College Green Project

Environmental Impact Statement

May 2017

Comhairle Cathrach Bhaile Átha Cliath Dublin City Council

Údarás Náisiúnta Iompair National Transport Authority

ARUP

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1 EIS Non-Technical Summary

1. Introduction

Dublin City Council (DCC) proposes undertake the development of a civic plaza and to implement traffic management measures in the area of College Green, Dublin. The site location is shown on **Figure NTS.1**. The Environmental Impact Statement (EIS) is a statement of the potential impacts on the environment, which may result from the proposed College Green Project (the 'Proposed Project').

The Proposed Project involves the development of a civic plaza at College Green, the rerouting of traffic away from College Green, relocation of some taxi parking and loading areas to nearby streets and other minor works.

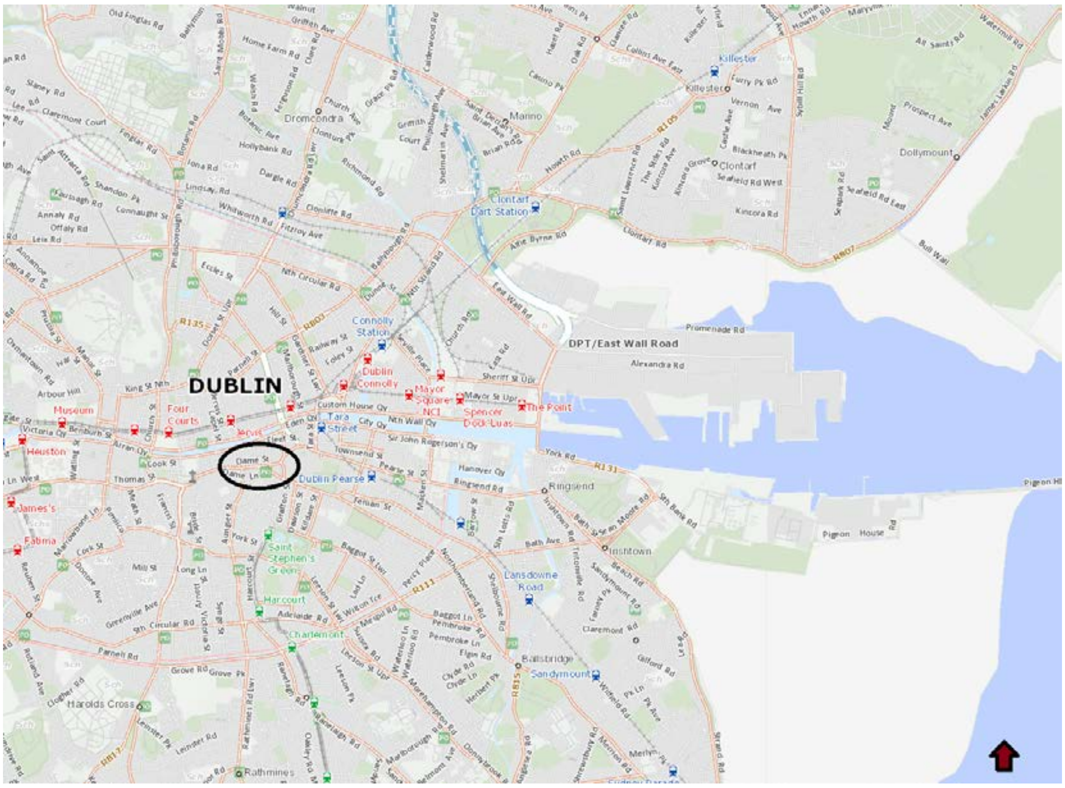

Figure NTS.1 - Site Location

The Proposed Project is described in further detail in **Section 4** of this Non-technical summary (NTS).

The (EIS) documents a systematic analysis of the impact of the Proposed Project in relation to the existing environment and follows guidelines published by the Environmental Protection Agency.

2. Background to the Project and Alternatives Considered

The Proposed Project will transform College Green and redefine the area as a Civic Space of National importance in line with DCC's long standing objective. The Proposed Project will contribute to the achievement of the vision for College Green set out both in the Dublin City Development Plan 2016-2022 and the Public Realm Strategy for the City.

A number of concept and design alternatives were considered in the development of the Proposed Project. Initially a public realm strategy was developed which considered a number of strategy options. A preferred option was selected which formed the basis for the further development of the Proposed Project.

In order to accommodate the rerouted traffic due to the removal of the east-west traffic at College Green, a number of traffic management measures were explored. This included the provision of two-way bus lanes on Parliament Street. However, this scenario resulted in the exceedance of air quality standards on Parliament Street and was ruled out. On this basis, it was proposed to retain Parliament Street in its current form as southbound only and to limit the number of buses being rerouted on this street.

The layout of the civic plaza was developed by the design team in close consultation with DCC, key stakeholders and the EIS team. The design also considered the opinions received during the consultation process. The original western boundary of the plaza only extended as far as the junction with Church Lane. Further research by the design team established that College Green had historically extended from Trinity College and Grafton Street as far as the junction of Trinity Street with Dame Street. On this basis, the plaza was extended to run the full historic length of College Green, and centred on an axis between the centre of Dame Street and the entrance to Trinity College, with Foster Place as a separate and more recent adjunct to it as the result of the 19th century extension of the Parliament Building.

A number of options for the provision of cycling through the civic plaza or through alternative routes were also considered. It was deemed that the option which provides two one-way cycle lanes either side of the western end of College Green joining at the central turnaround and running along the south side of the plaza as a two-way dedicated cycle route, joining with the Westmoreland Street route at the north-east end of Grafton Street is preferred.

During the development of the final design, various options were explored on the basis of a number of specific issues to be addressed, including the following:

- Tree species, spacing and location;
- Types of surfacing to be used;
- Consideration of the removal of the railings at Bank of Ireland;
- Inclusion and number of the water jet fountains; and
- Relocation of statues.

These issues were then resolved into the final scheme design. The final agreed architectural design and traffic management measures form the Proposed Project that is presented and assessed in this EIS.

3. Consultation

DCC, the design team and the EIS team carried out extensive consultation during the concept and design development of the Proposed Project. Initially, a series of public consultation events and surveys were carried out to seek opinions on the challenges and opportunities at College Green.

During the preparation of the EIS, a scoping process was undertaken where an outline of the proposed EIS was provided to consultees requesting comment/input on the final scope and content of the document.

Further consultation was carried out with key stakeholders including various Dublin City Council departments, the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs (DAHRRGA), Business Organisations, including Dublin Town, IBEC, Dublin Chamber and Temple Bar Company and other interested Parties including the National Council for the Blind, Bank of Ireland, Office of Public Works and the Taxi Regulator.

A statutory public consultation shall be carried out in conformity with the applicable legislation including Section 175 of the Planning and Development Act, 2000 as amended, Part 10 of the Planning and Development Regulations 2001 as amended and any other applicable legislation.

4. Proposed Project Description

The Proposed Project involves the development of a civic plaza at College Green and the introduction of traffic management measures. The core area of works consists of College Green and parts of Dame Street, Trinity Street, St. Andrew’s Street, Church Lane, and the very northern end of Grafton Street. The overall site area is approximately 13,960m^2. Refer to **Figure NTS2**.

The space created by the Proposed Project will have the potential to transform College Green and to redefine the area as a Civic Space of National importance.

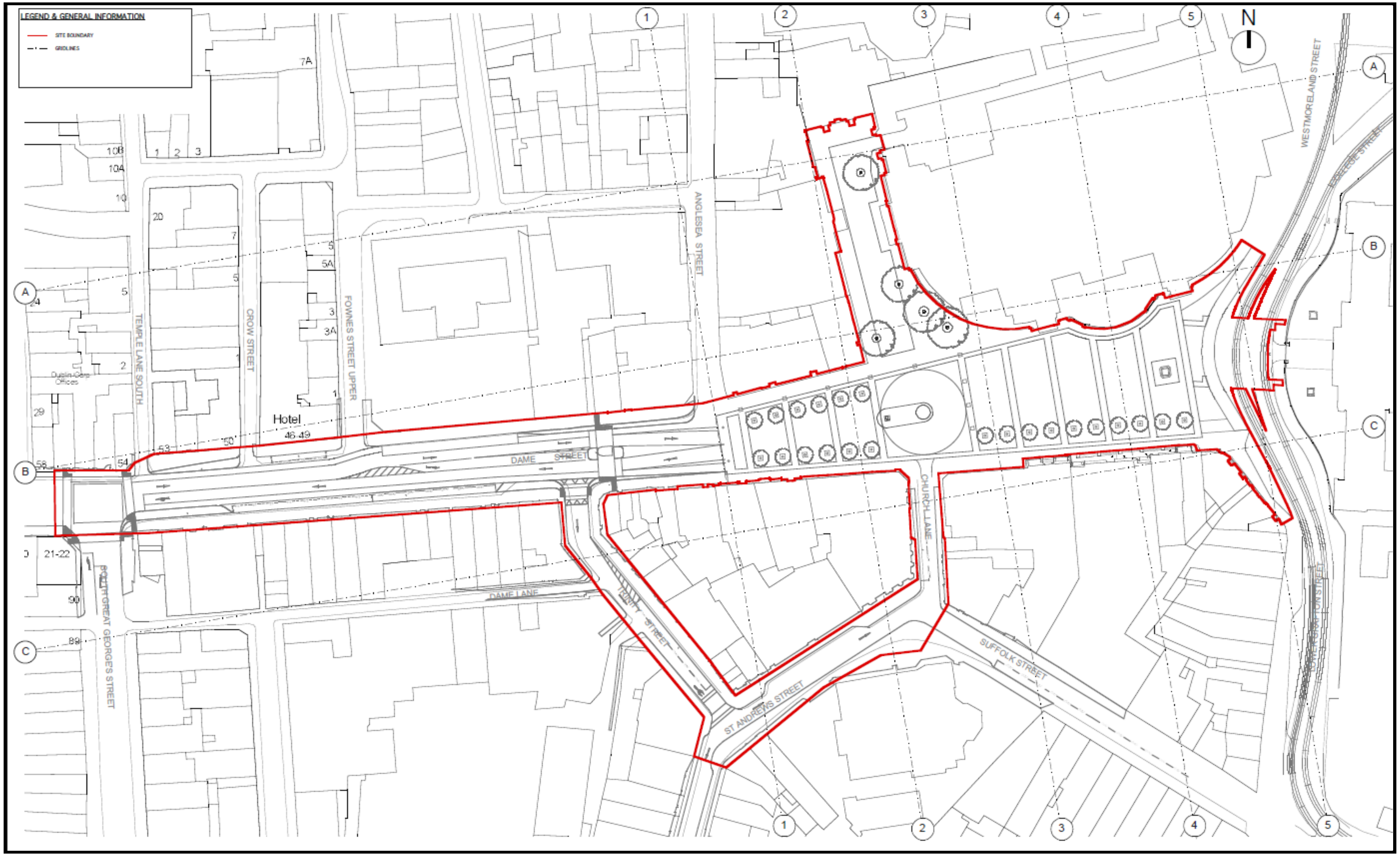

Figure NTS.2 - Proposed College Green Project

Civic Plaza

It is proposed to develop a civic plaza at College Green, extending from Grafton Street Lower to the junction with Anglesea Street, occupying an area of circa 7,300m^3. The pedestrian oriented space will improve the environment of College Green, making it attractive and accessible to a greater diversity of users. The creation of a level (step-free) surface across the space will facilitate movement of wheelchairs, buggies, suitcases and people using mobility aids.

The civic plaza will have the following features:

- The Thomas Davis memorial will be repositioned to the 'circus' area at the junction with Foster Place. A minimal repositioning of the Henry Grattan statue is also proposed.
- A total of 22 new trees will be planted in place of the eight that currently exist- ten in a single line along the south side of the plaza, and a further twelve forming an avenue at the approach to the space from Dame Street.
- Street furniture including seating, litter bins, bollards, cycle stands, planters and tree grilles will be selected to be consistent throughout and relate to the design of the space.
- It is proposed to install the infrastructure to make provision for special events.
- A fountain in the form of a number of stainless steel plates imbedded in the paving. When not in operation, the plates are nearly invisible and events can take place above them. When in operation, 32 jets of water can rise from 1m to 6m in height.
- Light and dark granite setts will be used to create the design wedge pattern. Existing setts in Foster Place will be removed, stored on/off-site and re-laid.
- Tall lighting columns are proposed along the northern and southern boundary of the plaza to further define the space, leaving the centre of the space for temporary events.
- It is proposed to complement the existing drainage system with the installation of a Sustainable Urban Drainage System (SuDS), where possible.

Traffic management measures

As part of the Proposed Project, all vehicular through traffic will be removed from the College Green area. Buses will continue to run along the same route as the new Luas tracks in front of Trinity College.

Buses which currently traverse College Green from Dame Street, Grafton Street and College Street will be diverted onto other routes. Those buses which will continue to use Dame Street will turn around at College Green, in a new turning circle at the junction of Foster Place and Church Lane.

Parliament Street will be public transport only from 7am to 7pm, Monday to Friday.

Works on Dame Street are required to tie in with the plaza at the eastern end of Dame Street and to provide cycling and pedestrian facilities between the civic plaza and South Great George's Street.

Alternative taxi ranks and loading bays will be provided in the study area, to make up for those which are to be removed as part of the Proposed Project. These are proposed at Dame Street, Trinity Street and Church Lane.

Two one-way cycle lanes on either side of Dame Street will join at the central turnaround and run along the south side of the plaza as a two-way dedicated cycle route that joins with the College Street route at the north-east end of Grafton Street.

Construction Strategy

The construction phase of the Proposed Project is likely to take 12 – 18 months, and is expected to commence in early 2018. Access through College Green will be maintained for pedestrians and cyclists for the duration of the works. Access to adjacent businesses will also be maintained.

5. Planning and Policy

The review of strategic, statutory and non-statutory plans clearly demonstrates that there is an extremely supportive and consistent policy framework for the College Green Project. At a national level, the National Spatial Strategy 2002-2020 (DoHPCLG, 2002) advocates the provision of pedestrian friendly zones as a component of encouraging cities to develop thriving, human–scale, cultural and social environments. In other words, pedestrianisation is a valuable policy tool to achieve attractive liveable city centres, where the creation of space for people over cars, supports the status of city centres as high quality destinations with robust economies. The Regional Planning Guidelines for the Greater Dublin Area 2010-2022 (Dublin Regional Authority, Mid-East Regional Authority, 2010) and Retail Planning Guidelines for Planning Authorities (DoHPCLG, 2012) reinforce this policy theme, correlating high-quality city centre public realm, with footfall growth providing customers for city centre businesses.

The Dublin City Development Plan 2016-2022 (DCC, 2016) supports the proposal for College Green as part of a dynamic and progressive planning policy agenda to improve the public realm and experience of the city, complement the protection and appreciation of the architectural and historic heritage, reposition College Green as the hub of Dublin’s Civic spine, and give the city a public realm that is befitting of a European city tourist destination. The proposed civic plaza is supported in policy as an important tool to enhance and increase footfall in the city centre, thereby supporting commercial and retail businesses. The College Green Plaza is directly proposed in accordance with objective SCO8 of the Dublin City Development Plan 2016–2022: *“prioritise the re-development of College Green as a civic space, to include the pedestrianisation of Foster Place.”*

The redevelopment of College Green is further supported in the Dublin City Centre Transport Study (NTA and DCC, 2016) and The Heart of Dublin City Centre Public Realm Masterplan (DCC, 2016), completing a comprehensive supportive policy environment for the Proposed Project.

6. Traffic and Transport

This section presents the Traffic and Transportation assessment for the construction and operation of the Proposed Project.

It is envisaged that access to the site during the construction phase will be from Dame Street. The Construction Access Strategy to serve the construction phase of College Green will be consistent with these designated HGV routes in the city centre and they will form the primary access and egress routes between the construction site and the external road network. The construction of the Proposed Project would result in an additional six trips on Dame Street during the peak hour. The impact of construction traffic is therefore considered to be slight and would result in negligible impact on the surrounding road network.

In order to understand the traffic impacts of the Proposed Project, the National Transport Authority have undertaken a detailed transport modelling exercise using the NTA's Regional Modelling System East Regional Model (ERM). In general, the projected change in traffic flows is dispersed among the wider street network serving the city centre and it is envisaged that overall there will be no significant change in traffic conditions on the surrounding street network during the peak hour periods, with congestion remaining on the strategic access routes serving the city centre. However, the provision of additional bus priority measures committed for the Quays will act to mitigate any potential increase in delays along these routes for buses and taxis.

The Proposed Project will result in a significant positive impact on pedestrians and cyclists through the significant increase in pedestrian space, which will remove the existing pinch points on either side of College Green and removing the need for pedestrians to cross a busy road at this location. At present, approximately 75,000 pedestrians pass through College Green on a daily basis, contending for space on footpaths which at peak times are insufficiently wide to cater for the peak demand. The Proposed Project will therefore result in a substantial time saving to the large number of pedestrians passing through College Green as well as improve the general safety of pedestrians through the removal of traffic in the area.

Similarly, there are approximately 6,500 cyclists currently passing through College Green on a daily basis, who will benefit greatly from the Proposed Project. Cyclists currently share the road through College Green with large volumes of cars and buses that pass through College Green with no dedicated facilities provided. The Proposed Project includes proposals for a two-way cycle track along the eastern and southern sides of the proposed plaza and will therefore greatly improve the quality of service and safety of cyclists passing through College Green.

In order to facilitate the Proposed Project, buses which currently pass through College Green will be rerouted. Generally speaking, existing bus routes will be rerouted to the north and south quays using Parliament Street or Winetavern Street to connect to the existing bus routes outside the study area.

The re-routing of buses will result in the relocation of bus stops to alternative locations along the new bus routes. To assess the impact on bus passengers, a 5-minute walk catchment analysis was undertaken for existing routes passing through College Green and compared to the 5-minute walk catchments for the proposed alternative routes. Generally, this assessment showed that overall, a similar number of people would be served by the new routing as is currently served by existing routes.

7. Air Quality and Climate

The impact of the proposed College Green Project has been assessed both during the construction phase and the operational phase for both air quality and climate.

In relation to climate, both the construction and operational phases of the Proposed Project will not be significant and will have a negligible impact on greenhouse gas emissions in a national context.

In relation to air quality, the construction phase of the Proposed Project will be of medium risk and thus a range of mitigation measures will be required to be implemented.

The operational phase of the Proposed Project was assessed in the opening year, 2018 and in 2035. The model utilised, ADMS-Roads, is an approved model for modelling road traffic emissions in urban areas and was validated against Dublin City Centre monitoring data for the Year 2012. The validation study found that good agreement was achieved between the observed and modelled data.

The baseline monitoring and modelling review found that existing levels of PM_{10} / $PM_{2.5}$ (particulate matter) are in compliance with the ambient air quality standards. In relation to nitrogen dioxide (NO_2), both the short-term and annual mean limit values are breached at hot-spot locations at the façade of buildings along the main arteries. Although levels measured at Winetavern Street are below the ambient air quality standard, levels elsewhere in the city centre are significantly higher for NO_2.

Modelling of the Do Something (DS) scenario for PM_{10} / $PM_{2.5}$ in both 2018 and 2035 confirms that compliance with the ambient air quality standards is maintained for all years and scenarios and thus the impact of the Proposed Project on level of PM_{10} / $PM_{2.5}$ in the study area is negligible.

Modelling of the DM scenario for NO2 in the opening year has determined that the Proposed Project will be overall beneficial with a significantly greater number of receptors improving in air quality relative to the number of receptors which deteriorate in air quality. In relation to the short-term limit value, full compliance is achieved at the building façades in the study area for both the opening and future years.

There will however be a period of time, between opening year and 2021, during which a number of first-floor facades are likely to remain above the annual mean NO_2 ambient air quality standard and between opening year and 2024, during which some ground level façades are likely to be in excess of the annual mean NO_2 ambient air quality standard. In terms of specific sensitive receptors, such as residential units, crèches, care homes, schools and hospitals, no ground level receptors have been identified along the specific “hot-spots” of the North Quays, D’Olier Street, College Street and Lord Edward Street.

In the absence of the Proposed Project, the impact on existing ground floor and first-floor façades will be greater with a greater number of receptors experiencing air quality in excess of the annual mean NO_2 limit value.

In 2035, all ambient air quality standards will be complied with at the façade of all buildings in the study area. In relation to NO_2 in 2035, the Proposed Project will remain overall beneficial in terms of the annual mean NO_2 concentration.

8. Noise and Vibration

This chapter assesses the noise and vibration impact of the Proposed Project on the existing noise environment.

Currently the College Green area is dominated by high sound emissions from traffic. The 2012 Dublin City ‘Noise Map’ indicates that sound emissions from traffic in the College Green area currently fall within the 60-65dB(A) band for night time (L_{night}) and the ‘greater than 75dB(A)’ band for the day time (L_{day}) period. These levels are considered undesirable with reference to the Noise Action Plan.

Noise impacts during the construction phase of the Proposed Project are expected to arise from the use of plant during excavation, site clearance and development of the plaza. The Contractor will take specific noise abatement measures and comply with the recommendations of BS 5228 Code of practice for noise and vibration control on construction and open sites, 2014 and the European Communities (Noise Emission by Equipment for Use Outdoors) Regulations, 2001. Normal working hours during the construction phase will be employed, however it may be necessary to work outside of these hours at night and at weekends during certain activities and stages of the development.

The assessment of the operational impacts of the Proposed Project was based around the do-minimum (DM) Scenario which represents movement and access in the city centre as it exists currently, taking into account permitted and planned developments and do-something (DS) scenario which includes the Proposed Project.

The modelling outputs for the daytime 2018 DS scenario predict an increase of 5% in residential addresses points in the undesirable daytime category and a decrease of 2% in residential locations in the desirable category.

The study concludes that when comparing the DM and DS 2018 scenarios for nighttime, a 5% increase in residential locations in the undesirable band and a slight decrease of approximately 1% in the desirable band is predicted.

The outputs of the 2035 DS scenario show that more residential address point locations are predicted to fall within the daytime undesirable band compared with the DM scenario and fewer residences are predicted to fall within the daytime desirable bands. Nighttime percentages are similar across all scenarios.

9. Biodiversity

This chapter provides information on ecological features of particular significance within or adjacent to the site of the Proposed Project. This assessment identifies areas of designated nature conservation, including Special Areas of Conservation, Special Protection Areas, Natural Heritage Areas and proposed Natural Heritage Areas within 15 km of the project site and identifies areas where rare or protected species of flora and fauna may occur within the study area. In addition, undesignated natural or semi-natural areas of biodiversity value are identified.

There are no designated conservation areas on the site of the Proposed Project. There are 16 Natura 2000 sites located within a 15km radius of the project study area. The development location in the area of College Green is then considered in terms of source-pathway-receptor relationship and proximity to the River Liffey with regards direct ecological and hydrological connectivity to Dublin Bay. There are four Natura 2000 sites located within a potential zone of influence of the development; North Dublin Bay SAC, South Dublin Bay SAC, North Bull Island SPA and South Dublin Bay and River Tolka Estuary SPA.

College green is an urban environment comprised of buildings and artificial surfaces (BL3). There are scattered London Plane trees surrounding the Henry Grattan statue and at Foster Place.

The Proposed Project is predominantly comprised of groundworks in the inner city urban environment. There will be no significant impact on surface water or on the hydrology of the surrounding area as a result of the Proposed Project and as such there will be no significant impact on the European sites located in Dublin Bay or on any other site of natural conservation during the operational phase of the Proposed Project.

There will be minor changes to the location of trees during the construction phase which will not be significant in terms of impacts on biodiversity. The quality of the impact on local habitats will be neutral.

By way of compensation for tree loss at the Henry Grattan statue and Thomas Davis memorial, it is proposed to plant 22 new trees - ten in a single line along the south side of the plaza, and a further twelve forming an avenue at the approach to the space from Dame Street. It is proposed to retain the distinguished Plane trees in Foster Place.

During construction, the contractor will employ management measures outlined in the Construction & Environmental Management Plan (CEMP) to contain any areas at risk of contaminated runoff.

There will be no significant impact on biodiversity due to the proposed works following the proposed best practice construction management measures and tree replacement.

10. Archaeology, Architectural and Cultural Heritage

Irish Archaeological Consultancy Ltd prepared this assessment on behalf of Dublin City Council, to study the impact, if any, on the archaeological, architectural and cultural heritage resource of the proposed pedestrian plaza at College Green, Dublin 2 (OS Sheet 18).

The Proposed Project area has been subject to development since the 1650s and whilst much of the area has been subject to modern disturbance, it is not clear as to how that disturbance has impacted on archaeological features or deposits that have the potential to survive beneath the current ground level. This is particularly the case in the eastern part of the Proposed Project where later medieval burials were found at a significant depth as part of the Luas Cross City.

It is possible that groundworks associated with the development may have a significant or profound negative impact on any features of archaeological significance that may survive below ground level.

All ground disturbances associated with the Proposed Project shall be subject to continuous archaeological monitoring. Monitoring will be carried out under licence to the DoAHRRGA in consultation with the National Museum and the Dublin City Archaeologist. Full provision will be made available for the resolution of any archaeological remains that may be discovered (i.e. preservation by record), should this be deemed an appropriate manner in which to proceed.

Furthermore, a suitably qualified archaeologist will be appointed as part of the detailed design team in order to advice on specific potential impacts as and when they may arise. This will result in continuous impact assessment of the detailed works, allowing mitigation measures to be agreed in advance, in full consultation with the statutory bodies.

The buildings that have been erected on either side of College Green mainly date from the 18th and 19th centuries and the majority of them are protected structures, as are several buildings in the project area in Dame Street, Foster Place, St. Andrew’s Street and Grafton Street. The southern side of College Green, along with Trinity Street, St Andrew’s Street and Church Lane, are also within an Architectural Conservation Area. The entire project area is within an area that is designated as a Conservation Area within the City Development Plan.

The present proposal is to remove traffic from College Green and to provide for new paving and lighting to maximise its potential as a prime urban space. This would involve relocating the two memorials, the Henry Grattan statue being slightly moved, while the Thomas Davis memorial would be turned to face westward and moved a short distance westward to the junction of Foster Place and Church Lane.

The design would include the removal of the trees that surround the Henry Grattan statue in the centre of the street and the planting of a new line of trees along the frontage of the protected structures on the southern side of the street.

College Green has the potential to be a significant urban space on a European scale, arising from the fine set of buildings that surround the triangular space that is terminated by the front of Trinity College, and which has the highly significant Bank of Ireland building on the northern side. The principal impediment to fulfilling its potential is the heavy traffic through the space and the present proposal would reclaim this space from the traffic, resulting in a positive outcome for built heritage.

11. Townscape and Visual

The Townscape and Visual Impact Assessment (TVIA) pertains to the proposed College Green Project, which seeks to convert the existing carriageways into a shared surface plaza for pedestrians and cyclists. The study was undertaken in accordance with the Guidelines for Landscape and Visual Impact Assessment (GLVIA - 2013), which is the industry standard and includes specific provision for 'Townscape' assessments. The townscape appraisal considered the way in which the Proposed Project ties into the existing urban fabric and character in terms of both form and function. Whereas, the visual impact appraisal utilises 'before-and-after' images (photomontages) of the College Green setting to consider the effects of visual change to the street scene from six representative viewpoint locations within and around College Green. The 'significance' of both townscape impacts and visual impacts is derived from a balance of the 'sensitivity' of the urban setting those that view it, versus the 'magnitude' of change to the urban fabric and street scenes.

For this project, the TVIA required a high degree of interaction between the Architectural design team that designed the plaza and the Cultural Heritage consultants. This allowed a comprehensive understanding of the design intent within the context of a heritage-rich urban environment. It also avoided confusion crossovers between disciplines and the risk of non-expert impact judgements being made.

In relation to townscape impacts, it is considered that the sensitivity of College Green can only be considered to be Very High. This is on the basis that it is critical element of the urban fabric of Dublin City. It is a major node for vehicular transport, cyclists and pedestrians and the heart of tourist activity. It is defined by landmark buildings and contains a number of protected monuments. These factors are reflected in the objectives and policies of the Dublin City Development Plan (2016-2022) in respect of urban design, architectural heritage and transport, which relate to a balance of protection and enhancement of College Green. Whilst it is acknowledged that there will be moderately negative townscape impacts during the construction stages of the proposed plaza, these will be short-term. Once completed, the shared surface plaza is deemed to contribute positively to the form and function of College Green and will strengthen it as a key node in the central city.

The new surface treatments and urban elements proposed in the plaza design are well organised to subtly define and suggest the uses of different portions of the plaza, whilst highlighting heritage features and tying-in seamlessly with the new public transport corridor (Luas Cross City and bus/taxi lanes) that is currently under construction.

In relation to visual impacts, it is again considered that there will be negative effects on the visual context of College Green during the construction stage of the proposed plaza. However, following completion of the plaza the visual effects at all six of the representative viewpoints are considered to be positive and the visual setting enhanced. This is principally due to the transformation of this space from a cluttered and traffic-dominated junction into a simply organised social and civic space (as it had been in earlier times). The visual enhancement of College Green is also a function of the use of high quality materials that reflect the heritage setting, strengthening of visual axis, the opening up of clearer views of landmark buildings and monuments as well as a general de-cluttering of the space.

Overall, it is not considered that any significant townscape and visual impacts will result from the Proposed Project. Negative short-term impacts experienced during the construction phase will be followed by positive effects that will enhance this urban setting.

12. Soils, Geology, Hydrogeology and Hydrology

The geological, hydrological and hydrogeological impact of the Proposed Project on the site and its immediate surroundings was assessed.

The study area is located in Dublin City Centre and has been an urban setting since 1709. The soils and subsoils consists of made ground which refers to soil which has either been altered or placed by man. Beneath the made ground the material consists of hard brown to black clay with occasional layers of gravel and cobbles overlying limestone bedrock. The bedrock is at approximately 3 - 4m below ground level.

Considering that the location of the site has been in an urban environment for centuries, and is currently in an area of high traffic volumes, it is possible that there is soil contamination at the site.

The bedrock underlying the study area is classified by the GSI as a Locally Important Aquifer which is productive only in local zones (Ll) and belongs to the Dublin Groundwater Body. The locally important aquifer is considered to be of medium importance according to the IGI guidelines.

Aquifer or groundwater vulnerability is a relative measure of the ease with which the groundwater could be contaminated by human activity and depends on the aquifer’s intrinsic geological and hydrogeological characteristics. The GSI has classified the aquifer vulnerability underlying the site as Medium to High in the western side of the site and Extreme in the eastern part of the site. However, based on rock head level it is more likely to be Extreme and at risk from pollution.

The study area is located within Hydrometric Area 09 which is the EPA classification for the catchments flowing into Dublin Bay.

The principal catchments are the River Liffey, Tolka River and Dodder River catchments and their associated sub-catchments. There are no open water courses rivers in the vicinity of the site. Surface water bodies that are considered to be relevant to the Proposed Project include the River Liffey, Grand Canal and Dublin Bay.

The study area is located outside of the Eastern Catchment Flood Risk Assessment and Management (CFRAM) predicted extreme fluvial flood extent and tidal flood extent. The risk of both fluvial and tidal flooding is therefore considered to be very low. The risk of groundwater flooding to the site is considered to be low. There is a minor risk of pluvial flooding to the site.

There are no sensitive features such as abstraction wells, hydrological sites, groundwater dependent ecological sites or geological heritage sites which are likely to be impacted by activities within the site. The features of importance identified in the study includes the soil, which is of low importance and the bedrock aquifer which is of medium importance.

During the construction phase the activities which may pose a potential impact include the excavation of inert soils, the excavation of made ground, contamination of soils and contamination of groundwater. The magnitude of excavating inert soils is negligible and the significance is imperceptible. The excavation of any hotspots of soil contamination will be a Permanent Positive impact on the soils environment and therefore, the magnitude of this impact is Minor Beneficial. The magnitude of the potential impact from contamination of is Small Adverse for soils or Negligible for groundwater. As a result, the significance of the potential impact on both the soil and groundwater is imperceptible.

The Proposed Project will have not have any impact on floodplain storage and conveyance. The Proposed Project will also not increase flood risk off site.

The operational phase of the Proposed Project is predicted to have an overall neutral long-term impact on the soils, geology, hydrological and hydrology within the study area. There will be a reduction in traffic within the area reducing the potential for associated hydrocarbons spills.

Mitigation measures will include a project-specific Construction Management Plan (CMP) during the construction phase. The CMP will cover all potentially polluting activities and include an emergency response procedure. Appropriate storage and temporary bunds will be put in place to prevent the accidental release of hazardous materials. Mitigation during the construction phase will include implementing best practice during excavation works to avoid sediment running into the drainage system which discharges to the River Liffey.

No mitigation measures are required during the operational phase.

Upon application of the mitigation measures the magnitude of any residual impacts both in the construction and operational phase are Negligible. As a result, the significance of all the residual impacts is Imperceptible.

13. Resource and Waste Management

This section describes the potential environmental effects of the generation and management of solid waste streams from the Proposed College Green Project, in the context of the existing local and national resource and waste management environment. The assessment considered the following aspects:

- The legislative context;
- The construction phase, including excavation; and
- The operational phase.

Surplus materials and wastes will be generated during the excavation, construction and operation phases of the Proposed Project. An estimated 15,172m^3 of excavation material will be required to be removed from the Proposed Project location for off-site recovery or disposal.

A detailed construction and demolition waste management plan (CDWMP) will be prepared and implemented by the Contractor following appointment and prior to commencing work on site.

Following implementation of a number of mitigation measures the residual impacts associated with the Proposed Project were determined to be as follows:

The residual impact of excavation waste will be:

- The impact of excavation waste is expected to be slight, negative and short-term.
- The impact of construction waste is expected to be imperceptible.
- The impact of operational waste is expected to be imperceptible.

14. Material Assets: Utilities

Potential impacts on material assets (utilities) are evaluated during both the construction and operational phases of the Proposed Project. Mitigation measures are proposed, where required.

During both the construction and operational phases of the Proposed Project, some realignment, upgrade, or replacement of services and utilities may be required in conjunction with or to accommodate the proposed works, as outlined below.

- Some local diversions may be required to power supplies. A new public lighting regime is proposed, and new ducting and mini pillars will be provided to cater for same.
- It is intended to complement the existing drainage regime by the installation of Sustainable urban Drainage Systems (SuDS) features, where possible.
- The existing gas utilities will be retained.
- Localised diversion of telecommunications services is anticipated, and new traffic ducting will be required.

During the construction phase, the Contractor will be obliged to put measures in place to ensure that there are no interruptions to existing services and all services and utilities are maintained unless this has been agreed in advance with the relevant service provider and local authority. Works will be carried out in ongoing consultation with the relevant utility companies and/or DCC. Where new services are required, the Contractor will apply to the relevant utility company for a connection permit where appropriate.

Due to the measures incorporated in the design i.e. SuDS, no mitigation measures will be necessary during the operational phase.

It is considered that residual impacts associated with the Proposed Project will vary from imperceptible to slight negative and will be short term in nature during construction and imperceptible during operation.

15. Material Assets: Land Use and Property

This section describes the potential impacts of the Proposed Project on land use at, and adjacent to, College Green. Land-use considers if there will be severance, loss of rights of way or amenities, conflicts, or other changes likely to ultimately alter the character and use of the surroundings.

All works for the proposed College Green Project are contained within the public road way, public footpaths and adjoining side streets.

The subject site is located at the core of a historic city centre and is surrounded by a broad range of uses. The eastern edge of College Green is dominated by Trinity College Dublin (TCD). The northern boundary is bounded by the Bank of Ireland. The Foster Place cul-de-sac is dominated by taxi parking.

The street section from Anglesea Street to the former Central Bank Plaza comprises office and institutional uses but does not include any active street uses. Moving westwards along Dame Street beyond the central bank plaza, the land use notably changes again with a predominance of bars, restaurants and cafes.

The southern edge to College Green includes large comparison retailing units accommodated within typically former institutional/banking structures, along with smaller units. The Ulster Bank building on the corner of Church Lane is a dominant presence. The character of the street changes slightly with the commencement of Dame Street, with a wide range of units including office, bars, language institutes, hotel and services.

The construction of the project will require temporary use of lands (currently roads) for the construction site, which shall transition to a permanent change as the Project is completed.

There will be no direct impact on any property adjoining the subject site. However, premises bounding the site at College Green will experience temporary disruption to pedestrian and vehicular access to their premises during the construction phase.

The use of College Green as a pedestrian plaza will significantly improve the functionality, attractiveness and integration of the location and facilitate public events and activities. In the long-term the College Green plaza is expected to become one of the core focal points of the city centre, sustaining a permanent positive legacy for the city.

16. Socio-Economics

This section of the EIS assesses the impact of the Proposed Project on the human environment and quality of life in the subject area of the proposed College Green Project. The assessment considers attributes and characteristics associated with demographics, community and residential settlement, economic activities, public amenity and community infrastructure, tourism and access.

This assessment, has determined that the negative impact on businesses during the construction will be of slight to moderate negative significance. A broad range of mitigation measures will be implemented for the construction of College Green Plaza and the Proposed Project.

The Proposed Project will have an operational residual significant positive impact on business, retail and tourism, by improving the public realm in a city centre site, increasing the space available to people and activity, improving the quality of the experience of visiting Dublin and improving convenient walking access to economic, commercial, tourism, educational and social facilities in the area. The residual impact of the Proposed Project is considered to be significant and positive in the long-term.

The re-location of the taxi ranks will not have a negative residual impact on that socio-economic group.

The implementation of the Proposed Project will improve the permeability of the city centre areas, and support the improved growth and integration of the city core. It is expected that footfall will grow significantly in College Green itself as well as Westmoreland Street, Dame Street and Temple Bar. This will have a significant positive impact on trade and business.

The considered review of bus route operations will address any potential negative impacts arising from change in routes and inconvenience for customers. The introduction of Luas stops beside College Green are likely to focus the new Civic Plaza as the activity and interaction hub for the city centre. While bus stops are being displaced, the careful management of this process will ensure that the new routes and stops remain with the 10 minute catchment area (and generally 5 minute catchment).

17. Interactions and Cumulative Impacts

The potential inter-relationship and interaction of key aspects and/or effects is considered in each of the individual sections of the EIS.

The qualitative assessment was based on information contained within this EIS and consultation with the relevant sub-consultants.

To facilitate the identification and consideration of interactions, an EIS workshop was held on 16th December 2016 with attendees including relevant sub-consultants, the Arup EIS Team and Dublin City Council.

The following summarises the main environmental interactions anticipated as a result of this Proposed Project:

- Traffic and Transportation and Air Quality and Climate;
- Traffic and Transportation and Noise and Vibration;
- Traffic and Transportation and Archaeology, Architectural and Cultural Heritage;
- Traffic and Transportation and Townscape and Visual;
- Traffic and Transportation and Resource and Waste Management;
- Traffic and Transportation and Socio-Economics;
- Air Quality and Climate and Material Assets: Land Use and Property;
- Air Quality and Climate and Socio-Economics;
- Noise and Vibration and Archaeology, Architectural and Cultural Heritage;
- Noise and Vibration and Soils, Geology, Hydrogeology and Hydrology;
- Noise and Vibration and Material Assets: Land-Use and Property;
- Noise and Vibration and Socio-Economics;
- Biodiversity and Townscape and Visual;
- Biodiversity and Soils, Geology, Hydrogeology and Hydrology;
- Soils, Geology, Hydrogeology and Hydrology and Resource and Waste Management;
- Archaeology, Architectural and Cultural Heritage and Townscape and Visual;
- Archaeology, Architectural and Cultural Heritage and Soils, Geology; Hydrogeology and Hydrology;
- Archaeology, Architectural and Cultural Heritage and Resource and Waste Management;
- Archaeology, Architectural and Cultural Heritage and Material Assets: Utilities;
- Townscape and Visual and Socio-Economics; and
- Material Assets: Land-Use and Property and Socio Economics.

As the proposed College Green Project is located adjacent to the Luas Cross City which is currently under construction, there is an immediate interface between the two projects. This interaction has been taken into consideration, as relevant.

The proposed traffic measures outlined in the NTA Transport Strategy for the Greater Dublin Area 2016 – 2035 have been considered cumulatively in this EIS.

Particularly, Chapter 6 '*Traffic and Transportation*', Chapter 7, '*Air Quality and Climate*' and Chapter 8 '*Noise and Vibration*'.

18. What Happens Next?

DCC has forwarded copies of the consent application documents including this EIS to An Bord Pleanála. Copies have also been circulated to the relevant prescribed bodies, as follows:

- An Chomhaile Ealion;
- Fáilte Ireland;
- An Taisce;
- CIE;
- Transport Infrastructure Ireland;
- National Transport Authority;
- Heritage Council;
- Minister for Housing, Planning, Community and Local Government.

The formal adjudication period for the Proposed Project commences when the planning application is lodged to the Board.

The planning application will be placed on display for public inspection for a statutory period of at least six weeks from the date of lodgement of the application. Any person may make a submission or observations to An Bord Pleanála, 64 Marlborough Street, Dublin 1 in relation to the application during this period.

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Submissions or observations on the application may be made only to An Bord Pleanála and must be accompanied by the appropriate fee of €50 (except for certain prescribed bodies).

Further details of the planning process can be found on the An Bord Pleanála website (http://www.pleanala.ie).

1 Introduction

1.1 Introduction

This Environmental Impact Statement (EIS) is a statement of the potential impacts on the environment which may result from the Proposed College Green Project (the 'Proposed Project').

The objectives of this EIS are:

- To identify the likely significant environmental impacts of the Proposed Project during the construction and operational phases, having regard to the characteristics of the local environment; and
- To evaluate the magnitude and significance of likely impacts and to propose appropriate measures to mitigate potential adverse impacts.

This EIS has been prepared as part of the statutory development consent procedure for the Proposed Project in accordance with the requirements of Section 175 of the Planning and Development Act, 2000, as amended ('The Act'), Part 10 Planning and Development Regulations 2001, as amended and any other applicable legislation.

This EIS has been prepared on behalf of Dublin City Council (DCC) by a Consultancy Team led by Arup with inputs from a number of specialist sub-consultants.

The site of the Proposed Project is located in Dublin City centre, as illustrated in **Figure 1.1**.

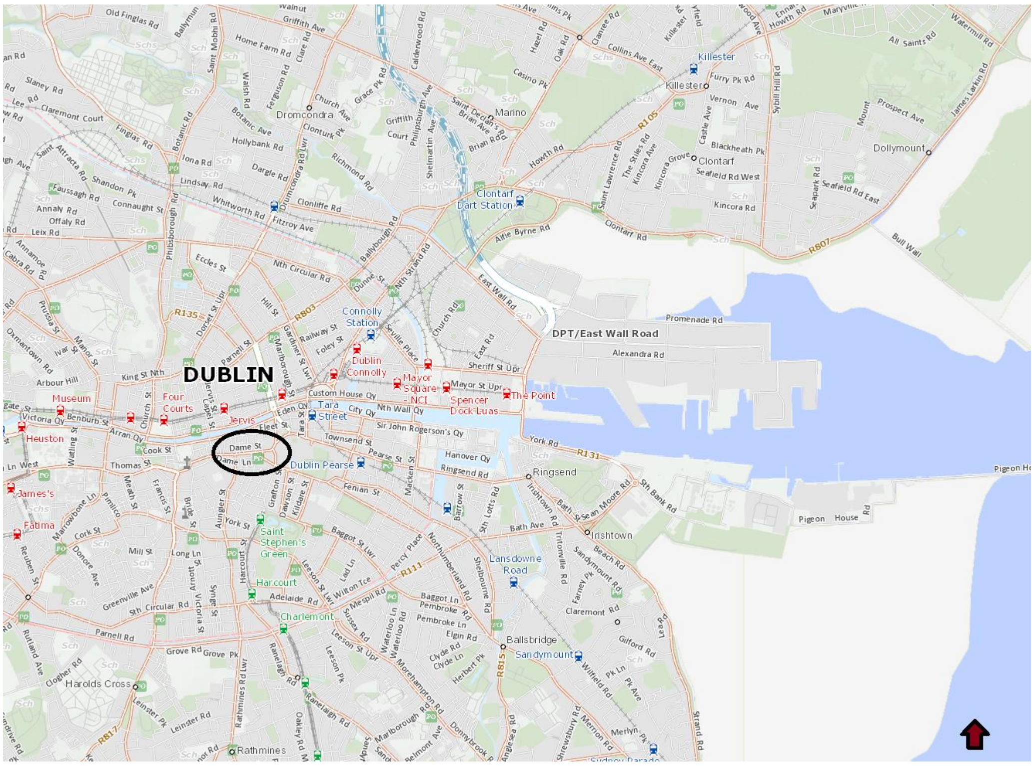

Figure 1.1 - Site location

1.2 The Proposed Project

The Proposed Project involves the development of a civic plaza and the introduction of traffic management measures and minor road works in the area of College Green, Dublin. The proposed civic plaza at College Green which will contribute to the achievement of the vision for College Green set out both in the Dublin City Development Plan 2016-2022 and the Heart of Dublin, City Centre Public Realm Masterplan (Dublin City Council, 2016).

The overall objective of the Proposed Project at College Green is in accordance with objective SCO8 of the Dublin City Development Plan (Dublin City Council, 2016) "*To prioritise the redevelopment of College Green as a pedestrian friendly civic space, including the pedestrianisation of Foster Place.*"

Policy SC2 aims to:

"*develop the city's character by cherishing and enhancing Dublin's renowned streets, civic spaces and squares; to create further new streets as part of the public realm when the opportunities arise; to protect the grain, scale and vitality of city streets; to revitalise the north and south Georgian squares and their environs, and to upgrade Dame Street/College Green as part of the Grand Civic Spine."*

The Heart of Dublin, City Centre Public Realm Masterplan recommends:

"To develop a transport strategy that facilitates the longer-term ambition to create a pedestrian friendly core by reorganising bus routes to minimise traversing of the city centre."

As outlined in the Dublin City Centre Transport Study (Dublin City Council, National Transport Authority, 2016) the development of Luas Cross City and associated traffic management measures provides a catalyst for major transport change at College Green and the creation of a new public realm:

"At College Green, those revised arrangements, reflecting the reduced road capacity following the commencement of Luas operations, will enable the creation of a new civic plaza, framed by Trinity College to the east, the Bank of Ireland to the north and a row of protected structures which form part of the Grafton Street Architectural Conservation Area, to the south."

The space created by the Proposed Project has the potential to transform College Green and to redefine the area as a Civic Space of National importance in line with Dublin City Council's long standing objective for College Green.

The core area of works occupies an area of approximately 14,000m^2 and extends east-west from the junction with South Great George's Street to the front of Trinity College. It extends north-south from the end of Grafton Street to College Street. It also includes a number of measures on Trinity Street, St. Andrew's Street and Church Lane. The extent of the main works area is illustrated in **Figure 1.2**. The proposed civic plaza occupies a space of approximately 7,300m^2.

The Proposed Project involves the removal of east-west through traffic at College Green, provision of a designated cycle track, bus re-routing and the relocation of some taxi parking and taxi ranks to nearby streets.

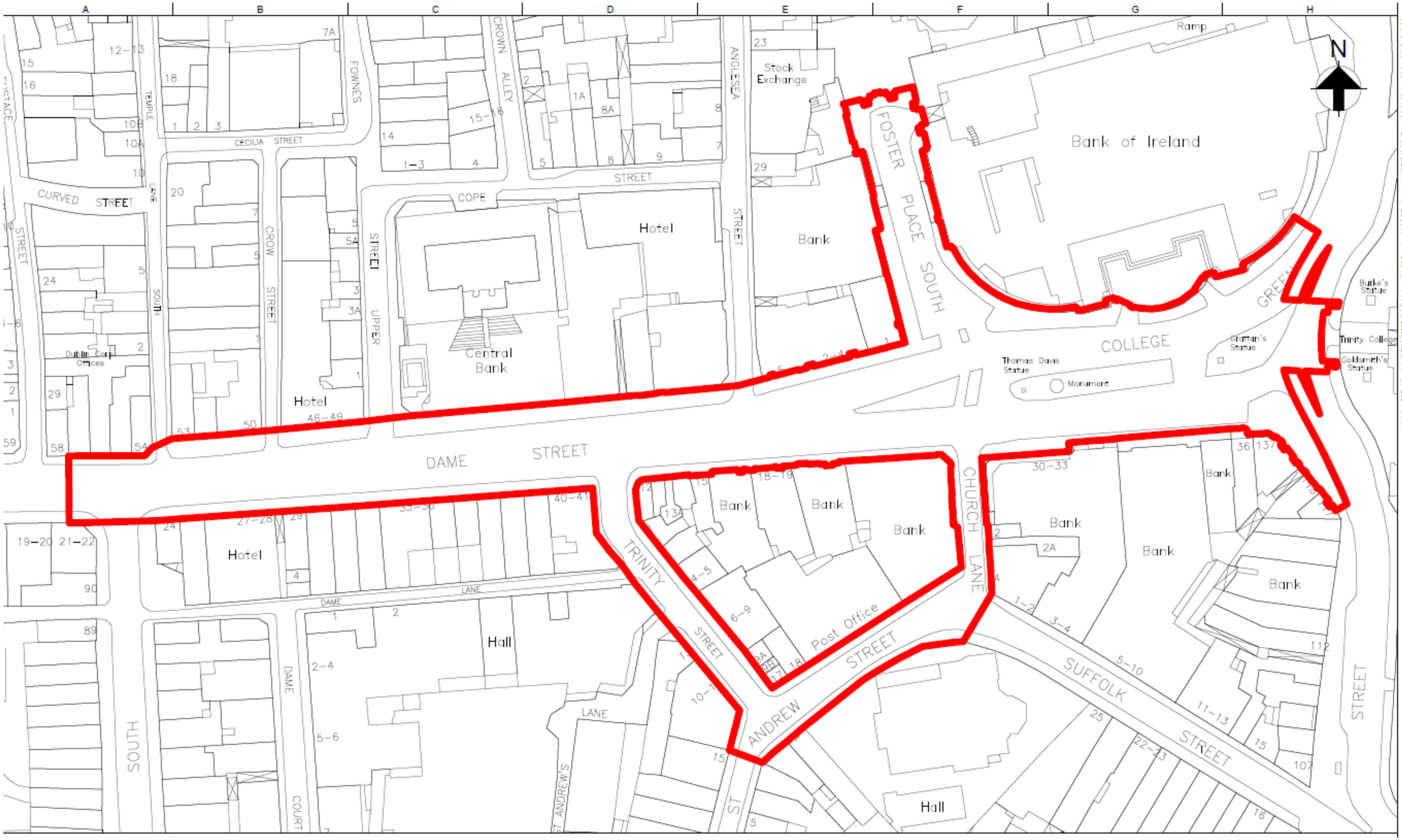

Figure 1.2 - Extent of Main Works Area

In addition, the Proposed Project involves the alteration of road and surface pavement, kerbs, street furniture, signage and utilities to provide for the development of a largely vehicular-free civic plaza at College Green.

Further detail on the Proposed Project is provided in Chapter 4, ‘*Proposed Project Description*’.

1.3 Planning Process for the Proposed Project

1.3.1 Need for an EIA

Environmental Impact Assessment legislation as it relates to the planning process has now been largely brought together in Part X of the Planning and Development Acts 2000-2010 and Part 10 and Schedules 5, 6 and 7 of the Planning and Development Regulations 2001-2010.

Part 1 of Schedule 5 to the Planning and Development Regulations lists projects included in Annex I of the EIA Directive (Directive 2011/92/EU) which automatically require EIA. Part 2 of the same Schedule outlines thresholds for other projects which also require EIA, per Annex II of the Directive.

Dublin City Council engaged CAAS Ltd. to carry out Environmental Impact Assessment Screening in order to determine whether the Proposed Project should be subject to EIA.

In the first instance it was necessary to determine whether the Proposed Project is of a type [or ‘class’] that requires an EIS. Part 10 of the Planning and Development Regulations 2001-2010 - in Schedule 5 Development for the Purposes of Part 10, Part 2, identifies:

“Class 10. Infrastructure projects (b) (iv) Urban development which would involve an area greater than 2 hectares in the case of a business district, 10 hectares in the case of other parts of a built-up area and 20 hectares elsewhere. (In this paragraph, “business district” means a district within a city or town in which the predominant land use is retail or commercial use).”

As the development area was deemed to be less than 2 hectares in area, CAAS determined that the Proposed Project was to be considered ‘sub-threshold development’ with respect to Class 10 developments.

In deciding whether an EIS is required for ‘sub-threshold developments’, it is then necessary to determine the characteristics of the Proposed Project, the location of the Proposed Project and the likelihood of whether significant effects on the environment could arise. In their assessment of the Proposed Project, CAAS and DCC determined that:

- The proposal comprises urban development over an extensive area of the core of the Central Business District, the Proposed Project is of a class that requires an EIS.
- The environmental sensitivity of the receiving environment – on account of its social, tourism, cultural and business significance there is a likelihood that significant environmental resources could be affected – which would warrant an Environmental Impact Assessment.

- The potential for significant environmental effects to arise relating to
  - Human Beings (socio-economic, amenity, tourism and trade);
  - Cultural Heritage (context and setting of Protected Structures);
  - Air [air quality and noise];
  - Material Assets (traffic and parking);
  - Health and Safety; and
  - Interaction, secondary and off-site effects.

In addition, Irish Case law agrees with the European Court of Justice that the wording of the 2011 EIA Directive 'has a wide scope and a broad purpose' and accordingly that a project which is likely to have significant effects on the environment is required to have an EIS to be prepared in accordance with the 2011 Directive and the Regulations.

It was therefore concluded that an Environmental Impact Assessment should be carried out of the Proposed Project.

1.3.2 Planning Process

This EIS has been undertaken in accordance with Section 175 of the Planning and Development Act, 2000 as amended ('The Act'), Part 10 Planning and Development Regulations 2001 as amended and any other applicable legislation.

Section 175 of the Act covers environmental impact assessment of certain development carried out by or on behalf of local authorities, as set out below:

175.-(1) "Where development belonging to a class of development, identified for the purposes of section 176, is proposed to be carried out—

(a) by a local authority that is a planning authority, whether in its capacity as a planning authority or in any other capacity, or

(b) by some other person on behalf of, or jointly or in partnership with, such a local authority, pursuant to a contract entered into by that local authority whether in its capacity as a planning authority or in any other capacity within the functional area of the local authority concerned (hereafter in this section referred to as "proposed development"), the local authority shall prepare, or cause to be prepared, an environmental impact statement in respect thereof."

Under Section 175 of the Planning and Development Act, 2000, An Bord Pleanála is the Competent Authority which is required to carry out the EIA. The requirement to submit the EIS to An Bord Pleanála is set out at section 175(3):

175.-(3) "Where an environmental impact statement has been prepared pursuant to subsection (1), the local authority shall apply to the Board for approval."

Article 120 of the Planning Regulations 2001 (as amended) outlines the procedure for submission of an EIS to the Board:

(1) "Where a local authority proposes to carry out a sub-threshold development, and where it considers that the development would be likely

to have significant effects on the environment, it shall prepare, or cause to be prepared, an EIS in respect thereof."

(5) *"Where an EIS is prepared, or caused to be prepared, by a local authority under this article, the local authority concerned shall apply to the Board for approval."*

(6) *"An application for approval under sub-article (5) shall be deemed to be an application for approval under section 175(3) of the Act and the provisions of that section shall apply to the application."*

It is acknowledged that the new EIA Directive (Directive 2014/52/EU) is due to be implemented by 16 May 2017. As DCC undertook an EIA screening assessment in August 2016, the 2011 EIA Directive applies. A copy of the Planning Authority Determination which agreed with the CAAS conclusion that an EIA was required, is included in **Appendix 1.1.**

Nevertheless, this EIS has been prepared with general regard to new requirements outlined in the 2014 directive.

1.4 EIS Methodology

1.4.1 Purpose of the Environmental Impact Statement

The purpose of an EIS is to report on the potential effects of a proposed development on the environment and to accompany the consent application of a proposed development.

This EIS includes information on potential significant environmental impacts of the Proposed Project, and highlights the proposed mitigation measures, where applicable.

1.4.2 Statutory Requirements and Guidance for the Contents of an EIS

Sections 1 and 2 of the European Communities (Environmental Impact Assessment) Regulations 1989 (S.I. No. 351/1998) as amended, sets out the information that should be included in an EIS, as follows:

1. *(a) "A description of the proposed development, comprising information about the site and the design and size or scale of the development;*

(b) The data necessary to identify and assess the main effects which that development is likely to have on the environment;

(c) A description of the likely significant effects, direct and indirect, on the environment of the development, explained by reference to its possible impact on —

human beings;

flora;

fauna;

soil;

water;

air;

climate;

the landscape;

the interaction between any of the foregoing;

material assets;

the cultural heritage;

(d) Where significant adverse effects are identified with respect to any of the foregoing, a description of the measures envisaged in order to avoid, reduce, and, if possible, remedy those effects."

2. *"Further information, by way of explanation or amplification of the information referred to in paragraph 1, on the following matters —*

(a) the physical characteristics of the proposed development, and the land use requirements during the construction and operational phases;

(b) the main characteristics of the production processes proposed, including the nature and quantity of the materials to be used;

(c) the estimated type and quantity of expected residues and emissions (including pollutants of surface water and groundwater, air, soil and substrata, noise, vibration, light, heat and radiation) resulting from the proposed development when in operation;

(d) (in outline) the main alternatives (if any) studied by the applicant, appellant or authority and an indication of the main reasons for choosing the development proposed, taking into account the environmental effects;

- *(e) the likely significant direct and indirect effects (including secondary, cumulative, short, medium and long term, permanent, temporary, positive and negative effects) on the environment of the proposed development which may result from —*
- *(i) the use of natural resources;*
- *(ii) the emission of pollutants, the creation of nuisances, and the elimination of waste;*
- *(f) the forecasting methods used to assess any effects on the environment about which information is given under subparagraph; and*
- *(g) any difficulties, such as technical deficiencies or lack of knowledge, encountered in compiling information in this Schedule."*

Consideration was also given to the following guidance in the preparation of this EIS.

- European Commission, 2001. *Guidance on EIA – EIS Review*;
- Department of the Environment, Community and Local Government (DoECLG), 2013. *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment*;
- NRA, 2004. *Environmental Assessment and Construction Guidelines*;
- Conservation and Amenity Advice Service (CAAS), 2002. *Guidelines on the Information to be contained in Environmental Impact Statements*;
- CAAS, 2003. *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements*;
- CAAS, 2015, *Draft Revised Guidelines on the Information to be contained in Environmental Impact Statement;*
- CAAS, 2015, *Draft Revised Advice Notes on Current Practise in the Preparation of Environmental Impact Statements.*

1.4.2 General EIS Methodology

1.4.2.1 Introduction

The methodology adopted for the preparation of this EIS comprised a systematic analysis of the impact of the Proposed Project in relation to the existing environment. The overall methodology for preparation of the EIS is discussed under the following headings:

- Basis for assessment;
- Impact assessment and mitigation; and
- Significance of environmental issues.

1.4.2.2 Basis for Assessment

The impact assessment examines the existing environmental conditions within the study area for each element of assessment and then determines the potential impacts associated with the Proposed Project during its construction and operational phases.

The impact assessment considers the following scenarios:

- Do-minimum (DM) scenario – Represents movement and access in the city centre as it exists currently, taking into account developments with approved planning permissions, as well as projects committed to be implemented prior to the Proposed Project. This scenario includes the continuation of all east-west through traffic at College Green during the weekends and public transport access only from Monday to Friday. This scenario includes no plaza provided at College Green;
- Do-something (DS) scenario – There will be two representative 'do-something' scenarios. The first represents a situation where the

Proposed Project has been implemented as well as other planned projects outlined in the do-minimum scenario (by 2018). The second represents a situation where the Dublin City Centre Transport Study (Dublin City Council, National Transport Authority, 2016) has been implemented in totality (by 2035). This includes the Proposed Project, as well as a number of 'other planned projects'. This scenario includes the plaza at College Green.

The do-minimum scenario is assessed in chapters where relevant. Where there is no discussion around the do-minimum scenario it is assumed that the Proposed Project area will remain as it currently exists and the impact would therefore be neutral.

The study area considered within this EIS differed for each environmental aspect and extended to incorporate all areas where there was potential for significant impact. Further information on the extent of study area considered for each topic is addressed in the relevant corresponding EIS chapter.

1.4.2.3 Impact Assessment and Mitigation

The preparation of the EIS was an iterative process, linking into the design development process. The approach adopted in the impact assessment and preparation of the EIS was generally based on that recommended in the *Guidelines on the information to be contained in Environmental Impacts Statements (*EPA, *2002),* as outlined below.

A design was developed and the potential impacts of the proposal on the receiving environment were identified along with mitigation measures, as required.

1.4.2.4 Significance of Environmental Issues

The glossaries contained in the *Guidelines on the information to be contained in environmental impact Statements* (EPA, 2002) describes an impact as "*the degree of change in an environment resulting from a development"* and a significant impact as *"an impact which, by its magnitude, duration or intensity alters an important aspect of the environment."*

The following factors were considered when determining the significance of the impact, both positive and negative, of the Proposed Project on the various aspects of the receiving environment:

- The quality and sensitivity of the existing/baseline receiving environment;
- The relative importance of the environment in terms of national, regional, county, or local importance;
- The degree to which the quality of the environment is enhanced or impaired;
- The scale of change in terms of land area, number of people impacted, number and population of species affected, including the scale of change resulting from cumulative impacts;
- The consequence of that impact/change occurring;
- The certainty/risk of the impact/change occurring;

- Whether the impact is temporary or permanent; and
- The degree of mitigation that can be achieved.

The guidance outlined in the EPA guidelines has also been followed when quantifying the duration and magnitude of impacts. The quality of the impact is described as 'negative', 'neutral' or 'positive'. Further information on the specific methodologies utilised for the assessment of each environmental aspect are included in the relevant EIS chapters.

Where no impact or a positive impact was predicted to occur, the design of the Proposed Project remained unchanged. In the case where significant adverse impacts were predicted, mitigation measures were proposed to avoid or minimise impacts. Where feasible, these measures were then incorporated into the design of the Proposed Project.

The Proposed Project presented in the planning application (including the environmental mitigation measures) will be further progressed and refined during the detailed design and construction stages. This includes any mitigation measures contained in such planning permission, as may be granted.

The detailed design and construction will develop the Proposed Project in a manner such that there is no material change in terms of significant adverse effect on the environment. Opportunities may be identified to further reduce the significance of adverse effect/impact and, in some cases, improve the residual effect/impact through modifications to the Proposed Project. Such modifications may be identified in detailed design or construction in order to allow for innovations in construction methods, available technology or changes in the existing situation.

Any modification to the Proposed Project will only be possible where there would be no significant change, or where there would be an improvement, in environmental impacts. The final Proposed Project design and construction will have to comply with all relevant statutory approvals.

1.4.3 EIS Format

The format used in this EIS document is referred to as the 'grouped format' in that it seeks to enable the reader to access the issues of interest to them as easily as possible. The EIS has been divided into the following chapters:

- Chapter 1 – Introduction;
- Chapter 2 – Background to the Proposed Project and Alternatives Considered;
- Chapter 3 – Consultation;
- Chapter 4 –Proposed Project Description;
- Chapter 5 –Planning and Policy;
- Chapter 6 – Traffic and Transportation;
- Chapter 7 – Air Quality and Climate Factors;
- Chapter 8 – Noise and Vibration;

- Chapter 9 – Biodiversity;
- Chapter 10 – Archaeological, Architectural and Cultural Heritage;
- Chapter 11 – Townscape and Visual;
- Chapter 12 – Soils, Geology, Hydrogeology and Hydrology;
- Chapter 13 – Resource and Waste Management;
- Chapter 14 – Material Assets: Utilities;
- Chapter 15 – Material Assets: Land Use and Property;
- Chapter 16– Socio-Economics;
- Chapter 17 – Cumulative Impacts and Interaction of Effects; and
- Chapter 18 – Summary of Mitigation Measures and Residual Impacts.

Each element of the environment is described in a separate chapter generally under the following headings:

- Introduction;
- Assessment Methodology;
- Baseline Environment;
- Predicted Impacts;
- Mitigation Measures; and
- Residual Impacts.

1.4.4 Consultation Process

Information on all consultation undertaken on the Proposed Project, including a summary of the comments and feedback received, is outlined in Chapter 3 of this EIS.

1.4.5 EIS and Design Team

The design team is led by Paul Keogh and Dixon Jones architects on behalf of DCC and the NTA.

This EIS has been prepared by Arup and various specialist sub-consultants on behalf of DCC. **Table 1.1** includes the relevant EIS specialists and their qualifications.

Table 1.1 - EIS team and qualifications

Environmental Aspect	Company name	Person responsible	Qualifications
EIS manager	Arup	Sinead Whyte	B.Sc, M.Sc
EIS support	Arup	Ailsa Doyle	B.Sc

EIS reviewer	Arup	Niamh O'Sullivan	BE, M.Sc, DIC
EIS review	Arup	Donal McDaid	BE, MSc
EIS technician	Arup	Gerry McTiernan	NCEA Diploma
Construction Strategy	Roughan O'Donovan Consulting Engineers	Eoin O'Cathain	BE, MSc, HDip, CEng, MIEI
Planning and Policy	Future Analytics Consulting	Richard Hamilton	BA, M.Sc, MIPI MRTPI
Traffic and Transportation	Arup	Conor McGrath	BAI
Air Quality & Climate	AWN Consulting Ltd.	Edward Porter	BSc PhD C Chem
Noise & Vibration	Dublin City Council	Brian McManus	Dip, Dip, MIOA, MEHAI
Biodiversity	Moore Group	Ger O'Donovan	B.Sc. M.Sc.
Archaeology, Architectural and Cultural Heritage	Irish Archaeological Consultancy	Faith Bailey	MA, BA (Hons)
Archaeology, Architectural and Cultural Heritage	Rob Goodbody	Rob Goodbody	BA(mod), Postgraduate Diploma, MA, MA,
Townscape and Visual	Macro Works	Richard Barker	Irish Landscape Institute Professional Practice Qualification MLA, PG Diploma, BA
Townscape and Visual	Macro Works	Nik Hennessy	B.Sc. (Agr.), MAgr(for)
Soils, Geology, Hydrogeology, Hydrology	Arup	Catherine Buckley	MSc, BA (Hons) PGeo
Soils, Geology, Hydrogeology, Hydrology	Arup	Alison Orr	PhD M.Sc, B.Sc

Resource and Waste Management	Arup	Janet Lynch	BE (Hons), FETAC Certificate
Material Assets, Land Use and Property	Future Analytics Consulting Ltd.	Richard Hamilton	BA, M.Sc, MIPI MRTPI
Socio-Economics	Future Analytics Consulting Ltd.	Richard Hamilton	BA, M.Sc, MIPI MRTPI

1.5 What Happens Next?

DCC has forwarded copies of the consent application documents including this EIS to An Bord Pleanála. Copies have also been circulated to the relevant prescribed bodies, as follows:

- An Chomhaile Ealion;
- Failte Ireland;
- An Taisce;
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- Transport Infrastructure Ireland;
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The planning application will be placed on display for public inspection for a statutory period of at least six weeks from the date of lodgement of the application. Any person may make a submission or observations to An Bord Pleanála, 64 Marlborough Street, Dublin 1 in relation to the application during this period.

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Submissions or observations on the application may be made only to An Bord Pleanála and must be accompanied by the appropriate fee of €50 (except for certain prescribed bodies).

Further details of the planning process can be found on the An Bord Pleanála website (http://www.pleanala.ie).

1.6 Difficulties Encountered During the Study

Difficulties encountered in the preparation of the EIS are outlined in each chapter as they relate to the various environmental topics.

Dublin City centre, as with all central environments, is ever-changing and evolving. Proposals for the Proposed Project are made within a dynamic city centre environment, with a broad range of developments and interventions to public space. This includes Luas Cross City construction (and operation) and access arrangements to the city centre generally. This raises issues in terms of the consideration of the baseline scenario. In instances where difficulties arise in determining what represents baseline conditions, a worst-case scenario is assessed.

1.7 References

Government of Ireland. Planning and Development Act. (2000) Dublin, Ireland.
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2 Background to the Proposed Project and Alternatives Considered

2.1 Introduction

This chapter provides a summary of the background to the Proposed Project namely, the need for the Proposed Project and how it evolved through relevant planning and transportation policy. The main strategic and design objectives of the Proposed Project are also outlined. Alternative designs considered through the design development are also outlined.

2.2 Background and Need for the Proposed Project

2.2.1 Background

College Green has had a prominent role as a civic space going back to Viking Dublin when the Thingmount, where town meetings were held, was located on the river shore nearby (close to the present-day St Andrew's Church).

Traditionally the place where the Trinity College campus met with the life of the city, its prominence today comes from its connection between the civic route from Parnell Square along O'Connell Street and the east-west route along Dame Street to Christchurch. It is believed that in the 16th century College Green was cobbled. There were no kerbs, so the street surface running up to the edge of the buildings.

In the 18th century redevelopment by the Wide Street Commissioners turned it from an irregular junction into a significant public space, fronted by the impressive House of Lords (now Bank of Ireland) which housed Ireland's parliament until its abolition in 1800.

This imposing setting has been the backdrop to major events in Irish life, such as the famous public address by Michael Collins in 1922. The layout of College Green and the elegant backdrop provided by the Bank of Ireland created a naturally impressive stage for President Barack Obama in 2011.

2.2.2 Need for the Proposed Project

The Proposed Project will transform College Green and redefine the area as a Civic Space of National importance in line with Dublin City Council's long standing objective for College Green. The Proposed Project will contribute to the achievement of the vision for College Green set out both in the Dublin City Development Plan 2016-2022 and the Heart of Dublin City Centre Public Realm Masterplan (Dublin City Council, 2016) for the City.

The Proposed Project plan for the city includes a specific objective to "*prioritise the redevelopment of College Green as a pedestrian friendly civic space, including the pedestrianisation of Foster Place.*"

This is in recognition of College Green's historic and architectural importance and its pivotal setting within the civic spine, the route running from Parnell Square through O'Connell Street, College Green and Dame Street to Christchurch Place.

College Green is identified as the City's potentially most important civic space in Dublin City's Public Realm Strategy 2012 – 'Your City, Your Space'. The strategy acknowledges that College Green has the potential to be a great civic space but is at present dominated by its traffic functions.

The introduction of Luas Cross City through the College Green area provides a catalyst for major transport change at College Green. The project, which is currently under construction, will involve two-way tram movement along Lower Grafton Street, replacing the current one way traffic movement.

The implementation of the Luas Cross City project opens the way for a complete redesign of the College Green area, including the removal of the many traffic management and signage infrastructure elements which currently clutter the area.

College Green is currently very congested with a high traffic volume of primarily bus and taxi currently passing through the area. The area is accessible only to public transport and taxis between the hours of 07:00-19:00 Monday to Friday with all traffic permitted outside these times.

In addition, approximately 6,500 cyclists and 75,000 pedestrians per day pass through College Green currently. The Proposed Project will ensure safe passage across this currently busy space.

2.3 Project Objectives

The Proposed Project has the potential to transform the College Green area through redefining the space and its use for the benefit of the citizens of, and visitors to Dublin. The following have been identified by Dublin City Council in its 'College Green Traffic Management Measures Public Consultation Document', April 2016 as objectives, and potential benefits of the Proposed Project:

- The space to be created can be used to meet the City Council's objective of creating a major civic space, presenting Dublin City Council with the opportunity to fulfil its policy and objectives in the creation of an improved public realm;
- Alleviate congestion in the area by barring all traffic travelling in an east-west direction across College Green;
- Transform the area of College Green into a more accessible and usable space by linking the Luas to a fully pedestrianised area;
- Provide an uninterrupted pedestrianised route from St. Stephen's Green to the quays, significantly improving pedestrian journey times;
- Provide cyclists with a designated cycle track which will physically separate the cyclist from Luas and bus movements; and
- The cycle provision in the plaza area will generate a key safe city centre link connecting to the cycle provisions planned for Dame Street and Westmoreland Street.

2.4 Alternatives Considered

2.4.1 Introduction

The EIA Directive which was transposed into Irish law as the European Communities (Environmental Impact Assessment) Regulations (as amended) require that the Environmental Impact Statement contains an outline of the main alternatives considered and the reasons for choosing the Proposed Project taking into account the environmental effects.

This section outlines the main alternatives considered for the Proposed Project.

Alternatives are considered through the development of the following design elements:

- Public realm strategy;
- Traffic management;
- Architectural plaza layout.

2.4.2 Overview

In order to achieve the Proposed Project objectives, an initial approach was adopted whereby consideration was given to whether there were feasible alternative means by which the Proposed Project objectives could be met. These are addressed in **Section 2.4.3**, '*Public Realm Strategy Alternatives'*.

Following this process, a number of alternative road designs and traffic management measures were considered in order to determine the optimal road layout and bus re-routing around the city centre. This process is described in **Section 2.4.4**, '*Road Design and Traffic Management Alternatives*'.

At a project design level, a number of key alternatives were considered in terms of the architectural design of the Civic Plaza, as summarised in **Section 2.4.5**, '*Architectural Design Alternatives'*.

2.4.3 Public Realm Strategy Alternatives

The need for the Proposed Project, as outlined in **Section 2.2** together with the Proposed Project objectives, as outlined in **Section 2.3** is focused on the provision of traffic management measures which allows for a civic space of national importance at College Green in line with the City Council's long standing objective for the area.

Clifton Scannell Emerson Associates (CSEA) was commissioned by DCC to assess a number of public realm strategy options for College Green. The options put forward for assessment by CSEA are listed in **Table 2.1**.

Table 2.1 - Public Realm Options Considered

Option	Public Realm Strategy
Option 1	Double bus lane - north side of the plaza - monuments relocated
Option 2a	Two-way cycle track - north side plaza - monuments relocated
Option 2b	Two-way cycle track - north side shared pedestrian / cyclist plaza - monuments relocated

Option 3a	One-way cycle lanes, no bus stop - north side plaza - monuments relocated
Option 3b	One-way cycle lanes with single bus stop - north side plaza - monuments relocated
Option 4	One-way cycle tracks, island bus stop - north side plaza - monuments relocated
Option 5	One-way cycle tracks, plaza on south side of college green - monument locations retained
Option 6	No westbound buses, two-way cycling adjacent Luas tracks, tracks side by side at pinch point - monument locations retained - north side plaza
Option 6a	Two-way cyclists between tracks and two-way cyclists on southside of College Green - monument locations retained - no westbound buses - north side plaza
Option 6b	North and south bound Luas track sharing - north side plaza
Option 7	Reduced numbers of westbound buses, two-way cycletracks, tracks side by side at pinch point, low number of westbound buses - monuments relocated - north side plaza
Option 8	No westbound buses, westbound cyclists between tracks - monument locations retained north side plaza
Option 9	No westbound buses, westbound cyclists between tracks, Luas track adjusted to allow a wider lane for bus and cyclist - monument locations retained - north side plaza
Option 10	One way cycle lanes, bus lanes in both directions, northbound Luas tracks moved towards Grattan monument - monuments relocated - north side plaza
Option 11	One way cycle lanes & bus lanes in both directions with central island, monuments retained, northbound Luas moved towards Grattan monument
Option 12	Shared north side plaza, no buses eastbound or westbound, monument location retained

The options assessment process involved the consideration of a number of determining factors including: safety, pedestrians, cyclists, bus, Luas, public realm, and monument locations. Each of the options were ‘graded’ with respect to each of these factors in order to determine the most viable option for the public realm.

Following the options assessment, CSEA determined that Option 12 was the most viable public realm strategy option, for the following reasons:

- This option provides a full shared pedestrian / cyclist plaza at College Green with cyclists being fully segregated from both buses and Luas facilities;
- The removal of the need for a pedestrian crossing for northbound / southbound pedestrian movements allows for a much more comfortable pedestrian environment without any delay;
- With the provision of a full plaza at College Green, there is greater scope for streetscaping and civic space development. A full plaza could cater for civic ceremonies as well as providing a space for meeting, idling, appreciation of buildings and monuments etc. This option does not require relocation of the monuments so the existing symmetry of the space can be retained; and
- This option presents the possibility of reducing cycle time at traffic signals outside Trinity College, thus improving services for northbound / southbound buses and Luas as well as allowing for a more frequent pedestrian stage between the proposed plaza and Trinity College.

Option 12 of the public realm strategy alternatives was then further developed from architectural and traffic management perspectives to generate the Proposed Project.

2.4.4 Traffic Management Alternatives

On the basis of the selection of Option 12 as the preferred strategy, a number of traffic management measures were originally developed and considered, including combinations of:

- No through east-west traffic movements in the College Green area except for pedestrians and cyclists;
- Reversal of Church Lane and Trinity Street to allow for traffic to access this area for deliveries, car parks etc. and to use this route to turn around and leave the area;
- Bus turn-around arrangement on Dame Street, west of the Plaza area;
- A right turn from O'Connell Bridge to the South Quays for southbound buses;
- A left turn from the South Quays to Parliament Street;
- Introduction of a contra-flow bus lane on Parliament Street; and
- A right turn from Dame Street to Parliament Street.

These proposals were modelled using the NTA Eastern Regional traffic model. An air dispersion modelling assessment determined that the increase in the number of buses on Parliament Street resulted in a breach of the air quality standards.

As a result, and in response to local opposition to the increased buses on Parliament Street, an alternative route was required to be identified for the buses which were proposed to travel in both directions on Parliament Street. A number of alternative routes were considered, as described below.

A. Contraflow bus lane on Winetavern Street

A contraflow bus lane on Winetavern Street to accommodate buses was considered. This proposal would see buses travelling from the South Quays under the arch at Christchurch.

This option was ruled out due to the extensive works which would be required at the High Street/Winetavern Street junction and the risk posed to cyclists in the bus lane, as it would be too narrow to accommodate a separate bus and cycle lane.

B. Fishamble Street bus lane

A bus lane on Fishamble Street to accommodate buses was considered which would result in buses travelling from the South Quays, up Fishamble Street, and rejoining traffic at the junction of Fishamble Street/Christchurch Place and Lord Edward Street.

This option was ruled out due to the gradient of the hill, the number of deliveries which take place here and the requirement to remove parking spaces. However, it remains an alternative route for general traffic.

C. Limiting the buses on Parliament Street

By limiting the number of buses on Parliament Street to less than 60 buses in the AM peak and only allowing public transport between 7am and 7pm, Monday to Friday, it was determined that good compliance with the air quality standards could be achieved.

On this basis, it was deemed that Option C, limiting the number of buses on Parliament Street was the preferred option. Further details on bus rerouting is provided in Chapter 6 '*Traffic and Transportation'*.

It was initially considered necessary to reverse flow on Church Lane and Trinity Street. However further assessment deemed this measure unnecessary for the provision of the Proposed Project.

2.4.5 Architectural Design Alternatives

2.4.5.1 Introduction

Paul Keogh Architects (PKA) and Dixon Jones Architects were commissioned by DCC to lead a design team to carry out the architectural design of the proposed civic plaza. The design was developed on the basis of the Option 12 from the CSEA Public Realm Strategy alternatives study.

2.4.5.2 Concept development

College Green is a highly particular and memorable shape, 200m in length, 25m wide at the west and increasing to 50m wide at the east.

As illustrated in Bernard De Gomme's map of Dublin of 1673, a clear wedge of space from Trinity Street to the west façade of Trinity College entitled 'College Green' is visible, refer to **Figure 2.1**.

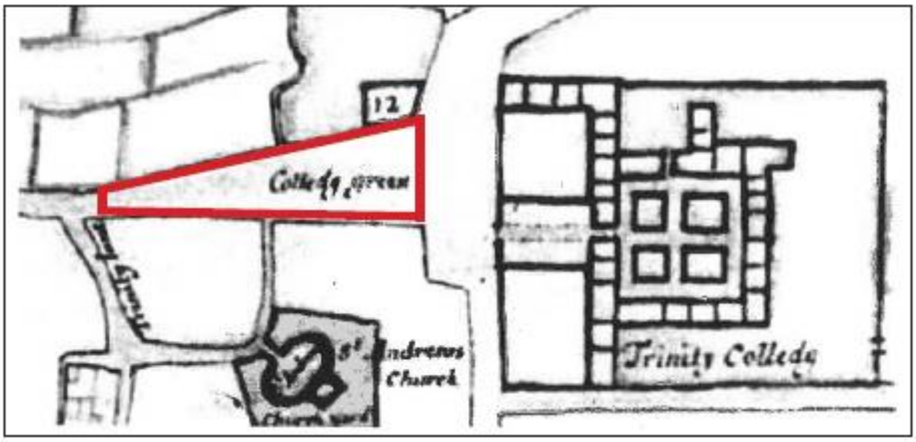

Figure 2.1 - De Gomme's map of Dublin 1673

It is in the spirit of this Proposed Project to reclaim the wedge shape of College Green as a civic enterprise. The position of the Parliament building, situated on the north side of College Green, introduces a strong asymmetry into the composition – city fabric on the south side versus city monument on the north.

The wedge is a fine urban form and has much historical precedence; from the Piazza di Spagna in Rome to the Place Dauphine in Paris and more recently Louis Kahn's commemorative Four Freedoms Park to Franklin D. Roosevelt on Welfare Island in New York City. Unlike the conventional normality of the square or rectangle the wedge is dynamic in perspective, exaggerating the length of the space by the device of trompe l'oeil.

