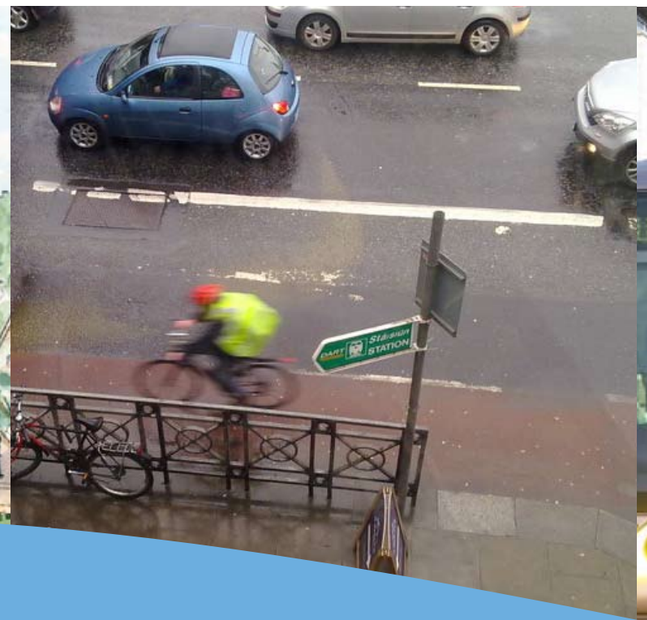
5 Planning Scheme

Grangegorman

Transportation, Movement and Mobility



Purpose and Layout of this Chapter

This chapter addresses the transportation issues in relation to the proposed development of Grangegorman Strategic Development Zone and sets out the access strategy for the development. The objectives of this chapter are as follows:

- To describe the existing transportation environment
- To describe the transport proposals including the access strategy and how they will take account of, and integrate with, existing and future transportation infrastructure
- To quantify the transportation demand associated with the proposed development
- To assess the impacts of the travel demand on the surrounding transportation infrastructure
- To identify possible measures which will mitigate against the transportation impacts of the development

Specific Transport Assessment and Mobility Management Plan reports for the proposed development have been prepared which present a full technical assessment of the development proposals. These documents should be referenced for additional detail to that presented in this Chapter. This chapter has had regard to all relevant guidelines, including the National Transport Authority's (NTA) recently published Draft Transport Strategy for the Greater Dublin Area 2011-2030 (see 5.2.4).[12]

Contents

12: The NTA is a State body set up under statute in 2009. The role and functions of the NTA are set out in two Acts of the Oireachtas; the Dublin Transport Authority Act 2008 and the Public Transport Regulation Act 2009 and include encouraging greater use of public transport, both nationally and in the Greater Dublin Area.

5.1 Development Proposals

The development proposals involve the construction of a consolidated campus location for Dublin Institute of Technology (DIT) as well as modern replacement facilities for the Health Service Executive (HSE). These aspects will be supplemented by facilities for the surrounding community, such as a public library and primary school, as well as commercial and research land uses.

The schedule of accommodation is set out in table 5.1. The overall quantum of development has been broken down into various land use categories for the purpose of assisting in transportation trip generation assessment. Grangegorman SDZ will be developed in an incremental manner, please see Chapter 8 (Phasing and Implementation) for further details.

DIT currently occupies approximately 39 individual buildings around Dublin city centre with a total population of 21,624 comprising of full and part time staff, undergraduates, postgraduates as well as apprentices and junior musicians. It should be noted that this population is quite diverse and produces staggered attendance times across a typical week. This pattern is expected to continue following D.I.T's relocation to Grangegorman. It is predicted that the DIT population will increase by 2,000 following its move to Grangegorman. This increase will comprise completely of full time students and will bring the total DIT population to approximately 23,624.

The existing diversification of DIT building locations generates significant travel demand across the city. Grangegorman will offer a consolidated campus environment which can play an important role in generating sustainable travel patterns for the city. While, the majority of travel demand for the DIT facilities at Grangegorman will have been rerouted from another city centre location, at a local level, it is important to note that at no time will the entire DIT population be on site on the same day let alone converge at the same time. The quantification of this travel demand will be discussed in more detail in Section 5.4 below.

The proposed HSE facilities within the Grangegorman SDZ will supplement replacement facilities which were subject to a separate planning application. These additional facilities will provide for additional health services for the rapidly expanding population in the Dublin North West area as well as providing improved facilities for staff and administration. The HSE estimate that it is at present providing services in the area for a population of 45,000 which is expected to rise to 70,000 in the near future. This will be supplemented by the addition of some 25,000 students and staff who may attend the DIT campus plus additional services and persons that the new Quarter will attract.

A primary school for approximately 460-490 pupils and with specific provision for special needs pupils is to be developed on the site and operated by the Educate Together body. The school currently occupies a temporary building on the Grangegorman site which opened in 2009. All of the above will be supported by a mixed use development proposed in the eastern section of the site. This aspect will comprise of commercial land uses such as office and retail as well as research space. Please refer to Chapter 4 for a more detailed description of the development proposals.

Indicative view of Grangegorman Lower

Table 5.1 Grangegorman SDZ Schedule of Accommodation

Development Type	Element	Building
Healthcare and Related	HSE Core (6,560 sqm)	HealthCare /Training, Primary Care and High Support Hostel
	HSE Core Additional (20,600 sqm)	Community Generated Rehab, Primary Care, Dementia Unit, Community Nursing Unit, Respite/Intermediate Care Unit & Services for People with Disabilities.
	Healthcare Related (14,500 sqm)	Residential accommodation and HSE expansion
Educational and Related	DIT Core (108,100 sqm)	Academic Faculty Buildings, Research Centres, Library, Sports Centre, Student Union, Building Maintenance, Executive Learning Centre, Early Learning Centre, supporting academic and student facilities
	DIT Core Additional (32,500 sqm)	Additional Academic Faculty Buildings and support services
	DIT Ancillary Educational (38,000 sqm)	Sports facilities, Performance Space, Bookstore, Cafe
	Student Residential Housing (57,000 sqm)	Student Residential Building (1,550-2,000 bed spaces)
	DIT Expansion (34,000 sqm)	
Public Bodies	Primary School (2,800 sqm), Library (1,500 sqm) & Elderly Housing (3,400 sqm)	Primary school for approximately 400 pupils and Dublin City Council operated library
Mixed Use	Mixed Use Development (61,000 sqm)	Offices, Retail, Science, Industry uses & Residential

The existing modal split for D.I.T was determined following extensive research carried out by the National Institute for Transport & Logistics (NITL) and published in a report: 'Towards a Transport Plan for DIT's Grangegorman Campus' (Aug 2006) which established travel patterns at each of DIT's current locations. The existing modal split for DIT can be seen in Figure 5.1. The NTA Employee & Student Travel Survey for D.I.T. (Dec 09/Jan 2010) was also referenced (See Section 4.4 of Mobility Management Plan Report).

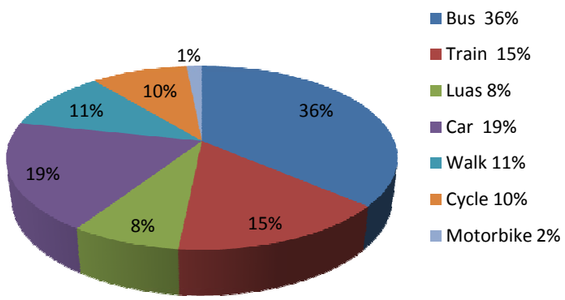


Figure 5.1 Modal Split for existing DIT Population

It can be seen that bus is the primary mode of transport across DIT's existing campus locations as it would provide the best access to facilities at Bolton Street and Cathal Brugha Street. The Luas has also quite a high modal share as the green line runs in close proximity to Kevin Street and Aungier Street and terminates at St Stephen's Green nearby while the Red Line serves the existing Bolton Street and Cathal Brugha Street campus locations. It can be seen from Figure 5.1 above that the existing modal split is well balanced with a reasonable share proportioned across all typical modes.

The modal share for Luas may be curtailed by high rents along the route which would discourage students from locating there. Walking and cycling are represented with reasonably high modal shares and this is reflective of the city centre locations of the existing campus with good pedestrian and cyclist linkages available. The existing DIT modal split is quite a desirable modal split with the modal split for the car only representing 19% of the total person trips. However, it is envisaged that the car modal share will decrease further when DIT relocates to Grangegorman as a result of a carefully managed car parking provision and access strategy.

A travel survey of existing HSE staff working in St Brendan's Hospital on the Grangegorman site was undertaken in 2009 to determine the residential location of existing staff, the time of arrival and departure from Grangegorman, the current modal split and the attitudes to potential changes to travel patterns. The modal split determined from the travel survey is illustrated in Figure 5.2.

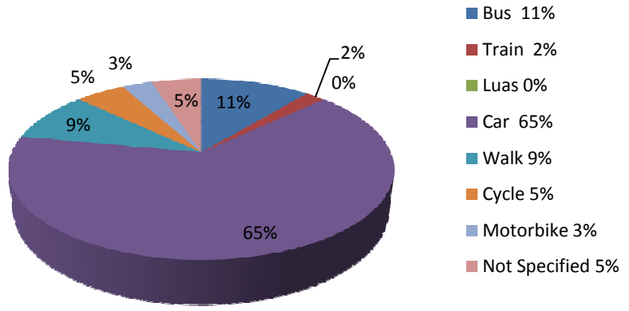


Figure 5.2 Modal Split for existing HSE population

It can be seen that there is a large proportion of staff using a private vehicle to access the site. This is primarily as a result of the existing provision of 382 parking spaces on site. There are no restrictions on the use of these parking spaces and as a result staff choose to drive despite excellent sustainable transport alternatives being available. Another reason for the large modal split for the car is the working hours of many of the staff and nurses in particular. The nursing shifts in operation at present are 08:00 – 20:30 and 20:30 – 08:00. Public transport services would not be as frequent at the shift turnover times, particularly in the evening.

It is an objective of this project to encourage these motorists to use more sustainable modes of transport, particularly cycling. This can be achieved primarily by implementing a car parking management plan which will restrict the quantum of parking available to staff. The overall proposed parking strategy for Grangegorman SDZ will be discussed in more detail in Section 5.4 below.

5.2 Transportation Context

The Grangegorman site has an area of approximately 28.69 hectares and is located north of the River Liffey and south of the Royal Canal, approximately 1 kilometre from Dublin's City Centre. The site is split by Grangegorman Lower and Upper which runs in a north south axis through the site. The Grangegorman SDZ site is surrounded by North Circular Road to the north, Prussia Street and Stoneybatter to the west, and Brunswick Street and Smithfield to the south.

The site occupies one of the largest undeveloped sites within Dublin City Centre and is currently poorly utilised and difficult to access. Its redevelopment is seen as an opportunity to address these issues. Its location, close to the city centre, provides excellent opportunities for the provision of sustainable travel measures. The proximity of the public transport network in the city centre and the intensification of land use at Grangegorman support the principles of sustainable transportation.

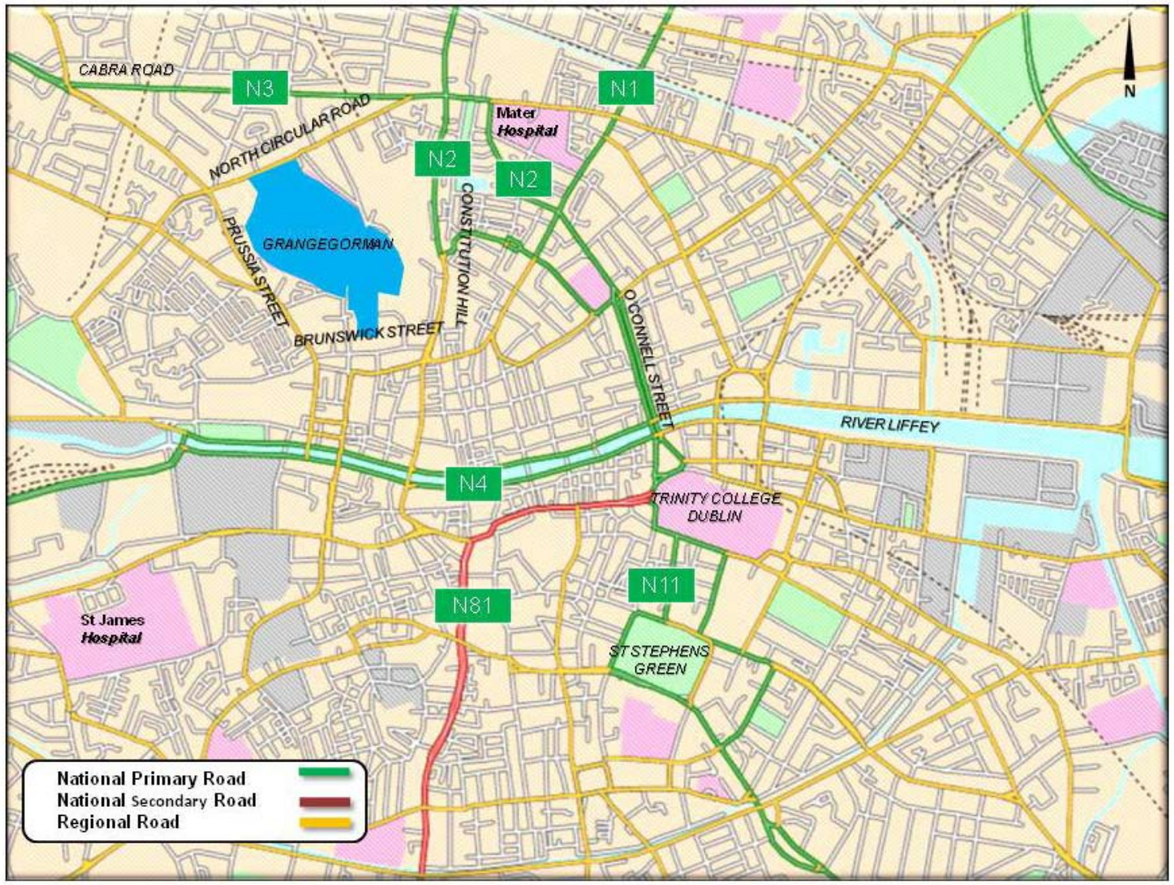


Figure 5.3 Grangegorman Location - (SDZ area shaded blue)
Source: Aecom

5.2.1 Existing Road Network

The road network surrounding the site provides a variety of movement functions. The N3 Cabra Road, N2, and N1 provide strategic movement functions by providing connectivity to the Greater Dublin Area and the North West. The North Circular Road provides an orbital function and plays an important role in cross city movement. These routes provide for pedestrians, cyclists and motorists alike and a general commentary on these facilities is presented below:

Cabra Road (N3)

Cabra Road is a high quality single carriageway road which runs in a general east to west direction in proximity to the site and forms part of the N3 National Primary Route. The N3 connects the northwest of Ireland to Dublin City. It is an important strategic route and forms an arm of a signalised junction with the North Circular Road (commonly referred to as 'St. Peter's Church') approximately 900m from the northern boundary of the proposed site. There are good quality footpaths provided on both sides of the N3 for the majority of its length. An eastbound bus lane is provided in the vicinity of the junction with the North Circular Road.

