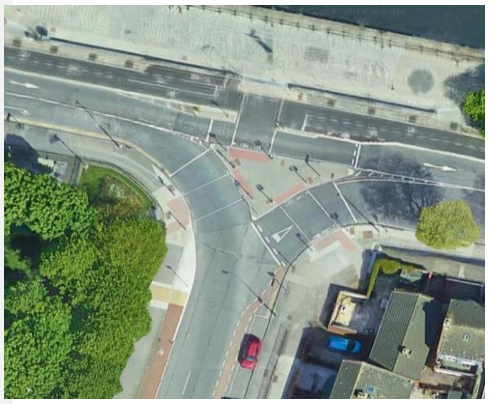
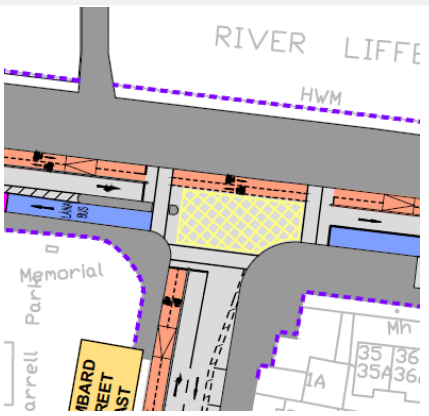
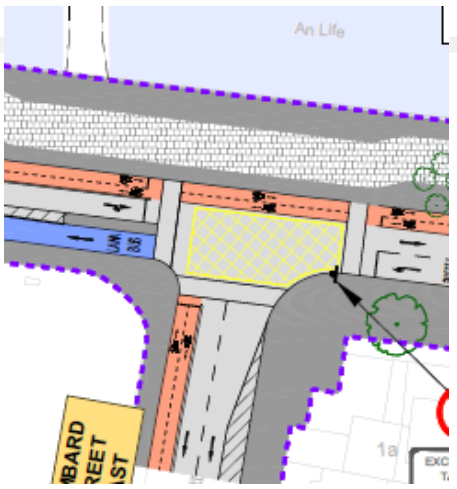
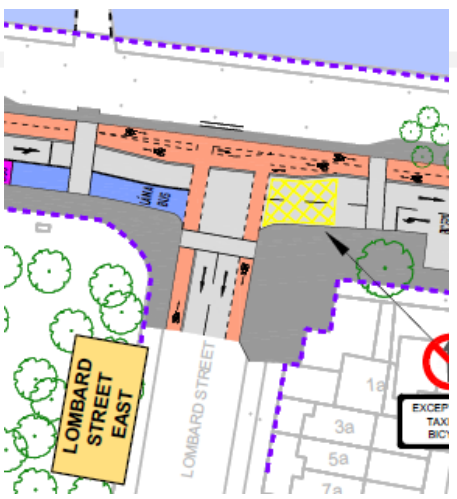


Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

Lombard Street/City Quay

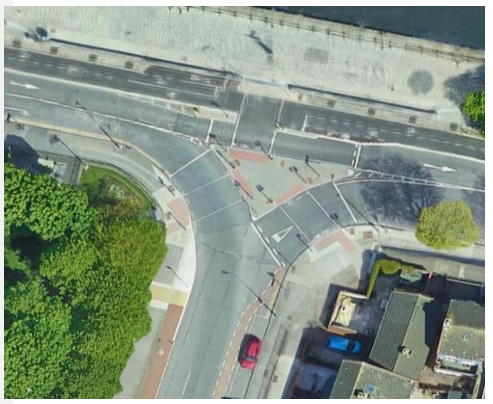
Summary
Junction is in compliance with the BusConnects Preliminary Design Guidance Booklet with respect to pedestrians, cyclists and buses.
Layout of junction updated introducing new Bus lane infrastructure and improving approach and egress alignments pedestrian and cycle crossing.
The design rationale is to provide more priority to buses, enable bus priority signalling, and to improve pedestrian and cyclist safety.

Signal Operation
A five stage signal operation.
Pedestrian crossings operate in their own stage.

	Change Made	Reason for Change	Impact of Change
EXISTING 			
EPR 	1. Removal of splitter island 2. Inbound bus lane infrastructure provided 3. South quays reduced to single eastbound lane 4. Nort-south two-way cycle track on Lombard Street East 5. Pedestrian crossing facilities re-configurated	1. To allow for the provision of bus infrastructure 2. To provide inbound bus priority along the south quays 3. To provide improved cycle facilities 4. All pedestrian crossings linked with the splitter island	1. Improved cycle infrastructure 2. Local traffic redistribution on alternative streets 3. Dedicated lane for turning right from the west removed to improved bus infrastructure. 4. Improved cycle infrastructure provision 5. Single crossing movements across all arms
DRAFT PRO (PC2) 	1. Bus lane shared with left turning at east of junction 2. Southbound cycle lane removed on Lombard Street East 3. Parking removed	1. Alternative streets not suitable to carry redistributed traffic 2. Alternative cycle track provided on western side of Lombard Street East 3. Reduce vehicular conflicts along Lombard Street East	1. Less impact on unsuitable alternative streets however reduced bus priority. 2. Reduced cycle infrastructure provision 3. Removal of amenity for local residents
DRAFT PRO (PC3) 	1. Access provided for cyclists on the two-way cycle track to and from Lombard Street East 2. Contra-flow cycle lane on Lombard Street East 3. Southbound cycle lane on Lombard Street East reinstated	1. To align with recent cycle track upgrades carried out by OPW 2. To tie in with existing cycle infrastructure further south on Lombard Street East 3. To tie in with existing cycle infrastructure further south on Lombard Street East	1. Direct access provided for cyclists to and from Lombard Street East and existing high quality cycle infrastructure provision retained 2. Ensures continuity in quality of cycle infrastructure on Lombard Street East 3. Ensures continuity in quality of cycle infrastructure on Lombard Street East

Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

Lombard Street/City Quay

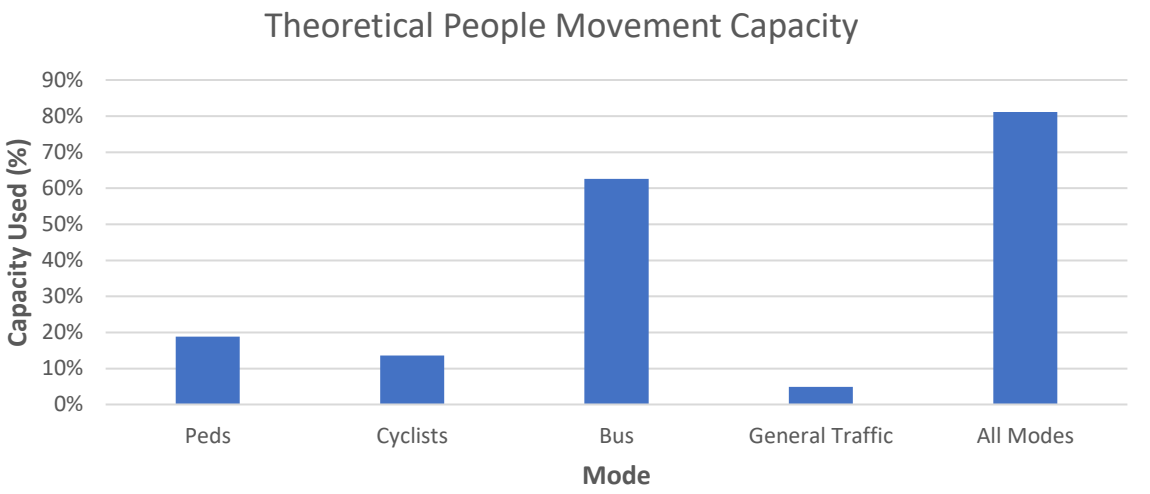
	Change Made	Reason for Change	Impact of Change
EXISTING 			
STAGE B REVIEW 	1. None	1. None	1. None
FINAL DRAFT 	1. None	1. None	1. None

Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

Lombard Street/City Quay

Capacity / Delay

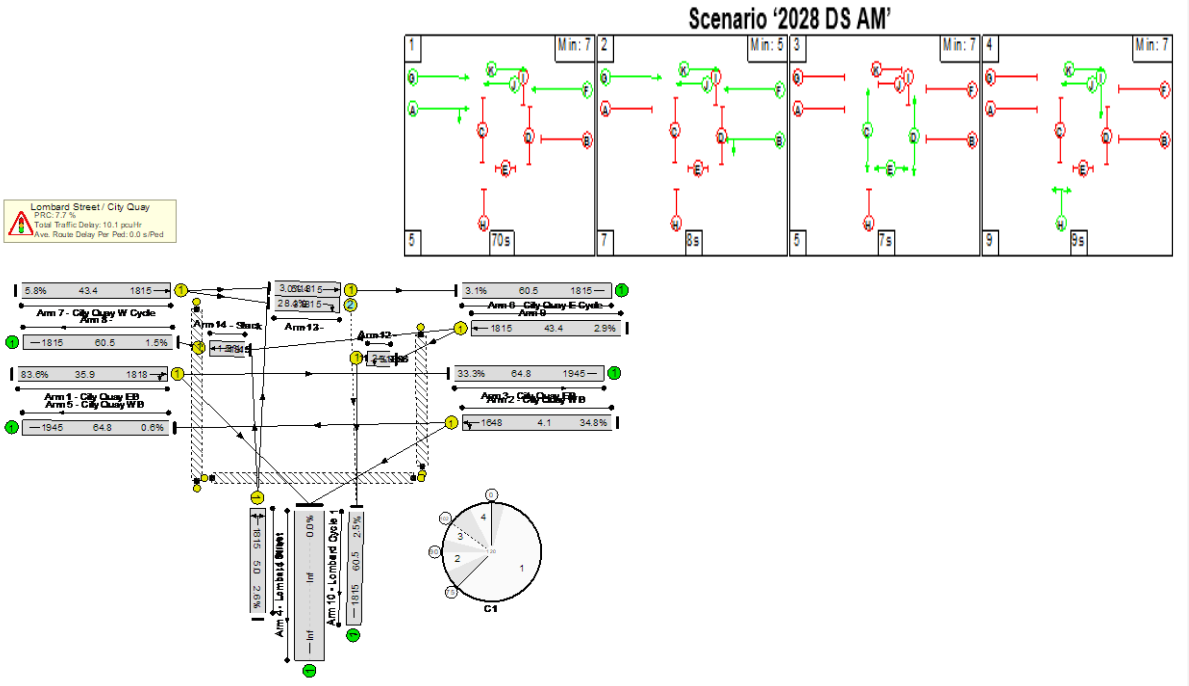
People Movement Calculator – Capacity



Do Something : 2028 : AM

Cycle = 120secs
PRC = 0.1%
Delay = 13pcuHr

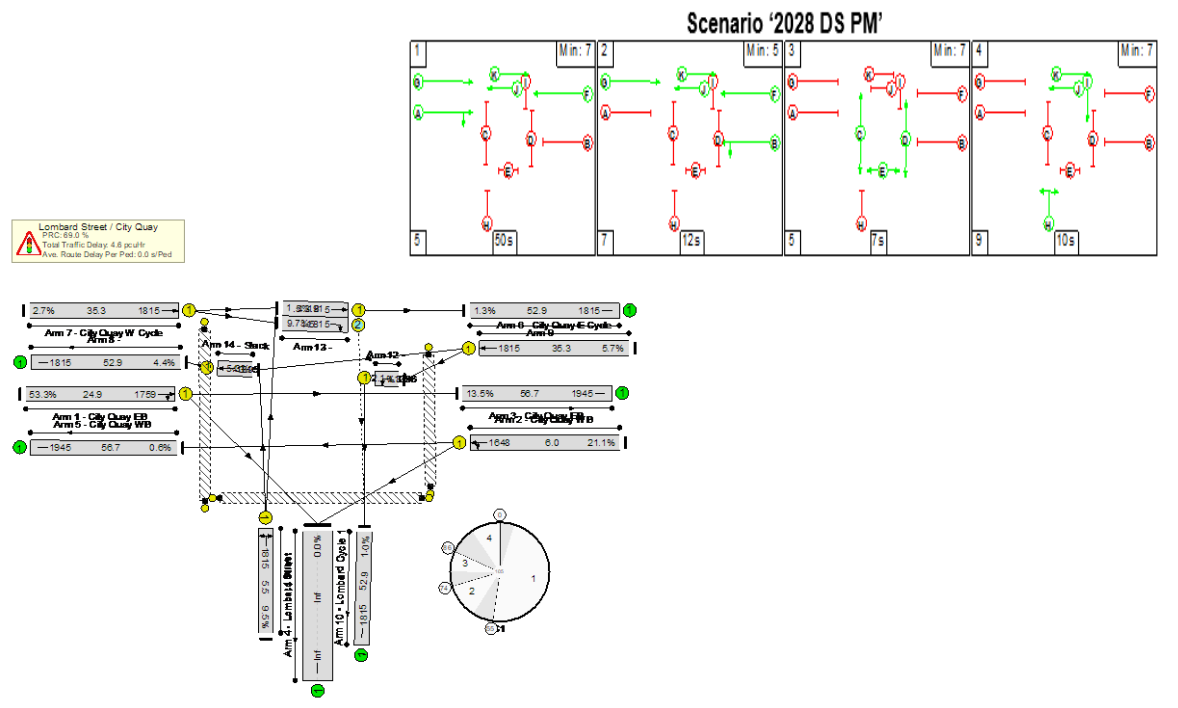
Bus Delay
Inbound = 75s
Outbound = N/A



Do Something : 2028 : PM

Cycle = 105secs
PRC = 52.4%
Delay = 5pcuHr

Bus Delay
Inbound = 53s
Outbound = N/A

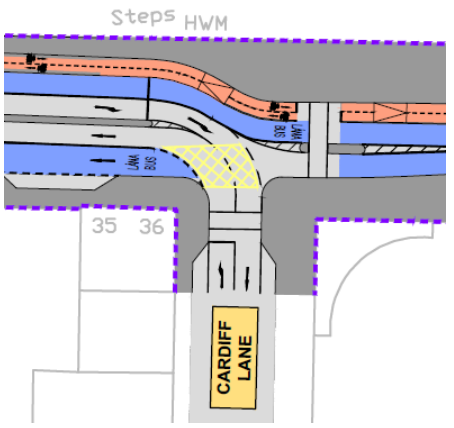
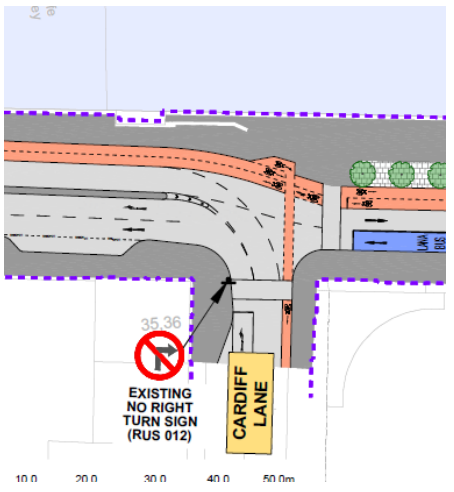
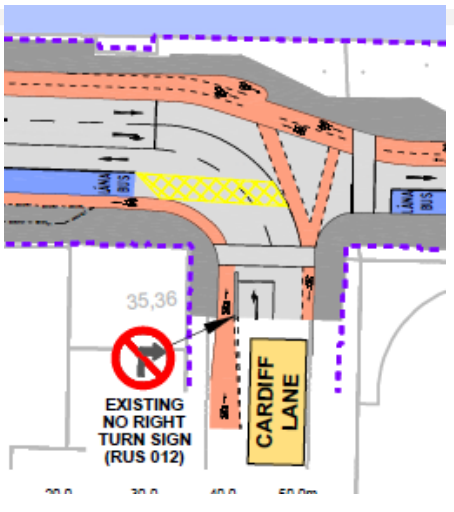


Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

Cardiff Lane/Sir John Rogerson's Quay

Summary
Junction is in compliance with the BusConnects Preliminary Design Guidance Booklet with respect to pedestrians, cyclists and buses.
Layout of junction updated introducing protected cycle infrastructure and new Bus lane infrastructure in the eastbound and westbound direction and improving approach and egress alignments.
The design rationale is to provide more priority to buses, enable bus priority signalling, and to improve pedestrian and cyclist safety.

Signal Operation
A six stage signal operation.
Signal controlled priority for buses.
Toucan and pedestrian crossings operate in their own stage

		Change Made	Reason for Change	Impact of Change
EXISTING				
EPR		1. Inbound us lane infrastructure introduced 2. Outbound Bus lane infrastructure introduced 3. Shared space interface at pedestrian crossing removed 4. Cardiff Lane reduced to single left turn lane	1. To provide bus priority access from the Dodder PT Bridge 2. To provide bus priority access to the Dodder PT bridge 3. To improve the segregation between cyclists and pedestrians at the crossing 4. Reduced capacity demands expected	1. Restricts access to premises on Sir John Rogerson's Quay 2. Restricts access to premises on Sir John Rogerson's Quay 3. Improved safety for waiting pedestrians 4. Improved pedestrian facilities
DRAFT PRO (PC2)		1. Shared outbound traffic lane 2. Southbound cycle lane on Cardiff Lane 3. Shared inbound traffic lanes on approach to Samuel Beckett Bridge 4. Tree landscaping included	1. To reduce the road carriageway and provide additional space to pedestrians along the quays 2. To provide access for cyclists in the southbound direction 3. To segregate westbound and northbound traffic movements 4. To ensure segregation between cyclists and pedestrians	1. Improved pedestrian facilities however reduced southbound capacity from Samuel Beckett Bridge 2. Improved accessibility for cyclists in the southbound direction 3. Reduced bus priority infrastructure 4. Improved visual amenity and character of the campshires
DRAFT PRO (PC3)		1. Two lanes reinstated in the outbound direction 2. Cycle lane provided on Cardiff Lane and continued inbound 3. Dedicated inbound bus lane 4. Landscaping scope reduced	1. In keeping with developing BusConnects design principles. 2. In keeping with developing BusConnects design principles. 3. To provide westbound bus infrastructure 4. Taking into consideration separate plans for the Liffey Campshires To ensure the safety of pedestrians	1. Reallocation of road space 2. Improved alignment 3. Improved bus provision in the westbound direction 4. Reduced landscaping and footpath adjacent to the cycle track

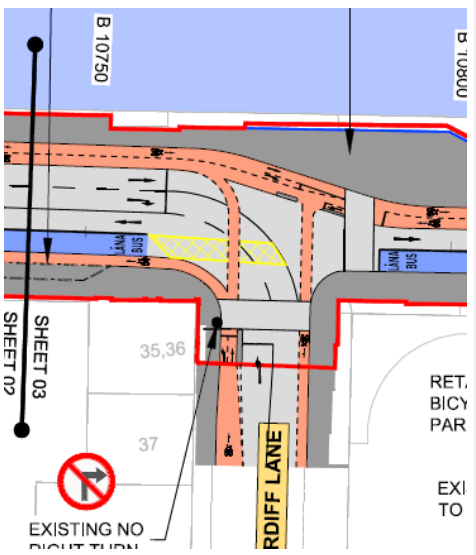
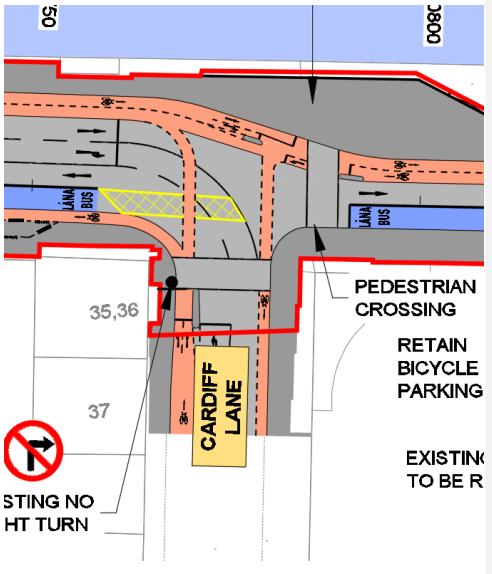
Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

EXISTING

STAGE B REVIEW

FINAL DRAFT

Cardiff Lane/Sir John Rogerson's Quay

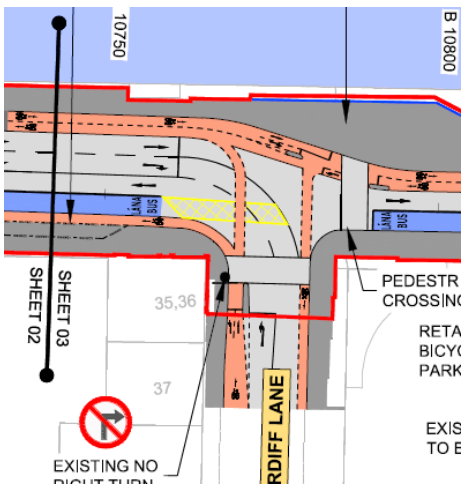
	Change Made	Reason for Change	Impact of Change
			
	1. Protected cycle infrastructure updated 2. Northbound connection provided to the two-way cycle track	1. To ensure protection for cyclists through the junction 2. Improved connectivity between the two-way cycle track and to facilitate right turning cyclists from Cardiff Lane	1. Improved cycle facilities 2. Improved cycle facilities
	1. None	1. None	1. None