There is a gentle slope of 2.5m rising from east to west which will further exaggerate the sense of false perspective. In the opposite direction College Green is transformed into a parallel sided place.

PKA and Dixon Jones Architects in association with DCC adopted this ‘wedge’ urban form as the design concept for the proposed civic plaza.

Based on this concept and urban form, the layout of the plaza was developed further into alternative layouts.

Alternative designs considered

A core objective in developing the plaza design was that the scheme represents a considered response to the characteristics of the context within which it is situated and the various constraints impacting on its design. Consideration of alternatives was a key ingredient in decision-making around how the preferred design scheme evolved. Of the many alternatives considered, the following options illustrate key milestones along the route of developing the scheme design on the basis of the ‘Option 12’ taken forward from the CSEA Public Realm Strategy Alternatives Study.

Version 1: The City Council project brief called for a pedestrian-oriented civic space in the area immediately in front of the Bank of Ireland. The Proposed Project area was also to include Foster Place. The first design concepts proposed removing the trees from the central reservation: these had made the Henry Grattan statue and Thomas Davis memorial almost invisible and blocked views of the Trinity façade from Dame Street. While the plaza area east of Church Lane was envisaged as a pedestrian-priority area, that to the west was to remain as a conventional street with pavements, kerbs, carriageways and a turnaround for buses travelling to and fro on Dame Street.

Version 2: Further research by the design team established that College Green had historically extended from Trinity College and Grafton Street as far as the junction of Trinity Street with Dame Street. On this basis, the plaza was envisaged as a trapezoidal space running the full historic length of College Green, and centred on an axis between the centre of Dame Street and the entrance to Trinity College, with Foster Place as a separate and more recent adjunct to it as the result of the 19th century extension of the Parliament Building. The entire space, from Trinity Street to Grafton Street, was to be treated as a European-style ‘shared space’, i.e. without kerbs or level differences to segregate pedestrians, cyclists and vehicles using the turnaround for buses travelling to and from the area along Dame Street.

Version 3: If Version 2 might be seen as a long-term ambition for College Green, it was considered to raise potential safety issues in relation to the ‘shared space’ on which it was based and potential conflicts between pedestrians, cyclists and vehicles. In particular, the design of the bus turnaround on College Green had to be resolved. As a result, the full extent of the plaza was divided into three zones: a ‘circus’ turnaround for buses was introduced at the intersection of College Green and Church Lane, and this separated a pedestrian-priority plaza area in front of the Parliament and Trinity College from a more conventional street, albeit a single surface without kerbs, to the west of Church Lane. This arrangement also had a secondary purpose, in that it provided a locus for the Thomas Davis memorial, with Thomas Davis positioned to west of the Four Angels fountain but in his traditional relationship looking east to Trinity College.

Version 3 was developed further into the finally adopted architectural design for the Proposed Project, with a detailed project description set out in Chapter 4.

During the development of Version 3, various options were explored on the basis of a number of specific issues to be addressed, including the following:

- Tree species, spacing and location;
- Types of surfacing to be used;
- Consideration of the removal of the railings at Bank of Ireland;
- Inclusion and number of the water jet fountains; and
- Relocation of statues.

These issues were then resolved into the final scheme design following discussions with the design team, various departments in DCC and other stakeholders.

Alternative Cycle Movements Considered

The following alternatives to accommodate cycle movement through the area were considered during the design development process:

1. Cycle Route provision via alternative route through Temple Bar

A route was considered via Fleet Street, most likely connecting to Dame Street via Anglesea Street. This option was discarded for the following reasons:

- It would require the removal of historic setts through Temple Bar in order to provide an appropriate standard of surfacing for a cycle route;
- Cyclists would have to share with vehicles accessing Fleet Street car park;
- Pedestrians tend to walk on the road through Temple Bar and these would pose a further obstacle;
- The route is indirect and uphill to Dame Street, which would likely result in cyclists going through College Green plaza even if the route were designated through Temple Bar; and
- Cumulatively, the above would result in an unacceptable low Quality of Service for cyclists.

2. No cycle route provision

- The non-provision of a cycle route through the area would be contrary to the Greater Dublin Area Cycle Network Plan, which identifies the Dame Street to Westmoreland Street route as a ‘primary route’ [Route 11]. As such, it would contravene the NTA’s policy – which is underpinned by the Development Plan and the NTA Greater Dublin Area Transport Strategy 2016 - 2035 that a cycle route should be provided through this area. Furthermore, as no convenient alternative route exists, it would therefore be inevitable that cyclists would continue to traverse the space, even if no facility or permission were provided. As such, this is not considered to be a viable option and was discarded from further consideration.

3. Two way cycle track along northern side of plaza

This option would see the provision of a cycle track on the northern side of the pedestrianised space. The design consideration for this option had a preference to delineate this space with a line of trees. It was however considered unacceptable to place the trees in front of the historic Bank of Ireland building and therefore this option would not be viable. No other satisfactory means of defining a segregated route was identified without an unacceptable visual impact on the plaza. Also, the single entry point at the north-eastern corner of the plaza from the cycle track past Bank of Ireland would create an unacceptable single point unregulated conflict between the heavy north-south pedestrian flow and east-west cyclists. On that basis, this option was not preferred.

4. Separate one way cycle routes through the plaza

This option would require double the number of interactions between cyclists and pedestrians, as well as facing similar issues as Option 3 in relation to the definition of the cycle route. On that basis, the option was not considered further.

5. Shared Space

A common shared space between pedestrians and cyclists was considered. However, the single entry point at the north-eastern corner of the plaza from the cycle track past Bank of Ireland would create an unacceptable single point unregulated conflict between the heavy north-south pedestrian flow and east-west cyclists. Furthermore, Dublin City Council's traffic department expressed concerns about the interactions between cyclists and buses at the western end of the pedestrianised space. On that basis, the 'shared space' concept would not achieve the objectives of the GDA Cycle Network Plan, as the 'Quality of Service' of the facility would be reduced to an unacceptable level. On that basis, the option was not considered further.

6. Pedestrian priority area with extended eastern entry

This option is similar to the Shared Space Option 5, but would remove the single point conflict between pedestrians and cyclists near Bank of Ireland by continuing the cycle track across the eastern side of the plaza adjacent to the Luas line. Cyclists would then weave through gaps in the heavy north – south pedestrian flow to continue across the 'pedestrian priority' area. While this option faced similar issues to the shared space option, the extended eastern entry would remove the greatest concern – being the interaction between pedestrians and cyclists at the eastern end. However, it was determined that this option would not achieve the objectives of the GDA Cycle Network Plan and it was therefore not considered further.

7. Underpass

The provision of an underpass was deemed not viable for the following reasons:

- The entry ramps would be circa 70m long and would require safety features such as railings, which would compromise the plaza design;
- It would need to cross beneath the Luas line at the eastern end, where on investigation it was concluded that there is insufficient room to construct ramps with retaining walls between the Bank of Ireland and the Luas. Passing

beneath the Luas line would therefore be prohibitively expensive and disruptive;

- Security and cleanliness concerns – below ground public washroom facilities at College Green were previously closed as a result of these issues;
- Potential impacts on utilities and services; and
- It is likely that many cyclists would be unwilling to use an underground route and that they would continue to cycle through the ground level plaza.

8. Overbridge

The option of an overbridge was briefly considered but ruled out on the grounds of visual impact.

9. Preferred option

The preferred option provides two one-way cycle lanes either side of the western end of College Green joining at the central turnaround and running along the south side of the plaza as a two-way dedicated cycle route, joining with the Westmoreland Street route at the north-west end of Grafton Street. The two-way cycle route through the plaza area is delineated with a line of trees.

The final agreed architectural design and traffic management measures form the Proposed Project that is presented and assessed in this EIS.

2.5 References

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3 Consultation

3.1 Introduction

The Design and EIS team have carried out extensive consultation in relation to the Proposed Project with members of the public, including residents, businesses, institutions, representative individuals and organisations and statutory bodies. The purpose of consultation was to inform consultees of the Proposed Project and provide them with an opportunity to offer feedback. It also enabled the project team to take account of issues raised and consider them as part of the design and EIA processes.

This chapter outlines the consultation activities undertaken in advance of the lodgement of the planning application for the Proposed Project. It also summarises the main issues identified during this process and identifies the main modifications to the Proposed Project arising from the consultation process.

3.2 Public Consultation

3.2.1 Proposed Project– Public Consultation, April 2016 (Non-Statutory)

Dublin City Council launched a non- statutory public consultation on the Proposed Project on 12th April 2016.

Members of the public were invited to review the Proposed Project with the intention of obtaining views of the public and interested parties on two aspects of the Proposed Project:

1. The proposal to remove east-west traffic from College Green allowing a civic space to be created, and;
2. The bus diversion routes which were proposed following consultation with the NTA and Dublin Bus.

Members of the public were asked to submit their suggestions and feedback, either using the on-line submission facility or by email or post before 24th May 2016.

Some 2,756 submissions were received during the six week consultation period. The consultation indicated that while there is widespread support for the proposals there is some opposition from the taxi industry, car park owners and also some retail interests.

The issue however of the bus diversion routes is one that is the most contentious, with both residents and businesses on Parliament Street objecting to the proposed re-routing of buses on Parliament Street and requesting that an EIA be carried out prior to any changes in bus services on Parliament Street.

3.2.2 'Imagine College Green Public Consultation Workshop'

As part of the brief development process for the Civic Plaza at College Green, Dublin City Council, in association with the National Transport Authority, hosted a Public Discussion Workshop. The Workshop was held in the Round Room of the Mansion House, Dublin 2, on 16th November 2016.

The Workshop was designed, organised and publicised by Dublin City Council in conjunction with event managers, Happenings, and workshop designers Connect the Dots. In an effort to ensure that the experience was engaging and meaningful for all involved, the approach was focused on co-creation with stakeholder insights and interests in mind.

Invitations to the Workshop were sent out directly by Dublin City Council to diverse interest groups and stakeholders, along with an open public invitation which was shared publicly via social media and on the Dublin City Council website.

Over 200 people attended the public Workshop, representing a cross-section of residents, businesses and interested parties present in the city. Attendees included members of the public, policy makers, and public representatives – interested citizens, researchers, planners, students, grassroots initiatives, business owners, lobby groups, transport experts, and many more.

The primary objectives of the Workshop were:

- To provide a platform for members of the public to express their ambitions, interests, ideas for the space as well as their hopes and concerns surrounding the upcoming process.
- To create an inclusive and open environment encouraging collaboration between diverse stakeholders with divergent perspectives.
- To help develop a holistic mission, vision, and design for College Green by engaging with interested members of the public from diverse perspectives.
- To spark and inspire all manner of ideas - from the very creative to the very practical – and to explore 'how' the mission and vision developed can become a reality.
- To inform the Design Brief for the development of College Green.

As part of their application to partake in the workshop, attendees were asked to fill out a brief survey. The survey questions asked about the attendee's background, what they hoped to get out of the event, and what topics relating to the design of College Green they were most interested in discussing. Based on the survey data provided by the attendees, and taking account of the ambitions of Dublin City Council and National Transport Authority, the format of the workshop was developed. The data from the survey was used to inform the seating arrangements of the attendees at the event – the aim was to spread people with similar interests across different tables in order to ensure a diverse mix of perspectives across the 25 tables.

In order to capture the ideas at each table, there were worksheets for each activity. The style of worksheets for each activity varied, with some to be filled out individually, while others were group exercises to be filled out by the group as a whole. For these group exercises there was a dedicated note-taker at each table, the note-takers role was to fill in the group worksheets and also to capture insights throughout the evening. Each table also had a dedicated facilitator who assisted participants in completing activities throughout the process. There was also five other facilitators who were tasked with the role of 'Butterfly'.

The role of each Butterfly was to circulate around a group of five tables throughout the night, picking up on key themes and ideas. Towards the end of the evening, each of the five Butterflies reviewed the completed activity worksheets for their five tables. Each Butterfly then presented a brief summary of their observations back to the room. The intention of this exercise was to give all participants an understanding of the general themes and ideas evolving at the other tables. Following this presentation, participants were given a final worksheet which allowed them to note any further comments which they felt essential for consideration as part of the process.

In the weeks following the Workshop a report was produced. This report contains a direct transcription of all of the contributions made by each individual and group on the night and is a direct record of the activities and outcomes arising from the workshop. The report was issued to the Design Team following their appointment and was used to inform the College Green Plaza Design Brief. The report was also issued directly to all attendees and was posted online on the Dublin City Council website where it is publically accessible.

3.2.3 'Imagine College Green' on-street survey

In January 2017 DCC commissioned Delve Research to undertake an '*Imagine College Green'* on-street survey with members of the public as part of the consultation strategy of the Proposed Project. The purpose of the survey was to gain an understanding of the public's views and ideas on the proposed new Civic Plaza. The survey was carried out through a series of face-to-face interviews over four days: the 12^{th}, 13^{th}, 14^{th} and 17^{th} January 2017. The interviews took place at College Green.

A total of 434 respondents took part in the on-street survey over the four days. Survey responses are summarised below.

Of the 434 survey respondents, some 43% either 'disagreed' or 'strongly disagreed' with the statement 'College Green is a good public space and does not need to be redeveloped. Furthermore, some 56% either 'agreed' or 'strongly agreed' with the statement 'College Green should be redeveloped as a major new civic space for the city.'

When asked what aspect or aspects of College Green the respondents like at the moment, responses indicated that the architecture, buildings (in particular Trinity

College and Bank of Ireland) and the history/culture were among the most favoured aspects.

'No traffic/less traffic/pedestrianisation', 'public seating' and 'more greenery' were the most common responses when asked 'what is the one thing you would like to see in a newly laid out College Green'.

When considering the most important function of College Green, respondents noted 'linking/central/transit point for city', 'social/meeting focal point', 'transport hub/access to transport' and 'tourism' as being among their most valued functions.

Some 73% of respondents believe there should be more greenery at College Green, and some 56% are strongly in favour of the provision of public seating.

3.2.4 'Imagine College Green' on-line public consultation

Delve Research were also commissioned by DCC to undertake an 'Imagine College Green' online survey as part of the consultation strategy of the Proposed Project. The purpose of the online survey was to gain an understanding of the wider public's views and ideas on the proposed new Civic Plaza. The online consultation was carried out through DCC's Consultation Hub, with offline contributions facilitated.

A total of 1,029 respondents took part in the online survey which was open to the public from the 12th-26th January 2017. 1,001 of the respondents were individuals with a further 28 identifying as representing a group or organisation. Survey responses are summarised below.

Of the 1,029 respondents, some 86% either 'disagreed' or 'strongly disagreed' with the statement 'College Green is a good public space and does not need to be redeveloped'. Furthermore, some 86% of respondents either 'agreed' or 'strongly agreed' with the statement 'College Green should be redeveloped as a major new civic space for the city'.

When asked what makes a public space great, and what they would like to see in the newly laid out College Green, 'traffic free/pedestrianized', 'greenery', 'seating' and 'cycling access' were among the most common responses.

The online survey outlined DCC's vision for College Green:

"*to design a civic space that is a safe, flexible and an even friendly meeting space of world class standard. Our aim is to create a primary destination in a vibrant city which is universally accessible by all.*"

When asked what they would like to change or add to this vision, or what should be the most important function of College Green, some 15% of respondents stated they were happy with the vision, as proposed. 'Meeting place,' (11% respondents) 'Safe place,' (10% respondents) 'Space for all,' (10% respondents) 'Cycle friendly' (9% respondents) and 'traffic free' (9% respondents) were other common suggestions.

With regards public concerns about the Proposed Project, the most common response was ‘too much traffic/any traffic.’ Other concerns included ‘congestion elsewhere’, ‘cycling access concern’, and ‘poor design/quality/not reach potential’.

Some 71% of respondents believe there should be more greenery at College Green, 61% believe there should be public seating.

Of the 28 respondents who identified as representing a group or organisation, a summary of their responses is provided below:

When asked ‘what does College Green mean to you’ some 25% of respondents stated ‘Trinity and/or Bank of Ireland’. Other common responses included ‘Traffic’, ‘Heart of Dublin/crossroads/accessibility of city’ and ‘events/festivals.’

Some 68% of respondents either ‘disagreed’ or ‘strongly disagreed’ with the statement ‘College Green is a good public space and does not need to be redeveloped.’ Furthermore, some 72% of respondents either ‘agreed’ or ‘strongly agreed’ with the statement ‘College Green should be redeveloped as a major new civic space for the city’.

‘Traffic free’ and ‘accessible by foot or by public transport’ were among the most common responses when asked ‘what makes a public space great’ and ‘what would you like to see in a newly laid out College Green?’.

The online survey outlined DCC’s vision for College Green:

“*to design a civic space that is a safe, flexible and an even friendly meeting space of world class standard. Our aim is to create a primary destination in a vibrant city which is universally accessible by all*.”

When asked what they would like to change or add to this vision, or what should be the most important function of College Green, some 21% of respondents stated they were happy with the vision, as proposed.

However, when asked what would be their concerns about the Proposed Project, some 36% of respondents stated that they were concerned about congestion elsewhere, following implementation of the Proposed Project.

Some 54% of respondents believe there should be more greenery at College Green, and some 54% strongly agree that there should be public seating in the newly developed College Green.

3.3 EIS Scoping Consultation

An informal EIS scoping exercise was undertaken as part of the EIA process. During this process information on the Proposed Project and an outline of the proposed EIS was provided to consultees requesting comment/input on the final scope and content of the EIS.

In December 2016, the EIS Scoping Report (Arup, 2016) was issued to the following bodies:

- Department of Housing, Planning, Community and Local Government;

- Department of Arts, Heritage, Regional, Rural and the Gaeltacht (including the Development Applications Unit, National Parks and Wildlife Service and the National Monuments Service);
- Department of Communications, Climate Action and the Environment;
- National Transport Authority;
- Transport Infrastructure Ireland;
- Environmental Protection Agency;
- An Chomhairle Ealaíon (The Arts Council);
- An Taisce;
- Fáilte Ireland;
- The Heritage Council;
- Southern and Eastern Regional Assembly;
- Inland Fisheries Ireland;
- Waterways Ireland;
- Córas Iompair Éireann including Iarnród Éireann and Dublin Bus;
- Department of Transport, Tourism and Sport;
- Health and Safety Executive;
- Irish Water;
- Office of Public Works;
- Eastern River Basin District Authority;
- Bat Conservation Ireland;
- Irish Georgian Society;
- Geological Survey of Ireland;
- Dublin Civic Trust;
- Tiomanai Tacsai Na hEireann;
- Temple Bar residents association;
- The Temple Bar Company;
- Dublin Cycling Campaign;
- Cycling Ireland;
- JCDecaux Ireland;
- Dublin Chamber of Commerce;
- The Centre for Excellence in Universal Design (CEUD) at the National Disability Authority;
- Dublin Town (Dublin City Business Improvement District);
- National Council for the Blind;

- Irish Wheelchair Association;
- Post-polio group;
- Trinity College;
- Bank Of Ireland;
- Ulster Bank;
- DCC Public Realm;
- Dublin City Councillors and;
- Local TDs.

Submissions on the basis of the scoping report were received from a number of consultees. Key points raised in the responses received are summarised in **Table 3.1** below:

Table 3.1 - Summary of Submissions Received

Consultee	Key Issue Raised
Dublin Bus	• Emergency Access • Journey times and reliability of Dublin Bus • Cumulative Impact • Congestion on periphery of city
Irish Georgian Society	• Further consultation
Temple Bar Company	• Satisfied EIS will address concerns
Dublin Cycling Campaign	• Satisfied with proposed approach • Need further clarification on underground aspect
Heritage Council	• Historic significance of College Green • Landscape and streetscape • Detailed method statement on cataloguing, storing and re-usual of historic features and materials should be prepared • Consideration of roof-level biodiversity, birds, and trees • Consideration of character of area, socio-economic vitality and condition of protected structures and ACA'S
Tiomanai Tacsai Na hEireann	• Taxi access through College Green (East-West) • Maintenance of the taxi rank at Foster Place
Failte Ireland	• Consideration of Guidelines on the treatment of tourism in an Environmental Impact Statement
TII	• Luas Cross City traffic interactions and modelling • Luas Cross City urban design requirements • Luas Cross City construction and operational phase issues
Ulster Bank	• Restrictions to cash transit vans delivery schedule

National Council for the Blind	• Impact upon people with impaired vision and people with other disabilities should be considered in the design.

3.4 Further Consultation with Key Stakeholders

3.4.1 Dublin City Council

A series of consultations with various departments within DCC were held during the design development process. This included meetings with the Parks department, Public Lighting Services and the Dublin City Heritage Office.

A presentation was made to officials and elected members in Dublin City Council in relation to the Environmental Impact Statement on 8 May 2017.

3.4.2 Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs

Consultation with the following sections of the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs was undertaken throughout the EIS preparation:

- The Development Applications Unit (DAU) of the Department of Arts, Heritage & Gaeltacht (DAHG) was sent a scoping email with a description of the Proposed Project. The Proposed Project was assigned a case number G Pre00379/2016 and a response to consultation received on the 19/12/16 to say that in the event of observations, a co-ordinated heritage-related response will be issued from Development Applications Unit (DAU) on behalf of the Department.
- The Archaeology and National Monuments Division was contacted in order to discuss the potential for impacts to archaeological heritage along the route of the Proposed Project.

Further information is available in Chapter 9 '*Biodiversity'* and Chapter 10 '*Archaeological, Architectural and Cultural Heritage'* as well as in the accompanying Report for the purposes of AA Screening (**Appendix 9.1**).

3.4.3 Business Organisations

In addition, sessions were held with business groups in the College Green area to inform them of the Proposed Project and to discuss potential business/economic impacts as well as accessibility impacts. Details of the consultations are outlined in **Table 3.2**.

Table 3.2 - Business Group Consultations

Business Group	Form of Consultation	Issues raised
Dublin Town IBEC Dublin Chamber	Presentation to members on 28 March, 2017	• Increase of number of buses on Parliament Street • Cycling on plaza • Impact on city centre footfall • Access retention
Temple Bar Company	Presentation to members on 13 April, 2017	• Impacts on businesses on Parliament Street. • Waiting times for buses on Dame Street. • Increase of number of buses on Parliament Street. • Consideration of alternatives.

Concerns and issues were considered and incorporated into the design where applicable and considered in this EIS.

3.4.4 Other meetings/consultations

During the design development process, the design team undertook a number of consultations with various interested parties, these included the National Council for the Blind, Bank of Ireland, Office of Public Works, Fáilte Ireland and the Taxi Regulator.

3.5 EIS Statutory Consultation

The statutory public consultation for the Proposed Project will be carried out in conformity with the applicable legislation including Section 175 of the Planning and Development Act, 2000 as amended, Part 10 of the Planning and Development Regulations 2001 as amended and any other applicable legislation.

DCC has forwarded copies of the consent application documents including this EIS to An Bord Pleanála. Copies have also been circulated to the relevant prescribed bodies, as follows:

- An Chomhaile Ealaíon
- Fáilte Ireland
- An Taisce

- CIE
- Transport Infrastructure Ireland
- National Transport Authority
- Heritage Council

The planning application will be placed on display for public inspection for a statutory period of at least six weeks from the date of lodgement of the application. Any person may make a submission or observations to An Bord Pleanála, 64 Marlborough Street, Dublin 1 in relation to the application during this period.

A copy of the consent application and each document accompanying the application (including this EIS) may be inspected, free of charge, during normal office or opening hours at the following locations:

- An Bord Pleanála, 64 Marlborough Street, Dublin 1; and
- Dublin City Council, Civic Offices, Wood Quay, Dublin 8.

All planning documents will also be available for download from the Dublin City Council website i.e. www.dublincity.ie/main-menu-services/roads-and-traffic.

Submissions or observations on the application may be made only to An Bord Pleanála within six weeks from the date of lodgement.

3.6 References

Delve Research (2017) *"Imagine College Green" On-Street Survey & Online Public Consultation January 2017 Draft Report- Not for Circulation* Dublin, Ireland

Arup (2016) *College Green Civic Plaza and Traffic Management Measures EIS Scoping Report*, Dublin, Ireland

Government of Ireland. Planning and Development Act. (2000) Dublin, Ireland.

Government of Ireland. Planning and Dev Regulations. (2001) Dublin, Ireland.

4 Proposed Project Description

4.1 Introduction

This chapter provides an overview of the existing area and environs covering the extent of the Proposed Project area, the neighbouring land uses and a description of the Proposed Project.

4.2 Site Area and Existing Environment

4.2.1 Introduction

The site area comprises College Green and parts of Dame Street, Trinity Street, St. Andrew’s Street, Church Lane, and the very northern end of Grafton Street. The existing site area layout is illustrated in **Figure 4.1**.

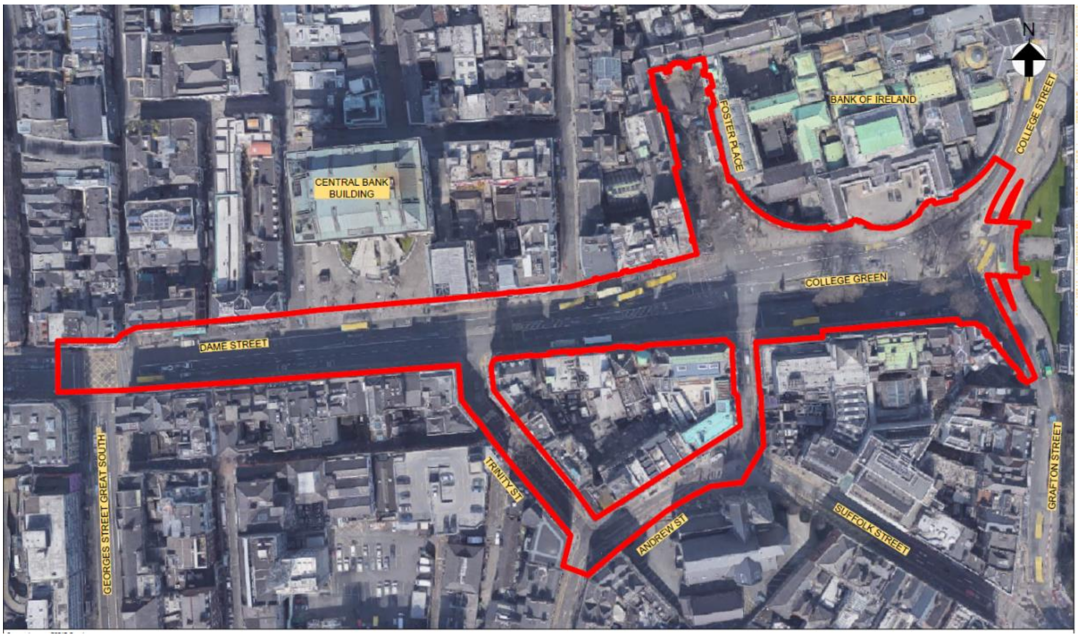

Figure 4.1 - Existing Site Area Layout

The site area is fully developed. It comprises a number of roads and streets as outlined above, that are paved or tarmacadamed with flanking footpaths. In some areas, these footpaths contain original granite paving stones but other surfaces are modern such as those present on St. Andrew’s Street. The Proposed Project area largely comprises roadways, footpaths, commercial properties including banks and office as well as shops and restaurants typically situated along the lower level of buildings. For the most part, the buildings are historic dating from the 18th, 19th and early 20th centuries.

4.2.2 College Green

College Green has been the setting for the civic and social life of Dublin for over 500 years and is renowned as being Dublin's prime urban space. As an urban set-piece, College Green is of international quality- for the architecturally significant facades that define it, the history of the space and for its strategic location within the historic centre of Dublin.

However, from the late nineteenth century onwards the expansive space portrayed in historic illustrations has been replaced by a noisy, traffic-dominated streetscape contaminated over time by an accumulation of urban clutter.

College Green exists today as a large multi lane street measuring approximately 26m at its narrowest extent but expanding to circa 50m as it moves east towards Trinity College. A traffic island that contains number of trees, as well as cycle parking facilities providing for 29 cycle spaces is located in the centre of the urban space. The historic statue of Henry Grattan and the Thomas Davis memorial fountain are also located within the College Green area

The Henry Grattan statue stands at the eastern end of College Green, in the traffic island. The statue is of bronze, set on a high pedestal of limestone facing Trinity College. To the east of the statue, on either side of the plinth, there are two decorative lamps, each of which has intertwined sea horses on the pedestal. These lamps were part of the original setting of the Grattan monument.

In 1966, a statue of Thomas Davis was unveiled in College Green on the western end of the traffic island. This includes a fountain with bronze plaques on stone bases.

Currently, College Green is a public transport only area (i.e. buses and taxis) between the hours of 07:00-19:00 Monday to Friday. It carries two lanes of traffic travelling from College Street to Dame Street and Grafton Street, and two lanes of traffic from Dame Street to Westmoreland Street. There are currently two pedestrian crossings at College Green facilitating pedestrian movements from Grafton Street to College Street. The pedestrian crossings are separated by the existing traffic island.

The existing College Green taxi rank is located at the traffic island adjacent to the Thomas Davis Statue and Memorial Fountain is approximately 24 metres long and holds five taxi spaces.

Taxi parking which accommodates approximately 20 taxis is available at Foster Place (nine permanent spaces and 11 evening time spaces). Taxis park in this area while awaiting spaces at the College Green rank to become available.

4.2.3 Trinity Street

Trinity Street is a narrow, relatively short street which was laid out in the 17th Century. Traffic currently moves in a one way direction on Trinity Street, from College Green towards its junction with St. Andrew's Street. The Trinity Street multi-storey car park, with approximately 373 car parking spaces, is located on St. Andrew's Lane, just off Trinity Street.

Trinity Street is also adjoined by a narrow, pedestrianized thoroughfare, Dame Lane, which is a popular area for socialising and entertainment.

4.2.4 St. Andrew's Street

St. Andrew Street has its origins in the 17th century, and possibly dates to the time of the construction of the first St Andrew's Church in this location in 1670. St. Andrews Street joins Trinity Street and Church Lane. It is a narrow street with one way, west-east traffic movements.

The newly relocated Molly Malone statue is placed in the area to the north of St. Andrew's church.

4.2.5 Church Lane

Church Lane, like St Andrew's Street, was possibly laid out in 1670 when St Andrew's Church was built on the site opposite the southern end of the street. Traffic currently moves in a one-way direction on Church Lane, from its junction with St. Andrews Street and Suffolk Street, towards College Green.

4.2.6 Dame Street

Dame Street is a large, busy street running from College Green to Lord Edward Street. The street is a prime location in the city centre located only a five-minute walk from the shopping area of Grafton Street and ten minutes walk from O'Connell Street. The street holds significant historic importance, with a number of protected structures located in the area, as described in Chapter 10 '*Archaeological, Architectural and Cultural Heritage'.*

The street is the location for a number of banks such as AIB, Ulster Bank and the former Central Bank of Ireland, as well as a number of shops, restaurants, bars and service providers.

At present there is one traffic lane eastbound with bus stops, two lanes westbound with bus stops and no dedicated cycle or bus lanes. There is also a right turn lane to Trinity Street.

4.2.7 Grafton Street

Grafton Street was developed in the early eighteenth century and became part of the core urban area of the city. It is now one of the two principal shopping streets in Dublin city centre, the other being Henry Street.

It runs from St. Stephen's Green in the south (at the highest point of the street) to College Green in the north (to the lowest point).

The pedestrianisation of Grafton Street was first introduced in 1982. The northern end of the street, between Nassau Street and College Green is not pedestrianised.

A number of protected structures are located along Grafton Street, as described in Chapter 10 '*Archaeological, Architectural and Cultural Heritage'*.

4.3 Neighbouring Land Uses

The study area is surrounded by a broad range of land uses.

The east is dominated by Trinity College Dublin, a university campus and popular tourist destination.

To the north of College Green, the Bank of Ireland, former Houses of Parliament building, a range of commercial buildings, Foster Place and the Stock Exchange building. The street section from Bank of Ireland to Angelsea Street comprises office and institutional uses but includes few active street uses. The street section from Anglesea Street to Central Bank building comprises commercial uses at ground floor level. A hotel and nightclub is located to the rear of this block. Moving westwards along Dame Street beyond the central bank plaza, the land use notably changes again with a predominance of bars, restaurants and cafes.

The southern boundary of College Green from Grafton Street Lower to Church Lane includes large retailing units accommodated within typically former institutional/banking structures, along with a range of smaller units. The Ulster bank on the corner of Church Lane is a dominant presence.

The character of the street changes slightly with the commencement of Dame Street, with a wide range of units including office, bars, language institutes, hotel and services.

Luas Cross City is currently under construction along Lower Grafton Street. Upon completion, a station will be located at College Street for south-bound Luas services and a station at Westmoreland Street catering for north-bound services.

4.4 Description of the Proposed Project

4.4.1 Introduction

It is proposed to develop a civic plaza and implement a number of traffic management measures at College Green. The proposals will contribute to the achievement of the vision for College Green set out both in the Dublin City Development Plan 2016-2022 and the Heart of Dublin, City Centre Public Realm Masterplan (Dublin City Council, 2016).

The space created by the Proposed Project will have the potential to transform College Green and to redefine the area as a Civic Space of National importance in line with Dublin City Council's long standing objective for College Green –

"*To prioritise the redevelopment of College Green as a pedestrian friendly civic space, including the pedestrianisation of Foster Place."* (Dublin City Council, 2016).

The Proposed Project provides for the development of a civic plaza and ancillary traffic management measures on an overall site of 13,960m^2, (of which the plaza component covers an area of circa 7,300 m^2). The area currently comprises roadways and pathways on a site which includes the full area of College Green to the south of Bank of Ireland and immediately west of Trinity College, Foster Place, Church Lane, Trinity Street, St. Andrew's Street and the northern end of Grafton Street. The eastern edge of the Proposed Project is demarcated by the north-south alignment of the Luas light rail (currently under construction), and runs westwards as far as Anglesea Street (with a maximum east-west length of 148m).

A description of the Proposed Project is outlined in the following sections and shown on **Figure 4.2**.

4.4.2 Traffic Management Measures

Traffic measures

It is proposed to provide a civic plaza space at College Green which would be reserved for pedestrians and cyclists. The ability to realise such a valuable civic space is enabled by the Luas Cross City becoming operational, which requires which requires changes to be implemented to the current traffic configuration in order for Luas be able to function appropriately.

As part of the accompanying local traffic management measures, buses will run along the same route as the new Luas tracks, north and south in front of Trinity College, and can use this route to access Nassau Street heading south, and Westmoreland Street heading north. On a trial basis, taxis will also be allowed to use the tram line route in front of Trinity College.

Most buses currently using Dame Street to cross the city centre will be diverted onto other routes, while buses which continue to use Dame Street will turn around at College Green, in a new turning circle at the junction of Foster Place and Church Lane.

Between 7am and 7pm on weekdays, general traffic cannot currently use College Green to travel from Dame Street to Westmoreland Street or from College Street to Dame Street. The implementation of the Proposed Project would see this general traffic exclusion extended to operate on a continuous basis.

As outlined in **Section 4.4.2** in the paragraph '*Bus Rerouting'*, Parliament Street will be used by public transport only from 7am to 7pm, Monday to Friday with buses continuing to travel southbound only. The road design details of the Proposed Project are provided on **Figures 4.4- 4.9.**

Minor Road Works

Works on Dame Street are required to tie in with the plaza at the eastern end of Dame Street and to provide additional bus stops, taxi and loading facilities, cycling and pedestrian facilities between the civic plaza and South Great George's street.

The proposed works on Dame Street will maintain one lane eastbound with an additional length of bus stop. As buses will no longer move through College Green the routes that are planned to use the turnaround will instead terminate and commence services on Dame Street. This bus stop will be 40m long (maximum of two buses) and located on the northern side of Dame Street. There will be no bus stops on the southern side of Dame Street between the plaza and South Great George's street with the unloading and loading of passengers all taking place on the northern side.

In the westbound direction, the two traffic lanes have been reduced to one and additional taxi ranks and loading bays are being provided on the southern side of

Dame Street. The reduction in lanes and realignment to tie in with the plaza have allowed for the opportunity to build out the footpaths in a number of locations. At the junction of Dame Street and South Great George's Street, the reduction from two traffic lanes to one allows for a build out on both sides, improving the public realm for the significant number of pedestrians at this location. There are also build outs at the Trinity Street junction and Anglesea Street junction.

Bus rerouting

By 2018, a number of bus routes which were previously traversing through College Green will be re-routed when the Proposed Project commences construction. These can generally be described as follows:

1. Routes previously travelling through College Green westbound are rerouted to travel along the South Quays and along Parliament Street southbound, to meet Dame Street. The number of buses permitted on Parliament Street at any time period will be limited on the basis of ensuring compliance with Air Quality Standards (refer to **Section 2.4.4**). In this regard bus movements in the future may vary following the introduction of cleaner, more efficient buses including electrical vehicles.
2. Routes previously travelling through College Green eastbound will be rerouted to travel along Winetavern Street northbound, across O'Donovan Rossa Bridge and along the North Quays.

Taxi parking and loading areas

It is proposed to introduce a 24 hour taxi rank for eight taxis on the westbound lane on Dame Street, east of South Great George's Street and west of Trinity Street. Adjoining this, 35 metres of loading bay is proposed which will provide a night time taxi rank (totalling seven spaces). The existing evening taxi rank on the inbound lane on Dame Street will be converted into a permanent taxi parking for three taxis.

A loading bay of approximately 32 metres long, which will act as a night time taxi rank, is also proposed for the eastern side of Trinity Street just prior to the junction of St. Andrew's Street. This will provide six evening spaces.

Similarly, loading bay of approximately 20 metres long, which will act as night time taxi rank, is proposed for the western side of Church Lane. This will provide four taxi spaces.

Following the trial operation of taxis along Lower Grafton Street, consideration will be given to facilitating a taxi rank at this stop location during nighttime hours, which would equate to enough space for four taxis.

The existing loading bay and evening taxi rank on Andrew's Street will be retained.

In addition, DCC proposes to provide a 10 space taxi rank on College Street. This provision is not part of the Proposed Project.

Cycle provision

Two one-way cycle lanes on either side of Dame Street will join at the central turnaround and run along the south side of the plaza as a two-way dedicated cycle route that joins with the College Street route at the north-east end of Grafton Street.

These proposals will allow for safe passage of cyclists through the physical separation of cyclists from Luas and bus movements on Westmoreland Street/Grafton Street Lower. Cyclists will not have to cross any Luas tracks in heavy moving traffic in this area, meaning this area will now be safe for all types of cyclists, as illustrated on **Figure 4.3**.

The cycling provision in the Dame Street to South Great George's Street area will likely change in the future with the completion of the Greater Dublin Area cycle network and in particular the Clonskeagh to City Centre cycle project.

Parking for 32 bicycles will be provided at the plaza.

Signage and access

Signage will be provided as necessary to redirect traffic away from the College Green area.

Vehicular access onto the College Green Civic Plaza will only be permitted by a small number of vehicles accessing the existing car park at the front of the Bank of Ireland, by emergency vehicles and maintenance vehicles. Vehicular access to the Bank of Ireland car park off Foster Place will be permitted by cash in transit vehicles. Permitted access routes are outlined in **Figure 4.10**. Signage will be provided to direct bus passengers to new stops and taxi customers to relocated ranks.

Disabled Parking

Two disabled car parking spaces are to be provided at Foster Place/College Green. One space is currently provided for at this location.

Luas Pedestrian Crossing

The pedestrian crossing being installed as part of the Luas Cross City Project to the south of the gates of Trinity College will be modified as part of the Proposed Project works. The pedestrian crossings will be changed to Toucan crossings to facilitate safe crossing of the Luas Tracks by cyclists. The alignment of the crossing will be changed slightly to better align with the proposed plaza. In addition, the existing crossing will be narrowed, with tactile paving and signal pole locations modified to suit. However, a second crossing will be installed at the northern side of the gates of Trinity College. This will run parallel to the modified southern crossing. Two new islands will be installed between the Luas lines to channelize traffic and to facilitate the installation of traffic signal poles.

Separate designated signals will be provided to regulate cycle movements through the pedestrian crossings.

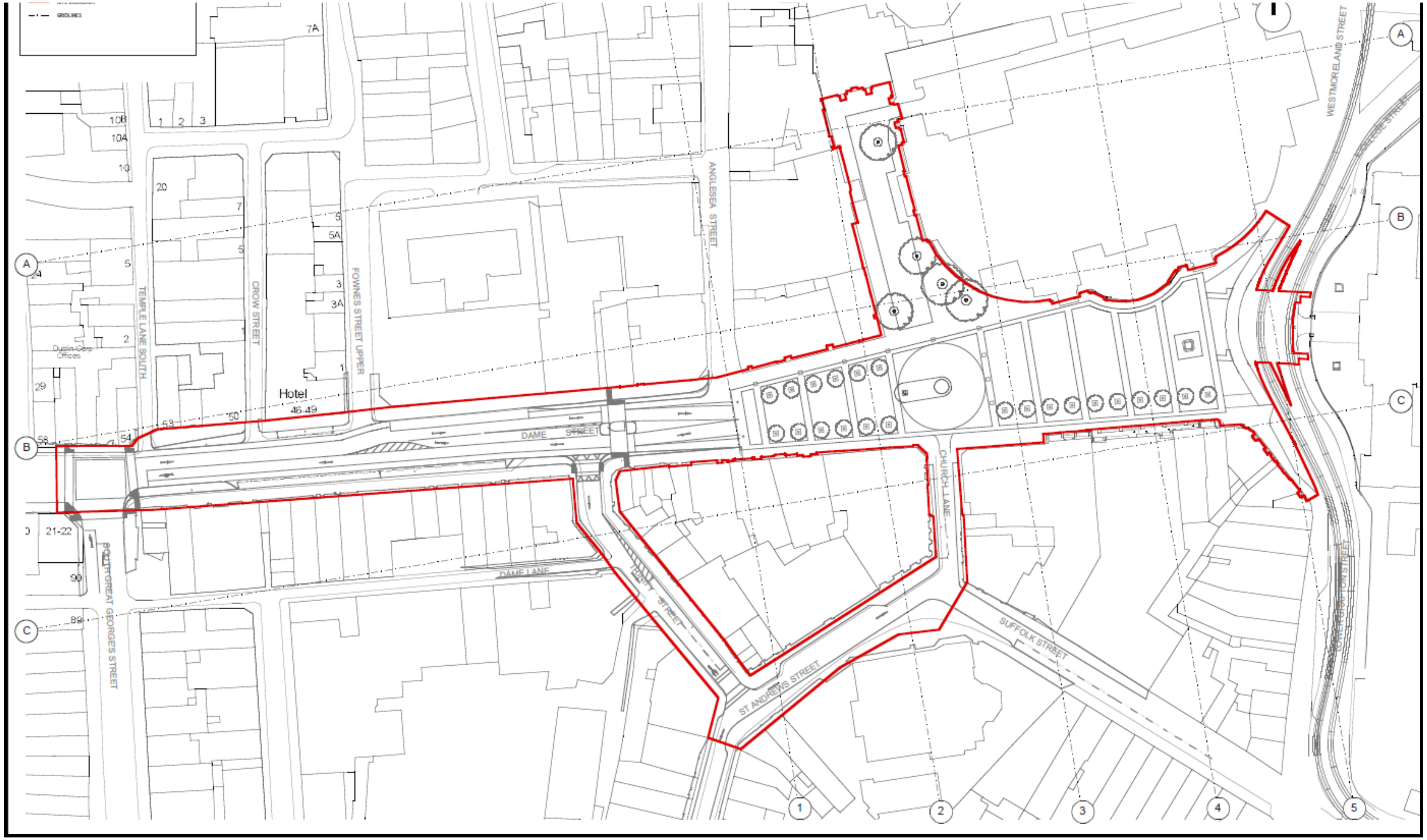

Figure 4.2 - The Proposed Project (Refer to **Figures 4.4 - 4.9** for details on road design. Refer to **Figure 4.11** for more detail on the plaza layout)

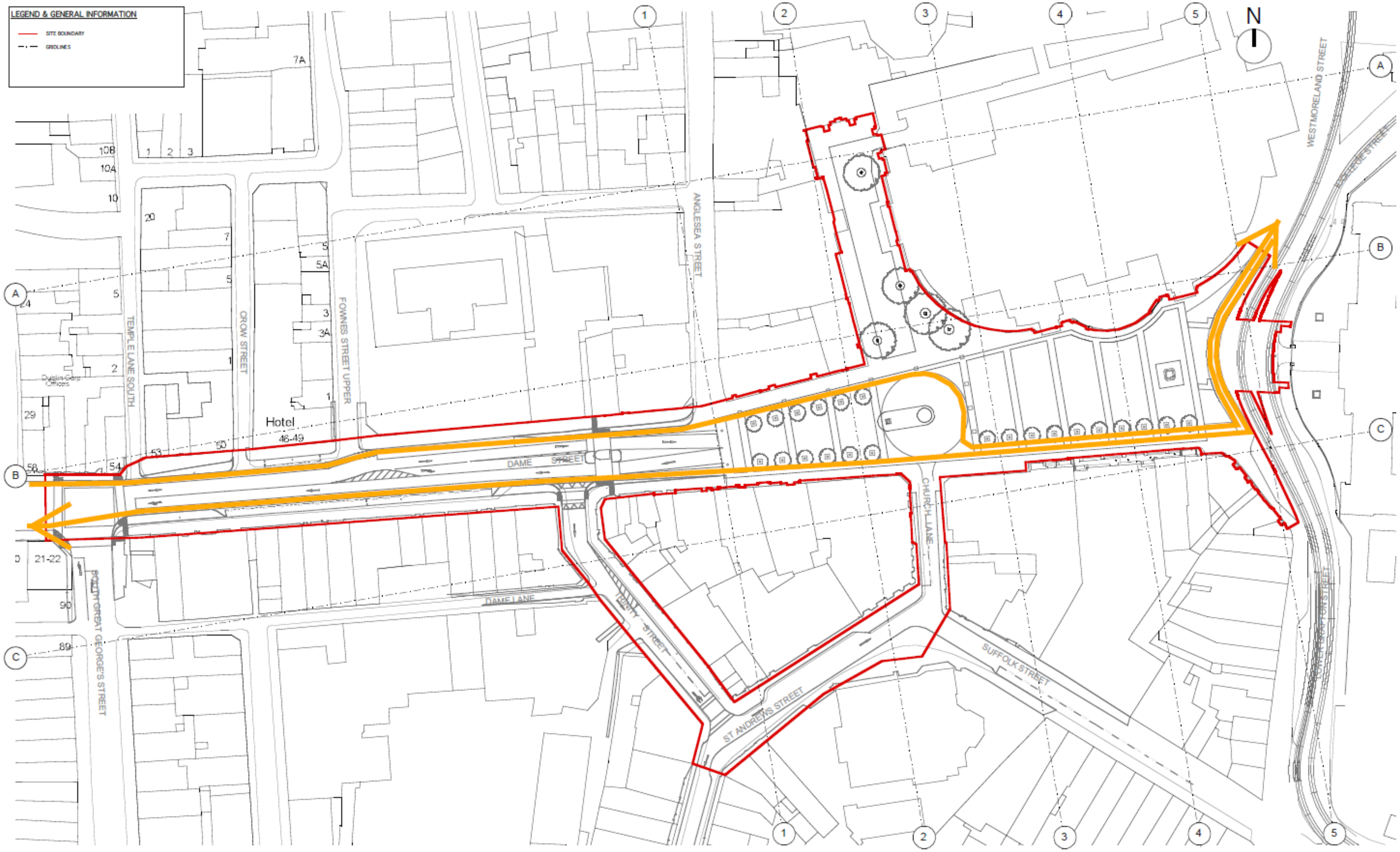

Figure 4.3- Proposed Cycle Route

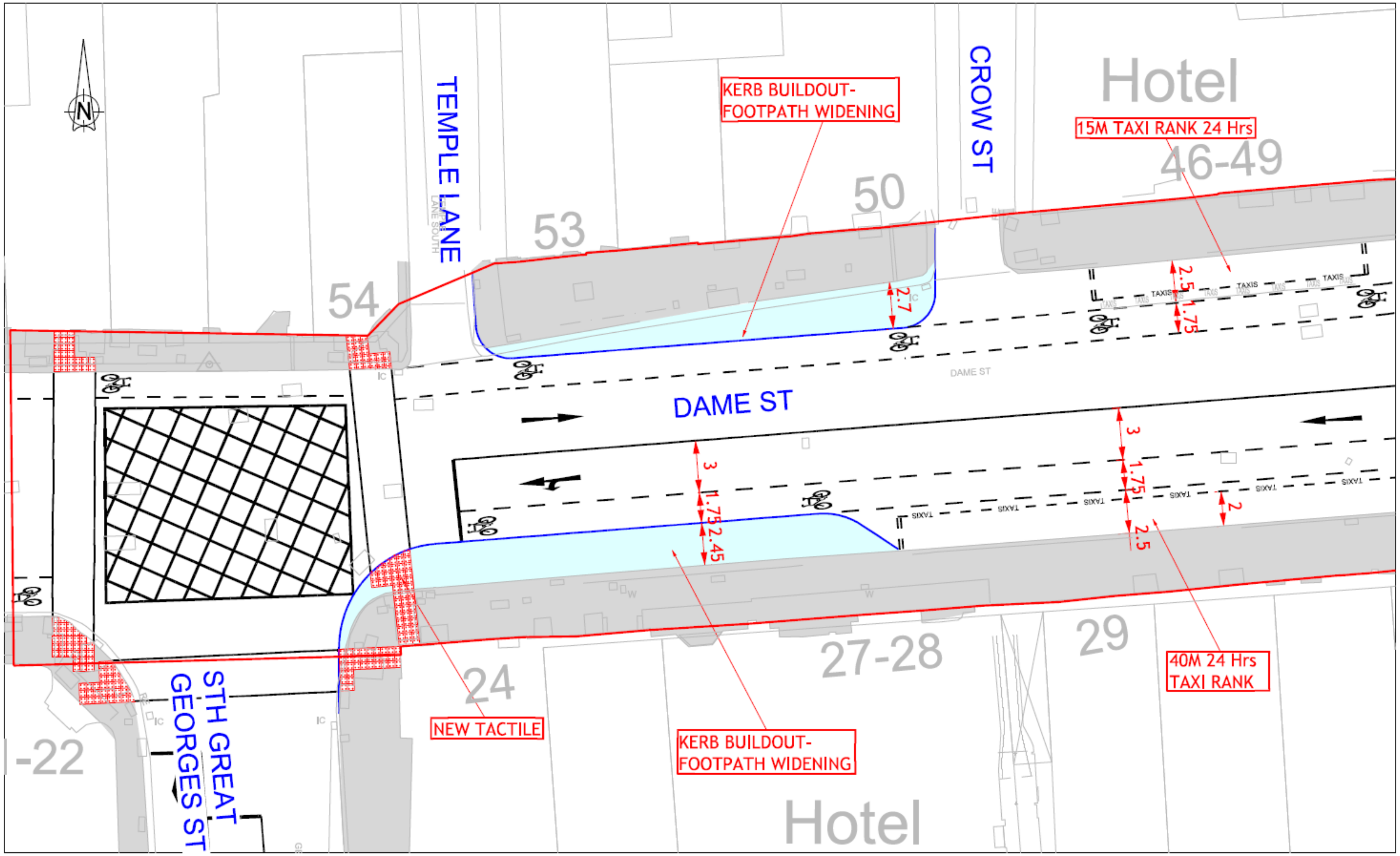

Figure 4.4 - Road design detail- Dame Street

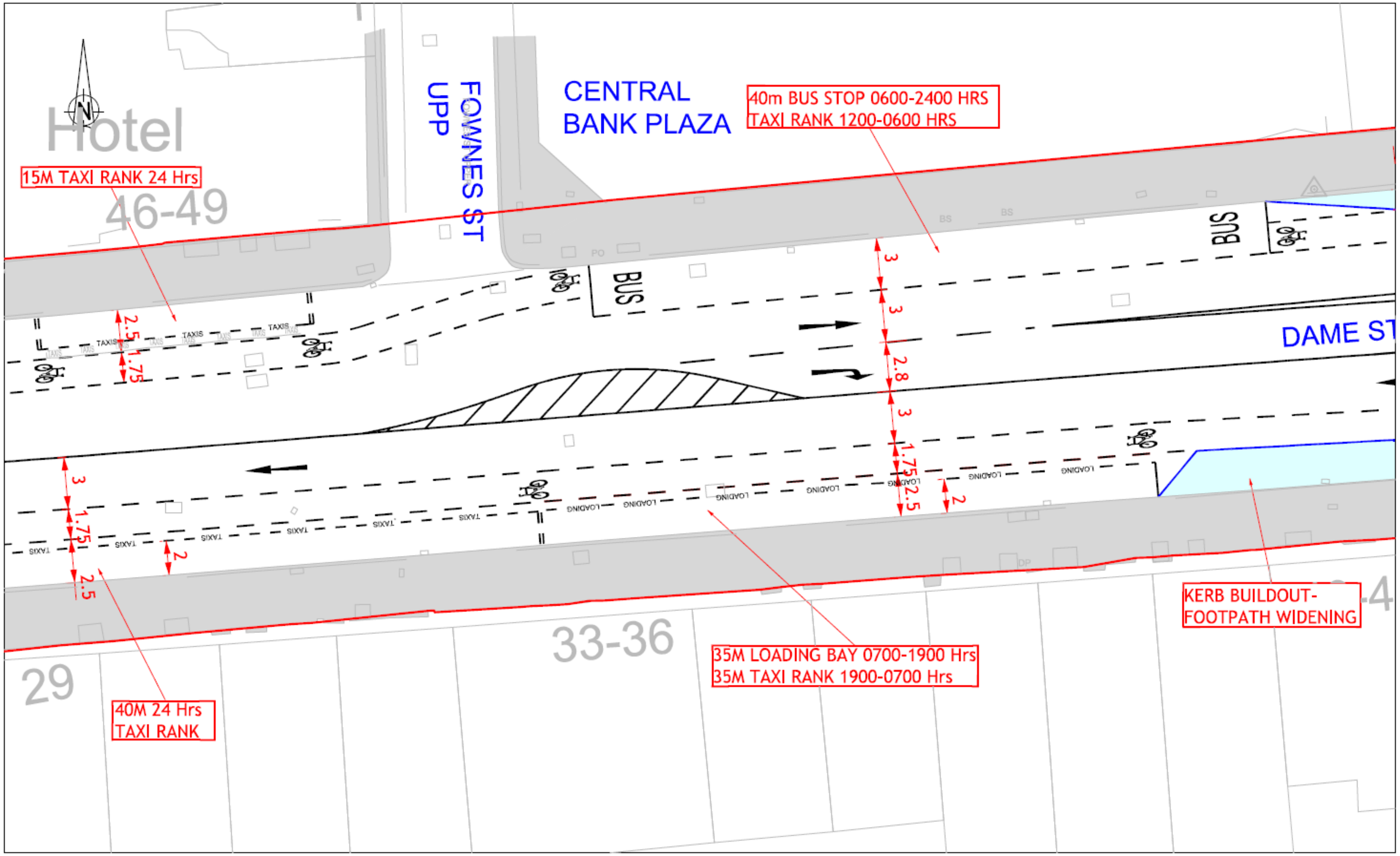

Figure 4.5- Road Design Detail- Dame Street

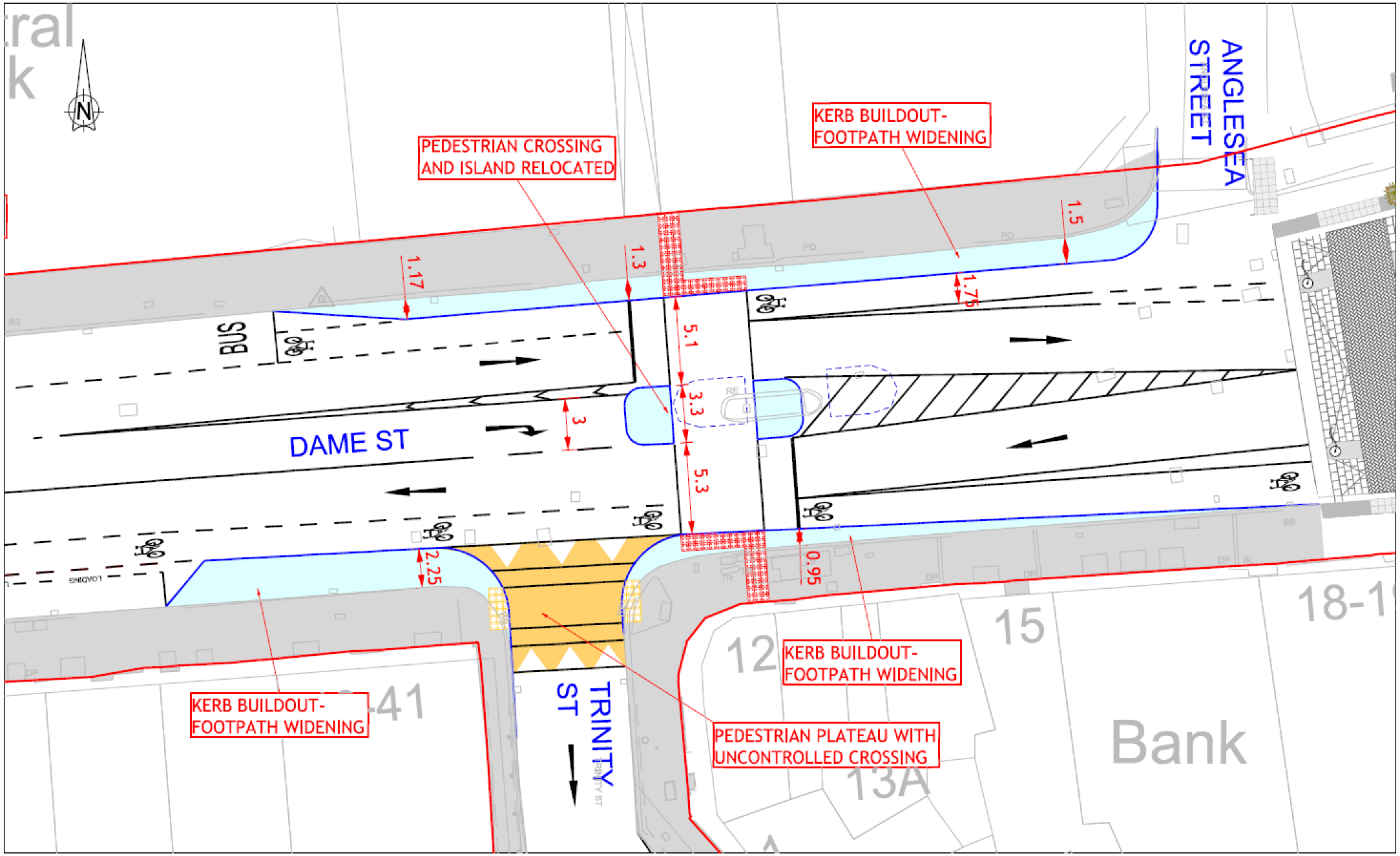

Figure 4.6 - Road Design Detail- Dame Street, Trinity Street

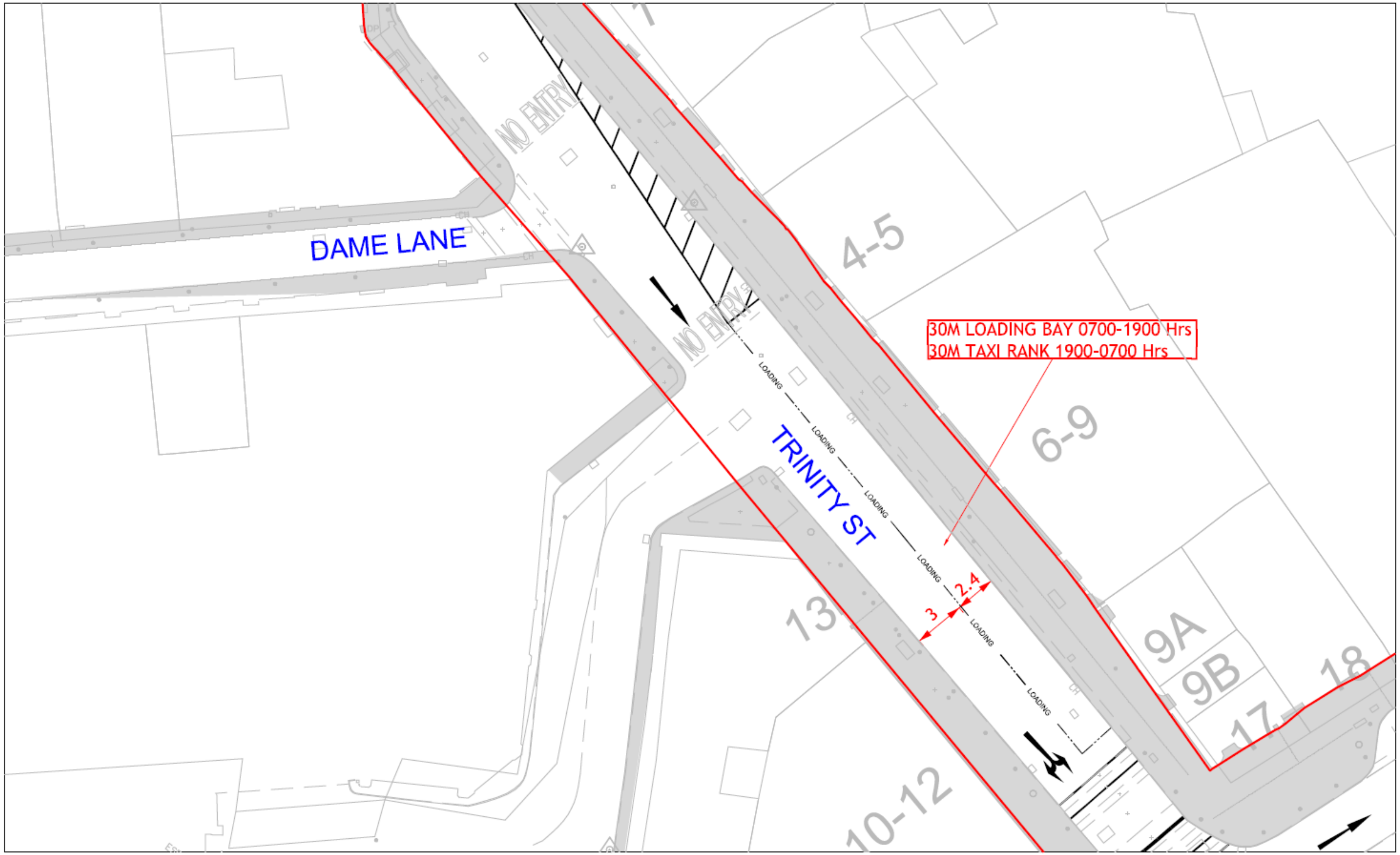

Figure 4.7 - Road Design Detail- Trinity Street

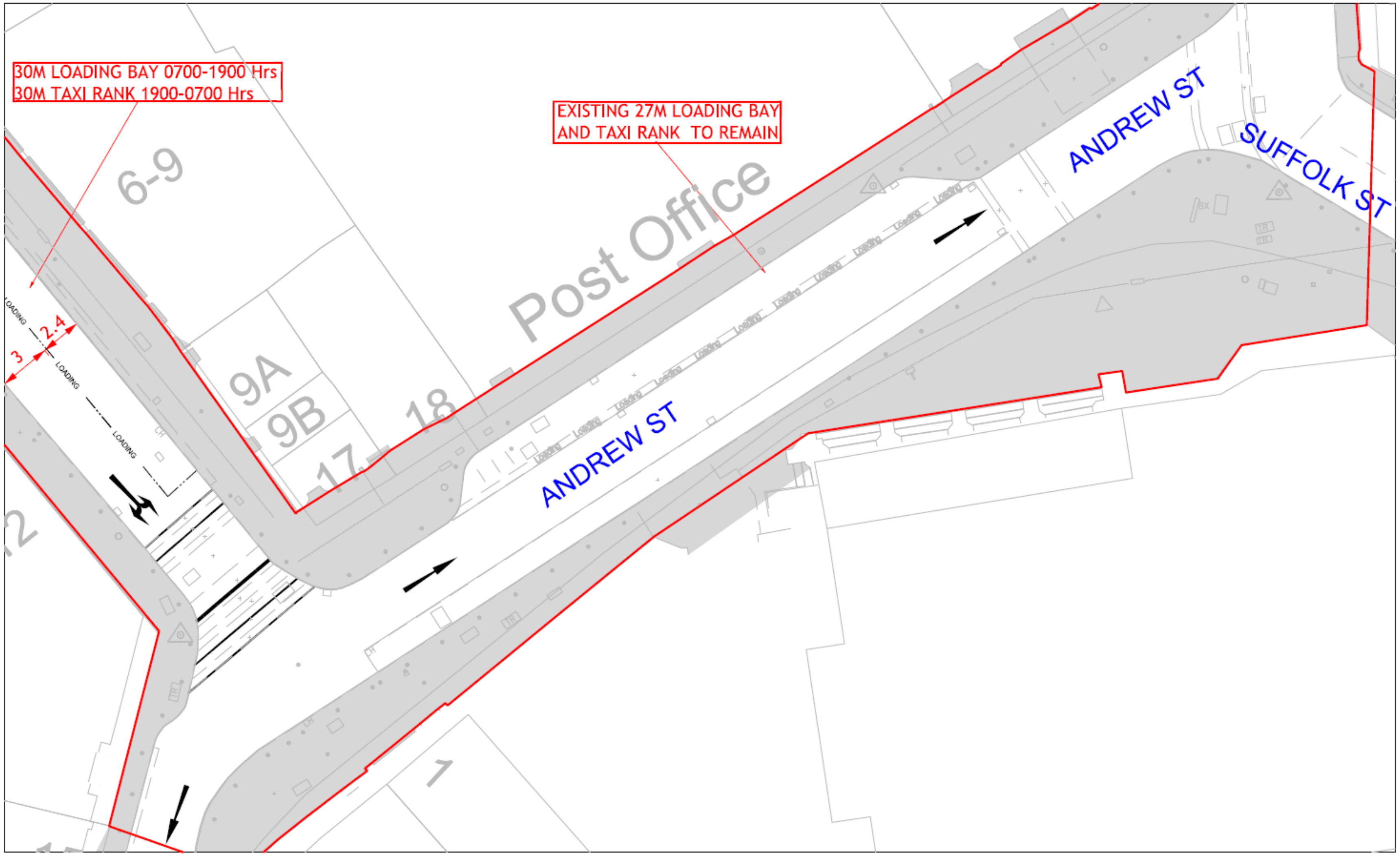

Figure 4.8 - Road Design Detail- St. Andrew's Street

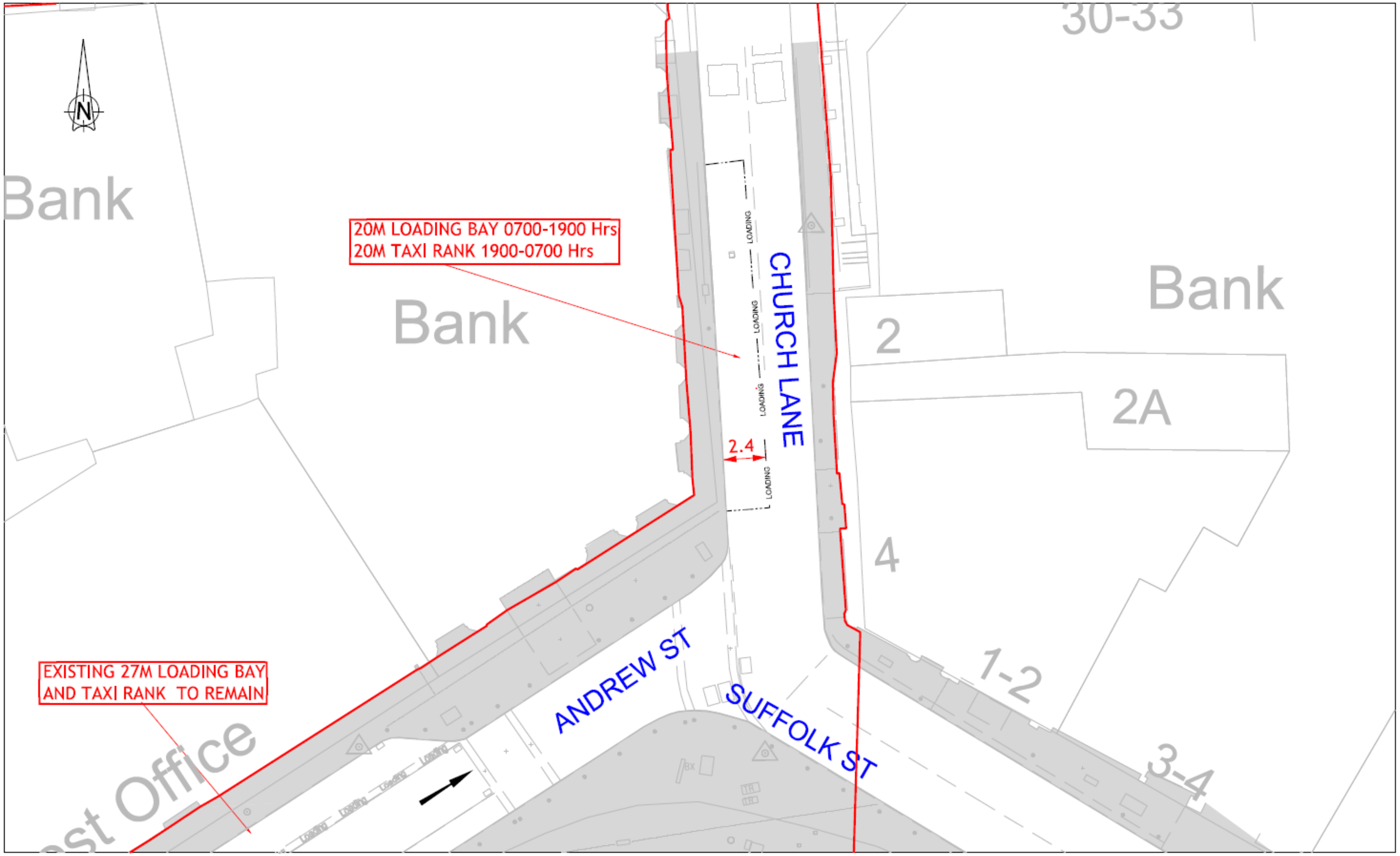

Figure 4.9 - Road Design Detail- St. Andrew's Street, Church Lane

Figure 4.10 - Permitted Access Routes

4.4.3 Civic Plaza

Introduction

The description of the proposed civic plaza is set out in this section of the EIS.

Principally, the change in priority from motor vehicle oriented to a pedestrian oriented space will improve the environment of College Green, making it attractive and accessible to a greater diversity of users. The creation of a level (step-free) surface across the space will facilitate movement of wheelchairs, buggies, suitcases and people using mobility aids.

Civic plaza

The proposed civic plaza extends east-west from the junction with Anglesea Street to the front of Trinity College and north-south from the end of Grafton Street to College Street, as illustrated on **Figure 4.11**. The proposed civic plaza has a maximum length of 63m (east-west) and maximum width of 34m (north-south) and occupies a space of approximately 7,300m^2. College Green has the potential to be a memorable place once the traffic and clutter that currently exists is removed.

This design proposes that the entire space be treated as a grand civic set piece designed with its central axis aligned on the axis of the space from Dame Street and the gates of Trinity College. This will reinstate the historic footprint depicted in the historic maps of the city since College Green was first depicted as an urban space on De Gomme's map of 1673, as illustrated on **Figure 2.1**.

Following from this overarching concept, the space is divided into three distinct zones - from east west - each reflecting its place and its role within the overall Proposed Project. A 'circus' (diameter circa 24.5m) on the axis of Foster Place and Church Lane separates the pedestrian-priority area to the east from a more conventional 'street' arrangement to the west. This central 'circus' provides a turnaround for the limited traffic entering from Dame Street.

The east end is designated as a fully pedestrianised space framed by the splendid facades of the Bank of Ireland and Trinity College. Once cleared of its clutter and central trees, the space will be available for events and celebrations. The proposed central water fountain feature will ensure the space becomes a memorable experience and meeting place for residents and visitors alike.

Foster Place will be developed as a pedestrian-priority 'piazetta' which has the potential to become an important urban room with south-facing café terrace under the canopy of mature Plane trees.

The west end of the plaza will be framed on both sides with lines of trees to separate the designated footpaths and cycleways from the central architecturally designed carriageway.

The plaza design also includes for the installation infrastructure and services installations to accommodate concerts, film and other such public events.

In summary, the civic plaza seeks to reconfigure College Green from the traffic and clutter dominated space it is today into Dublin's 'living room' – a place that is safe, adaptable and friendly for people of all ages – both for everyday social interaction and for major public events and celebrations.

Universal Design

The design sets out to be an exemplar of best practice in applying the principles of 'universal access' to ensure that the College Green plaza is usable by people of all ages and all abilities, including the visually impaired.

The pedestrian-priority central area is demarcated at its perimeter by bands of contrasting tactile paving, to ensure that the space is accessible and safe for people of all ages, irrespective of their age, race, gender or ability. Application of best practice will be applied during the detailed design stage to ensure that the plaza itself, and the routes in and out of it, are convenient, legible, well lit, safe and free of obstructions.

Distinctions have been made between pedestrian, cycle and vehicle-priority areas so that the risk of accidents is minimised and the particular needs of those with physical, sensory and / or intellectual disabilities is met.

The creation of a level (step-free) surface across the plaza will ease the movement of wheelchairs, buggies, suitcases and people using mobility aids. Foster Place will have no through pedestrian/ cycle traffic and is designed as a quiet, south facing space with mature trees which can accommodate tables and chairs from neighbouring cafes.

Water and Fountains

The proposed College Green plaza design incorporates two water features: the Four Angels fountain that is an integral part of the Thomas Davis memorial; and the installation of 32 water jets as a feature to the centre of the pedestrian-only area.

The plaza design proposes that the Thomas Davis Monument be moved west of its present position to the centre of the extended space, as described in the following section.

At the centre of the plaza there will be a new water feature consisting of 32 jets, one for each county, that will be controlled by a computer programme and can rise from 1m to 6m in height, in static or dance mode. At night, fibre optics concealed in the base plates illuminate the water thereby creating a different atmosphere and character to College Green. When not in operation, the plates are nearly invisible and events can take place above them. An underground control chamber will be constructed to the west of the fountains to accommodate the associated plant and services.

Monuments and Railings

The commemorative monuments that stand in College Green, Thomas Davis and Henry Grattan are of national importance. Both are important contributors to

College Green's 'sense of place' and their integration into the plaza has been a fundamental design consideration from the outset.

It is proposed that the Henry Grattan monument will remain unchanged, subject to a minor adjustment in its positioning to align with the axis of the plaza. The restoration of its original setting is proposed by reinstating the four lights and their dolphin bases - of which only two originals remain- that surround the statue. It is also proposed that the composition be reinstated as intended, with the statue and lamps sitting on a plinth flanked by benches on its four sides.

The plaza design proposes that the Thomas Davis Monument be moved west of its present position to the centre of the extended space. The proposed 'circus' provides a more appropriate location for the Thomas Davis memorial, as the place previously occupied by the demolished equestrian statue of King William. The Four Angels fountain which makes up part of the assemblage, will occupy the centre of the 'circus' with the statue at is edge, but retaining the spatial integrity of the original. The proposed turning 'circus' will be c.24.5m in diameter.

The Four Angels fountain, each representing one of Ireland's four provinces, will be restored to its original condition: the angels' arms will be returned to their upwards position, and the polycarbonate spandrel panels will be replaced. The statue will be positioned on a new base exactly following the 1966 design by Edward Delaney.

It is proposed that each monument will be removed for the duration of the construction works, for protection and to enable essential cleaning, repair and general conservation works to be carried out.

All railings located around the Bank of Ireland premises are to be retained.

Trees and Planting

Expanding the extent of planting within the city is a key recommendations of the Public Realm Masterplan (Dublin City Council, 2016). This was also a recurring theme in the City Council's public consultation process for the plaza. Increasing the number of trees in College Green has therefore been a core objective in developing the plaza plan.

It is proposed to remove eight trees from the area of the traffic island at the Grattan and Davis monuments. These will be replaced by an increased number of new trees in a more appropriate location along the south side of the plaza, forming an avenue at the approach to the space from Dame Street. A total of 22 new trees will be planted in place of the eight that currently exist- ten in a single line along the south side of the plaza, and a further twelve forming an avenue at the approach to the space from Dame Street.

The allée of new trees line along the south side of the plaza will free-up the space for events, provide a natural segregation between the cycleway and the plaza, improve the setting of the monuments and allow the façades of the Bank of Ireland and Trinity College to be visible from everywhere within the plaza.

It is proposed to retain the mature trees in Foster Place. They will be protected during the works and pruned on completion to expose their character and quality in the best light.

The species of trees to be planted at College Green will be London Planes (Platanus Acerfolia). This species has been planted in Dublin since the eighteenth century and might now be described as a native Dublin species.

Along with pleached Limes, Planes were planted in the remodelling of O'Connell Street. Their use in College Green will add continuity to the Civic Spine from Parnell Square to Dublin Castle.

In order to inhibit motor traffic entering the pedestrian priority area of College Green from the west, it is proposed to add metal planters punctuated with retractable bollards between them. The planters will be movable and made of Corten steel. They will be 1.25m by 1.25m by almost 1m in height, and will contain seasonable planting.

Street Furniture

Street furniture provision including seating, litter bins, bollards, cycle stands and planters will be consistent throughout and relate to the design of the space. The redesign of College Green provides the opportunity for the furniture, lighting and signage to be relocated in a more strategic and co-ordinated approach. The furniture will be robust, sustainable and demountable where necessary.

Infrastructure and Services

Preliminary ground penetrating radar surveys have been carried out by TST Engineering on behalf of DCC in order to identify the extent of underground services in the area.

Consultations with utilities providers at detailed design stage will establish the precise locations, status and condition of all known services. The renewal and / or relocation of services will be addressed comprehensively to ensure that there are no subsequent requirements for post-construction works to upgrade or install new infrastructure.

The proposed water feature will be controlled by a computer programmed from an underground controlled chamber, using recycled water harvested from rainfall, drained to a perimeter channel and into a storage reservoir, with excess rainwater being drained to the public system.

Public lighting will be installed in accordance with current EU standards to ensure the space is safe and attractive. The eastern pedestrian-priority area will have three custom-designed poles between the trees along its south side. In the west end and in Foster Place the existing heritage will be retained, albeit in new positions, to suit the plaza layout. Lighting and electricity infrastructure will also be provided as part of the development

The installation of new services infrastructure and the integration of existing systems will be integrated into the overall design by reducing above ground protrusions to the absolute minimum and ensuring that access chambers to below-ground services are fitted with recessed covers so that these are integrated into the design of the stone plaza surface.

Surfaces and Materials

It is proposed to re-establish the original extent of College Green by laying the extent of the space with a patterned paving in light and dark granite. The remaining areas will be paved at right angles to the building line.

Around the Bank of Ireland the existing paving finish also forms an important context for the buildings and has historic significance. The historic paving is limited to the area around the Bank of Ireland and Foster Place which is currently broken up with areas of new paving and drives. With the elevation of the road surface to the same level as the pavement the drives would no longer be required. It is proposed to salvage and re-lay the historic paving to form a consistent edge to the bank and retain the character of the original.

In Foster Place it is proposed to retain the existing flags and setts which would be re-laid to be level across the street.

The proposed 'circus' will be created in asphalt of the same tone as the dark granite, defined with light granite edging. This provides a durable surface for turning vehicles. The Department of Arts, Heritage and the Gaeltacht report '*Paving, The Conservation of Historic Ground Surfaces'* (DoAHG, DCC , 2015) will guide the retention, relocation and repair of historic paving within the site.

Lighting

The city's Public Realm Masterplan (DCC, 2016) highlights the importance of a strategic approach to the design of lighting and street furniture.

The public lighting design of the proposed civic plaza will have a big impact on how the space is used and College Green's success as an urban space with an attractive night-time environment. It will also ensure the space is sufficiently illuminated to be safe, secure and well-used at all times of day and at night.

The plaza design provides for a new public lighting installation, designed in accordance with current EU standards. The eastern pedestrian-priority area will have three custom-designed poles between the trees along its south side. In the west end and in Foster Place the existing heritage fittings will be retained, albeit in new positions, to suit the plaza layout. Lighting and electricity infrastructure will also be provided for events as part of the development.

The tall masts proposed between the trees on the south side of the space will have high-level downward-facing luminaires to light the main civic space. In addition, a lamp is positioned on the other side of the masts to provide low level lighting to the cycleway and footpath adjacent to the buildings.

The Bank of Ireland and Trinity College have existing architectural lighting to their facades. Although essential to the attractiveness of College Green, this is complementary to the public lighting and not considered as providing illumination to the space. High level lighting to the Luas lines between the plaza and College Green are likewise not considered as part of the public lighting installation.

Infrastructure will be installed to allow for the addition of 'fairy lights' in the trees, and for the potential installation of a Christmas tree or other temporary structures in the space. It is proposed to install water and power to make provision for special events. The fountains will also have integral lighting within the floor fittings.

