

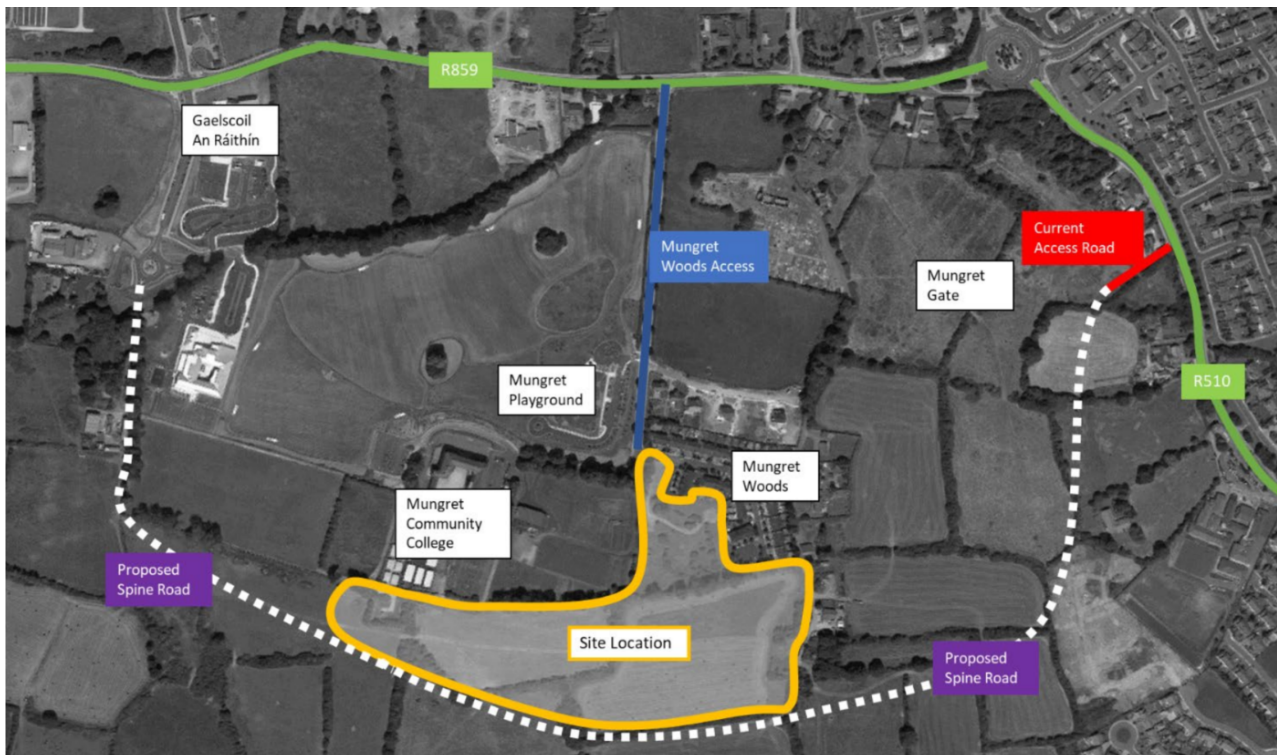
Limerick City and County Council

Mungret Residential Development

Traffic and Transport Assessment

Reference:

I01 | 20 December 2023



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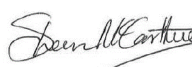


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1. Introduction

Arup has been appointed by Limerick City and County Council (LCCC) to prepare a Traffic and Transport Assessment (TTA) for a proposed residential housing development in Mungret, Co. Limerick. The proposed development on circa 7.2 hectares of land, zoned for development purposes within the Limerick Development Plan 2022 – 2028, is located within the curtilage of a protected structure Mungret College Stables and Outbuildings (RPS No. 1658 1660 & 1661) whilst repair works are proposed to the Observatory (Seismic Station) (RPS No.1658).

The proposed development seeks the construction of:

- i) 250 no. residential units including 36 no. two bed houses; 108 no. three bed houses; 25 no. four bed houses; 2 no. five bed community dwellings; 37 no. two bed apartment units; and 42 no. one bed apartment units with renewable energy design measures (which may be provided externally) for each housing unit.
- ii) A crèche facility with capacity to accommodate 70 no. children;
- iii) 1 no. community facilities with ancillary café;
- iv) 2 no. community facility units fronting the public square and positioned within the Independent Living for Older Persons complex;
- v) Public toilet;
- vi) Landscaping works including (a) provision of playground and kick about areas; (b) new pedestrian and cycle connections; and (c) public square;
- vii) Associated site and infrastructural works including provision for (a) water services, foul and surface water drainage and associated connections and (b) attenuation proposals including permeable paving and swales; (c) 4 no. ESB substations; (d) external plant and services; (e) car and bicycle parking; and
- viii) all associated site development works.

The proposed Mungret Residential Development site is located to the south-east of the village of Mungret in Co. Limerick, where the land use is currently primarily agricultural. The site is bounded to the north by Mungret College and Mungret Woods residential housing estate, and to the south by agricultural lands and Loughmore Common. Access to the lands is currently via private access roads and farm gates. The development site is located within the sub-area of the Limerick City West Municipal District. It lies in the jurisdiction of Limerick City and County Council.

The development includes two distinct elements; a standard housing development, plots A1 to A3, which comprises of 183 housing units and an independent living development for older persons, plot A4, which includes 55 apartments for Independent Living and a further 12 apartments which will be standard units open to any occupancy.

In addition to the Creche, Community Facilities and a number of Public Open Spaces (POS) will be included in the proposed development, including a public square (S1). Further details of the proposed development are provided in Section 4.

It should be noted that separate to this application, LCCC are progressing with a road scheme which will form the main road infrastructure for access to a wider area of zoned land in Mungret, which will likely be developed in the future. This road scheme is funded by the Local Infrastructure Housing Activation Fund (LIHAF). For the purpose of this assessment, it is assumed that the LIHAF spine road, which will form the southern boundary of the proposed LCCC residential development, will be in place prior to the full occupation of the development. Details of the proposed LIHAF spine road are presented in Section 3 of this report.

This report describes the existing environment and current site accessibility, presents the proposed development, estimates the future traffic generated by the proposed development and assesses the impact of the traffic on the surrounding network.

2. Assessment Methodology

This TTA has been carried out to accompany the planning application for a proposed residential development in Mungret, Co. Limerick. A brief description of the methodology behind this TTA is presented below:

- **Section 3** of this TTA describes the '*Existing Receiving Environment*'. It describes the location of the proposed development in its context to Mungret and gives a detailed description of the local road network, pedestrian and cyclist facilities, and the public transport network in respect of the proposed development.
- **Section 4** of this TTA sets out the '*Characteristics of the Proposed Development*'. Within this section, the nature of the proposed development is set out, in terms of the proposed use and scale of development. It also details the projected trip generation and distribution on the local road network and the proposed parking provision in conjunction with the proposed development.
- **Section 5** of this TTA sets out the '*Impact of the Proposed Development*', with reference to the previous traffic assessment carried out as part of the planning application for the overall Mungret masterplan.
- **Section 6** of this TTA describes the '*Mitigation Measures*' proposed to reduce the impact of the proposed development on the receiving environment.
- **Section 7** of this TTA sets out the '*Outline Mobility Management Plan*'. It describes the objectives of the Mobility Management Plan and sets out a suitable action plan. It also sets out a strategy for Monitoring and Review.

3. Existing Receiving Environment

3.1 Site location

The development site is located within the sub-area of the Limerick City West Municipal District.

A spine road is proposed from an existing roundabout south of Gaelscoil An Ráithín, connecting to the as-built access road to the recently developed Mungret Gate housing estate to the north east of the site. A map showing the site location is presented in Figure 1 below. This spine road is shown as a white dashed line.

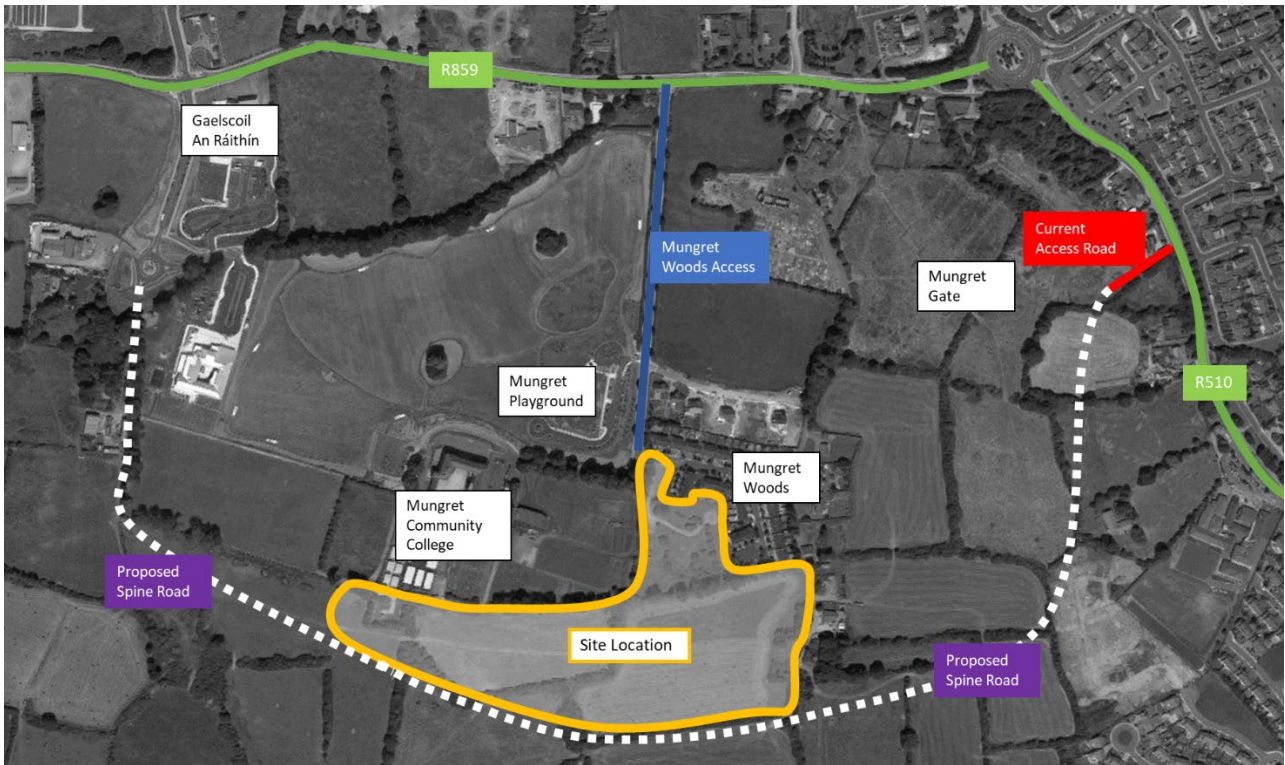


Figure 1: Site Location

The proposed development will comprise a residential development of 250 residential units, 195 of which will be detached and semidetached housing units and apartments. The remaining 55 units are proposed as part of a complex which will provide independent living for older persons. The proposed development layout can be seen in Figure 2 below.



Figure 2: Proposed Development Site Layout

3.2 Local Road Network

3.2.1 General

The layout of the local road network the vicinity of the site is presented in Figure 3 below. It can be seen that the proposed site is well served by the local, regional, and national road network with the N69 and N18 in close proximity to the existing R859 Mungret Road.

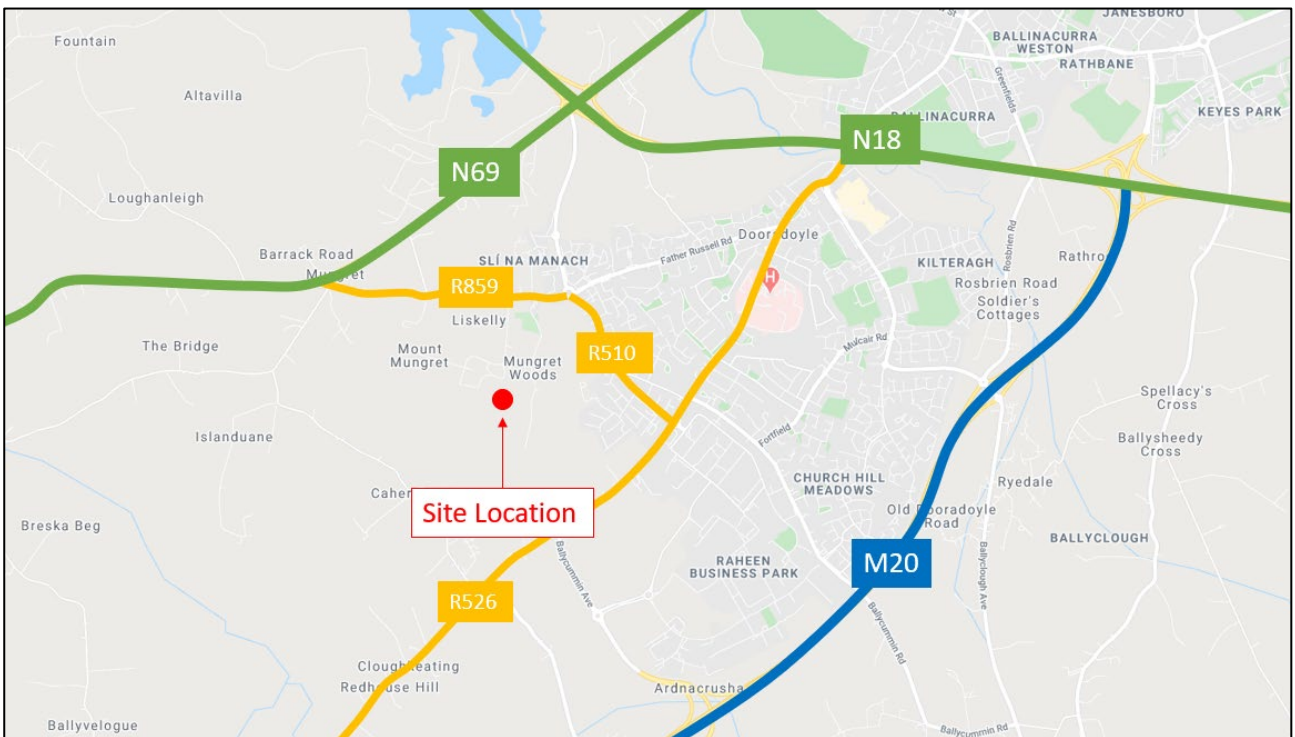


Figure 3: Local Road Network

3.2.2 Access

Access to the 195 residential units and the 55 independent living units in the complex will be from the proposed spine road, which will be delivered separately as part of a LIHAF-funded project. Access to the spine road will be achieved from two directions;

- from the north-west via the existing access road to Gaelscoil An Ráithín, which is accessed from the R859;
- from the north-east via a new access junction at the recently developed Mungret Gate housing estate off the R510.

Pedestrian and Cycle access to the proposed development will also be possible from the north through the existing Mungret Woods housing estate; vehicular access will through this route will not be permitted.

The above access strategy is assumed to be in place in the 2025 design year. It should be noted that a third access (southern spur), via the R526 to the south, is also proposed under the LIHAF-funded scheme, but this will be subject to a separate planning application. For the purposes of this assessment, the southern spur is assumed to be in place for the 2035 design year only.

3.2.3 Surrounding Road Network

North of the site is the N69, a national secondary road that runs between Tralee and Limerick City, passing through Mungret, Foynes, Tarbert and Listowel, bypassing Askeaton. The N69 continues north-east through a grade-separated interchange with the N18 and then becomes the Dock Road within Limerick City Centre. The N18 is a national primary road connecting Limerick and Galway, and providing access to Shannon Airport via the connecting N19.

To the south-east of the site is the M20 which links Cork and Limerick. The N20 road is a national primary road in Ireland, connecting the cities of Cork and Limerick, with the northernmost 9km becoming a motorway (M20) near Patrickswell. The N20 passes through the towns of Mallow, Buttevant and Charleville.

3.3 Proposed Road Upgrades

3.3.1 Mungret LIHAF Access Road

As outlined above, LCCC are progressing separately with a LIHAF-funded road scheme which will provide the spine road necessary to gain access to the proposed residential development. The road scheme will serve the wider Mungret area which is zoned for residential development. Using average densities as set out in the Southern Environs Local Area Plan it has been estimated that approximately 2,000 residential units can be accommodated on the zoned land.

The road scheme will be developed in two phases. Phase 1 includes the access road between Gaelscoil An Ráithín and Mungret Gate. For the purpose of this assessment, it is assumed that Phase 1 will be in place by the 2025 design year. Phase 2 includes a southern spur towards the R526. For the purpose of this assessment, Phase 2 is not expected to be in place by 2025 but is expected to be in place by the 2035 design year. Both of these phases are currently at planning stage. Figure 4 below illustrates the phased nature of the proposed LIHAF-funded road infrastructure.

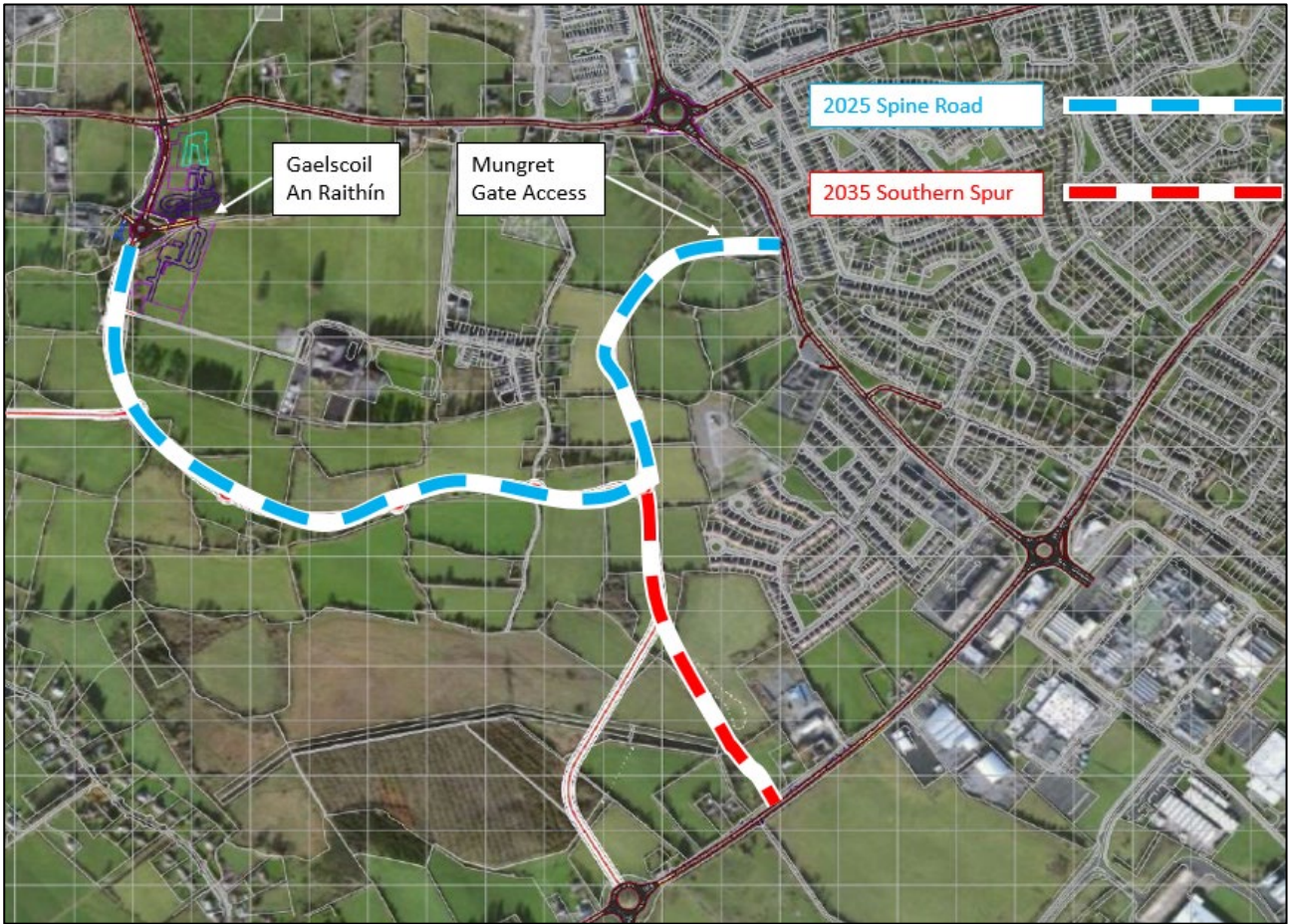


Figure 4: Proposed LIHAF-funded Road Infrastructure

3.3.2 N20/M20 Cork to Limerick Improvement Scheme

LCCC in partnership with Cork County Council, Cork City Council, Tipperary County Council, Transport Infrastructure Ireland (TII) and the Department of Transport is currently developing the N/M20 Cork to Limerick Improvement Scheme.

The scheme will be developed through seven phases, from Phase 1 Concept and Feasibility to Phase 7 Close out and Review. The project is part of Project Ireland 2040 and aims to improve safety and reduce journey times between Limerick and Cork.

3.4 Cyclists and Pedestrians

3.4.1 Existing Cyclist and Pedestrian Provision

Footpaths are provided on both sides of the R859 and R510 as well as at the entrance to Mungret Woods and Mungret Community College. Cycle lanes are also provided on both sides of the R859. There is currently no dedicated cyclist infrastructure on the R510, although the Quin’s Cross Roundabout caters for cyclists on all approach arms as well as around the roundabout.

The new signalised junction on the R510 at the entrance to Mungret Gate has controlled crossings on all arms, and a shared pedestrian / cycle track is provided on the access road into the estate.

The R526 has a footpath on one side of the road as well as cycle lanes on both sides of the road.

3.4.2 Proposed Cyclist and Pedestrian Provision

The proposed LIHAF-funded spine road will include a footpath and separate cycle track on both sides of the road. The internal roads within the proposed residential development are designed for low traffic volumes travelling at low speeds. This is achieved through carriageway widths of 5.0-5.5m as well as small corner radii.

Home Zones form an integral part of the design, which emphasise a shared approach to the use of the internal links in terms of all modes. This will be achieved via traffic calming measures such as entry treatment ramps, no provision of footpaths or cycle lanes, indicating that the streets in the Home Zones are completely shared, and provision of static signage to indicate to all road users that the street is shared between pedestrians, cyclists and motorists. The Home Zones include internal links, some of which are not accessible by motorised vehicles, which connect back to the development's internal spine road to the north and an external road to the south.

As a result of the above design principles, dedicated cycle facilities are not proposed for the internal roads within the development.

There is, however, a two-way shared pedestrian and cycle pathway proposed along the northern boundary of the development to connect the access to the proposed crèche to the west with the eastern section of the proposed development, as shown in Figure 5 below. This will complement the east-west cycle facilities proposed for the spine road.



Figure 5: Proposed Two-Way Shared Pedestrian and Cycle Path

3.4.3 Fr. Russell Road and Dooradoyle Cycle Lanes

LCCC are progressing the development of cycle infrastructure design on Fr. Russell Road and within Dooradoyle which will include junction improvements. This will provide additional cycle infrastructure in the area between Mungret and Dooradoyle and onwards towards the city centre which will improve safety and encourage a modal shift to cycling.

3.5 Public Transport

3.5.1 Existing Public Transport Provision

Figure 6 shows the location of existing bus stops in the vicinity of the proposed development. The area is served by four local bus services: the 301, 314, 304 and 304A.

Along the R510, the 301 inbound and outbound bus stops (stop 311661 and stop 609331) are 190m from the site access. There is a zebra crossing located near each bus stop.

The 314 inbound bus stops (Stop 332411, stop 332441 Stop 332081) are located centrally in Mungret village on the R859, 600m from the entrance of Gaelscoil An Ráithín. There are also inbound and outbound bus stops (Stop 332411, stop 332441) 100m from the entrance of Gaelscoil An Ráithín, which leads to the spine road for the proposed development.

The inbound and outbound bus stops that serves the 304 and 304A on St. Nessan’s Road is 85m from the R510 and R526 roundabout junction. These stops (stop 607461 and stop 607821) are approximately 750m from the site access along the R510. These stops have a bus shelter as well as a pedestrian crossing within 70m.

The railway station (Limerick Colbert) is approximately a 15-minute drive, 20-minute cycle or 40-minute bus journey using the 301 or 304A. The approximate frequency of these services is presented in Table 1.

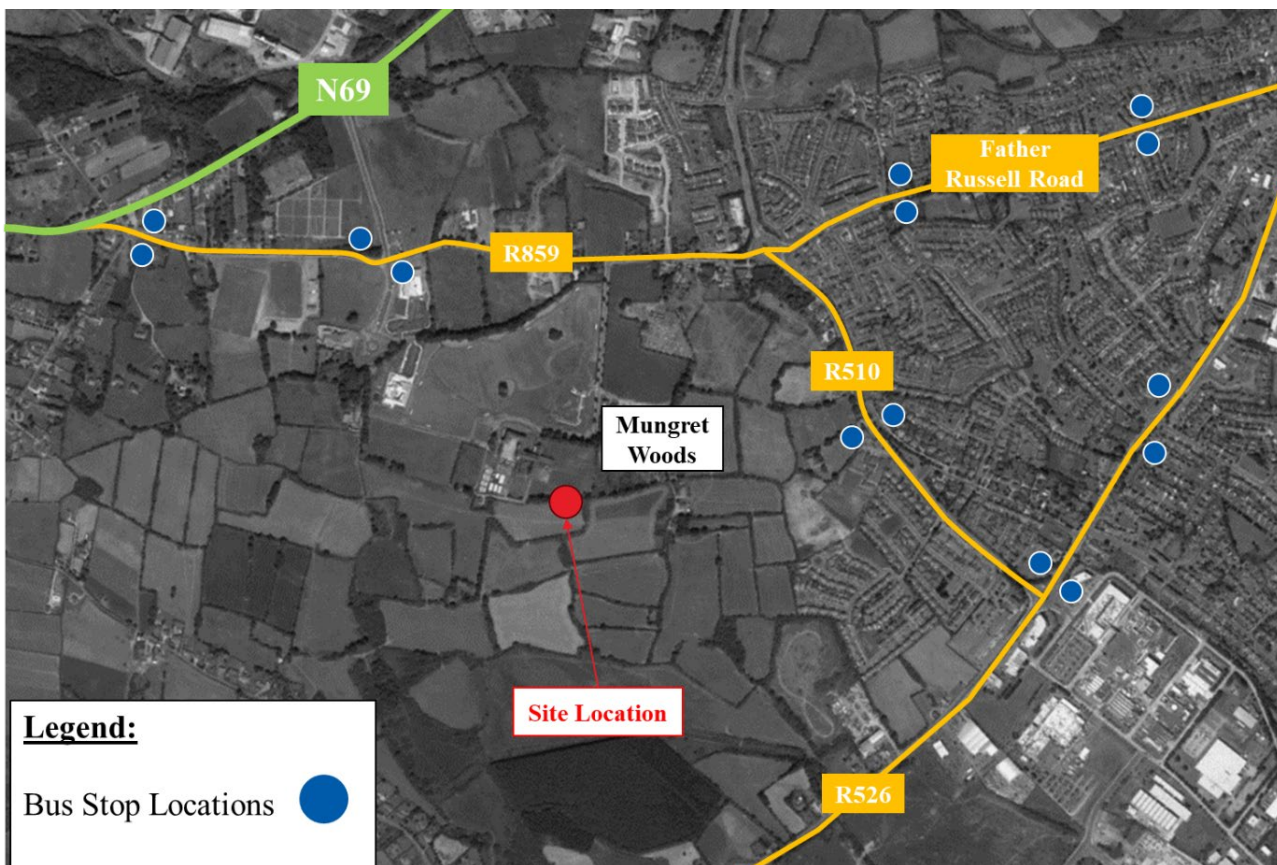


Figure 6: Bus Stop Locations in the Vicinity of the Proposed Development

Table 1: Public Transport Service Frequencies

Bus Service	Provider	Approximate Frequency
Bus No. 301 Raheen - Westbury	Bus Éireann	Every 15-30 minutes
Bus No. 304 UL Stables - Raheen	Bus Éireann	Every 10-20 minutes
Bus No. 304A Raheen - UL via Parnell St	Bus Éireann	Every 20-30 minutes
Bus No. 314 Limerick Bus Station - Ballybunion via Foynes	Bus Éireann	Every 2-3 hours

3.5.2 Proposed Public Transport Upgrades

The NTA’s BusConnects Limerick programme to review the bus services for Limerick has presented a significant change to public transport routes and their frequency in the area. Under the proposals within the Limerick bus network redesign report, the level of bus services in Limerick city and its suburbs will increase by approximately 70%. The proposed network map is shown below in Figure 7.

The new routes presented in the proposed network map which improve connectivity for the proposed development include Route 5 University Hospital Limerick – St Mary's Park, which will operate at a 30-minute frequency and routes through Limerick City Centre. Route 1 University Hospital Limerick – Athlunkard, which will operate at a 15-minute frequency and routes through Limerick City Centre. Route 4 St Nesan’s Church – University of Limerick will operate at a 10-minute frequency through Limerick City Centre. Route 4A Father Russell Rd – Anacotty via Plassey Park Rd and route 4B Raheen Industrial Estate – Anacotty via Castletroy College Rd will both operate at a 20-minute frequency.

Limerick Network Map - How BusConnects gets you to where you want to go.

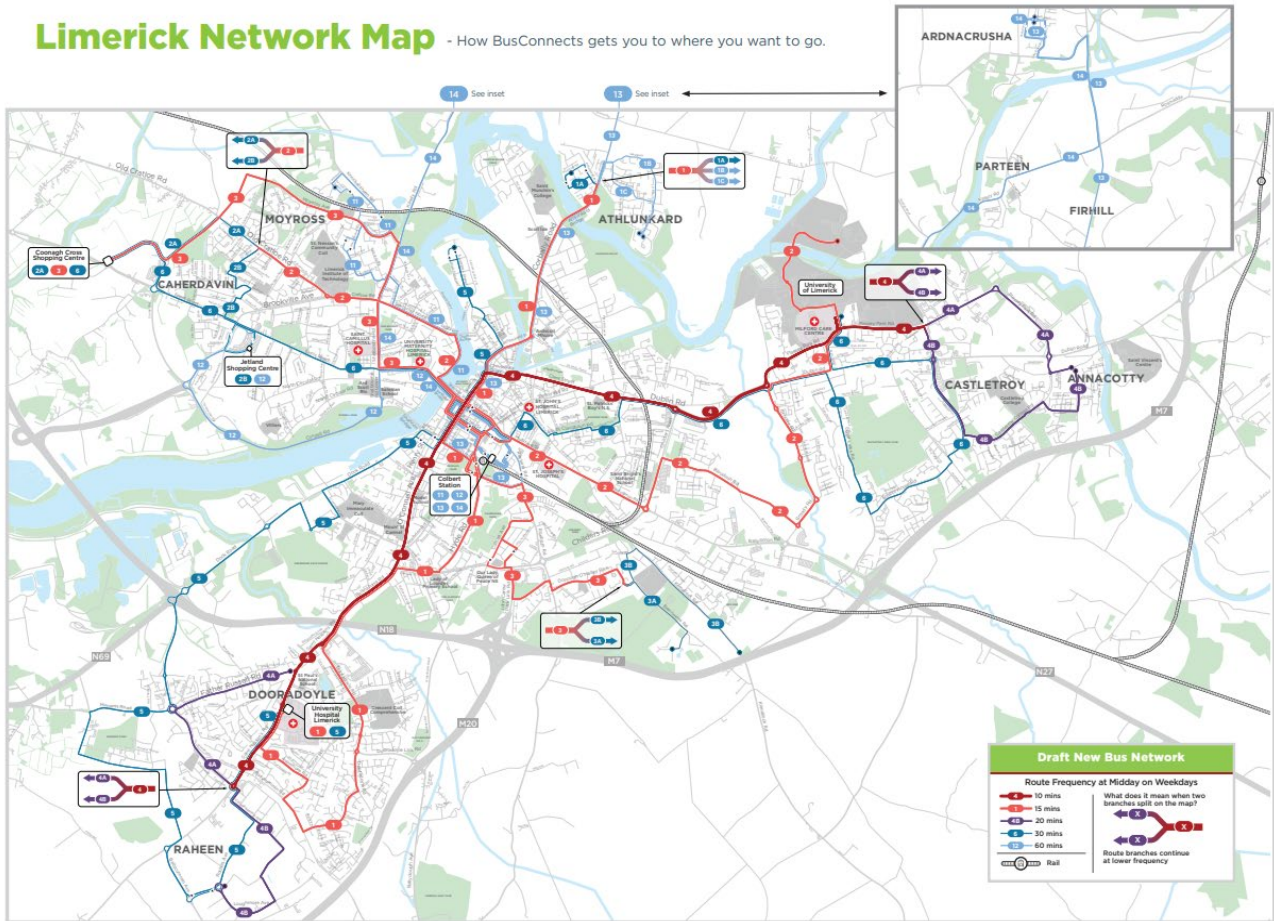


Figure 7: Proposed Network Map | source: Busconnects.ie

The Limerick Shannon Metropolitan Area Transport Strategy (LSMATS) also proposed a new cycle network for Limerick. The proposed Limerick Cycle Network is shown below in Figure 8. In the proposed network presented in LSMATS, a route from Mungret to the City Centre is identified as a primary radial cycle route. The proposed primary cycle route travels along the R510, R526, Ballinacurra Rd, South Circular Road and Henry Street, which will improve connectivity for cyclists between the proposed site location and Limerick City Centre.