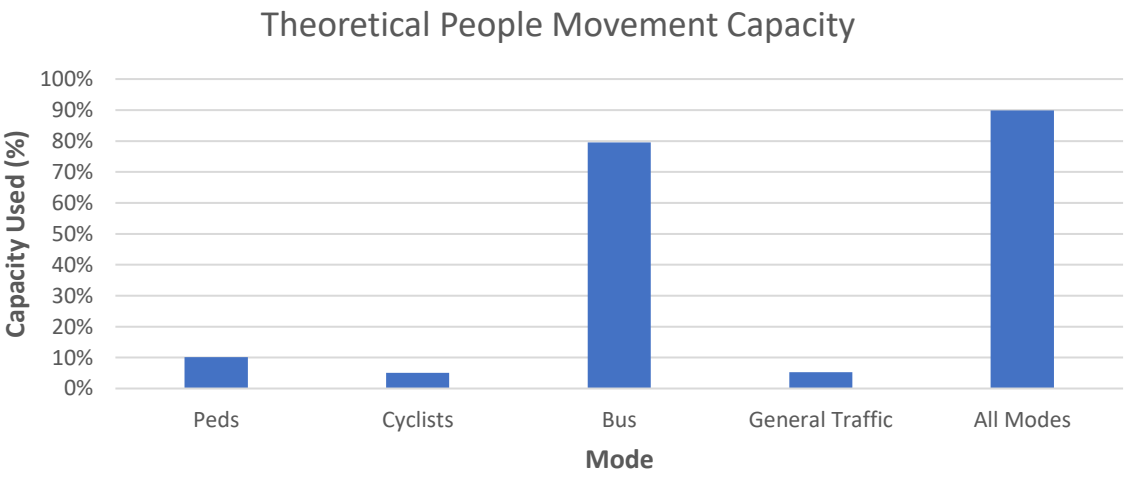
Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

Cardiff Lane/Sir John Rogerson's Quay

Capacity / Delay

People Movement Calculator – Capacity

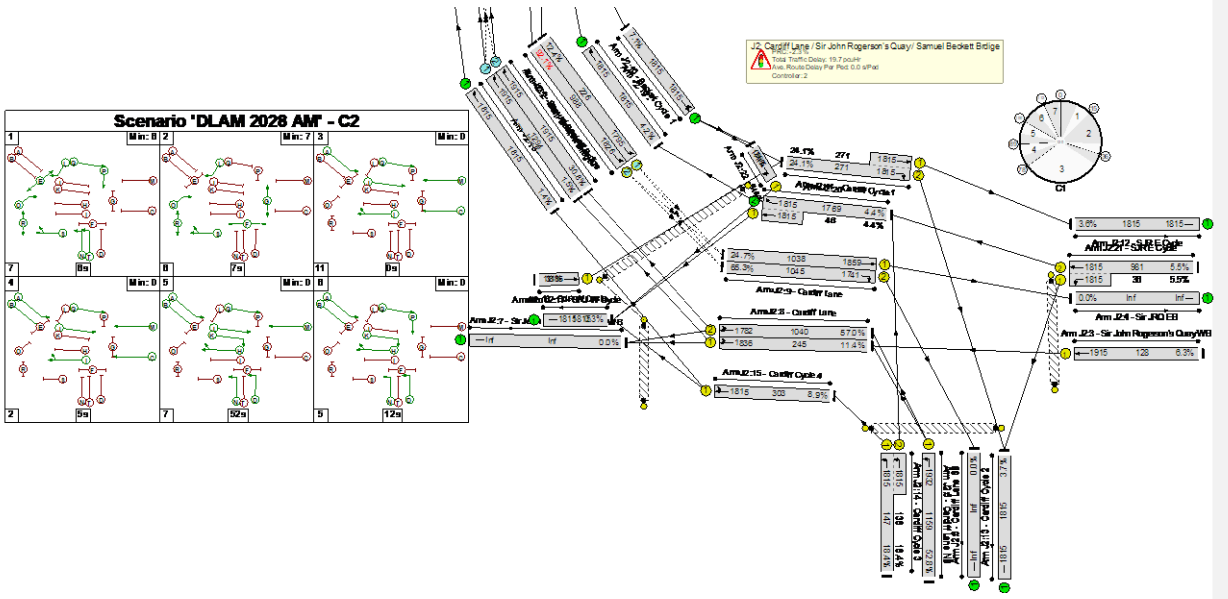




Do Something : 2028 : AM

Cycle = 120secs
PRC = -2.3%
Delay = 19pcuHr

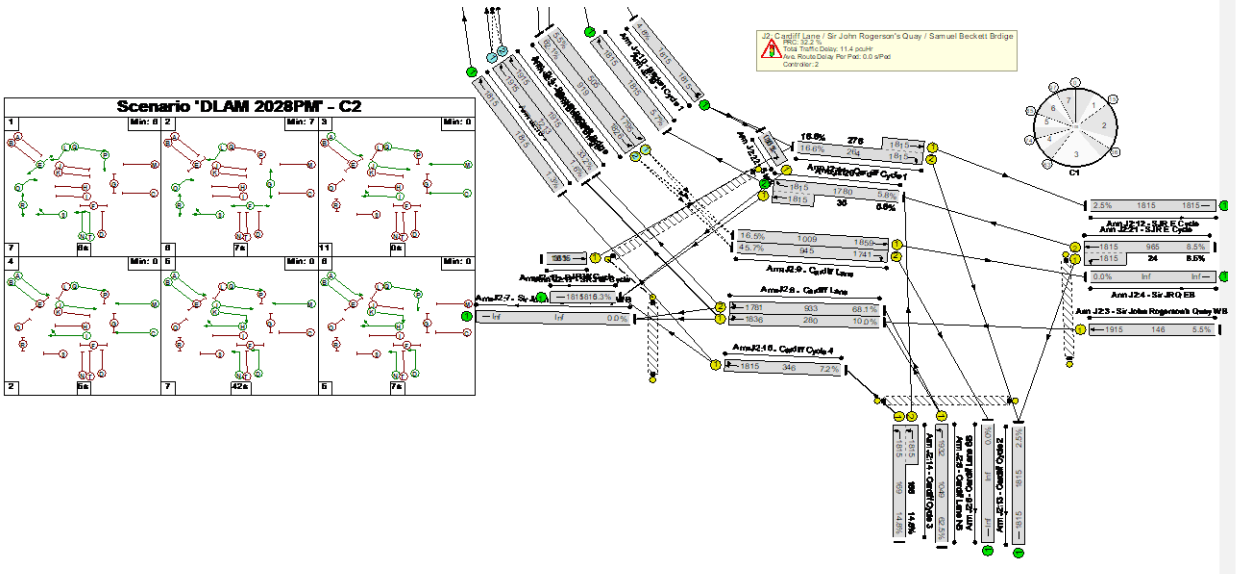
Bus Delay
Inbound =68s
Outbound = N/A



Do Something : 2028 : PM

Cycle = 105secs
PRC = 32.2%
Delay = 11pcuHr

Bus Delay
Inbound = 58s
Outbound = N/A

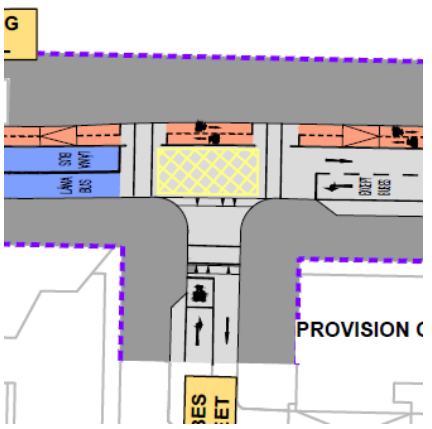
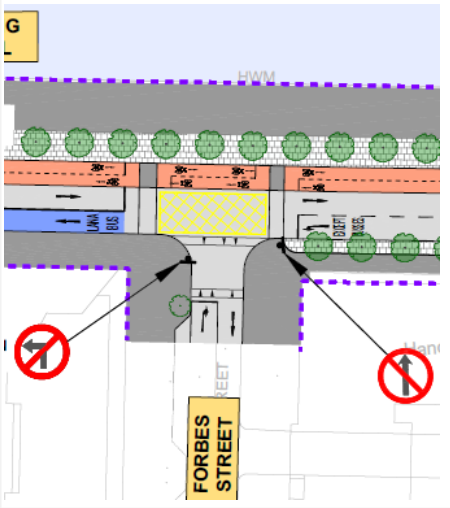
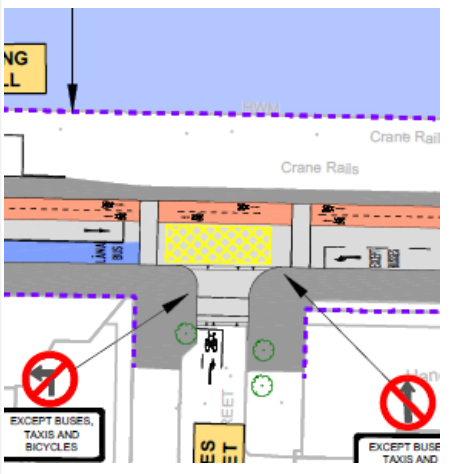


Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

Forbes Street/Sir John Rogerson's Quay

Summary
Junction is in compliance with the BusConnects Preliminary Design Guidance Booklet with respect to pedestrians, cyclists and buses.
Layout of junction updated improving protected cycle infrastructure, pedestrian crossing, Bus lane infrastructure and egress alignments.
The design rationale is to provide more priority to buses and to improve pedestrian and cyclist safety.

Signal Operation
A four stage signal operation.
Pedestrian crossings operate in their own stage.

		**Change Made**	**Reason for Change**	**Impact of Change**
EXISTING				
EPR		1. Shared space interface at pedestrian crossing removed 2. Bus gate introduced on the western arm 3. Parking removed from the western arm	1. To improve the segregation between cyclists and pedestrians at the crossing 2. To provide dedicated bus facilities. 3. No access to parking as a result of the bus gate	1. Improved safety for waiting pedestrians 2. Local redistribution of traffic to unsuitable alternative streets 3. Improved public realm area
DRAFT PRO (PC2)		1. Shared outbound traffic on western arm 2. ASL removed from Forbes Street 3. Tree landscaping included	1. To align with changes made at Cardiff Lane 2. Design Error 3. To ensure segregation between cyclists and pedestrians	1. Less impact from traffic redistribution on unsuitable alternative streets however reduced bus priority. 2. Reduced cycle infrastructure provision 3. Improved visual amenity and character of the campshires
DRAFT PRO (PC3)		1. ASL reinstated on Forbes Street 2. Landscaping scope reduced 3. Controlled crossings across cycle track	1. Rectifying an earlier design error 2. Taking into consideration separate plans for the Liffey Campshires To ensure the safety of pedestrians 3. To ensure pedestrian right of way across the cycle tracks	1. Cycle infrastructure reinstated 2. Removed landscaping and footpath adjacent to the cycle track 3. Increased intergreen times for pedestrian crossings

Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

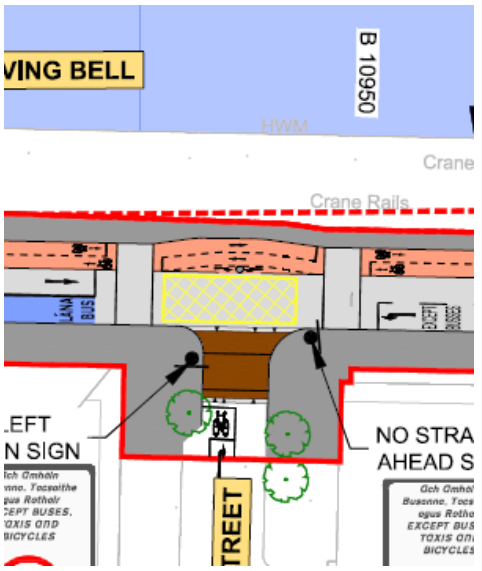
EXISTING

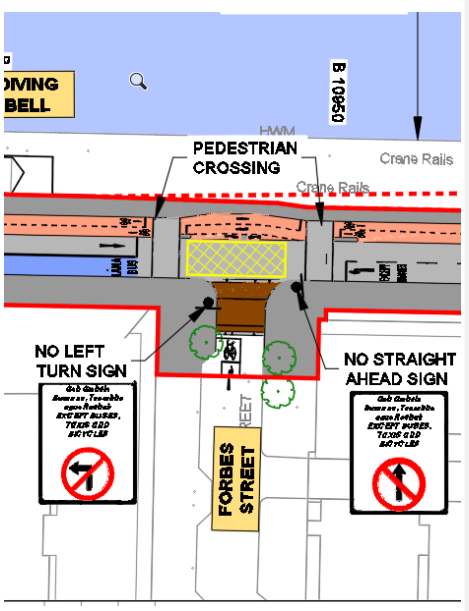
STAGE B REVIEW

FINAL DRAFT (WIP)

Forbes Street/Sir John Rogerson's Quay

Change Made	Reason for Change	Impact of Change
1. Access provided for cyclists on the two-way cycle track to and from Forbes Street	1. To improve interconnectivity between radial and orbital cycle infrastructure	1. Direct access to the two-way cycle track provided to and from Forbes Street
1. None	1. None	1. None



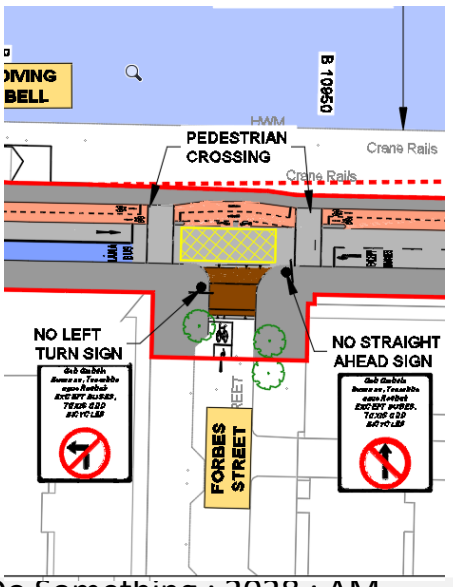


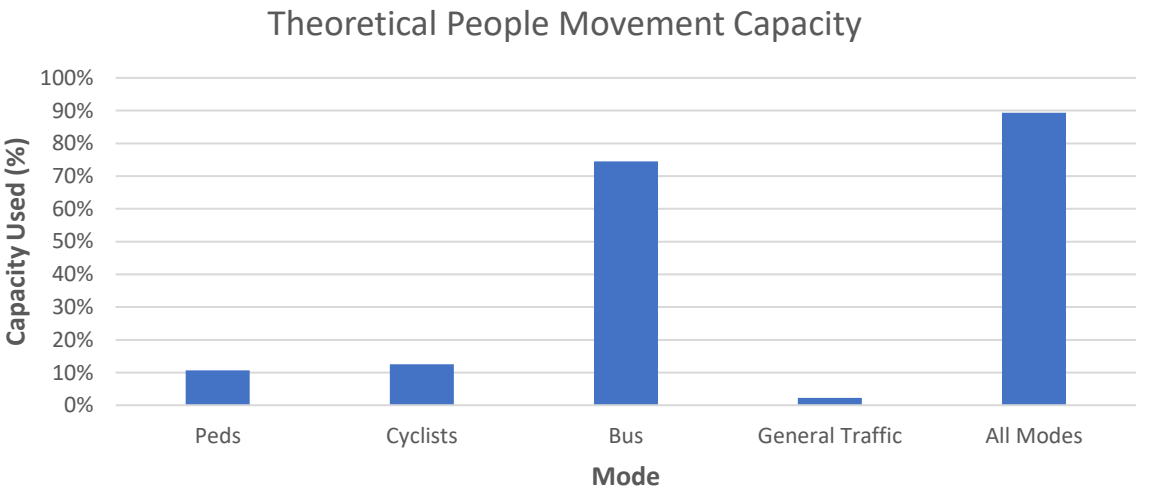
Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

Forbes Street/Sir John Rogerson's Quay

Capacity / Delay

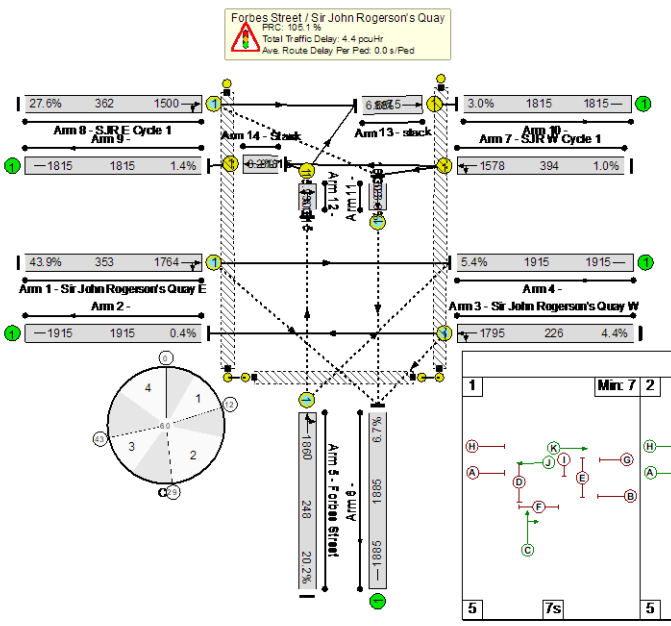
People Movement Calculator – Capacity

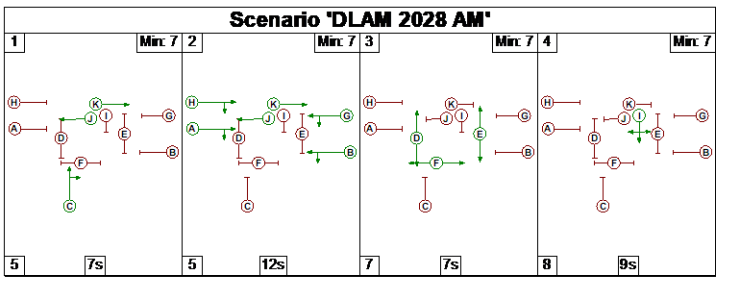




Do Something : 2028 : AM

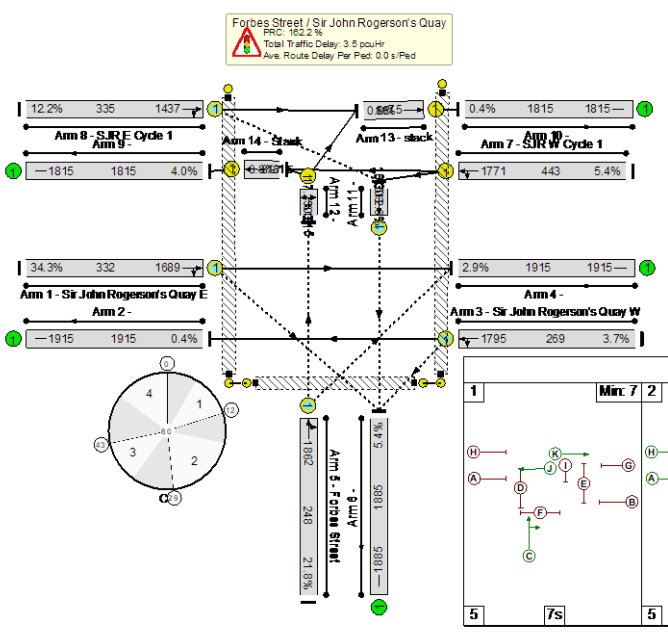
Cycle = 60secs
PRC = 105.1%
Delay = 5pcuHr

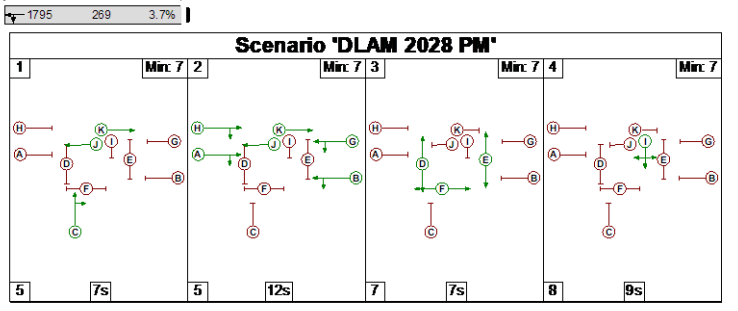




Do Something : 2028 : PM

Cycle = 60secs
PRC = 162.2%
Delay = 4pcuHr



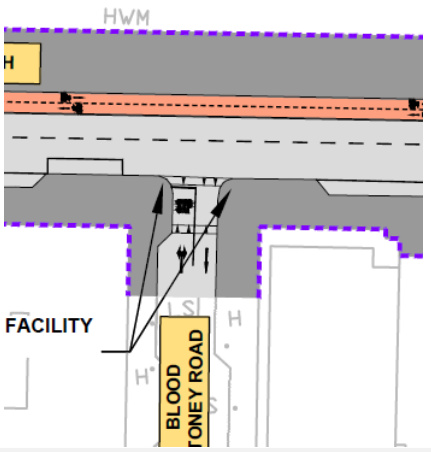
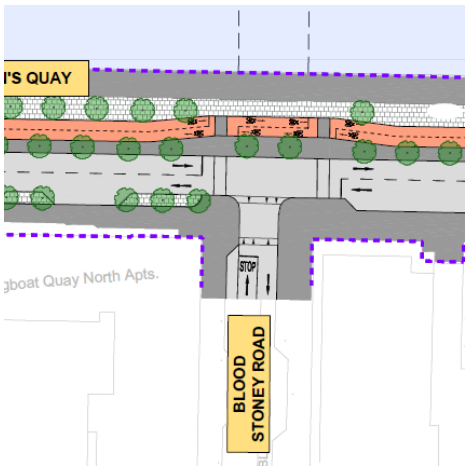
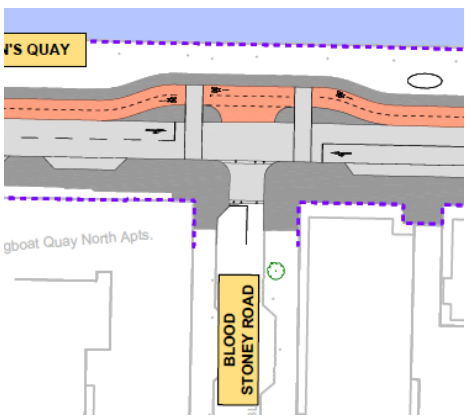


Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

Blood Stoney Road/Sir John Rogerson's Quay

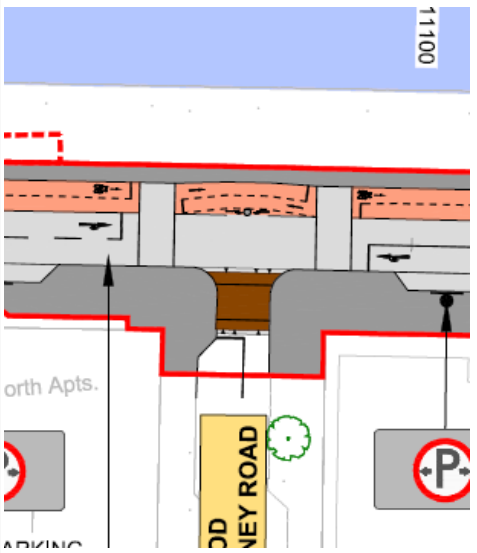
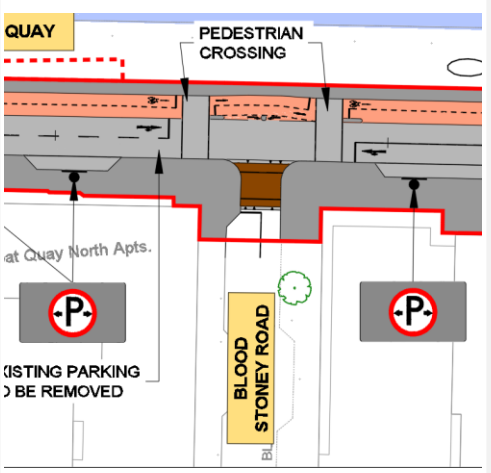
Summary
Junction is in compliance with the BusConnects Preliminary Design Guidance Booklet with respect to pedestrians, cyclists and buses.
The Junction has become fully signalised junction with new pedestrian crossings and improved cycle infrastructure.
The design rationale is to provide more priority to buses and to improve pedestrian and cyclist safety.

Signal Operation
A four stage signal operation.
Pedestrian crossings operate in their own stage.

	Change Made	Reason for Change	Impact of Change
EXISTING		1. Improved two-way cycle track on the northside side.	1. Existing cycle track too narrow to safely accommodate two-way cycling	1. Improved cycle facilities
EPR				
DRAFT PRO (PC2)		1. Fully signalised junction with wrap around pedestrian facilities 2. Tree landscaping included	1. To improve pedestrian crossing priority. 2. To ensure segregation between cyclists and pedestrians	1. Improved priority for pedestrians across all arms 2. Improved visual amenity and character of the campshires
DRAFT PRO (PC3)		1. Pedestrian crossing extended across cycle track 2. Landscaping scope reduced 3. Access provided for cyclists on the two-way cycle track to and from Blood Stoney Road	1. To ensure pedestrian right of way across the cycle tracks 2. Taking into consideration separate plans for the Liffey Campshires To ensure the safety of pedestrians 3. To improve interconnectivity between radial and orbital cycle infrastructure	1. Increased pedestrian intergreen times. 2. Removed landscaping and footpath adjacent to the cycle track 3. Direct access to the two-way cycle track provided to and from Blood Stoney Road

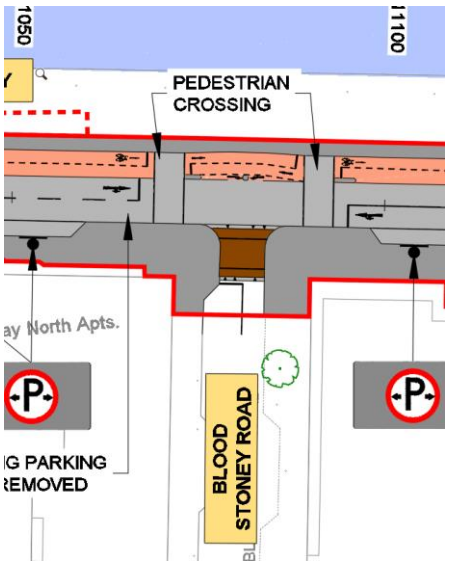
Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

Blood Stoney Road/Sir John Rogerson's Quay

	Change Made	Reason for Change	Impact of Change
EXISTING 			
STAGE B REVIEW 	1. Cycle track footprint reduced 2. All pedestrian crossings widened	1. To minimise pedestrian crossing lengths 2. To improve pedestrian facilities	1. Reduced impact on the Liffey Campshires and reduced pedestrian intergreen times 2. Improved pedestrian facilities
FINAL DRAFT (WIP) 	1. None	1. None	1. None

Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

Blood Stoney Road/Sir John Rogerson's Quay

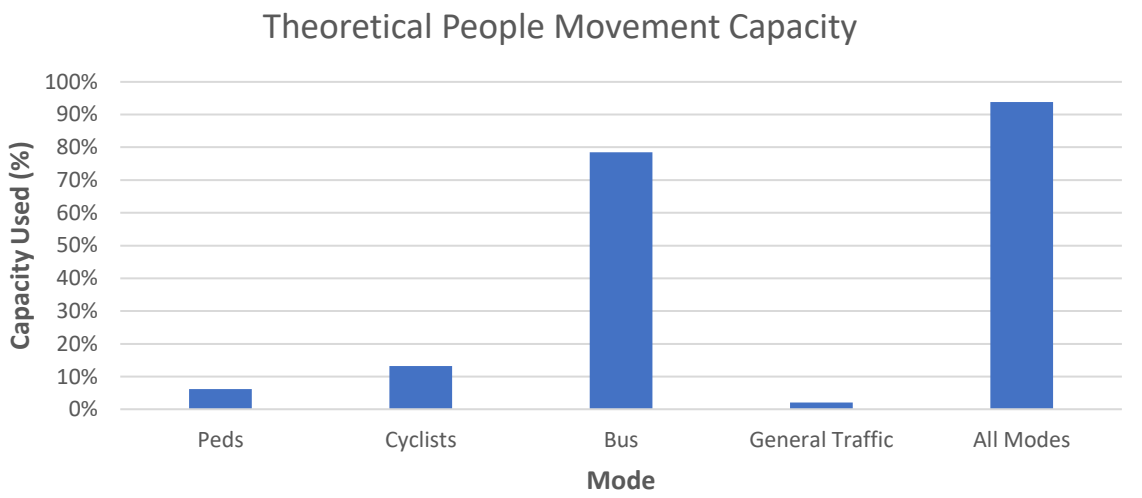


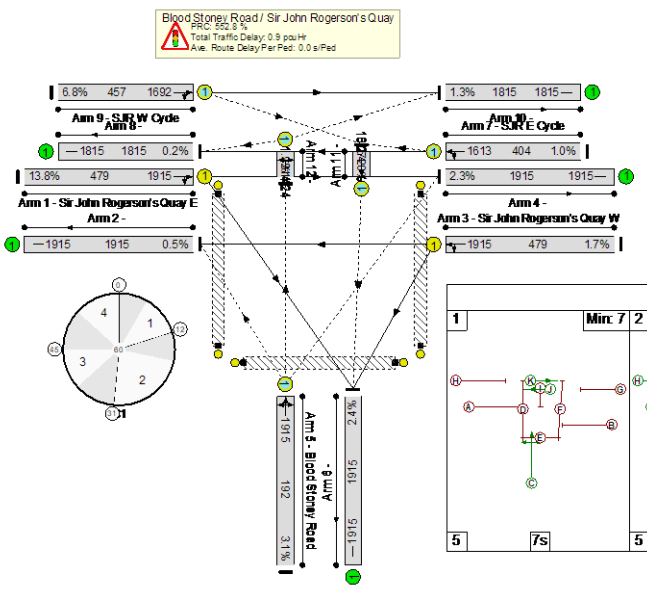
Do Something : 2028 : AM

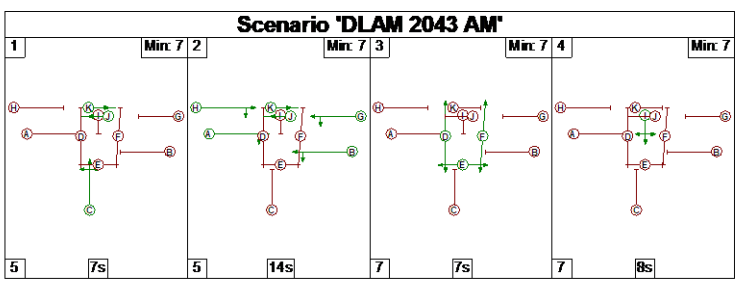
Cycle = 60secs
PRC = 498.4%
Delay = 1pcuHr