It is proposed to restore the four hippocampus lamp standards that originally surrounded the Grattan statue, only two of which remain. These are regarded as integral to the space, and reinstated as originally intended they will contribute to the general lighting levels at the widest point of the plaza and, more importantly, illuminate the statue itself.

Drainage

While the existing drainage regime at College Green is being retained, it is proposed to complement the existing system with the installation of a Sustainable Urban Drainage System (SuDS), where possible.

These SuDS features will consist of new attenuation/infiltration areas filled with crushed stone or soil. These will predominately be located beneath the proposed trees. New gullies will be arranged such that overflow from these attenuation/ infiltration areas will discharge to the piped surface water drainage system. Some new gully connections will be required, and these will connect to the existing surface water infrastructure, either directly, or via small collector pipes to a single discharge point.

A drainage channel will be installed around the proposed fountain installation to harvest rainwater and to return water from the fountains to the water pumps in the proposed underground control chamber. This channel will consist of precast drainage units covered by a continuous steel grating. Small connector pipes (c. 150mm) will connect the low points in the drainage channel to the control chamber. The application of SuDS principles will reduce surface water run-off by incorporating water attenuation within the tree irrigation and drainage system.

The removal of vehicles from the space will also reduce the quantum of contaminants entering the public drainage system.

Maintenance and Security

A Management Plan will be prepared and maintained by DCC in respect of the management and maintenance of the civic space and An Garda Síochana will be consulted in relation to policing issues including the preparation of policing plans for any major public events.

Figure 4.11 - Proposed Civic Plaza

4.5 Construction Strategy

4.5.1 Introduction

This section provides an outline of the general activities associated with the construction of the Proposed Project. Ultimately, a Construction Management Plan (CMP) for the works will be prepared by the Contractor on appointment, in advance of any works commencing, incorporating all measures set out in this EIS and any additional measures which may be conditional as part of a planning permission granted for the Proposed Project. This will be updated at each stage of the Proposed Project as it progresses and will deal with health and safety, security, access to and within the site, entrance and fencing treatment and parking.

The Construction Management Plan will be subject to the restrictions imposed by the Employer's Works Requirements. These restrictions will include:

1) The need to maintain access to premises through the Works area;
2) The need to maintain servicing to premises through the Works area;
3) The need to maintain adequate width pedestrian / cycle routes through the Works area;
4) The need to maintain utilities and services; and
5) The need to maintain emergency access.

This section also includes an indicative outline of the construction programme, phasing and the typical construction activities required for the construction of the Proposed Project. Mitigation measures relating to minimising potential negative impacts arising from construction activities are described in relevant chapters, for example, Chapters 7 and Chapter 8, '*Air Quality and Climate Factors'* and '*Noise and Vibration'* respectively. Proposed construction management measures are also described with reference to the outline Construction and Environmental Management Plan (CEMP) prepared for the Proposed Project, as contained in **Appendix 4.1**.

The main construction works are associated with the development of the civic plaza area, as shown in **Figure 4.11**. The construction works associated with this phase of the development are described and assessed in this strategy. Other works that relate to road realignments and marking on Dame Street, Trinity Street, Andrew's Street, Church Lane and Grafton Street are considered minor and on that basis the measures outlined in this strategy do not apply. Standard Dublin City Council requirements, control procedures and permits will apply to those works.

4.5.2 Indicative Construction Programme

An indicative construction sequence is described in this section. It should be noted that this construction sequence set-out is intended to provide an overview of likely construction activities and potential impacts, and the actual construction sequence will be confirmed when a Contractor is appointed.

The construction phase of the Proposed Project is likely to take 12 – 18 months, and is expected to commence in early 2018. The main stages of construction will proceed in a general sequence as follows:

- Enabling works- including the set-up of site construction facilities, hoarding, signage etc.;
- Excavation and site clearance- including the excavation of roads and paved surfaces, and clearance of study area including careful removal of trees, street furniture, historic features etc.;
- Provision of services- including the implementation of Sustainable Urban Drainage System (SuDS), localised diversion to local power supplies, and localised diversion of telecommunication services. A new public lighting regime is proposed for College Green, and new ducting and mini pillars will be provided to cater for same. In addition, an underground control chamber will be provided for the fountains, along with associated water supply, power supply and drainage connections;
- Construction of the civic plaza including relaying the setts at Foster Place, laying granite setts in the civic plaza area, paving works to trafficked plaza area at western end, construction of turning circle, incorporation of water jets and works to existing footpaths; and
- Replacement of statues and fountain, and planting of trees. This stage of construction will also involve the placement of street furniture, bicycle parking, lighting, signage etc.

4.5.3 Main Stages of Construction

Enabling Works

Enabling works are generally undertaken in advance of the main works. Enabling works will be carried out to ensure that;

- Site construction facilities are established in advance of commencement of significant elements of work; and
- Adequate work areas and access for the permanent works and or construction is provided.

The timing of enabling works depends on the programmed start of the phase of main works that they are designed to enable. Some may start significantly in advance of the main construction activities.

The initial phase of enabling works will include the provision of construction facilities located within the works area. The initial works area is expected to include the northern side of the site, with pedestrian and cyclist access being retained along the southern side of the site.

Once this main section of plaza works is complete, the works area will move to the southern side of the site, with pedestrians and cyclist access to be provided on the northern side of the site. A works area will provide secure and safe refuge space for Contractor facilities and equipment.

Construction site hoardings are used to provide a secure site boundary to what can be a dangerous environment for people who have not received the proper training and are unfamiliar with construction operations. Site hoarding also performs an important function in relation to minimising some of the potential environmental impacts associated with construction, namely noise, visual impact, and dust deposition.

Hoarding will be established around the site construction area before any significant construction activity takes place. Hoarding will be established such that maximum pedestrian access will be maintained around the works area. Hoardings works will be of the same nature as that carried out for similar operations at most urban construction and building sites.

Construction lighting will be powered by mains supplies or diesel generators where an electrical supply is not available and will be positioned and angled downwards to minimise spillage of light from the site. Weather and vandal resistant fluorescent fitting will be installed on hoardings around the construction area to illuminate public walkways.

Construction vehicles will gain access to the site using designated routes and access points such as Dame Street. Further detail on construction traffic and access is provided in Chapter 6 '*Traffic and Transportation.*'

A construction traffic management plan will be developed as required by the Contractor so as to ensure that routes around the works are maintained for pedestrians and vehicles for the duration of the construction works. Refer to Chapter 6 '*Traffic and Transportation'*.

Site Clearance and Excavation

Following erection of hoarding, street furniture, such as cycle features, traffic lights, bins and public lighting columns will be cleared where required from the excavation area and safely stored for reinstatement following the works. The monuments of Henry Grattan and Thomas Davis with the Four Angels Fountain will also be safely stored offsite for reinstatement.

It is proposed to remove eight trees from the area of the traffic island at the Grattan and Davis Statues. It is proposed to retain the distinguished Plane trees in Foster Place. Measures will be put in place to protect all retained trees.

Detailed surveys of existing underground utilities have been carried out by TST Engineering on behalf of DCC to determine if underground services are present in the area of the proposed works. In addition, areas to be excavated for utility trenches and the underground control chamber for the fountains will be scanned using a CAT scanner or similar utility scanning techniques to identify the location of any live cables prior to any excavation works commencing. All service diversions will be carried out in consultation with the relevant utility companies. The Contractor will as appropriate submit diversion proposals to the relevant utility company for their consideration prior to works being carried out.

Footpath and road surfacing will be removed by either manual or mechanical means and disposed of appropriately or stored onsite for reuse. Trenches excavated for utility diversions will be supported to ensure that the sides of the excavation are secure. New utility ducts and pipes will be laid in an open cut trench with any existing utilities crossing the diversion trench protected and supported. Ducting, pipework, manholes, and chambers will be constructed to the utility owner specification and the trench then backfilled.

A significant proportion of the surplus excavation material from the Proposed Project will consist of soil and stones which may be accepted for recovery or recycling at waste licenced and permitted facilities.

Excavation will be typically carried out using excavators where cut and re-profiling works are carried out on site. Material to be taken off site will be transferred to trucks for onward transportation to the disposal recovery site as soon as possible following excavation in order to minimise the amount of excavated material being stored on-site. In addition, materials required for the works will be delivered on a 'just in time basis' so as to minimise storage of materials on site. Chapter 13, '*Resource and Waste Management',* contains more detailed information on Resource and Waste Management associated with the Proposed Project.

Archaeological monitoring of earthmoving works for site preparation will be undertaken to ensure that any features of an archaeological nature that may be revealed are identified, recorded and fully resolved. Hoardings, additional support and temporary weathering will be provided, if required for protected structures on site. Chapter 12, '*Soils, Geology, Hydrogeology and Hydrology',* provides detailed information on excavation material and mineralogy.

Provision of Services

Following on from completion of site clearance and excavation works, construction activities will focus on the installation/diversion of underground utilities to provide the infrastructure required for drainage, electricity and telecommunications.

Detailed surveys of existing underground utilities have been carried out by TST Engineering on behalf of DCC. This survey information, together with information provided by the individual utility providers will be used to highlight the scope of early enabling works where service isolation or diversions may be required.

Installation of underground services within the civic plaza will be carried out including a new public lighting regime, as well as new traffic communications and electricity ducting, and the provision of the underground control chamber for fountains. Localised diversion of services will also be required.

A specific works sequencing programme will be developed by the Contractor in advance of commencement of these works. This plan will ensure that particular consideration is given to the sequence of excavations, consultation with utility providers and the phased completion of works in each area to ensure a sequenced handover of the completed installation.

While the existing drainage regime at College Green is being retained, it is intended to complement the existing system with the installation of a Sustainable Urban Drainage System (SuDS), where possible. These SuDS features will consist of new attenuation/infiltration areas filled with crushed stone or soil. These will predominately be located beneath the proposed trees. New gullies will be arranged such that overflow from these attenuation/ infiltration areas will discharge to the piped surface water drainage system. Some new gully connections will be required, and these will connect to the existing surface water infrastructure, either directly, or via small collector pipes to a single discharge point.

A drainage channel will be installed around the proposed fountain installation to harvest rainwater and to return water from the fountains to the water pumps in the proposed underground control chamber. This channel will consist of precast drainage units covered by a continuous steel grating. Small connector pipes (c. 150mm) will connect the low points in the drainage channel to the control chamber.

Construction of Civic Plaza

Construction of the civic plaza will involve the construction of the hard landscape throughout the site. Light and dark granite setts will be laid in the central area. The original setts located at Foster Place will be removed, stored (on/off-site) and reinstated. The proposed turning circus will be constructed in asphalt.

The construction of the soft landscape will be carried out in tandem with completion works on elements of hard landscape.

Replacement of Street Furniture and Statues, and Replanting

The final phase of the construction works will involve the replacement /placement of street furniture including seating, litter bins, bollards, cycle stands, lighting planters and tree grilles.

The monuments of Henry Grattan and Thomas Davis will be repositioned to the locations described in **Section 4.4.3**.

The final phase of the construction works will also involve the planting of 22 new plane trees, as described in **Section 4.4.3**.

Water Management

Site drainage will be provided to collect surface runoff prior to discharge to the local drainage network – all in accordance with the necessary Dublin City Council approval.

Employment

The construction workforce numbers will vary depending on the construction stage of the Proposed Project. However, it is anticipated that at the peak of construction there will be an average construction workforce of approximately 50 people employed on site.

Hours of Working

Normal working hours during the construction phase will typically be as follows:

Start	**Finish**	
0700	1800	Monday to Friday
0800	1400	Saturday

However, it may be necessary to work outside of these hours at night and at weekends during certain activities and stages of the development.

Community Liaison During Construction

During the construction phase, site management measures including proactive communication with business and public regarding phasing, extent and duration of works will be required to be undertaken out by the Contractor, as set out in **Appendix 4.1**. Access to all properties will be maintained during the construction phase. Signage and hoarding will be provided as necessary.

4.5.4 Construction Health and Safety

Health and Safety

The Contractor will be required to ensure all Health & Safety requirements are agreed with Dublin City Council. This is to protect the public who will be accessing College Green during the construction phase of the works and will include all suitable temporary signage, barriers and hoarding as necessary.

All construction staff and operatives will be inducted into the security, health and safety and logistic requirements on site prior to commencing work.

All contractors will be required to progress their works with reasonable skill, care and diligence and to proactively manage the works in a manner most likely to ensure the safety, health and welfare of those carrying out construction works, all other persons accessing College Green and interacting stakeholders.

Contractors will also have to ensure that, as a minimum, all aspects of their works and project facilities comply with legislation, good industry practice and all necessary consents.

Particular cognisance will be taken by the contractor to managing the use of machinery in a public environment.

The requirements of the Safety, Health and Welfare at Work Act 2005, the Safety, Health and Welfare at Work (Construction) Regulations, 2006 and other relevant Irish and EU safety legislation will be complied with at all times.

As required by the Regulations, a Health and Safety Plan will be formulated which will address health and safety issues from the design stages through to completion of the construction and maintenance phases. This plan will be reviewed and updated as required, as the development progresses.

In accordance with the Regulations, a “Project Supervisor Construction Stage” will be appointed as appropriate. The Project Supervisor Construction Stage will assemble the Safety File as the project progresses.

Emergency Response Provision

The Contractor will maintain an emergency response action plan which will cover all foreseeable risks, i.e. fire, spill, flood, etc. Appropriate site personnel will be trained as first aiders and fire marshals. In addition, appropriate staff will be trained in environmental issues and spill response procedures.

Equipment and vehicles will be locked, have keys removed and be stored securely in the works area.

Site Management and Security

A construction management team will be established for the duration of the construction phase. The team will manage the construction of the Works including monitoring the Contractor’s performance to ensure that the proposed construction phase mitigation measures are implemented and that construction impacts and nuisance are minimised.

A Construction Management Plan for the works will be prepared and submitted to DCC in advance of any works commencing. This will be updated at each stage of the development as it progresses and will deal with health and safety, security, access to and within the site, entrance and fencing treatment and parking.

The primary function of site security will be to ensure that no unauthorised entry to site occurs. There will be hoarding around the construction sites to minimise the risk of vandalism and unauthorised access.

Environmental Management

Environmental impacts during construction will be mitigated or reduced where possible (refer to the individual chapters in this EIS for specific mitigation measures).

In this regard, the appointed Contractor will be required to produce a Construction and Environmental Management Plan (CEMP) for DCC approval prior to commencing any works on site. The Contractor’s CEMP will be a development of the outline CEMP contained in **Appendix 4.1**.

This plan will deal with issues such as noise and dust mitigation measures, hours of operation, traffic management, waste management, environmental management, demolition, protection of trees and monuments, etc.

Resource and Waste Management

Resource and waste generation during construction will be mitigated and managed where possible. In this regard, the appointed Contractor will be required to produce a Construction and Demolition Waste Management Plan (CDWMP) for DCC approval prior to commencing any works on site.

The CDWMP will address waste generation and arrangements made for prevention, reuse, recycling disposal and collection of recyclables and wastes.

The CDWMP will be prepared in line with the DoEHLG Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects (DoEHLG, 2006).

The following is an indicative list on the content of a CEWMP:

- Description of the Proposed Project;
- Wastes arising including proposals for minimisation/reuse/recycling;
- Procedures for prevention, reuse and recycling of wastes;
- Estimated cost of waste management;
- Roles including training and responsibilities for C&D Waste;
- Procedures for education of workforce and plan dissemination programme;
- Record keeping procedures;
- Waste collectors, recycling and disposal sites including copies of relevant permits or licences; and
- Waste auditing protocols.

Using the information identified, the Contractor will be required to develop, implement and maintain a CDWMP for the construction phase of the Proposed Project.

4.6 References

Dublin City Council (2016) *Dublin City Development Plan 2016-2022*. Dublin, Ireland.

Dublin City Council (2016) *The Heart of Dublin City Centre Public Realm Masterplan*. Dublin, Ireland.

The Design Manual for Urban Roads and Streets, Department of Transport, Tourism and Sport, 2013

Best Practice Guidelines on the Preparation of Waste Management Plans for Construction & Demolition Projects, DoEHLG, July 2006Keohane, F (X) *College Green Conservation Assessment*, Dublin, Ireland.

Department of Arts Heritage and the Gaeltacht, Dublin City Council (2015) *Paving: The Conservation of Historic Ground Surfaces.'* Dublin, Ireland

Dixon Jones Ltd., Paul Keogh Architects (2017) *College Green Design Report*, Dublin, Ireland.

5 Planning and Policy

5.1 Introduction

This section of the EIS sets out the planning policy context under which the Proposed Project is proposed. This review ranges from high level strategic statements regarding the role of Dublin and the City Centre, down to detailed planning policy statements which specifically provide for the scheme and consider its implementation a key policy objective for the City.

5.2 National Spatial Strategy 2002-2020

The strategic vision for the spatial development of Ireland for the period from 2002 to 2020 is outlined in the 'National Spatial Strategy' (NSS). The NSS aims to achieve balanced regional development over the country of Ireland within the period up to 2020, in a way that is internationally competitive, socially cohesive and environmentally sustainable. The NSS envisages the establishment of a national spatial structure based around a series of 'gateways' and 'hubs', which will act as growth engines. Dublin is included in the 'Dublin and Mid-East Region' (the Greater Dublin Area). The strategy sets out the following role for the region:

"Enhancing the competitiveness of the Greater Dublin Area (GDA), so that it continues to perform at the international level as a driver of national development, means physically consolidating the growth of the metropolitan area i.e. Dublin City and suburbs. At the same time, development in the hinterland of the metropolitan area is to be concentrated in strategically placed, strong and dynamic urban centres, i.e. the 'Primary Development Centres' identified in the Strategic Planning Guidelines. These development centres have a unique role in Irish terms, given the scale of the Dublin City region and the need for internal balance between the city and its surrounding counties."

Dublin City is defined as a 'Gateway'. Gateways have a strategic location, nationally and relative to their surrounding areas, and provide national scale social, economic infrastructure and support services. Further development of the five existing gateways at Dublin, Cork, Limerick/Shannon, Galway and Waterford is a key component of the NSS.

At section 5.4.2, the NSS refers to Larger Urban Areas as follows:

"Internationally mobile labour with 'in-demand' skills has particular preferences. People in this category are often attracted to cities and larger towns, where there is a vibrant social and cultural life, coupled with broad employment opportunities and a wide range of services including education, healthcare and childcare facilities, transport systems and ready access to entertainment and amenity facilities. In Ireland, certain cities and towns have developed strong economies around their power. The elements that contribute to the attractiveness of such places include

– a thriving, human–scale, cultural and social environment, concentrated around distinctive street patterns, mixes of restaurants, cafés, bars and attractive shops

– a high quality physical setting in terms of sensitive conservation of heritage buildings, contemporary architecture, street paving, formal and high quality public spaces and parks

– pedestrian friendly zones.

If balanced regional development is to work, the spatial structure outlined in Section 3 must be supported by policies aimed at enhancing the attractiveness of areas for people. Physical and cultural liveliness will be required to ensure that there is a combination of attractive social and cultural facilities for both people and business."

5.3 Regional Planning Guidelines for the Greater Dublin Area 2010-2022

At a regional level, the Regional Planning Guidelines (RPGs) (Dublin Regional Authority and Mid-East Regional Authority, 2010) provide for the implementation of the NSS in the Greater Dublin Area (GDA). The principal objective of these RPGs is to develop a broad, spatially-oriented planning framework comprising of the administrative areas of Dublin City, Dún Laoghaire-Rathdown, South Dublin, Fingal, Kildare, Meath and Wicklow. Within the GDA, a distinction is made in the guidelines between the existing built up area of Dublin and its immediate environs (the Metropolitan Area) and the remaining extensive areas of countryside containing a range of designated development centres specifically located on transportation corridors (the Hinterland Area).

The overall vision at section 2.2. of the Guidelines supports:

"*an economically vibrant, active and sustainable international Gateway Region, with strong connectivity across the GDA Region, nationally and worldwide; a region which fosters communities living in attractive, accessible places well supported by community infrastructure and enjoying high quality leisure facilities."*

Core principles from this strategic vision for these RPGs, drawing on the 2004 RPGs are:

- *"Dublin as the capital city of Ireland and a major European centre shall grow and progress, competing with other cities in the EU, and serving a wide range of international, national, regional and local needs.*
- *The Dublin and Mid-East Regions will be attractive, vibrant locations for industry, commerce, recreation and tourism and will be a major focus for economic growth within the Country.*
- *The GDA, through its ports and airport connections will continue to be the most important entry/exit point for the country as a whole, and as a Gateway between the European Union and the rest of the World. Access to and through the GDA will continue to be a matter of national importance.*
- *Development in the GDA shall be directly related to investment in integrated high quality public transport services and focused on compact urban form.*
- *Development within the existing urban footprint of the Metropolitan Area will be consolidated to achieve a more compact urban form, allowing for the accommodation of a greater population than at present, with much-enhanced*

public transport system, with the expansion of the built up areas providing for well-designed urban environments linked to high quality public transport networks, enhancing the quality of life for residents and workers alike."

5.4 Transport Strategy for the Greater Dublin Area 2016 – 2035

The Greater Dublin Area Transport Strategy 2016 – 2035 (National Transport Authority, 2016) sets out a framework for the planning and delivery of transport infrastructure and services in the Greater Dublin Area (GDA) as required under section 12 of the Dublin Transport Authority Act 2008.

The relationship between the city centre and suburban areas is examined in detail in the strategy given the importance of origin and destinations for various modes and purposes of trips. This has regard to land use characteristics, trends and changes.

In relation to Dublin City Centre, the strategy notes that the city centre has maintained its position as the pre-eminent location for employment in the region. It also highlights that the intensity of employment (the share of employment in the city centre) has been maintained on the basis that between 2006 and 2011 the share of employment in the city centre grew from 26% of the GDA's jobs to 28%. In other words, while regional centres and commercial centres in the suburbs and periphery are attracting employment, the city centre continues to maintain its pre-eminent position. The Transport Strategy attributes this to a higher rate of employment reduction on the periphery, during the economic downturn, rather than any major upswing in the number of people employed in the city centre.

The strategy considers the retail sector also displays the suburbanisation trend very clearly where major regional-scale shopping centres have challenged Dublin City Centre as the primary destination for shopping trips. It highlights the Pavilions in Swords, IKEA, Blanchardstown Town Centre, Liffey Valley Shopping Centre, the Square Tallaght and Dundrum Town Centre as strong retail centres that function as a counter balance to the city centre.

The strategy focuses on the transport network rather than place specific measures for the city centre. Dublin city centre is the key nodal point for the region with a multiple modes of access, stations, stops and transport corridor, in effect making it the point of maximum accessibility for the region.

5.5 Retail Strategy for the Greater Dublin Area 2008-2016

The Retail Strategy for the Greater Dublin Area 2008-2016 (Dublin and Mid-East Regional Authorities, 2008) adopted in July 2008, provides guidance and policies for retail development at a strategic level in the Greater Dublin Area.

Dublin city centre is identified as a-Level 1 Centre (Section 6.15). As the centre at the highest grade in the hierarchy, Dublin city centre is considered:

"*unique in the range and mix of retail and associated linked services provided, the levels of connectivity it offers and the wide hinterland and tourist trade it serves. As the primary centre for retail, located at the terminus of almost all public transport connections in the GDA."*

The Strategy states that:

"*it is essential that the City continues to re-invent itself to provide a modern attractive retail environment that can compete both with the modern level 2 centres but also with other international cities in both attracting trade and new retail formats."*

For Dublin City Council centre the 'Council Specific' Policy Recommendation at section 6.33 is:

"Maintaining the role of the city centre as the main retail centre for comparison goods in the Country through continuing to develop the retail environment, urban design of centres, range of retail uses and quality of the public realm to the highest quality to ensure that the City retail core competes on a national and international scale. As part of this, to continue to facilitate complementary uses to retail, where relevant and suitable, to form mixed use development in highly accessible locations."

5.6 Smarter Travel – A Sustainable Transport Future (2009)

Smarter Travel was published in 2009 by the Department of Transport which outlines a broad vision for the future and establishes objectives and targets for transport. The document examines past trends in population and economic growth and transport concluding that these trends are unsustainable into the future.

This document sets out ambitious national-level targets for the period 2009-2020 which included a reduction in the total share of car commuting from 65% to 45%, and a related increase in walking, cycling and public transport modes to 55% of total commuter journeys to work.

Actions to encourage Smarter Travel include:

"Action 2: Ensure better integration of land use planning and transport policies in the relevant planning guidelines as part of their ongoing review and we will avail of policy directives to give effect to specific measures needed to meet the vision for sustainable travel.

Action 4: The delivery of public transport, cycling and promotion of more sustainable travel patterns generally in many existing urban centres can only be achieved through retrofitting. We will require local authorities to prepare plans to retrofit areas towards creating sustainable neighbourhoods so that walking and cycling can be the best options for local trips, for example to reach local facilities such as shops and schools.

Action 15: To create a strong cycling culture in Ireland and ensure that all cities, towns, villages and rural areas will be cycling-friendly. Cycling will be a normal way to get about, especially for short trips. Next to walking, cycling will be the most popular means of getting to school, both for primary and secondary school. Our universities and colleges will be bursting with bicycles. Businesspeople will see the bicycle as the best way to travel for part or all of their daily commute. Shopping by bike will be as normal as it is in many of the Northern European cycling-friendly countries. The bicycle will be the transport mode of choice for all ages and will both improve the health, and reduce obesity levels, of the general population and build social capital.

Action 16: creating a culture of walking in Ireland. In that context, there is strong convergence between walking as a tourism asset and walking as recreational activity for local residents. This in turn complements a culture of walking as a mode of everyday transport, by encouraging people to walk as a matter of routine. We will ensure that urban walking networks are strengthened by increasing opportunities for walking and removing constraints as part of planning for more attractive public realms."

5.7 Retail Planning Guidelines for Planning Authorities 2012

The Retail Planning Guidelines (DoECLG, 2012) provide a framework for local authorities in the preparation of development plans and the assessment of planning applications as well as providing guidance to developers, regional authorities and An Bord Pleanála.

The guidelines establish five clear policy objectives:

- Ensuring that retail development is plan-led;
- Promoting city/town centre vitality through a sequential approach to development;
- Securing competitiveness in the retail sector by actively enabling good quality development proposals to come forward in suitable locations;
- Facilitating a shift towards increased access to retailing by public transport, cycling and walking in accordance with the Smarter Travel strategy; and
- Delivering quality urban design outcomes.

It notes at section 2.2.1 that:

"Metropolitan Dublin City supplies retail functions of a specialist nature not found elsewhere in the State, as well as providing the broadest range of comparison goods shopping."

Enhancing the vitality and viability of city and town centres in all their functions through sequential development is an overarching objective in retail planning.

Section 2.3 highlights that "*City and town centres provide a broad range of facilities and services and act as a focus for their wider regions, including rural areas."*

The guidelines emphasise that:

"*City and town centres have evolved over a considerable period of time as the focus for a range of commercial and community activities, resulting in a mix of often interdependent land uses which contribute to a sense of place and identity. City and town centres derive their strength from a combination of natural and other features: historic buildings, cultural, civic and governmental buildings, as well as public spaces.*

...This character can be further enhanced by introducing appropriate new uses into historic buildings. The city and town centres also have a high level of accessibility to employment, services, and facilities for all the community as such centres are key destinations for public transport systems.

The development of major shopping centres within city and town centre areas has contributed very positively to the vitality of these areas and has been a major success of previous planning policy."

5.8 Dublin City Development Plan 2016-2022

The Dublin City Development Plan 2016-2022 (Dublin City Council, 2016) was adopted by the Council in October 2016 and is the local authority's primary planning statutory plan. There is a consistent trend throughout the Development Plan that promotes the improvement of public spaces and civic areas. The proposals for College Green complement a dynamic and progressive planning policy agenda in the City Plan which are summarised below. College Green is very much viewed as an integral part of the Grand Civic Spine under policy SC01:

"SCO1: To implement a programme of environmental improvements along the Grand Civic Spine from Parnell Square to Christchurch Place, including College Green and Dame Street, arising from the opportunities provided by the introduction of the College Green Bus Priority System, the Luas Cross City and the 'Dubline' initiative."

The Proposed Project is specifically incorporated as an objective of the City Development Plan under SC08 "*To prioritise the redevelopment of College Green as a pedestrian friendly civic space, including the pedestrianisation of Foster Place."*

The overall objective of the proposed traffic management measures and civic plaza at College Green is consistent with, and follows-on from the objective SCO15 of the previous Dublin City Development Plan 2011–2017:

"To examine the possibility of, and promote the creation of a new public realm improvement space in the area fronting onto Trinity College and the Bank of Ireland at College Green."

The Vision and Core Strategy of the Plan set out at Chapter 2. An extract from Dublin City Development Plan 2016-22 Map E illustrates the zoning objectives and other policy objectives for the area at **Figure 5.2**. At a strategic level it is important to highlight the following policy objectives:

"Settlement Strategy (2.2.3) –
For the inner city, the plan seeks to strengthen and consolidate the robust city-centre mixed use zoning (Z5), with active promotion of the inner city as an attractive place for urban living, working and visiting; the delivery of housing regeneration projects, the emergence of spatial clusters of economic specialism's, public realm improvements and the strengthening of the retail core, all supported by multiple levels of public transport accessibility in the city centre.

Shaping the City – Urban Form and Structure (2.3.2):
It is a central aim of the core strategy to consolidate and enhance the inner city in order to augment its crucial role at the heart of the capital city and the city region. The inner city of Dublin is the most connected destination in the country and at international level, and supports a dynamic range of economic, educational and cultural clusters, together with a growing residential population. It is a central part

of the core strategy to enhance the links between the existing and emerging clusters in the city as depicted on the core strategy map.

Green Infrastructure, Open Space and Recreation –
Dublin is shaped by its major landscape features – the Phoenix Park, the River Liffey, Dublin Bay, and also the river valleys of the Tolka and Dodder. These features are complemented by the man-made amenities and green spaces of the city squares and historic gardens, the canals and waterfront promenades. All of these features contribute to the city's high-quality environment."

The City Plan addresses the *Shape and Structure of the City* at Section 4.5.1.1 and sets out a number of policy objectives including the following relevant items:

"SC2: To develop the city's character by cherishing and enhancing Dublin's renowned streets, civic spaces and squares; to create further new streets as part of the public realm when the opportunities arise; to protect the grain, scale and vitality of city streets; to revitalise the north and south Georgian squares and their environs, and to upgrade Dame Street/College Green as part of the Grand Civic Spine.

SC3: To develop a sustainable network of safe, clean, attractive pedestrian routes, lanes and cycleways in order to make the city more coherent and navigable.

SC4: To promote a variety of recreational and cultural events in the city's civic spaces.

SC19: To promote the development of a network of active, attractive and safe streets and public spaces which are memorable, and include, where appropriate, seating, and which encourage walking as the preferred means of movement between buildings and activities in the city. In the case of pedestrian movement within major developments, the creation of a public street is preferable to an enclosed arcade or other passageway.

SC20: To promote the development of high-quality streets and public spaces which are accessible and inclusive, and which deliver vibrant, attractive, accessible and safe places and meet the needs of the city's diverse communities.

SC21: To promote the development of a built environment and public spaces which are designed to deter crime and anti-social behaviour, which promote safety and which accord with the principles of universal design, as set out in the Dublin City Public Realm Strategy.

SC28: To promote understanding of the city's historical architectural character to facilitate new development which is in harmony with the city's historical spaces and structures."

Zoning

Figure 5.2 comprises an Extract from Map E of the Dublin City Development Plan 2016-22 indicating the location of College Green within Conservation Area (red hatch), ACA (Green hatch) and bounded by protected structures (red asterisk). The map also shows the location of the principles zoning objectives for College Green and surrounds. The dominant zoning is Z5 highlighted in blue with the objective *"To consolidate and facilitate the development of the central area, and to identify, reinforce, strengthen and protect its civic design character and dignity"*. The orange zoning reflects the designation of important institutional uses as Z8 *"To protect the existing architectural and civic design character, and to allow only for limited expansion consistent with the conservation objective"*. The green designation Z9 *"To preserve, provide and improve recreational amenity and open space and green networks"* is also noted.

5.8.1 City Economy and Enterprise

Chapter 6 of the City Plan addresses Economy and Enterprise, which highlights that the quality of the city environment is an important elements of its competitiveness and economic well-being. It notes:
"*Significant improvements in the urban environment such as new spaces and parks, cleaner streets, improved apartment housing, new arts and cultural facilities, and an increasingly open and multi-cultural city at ease with its diversity, have made the city more attractive and competitive."*

The following relevant Policy Objectives are noted:

"CEE5: (iii) To recognise the need to improve linkages between the key economic areas of the city such as Docklands, the central business district, Heuston, Newmarket and the Digital Hub area by improving facilities for pedestrians and cyclists, facilitating public transport, improving the public domain and tackling vacant sites/dilapidated buildings.

CEE7: To recognise that 'quality of place', 'clean, safe', is crucial to the economic success of the city, in attracting foreign and domestic investment, and in attracting and retaining key scarce talent, tourists, and residents.

CEE12: (i) To promote and facilitate tourism as one of the key economic pillars of the city's economy and a major generator of employment and to support the provision of necessary significant increase in facilities such as hotels, apart hotels, tourist hostels, cafes, and restaurants, visitor attractions, including those for children (ii) To promote and enhance Dublin as a world class tourist destination for leisure, culture, business and student visitors
(iii) To promote and facilitate the optimum benefits (including the international marketing benefits) to the city of the Convention Centre Dublin, as well as all other major existing and future visitor attractions

CEE14: To recognise that many of our key tourist attractions are in regeneration areas with challenges of dilapidated buildings, vacant sites, and public domain in need of improvement; and to develop projects such as Dubline that will address these challenges."

6 Traffic and Transportation

6.1 Introduction

This chapter presents the Traffic and Transportation Assessment for the construction and operation of the Proposed Project. The Proposed Project is presented in detail in Chapter 4 and includes the construction of a new pedestrian plaza at College Green to enhance the street environment in this very central location in Dublin City.

6.2 Methodology

This chapter presents the findings of the assessment of the impact of the Proposed Project on the transportation networks both at a local and strategic level.

In order to understand the traffic impacts of the Proposed Project, the National Transport Authority have undertaken a detailed transport modelling exercise using the NTA's Regional Modelling System East Regional Model (ERM). This exercise compared the do-minimum and do-something scenarios to understand the change in traffic flows on the street network and also to understand any impact on public transport users as a result of the Proposed Project. These two scenarios are as defined below:

- **Do-minimum (DM)** – Existing street network and public transport provision and any future proposals recommended in the Greater Dublin Transport Strategy 2016 – 2035 for each assessment year (2018 and 2035). Further details on the infrastructure in place in each assessment year is presented in **Section 6.4**.

- **Do-something (DS)** – As above but with the Proposed Project and associated traffic management measures in place.

The relevant results from the transport modelling are presented in **Appendix 6.1**.

In addition to the impact on traffic, the local impacts on bus users as a result of the rerouting of buses has also been assessed along with construction traffic impacts.

This assessment has been carried out generally in accordance with the Traffic and Transport Assessment Guidelines (Transport Infrastructure Ireland 2014).

6.3 Existing Receiving Environment

6.3.1 Local Street Network

There are a number of streets and junctions that will be directly or indirectly impacted by the development of the Proposed Project. These streets are presented in **Figure 6.1** and described in the following section.

Figure 6.1 - Local Street Network

College Green

Currently, College Green is a public transport only area between the hours of 07:00-19:00 Monday to Friday. A large traffic island provides Sheffield stands for 26 bicycles, a taxi rank and is used as an informal area for parking motorcycles. There are currently two pedestrian crossings at College Green facilitating pedestrian movements from Grafton Street to College Street. The pedestrian crossings are separated by the existing traffic island. There are an additional 24 cycle parking spaces provided to the south of College Green near the junction with Grafton Street.

There is a very significant volume of pedestrians crossing College Green on a daily basis, and this corridor could be considered one of the primary walking routes in Dublin City Centre. College Green connects the pedestrianised shopping street of Grafton Street with O'Connell Street, in addition Trinity College has one of its primary pedestrian entrances located at College Green.

Dame Street

Dame Street extends from Parliament Street in the west to College Green in the east. Westbound, two general traffic lanes are provided from College Green to the junction with South Great George's Street. Eastbound, a bus lane and a single traffic lane are provided along the same length. Pedestrian footpaths are provided on either side of the street. Signalised pedestrian crossings are provided at the junctions with South Great George's Street, Trinity Street and Church Lane. There are no dedicated cycling lanes present along this section of Dame Street. A total of 18 bicycle spaces are provided along Dame Street (14 on the northern side and 4 on the southern side).

As with College Green there are very high pedestrian flows along Dame Street along with a high throughput of cyclists as Dame Street acts as an important east – west route through the south city centre.

In terms of traffic flow, the majority of traffic on Dame Street is either buses or taxis due to the upstream restrictions at College Green.

Lower Grafton Street and Nassau Street

Nassau Street (between Dawson Street and Grafton Street) was converted to one-way in early 2015 to accommodate the Luas Cross City construction works and would be returned to two-way following completion of the works.

Pedestrian footpaths are maintained throughout the ongoing works of Luas Cross City. Due to the closure of Suffolk Street to through traffic, pedestrians have free movement through the Suffolk Street / Grafton Street junction. Signalised pedestrian crossings are present at the Grafton Street / College Green junction and outside the study area at the junction with Nassau Street and Dawson Street. There are no dedicated cycle facilities provided on these streets.

As noted earlier, there is a significant volume of pedestrians using the western side of Lower Grafton Street to cross College Green.

Westmoreland Street and College Street

Westmoreland Street and College Street merge at College Green with Westmoreland Street facilitating northbound traffic and College Street facilitating southbound traffic.

Westmoreland Street consists of a three lane street while College Street is a two lane street following the construction of the Luas tracks. There is no specific provision for cyclists on-street or off-street. Pedestrians are catered for with footpaths and signalised staggered pedestrian crossings on Westmoreland Street and College Street.

Foster Place

Foster Place provides access to Bank of Ireland, as well as other offices and cafes. The uses on Foster Place includes on-street car parking and a subsidiary rank for taxis feeding the taxi rank in the central median on College Green. There are 8 bicycle spaces provided using Sheffield stands on the western side and pedestrians are catered for with footpaths along the perimeter.

South Great George’s Street

South Great George’s Street connects Dame Street to Aungier Street as well as Cuffe Street to the south. This street comprises of a single lane in each direction with a central bus-only lane travelling northbound onto Dame Street. Cyclists are catered for with an on-street advisory cycle lane in the southbound direction only. There are pedestrian footpaths on both sides of the street with a signalised pedestrian crossing on South Great George’s Street at the junction with Exchequer Street.

There is a signalised pedestrian crossing on all arms of the junction with Dame Street. Public bicycle parking is also provided at the corner of South Great George's Street and Dame Lane with spaces for 20 bicycles and also along both sides of South Great Georges Street.

Trinity Street

Trinity Street is one-way southbound between Dame Street and St. Andrew's Street. Access is provided to Dame Lane off Trinity Street approximately 25m from its junction with Dame Street. Footpaths are provided on each side of the street. Provision is made for approximately 20 bicycle spaces on the eastern side of Trinity Street.

St. Andrew's Street

St. Andrew's Street is one-way eastbound from Trinity Street to Church Lane. Cyclists are catered for with a dedicated contra-flow cycle lane. A loading bay is provided outside the post office on the northern side of the street. Six bicycle spaces are provided beside the loading bay. The paved area outside the tourist office is used as an informal area for parking motorcycles. Footpaths are provided on each side of the street.

Church Lane

Church Lane is one-way northbound from St. Andrew's Street to College Green. Right and left turning lanes are provided at this junction. There are no dedicated cycling facilities along Church Lane. Footpaths are provided on each side of the street.

Suffolk Street

The existing layout of Suffolk Street provides a single traffic lane in each direction with footpaths on either side of the street. Suffolk Street was closed to through traffic in early 2015 to facilitate the Luas Cross City works. It is envisaged that this layout will remain following the completion of the Luas Cross City works. Prior to this, Suffolk Street was one-way westbound catering primarily for buses and taxis. A total of 8 bicycle parking spaces are provided on Suffolk Street.

6.3.2 Existing Public Transport

The following section describes the existing public transport operating in the vicinity of the Proposed Project.

Buses

A number of bus routes currently run through the Proposed Project area. These are presented in **Table 6.1**.

Table 6.1 - Existing Buses in the Study Area

Bus Route	To / From
Dublin Bus	
7b	Mountjoy Sq. to/from Shankill
9	Limekiln Avenue to/from Charlestown
13	Grange Castle to/from Harristown
14	Beaumont (Ardlea Rd.) to/from Dundrum Luas Station
15	Clongriffin to/from Ballycullen Rd.
16	Ballinteer (Kingston) to/from Dublin Airport
25a	Merrion Sq. to/from Lucan (Esker Church)
27	Jobstown to/from Clare Hall
37	Baggot St. / Wilton Terrace to/from Blanchardstown Centre
38a	Burlington Rd. from/from Damastown
39a	UCD Belfield to/from Ongar
40	Liffey Valley Shopping Centre to/from Charlestown Shopping Centre
41x	UCD Belfield to/from Knocksedan
44	DCU to/from Enniskerry
46x	Phoenix Park to/from Dún Laoghaire
49	Tallaght (The Square) to/from Pearse Street
54a	Ellensborough / Kiltipper Way to/from Pearse Street
56a	Tallaght (The Square) / Ringsend Road
61	Eden Quay to/from Whitechurch
65	Blessington / Ballymore to/from Poolbeg
65b	Citywest to/from Poolbeg
66a/x	Merrion Sq. to/from Leixlip (Captain's Hill)
67x	Merrion Sq. to/from Maynooth
68/a	Newcastle / Greenogue Business Park to/from Fleet Street
69/x	Fleet St. to/from Rathcoole
70	Burlington Rd. to/from Dunboyne
77a/x	Citywest to/from Ringsend Road
79/a	Aston Quay to/from Spiddal Park / Park West (79a)
83/a	Kimmage to/from Harristown
84x	Hawkins St. to/from Newcastle / Kilcoole
116	Parnell Sq. to/from Whitechurch
122	Drimnagh Road to/from Ashington
123	Walkinstown (Kilnamanagh Rd.) to/from Marino
140	Palmerston Park to/from Finglas (Ikea)
142	Portmarnock to/from UCD Belfield
145	Heuston Rail Station to/from Ballywaltrim
150	Rossmore to/from Fleet Street
151	Foxborough (Balgaddy Road) to/from Docklands
747	Heuston Rail Station to/from Dublin Airport
Bus Eireann	
109	Dublin – Dunshaughlin – Navan – Kells – Virginia – Cavan Town
111	Athboy – Trim – Batterstown – Dublin
120	Tullamore – Edenderry – Prosperous – Clane – Dublin
126	Dublin – Kill – Naas – Newbridge - Kildare
130	Athy – Kilcullen – Dublin

Bus Route	To / From
132	Bunclody – Kidavin – Ballon – Tullow – Baltinglass - Dublin
133	Dublin Airport – City Centre – Ashford – Wicklow
Aircoach	
700	Dublin Airport – Dublin City Centre
704x	Cork – Dublin City – Dublin Airport
McConnos Buses	
180	Monaghan to/from Dublin
Sillan Tours	
179	Cavan - Dublin
JJ Kavanagh	
717	Clonmel – Kilkenny – Dublin City – Dublin Airport
John Kearns	
845	Portumna - Dublin

A number of the bus services noted above have been temporarily diverted to alternative routes to facilitate the construction of Luas Cross City along Westmoreland Street, College Green, Nassau Street and Dawson Street. Following the completion of the Luas Cross City works, it is intended that these services would return to their previous routes, with the exception of those which run along Suffolk Street. These bus services will be rerouted to Grafton Street Lower through College Green along the Luas tracks currently under construction.

It is important to note that the city's bus services and routes are subject to change, amendment and alteration on an on-going basis to improve the services with changing demographics and public transport use both within the city centre and in the wider hinterland of Greater Dublin. However, as part of this assessment the baseline conditions with respect to the routing of bus services through the study area has been assumed as that presented above. The general routes which buses take through the study area are summarised in **Figure 6.2**.

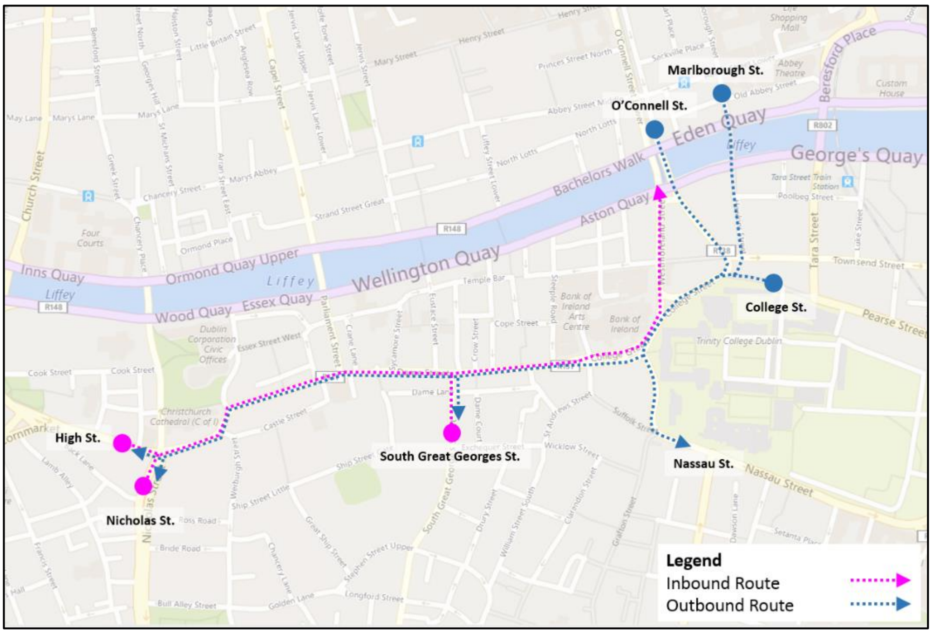

Figure 6.2 – General Routes of Existing Buses through College Green

Taxi

There is an existing taxi rank which is located on College Green adjacent to the traffic island supporting the Thomas Davis statue and Memorial Fountain. This taxi stand is approximately 24 metres long accommodating 5 taxis.

A second taxi rank is provided on Foster Place which accommodates approximately 9 permanent taxi bays and a further 11 night time bays. Taxis park in this area while awaiting spaces at the College Green rank to become available.

Dublin Bikes

There are two Dublin bike stations in close proximity to the study area on Exchequer Street and on Fownes Street Upper by the Central Bank.

6.4 Future Receiving Environment

The future receiving environment outlines any committed projects which will be completed by 2018 and 2035 which represent the opening year and design horizon years for this assessment. The projects presented in the following sections represent the assumptions made for the purposes of the traffic modelling with regard to the delivery of infrastructure in 2018 and 2035. These all form part of the do-minimum assessment scenario.

6.4.1 Public Transport Projects

6.4.1.1 Scheduled to be completed in 2018

A number of public transport changes are scheduled to be completed by 2018 including Luas Cross City and increased DART frequencies. The planned changes and assumptions made in this assessment are detailed in the following sections.

Luas Cross City

The Luas Cross City is an extension of the existing Luas Green Line beginning at the current Green Line Terminus at St. Stephen’s Green, connecting with the Luas Red Line at O’Connell’s Street / Abbey Street and continuing northbound to the DIT Grangegorman Campus, Phibsborough and terminating at the Broombridge Rail Station. This scheme passes immediately adjacent to the Proposed Project. Luas Cross City is currently under construction and is scheduled to be open at the end of 2017.

DART Frequency Increase

The DART frequency increase will provide for increased rail throughput, in particular an increase of up to 17 trains per hour (tph) running across the Loop Line Bridge across the Liffey.

6.4.1.2 Scheduled to be Completed in 2035

A large number of public transport proposals are included in the Transport Strategy for the Greater Dublin Area 2016 – 2035. For the purposes of this assessment, it has been assumed that all proposals made in that document have been delivered by 2035. The main proposals contained in the Transport Strategy for the Greater Dublin Area 2016 – 2035 are summarised below:

- GDA Cycle Network Plan;
- Core Bus Network;
- Swords/Airport-City Centre, Blanchardstown-UCD and Clongriffin-Tallaght Swiftway BRT lines;
- DART Expansion Programme;
- New Metro North from Fingal / North Dublin Transport Study;
- Dublin Corridor Study proposals;
- Dublin City Centre Transport Study; and
- Integration and ITS Measures.

6.4.2 Road Network Projects

6.4.2.1 Scheduled to be Completed by 2018

A number of changes to the road network that could affect the traffic flow in the vicinity of the site are assumed to be in place by 2018 prior to the opening of College Green Plaza. Those local to the Proposed Project are listed below:

- One bus lane and one traffic lane on Bachelors Walk;
- Two bus lanes and one lane of traffic on Eden Quay;
- Two bus lanes and one traffic lane along George’s Quay;
- Two bus lanes (one for stopping) and one traffic lane along Aston Quay, Wellington Quay and Essex Quay. Left turn provided public transport only for traffic turning from Wellington Quay to Parliament Street.
- One bus lane (with indented bus stops) and one traffic lane on Burgh Quay. Dedicated lanes for left, right and straight movements at junction with O’Connell Bridge.
- No right turn to Nassau Street from Dawson Street. Two-way traffic along Dawson Street between St. Stephens Green and Duke Street, public transport only north of Duke Street.
- Suffolk Street closed to traffic with bus routes previously using this street rerouted to Grafton Street Lower.

- College Green eastbound restricted to bus-only (i.e. no taxis).

6.4.2.2 Scheduled to be Completed by 2035

In addition to the street network changes to be implemented in the short term, there are a number of long term proposals that are envisaged to be completed by 2035. The following lists some of the relevant road network proposals that will become operational between 2018 and 2035:

- Road / traffic management infrastructure upgrades;
- M50 and radial national road demand management proposals;
- Integration and ITS Measures;
- Dublin Corridor Study proposals; and
- Dublin City Centre Transport Study Proposals.

6.5 Details of the Proposed Project

The Proposed Project is described in detail in Chapter 4. The following key components of the Proposed Project relevant to this chapter are noted below:

- It is proposed to provide a civic plaza space at College Green which would be reserved for pedestrians and cyclists, preventing all traffic travelling from Dame Street through College Green to Westmoreland Street, and travelling in the opposite direction, from D'Olier Street to Dame Street.
- Buses currently using Dame Street to cross the city will be diverted onto other routes, while buses which continue to use Dame Street will turn around at College Green, in a new turning circle at the junction of Foster Place and Church Lane.
- Parliament Street will be restricted to public transport only from 7am to 7pm Monday to Friday.
- The proposals include a dedicated two-way cycle track on the eastern and southern sides of the plaza.
- 32 bicycle parking spaces are proposed within the plaza.
- The existing permanent taxi rank on College Green will be relocated to Dame Street with capacity increased from 5 taxis to 8. The existing nightime rank with capacity for 3 taxis on the northern side of Dame Street will be converted to a permanent taxi rank. Additional night time capacity equating to 21 spaces will also be provided through the use of proposed loading bays on Trinity Street, Church Lane and Dame Street.

The Proposed Project is presented in **Figure 4.1** in Chapter 4.

6.6 Predicted Impacts

The Proposed Project will have an impact during both the construction and operational phases, both of which are considered in the following sections.

6.6.1 Construction Stage

6.6.1.1 Construction Access

It is envisaged that access to the site during the construction phase will be from Dame Street.

Dublin City Council operate a Heavy Goods Vehicle restriction within Dublin City Centre where 5 axle Heavy Goods Vehicles are banned within the city centre from 07:00-19:00 every day. Any Heavy Goods Vehicle wishing to access the restricted zone has to apply for a permit and is also obliged to use the designated Heavy Goods Vehicle routes within the restricted zone as illustrated in **Figure 6.3**.

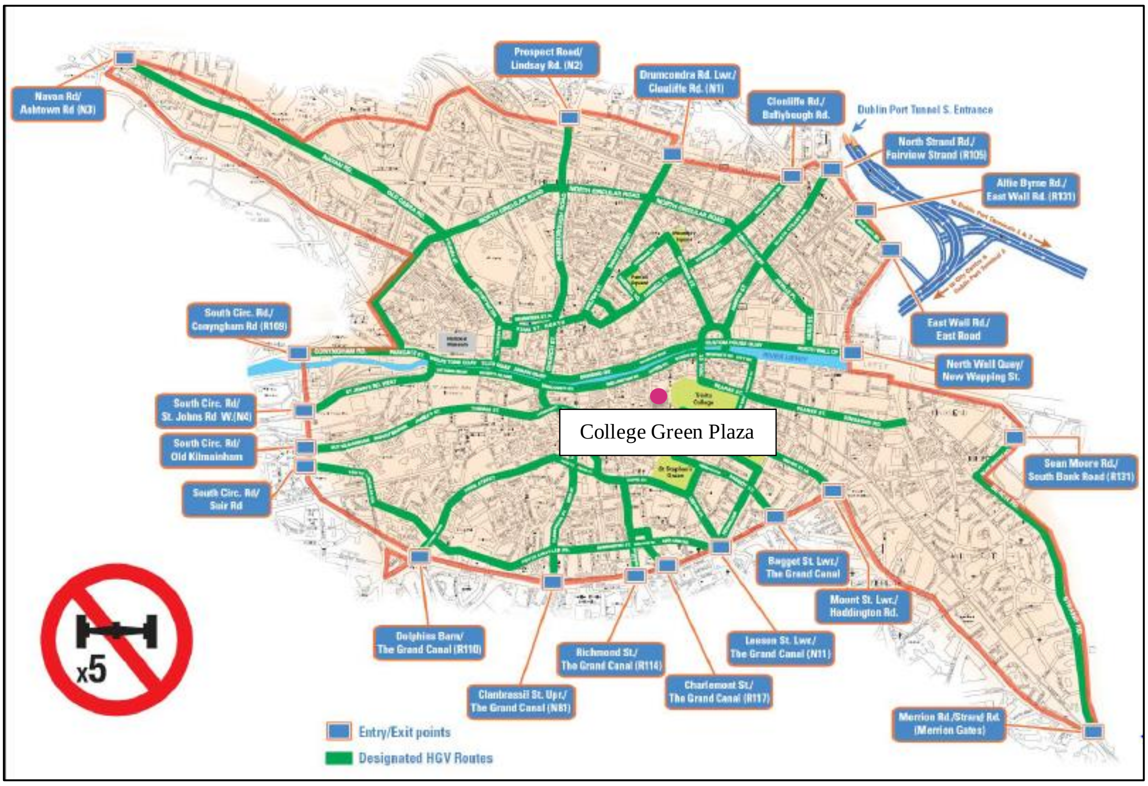

Figure 6.3 - Dublin City Council – HGV Routes

College Green lies within this restricted zone and there are three possible routes designated for site traffic to and from the designated Heavy Goods Vehicle Routes.

The Construction Access Strategy to serve the construction phase of College Green will be consistent with these designated HGV routes in the city centre and they will form the primary access and egress routes between the construction site and the external road network.

Figure 6.4 presents the HGV access routes to serve the construction phase of the College Green Plaza. Construction vehicles will arrive and depart the site via one of the following routes:

- North or South Quays/Bridge Street/High Street/Dame Street; and
- Patrick Street/Dame Street.

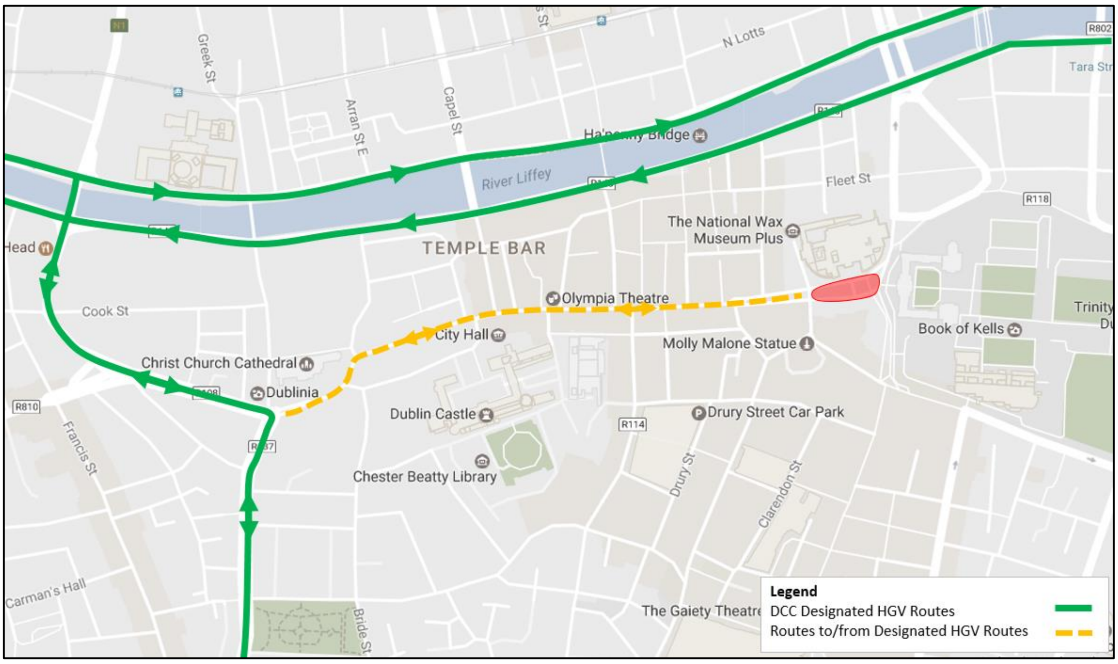

Figure 6.4 - Construction Access Routes

6.6.1.2 Construction Traffic Generation

Construction traffic would be generated from a number of sources during the construction of the College Green Plaza, primarily attributable to:

- Removal of spoil;
- Materials delivery; and
- Equipment delivery.

In terms of construction staff, it is envisaged that during peak construction activity, the site will engage approximately 50 construction personnel. Considering a 11-hour (07:00-18:00 Monday to Friday) working day, it is likely that most of the construction staff will arrive to the site before the local AM peak traffic period and will depart after PM peak hour. No car parking spaces will be provided within the works area to minimise the impact of construction traffic on the local road network.

It is envisaged that peak daily HGV traffic would be in the region of 8-10 one-way trips, during the most onerous construction stage (excavation). It has been robustly assumed that 30% of these trips would occur in the peak hour equating to 6 two-way trips.

6.6.1.3 Construction Traffic Impact

The construction of the Proposed Project would result in an additional 6 trips on Dame Street during the peak hour. The impact of construction traffic is therefore considered to be slight and would result in negligible impact on the surrounding road network.

6.6.2 Operational Stage

6.6.2.1 Traffic Impacts

The traffic modelling work undertaken by the National Transport Authority allows the impact of the Proposed Project on the Dublin street network to be assessed. Overall the results show both increases and decreases in traffic flows on various streets across the network as traffic on the street system reassigns following the closure of College Green. For the purposes of this assessment, all streets where an increase of greater than 2.5% would be experienced as a result of the proposed project have been extracted from the model for both the morning and evening peak hours for the 2018 and 2035 assessment years. This information is presented in **Appendix 6.1**.

The projected change in traffic flows in the local area are summarised below:

- There will be a slight increase in traffic along the city quays in 2018 resulting from the reassignment of buses and taxis from College Green (i.e. Aston Quay 5%-8% increase, Burgh Quay 6%-8%, Wellington Quay 5-8%%). In 2035, there are reductions in traffic flows along some of the city quays during the morning peak period (e.g. Ormond Quay -10%) with increases experienced on most quays in 2035.
- Traffic along Dame Street/ Lord Edward Street, Christchurch Place and High Street experience an increase in traffic during the morning peak period and a slight reduction during the evening peak period in 2018 with increases in both peak periods in 2035.
- Traffic along some local streets parallel to Parliament Street experience increases in traffic flow including Fishamble Street, Bridgefoot Street and Winetavern Street.
- Traffic through Temple Bar, Nassau Street and Dawson Street will not experience any significant change.

In general, the projected change in traffic flows is dispersed among the wider street network serving the city centre and it is envisaged that overall there will be no significant change in traffic conditions on the surrounding street network during the peak hour periods, with congestion remaining on the strategic access routes serving the city centre. However, the provision of additional bus priority measures committed for the Quays will act to mitigate any potential increase in delays along these routes for buses and taxis.

The environmental impact of the development on individual road links as a result of the changes to traffic routings are considered further in the Chapter 7 '*Air Quality and Climate Factors'* and Chapter 8 '*Noise and Vibration'* which are the direct environmental impacts as a result of traffic increases or decreases.

6.6.2.2 Pedestrian and Cyclist Impacts

The Proposed Project will result in a significant positive impact on pedestrians and cyclists.

The Proposed Project will provide pedestrians with a significant increase in pedestrian space, removing the existing pinch points on either side of College Green. At present, approximately 75,000 pedestrians pass through College Green on a daily basis, contending for space on footpaths which at peak times are insufficiently wide to cater for the peak demand. Many of these pedestrians also must cross two streams of traffic on College Green in two separate stages with substantial delays experienced by pedestrians. The removal of these crossing points will therefore result in a substantial time saving to pedestrians passing through College Green as well as improve the general safety of pedestrians through the removal of traffic in the area.

Similarly, there are approximately 6,500 cyclists currently passing through College Green on a daily basis, who will benefit greatly from the Proposed Project. Cyclists currently share the road through College Green with large volumes of cars and buses that pass through College Green with no dedicated facilities provided. The Proposed Project includes proposals for a two-way cycle track along the eastern and southern sides of the proposed plaza. This will connect in future to improved cycle facilities on Dame Street and Westmoreland Street providing a cohesive cycle route through the city centre. The Proposed Project will therefore greatly improve the quality of service and safety of cyclists passing through College Green.

A total of 32 cycle parking spaces will be provided in College Green Plaza as part of the Proposed Project. This represents an increase of 6 spaces over and above what is currently available in College Green.

6.6.2.3 Public Transport Impacts

Bus Routes

As identified in Section 6.3.2, bus services and bus routes change and evolve on an on-going basis. For the purposes of this assessment, the bus re-routing arrangements set out in the following section have been identified and used in the evaluation of the Proposed Project. Further refinements and changes to these routes may occur in the future.

The rerouting of buses assumed in this assessment is summarised below:

- Routes which currently originate/terminate in the vicinity of College Green (e.g. 65, 68, 150) would continue to use Dame Street terminating at the new turning around facility proposed at the junction of Foster Place and Church Lane;

- Routes which currently use South Great George’s Street before passing through College Green and vice versa (e.g. 122, 16), would be rerouted to Patrick Street, Nicholas, Winetavern Street, North Quays in the inbound direction. Some routes may also be maintained along South Great Georges Street turning left onto Dame Street and onwards to Winetavern Street. Outbound, at O’Connell Bridge, buses will either use D’Olier Street and Westmoreland Street as per the existing situation or may be permitted in future to turn right directly from O’Connell Bridge onto Aston Quay. These routes would be rerouted to the South Quays, Parliament Street and Patrick Street (outbound, route 16 would use Parliament Street and South Great Georges Street). This is illustrated in **Figure 6.5**;

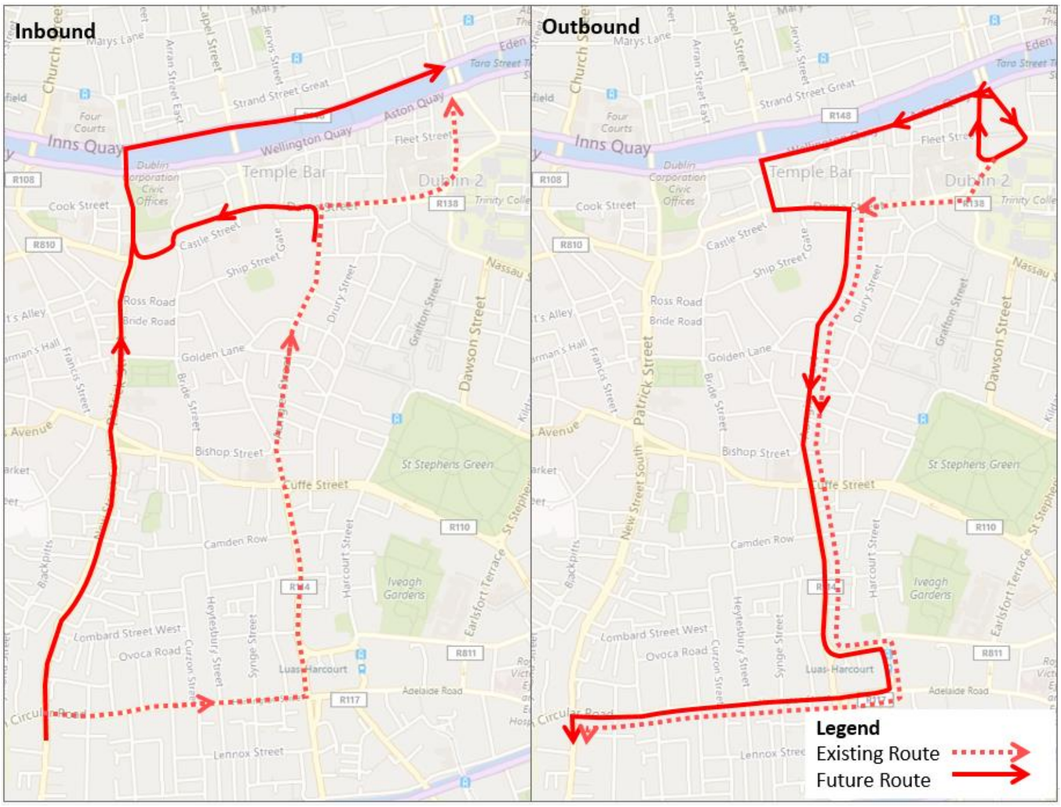

Figure 6.5 - Future Rerouting of Buses Which Currently Pass Through College Green to South Great Georges Street

- Routes which currently pass through College Green other than those using South Great Georges Street which do not terminate originate in the vicinity (e.g. 27, 123), would be rerouted onto the South Quays and Parliament Street in the outbound direction. At O’Connell Bridge, buses will either use D’Olier Street and Westmoreland Street as per the existing situation or may be permitted in future to turn right directly from O’Connell Bridge onto Aston Quay. In the inbound direction, buses would be rerouted along Winetavern Street and the North Quays. This is illustrated in **Figure 6.6**.

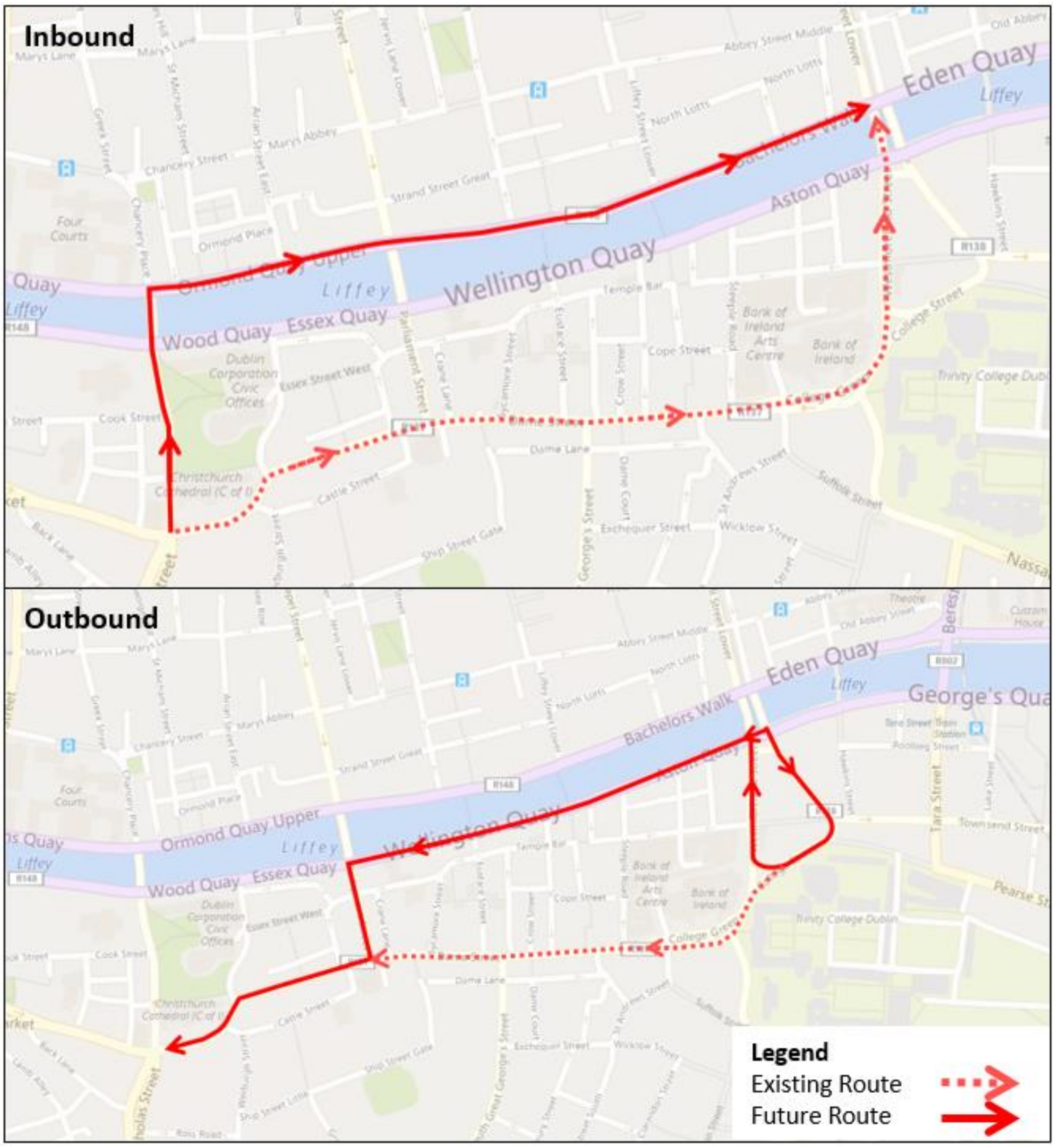

Figure 6.6 - Future Rerouting of Buses Which Currently Pass Through College Green to High Street

Bus Stop Locations

The re-routing of buses noted above will result in the relocation of bus stops to alternative locations along the new bus routes. The distance which bus stops are moving from their current location varies between routes but all relocated stops will be within comfortable walking distance of the existing stops (maximum relocation of approximately 500m).

To assess the impact on bus passengers, a walk catchment analysis was undertaken for existing routes passing through College Green and compared to the walk catchments for the proposed alternative routes. To simplify the assessment, the general routes of buses, as well as representative bus stops were included, rather than an assessment of each individual route. This assessment looked at residential/employment populations living/working within a 5 minute walk catchment of stops along each route. The 5 minute walk catchments are illustrated in **Figure 6.7** and **Figure 6.8** for both the existing and future routes. The results of the catchment analysis are presented in **Table 6.2**.

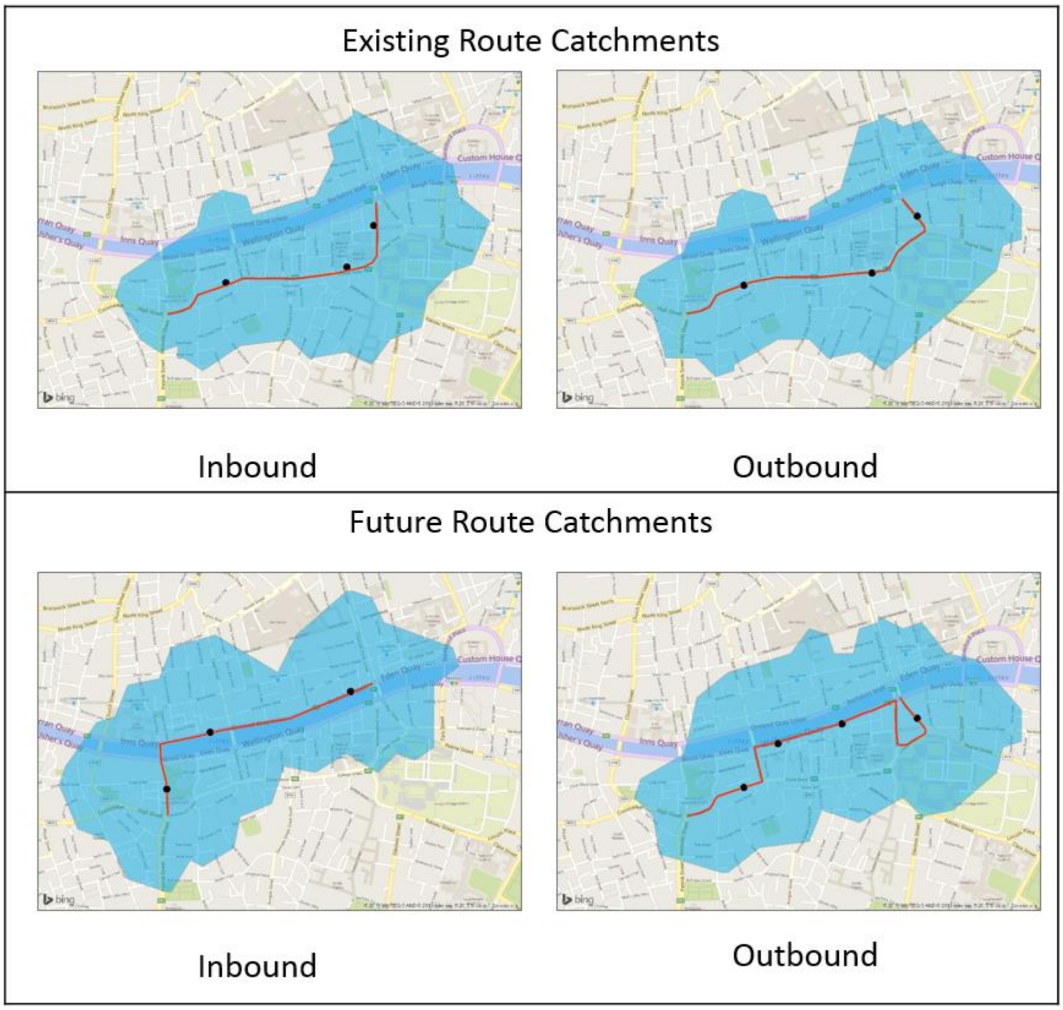

Figure 6.7 - Existing and Future Catchments for Routes Currently Passing Through College Green, Dame Street and High Street

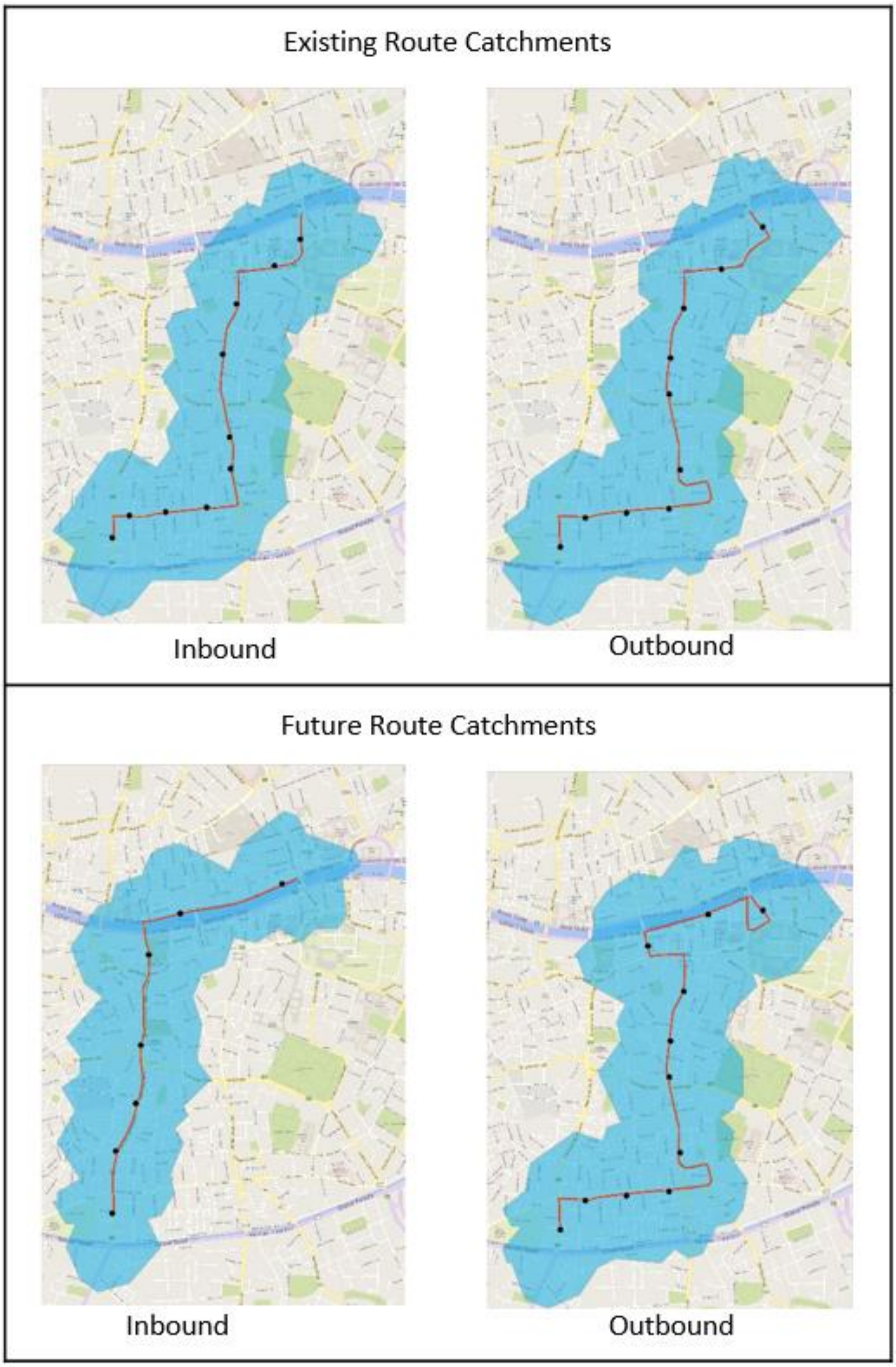

Figure 6.8 - Existing and Future Catchments for Routes Currently Passing Through College Green, Dame Street and Parliament Street

Table 6.2 - Number of People Living or Working with a 5 minute Walk of Existing and Future Bus Routes

Routes Currently Passing Through College Green, Dame St and High St			
Direction	**Base Route**	**Future Route**	**Change**
Inbound	35,022	35,338	+316
Outbound	37,378	39,060	+1,682
Routes Currently Passing Through College Green, Dame St and Parliament St			
Direction	**Base Route**	**Future Route**	**Change**
Inbound	59,415	49,372	-10,043
Outbound	63,227	74,926	+11,699

As can be seen in **Table 6.2**, routes which currently pass through College Green, Dame Street and High Street, would see a small increase in people working or living within a 5 minute walk catchment in each direction.

For routes which currently pass through College Green, Dame Street and Parliament Street, there would be a decrease in people living or working within a 5 minute walk catchment of the future bus routes. This is largely due to the movement of the route to Patrick Street which is further from the large employment areas around St. Stephens Green. However, the rerouting of the inbound route would bring buses closer to high employment centres such as Wood Quay and Jervis Street/Henry Street. This results in an increase to the number of people within a 5-minute walk catchment. On balance, the changes to inbound and outbound buses along these routes is considered to be neutral as overall, it would serve a similar number of people.

Generally, this assessment shows that while bus stops may be moving further away from some users, it will also move closer to others and overall there is a small increase in the total number of people that would be served by buses along the future routing. It is also worth noting that the distance which routes are moving are all within comfortable walking distance of the existing routes. For these reasons, on balance, the local impact of the bus route changes on bus users is considered to be neutral.

Bus Stop Capacity on North/South Quays

As part of a separate project, DCC propose to increase the length of bus bays, on the North and South Quays in order to provide additional kerbside capacity. The additional bus lanes on the north and south quays will also assist in maximising the existing kerb side space. Additional bus lanes, as planned on the North and South quays will allow buses to access and egress more easily to their stops without impeding following buses and causing the buses to bunch. This better use of the road space and kerb space will enable buses to adhere more closely to their schedules, thereby loading and unloading passengers in a more timely fashion. The more efficient turnover of passengers will in turn assist in reducing congestion on the footpaths.

Taxis

To facilitate the Proposed Project, it is necessary to remove a total of 5 taxi ranks spaces from College Green (located on the eastbound carriageway in the traffic island). In addition, it is proposed to remove the taxi rank on Foster Place. This taxi rank accommodates approximately 9 permanent taxi bays and a further 11 night time bays.

As part of the Proposed Project it is proposed to provide a new taxi rank accommodating approximately 8 taxis on the southern side of Dame Street between South Great George's Street and Trinity Street. In addition, the existing night-time rank on the northern side of Dame Street just east of South Great George's Street which accommodates 3 taxis will be converted to a permanent rank.