North Circular Road (R101)

North Circular Road is a high quality single carriageway road approximately 7.5m wide with approximate 2m wide footpaths on both sides. It runs in a general southwest to northeast direction and forms part of regional route R101. It is envisaged that the North Circular Road will form a key access route to the proposed development. The North Circular Road forms a signalised junction with the N3 Cabra Road in the northeast and another signalised junction at Old Cabra Road/Prussia Street in the southwest. This signalised cross-road to the southwest of the site is known locally as Hanlon's Corner. This road is currently assigned a 50km/h speed limit. There are good quality footpaths provided on both sides of the North Circular Road for its length. On road cycle lanes are provided in both directions between St Peter's church and the junction with Rathdown Road while a westbound on road cycle lane is provided for the majority of the remaining length.

Grangegorman Lower/Upper

Grangegorman Lower is a local road which runs between Brunswick Street in the south before diverging into Grangegorman Upper and Rathdown Road which both form junctions with North Circular Road in the north. Traffic travels in both directions along the road which is approximately 10.9m wide in the vicinity of the existing access to St Brendan's Hospital.

Good quality footpaths are provided on both sides of Grangegorman Lower/Upper with some sections of footpath closer to Brunswick Street in possible need of repair.

Rathdown Road

Rathdown Road runs between North Circular Road and Grangegorman Lower and provides access to existing houses which line both sides of the road. The total carriageway width is approximately 9.9m which comprises of 2 general traffic lanes as well as on street parallel parking on both sides of the road. Good quality footpaths of approximately 2.5m width are provided on both sides of the road.

Prussia Street/Manor Street/Stoneybatter/Blackhall Place

Prussia Street runs from North Circular Road and becomes Manor Street, Stoneybatter and then Blackhall Place before joining Ellis Quay to the south. The junction between Prussia Street and North Circular Road is locally known as Hanlon's Corner and the distance between this and Ellis Quay is approximately 1.25km. The total carriageway width varies between 7.9m and 16.9m while minimum footpath widths of 1.9m are present on both sides along the route.

The southbound lane of Blackhall Place is for buses only between King Street North and the quays. General traffic must turn left onto King Street North before accessing the quays via Queen Street. A further section of southbound bus lane is provided between the Aughrim Street and Arbour Place junctions. A northbound bus lane is provided between the quays and the Blackhall Street junction while a northbound section of on road cycle lane is provided between Arbour Place and Hanlon's Corner.

Brunswick Street

Brunswick Street is a one way street for the majority of its length and runs in a west to east direction between Stoneybatter and Church Street. The street is two way for a limited section between its junction with Stoneybatter and Fountain Place to allow for local access. The road is approximately 9.0m wide and consists of 2 lanes of eastbound traffic between its junction with Grangegorman Lower and Church Street. Footpaths are provided on both sides of the road for its entire length. A limited section of on road cycle track is provided in a westbound direction between George's Lane and Stoneybatter.

King Street North

King Street North is also a two lane one way street which runs between Stoneybatter and Church Street. Traffic flows in an easterly direction from Stoneybatter before turning left onto George's Lane and right towards Queen Street. There is no through traffic allowed in an eastbound direction beyond this point. All southbound traffic wishing to access the quays from Stoneybatter must do so via King Street North because Blackhall Place caters for buses and taxis only between North King Street and Ellis Quay.

Traffic flows in a westbound direction only from Church Street with no through traffic allowed beyond the junction with Queen Street and George's Lane. Therefore, traffic either turns right onto George's Lane or left onto Queen Street.

King Street North is approximately 9.5m wide in the vicinity of the junction with Church Street and footpaths are provided on both sides of the road for its entire length. A westbound on road cycle lane is provided between Church Street and continues onto Queen Street.

Queen Street

Queen Street runs between King Street North and Ellis Quay and caters for southbound traffic only. The total carriageway width is approximately 10.5m and consists of 3 southbound lanes with minimum 2.5m wide footpaths on both sides. Southbound traffic from Stoneybatter must access the quays via Queen Street because of the southbound bus only movement allowed on Blackhall Place. A limited section of on road cycle lane is provided from the junction with King Street North.

Morning Star Avenue

Morning Star Avenue is a 6m wide road and runs between Brunswick Street and the south eastern corner of the Grangegorman site. It currently provides access to a number of existing HSE facilities, residences and hostels. Morning Star Avenue has one footpath on the eastern side of the pavement approximately 1.5m wide. On street parking is also provided on the eastern side of the road.

Church Street/Constitution Hill

The R108 commences as Bridge Street just south of the River Liffey and becomes Church Street as it crosses to the north side. The road becomes Constitution Hill in the vicinity of the CIE Broadstone depot before it becomes the N2 national route. The R108 varies between a two and three lane road on both sides north of the River Liffey. A northbound cycle lane is provided north of Broadstone while cycle lanes are also provided on both sides of the road for the majority of its length. The maximum carriageway width is approximately 15m which includes a solid central median in the vicinity of its junction with Brunswick Street.

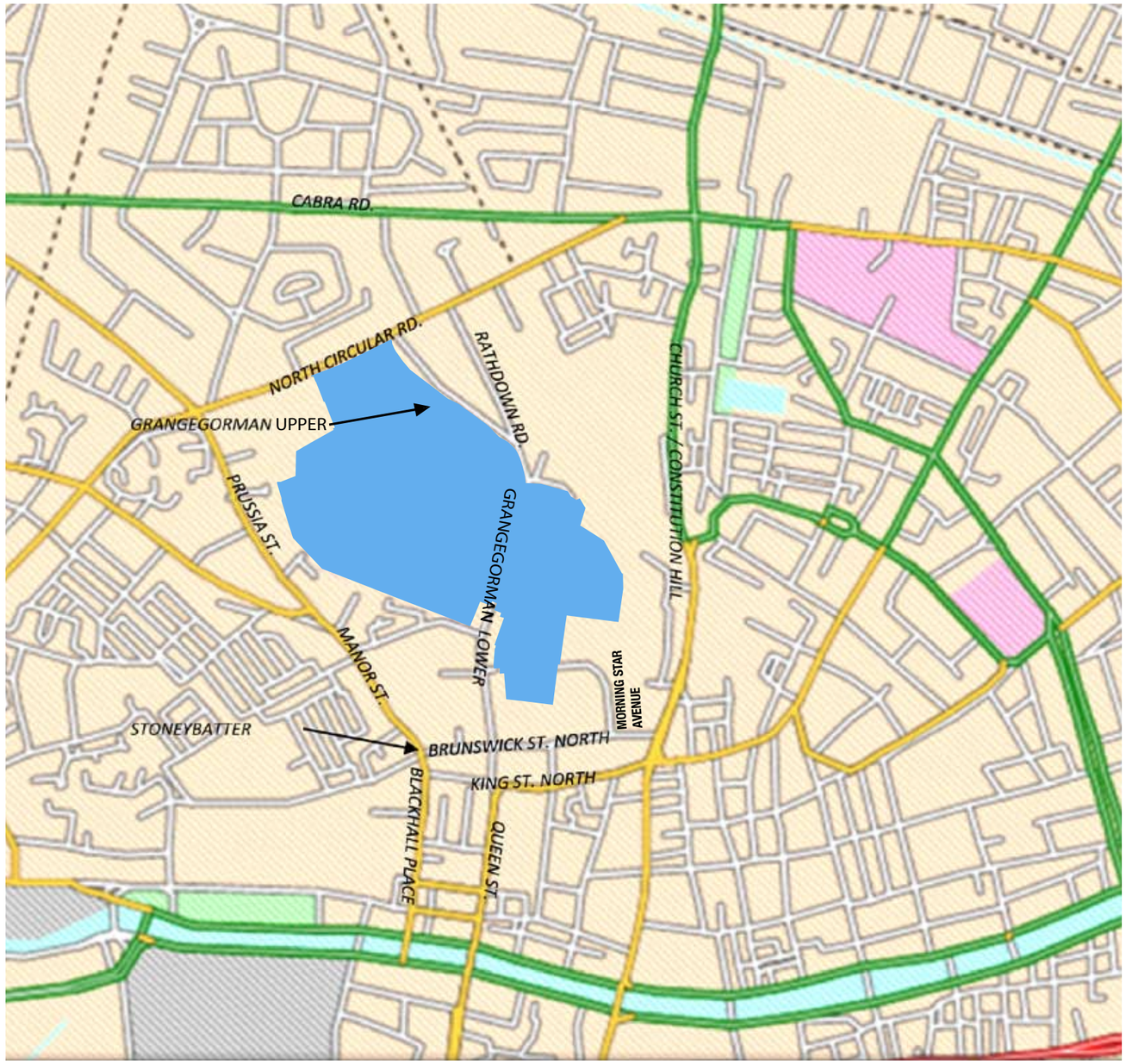


Figure 5.4 Local Road Network - (SDZ area shaded blue)
Source: Aecom

5.2.2 Existing Pedestrian Provision

Existing pedestrian movement through the area tends to correspond with the more significant traffic corridors such as Prussia Street and Constitution Hill / Phibsborough Road. This is a function of the current land use within Grangegorman and its weak connectivity with the surrounding areas. The addition of the east- west permeability offered by the proposed development would be of a major benefit for the area. The majority of the road junctions in the area are signalised and provide good pedestrian crossing facilities in the form of drop kerbs, tactile paving and pedestrian refuge islands at the larger junctions. Pedestrian facilities in certain areas would be in need of repair such as around Stoneybatter and the Grangegorman Lower/Brunswick Street junction.

5.2.3 Existing Cycling Provision

Cycle facilities are provided on the North Circular Road which connects with facilities on Old Cabra Road and Prussia Street linking to the City Centre. Cycle lanes are also provided on both sides of the Constitution Hill/Church Street. Sections of cycle lanes are also provided along Blackhall Place/ Stoneybatter as well as King Street North and Queen Street.

Cycle lanes are also provided along the north and south quays of the River Liffey. Some of the residential streets in the wider Grangegorman area are lightly trafficked and provide suitable cycling environments. Figure 5.5 illustrates the Grangegorman site location in the context of the existing Dublin cycle network. It can be seen that Grangegorman is well positioned to avail of this existing network.

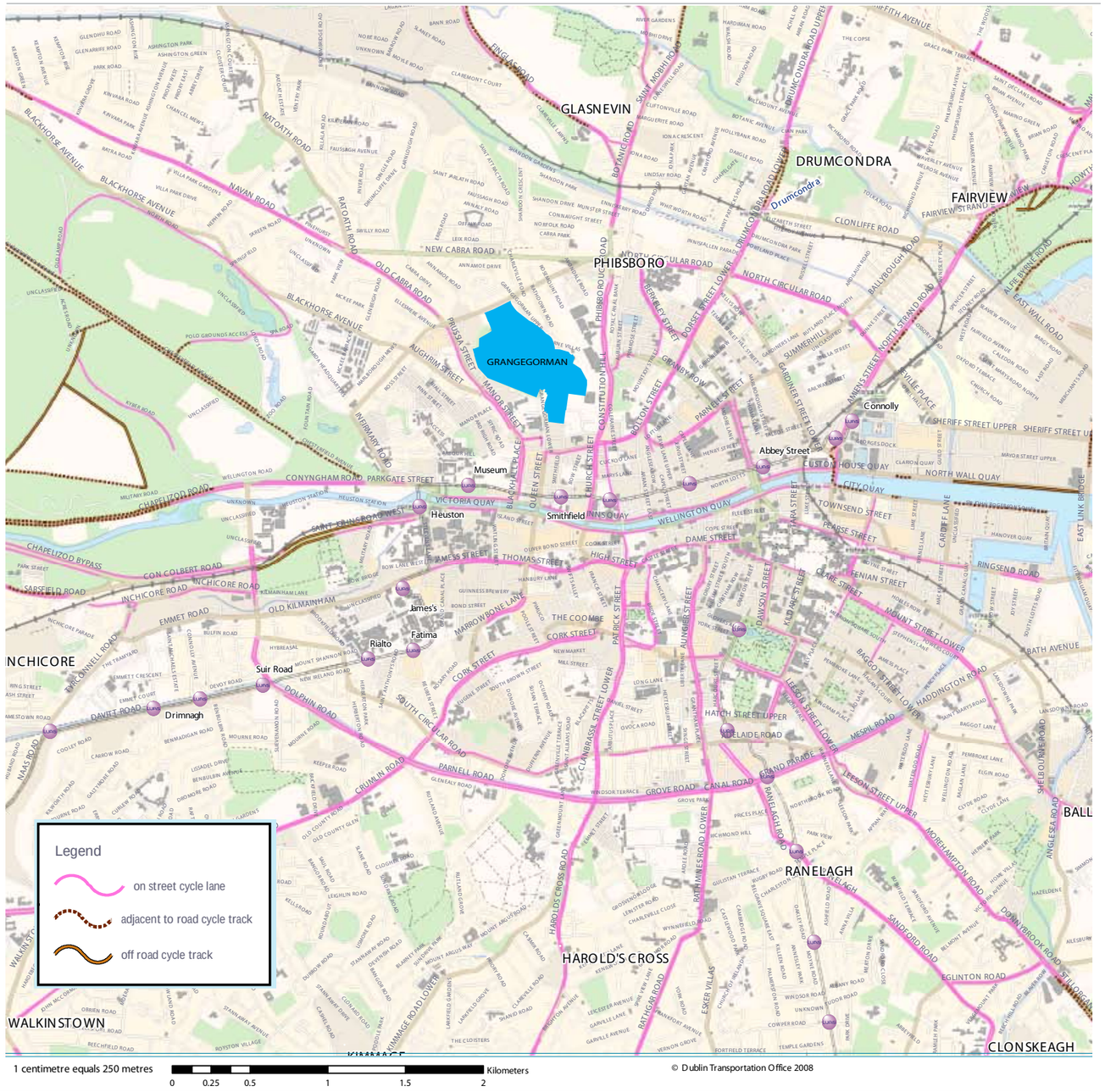


Figure 5.5 Existing cycle provision in Dublin City Centre
Source: Dublin Transport Office