Capacity / Delay

People Movement Calculator – Capacity

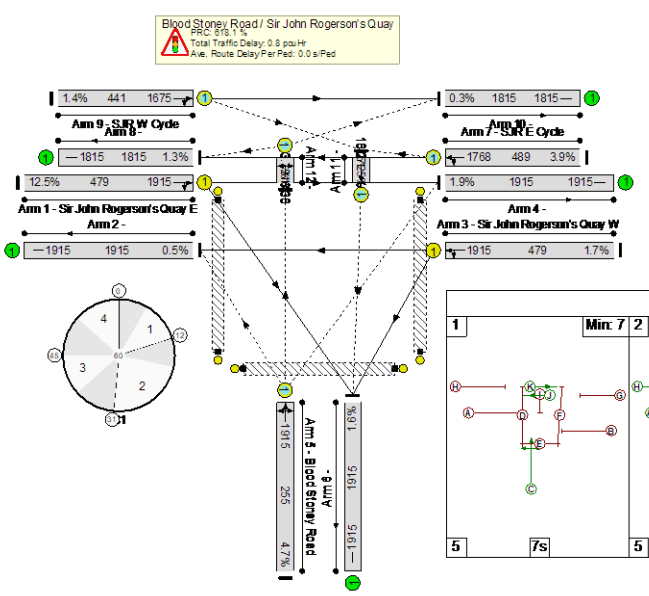


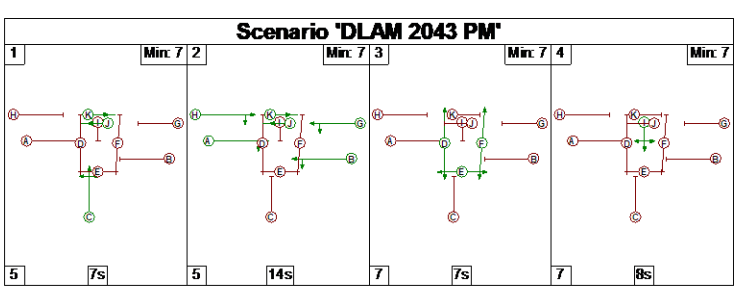




Do Something : 2028 : PM

Cycle = 60secs
PRC = 713%
Delay = 1pcuHr



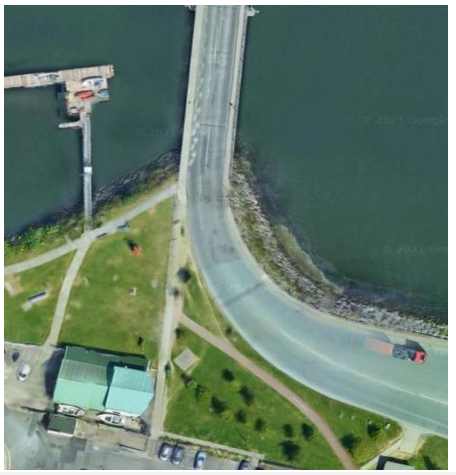
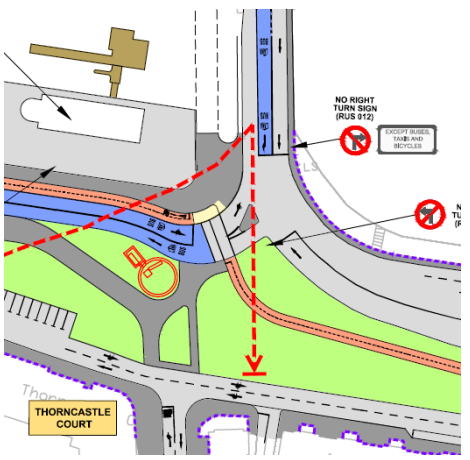
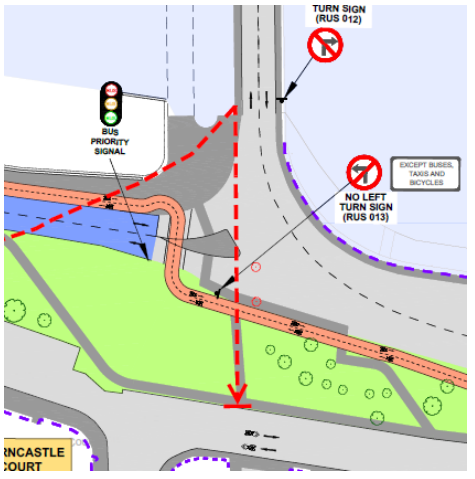


Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

Dodder PT Bridge

Summary
Junction is in compliance with the BusConnects Preliminary Design Guidance Booklet with respect to pedestrians, cyclists and buses.
The future junction is a 3-arm junction formed between link to existing Tom Clarke Bridge and link to proposed Dodder Bridge. The proposed bridge will only be crossed by buses and cycle lanes
The design rationale is to provide more priority to buses and to improve pedestrian and cyclist safety.

Signal Operation
A three stage signal operation.
Toucan and Pedestrian crossings operate in their own stage.

	Change Made	Reason for Change	Impact of Change
EXISTING			
EPR		1. New public transport road link, and cycle and pedestrian facilities to and from the Dodder PT Bridge. 2. Narrowed northbound traffic lane 3. Tom Clarke Bridge increased to three lanes 4. New cycle track adjacent to the toll road 5. Relocation of the Rowing Club	1. To provide public transport, cycle and pedestrian access to the Dodder PT Bridge 2. To reduce the road footprint 3. To print a bus lane from the north towards the Dodder PT Bridge 4. To accommodate the existing cycle demand in the area 5. To accommodate the new link to the Dodder PT bridge	1. New signalised junction 2. Reduced manoeuvrability for HGV's to Tom Clarke Bridge 3. Bridge widened by either replacing existing Tom Clarke Bridge or provision of a new adjacent bridge 4. Dedicated cycle infrastructure provision 5. Improved public realm area
DRAFT PRO (PC2)		1. Separation of cycle and pedestrian crossing provision 2. Priority control at the junction 3. Northbound traffic lane width reinstated 4. Modified public realm layout	1. To minimise the use of shared landing areas 2. Reduced control at the junction 3. To accommodate required HGV manoeuvrability 4. To accommodate pedestrian desire lines	1. Improved segregation between cyclists and pedestrians 2. Reduced priority for public transport 3. Wider road carriageway footprint 4. Improved pedestrian connectivity and desire lines accommodated
DRAFT PRO (PC3)		1. Cycle track relocated adjacent to York Road 2. Signalised control introduced at the junction 3. Modified public realm area	1. To improve cycle movements and quality of service 2. To improve priority for public transport 3. To improve accessibility for cyclists	1. Line markings and kerb locations amended. 2. Line markings, kerb and island locations amended. 3. Reduced accessibility for pedestrians

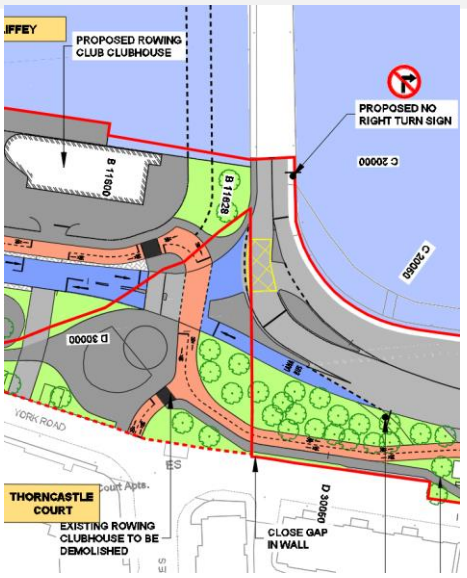
Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

Dodder PT Bridge

	Change Made	Reason for Change	Impact of Change
EXISTING			
STAGE B REVIEW	1. Pedestrian footpath adjacent to cycle track along York Road removed 2. Signalised access to the Rowing Club	1. Connection to existing footpaths on York Road prioritised 2. Improved priority for buses	1. Reduced pedestrian connectivity and desire lines accommodated 2. Better control between
FINAL DRAFT (WIP)	1. Pedestrian footpath reinstated adjacent to cycle track along York Road 2. Zebra crossings across cycle tracks	1. To improve pedestrian facilities and connectivity 2. To ensure pedestrian priority across the cycle tracks	1. Improved accommodation of pedestrian desire lines 2. Improved safety for pedestrians crossing the cycle tracks

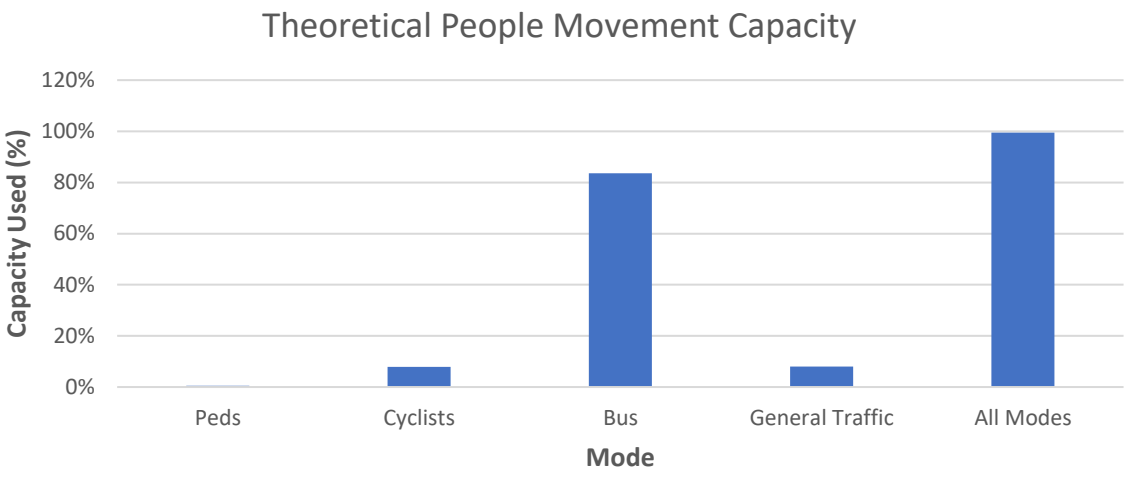
Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