In addition to this, the following three loading bays which are proposed will also act as a night-time rank between the hours of 19:00 and 07:00:

- Southern side of Dame Street between South Great George's Street and Trinity Street with space for approximately 7 taxis;
- Eastern side of Trinity Street just north of the junction with St Andrew's St with space for approximately 6 taxis; and
- Western side of Church Lane with space for approximately 4 taxis.

In summary, it is proposed to remove 14 permanent taxi rank spaces and replace it with a new taxi rank with capacity for 11 permanent taxi spaces. Additionally, it is proposed to remove 14 night-time bays and replace them with 17 night-time bays.

While there is some reduction in day time taxi rank capacity as a result of the Proposed Project, the night time capacity has been increased.

In addition, DCC propose providing an additional 10 space taxi rank on College Street as part of a separate project. Combined with the College Green Plaza proposals, this will result in an increase in provision for taxis in the College Green area.

The proposed taxi rank facilities are presented in **Figure 4.2**.

Mode Split

To understand the impact on public transport use as a result of the proposed scheme, the mode split data was extracted from the model for both the do minimum and do something assessment scenarios. This showed that the mode split for all modes was identical for each scenario (16% public transport in 2018 and 30% in 2035) across the metropolitan area meaning that the proposed scheme would have no impact on public transport use in the city.

6.6.2.4 Impact on Access to Bank of Ireland

Access to, and egress from, the Bank of Ireland customer car park is via College Green. The Proposed Project will continue to facilitate access / egress to / from this car park through the proposed plaza.

Access to and egress from the cash transit operations to the rear of the Bank of Ireland is provided via Foster Place. The Proposed Project will continue to facilitate access /egress to / from this area through the proposed plaza and via Foster Place.

6.7 Mitigation Measures

6.7.1 Construction Stage

6.7.1.1 General Construction Traffic Strategy

Construction traffic will be limited to certain routes and times of day, with the aim of keeping disruption to existing traffic and public transport to a minimum. To minimise disruption to the local areas, construction traffic volumes will be managed through the following measures which include:

- During peak hours, ancillary, maintenance and other site vehicles movements will be discouraged.
- Daily construction programmes will be planned to minimise the number of disruptions to surrounding streets by staggering HGV movements to avoid site queues.
- No car parking will be provided on site for staff.
- The Contractor will be required to promote travel by sustainable modes of transport. A framework mobility management plan is presented later in this section.

6.7.1.2 Hours of Working

Construction operations on site will generally be between the hours of 07:00 and 18:00, Monday to Friday, and 08:00 to 14:00 on Saturdays. Similarly, deliveries of materials to site will generally be between the hours of 07:00 and 18:00, Monday to Friday, and 08.00 to 14:00 on Saturdays. However, it is acknowledged that works outside of these hours will be required on occasion. Any works proposed outside the core site hours will be agreed in advance with Dublin City Council.

The construction shift times will ensure any staff travelling to the site by car will have limited impact on the peak periods of 08:00-09:00 in the morning and 17:00-18:00 in the evening as it is envisaged most construction staff will arrive to work before 08:00 in the morning and leave after 18:00 in the evening.

6.7.1.3 Construction Traffic Management Plan

As part of the construction works the appointed Contractor shall prepare a Construction Traffic Management Plan (CTMP) which will outline their approach to the Proposed Project and detail potential impacts for the public road system. This will include provision of transport facilities and encouragement of car sharing for staff. It will also include measures to mitigate any potential noise and air quality impacts resulting from construction activities, namely from traffic movements in and out of the site.

The CTMP will provide details of intended construction practice for the development, including:

- Location of the site and materials compound(s) including area(s) identified for the storage of construction refuse.
- Location of areas for construction site offices and staff facilities.
- Details of site security fencing and hoardings.
- Details of pedestrian routes through College Green.
- Details of the timing and routing of construction traffic to and from the construction site and associated directional signage, to include proposals to facilitate the delivery of abnormal loads to the site.
- Measures to obviate queuing of construction traffic on the adjoining road network.
- Measures to prevent the spillage or deposit of clay, rubble or other debris on the public road network.
- Alternative arrangements to be put in place for pedestrians and vehicles in the case of the closure of any public road or footpath during the course of site development works.
- Details of appropriate mitigation measures for noise, dust and vibration, and monitoring of such levels.
- Containment of all construction-related fuel and oil within specially constructed bunds to ensure that fuel spillages are fully contained. Such bunds shall be roofed to exclude rainwater.
- Off-site disposal of construction/demolition waste and details of how it is proposed to manage excavated soil.
- Means to ensure that surface water run-off is controlled such that no silt or other pollutants enter local surface water sewers or drains.

The CTMP will be agreed with both Dublin City Council and An Garda Síochana, prior to commencement of works.

6.7.1.4 Mobility Management

The Contractor will be required as part of the contract to introduce a Mobility Management Plan (MMP) for its workforce to encourage access to the site by means other than by private car. The following section identifies some of the measures the Contractor will provide as part of the MMP. The Mobility Management Plan will form part of the Construction Traffic Management Plan and will be agreed with DCC prior to works beginning on site.

Cycling: Cycle parking spaces will be provided on the site for construction staff, in addition lockers will be provided to allow cyclists store their cycling clothes.

Car Sharing: Car sharing among the construction staff should be encouraged, especially from areas where construction staff may be clustered. The Contractor will aim to organise shifts in accordance to staff origins, hence enabling higher levels of car sharing. Such a measure offers a significant opportunity to reduce the proportion of construction staff driving to the off-site car parking facility, and will minimise the potential traffic impact on the road network surrounding this facility.

Public Transport: The Contractor will issue an information leaflet to all staff as part of their induction on site highlighting the location of the numerous bus routes that operate in the vicinity of the site. The Contractor will also offer the “Travel to Work Scheme” to employees.

6.7.2 Operational Stage

Other than the proposed measures included as part of the Proposed Project, no further mitigation measures are proposed.

6.8 Residual Impacts

During construction, the Proposed Project will result in a temporary increase in traffic volumes along Dame Street and approach routes to the construction site. However, as noted in **Section 6.6.1** these increases will be negligible and not result in any material impact on the operation of the local road network.

Once operational, the College Green Project will improve pedestrian, cyclist and public transport mobility through the centre of the city. The Proposed Project will result in changes to traffic flows on a number of road links within the city centre. The residual impacts in terms of traffic are considered further in the Chapter 7 ‘*Air Quality and Climate Factors’* and Chapter 8 *‘Noise and Vibration’* which are the direct environmental impacts as a result of increased traffic.

6.9 Difficulties Encountered

6.9.1 Defining the Baseline

A number of temporary traffic management measures have been made in the city centre since 2015 to facilitate the construction of Luas Cross City. While some of the changes made as part of this proposal were temporary (rerouting of buses), others were permanent (closure of Suffolk Street) meaning that the existing situation on the ground was not reflective of the actual baseline following construction of Luas Cross City. For the purposes of this assessment, the future baseline (following the construction of the Luas Cross City) has been assumed.

6.9.2 Changes to City Centre Traffic Management Proposals

Since the modelling assessment was completed and the results presented for inclusion in the preparation of the EIS for the College Green Project, a number of changes have been made to the traffic management arrangements planned in the City Centre as part of other projects that were considered in the evaluation of the Proposed Project. The relevant changes from the measures that were included in the transport model are:

- Reversal of direction of flow around Church Lane, Andrew's Street, and Trinity Street.
- PT (bus & taxi) only from O'Connell Street to Rosie Hackett Bridge, with local access from Harbour Court aka the Eden Quay Bus Gate.
- Bus only on Kildare street, 2-way. 1 traffic lane as far as Molesworth Street for local access. General traffic access one way from Setanta Place to Molesworth Street for local access.

The details of the proposed amendments are as follows:

- The flow around Church Lane, Andrew's Street, and Trinity Street to remain as it currently operates.
- Following a public consultation process, the proposal to restrict vehicular traffic on Eden Quay to public transport only has been amended. Under the revised proposals, traffic travelling eastward on Bachelors Walk will be able to either turn left on to O'Connell Street or continue straight on to Eden Quay. All other private vehicle movements to Eden Quay will be banned.
- The modelling work had assumed that southbound movement on Kildare Street between Naasau Street and Setanta Place would be restricted to public transport only. Instead, it is intended that general traffic will also be able to travel southbound on this link, allowing general car traffic entering Naasau Street via Frederick Street South, to use this route.

Each of these changes has been reviewed to assess whether or not they are likely to alter the results. This assessment is based on professional judgement and a review of the relevant traffic assignments.

- Having reviewed the transport modelling output, the impact of retaining the current flow direction at Church Lane etc. will only have minor traffic routing impacts in the immediate vicinity of the change. Traffic on Andrews

Street is likely to increase as traffic accessing South William street etc. will now use this route. Traffic on Church Lane is likely decrease as traffic accessing South William Street etc. is now using Andrews Street.

- Allowing straight through traffic from Bachelors Walk to Eden Quay is unlikely to change the impacts of the College Green Plaza. The key reason for this is that traffic wishing to access the North Quays east of Eden Quay, cannot route through Dame Street due to the recently introduced right turn restriction on O'Connell Bridge, and the existence of the 12-hour bus gate at College Green. The alternative routes are via Kevin Street or further south or via King Street North or further north.
- General traffic use of the southbound traffic lane on Kildare Street from Nassau Street to Setanta Place is unlikely to have any impact on the results. The impact is limited to egress from Fredrick Street South. In the modelled arrangement this traffic can route via Lincoln Place and Merrion Row to arrive at the same location. All other possible traffic movements are accommodated at the Setanta Place and Molesworth Street junctions.

6.10 References

National Transport Authority (2016) *Transport Strategy for the Greater Dublin Area 2016-2035*

Transport Infrastructure Ireland (2014) *Traffic and Transport Assessment Guidelines*

7 Air Quality and Climate Factors

7.1 Introduction

This chapter assesses the air quality and climate impact associated with the Proposed Project. Details of the Proposed Project are outlined in Chapter 4.

7.2 Assessment Methodology

The impacts have been assessed in terms of Air Quality and Climate of the local environment as defined in the EPA "Advice Notes on Current Practice in the Preparation of EIS" (EPA, 2003). The assessment methodology is based on guidance outlined in the Environmental Protection Agency (EPA) Guidance "Air Dispersion Modelling From Industrial Installations Guidance Note" (EPA, 2010), Transportation Infrastructure Ireland (TII (formerly the National Roads Authority) Guidance "Guidelines For The Treatment Of Air Quality During The Planning And Construction Of National Road Schemes" (TII, 2011) and UK DEFRA Guidance "Part IV of the Environment Act 1995: Local Air Quality Management, LAQM.TG(16)" (UK DEFRA, 2016). Vehicle-derived air emissions in the study area have been modelled using the ADMS-Roads dispersion model (Version 4) which has been developed by the Cambridge Environmental Research Consultants (CERC) and following guidance issued by the EPA (EPA, 2010). The model is a steady-state Gaussian plume model used to assess pollutant concentrations associated with road sources and is based on the ADMS model also developed by CERC.

The air dispersion modelling input data consisted of information on the physical environment (source geometry and building dimensions), detailed emission factor formulations and appropriate hourly meteorological data. Using this input data, the model predicted ambient ground level concentrations for each hour of the modelled meteorological years. The model post-processed the data to identify the location and maximum of the worst-case ground level concentration. This worst-case concentration (including background concentration) is then compared with the relevant ambient air quality standard to assess the significance of the air emissions.

The impact assessment considers the following scenarios:

- Do-minimum (DM) scenario – Represents movement and access in the city centre as it exists currently, taking into account developments with approved planning permissions, as well as projects committed to be implemented prior to the Proposed Project. This scenario includes the continuation of all east-west through traffic at College Green during the weekends and public transport access only from Monday to Friday. This scenario includes no plaza provided at College Green;
- Do-something (DS) scenario – There will be two representative 'do-something' scenarios. The first represents a situation where the Proposed Project has been implemented as well as other planned projects outlined in the do-minimum scenario (by 2018). The second represents a situation where the Dublin City Centre Transport Study (Dublin City Council, National Transport Authority, 2015) has been implemented in totality (by 2035). This includes the Proposed Project,

as well as a number of ‘other planned projects’. This scenario includes the plaza at College Green.

Throughout this chapter a worst-case approach was taken. This will most likely lead to an over-estimation of the levels that will arise in practice. The worst-case assumptions are outlined below:

- Maximum predicted concentrations were reported in this study, even if no residential receptors were near the location of this maximum;
- Conservative background concentrations were used to assess the proposed air quality impact in 2018.

Parliament Street and Winetavern Street are expected to experience large increases in the number of buses oas a result of the Proposed Project. For this reason and due to the narrowness of the road and proximity building facades to the road, more detailed modelling results are provided at these locations.

7.2.1 Guidance and Legislation

In order to reduce the risk to health from poor air quality, national and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values or “Air Quality Standards” are health or environmental-based levels for which additional factors may be considered. The applicable standards in Ireland include the Air Quality Standards Regulations 2011, which incorporate EU Directive 2008/50/EC as shown in **Table 7.1**.

Table 7.1 - Air Quality Standards 2011 (Based on Directive 2008/50/EC)

Pollutant	Regulation	Limit Type	Value
Nitrogen Dioxide	2008/50/EC	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 $\mu g/m^3$ NO_2
		Annual limit for protection of human health	40 $\mu g/m^3$ NO_2
		Critical value for protection of vegetation	30 $\mu g/m^3$ $NO + NO_2$
Particulate Matter (as PM_{10})		24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 $\mu g/m^3$ PM_{10}
		Annual limit for protection of human health	40 $\mu g/m^3$ PM_{10}
$PM_{2.5}$		Annual limit for protection of human health	25 $\mu g/m^3$ $PM_{2.5}$

7.2.2 Policy Context

In 1999, the four Local Authorities in the Dublin region produced a regional air quality management plan. The plan identified a range of strategies and actions to be implemented over the next five years. The plan included the introduction and expansion of the Luas light rail network, the expansion of the Quality Bus corridors, restrictions on heavy good vehicles (HGVs) in Dublin City Centre and the completion of the port tunnel.

In 2009, the Dublin Regional Air Quality Management Plan 2009-2012 was updated and a range of strategies defined. The strategies included an improvement in co-ordination to build on the good work to date, to mainstream air quality management into all major policy areas, strengthen the decision-making by improving sharing of information on air quality, introduce measures related to local authority activities that will reduce air emissions and identify and prioritise the main potential threats to air quality.

In relation to specific policies, Policy 7 states that the Local Authorities will "*manage and control traffic flows within their functional areas to reduce congestion and queuing time at road junctions and in urban areas, thereby improving air quality at these locations*". One of the strategies to help implement Policy 7 is the introduction of traffic management strategies as a means to prevent a further deterioration in air quality at traffic "hot-spots".

The document "*Dublin Regional Air Quality Management Plan for Improvements in Levels of Nitrogen Dioxide in Ambient Air Quality*" is a companion document to the plan. The document has reviewed the measured levels of NO_2 in the city centre including an exceedance of the NO_2 annual mean limit value at Winetavern Street in 2009. The document defines the current strategic planning approach as the promotion of "*consolidated urban development based on enhanced public transport*" and outlines a range of measures and policies which will help to improve ambient levels of NO_2.

7.2.3 Significance Criteria

The *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (TII 2011) detail a methodology for determining air quality impact significance criteria for road schemes. The degree of impact is determined based on both the absolute and relative impact of the Proposed Project. The TII significance criteria have been adopted for the Proposed Project and are detailed in **Table 7.2** to **Table 7.4**. The significance criteria are based on PM_{10} / $PM_{2.5}$ and NO_2 as these pollutants are most likely to exceed the annual mean limit values (40 µg/m^3).

Table 7.2 - Definition of Impact Magnitude for Changes in Ambient Pollutant Concentrations

Magnitude of Change	Annual Mean NO_2 / PM_{10}	No. days with PM_{10} concentration > 50 µg/m^3	Annual Mean $PM_{2.5}$
Large	Increase / decrease ≥4 µg/m^3	Increase / decrease >4 days	Increase / decrease ≥2.5 µg/m^3
Medium	Increase / decrease 2 - <4 µg/m^3	Increase / decrease 3 or 4 days	Increase / decrease 1.25 - <2.5 µg/m^3

Small	Increase / decrease 0.4 - <2 $\mu g/m^3$	Increase / decrease 1 or 2 days	Increase / decrease 0.25 - <1.25 $\mu g/m^3$
Imperceptible	Increase / decrease <0.4 $\mu g/m^3$	Increase / decrease <1 day	Increase / decrease <0.25 $\mu g/m^3$

Source: *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes - National Roads Authority (2011)*

Table 7.3 - Air Quality Impact Significance Criteria for Long Term Annual Mean NO_2 and PM_{10}

Absolute Concentration in Relation to Objective / Limit Value	Change in Concentration		
	Small	**Medium**	**Large**
Increase with Scheme			
Above Objective/Limit Value With Scheme (≥40 $\mu g/m^3$ of NO_2 or PM_{10}) (≥25 $\mu g/m^3$ of $PM_{2.5}$)	Slight adverse	Moderate adverse	Substantial adverse
Just Below Objective/Limit Value With Scheme (36 - <40 $\mu g/m^3$ of NO_2 or PM_{10}) (22.5 - <25 $\mu g/m^3$ of $PM_{2.5}$)	Slight adverse	Moderate adverse	Moderate adverse
Below Objective/Limit Value With Scheme (30 - <36 $\mu g/m^3$ of NO_2 or PM_{10}) (18.75 - <22.5 $\mu g/m^3$ of $PM_{2.5}$)	Negligible	Slight adverse	Slight adverse
Well Below Objective/Limit Value With Scheme (<30 $\mu g/m^3$ of NO_2 or PM_{10}) (<18.75 $\mu g/m^3$ of $PM_{2.5}$)	Negligible	Negligible	Slight adverse
Decrease with Scheme			
Above Objective/Limit Value With Scheme (≥40 $\mu g/m^3$ of NO_2 or PM_{10}) (≥25 $\mu g/m^3$ of $PM_{2.5}$)	Slight beneficial	Moderate beneficial	Substantial beneficial
Just Below Objective/Limit Value With Scheme (36 - <40 $\mu g/m^3$ of NO_2 or PM_{10}) (22.5 - <25 $\mu g/m^3$ of $PM_{2.5}$)	Slight beneficial	Moderate beneficial	Moderate beneficial
Below Objective/Limit Value With Scheme (30 - <36 $\mu g/m^3$ of NO_2 or PM_{10}) (18.75 - <22.5 $\mu g/m^3$ of $PM_{2.5}$)	Negligible	Slight beneficial	Slight beneficial
Well Below Objective/Limit Value With Scheme (<30 $\mu g/m^3$ of NO_2 or PM_{10}) (<18.75 $\mu g/m^3$ of $PM_{2.5}$)	Negligible	Negligible	Slight beneficial

Note 1 Where the Impact Magnitude is Imperceptible, then the Impact Description is Negligible

Source: *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes - National Roads Authority (2011)*

Table 7.4 - Air Quality Impact Significance Criteria for Short Term PM_{10}

Absolute Concentration in Relation to Objective / Limit Value (PM_{10})	Change in Concentration		
	Small	**Medium**	**Large**
Increase with Scheme			
Above Objective/Limit Value With Scheme (≥35 days)	Slight Adverse	Moderate Adverse	Substantial Adverse
Just Below Objective/Limit Value With Scheme (32 - <35 days)	Slight Adverse	Moderate Adverse	Moderate Adverse
Below Objective/Limit Value With Scheme (26 - <32 days)	Negligible	Slight Adverse	Slight Adverse
Well Below Objective/Limit Value With Scheme (<26 days)	Negligible	Negligible	Slight Adverse
Decrease with Scheme			
Above Objective/Limit Value With Scheme (≥35 days)	Slight Beneficial	Moderate Beneficial	Substantial Beneficial
Just Below Objective/Limit Value With Scheme (32 - <35 days)	Slight Beneficial	Moderate Beneficial	Moderate Beneficial
Below Objective/Limit Value With Scheme (26 - <32 days)	Negligible	Slight Beneficial	Slight Beneficial
Well Below Objective/Limit Value With Scheme (<26 days)	Negligible	Negligible	Slight Beneficial

Note 1 Where the Impact Magnitude is Imperceptible, then the Impact Description is Negligible

Source: *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* - *National Roads Authority (2011)*

The UK Institute of Air Quality Management (IAQM) in conjunction with the Environmental Protection UK (EPUK) has recently published impact descriptors for individual receptors based on long-term average concentrations. The matrix takes into account both the change in concentration and the resulting overall concentration as shown in **Table 7.5**. The guidance states that overall significance should be determined using professional judgement and consider:

- The existing and future air quality in the absence of the development;
- The extent of current and future population exposure to the impacts; and
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

Table 7.5 - Impact Descriptors For Individual Receptors

Long-term average concentration at receptor in assessment year	% Change in concentration relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial
Notes AQAL for NO_2 is 40 µg/m^3, for PM_{10} is 40 µg/m^3 and for $PM_{2.5}$ is 25 µg/m^3 Percentages should be rounded to whole numbers with < 0.5% described as negligible				

7.2.4 Study Area

The study area is shown in **Figure 7.2** in terms of the roads input to the air dispersion model. The road network extends to High Street to the west, the North Quays to the north, Dame Street to the south and College Street to the east. Whilst some traffic flows will be impacted outside of this area, the most significantly affected roads are included within the study area.

7.2.5 Impact Assessment Methodology

The ADMS-Roads (version 4) dispersion model has been used to predict the ground level concentrations (GLC) of nitrogen dioxide and PM_{10} / $PM_{2.5}$ in Dublin City Centre for the existing scenario of 2012 (base year) and the proposed opening year of 2018 and 2035 for the Do Minimum and Do Something scenarios.

The modelling incorporated the following features:

- Terrain was not included in the model as the area is relatively flat within the modelling domain.
- The detailed Street Canyon Tool (CERC, 2015) was used in order to generate detailed canyon widths, heights (maximum, mean and minimum) and lengths using ArcGIS. This data was used in ADMS-Roads to run the Advanced Canyon module throughout the study area. The Advanced Canyon module has various advantages over the basic street canyon module in ADMS-Roads. These include the ability to represent asymmetric street canyons, to represent the effects of pavements with a canyon and to calculate the effect of a street canyon on the surrounding area (CERC, 2015).
- Hourly-sequenced meteorological information has been used in the model. Meteorological data over a five-year period (Dublin Airport, 2011 – 2015) was used in the model (see **Figure 7.1** and **Appendix 7.1**).

The selection of the appropriate meteorological data has followed the guidance issued by the USEPA (USEPA, 2016). A primary requirement is that the data used should have a data capture of greater than 90% for all parameters. Dublin Airport meteorological station, which is located approximately 8.5 km north of the site, collects data in the correct format and has a data collection of greater than 90%. Long-term hourly observations at Dublin Airport meteorological station provide an indication of the prevailing wind conditions for the region (see **Figure 7.1**). Results indicate that the prevailing wind direction is from south to westerly in direction over the period 2011 - 2015. The mean wind speed is approximately 5.3 m/s over the period 1981-2010. Calm conditions account for only a small fraction of the time in any one year peaking at 26 hours in 2013 (0.3% of the time) as shown in **Appendix 7.1**. There are also no missing hours over the period 2011 – 2015.

- A receptor grid of 31 x 31 points was created at which concentrations would be modelled in order to determine the concentration gradient in the study area. Receptors were mapped at intervals of 50m in the E-W direction and at 33.3m in the N-S giving a total of 961 calculation points for the model as shown in **Figure 7.2**. In addition, intelligent gridding (CERC, 2015) was employed leading to a minimum along-source spacing between extra receptors of 6.1m. For each run typically an additional 1,936 extra receptors were added with an additional 4,875 points interpolated between these extra receptor points.
- Specific receptors were also mapped at the façade of the buildings along the main traffic routes (as shown in **Figure 7.3**). 1,149 receptors were created at which concentrations would be modelled in order to determine the concentration gradient in the study area. Receptors heights were input at 1.8m to represent breathing height and at 4.0m to represent first-floor receptors.

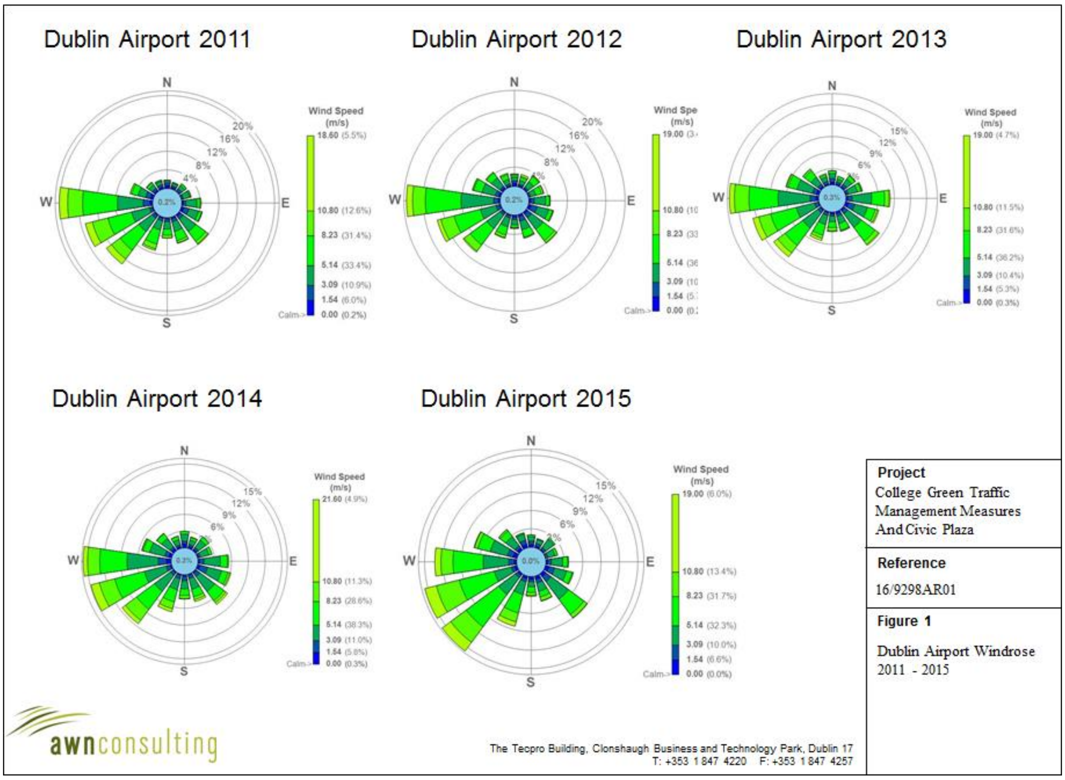

Figure 7.1 - Dublin Airport Windrose 2011 – 2015

Figure 7.2 - Receptor Grid Points (Green) and Road Sources (Yellow)

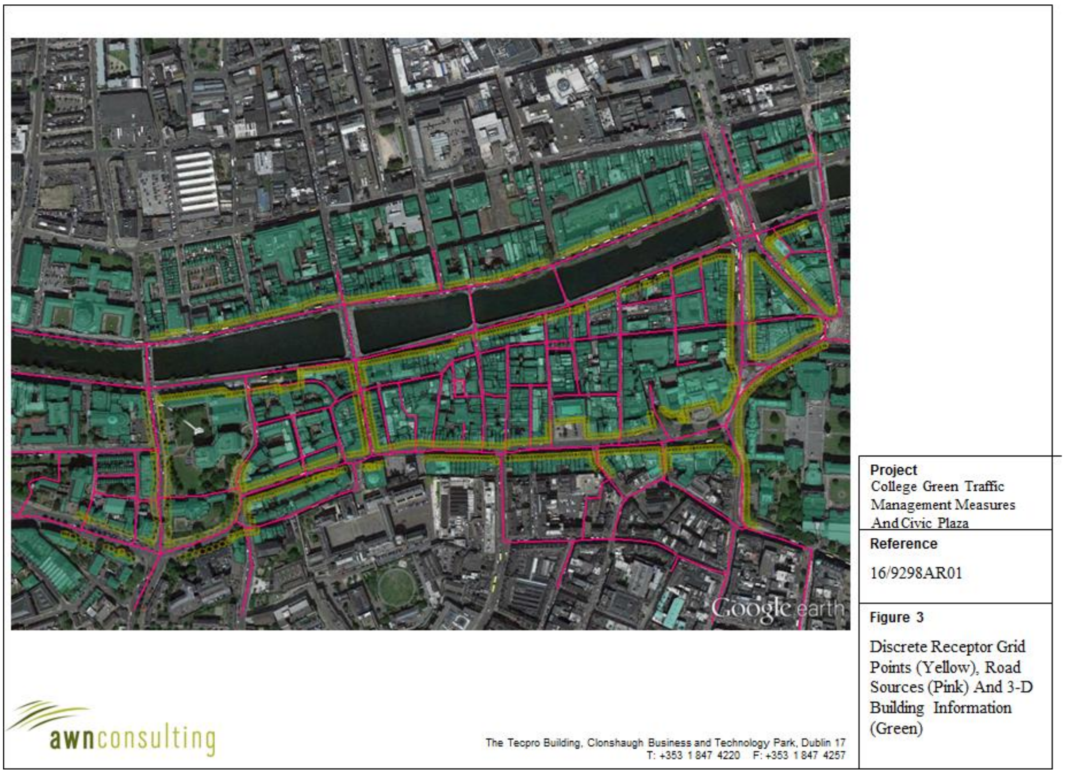

Figure 7.3 - Specific Receptor Points (Yellow), Road Sources (Pink) and 3-D Building Information (Green)

7.2.6 Climate agreements

Ireland ratified the United Nations Framework Convention on Climate Change (UNFCCC) in April 1994 and the Kyoto Protocol in 1997. For the purposes of the EU burden sharing agreement under Article 4 of the Kyoto Protocol, Ireland agreed to limit the net anthropogenic growth of the six GHGs under the Kyoto Protocol to 13% above the 1990 level over the period 2008 to 2012. The UNFCCC is continuing detailed negotiations in relation to GHGs reductions and in relation to technical issues such as Emission Trading and burden sharing.

The most recent Conference of the Parties (COP22) to the agreement was convened in Marrakesh, Morocco in December 2016. The previous conference in Paris, COP21, was an important milestone in terms of international climate change agreements. The "*Paris Agreement*", agreed by over 200 nations, has a stated aim of limiting global temperature increases to no more than 2°C above pre-industrial levels with efforts to limit this rise to 1.5°C. The aim is to limit global GHG emissions to 40 gigatonnes as soon as possible whilst acknowledging that peaking of GHG emissions will take longer for developing countries. Contributions to greenhouse gas emissions will be based on Intended Nationally Determined Contributions (INDCs) which will form the foundation for climate action post 2020. Significant progress was also made on elevating adaption onto the same level as action to cut and curb emissions.

The EU, on the 23/24th of October 2014, agreed the "*2030 Climate and Energy Policy Framework*". The European Council endorsed a binding EU target of at least a 40% domestic reduction in greenhouse gas emissions by 2030 compared to 1990. The target will be delivered collectively by the EU in the most cost-effective manner possible, with the reductions in the ETS and non-ETS sectors amounting to 43% and 30% by 2030 compared to 2005, respectively. Secondly, it was agreed that all Member States will participate in this effort, balancing considerations of fairness and solidarity. The policy also outlines, under "*Renewables and Energy Efficiency*", an EU binding target of at least 27% for the share of renewable energy consumed in the EU in 2030.

Gothenburg protocol

In 1999, Ireland signed the Gothenburg Protocol to the 1979 UN Convention on Long Range Transboundary Air Pollution. The initial objective of the Protocol was to control and reduce emissions of Sulphur Dioxide (SO_2), Nitrogen Oxides (NO_X), Volatile Organic Compounds (VOCs) and Ammonia (NH_3). To achieve the initial targets Ireland was obliged, by 2010, to meet national emission ceilings of 42 kt for SO_2 (67% below 2001 levels), 65 kt for NO_X (52% reduction), 55 kt for VOCs (37% reduction) and 116 kt for NH_3 (6% reduction). In 2012, the Gothenburg Protocol was revised to include national emission reduction commitments for the main air pollutants to be achieved in 2020 and beyond and to include emission reduction commitments for $PM_{2.5}$. In relation to Ireland, 2020 emission targets are 25 kt for SO_2 (65% on 2005 levels), 65 kt for NO_X (49% reduction on 2005 levels), 43 kt for VOCs (25% reduction on 2005 levels), 108 kt for NH_3 (1% reduction on 2005 levels) and 10 kt for $PM_{2.5}$ (18% reduction on 2005 levels).

European Commission Directive 2001/81/EC, the National Emissions Ceiling Directive (NECD), prescribes the same emission limits as the 1999 Gothenburg Protocol. A National Programme for the progressive reduction of emissions of these four transboundary pollutants has been in place since April 2005. Data available from the EU in 2010 indicated that Ireland complied with the emissions ceilings for SO_2, VOCs and NH_3 but failed to comply with the ceiling for NO_X. Directive (EU) 2016/2284 "*On the Reduction of National Emissions of Certain Atmospheric Pollutants and Amending Directive 2003/35/EC and Repealing Directive 2001/81/EC*" was published in December 2016. The Directive will apply the 2010 NECD limits until 2020 and establish new national emission reduction commitments which will be applicable from 2020 and 2030 for SO_2, NO_X, NMVOC, NH_3 and $PM_{2.5}$. In relation to Ireland, 2020-29 emission targets are for SO_2 (65% below 2005 levels), for NO_X (49% reduction), for VOCs (25% reduction), for NH_3 (1% reduction) and for $PM_{2.5}$ (18% reduction). In relation to 2030, Ireland's emission targets are for SO_2 (85% below 2005 levels), for NO_X (69% reduction), for VOCs (32% reduction), for NH_3 (5% reduction) and for $PM_{2.5}$ (41% reduction).

7.3 Baseline Environment

Air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities. The most recent annual report on air quality "Air Quality Monitoring Annual Report 2015" (EPA, 2016), details the range and scope of monitoring undertaken throughout Ireland. As part of the implementation of the Framework Directive on Air Quality (1996/62/EC), four air quality zones have been defined in Ireland for air quality management and assessment purposes. Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000 is defined as Zone D. In terms of air monitoring, Dublin City Centre is categorised as Zone A.

Background air quality is the air quality at a specific location when the local emissions of air quality have been subtracted from the measured air quality. Thus, a "background" air concentration is usually representative of a wider area (such as an urban area or sub-urban area). Baseline air quality is the current air quality at a specific location including all local and non-local sources. In order to obtain a "background" concentration from a specific measurement location, it is necessary to subtract the local sources of air emissions.

There are currently three urban monitoring stations in Dublin – Rathmines (urban background), Winetavern Street (urban traffic) and Coleraine Street (urban traffic). In contrast to Winetavern Street and Coleraine Street, Rathmines is an urban background station being a significant distance (65 m) from the nearest major road centreline (Rathmines Road) and thus is the most suitable station for use as a background station in deriving local air quality.

The ambient NO_2 monitoring results for Winetavern Street, Coleraine Street and Rathmines over the period 2010 - 2015, based on a three year rolling average, are shown in **Figure 7.4**. The data and trend line indicates that levels are slowly decreasing at each location due to a combination of improvements in engine technology, vehicle turnover and possibly changes in traffic levels at each location. Year-on-year data over the period 2010 – 2015 is shown in **Table 7.6**.

Continuous PM_{10} monitoring carried out at the urban location of Winetavern Street showed an average level of 14 µg/m^3 in 2015, with 4 exceedances of the of the 24-hour limit value of 50 µg/m^3 (36 exceedances are permitted per year) (see **Table 7.7**) (EPA, 2016). In addition, the average PM_{10} level at the urban background monitoring location in the Phoenix Park in 2015 was 12 µg/m^3, with 2 exceedances of 50 µg/m^3 (EPA, 2016). The long-term data at Winetavern Street shows a general downward trend in PM_{10} concentrations.

Table 7.6 - Trends In Dublin City Air Quality - Nitrogen Dioxide (NO_2)

Station	Station Classification Council Directive 96/62/EC	Averaging Period Notes 1,2,3	Year					
			2010	2011	2012	2013	2014	2015
Rathmines	Urban Background	Annual Mean NO_2 (µg/m^3)	25	20	21	19	17	18
		99.8th%ile Of 1-hr NO_2 (µg/m^3)	104	98	96	92	105	95
Coleraine Street	Urban Traffic	Annual Mean NO_2 (µg/m^3)	33	26	26	26	25	25
		99.8th%ile Of 1-hr NO_2 (µg/m^3)	115	119	107	100	127	107
Winetavern Street	Urban Traffic	Annual Mean NO_2 (µg/m^3) Note 1	35	34	29	31	31	31
		99.8th%ile Of 1-hr NO_2 (µg/m^3)	117	132	108	113	123	128

Note 1 Annual average limit value - 40 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011).

Note 2 1-hour limit value - 200 µg/m^3 as a 99.8th%ile, i.e. not to be exceeded >18 times per year (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011).

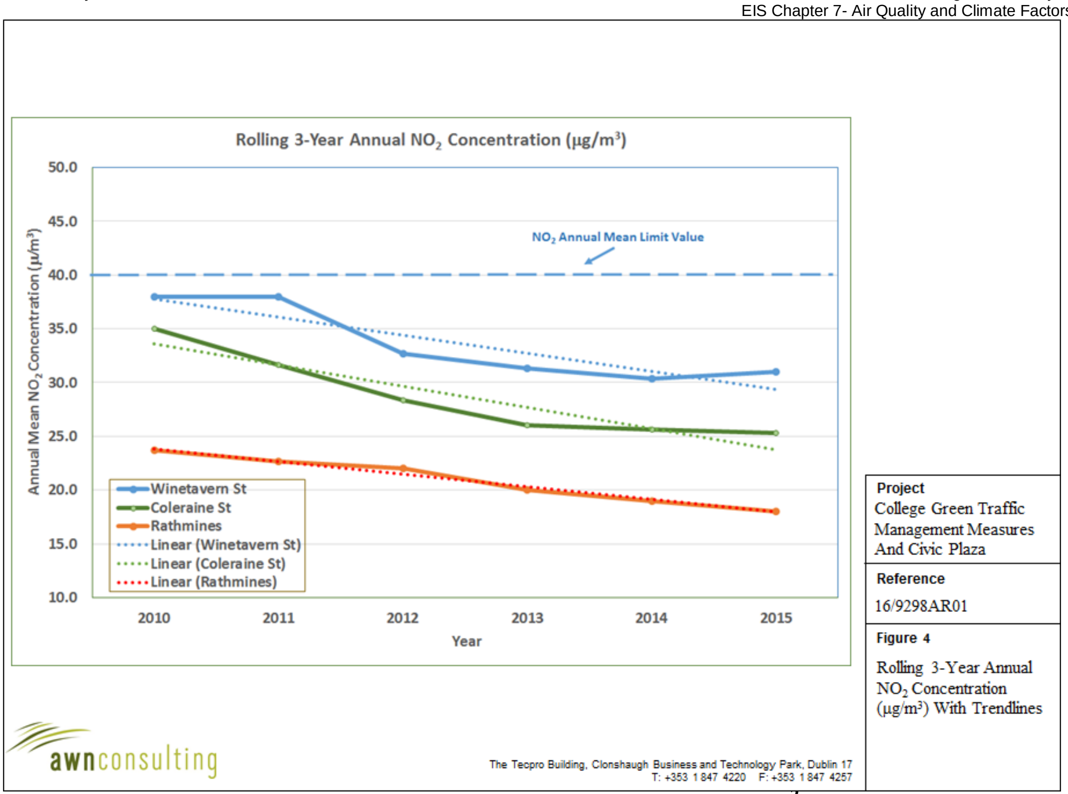

Figure 7.4 - Rolling 3-Year Annual NO_2 Concentration (µg/m^3) With Trendlines

Table 7.7 - Trends In Dublin City Air Quality – PM_{10}

Station	Station Classification	Averaging Period Notes 1,2	Year					
			2010	2011	2012	2013	2014	2015
Rathmines	Urban Background	Annual Mean (µg/m^3)	18	16	14	17	14	15
		24-hr Mean > 50 µg/m^3 (days)	5	10	2	8	3	5
Winetavern Street	Urban Traffic	Annual Mean PM_{10} (µg/m^3)	19	14	13	14	14	14
		24-hr Mean > 50 µg/m^3 (days)	7	7	0	3	1	4
Phoenix Park	Suburban Background	Annual Mean PM_{10} (µg/m^3)	11	12	11	14	12	12
		24-hr Mean > 50 µg/m^3 (days)	1	3	0	3	0	2

Note 1 Annual average limit value - 40 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011).

Note 2 24-hour limit value - 50 µg/m^3 as a 90.4th%ile, i.e. not to be exceeded >35 times per year (EU Council Directive 1999/30/EC & S.I. No. 180 of 2011).

Continuous $PM_{2.5}$ monitoring carried out at the Zone A urban location of Coleraine Street showed an average level of 9 µg/m^3 in both 2014 and 2015.

The annual average level measured in Rathmines in 2014 and 2015 was 9 µg/m^3 and 10 µg/m^3 respectively. Based on this information, the ratio of $PM_{2.5}$ to PM_{10} is estimated to be in the region of 0.65 – 0.70 with a representative background concentration of 9 $\mu g/m^3$ estimated for the study area in 2018.

Road Traffic Emission Rates

Road traffic emission rates were derived from the COPERT IV database (Version 11.3 updated June 2015) which have been incorporated into the UK DEFRA Emission Factor Toolkit (EFT) Version 7.0 (released August 2016). COPERT 4v11 reflects more recent evidence on real-world emission performance of Euro 5 and 6 vehicles.

The EFT version 7.0 has been incorporated into ADMS-Roads dated August 2016. The toolkit provides emission rates from 2013 – 2030 and is based on the following sources of data:

- Fleet composition data for urban Northern Ireland;
- EFT Version 7.0 was based on eight vehicle categories including petrol cars, diesel cars, diesel LGV, rigid HGVs and buses;
- Version 7.0 incorporates updated NO_X and PM speed emission coefficient equations for Euro 5 and 6 vehicles, taken from the European Environment Agency (EEA) COPERT 4 Version 11 emission calculation tool which reflects the most recent evidence on the real-world emission performance of these vehicles;
- Fleet composition based on European emission standards from pre-Euro 1 to Euro 6/VI;
- Scaling factors reflecting improvements in the quality of fuel and some degree of retrofitting; and
- Technology conversion in the national fleet.

As the urban fleet composition data for Northern Ireland has been used in the model (in the absence of the ability to use Republic Of Ireland data in ADMS-Roads), a comparison between the age profile of petrol and diesel cars, LGV, Rigid HGV and buses was undertaken based on a review of the Irish Bulletin of Vehicle & Driver Statistics (DOTTS, 2015) and Northern Ireland age profile which is embedded in the EFT Version 7.0 spreadsheet. The emission factor results show some variation in age profile between the fleets depending on vehicle type. However, the resultant composite NO_X emission rate was similar along Parliament Street using both Northern Ireland defaults and the actual age profile of the Irish fleet for each type of vehicle.

Validation Study – Year 2012 Traffic Data

A validation study was undertaken based on the traffic data for the study area from the NTA traffic model for year 2012. The study compared the ambient NO_2 monitored concentration on Winetavern Street with the ADMS-Roads model output for every hour of the year.

Background data was based on nitrogen oxide (NO), NO_2 and ozone (O_3) data from Rathmines for 2012. Rathmines was selected as the background station as it is a suburban / urban background ambient air monitoring station near Dublin City Centre. One additional urban traffic station is situated in the city centre, Coleraine Street, but is subject to significant local traffic and thus is unsuitable for use as a background station.

The emission data for the ADMS-Roads model was based on EFT Version 6.1 rather than EFT Version 7.0 which was used for the DM and DS scenarios in 2018. This selection was necessary as the EFT Version 7.0 only models the years 2013 – 2030.

As a sensitivity study, EFT Version 7.0 for 2013 was used also within the model with 2012 traffic and background input data. Results were found to be very similar using both sets of emission rates as outlined in **Table 7.8**.

An average traffic speed was selected for the study area based on the output from the NTA traffic model. The network average within the study area for both the 2018 DM and DS scenarios over the AM Peak, PM Peak and off-peak periods was approximately 20 km/hr. Levels along Parliament Street were a little lower averaging around 15 km/hr and thus 15 km/hr was selected for the study area as a conservative approach.

As shown in **Figure 7.5**, results of the quantile-quantile (Q-Q) plot for 2012, based on EFT Version 6.1, give good agreement particularly at the higher values with the modelled results tending to slightly overestimate the observed (monitored) results. Q-Q plots are created by sorting from highest to lowest the predicted and the observed concentrations which are initially paired in time and space. After sorting, the concentration pairs are no longer paired in time or location (EPA, 2010). This approach is useful in confirming whether the model can reproduce the highest recorded concentration over the course of a year rather than trying to confirm an actual concentration paired in time and space. This much more difficult test, due to inaccuracies in wind speed / direction, result in Gaussian plume models typically performing badly.

Comparing the Q-Q results when modelling different average speeds over the range 5 – 20 km/hr indicates that higher speeds lead to slightly lower concentrations along Winetavern Street as would be expected from a review of the relevant emission factors for the three average speeds investigated. Both 15 km/hr and 20 km/hr give better agreement with the measured levels than 5 km/hr, which agrees with the outputs from the NTA TRAFFIC model in relation to network traffic speeds. A comparison with the EFT Version 7.0 emission rates (based on an assessment year of 2013) also agrees quite well with monitoring data and is also in good agreement with the EFT Version 6.1 emission rates as shown in **Figure 7.6**.

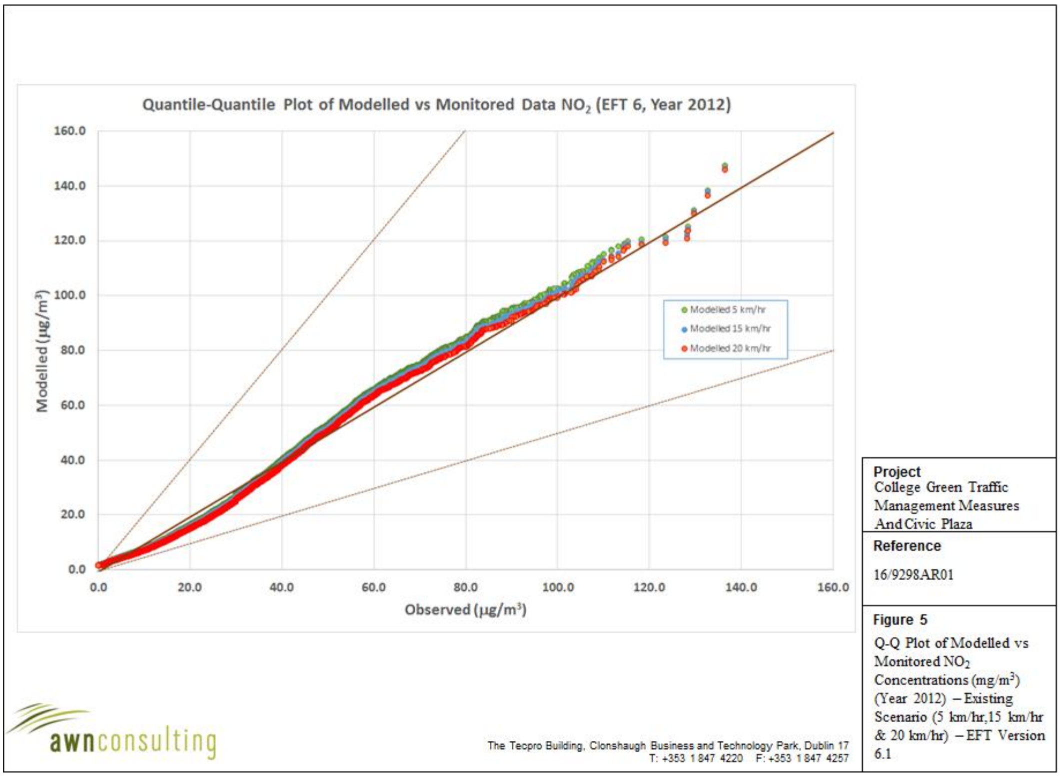

Figure 7.5 - Q-Q Plot of Observed vs Modelled NO2 Concentration (µg/m3) (EFT Version 6.1)

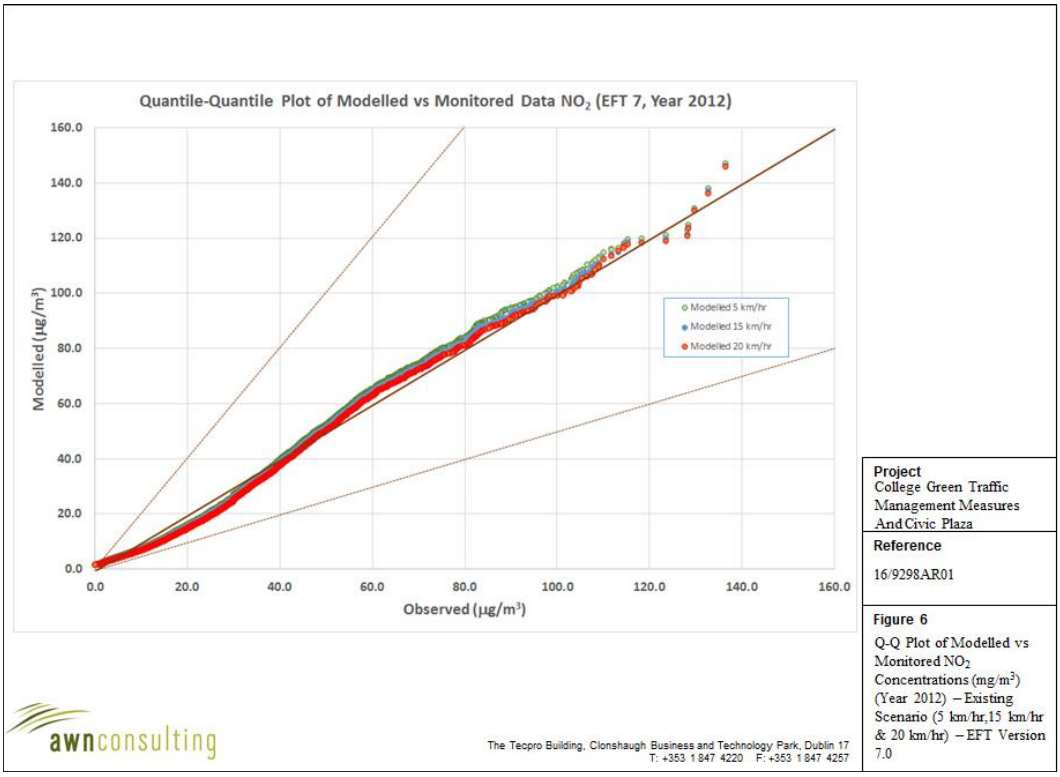

Figure 7.6 - Q-Q Plot of Observed vs Modelled NO2 Concentration (µg/m3) (EFT Version 7.0)

The annual mean NO_2 concentration contour plot for 2012 is shown in **Figure 7.7** based on an average traffic speed of 15 km/hr in the study area. Relatively high levels of NO_2 are found along the main thoroughfares in Central Dublin with levels along the North Quays, Dame Street, College Green and D'Olier Street above the EU ambient annual mean limit value, peaking at approximately 100 $\mu g/m^3$ at the building façade near the junction of College Street and College Green as outlined in **Table 7.8**.

Along Parliament Street, localised peaks are apparent at the Dame Street and Wellington Quay junctions with maximum levels of approximately 50 $\mu g/m^3$, or approximately 125% of the EU ambient air quality standard.

The Winetavern Street station, for this scenario, is predicted to record a level of approximately 27 $\mu g/m^3$ compared to a measured level of 29 $\mu g/m^3$ recorded in 2012 and thus is in good agreement with the observed data.

The 99.8^{th}%ile of 1-hr mean NO_2 concentration contour plot for 2012 is shown in **Figure 7.8**. Relatively high levels of NO_2 are found again along the main thoroughfares in Central Dublin with levels along the North Quays, Dame Street and College Green above the EU ambient short-term limit value, peaking at approximately 280 $\mu g/m^3$ at the building façade along College Street as outlined in **Table 7.8**.

Along Parliament Street, localised peaks are apparent at the Dame Street and Wellington Quay junctions with maximum levels of 165 $\mu g/m^3$, or approximately 82% of the EU 1-hr (as a 99.8^{th}%ile) ambient air quality standard.

The Winetavern Street station, for this scenario, is predicted to record a level of approximately 108 $\mu g/m^3$ compared to a level of 108 $\mu g/m^3$ recorded in 2012 and thus again is in good agreement with the observed data.

In relation to PM_{10} / $PM_{2.5}$, modelling was also undertaken based on the assumptions outlined above for NO_2. The results of the PM_{10} / $PM_{2.5}$ modelling indicate that all locations were in compliance with the ambient air quality standards in 2012 at a traffic speed of 15 km/hr as outlined in **Table 7.9** and **Table 7.10**. In relation to PM_{10} / $PM_{2.5}$, results of the validation study indicated that, based on Phoenix Park PM_{10} data as a background station, results from the ADMS-Roads model and observed data from the Winetavern Street PM_{10} ambient monitor were in reasonable agreement given the many different sources of particulates in an urban setting.

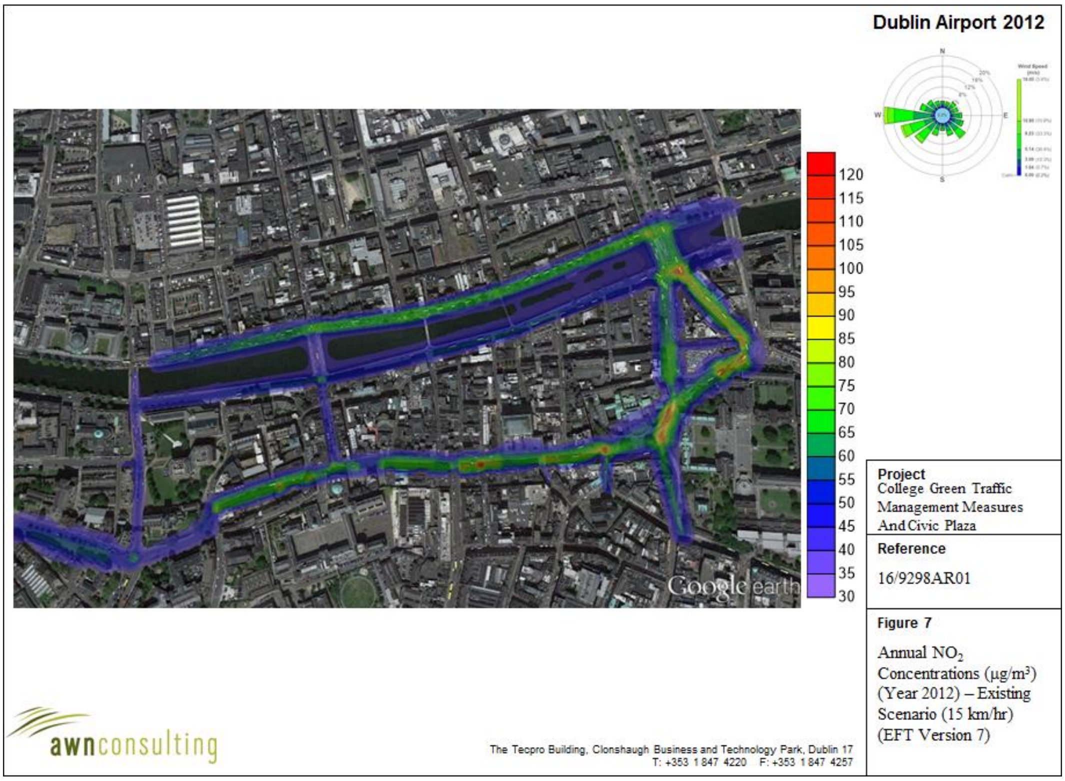

Figure 7.7 - Annual Mean Modelled NO2 Concentration (µg/m3) (Year 2012) (EFT Version 7.0)

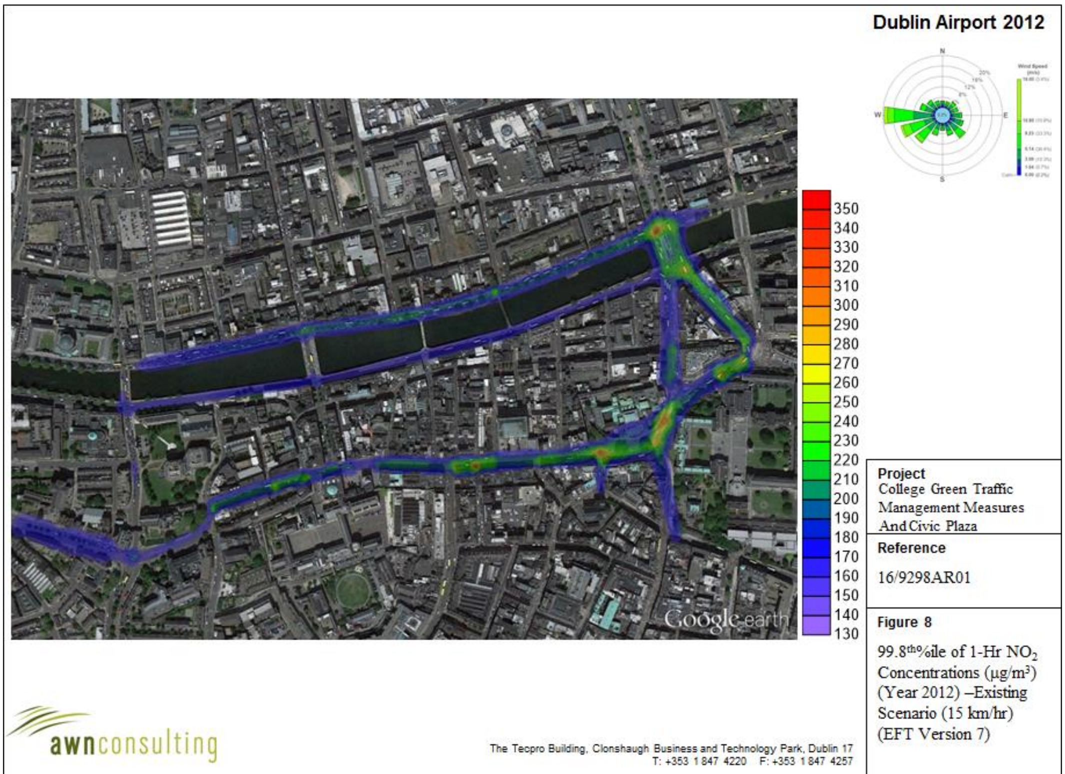

Figure 7.8 - Maximum 99.8th%ile Of Modelled NO2 Concentrations (µg/m3) (Year 2012) (EFT Version 7.0)

Do Minimum Scenario 2018

The Do Minimum (DM) modelling scenario was undertaken based on the traffic data from the NTA traffic model (refer to **Appendix 6.1**) for 2018 without the Proposed Project in place. Modelling was undertaken using 2018 emission factors and based on meteorological data from Dublin Airport for 2011 - 2015. Each year was modelled using the 2018 emission factors and the year giving the highest modelled results reported below as shown in **Table 7.8** for the ground level façades and in **Table 7.11** for the first-floor façades.

Background data was based on NO, NO_2 and O_3 data from Rathmines for 2015. Rathmines data was used to represent background concentrations in the city centre in 2018 as this is the most recent data currently available. No correction for expected reduced background NO and NO_2 concentrations in future years was conducted.

The emission data for the ADMS-Roads model was based on EFT Version 7.0 for the DM scenario in 2018. An average traffic speed of 15 km/hr was selected for the study area based on the output from the NTA traffic model.

As shown in **Figure 7.9**, peak concentrations of NO_2 occur along both the North and South Quays and along D'Olier Street / College Street / College Green. Roadside levels are above the EU annual mean ambient air quality standard for NO_2 peaking at approximately 87 $\mu g/m^3$ at the ground level façade of buildings near the junction of College Street and College Green. At the first-floor façade, levels decrease somewhat peaking at 65 $\mu g/m^3$, which is a decrease equivalent to 50% of the annual limit value although levels are still significantly above the ambient NO_2 annual limit value at these locations.

Along Parliament Street, localised peaks are apparent at the Dame St and Wellington Quay junctions with maximum levels peaking at 37 $\mu g/m^3$, or approximately 93% of the EU ambient air quality standard at ground level although first-floor levels peak at 1 $\mu g/m^3$ lower and thus are in compliance with the limit values.

The Winetavern Street station, for this scenario, is predicted to record a level of approximately 22 $\mu g/m^3$ compared to a level of 31 $\mu g/m^3$ recorded in 2015 and thus remains in compliance with the NO_2 annual mean ambient air quality standard.

In relation to the short-term limit value (99.8th%ile of one hour means), the maximum predicted ground level concentration for the DM scenario in 2018 exceeds the ambient limit value of 200 $\mu g/m^3$ as shown in **Figure 7.10** and **Table 7.8**. Levels are predicted to peak at approximately 237 $\mu g/m^3$ at the façade near the junction of College Street and College Green. Again, first-floor receptors experience reduced pollutant levels with peak NO_2 concentrations approximately 25% lower.

Along Parliament Street, localised peaks are apparent at the Dame Street and Wellington Quay junctions with maximum levels of 115 $\mu g/m^3$, or approximately 58% of the EU 1-hr (as a 99.8th%ile) ambient air quality standard. Again, first-floor receptors experience reduced ambient NO_2 concentrations by up to 2% of the ambient standard.

The Winetavern Street station, for this scenario, is predicted to record a level of approximately 91 $\mu g/m^3$ compared to a level of 128 $\mu g/m^3$ recorded in 2015 and thus remains in compliance with the NO_2 short-term ambient air quality standard.

The results of the PM_{10} / $PM_{2.5}$ modelling indicates that all locations will be in compliance with the ambient air quality standards in 2018 for the DM scenario as shown in **Table 7.9** and **Table 7.10**. The annual mean PM_{10} concentration for 2018 Do Minimum scenario is shown in **Figure 7.11** and **Table 7.9** (based on background data taken from the Phoenix Park monitoring station) with peak concentrations located along the North Quay, D'Olier Street and College Green. Compared to 2012 levels, the ambient levels of PM_{10} along Parliament St have increased slightly although all levels remain less than 45% of the ambient annual limit value. The short-term PM_{10} concentration (90^{th}%ile of 24-hour concentrations) is shown in **Figure 7.12** for the 2018 DM scenario with results detailed in **Table 7.9**. Again, peak concentrations are located along the North Quay, D'Olier Street and College Green although all concentrations are less than 76% of the short-term limit value with levels along Parliament Street falling below 65% of the limit value.

Levels of $PM_{2.5}$ are less than 55% of the ambient annual mean limit value and are slightly lower than the 2012 levels.

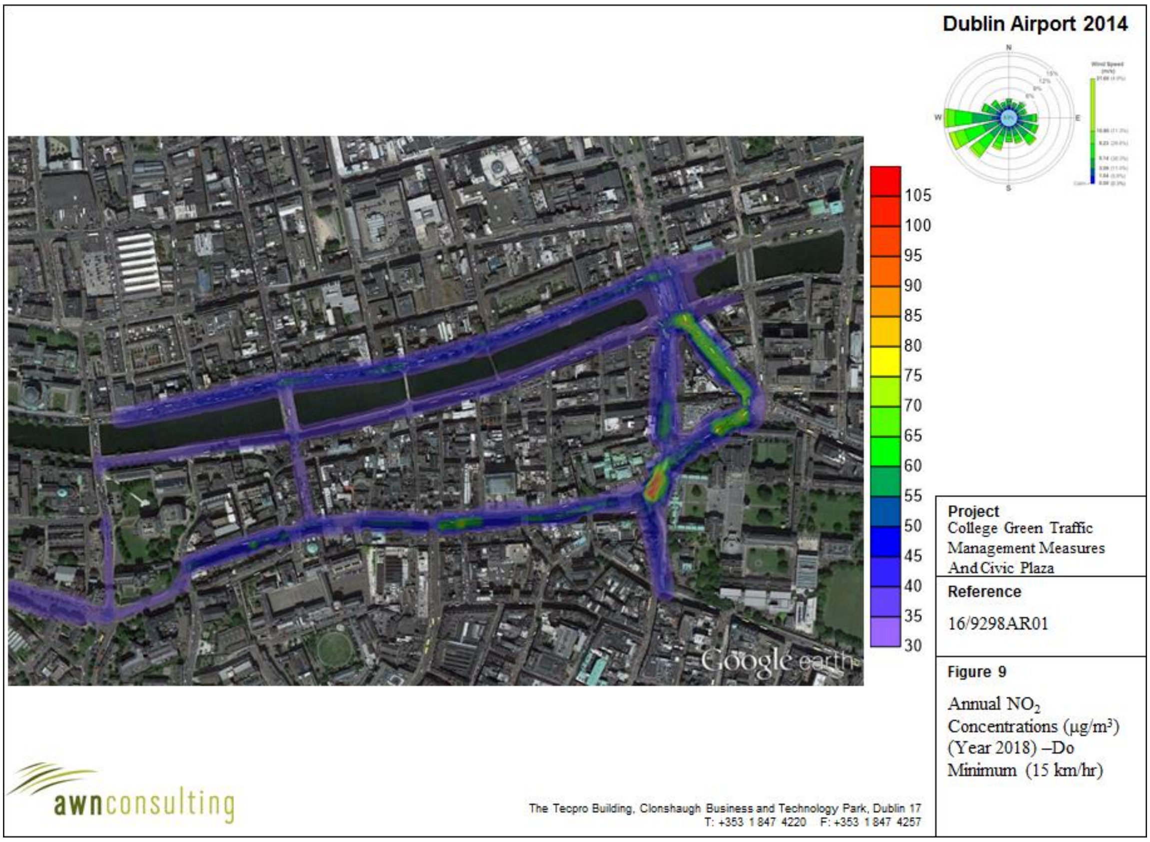

Figure 7.9 - Annual Mean Do Minimum Modelled NO2 Concentration (µg/m3) (Year 2018) (EFT Version 7.0)

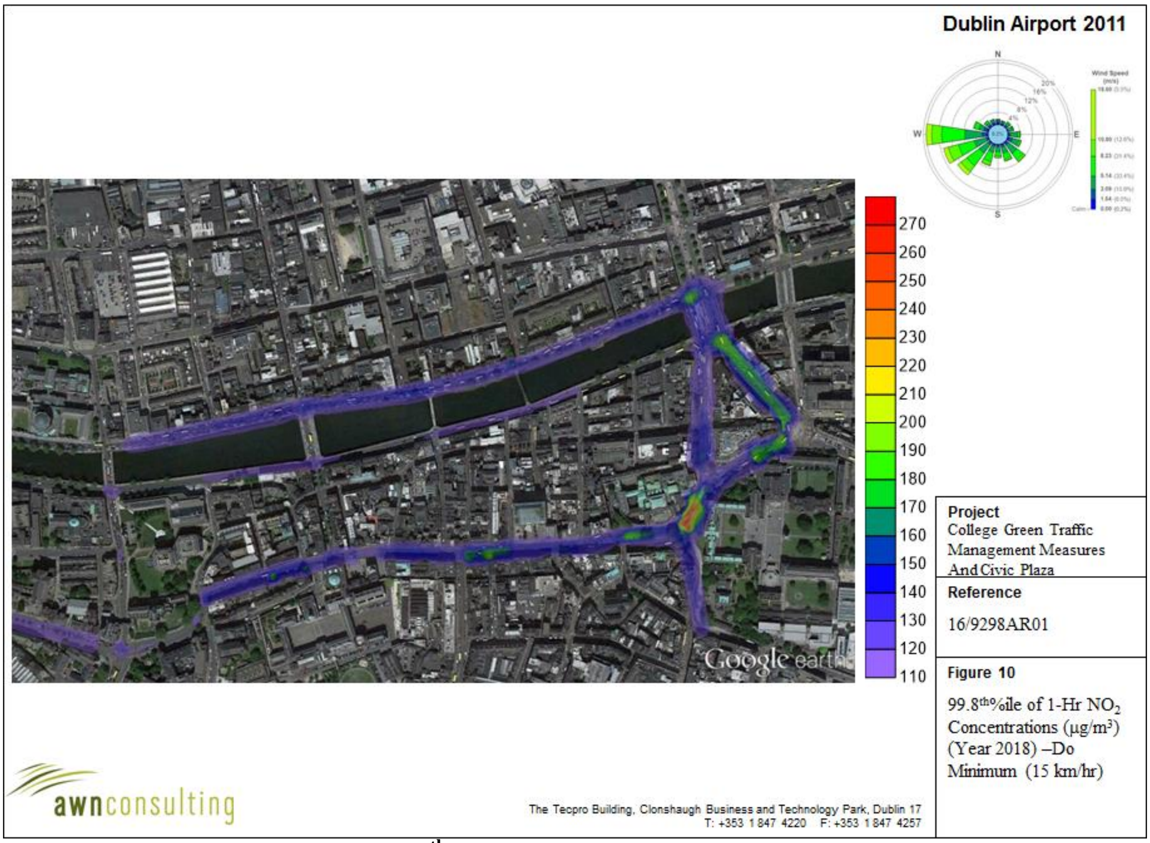

Figure 7.10 - Maximum 99.8th%ile Of Do Minimum Modelled1-Hr NO2 Concentrations (µg/m3) (Year 2018) (EFT Version 7.0)

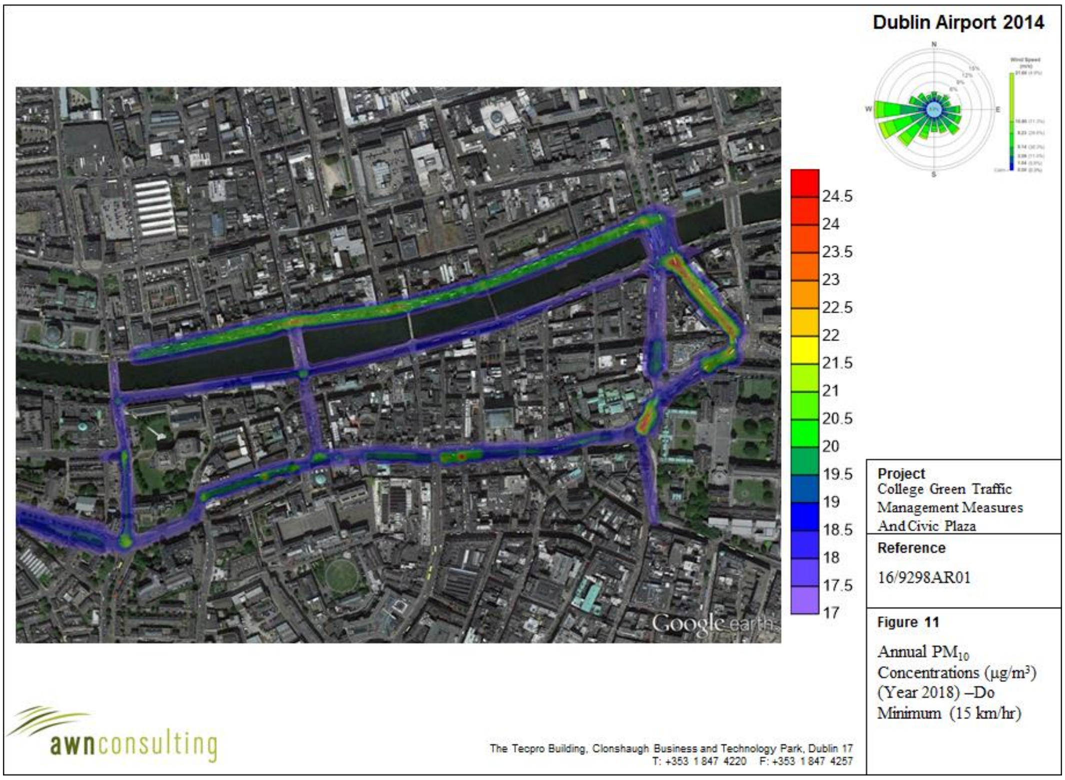

Figure 7.11 - Annual Mean Do Minimum Modelled PM10 Concentration (µg/m3) (Year 2018) (EFT Version 7.0)

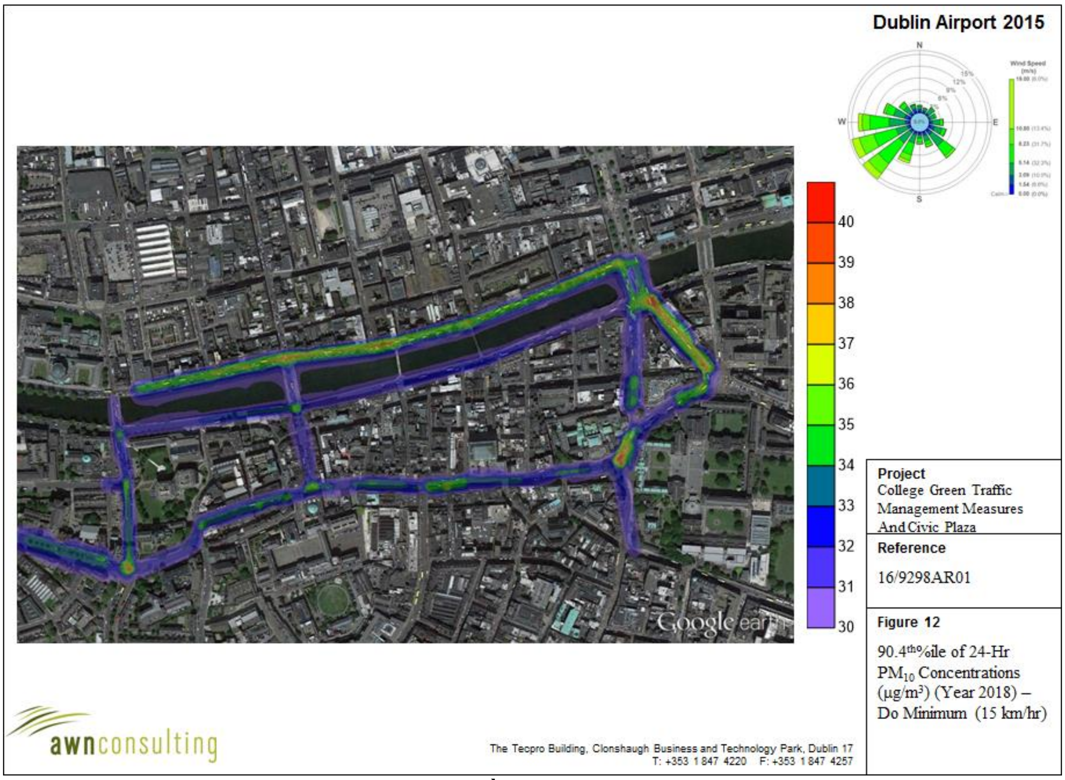

Figure 7.12 - 24-Hr Maximum (as a 90^{th}%ile) Do Minimum Modelled PM10 Concentration (µg/m3) (Year 2018) (EFT Version 7.0)

Table 7.8 - ADMS-Roads Air Modelling Ground Level Results - Nitrogen Dioxide (NO_2) 2012 and 2018 Do Minimum

Location			Winetavern St		Parliament St		Maximum Result[Note 1]	
Scenario	**Meteorological**	**Speed**	**Annual NO_2**	**1-Hr**	**Annual NO_2**	**1-Hr**	**Annual NO_2**	**1-Hr**
EFT Version 7	**2012**	**5 km/hr**	27.8	110.9	56.4	175.8	117.2	326.3
		15 km/hr	27.0	108.0	51.3	164.2	99.9	281.0
		20 km/hr	26.3	106.7	46.9	153.4	85.6	243.3
EFT Version 6	**2012**	**5 km/hr**	28.2	112.1	57.9	179.7	120.0	334.2
		15 km/hr	27.4	109.6	53.1	167.9	103.5	289.9
		20 km/hr	26.7	107.1	48.7	157.5	89.2	252.1
DM 2018	**2011**	**15 km/hr**	21.9	90.2	36.0	114.2	84.2	237.2
	2012		22.0	89.1	37.3	107.4	85.0	231.0
	2013		22.0	89.3	37.0	115.2	85.8	230.2
	2014		22.1	90.6	37.3	104.8	87.1	236.6
	2015		21.5	90.9	34.2	115.0	80.4	241.4
Ambient Air Quality Limit Value ($\mu g/m^3$)			**40**	**200**	**40**	**200**	**40**	**200**

Note 1 Maximum result at the façade of any building in the study area.

Table 7.9 - ADMS-Roads Air Modelling Ground Level Results – PM_{10} 2012 and 2018 Do Minimum

Location			Winetavern St		Parliament St		Maximum Result[Note 1]	
Scenario	Year	Speed	Annual PM_{10}	24-hr 90^{th}%ile	Annual PM_{10}	24-hr 90^{th}%ile	Annual PM_{10}	24-hr 90^{th}%ile
EFT Version 7	2012	5 km/hr	15.0	25.3	17.7	28.5	22.7	35.3
		15 km/hr	15.0	25.3	17.5	28.2	22.2	34.3
		20 km/hr	14.9	25.2	17.3	28.0	21.8	33.7
EFT Version 6	2012	5 km/hr	15.0	25.3	17.9	28.7	23.2	36.5
		15 km/hr	15.0	25.3	17.7	28.4	22.6	34.9
		20 km/hr	15.0	25.3	17.5	28.2	22.2	34.2
DM 2018 (EFT Version 7)	2011	15 km/hr	15.9	28.1	17.6	30.5	21.9	35.3
	2012		15.9	28.1	17.7	30.3	22.0	34.7
	2013		15.9	28.1	17.6	30.7	22.0	34.5
	2014		15.9	28.4	17.7	30.0	22.2	35.3
	2015		15.9	28.4	17.6	31.6	21.8	37.9
Ambient Air Quality Limit Value ($\mu g/m^3$)			40	50	40	50	40	50

Note 1 Maximum result at the façade of any building in the study area.

Table 7.10 - ADMS-Roads Air Modelling Ground Level Results – $PM_{2.5}$ 2012 and 2018 Do Minimum

Location			Winetavern St	Parliament St	Maximum Result[Note 1]
Scenario	**Year**	**Speed**	**Annual $PM_{2.5}$**	**Annual $PM_{2.5}$**	**Annual $PM_{2.5}$**
EFT Version 7	**2012**	**5 km/hr**	9.5	11.5	15.1
		15 km/hr	9.5	11.3	14.5
		20 km/hr	9.5	11.1	14.1
EFT Version 6	**2012**	**5 km/hr**	9.5	11.7	15.6
		15 km/hr	9.5	11.5	14.9
		20 km/hr	9.5	11.3	14.4
DM 2018 (EFT Version 7)	**2011**	**15 km/hr**	9.3	10.4	13.4
	2012		9.3	10.4	13.4
	2013		9.3	10.4	13.5
	2014		9.3	10.4	13.6
	2015		9.3	10.4	13.3
Ambient Air Quality Limit Value ($\mu g/m^3$)			**25**	**25**	**25**

Note 1 Maximum result at the façade of any building in the study area.

Table 7.11 - ADMS-Roads Air Modelling First-floor Results - Nitrogen Dioxide (NO_2) 2012 and 2018 Do Minimum

Location			Winetavern St		Parliament St		Maximum Result[Note 1]	
Scenario	**Meteorological**	**Speed**	**Annual NO_2**	**1-Hr**	**Annual NO_2**	**1-Hr**	**Annual NO_2**	**1-Hr**
EFT Version 7	**2012**	**5 km/hr**	27.8	110.9	54.0	170.3	84.2	244.9
		15 km/hr	27.0	108.0	49.3	157.9	73.4	212.4
		20 km/hr	26.3	106.7	45.2	147.8	65.0	187.6
EFT Version 6	**2012**	**5 km/hr**	28.2	112.1	55.4	174.3	86.0	250.0
		15 km/hr	27.4	109.6	50.9	162.2	75.8	218.4
		20 km/hr	26.7	107.1	46.8	152.2	67.5	194.9
DM 2018 (EFT Version 7)	**2011**	**15 km/hr**	21.9	90.2	34.7	110.8	63.1	176.6
	2012		22.0	89.1	36.1	105.2	63.4	173.0
	2013		22.0	89.3	35.7	111.7	64.0	174.7
	2014		22.1	90.6	36.0	102.2	65.2	178.4
	2015		21.5	90.9	33.1	111.6	60.0	187.0
Ambient Air Quality Limit Value ($\mu g/m^3$)			**40**	**200**	**40**	**200**	**40**	**200**

Note 1 Maximum result at the first-floor façade of any building in the study area.