5.2.4 Existing Public Transport

The Grangegorman site is currently well connected by bus services as shown in Figure 5.6 and is surrounded by a number of existing Quality Bus Corridors (QBC). Blanchardstown QBC, Lucan QBC, and Ballymun QBC are all in close proximity to Grangegorman.

The existing LUAS Red line running from Tallaght to Connolly/The Point has three stops (Four Courts, Smithfield and Museum) within 12 - 15 minutes walking distance from the Grangegorman site as shown in Figure 5.7 below. The Luas lines connect the site to the mainline rail network at Heuston and Connolly Stations.

Grangegorman is within 30 minutes walking distance of the City Centre where the majority of bus routes terminate, making the site accessible from transport hubs such as Bus Aras and Connolly Station.

The site's proximity to existing public transport nodes as well as existing pedestrian and cyclist linkages mean that the sustainable modes will be highly attractive and should lead to a modal shift from the private vehicles.

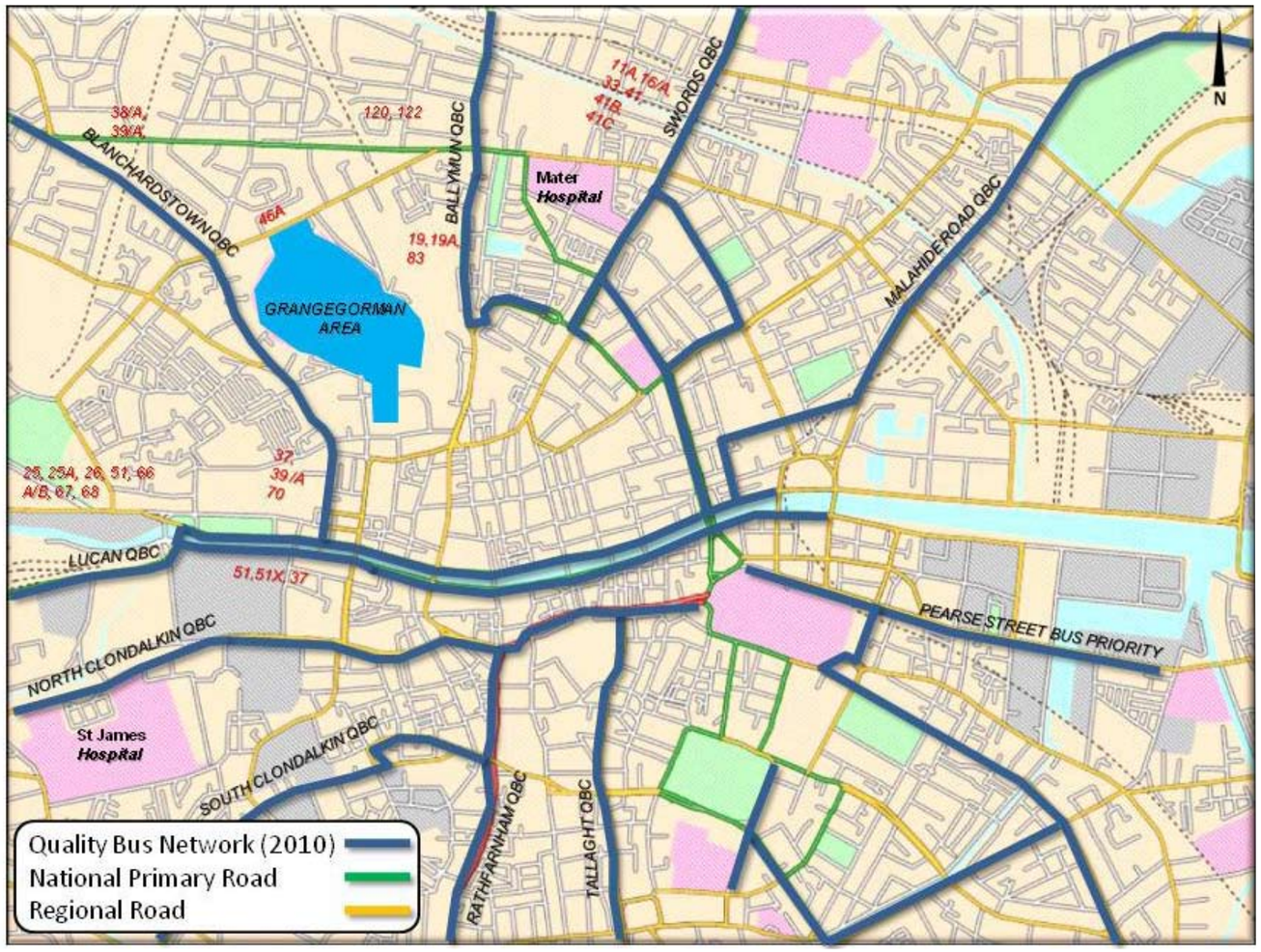


Figure 5.6 Quality Bus Network
Source: Aecom

The National Transport Authority (NTA) carried out accessibility modelling using the Accession modelling tool on behalf of the GDA and this showed that 95% of the population of the Greater Dublin Area is within a 90 minute catchment of Grangegorman by walking & public transport combined. 58% of the population of the Greater Dublin Area was found to be within 60 minutes of Grangegorman by walking & public transport. This is presented graphically in Figure 5.7 and is based on the existing public transport pedestrian linkages.

A similar exercise was carried out by the NTA based on travel to the site by bicycle only. This assessment showed that approximately 245,000 people live within an acceptable 20 minute cycling distance of Grangegorman. Therefore, it can be concluded that Grangegorman is ideally located to offer excellent connectivity to adjacent existing public transport nodes and pedestrian and cyclist links so as to ensure that sustainable modes of transport will be used by the vast majority of visitors to the site. This accessibility will be improved upon further following the introduction of several infrastructural upgrades which will be discussed below.

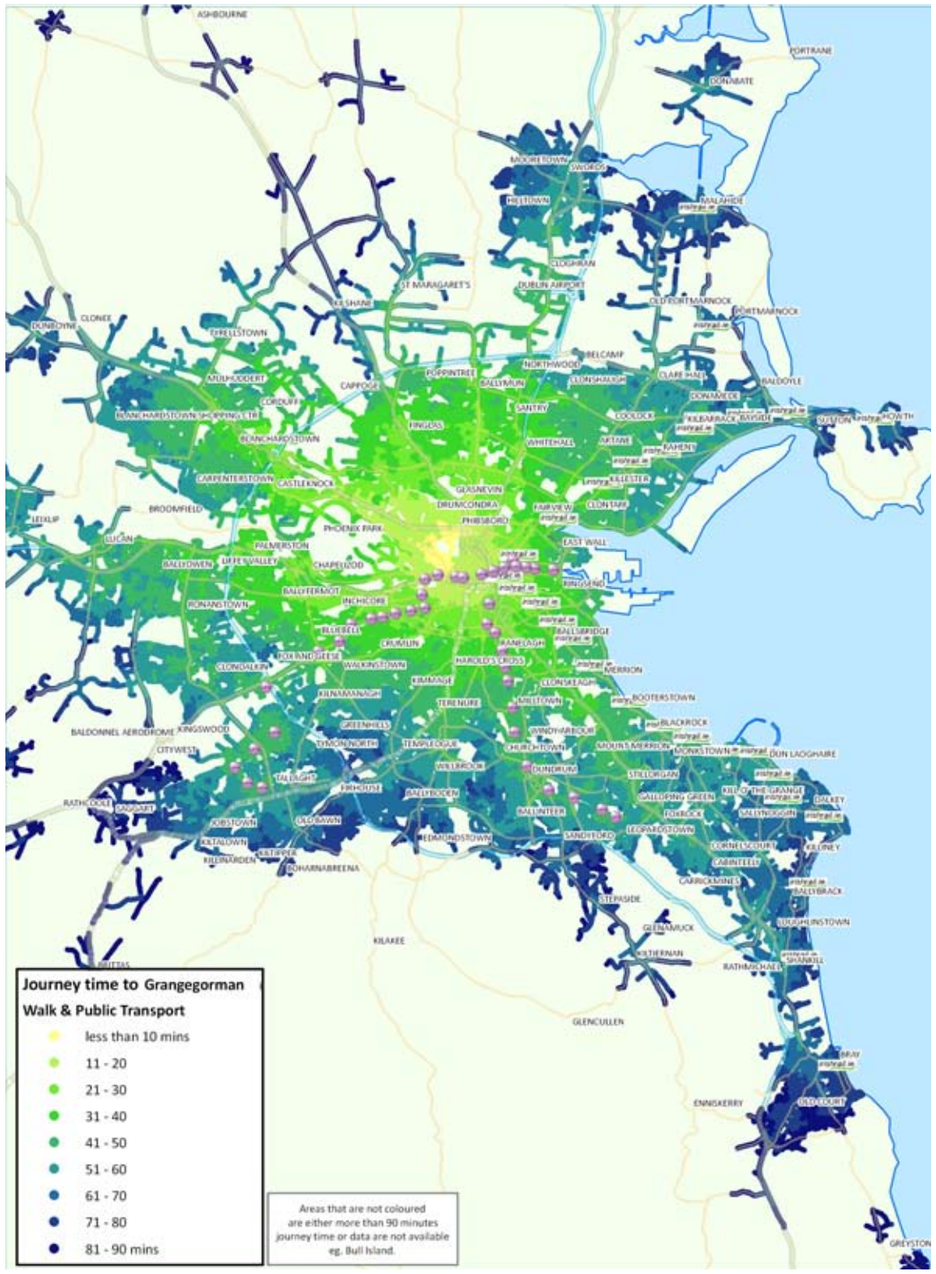


Figure 5.7 Journey time to Grangegorman by walking and existing public transport
Source: NTA

5.2.5 Proposed Public Infrastructural Upgrades

Transport 21 Proposals

There are significant proposals planned in Transport 21 that will improve access to the site. Within the local vicinity, Metro North and Luas Line BX and D will directly improve services providing high capacity public transport links. Metro North will connect Swords to Dublin City Centre (St Stephen's Green) via Dublin Airport. Two proposed stops at the Mater and Parnell Square are located within reasonable walking distance from Grangegorman.

Luas line BX will connect the two existing Luas lines, providing enhanced penetration to the City Centre. Luas line D will extend line BX towards Liffey Junction via Broadstone. The preferred route for line is illustrated in Figure 5.8. The proposed Broadstone D.I.T. stop has been designated to serve Grangegorman SDZ while an additional stop (Grangegorman) which could also serve the site may be constructed slightly further north. The proposed link to Broombridge train station to the north would also provide a connection to the Maynooth commuter rail line to the west.

A further initiative proposed within Transport 21 which will improve accessibility to Grangegorman is the rail interconnector. This planned link connecting the northern rail line to Heuston Station will remove the existing rail capacity restriction within the city centre at Butt Bridge.

The Grangegorman Development Agency supports the principals of the Transport 21 proposals based on the increased levels of accessibility offered by the initiatives.