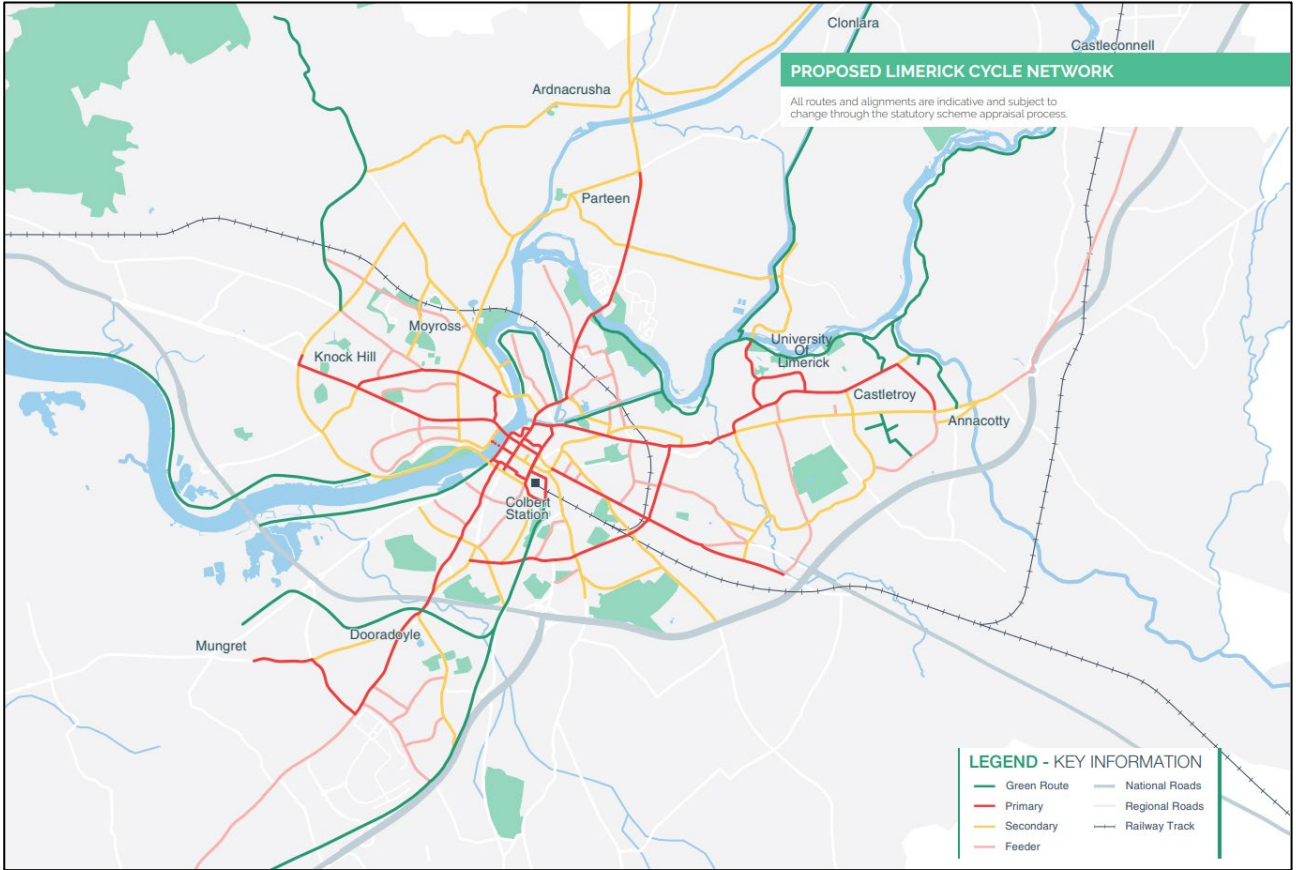


Figure 8: Proposed Limerick Cycle Network Map | source: LSMATS

4. Characteristics of the Proposed Development

4.1 Nature of the Proposed Development

The proposed development on circa 7.2 hectares of land, zoned for development purposes within the Limerick Development Plan 2022 – 2028, is located within the curtilage of a protected structure Mungret College Stables and Outbuildings (RPS No. 1658 1660 & 1661) whilst repair works are proposed to the Observatory (Seismic Station) (RPS No.1658).

The proposed development seeks the construction of:

- ix) 250 no. residential units including 36 no. two bed houses; 108 no. three bed houses; 25 no. four bed houses; 2 no. five bed community dwellings; 37 no. two bed apartment units; and 42 no. one bed apartment units with renewable energy design measures (which may be provided externally) for each housing unit.
- x) A crèche facility with capacity to accommodate 70 no. children;
- xi) 1 no. community facilities with ancillary café;
- xii) 2 no. community facility units fronting the public square and positioned within the Independent Living for Older Persons complex;
- xiii) Public toilet;
- xiv) Landscaping works including (a) provision of playground and kick about areas; (b) new pedestrian and cycle connections; and (c) public square;
- xv) Associated site and infrastructural works including provision for (a) water services, foul and surface water drainage and associated connections and (b) attenuation proposals including permeable paving and swales; (c) 4 no. ESB substations; (d) external plant and services; (e) car and bicycle parking; and
- xvi) all associated site development works.

A site layout plan is provided below in Figure 9. Refuse truck tracking is also provided in Appendix A.3.



Figure 9: Site Layout Plan

A Stage 2 Road Safety Audit shall be submitted for written agreement with the Planning Authority for approval prior to the commencement in compliance with the TII Publication 'Road Safety Audit GE-STY-01024'. Details of the proposed Audit Team shall be submitted for written agreement with the Planning Authority prior to proceeding with the Audit. Issues identified in the Audit shall be addressed in full prior to occupation of the development and revised Site Layout Plans to include the recommendations of the Audits shall be submitted if required.

As part of the Detailed design stage, the following shall be submitted to the Planning Authority for prior approval in advance of commencing on the site:

- Pedestrian crossing points with the inclusion of tactile paving on the pedestrian desire line;
- Proposals for an estate/street name, house numbering scheme and associated signage and road markings, along with the designs, locations and how they will be mounted; and
- A road marking and signage layout, which shall include Shared Surface Signs.

4.2 Changes from Previously Proposed Scheme

A previously proposed scheme from 2021 consisted of 253 residential units in total, 198 of which will be mainstream housing units and the remaining 55 units forming part of a housing complex which will provide independent living for older persons. The scheme also included a Crèche, Community Facilities, Café and local shops.

The updated scheme removes a total of 3 no. housing units from the previously proposed scheme, and comprises 250 residential units in total, 195 of which will be mainstream housing units and the remaining 55 units forming part of a housing complex which will provide independent living units for older persons. In addition, the updated scheme includes a Crèche, a Community Facility with ancillary café and community facility units.

A Stage 1 Road Safety Audit (RSA) was carried out on the previously proposed scheme design in January 2021. The new proposed scheme layout therefore includes the modifications suggested in this RSA, and as there are no material changes to the proposed scheme layout (i.e. no addition of elements that have not been audited previously) there is no requirement for a new RSA to be completed for the new scheme proposal. A summary of the modifications to the scheme based on the suggestions of the RSA are outlined below. The Stage 1 Road Safety Audit is attached in Appendix A.2, and images for the comparison of recommendations made and the design response are attached in Appendix A.3.

4.2.1 Traffic Calming

The RSA identified that the western site access which provides the most direct access to the crèche from the spine road has a straight alignment which could be conducive to higher traffic speeds, noting that the likelihood and severity of collisions is greatly exacerbated at higher speeds, whilst also creating an unsafe environment for road users, in particular pedestrians and cyclists.

The crossing point located midway along the access road is proposed to be cobbled paving which will be raised above the road surface and act as a rumble strip and as such will aid in the lowering of traffic speeds.

4.2.2 Forward Visibility

The RSA identified that the proposed location of trees adjacent to the pedestrian crossing which provides access to the crèche will reduce the forward visibility of the crossing increasing the risk of a collision with a pedestrian. The RSA notes maximising visibility is especially important considering the adjacent sharp bend on the approaching road. The RSA also raised that some of the parking bays to the south of the crossing may reduce the forwards visibility of the crossing.

The new layout addresses the forward visibility concerns around the pedestrian crossing by moving the crossing further away (to the east) from the bend on the approach road and offsetting the line of trees away from the road edge towards the footpath.

4.2.3 Parking Close to Pedestrian Crossing

The RSA identified that parking bays are located close to a significant pedestrian crossing, providing access to the crèche from the set-down area. There is a danger that a motorist might need to reverse onto the crossing in order to exit a parking space increasing the risk of a collision with a pedestrian.

The buffer areas between parking bays and the crossing has been increased allowing space for vehicles to manoeuvre clear of the crossing.

4.2.4 Shared Route to Crèche

The RSA identified that the shared pedestrian/cycle route which provides access to the crèche has a straight alignment, bounded by a row of trees and leads directly on to a pedestrian crossing. There is a danger that small children might run or cycle straight across this road without paying due caution to traffic. The adjacent parking spaces form a tunnel effect and reduces the inter-visibility between motorists and pedestrians.

The crossing has been offset from the desire line maximising the cross-visibility between vehicles and pedestrians.

4.2.5 Sight Lines at Junctions

The RSA identified that it is unclear from the scheme drawings if the necessary sight lines can be achieved at many of the internal junctions due to proposed tree planting or carparking close by. Reduced visibility increases the risk of 'side-sweep' or 'rear-end shunt' type collisions.

As this is a low speed traffic calmed urban setting, with speeds around 10kph, the required visibility play is 7m. The proposed layout has taken this into account, ensuring all internal junction have the necessary sightlines in accordance with DMURS.

4.2.6 Lack of Uncontrolled Crossings

The RSA identified that there appears to be a lack of uncontrolled crossings for pedestrians wanting to access the shared pedestrian and cycle route which runs along the northern boundary from other parts of the development. This may lead to pedestrians crossing the street at unsafe locations.

The new proposed layout in the vicinity of the Shared Leisure Route improves the uncontrolled crossing locations providing appropriate crossing points and connectivity from the development to the Shared Leisure Route.

4.2.7 Lack of Tactile Paving at Pedestrian Crossings

The RSA identified that no tactile paving is prescribed at pedestrian crossings which could lead to pedestrians with visual impairments stepping out onto the carriageway and in front of a passing vehicle.

The layout and position of tactile paving will be completed in the detailed design stage and will ensure that correct tactile paving is used and the correct location, on the desire line, at each pedestrian crossing throughout the entire scheme.

4.2.8 Turning Area in Carpark

The RSA identified that it was not clear if motorists could safely egress from the end parking spaces in the carpark located to the east of the crèche when all other parking spaces are occupied by a vehicle. This could lead to an increased risk of collision with another vehicle.

The layout of this car park area has been amended to provide a turnaround space, ensuring that motorists can safely park and vacate all parking spaces in the carpark area.

4.2.9 General Parking Movements

The RSA identified that it was unclear from the drawings if there was sufficient space for vehicles to carry out the required movements, particularly for parking. Some of the parking spaces appear tight and may take several movements to access/egress the spaces. Parking spaces that are difficult the use may increase the risk of an incident.

A review of parking areas within the site was undertaken and a swept path analysis of parking areas was conducted to ensure that all spaces can be accessed and egressed safely and comfortably.

4.2.10 Unsafe Bike Stand Location

The RSA identified that the location of the bike parking area within the car park located to the east of the crèche has little space for cyclists to stand when using the bike-stand which could lead to a cyclist being struck by a vehicle within the carpark.

The bike parking area will be relocated to a position with more footpath space in order to improve the accessibility, moving to a space with more room will reduce the risk of a cyclist being struck by a vehicle within the carpark.

4.3 Projected Traffic Generation

4.3.1 Trip Generation

The trip generation associated with the previously proposed development has been developed in consultation with Limerick City and County Council in the context of the planning application for the overall masterplan for Mungret. The industry standard tool 'TRICS' was used to calculate the trips generated by the proposed development. As there is minimal change in the newly proposed development, in which the scheme is reduced by 3 no. residential units, this trip generation remains relevant for the assessment of the development. In reality the trips will be slightly reduced for the new scheme.

The Interim Design Year, 2025, considers the Inclusion of 659 residential units and the completion of the 1,000 pupil secondary school. It is proposed that these residential units would access the adjoining public road network at the eastern access junction (onto the R510) and at the Northern Access Junction (the existing school signalised junction onto the R859).

The Final Design Year scenario, 2035, considers the completion of all residential units in the zoned lands and also the mixed-use development of the Mungret College property. This scenario assumes that the access road to the Patrickswell Road (R526) at the Loughmore Roundabout (southern spur) will be completed and operational, providing a third access point for the proposed development.

The background traffic growth on the existing road network as per TII's Project Appraisal Guidelines, Unit 5.5 Link-Based Traffic Growth Forecasting, has been combined with the additional traffic generated by the proposed development to calculate likely traffic volumes for the Interim Design Year (2025) and the Final Design Year (2035). These traffic volumes were assessed by building static traffic models which use empirical formulae to calculate individual junction capacities and time-dependant queuing. The resultant model outputs are estimated values for traffic queues and delays. The trip generation for the AM and PM peak hours are shown in Table 2 and Table 3 below.

Table 2: AM Peak Trip Generation

AM Peak	Direction	2025 Do Nothing	2025 Do Something	2035 Do Something
Housing	Arrival	140	207	663
	Departure	360	530	1624
School	Arrival	198	198	198
	Departure	123	123	123
Residential Care Home	Arrival	0	22	22
	Departure	0	13	13

Convenience Retail	Arrival	0	33	33
	Departure	0	30	30
Salon	Arrival	0	10	10
	Departure	0	9	9
Creche	Arrival	0	37	37
	Departure	0	28	28
Coffee Shop	Arrival	0	2	2
	Departure	0	1	1
Mungret College Redevelopment	Arrival	0	44	44
	Departure	0	60	60
Total	Arrival	338	553	979
	Departure	483	794	1888

Table 3: PM Peak Trip Generation

PM Peak	Direction	2025 Do Nothing	2025 Do Something	2035 Do Something
Housing	Arrival	362	533	1633
	Departure	204	300	920
School	Arrival	82	82	82
	Departure	125	125	125
Residential Care home	Arrival	0	15	15
	Departure	0	17	17
Convenience Retail	Arrival	0	16	16
	Departure	0	39	39
Salon	Arrival	0	14	14
	Departure	0	14	14
Creche	Arrival	0	21	21
	Departure	0	28	28
Coffee Shop	Arrival	0	3	3
	Departure	0	2	2
School	Arrival	0	30	30
	Departure	0	19	19
Total	Arrival	444	713	1813
	Departure	329	545	1165

4.3.2 Traffic Distribution

Access to the proposed development will be from the proposed spine road to the south, which itself will connect to the existing road network via an access road connecting to the R510 to the north-east of the proposed development, and via the existing access road to Gaelscoil An Ráithín from the R859. Distribution of traffic on the network from these access points is outlined in the previous Traffic Modelling Report.

4.4 Parking Provision

4.4.1 Private Car Parking

The car parking strategy for the site follows the standards set out in the Limerick Development Plan 2022 – 2028. The parking strategy for the housing and apartment units on plots A1-A3 is different to that for the Independent Living Units on plot A4.

Car parking for plots A1-A3 provides for a total of 289 no. car parking spaces including 1.5 car parking spaces per 2 bed unit and 2 car parking spaces per 3 and 4 bed units with 1 visitor car parking space provided per 3 no. houses as detailed in Table 4. A balance of onsite curtilage parking, on-street assigned parking and visitor parking is provided throughout the development. Those residential units proposed with no on curtilage car parking will be reserved a dedicated / demarcated parking space on the street in close proximity to the unit.

Table 4: Car Parking Calculations plots A1-A3

Unit Size & Type	No. of Units	Car Parking Standard	No. of Spaces Permitted
2 Beds	36	1.5 spaces per unit	54
3 Beds	108	2 spaces per unit	216
4 Beds	25	2 spaces per unit	50
Apartment Units	12	1 space per unit	12
Visitor Spaces (Apartments)	12	1 space per 3 units	4
4+1 Bed Community House	2	2 spaces per unit	4
Total Car Parking Spaces Permitted			340
Total Car Parking Spaces Provided			280

A different approach is adopted for plot A4 accommodating the independent living units for older persons, creche, community centre and apartments. Given the nature of the independent living units, the vast majority of occupants will not have cars. In collaboration with the Housing Body intended on managing the residential units, the focus is on providing visitor parking with on street parking for a number of residential units. On-street car parking spaces are provided to serve plot A4 including the independent living units, the creche and the community facilities. The apartment units over the creche and community centre have their own dedicated and secure parking, located immediately east of the building and accommodating 12 no. car parking spaces.

The breakdown for each type of unit is detailed in Table 5. Importantly the apartments, creche and community facility units are provided with full car parking in accordance with development plan standards, whilst reduced parking is provided for the independent living units.

Table 5: Car Parking Calculations plot A4

Unit Size & Type	No. of Units	Car Parking Standard	No. of Spaces Permitted
Independent Living Units	55	0.5 space per unit	27.5
Visitor Spaces (Independent Living Units)	55	1 space per 6 units	9.17
Apartments	12	1 space per unit	12
Visitor Spaces (Apartments)	12	1 space per 2 units	6
Crèche	13 staff + 70 children	1 space staff + 1 space per 5 children	27

Community Facility Units	195sqm gross	1 space per 100sqm + set down	3
Total Car Parking Spaces Permitted			84.67
Total Car Parking Spaces Provided			92

Cumulatively, the development includes a total of 372 no. car parking spaces, thereby resulting in an overall deficiency of 53 no. spaces only which is considered to be immaterial, particularly having regard to the public transport proposals envisaged for the area as detailed in the Draft Limerick Metropolitan Area Transport Strategy and in particular having regard to the proposed Quality Bus Corridor (QBC) which will front the site (on the proposed LIHAF Road).

4.4.2 Electric Car Parking Provision

A total of 30 no. electric vehicle charging points will be provided within the development. Car parking areas will be laid out so as to accommodate the infrastructure to facilitate the future roll-out of EV charging facilities to each parking bay.

4.4.3 Accessible Parking Provision

Accessible parking is provided throughout the scheme, with a focus on concentrating these spaces near the Independent Living units complex. A total of 13 no. Accessible Parking Bays will be provided within the development.

4.4.4 Cycle Parking

Limerick Development Plan 2022 – 2028 requires the provision of 1 no. space per house and apartment unit less than three bedrooms and 2 no. spaces per house and apartment unit of three or more bedrooms. The development plan also requires visitor/short term spaces of 1 no. space per two house and/or apartment units. The Independent Living Units require a provision of 1 no. space per four units as per the development plan. The crèche requires 1 no. space per three staff members and it is also required to provide and 1 no. space per 200sqm of community facility provision, and a further 1 space per 5 staff members. A breakdown of the bicycle parking requirements and provision can be found below in Table 6.

Table 6: Cycle parking Calculations

Bicycle Spaces	Cycle Parking Standard	No. of Spaces Required
Independent Living	1 space per 4 units	13.75
Apartment Units 1-2 Bed	1 space per unit + 1 visitor space per 2 units	18
Crèche	1 space per 3 staff	4.33
Community Facility Units	1 space per 200sqm + 1 space per 5 staff	2
Housing Units	1 space per unit	183
Housing Visitor/Short Term	1 space per 2 units	91.5
Total Bicycle Parking Required		312.58
Total Bicycle Parking Provided		349

Provision has been made for a total of 349 no. bicycle spaces on site. Overall, the bicycle parking provision on site is in excess of Development Plan requirements.

The 12 no. apartments overhead the creche and community building are served with 12 no. covered spaces within the gated parking area. A total of 10 no. dedicated bicycle stands are provided to serve the creche facility with 14 no. bicycle stands provided to serve the community centre, community facilities units and to provide for additional visitor spaces.

5. Impact of the Proposed Development

An assessment for a previously proposed scheme was carried out and supported the grant of Planning Permission in 2021. The newly proposed scheme presented in this application is slightly smaller than the one subject to the previous application, with the removal of 3 no. residential units. There have been no material changes to remainder of the scheme. The internal layout has been modified in relation to the recommendations received in the stage 1 RSA.

The assumptions made in the assessment of the proposed scheme in 2021 regarding car mode share were robust, and there has since been a number of proposals in relation to improved walking, cycling and public transport provision in the area, as outlined above in Section 3.4 and 3.5 respectively. Based on this, and the slight reduction in scheme size previously presented, it is assumed that car trip generation shall be less when compared to the previous assessment.

An increase in background traffic will be reflected in a less notable impact of the traffic generated by the development (note reduction in car trips generated mentioned above).

Based on the above we do not believe that new traffic counts are required for this application, and consider the impact assessment of the proposed development conducted in 2021 to remain relevant for the newly proposed scheme. The MHL Paramics Modelling Report assessment conducted in attached in Appendix A.1.

6. Mitigation Measures

6.1 General

The following section details the various measures which have been included within the scheme in order to reduce the potential impact on the transport environment in the vicinity of the proposed development.

6.2 Sustainable Transport Measures

The design development has included for the accommodation of sustainable transport. The internal road network will incorporate narrow lanes and traffic calming measures to promote the Home Zone concept and to reduce any perceived priority for the private motor car. Pedestrians and cyclists are considered and prioritised throughout the development. Cycle parking is provided throughout the development including adjacent to the proposed amenity areas.

The proposed spine road to the south of the development includes segregated cycle tracks on both sides of the road. There is also the potential for the proposed spine road to facilitate an expansion of existing public transport services to the Mungret area. The spine road design can accommodate bus stops that may form part of any future agreed expansions of services.

The proposed development was designed in compliance with DMURS principles, standards and requirements. The development balances the use of transport modes and places the pedestrian and cyclist ahead of the motorised vehicle as per the DMURS user hierarchy. The development is intended to further promote sustainable modes of transport and provide a new high-quality public space in the area. The dimensions of vehicular infrastructure are in line with DMURS requirements such that adequate provision is made for all necessary circulation and vehicular manoeuvres, but that they will be carried out at low speeds and in a safe manner. This ensures legibility for those travelling to and through the development by all modes whilst ensuring comfort for residents availing of the streets as a “place” as well as a “link”.

6.3 Construction Traffic Management Plan

It is recommended that the appointed contractor for the scheme prepares a detailed construction traffic management plan to ensure safe access to the site is maintained and the local road network operates efficiently and safely during the course of the development. It is considered that the majority of works will be contained within the existing site boundary, and as such impact on the local road network is considered minimal.

The CTMP will take cognisance of the measures identified below and any conditions of statutory approvals, attached to the proposed development. Given the proposed development will be constructed over a five-year period the Contractor will prepare a specific CTMP for each of the construction phases taking into consideration the continual development of the project such as the opening and closing of construction compounds, occupancy of residential units etc.

To access the site construction traffic will use Mungret Link Streets Project which is expected to be complete or close to completion prior to the commencement of construction of the proposed development.

Light vehicles, such as cars and vans, will be used by site operatives travelling to and from the site. Heavy Construction Vehicles (HCV) will be required to deliver general construction materials, such as concrete, to the site.

The traffic generated by the proposed construction of the development will be on a temporary basis and is anticipated to be less than the traffic generated by the development when it is occupied. It will be necessary to agree any traffic management plan with Limerick City and County Council in advance of the project and that this plan is reviewed throughout the course of construction.

7. Outline Mobility Management Plan

7.1 Objectives

The primary objectives of this travel plan are to:

- Reduce car dependency and demand;
- Promote the use of sustainable travel modes;
- Create awareness of alternative modes of transport available;
- Reduce the environmental effects associated with increased car use such as congestion, parking impacts, longer journey times and increased pollution; and
- Set, and work towards, achievable modal split targets based on strategies to improve alternative modes of transport.

7.2 Mode Split

The modal split for the area where the proposed development is located has been derived from the Central Statistics Office (CSO) Small Area Data 2022. On analysis of the Ballycummin electoral division commuter data, the following travel patterns were established:

The Limerick Development Plan 2022-2028 identifies that the most popular means of travel for those living in Limerick City and Suburbs (in Limerick), Mungret and Annacotty was by means of private transport, car driver and car passenger (71.7%). A breakdown of the modal split in the vicinity of the proposed development (Ballycummin ED) and for the County of Limerick is provided below in Table 7.

Table 7: Existing Modal Split for Ballycummin ED and Limerick County | CSO 2022

Mode	Ballycummin ED	Limerick County
Walking	13.9%	14.7%
Cycling	2.5%	1.8%
Public Transport	9.2%	8.4%
Car Driver	46.5%	44.7%
Car Passenger	24.9%	24.9%
Van	2.5%	4.7%
Other	0.5%	0.8%

Based on the improvement of public transport and the prevailing transportation and planning policies, it is expected that the car mode share will significantly decrease in the future years. The target private car mode share for the Limerick and Suburbs (in Limerick), Mungret and Annacotty, according to the Limerick Development Plan 2022-2028 is 46%, and this target and even a target below is considered to be an achievable target for the proposed development.

7.3 Residential Travel Plan

A key objective of the development will be to promote sustainable access by all modes of transport. To achieve this goal, Travel Plans should be created for development.

The proposed development should have a Travel Plan prepared as and when the occupiers are known. At this stage, it is not possible to prepare a full Travel Plan, but it is important to set out the aims and potential contents of such a plan.

The primary objective of the Travel Plan should be to contribute to sustainable transport by optimising the existing transportation infrastructure, reducing car dependency, and creating awareness of alternative modes of transport.

The main objective of the Residential Travel Plan will be to influence the residents' travel habits from the outset of the development's occupation. Life events such as moving to a new home are the moments at which sustainable behavioural changes can be achieved, and so the moment the new residents move into the development is the best moment to influence the existing behavioural (or travel) patterns. It is intended that, as a lease/sale condition, all occupants are required to adhere to the principles of the Travel Plan.

7.3.1 Travel Plan Coordinator

It is recommended that a Travel Plan Coordinator be nominated for the Residential Travel Plan to oversee the development and implementation of the Travel Plan. The coordinators should liaise on a regular basis to review the progress of the plan, and co-ordinate events.

A key objective of the Travel Plan should be coordinating with the residents to ensure that they are striving towards the targets set in the Travel Plan. These targets may be along the lines of:

- To develop and support a culture of sustainable travel into and within the development site;
- To raise awareness of sustainable transport issues in the development site;
- To act as a single point of contact for all queries relating to the Travel Plan and transport issues in the Development and to centrally coordinate the Travel Plan initiatives;
- To coordinate the development and implementation of the Travel Plan;
- To liaise with external bodies and local public transport operators on transport issues in the area;
- To liaise with car-sharing, and bike-sharing operators;
- To promote smarter travel events in the area; and
- To coordinate the monitoring and reporting of the Travel Plan progress towards achieving targets, setting clear dates for actions to ensure that the Travel Plan makes progress.

7.3.2 Communication and Marketing

An ongoing communication strategy will ensure that the initiatives being implemented are promoted to residents of the building. Events and initiatives will be promoted through a range of marketing means:

- Posters in communal areas within buildings;
- Circulation of emails to notify residents of specific events;
- Induction Manual containing information on all travel options available to development staff and residents; and
- Quarterly newsletters will notify residents of any transport related changes coming up (additional bus routes/stops, new cycle parking locations etc.) and promote upcoming events. It will also report on events held in the previous quarter.

7.4 Action Plan

The Travel Plan Coordinator will oversee the promotion and implementation of promotional measures as outlined in the non-exhaustive list below. The Travel Plan Coordinator will set a timeline and targets for the actions.

The Travel Plans should set-out a number of mobility management measures that are relevant to the development. Table 8 below list a selection of residential measures that are considered applicable to the development.

Table 8: Action Plan - Promotional Measures for Residents

Reduced Car Parking and Car Sharing
Reduced car parking provision compared to the permitted number of car spaces.
Implementation of a bespoke residential car club.
Cycling
Provision of a mobility hub including bike rental and other functions.
Organise a Bike Maintenance class.
Publicise TFI Bikes registration for people interested in cycling in the City.
Arrange tours of cycling facilities for residents.
Public Transport
Introduce & promote Tax Saver monthly & annual commuter tickets for public transport. Highlight potential savings to employees.
Offer in-house health checks for people interested in getting more active.

7.5 Monitoring and Review

An annual review should be carried out on the Travel Plans targets and action plan to assess progress.

Travel pattern data will be obtained by undertaking a survey of existing travel patterns (including at participating occupiers). A fundamental part of the Plan is monitoring to determine progress, identify problem areas and initiate corrective measures to ensure targets are achieved. This monitoring programme will be carried out on an on-going basis. The basic procedure will consist of:

- Reviewing the implementation of the different Travel Plan measures;
- Carrying out a travel survey;
- Controlling the achievement of the different targets;
- Proposing corrective measures if needed; and
- Informing Limerick City and County Council about the implementation and progress on the Travel Plans.

8. Conclusion

The proposed residential housing development is located in Mungret, Co. Limerick. The proposed development will consist of 250 residential units, public spaces, a crèche, community facility units as well as a community facility with ancillary café.

The analysis presented previously represents a robust estimate of traffic generated by the proposed development. The traffic and transport assessment of the operational phase of the proposed Mungret development indicates that the local traffic network will not be adversely affected as a result of the traffic generated by the proposed development.

The level of traffic generated by construction activities during the construction of the development will be less than that generated by the development once operational. A construction traffic scenario has therefore not been included in this assessment.

Sustainable transport infrastructure is to be included as part of the scheme and will help bring about a modal shift toward cycling, walking and public transport.

A.1 Traffic Modelling Report

MHL Paramics Modelling Report

Planning Application

Residential Development at Mungret, Co. Limerick



Transportation Modelling Assessment

December 2020



MHL & Associates Ltd.
Consulting Engineers



Document Control Sheet

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1.0 Background & Introduction

MHL were appointed by ARUP Consulting Engineers to undertake a traffic modelling assessment of a proposed residential development in Mungret, Co. Limerick. MHL employed the Mungret Paramics Microsimulation Model which had been developed by MHL for Limerick City & County Council as part of the development of a wider Mungret Masterplan design proposal. The Mungret Paramics Microsimulation Model served to assess the impact of various levels of development and infrastructural improvements, in light of likely traffic conditions on the existing and proposed transport network. The models were developed in consultation with Limerick City & County Council and the Mungret Masterplan Design Team.

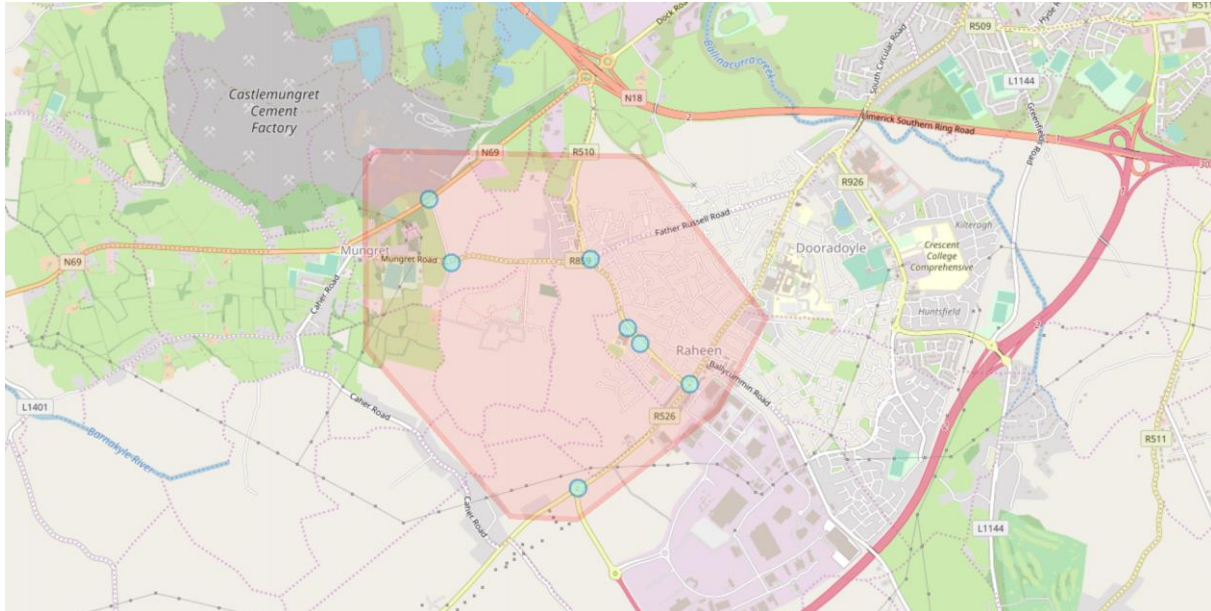


Figure 1.1 Study Area and Major Junctions included in the Mungret Traffic Model

A number of 'Interim Design Year' and 'Design Year' traffic models have been developed:

- **Interim Design Year (2025) – Do Nothing:** This model comprised of the growthed base model traffic flows, but without the inclusion of an estimated quantum of development of housing (419 units in advance of this application), plus a new 1000 Pupil School.
- **Interim Design Year (2025) – Do Something:** This model comprised of growthed base model traffic flows coupled with the "Do Nothing" development traffic volumes and inclusion of the application development (191 Houses, 55 bed Residential Care Home and 2 No Retail Units) with all proposed "Phase 1" infrastructural improvements.
- **Interim Design Year (2025) – Do Something with Modal Shift:** This model comprised of Do Something Model with a moderate Modal Shift from Private Car travel mode to sustainable travel modes applied to background traffic.
- **Design Year (2035) – Do Nothing:** This model comprised of the growthed base model traffic flows to 2035, without the inclusion of an estimated quantum of development of housing (estimated 419 units in advance of this application), plus a new 1000 Pupil School. No further infrastructural improvements are assumed compared to the 2025 models.
- **Design Year (2035) – Do Something:** This model comprised of growthed base model traffic flows coupled with the expected full development traffic coupled associated with 1946 residential units and with all proposed "Phase 2" infrastructural improvements.
- **Design Year (2035) – Do Something – With Modal Shift:** This model was the same as the previous 2035 model but with a moderate modal shift assigned to overall traffic volumes.

The Proposed Infrastructure Improvements are based on the Mott MacDonald's proposed Link Street/Road design, developed as part of the Mungret Masterplan design solution. The proposed network includes footpath and cycleways along with a 6m carriageway throughout the internal network. Internal link streets are to link to the main spine road at compact roundabouts. The proposed internal road network is shown to link to the wider existing road network at 3 locations, namely:

- Eastern Access - A signalised junction, including a right-turn lane, onto the R510 to the east of the site (recently constructed).
- Northern Access – A connection onto the recently completed access road currently serving the new school campus in Mungret.
- Southern Access – Signalised junction onto the R526 to the South of the site.

The analysis of the operation of traffic flows was undertaken through the comparison of a number of 'Key Performance Indicators' (KPI's). These KPI's present comparative model statistics for a particular criterion. The KPI's employed in this assessment are Journey Times and Queue Lengths. Journey Time Data is collected for a particular, defined route through the various models. The time for all vehicles travelling this route, in the model, is recorded. This journey time data, for identical journeys was collected for each of the models, allowing a comparison of the operation of the models to be presented. Similarly, queue length data presents the length of queues at particular junction approaches at pre-defined time intervals. As for the journey time statistics, this information provides an insight into the respective efficiencies of the models.



Figure 1.2 Microsimulation Model Extents

2.0 Existing Conditions

The proposed development lands are located near Mungret Village, to the south west of Limerick City centre. (See figure 2.1 below and 2.2 next page). It lies within the boundaries of the Limerick Southern Environs Local Area Plan 2011-2017. Mungret has been identified as a priority development area within the Limerick Metropolitan District and is a zoned urban expansion of Limerick City under the Southern Environs Local Area Plan 2011-2017 (Extended until May 2021).