Table 7.12 - ADMS-Roads Air Modelling First-floor Results – PM_{10} 2012 and 2018 Do Minimum

Location			Winetavern St		Parliament St		Maximum Result[Note 1]	
Scenario	Year	Speed	Annual PM_{10}	24-hr 90^{th}%ile	Annual PM_{10}	24-hr 90^{th}%ile	Annual PM_{10}	24-hr 90^{th}%ile
EFT Version 7	2012	5 km/hr	15.0	25.3	17.4	28.2	19.4	32.3
		15 km/hr	15.0	25.3	17.2	27.9	19.1	31.7
		20 km/hr	14.9	25.2	17.0	27.7	18.8	31.2
EFT Version 6	2012	5 km/hr	15.0	25.3	17.6	28.4	19.7	32.9
		15 km/hr	15.0	25.3	17.4	28.1	19.4	32.2
		20 km/hr	15.0	25.3	17.2	27.9	19.1	31.6
DM 2018 (EFT Version 7)	2011	15 km/hr	15.9	28.1	17.2	30.0	19.3	32.0
	2012		15.9	28.1	17.3	30.0	19.3	32.3
	2013		15.9	28.1	17.3	30.2	19.4	32.9
	2014		15.9	28.4	17.3	29.6	19.4	32.6
	2015		15.9	28.4	17.2	31.4	19.2	34.6
Ambient Air Quality Limit Value ($\mu g/m^3$)			40	50	40	50	40	50

Note 1 Maximum result at the first-floor façade of any building in the study area.

Table 7.13 - ADMS-Roads Air Modelling First-floor Results – $PM_{2.5}$ 2012 and 2018 Do Minimum

Location			Winetavern St	Parliament St	Maximum Result[Note 1]
Scenario	Year	Speed	Annual $PM_{2.5}$	Annual $PM_{2.5}$	Annual $PM_{2.5}$
EFT Version 7	2012	5 km/hr	9.5	11.3	12.8
		15 km/hr	9.5	11.1	12.4
		20 km/hr	9.5	10.9	12.1
EFT Version 6	2012	5 km/hr	9.5	11.4	13.1
		15 km/hr	9.5	11.2	12.6
		20 km/hr	9.5	11.0	12.3
DM 2018 (EFT Version 7)	2011	15 km/hr	9.3	10.1	11.6
	2012		9.3	10.2	11.6
	2013		9.3	10.2	11.7
	2014		9.3	10.2	11.8
	2015		9.3	10.1	11.6
Ambient Air Quality Limit Value ($\mu g/m^3$)			25	25	25

Note 1 Maximum result at the first-floor façade of any building in the study area.

Do Minimum Scenario 2035

The Do Minimum (DM) modelling scenario was undertaken based on the traffic data from the NTA traffic model for 2035 without the Proposed Project in place. Modelling was undertaken using 2030 emission factors (the upper limit of the emission factor database) and based on meteorological data from Dublin Airport for 2011 - 2015. Each year was modelled using the 2030 emission factors and the year giving the highest modelled results reported below.

Background data was based on NO, NO_2 and O_3 data from Rathmines for 2015. Rathmines data was used to represent background concentrations in the city centre in 2035 as this is the most recent data currently available. No correction for expected reduced background NO and NO_2 in future years was conducted which will be particularly conservative for this scenario.

The emission data for the ADMS-Roads model was based on EFT Version 7.0 (Year 2030) for the DM scenario in 2035. An average traffic speed of 15 km/hr was selected for the study area based on the output from the NTA traffic model.

As shown in **Figure 7.13** and **Table 7.14**, peak concentrations of NO_2 occur along Lord Edward Street / Dame Street and D’Olier Street / College Street / College Green. Roadside levels are below the EU annual mean ambient air quality standard for NO_2 peaking at approximately 30 $\mu g/m^3$ at the façade of buildings along Lord Edward Street. Again, first-floor receptors have reduced levels of NO_2 with annual mean concentrations peaking at 29 $\mu g/m^3$ along Lord Edward Street.

Along Parliament Street, localised peaks are apparent at the Dame Street and Wellington Quay junctions with maximum levels 25 $\mu g/m^3$, or approximately 63% of the EU ambient air quality standard reducing by around 2% of the air quality standard, at first-floor level, as shown in **Table 7.14**.

The Winetavern Street station, for this scenario, is predicted to record a level of approximately 20 $\mu g/m^3$ and thus remain in compliance with the NO_2 annual mean ambient air quality standard.

In relation to the short-term limit value (99.8^{th}%ile of one hour means), the maximum predicted level for the DM scenario in 2035 is below the ambient limit value of 200 $\mu g/m^3$ as shown in **Figure 7.14** and **Table 7.14**. Levels are predicted to peak at approximately 105 $\mu g/m^3$ at the façade along College Street.

Along Parliament Street, localised peaks are apparent at the Dame Street and Wellington Quay junctions with maximum levels of 95 $\mu g/m^3$, or approximately 48% of the EU 1-hr (as a 99.8^{th}%ile) ambient air quality standard.

The Winetavern Street station, for this scenario, is predicted to record a level of approximately 90 $\mu g/m^3$ and thus remain in compliance with the NO_2 short-term ambient air quality standard.

Compared to 2018 levels, the ambient levels of NO_2 at the worst-case façades in the study area have decreased significantly by up to 87% of the ambient annual limit value and by 42% of the short-term limit values.

Compared to 2018 levels, the ambient levels of NO_2 along Parliament Street have decreased by up to 25% of the ambient annual limit value and by 9% of the short-term limit values.

The results of the PM_{10} / $PM_{2.5}$ modelling indicate that all locations will be in compliance with the ambient air quality standards in 2035 for the DM scenario as shown in **Table 7.15** and **Table 7.16**. The annual mean PM_{10} concentration for 2035 Do Minimum scenario is shown in **Table 7.15** (based on background data taken from the Phoenix Park monitoring station). Compared to 2018 levels, the ambient levels of PM_{10} at the worst-case façades in the study area have decreased significantly by up to 7% of the ambient annual limit value and by 6% of the short-term limit value. Compared to 2018 levels, the ambient levels of PM_{10} along Parliament Street have remained essentially unchanged (due to the dominant role of the unchanging background concentration) with all levels less than 65% of the ambient limit values. Levels of $PM_{2.5}$ are less than 45% of the ambient annual mean limit value and are essentially unchanged from the 2018 levels as outlined in **Table 7.16**.

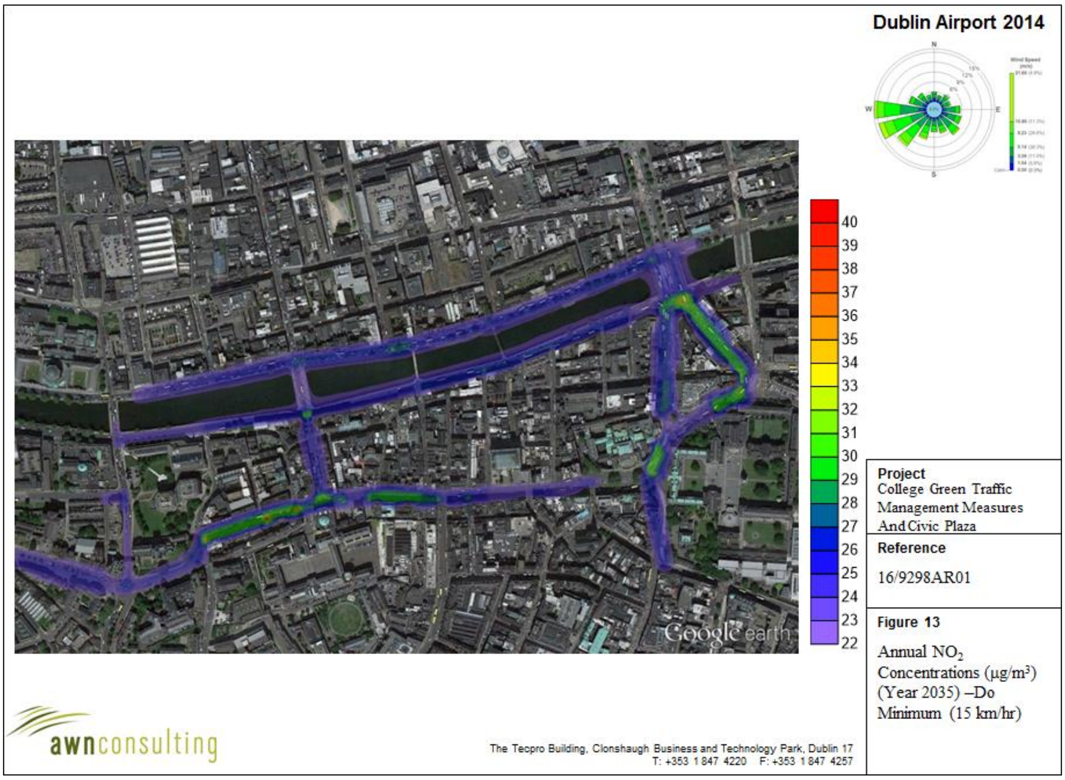

Figure 7.13 - Annual Mean Modelled NO2 Concentration (µg/m3) (Year 2035) (EFT Version 7.0)

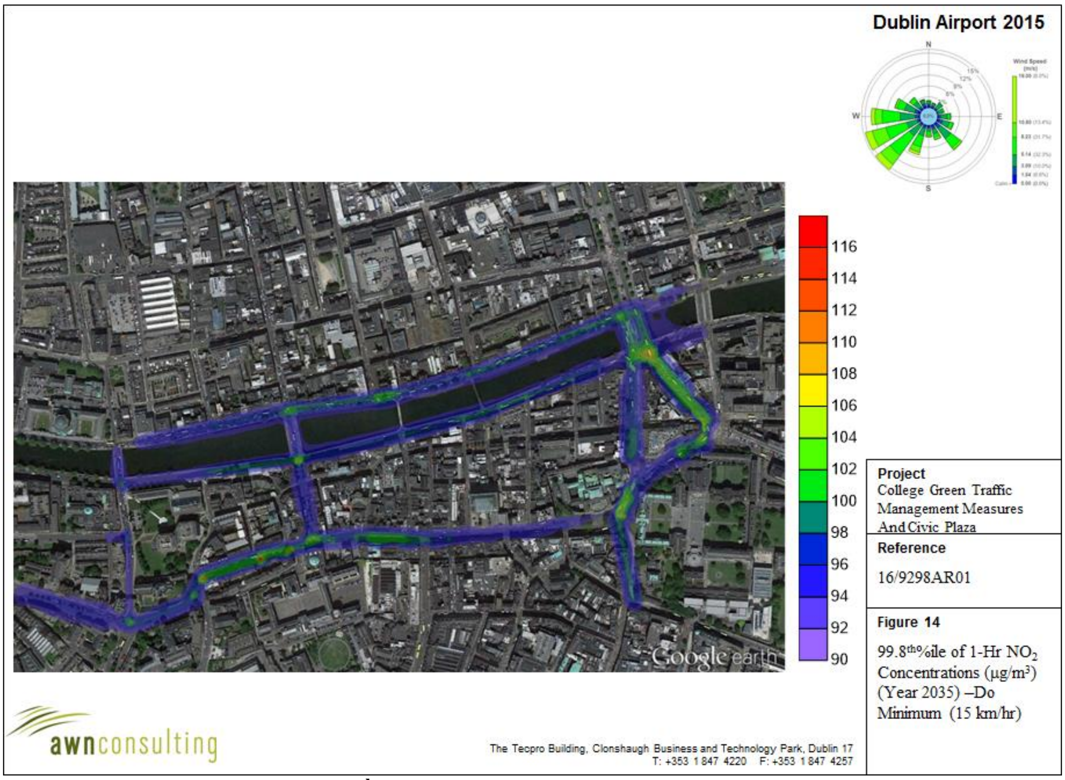

Figure 7.14 - Maximum 99.8th%ile Of Do Minimum Modelled 1-Hr NO2 Concentrations (µg/m3) (Year 2035) (EFT Version 7.0)

Table 7.14 - ADMS-Roads Air Modelling Results – Nitrogen Dioxide (NO_2) 2035 Do Minimum

Location			Winetavern St		Parliament St		Maximum Result[Note 1]	
Scenario	**Meteorological**	**Speed**	**Annual NO_2**	**1-Hr**	**Annual NO_2**	**1-Hr**	**Annual NO_2**	**1-Hr**
DM 2035 – Ground Level Receptor (EFT Version 7, Year 2030)	**2011**	**15 km/hr**	19.6	88.1	25.0	93.0	30.0	99.2
	2012		19.6	88.4	25.2	92.9	30.2	97.4
	2013		19.6	88.0	25.0	94.2	30.3	97.5
	2014		19.7	89.1	25.2	92.4	30.6	97.9
	2015		19.4	88.5	24.5	96.0	28.9	104.5
DM 2035 – First-floor Receptor (EFT Version 7, Year 2030)	**2011**	**15 km/hr**	19.6	88.1	24.2	91.9	28.5	96.1
	2012		19.6	88.4	24.7	91.9	28.5	96.9
	2013		19.6	88.0	24.5	93.2	28.5	95.9
	2014		19.7	89.1	24.7	91.4	28.8	95.2
	2015		19.4	88.5	23.5	95.2	27.3	99.6
Ambient Air Quality Limit Value (μg/m³)			**40**	**200**	**40**	**200**	**40**	**200**

Note 1 Maximum result at the façade of any building in the study area.

Table 7.15 - ADMS-Roads Air Modelling Results – PM_{10} 2035 Do Minimum

Location			Winetavern St		Parliament St		Maximum Result[Note 1]	
Scenario	Year	Speed	Annual PM_{10}	24-hr 90^{th}%ile	Annual PM_{10}	24-hr 90^{th}%ile	Annual PM_{10}	24-hr 90^{th}%ile
DM 2035 - Ground Level Receptor (EFT Version 7, Year 2030)	2011	15 km/hr	15.7	27.8	18.0	30.9	19.4	32.3
	2012		15.7	27.8	18.1	30.7	19.3	32.4
	2013		15.7	27.7	18.0	31.0	19.3	32.4
	2014		15.7	28.0	18.1	30.7	19.4	32.4
	2015		15.7	28.0	18.0	32.1	19.2	34.7
DM 2035 – First-floor Receptor (EFT Version 7, Year 2030)	2011	15 km/hr	15.7	27.8	17.3	30.3	18.9	32.1
	2012		15.7	27.8	17.4	30.3	18.9	31.8
	2013		15.7	27.7	17.3	30.2	18.9	31.8
	2014		15.7	28.0	17.3	29.8	19.0	31.9
	2015		15.7	28.0	17.3	31.3	18.8	32.8
Ambient Air Quality Limit Value ($\mu g/m^3$)			40	50	40	50	40	50

Note 1 Maximum result at the façade of any building in the study area.

Table 7.16 - ADMS-Roads Air Modelling Results – $PM_{2.5}$ 2035 Do Minimum

Location			Winetavern St	Parliament St	Maximum Result Note 1
Scenario	**Year**	**Speed**	**Annual $PM_{2.5}$**	**Annual $PM_{2.5}$**	**Annual $PM_{2.5}$**
DM 2035 - Ground Level Receptor (EFT Version 7, Year 2030)	**2011**	**15 km/hr**	9.2	10.5	11.2
	2012		9.2	10.5	11.2
	2013		9.2	10.5	11.2
	2014		9.2	10.5	11.3
	2015		9.2	10.5	11.1
DM 2035 – First-floor Receptor (EFT Version 7, Year 2030)	**2011**	**15 km/hr**	9.2	10.1	11.0
	2012		9.2	10.1	10.9
	2013		9.2	10.1	10.9
	2014		9.2	10.1	11.0
	2015		9.2	10.1	10.9
Ambient Air Quality Limit Value ($\mu g/m^3$)			**25**	**25**	**25**

Note 1 Maximum result at the façade of any building in the study area.

Climate

Anthropogenic emissions of greenhouse gases in Ireland included in the EU 2020 strategy are outlined in the most recent review by the EPA. Combustion of fossil fuels for energy purposes is the greatest source of emissions at 97% of CO_2. Agriculture is the greatest source of emissions at 33% of $CO2_{eq}$ (2014 data). The largest share of energy emissions in 2015 is from fuel combustion for power generation (19.7% of total emissions) and road transport (19.7%). Industry and commercial sources account for 10.9% of emissions in 2015. 2015 is the third year where compliance with the European Union's Effort Sharing Decision "EU 2020 Strategy" (Decision 406/2009/EC) will be assessed. Ireland had non-ETS sectors emissions of 43.0 Mt CO_{2eq} in 2015, when emissions covered by the EU's emissions trading scheme for stationary and aviation operators were removed. This is 1.63 Mt CO_{2eq} lower than Ireland's annual target for emissions in 2015. However, the latest note from the EPA in 2016 indicates that compliance with the EU 2020 targets will be very challenging (EPA, 2016).

Greenhouse gases have different efficiencies in retaining solar energy in the atmosphere and different lifetimes in the atmosphere. In order to compare different greenhouse gases, emissions are calculated on the basis of their Global Warming Potential (GWP) over a 100-year period, giving a measure of their relative heating effect in the atmosphere. The GWP100 for CO_2 is the basic unit (GWP = 1) whereas CH_4 has a global warming potential equivalent to 23 units of CO_2 and N_2O has a GWP100 of 310.

7.4 Predicted Impacts

The Proposed Project will involve the development of a civic plaza and the implementation of traffic management measures over a defined construction period. When considering a development of this nature, the potential air quality and climate impact on the surroundings must be considered for each of two distinct stages:

- construction phase; and
- operational phase.

7.4.1 Construction Phase

The construction phase will involve excavation over the Proposed Project site and the erection of a civic plaza over a phased construction period.

Climate

The impact of climate due to the construction phase of the Proposed Project will not be significant.

Air Quality

Transport Infrastructure Ireland (6) have published guidelines outlining the assessment criteria for assessing the impact of dust emissions from construction activities with standard mitigation in place. As shown in **Table 7.17** below, the risk from soiling ranges from 25m – 100m and in relation to PM10, the risk ranges from 10m – 25m depending on the scale of the construction activity.

Table 7.17 - Assessment Criteria for the Impact of Dust Emissions from Construction Activities with Standard Mitigation in Place

Source		Potential Distance for Significant Effects (Distance from source)		
Scale	**Description**	**Soiling**	**PM_{10}**	**Vegetation Effects**
Major	Large construction sites with high use of haul routes	100m	25m	25m
Moderate	Moderate sized construction sites with moderate use of haul routes	50m	15m	15m
Minor	Minor construction sites with limited use of haul routes	25m	10m	10m

Source: Appendix 8: Assessment of Construction Impacts taken from "*Guidelines for the treatment of Air Quality During the Planning & Construction of National Road Schemes*" (TII, 2011)

The Institute of Air Quality Management (IAQM) recently issued guidelines(7) outlining the assessment criteria for assessing the impact of dust emissions from construction activities based on both receptor sensitivity and the number of receptors affected. In terms of receptor sensitivity, the area is characterised as having high and medium sensitivity receptors within 50m of the site. In terms of the prevailing wind, which is south-westerly (as shown in **Figure 7.1**), the dominant land use downwind of the site is a medium sensitivity environment (commercial / office / hotel receptors).

As shown in **Table 7.18** below, the risk from dust soiling at the nearest receptor (a medium sensitivity environment, distance <50m and with receptor numbers 10 - 100) is considered **medium** under this guidance.

Table 7.18 - Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number Of Receptors	Distance from source (m)			
		<20	**<50**	**<100**	**<350**
High	**>100**	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	**>1**	Medium	Low	Low	Low

Low	**>1**	Low	Low	Low	Low

Source: *IAQM (2014) Guidance on the Assessment of Dust from Demolition and Construction*

In addition, the IAQM guidelines(7) also outline the assessment criteria for assessing the impact of PM_{10} emissions from construction activities based on the current annual mean PM_{10} concentration, receptor sensitivity and the number of receptors affected. The current PM_{10} concentration in Zone A locations as reported above is approximately 16 $\mu g/m^3$. As shown in **Table 7.19** below the risk to human health from PM_{10} emissions at the nearest residential receptor (high sensitivity, distance <20m and with receptor numbers >100) is considered **medium** under this guidance.

However, for the nearest medium sensitivity properties, as shown in **Table 7.19**, the risk to human health from PM_{10} emissions (medium sensitivity, distance <20m and with receptor numbers >10) is considered **low** under this guidance.

Table 7.19 - Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	**Annual Mean PM_{10} Concentration**	**Number Of Receptors**	**Distance from source (m)**			
			<20	**<50**	**<100**	**<200**
High	**< 24 $\mu g/m^3$**	**>100**	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	**< 24 $\mu g/m^3$**	**>10**	Low	Low	Low	Low
		1-10	Low	Low	Low	Low

Source: *IAQM (2014) Guidance on the Assessment of Dust from Demolition and Construction*

Defining the Potential Dust Emission Magnitude

In order to determine the level of dust mitigation required during the proposed works, the potential dust emission magnitude for each dust generating activity needs to be taken into account, in conjunction with the previously established sensitivity of the area. The major dust generating activities are divided into four types within the IAQM guidance to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout.

Demolition

There are no significant demolition activities associated with the Proposed Project. Therefore, there is no significant demolition impact predicted as a result of the works.

Earthworks

Earthworks will primarily involve excavating material, haulage, tipping and stockpiling activities. Activities such as levelling the site and landscaping works are also considered under this category. The dust emission magnitude from earthworks can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- **Large:** Total site area > 10,000 m^2, potentially dusty soil type (e.g. clay which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds > 8 m in height, total material moved >100,000 tonnes;
- **Medium:** Total site area 2,500 m^2 – 10,000 m^2, moderately dusty soil type (e.g. silt), 5 - 10 heavy earth moving vehicles active at any one time, formation of bunds 4 – 8 m in height, total material moved 20,000 – 100,000 tonnes; and
- **Small:** Total site area < 2,500 m^2, soil type with large grain size (e.g. sand), < 5 heavy earth moving vehicles active at any one time, formation of bunds < 4 m in height, total material moved < 20,000 tonnes, earthworks during wetter months.

The dust emission magnitude for the proposed earthwork activities can be classified as medium as a worst-case. The total site area is likely to be between 2,500 – 10,000 m^2 and it is unlikely there would be more than 5 – 10 heavy earth moving vehicles in use at any one time during construction.

The sensitivity of the area is combined with the dust emission magnitude for each dust generating activity to define the risk of dust impacts in the absence of mitigation. The sensitivity of the area would be described as high. As outlined in **Table 7.20**, this results in an overall medium risk of temporary dust soiling impacts and an overall medium risk of temporary human health impacts as a result of the proposed earthworks activities.

Overall, in order to ensure that no dust nuisance occurs during the earthworks activities, a range of dust mitigation measures associated with a medium risk of dust impacts must be implemented. When the dust mitigation measures detailed in the mitigation section of this chapter are implemented, fugitive emissions of dust from the site will be insignificant and pose no nuisance at nearby receptors.

Table 7.20 - Risk of Dust Impacts - Earthworks

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Construction

Dust emission magnitude from construction can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- **Large:** Total building volume > 100,000 m^3, on-site concrete batching, sandblasting;
- **Medium:** Total building volume 25,000 m^3 – 100,000 m^3, potentially dusty construction material (e.g. concrete), on-site concrete batching; and
- **Small:** Total building volume < 25,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber).

The dust emission magnitude for the proposed construction activities can be classified as medium. There are no buildings being constructed as part of the works. The key construction activities after earthworks are installation of the paving materials.

The sensitivity of the area is combined with the dust emission magnitude for each dust generating activity to define the risk of dust impacts in the absence of mitigation. As outlined in **Table 7.21**, this results in an overall medium risk of temporary dust soiling impacts and an overall medium risk of temporary human health impacts as a result of the proposed construction activities.

Overall, in order to ensure that no dust nuisance occurs during the construction activities, a range of dust mitigation measures associated with a medium risk of dust impacts must be implemented. When the dust mitigation measures detailed in the mitigation section of this chapter are implemented, fugitive emissions of dust from the site will be insignificant and pose no nuisance at nearby receptors.

Table 7.21 - Risk of Dust Impacts – Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Trackout

Factors which determine the dust emission magnitude are vehicle size, vehicle speed, number of vehicles, road surface material and duration of movement. Dust emission magnitude from trackout can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- **Large:** > 50 HDV (> 3.5 t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length > 100 m;
- **Medium:** 10 - 50 HDV (> 3.5 t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 - 100 m; and
- **Small:** < 10 HDV (> 3.5 t) outward movements in any one day, surface material with low potential for dust release, unpaved road length < 50 m.

The dust emission magnitude for the proposed trackout can be classified as medium as a worst-case.

The sensitivity of the area is combined with the dust emission magnitude for each dust generating activity to define the risk of dust impacts in the absence of mitigation. As outlined in **Table 7.22**, this results in an overall medium risk of temporary dust soiling impacts and an overall medium risk of temporary human health impacts as a result of the proposed trackout activities.

Overall, in order to ensure that no dust nuisance occurs during the trackout activities, a range of dust mitigation measures associated with a medium risk of dust impacts must be implemented. When the dust mitigation measures detailed in the mitigation section of this chapter are implemented, fugitive emissions of dust from the site will be insignificant and pose no nuisance at nearby receptors.

Table 7.22 - Risk of Dust Impacts – Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Summary of Potential Dust Impacts

The risk of dust impacts as a result of the Proposed Project are summarised in **Table 7.23** for each activity. The magnitude of risk determined is used to prescribe the level of site specific mitigation required for each activity in order to prevent significant impacts occurring.

Table 7.23 - Summary of Dust Impact Risk used to Define Site-Specific Mitigation

Potential Impact	Dust Emission Magnitude			
	Demolition	**Earthworks**	**Construction**	**Trackout**
Dust Soiling	-	Medium Risk	Medium Risk	Medium Risk
Human Health	-	Medium Risk	Medium Risk	Medium Risk

7.4.2 Operational Phase

7.4.2.1 Climate

The Proposed Project, in 2018, will lead to a reduction of the total vehicle kilometres travelled, reducing from approximately 7,587,000 km for the 2018 Do Minimum scenario to 7,384,000 km for the 2018 Do Something scenario. This reduction of approximately 2.5% in total vehicle kilometres travelled will be beneficial in terms of greenhouse gas emissions associated with road traffic emissions within the study area.

By 2035, the Do Minimum and Do Something scenarios will be essentially equivalent (within 0.1% of each other) and thus the climatic impact of the Proposed Project in this year will be negligible.

7.4.2.2 Air Quality

Do Something Scenario 2018

The Do Something (DS) modelling scenario was undertaken based on the traffic data from the NTA traffic model for 2018 with the Proposed Project in place. Modelling was undertaken using 2018 emission factors and based on meteorological data from Dublin Airport for 2011 - 2015. Each year was modelled using the 2018 emission factors and the year giving the highest modelled results reported below.

Background data was based on NO, NO_2 and O_3 data from Rathmines for 2015. Rathmines data was used to represent background concentrations in the city centre in 2018 as this is the most recent data currently available. No correction for expected reduced background NO and NO_2 in future years was conducted.

The emission data for the ADMS-Roads model was based on EFT Version 7.0 for the DS scenario in 2018. An average traffic speed of 15 km/hr was selected for the study area based on the output from the NTA traffic model.

As shown in **Figure 7.15** and **Table 7.24**, peak concentrations of NO_2 occur along D'Olier Street / College Street / Grafton Street. Roadside levels are above the EU annual mean ambient air quality standard for NO_2 peaking at approximately 65 $\mu g/m^3$ at the façade of buildings along College Street. First-floor receptors have reduced impacts with maximum levels peaking at 51 $\mu g/m^3$ at the first-floor façade of buildings along College Street.

Along Parliament Street, localised peaks are apparent at the Dame Street and Wellington Quay junctions with maximum levels 35 $\mu g/m^3$, or approximately 88% of the EU ambient air quality standard.

The Winetavern Street station, for this scenario, is predicted to record a level of approximately 22 $\mu g/m^3$ and thus remains in compliance with the NO_2 annual mean ambient air quality standard.

In relation to the short-term limit value (99.8th%ile of one hour means), the maximum predicted levels for the DS scenario in 2018 approach the ambient limit value of 200 $\mu g/m^3$ as shown in **Figure 7.16** and **Table 7.24**. Levels are predicted to peak at approximately 190 $\mu g/m^3$ at the façade along College Street.

Along Parliament Street, localised peaks are apparent at the Dame St and Wellington Quay junctions with maximum levels of 110 $\mu g/m^3$, or approximately 55% of the EU 1-hr (as a 99.8th%ile) ambient air quality standard.

The Winetavern Street station, for this scenario, is predicted to record a level of approximately 90 $\mu g/m^3$ and thus remains in compliance with the NO_2 short-term ambient air quality standard.

Compared to 2018 DM levels, the ambient DS levels of NO_2 in 2018 at the worst-case façades in the study area decrease significantly by up to 54% of the ambient annual limit value and by 27% of the short-term limit value.

Compared to 2018 DM levels, the ambient DS levels of NO_2 in 2018 along Parliament St have decreased by up to 5% of the ambient annual limit value and by 3% of the short-term limit value.

The results of the PM_{10} / $PM_{2.5}$ modelling indicate that all locations will be in compliance with the ambient air quality standards in 2018 for the DS scenario as shown in **Table 7.25** and **Table 7.26**. The annual mean PM_{10} concentration for 2018 Do Something scenario is shown in **Table 7.25** and **Figure 7.17** (based on background data taken from the Phoenix Park monitoring station). Compared to 2018 DM levels, the ambient levels of PM_{10} along Parliament St have decreased slightly by up to 1% of the ambient limit values with all levels less than 65% of the ambient limit values.

The short-term PM_{10} concentration (90^{th}%ile of 24-hour concentrations) is shown in **Figure 7.18** for the 2018 DS scenario with results detailed in **Table 7.25**. Again, peak concentrations are located along the North Quay, D'Olier Street and College Green although all concentrations are less than 76% of the short-term limit value with levels along Parliament Street falling below 65% of the limit value. Levels of $PM_{2.5}$ are less than 45% of the ambient annual mean limit value at all receptors and results indicate that the results for the DS scenario are generally lower than the DM scenario.

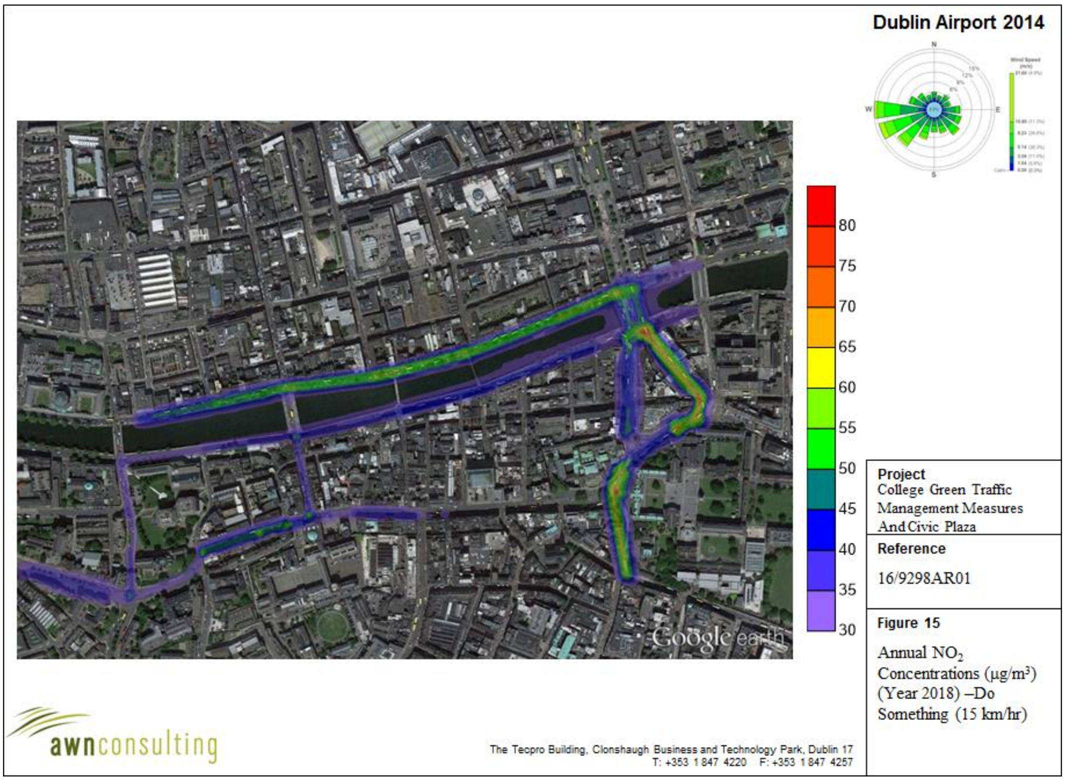

Figure 7.15 - Annual Mean Modelled NO2 Concentration (µg/m3) (Year 2018) (EFT Version 7.0) – Do Something Scenario

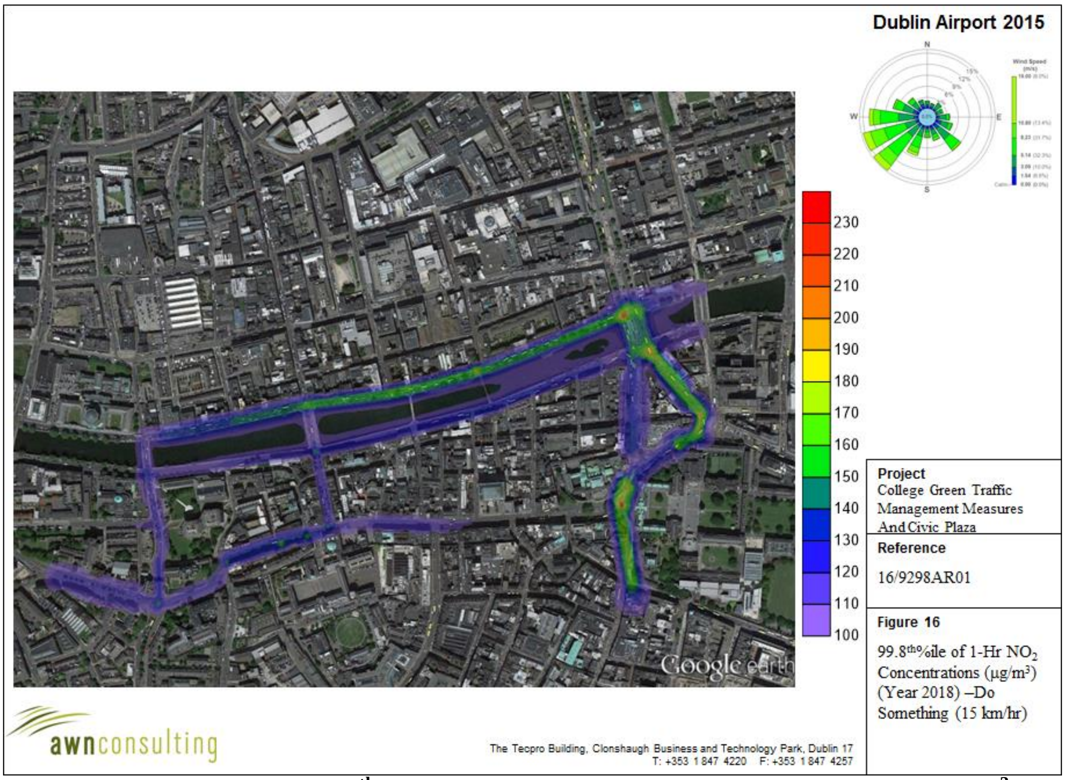

Figure 7.16 - Maximum 99.8th%ile Of Modelled1-Hr NO_2 Concentrations (µg/m^3) (Year 2018) (EFT Version 7.0) - Do Something Scenario

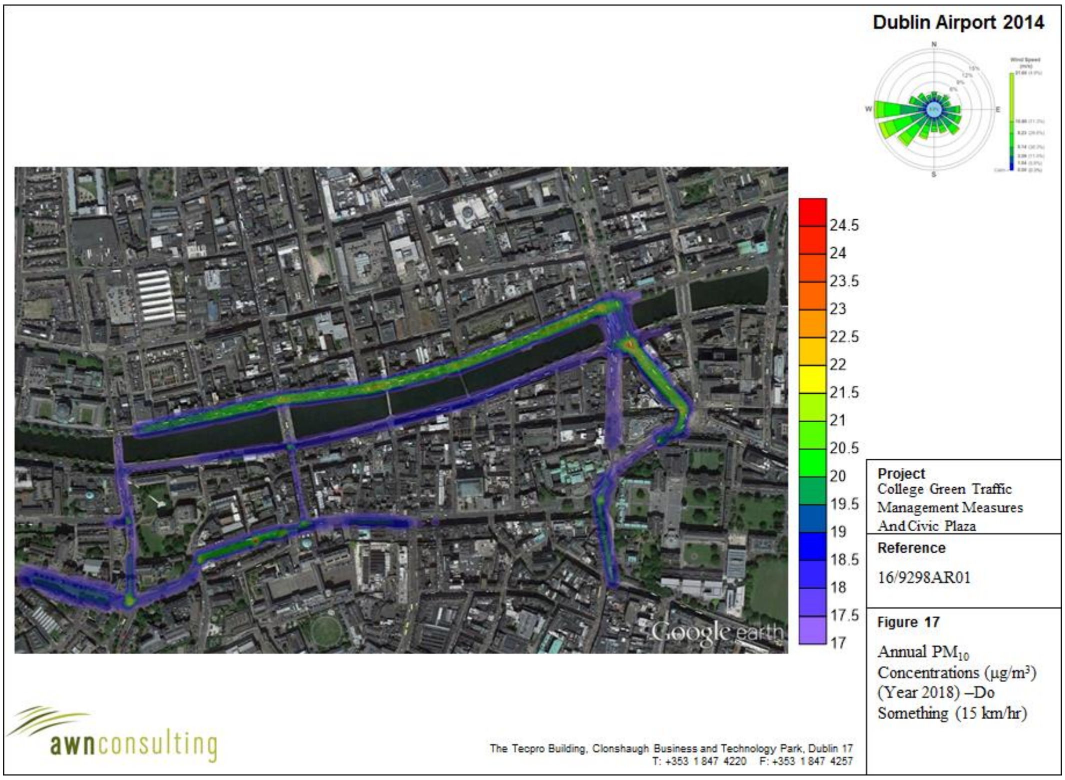

Figure 7.17 - Annual Mean Do Something Modelled PM_{10} Concentration (µg/m3) (Year 2018) (EFT Version 7.0)

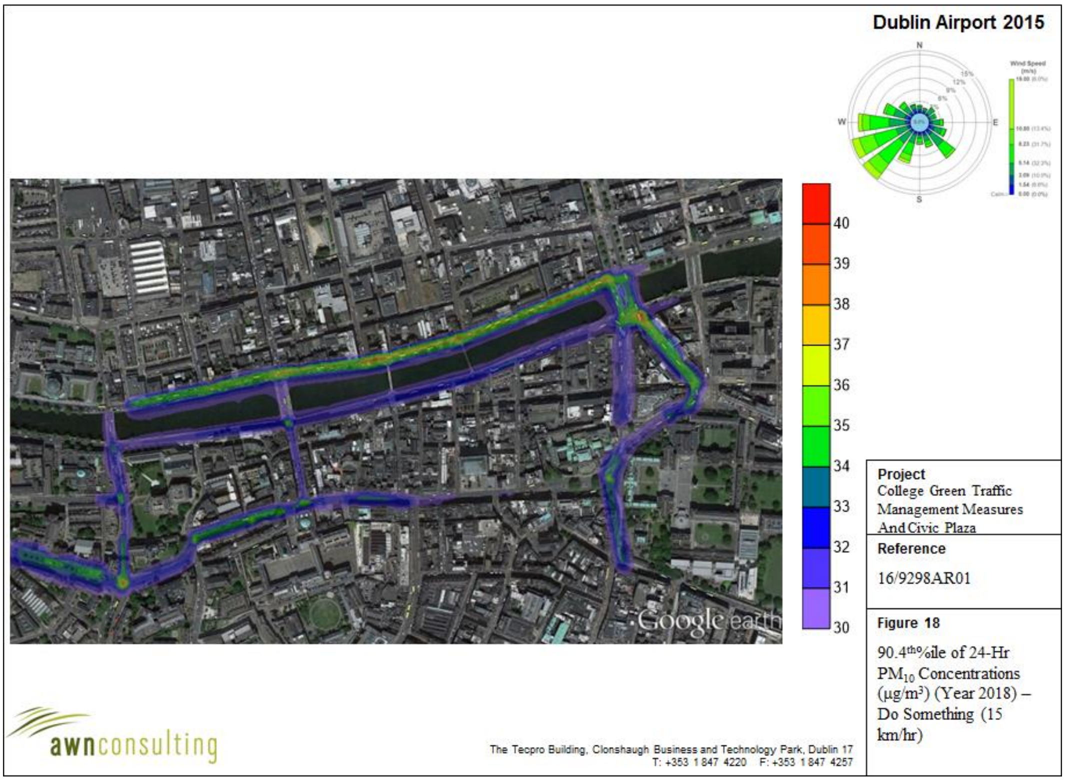

Figure 7.18 - 24-Hr Maximum (as a 90^{th}%ile) Do Something Modelled PM10 Concentration (µg/m3) (Year 2018) (EFT Version 7.0)

Table 7.24 - ADMS-Roads Air Modelling Results - Nitrogen Dioxide (NO_2) 2018 Do Something

Location			Winetavern St		Parliament St		Maximum Result[Note 1]	
Scenario	**Meteorological**	**Speed**	**Annual NO_2**	**1-Hr**	**Annual NO_2**	**1-Hr**	**Annual NO_2**	**1-Hr**
DS 2018 - Ground Level Receptor (EFT Version 7)	**2011**	**15 km/hr**	22.2	90.4	34.2	110.1	63.3	182.2
	2012		22.3	89.5	35.5	103.4	64.0	178.1
	2013		22.3	89.9	35.0	109.2	64.6	179.3
	2014		22.5	91.9	35.4	101.0	65.5	182.3
	2015		21.8	91.9	32.6	111.5	61.3	188.1
DS 2018 – First-floor Receptor (EFT Version 7)	**2011**	**15 km/hr**	22.2	90.4	33.1	107.8	49.3	141.7
	2012		22.3	89.5	34.3	102.6	50.9	139.6
	2013		22.3	89.9	33.9	106.5	49.5	141.6
	2014		22.5	91.9	34.2	98.6	50.3	142.2
	2015		21.8	91.9	31.6	108.0	47.5	150.9
Ambient Air Quality Limit Value ($\mu g/m^3$)			**40**	**200**	**40**	**200**	**40**	**200**

Note 1 Maximum result at the façade of any building in the study area.

Table 7.25 - ADMS-Roads Air Modelling Results – PM_{10} 2018 Do Something

Location			Winetavern St		Parliament St		Maximum Result[Note 1]	
Scenario	Year	Speed	Annual PM_{10}	24-hr 90^{th}%ile	Annual PM_{10}	24-hr 90^{th}%ile	Annual PM_{10}	24-hr 90^{th}%ile
DS 2018 - Ground Level Receptor (EFT Version 7)	2011	15 km/hr	15.9	28.1	17.4	29.8	21.0	34.0
	2012		15.9	28.1	17.6	30.3	21.2	33.4
	2013		15.8	28.0	17.5	30.4	21.1	34.1
	2014		15.9	28.3	17.6	29.7	21.2	33.2
	2015		15.9	28.4	17.4	31.5	21.0	37.6
DS 2018 – First-floor Receptor (EFT Version 7)	2011	15 km/hr	15.9	28.1	17.2	29.7	18.8	32.1
	2012		15.9	28.1	17.4	30.0	18.7	31.8
	2013		15.8	28.0	17.3	30.2	18.7	31.8
	2014		15.9	28.3	17.3	29.6	18.8	31.7
	2015		15.9	28.4	17.2	31.3	18.6	33.9
Ambient Air Quality Limit Value ($\mu g/m^3$)			40	50	40	50	40	50

Note 1 Maximum result at the façade of any building in the study area.

Table 7.26 - ADMS-Roads Air Modelling Results – $PM_{2.5}$ 2018 Do Something

Location			Winetavern St	Parliament St	Maximum Result[Note 1]
Scenario	**Year**	**Speed**	**Annual $PM_{2.5}$**	**Annual $PM_{2.5}$**	**Annual $PM_{2.5}$**
DS 2018 - Ground Level Receptor (EFT Version 7)	**2011**	**15 km/hr**	9.3	10.3	12.5
	2012		9.3	10.4	12.7
	2013		9.3	10.4	12.6
	2014		9.3	10.4	12.7
	2015		9.3	10.3	12.5
DS 2018 – First-floor Receptor (EFT Version 7)	**2011**	**15 km/hr**	9.3	10.2	11.1
	2012		9.3	10.3	11.1
	2013		9.3	10.2	11.1
	2014		9.3	10.2	11.1
	2015		9.3	10.1	11.0
Ambient Air Quality Limit Value ($\mu g/m^3$)			**25**	**25**	**25**

Note 1 Maximum result at the façade of any building in the study area.

Do Something Scenario 2035

The Do Something (DS) modelling scenario was undertaken based on the traffic data from the NTA traffic model for 2035 with the Proposed Project in place. Modelling was undertaken using 2030 emission factors and based on meteorological data from Dublin Airport for 2011 - 2015. Each year was modelled using the 2030 emission factors and the year giving the highest modelled results reported below.

Background data was based on NO, NO_2 and O_3 data from Rathmines for 2015. Rathmines data was used to represent background concentrations in the city centre in 2030 as this is the most recent data currently available. No correction for expected reduced background NO and NO_2 in future years was conducted.

The emission data for the ADMS-Roads model was based on EFT Version 7.0 for 2030 as this is the upper limit to the emission factor years in the EFT model. An average traffic speed of 15 km/hr was selected for the study area based on the output from the NTA traffic model.

As shown in **Figure 7.19** and **Table 7.27**, peak concentrations of NO_2 occur along D'Olier Street / College Street and Dame Street / Lord Edward Street. Roadside levels are above the EU annual mean ambient air quality standard for NO_2 peaking at approximately 29 $\mu g/m^3$ at the façade of buildings along Lord Edward Street with a reduced impact at first-floor level.

Along Parliament Street, localised peaks are apparent at the Dame St and Wellington Quay junctions with maximum levels of 25 $\mu g/m^3$, or approximately 63% of the EU ambient air quality standard with again a small reduction at first-floor level.

The Winetavern Street station, for this scenario, is predicted to record a level of approximately 20 $\mu g/m^3$ and thus remains in compliance with the NO_2 annual mean ambient air quality standard.

In relation to the short-term limit value (99.8th%ile of one hour means), the maximum predicted level for the DS scenario in 2035 is below the ambient limit value of 200 $\mu g/m^3$ as shown in **Figure 7.20** and **Table 7.27**. Levels are predicted to peak at approximately 100 $\mu g/m^3$ at the façade along Lord Edward Street.

Along Parliament Street, localised peaks are apparent at the Dame Street and Wellington Quay junctions with maximum levels of 95 $\mu g/m^3$, or approximately 48% of the EU 1-hr (as a 99.8th%ile) ambient air quality standard.

The Winetavern Street station, for this scenario, is predicted to record a level of approximately 90 $\mu g/m^3$ and thus remains in compliance with the NO_2 short-term ambient air quality standard.

Compared to 2035 DM levels, the ambient DS levels of NO_2 in 2035 at the worst-case façades in the study area have decreased slightly by up to 3% of the ambient annual limit value and by 2% of the short-term limit values. Compared to 2035 DM levels, the ambient DS levels of NO_2 in 2035 along Parliament St have remained essentially unchanged.

The results of the PM_{10} / $PM_{2.5}$ modelling indicate that all locations will be in compliance with the ambient air quality standards in 2035 for the DS scenario as shown in **Table 7.28** and **Table 7.29**.

The annual mean PM_{10} concentration for 2035 Do Something scenario is shown in **Table 7.28** (based on background data taken from the Phoenix Park monitoring station). Compared to 2035 DM levels, the ambient levels of PM_{10} along Parliament St have decreased slightly by up to 1% of the ambient limit values with all levels less than 65% of the ambient limit values. Levels of $PM_{2.5}$ are less than 45% of the ambient annual mean limit value and are slightly lower than the DM scenario.

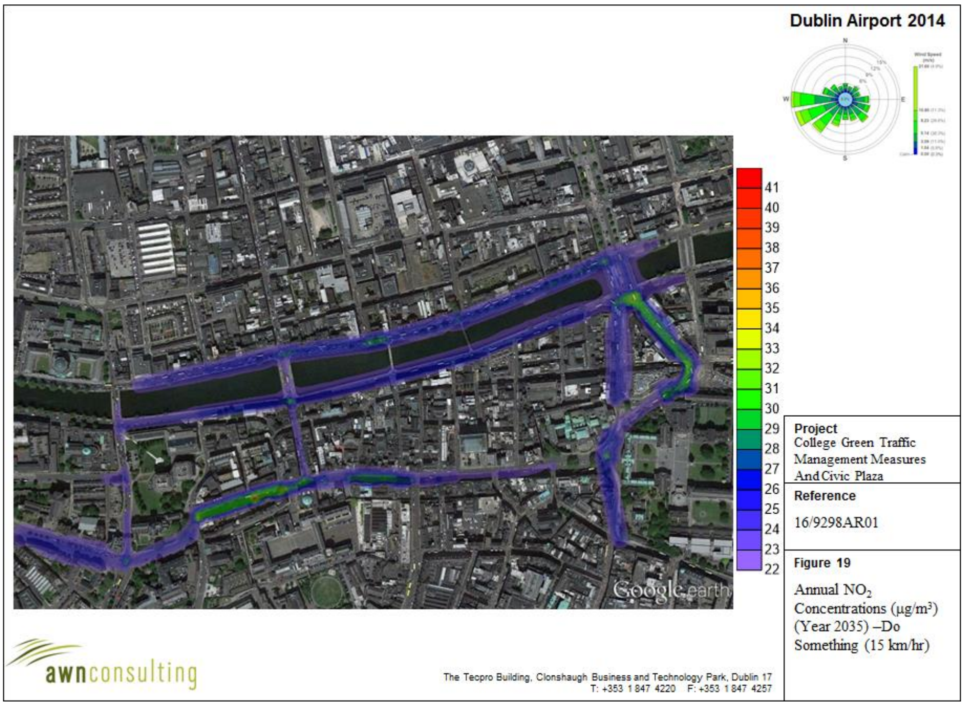

Figure 7.19 - Annual Mean Modelled NO2 Concentration (µg/m3) (Year 2035) (EFT Version 7.0) – Do Something Scenario

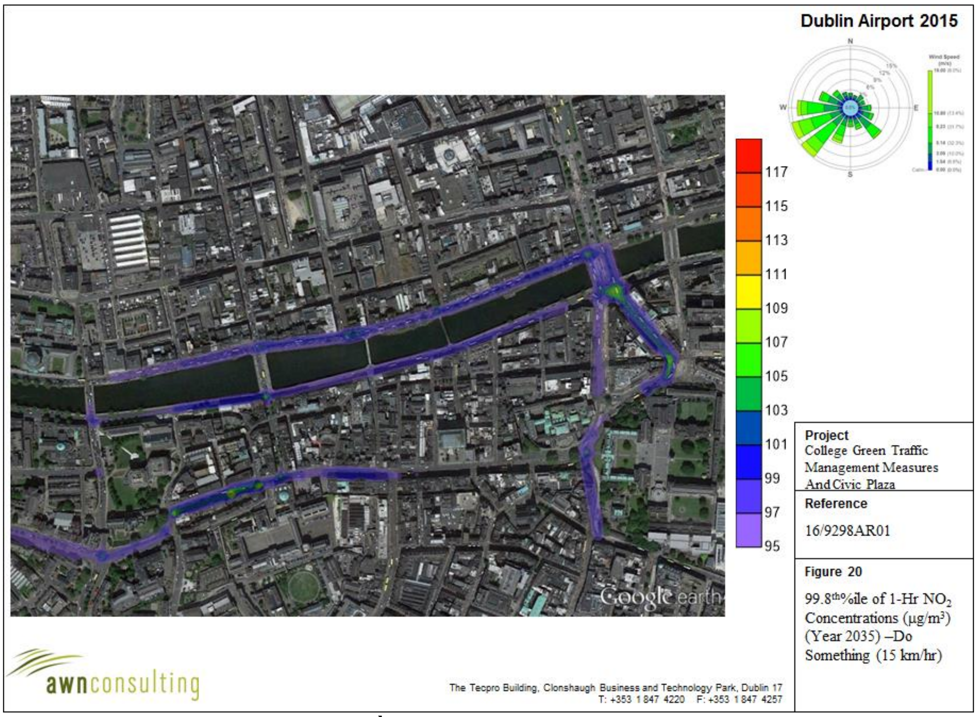

Figure 7.20 - Maximum 99.8th%ile Of Modelled1-Hr NO2 Concentrations (µg/m3) (Year 2035) (EFT Version 7.0) - Do Something Scenario

Table 7.27 - ADMS-Roads Air Modelling Results - Nitrogen Dioxide (NO_2) 2035 Do Something

Location			Winetavern St		Parliament St		Maximum Result[Note 1]	
Scenario	**Meteorological**	**Speed**	**Annual NO_2**	**1-Hr**	**Annual NO_2**	**1-Hr**	**Annual NO_2**	**1-Hr**
DS 2035 - Ground Level Receptor (EFT Version 7, Year 2030)	**2011**	**15 km/hr**	19.7	88.0	24.9	93.6	29.2	99.1
	2012		19.7	88.4	25.4	92.2	29.2	97.5
	2013		19.7	88.1	25.2	94.4	29.2	96.8
	2014		19.7	89.1	25.4	91.8	29.5	96.2
	2015		19.5	88.6	24.2	96.0	28.0	101.3
DS 2035 – First-floor Receptor (EFT Version 7, Year 2030)	**2011**	**15 km/hr**	19.7	88.0	24.4	92.5	28.4	96.0
	2012		19.7	88.4	24.9	91.9	28.3	96.8
	2013		19.7	88.1	24.8	93.9	28.4	95.8
	2014		19.7	89.1	24.9	91.6	28.7	95.2
	2015		19.5	88.6	23.8	95.5	27.2	99.3
Ambient Air Quality Limit Value ($\mu g/m^3$)			**40**	**200**	**40**	**200**	**40**	**200**

Note 1 Maximum result at the façade of any building in the study area.

Table 7.28 - ADMS-Roads Air Modelling Results – PM_{10} 2035 Do Something

Location			Winetavern St		Parliament St		Maximum Result[Note 1]	
Scenario	Year	Speed	Annual PM_{10}	24-hr 90^{th}%ile	Annual PM_{10}	24-hr 90^{th}%ile	Annual PM_{10}	24-hr 90^{th}%ile
DS 2035 - Ground Level Receptor (EFT Version 7, Year 2030)	2011	15 km/hr	15.7	27.9	17.5	30.0	19.3	32.3
	2012		15.7	27.9	17.7	30.5	19.3	32.3
	2013		15.7	27.8	17.6	30.6	19.3	32.3
	2014		15.7	28.1	17.7	29.8	19.4	32.3
	2015		15.7	28.1	17.5	31.6	19.1	34.4
DS 2035 – First-floor Receptor (EFT Version 7, Year 2030)	2011	15 km/hr	15.7	27.9	17.3	29.6	18.9	32.1
	2012		15.7	27.9	17.5	30.2	18.9	31.8
	2013		15.7	27.8	17.4	30.3	18.8	31.8
	2014		15.7	28.1	17.4	29.7	19.0	31.9
	2015		15.7	28.1	17.3	31.4	18.7	32.6
Ambient Air Quality Limit Value ($\mu g/m^3$)			40	50	40	50	40	50

Note 1 Maximum result at the façade of any building in the study area.

Table 7.29 - ADMS-Roads Air Modelling Results – $PM_{2.5}$ 2035 Do Something

Location			Winetavern St	Parliament St	Maximum Result[Note 1]
Scenario	**Year**	**Speed**	**Annual $PM_{2.5}$**	**Annual $PM_{2.5}$**	**Annual $PM_{2.5}$**
DS 2035 - Ground Level Receptor (EFT Version 7, Year 2030)	**2011**	**15 km/hr**	9.2	10.2	11.2
	2012		9.2	10.3	11.2
	2013		9.2	10.3	11.2
	2014		9.2	10.3	11.2
	2015		9.2	10.2	11.1
DS 2035 – First-floor Receptor (EFT Version 7, Year 2030)	**2011**	**15 km/hr**	9.2	10.1	11.0
	2012		9.2	10.2	10.9
	2013		9.2	10.1	10.9
	2014		9.2	10.2	11.0
	2015		9.2	10.1	10.9
Ambient Air Quality Limit Value ($\mu g/m^3$)			**25**	**25**	**25**

Note 1 Maximum result at the façade of any building in the study area.

Comparison of Overall Do Something Versus Do Minimum Scenarios

The Do Something (DS) modelling scenario has been compared to the Do Minimum (DM) modelling scenario for both 2018 and 2035. The significance of the changes in the concentration of each of the ground level receptors has been determined in the context of the IAQM significance criteria as outlined in **Table 7.5**. As shown in **Table 7.30**, for the ground level receptors in 2018, the Proposed Project is overall beneficial in terms of the annual mean NO_2 concentration:

Table 7.30 - Summary of Signifiance of the Proposed Project on Individual Receptors in the Study Area in 2018 – Annual Mean NO_2 (ground floor)

	Ground Level Receptors		
Ground Floor	**Increase**	**Decrease**	**Overall Impact**
Substantial	57	157	-100
Moderate	69	102	-33
Slight	114	60	54
Negligible	590		1149

As shown in **Table 7.30**, the Proposed Project will substantially decrease the long-term levels of NO_2 at 157 building façades whilst moderately improving 102 building façades. However, there will be a substantial increase in the long-term NO_2 concentration at the building façades of 57 properties with a moderate increase at 69 properties. In terms of specific sensitive receptors, such as residential units, crèches, care homes, schools and hospitals, no ground level receptors have been identified along the specific “hot-spots” of the North Quays, D’Olier Street, College Street and Lord Edward Street.

However, sensitive receptors are located at first-floor level at these locations and thus the significance of the Proposed Project on the changes to the concentration of the first-floor façade receptors has been determined in the context of the IAQM significance criteria also. As shown in **Table 7.31**, for first-floor receptors in 2018, the scheme is overall beneficial in terms of the annual mean NO_2 concentration:

Table 7.31 - Summary of Signifiance of the Proposed Project on Individual Receptors in the Study Area in 2018 - Annual Mean NO_2 (first floor)

	First-Floor Receptors		
First-Floor	**Increase**	**Decrease**	**Overall Impact**
Substantial	23	136	-113
Moderate	87	100	-13
Slight	95	75	20
Negligible	633		1149

The Proposed Project will substantially decrease the long-term levels of NO_2 at 136 building façades whilst moderately improving 100 building façades. However, there will remain a substantial increase in the long-term NO_2 concentration at the building façades of 23 properties with a moderate increase in long-term NO_2 concentration at 87 properties.

In relation to 2035, the Proposed Project will remain overall beneficial in terms of the annual mean NO_2 concentration as outlined in **Table 7.32**.

Table 7.32 - Summary of Signifiance of the Proposed Project on Individual Receptors in the Study Area in 2035 – Annual Mean NO_2 (ground floor)

	Ground Level Receptors		
Ground Floor	**Increase**	**Decrease**	**Overall Impact**
Substantial	0	0	0
Moderate	0	1	-1
Slight	0	2	-2
Negligible	1146		1149

As shown in **Table 7.32**, the Proposed Project will moderately improve the long-term NO_2 concentration at 1 ground floor building façade whilst there will be no negative impacts as a result of the Proposed Project by 2035.

As shown in **Table 7.33**, for first-floor receptors in 2035, the Proposed Project will be of negligible impact.

Table 7.33 - Summary of Signifiance of the Proposed Project on Individual Receptors in the Study Area in 2035 - Annual Mean NO_2 (first floor)

	First-Floor Receptors		
Ground Floor	**Increase**	**Decrease**	**Overall Impact**
Substantial	0	0	0
Moderate	0	0	0
Slight	0	0	0
Negligible	1149		1149

The significance of the Proposed Project at the worst-case building façades was reviewed on a year-by-year basis from 2018 onwards to determine in which year there would be no exceedance of the NO_2 annual mean air quality standard both at ground level and at the first-floor façade. As shown in **Table 7.34**, compliance with the ambient air quality standard is achieved at all first-floor façades by 2021 whilst compliance with the ambient air quality standard is achieved at all ground level façades by 2024. The improvements in ambient air quality in future years are as a result of a reduction in composite emission factors in future years as older more polluting vehicles are replaced with cleaner vehicles.

The difference in the Do Something and Do Minimum PM_{10} 24-hour and annual mean concentrations has been compared to the significance criteria outlined in **Tables 7.2 – 7.4**. The comparison indicates that all receptors will have either a negligible or slightly beneficial impact. For $PM_{2.5}$, comparing the difference in the Do Something and Do Minimum $PM_{2.5}$ annual mean concentration to the significance criteria outlined in **Tables 7.2** and **Table 7.3** indicates that the impact of the development in both the opening year and 2035 will be negligible.

Table 7.34 - ADMS-Roads Air Modelling Results – NO_2

Location			Maximum Result Note 1	
Scenario	**Modelled**	**Speed**	**Annual NO_2**	**99.8th%ile**
DS 2035 - Ground Level Receptor	**2019**	**15 km/hr**	59.5	166.1
	2020		54.0	150.3
	2021		48.7	136.0
	2022		44.0	123.1
	2023		40.1	115.9
	2024		36.8	108.1
DS 2035 – First-floor Receptor	**2019**	**15 km/hr**	46.9	128.3
	2020		43.2	118.5
	2021		39.7	111.7
	2022		36.6	106.2
	2023		34.1	101.9
	2024		31.8	98.1
Ambient Air Quality Limit Value (µg/m^3)			**40**	**200**

Note 1 Maximum result at the façade of any building in the study area.

7.5 Mitigation Measures

In order to sufficiently ameliorate the likely air quality impact, a schedule of air control measures has been formulated for both construction and operational phases associated with the Proposed Project.

7.5.1 Construction phase

Climate

No additional mitigation measures are required as the construction phase of the Proposed Project is predicted to have a negligible impact on climate.

Air Quality

In order to ensure that no dust nuisance occurs, a series of measures will be implemented. In summary, the measures which will be implemented will include:

- Vehicles delivering material with dust potential (soil, aggregates) will be enclosed or covered with tarpaulin at all times to restrict the escape of dust.
- Public roads outside the site will be regularly inspected for cleanliness, and cleaned as necessary.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.
- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.
- Hoarding will be provided around the construction site.

At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

Construction vehicles, generators etc., may give rise to some CO_2 and N_2O emissions. However, due to short-term and temporary nature of these works the impact on climate will not be significant.

7.5.2 Operational phase

Climate

No additional site-specific mitigation measures are required as the operational phase of the Proposed Project is predicted to have a negligible impact on climate.

At a national / European level, improvements in air quality are likely over the next few years as a result of the on-going comprehensive vehicle inspection and maintenance program, fiscal measures to encourage the use of alternatively fuelled vehicles and the introduction of cleaner fuels.

CO_2 emissions for the average new car fleet were reduced to 120 g/km by 2012 through EU legislation on improvements in vehicle motor technology and by an increased use of biofuels. Additional measures included in the National Climate Change Strategy include: (1) VRT and Motor Tax rebalancing to favour the purchase of more fuel-efficient vehicles with lower CO_2 emissions; (2) continuing the Mineral Oils Tax Relief II Scheme and introduction of a biofuels obligation scheme; (3) implementation of a national efficient driving awareness campaign, to promote smooth and safe driving at lower engine revolutions; and (4) enhancing the existing mandatory vehicle labelling system to provide more information on CO_2 emission levels and on fuel economy.

Air Quality

The pedestrianisation of College Green will be beneficial in terms of air quality in the vicinity of Dame Street and College Green with the termination of the East – West traffic flow and with a significant reduction in traffic along Dame Street east of South Great Georges Street. Similarly, during the hours of 07:00 – 19:00 weekdays, Parliament Street will be restricted to taxis and buses only and will have an overall reduction in traffic and resultant air emissions.

At European level, mitigation measures in relation to traffic-derived pollutants have focused generally on improvements in both engine technology and fuel quality. EU legislation, based on the EU sponsored Auto-Oil programmes, has imposed stringent emission standards for key pollutants (REGULATION (EC) No 715/2007) for passenger cars which was complied with in 2009 (Euro V) and 2014 (Euro VI).

As outlined in the TII publication "*Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes*" the guidance states that "*for the purpose of the EIS, it should be assumed that pollutant concentrations will decline in future years, as a result of various initiatives to reduce vehicle emissions both in Europe and in Ireland*" (Page 52).

A range of legislation in Europe since 1992 has significantly reduced the allowable steady cycle emissions of both NO_X and PM from road vehicles with NO_X emission reductions for HDV (Heavy Diesel Vehicles) a factor of 20 and PM a factor of 36 over this period (Euro I to Euro VI). In relation to LDV (Light Diesel Vehicles) the reduction of NO_X and PM from road vehicles has also been significant with NO_X emission reductions from HDV a factor of 12 and PM a factor of 40 over this period (Euro I to Euro VI). Although actual on-road emission reductions will be less dramatic, significant reductions in vehicle-related NO_X and PM emissions are to be expected over the next 5-10 years as the fleet turns over.

Improvements in air quality are also likely over the next few years as a result of the on-going comprehensive vehicle inspection and maintenance program, fiscal measures to encourage the use of alternatively fuelled vehicles and the introduction of cleaner fuels. In addition, Dublin Bus proposes to introduce cleaner, more efficient buses, including electric vehicles, in the future.

7.6 Residual Impacts

7.6.1 Construction phase

7.6.1.1 Climate

There will be no residual impacts of significance on climate from the construction of the Proposed Project.

7.6.1.2 Air Quality

When the dust minimisation measures detailed in the mitigation section of this chapter are implemented, fugitive emissions of dust from the site will be insignificant and pose no nuisance at nearby receptors.

Due to the size and nature of the construction activities, CO_2 and N_2O emissions during construction will have a negligible impact on climate.

7.6.2 Operational phase

7.6.2.1 Climate

There will be no residual impacts of significance on climate from the operation of the Proposed Project.

7.6.2.2 Air Quality

The air dispersion modelling assessment has found that the proposed College Green Project will be beneficial overall in the study area. By 2035 all ground level and first-floor façades will have ambient air quality in compliance with the ambient air quality standards for the do something (and do minimum) scenario.

In relation to 2018, the Proposed Project will improve air quality at significantly more receptors relative to the number of receptors which deteriorate in air quality.

There will however be a period of time, between opening year and 2021, during which a number of first-floor facades are likely to remain above the annual mean NO_2 ambient air quality standard and between opening year and 2024, during which some ground level façades are likely to be in excess of the annual mean NO_2 ambient air quality standard.

However, in the absence of the Proposed Project, the impact on existing ground floor and first-floor façades will be greater with a higher number of receptors experiencing air quality in excess of the annual mean NO_2 limit value for a period of time.

7.7 Difficulties Encountered

Full resolution of traffic data on a 24 hour, 7-day week was not available for future years. In the absence of this data, the diurnal and weekday / Saturday / Sunday relative traffic profile was derived from modelled AM Peak levels for the relevant future scenario and using 2016 24-hour count data for the relevant links.

7.8 References

Environmental Protection Agency (EPA) "Advice Notes On Current Practice In The Preparation Of EIS" (EPA, 2003)

Environmental Protection Agency (EPA) "Air Dispersion Modelling From Industrial Installations Guidance Note" (EPA, 2010)

Transportation Infrastructure Ireland (TII (formerly the National Roads Authority) "Guidelines For The Treatment Of Air Quality During The Planning And Construction Of National Road Schemes" (TII, 2011)

UK DEFRA Guidance "Part IV of the Environment Act 1995: Local Air Quality Management, LAQM. TG(16)" (UK DEFRA, 2016)

IAQM / EPUK "Land-Use Planning & Development Control: Planning For Air Quality"

Framework Convention on Climate Change (FCCC) (1997) Kyoto Protocol To The United Nations Framework Convention On Climate Change

European Council (2014) European Council (23 and 24 October 2014) Conclusions on 2030 Climate and Energy Policy Framework, SN 79/14

DEHLG (2004) National Programme for Ireland under Article 6 of Directive 2001/81/EC for the Progressive Reduction of National Emissions of Transboundary Pollutants by 2010

EEA (2014) NEC Directive Status Reports 2013

EPA (2016) Ireland's Greenhouse Gas Emissions to 2020 – An Update

Department of Environment, Heritage and Local Government (2007) National Climate Change Strategy 2007-2012

8 Noise and Vibration

8.1 Introduction

This chapter of the EIS assesses the potential noise and vibration impact of the Proposed Project on the baseline environment. The potential noise impact due to the construction and operational phase of the Proposed Project is considered. The baseline environment is described, the impact during the construction and operational phases is assessed and mitigation measures are proposed as required.

8.2 Assessment Methodology

8.2.1 Introduction

The Traffic Noise and Air Quality Unit of Dublin City Council was requested to use their sound emission modelling software and the Dublin City ‘Noise Model’ to assess any potential noise impact on the implementation of traffic management measures at College Green, creating a public plaza. Noise modelling was carried out using the Bruel & Kjaer Predictor V11.1 noise modelling software and incorporating CRTN (TRL) assessment Method 3. This method is accepted by the EPA for strategic noise mapping, as per EU Directive 2002/49/EC and Statutory Instrument S.I. No 140 of 2006. The aim of the study was to assess the impact of the Proposed Project ambient sound levels in Dublin City Centre with a particular focus on noise emissions along Parliament Street. The noise model study consisted of the following:

- Noise modelling of five scenarios - 2012 base year, the scheme opening year 2018 Do Minimum (DM), 2018 Do Something (DS), 2035 Do Minimum (DM) and 2035 Do Something (DS). Where the DM and DS scenarios are as defined in Chapter 1 *Introduction.*
- Calculation of the change in ambient sound levels at total address points and residential address points within the study area;
- An assessment of the impact of the various scenarios at total address points and residential address points within the study area using the ‘Desirable/Undesirable’ descriptions as set out in the Dublin Agglomeration Environmental Noise Action Plan Dec. 2013- Nov. 2018.

The Do-Minimum Scenario represents movement and access in the city centre as it exists currently, taking into account developments with approved planning permissions, as well as projects committed to be implemented prior to the Proposed Project. This scenario includes the continuation of all east-west through traffic at College Green during the weekends and public transport access only from Monday to Friday. This scenario includes no plaza provided at College Green.

There are two representative ‘Do-Something’ scenarios. The first represents a situation where the Proposed Project has been implemented as well as other planned projects outlined in the do-minimum scenario (by 2018).

The second represents a situation where the NTA Dublin City Centre Transport Study (DCC, NTA, 2015) has been implemented in totality (by 2035). This includes the Proposed Project, as well as a number of ‘other planned projects’.

CRTN (TRL) Method 3 was used to calculate the impact of the five scenarios outlined above on the ambient sound levels in the study area. The traffic volume inputs for the sound model were derived from the NTA's 'Regional Modelling System East Regional Model (ERM)', except for the 2012 base year scenario, and were based on the report 'College Green Traffic Management Measures Draft Modelling Report, March 2017' (NTA, 2017)- the results of which are outlined in **Appendix 6.1**. As such the resulting sound level outputs are solely based on these inputs. The model structure including building heights, barriers, ground hardness etc., were all taken from Dublin City Council's main ambient sound model datasets, which are used to calculate 'noise maps' for the purpose of compliance with Directive 2002/49/EC. The outputs from this model have been accepted by the EPA, the European Commission and the European Environment Agency to be in compliance with this directive.

8.2.2 Study area

The Study area is bounded to the North by the North Quays from Inns Quay to Eden Quay, to the South from College Street, Suffolk Street\St. Andrew Street via Dame Street to High Street, to the East by O'Connell Bridge to D'Olier Street via College Street and Grafton Street and to the West by Church Street to Bridge Street Upper. This area encompasses the proposed College Green Plaza itself and includes all roads directly associated with those relocated traffic movements which were determined to have the greatest impacts, and in particular public transport movements, related to the proposal.

8.2.3 Limits and Significance Criteria

8.2.3.1 Construction Phase

There is currently no published statutory Irish guidance relating to the maximum allowable noise level that may be generated during the construction phase of a project.

BS 5228-1:2009+A1:2014 *Code of Practice for Noise and Vibration Control on Construction and Open Sites - Noise*, sets relative construction noise criteria with reference to the existing noise environment. These limits are considered the most appropriate noise limits to apply in this instance as they consider the existing baseline noise environment. The significance criteria are the recommended range of 'total noise' (i.e. the ambient combined with the construction noise) which should not be exceeded for each assigned category. **Table 8.1** sets out construction noise criteria presented in BS5228.

Table 8.1 - BS5228 (Part 1) ABC Assessment Categories and Thresholds (BSI, 2014)

Assessment Category and Threshold Value Period L_{Aeq}	**Threshold Value in Decibels (dB)**		
	A[A)]	**B[B)]**	**C[C)]**
Night (23:00-07:00hrs)	45	50	55
Evening [D)]	55	60	65
Day (07:00-19:00hrs)	65	70	75

A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values

B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values

C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A

D) 19:00 – 23:00hrs weekdays, 13:00-23:00hrs Saturdays and 07:00-23:00hrs Sundays

The limits outlined in **Table 8.2** will be applied at the nearest sensitive receptor to the works area. Sensitive receptors are defined in BS5228 as any occupied premises outside a site used as a dwelling, place of worship, educational establishment, hospital or similar institution or any other property likely to be adversely affected by an increase in noise level. Based on noise predictions in the area shown in **Figure 8.1**, Category C limits apply, refer to **Table 8.2.**

Table 8.2 - Noise Limits to be applied based on BS5228 Criteria

Assessment Category and Threshold Value Period L_{Aeq}	**Threshold Value in Decibels (dB)**
Night (23:00-07:00hrs) (L_{Aeq}, dB)	55
Evening (19:00-23:00hrs) (L_{Aeq}, dB)	65
Day (07:00-19:00hrs) (L_{Aeq}, dB)	75

The main vibration source during the construction phase will be during the excavation of existing pathways and stone setts. Vibration limits during construction phase of the Proposed Project is provided in the TII Noise guidance, refer to **Table 8.3.**

Table 8.3 - Vibration limits at the nearest sensitive receptor

Allowable vibration velocity (peak particle velocity) at the closest part of any sensitive property to the source of vibration, at a frequency of		
Less than 10Hz	10 to 50 Hz	50 to 100 Hz (and above)
8mm/s	12.5mm/s	20mm/s

As the construction phase of the Proposed Project is not predicted to generate traffic increases of greater than 25%, no construction assessment has been undertaken, refer to Chapter 6 ‘*Traffic and Transportation’*.

8.2.3.2 Operational Phase

There are currently no Irish standards or limits governing the assessment of noise associated with new or existing roads. TII, formally the NRA, produced ‘Guidelines for the treatment of Noise and Vibration in National Road Schemes’.

There are no national roads within the Proposed Project. While the Proposed Project will involve a modal distribution of traffic flows, it does not involve the construction of new roads.

The Dublin Agglomeration Environmental Noise Action Plan Dec. 2013 - Nov. 2018 (DCC, 2103) was adopted by Dublin City Council as the plan, consisting of related actions, to be used in the management of various transport related sound emissions within the Dublin City Region over the period December 2013-

November 2018. It sets out levels that are considered to be desirable\undesirable within the Dublin Agglomeration (Ch.6, Para 6.2.1). These are:

Desirable Sound Levels L_{Aeq}	
Night (23:00-07:00hrs) (L_{Aeq}, dB)	< 50 dB(A) L_{night}
Day (07:00-19:00hrs) (L_{Aeq}, dB)	< 55 dB(A) L_{day}

Undesirable Sound Levels L_{Aeq}	
Night (23:00-07:00hrs) (L_{Aeq}, dB)	> 55 dB(A) L_{night}
Day (07:00-19:00hrs) (L_{Aeq}, dB)	> 70 dB(A) L_{day}

8.2.4 Impact Assessment Methodology

This study noise modelling was carried out using the Bruel & Kajer Predictor V11.1 noise modelling software and incorporating CRTN (TRL) assessment Method 3 which is accepted by the EPA for strategic noise mapping, as per EU Directive 2002/49/EC and Statutory Instrument S.I. No 140 of 2006.

The software inputs required to create a noise model, consist of building polygons and barriers with associated heights, ground hardness, ground height contours, and road centre lines with associate attributes such as road widths, pavement type, and slope. As previously stated, this data was extracted from Dublin City Council's noise model data sets.

Assigned to each road centre line are traffic volumes with associated attributes such as traffic speed and traffic type (HGV, LV). This data was provided by the NTA for each scenario, except the 2012 base year, and which was extracted from their Regional Modelling System East Regional Model (ERM).

Based on these inputs the software calculates a basic sound pressure level along the road centre lines. This basic sound level is then used by the software in further computations to assess, amongst other things, the impact of distance between source and receive, the impact of reflecting surfaces, buildings, barriers and hardness of the ground over which the sound travels.

The modelling process calculated sound emission values at 10m grid intervals across the study area which were used to produce sound contours and at 2m spacing around the façades of each building in order to assess the population exposure. Sound level emissions were apportioned to periods for day (L_{day}) 7am-7pm, evening ($L_{evening}$) 7pm – 11pm, night time (L_{night}) 11pm-7am, and a 24hr weighted value (L_{den}). The exposure assessment is based on the maximum calculated sound level value at the facades of each building.

An assessment as to the robustness of the model has been carried out using 2012 traffic volumes and measurements taken from the Dublin City Council's ambient sound monitoring network. In 2012, this network consisted of 11 sites monitoring 24 hours a day, 365 days of the year at fixed locations around Dublin. The averaged network wide measurements gave values of 56dB(A), 50dB(A) and 59dB(A) for the L_{day}, L_{night} and L_{den} respectively. The modelled values for the same network locations gave average values for L_{day} between the 50-55dB(A) band, L_{night} values between 45-50dB(A) band and the L_{den} values between 55-

60dB(A) band. From this it can be seen that the L_{night} and L_{den} measured values fall within the modelled bands, whilst the L_{day} is 1dB above the modelled bands. The noise modelled outputs could therefore be deemed to be robust.

8.3 Baseline Environment

The College Green area is surrounded by historical buildings 4-5 stories high, which enclose the area and which militate against the natural decay of the sound emitted in the area. There are 37 residential address points located in the immediate College Green area as per An Post's GeoDirectory.

Currently the College Green area is dominated by high sound emissions from traffic despite restrictions placed on access by heavy goods vehicles and a 7am-7pm bus gate, Monday -Friday, which prohibits through access for all vehicles other than for public transport.

The 2012 Dublin City 'Noise Map' (DCC, 2013) produced to fulfil the requirements of Directive 2002/49/EC and I.S. No.140 of 2006 indicates that sound emissions from traffic in the College Green area currently fall within the 60-65dB(A) band for night time (L_{night}) and the 'greater than 75dB(A)' band for the day time(L_{day}) period. These levels are considered undesirable with reference to the Noise Action Plan.

The implementation of the Proposed Project will mean the removal of all vehicles from the College Green area, thus requiring the existing volumes of traffic in that area to be absorbed over the wider Dublin City road network.

8.4 Predicted Impacts

8.4.1 Construction phase

The construction phase of the Proposed Project will involve site clearance, some excavation and the development of the plaza.

A variety of items of plant will be in use, such as excavators, breakers, crushers, lifting equipment, dumper trucks, compressors and generators. There will be vehicular movements to and from the site that will make use of existing roads and site access points.

Normal working hours during the construction phase will be as follows:

Start	**Finish**	
0700	1800	Monday to Friday
0800	1400	Saturday

However, it may be necessary to work outside of these hours at night and at weekends during certain activities and stages of the Proposed Project.

8.4.2 Operational Phase

8.4.2.1 Introduction

The transport changes likely to contribute to noise impacts during the operational phase of the Proposed Project is due to the rerouting of buses due to the closure of College Green to east-west traffic. These re-routings are inputted into the noise model to determine the noise impact.

The largest increase in bus numbers during the AM peak is predicted to occur along Grafton Street, an increase of 100 buses compared to the DM scenario.

The North Quays show an increase in bus numbers during the AM peak between Ormond Quay and Bachelors Walk (54 buses), and on Eden Quay (28 buses). The South Quays show an increase between Aston Quay and Wellington Quay (44 buses) and on Burgh Quay (22 buses).

Winetavern Street, Parliament Street, and College Street also show an increase (50, 47 and 30 buses respectively) in the DS scenario during the AM peak.

Bus numbers are predicted to decrease along South Great George’s Street and Dame Street.

In the 2035 scenario, the largest increase in bus numbers during the AM peak is along Winetavern Street, Ormond Quay and Bachelors Walk, an increase of 44, 41 and 45 buses respectively. There is a decrease of bus numbers along South Great George’s Street and Dame Street.

Due to the narrowness of streets such as Parliament Street and the proximity of building facades to the road, more detailed results are provided in these areas.

Further details on bus rerouting are provided in Chapter 6 *Traffic and Transportation.*

8.4.2.2 2018 Do Minimum Scenario

The noise model was run based on the NTA’s East Regional Model (ERM) 2018 Do Minimum traffic outputs. A total of 5,311 address points are located within the study area, of which 2,892 are residential addresses. The outputs of this run indicate that 28% of all address points and 20% of residential address points are predicted to fall within the undesirable category during the day. 41% of all address points and 49% of ‘Residential Addresses Points’ are predicted to fall within the desirable category during the day.