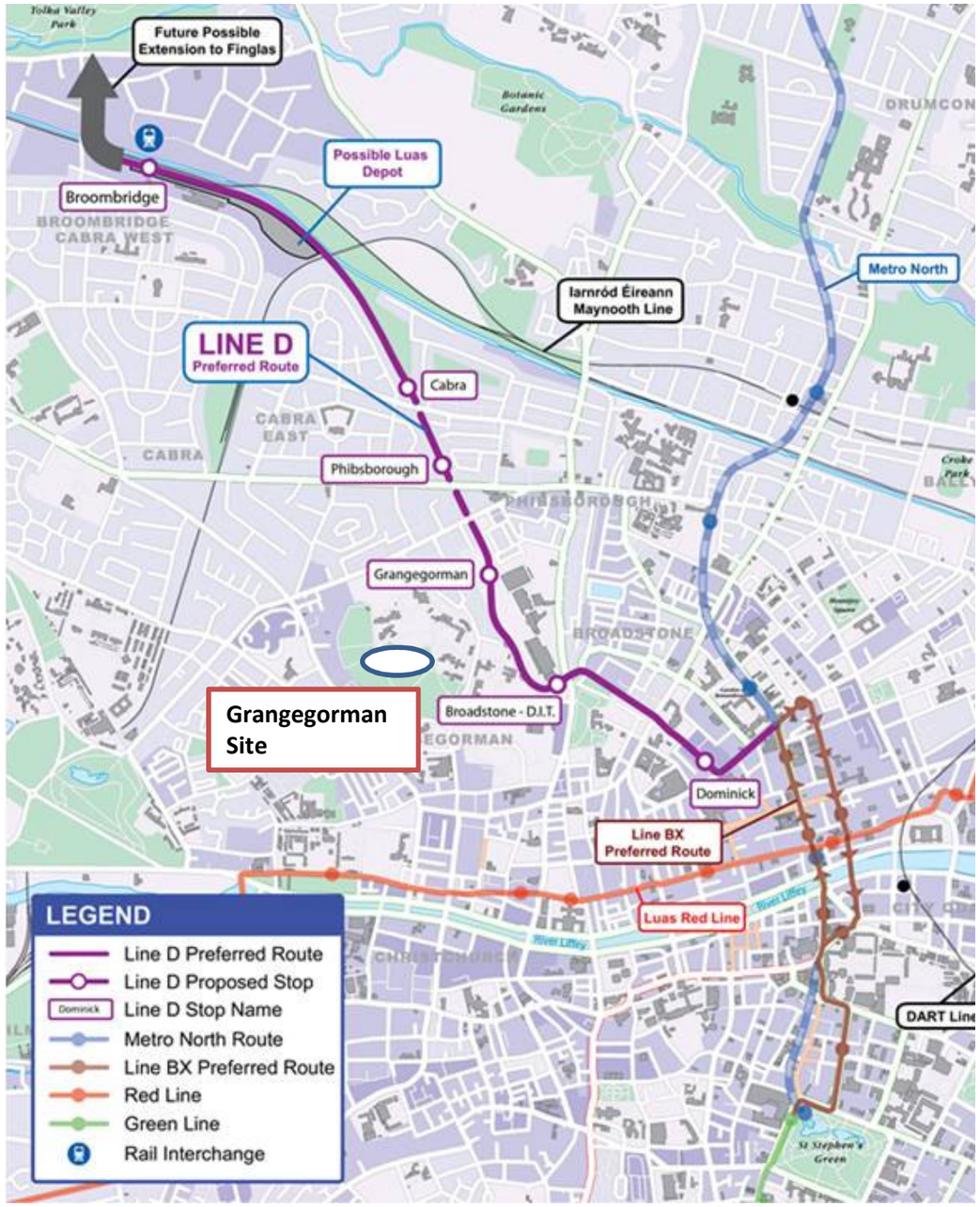


Figure 5.8 Preferred route for Luas Line BXD
Source: RPA

Dublin City Council Strategic Green Routes

The Dublin City Council Development Plan (2011 – 2017) identifies a number of proposed Green Routes (which would provide for cyclist and pedestrians), strategic pedestrian routes and cycle routes across the city. Figure 5.9 illustrates the city centre green route network proposed in the Development Plan while Figure 5.10 illustrates the strategic pedestrian routes proposed in the same document.

It can be seen from Figure 5.9. that Grangegorman SDZ has been identified to form part of a future strategic pedestrian route that will extend westwards towards the Phoenix Park and the Royal Hospital via Heuston Station and the Liberties and eastwards towards the city centre commercial areas of Henry Street, Jervis Street etc. Similarly it can be seen from Figure 5.11 above that the development of Grangegorman in conjunction with other linkages will enhance connectivity within the city centre green route network.

Grangegorman in its current state restricts and represents a barrier to east-west connectivity. However, the proposed permeability and layout of Grangegorman SDZ will lend to DCC's access strategy for the city. In fact the site holds such a strategic location that it could be stated that its development will integrate the city. The proposed site layout and access strategy will be described in further detail in Section 5.4 below.

The Dublin City Council Development Plan also outlines citywide proposals for the construction of new cycle tracks and upgrades to existing cycle tracks. The majority of these routes may form some part of journeys for visitors to Grangegorman however some routes which would be of particular significance are shown adjacent.

Therefore, cycle approaches to Grangegorman from north, south, east and west will be upgraded or introduced under the proposals of the Development Plan. This will further encourage the use of the bicycle as a means of accessing the site. The GDA is committed to working in conjunction with Dublin City Council to deliver the principles and proposals outlined in the current Development Plan.

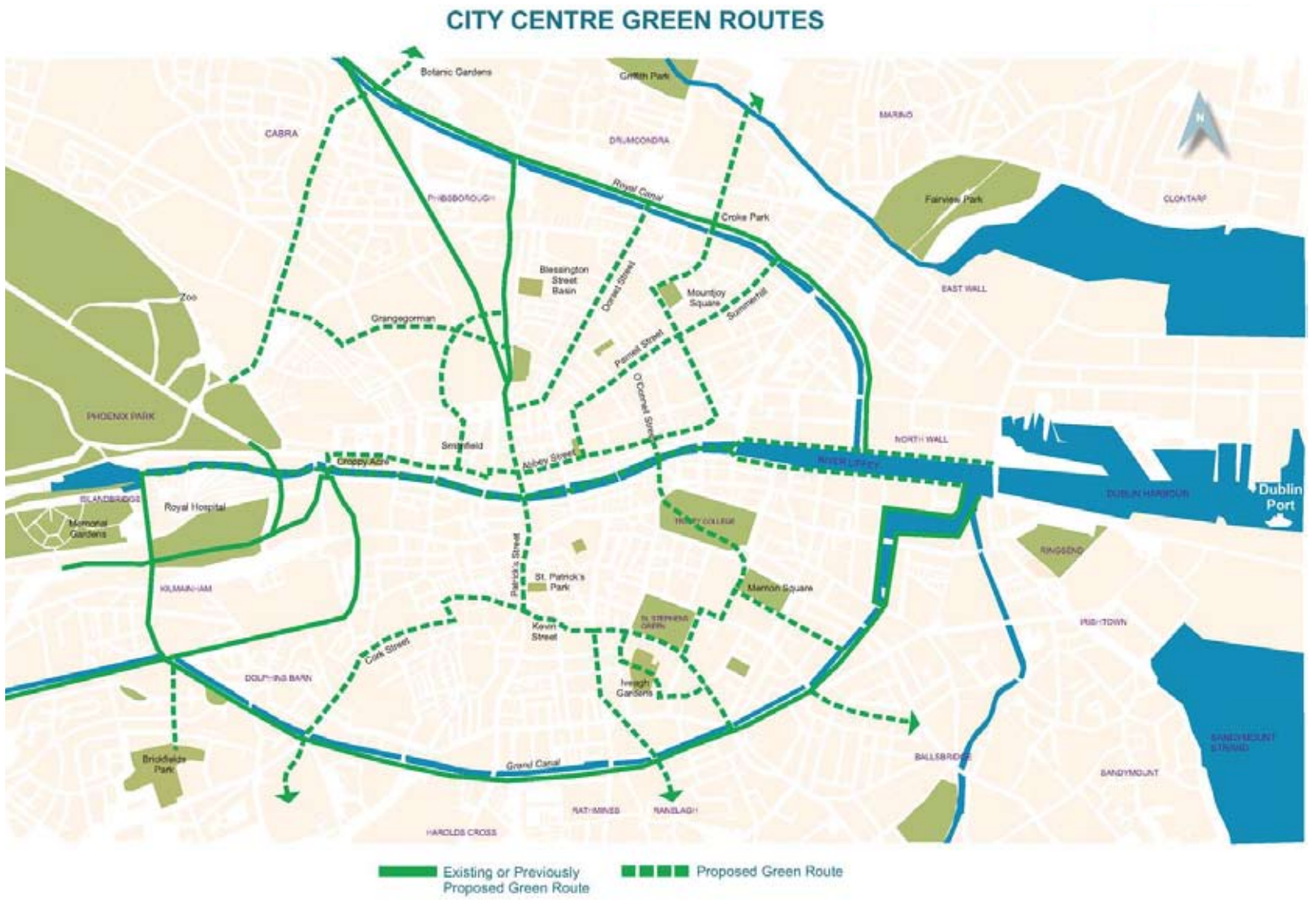
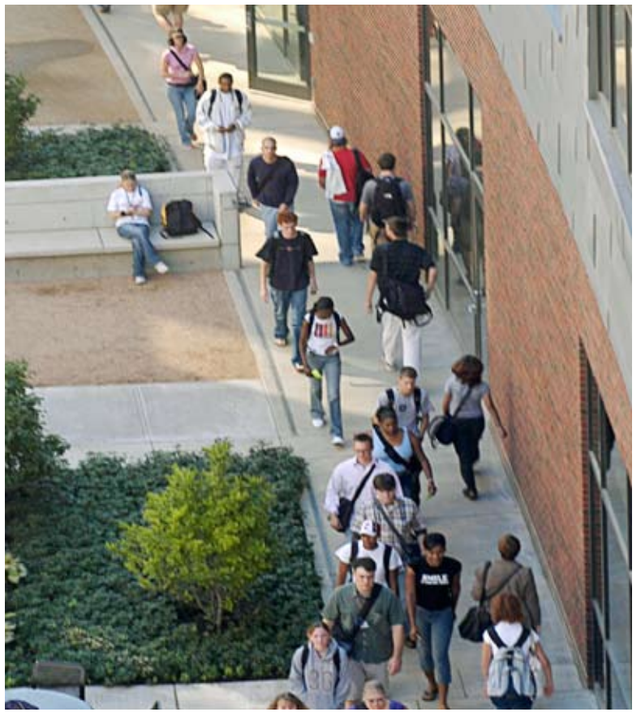


Figure 5.9 City Centre Green Routes (DCC Development Plan 2011 - 2017)

New/upgraded cylcle tracks serving Grangegorman (Dublin City Development Plan 2011-2017)

- Rathdown Road, Grangegorman Upper and Lower, Brunswick Street
- Prussia Street, Manor Street, Stoneybatter, Blackhall Place
- Phibsborough Road, Connaught Street, St Peter's Road
- North Circular Road, Cabra Road, Old Cabra Road
- Parnell Square/Parnell Street
- Conyngham Road, Parkgate Street, North Quays
- Infirmary Road
- Capel Street
- Dorset Street
- Queen Street
- King Street North, Bolton Street



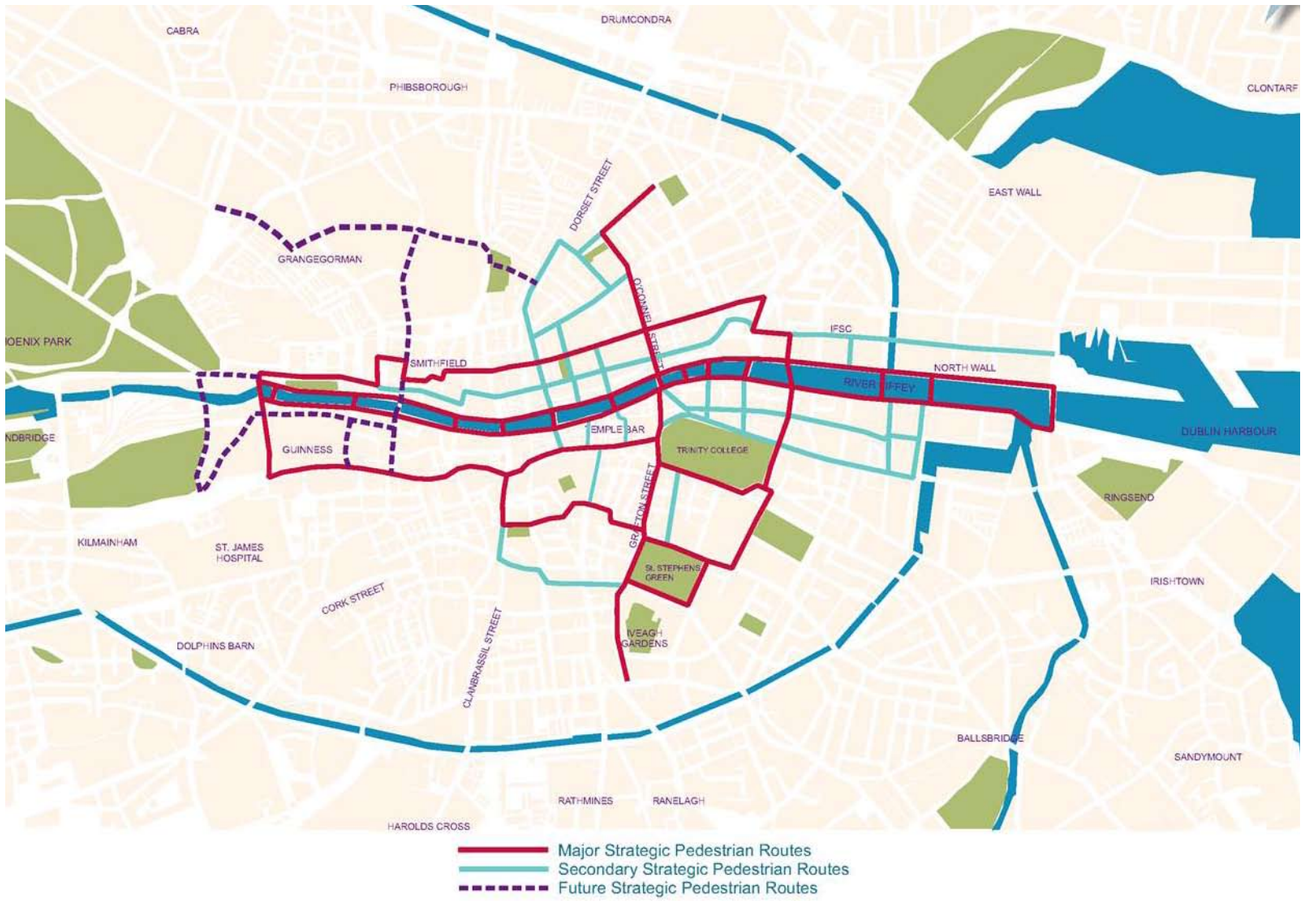


Figure 5.10 Strategic Pedestrian Routes (DCC Development Plan 2011 – 2017)

Draft Transport Strategy 2011 – 2030, National Transport Authority

Within the Draft Transport Strategy 2011 – 2030, the NTA highlight the importance of bus priority measures in particular measures such as the dedicated provision of road space, priority for buses at signals and restriction to some or all vehicles along sections of road.