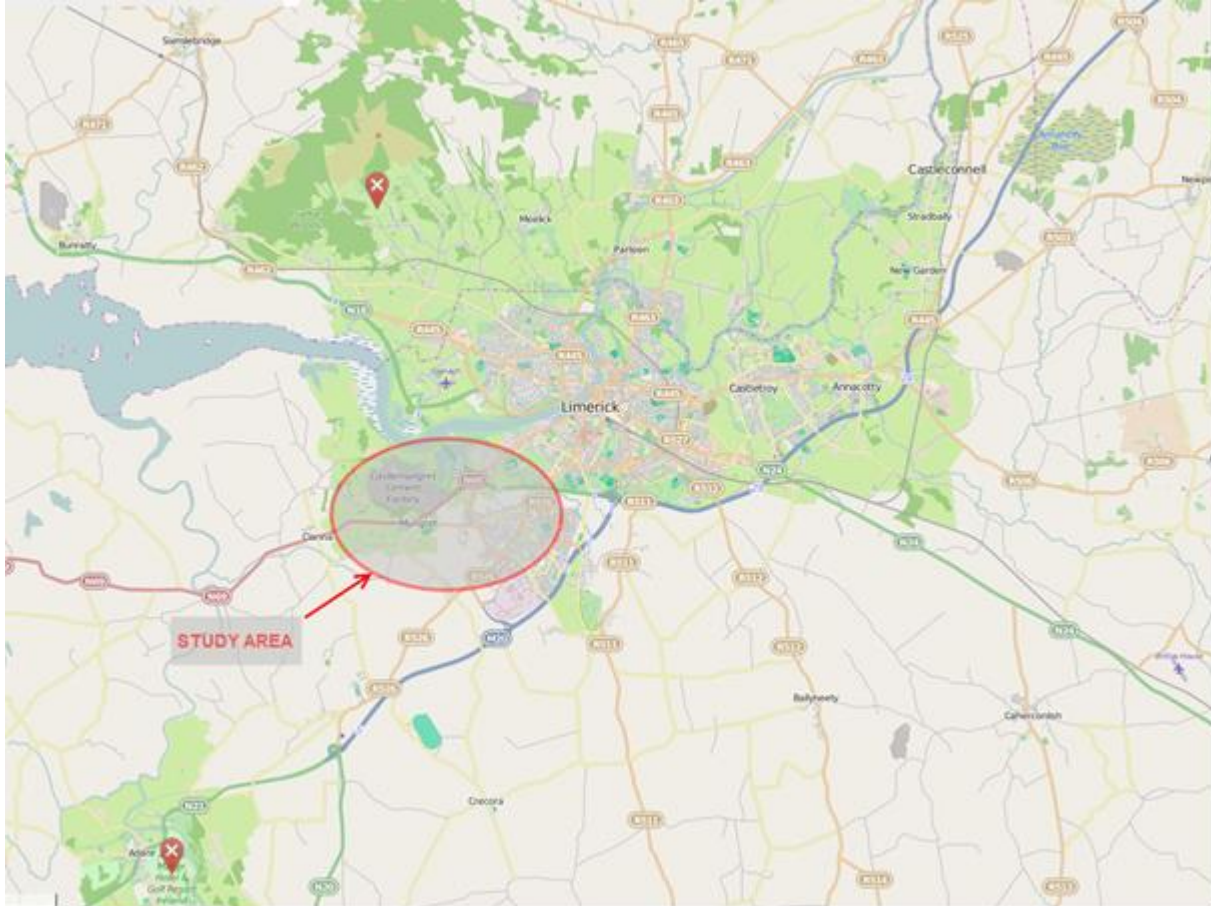


Figure 2.1: Traffic and Transport Study Area in context of Limerick City

The site which is the focus of this report has been identified by the planning authority as an “Opportunity Site” for which represents opportunities for delivering environmental and economic benefits to the area. It stretches between Mungret Village and the City suburb of Raheen. The Opportunity Site is known as Mungret Loughmore. A Masterplan has been developed by LCCC for the Opportunity Site. The Masterplan sets out development objectives, a development framework and design guidelines. The Mungret Loughmore site stretches from Mungret village to the west to Raheen in the east and to Loughmore Common to the south. See Figure 2.2 showing the Southern Environs Local Area Plan Land Use Zoning Map.

The site is currently used for agricultural purposes. A major schools complex is partly developed on the site. It is envisaged that 3 no schools will finally be located here, comprising of two National Schools (an Educate Together and a Gaelscoil) and one Secondary School. The 2 primary schools were recently completed. In the medium term, a community park, playing pitches, playground and redevelopment of Mungret College into a resource centre for community activities is proposed. And in the longer term a zoned residential/neighbourhood centre is also incorporated into the study, to consist of a maximum of 1,946 residential dwelling units and a mix of educational, community, and employment land uses.

The site is bounded by the N69 and the R859 Mungret Road to the north, the R510 to the east and the R526 to the Caher Road to the southeast and southwest. The proposed Masterplan Opportunity Site is outlined in figure 2.2 below. The graphic also show the existing land uses within and abounding the site.

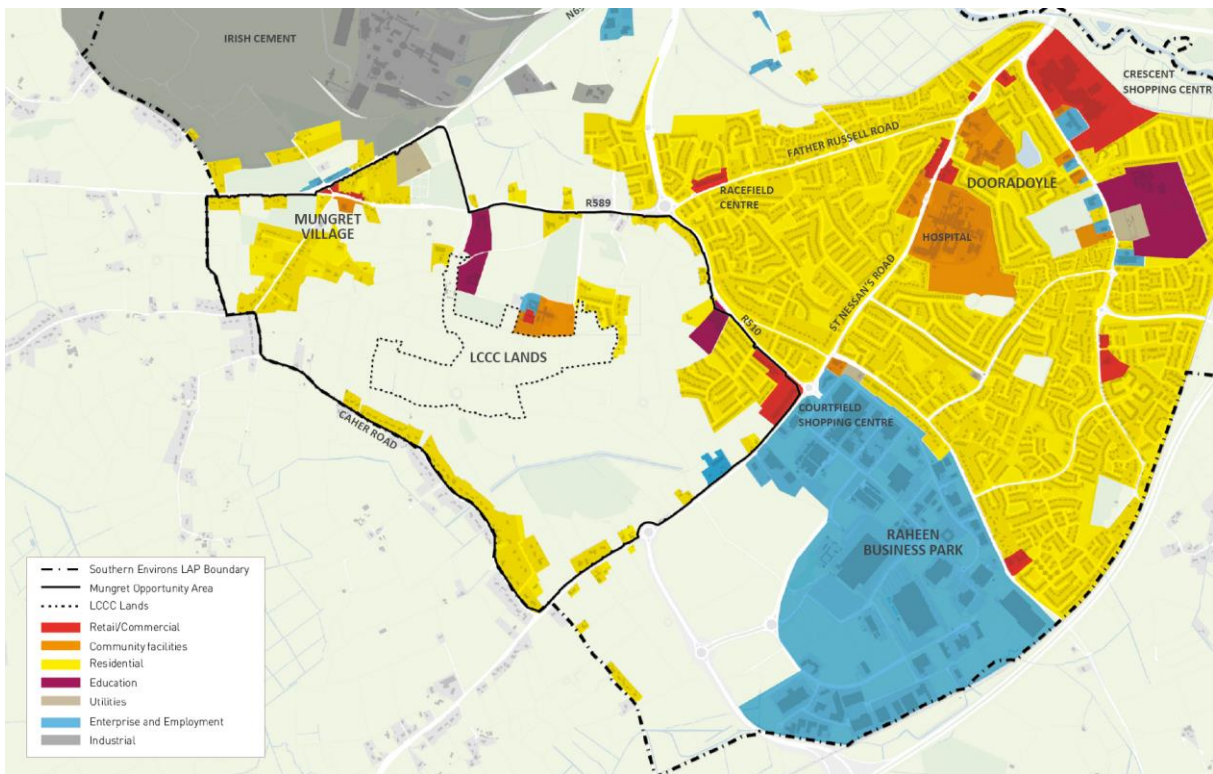


Figure 2.2: Mungret Masterplan Area showing Opportunity Site boundary & existing land uses
(Source: "Strategic Masterplan and Urban Design Strategy for Mungret" for Limerick Twenty Thirty)

2.1 Local Road & Transport Network

2.1.1 Road Network

The village of Mungret is just outside the Limerick City suburbs, approximately one kilometre west of Quinn’s Cross Roundabout on the R510 in Raheen and just over one kilometre south west of the N69 Dock Road Interchange on the N18 Limerick Southern Ring Road. The N69 National Secondary road passes through Mungret, to the north of the village centre and meets the N18 at the Dock Road interchange. See Figure 2.3 below showing the surrounding road network around Mungret and Loughmore. The existing School Campus site is also highlighted along with strategic roads and junctions.

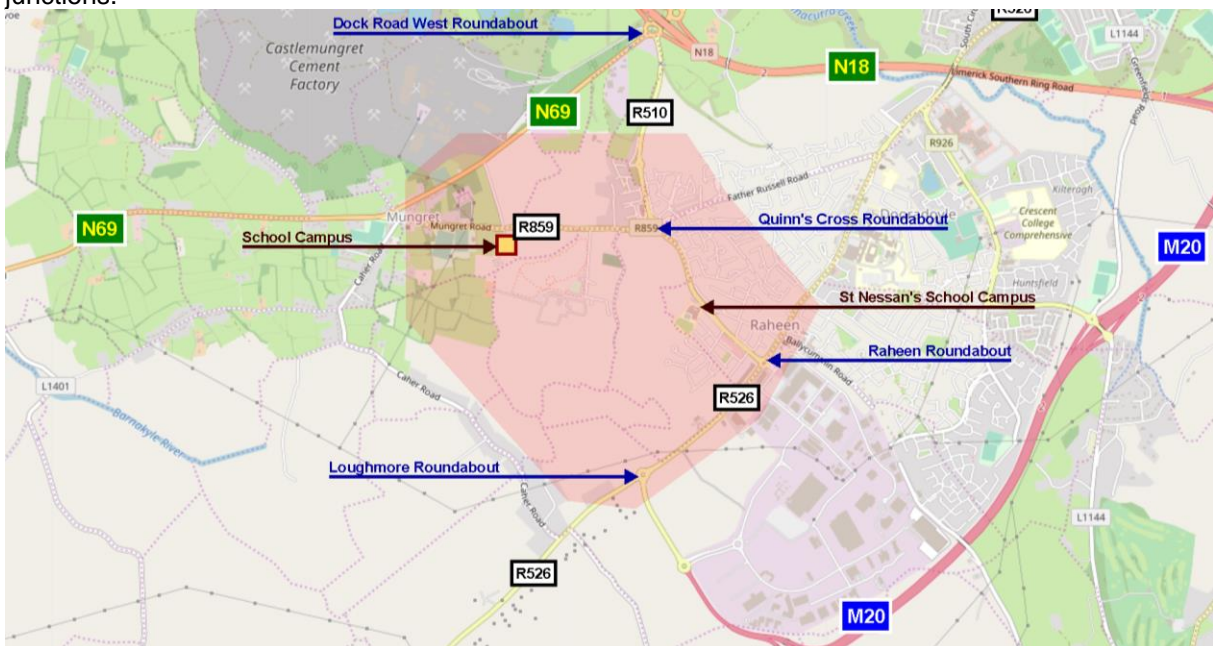


Figure 2.3: Study Area showing local road network

As can be seen in Figure 2.3 above the opportunity site is well served by the local, regional and national road network with the N69 and N18 in close proximity and the existing R859 Mungret Road

forming the northern boundary to the site. The R510 which bypasses Limerick City to its west from Raheen in the south to the Dock Road interchange just south of the River Shannon Crossing to the east of the site, where the R859 meets the R510 at Quinns Cross Roundabout. The main radial arteries into the city centre from the south western suburbs are Father Russell Road, which goes from R510 Quinn's Cross to the R526 St. Nessian's Road. The R526 itself is a main arterial route that runs from Patrickswell, through Raheen and Dooradoyle, where it's known as St. Nessian's Road, and onward to the city centre where it becomes the Ballinacurra Road and O'Connell Avenue/O'Connell Street. The N69 goes from the N18 Dock Road Interchange to the port of Foynes in West Limerick and onwards to Tralee via Listowel. The N18 to the north of the Dock Road Interchange links Limerick to Galway City and the West of Ireland. Three kilometres to the east of the Dock Road Interchange is the Rossbrien Interchange where the N18 meets the M7 Limerick to Dublin Motorway and the M20 Limerick to Cork/Kerry Motorway.

The site is currently accessed via the R859 at the signalised crossroads junction between the R859 and the L-1438 Moore's Lane and also to the east by a recently completed signalised junction on the R510 St Nessian's Road.

Moore's Lane connects the Mungret Road and the N69, some 250m east of the village. The R859 runs west to east from where it meets the N69, 700m to the west of the site, through Mungret Village, passing the signalised junction, forming a crossroads junction with Moore's Lane Junction. The R859 continues eastward for another 850m to its junction with the R510 at Quinn's Cross Roundabout.

The signalised junction on St Nessian's Road is located to the south of Quinn's Cross Roundabout and incorporates a right turn lane and pedestrian crossing facilities.

The Mungret Road has recently been upgraded by Limerick City and County Council to present a high-quality route for all road users and incorporates cycle lanes and footpaths on both sides of the road. The 50kph speed limit for Mungret Village is immediately west of the junction with Moore's Lane. The road carries a traffic flow of approximately 6,000 vehicles per day.

2.2 Existing Traffic Conditions

M.H.L. & Associates Ltd. Consulting Engineers were appointed to carry out the Mungret Masterplan Traffic Modelling Assessment, by Limerick City & County Council to assess the traffic impact of the proposed Mungret Masterplan. The traffic assessment serves to inform the sustainable development of the strategic opportunity site for educational, community, amenity and residential land use.

A number of junctions on the surrounding road network were identified as being critical to this study. For the purposes of this report these junctions have been labelled Junctions 1 to 7 and are highlighted in Figure 2.4 below. The counts were undertaken by NDC on the 21st of March 2018. A 24-hour profile of traffic flows of the individual junctions is shown in figure 2.5.

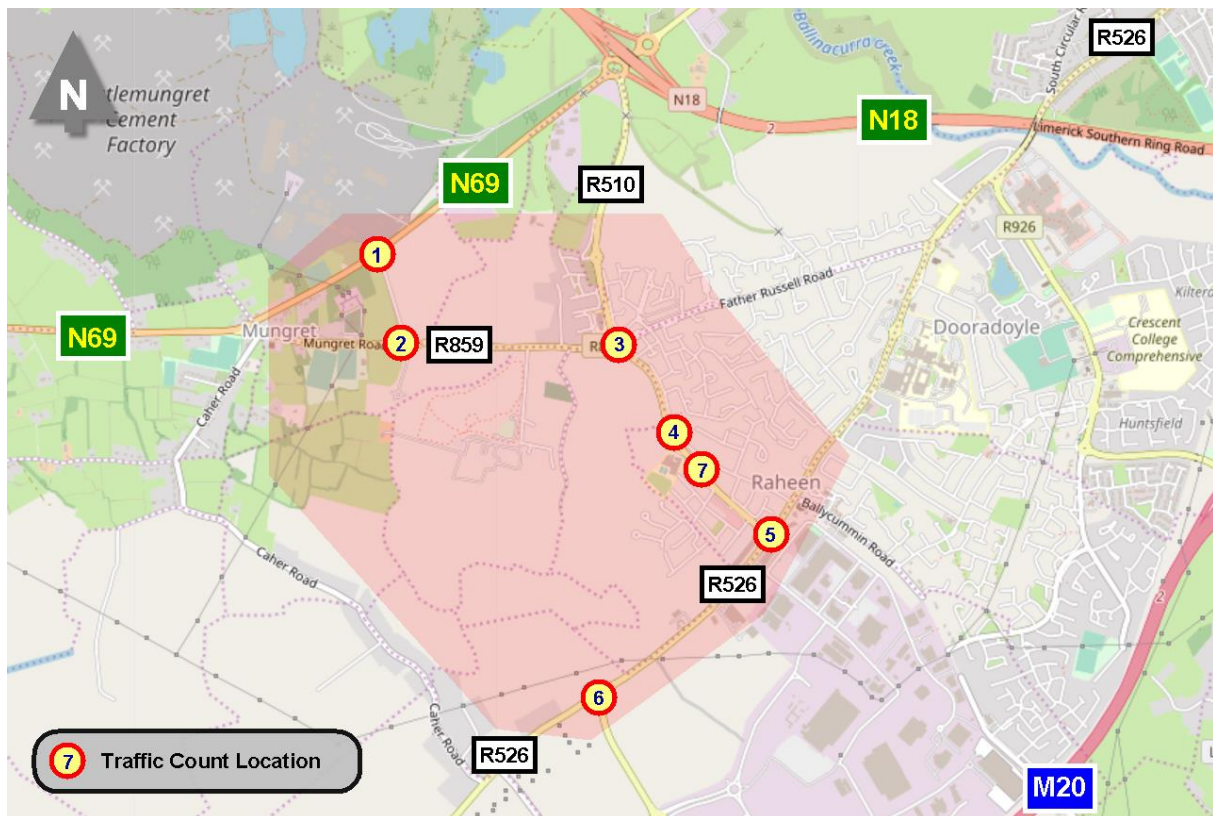


Figure 2.4: Study Area Traffic Count Locations

The 7 junctions are as follows:

Junction 1: N69/L-1438 Moore's Lane: Priority T-Junction east of Mungret Village

Junction 2: R859 Mungret Road/L-1438 Moore's Lane/Mount Mungret Farmhouse: Priority Cross Roads Junction east of Mungret Village and proposed entrance to the proposed school campus site.

Junction 3: Quinn's Cross Roundabout: 4 arm Roundabout Junction of R510 (north & south), R859 Mungret Road and L-1429 Fr. Russell Road

Junction 4: School Access Junction: Two number priority junctions serving St Nessian's National School

Junction 5: Raheen Roundabout: 4 arm Roundabout Junction of R510, R526 St. Nessian's Road (north & south) and Raheen Business Park access.

Junction 6: Loughmore Roundabout: 3 arm Roundabout Junction of R510, R526 St. Nessian's Road (north & south) and Raheen Business Park access.

Additional traffic count information related to the previous Mungret Environs Road Infrastructure Works Traffic Study in 2014 were also utilised in this study. These traffic counts were collected at:

Junction 7: R510 / Church Road Junction: Priority T-Junction to south east of St. Nessian's School

MHL & Associates carried out a detailed analysis of all of the traffic survey data. See Figure 2.5 below which illustrates the traffic flow profile over the 24-hour survey period. It is compiled from the surveys of all 6 junctions collected in the most recent, 2018 traffic surveys, carried out by Mott MacDonald. The traffic flow figures are composed of all traffic movements through each of the respective seven junctions at 15-minute intervals.

The morning peak hour is 07.45 – 08.45 and is the busiest peak, followed closely by the evening peak hour which occurs between 16.45 and 17.45. Trics trip generation analysis confirms that the likely development associated with the subject site will also generate maximum traffic between 08.00 and 09.00 hours. This is the busy peak for school arrivals and coincides with residential development commuter peak traffic movements as well as local network commuter peak period traffic.

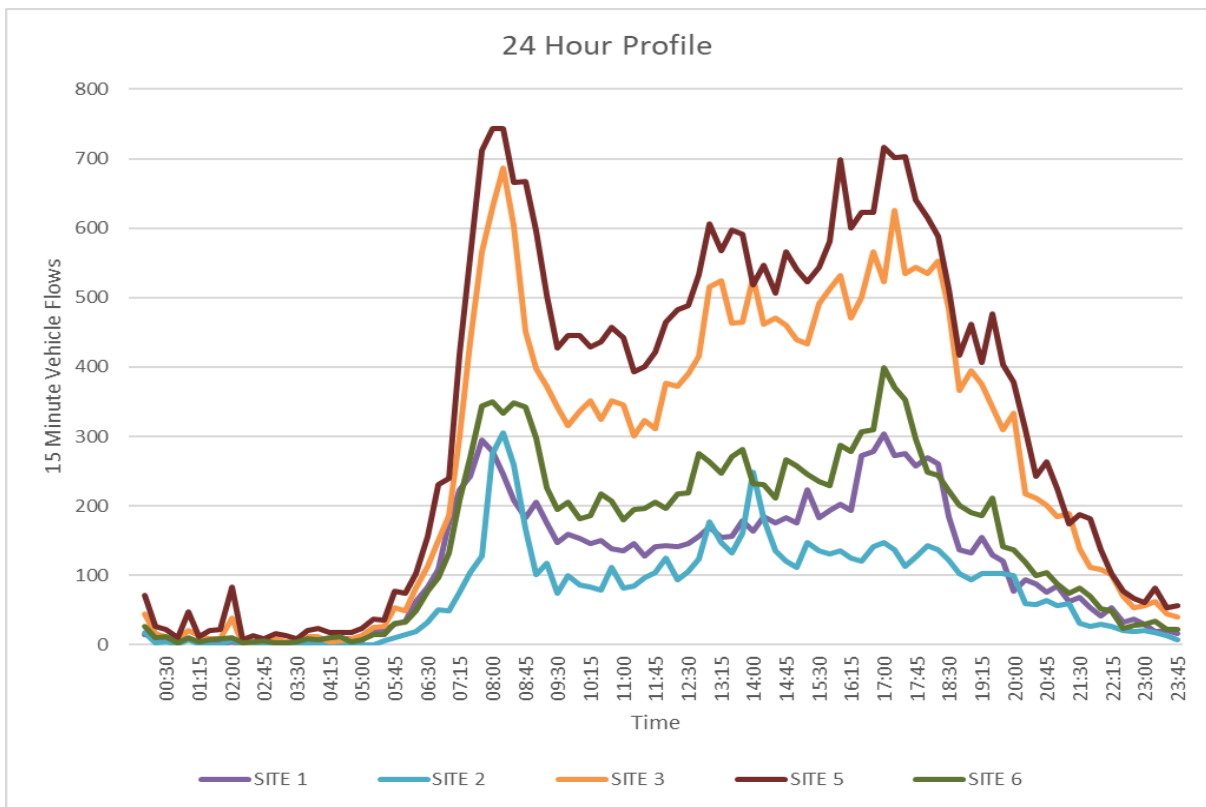


Figure 2.5: 24-hour traffic profile at each of the traffic count locations

The busiest location in terms of traffic movements at any junction on the surveyed network is the Raheen Roundabout on St. Nessian’s Road with 32,000 vehicles passing through it over the 24 hour period. This is followed closely by the Father Russel Roundabout on St. Nessian’s Road, with 27,000 vehicle movements over the same period. Quinn’s Cross Roundabout is third busiest with approximately 26,000 vehicles passing through in 24 hours. Quinns Cross and Raheen roundabouts both

The peak hour varies between the morning and evening periods depending on the junction location.

For the purposes of this study the AM and PM peak 3-hour periods of 07.00-10.00 and 16.00-19.00 were examined for current and future year scenarios. Such an extended modelling period ensures that an accurate traffic microsimulation model is presented for analysis. The 2018 recorded traffic flow count locations are shown in Appendix B.

3.0 Base Model Development

Paramics Discovery models were built for the Existing, 2018 scenarios. These models represent the AM and PM three-hour peak periods, from 07:00 to 10:00 and 15:00 to 18:00.

Traffic count information was collected by 'Nationwide Data Collection' in March 2018. This information was used to build the prior matrix and construct the preliminary base model.

The flow chart shown in Figure 3.1 illustrates the stages of the modelling process undertaken to build each of the base year Paramics models. This is the standard system of developing such large-scale Microsimulation models.

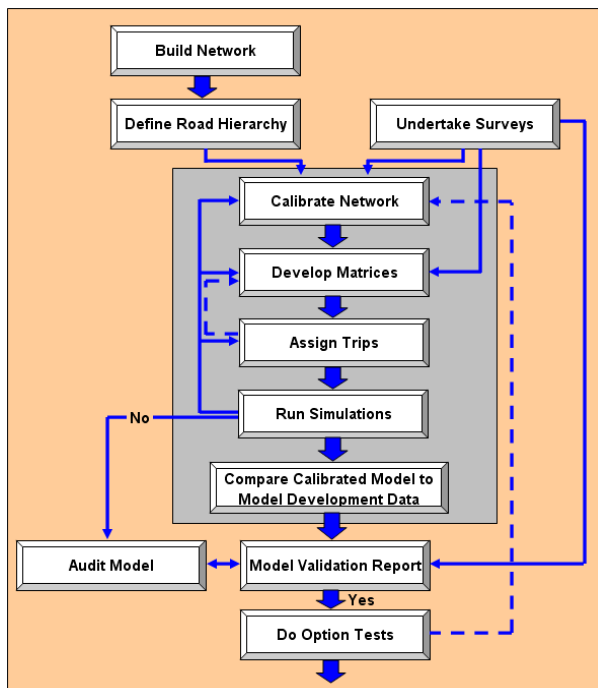


Figure 3.1 Stages of the Paramics Modelling Process

3.1 Data Collection

Traffic Survey data was provided to the traffic modelling team by Mott MacDonald's to inform this study. The data included coordinated classified vehicular turning counts, pedestrian counts and queue length data.

3.2 Digital Mapping

This process involved the coordination of digital Ordnance Survey mapping as supplied by Limerick City & County Council to provide a working AutoCAD template for the Paramics traffic analysis. Drawings setting out planned Masterplan infrastructural improvements were also provided by Mott MacDonald to inform future year modelling scenarios.

3.3 Site Visits

As part of the model development a number of site visits were undertaken by MHL. Data required in the model build process as well as the calibration and validation process was collected. This information included:

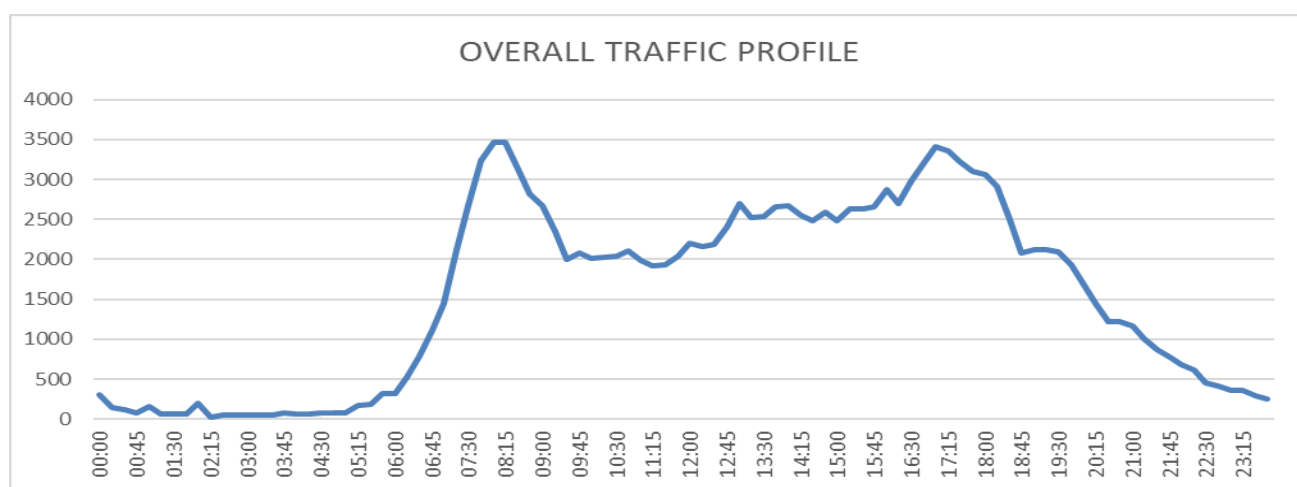
- Road Geometry Details
- Junction Traffic Counts
- Queue Length Survey
- Junction Operation Characteristics

3.4 Traffic Surveys

Mott MacDonald commissioned Nationwide Data Collection Ltd to collect coordinated classified traffic surveys counts for 24-hours for each of the major junctions encompassed in this study. These traffic counts were undertaken from 00:00 to 24:00 on Wednesday 21st March 2018. Detail of the traffic count locations undertaken by NDC are shown in Appendix A of this report.

Traffic counts for previous traffic assessments were also utilised in this study for critical junctions. MHL were able to compare these older 2014 counts with 2018 counts in order to apply an acceptable adjustment factor.

A graphic showing the daily traffic profile for the overall study area is shown below. The graphic shows the volume of traffic recorded in any given 15 minute interval on the network during the 24 hour period. The graph shows clearly the morning and evening peaks. The busiest peak hour traffic flows were recorded at 07.30- 08:30 & 16:30-17:30.



3.5 Queue Length Surveys

Nationwide Data Collection also carried out queue length surveys on key junction approaches. The queue length results were used to calibrate the traffic models for the peak hours in the current base year 2018.

3.6 Model Calibration

Following the construction of the network from digital mapping and survey data, derivation of traffic demands and assignment of the demands; the model was examined for inaccuracies and inappropriate model parameters.

The Mungret & Environs Paramics Discovery Model (MPM) was calibrated by employing an iterative design process along with Matrix Estimation methods. Several input factors were observed and/or adjusted until the model performed in a way that was consistent with existing traffic conditions thus ensuring the integrity of the simulation.

Aspects of the modelling inputs, important to achieve a well calibrated model, that were carefully adjusted for Mungret Loughmore include:

- Junction capacity and performance.
- Route choice.
- Road hierarchy.
- Vehicle speeds.
- Perturbation.

Calibrating the model in this way meant that it was being designed to take into account variables that could accurately establish whether the model was a true representation of actual network conditions.

3.7 Model Validation

Traffic Count Validation

Design Standards and good practice requires that there should be two sets of observed data used in the development of the model; the first is in the network calibration process, the second to validate the model. For the purposes of this model the NDC and also 2014 collected traffic data were used to validate the base model.

Statistical Flow Validation

The model was validated by comparing the traffic count information to the modelled flows from Paramics. This involved running the Paramics Matrix Estimation mode through thousands of iterations to ensure that the flows are representative of actual measured flows. The GEH statistic is used to assess the accuracy of modelled flows and is the standard by which Traffic Model Assignment is validated.

The reason for using the GEH statistic, rather than an absolute or relative flow difference, is that it can cope with a wide range of traffic flows. Whereas an absolute difference of 100pcu/hr can be important in a flow of 200pcu/hr it is largely irrelevant in a flow of several thousand pcu/hr. In this report the GEH statistics have been presented on a junction by junction basis. Individual link flow movements have also been considered.

TII Standards recommend that a GEH value of less than 5 is a very good match, less than 10 is acceptable whereas more than 10 may warrant further investigation. The results of the comparative flow analysis for the Mungret Loughmore models were exceptionally good and indicate that the simulated congestion and interaction reflects the current situation with an average of 97% of modelled flows achieving a GEH value under 5..

The phrase 'Turn Count' refers to a movement of traffic at a junction. For example, a simple T junction, with two-way traffic on all arms of the junction, and no barred turns, will have 6 turn counts. Each of these movements will have a surveyed traffic count, i.e. the number of vehicles performing that movement.

The surveyed traffic counts and the simulated traffic counts are compared using the GEH Statistic. In accordance with the TII "Project Appraisal Guidelines for National Roads Unit 5.1 -Construction of Transport Models" (PE-PAG-02015) 85% of Turning Counts should have a GEH value of less than 5. This compares favourably to the results of the Matrix Estimation procedure carried out as part of the validation process. For each of the current year models AM and PM the GEH values were found to be well within the requirement.

See Table 3.1 on this page for GEH values of the current year AM and PM models respectively.

PEAK PERIOD:	AM	PM
Total Number of Turn Counts Recorded	60	60
Number Of Turn Counts - GEH Value >5	3	1
Number Of Turn Counts - GEH Value <5.	57	59
Required DMRB GEH Value for Turn Counts <5.	85%	85%
Paramics Output for GEH Value for 2018 AM Model	95%	98%

Table 3.1: Base Model GEH Statistical Breakdown

3.7.1 Queue Length Validation

The base model was validated by comparing the queue lengths, as recorded on-site, with those in the Paramics model to ensure the integrity of the simulation. Validating the model in this way meant that it was being constructed to take into account actual real time traffic and road conditions as observed on the ground. This comparison showed that the level of queuing shown in the model accurately represents on site conditions.

4.0 Proposed Development

The overall Mungret Masterplan site was identified by the planning authority in the Limerick Southern Environs Local Area Plan 2011-2017 (extended until May 2021) as being an “Opportunity Site” for development of educational and community facilities mixed with residential and open space land uses. The site is currently used for agricultural purposes apart from the northern end in the vicinity of Mungret College. A portion of the site has been developed by the Department of Education and Skills as a school campus. Two of the planned three schools have been constructed on the site to date. The existing two schools are primary school and the third school is to be a secondary school.

The Strategic Masterplan and Urban Design Strategy for Mungret set out in detail the development potential of the overall Masterplan Area. It sets out the following development schedule:

- 835 homes on LCCC lands in the Masterplan Area
- 1,111 homes on third party lands in the Masterplan Area
- A mix of uses including education, community, employment & residential in assemblage of buildings at Mungret College
- Local retail provision, community facilities and schools
- A network of public spaces
- A network of safe walking and cycling routes

This report considers the transportation infrastructure to be provided to service the lands for short and medium term, i.e. the Interim Design Year (2025) and Design Year (2035) scenarios, in light of the proposed development.

The site lies to the east of Mungret Village and to the south of the R859 Mungret Road. See Figure 4.1 below showing the proposed site layout.



Figure 4.1: Proposed Site Layout

5.0 Modal Choice & Trip Generation

It is Limerick City and County Council’s stated ambition to increase the use of sustainable travel modes, thereby reducing the use of private cars for commuter travel (*Ref: Limerick County Development Plan 2010-2016 November 2010 (as varied), Policy IN P2: Suitability of Facilities*). The national policy document on sustainable transport Smarter Travel: “A Sustainable Transport Future, 2009 – 2020” sets out a long-term objective to reduce the percentage of “single occupancy” car based work trips nationwide. The “Southern Environs Local Area Plan 2011-2017 as amended” sets out a number of specific objects (Objective T1 to T11) aimed at achieving this modal shift from private car usage to sustainable travel modes.

To predict the level of traffic that will be generated by the proposed development, the means of transport (modal choice) and quantity of traffic generated (trip attraction) must be derived. At present the site attracts trip related to the recently completed school campus and agriculture related traffic.

For the Future Year traffic forecast, the transport trip generation figures are generated, based on the phased development schedules. For the Opening Year + 15 Design Year (2035) traffic forecasts, the industry standard tool “TRICS” is used for the additional land uses of residential development, local retail/neighbourhood shopping development and sports/amenity/community type land uses.

5.1 Modal Choice

Given its location outside the City suburbs the car is the predominant transport mode around Mungret Village and environs, particularly for its inhabitants. As this is a mixed-use development, trips are either commuter trips to/from work or school, retail trip visits to/from the neighbourhood centre or residential commuter/social trips etc. Local trip attraction to or from the proposed development may be by public transport, pedestrian or cycle mode but will be predominantly made via the private car (or Taxi). The quantity of trips generated by car is investigated in detail in section 5.3 “Traffic Generation” below.

CSO Census data was interrogated to determine commuter travel patterns for the wider area. The graphic below shows the overall means of travel to work, school or college for the relevant Electoral Division.

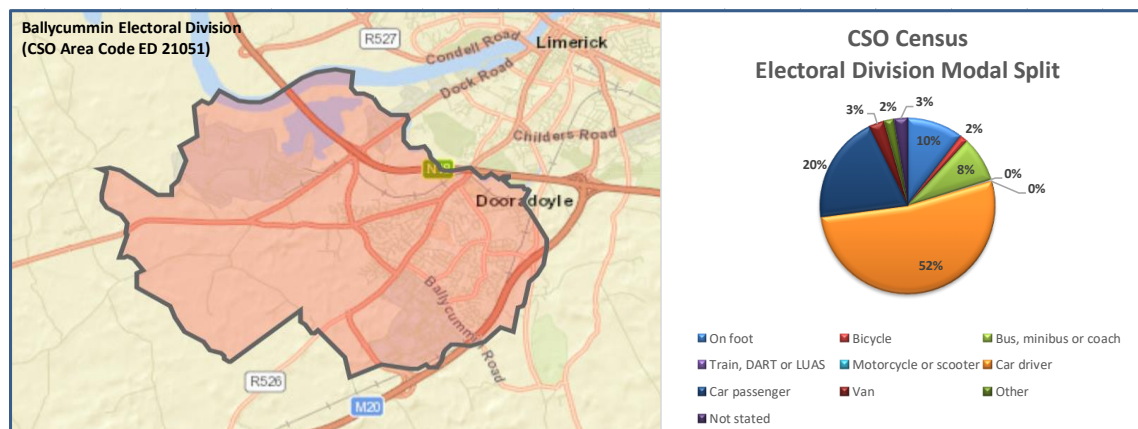


Figure 5.2: CSO 2011 Census Modal Split for Ballycummin Electoral Division

The CSO data suggests that 72% of commuters travel to work/school/college by car (either as driver or as a passenger). 10% of commuters travel by walking, 2% travel by bicycle and 8% travel by public transport.