During the night time period, 49% of all address points and 37% of residential address points are predicted to fall within the undesirable band. 44% of all address points and 54% of residential address points are predicted to fall within the desirable band during the night.

Refer to **Table 8.4** for the number of properties falling into each noise band for residential address points and **Table 8.5** for all address points for the 2018 Do Minimum Scenario within the study area.

Table 8.4 - 2018 Do Minimum number of Residential Address Points in each noise band within the study area

Noise band (dB)	Day	Night	L_{den}
<45	595	1,232	521
45-50	322	317	276
50-55	512	270	552
55-60	331	219	335
60-65	83	833	154
65-70	466	21	255
70-75	575	0	784
>=75	8	0	15

<50@ Night-Desirable		**<55@ Day-Desirable**	
>55@ Night -Undesirable		>70@ Day -Undesirable	

Table 8.5 - 2018 Do Minimum number of Total Address Points in each noise band within the study area

Noise band (dB)	Day	Night	L_{den}
<45	826	1,813	685
45-50	512	542	450
50-55	813	378	851
55-60	471	622	543
60-65	187	1,838	255
65-70	1,035	120	667
70-75	1,417	0	1,798
>=75	52	0	64

<50@ Night-Desirable		**<55@ Day-Desirable**	
>55@ Night -Undesirable		>70@ Day -Undesirable	

Figures 8.1 and **Figure 8.2** display the day and night time outputs from the model in colour contour format. The highest noise levels during the day are shown to occur along Dame Street, from the Trinity Street junction through to College Green, Westmorland Street, D'Olier Street and O'Connell Bridge. On Parliament Street, the noise levels at building facades are predicted to fall within the 70-75dB(A) band. This equates to 110 address points falling within this band, with 65 of them being residential. Road facing building facades on Winetavern Street are also predicted to fall within this noise contour. The majority of road facing facades along both the north and south quays of the Liffey are predicted to fall within the 65-70dB(A) band.

During the night, the highest levels are predicted between College Green and O'Connell Bridge and from College Green along Dame Street to South Great Georges Street. The majority of the road facing building facades on Parliament Street are predicted to fall within the 60-65dB(A) band at night, equating to 103 address points, 59 of them being residential. The remaining address points are predicted to fall within the next highest decibel band.

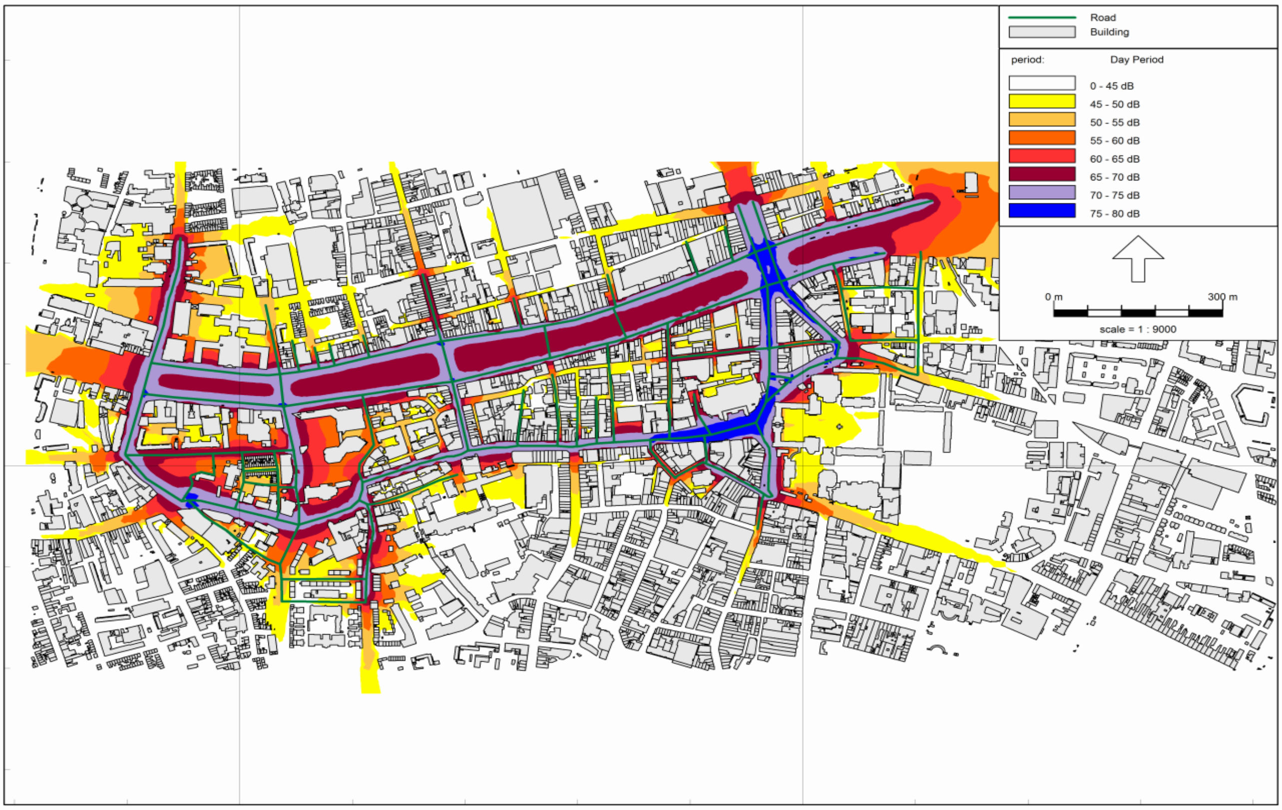

Figure 8.1 - 2018 Do Minimum Scenario (L_{day})

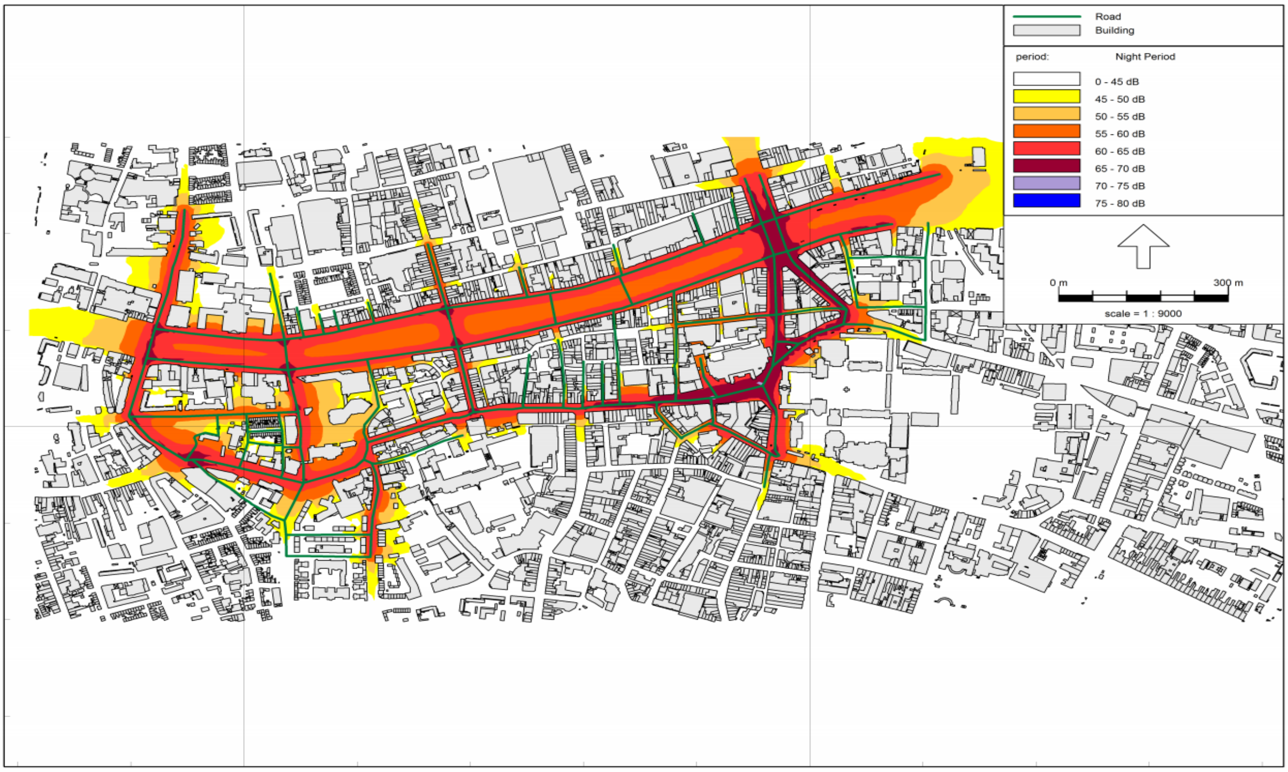

Figure 8.2 - 2018 Do Minimum Scenario (L_{night})

8.4.2.3 2018 Do Something Scenario

The noise model for the 2018 DS scenario was run based on the traffic data from the NTA's East Regional Model (ERM) for 2018 with the Proposed Project in place. A total of 5,311 address points are located within the study area of which 2,892 are residential addresses. The outputs of this run indicate that 25% of all address points and 25% of residential address points are predicted to fall within the undesirable category during the day. 40% of all address points and 47% of residential addresses points are predicted to fall within the desirable category during the day.

During the night time period, 50% of all address points and 42% of residential address points are predicted to fall within the undesirable band. 45% of all address points and 53% of residential address points are predicted to fall within the desirable band during the night.

Compared to the 2018 DM scenario, an increase of 5% of residential address points in the undesirable day time category is predicted and a decrease of 2% of residences in the desirable category is expected. When comparing the two scenarios for night time a 5% increase in residential numbers in the undesirable band is predicted in the DS scenario and a slight decrease of approximately 1% is expected in the desirable band in the 2018 DS scenario.

Refer to **Table 8.6** for the number of properties falling into each noise band for residential address points and **Table 8.7** for all address points for the 2018 Do Something Scenario.

Table 8.6 - 2018 Do Something number of Residential Address Points in each noise band within the study area

Noise band (dB)	Day	Night	L_{den}
<45	570	1,156	500
45-50	399	386	271
50-55	378	142	508
55-60	235	348	272
60-65	253	846	145
65-70	341	14	399
70-75	708	0	789
>=75	8	0	8

<50dB at night-desirable		**<55dB at day-Desirable**	
>55dB at night -undesirable		>70dB at day -Undesirable	

Table 8.7 - 2018 Do Something number of Total Address Points in each noise band within the study area

Noise band (dB)	Day	Night	L_{den}
<45	823	1786	695
45-50	636	628	456
50-55	645	245	808
55-60	382	787	478
60-65	376	1824	247
65-70	1107	43	990
70-75	1326	0	1603
>=75	18	0	36

<50dB at night-desirable		**<55dB at day-Desirable**	
>55dB at night -undesirable		>70dB at day -Undesirable	

Figures 8.3 and **Figure 8.4** display the day and night time outputs from the model in colour contour format. The highest noise levels during the day are predicted to occur on O'Connell Bridge, High Street and Winetavern Street. On Parliament Street, the noise levels along the road facing façades are predicted to fall within the 70-75dB(A) band. This equates to 110 address points falling within this band, with 65 of them being residential; the same as the DM scenario. Buildings along Winetavern Street are similarly exposed. Daytime noise levels are predicted to drop to the 60-65dB(A) band in front of the Central Bank of Ireland, College Green compared to the DM scenario. The highest night time levels are predicted at the same locations as daytime. The majority of building facades on Parliament Street are predicted to fall within the 60-65dB(A) band at night, equating to 103 address points, 59 of them being residential, as per the DM scenario. The remaining address points are predicted to fall within the next highest decibel band and on Winetavern Street portion of the road is exposed to the 65-70dB(A).

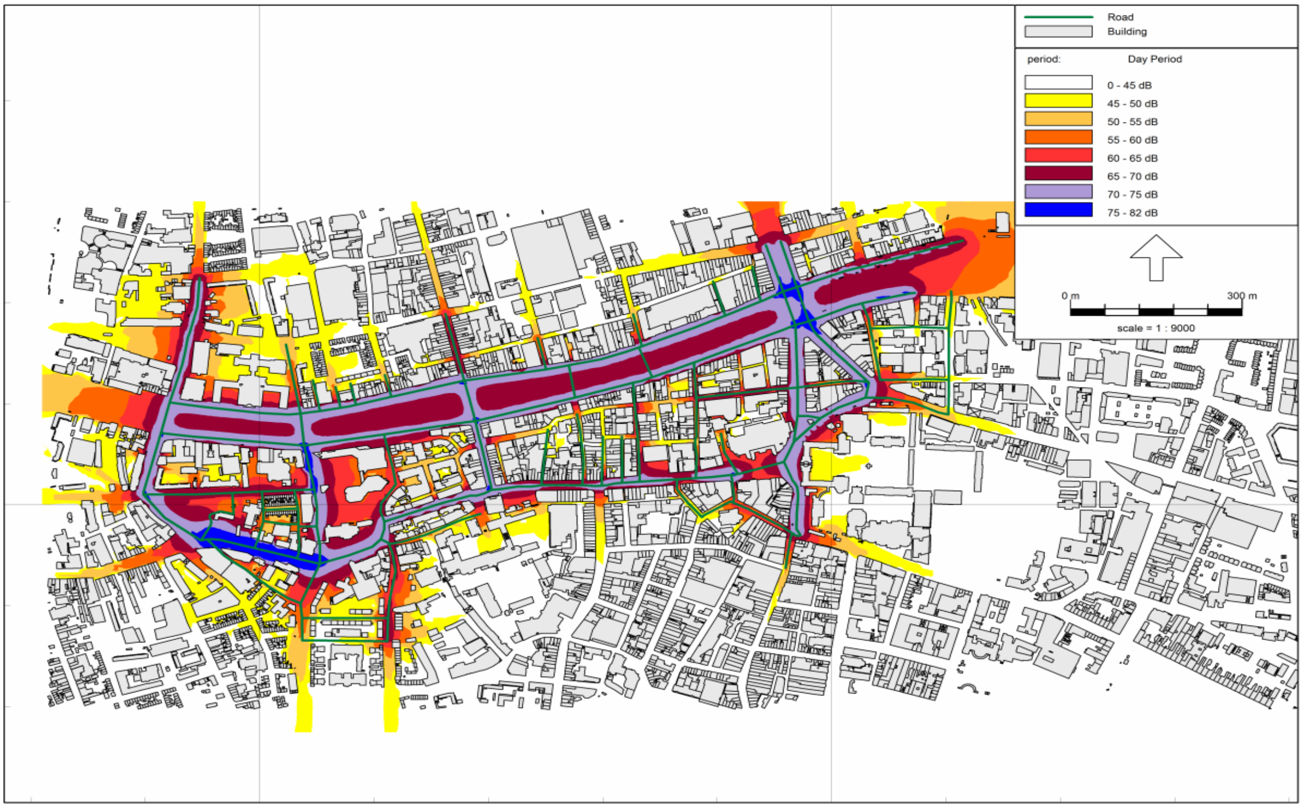

Figure 8.3 - 2018 Do Something Scenario (L_{day})

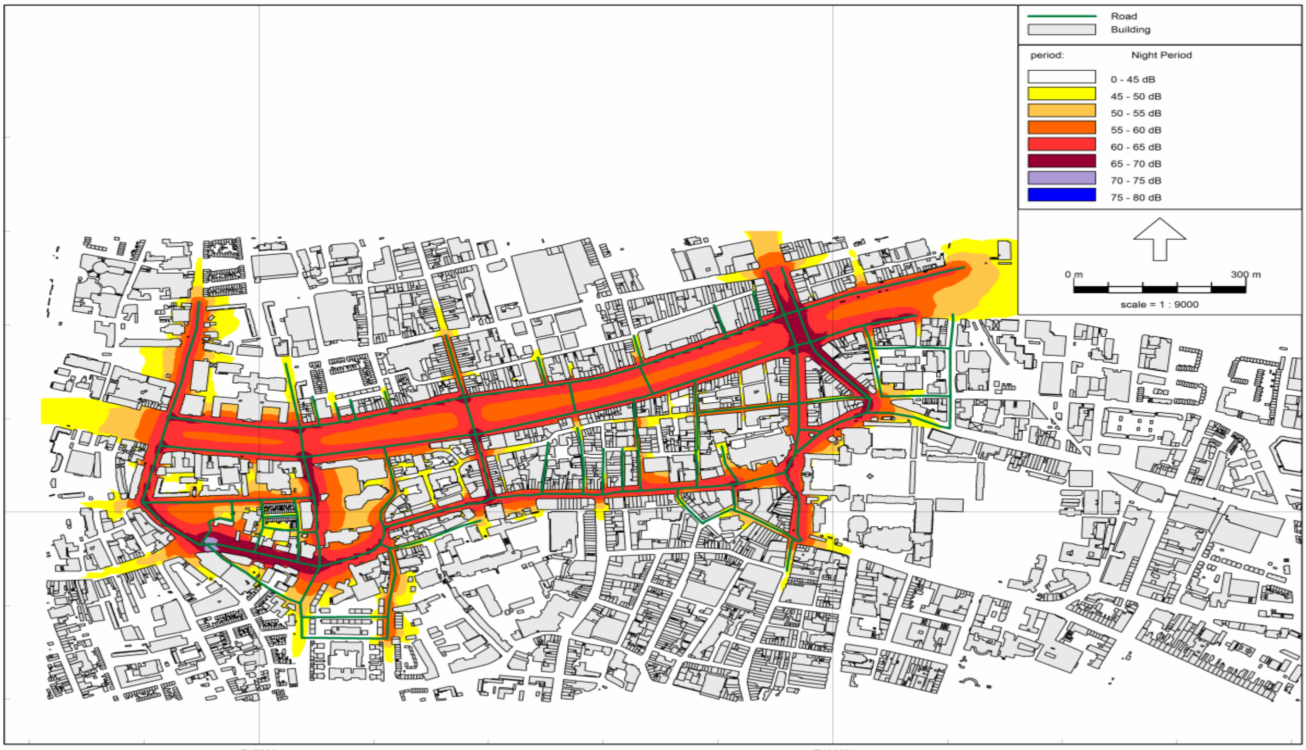

Figure 8.4 - 2018 Do Something Scenario (L_{night})

8.4.2.4 2035 Do Minimum Scenario

The model for 2035 DM scenario was run based on the traffic data from the NTA's East Regional Model (ERM) model for 2035 without the Proposed Project in place. A total of 5,311 address points were included within the study area of which 2,892 are residential addresses. The outputs of this run indicate that 26% of all address points and 20% of residential address points are predicted to fall within the undesirable category during the day. 39% of all address points and 46% residential address points are predicted to fall within the desirable category during the day.

During the night time period, 50% of all address points and 41% of residential address points are predicted to fall within the undesirable band. 45% of all address points and 53% of residential address points are predicted to fall within the desirable band during the night.

Refer to **Table 8.8** for the number of properties falling into each noise band for residential address points and **Table 8.9** for all address points for the 2035 Do Minimum Scenario.

Table 8.8 - 2035 Do Minimum number of Residential Address Points in each noise band within the study area

Noise band (dB)	Day	Night	L_{den}
<45	561	1113	503
45-50	438	428	287
50-55	318	162	395
55-60	313	292	392
60-65	80	764	132
65-70	607	133	364
70-75	569	0	716
>=75	6	0	103

<50dB at night-desirable		**<55dB at day-Desirable**	
>55dB at night -undesirable		>70dB at day -Undesirable	

Table 8.9 - 2035 Do Minimum number of Total Address Points in each noise band within the study area

Noise band (dB)	Day	Night	Lden
<45	805	1693	688
45-50	607	699	445
50-55	651	288	694
55-60	463	715	624
60-65	206	1610	272
65-70	1185	308	801
70-75	1368	0	1602
>=75	28	0	187

<50dB at night-desirable		**<55dB at day-Desirable**	
>55dB at night -undesirable		>70dB at day -Undesirable	

Figures 8.5 and **Figure 8.6** display the day and night time outputs from the model in colour contour format. The highest noise levels are predicted on High Street, along Lord Edward Street\Dame Street and Parliament Street. During the night time, the same roads as daytime are predicted to experience the highest noise levels. Most building facades in Parliament Street are predicted to be exposed to noise levels in the 70-75dB(A) band during the day which equates to 103 address points of which 59 are residential. The remaining address points are predicted to fall within the next highest decibel band. At night time most of the facades are predicted to be exposed to noise levels in the 65-70dB(A) band at night. This equates to 110 address points of which 65 are residential.

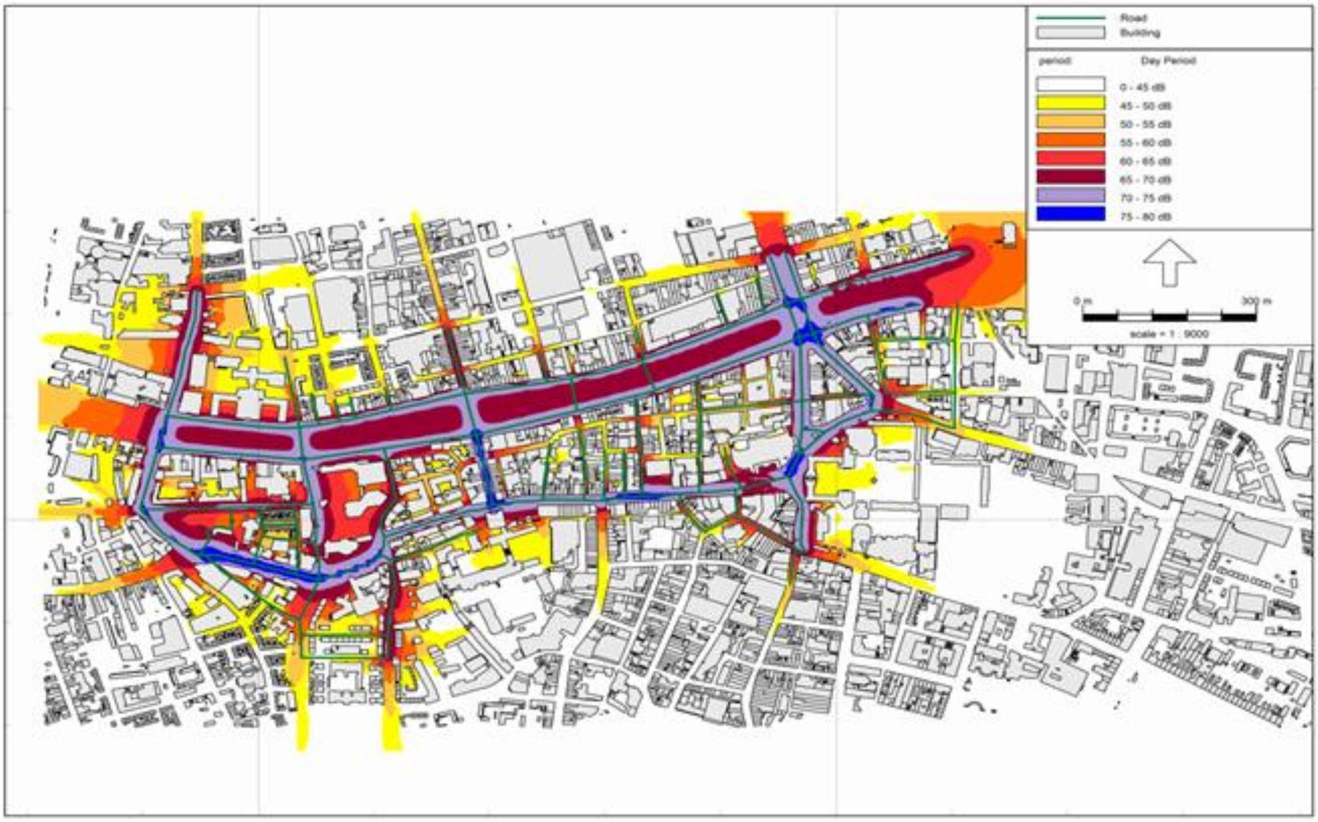

Figure 8.5 - 2035 Do Minimum Scenario (Lday)

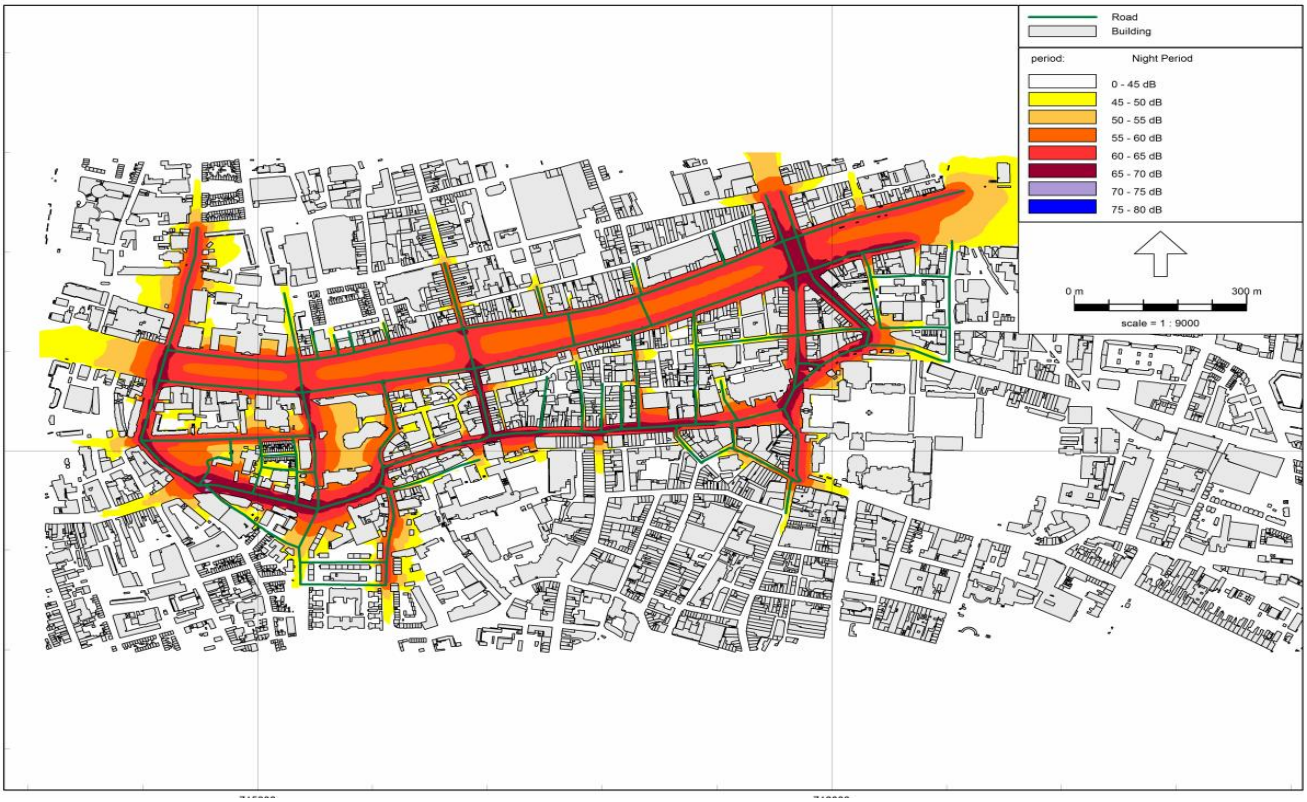

Figure 8.6 - 2035 Do Minimum Scenario (L_{night})

8.4.2.5 2035 Do Something Scenario

The noise model for the 2035 DS scenario was run based on traffic data from the NTA's East Regional Model (ERM) model for 2035 with the Proposed Project in place. A total of 5,311 address points are located within the study area of which 2,892 are residential addresses. The outputs of this run indicated that 33% of all address points and 29% of residential address points are predicted to fall within the undesirable category during the day. 37% of 'All Address Points' and 43% Residential address points are predicted to fall within the desirable category during the day.

During the night time period, 50% of all address points and 42% of residential address points are predicted to fall within the undesirable band. 44% of 'All Address points' and 51% of residential address points are predicted to fall within the desirable band during the night. The night time percentages are very similar to the 2035 Do Minimum Scenario outputs.

Refer to **Table 8.10** for the number of properties falling into each noise band for residential address points and **Table 8.11** for all address points for the 2035 Do Something Scenario.

Table 8.10 - 2035 Do Something Scenario number of Residential Address Points in each noise band within the study area

Noise band (dB)	Day	Night	Lden
<45	564	1115	503
45-50	435	359	286
50-55	236	195	395
55-60	348	210	328
60-65	168	984	188
65-70	290	29	189
70-75	849	0	975
>=75	2	0	28

<50dB at night-desirable		**<55dB at day-desirable**	
>55dB at night -undesirable		>70dB at day -undesirable	

Table 8.11 - 2035 Do Something number of Total Address Points in each noise band within the study area

Noise band (dB)	Day	Night	L_{den}
<45	810	1,720	689
45-50	652	613	486
50-55	502	329	655
55-60	542	574	582
60-65	285	1,993	305
65-70	788	84	599
70-75	1,710	0	1,925
>=75	24	0	72

<50dB at night-desirable		**<55dB at day-desirable**	
>55dB at night -undesirable		>70dB at day -undesirable	

Figures 8.7 and **Figure 8.8** display the day and night time outputs from the model in colour contour format. The highest day time noise levels are predicted on High Street, along Lord Edward Street\Dame Street to Parliament Street and portions of Winetavern Street. During the night time, the same roads as daytime are predicted to experience the highest noise levels. Most building facades on Parliament St are predicted to be exposed to noise levels in the 70-75dB(A) band during the day which equates to 110 address points of which 65 are residential and the 60-65dB(A) band at night, which equates to 97 address points of which 59 are residential. The remaining address points are predicted to fall within the next highest decibel band.

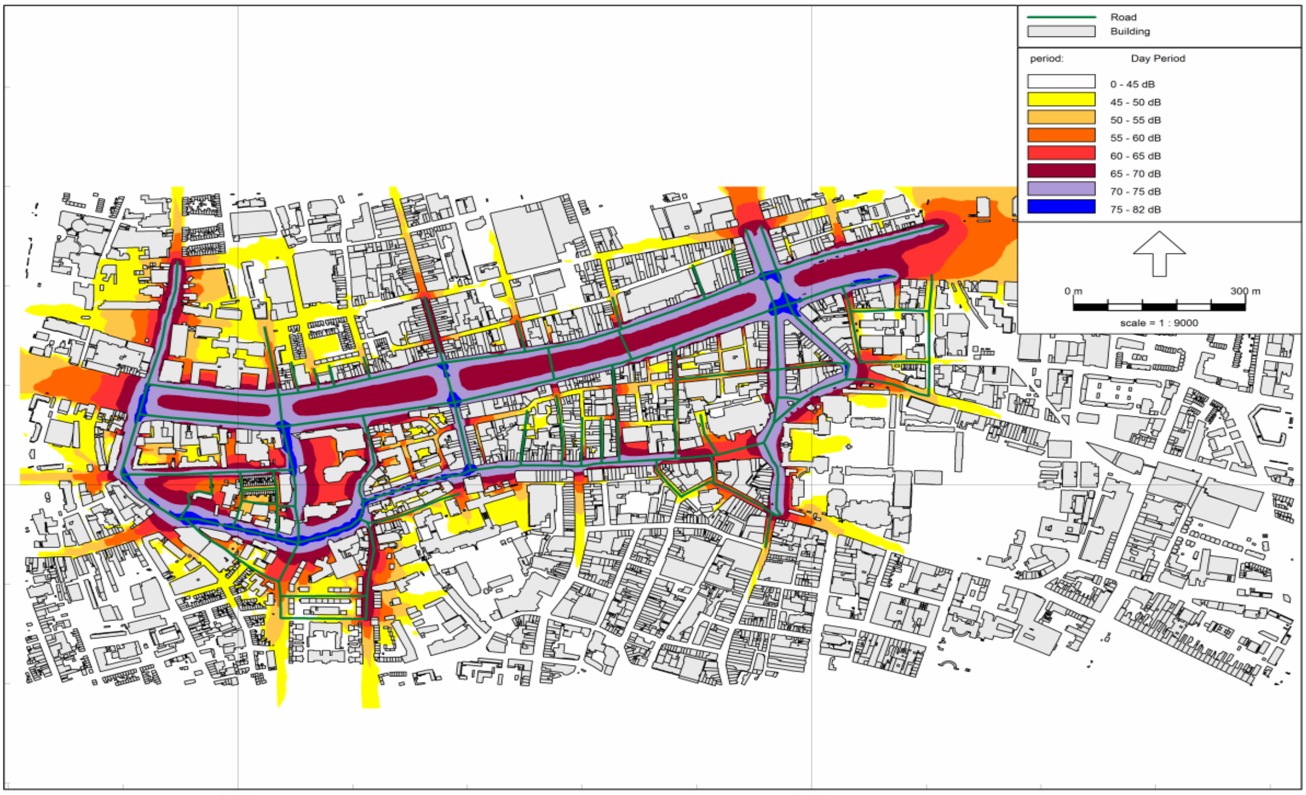

Figure 8.7 - 2035 Do Something Scenario (L_{day})

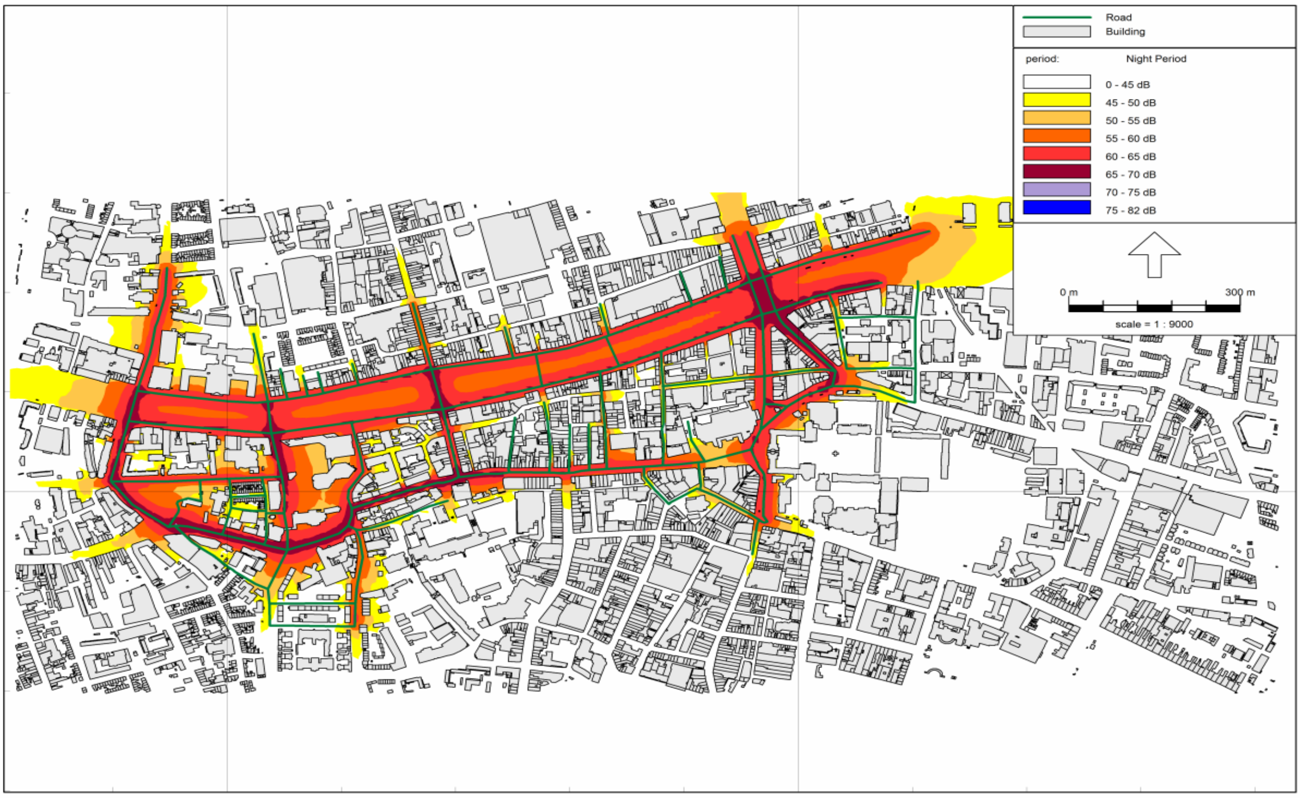

Figure 8.8 - 2035 Do Something Scenario (L_{night})

Vibration

The Proposed Project requires the redistribution of buses due to the closure of College Green. There is the potential for an increase in vibration levels at properties in the areas where large increases in bus numbers are predicted. The areas of Grafton Street and the quays currently experience high volumes of buses. The additional buses are unlikely to generate a noticeable vibration effect.

Increases in bus numbers are also predicted on Parliament Street. However, the restriction on private vehicle access to Parliament Street will have the effect of reducing traffic volumes on this road. On this basis, the additional buses are unlikely to generate a noticeable vibration effect.

8.5 Mitigation Measures

8.5.1 Construction Phase

This section describes typical measures to minimise the potential for noise and vibration disturbance to the surrounding area which will be employed by the Contractor. This will ensure the noise and vibration criteria outlined in **Table 8.1** and **Table 8.2** are not exceeded in the vicinity of the works. BS 5228 includes guidance on several aspects of construction site practices, including, but not limited to:

- Selection of quiet plant and the control of noise sources – the use of proprietary acoustic enclosures and the quietest plant, where possible;
- Selection of the method of excavation to ensure there is no likelihood of structural or cosmetic damage to neighbouring buildings;
- Screening – the effectiveness of screening is based on the location, height and length of the barrier;
- Liaison with the public – a designated liaison officer will be appointed to deal with any complaints relating to noise.

8.5.2 Operational Phase

No mitigation measures are deemed appropriate in this instance. The locations where potential noise impacts may occur are located in a busy city centre environment, where noise levels are already elevated. The provision of noise mitigation measures in the form of noise barriers are not feasible in such an environment.

8.6 Residual Impacts

8.6.1 2018 Do Something Scenario

The modelling outputs for the day time 2018 DS scenario predict an increase of 5% in residential addresses points in the undesirable day time category and a decrease of 2% in residential locations in the desirable category.

The study concludes that when comparing the DM and DS 2018 scenarios for night time, a 5% increase in residential locations in the undesirable band and a slight decrease of approximately 1% in the desirable band is predicted.

At Parliament Street, it is predicted that there will be no difference to noise exposure levels at all address points, for either day or night time.

8.6.2 2035 Do Something Scenario

The modelling outputs for the day time 2035 DS scenario predict an increase of 9% in residential addresses points in the undesirable day time category and a decrease of 3% in residential locations in the desirable category.

The study concludes that when comparing the DM and DS 2035 scenarios for night time, a 1% increase in residential locations in the undesirable band and a slight decrease of approximately 2% in the desirable band is predicted.

At Parliament Street, it is predicted that there will be no difference to noise exposure levels at all address points, for either day or night time.

8.7 Difficulties Encountered

No difficulties were encountered in this assessment.

8.8 References

TII (formerly NRA) Guidelines for the Treatment of Noise and Vibration in National Road Schemes' NRA, 2004

BS 5228-1 and 2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Noise and vibration

EPA Guidelines on the Information to be contained in Environmental Impact Statements EPA, 2002;

EPA Advice Notes on Current Practice in the preparation of Environmental Impact Statements, EPA, 2003;

EPA Revised Guidelines on the Information to be contained in Environmental Impact Statements Draft September 2015;

EPA Advice Notes for Preparing Environmental Impact Statements Draft September 2015; and

Council Directive 2002/49/EC of 25 June 2002 relating to the assessment and management of environmental noise

NTA College Green Traffic Management Measures Draft Modelling Report, 2017

Dublin City Council, Dublin Agglomeration Environmental Noise Action Plan, 2013

NTA Regional Modelling System- East Regional Model, 2012

DCC, NTA Dublin City Centre Transport Study, 2015

9 Biodiversity

9.1 Introduction

This chapter provides information on ecological features of particular significance within or adjacent to the site of the Proposed Project, primarily designated habitats and species, including habitats/species listed in Annex I, II and IV of the EU Habitats Directive, rare flora listed in the Flora Protection Order, along with other semi-natural habitats of conservational value.

The following important ecological receptors were considered in the design of the overall development, and in assessing its likely ecological effects:

- Sites with nature conservation designations, including proposed Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Natural Heritage Areas (pNHAs), the reasons for their designation, and their conservation objectives, where available;
- Annex IV (Habitats Directive) species of fauna and flora, and their breeding sites and resting places, which are strictly protected under the European Communities (Birds and Natural Habitats) Regulations, 2011;
- Other species of fauna and flora which are protected under the Wildlife Acts, 1976-2012;
- 'Protected species and natural habitats', as defined in the Environmental Liability Directive (2004/35/EC) and European Communities (Environmental Liability) Regulations, 2008, including:
  - Birds Directive – Annex I species and other regularly occurring migratory species, and their habitats (wherever they occur).
  - Habitats Directive – Annex I habitats, Annex II species and their habitats, and Annex IV species and their breeding sites and resting places (wherever they occur).
- Other habitats of ecological value in a national to local context, including water courses in the general area;
- Stepping stones and ecological corridors including nature conservation sites (other than Natura 2000 sites) encapsulated by Article 10 of the Habitats Directive. Such features are those which, by virtue of their linear and continuous structure such as rivers with their banks or the traditional systems for marking field boundaries or their function as stepping stones (such as ponds or small woods) are essential for the migration, dispersal and genetic exchange of wild species.

9.2 Assessment Methodology

9.2.1 Guidance and Legislation

9.2.1.1 EU Habitats Directive

The "Habitats Directive" (Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna) is the main legislative instrument for the protection and conservation of biodiversity within the European Union and lists certain habitats and species that must be protected within wildlife conservation areas, considered to be important at a European as well as at a national level. A "Special Conservation Area" or SAC is a designation under the Habitats Directive. The Habitats Directive sets out the protocol for the protection and management of SACs.

The Directive sets out key elements of the system of protection including the requirement for "Appropriate Assessment" of plans and projects. The requirements for an Appropriate Assessment are set out in the EU Habitats Directive. Articles 6(3) and 6(4) of the Directive.

9.2.1.2 EU Birds Directive

The "Birds Directive" (Council Directive 79/409/EEC as codified by 2009/147/EC) provides for a network of sites in all member states to protect birds at their breeding, feeding, roosting and wintering areas. This Directive identifies species that are rare, in danger of extinction or vulnerable to changes in habitat and which need protection (Annex I species). Appendix I of the Directive indicates Annex I bird species. A "Special Protection Area" or SPA, is a designation under The Birds Directive.

9.2.1.3 Appropriate Assessment

Special Areas of Conservation and Special Protection Areas form a pan-European network of protected sites known as Natura 2000 sites.

Article 6(3) of the Habitats Directive requires that any plan or project that is not directly connected with or necessary to the management of the Natura 2000 site concerned but is likely to have a significant effect on it, on its own or in combination with other plans and projects, is to be authorised only if it will not adversely affect the integrity of that site. Screening for AA and, if screening indicates the need, AA itself, must be carried out and the assessment and conclusions recorded to ensure that existing and future plans or projects are authorised only if they will not adversely affect the integrity of a site. These safeguards are designed to ensure the conservation of Natura 2000 sites.

The core principal objectives of the Planning and Development (Amendment) Act 2010 envisage a closer alignment of the National Spatial Strategy with Regional Planning Guidelines, Development Plans and Local Area Plans, while also clarifying the key obligations required of Planning Authorities under the Birds and Habitats Directives.

A report for the purposes of AA Screening is presented in **Appendix 9.1.**

9.2.1.4 Wildlife Acts 1976 – 2012

The primary domestic legislation providing for the protection of wildlife in general, and the control of some activities adversely impacting upon wildlife is the Wildlife Act of 1976. The aims of the Wildlife Act, according to the National Parks and Wildlife Service are "... to provide for the protection and conservation of wild fauna and flora, to conserve a representative sample of important ecosystems, to provide for the development and protection of game resources and to regulate their exploitation, and to provide the services necessary to accomplish such aims.". All bird species are protected under the Act. The Wildlife

(Amendment) Act of 2000 amended the original Act to improve the effectiveness of the Act in order to achieve its aims.

9.2.2 Study Area

The study area comprises the immediate area of College Green and adjacent streets as identified in Chapter 4 '*Proposed Project Description*'.

9.2.3 Site Visits

A site visit was undertaken on the 28th December 2016 by the project ecologist. A separate survey was undertaken by a qualified Arborist to examine the status of trees in the study area. The arborists report is presented as a separate appendix to the EIS.

9.2.4 Consultation

The Development Applications Unit (DAU) of the Department of Arts, Heritage & Gaeltacht (DAHG) was sent a scoping email with a description of the Proposed Project. The Proposed Project was assigned a case number G Pre00379/2016 and a response to consultation received on the 19/12/16 to say that in the event of observations, a co-ordinated heritage-related response will be issued from Development Applications Unit (DAU) on behalf of the Department.

It should be noted that during the iterative process of the preparation of the EIS, due cognisance of the hydrogeological links between the study area and the River Liffey have been taken into account and are discussed in this chapter and the accompanying Report for AA Screening (**Appendix 9.1**). There has been liaison with other disciplines where interactions occur including hydrogeologists and landscape designers. Interactions with other environmental topics are discussed in Chapter 17 '*Cumulative Impacts and Interaction of Effects'*.

9.2.5 Categorisation of the Baseline Environment

This assessment identifies areas of designated nature conservation, including Special Areas of Conservation, (SACs), Special Protection Areas (SPAs), Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs) within 15 km of the Proposed Project site and identifies areas where rare or protected species of flora and fauna may occur within the study area. In addition, undesignated natural or semi-natural areas of biodiversity value are identified.

9.2.6 Impact Assessment Methodology

The assessment was carried out in three stages, firstly through desktop assessment to determine existing records in relation to habitats and species present in the study area. This included research on the National Parks and Wildlife Service (NPWS) website (www.npws.ie) the National Biodiversity Data Centre (NBDC) database (www.biodiversityireland.ie), BirdWatch Ireland (www.birdwatchireland.ie) and a literature review of published information on flora and fauna occurring in and adjacent to the Proposed Project area.

The following resources assisted in the production of this section of the assessment:

- Ordnance Survey Ireland maps;
- OSI, Google & Bing Aerial photography;
- National Biodiversity Data Centre data: http://www.biodiversityireland.ie/;
- National Parks and Wildlife Service (NPWS) Mapviewer: http://www.npws.ie/en/MapsData/
  - Designated sites (SACs, SPAs, NHAs);
  - Records of protected species from 10km squares; and
  - Species related publications.

Other environmental information for the area was reviewed, e.g. in relation to soils, geology, hydrology and hydrogeology. Interactions in terms of the chapters on these topics presented in this EIS were important in the determination of source vector pathways and links with potentially hydrogeologically connected areas outside the Proposed Project site.

The second phase of the assessment involved site visits to establish the existing environment in the footprint of the Proposed Project. Areas which are highlighted during the desktop assessment were investigated in closer detail according to the Heritage Council Publication *Best Practice Guidance for Habitat Survey and Mapping* (Smith *et al*., 2011) which is the agreed national methodology.

Flora and habitats at the site of the Proposed Project were classified according to the Heritage Council publication '*A Guide to Habitats in Ireland'* (Fossitt, 2000). This publication sets out a standard scheme for identifying, describing and classifying wildlife habitats in Ireland according to a hierarchical framework, with Level One habitats representing broad habitat groups, Level Two representing habitat sub-groups and Level Three representing individual habitat types. The Habitat Survey focused on identifying habitats to Level Three of the *Guide to Habitats in Ireland*. The annotation of vegetation occurring within sites was undertaken using the DAFOR scale. This scale refers to plant species in terms of dominance, abundance, frequency, occasional and rare (DAFOR). Species recorded in this report are given in both their Latin and English names. Latin names for plant species follow the nomenclature of Webb's "An Irish Flora" (Parnell & Curtis, 2012).

Fauna were surveyed in the context of direct and indirect disturbance effects, especially for mammals and birds.

Any mammalian fauna, their tracks etc. observed during the visit were identified, and the potential value of the site to mammals was assessed in terms of potential disturbance, loss of feeding, resting/roosting or breeding habitat.

Birds present on site were recorded while undertaking habitat surveys. Species descriptions are based on BirdWatch Ireland data (www.birdwatchireland.ie/IrelandsBirds) and the Collins Bird Guide App.

Amphibians, reptiles and invertebrates if present were recorded as casual observations.

The final part of the assessment involves an evaluation of the Proposed Project area and determination of the potential impacts of the Proposed Project on the flora and fauna of the area. Habitat evaluation and impact assessment is based on the Chartered Institute of Ecology and Environmental Management's *Guidelines* *for Ecological Impact Assessment* (CIEEM, 2016). Judgments on the evaluation are made using geographic frames of reference, e.g. European, National, Regional or Local.

This part of the assessment forms the basis for impact assessment and is based on the following guidelines and publications:

- Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (DEHLG, December 2009, Rev 2010);
- EPA Revised Guidelines on the Information to be contained in Environmental Impact Statements Draft September (EPA, 2015a);
- EPA Revised Advice Notes on for Preparing Environmental Impact Statements Draft September (EPA, 2015b);
- EPA Guidelines on the Information to be contained in Environmental Impact Statements (EPA, 2002);
- EPA Advice Notes on for Preparing Environmental Impact Statements Draft September (EPA, 2003);
- Fossitt, J. (2000) A Guide to Habitats in Ireland. The Heritage Council;
- Best Practice Guidance for Habitat Survey and Mapping (Smith et al., 2011);
- Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2016).

The EPA set out a system of impact assessment and rating of significance in Section 3.7.7 of the draft EIS Guidelines (EPA, 2015a). Refer to Section 1.4.3.3 for a description of impact significance ratings.

9.3 Baseline Environment

9.3.1 Designated Conservation Areas

There are no designated conservation areas on the site of the Proposed Project.

Departmental guidance suggests an assessment of Natura 2000 sites within a zone of influence of 15 km which can be revised down depending on the Proposed Project and location of Natura 2000 sites. There are 16 Natura 2000 sites located within a 15km radius of the Proposed Project study as detailed in the Report for AA Screening.

Of the 16 Natura 2000 sites identified, a number of these are not considered to have any direct ecological or hydrological connectivity to the Proposed Project site, by which a significant impact could arise. These 12 sites include:

- 000199 Baldoyle Bay SAC
- 000202 Howth Head SAC
- 000205 Malahide Estuary SAC
- 001209 Glenasmole Valley SAC
- 002193 Ireland’s Eye SAC
- 003000 Rockabill to Dalkey Island SAC
- 004016 Baldoyle Bay SPA
- 004025 Malahide Estuary SPA
- 004040 Wicklow Mountains SPA

- 004113 Howth Head Coast SPA
- 004117 Ireland's Eye SPA
- 004172 Dalkey Island SPA

It is determined that there is no potential for significant effect on these sites and they are screened out at this preliminary stage for the following reasons:

- Distance from the Proposed Project site;
- There is no direct connection between the site of the Proposed Project and these three sites; and
- The potential for indirect impacts is unlikely due to distance and lack of connectivity.

The Proposed Project location at College Green is then considered in terms of source-pathway-receptor relationship and proximity to the River Liffey with regards direct ecological and hydrological connectivity to Dublin Bay. There are four Natura 2000 sites located within a potential zone of influence of the Proposed Project:

- 000206 North Dublin Bay SAC
- 000210 South Dublin Bay SAC
- 004006 North Bull Island SPA
- 004024 South Dublin Bay and River Tolka Estuary SPA

The location of the Proposed Project site is presented in **Figure 9.1** below in relation to the Natura 2000 sites considered within the potential zone of influence.

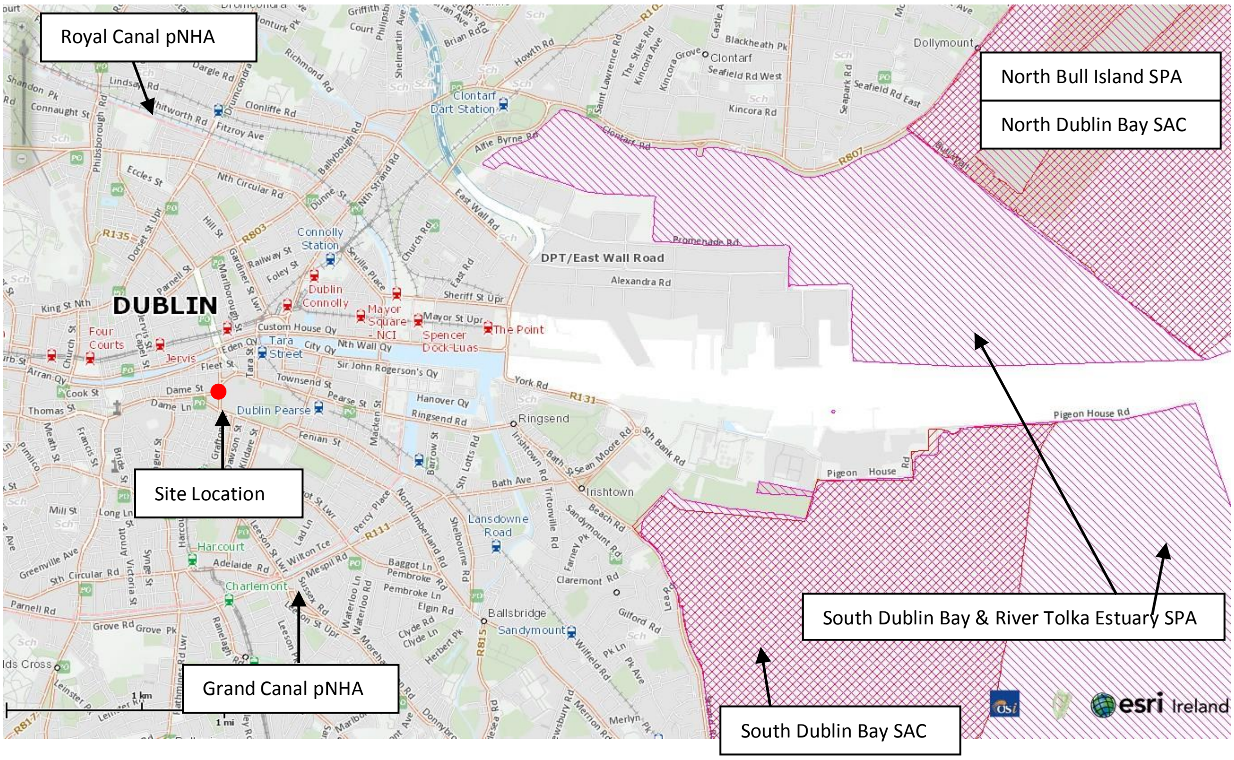

Figure 9.1 - Site Location at College Green in relation to downstream Natura 2000 sites

9.3.2 Undesignated Habitats

College green is an urban environment comprised of Buildings and artificial surfaces (BL3). There are scattered London Plane trees surrounding the Henry Grattan statue and in Foster Place. The bases of trees were colonised in places by Common chickweed (*Stellaria media*) and Annual Wall rocket (*Diplotaxis muralis*). Both species have been long recorded in Dublin City (P. Wyse Jackson & M. Sheehy Skeffington, 1984), the latter is an introduced species ('a characteristic Co. Dublin species' (D. Doogue *et al.* eds. 1998), both found on disturbed ground.

The River Liffey represents a highly significant regional salmonid catchment and also supports a diversity of coarse fish. The River Liffey also supports protected lamprey species and white-clawed crayfish. There are no known direct links with the River Liffey which is located at a distance of c. 235 m from the works area and there will be no discharge to the watercourse and no in-stream structures. There is low potential for contamination of the River Liffey as a result of adjacent construction activities associated with the Proposed Project. An accidental contamination event could adversely affect protected aquatic species and fish stocks. Consequently, there is potential for a moderate negative impact on protected aquatic species and fish if best practice construction measures are not fully implemented.

9.4 Predicted Impacts

9.4.1 Direct Impacts

9.4.1.1 Construction Phase

The Proposed Project is predominantly comprised of groundworks in the inner city urban environment (refer to Chapter 4, '*Proposed Project Description'* for a detailed description).

It is proposed to remove eight trees from the area of the traffic island at the Henry Grattan statue and Thomas Davis memorial. At the junction of Grafton Street, two trees are also to be removed as a result of the Luas Cross City scheme.

The predicted impact is not significant on local habitats of lower value and will be neutral after landscaping.

By way of compensation it is proposed to add 22 new London Plane trees; ten in a single line along the south side of the plaza, and a further twelve forming an avenue at the approach to the space from Dame Street. It is proposed to retain the distinguished Plane trees in Foster Place. In order to inhibit motor traffic entering the pedestrian priority area of College Green from the west, it is proposed to add metal planters of Corten steel, 5m x 1m, punctuated with retractable bollards between.

There will be minor changes to the location of trees during the construction phase which will not be significant in terms of impacts on biodiversity. The quality of the impact on local habitats will be neutral.

No planned construction activities have the potential to impact on surface water quality. The unplanned activities which may impact upon the surface water quality on site during the construction phase are:

- Accidental spillages of polluting materials on site;
- Release of fines into the surface water; and
- The potential for contaminated runoff to enter the surface water.

Accidental spillages and contaminated runoff and will be avoided by construction management measures which are set out in the Construction and Environmental Management Plan (CEMP), refer to **Appendix 4.1**.

9.4.1.2 Operational Phase

Surface water from artificial surfaces will drain to the municipal stormwater system and will not affect the River Liffey or downstream areas of conservation.

The predicted impact will be neutral.

9.4.2 Indirect Impacts

9.4.2.1 Construction Phase

As previously mentioned, the potential for accidental contaminated runoff to enter the surface water system during construction will be avoided by construction management.

The predicted impact will be neutral.

9.4.2.2 Operational Phase

There will be no significant impact on surface water or on the hydrology of the surrounding area as a result of the Proposed Project and as such there will be no significant impact on the European sites located in Dublin Bay or on any other site of natural conservation during the operational phase of the Proposed Project – refer also the Report for the Purposes of Appropriate Assessment Screening report in **Appendix 9.1**.

9.5 Mitigation Measures

9.5.1 Tree Replacement

By way of compensation for tree loss at the Henry Grattan Statue and Thomas Davis memorial, it is proposed to plant 22 new London Plane trees; ten in a single line along the southern side of the plaza, and a further twelve forming an avenue at the approach to the space from Dame Street. It is proposed to retain the distinguished Plane trees in Foster Place. In order to inhibit motor traffic entering the pedestrian priority area of College Green from the west, it is proposed to include metal planters of Corten steel.

9.5.2 Management Measures for Surface Water

The surface water drainage network is designed in full cognisance of the recommendations of the Greater Dublin Strategic Drainage Study (GDSDS). Sustainable Urban Drainage Systems (SUDS) are to be incorporated into the design of all storm control areas, using best practice standards as detailed in the Chapter 12 '*Soils, Geology, Hydrogeology and Hydrology*').

Chapter 12 '*Soils, Geology, Hydrogeology and Hydrology'* of this EIS highlights the construction management measures to be implemented to reduce potential impacts on surface water quality. During construction, the Contractor will employ management measures outlined in the Construction and Environmental Management Plan (CEMP) attached to this EIS to contain any areas at risk of contaminated runoff. Construction management measures specifically related to the protection of surface water quality are listed below:

- Any stockpiles of construction material shall be stored on impermeable surfaces and covered using tarpaulin;
- Good housekeeping (daily site clean-ups, use of disposal bins, etc.) on the site during construction, and the proper use, storage and disposal of these substances and their containers will prevent groundwater contamination;
- For all activities involving the use of potential pollutants or hazardous materials, there will be a requirement to ensure that material such as concrete, fuels, lubricants and hydraulic fluids will be carefully handled and stored to avoid spillages. Potential pollutants shall also be adequately secured against vandalism and will be provided with proper containment according to codes of practice. Any spillages will be immediately contained and contaminated soil removed from the site and properly disposed of;
- The risk of water pollution will be minimised by the implementation of good construction practices. Such practices will include adequate bunding for silos, oil containers, wheel washers and dust suppression on site roads, and regular plant maintenance. The Construction Industry Research and Information Association (CIRIA) provides guidance on the control and management of water pollution from construction sites in their publication Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (Masters – Williams et al, 2001). A contingency plan for pollution emergencies will also be developed by the appointed Contractor prior to the commencement of the works and regularly updated, which will identify the actions to be taken in the event of a pollution incident;
- In accordance with recommendations in the CIRIA document, a contingency plan for pollution emergencies will be prepared which will address the following:
  - Containment measures;
  - Emergency discharge routes;
  - List of appropriate equipment and clean-up materials;
  - Maintenance schedule for equipment;
  - Details of trained staff, location and provision for 24-hour cover;
  - Details of staff responsibilities;
  - Notification procedures to inform the Environmental Protection Agency (EPA) or Environmental Department of the Dublin City Council;
  - Audit and review schedule;
  - Telephone numbers of statutory water consultees; and

- List of specialist pollution clean-up companies and their telephone numbers.

9.6 Residual Impacts

There will be no significant impact on biodiversity discussed in this chapter from the proposed works following the proposed best practice construction management measures and tree replacement.

Construction management measures to prevent impacts on surface water quality which have been described in the EIS (see **Section 12.5**) will be included in a Construction and Environmental Management Plan (refer to **Appendix 4.1**) to ensure these measures are fully implemented by the Contractor. There will be no significant residual impacts on surface water quality once these measures have been employed.

9.7 Difficulties Encountered

There were no difficulties encountered during the preparation of the impact assessment of biodiversity.

9.8 References

Department of the Environment, Heritage and Local Government (2010) *Guidance on Appropriate Assessment of Plans and Projects in Ireland (as amended February 2010).*

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Smith, G.F., O'Donoghue, P., O'Hora, K. and E. Delaney (2011) *Best Practice Guidance for Habitat Survey and Mapping*. The Heritage Council.

Wyse Jackson, P. and Sheehy Skeffington, M. (1984) *The Flora of Inner Dublin.* Dublin: Royal Dublin Society.

10 Archaeology, Cultural Heritage and Architectural Heritage

10.1 Introduction

Irish Archaeological Consultancy Ltd has prepared this report on behalf of Dublin City Council to assess the impact, if any, on the archaeological, architectural and cultural heritage resource of the Proposed Project at College Green, Dublin City Centre (OS Sheet 18). The Proposed Project occupies a city-centre location, c. 235m south of the River Liffey, adjacent to landmark buildings including Bank of Ireland and Trinity College. The study area falls within 1.4 hectares (including the block formed by St Andrew's, Trinity, and Church Street). It is located at College Green which encompasses parts of Dame Street, Trinity Street, St Andrew's Street and Church Lane, at the very northern end of Grafton Street. The Project is adjacent to the southern end of Anglesea Street and occupies the full area of Foster Place and College Green which includes the southernmost part of Westmoreland Street, the area south of Bank of Ireland (former House of Parliament) and immediate west of Trinity College.

As part of the Proposed Project, it has been indicated that a large area of eastern College Green (170m x 40m) may be excavated to a depth of 2.5m to accommodate the main plaza. The Proposed Project is located within the zone of archaeological potential for the historic centre of Dublin City (DU018-020). It is located c. 270m outside of the medieval town walls of Dublin. The Proposed Project is also surrounded by numerous protected structures and partially located within Architectural Conservation Areas (ACAs) associated with O'Connell Street, The South City Retail Quarter and Grafton Street and Environs. Recorded monuments are shown on **Figure 10.1**, whereas recorded built heritage sites are shown on **Figure 10.2**.

This is an area that was once part of a wet landscape associated with the River Liffey and River Steine and much of surrounding land has been reclaimed both in the medieval, post-medieval and modern periods. The area of the Proposed Project was external to the medieval city and was substantially developed during the post-medieval period and subsequently redeveloped by the Wide Streets Commission in the late 18th century.

10.2 Assessment Methodology

10.2.1 General

This study determines, as far as reasonably possible from existing records, the nature of the cultural heritage resource within the area of Proposed Project using appropriate methods of study.

The study involved detailed interrogation of the archaeological, historical and architectural background of the Proposed Project. This included information from the Record of Monuments and Places of County Dublin, Dublin City Development Plan (2016–2022), the topographical files of the National Museum of Ireland and cartographic and documentary records.

A field inspection has been carried out on date in an attempt to identify any known cultural heritage sites and previously unrecorded features, structures and portable finds within the Proposed Project.

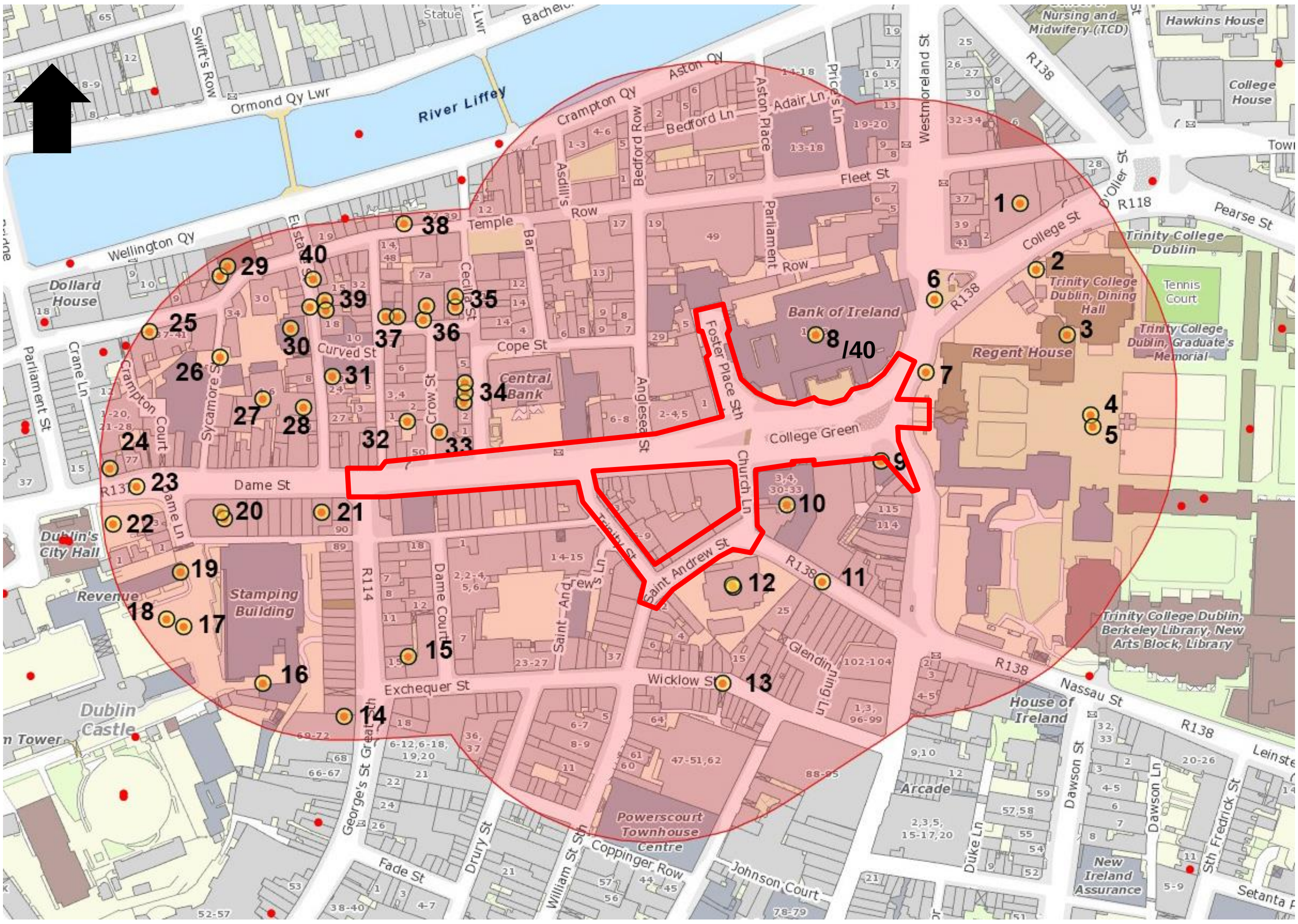

Figure 10.1 - Extract from archaeology.ie showing recorded monuments within 150m of the Proposed Project

An impact assessment and a mitigation strategy have been prepared. The impact assessment is undertaken to outline potential adverse impacts that the Proposed Project may have on the cultural heritage resource, while the mitigation strategy is designed to avoid, reduce or offset such adverse impacts.

10.2.2 Guidance and Legislation

The following legislation, standards and guidelines were consulted as part of the assessment.

- National Monuments Acts, 1930-2014
- The Planning and Development (Strategic Infrastructure) Act, 2006
- Heritage Act, 1995
- Environmental Protection Agency. 2015 Advice Notes for preparing Environmental Impact Statements (DRAFT Sept. 2015). Dublin, Government Publications Office.

- Environmental Protection Agency. 2015 Revised Guidelines on the Information to be Contained in Environmental Impact Statements (Draft Sept. 2015). Dublin: Dublin: Government Publications Office.
- Frameworks and Principles for the Protection of the Archaeological Heritage, 1999, (formerly) Department of Arts, Heritage, Gaeltacht and Islands
- Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 1999 and the Local Government (Planning and Development) Act 2000
- Architectural Heritage Protection: Guidelines for Planning Authorities, 2011), (formerly) Department of Arts, Heritage and the Gaeltacht

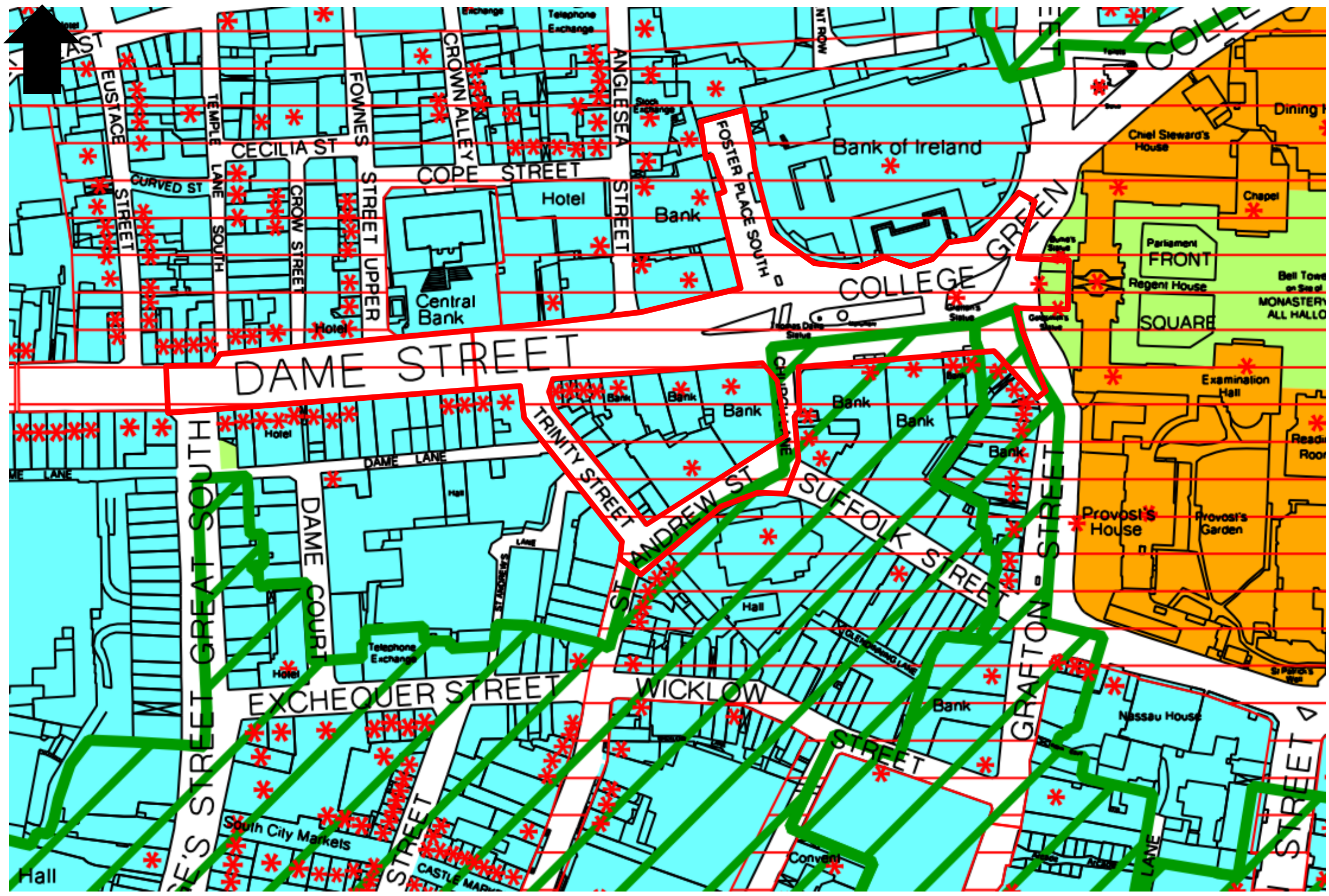

Figure 10.2 - Extract from the Dublin City Development Plan showing protected structures (red stars) and ACAs (green hatching)

Field inspection is necessary to determine the extent and nature of archaeological and architectural remains, and can also lead to the identification of previously unrecorded or suspected sites and portable finds through topographical observation and local information.

The archaeological and architectural field walking inspection entailed:

- Walking the Proposed Project and its immediate environs.
- Noting and recording the terrain type and land usage.

- Noting and recording the presence of features of archaeological, architectural or cultural heritage significance.
- Verifying the extent and condition of recorded sites.
- Visually investigating any suspect landscape anomalies to determine the possibility of their being anthropogenic in origin.

A site visit was conducted over several days during December 2016 and January 2017.

10.2.4 Consultation

Following the initial research, a number of statutory and voluntary bodies were consulted to gain further insight into the cultural background of the baseline environment, receiving environment and study area, as follows:

- Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs – the Heritage Service, National Monuments and Historic Properties Section: Record of Monuments and Places; Sites and Monuments Record; Monuments in State Care Database; Preservation Orders; Register of Historic Monuments and the Architectural Heritage Advise Unit;
- National Museum of Ireland, Irish Antiquities Division: topographical files of Ireland;
- National Inventory of Architectural Heritage: Dublin City
- The Heritage Council:
- Dublin City Council: Planning and Economic Development Department including Archaeology, Conservation & Heritage section; and
- Trinity College Dublin, Map Library: Historical and Ordnance Survey Maps.

10.2.5 Desktop Study

This is a document search. The following sources were examined and a list of areas of archaeological, architectural and cultural heritage potential was compiled:

- Record of Monuments and Places for County Dublin
- Sites and Monuments Record for County Dublin;
- Monuments in State Care Database;
- Preservation Orders;
- Register of Historic Monuments;
- Topographical files of the National Museum of Ireland;
- Cartographic and written sources relating to the Proposed Project;
- Dublin City Development Plan 2016–2022;
- National Inventory of Architectural Heritage;
- Place name analysis;
- Aerial photographs; and
- Excavations Bulletin (1970–2016).

Record of Monuments and Places (RMP) is a list of archaeological sites known to the National Monuments Section, which are afforded legal protection under Section 12 of the 1994 National Monuments Act and are published as a record.

Sites and Monuments Record (SMR) holds documentary evidence and field inspections of all known archaeological sites and monuments.

Some information is also held about archaeological sites and monuments whose precise location is not known e.g. only a site type and townland are recorded. These are known to the National Monuments Section as 'un-located sites' and cannot be afforded legal protection due to lack of locational information. As a result, these are omitted from the Record of Monuments and Places. SMR sites are also listed on the recently launched website maintained by the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs (DoAHRRGA) – www.archaeology.ie.

National Monuments in State Care Database is a list of all the National Monuments in State guardianship or ownership. Each is assigned a National Monument number whether in guardianship or ownership and has a brief description of the remains of each Monument.

The Minister for the DoAHRRGA may acquire national monuments by agreement or by compulsory order. The state or local authority may assume guardianship of any national monument (other than dwellings). The owners of national monuments (other than dwellings) may also appoint the Minister or the local authority as guardian of that monument if the state or local authority agrees. Once the site is in ownership or guardianship of the state, it may not be interfered with without the written consent of the Minister.

Preservation Orders List contains information on Preservation Orders and/or Temporary Preservation Orders, which have been assigned to a site or sites. Sites deemed to be in danger of injury or destruction can be allocated Preservation Orders under the 1930 Act. Preservation Orders make any interference with the site illegal. Temporary Preservation Orders can be attached under the 1954 Act. These perform the same function as a Preservation Order but have a time limit of six months, after which the situation must be reviewed. Work may only be undertaken on or in the vicinity of sites under Preservation Orders with the written consent, and at the discretion, of the Minister.

Register of Historic Monuments was established under Section 5 of the 1987 National Monuments Act, which requires the Minister to establish and maintain such a record. Historic monuments and archaeological areas present on the register are afforded statutory protection under the 1987 Act. The register also includes sites under Preservation Orders and Temporary Preservation Orders. All registered monuments are included in the Record of Monuments and Places.

Topographical files of the National Museum of Ireland is the national archive of all known finds recorded by the National Museum. This archive relates primarily to artefacts but also includes references to monuments and unique records of previous excavations. The find spots of artefacts are important sources of information on the discovery of sites of archaeological significance.

Cartographic sources are important in tracing land use development within the development area as well as providing important topographical information on areas of archaeological potential and the development of buildings. Cartographic analysis of all relevant maps has been made to identify any topographical anomalies or structures that no longer remain within the landscape.

- Speed's Map of Dublin, 1610;
- Bernard de Gomme, The City and Suburbs of Dublin, 1673;
- Charles Brooking, A Map of the City and Suburbs of Dublin, 1728;
- John Rocque's Exact survey of the city and suburbs of Dublin, 1756;
- Bernard Scalé's Map of Dublin, 1773
- Wilson's Directory Map of Dublin City, 1760;
- Thomas Campbell's Map of Dublin, 1811
- William Duncan's Map of the city and county of Dublin 1821;
- Cooke's royal Map of Dublin, 1822; and
- Ordnance Survey Mapping, 1843, 1847, 1867, 1871 and 1912.

Documentary sources were consulted to gain background information on the archaeological, architectural and cultural heritage landscape of the Proposed Project area.

Aerial photographic coverage is an important source of information regarding the precise location of sites and their extent. It also provides initial information on the terrain and its likely potential for archaeology. A number of sources were consulted including aerial photographs held by the Ordnance Survey and Google Earth.

Place Names are an important part in understanding both the archaeology and history of an area. Place names can be used for generations and in some cases have been found to have their root deep in the historical past.

Development Plans contain a catalogue of all the Protected Structures, ACAs and archaeological sites within the county. The Dublin City Development Plan (2016-2022) was consulted to obtain information on cultural heritage sites in and within the immediate vicinity of the Proposed Project.

The National Inventory of Architectural Heritage is a government based organisation tasked with making a nationwide record of significant local, regional, national and international structures, which in turn provides county councils with a guide as to what structures to list within the Record of Protected Structures. The architectural survey for County Dublin / Dublin City was carried out in six phases, the first the Dublin 1 area in 2011, the second the Dublin 7 area in 2012, the third, fourth and fifth the Dublin area in 2013, and the sixth phase covers the north inner city bounded by the canal in 2014.

Excavations Bulletin is a summary publication that has been produced every year since 1970. This summarises every archaeological excavation that has taken place in Ireland during that year up until 2016 and since 1987 has been edited by Isabel Bennett. This information is vital when examining the archaeological content of any area, which may not have been recorded under the SMR and RMP files. This information is also available online (www.excavations.ie) from 1970-2016.

10.3 Impact Assessment Methodology

In order to assess, distil and present the findings of this study, the following definitions apply:

'Cultural Heritage' where used generically, is an over-arching term applied to describe any combination of archaeological, architectural and cultural heritage features, where –

- the term 'archaeological heritage' is applied to objects, monuments, buildings or landscapes of an (assumed) age typically older than AD 1700 (and recorded as archaeological sites within the Record of Monuments and Places);
- the term 'architectural heritage' is applied to structures, buildings, their contents and settings of an (assumed) age typically younger than AD 1700; and
- the term 'cultural heritage', where used specifically, is applied to other (often less tangible) aspects of the landscape such as historical events, folklore memories and cultural associations. This designation can also accompany are archaeological or architectural designation.

For the purposes of this report the terms 'architectural heritage' and 'built heritage' have the same intended meaning and are used interchangeably.

Impact Definitions (as defined by the EPA 2015 Guidelines, page 42)

- Imperceptible: An effects capable of measurement but without noticeable consequences.
- Not significant: An effects which causes noticeable changes in the character of the environment but without noticeable consequences
- Slight Effects: An effects which causes noticeable changes in the character of the environment without affecting its sensitivities.
- Moderate Effects: An effects that alters the character of the environment in a manner that is consistent with existing and emerging trends.
- Significant Effects: An effects which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
- Very Significant: An effects which, by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the environment.
- Profound Effects: An effects which obliterates sensitive characteristics

10.4 Baseline Environment

Archaeology

10.4.1 Archaeological Background

The Proposed Project is located within the zone of archaeological potential for the historic centre of Dublin City (RMP DU018-020). It is located c. 270m outside of the medieval town walls of Dublin. The Project is within an area previously known as Hoggen Green, which is thought to have once contained a number of Viking burial mounds dating from the 9th-10th centuries (**Figure 10.3**). It also contained a Norse assembly place, which comprised a large mound known as 'Thing Motte' (DU018-020132) c. 25m south of College Green. The Proposed Project spans the parishes St Andrew's (largest area), St Mark's and St. Anne's. During the Middle Ages the Steine district (Hawkins Street and Townsend Street) and the site of Trinity College were within the mud flats of the Liffey and Dodder River.