Dodder PT Bridge



Capacity / Delay

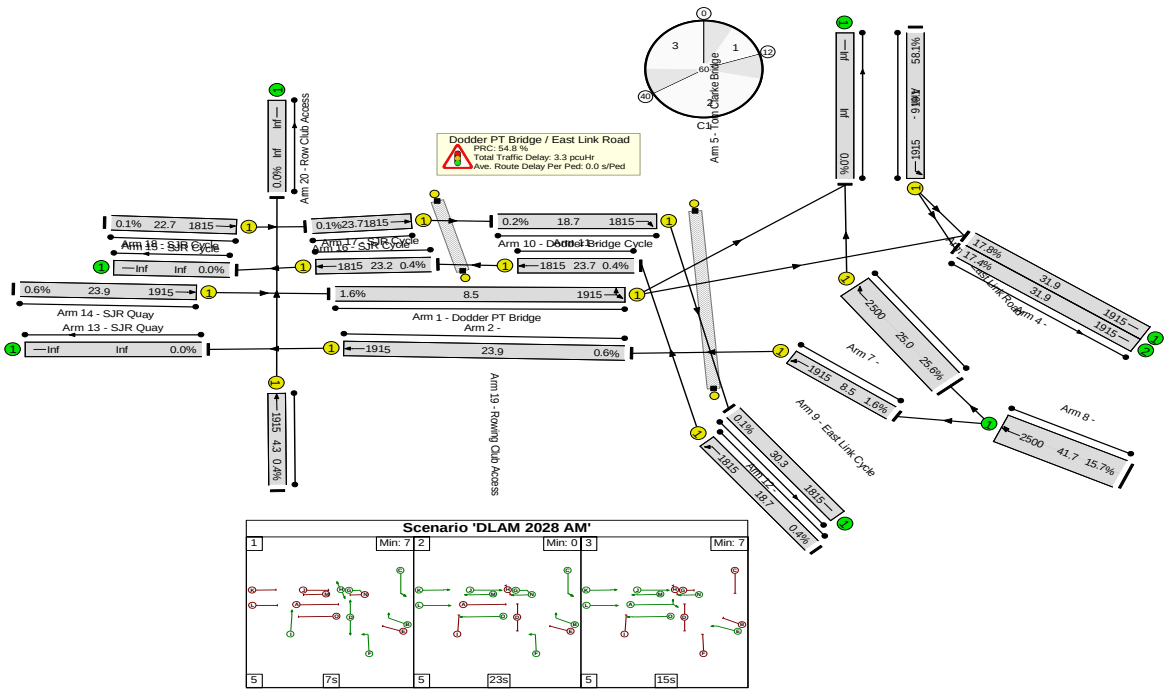
People Movement Calculator – Capacity



Do Something : 2028 : AM

Cycle = 60secs
PRC = 54.8%
Delay = 3pcuHr

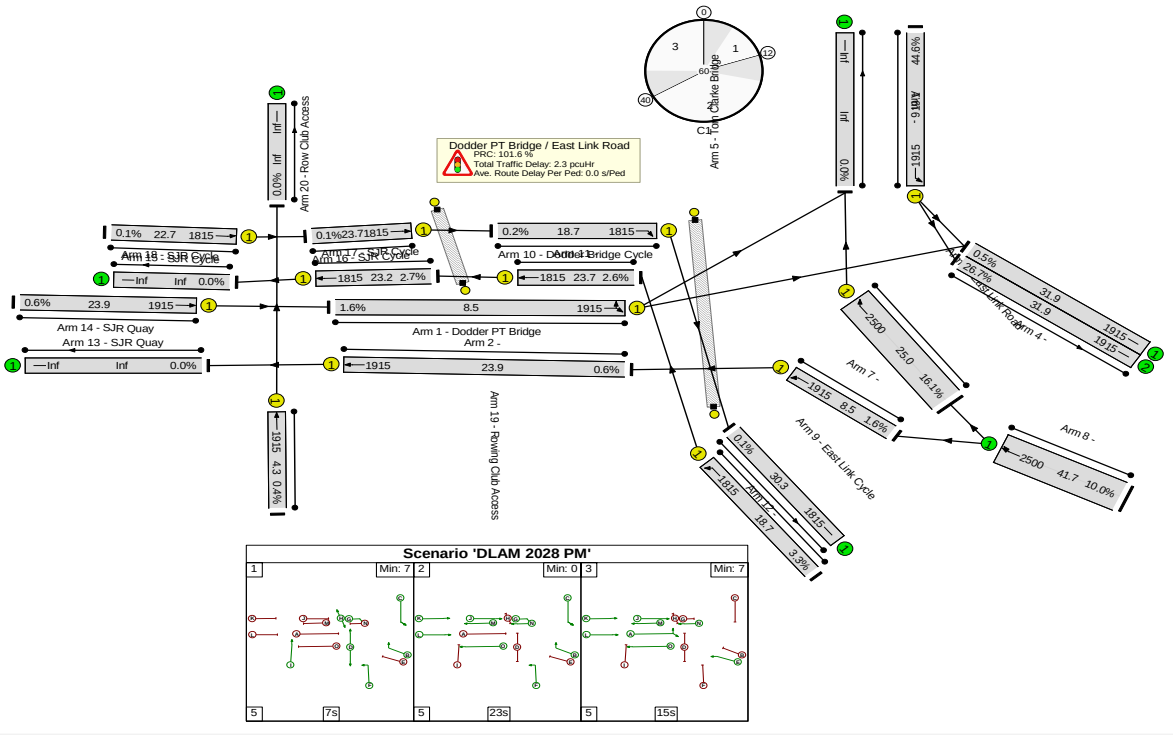
Bus Delay
Inbound = 20s
Outbound = 20s



Do Something : 2028 : PM

Cycle = 60secs
PRC = 101.6%
Delay = 2pcuHr

Bus Delay
Inbound = 20s
Outbound = 20s



Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

EXISTING

Custom House Quay/Memorial Bridge

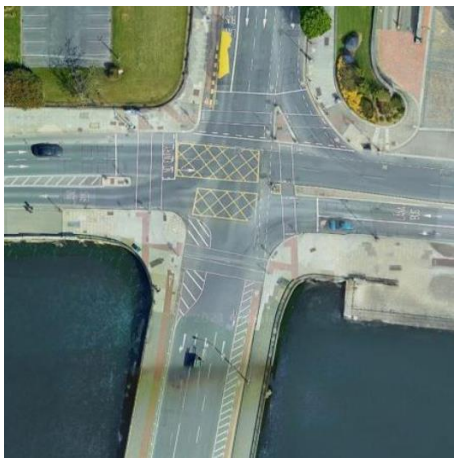
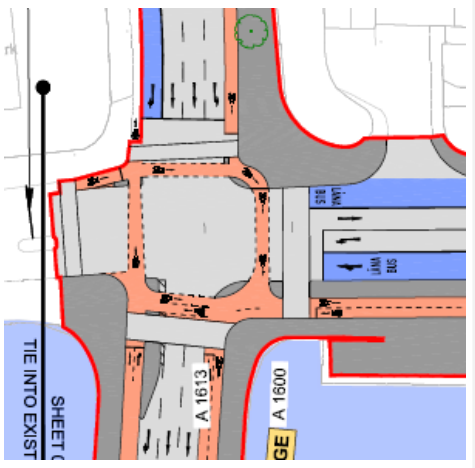
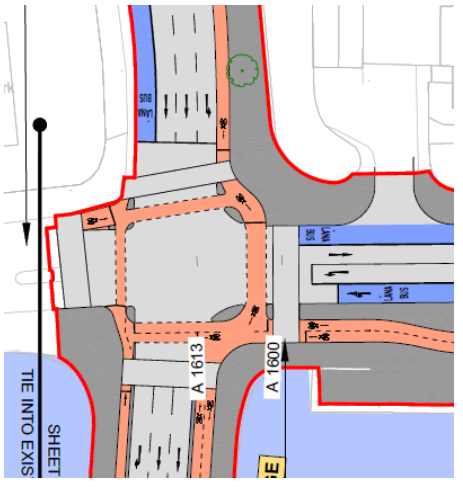
Summary
Junction is in compliance with the BusConnects Preliminary Design Guidance Booklet with respect to pedestrians, cyclists and buses.
Layout of junction updated introducing protected cycle infrastructure and new Bus lane infrastructure in the eastbound and westbound direction and improving approach and egress alignments.
The design rationale is to provide more priority to buses, enable bus priority signalling, and to improve pedestrian and cyclist safety.

Signal Operation
A six stage signal operation.
Pedestrian crossings operate in separate stages.

	Change Made	Reason for Change	Impact of Change
EPR	N/A			
DRAFT PRO (PC2)	N/A			
DRAFT PRO (PC3)	N/A			

Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

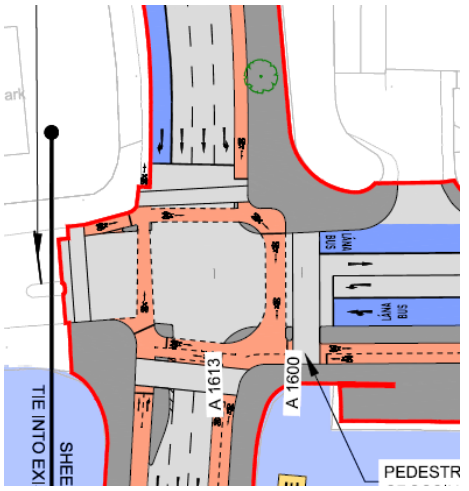
Custom House Quay/Memorial Bridge

		Change Made	Reason for Change	Impact of Change
EXISTING				
STAGE B REVIEW		1. Inbound lane reconfiguration with bus lane relocated to nearside lane 2. Outbound bus lane provided 3. Continuous Pedestrian crossings separated from Cycle crossing 4. Protected cycle infrastructure 5. Physical island provided on Memorial Bridge	1. To tie in with lane configurations along the north quays 2. To improve bus provision and priority along the north quays 3. To remove staggered crossing requirements and provide single crossing stages 4. To improve safety and permeability of cyclists through the junction 5. To provide a large cycle waiting area and prevent weaving manoeuvres by vehicles through the junction	1. Separate staging required due to conflict of movements with ahead buses and left turning vehicles 2. Improved bus permeability and priority along the north quays 3. Improved pedestrian facilities however increased intergreen time requirements for pedestrian phases 4. Improved safety and permeability for cyclists through the junction 5. Weaving manoeuvres by vehicles constrained
FINAL DRAFT (WIP)		1. Pedestrian crossings widened where possible 2. Physical island on Memorial Bridge removed 3. Southbound cycle lane through the junction widened 4. Northbound cycle lane on Memorial Bridge narrowed	1. To improve the crossing capacity and safety of pedestrians 2. To accommodate ahead buses from Memorial Road 3. To accommodate the high volume of cyclists expected 4. Lower volume of cyclists expected to use this cycle lane	1. Improved pedestrian crossing facilities 2. Improved opportunities for bus routing 3. Improved facilities for the high volumes of cyclists expected 4. Smaller landing area required for cyclists

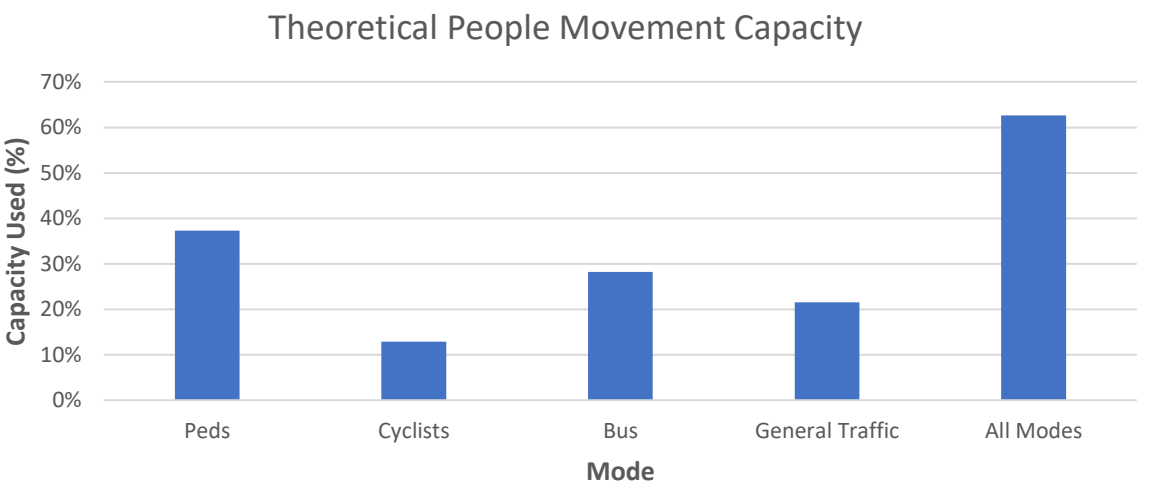
Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