5.2 Modal Shift Target

The study area traffic counts indicate that 84% of commuters in the Study Area travel by private car. This aligns with the overall County wide split, as outlined in the Limerick County Development Plan 2011-2016 which states that 81% of commuters use private motor transport in journeys to work. The Plan further explains that this statistic is not surprising given the dispersed nature of settlements in Limerick County, the extensive road network, and the increase in car ownership in recent years. The

Development Plan sets out a number of Objectives aimed at improving modal shift to sustainable modes. The objectives include:

IN O3: Quality Bus Services and Facilities
IN O4: Provision for Park and Ride
IN O5: Protection of rail infrastructure
IN O6: Improvement of Rail Infrastructure
IN O7: Rural Transport
IN O8: Cycle and Pedestrian Facilities

The national policy document on sustainable transport Smarter Travel: A Sustainable Transport Future, 2009 – 2020 sets out a long-term objective to reduce the percentage of “single occupancy” car based work trips to 45%, therefore a proposed mode share assigned to sustainable travel modes of 55%. A reduction in private car travel from the existing 81% private car usage to 45% would represent quite an aspirational target reflective of very significant investment in infrastructure and public attitude change.

For the purposes of this study a Modal Shift of half of the national policy objective is proposed. This moderate modal shift target is more likely to be attained within the timeframe of this Masterplan. It is therefore proposed to assign a reduction to development and background traffic of 10% for comparison with the “No Modal Shift” scenario for future design year traffic models. The inclusion of increased modal shift factors are likely to further improve the projected traffic impact of the opportunity site. The introduction of city bus routes and completion of cycle facilities to the City Centre and surrounding commuter destination hubs will also serve to encourage this shift.

5.3 Traffic Generation

The trip generation rates assigned to the proposed development schedule has been developed in consultation with Limerick City & County Council. A schedule of the trip generation is outlined below.

For the purposes of the traffic generation in the Interim and Final Design Year, i.e. Opening Year + 5 years (2025) and Opening Year + 15 years (2035), it is expected that the schedule of development outlined in table 4.1 below will be completed.

The “Do Nothing” Traffic model for the 2025 Interim Design Year considers likely development that will have been completed by that year. Based on previous Mungret Traffic Modelling carried out for Limerick City and County Council and through pre-application discussion with the Local Authority it has been agreed that the, 2025 Do Nothing Scenario would include for the completion of the 1000 pupil secondary school and also the completion of 419 residential units.

The 2035 Final Design Year Do Nothing scenarios considers the completion of only the 2025 Do Nothing quantum of development, but with background traffic growthed to the 2035 Design Year flows. The 2035 Do Something model considers the completion of the entire Masterplan site with background traffic growthed to 2035 flows.

The table outlines the associated trip generation total, based on TRICs trip rates, for the AM and PM (3-hour) peak periods.

AM Peak Trip Generation	Housing		School		Residential Care Home		Convenience Retail		Salon		Creche		Coffee Shop		Mungret College Redevelopment		TOTAL	
	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart
Trip Rate	0.335	0.859	0.198	0.123	0.405	0.235	33.045	30.203	9.671	8.799	0.566	0.434	4.160	2.394	(per Schedule of rates)			
	419		1000		0		0		0		0		0					
2025 Do Nothing	140	360	198	123	0	0	0	0	0	0	0	0	0	0	0	0	338	483
	617		1000		55		100		100		65		51					
2025 Do Something	207	530	198	123	22	13	33	30	10	9	37	28	2	1	44	60	553	794
	419		1000		0		0		0		0		0					
2035 Do Nothing	140	360	198	123	0	0	0	0	0	0	0	0	0	0	0	0	338	483
	1890		1000		55		100		100		65		51					
2035 Do Something	633	1624	198	123	22	13	33	30	10	9	37	28	2	1	44	60	979	1888
PM Peak Trip Generation	Housing		School		Residential Care Home		Convenience Retail		Salon		Creche		Coffee Shop		Mungret College Redevelopment		TOTAL	
	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart
Trip Rate	0.864	0.487	0.082	0.125	0.274	0.311	15.686	39.036	13.807	14.452	0.321	0.427	5.837	4.318	(per Schedule of rates)			
	419		1000		0		0		0		0		0					
2025 Do Nothing	362	204	82	125	0	0	0	0	0	0	0	0	0	0	0	0	444	329
	617		1000		55		100		100		65		51					
2025 Do Something	533	300	82	125	15	17	16	39	14	14	21	28	3	2	30	19	713	545
	419		1000		0		0		0		0		0					
2035 Do Nothing	362	204	82	125	0	0	0	0	0	0	0	0	0	0	0	0	444	329
	1890		1000		55		100		100		65		51					
2035 Do Something	1633	920	82	125	15	17	16	39	14	14	21	28	3	2	30	19	1813	1165

Table 5.1: Development Trip Generation Schedule

6.0 Traffic Microsimulation Results

The study encompassed the road network and its junctions throughout the Mungret and Environs area. The study considers the existing situation along with future design year situations. The traffic counts for the study were carried out in 2018, growthed to the appropriate future design year. The future year scenarios consider the impact of the proposed development of the lands, as identified previously. The lands are expected to accommodate 1946 housing units, schools, office and some convenience retail development. The other land use proposals of sports facilities and neighbourhood amenity are not expected to generate traffic during road network peak hours.

The Interim Design Year, 2025, considers the inclusion of at total 659 residential units retail units and a 1000 pupil school. It is proposed that these residential units would access the adjoining public road network at the eastern access junction (onto the R510) and at the Northern Access Junction (the existing school signalised junction onto the R859 and Moore's Road). The 2025 road network will include for the completion of the internal link roads between the northern and eastern access junctions.

The Final Design Year scenario, 2035 considers the completion of 1946 residential development and also the mixed-use development of the Mungret College property. This scenario assumes that, along with the new signalised junction, the access road will be completed to the Patrickswell Road (R526) at a signalised junction between the Loughmore Roundabout and the Raheen Roundabout. The appropriate trip generation for these scenarios has been outlined previously in this report. Trip Distribution follows existing measured local traffic patterns.

The effects of traffic growth on the existing road network plus the additional traffic generated by the proposed development, have been compiled to generate likely traffic volumes for the Interim Design Year (2025) and also the Design Year (2035). These traffic volumes were also assessed by building static traffic models which use empirical formulae to calculate individual junction capacities and time-dependant queuing. The resultant model outputs are estimated values for traffic queues and delays.

6.1 Microsimulation Model Key Performance Indicators

In order to compare various model scenarios from a statistical point of view a comparison of specific 'Key Performance Indicators' (KPI's) is carried out. This comparison of such KPI's provides a quantifiable, relative evaluation of various modelled scenarios. The primary KPI's collected in this assessment were Journey Time Comparisons. These KPIs include:

- **Overall Trip Duration:** Average journey times for all trips in the respective traffic models in seconds.
- **Average Network Speed:** Average speed for vehicles on the modelled network in kilometres per hour (kph)
- **Latent Demand:** Latent demand is defined as the number of vehicles unable to enter the network at the end of a simulation period. A high latent demand can be indicative of a traffic network reaching, or operating above the available capacity.
- **Average Queue Length:** Average length of queuing in metres for all trips on the network.

6.2 Overall KPI Modelling Results

Table 6.1 below shows overall transportation modelling Key Performance Indicators, highlighting an overview of traffic conditions for the respective models. The table provides an overview of the modelling results for each of the study scenarios. These KPIs have been extracted from each of the models to ascertain the impact of the proposed development on the local road network.

	2025 Do Nothing	2025 Do Something	2025 Do Something + Modal Shift	2035 Do Nothing	2035 Do Something	2035 Do Something + Modal Shift
AM PEAK						
Overall Trip Duration (Average)	334	424	284	385	376	347
Average Network Speed (m/s)	8.3	8.6	9.1	8.5	8.0	8.0
Latent Demand	174	248	122	324	606	344
Average Queue Length	45	44	39	44	41	37
PM PEAK						
Overall Trip Duration (Average)	460	429	346	370	394	388
Average Network Speed (m/s)	10.0	9.5	9.8	10.0	8.5	9.3
Latent Demand	399	523	392	461	854	525
Average Queue Length	37	41	37	38	41	37

Table 6.1 Overall Transportation Model Key Performance Indicators (KPI's)
(M/S* refers to an assigned moderate Modal Shift for all future year traffic flows, as outlined in section 5)

The overall transportation modelling findings point to a number of key findings:

The inclusion of a modal shift reduction for both the 2025 and 2035 models results in a significant improvement to overall traffic conditions in the study area. It can be seen from the results that the inclusion of the moderate (3%) modal shift reduction in the 2025 Interim Design Year will offset the impact of the subject development, compared to the "Do Nothing" scenario model and will result in a relative improvement to overall traffic conditions.

Similarly for the 2035 Design Year the inclusion of a 10% Modal Shift, coupled with the completion of the intended inclusion of the full infrastructural improvements and link roads will result in a further overall improvement to local traffic conditions.

The high latent Demand recorded in the PM Peak models, for all scenarios indicates that the local road network is approaching capacity, particularly for the 2035 "Do Nothing" and "Do Something" scenarios. Traffic conditions at the Quinn's Cross Roundabout and at the Raheen Roundabout are a particular cause for delay in these models.

The overall model findings for the 2035 Do Something + Modal Shift indicate an overall improvement in traffic conditions compared to the 2025 Do Nothing scenario. This moderate modal shift target is reflective of significant capital investment in sustainable travel infrastructure in the wider road network, as well as internally in the Masterplan area.

6.3 Journey Time Comparisons

'Journey Time' comparisons reflect a measure of the time it takes to traverse the network for a vehicle for individual, defined routes. For the purposes of this study these routes were chosen to traverse the entire network, for example for Journey J2 measures vehicle journey times between zone 3 and 8. Such a Journey Time route provides an invaluable insight into traffic conditions on the network in the vicinity of this route. A comparison 'Journey Times' for various scenario models over the same route therefore provides an indication of the relative traffic conditions in terms of congestion and delays for the respective routes. For this study, journey times are measured using Paramics Discovery Statistics mode. Each individual vehicle is tracked and timed as it travels through the transport network model. The model is constructed of zones of Origin/Destination for vehicle trips. Individual trips can be tracked from zone 3 to zone 7/8 for example. Figure 6.1 is a visual graphic of the Paramics Discovery model with the trip start/end zones identified. Table 6.1 presents 6 different journeys through the network for which detailed journey time analysis was carried out. These journey times were picked to give a reasonable oversight of the overall model operation.

The overall average journey times vary from the overall average journey times presented in Section 6.2 which references all journeys undertaken in the model during the model run period.

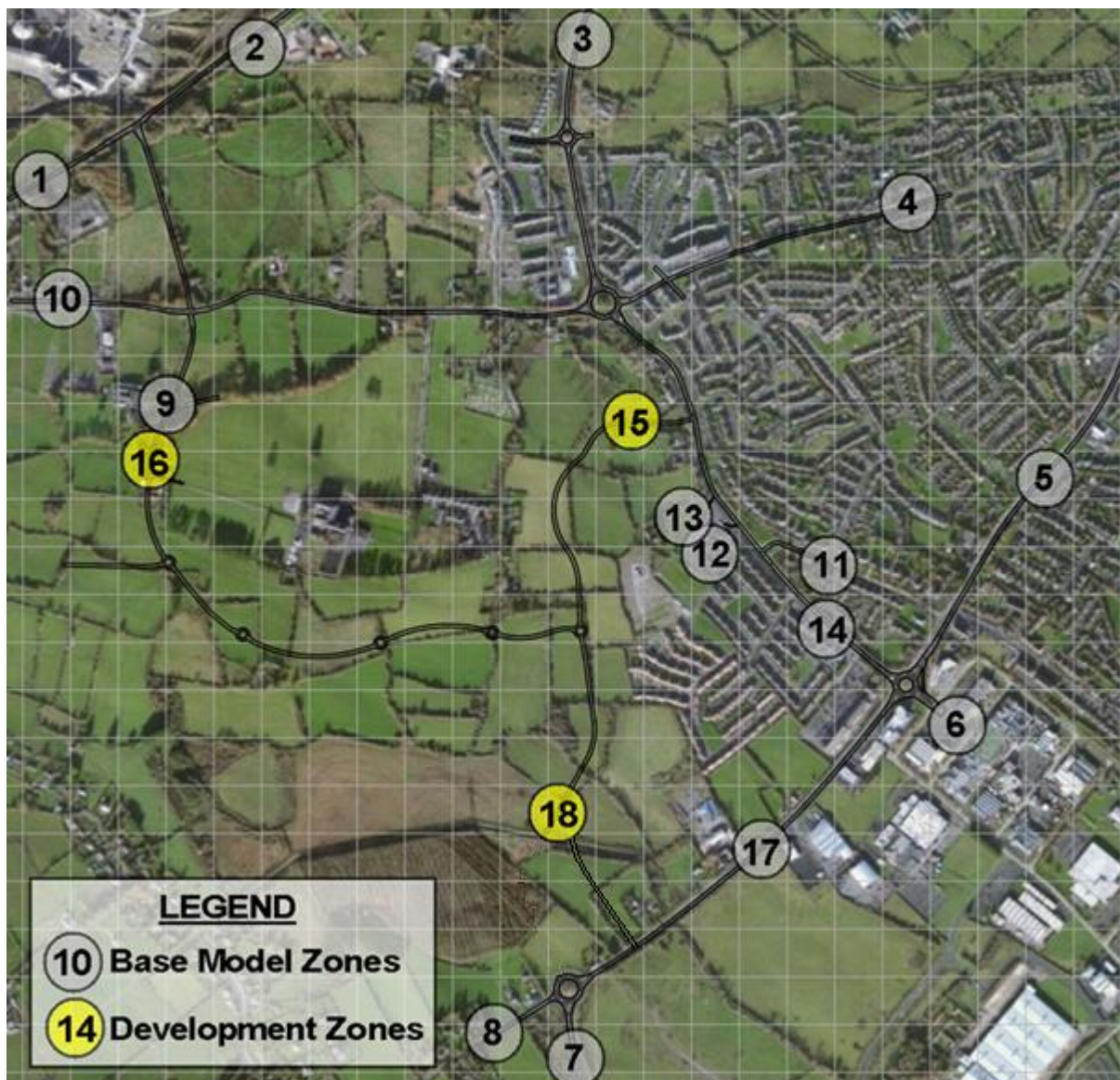


Fig 6.1 Map of Model Zones.

No.	Journey Description	Zone Route
J1	South to North	8 to 3
J2	North to South	3 to 8
J3	R526 West to East	8 to 5
J4	R526 East to West	5 to 8
J5	R859 West to East	10 to 4
J6	R859 East to West	4 to 10

Table 6.2 Modelled Journey Routes

Journey Times are measured in seconds. Tables 6.3 and 6.4 below display the modelled journey times in bar chart format.

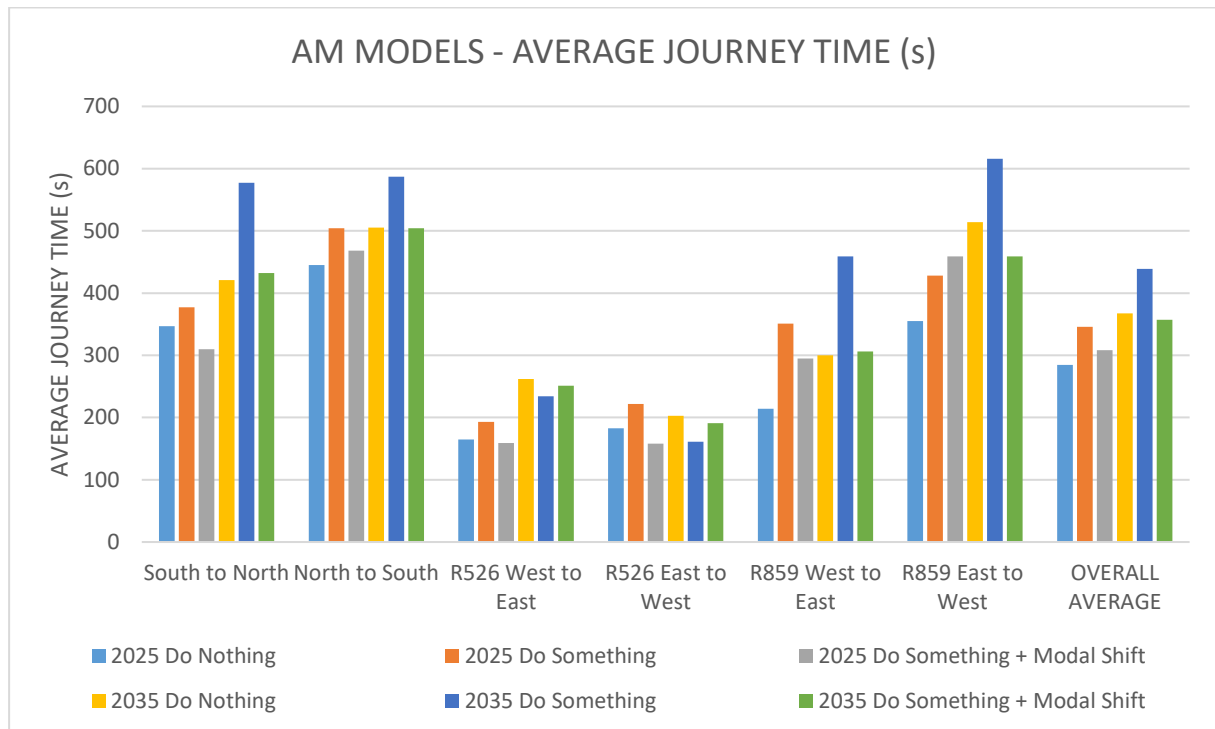


Table 6.3 AM Journey Time Analysis Results in seconds

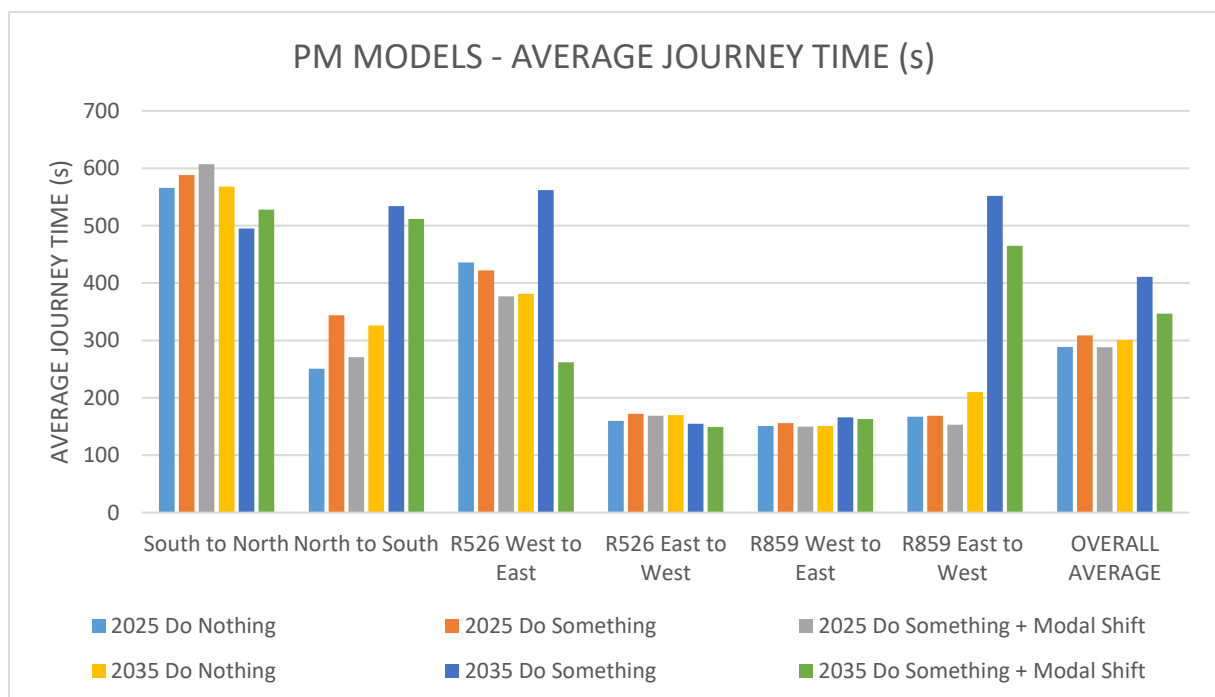


Table 6.4 PM Journey Time Analysis Results in seconds

6.4 Queue Length Comparisons

'Queue Length' comparisons require individual queues to be measured at particular, designated junction approaches. For the purposes of this study these queue lengths, measured at individual junction arms have been combined to present an overall average queue length for all arms of the respective junctions, thereby presenting an 'Average Queue Length' at a particular junction. Queue length is measured in metres. Tables 6.5 and 6.6 below display the average queue lengths at critical junctions in bar chart format, for comparison purposes. These overall average queue lengths vary from the overall average queue lengths presented in Section 6.2 which references all queues occurring on the model during the run period.

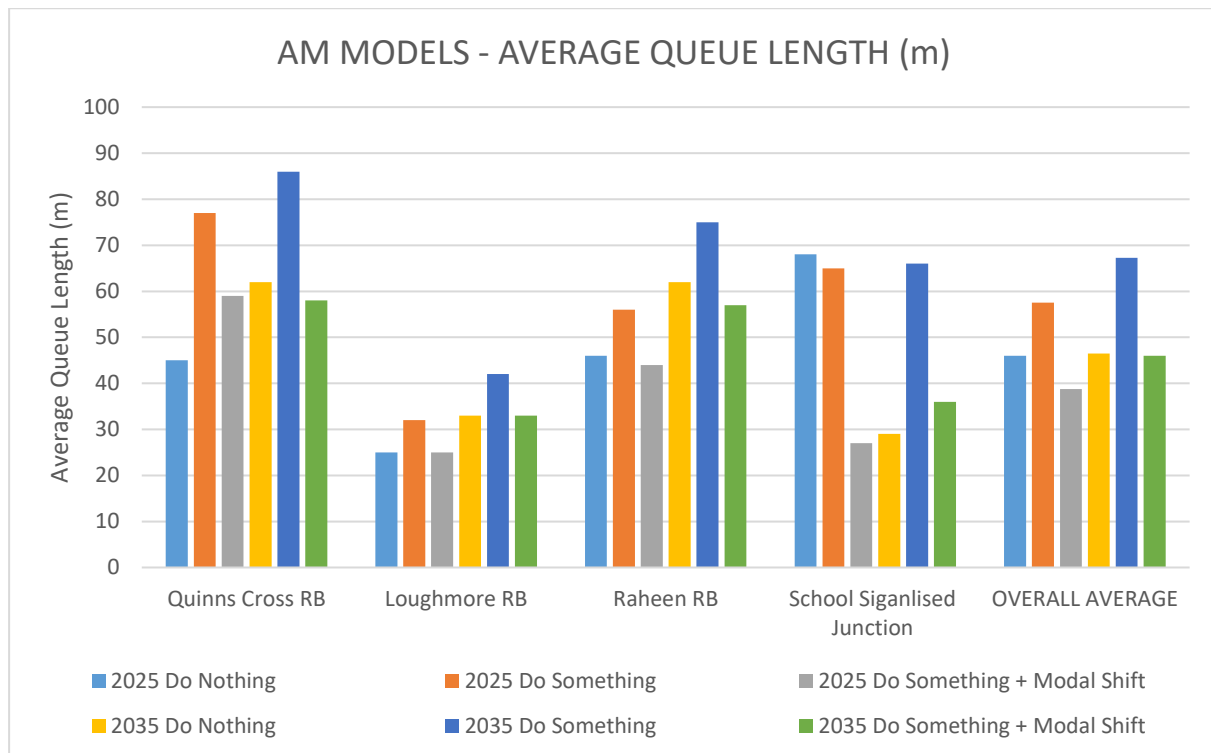


Table 6.5 AM Queue Length Analysis Results in metres

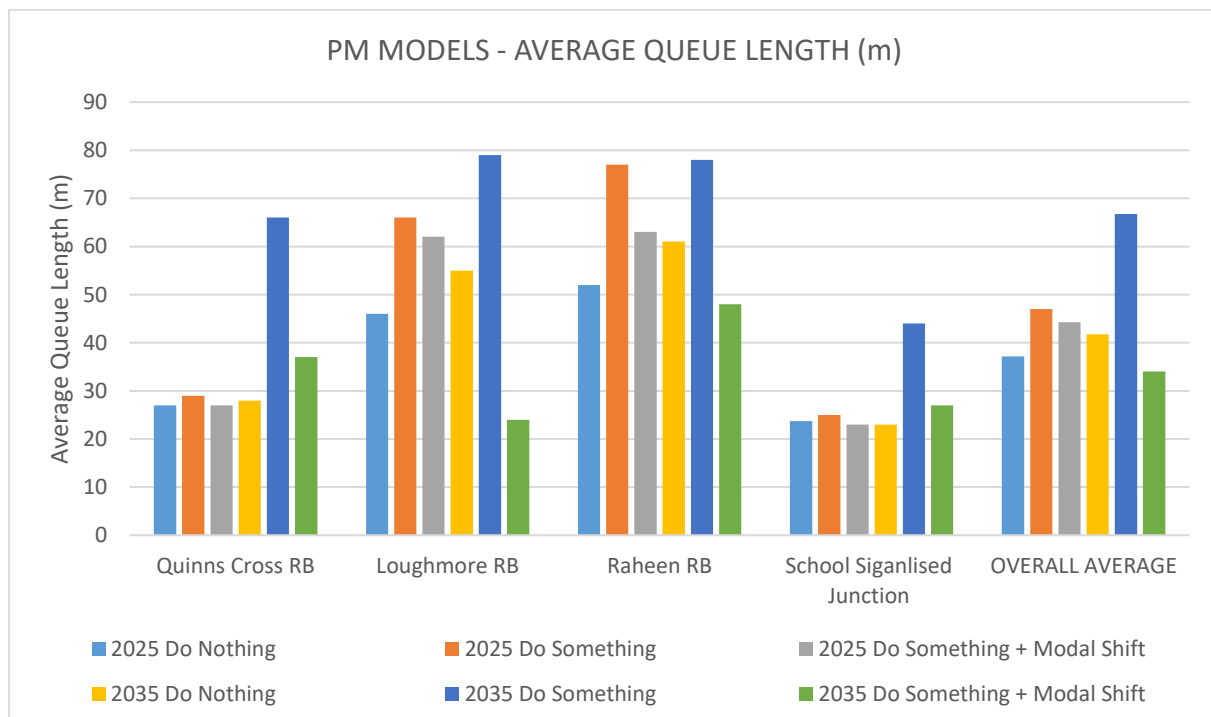


Table 6.6 PM Queue Length Analysis Results in metres

7.0 Report Summary

The traffic modelling assessment outlined in this report has employed the Mungret Paramics Microsimulation Model, developed by Limerick City & County Council. The model was developed to assess the wider impact of the overall Mungret zoned “Opportunity Site” forming part of the urban expansion of Limerick City under the Southern Environs Local Area Plan 2011-2017 (Extended until May 2021). This model is being used by Limerick City & County Council to determine the overall network mitigation measures required to accommodate and integrate the planned wider development.

By employing this Mungret Paramics Microsimulation Model the impact of the subject application can be considered over a wide area network, and in light of the planned overall Mungret network improvement proposals, as developed for Limerick City & County Council.

The traffic modelling carried out to inform this report has been used to generate particular “Key Performance Indicators” (KPI’s) which serve to provide an overview of traffic conditions for the various model scenarios, allowing the traffic impact of the respective models to be compared. The KPIs for referenced in this assessment point to the following findings:

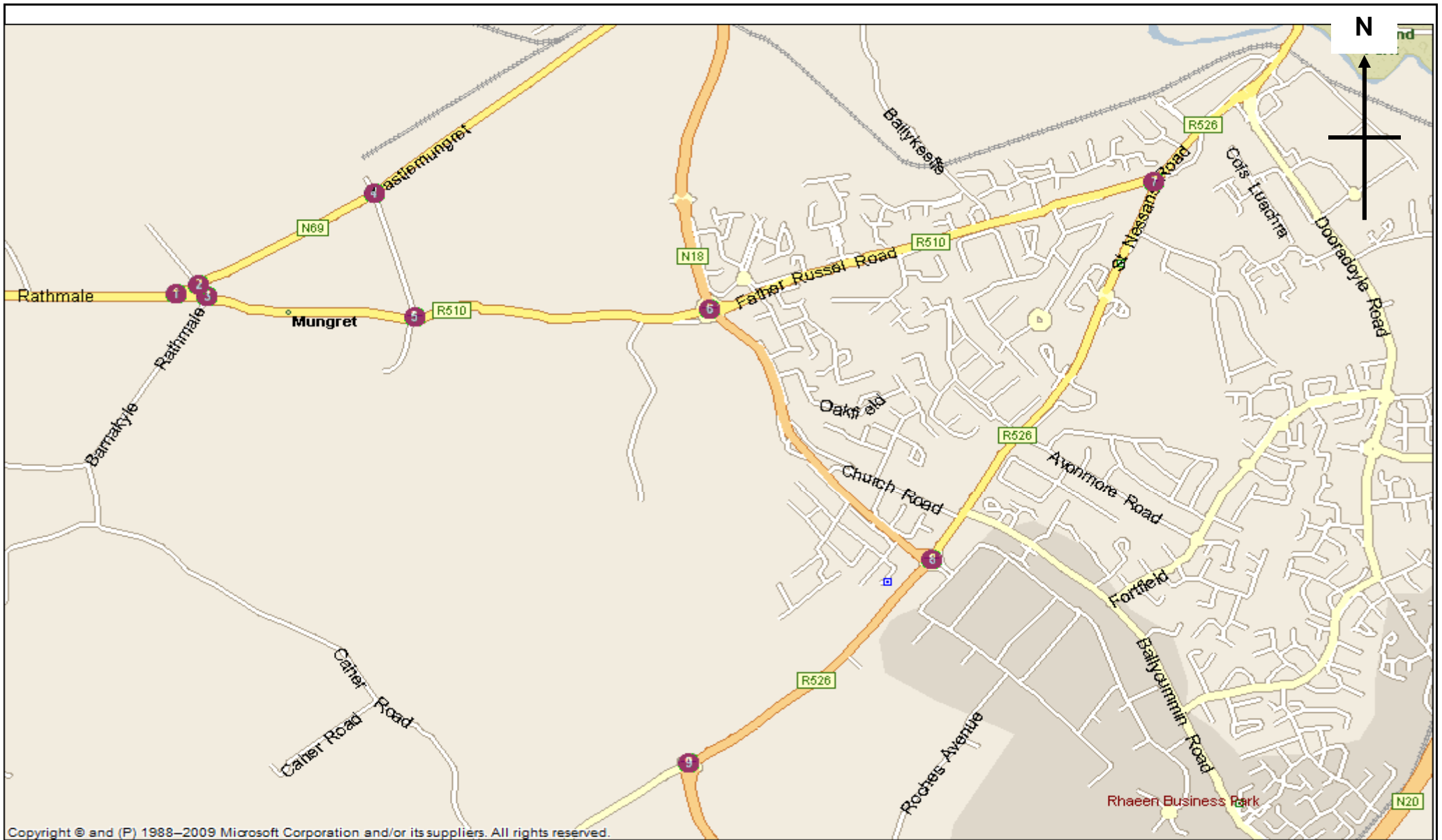
The overall model KPI’s provide an overview of modelling results for each of the study scenarios. It can be seen for the “Do Nothing” model scenarios that the wider road network is heavily congested, particularly in the PM peak with a high Latent Demand indicating that traffic congestion is affecting flows though the network during the model run. The Overall KPI results indicate the “Do Something + Modal Shift” presents improved model statistics compared to the “Do Nothing” scenario. These results indicate that the traffic impact of the proposed development, and wider development of the Opportunity Site, can be offset from a traffic capacity point of view with the completion of the proposed infrastructural improvements and with the inclusion of a moderate modal shift. Improvements to the external road network will also be required for the future Design Year scenarios at sensitive, heavily congested external junctions such as Quinn’s Cross and Raheen Roundabout.


The comparison of the Queue Length and Journey Time KPI’s indicates that the “Do Something With Modal Shift” scenario will result in improved traffic conditions compared to the “Do Nothing” models.

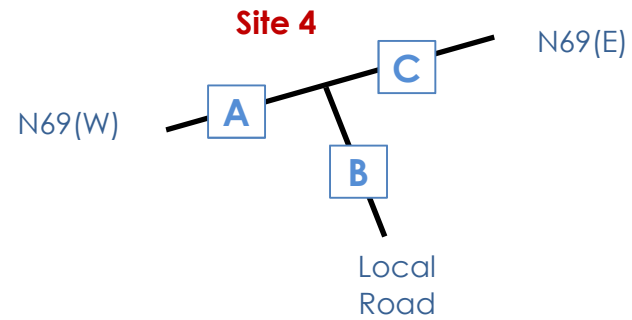
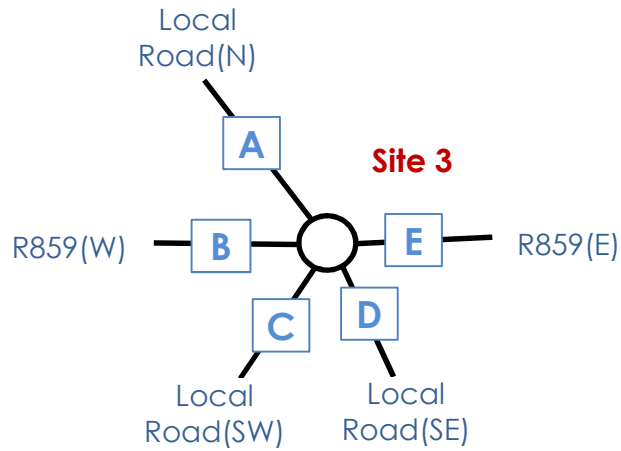
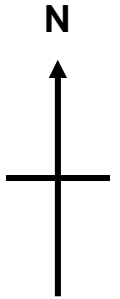
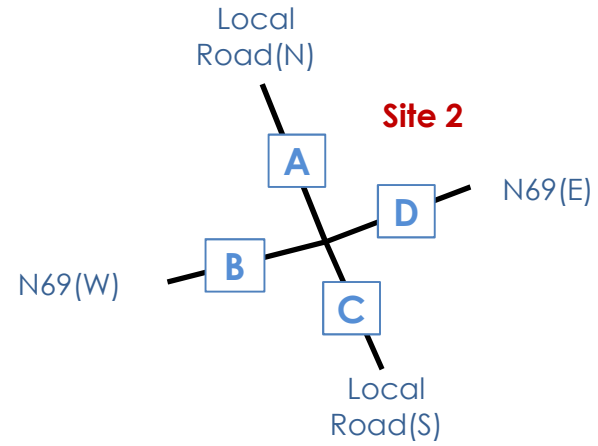
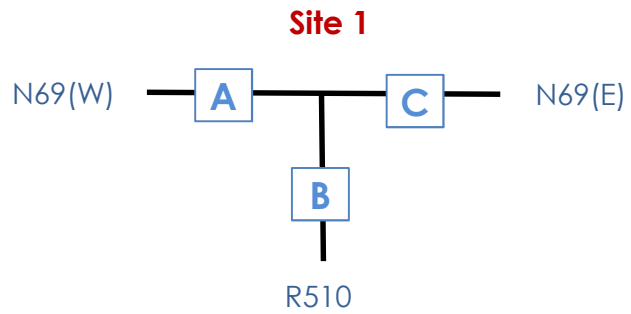
The overall finding is that the inclusion of the respective infrastructural improvement proposals for the Interim Design Year (2025) and Final Design Year (2035), coupled with an overall moderate modal shift will result in improved traffic conditions compared to the “Do Nothing” scenario. The inclusion of a moderate “Modal Shift” target in the future year models is in accordance with national and international ambitions. The assumed level of modal shift represents a very moderate modal shift target, lower than targets set out in Government strategy documents such as “Smarter Travel-A Sustainable Transport Future”. The proposed development should facilitate this modal shift by implementing site specific mobility management proposals.