There are no recorded sub-constraints (recorded monuments within the overall zone of potential) located within the Proposed Project. These are individual recorded monuments located within the overall zone of archaeological potential (DU018-020). A total of 40 individual or groups of sub-constraints are located within c. 150m of the area. The closest recorded monument is less than 5m south of the Proposed Project. It is an unclassified mill (DU018-020401) that has no surface expression. There is a clear cluster of recorded monuments in the area designated Dublin's Medieval Core c. 65m northwest of the Proposed Project comprising various monuments including medieval housing (DU018-020512; DU018-020513) and a burial ground (DU018-020188). The remaining monuments are distributed along the north, northeast, east, southeast and south of the Proposed Project including a series of successively constructed churches (DU018-020072) that occur within the plot bounded by St Andrew's Lane and Church Lane. Trinity College and the site of an earlier medieval ecclesiastical foundation (DU018-020391) is located to the immediate east of the Proposed Project.

Table 10.1 - Recorded Archaeological Sites (RMPs) within 150m of the Proposed Project

Fig 10.1 No.	RMP No.	Location	Classification	Distance to Site
9	DU018-020401	College Green	Mill - unclassified	Immediately adjacent
6	DU018-020385	Westmoreland Street	Bridge	5m east
7	DU018-020099	College Green	Water mill - unclassified	Immediately adjacent
40	DU018-020047	St Andrew's Street	Religious house - Augustinian, of Arrouaise nuns	Immediately adjacent
12	DU018-020072	St Andrew's Street	Church	18m south
10	DU018-020132	College Green	Mound	20m south
8	DU018-020430	College Green	Hospital	Immediately adjacent
28	DU018-020239	Eustace Street	Inn	40m northwest
11	DU018-020386	Suffolk Street	Bridge	50m southeast

31	DU018-020511	Eustace Street	House - indeterminate date	55m north
34	DU018-020512	Cecilia Street	House - indeterminate date	60m west-northwest
	DU018-020513	Cecilia Street	House - indeterminate date	65m west-northwest
	DU018-020514	Cecilia Street	House - indeterminate date	65 west-northwest
13	DU018-020387	Wicklow Street	Bridge	65m southeast
27	DU018-020345	Dame Street	Meeting House	60m northwest
20	DU018-296	Dame Street	Burial	65m west-southwest
	DU018-020071	Dame Street	Church	65m west-southwest
1	DU018-020487	College Street	Ecclesiastical site	75m northeast
33	DU018-020188	Crow Street	Burial ground	70m west-northwest
2	DU018-020995	College Street	Chapel	70m east
3	DU018-020411	Trinity College Campus	Graveyard	90m east
30	DU018-020510	Eustace Street	Meeting House	90m north-northwest
32	DU018-020671	Crow Street	Burial ground	90m west
26	DU018-020604	Sycamore Street	Water mill	95m northwest
39	DU018-020344	Eustace Street	Holy well	95m north
	DU018-020553	Eustace Street	House - indeterminate date	95m north
	DU018-020552	Eustace Street	House - indeterminate date	100m north
35	DU018-020965	Cecilia Street	Kiln - lime	105m northwest
	DU018-020978	Cecilia Street	Building	110m northwest
4	DU018-020044	Trinity College Campus	Religious house - Augustinian canons	110m east-southeast
19	DU018-020619	Dame Lane	Building	110m west-southwest
5	DU018-020391	Trinity College Campus	College	110m east-northeast
36	DU018-020046	Curved Street, Temple Bar	Religious house - Augustinian friars	110 northwest

	DU018-020333	Cecilia Street	Building	115m northwest
23	DU018-020382	Dame Street	Bridge	120m west
37	DU018-020555	Cecilia Street	House - indeterminate date	125m northwest
	DU018-020554	Cecilia Street	House - indeterminate date	130m northwest
17	DU018-020191	Dublin Castle complex	Mill	125m southwest
18	DU018-020094	Dublin Castle complex	Water mill	130m southwest
16	DU018-020088	George’s St South Great	Church	125m southwest
29	DU018-020670	Essex St East	Watercourse	135m northwest
	DU018-020601	Essex St East	Watercourse	135m northwest
14	DU018-020076	George’s St South Great	Church	135m south
21	DU018-020368	Dame Street	House - 16th/17th century	145m west
40	DU018-020551	Eustace Street	Well	120m north
24	DU018-020091	Dame Street	Water mill	135m west
25	DU018-020550	Essex St East	House - indeterminate date	140m northwest
22	DU018-020093	Dame Street	Water mill	140m west-southwest
38	DU018-020594	Essex St East	Quay	145m west
15	DU018-020137	South Great George's Street	Building	150m southwest

Prehistoric Period (c. 7000 BC-AD 400)

The Mesolithic period (c.7000-4000BC) is the earliest time for which there is clear evidence for prehistoric activity in Ireland. During this period people hunted, foraged and gathered food and appear to have had a relatively mobile lifestyle. Evidence of permanent settlement during this period is rare, although Mesolithic deposits are typically found within riverine and coastal areas. Mesolithic remains have been identified on the northern side of the River Liffey, (McQuade 2008, 8–11); but no sites of this date have been discovered in the vicinity of the Proposed Project. While there is no further evidence for Neolithic, Bronze Age or Iron Age activity within the immediate environs of the Proposed Project, the estuary and the river would have been an excellent resource for people to utilise in terms of food, water and transport during the prehistoric period. The area in which the Proposed Project was located may have been too low-lying to provide a suitable settlement location but because of its close proximity to the Liffey to the north and the River Steine to the east, this cannot be ruled out.

Early Medieval Period (AD 400–1100)

The area now known as County Dublin straddled the ancient kingdoms of *Brega* (north of the River Tolka) and *Laigin* (south of the Tolka). The name Dublin (*Dubhlinn*), meaning black pool, is generally taken to refer to the pool or pond that was located directly southeast of the site of the present Dublin Castle. However, it has been suggested that this name refers to an early Christian monastic settlement south of the black pool. Clarke (1990, 58) believed that this interpretation of *Dubhlinn* would explain why the town has two names: *Dubhlinn* (for the enclosed ecclesiastical area) and *Baile Ath Cliath* for the secular settlement. Clarke has also identified the likely position of this ecclesiastical enclosure, depicting it as a roughly pear-shaped boundary 335m north-south by 260m east-west (2002, 2). A suspected echo of the alignment of this enclosure occurs c. 300m to the southwest of the Proposed Project roughly parallel to the curving alignment of Stephen Street (*ibid*). It has been argued that this enclosure formed the focus of pre-Viking Dublin (Stout & Stout 1992, 15). The *Dubhlinn* ecclesiastical enclosure may have served as the chief church of a minor dynastic group – the *Uí Fergusa*, who were part of a confederation that extended their hegemony over the province of Leinster from 738 to 1042 AD.

The Dublin area was transformed by the coming of the Vikings who had established themselves on the shores of the Liffey by the middle of the 9th century. By the 10th century, Dublin had become a recognised urban centre. The first Viking settlement within Dublin consisted of a *longphort,* which was a semi-permanent encampment used initially as an over-Winter base, but then developed over the succeeding 60 years into a commercial centre that was an important market place. The precise location of this settlement has remained somewhat elusive and both the current site of Dublin Castle and an area of Kilmainham close to the current Heuston Station have been proposed. Clark has argued that the initial longphort of the Vikings was actually the enclosure of *Dubhlinn* commandeered by the invaders. He also proposes that the second secular enclosure at *Ath Cliath* was also commandeered soon after (2002, 2). Excavations at the intersection of Stephen’s Street Lower and South Great George’s Street in 2003, c. 300m southwest of Proposed Project, produced evidence of a Viking cemetery and associated settlement, along the southern flank of the ‘Black Pool’ (*Dubhlinn*), which was found to extend as far south as the excavated area. This activity can likely be dated to the 9th century and would seem to bolster Clarke’s thesis.

Although, the area containing the Proposed Project was external to this more permanent and substantial Viking town, it was home to a different type of focal point: Hoggen Green. This area contained an assembly place known as a ‘*haugr’* and potentially an old Norse burial ground characterised by mounds. The *haugr* was a large flat topped mound known as ‘Thingmount’ (DU018-020132), which was located c. 20m south of the Proposed Project. ‘Hoggen Green’, the medieval name for this area, is both a legacy of the old Norse word as well as demonstrating the continued importance of the place for subsequent generations. The probable extent of the green is shown in **Figure 10.3**, which maps the significant early medieval and medieval features throughout the city.

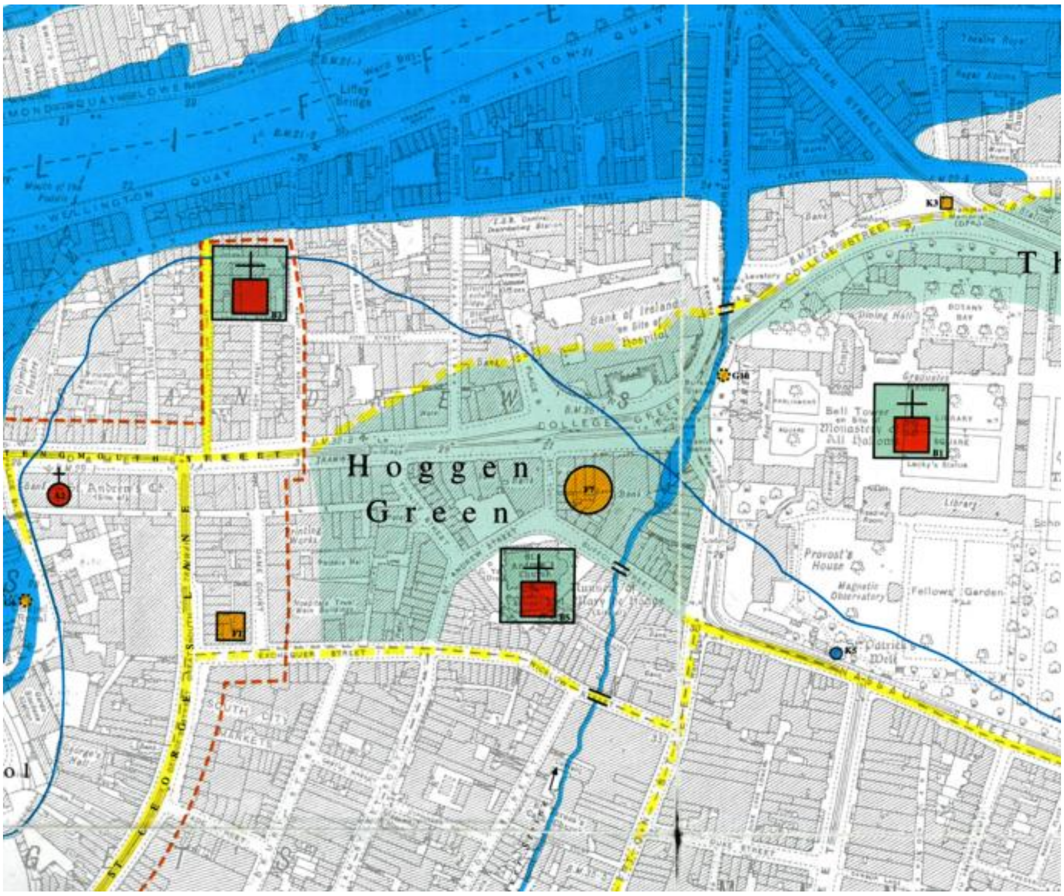

Figure 10.3 - Extract from Clarke's map of Dublin showing the possible extent of 'Hoggen Green' within the landscape containing the Proposed Project.

Medieval Period (AD 1100–1700)

Before the Normans arrived, Dublin was already a thriving centre; one of the so-called 'Seven wonders of Ireland' as detailed within the Book of Leinster. Despite the fact that the patron of this book was Diarmuid Mac Murchada, the King of Leinster and overlord of Dublin, does not negate the fact that Dublin was an impressive place. During the 1160s, the medieval city contained a royal hall, a large cathedral, seven parish churches within the town walls (as well as a further seven external to them), two Viking monuments as well as a plethora of post-and-wattle houses and workshops (Clarke 1995, 5). The parish churches of the city were associated with wealthy families or with national groups who has settled in the city including French, Scandinavians and English people. Diarmuid Mac Murchada, founded a community of Arroasian nuns (DU018-020047) located to the north of the Proposed Project at the site of the Bank of Ireland (RMP incorrectly places the establishment at the site of St Andrew's Church). This abbey become known as 'St. Mary's de Hogges' due to the presence of the haugr to the south. Throughout the later medieval period, this area was known as Hoggen Green and acted as an open commonage for livestock and recreation (De Courcy 1996, 20–21). It was bounded on the west by Blind Gate, the most easterly gate into Dublin City.

The nunnery was a major local landowner until the Reformation, when the religious house was dissolved by King Henry the VIII. When the abbey was dissolved in 1538, Sir Robert Baggot was granted three acres in tenement of Baggotrath (Baggot Street). William Brabazon, under treasurer of Ireland, disposed of about 254 acres with several messuages (medieval house plots), houses, cottages and gardens in the counties of Dublin, Meath, Kildare and Carlow. The value at that time given was 18 pounds 5 pence, but the acreage and value of some property in Meath is not entered. In 2016 it is possible that a medieval wall foundation was identified during archaeological monitoring at the Bank of Ireland, c. 30m north of the Proposed Project (Licence Ref.: 16E0399).

After the arrival of the Anglo-Normans in 1169, the ruling order was altered: the citizens had a new lord – the King of England. During this time the medieval town of Dublin enjoyed a period of prosperity and its development was very much connected with and orientated towards England, the centre of colonial power. The Anglo-Norman administration augmented the town walls with towers and gates.

Further gates were established outside these walls that funnelled people into the city along prescribed routes. As well as these new works, a castle was constructed within the southwest corner of the medieval city, likely over a pre-existing Hiberno-Norse hall, where the ceremonial and administrative parts of civic life were carried out.

During this time, the first large scale reclamation works of land from the River Liffey began at Wood Quay and Exchange St Lower as a part of the extramural development of medieval Dublin. The 1192 Dublin Charter admitted that citizens were free to "*improve themselves in making buildings…..upon the water*," implying that land was being reclaimed from the river at that date (Halpin 2000, 34).

These were not the only additions during this period; Dublin was now home to a number of new religious houses which were constructed both south and north of the River Liffey, including St. Francis's Friary (DU018-020045) c. 815m southwest of the Proposed Project and an Augustinian Friary (DU018-020046), located c. 110m to the northwest of the Proposed Project. In 1166, the Augustinian Priory of All Saints (All Hallows) (DU018-020044) was established by Diarmait Mac Murchada, outside of the town walls on the location that was to later become Trinity College (Gwynn and Hadcock 1970, 171).

Another religious foundation occurring to the east of the medieval town was established in 1220 by Henry of London, the Archbishop of Dublin. De Courcy states that the growing number of Dubliners embarking on pilgrimage to Santiago de Compostella departed on ships sailing from the southern shore of the Liffey, east of the mouth of the Stein River (1996, 190). Henry of London's foundation is reputed to have cared for waiting pilgrims as well as lepers (Lee 1996, 14). The site of this foundation is believed to have been located c. 325m east-northeast of the Proposed Project (DU018-020061). A 'Lazaretto' is the name for a quarantine station for maritime travellers, while a leper colony administered by a Christian order is known as a lazar house after the parable of Lazarus the beggar (Takeda 2011, 118). It is believed that this foundation gave its name to the area – Lazar's Hill which was later corrupted to Lazy Hill, eventually becoming modern Townsend Street.

Dame Street once formed a central point for the eastern suburb and also provided access from the east to the city. This area still contained the ceremonial monuments of Viking Dublin and 'Thingmount' remained as a prominent feature in this area. The Anglo-Normans concentrated their judicial and exchequer administration within this eastern suburb, reflected in the name Exchequer Street, to the southwest of the Proposed Project. Clarke (1995, 7) noted that the proliferation of medieval churches visible in other suburbs was not present in the eastern suburb. He reasoned that unlike the rest of the city, this area was not residential; therefore, the spiritual needs of the community were not a priority. Perhaps, this theory is further supported by the presence of a number of industrial features such as mills, which lay within the eastern part of this suburb along the Steine River and within the Proposed Project area.

In 1602, Sir George Carey was given a lease for land in Hoggen Green 'to build a hospital for the relief of poor, sick, and maimed soldiers'. The lands were formerly the site of the Abbey of St Mary de Hogges. The resultant hospital (DU018-020/430) is depicted on Speed's map of 1610 as 'Hospitall'. It was also known as Carye's, or Carew's, Hospital.

The house was described as a large three-bay building in 1610 (Clarke 2000, 28). In 1612, Sir Arthur Chichester, acquired it as a 'capitall massuadge (or house), neere the cittie called the hospital' (DU018- 020430), together with the gatehouse (DU018-020/432), court, and wall (DU018-020/433) about the same' (De Courcy 1996, 20–21). Following the death of Chichester, the house, known as 'Chichester House' in 1613, passed first to Samuel Smith, and then to Lord Justice Sir John Borlase, who received the structure in 'a much decayed and ruinous condition' (De Courcy 1996, 21). The Parliament of Ireland was held in this building in 1661, and in 1673 the Crown took a lease of the property for use as a parliament house (ibid, 21).

10.4.2 Summary of Previous Archaeological Fieldwork

A review of the Excavations Bulletin (1970–2016) has revealed that a number of archaeological excavations have been carried out within the environs of the Proposed Project, although most excavations have taken place within the medieval core of the city, further to the west.

Monitoring was undertaken as part of the Luas Cross City (LCC) Heritage Works contract for the Railway Procurement Agency (RPA) (Bennett 2015:326, Licence Ref.: 14E0405 & Bennett 2015:011, Licence Ref.: 13E0353). The contract was designed to identify previously unrecorded sub-surface archaeological stratigraphy which will be impacted upon by the construction of LCC. In 2014, the remains of four burials were identified as part of archaeological works within the eastern part of the Proposed Project. These were initially thought to be Viking burials. However, Carbon 14 dating confirmed that the burials dated to the later medieval periods (c. 15th and 17th centuries).

In addition to the above, several previously unrecorded cellars and associated structures were identified. Numerous drains, cobbled surfaces, sewers and other culverted services were identified and a number of calp limestone walls foundations related to buildings which fronted onto College Green were recorded. Layers representing phases of road surfacing, activity and demolition were also found to be present.

In 2014, as part of the Luas Cross City works, the base plinth of the Molly Malone statue was removed from its original location on Grafton Street as well as the plinth of the Thomas Moore statue on College Street. No archaeological material was recorded in the course of these works. In advance of the re-location of the Molly Malone statue to outside of the entrance to the Dublin Tourism centre on St Andrew's Street, an area measuring 3.8m x 2m x 0.72m was excavated in order to accommodate the new plinth. The basal course of a post-medieval wall (1.85m) and some stone paving were recorded, which extended beyond the northern and eastern excavation limits. The partial remains of a stone-paved pathway were recorded on the western side of the trench and aligned north-northeast/south-southwest. The paving stones were laid on a bed of lime mortar. The paving and basal course of the wall were removed under supervision.

In 2013, archaeological monitoring of site investigations within the basement of No. 37 College Green was carried out due to the site of a mill being recorded at this location (DU018-020401). The mill site is located to the immediate south of the Proposed Project. Six pits were hand dug through the basement floor, which was found to be constructed directly upon natural sub-soils. Nothing of archaeological significance was identified.

In 2016 the remains of a corner of a medieval building were identified within the Bank of Ireland complex c. 30m north of the Proposed Project, within an existing small courtyard (Licence Ref.: 16E0399). It is likely that the wall foundations relate to the Arrosian nunnery (DU018-020047), although post excavation work has yet to take place (Dr Ruth Johnson, *in lit.*).

Archaeological monitoring was carried out during redevelopment work in the basement of Nos 3–4 College Street, c. 15m north of the Proposed Project (Bennett 2003:511, Licence Ref.: 03E0083). During the monitoring programme the basement slab was reduced by 0.5m but was found to sit directly on a coarse gravel deposit, originally associated with the river.

At 116 Grafton Street, which is within the Proposed Project are, two test-trenches were opened by hand to the rear of the basement of the existing building (Bennett 1999:205, Licence Ref.: 99E0048).

There was no evidence for any archaeological features or soils. The existing concrete floor appeared to have been laid directly on yellow natural sub-soil.

In 2007, archaeological investigations were carried out at 32 Dame Street, c. 60m west of the Proposed Project. These took place below the existing basement of the structure that fronts onto Dame Street. Despite the fact that little archaeology has been found at this depth along other parts of Dame Street, the remains of a medieval ditch were identified. Due to the limited nature of the excavation, the ditch appeared to curve significantly and was interpreted as potentially marking the boundary between Hoggens Green to the east and the city to the west (Bennett 2007:471, Licence Ref.: 07E0582).

In 2006, Monitoring took place of a service trench in Parliament Square (Front Square), Trinity College, Dublin 2 (Bennett 2006:648, Licence Ref.: 03E0152). The service trench was excavated as part of the refurbishment programme of the square and involved the replacement of the water main and fire hydrant servicing the main blocks. Works at the northern end of the square (Nos 7–12) revealed original ground level between 1m and 1.1m below present ground level. This underlying ground was deliberately built up. Most distinctive was a deep deposit of brick rubble at the western end of the trench, which lay 0.6m below present ground level and was 0.5m in depth. The brick was handmade, probably 17th-century in date. The brick rubble at the western end of the trench is in roughly the same location as the original precinct wall and may represent the demolished and robbed-out remains. The remainder of the infill deposits consisted of mixed clays, which contained oyster and cockleshells, animal bone, plaster, fragments of limestone mouldings and brick fragments. No ceramics were found within the fill.

10.4.3 Cartographic analysis

Speed's Map of Dublin, 1610

Speed's Map of 1610 illustrates that the area comprising present-day College Green consisted of undeveloped land, bounded by "The Hospitall" to the north (DU018-020430) and the College of the Holy Trinity to the east. The River Steine is shown on this map, extending from the west front of the college southwards, parallel to Grafton Street on its western side towards St. Stephen's Green area.

*Bernard de Gomme, The City and Suburbs of Dublin, 1673 (***Figure 10.4***)*

De Gomme's map of 1673 is the next detailed depiction of the city centre. 'Colledg Green' and 'Trinity Colledg' are annotated as is Trinity Lane. However, the remaining streets that are part of the Proposed Project are depicted including Dame Street, Church Street and St Andrew's Street. St. Andrew's Church (DU018-020072), is shown within a sub-rectangular precinct. Interestingly, the church is drawn as an elliptical shape with a squared portico to the southeast and aligned northeast-southwest. This church was built 1670-74 by the architect William Dodson (Craig and Wheeler 1948, 9-10). Its position was close to the Norse 'Thing Motte', or assembly site, which was also round. Perhaps, the shape of the church referenced this site. It also thought that this could be influenced by the church of Sant Andrea al Quirinale in Rome (Lennon & Montague 2010, 39).

The area which is currently occupied by Bank of Ireland on the northern side of College Green is notably different. A structure in this location is detailed as 'Parliament House'. This occupies the eastern corner of College Green and later Westmoreland Street. It bears no resemblance to later buildings and represents the Chichester House. It is set within an irregularly shaped quadrant that does not appear to contain any other structures. Foster Place is not depicted. The area to the north and northwest of the Proposed Project is depicted as enclosed plots of land potentially fields. The curving road that now flanks Trinity College at the west end of college Green is absent and the college presents as a uniform fronted façade immediately adjacent to the street.

Westmoreland Street is not yet laid out and the area north of the Proposed Project is annotated as 'Ground taken in from the Sea'. A street leading east-northeast from College Green is annotated as 'Lazy Hill'.

Charles Brooking, A Map of the City and Suburbs of Dublin, 1728

By the time of this map, there have been a variety of developments with the Proposed Project including the laying out of new streets and construction of buildings. 'Colledge Green' is annotated and it contains two features that are known to have been equestrian statues. The street widens as it approaches Trinity College to the east. A bowed courtyard to the front of Trinity is now depicted. It protrudes into College Green. This is likely the reason for the curved street that wraps the college. College Street has been laid out and is now annotated.

Within the southwestern area of the Proposed Project, Trinity Street is shown, St Andrew's is annotated as Hog Hill, Church Street is shown but not annotated. A circular structure is shown as set within a precinct and annotated as 'The Round Church'. Suffolk Street is shown and annotated.

The area to the north of College Green where Bank of Ireland is now located is shown as fully developed. However, it is clear that the new House of Parliament has not been constructed as its distinctive colonnaded front is not depicted. A yard and access laneway are centrally located within the block. A laneway is shown but not annotated which provided access to Fleet Street. Anglesea Street is shown and annotated.

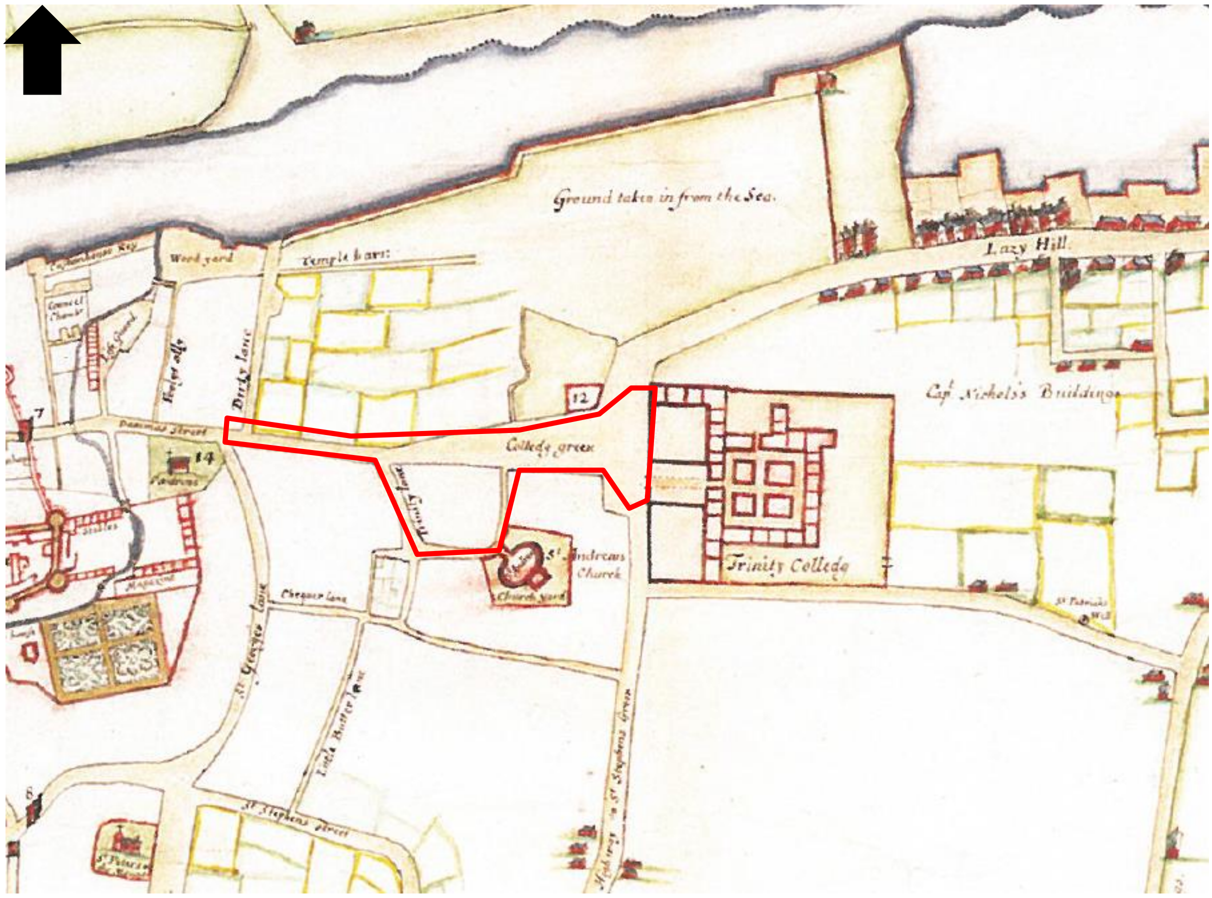

Figure 10.4 - Extract from De Gomme's map of 1673 showing the approximate location of the Proposed Project

*John Rocque's Exact survey of the city and suburbs of Dublin, 1756 (***Figure 10.5***)*

Unlike Brooking, Rocque provides vivid detail in his map of Dublin City. The entire area of the Proposed Project is clearly depicted. The information presented on the general layout of the street mirrors that from Brookings earlier map. However, Rocque depicts the individual buildings, which front the street, their property boundary and gardens.

By this time, Parliament House which was designed by Edward Lovett Pearce has been constructed. It appears as irregular in plan. Its distinctive Palladian front engages directly with College Green. An arc of bollards curves outwards into College Green, which explain the modern curving path around the building. The famous octagonal House of Commons inside of the Parliament is shown. The eastern extension has not yet been constructed and is shown to contain a row of residential structure that front onto College Street.

Trinity College is depicted as a uniform range framing the eastern end of College Green. Similar to Parliament House this too has an arc of bollards that address College Green creating a symmetrical front.

Although College Green was once a large commonage only a small area of this survives at its very eastern end where the street appears to open outwards towards Trinity College. A large equestrian statue of William II or William of Orange was installed on College Green to commemorate his success at the Battle of the Boyne over James II. The status remained in situ for over 200 years.

The area around St Andrew's Church is depicted in great detail with residential buildings depicted as flanking Trinity Lane, Suffolk Street Church Lane and Hog Hill as St Andrew's Street was known at this time. The plots are largely rectangular with street fronting house and rear garden as well as mews buildings or workshops. St Andrew's Church is situated in a diamond shaped prescient and the building depicted as circular.

Scalé does not show any major changes within the area containing the Proposed Project on his 1773 revision to Rocque's original map.

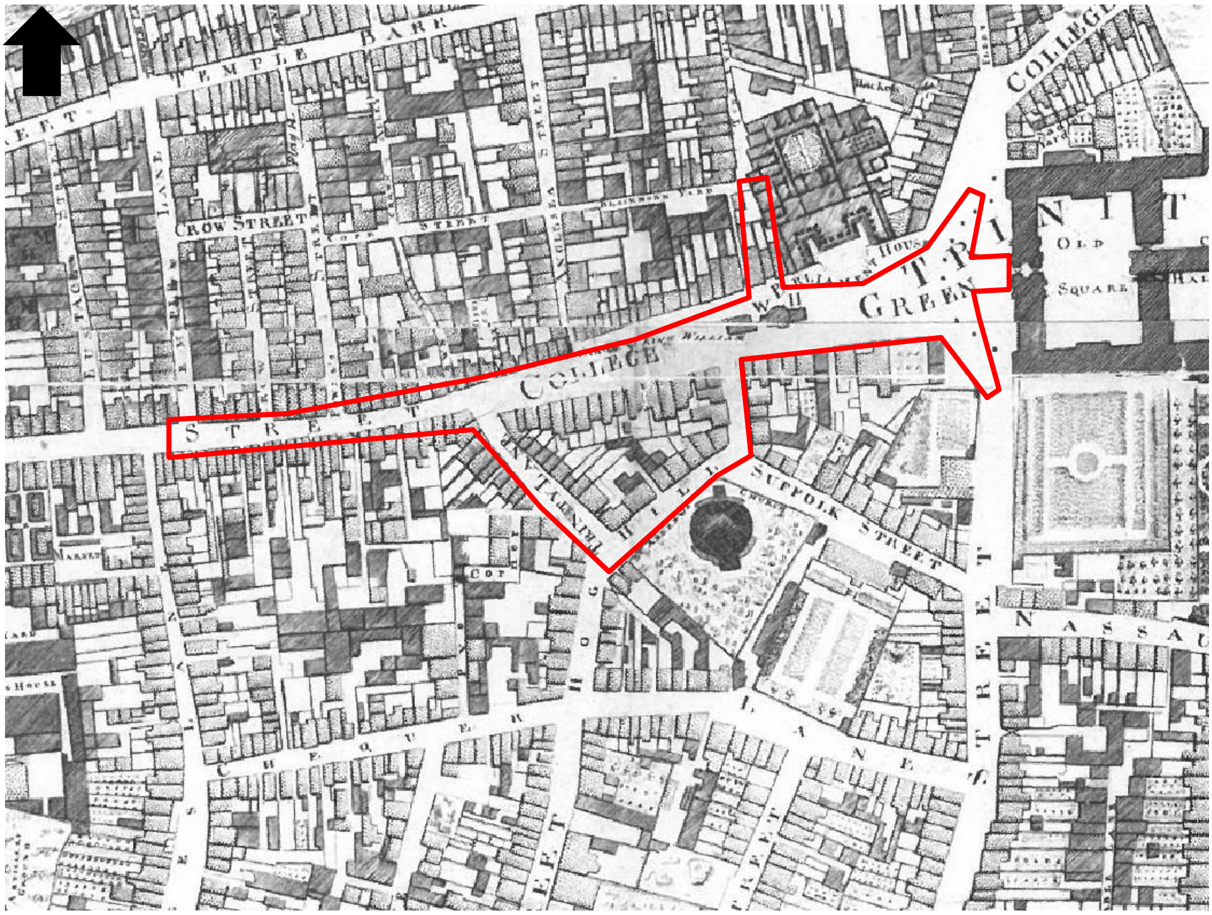

Figure 10.5 - Extract from Rocque's map of 1756, showing the approximate location of the Proposed Project

Wilson's Directory Map of Dublin City, 1760

The map, like Brookings does not depict individual buildings or show the Proposed Project in great detail or accurate scale. It depicts the general area of the Project as streets and blocks that largely conform to the current layout. However, Westmoreland Street has not yet been developed. Parliament House is annotated.

William Duncan's Map of the city and county of Dublin, 1821

The area of the Proposed Project is depicted; however, the detail is limited to larger blocks and the overall street pattern. By this time, Parliament House has been extended to the east by Gandon and recommissioned as Bank of Ireland. The status of William II is marked as before. The area of Fleet Lane is shown to have been widened to become Westmoreland Street. The laneway formerly visible immediately west of the House of Parliament is now enclosed and appears to mirror the modern extent of Foster Place. The remaining area of the Proposed Project is unchanged. No further aspects of interest discerned from this map.

Cooke's royal Map of Dublin, 1822

This map shows somewhat more detail than Duncan's map although the overall layout of the blocks and road network with the Proposed Project remains much the same. The laneway immediately west of Parliament House is connected to Fleet Street via a curving lane way annotated 'Parli. R' taken to mean Parliament Row. Westmoreland Street is clearly shown and annotated as a large wide street. This replaced the narrow Fleet Lane and was constructed over reclaimed ground. The statue of William II is marked. The streets that form the Proposed Project are all shown and annotated with the same names that are in use today with the exception of Foster Place which is shown but not annotated and Bank Street (now College Street, as it was previously).

First Edition Ordnance Survey Map, 1843, scale 1:10,560

This is the first accurate historic mapping coverage of the area containing the Proposed Project. The overall road network, the properties and their boundaries that comprise the area of the Proposed Project are clearly visible.

The Proposed Project area is shown as fully developed. Individual plot boundaries cannot be distinguished at this scale. Some yard spaces discernible to the rear of the properties that front onto the road network of the Project.

St Andrew's Church and prescient is clearly shown as an elliptical shape with a square portico to the south. The diamond shaped prescient is depicted as containing a graveyard and the area is also incorrectly annotated 'Site of St. Mary de Hogges' (DU018-020047).

Parliament House is very clearly shown with individual spaces within the overall structure visible. A note is present on the mapping indicating that the current buildings was constructed on 'the site of Hospital'. Foster Place is annotated and now appears to be segregated from Parliament Row but access many now be via closed cover-way that is shown on the map. The Royal Bank of Ireland is detailed and annotated along the western side of this street.

The courtyard and colonnade to the immediate west of Trinity College is shown. In this mapping, it clearly mirrors the parish and ward boundary of St Mark's and St Andrew's.

Ordnance Survey Map, 1864, scale 1:1,056

There has been no notable change to the overall layout of road or properties boundaries within the Proposed Project. However, St Andrew's Church has been completely redeveloped as a five-bay aisled structure with a semi-circular apse facing northeast.

Not previously indicated on any map but present on this edition are public facilities such as water foundations, urinals and post boxes. This reflects this Victorian culture of the provision of civic amenities.

Ordnance Survey Map, 1911, scale 1:2,500

By the time of this map there have been one notable change within the Proposed Project. Tramlines now cross the Proposed Project area along Dame Street, College Street, Grafton Street and Westmoreland Street. The scale of this mapping allows individual buildings to be represented. Some buildings are annotated with a particular function such as banks or post office.

10.4.4 City Development Plan

The Dublin City Development Plan (2016–2022) recognises the statutory protection afforded to all RMP sites under the National Monuments Legislation (1930–2014). The development plan lists a number of aims and objectives in relation to archaeological heritage. It is a policy of the Dublin City Development Plan to promote the *in situ* preservation of archaeology as the preferred option where development would have an impact on buried artefacts. Where preservation in situ is not feasible, sites of archaeological interest shall be subject to archaeological investigations and recording in line with best practice, in advance of redevelopment.

The Study Area is located within the zone of potential for the historic town (DU018-020). There are no recorded monuments located within the Proposed Project. A total of 40 individual or groups of sub-constraints are located within c. 150m. These are marked on **Figure 10.1** with numbers that correspond to the entries in **Table 10.1**.

10.4.5 Aerial Photographic Analysis

Inspection of the aerial photographic coverage of the Proposed Project area held by the Ordnance Survey (1995, 2000 and 2005) and Google Earth (2008-2016) failed to identify any previously unknown features or areas of archaeological potential due to the urban nature of the landscape.

10.4.6 Field Inspection

The field inspection sought to assess the area, its previous and current land use, the topography and any additional information relevant to the report. During the course of the field inspection the area of the Proposed Project and its immediate surrounding environs were inspected for known or previously unknown archaeological sites. The visit was carried out over several days in December 2016 and January 2017 in varying weather conditions. The Proposed Project is undergoing extensive construction works throughout the eastern part due to works associated with the Luas Cross City development.

The Proposed Project contains College Green and parts of Dame Street, Trinity Street, St Andrew's Street, Church Lane and the very northern end of Grafton Street. The Proposed Project is adjacent to the southern end of Anglesea Street and occupies the full area of Foster Place and College Green which includes the southernmost part of Westmoreland Street, the area south of Bank of Ireland (former House of Parliament) and immediate west of Trinity College (DU018-020044). St Andrew's Street area are located on a slight ridge that creates a local elevation above College Green.

The Proposed Project area is fully developed. It comprises a number of roads as outlined above, that are paved or tarmacadamed with flanking footpaths. In some areas, these contain original granite paving stones but other surfaces are modern such as St Andrew's Street. The Proposed Project largely comprises commercial properties including banks and office as well as shops and restaurants typically situated along the lower level of buildings. For the most part the buildings are historic dating from the 18th, 19th and early 20th centuries.

Although, there are some modern buildings throughout the Proposed Project. Notably, the vast majority of these buildings contain basements, several of which are accessible from street level.

College Green is a large dual lane roadway measuring c. 26m at its narrowest extent but expanding to c. 46m as it moves east towards Trinity College. There is a traffic island that contains a number of statues or installations including Henry Grattan and Thomas Davis memorial fountain. This area also contains a bike depot and a taxi rank. A larger taxi rank occupies Foster Place. There are a number of bike depots / racks throughout the area including along St Andrew's Street. The newly relocated Molly Malone statue is placed in the area in front (north) of St Andrew's church.

Whilst the developed nature of the Proposed Project certainly disguises any subsurface remains there are some interesting features that may indicate area of archaeological potential. Of interest is the irregular shape of the blocks formed by Andrew and Trinity but also Suffolk and Grafton Street, which both front onto College Green. These are likely to represent 'infilling' blocks, which were often established on the edge of green or common areas during development associated with the expansion of a town or city.

Architecture

10.4.7 Architectural Background

During the post medieval period (AD 1700-1950), Dublin city changed in plan, function and composition. It moved from a decaying colonial outpost to a cosmopolitan 'city of the Empire' (Boyd 2006). In 1610, Speed created a map of Dublin that largely depicted the last snapshot of a medieval city, which more or less had occupied the same structural framework for the previous 600 years. However, in 1756, John Rocque's map captured a transformed city (Lennon 1995, 1-9). The reasons for this are multifaceted. In 1538, the Dissolution of the Monasteries, an act to remove the power (and vast wealth) from religious houses changed the ecclesiastical landscape of Dublin and many of the former monasteries were repurposed. Chichester House was constructed upon the site of the nunnery to temporarily house Parliament. All Saints Priory became Trinity College and St. Saviour's Priory emerged as an inn of the court. Around this time, the name 'Hoggen Green' was replaced with 'College Green' perhaps to reflect the repurposing of the former monastery as an educational institution. On the northern side of the College Green a hospital was constructed by Sir George Carey as a place to house and care for maimed soldiers in 1602 (De Courcy 1996, 20–21). Parliament occupied this building until a purpose-built structure was ready in 1728.

Major improvements to the City of Dublin took place in the latter half of the 17th century and this included the development of lands by the Corporation of Dublin. This comprised area that had been part of the margins of the river or low-lying land adjacent. The Corporation were facilitated by the earlier Norman charter, which had granted to the city all of the tidal area, so that any land reclaimed from the water became city property with potential rental income. Throughout the 1600's shallow areas of the Liffey estuary were reclaimed and quays were created on the south banks. Furthermore, around this time, access to Dublin Port had become problematic as the Liffey channel frequently silted up. Ingeniously, the channel was dredged and the silt was used in further the reclamation process. This provided more land for development and enabled larger ships access to the port thereby increasingly trade and economic growth.

Dublin experienced a period of relative prosperity after the restoration of the Monarchy in 1660 and the re-establishment of colonial control of Ireland. During this period, a new social order was established with the emergence of a wealthy merchant class whose signature building appeared to have been the 'Dutch Billy' style houses. They were terraced rows of houses with decorative gables that fronted the street. The distinctive features of these buildings was their stepped or curved pediment as well as their arrangement at right angles to the street. One further defining feature is that two houses shared a single large chimney-stack that was angled to accommodate two dwellings. These buildings were to become the dominant form of housing in Dublin during the late 17th century. An image of College Green in 1753 depicts a number of these buildings.

In the later 18th century, various schemes for the improvement of Dublin's streets were devised and implemented by the Wide Streets Commissioners. Amongst those selected for redevelopment was Dame Street and College Green. The former had largely retained a narrow medieval form up to that time. Dame Street had been earmarked for earlier demolition in 1699 (Lennon 1995). From the early 1780s properties on either side of Dame Street were acquired by the commissioners and demolished. The street frontage was rebuilt further back from the earlier boundary to achieve the broad, straight street that is seen today at Dame Street. College Green did not require the same degree of intervention as it was already reasonably wide, though

During the 18th century, large civic buildings were constructed including the Houses of Parliament, a new façade for Trinity College, the Central Bank on Foster Place.

In 1727 it was decided to construct new parliament building at College Green as the previous building, Chichester House, was increasingly dilapidated. The new building was designed by Edward Lovett Pearce and it was to be the first purpose-built two-chamber parliament building in the world. The principal entrance consisted of a colonnade of Ionic columns extending around three sides of the entrance formed an 'E' shape. The building was later added to by James Gandon, who designed, the Custom House, the Four Courts and the King's Inns. Between 1785 and 1789 a new peer's entrance was added to the east of the building, facing onto Westmoreland Street.

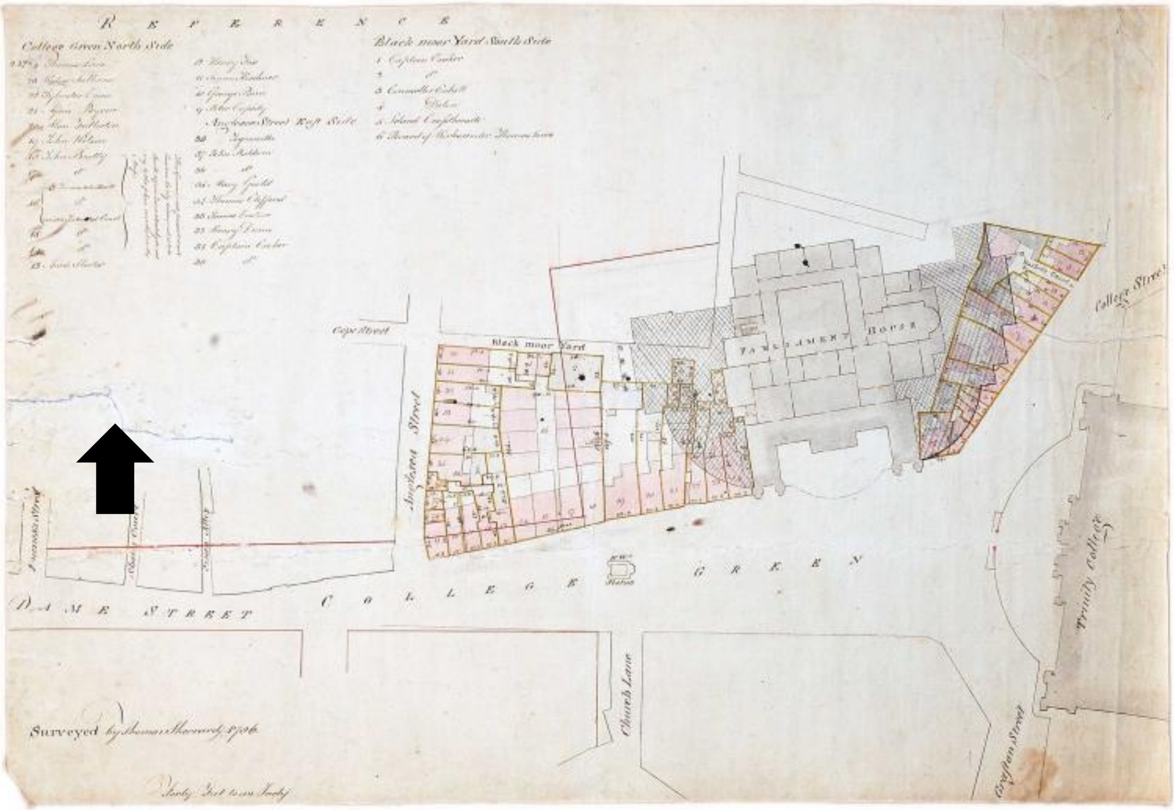

Figure 10.6 - Extract from the WSC mapping, showing proposed changes on the northern side of College Green

While the plans for Westmoreland Street and D'Olier Street were drawn up in the early 1790s, it was 1800 before Westmoreland Street was laid out and D'Olier Street followed later. **Figure 10.6** shows the original plan prepared by the Wide Streets Commissioners; the proposed new streets are shown superimposed on the existing streets and buildings. "Bank Street" was a proposal for a change of name of College Street, though this was never implemented.

An architectural characteristic of domestic buildings of Dublin from this period are the long, terraced rows of brick-built Georgian houses with distinctive 12-pane windows and granite steps leading to a doorway crowned with a fanlight. Many of the earlier 'Dutch Billy' houses were modified during this period and their gables were 'filled in' to mimic the new and fashionable Georgian houses. These new estates were typically set around large squares or green spaces. From the 1750s onwards, there was an increased emphasis on the construction of suburban estates, which coincided with the decline of the inner city. This was a key turning point in Dublin City's history; as the suburbs grew so did the tenements and poor living conditions within the inner or historic city.

Since the early 19th century there have been no major changes to the street pattern in the College Green area. Many buildings have been replaced and street surfaces and street furniture have been renewed, along with traffic islands, signs and signals. Street furniture has included the provision of statues, including the following, in the order in which they were erected:

Thomas Moore, College Street, by Christopher Moore, erected in 1857. This stood on top of the underground public toilets at the junction with Westmoreland Street, leading James Joyce's Leopold Bloom to remark "the meeting of the waters". The statute is currently in storage during the works for Luas Cross City.

Henry Grattan, College Green, by John Henry Foley, erected in 1876. Neal Doherty has remarked that "College Green is the perfect place for a statue of the great orator Henry Grattan, facing Trinity College, where he was educated, and to his left the old Irish Parliament building". The lamp standards with the sea horse sculptures that stand adjacent to the Grattan statue are part of the assemblage.

Thomas Davis, College Green, 1945. A stone plaque to the memory of Thomas Davis laid in 1945 is located close to the Thomas Davis fountain.

Thomas Davis, College Green, by Edward Delaney, 1966. The assemblage with this statue includes a fountain surrounded by four trumpet-playing figures and four plaques.

Molly Malone, Grafton Street, by Jeanne Rynhart, erected in 1988. This statue is currently located outside the tourist office in the former St Andrew's Church, Suffolk Street, during the works for the Luas Cross City.

10.4.8 Dublin City Development Plan

10.4.8.1 Protected Structures

A number of structures immediate to the Proposed Project are included in the Record of Protected Structures as set down in the Dublin City Development Plan 2016-2022. These include most buildings in College Green, Dame Street and Grafton Street, along with others in the remaining streets (52 in total). Structures fronting onto the Proposed Project are listed in **Table 10.2**. The structures are marked on **Figure 10.2** and illustrate how the Proposed Project is directly flanked by protected structures within the exception of Trinity Street. Of particular relevance to the present Proposed Project are the statues of Thomas Moore and Henry Grattan, which are protected structures within the streets, although the Thomas Moore statue is currently in storage.

The following features are in the public arena:

- Thomas Moore statue, College Green (Ref.: 2007)
- Henry Grattan Monument, College Green (Ref.: 1987)

Table 10.2 - Protected Structures

RPS Ref.	Address	Description
1541	2 Church Lane, Dublin 2	Shop
1542	3-4 Church Lane, Dublin 2	Licensed premises side elevation of 1-2 Suffolk Street

1986	College Green, Dublin 2	Bank of Ireland (old Parliament House and armoury building)
1987	College Green, Dublin 2	Henry Grattan monument
1988	2,3 College Green, Dublin 2	Former Yorkshire Insurance building
1989	9 College Green, Dublin 2	Shop and offices
1990	12-14 College Green, Dublin 2	Shops and offices
1991	15 College Green, Dublin 2	Commercial premises
1992	16-17 College Green, Dublin 2	Bank and offices
1993	20-22 College Green, Dublin 2	Former bank (now licensed premises)
1994	23-27 College Green, Dublin 2	Bank building
1995	32-33 College Green, Dublin 2	Ulster Bank: façade, including front domed roof and flanking chimneys
1996	34 College Green, Dublin 2	Former bank (now commercial premises)
1997	35 College Green, Dublin 2	Bank buildings
1998	36 College Green, Dublin 2	Commercial premises and offices
1999	College Green: Trinity College, Dublin 2	Buildings fronting Parliament Square, including Regent House, the Chapel, the Examination Hall, the Dining Hall and the 1937 Reading Room
2000	College Green: Trinity College, Dublin 2	Statues of Oliver Goldsmith and Edmund Burke
2001	College Green: Trinity College, Dublin 2	Entrance gates and railings with granite bases on Grafton Street, facing College Green; railings with granite walls on College Street and the western end of Pearse Street; railings with granite walls on Nassau Street and Leinster Street South.
2007	College Street, Dublin 2	Thomas Moore monument
2102	19-22 Dame Street, Dublin 2	Burton Chambers
2103	24 Dame Street, Dublin 2	Commercial premises (Dame House)
2104	25 Dame Street, Dublin 2	Commercial premises
2105	26-27-28 Dame Street, Dublin 2	Commercial premises
2106	29-30 Dame Street, Dublin 2	Commercial premises
2107	31 Dame Street, Dublin 2	Commercial premises
2108	37 Dame Street, Dublin 2	Commercial premises
2109	38 Dame Street, Dublin 2	Commercial Premises
2110	39 Dame Street, Dublin 2	Commercial Premises
2111	40-41 Dame Street, Dublin 2	Commercial Premises
2112	46-49 Dame Street, Dublin 2	Commercial Premises
2113	50-51 Dame Street, Dublin 2	Building

2114	52 Dame Street, Dublin 2	Hibernia House, including ground floor shop front
2115	53 Dame Street, Dublin 2	Building
2116	54 Dame Street, Dublin 2	Building
2117	55 Dame Street, Dublin 2	Commercial premises
2118	56 Dame Street, Dublin 2	Commercial premises
2119	57 Dame Street, Dublin 2	Commercial premises
2927	3-4 Foster Place South, Dublin 2	Offices (former bank)
2928	5-6 Foster Place South, Dublin 2	Offices
3240	1 Grafton Street, Dublin 2	The Provost's House, Trinity College: House, boundary walls, gate piers and gates
3257	107 Grafton Street, Dublin 2	Shop (at corner of Suffolk Street)
3258	108 Grafton Street, Dublin 2	Shop
3259	110 Grafton Street, Dublin 2	Shop
3260	112 Grafton Street, Dublin 2	Shop
3261	113 Grafton Street, Dublin 2	Offices
3262	114 Grafton Street, Dublin 2	Former bank
3263	115 Grafton Street, Dublin 2	Shop
3264	116 Grafton Street, Dublin 2	Shop
3265	117 Grafton Street, Dublin 2	Shop
3266	118 Grafton Street, Dublin 2	Shop and offices
3267	119 Grafton Street, Dublin 2	Shop and offices (including 37 College Green)
7569	19-24 St Andrew’s Street, Dublin 2	Post Office

10.4.8.2 Conservation Areas & ACAs

The areas outlined and hatched in green as shown on **Figure 10.2** are ACAs. Sections of three ACAs are included within the Proposed Project. The O’Connell Street ACA includes Westmoreland Street and College Street. The South City Retail Quarter ACA crosses over Suffolk Street to include the frontage of College Green to the east of Church Lane as well as the south-eastern side of St Andrew’s Street. The Grafton Street and Environs ACA includes the eastern side of Grafton Street at its northern end.

In addition to the ACAs the entire Proposed Project lies within a Conservation Area that is hatched in red within the development plan mapping. This is a conservation area that is not an architectural conservation area, but is subject to certain policies and objectives set down in the Dublin City Development Plan 2016-2022. Within these areas, it is the policy that:

"CHC4 *To protect the special interest and character of all Dublin's Conservation Ares (11.1.5.4). Development within or affecting all conservation areas will contribute positively to the character and distinctiveness; and take opportunities to protect and enhance the character and appearance of the area and its setting, wherever possible."*

Grafton Street and Environs ACA

The northern part of the Grafton Street and Environs Architectural Conservation Area, from the junction with Nassau Street to the corner of College Green, is included with the area affected by the Proposed Project. One of the key objectives of that ACA is:

"It is an objective to carry out a co-ordinated street improvement scheme for Grafton Street that will upgrade the existing paving and street furniture. Paving work will be to a high design standard and of high quality paving materials and complementary in slab size, colour and texture with the architectural character of the street. As yet there is no time scale proposed for this work."

10.4.8.3 Paved Areas and Stone Kerbing and Setts

Dublin City Development Plan 2016-2022 reads as follows:

"CHC15 *To preserve, repair and retain in situ, where possible, historic elements of significance in the public realm including railings, milestones, city ward stones, street furniture, ironmongery, and any historic kerbing and setts identified in Appendices 7 and 8 of the Development Plan, and promote high standards for design, materials and workmanship in public realm improvements. Works involving such elements shall be carried out in accordance with the Department of Arts, Heritage and the Gaeltacht Advice Series: Paving, the conservation of the historic Ground Surfaces."*

Stone Setts

Appendix 7 of the Dublin City Development Plan 2016-2022 is headed "Stone setts to be retained, restored or introduced" and lists a number of streets and bridges. The text along with this list reads:

"Works pertaining to this schedule of streets pertaining to: paved areas; granite paving flags and kerbing; original coal-hole covers; traditional pattern manhole covers; and stone and cast-iron protective bollards; shall be retained in situ or restored and included in the City Council's implementation of the Historic Street Surfaces in Dublin: Conservation Study and Guidance Manual (2009)."

None of the streets that form part of the Proposed Project are listed in Appendix 7.

Paved areas

Appendix 8 of the Dublin City Development Plan 2016-2022 lists locations where there are paved areas – listed in appendix 8.1 – and paved areas and streets with granite kerbing – listed in appendix 8.2. The text that accompanies this appendix reads:

"Works pertaining to this schedule of streets pertaining to: paved areas and streets with granite kerbing, concrete flags or brick, and /or some other traditional features, such as coal-hole covers, and stone and cast-iron protective

bollards, to be retained or restored and included in the City Council's implementation of the Historic Street Surfaces in Dublin: Conservation Study and Guidance Manual (2009)."

Appendix 8.1: "*Paved areas and streets with granite paving slabs and kerbing, original coal-hole covers, traditional pattern manhole covers, and stone and cast iron protective bollards, to be retained or restored and included in the city council's programme for restoration*":

College Green (Bank of Ireland and Trinity College) is listed in this appendix.

Appendix 8.2: "*Paved areas and streets with granite kerbing, concrete flags or brick and/or some other traditional features such as coal-hole covers, manhole covers, and stone and cast iron protective bollards, to be retained or restored and included in the city council's programme for restoration*":

None of the streets that form part of the Proposed Project are listed in Appendix 8.2.

10.4.9 National Inventory of Architectural Heritage

The NIAH survey for this section of Dublin City has yet to be published.

10.4.10 Architectural Heritage Protection Guidelines for Planning Authorities

The Architectural Heritage Protection Guidelines for Planning Authorities includes guidelines relating to developments within architectural conservation areas. Section 14.4, in particular, refers to street furniture and paving and is relevant in the present Proposed Project.

"14.4.1 An item of street furniture may be protected by being included in the RPS in its own right where it is special or rare; as part of the curtilage of a protected structure; or as part of an ACA. Such items could include lamp standards, seats and benches, bollards, railings, street signs, iron signposts, freestanding or wall-mounted post boxes, telephone kiosks, horse troughs, water-pumps, drinking fountains, jostle stones, milestones, paving, kerbstones, cobbles and setts, pavement lights, coalhole covers, weighbridges, statues and other monuments.

CONSIDERATION OF PROPOSALS

14.4.2 Proposals to remove or relocate items of street furniture or other features should not be granted permission without consideration of all the implications. Statues or monuments may close a vista. Other items of street furniture, such as jostle stones or weighbridges, may have close historical associations with an adjacent building.

14.4.3 Proposals to replace historic or rare items of street furniture such as telephone kiosks, post boxes or lamp standards should be resisted by the planning authority. Traditional paving elements are important to their locality and should generally be retained where found and not moved to alternative locations which are perceived as more prestigious or as having more character.

14.4.4 Historic street furniture and paving should be protected from accidental damage. Where planning permission is granted on a site adjacent to protected *items of street furniture or paving, these elements should be sheltered from damage for the duration of the site works.*

14.4.5 Regular or repeated lifting of historic paving for the installation and maintenance of public utilities is likely to cause damage and should only be carried out with due care and, if necessary, expertise. Where new utilities are to be installed, these should generally be located away from areas of historic paving whenever possible. If appropriate, the installation of bollards or other deterrents may be considered to prevent damage to important paving or street finishes.

14.4.6 Where it is proposed to pedestrianise a street in an ACA, or one that contributes to the character of a protected structure, it may be preferable that it should simply become a street without traffic rather than be converted into a new landscaped area which could adversely affect the character of protected structures or the character of an ACA. All original surfaces and finishes should be retained and protected. New paving materials should preferably be of natural materials, sourced locally and appropriate in scale and colour to the street.

14.4.7 New items of street furniture, which will impact on the character of a protected structure or of an ACA, should be appropriately and sensitively designed. The design of these objects need not imitate historical styles or detailing in order to be considered acceptable. The design and location of any proposed traffic-calming measures such as ramp, bollards or traffic islands should be carefully considered."

10.4.11 Field Inspection

10.4.11.1 College Green

College Green is the core of the study area. At its western end it is a continuation of Dame Street, while at the eastern end it meets the frontage of Trinity College, at the junction with Grafton Street and College Street (**Plate 10.1**). There are several issues in relation to historic paving, street furniture and monuments.

Plate 10.1 - College Green, facing west

Historic granite kerbing and paving is to be found throughout the street, including the traffic island, except for the area to the front of the western pavilion of the Bank of Ireland, where the granite paving and kerbing is more recent. College Green is listed in appendix 8 of the Dublin City Development Plan 2016-2022 as an area with granite paving flags and kerbing to be retained or restored and included in the city council’s programme for restoration. This mentions, in particular, the Bank of Ireland and Trinity College, to the front of which is original granite paving that has been cut to the curvature of the footway. The paving to the front of the college has recently been reinstated following its temporary removal during works on the Luas Cross City project. There are also original granite paving flags in the traffic island, though these have probably been brought from elsewhere.

Historic lamp standards found along the length of College Green are the Scotch Standard type dating from the period 1903 to 1920. These stand on the pavements on the northern and southern side of the street and on the traffic island. Those on the island at the western end of College Green are double-headed. There are two smaller lamp standards on the island at the eastern end of the street.

The Henry Grattan statue stands at the eastern end of the street, in the traffic island. The statue is of bronze, set on a high pedestal of limestone and it faces Trinity College. The statue was produced by Dublin-born sculptor, John Henry Foley, who had previously produced the statues of Burke and Goldsmith to the front of the college and Foley faced Grattan towards the other two, with his arm outstretched, as if addressing them. To the east of the statue, on either side of the plinth, there are two decorative lamps (**Plate 10.2**), each of which has intertwined sea horses on the pedestal. These lamps were part of the original setting of the Grattan monument and originally there were four lamps. The statue is overwhelmed by the four trees adjacent.

Plate 10.2 - Henry Grattan Statue and Lamp

A plaque to Thomas Davis is set into the paving on the traffic island in College Green (**Plate 10.3**). This was unveiled in September 1945 to mark the centenary of the death of Davis. This was the intended site of a statue of Davis that was not commissioned until 20 years later. In 1966 a statue of Thomas Davis was unveiled in College Green. This includes a fountain with bronze plaques on stone bases (**Plate 10.4**).

Plate 10.3 - Plaque to Thomas Davis in College Green

Plate 10.4 - Thomas Davies Statue and Fountain

10.4.11.2 College Street

The works for the construction of Luas Cross City are currently under way in College Street and the island at the junction with Westmoreland Street is being altered (**Plate 10.5**). The Thomas Moore statue which stood on the traffic island is in temporary storage pending completion of the works. College Street is one of the older streets in the vicinity, while Westmoreland Street was not laid out until around 1800.

Historic granite kerbing and paving is to be found on the western side of the street, where the historic granite paving flags run past the front of the Bank of Ireland and beneath the House of Lords portico as far as Westmoreland Street. The granite paving outside the portico is of more recent date. The historic granite paving that runs past the front of Trinity College has recently been reinstated following works in relation to the Luas Cross City works.

Historic lamp standards are not to be found at the western end of College Street.

The Thomas Moore statue (**Plate 10.6**) usually stands on the traffic island at College Street, at the junction with Westmoreland Street, although it is in temporary storage at present. As with the Grattan statue, the Moore statue was overwhelmed by plane trees planted with no consideration for the statue or for the architecture of the Bank of Ireland building.

Plate 10.5 - College Street

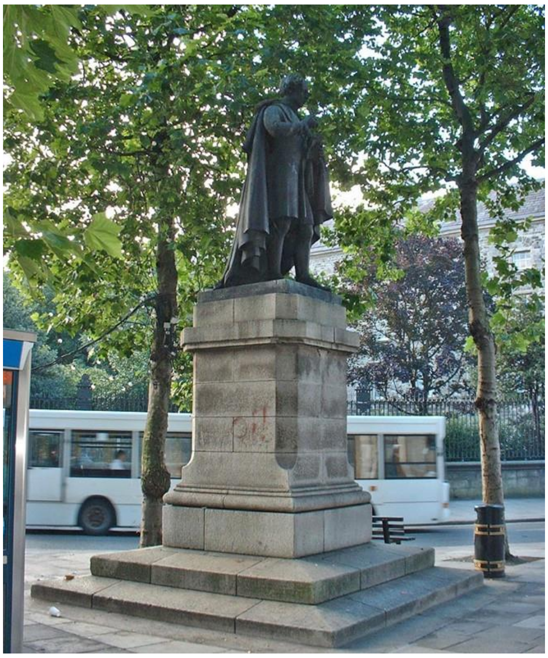

Plate 10.6 -Thomas Moore Statue (archive photograph)

10.4.11.3 Foster Place

With a length of only 75m, Foster Place is one of the shorter streets in the city, but is of great architectural significance, with the former parliament house on the eastern side, the Armoury Building to the north and the Royal Bank of Ireland building to the west, it incorporates works by James Gandon, Samuel Hayes, Francis Johnston and Charles Geoghegan (**Plate 10.7**).

Historic granite kerbing and paving is to be found throughout the street. The footways are of historic granite flags, bordered with wide granite kerb stones. There are several coal holes covers set into the granite flags and these are also of historic significance. Some projecting islands have been added to the paving using granite that is not historic. The carriageway is surfaced with stone setts; these are of very high quality, being even in colour and texture throughout the street.

Historic lamp standards in Foster Place are of the Scotch Standard type from the early years of the 20th century.

Plate 10.7 - Foster Place

10.4.11.4 Trinity Street

Trinity Street was laid out in the 17th century. It is a narrow, relatively short street with few features.

There is a certain amount of historic granite kerbing in the street, with historic granite kerb stones and recent replacements mixed along either side of the street. There is a small number of coal holes set into older kerb stones. There are several pavement lights and keg drops adjacent to the frontages of buildings and some of these have granite surrounds.

There are no historic lamp standards in Trinity Street.

10.4.11.5 St Andrew’s Street

St Andrew’s Street has its origins in the 17th century, and possibly dates to the time of the construction of the first St Andrew’s Church in this location in 1670.

There is no historic paving and no historic lamp standards in this street. Two shops have pavement lights, one of which has granite margins.

10.4.11.6 Church Lane

Church Lane, like St Andrew’s Street, was possibly laid out in 1670 when St Andrew’s Church was built on the site opposite the southern end of the street.

Historic granite kerbing and paving is to be found at the northern end of the street, with narrow granite kerb stones on the eastern side and wider granite kerb stones and some historic granite flags on the western side. There are pavement lights at the front of properties on either side of the streets, in both cases with granite margins. There are some coal hole covers on the western side of the street.

There are no historic lamp standards in Church Lane.

Plate 10.8 - Church Lane

10.4.11.7 Grafton Street

Grafton Street follows the line of the River Steyne and is an ancient thoroughfare that ran to the common land at St Stephen's Green. In the early eighteenth century the development commenced and the street became part of the urban area of the city. The section of Grafton Street within the area of the present Proposed Project is the northern end, between Nassau Street and College Green.

The eastern side of this part of Grafton Street includes a section of the historic granite paving that has recently been replaced following works for the Luas Cross City project.

On the western side of the street the pavement has been widened in places. There is no surviving original historic paving on this side of the street. There are some keg drops and pavement lights, or former pavement lights, with some granite surrounds remaining.

There is no historic street lighting in this part of Grafton Street.

10.4.11.8 Dame Street

Dame Street is an ancient thoroughfare that led eastwards from the medieval city to Hoggen Green and the monastery of All Hallows. The street was widened by the Wide Streets Commissioners in the late 1770s and early 1780s and this included the straightening of the street, bringing the building line back on both sides of the street.

There are broad historic kerb stones on both sides of Dame Street, while at the junctions with the streets on the northern side there are historic stone setts in the carriageways. There are several pavement lights and keg drops along either side of the street, some of which retain their historic granite margins.

There are some coal hole covers on the southern side of the street, indicating the presence of vaulted coal stores beneath the ground.

There are two historic street light bases in the part of Dame Street that lies within the Proposed Project area. These are two of the few surviving lamp bases dating from the first introduction of electric street lighting in Dublin in the 1890s. They stand at the junctions with Crow Street and Temple Lane South. Neither is in use as a street light and they lack their original decorative heads.

Cultural Heritage

10.4.12 Placename Analysis

Townland, topographic and street names are an invaluable source of information on the geography, land ownership and land use within the landscape. They also provide information on history, archaeological monuments and folklore of an area. These names or labels may refer to a long-forgotten site, and may indicate the possibility that the remains of certain sites may still survive below the ground surface.

In the context of Dublin, placenames are interesting as they chart the rise and fall of the city as once a central node with the British Empire to a colonial outpost and subsequently an independent nation, refer to **Table 10.3**.

Table 10.3 - Placename Analysis

Name	Derivation	Possible Meaning
St Anne's, St. Mark's, St Andrew's,	Former wards of Dublin	Many communities had their own saint that they venerated. Parish churches were established and were named after the saints. Their parishes the same.
Hoggen Green	From the old Norse word 'haugr'. Green was an area of commonage.	A possible indication of the presence of Viking monuments on common land.
St. Mary de Hogges	The 12th century nunnery (DU018-020047-) was known as St Mary's. It was situated on Hoggen Green near the 'haugr'	Named after the former use of the green as a Viking assembly place
Hog Hill	'Haugr'	The hill of the 'haugr'
Dame Street	Known also as 'Damas'.	Possibly a memory of when there was a dam on the River Poddle in this location
Trinity Street	The Augustinian Friary of the Holy Trinity (DU018-020046-) located c. 140m northwest	Reference to the 'Holy Trinity' used as religious symbolism to represent Christian beliefs
St Andrew's Street	St Andrew's Church	After the ward name.

Grafton Street	Named after Henry FitzRoy, 1st Duke of Grafton, the illegitimate son of Charles II of England	To honour Duke of Grafton by the Dawson family
Westmoreland Street	-	Named after a patron
Foster Place	-	Named after a patron

Cultural Heritage Sites

The term 'cultural heritage' can be used as an over-arching term that can be applied to both archaeology and architectural. However, it also refers to more ephemeral aspects of the environment, which are often recorded in folk law or tradition or possibly date to a more recent period.

College Green can be understood in this sense as it has long been a place of assembly for both the living and the dead. It is thought to have once contained Viking burials from the 9th and 10th centuries as well as an assembly mound known as a 'haugr'. From this, the area received the name Hoggen Green, which was subsequently replaced by College Green.

More recently, Dublin was designated a UNESCO City of Literature in 2010. Dublin is believed to be a place of significant literary acclaim boasting Four Nobel Laureates of Literature as well as having once been home to some world-famous English language authors such as James Joyce. Dublin City, including the area of the Proposed Project also featured strongly in his stories such as The Dubliners and Ulysses.

10.5 Predicted Impacts

10.5.1 Archaeology

The Proposed Project area has been subject to development since the 1650s and whilst much of the area has been subject to modern disturbance, it is not clear as to how that disturbance has impacted on archaeological features or deposits that have the potential to survive beneath the current ground level. This is particularly the case in the eastern part of the Proposed Project where later medieval burials were found at a significant depth as part of the Luas Cross City.

It is possible that groundworks associated with the development may have a significant or profound negative impact on any features of archaeological significance that may survive below ground level.

10.5.2 Architecture

The proposed works would require some revisions to the street furniture, including paving and lamp standards. There would also be some works to the statuary in College Green. The works, insofar as they may impact architectural heritage, are outlined below, with assessments of the potential impacts.

10.5.2.1 Historic footway to front of Trinity College

The granite paving to the front of Trinity College is one of the most significant elements of street furniture in the Proposed Project area, along with the paving to the front of the Bank of Ireland. The works will not affect the paving to the front of the college.

Impacts of Proposed Project on feature: None

Impacts of Proposed Project on setting: None

Mitigation required: No

10.5.2.2 Historic footway to front of Bank of Ireland

The granite paving of the footway to the front of the Bank of Ireland will not be directly affected by the proposals, except that new paving will run across the end of College Green, between the northern and southern sides of the street cross from the bank to the northern end of Grafton Street. This will be carried out with due regard to the historic significance of the existing granite paving and will retain its character.

Impacts of Proposed Project on feature: None

Impacts of Proposed Project on setting: Additional paving will be provided adjacent to existing

Mitigation required: Yes

10.5.2.3 Paving in Foster Place

The historic paving in Foster Place, comprises of granite flag stones and diorite setts, would be retained, though with some modifications. The setts will be lifted and will be relaid at the same level as the adjacent footways. The more recent traffic islands will be removed.

Impacts of Proposed Project on feature: No significant impact

Impacts of Proposed Project on setting: There will be a positive impact on the setting, through the removal of the traffic islands

Mitigation required: No

10.5.2.4 Traffic islands in College Green

The traffic islands will be removed from the centre of College Green. While these include some historic granite kerbing and paving, these elements have been brought from elsewhere during the twentieth century when the traffic islands were created.

Impacts of Proposed Project on feature: The traffic islands are not of heritage significance

Impacts of Proposed Project on setting: n/a

Mitigation required: No

10.5.2.5 Lamp standards in College Green

The historic Scotch Standard street lights are to be removed from College Green. While these date from early in the twentieth century, they were not installed in College Green before the 1960s, at the earliest.

Impacts of Proposed Project on feature: The lamp standards are of historic significance, though they have been moved to College Green in more recent years and their presence in the street is not of historic significance.

Impacts of Proposed Project on setting: n/a

Mitigation required: Yes

10.5.2.6 Henry Grattan statue

The statue of Henry Grattan is to be moved slightly eastward. This will not affect the setting of the statue or the artist's intentions to a significant degree. The two lamps associated with the statue will be retained. The proposal includes the removal of the trees from the traffic island in College Green.

Impacts of Proposed Project on feature: The statue is to be moved slightly to the east resulting in an imperceptible impact.

Impacts of Proposed Project on setting: There will be a positive impact on the setting, with the removal of the overshadowing trees and the elimination of busy traffic from the vicinity.

Mitigation required: Yes.

10.5.2.7 Thomas Davis plaque

The Thomas Davis plaque is to be moved to a new location, still within College Green, though at the junction with Foster Place and Church Lane.

Impacts of Proposed Project on feature: The memorial plaque will be relocated nearby

Impacts of Proposed Project on setting: There is a positive impact on the setting, through the reduction of traffic to only those vehicles needing local access, or turning to go back westwards.

Mitigation required: Yes

10.5.2.8 Thomas Davis statue and associated works

The Thomas Davis statue, its fountain and its plinth are to be moved to a new location, still within College Green, though at the junction with Foster Place and Church Lane. The assemblage will be reversed so as to face westwards and will be located on the proposed roundabout. The direction in which this memorial faces is not critical to its character and the effect of the relocation will be small.

Impacts of Proposed Project on feature:	The memorial assemblage will be relocated nearby
Impacts of Proposed Project on setting:	There will be a positive impact on the setting, through the reduction of traffic to only those vehicles needing local access, or turning to go back westwards.
Mitigation required:	Yes

10.5.2.9 Tree planting in College Green

The proposal includes the planting of plane trees towards the southern side of College Green.

Impacts of Proposed Project on feature:	The proposed trees will ultimately obscure the view of the facades of protected structures on the southern side of College Green; this is within an architectural conservation area.
Impacts of Proposed Project on setting:	There will be a negative impact on the setting, as the trees will obscure the facades of the buildings and change their context.
Mitigation required:	Not applicable

10.6 Mitigation measures

10.6.1 Archaeology

All ground disturbances associated with the Proposed Project shall be subject to continuous archaeological monitoring. Monitoring will be carried out under licence to the DoAHRRGA in consultation with the National Museum and the Dublin City Archaeologist. Full provision will be made available for the resolution of any archaeological remains that may be discovered (i.e. preservation by record), should this be deemed an appropriate manner in which to proceed.

Furthermore, a suitably qualified archaeologist will be appointed as part of the detailed design team in order to advice on specific potential impacts as and when they may arise. This will result in continuous impact assessment of the detailed works, allowing mitigation measures to be agreed in advance, in full consultation with the statutory bodies.

10.6.2 Architecture

Generally, all of the mitigation measures will be undertaken in accordance with best conservation practice and the Guidelines for Planning Authorities on Architetural Heritage Protection (2011), and under the supervision of a conservation architect".

10.6.2.1 Historic footway to front of Bank of Ireland

During the works to extend the paving across to Grafton Street the adjacent granite paving of the footway to the front of the Bank of Ireland will be protected from damage in accordance with the Guidelines for Planning Authorities on Architetural Heritage Protection (2011) and the Advice Series: Paving – The Conservation of Historic Ground Surfaces (2015) and under the supervision of a conservation architect.

10.6.2.2 Lamp standards in College Green

The lamp standards will be removed with care, in accordance with a conservation method statement, and put into storage for potential use elsewhere.

10.6.2.3 Henry Grattan statue

The statue will be moved by a heritage Contractor with experience in moving monuments of this type and in accordance with a conservation method statement.

10.6.2.4 Thomas Davis plaque

The Thomas Davis plaque will be lifted and reset in accordance with a conservation method statement and the work will be carried out by a heritage Contractor with experience in lifting stones of this type.

10.6.2.5 Thomas Davis sculpture

The Thomas Davis sculpture assemblage will be lifted and moved in accordance with a conservation method statement and the work will be carried out by a heritage Contractor with experience in working with monuments of this type.

10.7 Residual Impacts

With regards to the archaeological resource, following the implementation of the mitigations measures, as proposed above, there will be no residual impact on the archaeological resource.

The residual impact of the Proposed Project on architectural heritage will be positive, removing traffic from College Green and allowing it to be a high-quality urban space, with the surrounding buildings and the memorials, all of which are of architectural heritage significance, to become an integral part of the space.

10.8 Difficulties Encountered

No difficulties were encountered during the compilation of this chapter.

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11 Townscape and Visual

11.1 Introduction

Macro Works Ltd. has been commissioned to carry out a Landscape / Townscape and Visual Impact Assessment ("LVIA") of the 'College Green Project' in Dublin City centre. Whilst centred on College Green the proposed works include all of Foster Place and extend westwards to Anglesea Street. The Proposed Project also encompasses the loop of northern Grafton Street, Suffolk Street and Church Lane, whilst extending northwards for a short distance along Westmoreland Street.

The LVIA describes the landscape context of the Proposed Project and assesses the likely landscape and visual impacts of the Proposed Project on the receiving environment. Although closely linked, landscape and visual impacts are assessed separately.

Landscape Impact Assessment (LIA) relates to assessing effects of a development on the landscape / townscape as a resource in its own right and is concerned with how the proposal will affect the elements that make up the landscape / townscape, the aesthetic and perceptual aspects of the setting and its distinctive character.

Visual Impact Assessment (VIA) relates to assessing effects of a development on specific views and on the general visual amenity experienced by people. This deals with how the surroundings of individuals or groups of people may be specifically affected by changes in the content and character of views as a result of the change or loss of existing elements of the landscape and/or introduction of new elements.

Cumulative landscape and visual impact assessment is concerned with additional changes to the landscape or visual amenity caused by the Proposed Project in conjunction with other developments (associated or separate to it), or actions that occurred in the past, present or are likely to occur in the foreseeable future.

11.2 Assessment Methodology

11.2.1 General

Although this is a 'townscape' assessment, it utilises the same outline methodology as would be employed for the more familiar Landscape and Visual Assessment (LVIA) of developments in rural settings. The justification for this approach is provided in Section **11.2.2** below.

11.2.2 Guidance and Legislation

This LVIA uses methodology as prescribed in the following guidance documents:

- Environmental Protection Agency (EPA) publication 'Guidelines on the Information to be contained in Environmental Impact Statements (2002 – Revised Draft 2015) and the accompanying Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (2003– Revised Draft 2015); and
- Institute of Environmental Management and Assessment (IEMA) and landscape Institute (UK) 'Guidelines for Landscape and Visual Impact Assessment' (GLVIA-2013).

It is important to note that the Guidelines for Landscape and Visual Impact Assessment' (GLVIA-2013) follow the European Landscape Convention (ELC) definition of landscape: *"Landscape is an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors" (Council of Europe, 2000)*. Thus, GLVIA-2013 covers all landscapes from *"high mountains and wild countryside to urban and fringe farmland (rural landscapes), marine and coastal landscapes (seascapes) and the landscapes of villages towns and cities (townscapes)"* - whether protected or degraded. College Green is a wholly urban setting or 'townscape' and this is defined in GLVIA-2013 in the following manner (section 2.7):

"- 'Townscape' refers to areas where the built environment is dominant. Villages, towns and cities often make important contributions as elements in wider-open landscapes but townscape means the landscape within the built-up area, including the buildings, the relationships between them, the different types of urban spaces, including green spaces, and the relationship between buildings and open spaces. There are important relationships with historic dimensions of landscape and townscape, since evidence of the way the villages, towns and cities change and develop over time contributes to their current form and character."