Custom House Quay/Memorial Bridge

Capacity / Delay



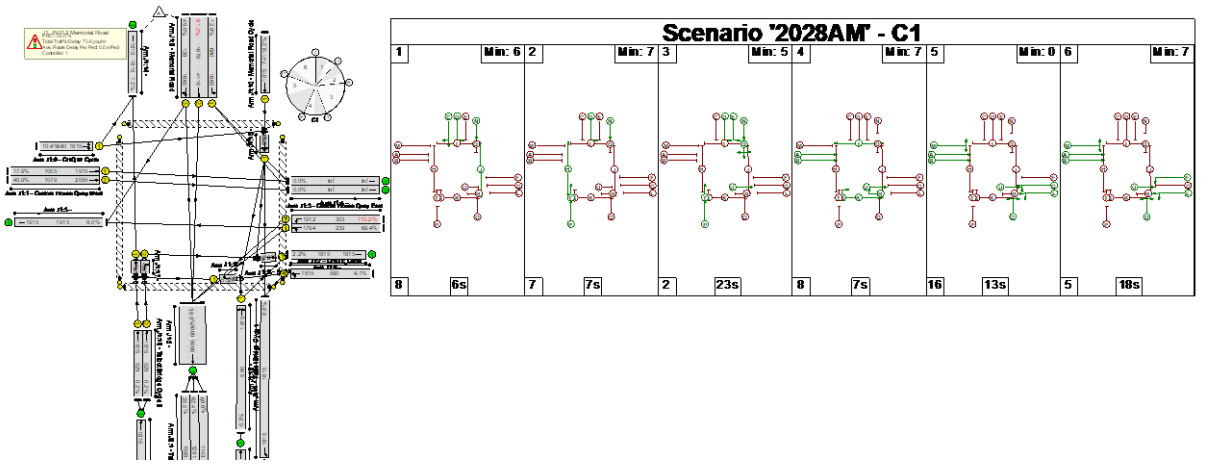
People Movement Calculator – Capacity



Do Something : 2028 : AM

Cycle = 120secs
PRC = -32.5%
Delay = 73pcuHr

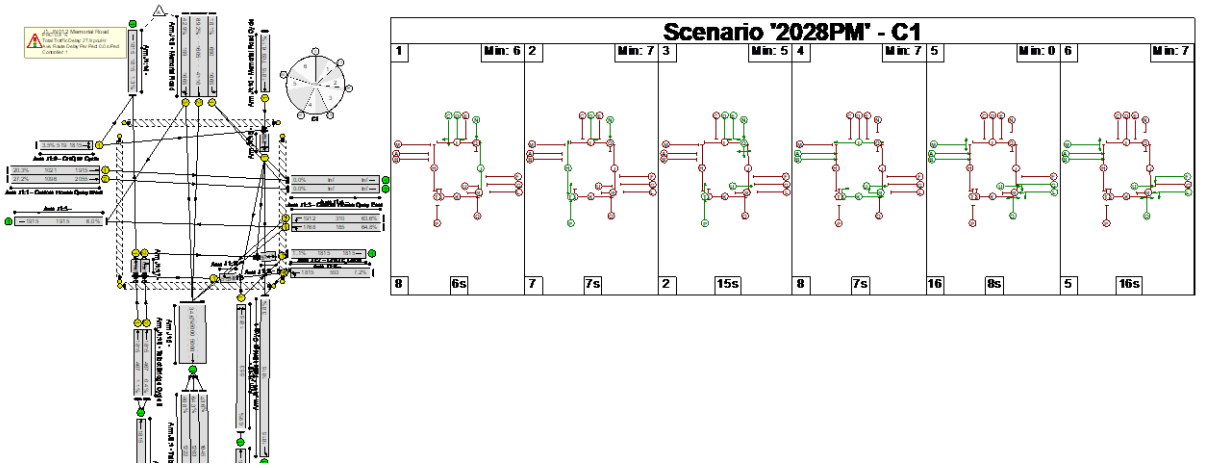
Bus Delay
Inbound = 74s
Outbound = 17s



Do Something : 2028 : PM

Cycle = 105secs
PRC = 0.9%
Delay = 28pcuHr

Bus Delay
Inbound = 72s
Outbound = 15s



Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

EXISTING

City Quay/Memorial Bridge

Summary
Junction is in compliance with the BusConnects Preliminary Design Guidance Booklet with respect to pedestrians, cyclists and buses.
Layout of junction updated introducing protected cycle infrastructure and new Bus lane infrastructure and improving approach and egress alignments.
The design rationale is to provide more priority to buses, enable bus priority signalling, and to improve pedestrian and cyclist safety.

Signal Operation
A four stage signal operation.
Pedestrian crossings operate in separate stages.

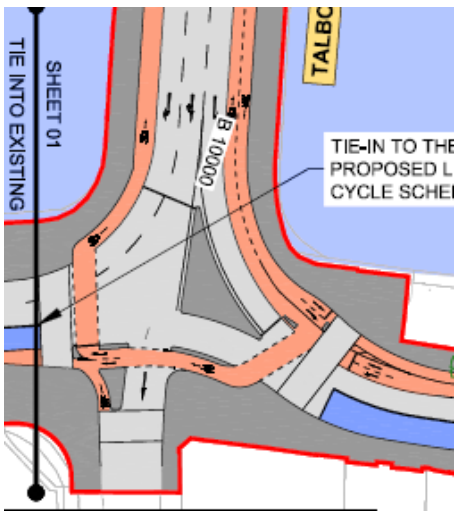
	Change Made	Reason for Change	Impact of Change
EPR	N/A			
DRAFT PRO (PC2)	N/A			
DRAFT PRO (PC3)	N/A			

Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
Route	Ringsend to City Centre Scheme	Job No/Ref	19.117

City Quay/Memorial Bridge

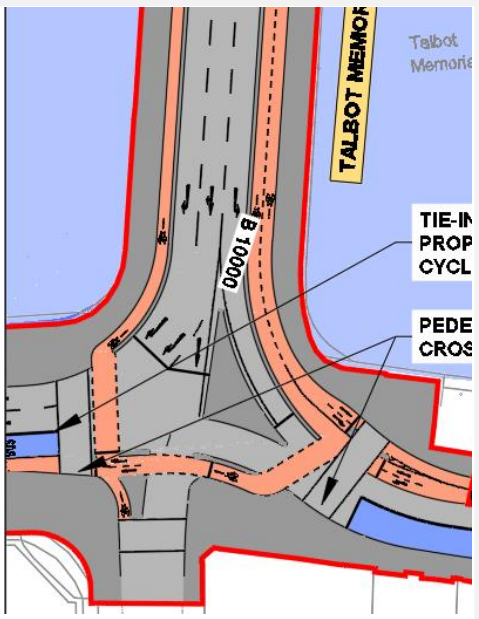
EXISTING

STAGE B REVIEW



Change Made	Reason for Change	Impact of Change
1. Lane reconfiguration to restrict access to City Quay to one lane 2. Bus lane introduced in the inbound direction from City Quay 3. Reconfiguration of cycle infrastructure across Moss Street and City Quay	1. To facilitate an inbound bus lane on City Quay 2. To improve bus priority along the south quays. 3. To avoid conflict with the contra-flow bus lane	1. Reduced capacity to City Quay 2. Island reconfiguration required to accommodate contra flow bus lane 3. Improved cycle facilities

FINAL DRAFT (WIP)



1. Memorial Bridge inbound stop lines set forward	1. To maximise stacking space and weaving manoeuvres along Memorial Bridge	1. Improved operational capacity of the junction and reduced intergreen times.

Subject	BusConnects Core Bus Corridors Junction Design Rationale		
Date	May 2022		
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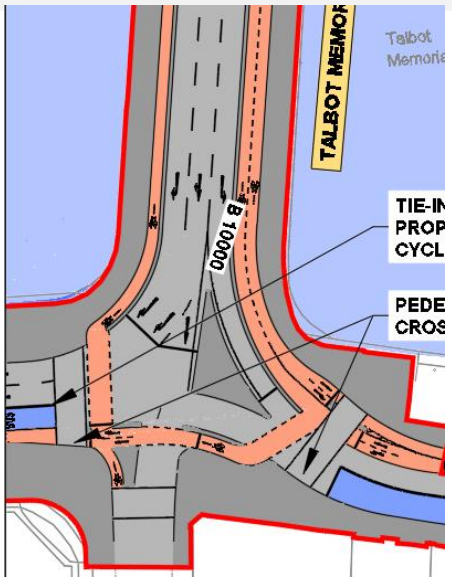
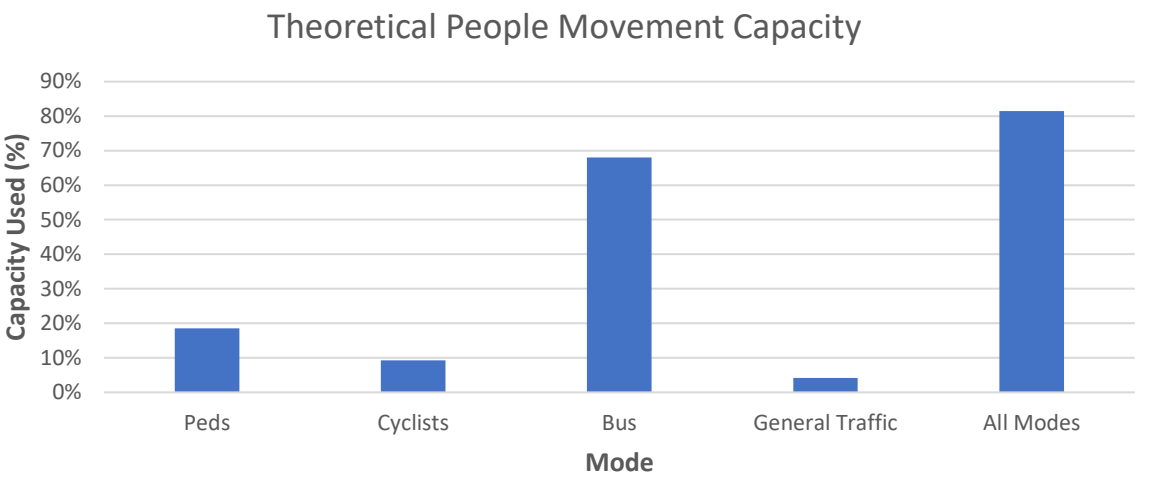
City Quay/Memorial Bridge



Capacity / Delay

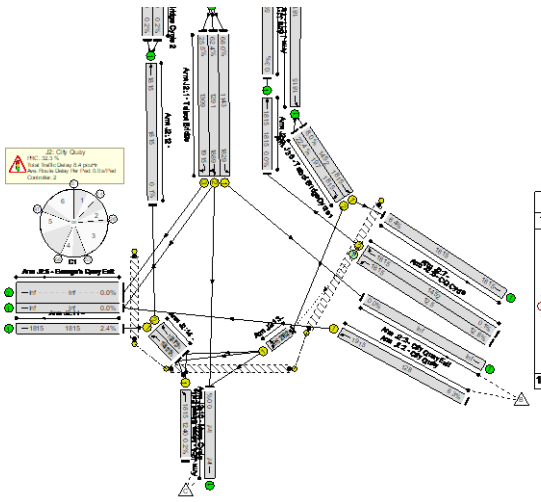
People Movement Calculator – Capacity

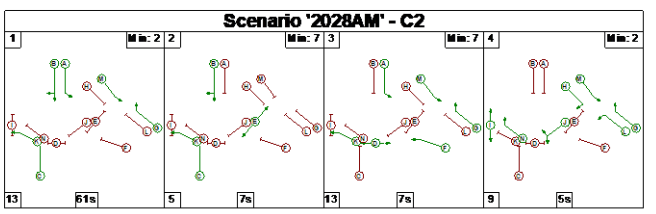


Do Something : 2028 : AM

Cycle = 120secs
PRC = 32.3%
Delay = 8pcuHr

Bus Delay
Inbound = 59s
Outbound = N/A





Do Something : 2028 : PM

Cycle = 105secs
PRC = 40%
Delay = 10pcuHr

Bus Delay
Inbound = 59s
Outbound = N/A