The NTA has identified a number of Quality Bus Corridors (QBCs) for proposed upgrades. The routes highlighted as Bus Priority 1 have been selected for improvement to journey times, service reliability and comfort levels on the basis of their significance. Routes highlighted as Bus Priority 2 have also been selected for improvements with regard to bus segregation and bus priority. Further to this, orbital routes outside the city centre have also been highlighted for improvement. The NTA will explore the possibility of introducing Bus Rapid Transit to a number of the QBCs. The NTA has stated in its document, that it anticipates that a number of the Bus Priority 1 routes will migrate to facilitate Bus Rapid Transit type services.

Routes of particular relevance to the Grangegorman site include the Swords, Finglas Road, Blanchardstown and Lucan QBCs. The Stillorgan Road QBC is also important to the Grangegorman site as a result of the recent rerouting of the 46a bus service along the North Circular Road. In addition to bus priority measures, the NTA also have a number of objectives in relation to the Luas. These objectives area as follows:

- The upgrade of passenger capacity on the existing Luas Green Line as required to meet demand;
- Extension of the Luas Green Line from St. Stephen's Green to Broombridge via Grangegorman (Luas BX & D);
- Extension of Luas Green from Brides Glen to Bray area;
- Upgrade of Luas Green Line to cater for Metro services and extension of the proposed Metro North tunnel to meet the Green Line.

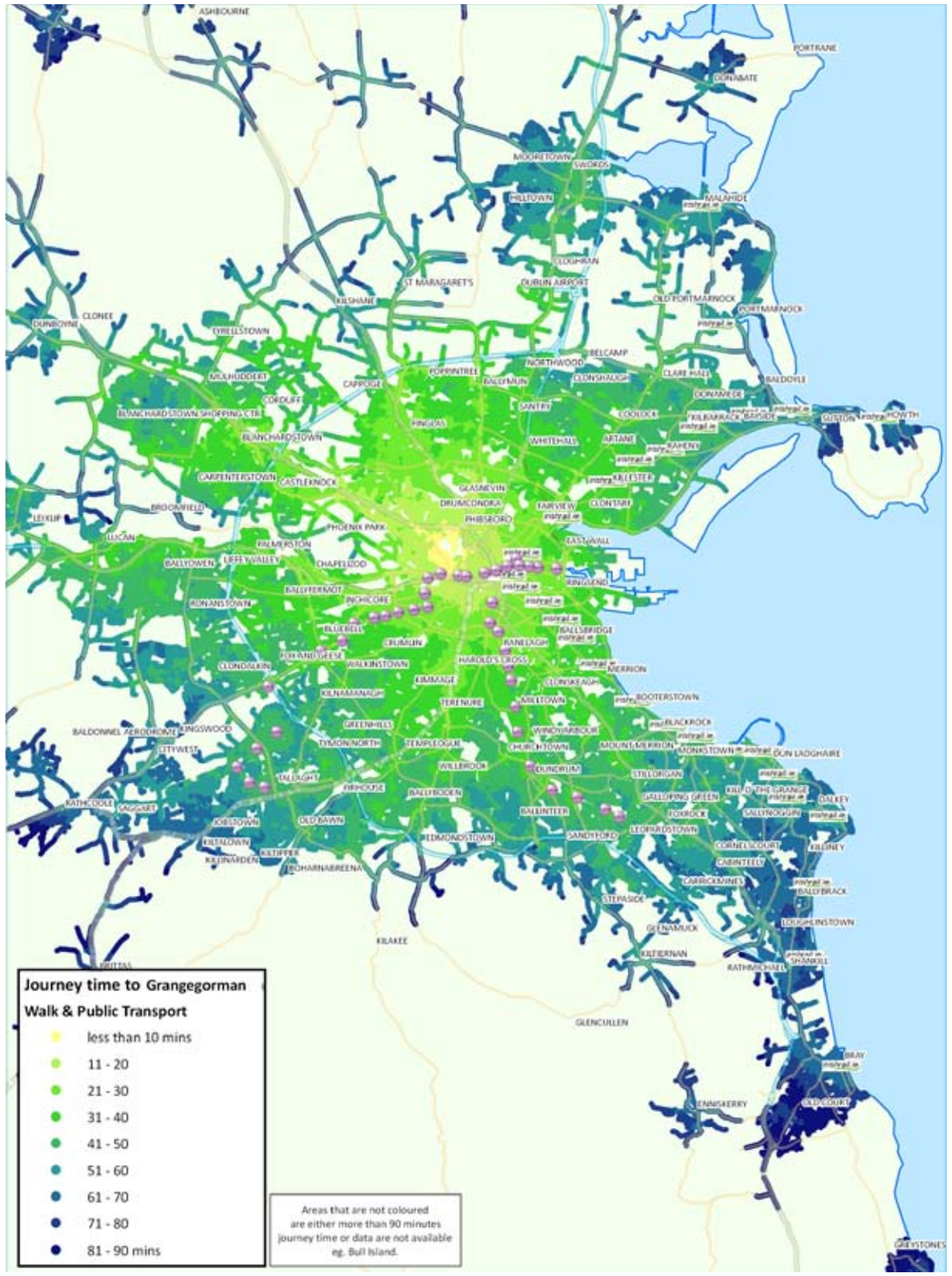


Figure 5.11 Future journey times to Grangegorman by walking and public transport
Source: NTA

The NTA has also used the Accession modelling programme to forecast future journey times to the Grangegorman site following the development of the 2030 strategy which includes Transport 21 proposals namely, Metro North and Luas Line BX and D and the Green routes proposed by DCC. Metro North and Luas BX and D will provide high capacity public transport links within the vicinity of the site. Metro North will connect Swords to Dublin City Centre (St Stephen's Green) via Dublin Airport. Figure 5.11 highlights the future site accessibility which illustrates improved levels of accessibility when compared to Figure 5.7.

As indicated in Figure 5.11, the 90 minute catchment within the Greater Dublin Area will have increased and will encompass 97% of the population, an increase of 2% the catchment shown on Figure 5.7.

It is expected that an increasing modal shift towards sustainable transport modes, such as public transport, walking, and cycling will occur in the future. Grangegorman is ideally located to benefit from the increased levels of accessibility offered by proposed infrastructure upgrades.

5.2.6 Proposed Modal Split

The modal split for DIT and HSE will change somewhat following the construction of their respective facilities in Grangegorman[13]. The existing modal split for DIT and HSE, determined from surveys undertaken, have been discussed in Section 5.1 above. Future modal splits have been developed for DIT to take account of the consolidation of the entire campus at one location in Grangegorman. Future modal splits were developed based on the expected location of the DIT population.

A modal split has been developed in conjunction with DIT based on the existing public transport infrastructure. This modal split can be seen in Figure 5.12.

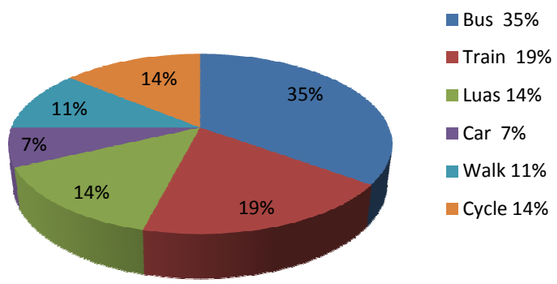


Figure 5.12 Proposed DIT Modal Split based on existing public transport

It can be seen that the Luas modal share has increased when compared to the existing modal split. This is due to the proximity of the existing Luas Red line at Smithfield. It is expected that a number of students would relocate along this line as rents tend to be more affordable than when compared to those along the Green line. Total car use has decreased significantly and this is reflective of the proposed car parking management plan and limited availability of car parking. The cycling modal share has also increased as it will be more attractive to site users because of cyclist facilities being proposed within the SDZ and also those proposed by Dublin City Council in the current Development Plan. The accessibility modelling undertaken by the NTA, and discussed in Section 5.2.4 above, demonstrates clearly that a significant population is within an acceptable cycling distance from the site and therefore the 14% cycle modal share is realistic.

It should be noted that the NTA's projected modal splits for the Grangegorman area predict a higher modal split for the soft modes of walking and cycling (31%) when compared to that illustrated in Figure 5.14 (25%) with a lower public transport share (36%) when compared to the figures above. It is felt that the adoption of a lower soft mode modal share and an increased public transport modal share would be more suitable for the purposes of producing a robust and conservative transport impact assessment with regard to capacity of public transport services. However, it will be an objective of the Mobility Management Strategy to attain an increased modal share for the soft modes.

An additional future modal split was also developed to take account of the introduction of Luas BX-D and Metro North. This modal split can be seen in Figure 5.13.

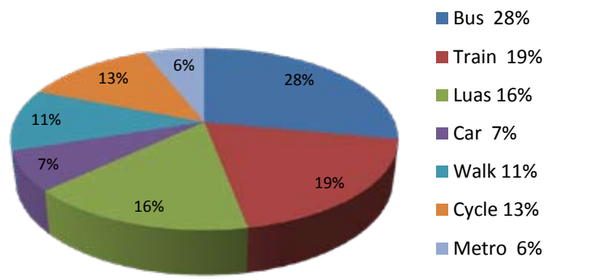


Figure 5.13 Proposed DIT Modal Split including Luas BX-D and Metro North

It has been assumed that this modal split will be applicable after 2019 which has been stated as the projected completion date for Luas BX-D. The proposed completion date for Metro North is 2016. However, in the interests of providing a conservative opening year transport impact assessment for the SDZ in 2016, Metro North has not been assumed to be operational at this time.

It can be seen that the Bus modal share decreases following the introduction of Luas BX-D and Metro North as students can move to these new modes instead. Car use remains almost exactly the same as the car parking provision is the primary driver of vehicular trips and this will remain the same for both scenarios. The Luas modal share increases by 2% following the construction of Luas BX – D as the principal benefit derived from this proposal is the secondary connection it will provide between the site and other public transport links which are already used as primary modes such as the existing Luas lines.

13: Further detail on the methodology adopted in generating the modal splits for each of the principal uses of Grangegorman SDZ and also future year modal splits Refer Chapter 5 of the Transport Assessment Report.

A modal split has been developed for HSE based on the existing public transport infrastructure as it is expected that HSE will have constructed its replacement mental health facilities at Grangegorman in advance of the completion of Luas BX-D or Metro North. This modal split can be seen in Figure 5.14.

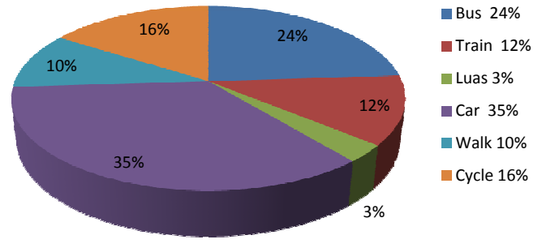


Figure 5.14 Proposed HSE Modal Split with existing Public Transport

It can be seen that the car modal share has decreased significantly when compared to the existing situation. This is as a direct result of a restriction on the number of car parking spaces proposed as part of the development. The HSE staff travel survey highlighted that a large proportion of staff live within an acceptable walking and cycling distance and as such it is envisaged that these modes will experience an increase in modal share as car use is restricted and incentives are implemented to improve their attractiveness. An additional future modal split was also developed to take account of the introduction of Luas BX-D and Metro North. This modal split can be seen in Figure 5.15. It has been assumed that this modal split will be applicable after the completion of both infrastructural upgrades.

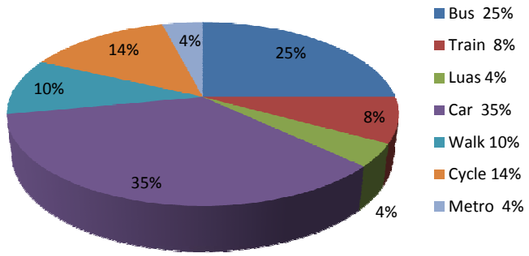


Figure 5.15 HSE Split with Proposed Public Transport

As mentioned above the majority of the existing HSE staff lives in close proximity to Grangegorman. This trend is expected to continue and as a result the Metro and Luas BX-D will not have as major effect on the modal split as that of DIT's. However it can be seen that a slight modal shift does occur from bus and rail to Metro North which will affect employees living along the Metro North corridor such as Swords or Ballymun.

The mixed use or commercial aspect of the development is proposed to be provided following the introduction of LUAS BXD and Metro North to the area. As such a future modal split was developed including these modes. This modal split is illustrated in Figure 5.16.