Appendices

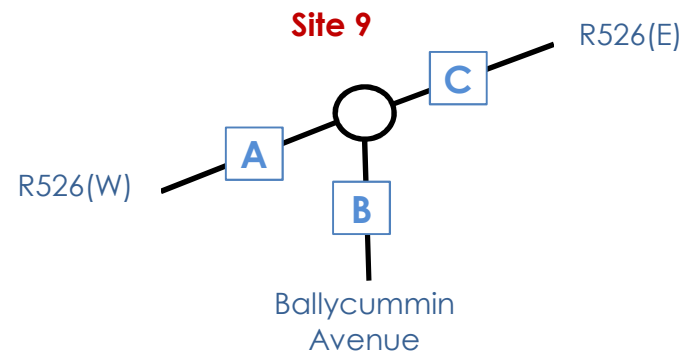
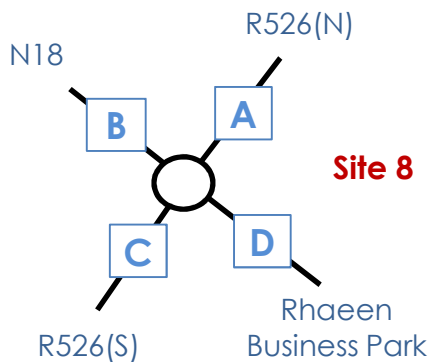
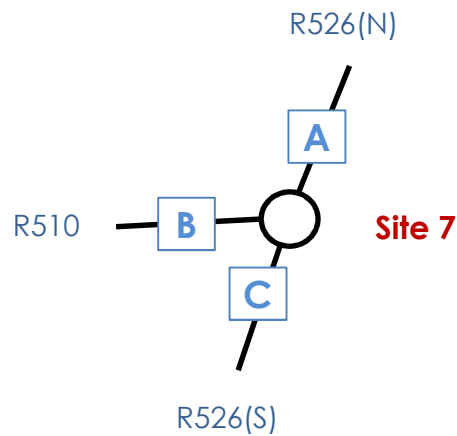
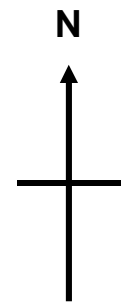
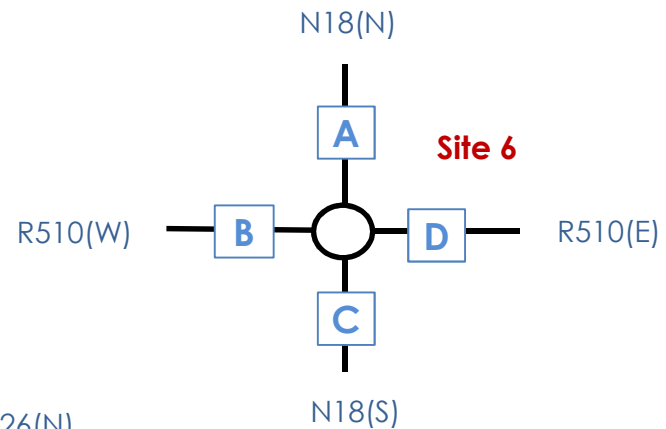
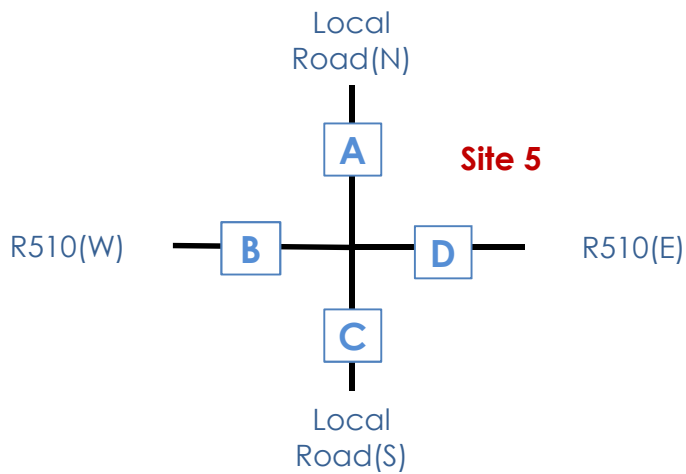
Appendix A – Traffic Count Details



	Sites / Location: 1 to 9 / Mungret, Limerick	Project No: 8537	Diagram No: 8537-01	Drawn By: AC
	Survey Date: Wednesday 21st March 2018	Project Name: MUNGRET, LIMERICK		
	Survey Times: JTC: 00:00 to 00(24):00 Queues: 07:00 to 19:00	Diagram Title: General Location Plan		



Sites / Location:	1 to 4 / Mungret, Limerick	Project No:	8537	Drawing No:	8537-01	Drawn By:	AC		
	Survey Date:		Wednesday 21st March 2018		Project Name:		MUNGRET, LIMERICK		
	Survey Times:		JTC: 00:00 to 00(24):00 Queues: 07:00 to 19:00				Drawing Title:	Site Layout and Observed Movements	



Sites / Location:	5 to 9 / Mungret, Limerick	Project No:	8537	Drawing No:	8537-02	Drawn By:	AC
	Survey Date:		Wednesday 21st March 2018		Project Name: MUNGRET, LIMERICK		
	Survey Times:	JTC: 00:00 to 00(24):00 Queues: 07:00 to 19:00	Drawing Title:		Site Layout and Observed Movements		

Appendix B – Base Model GEH Statistics

From Link	To Link	Survey Count	First Estimate	First Estimate Difference	First Estimate Difference (percentage)	First Estimate Difference (GEH)	Final Estimate	Final Estimate Difference	Final Estimate Difference (percentage)	Final Estimate Difference (GEH)
43:09:00	09:10	46	76.44	30.44	66.17	3.89	57.79	11.79	25.64	1.64
43:09:00	09:08	7	5.51	-1.49	-21.29	0.6	6.32	-0.68	-9.74	0.26
08:09	09:10	1549	1056	-493	-31.83	13.66	1549	0	0	0
08:09	09:43	20	15.42	-4.58	-22.9	1.09	18.7	-1.3	-6.49	0.3
10:09	09:08	805	1074	269	33.42	8.78	805	0	0	0
10:09	09:43	109	85.68	-23.32	-21.39	2.36	115.46	6.46	5.93	0.61
25:26:00	26:39:00	6	17.53	11.53	192.17	3.36	5.07	-0.93	-15.53	0.4
25:26:00	26:44:00	28	3	-25	-89.29	6.35	28	0	0	0
25:26:00	26:27:00	732	605.1	-126.9	-17.34	4.91	796.31	64.31	8.79	2.33
39:26:00	26:44:00	75	11.26	-63.74	-84.99	9.71	66.3	-8.7	-11.6	1.03
39:26:00	26:25:00	4	16.3	12.3	307.5	3.86	4.31	0.31	7.64	0.15
39:26:00	26:27:00	52	73.54	21.54	41.42	2.72	63.55	11.55	22.22	1.52
27:26:00	26:39:00	29	44.21	15.21	52.45	2.51	30.9	1.9	6.54	0.35
27:26:00	26:44:00	212	40.62	-171.38	-80.84	15.25	189.9	-22.1	-10.42	1.56
27:26:00	26:25:00	357	847.11	490.11	137.29	19.97	373.16	-16.16	4.52	0.18
44:26:00	26:39:00	37	20.21	-16.79	-45.38	3.14	28.15	-8.85	-23.93	1.55
44:26:00	26:25:00	19	8	-11	-57.89	2.99	19	0	0	0
44:26:00	26:27:00	206	50.51	-155.49	-75.48	13.73	185.57	-20.43	-9.92	1.46
37:38:00	76:75	203	119.17	-83.83	-41.3	6.61	190.32	-12.68	-6.25	0.9
37:38:00	77:78	483	287.71	-195.29	-40.43	9.95	453.76	-29.24	-6.05	1.35
37:38:00	82:81	533	322.27	-210.73	-39.54	10.19	501.36	-31.64	-5.93	1.23
75:76	77:78	262	538	276	105.34	13.8	262	0	0	0
75:76	82:81	1218	769.14	-448.86	-36.85	14.24	986.99	-231.01	-18.97	6.96
75:76	38:37:00	131	81.28	-49.72	-37.95	4.83	100.17	-30.83	-23.54	2.87
78:77	82:81	338	361.15	23.15	6.85	1.24	283.41	-54.59	-16.15	3.1
78:77	38:37:00	311	434.93	123.93	39.85	6.42	250.11	-60.89	-19.58	3.64
78:77	76:75	371	432	61	16.44	3.04	371	0	0	0
81:82	38:37:00	407	415.73	8.73	2.14	0.43	343.69	-63.31	-15.56	3.27
81:82	76:75	771	1124	353	45.78	11.47	784.19	13.19	1.71	0.47
81:82	77:78	222	409.72	187.72	84.56	10.56	228.96	6.96	3.13	0.46
268:89	89:258	35	61.52	26.52	75.77	3.82	35.46	0.46	1.32	0.08
262:89	89:258	189	185	-4	-2.12	0.29	233.13	44.13	23.35	3.04
258:89	89:262	67	65.08	-1.92	-2.87	0.24	64.84	-2.16	-3.22	0.27
258:89	89:268	69	59.73	-9.27	-13.43	1.16	55.04	-13.96	-20.23	1.77
92:93	97:196	750	578.75	-171.25	-22.83	6.64	905.09	155.09	20.68	5.39
92:93	99:98	77	161.02	84.02	109.12	7.7	101.97	24.97	32.42	2.64
92:93	95:94	306	592.82	286.82	93.73	13.53	333	27	8.82	1.55
92:93	93:92	0	0	0	NaN	NaN	0	0	NaN	
94:95	93:92	314	659.54	345.54	110.04	15.66	411.81	97.81	31.15	5.13
94:95	97:196	373	819.59	446.59	119.73	18.29	426.24	53.24	14.27	2.66
94:95	99:98	19	43.36	24.36	128.21	4.36	24.97	5.97	31.41	1.27
196:97	99:98	107	225	118	110.28	9.16	107	0	0	0
196:97	95:94	467	1188.84	721.84	154.57	25.09	492.77	25.77	5.52	1.18
196:97	93:92	725	723.8	-1.2	-0.17	0.04	709.26	-15.74	-2.17	0.59
98:99	95:94	34	246.41	212.41	624.74	17.94	39.58	5.58	16.42	0.92
98:99	93:92	188	537.01	349.01	185.64	18.33	198.73	10.73	5.71	0.77
98:99	97:196	212	616	404	190.57	19.86	212	0	0	0
198:201	209:202	851	927.35	76.35	8.97	2.56	799.09	-51.91	-6.1	1.81
198:201	210:205	348	726.14	378.14	108.66	16.32	323.3	-24.7	-7.1	1.35
198:201	201:198	14	256.12	242.12	1729.43	20.83	18	4	28.57	1.14
202:209	210:205	63	189	126	200	11.22	63	0	0	0
202:209	211:212	0	0	0	NaN	NaN	0	0	NaN	
202:209	201:198	813	647.32	-165.68	-20.38	6.13	735.21	-77.79	-9.57	2.8
205:210	201:198	949	514.97	-434.03	-45.74	16.04	859.53	-89.47	-9.43	2.98
205:210	209:202	214	87	-127	-59.35	10.35	214	0	0	0
89:262	262:266	143	18.76	-124.24	-86.88	13.81	109.1	-33.9	-23.71	3.02
88:262	262:266	66	21.32	-44.68	-67.7	6.76	73.25	7.25	10.98	0.87
264:263	263:88	24	26.62	2.62	10.92	0.52	19.63	-4.37	-18.22	0.94
264:263	263:269	138	44.3	-93.7	-67.9	9.81	116.75	-21.25	-15.4	1.88

AM GEH Stats Results

From Link	To Link	Survey Count	First Estimate	First Estimate Difference	First Estimate Difference (percentage)	First Estimate Difference (GEH)	Final Estimate	Final Estimate Difference	Final Estimate Difference (percentage)	Final Estimate Difference (GEH)
43:09:00	09:10	87	81.29	-5.71	-6.56	0.62	81.29	-5.71	-6.56	0.62
43:09:00	09:08	6	7.83	1.83	30.5	0.7	7.83	1.83	30.5	0.7
08:09	09:10	1056	1056	0	0	0	1056	0	0	0
08:09	09:43	15	18.71	3.71	24.73	0.9	18.71	3.71	24.73	0.9
10:09	09:08	1074	1074	0	0	0	1074	0	0	0
10:09	09:43	93	88.28	-4.72	-5.08	0.5	88.28	-4.72	-5.08	0.5
25:26:00	26:39:00	19	17.97	-1.03	-5.42	0.24	17.97	-1.03	-5.42	0.24
25:26:00	26:44:00	3	3	0	0	0	3	0	0	0
25:26:00	26:27:00	540	634.13	94.13	17.43	3.88	634.13	94.13	17.43	3.88
39:26:00	26:44:00	12	11.26	-0.74	-6.17	0.22	11.26	-0.74	-6.17	0.22
39:26:00	26:25:00	19	17.57	-1.43	-7.53	0.33	17.57	-1.43	-7.53	0.33
39:26:00	26:27:00	59	78.16	19.16	32.47	2.31	78.16	19.16	32.47	2.31
27:26:00	26:39:00	33	50.43	17.43	52.82	2.7	50.43	17.43	52.82	2.7
27:26:00	26:44:00	27	42.64	15.64	57.93	2.65	42.64	15.64	57.93	2.65
27:26:00	26:25:00	793	878.53	85.53	10.79	2.96	878.53	85.53	10.79	2.96
44:26:00	26:39:00	22	20.72	-1.28	-5.82	0.28	20.72	-1.28	-5.82	0.28
44:26:00	26:25:00	8	8	0	0	0	8	0	0	0
44:26:00	26:27:00	36	51.73	15.73	43.69	2.38	51.73	15.73	43.69	2.38
37:38:00	76:75	143	119.72	-23.28	-16.28	2.03	119.72	-23.28	-16.28	2.03
37:38:00	77:78	353	287.71	-65.29	-18.5	3.65	287.71	-65.29	-18.5	3.65
37:38:00	82:81	402	356.59	-45.41	-11.3	2.33	356.59	-45.41	-11.3	2.33
75:76	77:78	538	538	0	0	0	538	0	0	0
75:76	82:81	1049	1055.4	6.4	0.61	0.2	1055.4	6.4	0.61	0.2
75:76	38:37:00	91	83.65	-7.35	-8.08	0.79	83.65	-7.35	-8.08	0.79
78:77	82:81	406	415.67	9.67	2.38	0.48	415.67	9.67	2.38	0.48
78:77	38:37:00	497	434.93	-62.07	-12.49	2.88	434.93	-62.07	-12.49	2.88
78:77	76:75	432	432	0	0	0	432	0	0	0
81:82	38:37:00	518	453.02	-64.98	-12.54	2.95	453.02	-64.98	-12.54	2.95
81:82	76:75	1269	1202.34	-66.66	-5.25	1.9	1202.34	-66.66	-5.25	1.9
81:82	77:78	440	436.11	-3.89	-0.88	0.19	436.11	-3.89	-0.88	0.19
268:89	89:258	62	69.82	7.82	12.61	0.96	69.82	7.82	12.61	0.96
262:89	89:258	190	185	-5	-2.63	0.37	185	-5	-2.63	0.37
258:89	89:262	58	65.35	7.35	12.67	0.94	65.35	7.35	12.67	0.94
258:89	89:268	53	60.88	7.88	14.87	1.04	60.88	7.88	14.87	1.04
92:93	97:196	967	943.31	-23.69	-2.45	0.77	943.31	-23.69	-2.45	0.77
92:93	99:98	190	184.55	-5.45	-2.87	0.4	184.55	-5.45	-2.87	0.4
92:93	95:94	676	716.17	40.17	5.94	1.52	716.17	40.17	5.94	1.52
92:93	93:92	0	67.29	67.29	NaN	11.6	67.29	67.29	NaN	11.6
94:95	93:92	708	771.71	63.71	9	2.34	771.71	63.71	9	2.34
94:95	97:196	796	819.59	23.59	2.96	0.83	819.59	23.59	2.96	0.83
94:95	99:98	39	43.36	4.36	11.18	0.68	43.36	4.36	11.18	0.68
196:97	99:98	225	225	0	0	0	225	0	0	0
196:97	95:94	1149	1189.87	40.87	3.56	1.2	1189.87	40.87	3.56	1.2
196:97	93:92	1020	1032.88	12.88	1.26	0.4	1032.88	12.88	1.26	0.4
98:99	95:94	230	247.12	17.12	7.44	1.11	247.12	17.12	7.44	1.11
98:99	93:92	691	701.85	10.85	1.57	0.41	701.85	10.85	1.57	0.41
98:99	97:196	616	616	0	0	0	616	0	0	0
198:201	209:202	1056	986.95	-69.05	-6.54	2.16	986.95	-69.05	-6.54	2.16
198:201	210:205	830	773.97	-56.03	-6.75	1.98	773.97	-56.03	-6.75	1.98
202:209	210:205	189	189	0	0	0	189	0	0	0
202:209	211:212	0	0	0	NaN	NaN	0	0	NaN	NaN
202:209	201:198	743	696.08	-46.92	-6.31	1.75	696.08	-46.92	-6.31	1.75
205:210	201:198	591	554.05	-36.95	-6.25	1.54	554.05	-36.95	-6.25	1.54
205:210	209:202	87	87	0	0	0	87	0	0	0
89:262	262:266	16	19.55	3.55	22.19	0.84	19.55	3.55	22.19	0.84
88:262	262:266	20	21.73	1.73	8.65	0.38	21.73	1.73	8.65	0.38
264:263	263:88	22	26.75	4.75	21.59	0.96	26.75	4.75	21.59	0.96
264:263	263:269	38	44.3	6.3	16.58	0.98	44.3	6.3	16.58	0.98

PM GEH Stats Results

Appendix C – TRICS Traffic Generation Details

Calculation Reference: AUDIT-761701-200915-0901

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
 Category : A - HOUSES PRIVATELY OWNED
 VEHICLES

Selected regions and areas:

02	SOUTH EAST	
	ES EAST SUSSEX	2 days
	HC HAMPSHIRE	3 days
	KC KENT	6 days
	SC SURREY	2 days
	WS WEST SUSSEX	7 days
03	SOUTH WEST	
	SM SOMERSET	3 days
04	EAST ANGLIA	
	CA CAMBRIDGESHIRE	2 days
	NF NORFOLK	10 days
	SF SUFFOLK	2 days
05	EAST MIDLANDS	
	DS DERBYSHIRE	1 days
	LE LEICESTERSHIRE	1 days
	LN LINCOLNSHIRE	1 days
06	WEST MIDLANDS	
	SH SHROPSHIRE	2 days
	ST STAFFORDSHIRE	2 days
07	YORKSHIRE & NORTH LINCOLNSHIRE	
	NE NORTH EAST LINCOLNSHIRE	1 days
	NY NORTH YORKSHIRE	4 days
08	NORTH WEST	
	CH CHESHIRE	4 days
	LC LANCASHIRE	1 days
09	NORTH	
	DH DURHAM	2 days
10	WALES	
	VG VALE OF GLAMORGAN	1 days
11	SCOTLAND	
	AG ANGUS	1 days
	FA FALKIRK	2 days
	HI HIGHLAND	1 days
13	MUNSTER	
	WA WATERFORD	1 days
14	LEINSTER	
	CC CARLOW	1 days
	WX WEXFORD	1 days
15	GREATER DUBLIN	
	DL DUBLIN	1 days
17	ULSTER (NORTHERN IRELAND)	
	AN ANTRIM	1 days
	DO DOWN	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
VEHICLES

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	67	150	0.068	67	150	0.309	67	150	0.377
08:00 - 09:00	67	150	0.127	67	150	0.376	67	150	0.503
09:00 - 10:00	67	150	0.140	67	150	0.174	67	150	0.314
10:00 - 11:00	67	150	0.114	67	150	0.139	67	150	0.253
11:00 - 12:00	67	150	0.122	67	150	0.131	67	150	0.253
12:00 - 13:00	67	150	0.151	67	150	0.144	67	150	0.295
13:00 - 14:00	67	150	0.150	67	150	0.145	67	150	0.295
14:00 - 15:00	67	150	0.163	67	150	0.174	67	150	0.337
15:00 - 16:00	67	150	0.237	67	150	0.167	67	150	0.404
16:00 - 17:00	67	150	0.272	67	150	0.160	67	150	0.432
17:00 - 18:00	67	150	0.355	67	150	0.160	67	150	0.515
18:00 - 19:00	67	150	0.301	67	150	0.166	67	150	0.467
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			2.200			2.245			4.445

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: $COUNT/TRP*FACT$. Trip rates are then rounded to 3 decimal places.

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Parameter summary

Trip rate parameter range selected: 7 - 1817 (units:)
Survey date range: 01/01/12 - 19/11/19
Number of weekdays (Monday-Friday): 71
Number of Saturdays: 0
Number of Sundays: 0
Surveys automatically removed from selection: 10
Surveys manually removed from selection: 0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are shown. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

Calculation Reference: AUDIT-761701-200817-0820

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 01 - RETAIL
 Category : I - SHOPPING CENTRE - LOCAL SHOPS
 VEHICLES

Selected regions and areas:

02	SOUTH EAST	
	EX ESSEX	1 days
06	WEST MIDLANDS	
	SH SHROPSHIRE	1 days
08	NORTH WEST	
	CH CHESHIRE	1 days
11	SCOTLAND	
	SR STIRLING	1 days
16	ULSTER (REPUBLIC OF IRELAND)	
	DN DONEGAL	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Primary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Gross floor area
 Actual Range: 365 to 3394 (units: sqm)
 Range Selected by User: 210 to 84009 (units: sqm)

Parking Spaces Range: All Surveys Included

Public Transport Provision:

Selection by: Include all surveys

Date Range: 01/01/12 to 28/06/19

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Thursday	3 days
Friday	2 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	5 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaken using machines.

Selected Locations:

Town Centre	1
Suburban Area (PPS6 Out of Centre)	1
Edge of Town	2
Neighbourhood Centre (PPS6 Local Centre)	1

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Residential Zone	4
No Sub Category	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

LIST OF SITES relevant to selection parameters

1	CH-01-I-03	LOCAL SHOPS		CESHIRE
	MILL LANE			
	CHESTER			
	BACHE			
	Neighbourhood Centre (PPS6 Local Centre)			
	Residential Zone			
	Total Gross floor area:		365 sqm	
2	DN-01-I-02	LOCAL SHOPS		DONEGAL
	PEARSE ROAD			
	LETTERKENNY			
	Town Centre			
	No Sub Category			
	Total Gross floor area:		3394 sqm	
3	EX-01-I-02	LOCAL SHOPS		ESSEX
	QUEENS ROAD			
	BRAINTREE			
	Suburban Area (PPS6 Out of Centre)			
	Residential Zone			
	Total Gross floor area:		375 sqm	
4	SH-01-I-02	LOCAL SHOPS		SHROPSHIRE
	WREKIN DRIVE			
	TELFORD			
	DONNINGTON			
	Edge of Town			
	Residential Zone			
	Total Gross floor area:		900 sqm	
5	SR-01-I-02	LOCAL SHOPS		STIRLING
	ALLOA ROAD			
	STIRLING			
	Edge of Town			
	Residential Zone			
	Total Gross floor area:		550 sqm	

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 01 - RETAIL/I - SHOPPING CENTRE - LOCAL SHOPS
VEHICLES

Calculation factor: 100 sqm

Estimated TRIP rate value per 100 SQM shown in shaded columns

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS				DEPARTURES				TOTALS			
	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 01:00												
01:00 - 02:00												
02:00 - 03:00												
03:00 - 04:00												
04:00 - 05:00												
05:00 - 06:00												
06:00 - 07:00												
07:00 - 08:00	5	1117	2.812	2.812	5	1117	2.686	2.686	5	1117	5.498	5.498
08:00 - 09:00	5	1117	2.991	2.991	5	1117	2.740	2.740	5	1117	5.731	5.731
09:00 - 10:00	5	1117	3.868	3.868	5	1117	3.403	3.403	5	1117	7.271	7.271
10:00 - 11:00	5	1117	3.886	3.886	5	1117	3.617	3.617	5	1117	7.503	7.503
11:00 - 12:00	5	1117	4.370	4.370	5	1117	4.531	4.531	5	1117	8.901	8.901
12:00 - 13:00	5	1117	4.567	4.567	5	1117	4.119	4.119	5	1117	8.686	8.686
13:00 - 14:00	5	1117	4.011	4.011	5	1117	4.155	4.155	5	1117	8.166	8.166
14:00 - 15:00	5	1117	3.994	3.994	5	1117	3.832	3.832	5	1117	7.826	7.826
15:00 - 16:00	5	1117	3.886	3.886	5	1117	4.208	4.208	5	1117	8.094	8.094
16:00 - 17:00	5	1117	4.656	4.656	5	1117	4.656	4.656	5	1117	9.312	9.312
17:00 - 18:00	5	1117	4.620	4.620	5	1117	5.032	5.032	5	1117	9.652	9.652
18:00 - 19:00	5	1117	4.531	4.531	5	1117	4.764	4.764	5	1117	9.295	9.295
19:00 - 20:00	3	608	10.466	10.466	3	608	9.644	9.644	3	608	20.110	20.110
20:00 - 21:00	3	608	7.671	7.671	3	608	8.603	8.603	3	608	16.274	16.274
21:00 - 22:00	3	608	4.274	4.274	3	608	5.589	5.589	3	608	9.863	9.863
22:00 - 23:00												
23:00 - 24:00												
Total Rates:			70.603	70.603			71.579	71.579			142.182	142.182

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

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Parameter summary

Trip rate parameter range selected: 365 - 3394 (units: sqm)
 Survey date range: 01/01/12 - 28/06/19
 Number of weekdays (Monday-Friday): 5
 Number of Saturdays: 0
 Number of Sundays: 0
 Surveys automatically removed from selection: 0
 Surveys manually removed from selection: 0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are shown. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 04 - EDUCATION

Category : B - SECONDARY

VEHICLES

Selected regions and areas:

01	GREATER LONDON	
	HO HOUNSLOW	1 days
03	SOUTH WEST	
	DV DEVON	2 days
	WL WILTSHIRE	1 days
04	EAST ANGLIA	
	SF SUFFOLK	1 days
05	EAST MIDLANDS	
	LN LINCOLNSHIRE	1 days
	NT NOTTINGHAMSHIRE	1 days
06	WEST MIDLANDS	
	WM WEST MIDLANDS	1 days
07	YORKSHIRE & NORTH LINCOLNSHIRE	
	NE NORTH EAST LINCOLNSHIRE	1 days
	NY NORTH YORKSHIRE	1 days
09	NORTH	
	TV TEES VALLEY	1 days
10	WALES	
	RC RHONDDA CYNON TAFF	1 days
12	CONNAUGHT	
	RO ROSCOMMON	1 days
13	MUNSTER	
	TI TIPPERARY	1 days
16	ULSTER (REPUBLIC OF IRELAND)	
	DN DONEGAL	2 days

TRIP RATE for Land Use 04 - EDUCATION/B - SECONDARY
VEHICLES

Calculation factor: 1 PUPILS

Estimated TRIP rate value per 1000 PUPILS shown in shaded columns

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS				DEPARTURES				TOTALS			
	No. Days	Ave. PUPILS	Trip Rate	Estimated Trip Rate	No. Days	Ave. PUPILS	Trip Rate	Estimated Trip Rate	No. Days	Ave. PUPILS	Trip Rate	Estimated Trip Rate
00:00 - 01:00												
01:00 - 02:00												
02:00 - 03:00												
03:00 - 04:00												
04:00 - 05:00												
05:00 - 06:00												
06:00 - 07:00												
07:00 - 08:00	16	863	0.045	45.412	16	863	0.012	11.878	16	863	0.057	57.290
08:00 - 09:00	16	863	0.131	131.093	16	863	0.093	93.069	16	863	0.224	224.162
09:00 - 10:00	16	863	0.022	21.728	16	863	0.018	17.817	16	863	0.040	39.545
10:00 - 11:00	16	863	0.012	12.095	16	863	0.011	10.647	16	863	0.023	22.742
11:00 - 12:00	16	863	0.014	13.616	16	863	0.015	14.775	16	863	0.029	28.391
12:00 - 13:00	16	863	0.012	11.661	16	863	0.015	15.210	16	863	0.027	26.871
13:00 - 14:00	16	863	0.016	16.151	16	863	0.020	19.555	16	863	0.036	35.706
14:00 - 15:00	16	863	0.032	32.085	16	863	0.024	24.191	16	863	0.056	56.276
15:00 - 16:00	16	863	0.055	54.972	16	863	0.079	78.945	16	863	0.134	133.917
16:00 - 17:00	16	863	0.038	37.517	16	863	0.072	71.920	16	863	0.110	109.437
17:00 - 18:00	16	863	0.026	25.712	16	863	0.035	34.982	16	863	0.061	60.694
18:00 - 19:00	14	878	0.018	17.824	14	878	0.018	18.068	14	878	0.036	35.892
19:00 - 20:00												
20:00 - 21:00												
21:00 - 22:00												
22:00 - 23:00												
23:00 - 24:00												
Total Rates:			0.421	419.866			0.412	411.057			0.833	830.923

Parameter summary

Trip rate parameter range selected: 272 - 1847 (units:)
 Survey date date range: 01/01/11 - 02/04/19
 Number of weekdays (Monday-Friday): 16
 Number of Saturdays: 0
 Number of Sundays: 0
 Surveys automatically removed from selection: 0
 Surveys manually removed from selection: 0

Calculation Reference: AUDIT-761701-200817-0810

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 01 - RETAIL
 Category : 0 - CONVENIENCE STORE
 VEHICLES

Selected regions and areas:

07	YORKSHIRE & NORTH LINCOLNSHIRE	
	NY NORTH YORKSHIRE	1 days
	WY WEST YORKSHIRE	1 days
13	MUNSTER	
	TI TIPPERARY	1 days
17	ULSTER (NORTHERN IRELAND)	
	AN ANTRIM	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Primary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Gross floor area
 Actual Range: 305 to 539 (units: sqm)
 Range Selected by User: 70 to 1500 (units: sqm)

Parking Spaces Range: All Surveys Included

Public Transport Provision:

Selection by: Include all surveys

Date Range: 01/01/12 to 25/09/19

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	2 days
Tuesday	1 days
Thursday	1 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	4 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaken using machines.

Selected Locations:

Town Centre	1
Suburban Area (PPS6 Out of Centre)	1
Edge of Town	1
Neighbourhood Centre (PPS6 Local Centre)	1

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Residential Zone	3
High Street	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

TRIP RATE for Land Use 01 - RETAIL/O - CONVENIENCE STORE
VEHICLES

Calculation factor: 100 sqm

Estimated TRIP rate value per 100 SQM shown in shaded columns

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS				DEPARTURES				TOTALS			
	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 01:00												
01:00 - 02:00												
02:00 - 03:00												
03:00 - 04:00												
04:00 - 05:00												
05:00 - 06:00												
06:00 - 07:00	2	422	4.265	4.265	2	422	4.265	4.265	2	422	8.530	8.530
07:00 - 08:00	4	405	8.091	8.091	4	405	7.350	7.350	4	405	15.441	15.441
08:00 - 09:00	4	405	12.662	12.662	4	405	11.859	11.859	4	405	24.521	24.521
09:00 - 10:00	4	405	12.292	12.292	4	405	10.994	10.994	4	405	23.286	23.286
10:00 - 11:00	4	405	10.994	10.994	4	405	10.315	10.315	4	405	21.309	21.309
11:00 - 12:00	4	405	11.859	11.859	4	405	12.044	12.044	4	405	23.903	23.903
12:00 - 13:00	4	405	14.206	14.206	4	405	14.453	14.453	4	405	28.659	28.659
13:00 - 14:00	4	405	13.527	13.527	4	405	13.403	13.403	4	405	26.930	26.930
14:00 - 15:00	4	405	13.280	13.280	4	405	12.786	12.786	4	405	26.066	26.066
15:00 - 16:00	4	405	12.539	12.539	4	405	12.353	12.353	4	405	24.892	24.892
16:00 - 17:00	4	405	13.650	13.650	4	405	13.403	13.403	4	405	27.053	27.053
17:00 - 18:00	4	405	12.786	12.786	4	405	14.886	14.886	4	405	27.672	27.672
18:00 - 19:00	4	405	9.883	9.883	4	405	10.747	10.747	4	405	20.630	20.630
19:00 - 20:00	4	405	7.968	7.968	4	405	7.721	7.721	4	405	15.689	15.689
20:00 - 21:00	3	415	7.154	7.154	3	415	8.441	8.441	3	415	15.595	15.595
21:00 - 22:00	3	415	5.949	5.949	3	415	6.109	6.109	3	415	12.058	12.058
22:00 - 23:00												
23:00 - 24:00												
Total Rates:			171.105	171.105			171.129	171.129			342.234	342.234

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: $COUNT/TRP*FACT$. Trip rates are then rounded to 3 decimal places.

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Parameter summary

Trip rate parameter range selected:	305 - 539 (units: sqm)
Survey date range:	01/01/12 - 25/09/19
Number of weekdays (Monday-Friday):	4
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are shown. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

Calculation Reference: AUDIT-761701-200817-0846

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
 Category : O - RETIREMENT AND CARE COMMUNITY
 VEHICLES

Selected regions and areas:

02	SOUTH EAST		
	HF	HERTFORDSHIRE	1 days
	SC	SURREY	1 days
03	SOUTH WEST		
	BR	BRISTOL CITY	1 days
	DV	DEVON	1 days
16	ULSTER (REPUBLIC OF IRELAND)		
	CV	CAVAN	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Primary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: No of Dwellings
 Actual Range: 39 to 149 (units:)
 Range Selected by User: 36 to 149 (units:)

Parking Spaces Range: All Surveys Included

Parking Spaces per Dwelling Range: All Surveys Included

Bedrooms per Dwelling Range: All Surveys Included

Percentage of dwellings privately owned: All Surveys Included

Public Transport Provision:

Selection by: Include all surveys

Date Range: 01/01/12 to 22/05/17

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	1 days
Tuesday	1 days
Wednesday	1 days
Friday	2 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	5 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaken using machines.