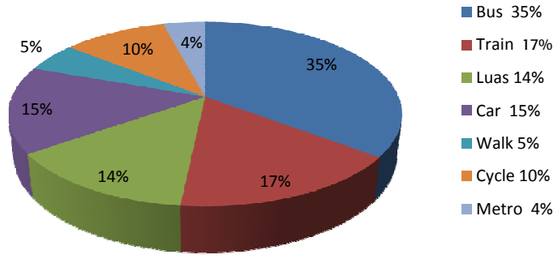


Figure 5.16 Modal Split for Proposed Commercial Development with Proposed Public Transport

Further detail on the methodology adopted in generating the modal splits for each of the principal uses of Grangegorman SDZ and also future year modal splits Refer Chapter 5 of the Transport Assessment Report.

5.3 Transportation Demand

A considerable data collection phase including extensive liaison with all stakeholders of Grangegorman SDZ allowed the trip generation associated with each phase of the development proposals to be fully understood. The table below sets out the travel demand in person trips during the weekday AM and PM peak period. Extensive detail on the methodology adopted in formulating the anticipated travel demand for Grangegorman can be found in reference document (Chapter 5 and Technical Appendix) Transport Assessment report.

It should be noted that the number of person trips evaluated are extreme values based on robust assumptions. It is unlikely that DIT will generate such a high transport demand during the traditional AM & PM peak hours. However, this extreme if unlikely scenario has been considered for the purposes of providing a conservative and robust assessment of the transportation impacts of the proposed development.

Table 5.2 Person Trips during Peak Periods

Element	Person Trips			
	Weekday AM (08:00 – 09:00)		Weekday PM (16:30 – 17:30)	
	Arrivals	Departures	Arrivals	Departures
HSE Core (6,560 sqm)	108	9	21	119
HSE Core Additional (20,600 sqm)	213	51	38	232
Healthcare Related (14,500 sqm)	91	60	45	110
DIT Core (108,100 sqm)	5500	0	672	2323
DIT Core Additional (32,500 sqm)	779	0	0	212
DIT Ancillary Educational (38,000 sqm)	341	14	62	400
Student Residential Housing[14]*	-527	0	0	-129
DIT Expansion (34,000 sqm)	815	0	0	222
Primary School	476	0	0	0
Library	0	0	0	0
Elderly Housing	0	0	7	5
Mixed Use Development (61,000 sqm)	1012	0	0	1314
Totals	**8808**	**134**	**845**	**4808**

14: Following the completion of the Student Residential Housing there will be a reduction in the number of external trips as some students will be located on campus.

5.4 Access Strategy and Traffic Management

The access strategy for Grangegorman SDZ has been developed with a multi modal approach in mind. Pedestrian and cyclist access points have been sited to maximise connectivity with public transport services and also the surrounding pedestrian and cyclist network. Vehicular access will be provided from North Circular Road, Morning Star Avenue and multiple access points from Grangegorman Lower/Upper.

The proposed development has been designed along the principals set out in the NTA Draft Transport Strategy 2011 – 2030 giving priority to soft modes (walking & cycling) followed by public transport and vehicular traffic in that specific order.

As development progresses within Grangegorman SDZ the more detailed analysis will be carried out (to the requirements of DCC) taking into consideration the specific priorities identified above. Therefore at specific locations where for example pedestrian movement is predicted to be high the junction will be designed to meet the pedestrian demand in terms of crossing facilities.

5.4.1 Pedestrian, Cyclist and Public Transport Accessibility

To achieve good integration with the external transport network and the best possible access to public transport, the development scheme has been designed with excellent permeability for all transport modes.

The pedestrian/cycle network will provide a comprehensive network of internal streets, designed to modern standards which will encourage the sustainable movement of people. This will be supplemented by the provision of ancillary facilities such as the generous provision of cycle parking, in addition to showers and locker rooms.

A pedestrian access route will be provided to the Blanchardstown QBC, which runs along Stoneybatter/ Prussia Street, from access points on Prussia Street and North Circular Road. Pedestrian access to the existing Luas Red Line and the Quays will be provided via multiple access points on Grangegorman Lower and Morning Star Avenue.

Pedestrian & Cyclist Access Opportunities

The main gateway accesses are to be supplemented by additional pedestrian and cyclist accesses at North Circular Road, Fingal Place and other locations, as illustrated on Figure 5.17. These accesses will provide for north-south and east-west connectivity, to avail of public transportation services proximate to Grangegorman. The pedestrian accesses will also cater for cyclists and link with existing cycling routes on the North Circular Road, Prussia Street and Church Street, Constitution Hill and future cycle routes, as set out in the Dublin City Council Development Plan.

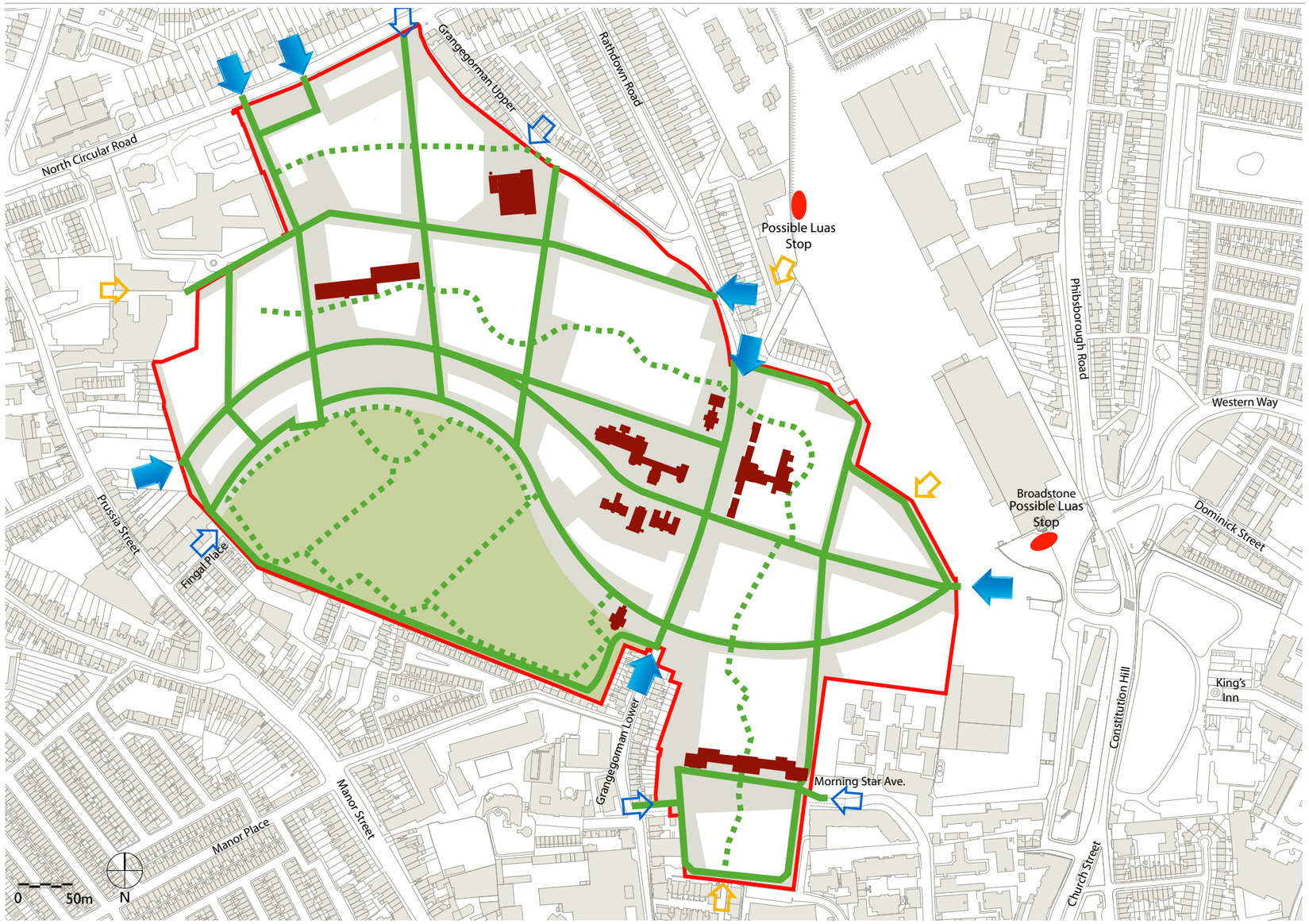


Figure 5.17 Proposed pedestrian/ cyclist access points

5.4.2 Vehicular Access

The principal vehicular accesses are to be provided from North Circular Road, Morning Star Avenue and Grangegorman Lower/Upper. Daytime vehicular access will be restricted to designated parking areas which are presented in Figure 5.18.

Traffic Calming

A vehicular traffic calming scheme has been designed and is described in the Planning Scheme. The traffic calming proposals are designed in a manner which prioritises pedestrians over motorised traffic. Shared surfaces are envisaged internally to give priority towards pedestrians along roads where appropriate.

In addition, traffic using the two car parks on the south-eastern part of the site will be required through signage and junction build out to exit to the north/south as appropriate, to discourage traffic exiting / entering the car parks passing along the most narrow part of the road of Grangegorman Lower.

The primary road link is Grangegorman Lower/Upper, which bisects the site. Grangegorman Lower will be the only available through route for external traffic and it will be traffic calmed along its length using build outs or appropriate surface treatment to the requirements of Dublin City Council.

Secondary links into the site include Ivy Avenue and Prussia Street, the access to the car parks, as well as servicing and maintenance roads along the periphery of the site. These secondary links are intended to be used by limited traffic volumes mainly related to servicing, maintenance, and disabled access. Emergency access will be provided in accordance with appropriate regulations.

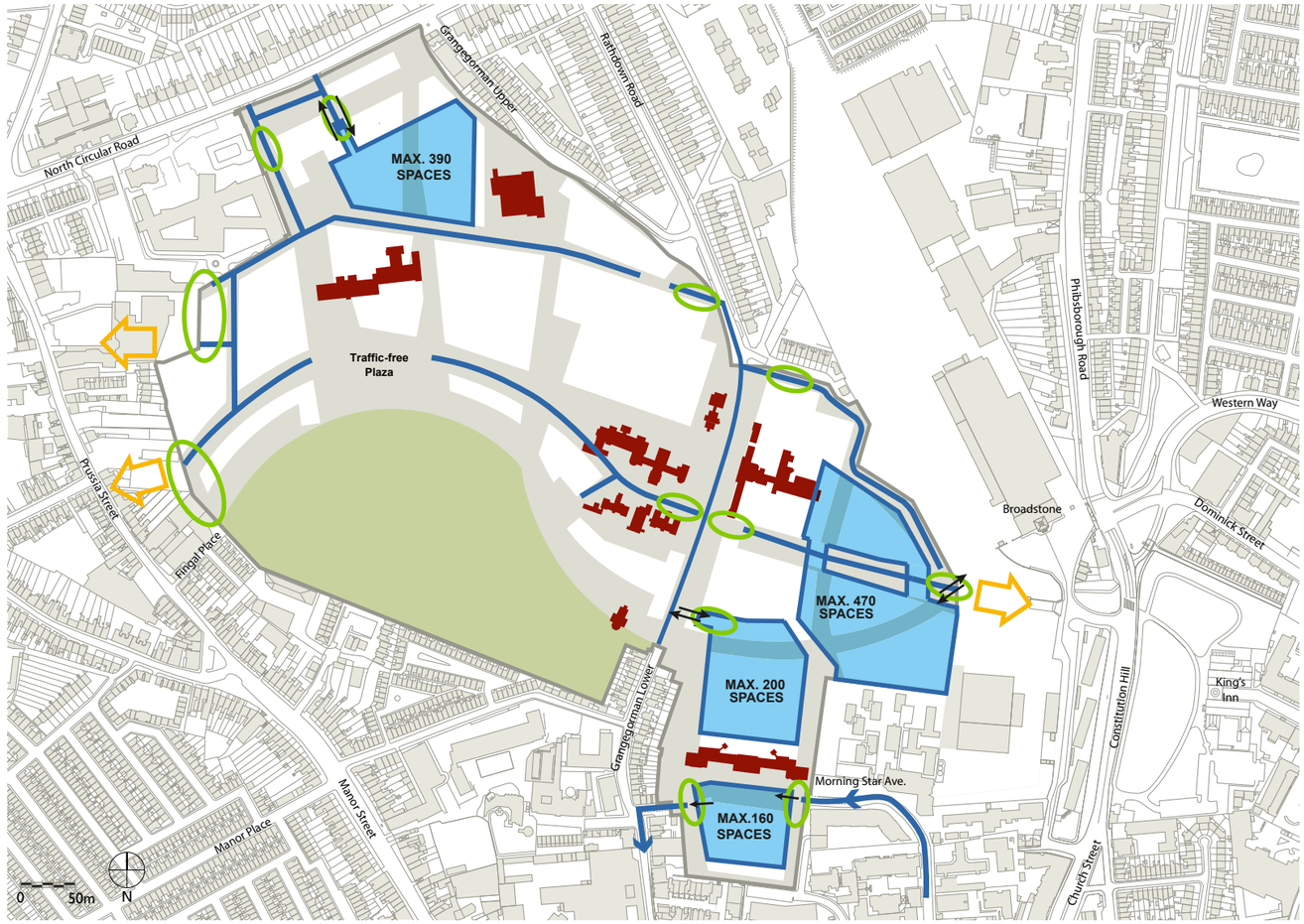


Figure 5.18 Proposed vehicular access points and possible car parking areas

5.4.3 Servicing

Servicing will be undertaken predominately from the North Circular Road access junction and Grangegorman Lower/ Upper. Within the site, the road network has been designed to accommodate servicing vehicular movements. However, vehicular access to these links will be restricted to off peak hours. Their character is predominantly pedestrian shared space with limited vehicular traffic and flush shared surfaces with minimal delineation of carriageway space.