Selected Locations:

Edge of Town	2
Neighbourhood Centre (PPS6 Local Centre)	1
Free Standing (PPS6 Out of Town)	2

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Residential Zone	3
Out of Town	2

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

TRIP RATE for Land Use 03 - RESIDENTIAL/O - RETIREMENT AND CARE COMMUNITY
VEHICLES

Calculation factor: 1 DWELLS

Estimated TRIP rate value per 55 DWELLS shown in shaded columns

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS				DEPARTURES				TOTALS			
	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate
00:00 - 01:00												
01:00 - 02:00												
02:00 - 03:00												
03:00 - 04:00												
04:00 - 05:00												
05:00 - 06:00												
06:00 - 07:00												
07:00 - 08:00	5	77	0.136	7.467	5	77	0.063	3.446	5	77	0.199	10.913
08:00 - 09:00	5	77	0.154	8.473	5	77	0.078	4.308	5	77	0.232	12.781
09:00 - 10:00	5	77	0.115	6.319	5	77	0.094	5.170	5	77	0.209	11.489
10:00 - 11:00	5	77	0.172	9.478	5	77	0.185	10.196	5	77	0.357	19.674
11:00 - 12:00	5	77	0.144	7.898	5	77	0.146	8.042	5	77	0.290	15.940
12:00 - 13:00	5	77	0.141	7.755	5	77	0.175	9.621	5	77	0.316	17.376
13:00 - 14:00	5	77	0.159	8.760	5	77	0.183	10.052	5	77	0.342	18.812
14:00 - 15:00	5	77	0.102	5.601	5	77	0.125	6.893	5	77	0.227	12.494
15:00 - 16:00	5	77	0.170	9.334	5	77	0.128	7.037	5	77	0.298	16.371
16:00 - 17:00	5	77	0.078	4.308	5	77	0.138	7.611	5	77	0.216	11.919
17:00 - 18:00	5	77	0.097	5.313	5	77	0.089	4.883	5	77	0.186	10.196
18:00 - 19:00	5	77	0.099	5.457	5	77	0.084	4.595	5	77	0.183	10.052
19:00 - 20:00	4	78	0.042	2.292	4	78	0.061	3.349	4	78	0.103	5.641
20:00 - 21:00	4	78	0.019	1.058	4	78	0.038	2.115	4	78	0.057	3.173
21:00 - 22:00												
22:00 - 23:00												
23:00 - 24:00												
Total Rates:			1.628	89.513			1.587	87.318			3.215	176.831

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: $COUNT/TRP*FACT$. Trip rates are then rounded to 3 decimal places.

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Parameter summary

Trip rate parameter range selected: 39 - 149 (units:)
 Survey date range: 01/01/12 - 22/05/17
 Number of weekdays (Monday-Friday): 5
 Number of Saturdays: 0
 Number of Sundays: 0
 Surveys automatically removed from selection: 0
 Surveys manually removed from selection: 0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are shown. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

Calculation Reference: AUDIT-761701-201209-1229

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 04 - EDUCATION
 Category : D - NURSERY
 TOTAL VEHICLES

Selected regions and areas:

04	EAST ANGLIA	
	SF SUFFOLK	1 days
05	EAST MIDLANDS	
	NR NORTHAMPTONSHIRE	1 days
06	WEST MIDLANDS	
	SH SHROPSHIRE	1 days
	WK WARWICKSHIRE	1 days
08	NORTH WEST	
	CH CHESHIRE	1 days
09	NORTH	
	TV TEES VALLEY	1 days
10	WALES	
	BG BRIDGEND	1 days
11	SCOTLAND	
	SR STIRLING	1 days
12	CONNAUGHT	
	RO ROSCOMMON	2 days
17	ULSTER (NORTHERN IRELAND)	
	DE DERRY	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Primary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Number of pupils
 Actual Range: 18 to 110 (units:)
 Range Selected by User: 18 to 450 (units:)

Parking Spaces Range: All Surveys Included

Public Transport Provision:

Selection by: Include all surveys

Date Range: 01/01/12 to 27/09/19

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	3 days
Wednesday	3 days
Friday	5 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	11 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaken using machines.

Selected Locations:

Edge of Town Centre	4
Suburban Area (PPS6 Out of Centre)	1
Edge of Town	5
Free Standing (PPS6 Out of Town)	1

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Industrial Zone	2
Residential Zone	7
No Sub Category	2

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village,

Secondary Filtering selection:

Use Class:

D1 11 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 500m Range:

All Surveys Included

Population within 1 mile:

1,001 to 5,000	2 days
5,001 to 10,000	3 days
10,001 to 15,000	1 days
15,001 to 20,000	2 days
20,001 to 25,000	1 days
25,001 to 50,000	2 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

5,001 to 25,000	3 days
50,001 to 75,000	1 days
75,001 to 100,000	7 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	2 days
1.1 to 1.5	9 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

No 11 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present 11 days

This data displays the number of selected surveys with PTAL Ratings.

TRIP RATE for Land Use 04 - EDUCATION/D - NURSERY

TOTAL VEHICLES

Calculation factor: 1

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. PUPILS	Trip Rate	No. Days	Ave. PUPILS	Trip Rate	No. Days	Ave. PUPILS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	11	55	0.100	11	55	0.040	11	55	0.140
08:00 - 09:00	11	55	0.290	11	55	0.219	11	55	0.509
09:00 - 10:00	11	55	0.176	11	55	0.175	11	55	0.351
10:00 - 11:00	11	55	0.054	11	55	0.043	11	55	0.097
11:00 - 12:00	11	55	0.064	11	55	0.038	11	55	0.102
12:00 - 13:00	11	55	0.115	11	55	0.152	11	55	0.267
13:00 - 14:00	11	55	0.063	11	55	0.086	11	55	0.149
14:00 - 15:00	11	55	0.058	11	55	0.049	11	55	0.107
15:00 - 16:00	11	55	0.056	11	55	0.082	11	55	0.138
16:00 - 17:00	11	55	0.102	11	55	0.107	11	55	0.209
17:00 - 18:00	11	55	0.214	11	55	0.267	11	55	0.481
18:00 - 19:00	10	58	0.005	10	58	0.053	10	58	0.058
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			1.297			1.311			2.608

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: $COUNT/TRP*FACT$. Trip rates are then rounded to 3 decimal places.

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Parameter summary

Trip rate parameter range selected: 18 - 110 (units:)
Survey date range: 01/01/12 - 27/09/19
Number of weekdays (Monday-Friday): 11
Number of Saturdays: 0
Number of Sundays: 0
Surveys automatically removed from selection: 1
Surveys manually removed from selection: 0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are shown. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 06 - HOTEL, FOOD & DRINK
Category : B - RESTAURANTS
TOTAL VEHICLES

Selected regions and areas:

01	GREATER LONDON	
	EN ENFIELD	1 days
06	WEST MIDLANDS	
	ST STAFFORDSHIRE	1 days
12	CONNAUGHT	
	GA GALWAY	1 days
	RO ROSCOMMON	1 days
14	LEINSTER	
	LU LOUTH	1 days
17	ULSTER (NORTHERN IRELAND)	
	AN ANTRIM	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Primary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Gross floor area
Actual Range: 259 to 2200 (units: sqm)
Range Selected by User: 75 to 100 (units: sqm)

Parking Spaces Range: All Surveys Included

Public Transport Provision:

Selection by: Include all surveys

Date Range: 01/01/12 to 25/09/19

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	1 days
Tuesday	1 days
Thursday	1 days
Friday	3 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	6 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaken using machines.

Selected Locations:

Town Centre	1
Edge of Town	3
Neighbourhood Centre (PPS6 Local Centre)	2

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Residential Zone	1
Retail Zone	2
Built-Up Zone	1
Village	1
No Sub Category	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Secondary Filtering selection:

Use Class:

A3 6 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 500m Range:

All Surveys Included

Population within 1 mile:

1,000 or Less	1 days
1,001 to 5,000	2 days
5,001 to 10,000	2 days
15,001 to 20,000	1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

5,000 or Less	1 days
25,001 to 50,000	3 days
75,001 to 100,000	2 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	3 days
1.1 to 1.5	2 days
2.1 to 2.5	1 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

No 6 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	5 days
3 Moderate	1 days

This data displays the number of selected surveys with PTAL Ratings.

TRIP RATE for Land Use 06 - HOTEL, FOOD & DRINK/B - RESTAURANTS
TOTAL VEHICLES

Calculation factor: 100 sqm

Estimated TRIP rate value per 51 SQM shown in shaded columns

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS				DEPARTURES				TOTALS			
	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 01:00	1	370	0.000	0.000	1	370	0.270	0.138	1	370	0.270	0.138
01:00 - 02:00												
02:00 - 03:00												
03:00 - 04:00												
04:00 - 05:00												
05:00 - 06:00												
06:00 - 07:00												
07:00 - 08:00												
08:00 - 09:00												
09:00 - 10:00												
10:00 - 11:00	3	911	0.658	0.336	3	911	0.293	0.149	3	911	0.951	0.485
11:00 - 12:00	6	857	1.031	0.526	6	857	0.778	0.397	6	857	1.809	0.923
12:00 - 13:00	6	857	2.471	1.260	6	857	1.323	0.675	6	857	3.794	1.935
13:00 - 14:00	6	857	2.529	1.290	6	857	2.354	1.201	6	857	4.883	2.491
14:00 - 15:00	6	857	1.459	0.744	6	857	1.965	1.002	6	857	3.424	1.746
15:00 - 16:00	6	857	0.973	0.496	6	857	1.381	0.704	6	857	2.354	1.200
16:00 - 17:00	6	857	1.089	0.556	6	857	0.953	0.486	6	857	2.042	1.042
17:00 - 18:00	6	857	1.946	0.992	6	857	1.089	0.556	6	857	3.035	1.548
18:00 - 19:00	6	857	2.802	1.429	6	857	2.276	1.161	6	857	5.078	2.590
19:00 - 20:00	6	857	2.685	1.369	6	857	2.665	1.359	6	857	5.350	2.728
20:00 - 21:00	6	857	1.576	0.804	6	857	2.218	1.131	6	857	3.794	1.935
21:00 - 22:00	6	857	1.167	0.595	6	857	1.751	0.893	6	857	2.918	1.488
22:00 - 23:00	6	857	0.623	0.318	6	857	1.089	0.556	6	857	1.712	0.874
23:00 - 24:00	5	768	0.182	0.093	5	768	0.938	0.478	5	768	1.120	0.571
Total Rates:			21.191	10.808			21.343	10.886			42.534	21.694

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

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Parameter summary

Trip rate parameter range selected: 259 - 2200 (units: sqm)
Survey date date range: 01/01/12 - 25/09/19
Number of weekdays (Monday-Friday): 6
Number of Saturdays: 0
Number of Sundays: 0
Surveys automatically removed from selection: 0
Surveys manually removed from selection: 0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

A.2 Road Safety Audit

Stage 1 Road Safety Audit



Mungret Residential Development
Stage 1 Road Safety Audit

Proposed Development at Dromdarrig, Mungret, Co. Limerick

January 2021

Application prepared with



Limerick City and County Council

Proposed Residential Development at Mungret, Co. Limerick

Stage 1 Road Safety Audit

January 2021



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APPENDIX 1: DRAWINGS PROVIDED

APPENDIX 2: FEEDBACK FORM

SECTION 1: Introduction

1.1 Background

This report results from a Stage 1 Road Safety Audit (RSA) of a Proposed Residential Development at Mungret, Co. Limerick. It is proposed to construct residential units as well as a community building and creche on the north side of a proposed new spine road. This spine road is being designed separately by others and a separate RSA was carried out for that scheme which included the access junctions to the subject site. Therefore, this audit is based on the internal site layout only and does not include these access junctions. The external road network and access junctions to serve the subject site have already been assessed under the previous and separate RSA.

Arup prepared the drawings on behalf of their Client, Limerick City and County Council. Arup commissioned this RSA on behalf of their Client.

The audit has been prepared in accordance with TII GE-STY-01024 (December 2017) - Road Safety Audit. The Audit Team has examined and reported on only the road safety implications of the design submitted by the Design Team and has not examined or verified the compliance of the design to any other criteria. The members of the Road Safety Audit Team are independent of the Design Team, and include:

Road Safety Audit Team Leader:
Mr. Adrian O'Neill
BEng MSc CEng MIEI
J.B. Barry & Partners

Road Safety Audit Team Member:
Mr. Tim Delaney
BEng CEng MIEI
J.B. Barry & Partners

The Documents/Drawings audited are as detailed on the drawing issue schedule contained in **Appendix A**. A copy of the RSA Feedback Form is contained in **Appendix B**.

1.2 Road Collision History

No historical road collision data for the study area was made available to the Audit Team.

An online check on the Road Safety Authority website shows that there were no recorded collisions between 2005 and 2016 within the immediate vicinity of the site.

There was a cluster of 8 separate collisions at the roundabout between the R859 and the R510 regional roads. Two of these collisions were classified as serious. One involved a cyclist and the other was a head-on collision. Refer to Figure 1.1.

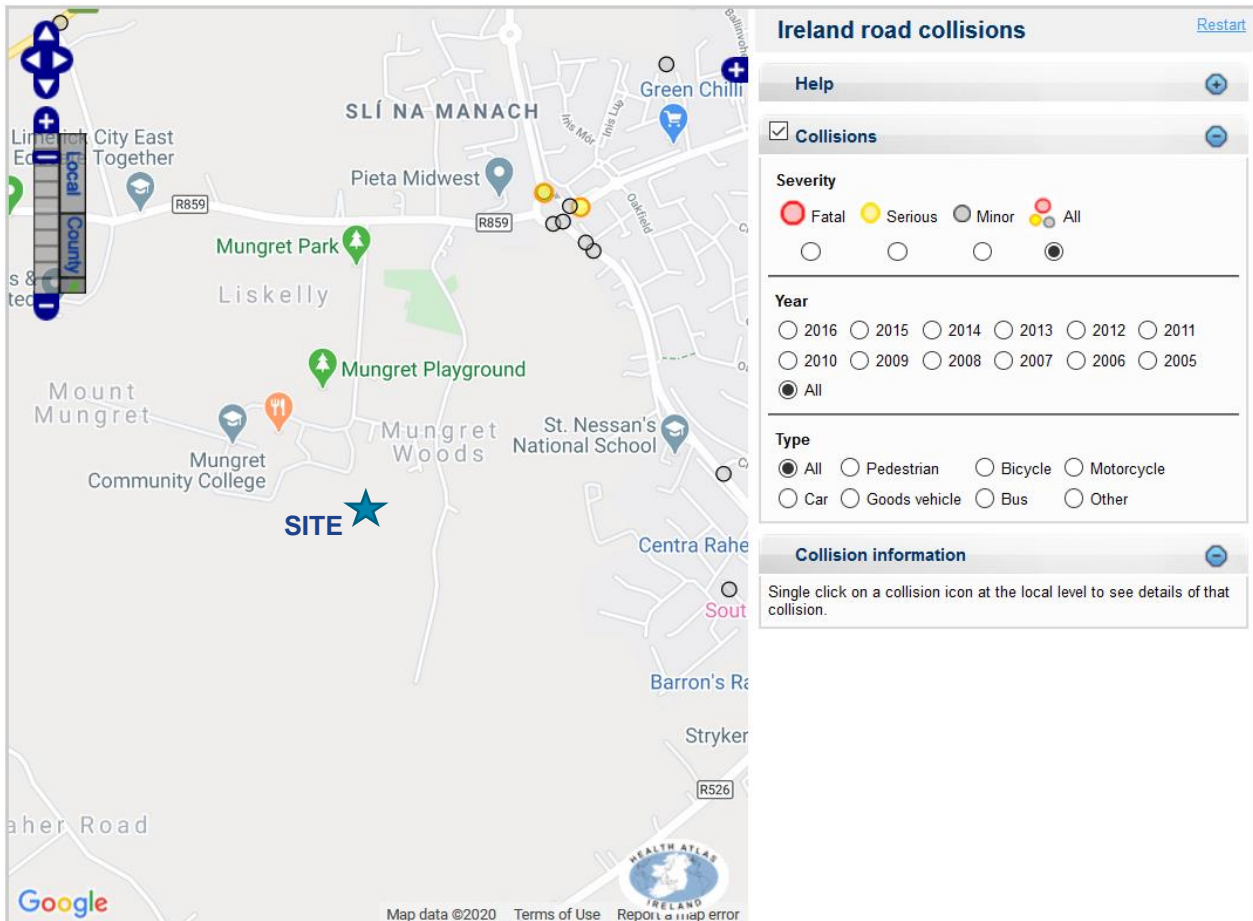


Figure 1.1: RSA collision history (2005 to 2016)

1.3 Site Visit

The audit was carried out between Wednesday 5 August 2020 and Wednesday 20 January 2021. The Road Safety Audit site visit was carried out on Wednesday 5 August 2020 during daylight. It did not rain during the site visit and the road surfaces were dry.

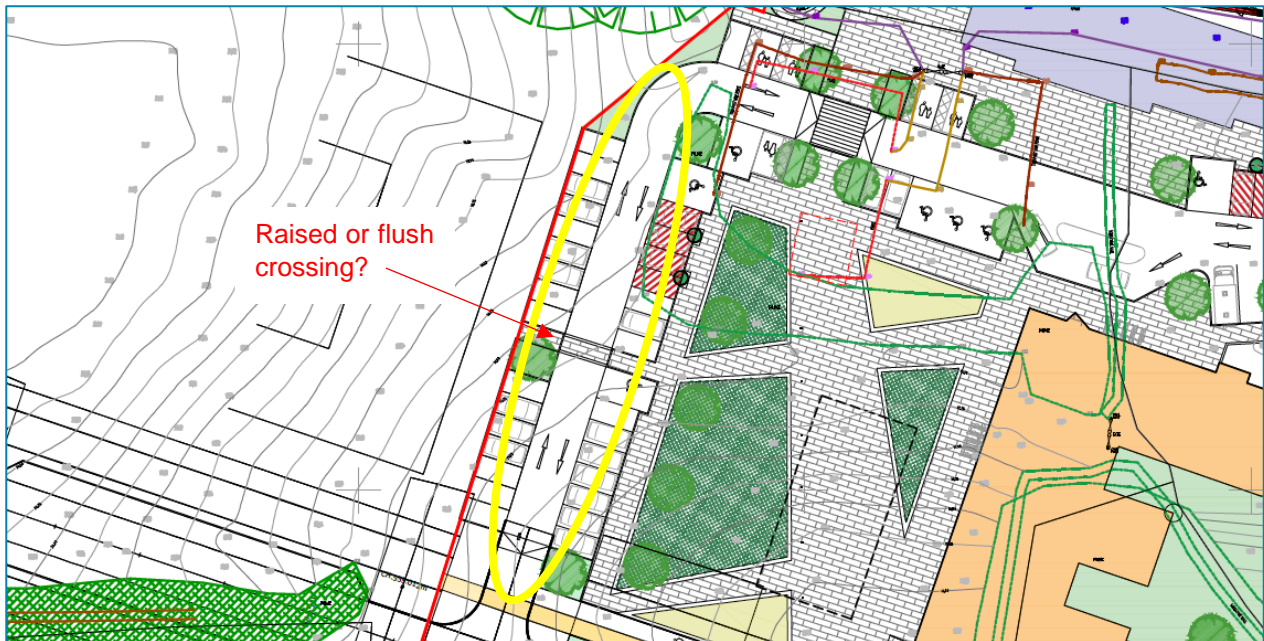
The site is currently a green field site and the proposed spine road was not constructed at the time of the site visit. Access to the site was gained via a distributor road which runs south from its junction with the R859 and which currently provides access to Mungret Community College, a large playground and the neighbouring Mungret Woods housing estate. During the site visit, it was observed that part of the proposed spine road serving the newly built Mungret Gate development was completed.

Traffic volumes, pedestrian activity and cycling activity were low at the time of the site visit.

SECTION 2: Audit Issues Identified

2.1 Problem: Traffic Calming

The western site access road which will provide the most direct access to the creche from the spine road has a very straight alignment which could be conducive to higher traffic speeds. It is not clear from the proposed site layout, if the crossing point located mid-way along the access road is to be raised or not. The likelihood and severity of all collisions is greatly exacerbated by higher speeds increasing the risk of a fatality and creating an unsafe environment for all road users especially pedestrians and cyclists.

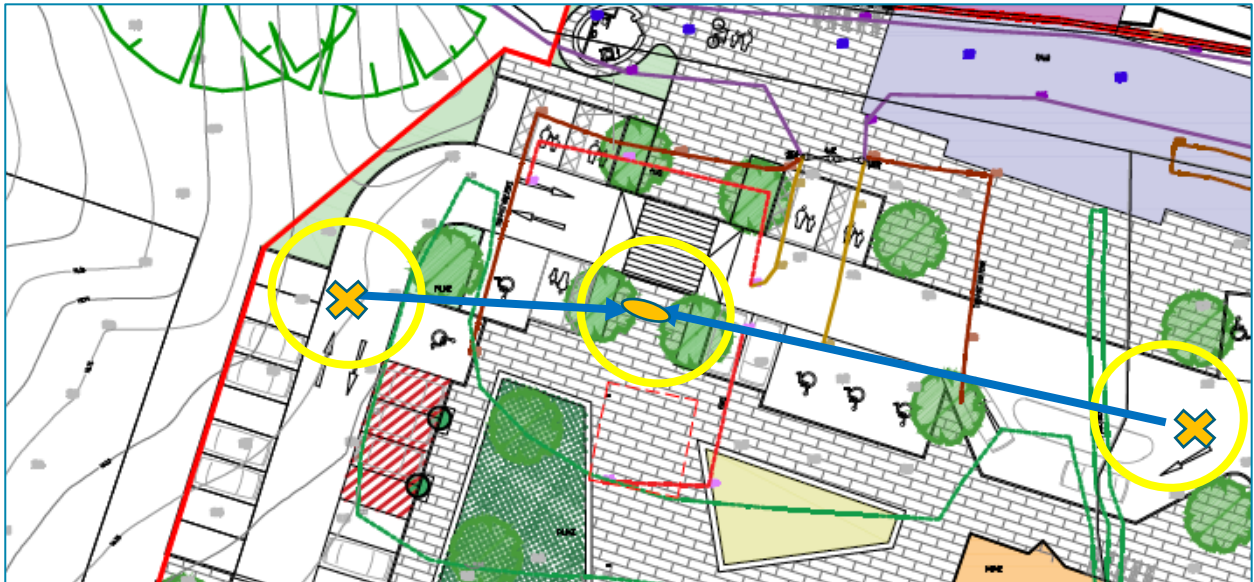


Recommendation

Include a vertical traffic calming measure mid-way along the straight section of the access road to slow vehicles

2.2 Problem: Forward Visibility

It is proposed to locate trees adjacent to the raised pedestrian crossing which provides access to the crèche. These trees will reduce the forward visibility of the crossing increasing the risk of a collision with a pedestrian. Maximising visibility is an important safety measure especially consider the adjacent sharp bend in the approaching road.

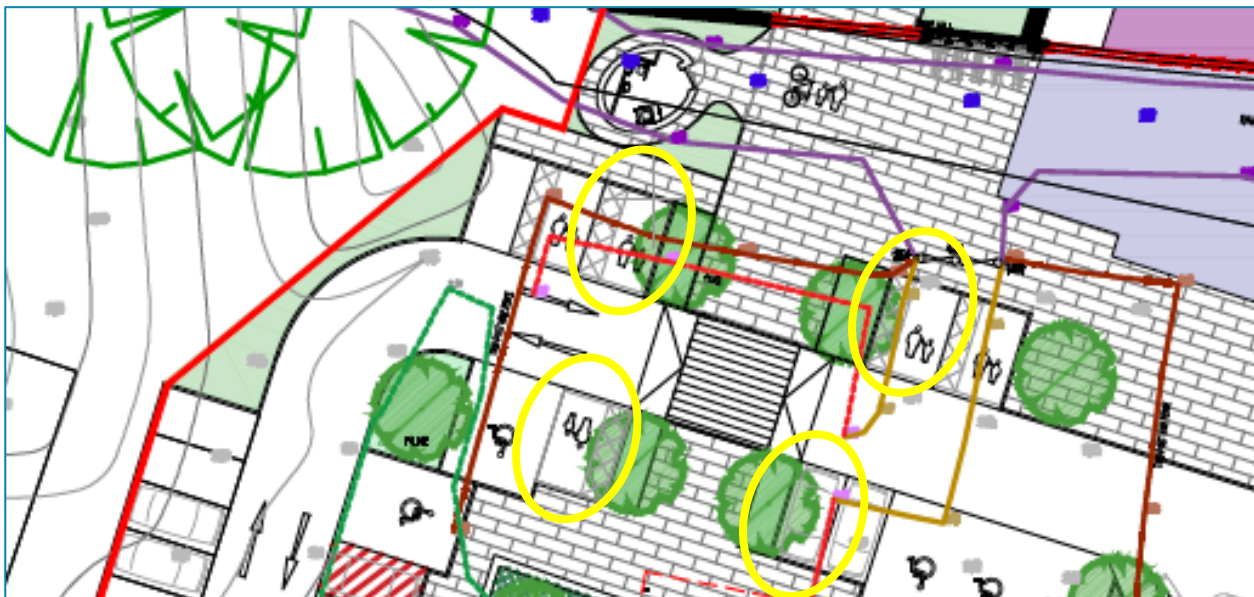


Recommendation

Ensure that the trees (and parking) do not reduce the forward visibility of motorists to see a pedestrian (especially a small child) about to cross. Tree types should be of a slender girth when mature and have a truck clear of side growth to a height of 1.8m. Also refer to Problem 2.3.

2.3 Problem: Parking close to Pedestrian Crossing

Parking bays are located very close to a significant pedestrian crossing, providing access to the creche from the set-down area. There is a danger that a motorist might need to reverse onto the crossing in order to exit a parking space increasing the risk of a collision with a pedestrian. Also, some of the parking bays to the south of the crossing may reduce the forward visibility of the crossing. Also refer to Problem 2.2.

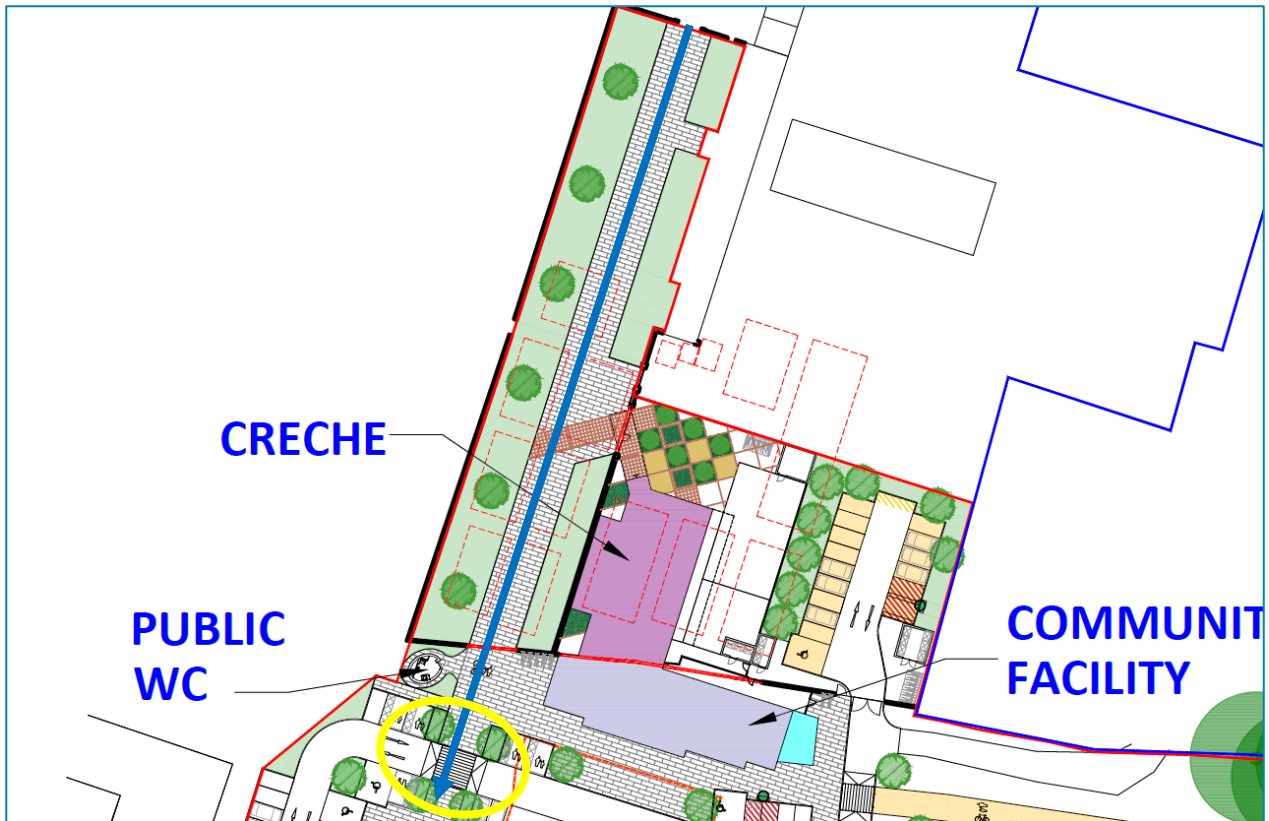


Recommendation

Increase the buffer between the crossing and the adjacent parking spaces. This may require removing some of the parking bays. Remove all of the parking to the southwest of the crossing.

2.4 Problem: Shared Route to Creche

The shared pedestrian/cyclist route which provides access to the creche has a straight alignment, bounded by a row of trees and leads directly onto a pedestrian crossing. There is a danger that small children might run or cycle straight across the road without paying due caution to traffic. The adjacent parking spaces (refer also to Problem 2.3) form a kind of tunnel effect and reduces inter-visibility between motorists and pedestrians. This could lead a child running/cycling in front of a passing vehicle and being struck.

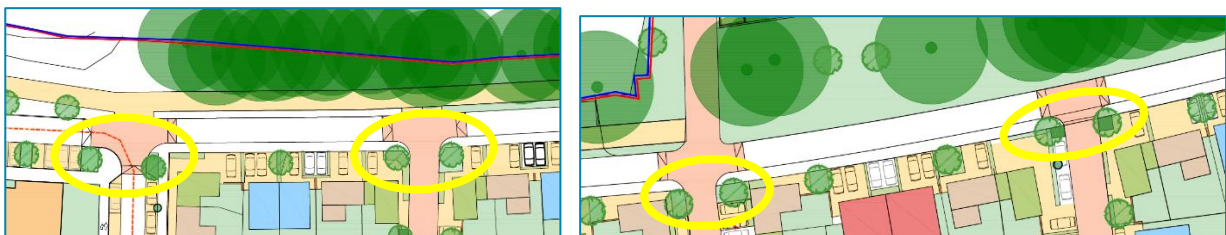


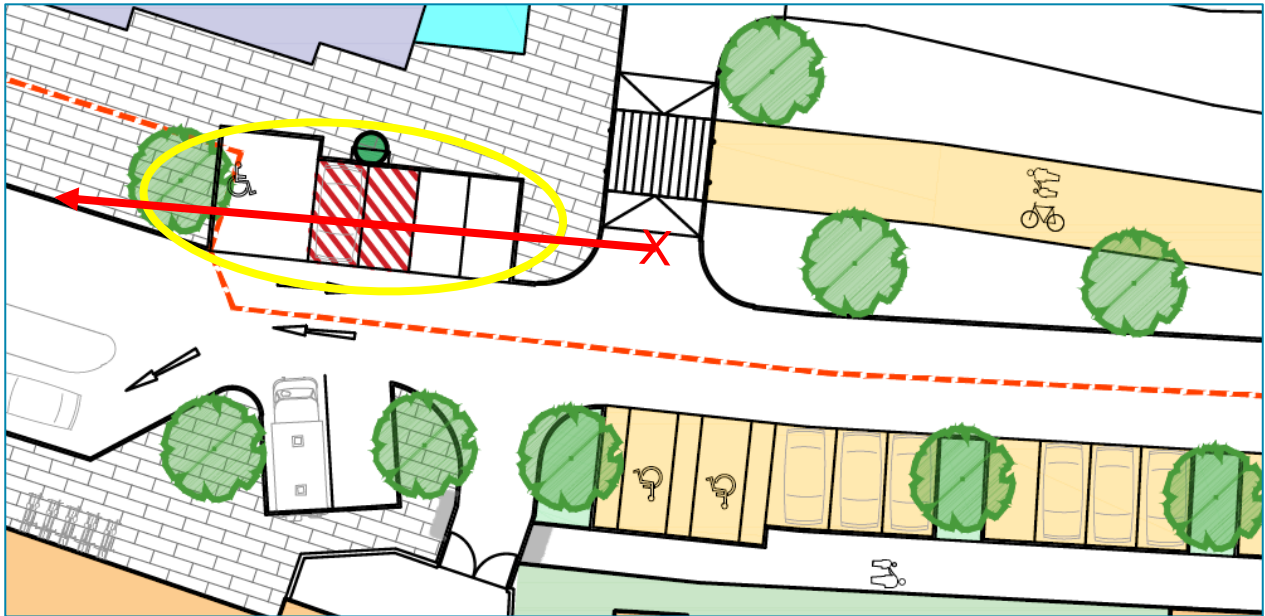
Recommendation

The Design Team should consider installing two or three bollards to encourage children to slow down and be more cautious on approach to the crossing. Ensure that different surface materials of varying contrast are used to clearly distinguish the crossing from the other shared pedestrian/cyclist areas. Ensure that the crossing is well lit with the appropriate tactile paving.

2.5 Problem: Sight Lines at Junctions

It is unclear from the scheme drawing if the necessary sight lines can be achieved at many of the internal junctions due to proposed tree planting or car parking close by. Reduced visibility increases the risk of 'side-seep' or 'rear-end shunt' type collisions.



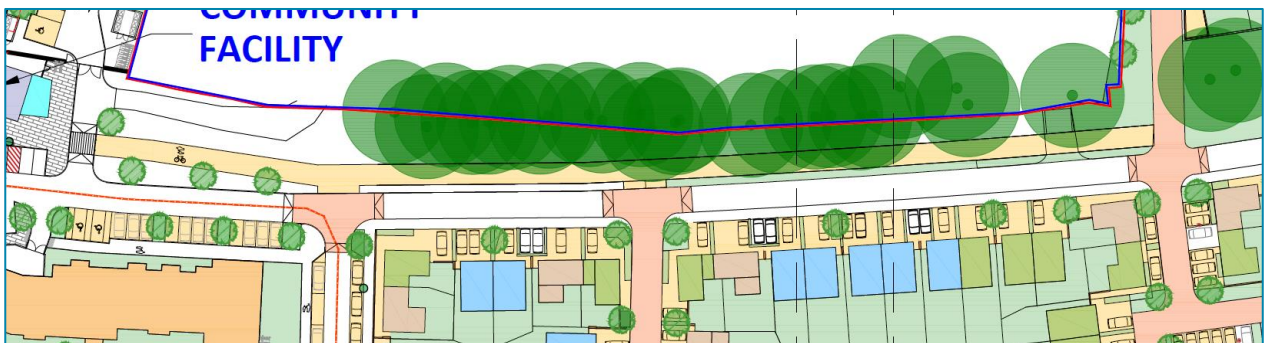


Recommendation

Ensure that all internal junctions have the necessary sightlines in accordance with DMURS.

2.6 Problem: Lack of Uncontrolled Crossings

There appears to be a lack of uncontrolled crossings for pedestrians wanting to access the 'Shared Leisure Route' which runs along the northern boundary from other parts of the development. This may lead to pedestrians crossing the street at unsafe locations.

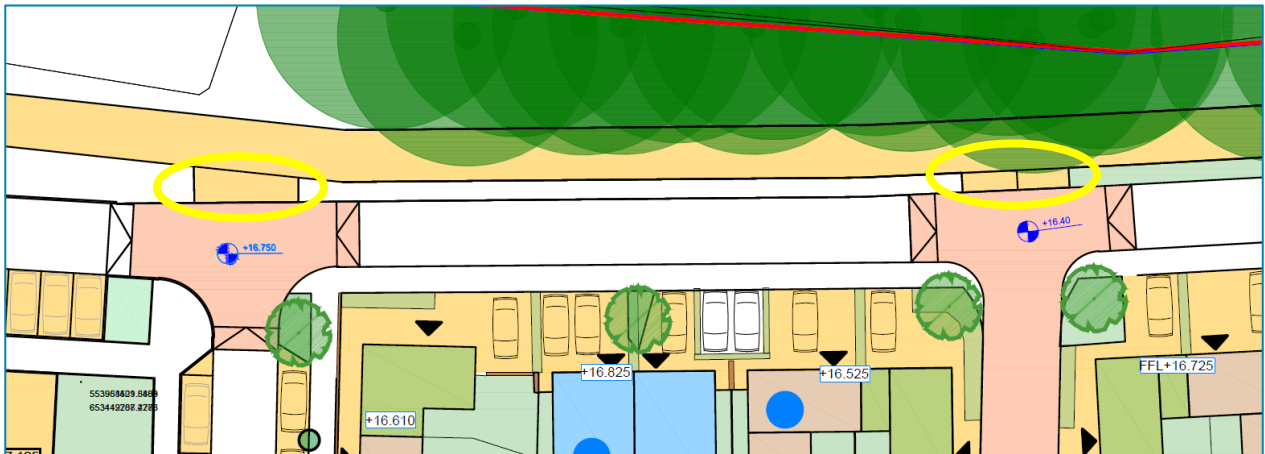
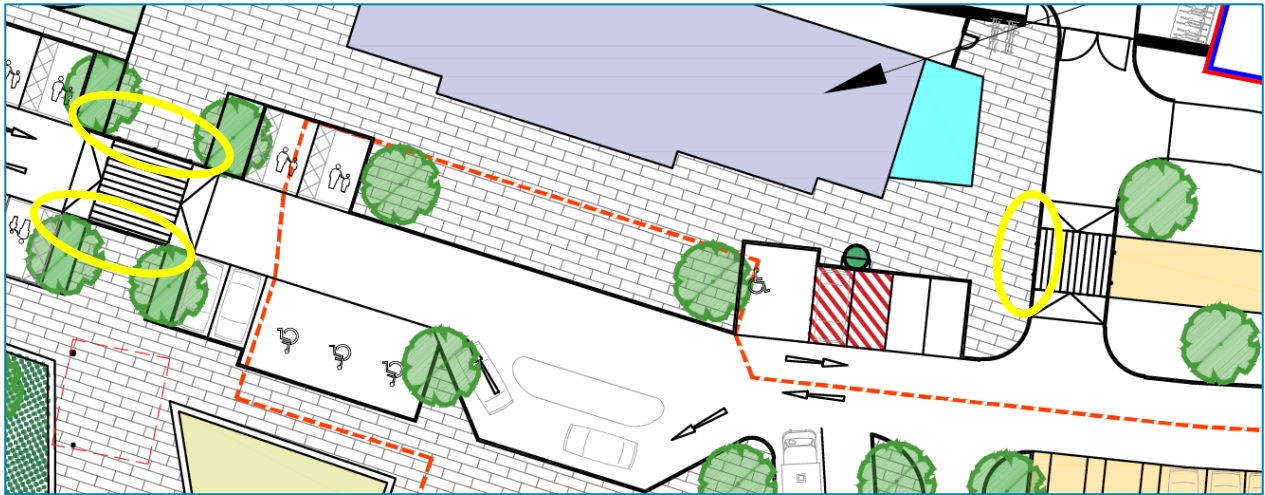


Recommendation

The Design Team should ensure that there is appropriate crossing points and connectivity from the development to the Shared Leisure Route.

2.7 Problem: Lack of Tactile Paving at Pedestrian Crossings

No tactile paving is prescribed at pedestrian crossings which could lead to pedestrians with a visual impairment stepping out onto the carriageway and in front of a passing vehicle.

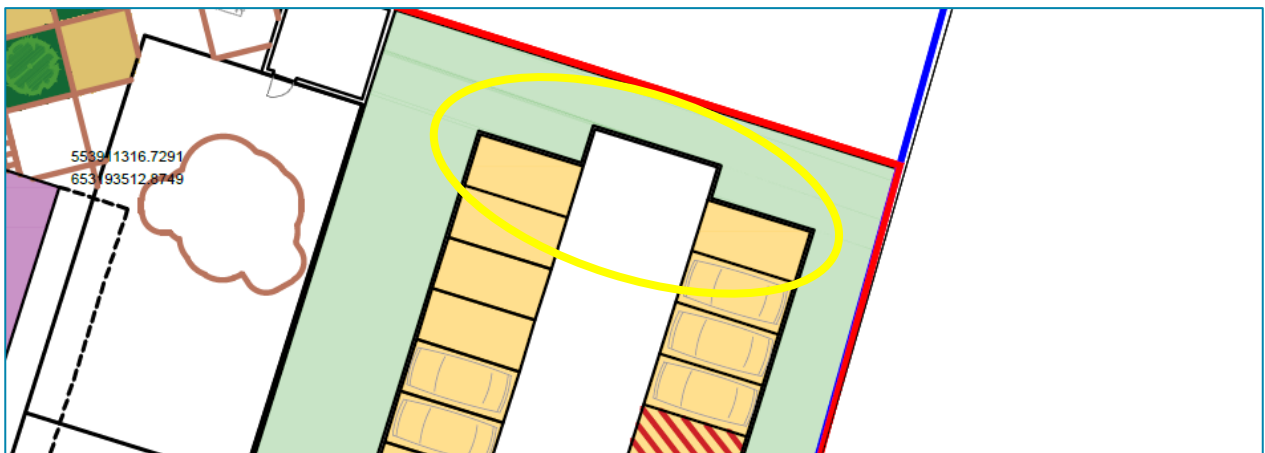


Recommendation

Ensure that the correct tactile paving is used at the correct location (i.e. on the desire line) at each pedestrian crossing for the entire scheme.

2.8 Problem: Turning Area in Carpark

It is not clear if motorists can safely egress from the end parking spaces when all other parking spaces are occupied by a vehicle. This could lead to an increased risk of collision with another vehicle.



Recommendation

Carry out a vehicle path sweep assessment to ensure that motorists can safely park and vacate the end parking spaces and if not, design accordingly.

2.9 Problem: General Parking Movements

It is not clear from the drawings, if there is sufficient space for vehicles to carry out the required movements, particularly for parking. Some parking spaces appear tight and may take several movements to access/egress the spaces. Parking spaces which are difficult to use may increase the risk of an incident.

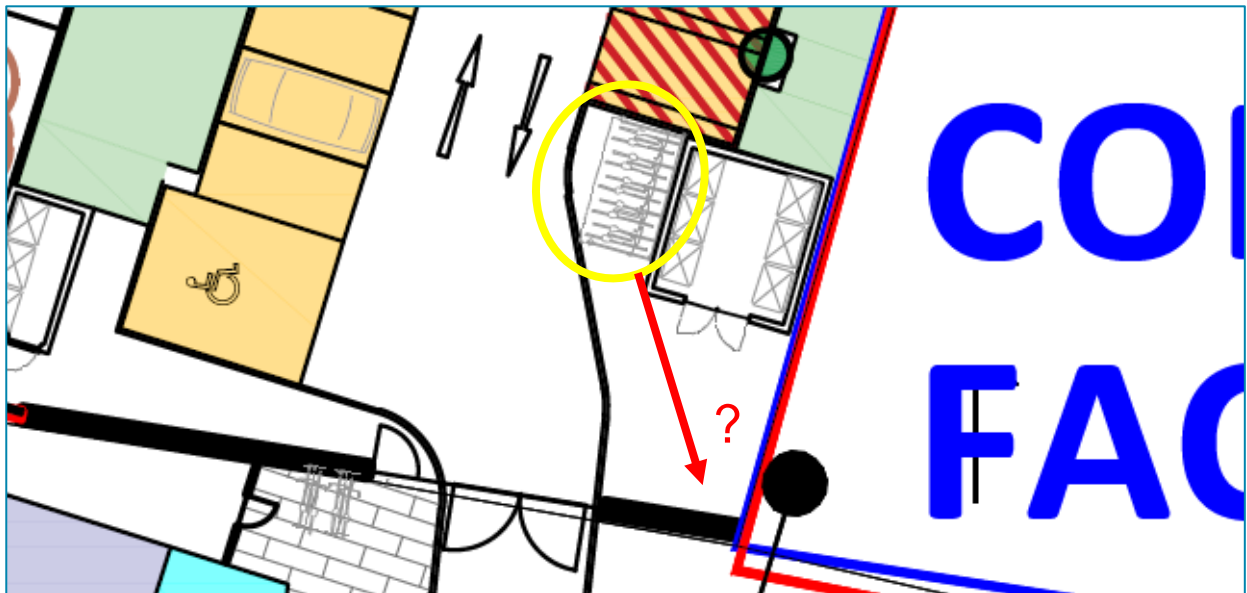


Recommendation

Review all of the parking areas within the site. Carry out a swept path analysis to illustrate that all spaces can be accessed and egressed safely. Consider keeping parking spaces away from junctions and raised tables / pedestrian crossings to increase safety and manoeuvrability.

2.10 Problem: Unsafe Bike Stand Location

The location of the bike parking area within the carpark has little space for cyclists to stand when using the bike-stand which could lead to a cyclist being struck by a vehicle within the carpark.



Recommendation

Relocate the bike parking area to a safe space with more room.

2.11 Observation: Preliminary to Final Stage Design

This report is a Stage 1 RSA based on a Preliminary Design Stage drawing. Ensure that tactile paving, continuous footpaths and cycle tracks through junctions, public lighting, road markings, signage and water gullies are all included to be audited under a Stage 2 RSA.

SECTION 3: Audit Team Statement

We certify that we have examined the drawings and documents listed in the appendices to this report.

The examination and subsequent report was made with the sole purpose of identifying any features of the scheme that could be removed or modified in order to improve the safety of the proposals.

The problems identified have been noted in this report together with associated safety improvement suggestions, which we recommend should be studied for implementation.

No one on the Audit Team has been involved in the initial scheme design.

Assessment Team Leader

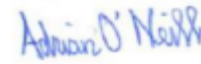
Name: A.O'Neill
BEng MSc CEng MIEI

Position: Design Engineer

Organisation: J.B. Barry & Partners Ltd.

Address: 3 Eastgate Road
Eastgate
Little Island
Co. Cork

Signed:



Date: 21.01.21



Assessment Team Member

Name: T. Delaney
BEng CEng MIEI

Position: Associate

Organisation: J.B. Barry & Partners Ltd.

Address: 3 Eastgate Road
Eastgate
Little Island
Co. Cork

Signed:



Date: 21.01.21



Appendix 1: Drawings Provided

Appendix 2: Feedback Form

Road Safety Audit Feedback Form

Scheme: Proposed Development at Mungret, Co. Limerick

Audit Stage: Road Safety Audit Stage 1

Date Audit Completed: 20 January 2021

Paragraph No. in Report	To Be Completed by the Design Team			To Be Completed by the Audit Team
	Problem accepted (yes/no)	Recommended measure accepted (yes/no)	Alternative measure (describe)	Alternative measure accepted by Auditors (yes/no)
2.1	Yes	Yes		
2.2	Yes	Yes	All tree species will accommodate visibility at junctions and corners	Yes
2.3	Yes	No	Parking spaces will be relocated to create a larger buffer between the parking spaces and the crossing.	Yes
2.4	Yes	Yes		
2.5	Yes	Yes	All tree species will accommodate visibility at junctions and corners	Yes
2.6	Yes	Yes	This will be provided through the introduction a raised table at this junction.	Yes
2.7	Yes	Yes		
2.8	Yes	Yes	These spaces can be accessed and egressed safely and in one movement.	Yes
2.9	Yes	Yes	These spaces can be accessed and egressed safely and in one movement.	Yes

2.10	Yes	Yes	The bike stands will be moved	Yes
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Signed: Designer

Date 21-01-2021...

Signed: Audit Team Leader

Date ...21/01/2021..

Signed: Client

Date 21/01/21.....

A.3 Road Safety Audit Images

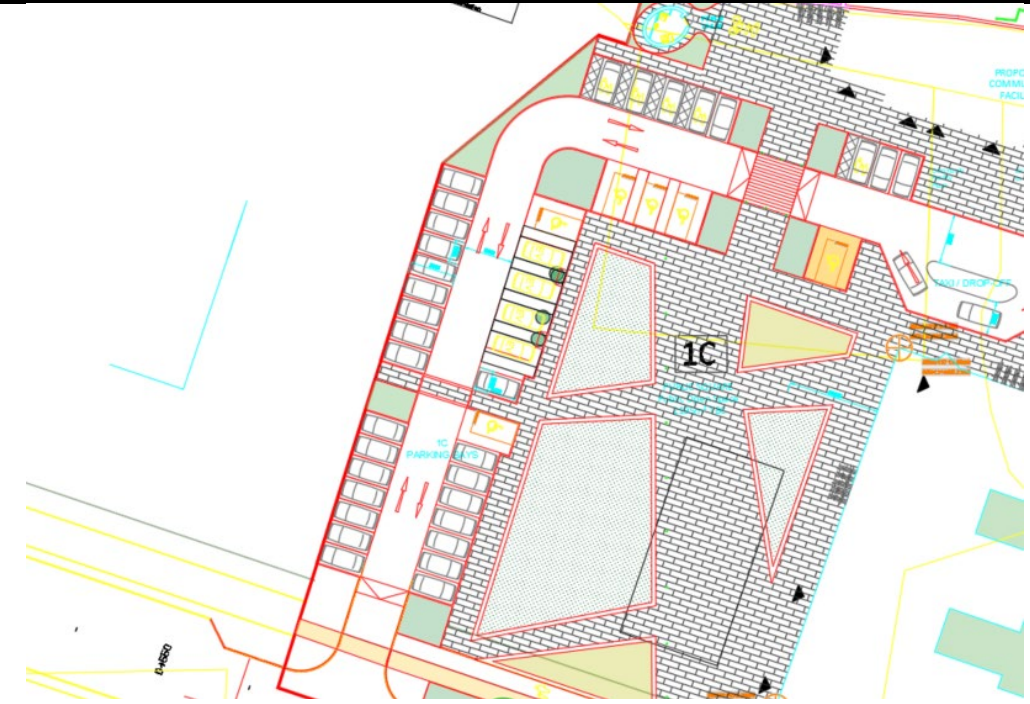
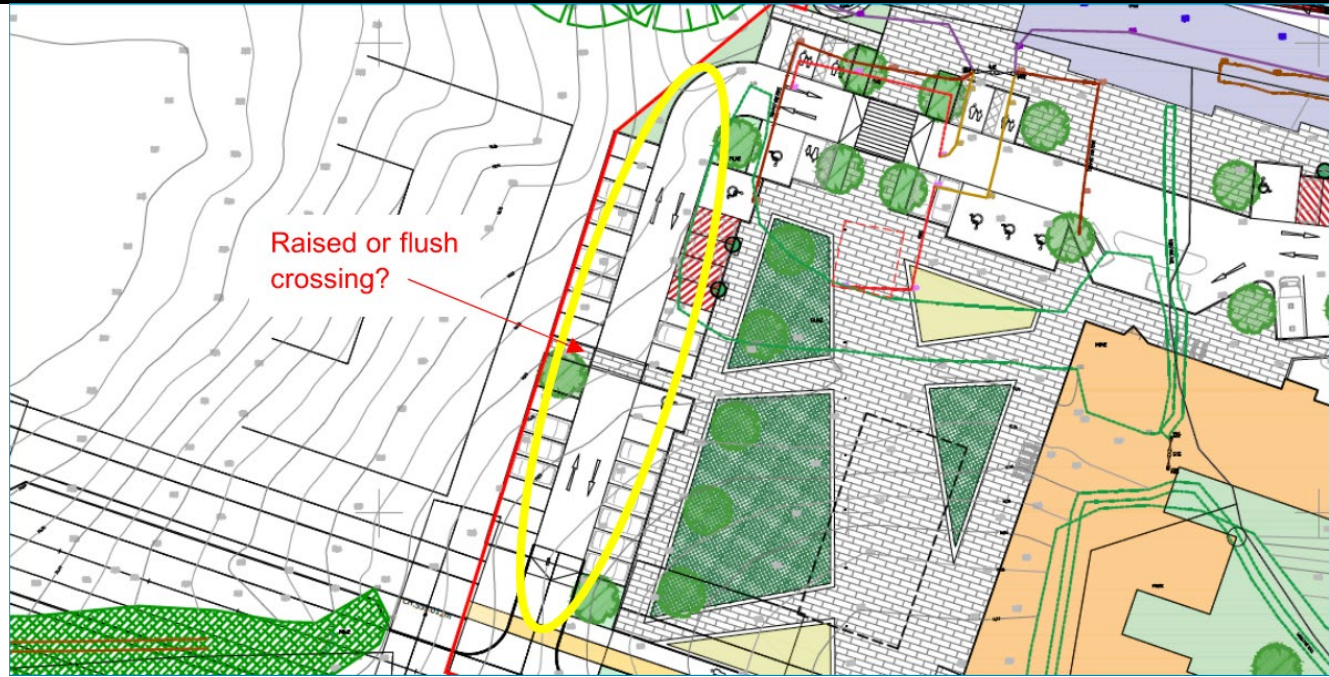
Stage 1 Road Safety Audit Recommendation and Design Response Comparison

Issue No.

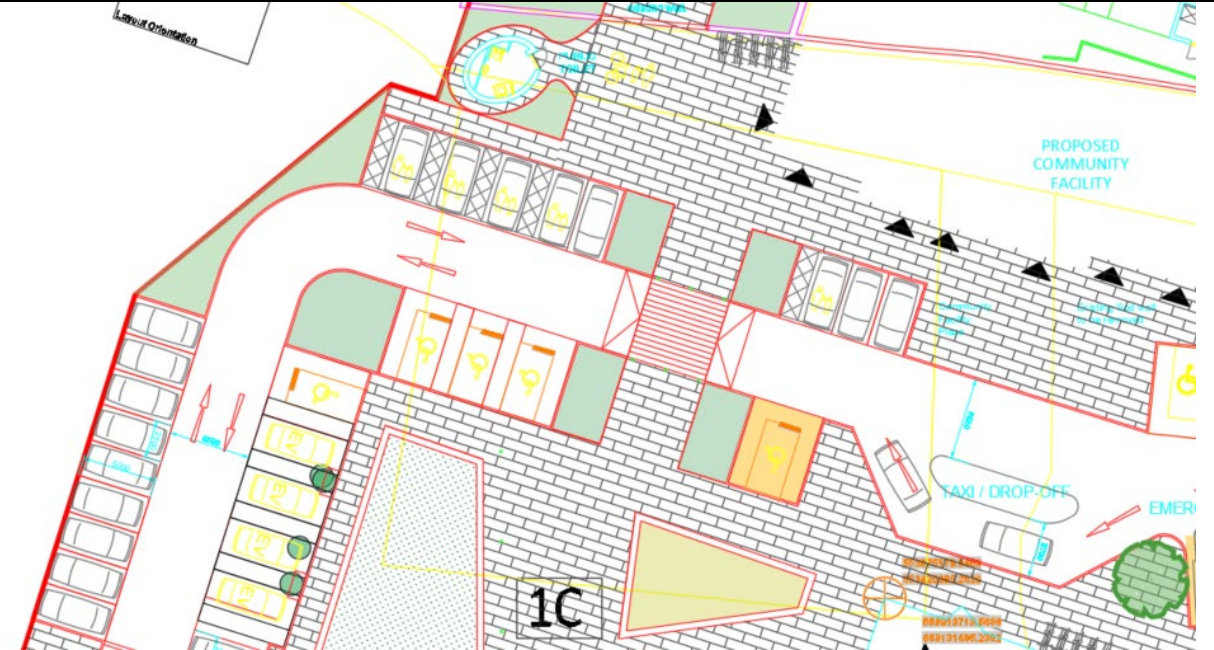
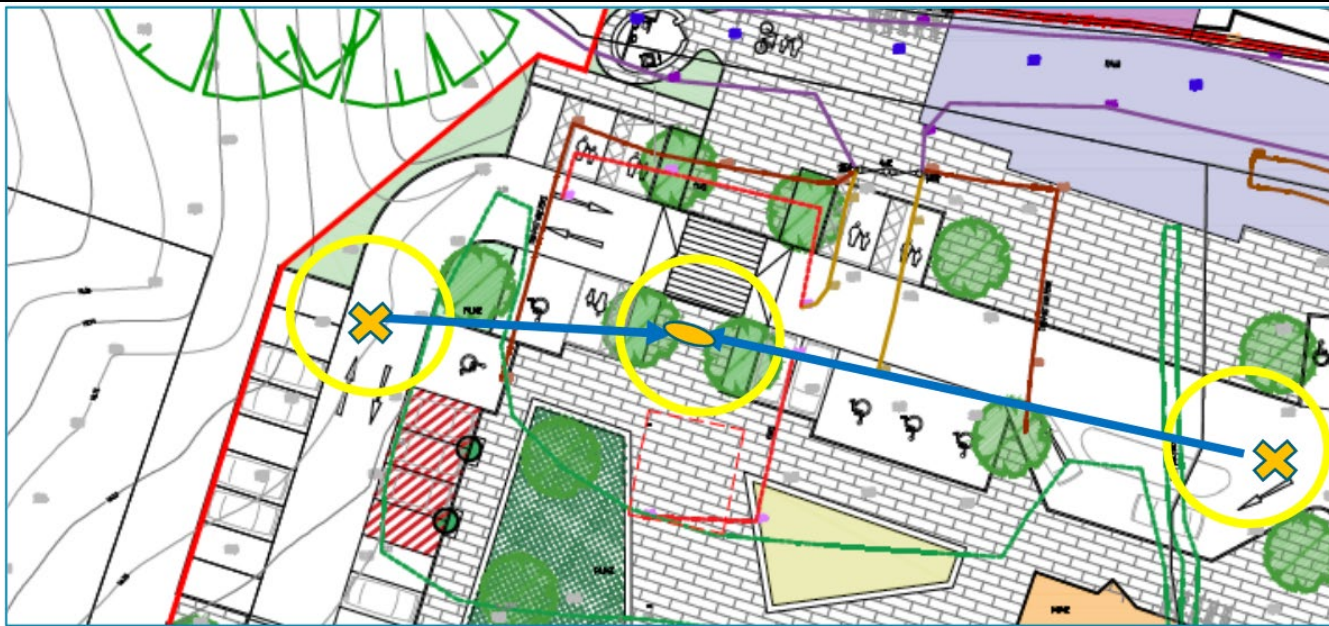
Recommendation

Design Response

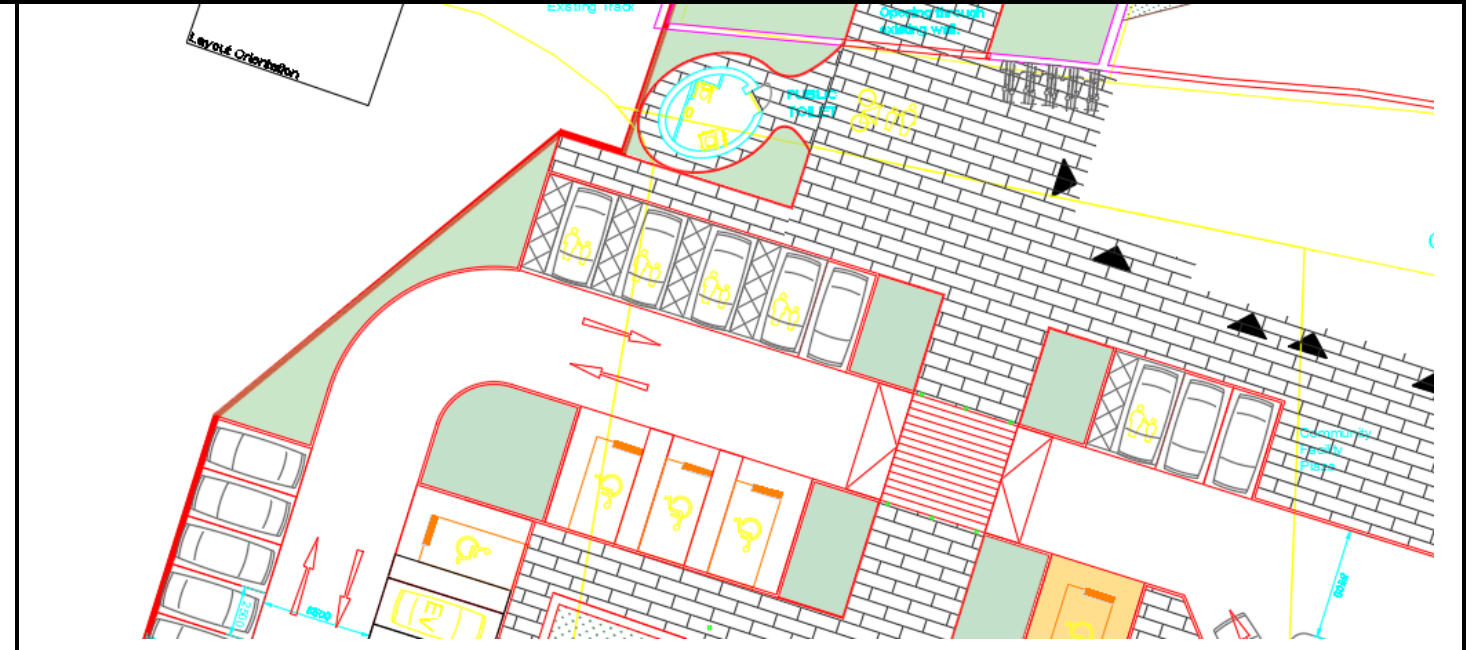
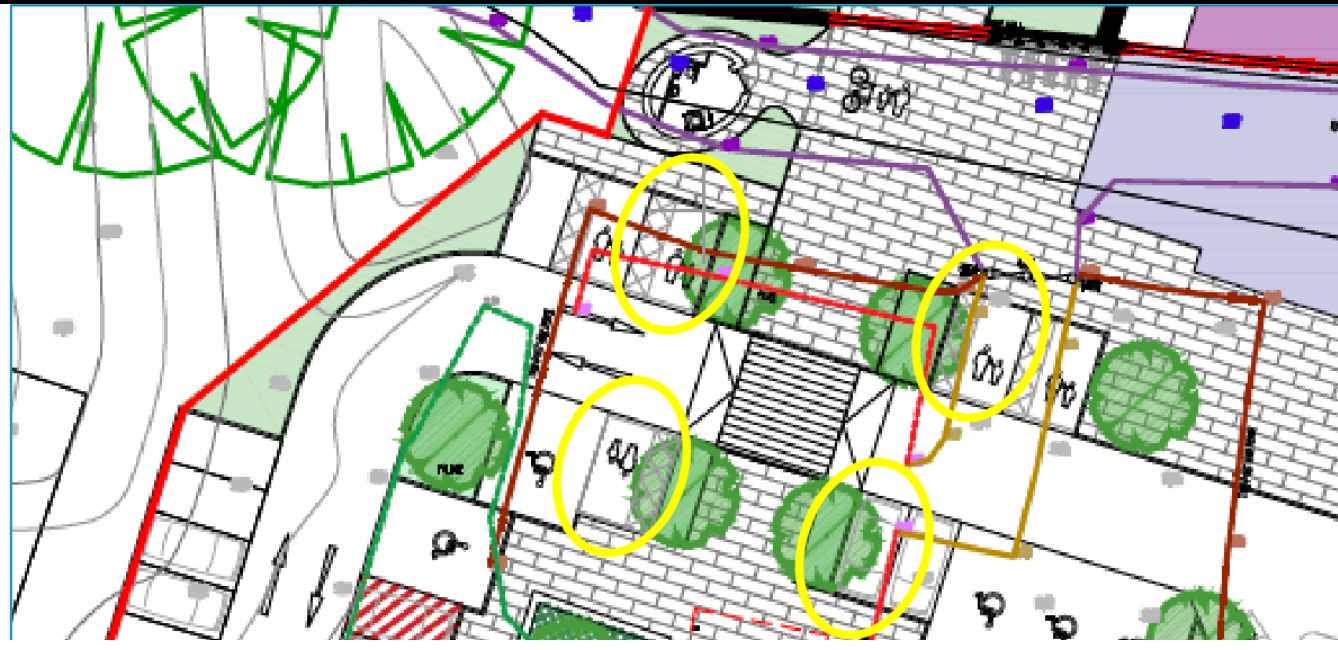
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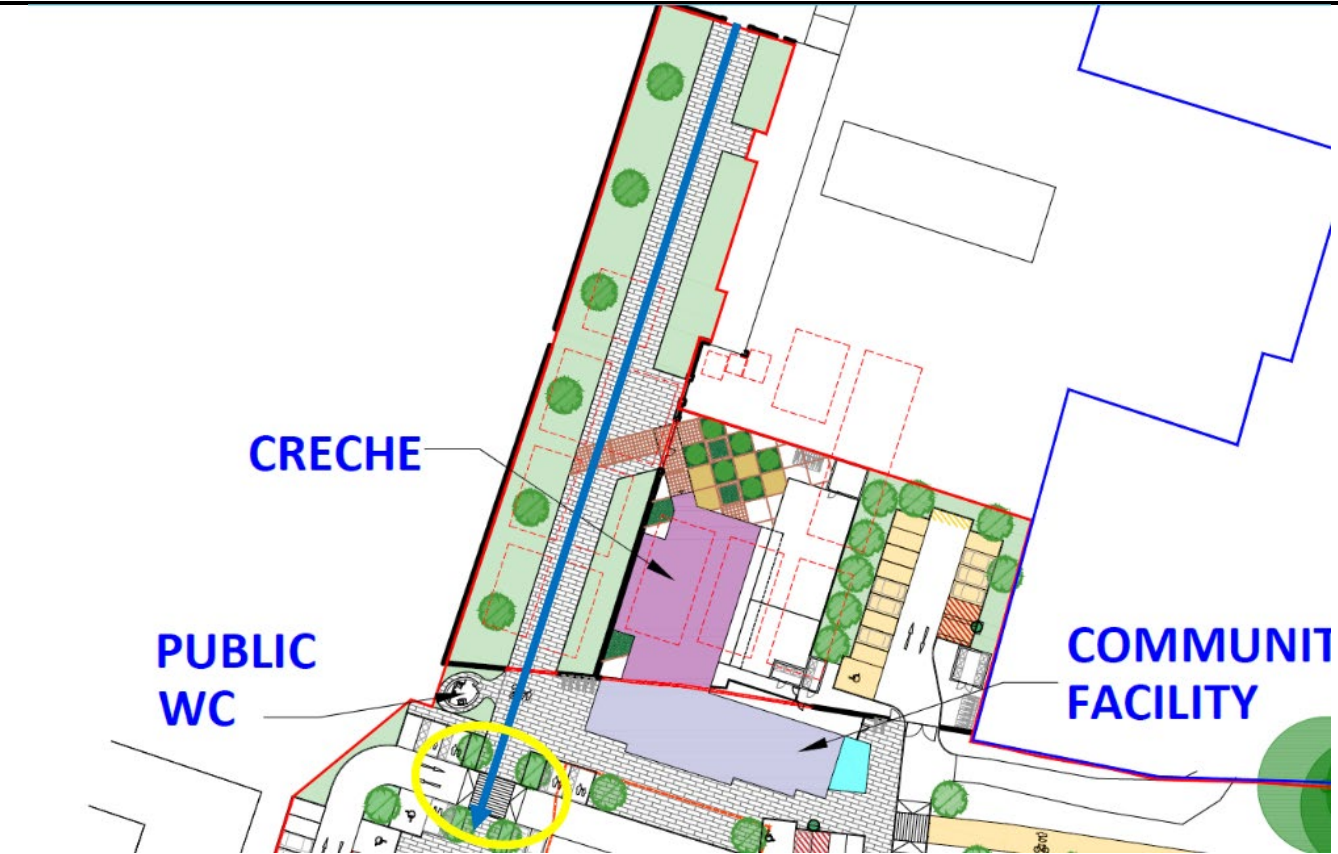
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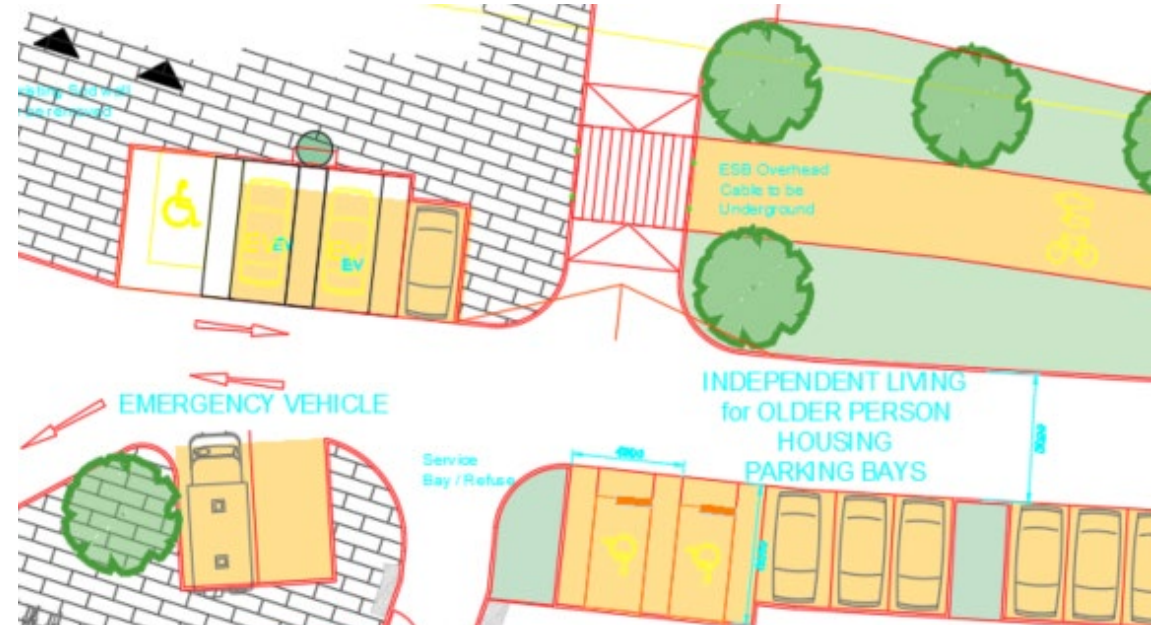
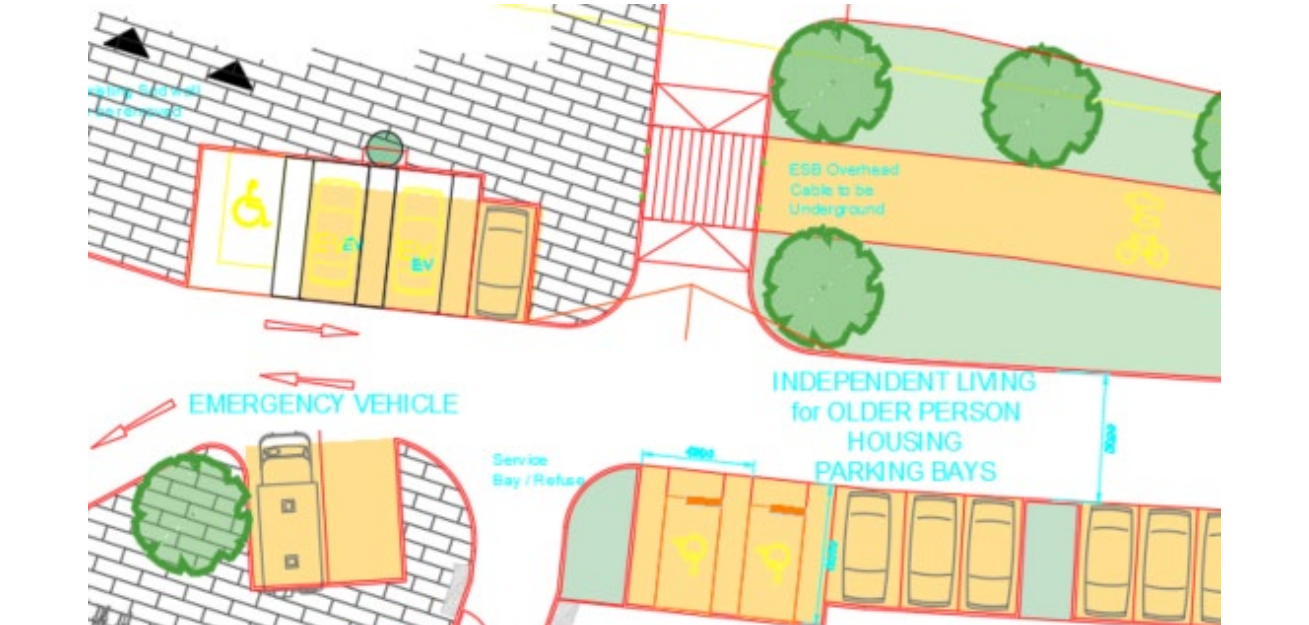
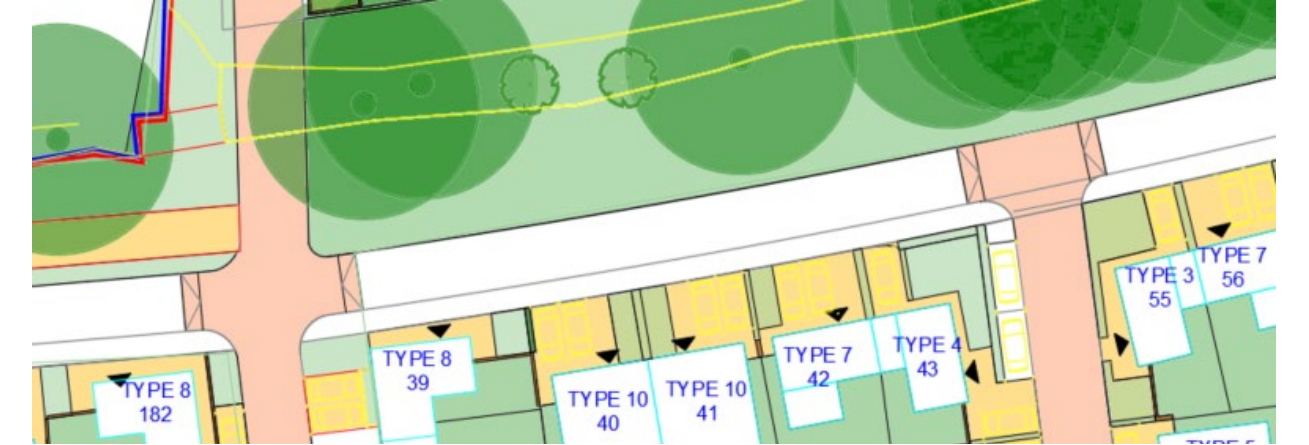
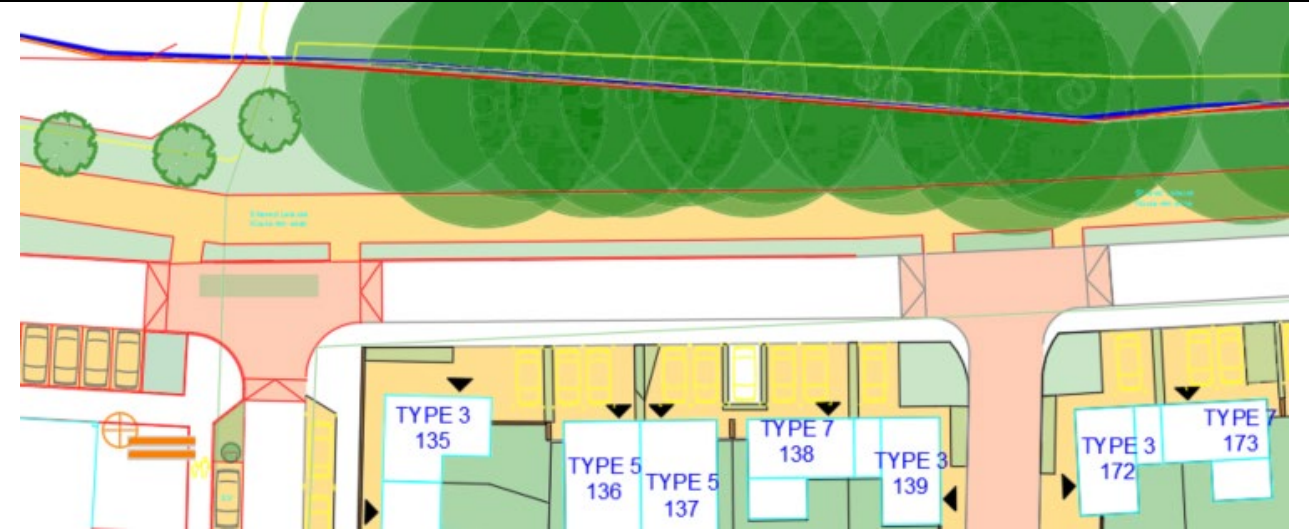
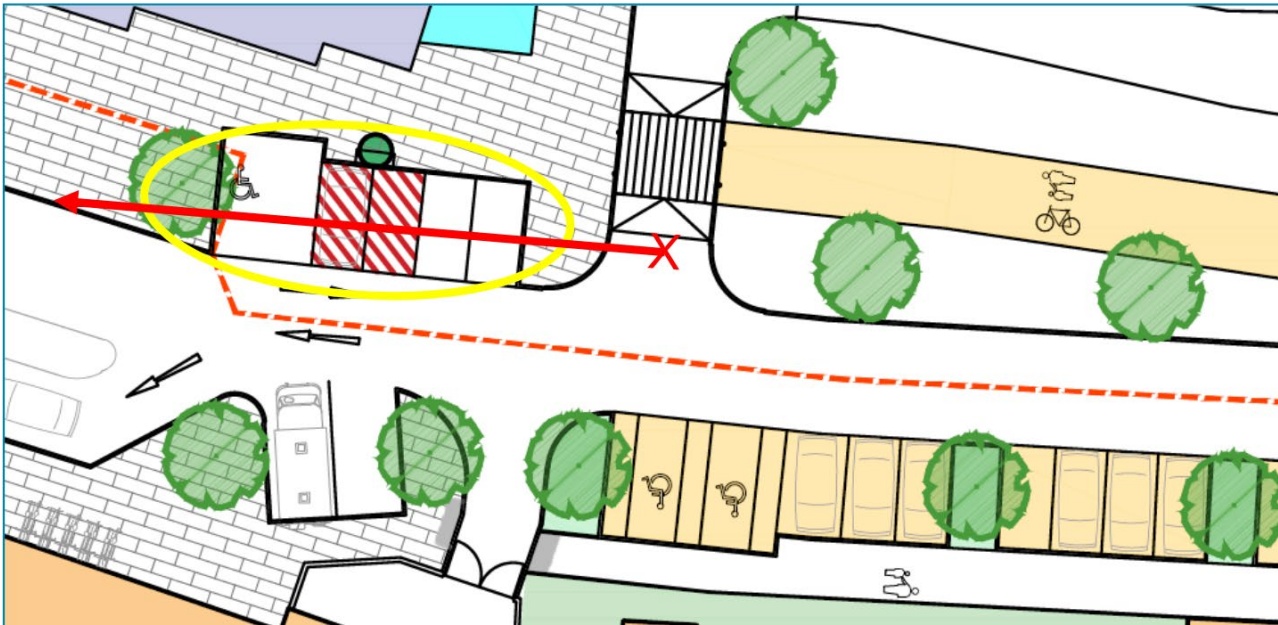
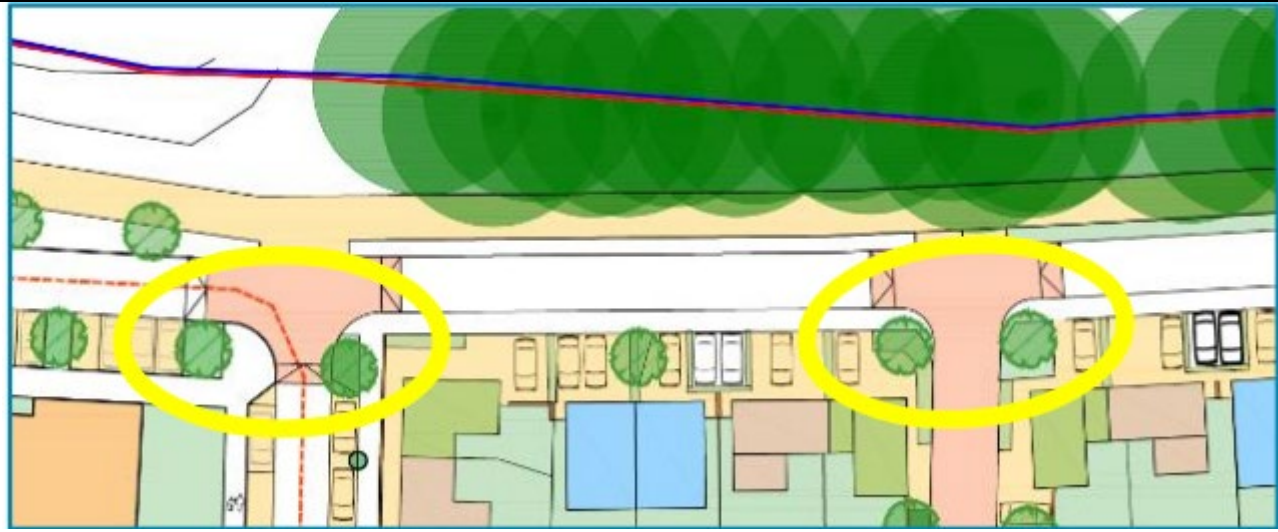