The proposed service access routes are illustrated in Figure 5.19. It can be seen that the proposed routes will be restricted to peripheral routes. In the interests of clarity and to protect residential amenity, the secondary service route via Grangegorman Lower/ Morning Star Avenue will include measures such as traffic calming and control points to ensure it does not become a through-route for the purpose of servicing and is restricted for use of emergency and maintenance vehicles.

5.4.4 Car Parking

The provision of car parking facilities is a key element to the management of travel demand to the development site. The proposed parking provision is also the principle driver for the vehicular modal split for each aspect of the development. An over - provision of car parking may lead to the inducement of vehicular trips while an under - provision may lead to an overspill to the surrounding on street car parking facilities. The provision of car parking on the site has been optimised to ensure that it satisfies the operational requirements of the various land uses while protecting the adjacent amenity.

The parking provision has been quantified and assigned with reference to the Dublin City Council Development Plan maximum standards.

Dublin City Development Plan 2011 - 2017 was referenced to establish the car parking requirement specified in this document. Table 5.3 outlines the car parking provision based on these standards. Car parking provision has been quantified for the entire Grangegorman site i.e. the SDZ site and the adjoining site to the north west where planning permission has been granted for a replacement health facility. Thus the HSE floor space areas are increased in Table 5.3 to reflect development across the entire site.

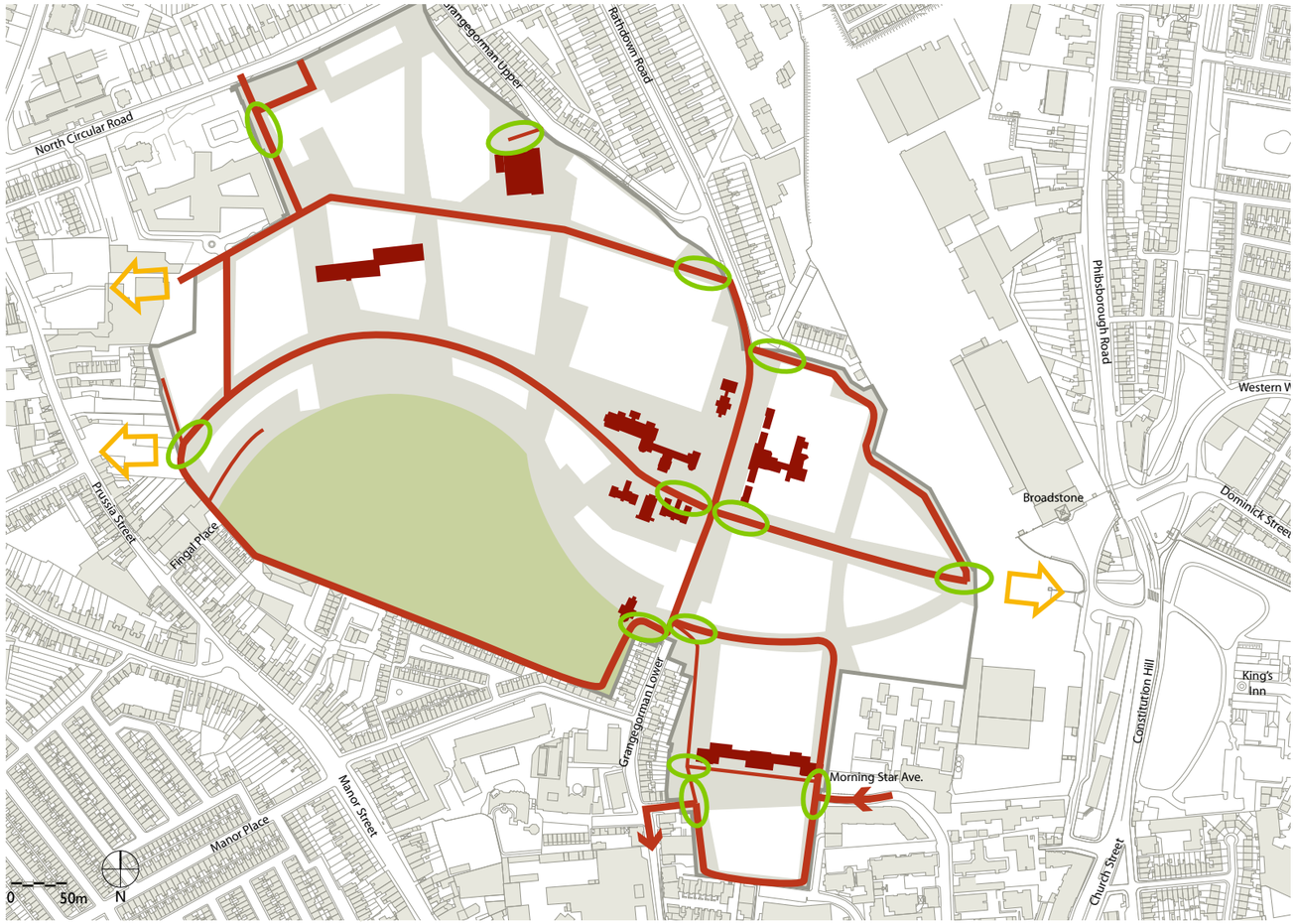


Figure 5.19 Proposed service access routes

The proposed parking provision for each land use is set out in Table 5.4

The proposed locations for on-site parking as well as the proposed vehicular access routes are presented in Figure 5.19. It should be noted that this Figure shows maximum parking numbers at each location which will be refined at a later date such that the on-site total of 1,150 car parking spaces will not be exceeded.

It should also be noted that the parking provision for the HSE replacement mental health facilities are also included within the 1,150 total provision. HSE replacement facilities will be constructed within the Grangegorman site but not within the SDZ designation.

The principal reason for the parking provision in excess of the Development Plan standards is the allocation of 350 spaces for DIT's Core educational facilities. There is no specific requirement for third level educational facilities in the Development Plan. However, this quantum is deemed appropriate due to the nature of the development, the majority of which is a replacement facility.

DIT currently has 300 parking spaces across its existing campus locations, 100 of which are provided at Aungier Street. It is felt that the provision of 350 spaces for DIT at Grangegorman is a reasonable quantum when it is considered that DIT will eventually expand its facilities by 58% when compared to its existing facilities. It would not be advisable to apply the Dublin City Council Development Plan standard of zero parking in this instance as this would lead to an increased demand for on-street parking in the vicinity of Grangegorman. The DIT parking provision will be carefully managed so as to discourage the unnecessary use of the private vehicle.

Provision will be made within the Grangegorman site for electric or battery operated vehicles with charging points and measures will be explored to facilitate the roll-out of charging infrastructure for such vehicles, including advance planning for the suitable layout and location of facilities for electric or battery operated transport. Provision will also be made for as an appropriate quantum of parking spaces for disabled motorists in accordance with National Policy.

Additional detail on the proposed parking management scheme can be found in the Mobility Management Plan report.

Table 5.3 Development Plan Car Parking Calculation

Element	Floor Areas (sqm)	Rate per sqm	DCC Car Parking Requirement	Overall Parking Requirement
HSE	22,000*	1 per 150	147	147
HSE Additional	20,600	1 per 150	137	137
HSE at North Circular Road	14,500 (6,500 sqm/65 units Residential, 8,000 HSE Facilities)	1 space per unit 1 space per 150 sqm	118	118
DIT Core & Core Additional	108,100 & 32,500	None	-	-
DIT Ancillary	3,400 (900 seats) 8,000 800 5,000 3,000 17,800	1 space per 100 seats, Performance Space 1 space per 400sqm, Sports Centre None for Early Learning Centre None for Energy Centre 1 space per 350 sqm retail space 1 space per 400 sqm Industry/ Research space	9 20 0 0 14 45	88
DIT Student Residential Accommodation	57,000 sqm 2,000 beds	1 per 10 beds**	200	200
DIT Expansion	34,000	None	0	0
School	2,800	None	0	0
DCC Library	1,500	No Standard	0	0
DCC Elderly Housing	3,400 sqm 34 units	1 per unit	34	34
Mixed Use Development	43,000 16,400 1,600	1 space per 400 sqm commercial labs/research space 1 space per 400 sqm office space 1 space per 350 sqm retail space	108 41 5	154
Total				**878**

Table 5.4 Proposed Car Parking

Element	Car Parking Allocation
HSE	385
HSE Additional	Included in 385 spaces above
HSE at North Circular Road	Included in 385 spaces above
DIT Core & DIT Core Additional	350
DIT Ancillary	43
DIT Student Residential Accommodation	200
DIT Expansion	Included in 350 spaces above
School	16
Library	0
DCC Elderly Housing	21
Mixed Use Development	135
Total	**1,150**

**15,060 sqm of 22,000 sqm HSE Core are HSE replacement facilities and are not within the SDZ designation but will be constructed by the opening year of the SDZ (2016). As such the parking requirements of this element of the HSE development is included in the overall parking provision for the site as set out in Table 5.4*

***Student residential parking requirement agreed with Dublin City Council*

On-site parking will be introduced on a pro rata basis in line with the proposed provision outlined in Table 5.4 and the quantum of development completed. The proposed car parking areas will be managed and designated for different aspects of the proposed uses so as to control and limit vehicular access to the site, thereby managing the traffic impact of the development.

Initially, a surface car park will be constructed in the area to the North of the site designated for later HSE facilities after it is no longer required as a site compound (see Figure 8.1). Similarly, an interim surface car park will be constructed adjacent to the existing Lower House building to the Southeast corner of the site. It is anticipated the surface car parks will be replaced with underground/ undercroft car parks in those general locations at such time as development comes on stream in those areas. Please refer to Chapter 4 of the Transport Assessment for more detail on the proposed parking provision.

5.4.5 Mobility Management

The Grangegorman Development Agency (GDA) will develop and co-ordinate a mobility management strategy for the Grangegorman site to be adopted by all stakeholders prior to occupation of the site. The approach to the development of an appropriate Mobility Management Strategy is the employment of the well-documented 'Carrot and Stick' approach. Such an approach tackles the transport problem from both ends. It utilises the 'Carrot' which incorporates the improvements in alternative modes of travel, effectively opening up transport options for commuters, and the 'Stick' which discourages the use of car transport for those who do not need it.

'Carrot' measures incorporate measures to facilitate Public Transport, car sharing, flexible travel times, and an improvement to the walking and cycling environment. 'Stick' measures include car parking restraint and other fiscal measures. Both elements of this approach are required to achieve a successful result. The parking provision for the Grangegorman area will act as a powerful mobility management measure as it has been calculated specifically to ensure against an overprovision of parking and a resultant over reliance on the private vehicle. This will be supplemented by measures to encourage more sustainable modes of transport such as walking, cycling and the use of public transport.

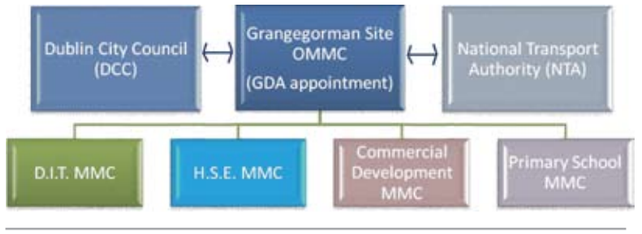


Figure 5.20 Proposed Mobility Management Structure

It is intended that all individual stakeholders will appoint a Mobility Management Coordinator (MMC) who will promote all aspects of the Mobility Management Plan (MMP) within their organisation. The GDA will appoint an overall MMC (OMMC) for Grangegorman who will liaise with individual MMCs and ensure that MMPs for all stakeholders are being developed in an appropriate and coordinated manner which will benefit the area as a whole. The overall co-ordinator will be appointed prior to any occupation of the site. A proposed Mobility Management structure for Grangegorman SDZ is presented in Figure 5.20

Table 5.5 presents a number of measures proposed within the Mobility Management Plan for Grangegorman. These measures were derived from consultation with the future occupants of Grangegorman, namely HSE employees and the existing DIT population.

These suggested measures, supplemented by further incentives such as the provision of a one-stop travel centre within the proposed student hub, will encourage the use of sustainable modes of access to Grangegorman. The travel / mobility management information point will be for the use of all of the future occupants of the Grangegorman area. The OMMC appointed by the GDA and associated staff will be accommodated at this facility and will coordinate the activities of the stakeholder MMCs from this point. This information point will dispense travel information to both staff and students at the site upon request in relation to walking, cycling and public transport. This facility will be located in the proposed student hub.

Please refer to the separate Mobility Management Plan Report for further detail on the mobility management strategy.

Table 5.5 Proposed Mobility Management Measures

Element	Car Parking Allocation	Car Parking Allocation
Secure, covered bicycle parking	Additional direct bus routes / services to campus	Car parking management
Shower and changing facilities	Improved bus waiting facilities	Reserved car parking for car sharers
Information on cycle routes	Incentives in terms of discounted fares	Development of a car sharers database
Safer, lit paths to campus	Real time information at bus stops	Emergency ride home service should the car share arrangement break down momentarily
Improved cycle lanes to campus	Metro line to serve campus	Reduced parking charges for car sharers
Bicycle maintenance classes	Luas tram line with stop at campus	
Cycle training	More convenient drop off points to campus	
A DIT bike fleet		

5.5 Transportation Impact

An assessment of the impact of the proposed development on traffic conditions in the vicinity has been undertaken. In addition an assessment of the likely impact of the development on existing public transport services was also carried out. The results of these assessments are discussed below.

5.5.1 Public Transport Interventions and Impacts

Following an assessment of the residual capacity available on the existing public transport network it was calculated that there are approximately 4,330 person trips available on the network for Grangegorman SDZ following upgrades to several Dublin Bus routes during the critical AM peak period. These upgrades are discussed in further detail below.

The estimated number of public transport trips generated by each element of the SDZ is presented in Table 5.6

The addition of circa 1500 – 2,000 student beds will actually lead to a reduction in the number of external public transport trips generated by Grangegorman SDZ. The addition of student accommodation will reduce the number of external trips being made by students to Grangegorman SDZ. Therefore, the number of public transport trips will also be reduced. However, in the interests of producing a conservative assessment this reduction in public transport demand has not been included & hence the student residential element of the SDZ is not included in Tables 5.6 and 5.7.

Table 5.7 sets out the public transport impacts based on a possible development scenario for Grangegorman and derived from the modal splits outlined in the Transport Assessment. The scenario below outlines a possible scenario for the delivery of the overall project. Delivery of individual elements will be dependent on availability of finance, procurement methods adopted and property disposal. Please refer to Chapter 8 of this document for more information on phasing and implementation. It is considered that the Dublin Bus upgrades required to

Table 5.6 Public Transport Trips (AM Peak Hour)

Element	Public Transport Trips
HSE Core (6,560 sqm)	46
HSE Core Additional (20,600 sqm)	103
Healthcare Related (14,500 sqm)	56
DIT Core (108,100 sqm)	3740
DIT Core Additional (32,500 sqm)	538
DIT Ancillary (38,000 sqm)	241
DIT Expansion (34,000 sqm)	562
Primary School (2,800 sqm)	105
Library (1,500 sqm)	0
Elderly Housing (3,400 sqm)	0
Mixed Use Development (61,000 sqm)	708

Table 5.7 Public Transport Impacts (AM Peak Hour 08:00 – 09:00)

Phase 1	Element	Public Transport Impacts
	HSE Core (6,560 sqm)	This phase of development will generate approx 4,255 additional public transport trips. The following bus routes will need to be enhanced during the peak periods: Dublin Bus Route 7 Cherrywood to City Centre Dublin Bus Route 14/A Dundrum Luas to Parnell Square Dublin Bus Route 33 Balbriggan to City Centre Dublin Bus Route 42 A/B Blunden Drive to City Centre Dublin Bus Route 116 Ballinteer to City Centre
	DIT Core (108,100 sqm)	
	HSE Core Additional (20,600 sqm)	
	DIT Ancillary (38,000 sqm)	
	Primary School (2,800 sqm) & Library (1,500 sqm)	
	Elderly Housing (3,400 sqm)	
Phase 2	DIT Core Additional (32,500 sqm)	This phase of development will generate approx 538 additional public transport trips. This number of public transport trips could be supported by either (i) LUAS BXD (ii) Metro North and additional Shuttle/Feeder bus services or (iii) the introduction of BRT services or increased capacity of existing Luas lines as proposed in the Draft NTA Strategy for 2030
Phase 3	Mixed Use Development (61,000 sqm)	This phase of development will generate approx 1,326 public transport trips LUAS BXD; Metro North could support this number of trips. The Interconnector rail tunnel and integrated ticketing will also facilitate greater integration between public transport services.
	DIT Expansion (34,000 sqm)	
	Healthcare Related (14,500 sqm)	

**Access from Constitution Hill will deliver greater levels of accessibility for pedestrian and vehicular trips*

accommodate Phase 1 of the development are feasible. The routes identified would typically require an increase in frequency by 1 service inbound during the AM peak with the 33 bus service requiring the greatest increase in frequency with an additional 4 services required in the AM peak.

The Red line would experience the highest patronage of the two existing Luas lines from the Grangegorman population with an occupancy of 13.8% of its existing inbound capacity compared to 11.8% on the Green line during the AM peak hour. The patronage on the outbound Red line services in the AM peak would be 21.9% as people use the route to connect Grangegorman with Connolly station. However, these short hop trips would be against the typical tidal flow of the Red line which would have ample capacity to serve these trips.

The subsequent phase of development as outlined in Table 5.7 shall be supported by further interventions in the form of additional public transport infrastructure, namely the completion of Luas BX-D. Luas BX-D is considered to be of greater benefit to Grangegorman as it will offer increased levels of connectivity with existing bus, train and Luas services as it traverses the city. Luas BX-D will also have a stop at Broadstone gate, at the eastern boundary of Grangegorman, while the closest Metro North stop will be located at Parnell Square.

In the scenario that Luas BX-D was not to be provided the public transport provision should be supplemented by additional Shuttle/Feeder bus services to achieve the improved levels of connectivity which Luas BX-D would offer. An example of such services could possibly include a shuttle bus from the Metro Parnell Square stop or a shuttle service from Broombridge train station and a service from Connolly Station.

The full development of the Grangegorman SDZ will generate a demand of approximately 1,332 additional public transport trips which could be accommodated following the construction of Luas BX-D and Metro North or further significant public transport upgrades such as Bus Rapid Transit or increased capacity on existing Luas lines as proposed within the NTA Draft Transport Strategy 2011 – 2030.

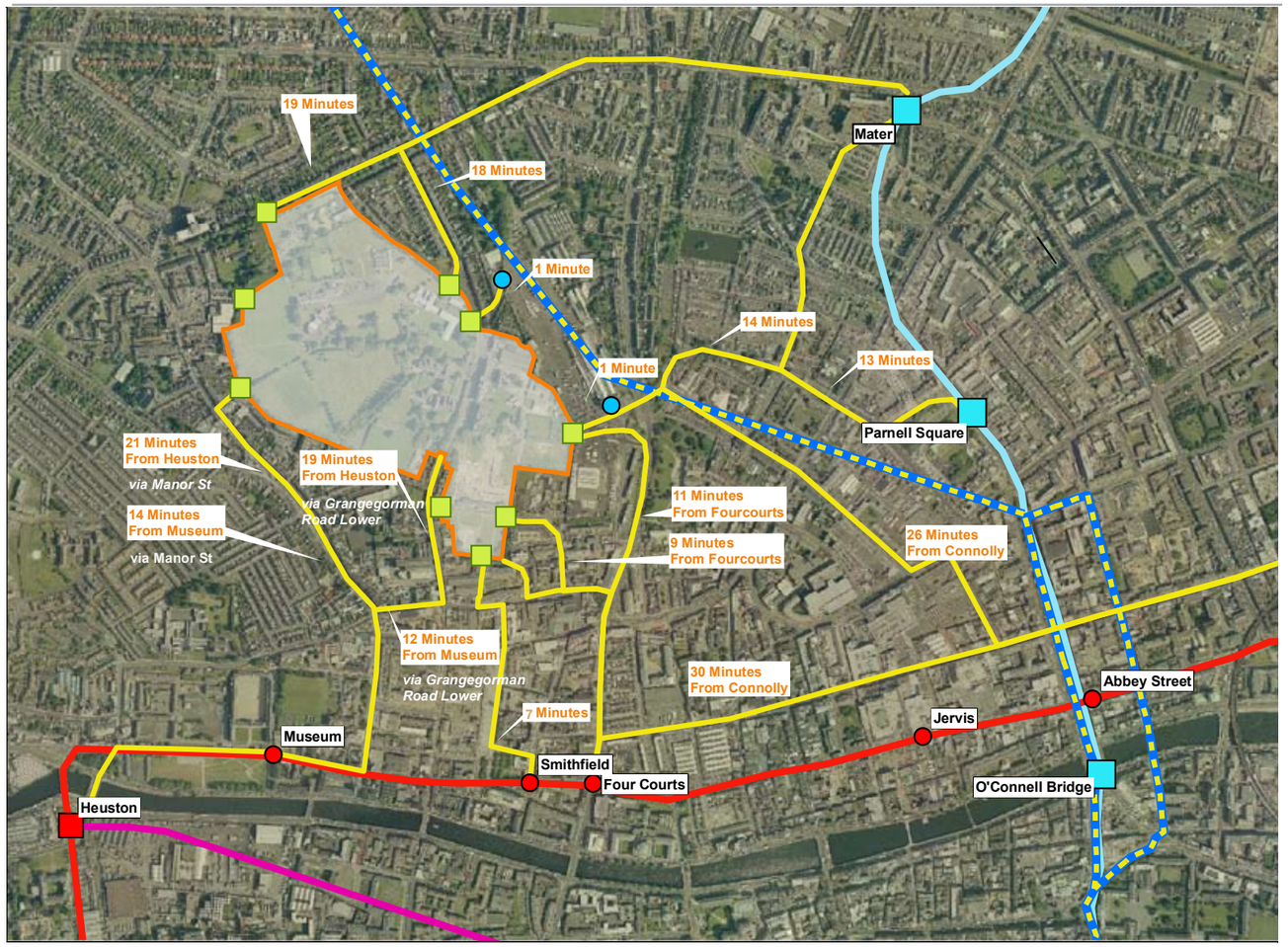


Figure 5.21 Walking distances from existing and proposesd Public Transport
Source: Arup

5.5.2 Road Interventions and Impacts

The traffic associated with the development proposals will be directly related to the volume of car parking provided within the site. The number and allocation of car parking has been set out in Section 5.2.4. The following sections of this Chapter will present the results of an assessment of the impacts associated with this quantum of parking.

Strategic Traffic Impacts[15]

The traffic model developed to assess the impacts associated with LUAS BXD was kindly made available to the Grangegorman Development Agency by the Railway Procurement Agency. This model provided a useful tool in understanding the wider traffic context given the implementation of a number of traffic management measures within the city centre such as the College Green bus gate. Specifically the model facilitated an understanding of the trip distribution patterns in the area. The results of this assessment facilitated the identification of key junctions in the vicinity of the site which warranted a more detailed assessment of their operational performance.

Key Junction Analysis

The following junctions were identified for further junction analysis following the strategic traffic assessment. The location of these junctions is presented in Figure 5.22

Junction 1: Infirmary Road / Parkgate Street signalised junction;

Junction 2: Aughrim Street / North Circular Road / Blackhorse Avenue signalised junction;

Junction 3: Prussia Street / Old Cabra Road / North Circular Road (Hanlon's Corner) signalised junction;

Junction 4: Cabra Road / North Circular Road signalised junction;

Junction 5: Grangegorman Road / Rathdown Road priority junction;

Junction 6: Grangegorman Road Lower / Brunswick Street signalised junction;

Junction 7: Stoneybatter / Brunswick Street / Arbour Hill priority controlled junction.

Junction 8: King Street North/ Blackhall Place signalised junction

[15] *For further detail on the methodology adopted in assessing these impacts refer to Chapter 6 of the Transport Assessment Report*

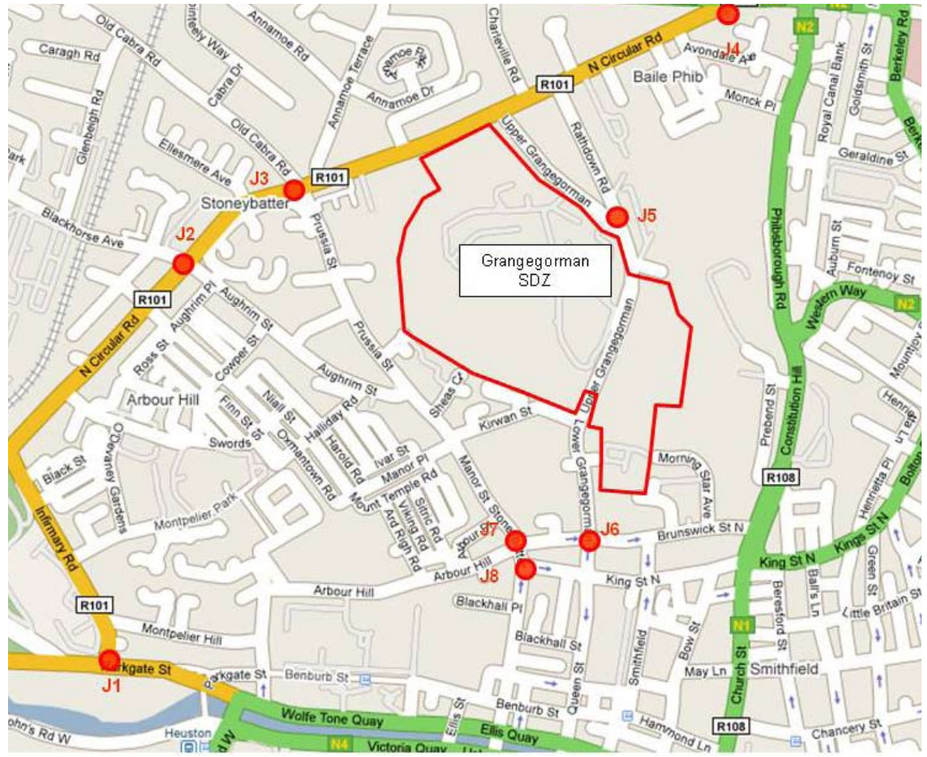


Figure 5.22 Scope of traffic junction assessment

These junctions were assessed using microscopic traffic modelling programs LINSIG and PICADY. The assessment concluded that the performance of the junctions in the post development scenario could be improved by a number of interventions. Subsequent to these interventions being implemented the junctions will operate at similar or better levels of service than that currently provided. The following junctions were identified as requiring mitigation measures:

Junction 6: Grangegorman Road Lower / Brunswick Street signalised junction

Junction 7: Stoneybatter / Brunswick Street / Arbour Hill priority controlled junction

Junction 4: Cabra Road / North Circular Road signalised junction

The transportation impacts of the proposed development of Grangegorman SDZ have been assessed in a multi faceted manner. This assessment concludes that the proposed development can be accommodated with minor modifications to existing road infrastructure while the programme of development will be aligned to the provision of proposed public transport infrastructure. The redevelopment of Grangegorman and the east – west permeability offered by the development will be of major benefit for the surrounding area and the city as a whole. In effect, the redeveloped site will integrate the city. Therefore the proposed development is appropriate from a transportation perspective.