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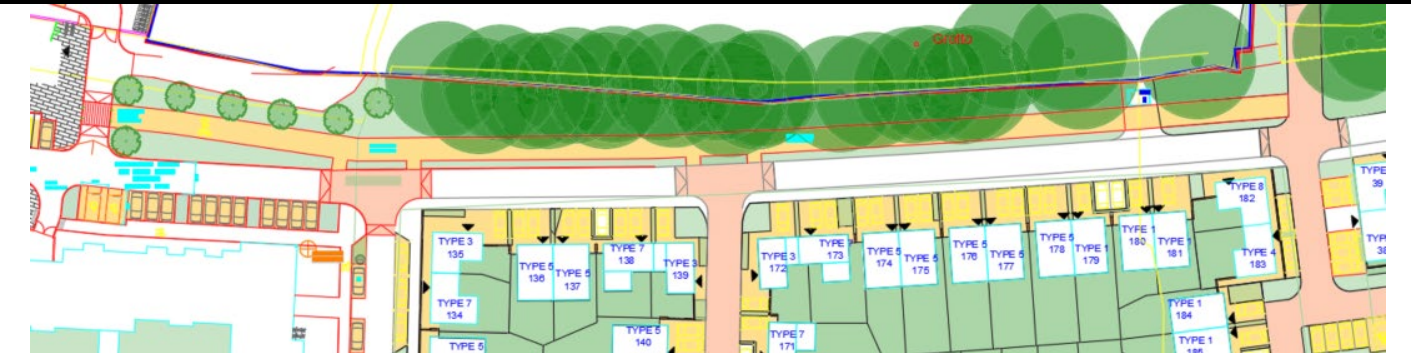
EMERGENCY VEHICLE

INDEPENDENT LIVING for OLDER PERSON HOUSING PARKING BAYS

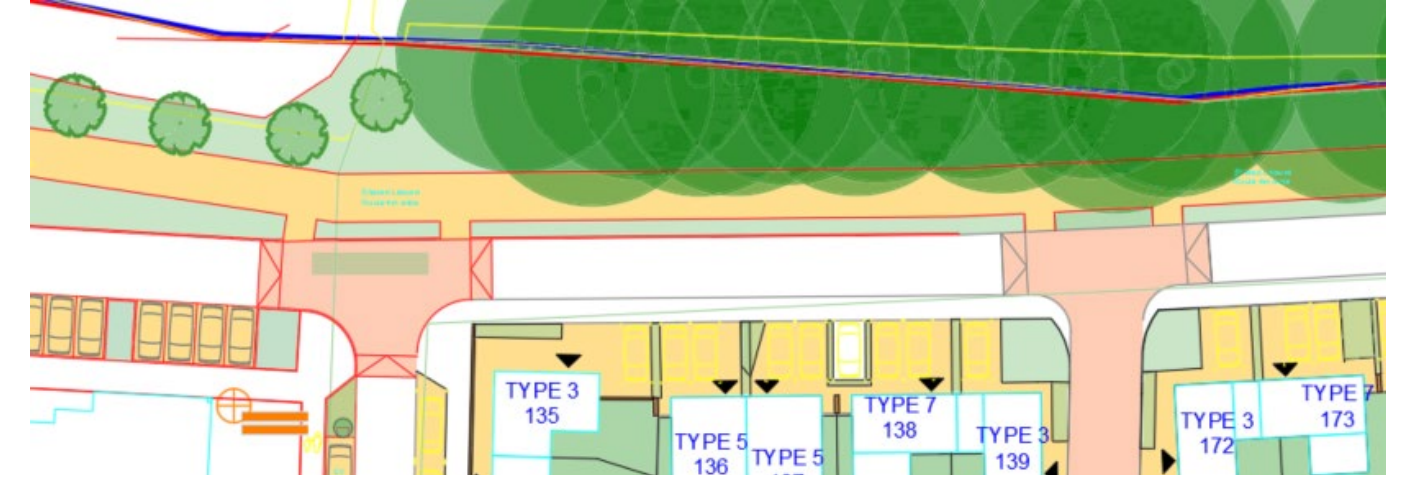
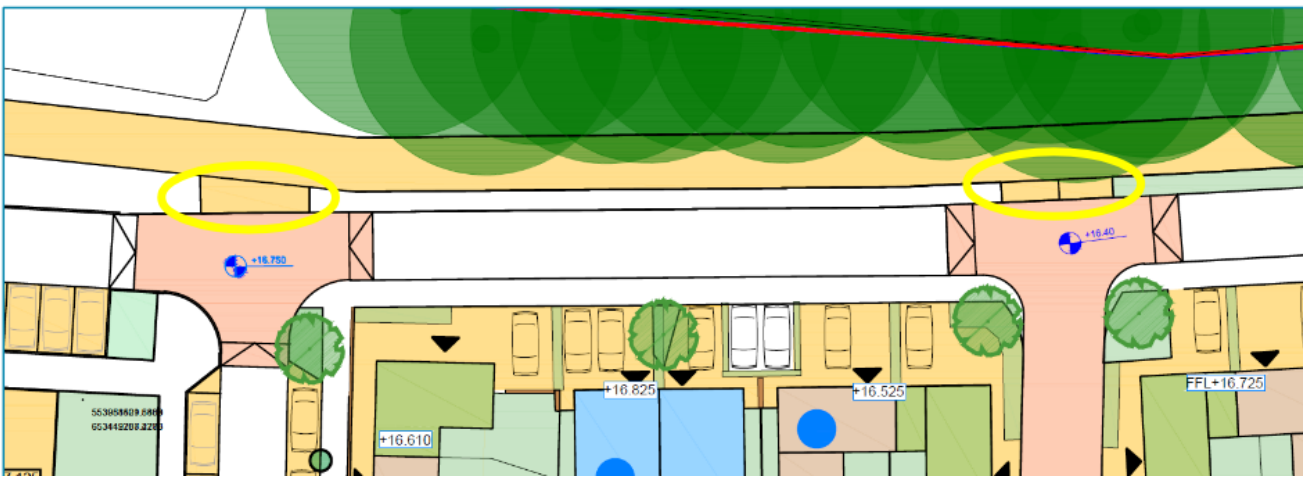
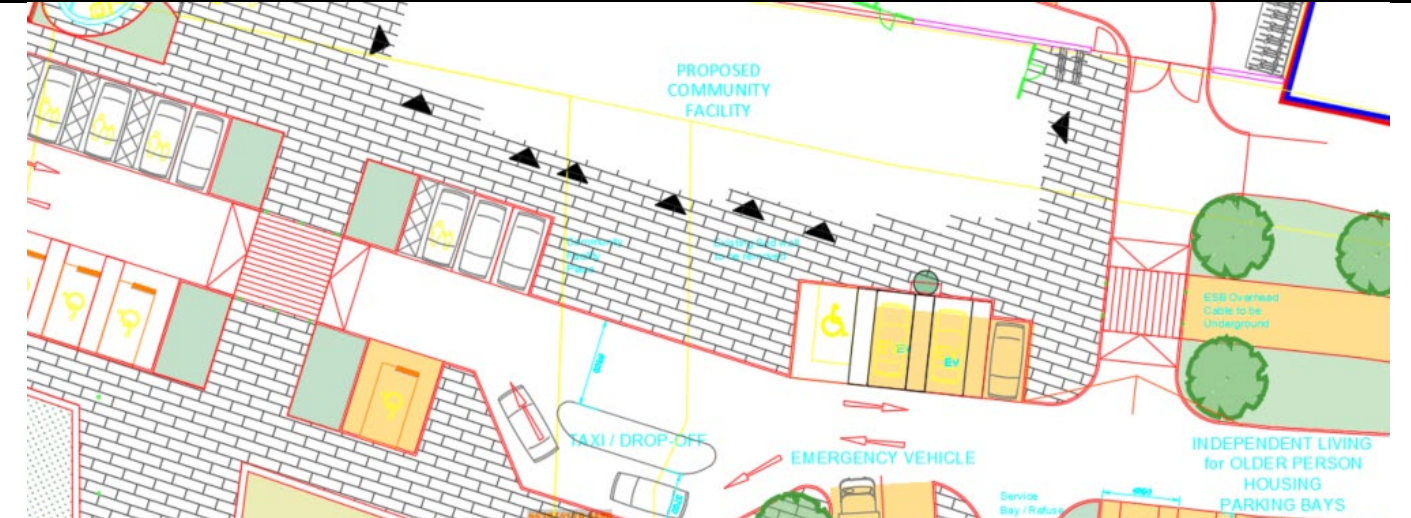
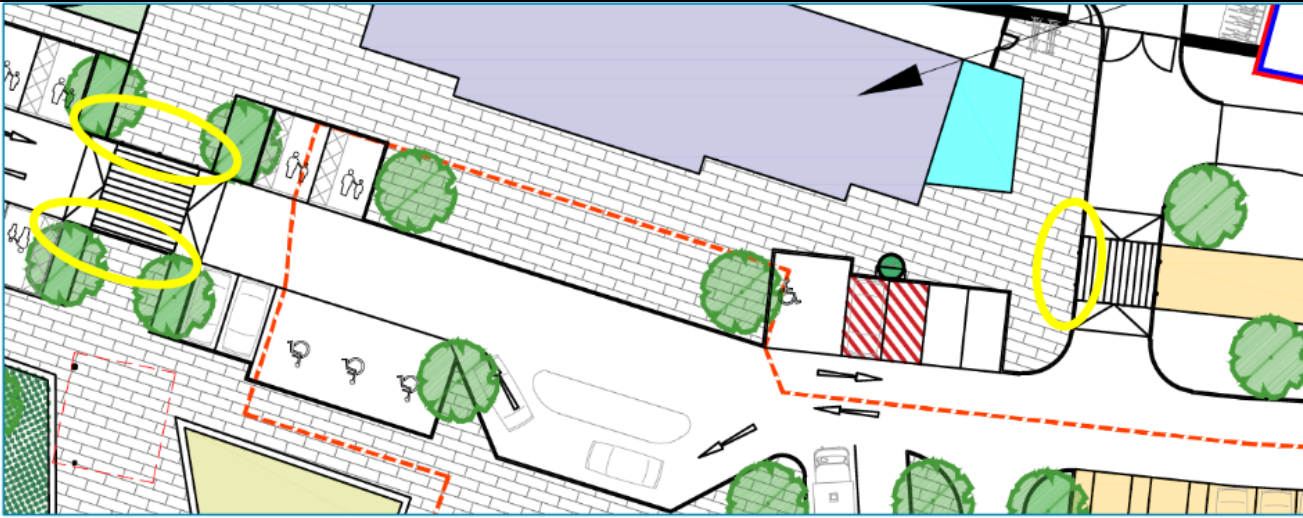
Service Bay / Refuge

ESB Overhead Cable to be Underground

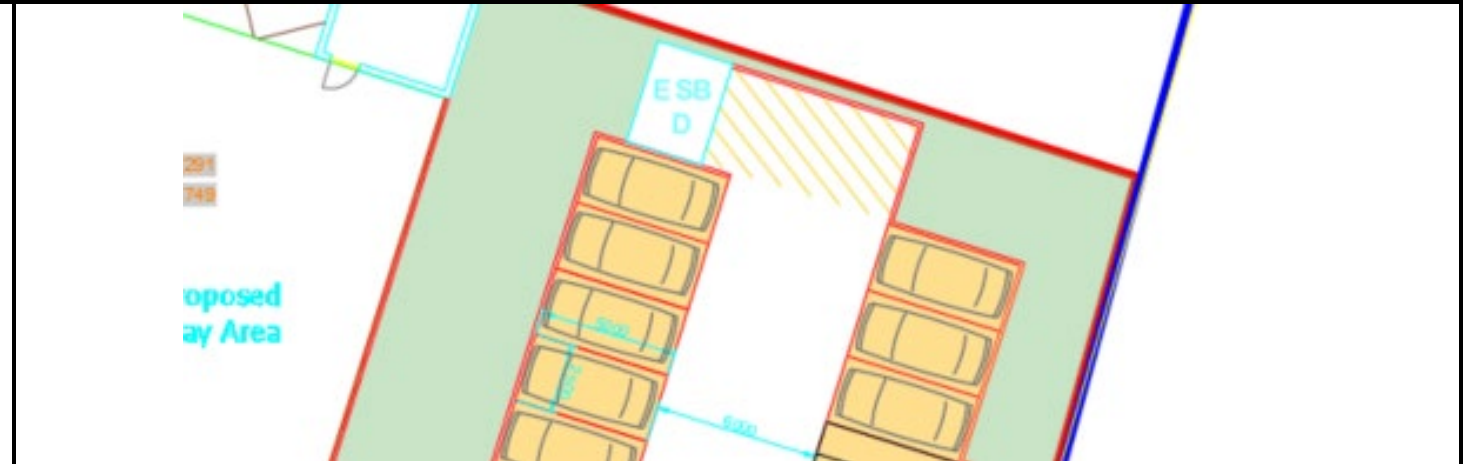
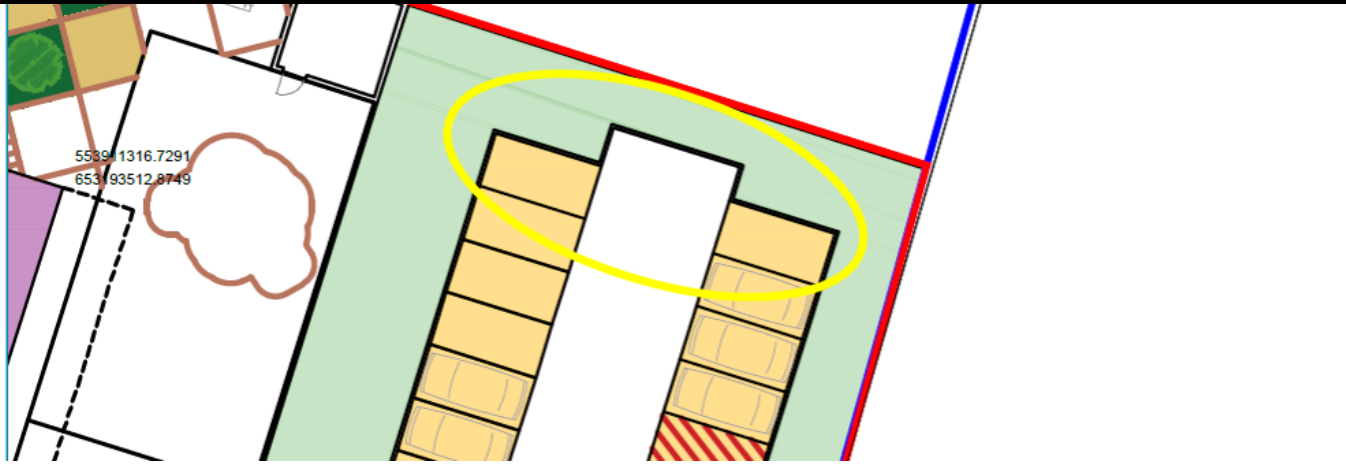
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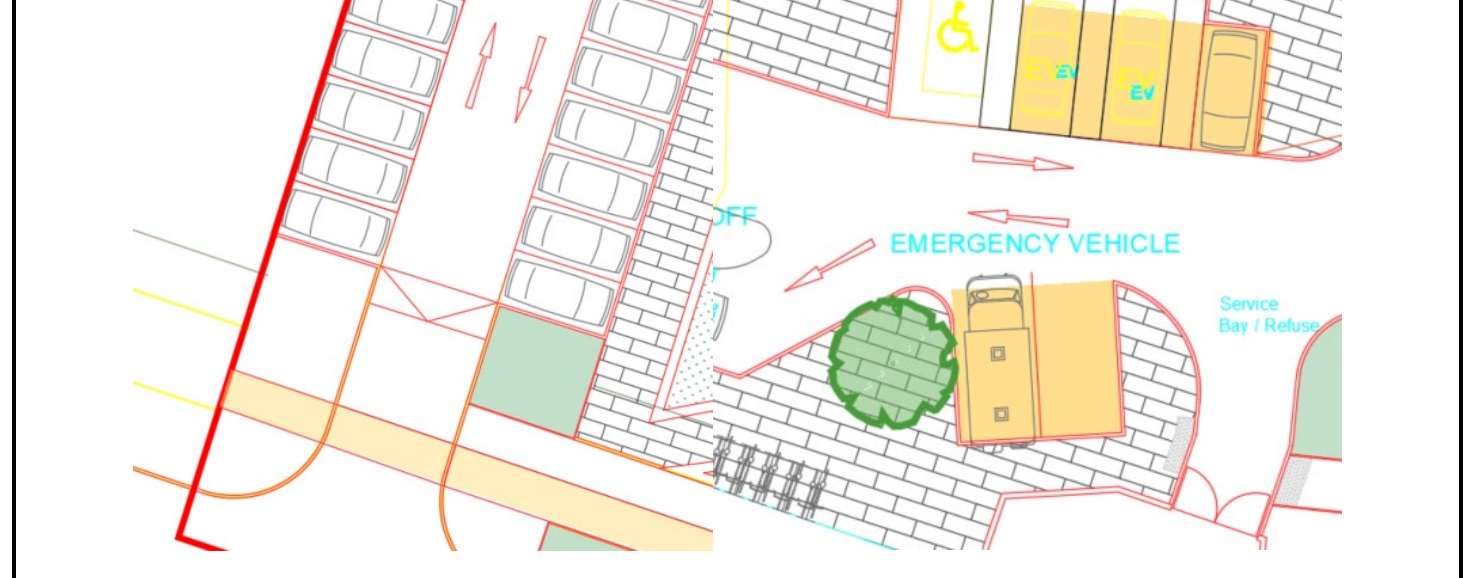
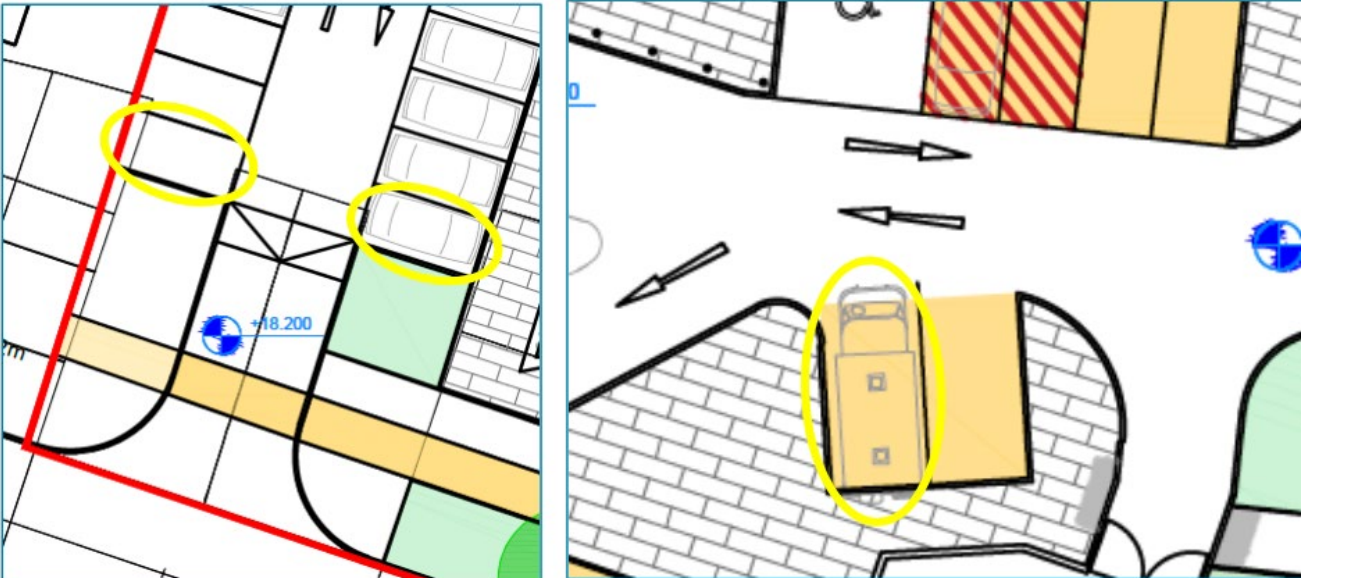
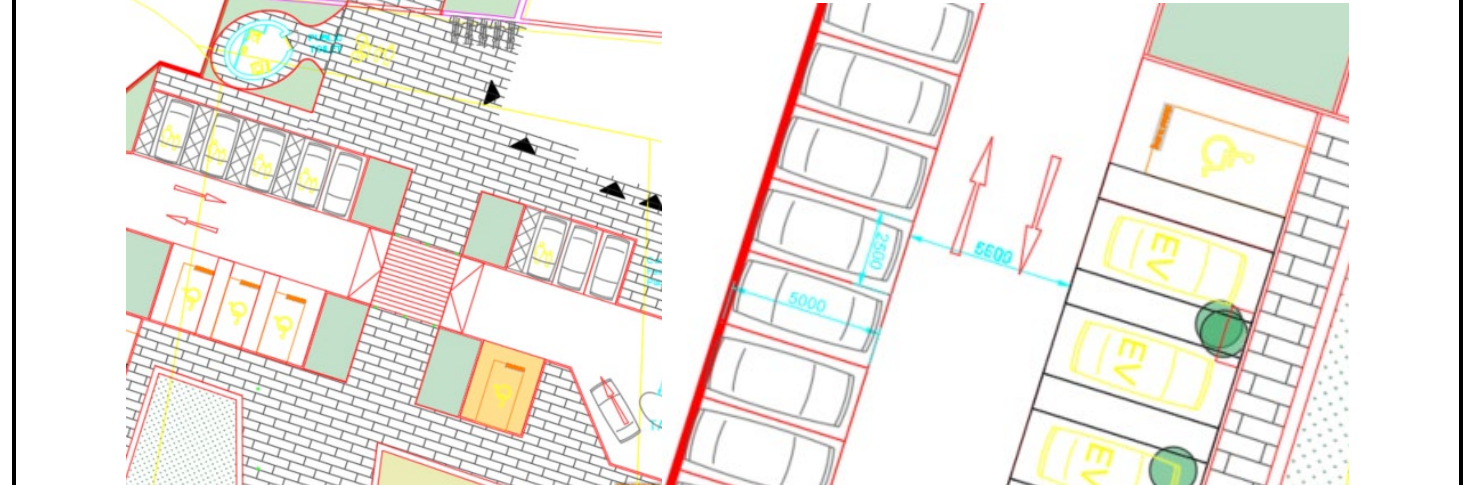
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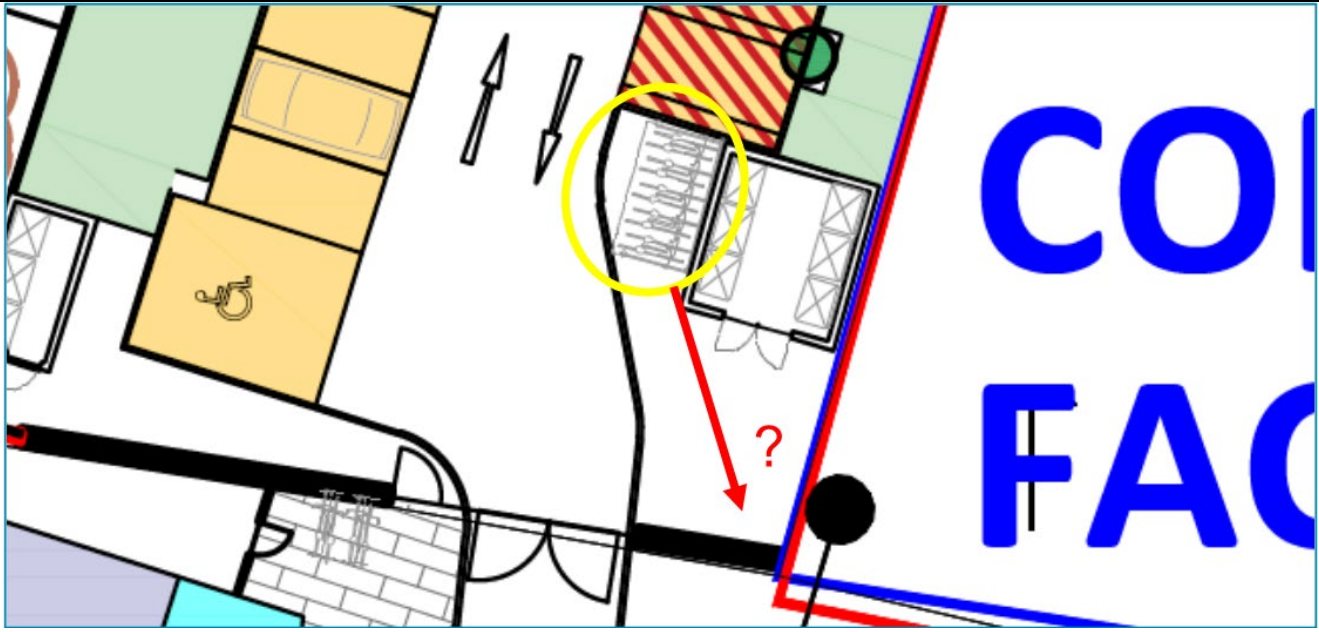
8



9



11



A.4 Vehicle Auto Tracking

Refuse Truck Auto Tracking