In this instance there is a strong interrelationship between the 'townscape' and 'cultural heritage' assessments. However, as stated at section 5.11 of GLVIA-2013; *"the sharing of relevant baseline information should not be confused with the need for separate cultural heritage appraisals such as historic landscape characterisation and assessment of historic townscape appraisal, or there will be a danger of both double handling and inappropriate judgements by non-experts. It is particularly important that responsibilities are clear in considering any effects on the settings and views for historic buildings, conservation areas and other heritage assets."*

11.2.3 Study Area

The core study area in this instance is the area from where the physical changes to College Green and surrounding streets can be seen and, within which, the townscape character may be noticeably altered. However, the traffic management implications of the Proposed Project have potentially broader reaching townscape and visual impacts in the form of altered traffic volumes on surrounding streets for example. Thus, a wider secondary study area is also identified in this instance.

The core study area consists of College Green extending c.50m northwards along Westmoreland Street and westward to Anglesea Street including all of the intervening Foster Place. It also includes the block northern Grafton Street, Suffolk Street and Church Lane.

The wider study area potentially affected by traffic management impacts resulting from the Proposed Project includes the minor works on Dame Street, Trinity Street, Andrew's Street and Church Lane and the impact of rerouting traffic in the area.

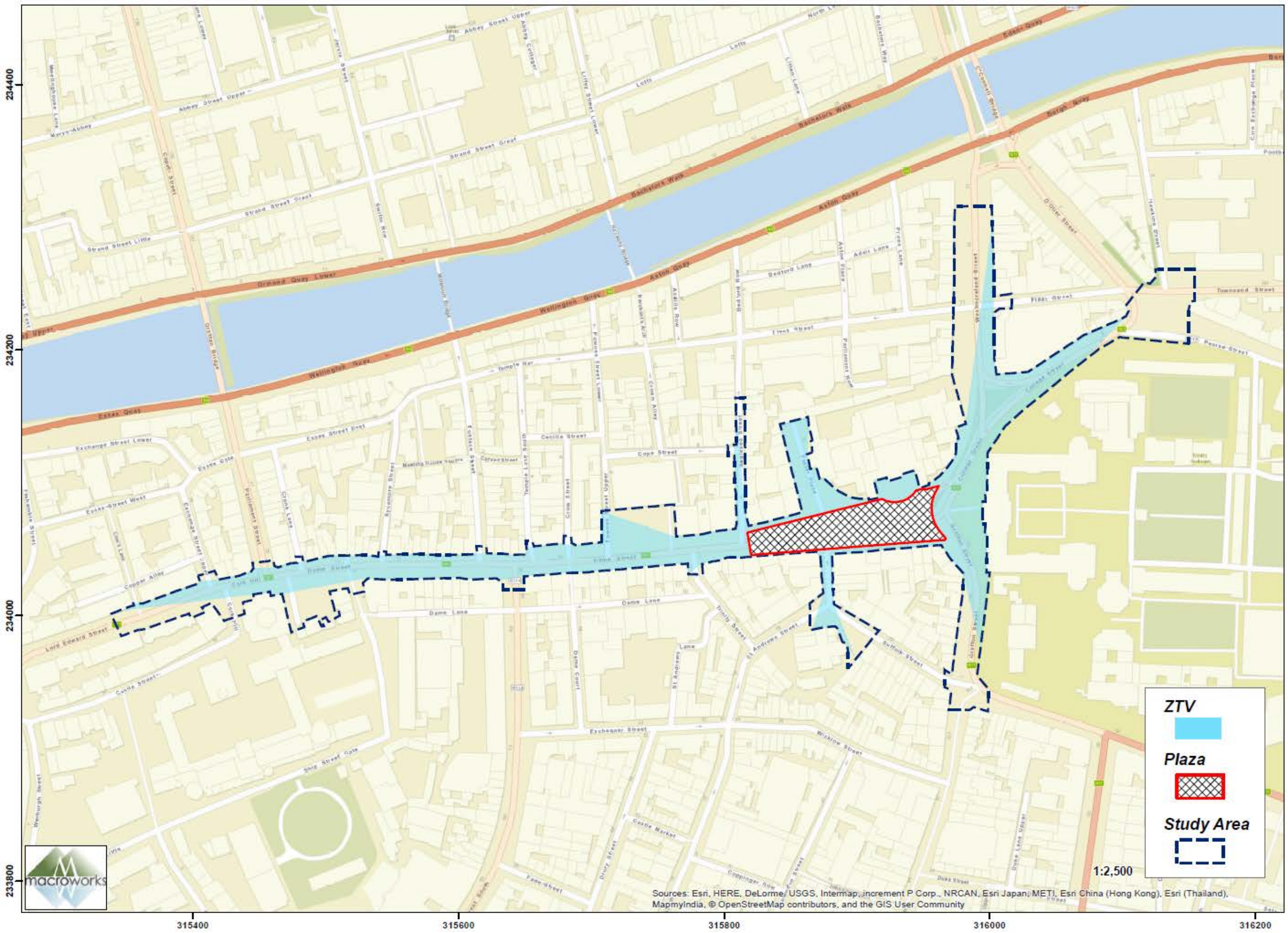


Figure 11.1 - Zone of Theoretical Visibility / Study Area - College Green Plaza

11.2.4 Site Visits

A series of site visits were undertaken by Macro Works staff members in December 2016 and January 2017 to select viewpoint locations from which to prepare photomontages of the Proposed Project for the visual impact assessment. Field notes and photography have also been captured to inform the baseline townscape setting description.

11.2.5 Consultation

Public consultation has been undertaken in respect of the future design of College Green. This is described in detail in Chapter 3 of the EIS.

The design presented for assessment herein has taken account of feedback from this public consultation process.

The landscape and visual assessment for College Green has also been undertaken in consultation with Planners and Engineers from Dublin City Council.

11.2.6 Categorisation of the Baseline Environment

In addition to descriptions of the baseline setting of the Proposed Project an analysis of urban form and function has been undertaken. This is based on foundation principals of urban design first introduced in Kevin Lynch's publication: 'The image of the City' (1960), the most widely read urban design publication of all time. This outlines that people tend to perceive urban areas (townscapes) as a series of 'Paths', 'Edges', 'Districts', 'Nodes' and 'Landmarks'. An analysis of the way in which College Green is likely to be currently perceived in these terms is provided in the baseline for later comparison with how such perceptions might change following completion of the Proposed Project and whether these changes will result in positive or negative impacts. This aspect of the baseline is concerned mainly with determining townscape impacts or effects on urban fabric and character, as opposed to visual impacts from particular viewpoints.

11.2.7 Impact Assessment Methodology

11.2.7.1 Townscape Impact Assessment Criteria

When assessing the potential impacts on the townscape resulting from a Proposed Project, the following criteria are considered:

- Townscape character, value and sensitivity;
- Magnitude of likely impacts; and
- Significance of landscape effects

The sensitivity of the townscape to change is the degree to which a particular setting can accommodate changes or new elements without unacceptable detrimental effects to its essential characteristics. Landscape Value and Sensitivity is classified using the following criteria set out in **Table 11.1**.

Table 11.1 - Townscape Value and Sensitivity

Sensitivity	Description
Very High	Areas where the townscape character exhibits a very low capacity for change in the form of development. Examples of which are high value townscapes, protected at an international or national level (e.g. World Heritage Site), where the principal management objectives are likely to be protection of the existing character.

High	Areas where the townscape character exhibits a low capacity for change in the form of development. Examples of which are high value townscapes, protected at a national or regional level, where the principal management objectives are likely to be considered conservation of the existing character.
Medium	Areas where the townscape character exhibits some capacity and scope for development. Examples of which are townscapes, which have a designation of protection at a county level or at non-designated local level where there is evidence of local value and use.
Low	Areas where the townscape character exhibits a higher capacity for change from development. Typically this would include lower value, non-designated townscapes that may also have some elements or features of recognisable quality, where management objectives include, enhancement, repair and restoration.
Negligible	Areas of townscape character that include derelict sites and degradation where there would be a reasonable capacity to embrace change or the capacity to include the development proposals. Management objectives in such areas could be focused on change, creation of townscape improvements and/or restoration.

The magnitude of a predicted townscape impact is a product of the scale, extent or degree of change that is likely to be experienced as a result of the Proposed Project. The magnitude takes into account whether there is a direct physical impact resulting from the loss of landscape components and/or a change that extends beyond the immediate setting that may have an effect on the townscape character **Table 11.2** refers.

Table 11.2 - Magnitude of Townscape Impacts

Sensitivity	Description
Very High	Change that would be large in extent and scale with the loss of critically important landscape elements and features, that may also involve the introduction of new uncharacteristic elements or features that contribute to an overall change of the townscape in terms of character, value and quality.
High	Change that would be more limited in extent and scale with the loss of important townscape elements and features, that may also involve the introduction of new uncharacteristic elements or features that contribute to an overall change of the townscape in terms of character, value and quality.
Medium	Changes that are modest in extent and scale involving the loss of landscape characteristics or elements that may also involve the introduction of new uncharacteristic elements or features that would lead to changes in landscape character, and quality.

Low	Changes affecting small areas of landscape character and quality, together with the loss of some less characteristic landscape elements or the addition of new features or elements.
Negligible	Changes affecting small or very restricted areas of landscape character. This may include the limited loss of some elements or the addition of some new features or elements that are characteristic of the existing landscape or are hardly perceivable.
Positive	Changes that restore a degraded landscape or reinforce characteristic landscape elements

The significance of a townscape impact is based on a balance between the sensitivity of the landscape receptor and the magnitude of the impact. The significance of landscape impacts is arrived at using the following matrix set out in **Table 11.3**.

Table 11.3 - Significance of Landscape Impacts

	Sensitivity of Receptor				
Scale Magnitude	***Very High***	***High***	***Medium***	***Low***	***Negligible***
Very High	Profound	Profound-substantial	Substantial	Moderate	Minor
High	Profound-substantial	Substantial	Substantial-moderate	Moderate-slight	Slight-imperceptible
Medium	Substantial	Substantial-moderate	Moderate	Slight	Imperceptible
Low	Moderate	Moderate-slight	Slight	Slight-imperceptible	Imperceptible
Negligible	Slight	Slight-imperceptible	Imperceptible	Imperceptible	Imperceptible
Positive	Enhanced	Enhanced	Enhanced	Enhanced	Enhanced

Note: The significance matrix provides an indicative framework from which the significance of impact is derived. The significance judgement is ultimately determined by the assessor using professional judgement. Due to nuances within the constituent sensitivity and magnitude judgements, this may be up to one category higher or lower than indicated by the matrix. Judgements indicated in orange are considered to be 'significant impacts' in EIA terms.

11.2.7.2 Visual Impact Assessment Criteria

As with the townscape impact, the visual impact of the Proposed Project will be assessed as a function of sensitivity versus magnitude. In this instance the sensitivity of the visual receptor, weighed against the magnitude of the visual effect.

Sensitivity of Visual Receptors

Unlike landscape sensitivity, the sensitivity of visual receptors has an anthropocentric basis. It considers factors such as the perceived quality and values associated with the view, the landscape context of the viewer, the likely activity they are engaged in and whether this heightens their awareness of the surrounding landscape. A list of the factors considered by the assessor in estimating the level of sensitivity for a particular visual receptor is outlined below to establish visual receptor sensitivity at each VRP:

Susceptibility of Receptors - In accordance with the Institute of Environmental Management and Assessment ("IEMA") Guidelines for Landscape and Visual Assessment (3rd edition 2013) visual receptors most susceptible to changes in views and visual amenity are;

- *"Residents at home;*
- *People, whether residents or visitors, who are engaged in outdoor recreation, including use of public rights of way, whose attention or interest is likely to be focussed on the landscape and on particular views;*
- *Visitors to heritage assets, or to other attractions, where views of the surroundings are an important contributor to the experience;*
- *Communities where views contribute to the landscape setting enjoyed by residents in the area; and*
- *Travellers on road rail or other transport routes where such travel involves recognised scenic routes and awareness of views is likely to be heightened"*.

Visual receptors that are less susceptible to changes in views and visual amenity include;

- *"People engaged in outdoor sport or recreation, which does not involve or depend upon appreciation of views of the landscape; and*
- *People at their place of work whose attention may be focussed on their work or activity, not their surroundings and where the setting is not important to the quality of working life"*.

Recognised scenic value of the view (County Development Plan designations, guidebooks, touring maps, postcards etc.). These represent a consensus in terms of which scenic views and routes within an area are strongly valued by the population because in the case of County Developments Plans, for example, a public consultation process is required;

Views from within highly sensitive townscape areas. These are likely to be in the form of Architectural Conservation Areas, which are incorporated within the Development Plan and therefore subject to the public consultation process. Viewers within such areas are likely to be highly attuned to the townscape around them;

Primary views from residential receptors. Even within a dynamic city context views from residential properties are an important consideration in respect of residential amenity;

Intensity of use, popularity. This relates to the number of viewers likely to experience a view on a regular basis and whether this is significant at a national or regional scale;

Connection with the townscape. This considers whether or not receptors are likely to be highly attuned to views of the townscape i.e. commuters hurriedly driving on busy roads versus tourists focussed on the character and detail of the townscape;

Presence of striking or noteworthy features. A view might be strongly valued because it contains a distinctive and memorable landscape / townscape feature such as a cathedral or castle;

Historical, cultural and / or spiritual significance. Such attributes may be evident or sensed by receptors at certain viewing locations, which may attract visitors for the purposes of contemplation or reflection heightening the sense of their surroundings;

Rarity or uniqueness of the view. This might include the noteworthy representativeness of a certain townscape type and considers whether the receptor could take in similar views anywhere in the broader region or the country;

Integrity of the townscape character. This looks at the condition and intactness of the townscape in view and whether the townscape pattern is a regular one of few strongly related components or an irregular one containing a variety of disparate components;

Sense of place. This considers whether there is special sense of wholeness and harmony at the viewing location; and

Those locations which are deemed to satisfy many of the above criteria are likely to be of higher sensitivity. No relative importance is inferred by the order of listing. Overall sensitivity may be a result of a number of these factors or, alternatively, a strong association with one or two in particular.

Visual Impact Magnitude

The visual impact magnitude relates to the scale and nature of the visual change brought about by the proposal and this is reflected in the criteria contained in **Table 11.4**.

Table 11.4 - Magnitude of Visual Impacts

Criteria	Description
Very High	The proposal alters a large proportion or critical part of the available vista and is without question the most distinctive element. A high degree of visual clutter or disharmony is also generated, strongly reducing the visual amenity of the scene

High	The proposal alters a significant proportion or important part of the available vista and is one of the most noticeable elements. A considerable degree of visual clutter or disharmony is also likely to be generated, appreciably reducing the visual amenity of the scene
Medium	The proposal represents a moderate alteration the available vista, is a readily noticeable element and/or it may generate a degree of visual clutter or disharmony, thereby reducing the visual amenity of the scene.
Low	The proposal alters the available vista to a minor extent and may not be noticed by a casual observer and/or the proposal would not have a marked effect on the visual amenity of the scene
Negligible	The proposal would be barely discernible within the available vista and/or it would not detract from, and may even enhance, the visual amenity of the scene
Positive	Changes that enhance the available vista by reducing visual clutter or restoring degraded features

Visual Impact Significance

As stated above, the significance of visual impacts is a function of visual receptor sensitivity and visual impact magnitude. This relationship is expressed in the same significance matrix and applies the same EPA definitions of significance as used earlier in respect of townscape impacts (**Table 11.3** refers).

11.3 Baseline Environment

In this instance the baseline context is slightly complex as College Green is currently in a state of transition with construction works underway on the new Luas line from Stephens Green to Connolly Station. These works sweep around from the north of Dawson Street along Nassau Street and veer past the front of Trinity College from the northern end of Grafton Street. At present this area is something of a construction zone with a high degree of temporary clutter and heavy vehicle movement. Furthermore, College Green will not revert to a setting that is substantially the same as that prior to the construction of the Luas line as the traffic management system must be altered and there will also be considerable change to the physical elements and nature of this urban space. It is important to note that this appraisal does not include the Luas works described above. Instead, the Luas works must be considered as an emerging alteration to the baseline urban setting. The Luas works are not so much a cumulative adjacent development, but the justification and facilitation for the currently proposed College Green development works.

College Green is much more than its current urban form having emerged and changed over hundreds of years as Dublin spread beyond its medieval walls. Any changes to the townscape setting of College Green must, therefore, reflect an understanding of its origins as a space and a place within the both the historic and current urban fabric.

11.3.1 Historical Context of College Green

As described (in more detail) in Chapter 10 of the EIS, '*Archaeology, Cultural heritage and Architectural Heritage*', College Green is located just outside of the medieval town walls of Dublin. It is in an area previously known as Hoggen Green, which is believed to have contained Viking burial mounds and a large mound known in Norse times as 'Thing Motte'. Much of the built fabric that defined the renamed College Green emerged in the 17th century with low-lying tidal areas around the River Liffey being reclaimed and River-side quays constructed. In the latter part of the 18th Century the 'Wide streets' commission facilitated the demolition of the buildings enclosing Dame Street and the reconstruction of a set-back building frontage to form the wide straight street that merges with College Green today. Large civic buildings were also constructed around that time that serve to define the current space and place of College Green. These included, the Houses of Parliament, a new façade for Trinity College, the Central Bank on Foster Place. In summary, College Green has been an important civic and social space in Dublin for over 500 years.

11.3.2 Existing Urban Context of College Green

At present College Green serves as a broadened extension to Dame Street conveying vehicular traffic along both sides and, up until recently, around its eastern end to the front of Trinity College as well. Whilst the Luas Cross City works have now curtailed vehicular traffic around the eastern end of College Green, this will form part of the new route for the Luas. The vehicle lanes on the northern and southern sides of College Green are divided by paved islands. These serve as pedestrian refuge and host the statues of Henry Grattan and Thomas Davis as well as the Four Angels Fountain. The islands also host a double row of mature Plane Trees, heritage lamp standards bicycle stands and traffic signs.

Along the northern side of College Green the space is defined by the distinctive Bank of Ireland building, the façade of which, has semi-circular components divided by a recessed section supported by ornate columns. Foster Place, at the western side of the Bank of Ireland building provides a further break in the northern containment of College Green and also contains around six mature Plane trees. A more consistent and typical circa four storey façade then continues westward along the northern side of College Green down to Anglesea Street and beyond along Dame street.

The eastern end of College Green is defined by the front façade and main entrance to Trinity College, which is set back from a plinth wall and railing at the street side with an intervening, curved lawn containing the statues of Oliver Goldsmith and Edmund Burke. It is understood that the Goldsmith and Burke statues are in a Trinity arrangement with the Grattan statue on the pedestrian island within College Green.

The southern side of College Green is contained by a consistent four-storey façade of richly varied colours and architectural finishes from ornate to utilitarian (all within the Southern Shopping District ACA). The ground floors of most of these buildings are contained in retail uses with steps up from the street level. The broad Ulster Bank building at the corner of College Green and Church Lane is recessed at the street level but without openings directly onto College Green.

11.3.3 Urban Image

Drawing from terminology and guiding principles contained in Kevin Lynch's 'Image of the City' outlined in **Section 11.2.6**, College Green embodies many of the elements described (Paths, Edges, Districts, Nodes and Landmarks). Hosting roads and footpaths along all of its perimeters, it is a 'path' or major thoroughfare within the city and also at the confluence of several paths. It contains several important landmark buildings, in particular, Trinity College and the Bank of Ireland building. These act as both 'landmarks' and, in conjunction with the adjacent building facades, they also form the 'edges' of key 'districts' within Dublin City centre. The Trinity College building marks the western edge of the substantial Trinity campus, which is a district in its own right. The Bank of Ireland building and the buildings surrounding Foster Place and along Westmoreland Street, mark the south-eastern edge of the Temple Bar district. Finally, the southern facades of College Green form the edge of the southern shopping district that is centred around Grafton Street. All of these aspects of urban fabric make College Green, almost by default, a major 'node' within the city. However, it can be considered a 'node' mainly in the sense of being an important junction rather than as a destination or place of congregation in its own right.

11.3.4 Visibility and Visual Receptors

This aspect of the baseline relates to the locations from which the Proposed Project may be visible and is concerned with the later estimation of visual impacts from representative viewpoint locations. Regard is also given to the various user groups that view College Green on a daily basis as some will be more highly attuned to their surroundings (tourists and residents) than others (commuters and city centre workers).

Given the relatively enclosed nature of College Green it is only openly visible in its entirely from within its immediate setting. This includes, from within College Green itself, Foster Place and from the Dame Street approach to Trinity. Otherwise, partial visibility of College Green can be obtained from the Westmoreland Street and Grafton Street approaches as well as smaller converging streets such as Church lane and Anglesea Street. Pedestrians exiting the Trinity College campus through the Trinity College building are also afforded comprehensive views across College Green.

In terms of visual receptors (people and groups of people), those most susceptible to visual change are likely to be residents of the local area who have College Green as part of their principle everyday view. This is not an area of the city that hosts a high number of residential units and most of these are likely to be contained in the upper levels of the buildings lining Dame Street to the west of College Green. These residents as well as office workers within the buildings that flank College Green and its approach roads are the only receptors likely to be afforded elevated views across College Green where a full appreciation of its layout can be obtained.

Tourists and visitors to Dublin are also likely to be sensitive to views College Green as it forms the centre of most tourist maps and hosts an array of historical landmarks. Dublin tourists are sensitive to their visual setting in the sense of being highly attuned to the surroundings and taking their time to absorb street scenes.

This differs slightly from the sensitivity of local residents who are more susceptible to change in their day-to day-visual amenity.

Other user groups who will be potentially affected by changes to the College Green street scene are commuters on public transport, private vehicles, bicycle or foot. Passengers on the new Luas Cross City route including commuters and tourists will be afforded clear visibility of College Green as they pass through its eastern end in front of Trinity College. Shoppers passing through College Green towards the Grafton Street shopping precinct to the south or the Henry Street precinct to the north will also experience visual change to the College Green setting.

11.3.5 Dublin City Development Plan (2016-2022)

Chapter 4 – 'Shape and Structure of the City' of the Dublin City Development Plan (2016-2022) contains relevant policies in respect of city centre urban design, some of which relate directly to College Green. This plan and the associated urban design policies are part of an integrate approach to traffic management within Dublin City centre, which seeks deprioritise private vehicles in favour of pedestrians, cyclists and public transport users. The most relevant policies in respect of the Proposed Project include;

SC2: To develop the City's character by cherishing and enhancing Dublin's renowned streets, civic spaces and squares; to create further new streets as part of the public realm when the opportunities arise; to protect the grain, scale and vitality of city streets; to revitalise the north and south Georgian squares and their environs, and to upgrade Dame Street/College Green as part of the Grand Civic Spine.

SC3: To develop a sustainable network of safe, clean, attractive pedestrian routes, lanes and cycleways in order to make the city more coherent and navigable.

SC4: To promote a variety of recreational and cultural events in the city's civic spaces.

SC5: To promote the urban design and architectural principle set out in chapter 15, and in the Dublin City Public Realm Strategy 2012 in order to achieve a quality, compact, well-connected city.

SC7: To protect and enhance important views and view corridors into, out of and within the city, and to protect existing landmarks and the prominence.

Relevant Objectives within the Dublin city plan 2016 to 2022 include;

SC01: to implement a program of environmental improvements along the Grand Civic Spine from Parnell Square to Christchurch Place, including College Green and Dame Street, arising from the opportunities provided by the introduction of the College Green Bus Priority System, the Luas Cross City and the 'Dublin' initiative.

SC02: To implement the actions and projects contained in the Dublin City Public Realm strategy 2012 and any successor public realm strategy.

SC04: To undertake a views and prospects study, with the aim of compiling a list of views and prospects for protection and/or enhancement which would be integrated with and complement the urban form and structure of the city.

With respect to objective ‘SC04’ outlined above, even though a full ‘views and prospects’ study has not yet been undertaken, the Dublin City Development Plan does contain a map indicating ‘Key Views and Prospects (indicative)’. This appears to relate to views of key civic buildings from particular locations. The most relevant of these to the Proposed Project is a view of Trinity College from Dame Street, which encompasses all of College Green. An excerpt of the views and prospects map is provided below.

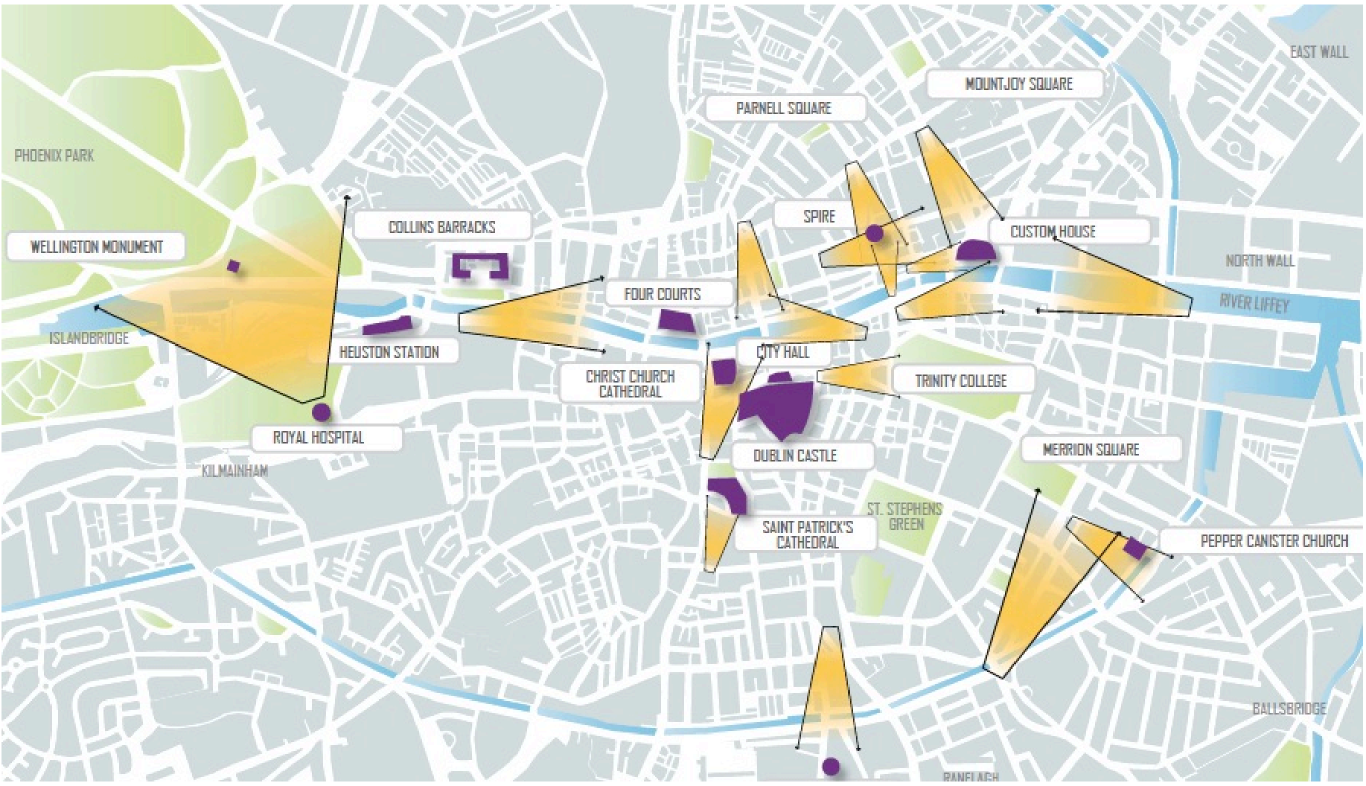


Figure 11.2 - Key Views and Prospects Map

Green Infrastructure

Volume 1 - Section 10.5.1 of the Dublin City Development Plan (2016-2022) deals with the role of green infrastructure within Dublin city. Green infrastructure is described here as an *‘interconnected network of green space that conserves natural ecosystem values and functions that also provides associated benefits to the human population. It is a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services.’*

The Dublin City Development Plan lists several policies related to green infrastructure. The following policy is deemed to be relevant to the Proposed Project:

- ***GI1:*** *To develop a green infrastructure network through the city, thereby interconnecting strategic natural and semi-natural areas with other environmental features including green spaces, rivers, canals and other physical features in terrestrial (including coastal) and marine areas.*

In addition to the policy above, Dublin City Council also have a number of Objectives related to green infrastructure, of which the following objectives are relevant to the Proposed Project:

- *"**GIO1:** To integrate Green Infrastructure solutions into new developments and as part of the development of a Green Infrastructure Strategy for the city.*
- ***GIO2:** To apply principles of Green Infrastructure development to inform the development management process in terms of design and layout of new residential areas, business/industrial development and other significant projects.*
- ***GIO3:** To focus on key streets in the city area between the canals for 'greening' by way of higher standards of planting and amenity along key routes."*

Section 16.3.3 of the Dublin City Council Development Plan relates to existing trees within Dublin city and includes the following statement: *"Dublin City Council will consider the protection of existing trees when granting planning permission for developments and will seek to ensure maximum retention, preservation and management of important trees, groups of trees and hedges."*

Regarding planning applications on sites where there are significant individual trees or groups/lines of trees are present, Dublin City Council will take into account the following five criteria when deciding either to protect and integrate trees into the scheme, or to permit their removal:

- Habitat/ecological value of the trees and their condition
- Uniqueness/rarity of species
- Contribution to any historical setting
- Significance of the trees in framing or defining views
- Visual and amenity contribution to streetscape

11.4 Predicted Impacts

11.4.1 Impacts on Townscape Character and Urban Fabric

The appraisal of impacts on townscape character and urban fabric balances the sensitivity of the receiving environment against the magnitude of predicted effects. This is considered in respect of both the construction stage and post-construction stages of the development.

11.4.1.1 Townscape Sensitivity

In this instance townscape sensitivity can only be considered to be **Very High**. This is on the basis that College Green is a critical element of the urban fabric of Dublin City. It is a major node for vehicular transport, cyclists and pedestrians and the heart of tourist activity. It is defined by two of Dublin's key landmark buildings – Trinity College and the Bank of Ireland (former Houses of Parliament).

It contains a number of protected statues and monuments and is defined by facades consisting of protected buildings and an Architectural Conservation Area. All of these factors are reflected in the objectives and policies of the Dublin City Development Plan (2016-2022) in respect of urban design, architectural heritage and transport. In summary, College Green is a key core element of one of Europe's major cities.

11.4.1.2 Magnitude of Townscape Impacts – Construction Stage

It is predicted that the construction stage for the Proposed Project will last for a period of between 12 and 18 months, which represents a Temporary/Short term impact in accordance with EPA definitions. This period of construction will marginally overlap and follow the current Luas Cross City construction works currently taking place at the eastern end of College Green.

The Proposed Project construction works will interrupt current traffic flows through and in the vicinity of College Green. However, like the Luas construction works, they provide a transition to a time when vehicular transport, particularly private vehicles, will be excluded from this portion of the central city. The construction works will require the near constant movement of construction machinery on-site as well as the delivery and removal of materials by HGVs via the surrounding road network. Although the nature of heavy vehicle traffic will change during this period, the intensity will be no greater than previous levels of double-decker bus and private vehicle movements throughout this area.

There will be physical impacts to the streetscape of College Green involving the removal of existing surface materials and excavations of up to 2.5m in depth to facilitate underground infrastructure in some areas. Heritage stone kerbs and setts will be stored for later re-use in the new College Green Plaza insofar as possible. All other surface materials will be disposed of off-site.

All of the existing mature Plane trees within the central islands of College Green and at the corner of Grafton street will be removed, whilst those in Foster Place will remain and are facilitated in the project design. These will be protected during the construction stage in accordance with BS5837:2012 – 'Trees in relation to design, demolition and construction'. The loss of the central trees within College Green will have an immediate impact on streetscape character and in the course of construction works College Green will appear more stark and open within a context of temporary hoardings, building materials, dust, noise and general construction activity. Indeed, it will be a relatively uninviting setting that may be avoided by tourists and regular city centre occupants alike during the construction period.

On balance of the negative nature of the construction stage works on townscape character against the fact that they will only be Temporary / Short term in duration, it is considered that the magnitude of construction stage townscape impacts will be **Medium low**. When coupled with the **Very High** sensitivity of this important urban setting, the overall significance of construction stage townscape impacts is deemed to be **Moderate** is accordance with the Townscape Impact Matrix contained in **Section 11.2.7.1**.

11.4.1.3 Magnitude of Townscape Impacts – Operational Stage

Following the completion of construction works, College Green will appear transformed. Not only in relation to the construction stage works, but also the College Green that existed prior to the Luas Cross City works as there is likely to be little/no interim period between the projects.

The high quality stone paving will be a consistent pattern across the whole of College Green without kerbs or other vertical delineation. This will give a much stronger sense of College Green being a broad plaza and a destination space in its own right rather than a divided and cluttered transport node in the space between heritage facades.

The opening up of the plaza space and reduction of static visual clutter (signposts, traffic lights etc.) and dynamic visual clutter (cars, buses) will provide an improved context from which to appreciate the heritage landmark buildings of Trinity College and the Bank of Ireland building. The use of uncomplicated and high quality stone sett paving throughout the plaza will also strengthen the sense of built heritage whilst providing an understated apron for the heritage buildings and facades to once again be the main players within the College Green setting.

The removal of east-west traffic through College Green (to and from Dame Street) will also help to transform the space from one of dynamic traffic movement, potential danger and congestion to social and meeting space that is likely to be regarded as the heart of the city centre. It will still be something of a movement space but focussed at the more human scale of pedestrians and cyclists. Though there will still be north-south public transport thoroughfare to the fore of the Trinity building, this will be much lighter in volume than before private vehicles were excluded (prior to the Luas Cross City works). The singular combined public transport corridor, including Luas tracks and dedicated bus / taxi corridors, will also be a much more organised traffic flow system than previously occurred through and around College Green. As well as providing necessary cross town traffic flow and public transport access to the city centre, the movement of the Luas, buses and taxis across the eastern end of College Green strikes a balance between College Green becoming a static plaza space and retaining some element of a dynamic movement space. Light rail / tram networks (such as the Luas) are frequently the main form of transport within city centres throughout Europe and these tend to add to the liveliness of an urban environment rather than detracting from it.

The loss of a number of mature Plane trees from the central section of College Green is likely to reduce visual amenity slightly as these substantial sized trees serve to soften the urban context and provide a sense of establishment. Indeed, mature street trees almost always contribute positively to streetscapes and can be the defining element in some instances. However, it is not considered that the existing Plane trees within College Green are the defining element given the heritage landmark buildings that define the space. Indeed, the mature trees within College Green tend to enclose the space and reduce the visibility of these heritage buildings and facades. By way of compensation it is proposed to retain the mature Plane trees around Foster Place and to replant a row of semi-mature Plane trees along the southern side of the plaza. As these establish they will begin to contribute to the amenity of the space in a similar manner to the existing mature trees, but are more appropriately placed so as not to divide and shade the plaza or restrict visibility of the Trinity building and the Bank of Ireland building.

They will, however, partially screen the facades of buildings along the southern side of College Green. Overall, the improved placement of the new semi-mature Plane trees and the retention of the mature trees around Foster Place are considered to balance the loss of the mature trees from the centre of the College Green.

Another benefit of removing the central line of mature trees within College Green is that the visual axis along Dame Street from Dublin Castle to the Trinity College building (an indicative designated view in the CDP) is improved. The reinforcement of physical and visual axis is central to the proposed College Green plaza design. This includes the east – west axis along Dame Street as well as the minor axis between Church Lane and Foster Place, the intersection of which will now be defined by the 'Circus' feature centred around the Thomas Davis statue and incorporating the four provinces fountain. The Henry Grattan Statue at the eastern end of the plaza is also moved slightly to reinforce the alignment of the Plaza with the Trinity College Building. However, this subtle movement of the Grattan Statue is cognisant of its relationship to the Goldsmith and Burke statutes in the lawns on either side of the Trinity College entrance.

The design of the plaza is not solely focussed on the pragmatics of movement and axis alignment and also incorporates a sense of fun through the installation of ground mounted fountains within the centre of the space. These will add to the dynamism and liveliness of the space when in operation and will not unduly impede or divide the space when not in use. Indeed, one of the key aspects of the design is its simplicity, which allows it to be a multifunctional node for occasional events. There is minimal street furniture and planting to soften the plaza and facilitate its users as well as a consistent ground treatment that subtly defines areas of use. This design simplicity allows the space itself and the defining landmark buildings to be the key features, rather the elements that fill the plaza. Such an approach appears to be consistent with the historic use of College Green as a social and civic space, within the heart of Dublin rather that the cluttered traffic dominated junction it had become over time.

In terms of the urban fabric of the inner city and the analysis of this in relation to Lynch's 'Image of the City' (see 13.3.3), the proposed College Green development is likely to alter user perceptions. It is considered that College Green itself will become a much stronger urban node and the even the epicentre of the city for many. College Green will be weakened as a 'path' and intersection of paths due to the removal of east west through traffic. Trinity and the Bank of Ireland building will have a stronger presence as defining elements of the space due to the reduction in traffic and visual clutter including mature street trees. This will reinforce them as 'landmarks' within the city and also as the defining 'edges' of the trinity 'district' and the Temple Bar 'district'. Whilst Lynch's urban elements are not inherently positive or negative in their own right, the overriding principle is legibility and collective comprehension of urban fabric and character. In this respect, it is considered that the proposed College Green development strengthens the legibility and function of Dublin's inner city for both locals and visitors alike.

In terms of indirect / secondary impacts, the Proposed Project will result in the redistributing of east-west through traffic to and from Dame Street. There will be a turning head at the western end of the plaza for public transport, which will then return westwards along Dame Street.

There will be a net increase of buses along the North and South Quays, Winetavern Street, College Street and Parliament Street as part of the altered traffic management plan. In some cases, this will result in considerable peak time increases in bus numbers – equivalent to about 1 extra bus every 1-2 minutes on average. Though double-decker buses could represent a considerable visual obstruction when stationary, they are transient. Thus, any visual obstruction of building facades, river views etc. is momentary. Although buses might be reasonably frequent and even slow moving during peak commuter times, they are a typical inner city feature and any obstruction or intrusion on views will be fleeting.

On the basis of all of the factors outlined above, it is considered that the proposed College Green development, once completed, will have a **Positive** impact on townscape character and that this **Very High** sensitivity urban setting will be **Enhanced** in accordance with the Townscape Impact Matrix contained in **Section 11.2.7.1**.

11.4.2 Visual Impacts

11.4.2.1 Visual Receptor Sensitivity

Based on the criteria and considerations contained in **Section 11.2.7.2** there is a balance of factors to be weighed in determining visual receptor sensitivity in this dynamic urban setting. However, it is considered that given the relatively confined visual context of College Green, all of the views can be considered to be of similar sensitivity.

Visual receptors (people and groups of people) who experience views of College Green range between, those identified in GLVIA-2013 as being highly susceptible to visual change (residents and tourists) and those that are less susceptible (commuters and workers). Taking a cautious approach, it must be considered that visual receptors within the context of College Green are highly susceptible to visual change, but mainly in relation to key permanent elements and not dynamic and non-permanent change due to congestion, traffic and advertising etc.

In terms of the value of the views on offer, this is a key heritage node in Dublin City Centre contained by landmark heritage buildings and containing important monuments and statues. Although the visual context is generally busy and cluttered, there are aspects of the scene that are highly valued and contribute to high order visual amenity.

On balance of the fact that views towards and across College Green are highly dynamic and cluttered, but there are framed by important permanent heritage features it is considered that visual receptors have a **High-medium** level of sensitivity to visual change of a permanent nature.

11.4.2.2 Magnitude of visual impacts – Construction Stage

Photomontages from selected viewpoints have not been prepared for the purposes of appraising construction stage visual impacts. This is on the basis that depicting the associated dynamic effects of construction works in a static image is difficult to achieve in terms of accuracy and impossible to achieve in terms of its dynamic and multifaceted nature.

During the construction stage College Green will be a relatively extensive construction site surrounded by a temporary hoarding, but allowing partial visibility of construction machinery and worker welfare facilities etc. There will also be HGVs delivering and removing materials from site and the constant movement of workers to and from site. Mature trees will be removed from the central portion of the site and the visual amenity and softening of the built environment that they offer will be lost in the short to medium term. The construction works and associated hoardings may intrude on iconic views of Trinity College and the Bank of Ireland building as well as axial views along Dame Street. There is also likely to be dust and debris within and around the site that will contribute to an overall reduction in tidiness and visual amenity around College Green.

Vehicles (other than bicycles) will be excluded from east- west transit through College Green at the beginning of the construction stage and will not return after construction is finished. A minimum 20m wide pedestrian / cycle zone will be maintained to the southern side of College Green for the majority of the construction stage in order to maintain free-flowing east – west access. Once safe access can be provided along the northern side of college Green the pedestrian / cycle access will reverse until such time as the works are completed in their entirety.

The main ameliorating factor in relation to construction stage visual impacts is that they will be temporary / short term in terms of duration. It is also important to consider that the baseline scenario for College Green is a busy and cluttered visual environment where the main aspects of visual amenity are the heritage buildings that define the space.

On the basis of the reasons outlined above, the magnitude of construction stage visual impacts is deemed to be **Medium-low**. When coupled with the **High-medium** viewer sensitivity, the overall significance of construction stage townscape impacts is deemed to be **Moderate** in accordance with the Townscape / Visual Impact Matrix contained in **Section 11.2.7.1**.

11.4.2.3 Magnitude of Visual Impacts – Operational stage

Photomontages have been prepared from six viewpoints to aid the appraisal of Operational Stage visual impacts. These depict the design of the scheme once constructed compared to the baseline visual context at the time the photography for the photomontages was captured. For contextual simplicity, this includes the construction works for the Luas Cross City line, which adds a degree of additional clutter to some of the baseline images. Although it could be considered preferable to prepare a baseline scenario of the completed Luas works (as these will be completed independently of the Proposed Project) this would have to include existing east – west traffic through College Green. A scenario that has not been fully investigated and which may not be feasible once the Luas Cross City is operational.

The selected viewpoint locations are outlined in **Table 11.5** and independently appraised thereafter.

Table 11.5 - Selected viewpoint locations

Viewpoint No.	Viewpoint Location	Direction of view
VP1a	Northern side of College Green	SE
VP1b	Northern side of College Green	SW
VP2	South-western corner of College Green	NE
VP3	Southern side of College Green	N
VP4	Trinity College entrance	W
VP5	Westmoreland Street	SW
VP6	Grafton Street	N

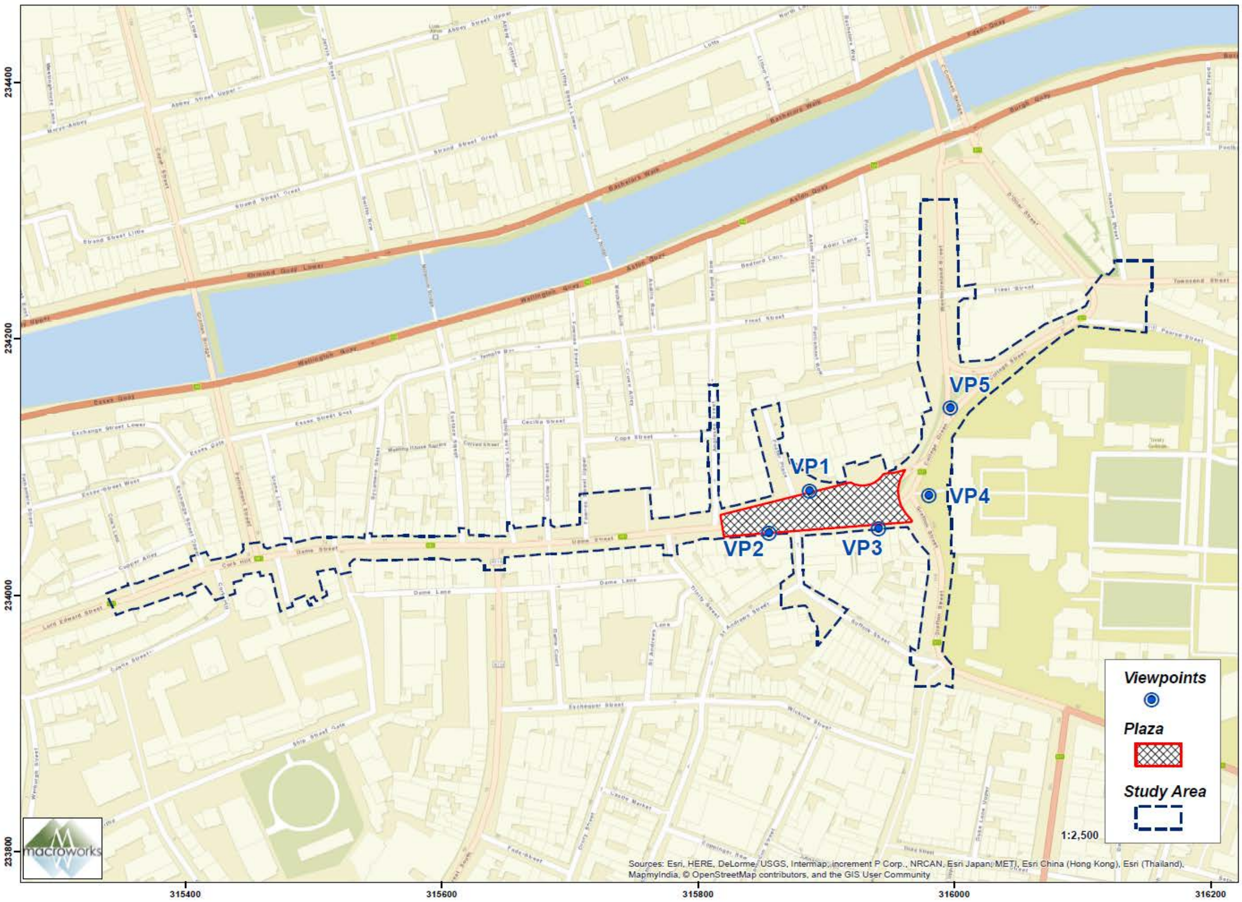


Figure 11.3 - Viewpoint Locations - College Green Plaza

Viewshed Reference Point			**View Direction**
VP1b	Northern side of College Green		SW
Receptor Sensitivity	**High-medium**		
Description of Existing View	This is a view from near the entrance to Foster Place looking towards Trinity College across the eastern end of College Green. The scene is framed to the north (left) by the dominating pillars of the Bank of Ireland building and the Thomas Davis statue is contained at the right hand side of the view on the traffic island that divides College Green. The façade of Trinity and the buildings on the southern side of street are only partially obscured by the winter trees that line the centre of College Green. The ground plane is dominated by tarmacadam road surface. In addition to the trees and monuments on the central traffic island there are numerous bike stands, heritage lampposts and signs.		
Visual Impact (Operational Stage)	Once construction works are completed, the view is transformed from a substantial traffic corridor to a pedestrian plaza. There is a stronger sense of openness and a clearer view of Trinity College. The scene is much less cluttered but remains vibrant. The public transport corridor is apparent at the western end of the plaza, but is not strongly delineated at the ground plane giving a sense of continuity. The new line of trees (depicted in early leaf) will partially obscure the upper facades of buildings on the southern edge of the Plaza, but without fully masking them. The Thomas Davis statue has been moved further to the west such that it is no longer contained in the depicted view. The Henry Grattan Statue is moved subtly to the left and is slightly more prominent without the same degree of visual clutter surrounding it. For the reasons outlined above, the nature of the visual change is deemed to be **Positive**.		
Summary	Based on the assessment criteria and matrices outlined at **Section 11.2.7.1** the significance of visual impact is summarised below.		
Factor	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
Appraisal	High-medium	Positive	**Enhanced**

<table>
<tr><td colspan="3">Viewshed Reference Point</td><td>View Direction</td></tr>
<tr><td>VP1b</td><td colspan="2">South-western corner of College Green</td><td>NW</td></tr>
<tr><td colspan="2">Receptor Sensitivity</td><td colspan="2">High-medium</td></tr>
<tr><td colspan="2">Description of Existing View</td><td colspan="2">This view is from the same location as VP1a, but looking in a south-westerly direction across College Green and along Dame Street to the west. Across a broad multilane roadway and traffic island the most prominent feature of the view is the ornate Hibernian Bank Building (now H&M). Along Church Lane, which divides this building from the more modern façade of the Ulster Bank building can be seen a glimpse of St Andrew’s Church. Further along Dame Street is an eclectic mix of building facades that vary in tone and style and architectural treatment. The entrance to Foster Place opens up to the right hand side of the view.</td></tr>
<tr><td colspan="2">Visual Impact (Operational Stage)</td><td colspan="2">In the proposed scenario, the broad tarmacadam roadway is replaced by the pedestrian plaza, the most distinctive feature of which, is the ‘circus’ in the immediate foreground. This hosts the relocated Four Provinces fountain at its centre and relocated Thomas Davis Statue at its perimeter, both contained on a slightly raised radial island. Subtle variations in paving tone and texture delineate the dedicated pedestrian zone along the edge of the plaza from the shared (occasional traffic) surface along the centre of the western end of the Plaza (the circus serves as a vehicle turnaround). Corten steel planter tubs bike stands and newly planted street trees also reinforce the subtle delineation of surface function avoiding the need for changes in paving level that would otherwise disrupt the open plaza.

In combination with other street furniture elements, the new lines of street trees along the sides of the Plaza give a greater sense of confinement to the western end of the Plaza than eastern end. This tends to accentuate the broadening wedge shape of the College Green space and will increase the sense of arrival at the eastern (pedestrian only) end of the plaza. This also subtly transforms the space from one of movement into one of congregation. The new lines of street trees will partially mask the view of the southern building facades. However they are offset from the building lines to a degree that both northern and southern building facades have enough space to be appreciated, particularly from the respective sides of the plaza.

For the reasons outlined above, the proposed works will be a Positive contribution to the visual setting of College Green when viewed from this location.</td></tr>
</table>

Summary	Based on the assessment criteria and matrices outlined at **Section 11.2.7.1** the significance of visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
	High-medium	Positive	**Enhanced**

Viewshed Reference Point		**View Direction**
VP2	South-western corner of College Green	NE
Receptor Sensitivity	**High-medium**	
Description of Existing View	This is a north-easterly view towards the Bank of Ireland building and Foster Place from the south-western portion of College Green. The foreground and indeed the vast majority of the ground plane is dedicated roadway with pedestrian footpaths along the building frontages and a pedestrian refuge lining the middle of the street. Mature trees within Foster Place provide a partially veiled view of the curved south-western façade of the Bank of Ireland building and a linear cluster of trees within the central island of the street further to the east have a light masking effect in relation to the façade of Trinity. Traffic lights, heritage lamp posts, sign posts, bollards, monuments and bike stands also occupy the central island and the footpaths.	
Visual Impact (Operational Stage)	In the proposed view, the vehicular roadway is converted into a pedestrian plaza. The most prominent aspect of the plaza is the circus feature located on the intersection between the Dame Street axis (east-west) and the Foster Place / Church Lane axis (north-south). At the centre of the circus is the relocated Four Provinces fountain, which was slightly further away and barely noticeable in the baseline view. Similarly, the relocated Thomas Davis statue, which is also nearer the viewer and less bound by clutter is now more prominent. The slightly raised lozenge shaped island shared by the Davis statue and the fountain reduces the sense that the circus feature is dedicated to vehicular traffic (it appears less like a roundabout). The granite paving, which stretches across the plaza, has only subtle variations in texture and tone to demark precincts and therefore seems to broaden College Green giving it a stronger sense of being an open space plaza than a street. This is aided by	

	the removal of kerbs and other vertical delineation in the ground plane. The newly proposed trees will soften the hard forms and materials of the plaza and blend well with the retained Foster Place trees of the same species. From this angle the new line of trees along the southern side of the plaza will partially veil the view of Trinity. However, it is clear that they have been positioned in order to afford unimpeded direct views of Trinity along the east-west (Dame Street) axis. They are also offset from the southern building facades to a generous enough degree that they allow these to be appreciated. Overall, it is considered that the proposed plaza is a substantial improvement to the visual quality and structure of this scene and allows the various heritage features and buildings to be appreciated to a much greater extent than the baseline scenario. The visual effect is therefore **Positive**.		
Summary	Based on the assessment criteria and matrices outlined at **Section 11.2.7.1** the significance of visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
	High medium	Positive	**Enhanced**

Viewshed Reference Point		**View Direction**
VP3	Southern side of College Green	N
Receptor Sensitivity	**High-medium**	
Description of Existing View	This is a view to the north from the south-eastern corner of College Green. The foreground context contains roadside bike stands, three lanes of roadway and a U-turn bay within a central pedestrian refuge island. Contained within the easternmost traffic island are four mature Plane trees surrounding the Henry Grattan statue. Ignoring the hoardings for the Luas works, there are also heritage lampposts, traffic signs and traffic lights on this island. On the opposite side the road is the commanding Bank of Ireland building, which is partially impeded by intervening street paraphernalia. The Trinity building is also visible at the eastern end of College Green in a similar manner.	

	Also visible are more distant buildings at the junction of Westmoreland Street and College Street. It is important to note that Trinity lies beyond the public transport corridor at the northern end of the plaza (currently under construction). Although it is not being assessed as part of this development, there will be some permanent and transient intrusions on the view of Trinity from vehicles and the overhead Luas lines.		
Visual Impact (Operational Stage)	Once the proposed works are complete this view across College Green will be substantially altered from a roadway context to a pedestrian plaza. This is the broadest section of the plaza and most likely to be used as a social space and meeting point. This function is reflected in the provision of seating, particularly around the focus of this end of the space, which is the slightly repositioned Grattan statue. Ornate heritage lamps will also reinforce this central feature as a focal point. Even though the Grattan statue is marginally further away from the viewer, it becomes a more noticeable feature away from the visual clutter of the existing street scene. The paving across the plaza varies only slightly in tone and texture to demark precincts within the overall space. However, a stronger line of division is provided by a new line of street trees, lightpoles, bike stands and electrical kiosks. These appear to subtly divide a movement space along the southern side of the plaza from a more static social space in the central plaza, which will also contain the paving fountains, which are likely to draw people in (when operational). Although there are a number of intervening elements within the plaza, there is generally a clearer view of the bank of Ireland building and Trinity College. Indeed the overall space and its relationship to the public transport corridor appears much more organised than the existing scenario. Overall, the visual effect is deemed to be **Positive**.		
Summary	Based on the assessment criteria and matrices outlined at **Section 11.2.7.1** the significance of visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
	High medium	Positive	**Enhanced**

<table>
<tr><td colspan="3">Viewshed Reference Point</td><td>View Direction</td></tr>
<tr><td>VP4</td><td colspan="2">Trinity College entrance</td><td>W</td></tr>
<tr><td colspan="2">Receptor Sensitivity</td><td colspan="2">High-medium</td></tr>
<tr><td colspan="2">Description of Existing View</td><td colspan="2">This is an axial view from the front of Trinity looking back along College Green down Dame Street. The reverse view from Dublin Castle is indicatively identified as being a designated view in the CDP towards the façade of Trinity. Ignoring the construction paraphernalia in the immediate foreground, the ground plane of this street scene is dominated by vehicular roadway running across the front of Trinity and also along both sides of College Green. The east – west roads are divided by a traffic island containing a cramped cluster of mature trees lighting columns, traffic lights and signs surrounding the Henry Grattan statue. On the southern side of the street is a series of vibrant and eclectic building façades. The northern side of the street is dominated by the Romanesque façade of the Bank of Ireland building. There is a distinct narrowing of the street as it transitions from College Green into Dame Street.</td></tr>
<tr><td colspan="2">Visual Impact (Operational Stage)</td><td colspan="2">In the imminent future scenario, the foreground of this view will be dominated by the public transport corridor (Luas and bus/taxi lanes) that will sweep across the front of Trinity regardless of whether the Proposed Project proceeds. Beyond this corridor the proposed pedestrian plaza will appear to expand the width of College Green by presenting a clearer view of the sky and removing the influence of tall vertical elements, particularly the mature central trees. The slightly repositioned Grattan statue will be a more distinctive feature due to the removal of cluttering elements around it. The statue has been repositioned so that it is on direct axis with the front of Trinity, to which it faces, whilst its triangular relationship with the Goldsmith and Burke statues (in the lawns to the front of Trinity) is also retained. The new line of street trees, off-centre to the south of the plaza, also reinforce this visual axis by allowing it to be opened up (existing central line of trees removed) and framing it. This is also to the benefit of the potential designated view in the opposite direction from Dame Street. Whilst the new line of street trees will partially obscure the southern building facades at upper levels, the nearest two or three buildings at the corner of Grafton street will be unimpeded. There is also enough space remaining between the trees and building frontages for the facades to be fully appreciated from other parts of plaza.

Overall, the view of the proposed pedestrian plaza at College Green is considered to be a substantial improvement to the street</td></tr>
</table>

	scene in comparison to the existing scenario. Thus, it has a **Positive** visual effect.		
Summary	Based on the assessment criteria and matrices outlined at **Section 11.2.7.**1 the significance of visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
	High medium	Positive	**Enhanced**

Viewshed Reference Point		**View Direction**
VP5	Westmoreland Street	SW
Receptor Sensitivity	**High-medium**	
Description of Existing View	This is a view across the front of Trinity in the direction of Grafton Street, which can be seen winding away from the viewer to the south. The view is framed in the foreground by the commanding Trinity building to the left and the Bank of Ireland building to the right. This ground plane of this view will be dominated by the sweeping public transport corridor (buses taxis and the Luas) that replaces the conventional roadway that runs north-south through the eastern end of College Green (construction works visible in the baseline image). The road corridor also currently diverges to the west along both sides of College Green in the direction of Dame Street. A traffic island can be seen between these roads, which contains a cluster of mature trees. Two further trees are located on the corner of Lower Grafton street on the opposite side of the road. Together, these trees partially screen the distinctive building facades on the south-eastern Corner of College Green.	
Visual Impact (Operational Stage)	Only the eastern end of the proposed pedestrian plaza can be seen from here replacing the carriageways and central traffic island that currently occupy College Green. The space will appear more open as a result of the removal of the mature trees and other elements of visual clutter. Although the new items of street furniture surrounding the slightly relocated Henry Grattan statue are visible from here, they are not prominent especially set against the complex backdrop of intricate building facades.	

	The newly proposed line of street trees along the southern side of the plaza will partially screen the southern building facades, but to no greater degree than the existing mature trees (that will be removed) currently do. For the reasons outline above the visual effect of the proposed pedestrian plaza is considered to be **Positive**.		
Summary	Based on the assessment criteria and matrices outlined at **Section 11.2.7.1** the significance of visual impact is summarised below.		
	Visual Receptor Sensitivity	Visual Impact Magnitude	**Significance of Visual Impact**
	High medium	Positive	**Enhanced**

11.4.2.1 Visual Impact Summary

Based on the appraisal of visual impacts contained in section 11.4.2.3 above, it is considered that there will be negative effects on the visual context of College Green during the construction stage of the proposed plaza and that these will be Moderate in terms of significance. However, following completion of the plaza the visual effects at all six of the representative viewpoints are considered to be positive and the visual setting enhanced. This is principally due to the transformation of this space from a cluttered and traffic-dominated junction into a simply organised social and civic space. It is also a function of the use of high quality materials that reflect the heritage setting, strengthening of visual axis, the opening up of clearer views of landmark buildings and monuments as well as a general de-cluttering of the space.

11.5 Mitigation measures

Given that the Proposed Project, once constructed, is considered to have a positive impact on the visual setting of College Green as well as its structure and function within the context of the surrounding urban fabric, it is not warranted to provide any long term forms of mitigation.

Only during the construction phase is mitigation considered necessary in respect of townscape and visual issues. These relate to ensuring that College Green does not become a place that will be avoided by locals and visitors during the 12-18 month construction period. Effects that could give rise to this situation relate to perceived danger, congestion, way-finding confusion, scattering of dust and debris and overall visual clutter and disharmony. Mitigation to reduce these adverse construction related effects is principally the concern of the Construction and Environmental Management Plan (an outline is provided in Appendix 4.1). This will include the form of site hoarding, which in this instance should be solid and well constructed to reduce visibility of the on-going works and will also reduce the noise and dust emissions from the site. It is proposed that the solid hoardings will also include images of the future plaza as this can remind those affected of the long-term benefit of the temporary works.

Pedestrian and cycle movement areas will be generous in dimension and clearly presented in terms of directional movement to avoid confusion. Areas outside of the site hoarding will also be kept clear of dust and debris.

11.6 Residual Impacts

As outlined in **Section 11.5**, there is no need to mitigate the operational stage of the development as it is deemed to result in positive impacts that will enhance the townscape of College Green and its environs. However, it is considered that if the construction stage mitigation measures to achieve a tidy and orderly site are appropriately implemented, the predicted 'Moderate' significance of visual impact (**Section 11.4.2.2**) will reduce to **Moderate-slight**.

11.7 Difficulties Encountered

The main difficulty encountered for this project was the determination of an appropriate baseline scenario given the on-going Luas Cross City works through the eastern end of College Green. This imminent project is separate, but integrated with College Green Project appraised herein and as such it should be considered as the imminent and permanent baseline scenario. However, it was under construction at the time the base photography for the photomontages was captured generating considerable visual clutter and reducing baseline visual amenity. Whilst the existing (baseline) scenes used in the photomontage set include the construction works for the Luas Cross City, they have not been described and do not influence the appraisal, which is instead based on the assumption of the Proposed Project in the context of the completed Luas / bus corridor.

11.8 References

Lynch, Kevin (1960) *The Image of the City*. Cambridge

Dublin City Council (2016) *Dublin City Development Plan 2016-2022*. Dublin, Ireland.

Figures

College Green Project

Photomontages

This book contains imagery for the viewpoints selected
for the Landscape and Visual Impact Assessment

May 2017

Prepared by

macroworks

www.macroworks.ie

Note that the recommended viewing distance of 40cm only applies
to this imagery when it is printed at full scale (297mm x 700mm)

Northern side of College Green

Figure VP 1(a) - Existing View

To view this panorama as a flat image one must move from left to right along its length whilst maintaining a perpendicular viewing direction and an approximate **viewing distance of 40cm**. To see this entire panoramic scene in reality would necessitate turning one's head through 60 degrees.

This verified panoramic image has been captured, compiled and presented in accordance with guidance from the Landscape Institute (UK)
Refer to: *Landscape Institute Advice Note 01/11, Photography and photomontage in landscape and visual impact assessment, Sections 3 & 4*

Northern side of College Green

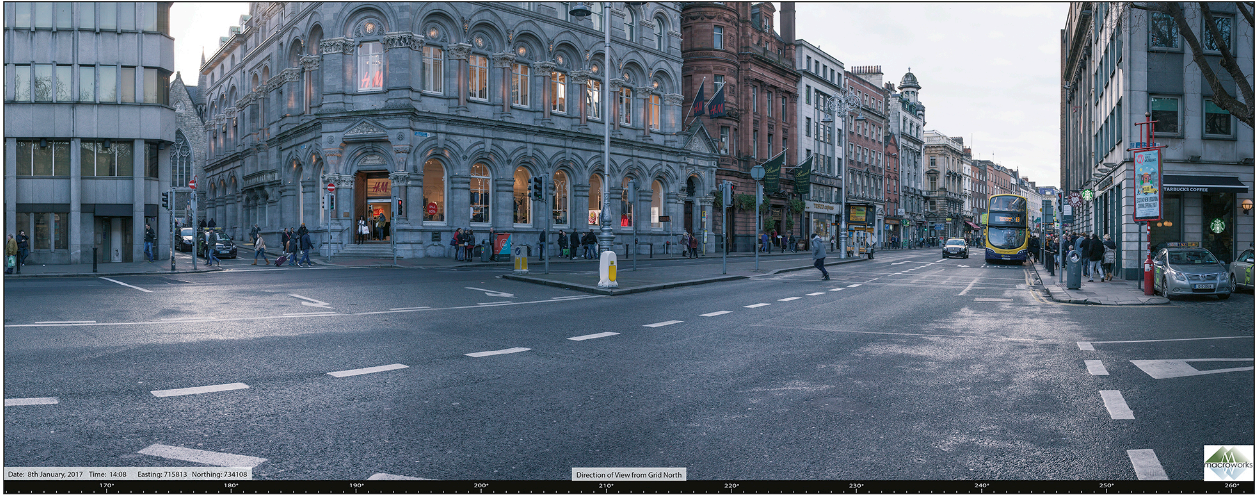
Figure VP 1(a) - Montage View

To view this panorama as a flat image one must move from left to right along its length whilst maintaining a perpendicular viewing direction and an approximate **viewing distance of 40cm**. To see this entire panoramic scene in reality would necessitate turning one's head through 60 degrees.

This verified panoramic image has been captured, compiled and presented in accordance with guidance from the Landscape Institute (UK)
Refer to: *Landscape Institute Advice Note 01/11, Photography and photomontage in landscape and visual impact assessment, Sections 3 & 4*

Northern side of College Green

Figure VP 1(b) - Existing View



To view this panorama as a flat image one must move from left to right along its length whilst maintaining a perpendicular viewing direction and an approximate **viewing distance of 40cm**. To see this entire panoramic scene in reality would necessitate turning one's head through 60 degrees.

This verified panoramic image has been captured, compiled and presented in accordance with guidance from the Landscape Institute (UK)
Refer to: *Landscape Institute Advice Note 01/11, Photography and photomontage in landscape and visual impact assessment, Sections 3 & 4*

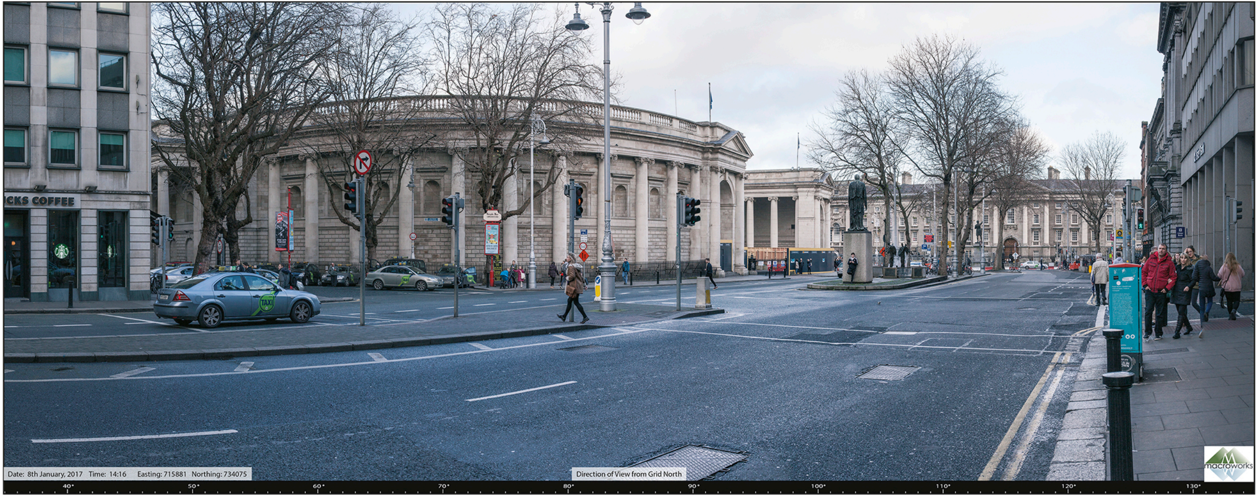
Northern side of College Green

To view this panorama as a flat image one must move from left to right along its length whilst maintaining a perpendicular viewing direction and an approximate **viewing distance of 40cm**. To see this entire panoramic scene in reality would necessitate turning one's head through 60 degrees.

This verified panoramic image has been captured, compiled and presented in accordance with guidance from the Landscape Institute (UK)
Refer to: *Landscape Institute Advice Note 01/11, Photography and photomontage in landscape and visual impact assessment, Sections 3 & 4*

South-western corner of College Green

Figure VP 2 - Existing View



To view this panorama as a flat image one must move from left to right along its length whilst maintaining a perpendicular viewing direction and an approximate **viewing distance of 40cm**. To see this entire panoramic scene in reality would necessitate turning one's head through 60 degrees.

This verified panoramic image has been captured, compiled and presented in accordance with guidance from the Landscape Institute (UK)
Refer to: *Landscape Institute Advice Note 01/11, Photography and photomontage in landscape and visual impact assessment, Sections 3 & 4*

South-western corner of College Green

To view this panorama as a flat image one must move from left to right along its length whilst maintaining a perpendicular viewing direction and an approximate **viewing distance of 40cm**. To see this entire panoramic scene in reality would necessitate turning one's head through 60 degrees.

This verified panoramic image has been captured, compiled and presented in accordance with guidance from the Landscape Institute (UK)
Refer to: *Landscape Institute Advice Note 01/11, Photography and photomontage in landscape and visual impact assessment, Sections 3 & 4*

Southern side of College Green

Figure VP 3 - Existing View

To view this panorama as a flat image one must move from left to right along its length whilst maintaining a perpendicular viewing direction and an approximate **viewing distance of 40cm**. To see this entire panoramic scene in reality would necessitate turning one's head through 60 degrees.

This verified panoramic image has been captured, compiled and presented in accordance with guidance from the Landscape Institute (UK)
Refer to: *Landscape Institute Advice Note 01/11, Photography and photomontage in landscape and visual impact assessment, Sections 3 & 4*

Southern side of College Green

To view this panorama as a flat image one must move from left to right along its length whilst maintaining a perpendicular viewing direction and an approximate **viewing distance of 40cm**. To see this entire panoramic scene in reality would necessitate turning one's head through 60 degrees.

This verified panoramic image has been captured, compiled and presented in accordance with guidance from the Landscape Institute (UK)
Refer to: *Landscape Institute Advice Note 01/11, Photography and photomontage in landscape and visual impact assessment, Sections 3 & 4*

Trinity College entrance

Figure VP 4 - Existing View

Date: 8th January, 2017 Time: 14:41 Easting: 715906 Northing: 734104

Direction of View from Grid North

220° 230° 240° 250° 260° 270° 280° 290° 300° 310°

To view this panorama as a flat image one must move from left to right along its length whilst maintaining a perpendicular viewing direction and an approximate **viewing distance of 40cm**. To see this entire panoramic scene in reality would necessitate turning one's head through 60 degrees.

This verified panoramic image has been captured, compiled and presented in accordance with guidance from the Landscape Institute (UK)
Refer to: *Landscape Institute Advice Note 01/11, Photography and photomontage in landscape and visual impact assessment, Sections 3 & 4*

Trinity College entrance

To view this panorama as a flat image one must move from left to right along its length whilst maintaining a perpendicular viewing direction and an approximate **viewing distance of 40cm**. To see this entire panoramic scene in reality would necessitate turning one's head through 60 degrees.

This verified panoramic image has been captured, compiled and presented in accordance with guidance from the Landscape Institute (UK) Refer to: *Landscape Institute Advice Note 01/11, Photography and photomontage in landscape and visual impact assessment, Sections 3 & 4*

Westmoreland Street

Figure VP 5 - Existing View

To view this panorama as a flat image one must move from left to right along its length whilst maintaining a perpendicular viewing direction and an approximate **viewing distance of 40cm**. To see this entire panoramic scene in reality would necessitate turning one's head through 60 degrees.

This verified panoramic image has been captured, compiled and presented in accordance with guidance from the Landscape Institute (UK) Refer to: *Landscape Institute Advice Note 01/11, Photography and photomontage in landscape and visual impact assessment, Sections 3 & 4*

Westmoreland Street

Figure VP 5 - Montage View

To view this panorama as a flat image one must move from left to right along its length whilst maintaining a perpendicular viewing direction and an approximate **viewing distance of 40cm**. To see this entire panoramic scene in reality would necessitate turning one's head through 60 degrees.

This verified panoramic image has been captured, compiled and presented in accordance with guidance from the Landscape Institute (UK)
Refer to: *Landscape Institute Advice Note 01/11, Photography and photomontage in landscape and visual impact assessment, Sections 3 & 4*

12 Soils, Geology, Hydrogeology and Hydrology

12.1 Introduction

This chapter on soils, geology, hydrogeology and hydrology provides a description of the existing geology, hydrogeology and hydrology in the study area of the Proposed Project and its immediate surroundings. The chapter also describes and assesses the likely impacts on the soils, geology, hydrogeology and hydrology associated with both the construction and operational phases of the Proposed Project.

Potential impacts of the Proposed Project are identified and residual impacts are described. The chapter initially sets out the assessment methodology used, describes the available baseline data for the existing environment and examines the potential impacts of the proposal and associated mitigation measures.

12.2 Study Area

The focus of the site specific studies comprises the proposed extent of the study area as presented on **Figure 12.1**.

In addition, for the purpose of assessment the impacts of the Proposed Project on the surrounding environment, the wider study area includes up to a 2km radius from the site. The extent of the wider study area was based on the IGI guidelines which recommend a minimum distance of 2km. It is considered that the scale of the Proposed Project does not necessitate a larger study area.

12.3 Guidelines and Sources

12.3.1 Soils, geology and hydrogeology

This chapter has been prepared in accordance with guidelines from the Environmental Protection Agency (EPA) and the Institute of Geologists of Ireland (IGI):

- IGI (2013) *Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements*.
- EPA (2015) *Revised Guidelines on the information to be contained in Environmental Impact Statements, Draft 2015.*

Data used in the baseline study was collected from the following available sources:

- Geological maps, Geological Survey of Ireland (GSI) (www.gsi.ie)
- Groundwater quality status maps (watermaps.wfdireland.ie)
- Teagasc Subsoils map (gis.epa.ie/Envision)
- Water Features, Rivers and Streams, EPA (gis.epa.ie/Envision)

- Geological Heritage Areas, GSI
- Protected areas, Biodiversity Ireland (maps.biodiversityireland.ie)
- Integrated Pollution Control (IPC) and Industrial Emissions (IE) Licences, EPA
- Historic Maps from the Ordnance Survey of Ireland (www.osi.ie)

12.3.2 Hydrology

This chapter has been undertaken in accordance with *The Planning System and Flood Risk Management – Guidelines for Planning Authorities* published in 2009 jointly by the Office of Public Works (OPW) and the Department of Environment, Heritage and Local Government (DEHLG) as well as Dublin City Development plan (2016-2022).

Data used in the baseline study was collected from the following available sources:

- National Flood Hazard Mapping, OPW (floodmaps.ie);
- Geological maps, Geological Survey of Ireland (GSI) (www.gsi.ie);
- Water Features, Rivers and Streams, EPA (gis.epa.ie/Envision);
- Flood history of the site from the OPW National Flood Hazard Mapping website (www.floodmaps.ie);
- Catchment Flood Risk Assessment and Management (CFRAM) Mapping produced by the OPW (map.opw.ie/floodplans);
- Preliminary Flood Risk Assessment (PFRA) Mapping produced by the OPW (www.cfram.ie/pfra);
- Predicted extreme water levels and flood extent maps from the ICPSS;
- Site Geological and hydrogeological data from the Geological Survey of Ireland website (www.gsi.ie);
- Guidelines for Planning Authorities on 'The Planning System and Flood Risk Management' published in November 2009, jointly by the Office of Public Works (OPW) and the then Department of Environment, Heritage and Local Government (DEHLG);
- Aerial photography and mapping from Bing Maps and Google Maps.

Water resource management in Ireland is dealt with in the following key pieces of legislation which were taken into consideration in this assessment:

a) The EU Water Framework Directive (WFD), 2000/60/EC;
b) The Groundwater Directive, 2006/118/EC;
c) European Communities (Water Policy) Regulations 2014 (S.I. No. 350 of 2014);
d) European Communities Environmental Objectives (Groundwater) Regulations 2016 (S.I. No. 366 of 2016);

e) European Communities Environmental Objectives (Surface Water) Regulations 2015 (S.I. No. 386 of 2015);

f) European Communities (Drinking Water) Regulations 2014 (S.I. No. 122 of 2014);

g) European Communities (Quality of Salmonid Waters) Regulations 1988 (S.I. No. 293 of 1988);

h) Water Services Acts (2007 – 2014);

i) The EU Floods Directive, 2007/60/EC.

12.4 Assessment Methodology

The potential impact of the Proposed Project on the soils, geological hydrogeological and hydrological environment has been assessed by classifying the importance of the relevant attributes and quantifying the likely magnitude of any impact on these attributes.

This impact assessment methodology is in accordance with the guidance outlined in *Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements* published by the Institute of Geologists of Ireland (IGI) in 2013.

This document outlines a 13 step methodology, which has four distinct elements, as follows:

- Element 1: Initial Assessment (Steps 1 to 5)
- Element 2: Direct and Indirect Site Investigation and Studies (Steps 6 to 9)
- Element 3: Mitigation Measures, Residual Impacts and Final Impact Assessment (Steps 10 to 12)
- Element 4: Completion of the Soils, Geological and Hydrogeological Sections of the EIS (Step 13)

The initial assessment as outlined in **Section 12.5** describes the existing geological, hydrogeological and hydrological environment and presents a description of the past and present uses of the site and other neighbouring sites. This section also describes the nature of the site based on both site specific and neighbouring site investigation data from publicly available sources.

Where specific features e.g. quarries etc. are identified, their importance is ranked in line with the IGI Guidelines. These criteria are presented in **Appendix 12.1**.

The outcome from examining this available data is the Conceptual Site Model (CSM) which is briefly outlined in **Section 12.5.6**.

Section 12.7 lists the predicted impacts associated with the development of the site. The magnitude of the potential impact is ranked in accordance with the IGI Guidelines (**Appendix 12.1**) and this allows the Significance of the Impact (**Appendix 12.1**) to be determined.

Following the assessment of impacts, specific mitigation measures have been developed to avoid, reduce and, if possible, remedy any negative impacts on the soils, geology, hydrogeology and hydrology. These are described in **Section 12.8** below.

Residual impacts are described in **Section 12.9**. The magnitude and significance of these residual impacts have also been classified based on the IGI Guidelines (presented in **Appendix 12.1**).

12.5 Baseline Environment

12.5.1 Site Location and Setting

The Proposed Project is located in Dublin City centre and covers an area of 1.4 Ha The site extends from Dame Street to Lower Grafton Street and is located in an entirely built-up urban environment surrounded by residential and commercial buildings as well as historic buildings (**Figure 12.2)**.

The closest rivers to the site are the River Liffey, located approximately 0.2km to the north, and the River Dodder, located approximately 2km to the east of the site. The Grand Canal is located approximately 1.3km south east of the site and Dublin Bay is located approximately 3km to the east.

Appendix 12.2 shows the historical setting of the area between 1709 to the present day. The site use has The OSI historical map, available on the OSI web page (www.osi.ie), provides 6" (1827 to 1841) and 25" (1897 to 1931) maps of the area. These indicate that the land has been a part of an urban environment for the last two centuries. The perimeter of the study area has been surrounded by the Bank of Ireland building (previously Ireland's Parliament House) on its northern side, Trinity College Dublin to its eastern side and a series of buildings to the south.

The study area is flat with little to no topographic variations. Based on borehole logs available from the GSI Geotechnical Data Viewer for an area adjacent to the site the ground level is approximately 6 mOD. The ground level gently falls towards the River Liffey and rises in the south towards the Grand Canal.

The study area is surrounded by an urban environment including a large proportion of hard standing and buildings with some green unpaved areas.

12.5.2 Soils and Geology Baseline Environment

12.5.3 Regional Soil and Subsoil

According to the Teagasc soils map Made Ground dominates the upper soils and subsoils in the region (**Figure 12.3** and **Figure 12.4).** Made Ground is a term which refers to soil which has either been altered or placed by man. The presence of Made Ground along the Proposed Project and across the study area is consistent with what is expected in a built-up urban environment. Other subsoils in the region further away from the city centre, and which are likely to underlie the made ground, includes Carboniferous Limestone Till, alluvium sediment and glaciofluvial sands and gravels derived from limestone.

12.5.4 Regional Bedrock Geology

The bedrock underlying Dublin City is the Lower Carboniferous basinal limestones and shale known as Calp **(Figure 12.5)**. The formations consists of dark grey massive limestones, shaley limestones with massive mudstones and chert common. The Geological Survey of Ireland (GSI) describes the bedrock geology underlying the Proposed Project as dark-grey argillaceous and cherty limestone and shale. No large-scale cavities have been observed in the Calp limestone.

12.5.5 Site Specific Soils and Geology

Information from previous ground investigations in the study area and its immediate vicinity have been attained from the GSI Geotechnical Data Viewer as well as an internal database of site investigations (**Figure 12.6**). A summary of the strata proven in the vicinity of the site is presented in **Table 12.1**. The borehole logs are available from the Geological Survey Ireland Spatial Resources Viewer (www.gsi.ie).

Borehole logs to the south of the site shows that the ground consists of Made Ground overlying dominantly hard brown to black clay with occasional layers of gravel and setts overlying bedrock. The proven depth to bedrock (with rotary drilling) ranges from approximately 3mbgl to 4mbgl (**Table 12.1**).

Table 12.1 - Soils and geology in the study area from previous site investigations

Depth to top of stratum (mbgl)	Stratum description	Thickness (m)
0	Fill – Made ground	0.5-2.4 (where present)
0-4.0	Brown clay	0.5-2.4 (where present)
0.2-6.1	Hard black clay	0.8-1.5
3.2-4.3	Limestone bedrock, Calp	Unproven

12.5.6 Contaminated land

The National Waste Collection Permit Office (NWCPO) issue Waste Collection Permits for all of the Waste Management Regions in Ireland. According to the EPA Envision map viewer, there are no waste licenced facilities or IPC or IE facilities within 500m and the closest facility is located approximately 1km from the site.

Considering that the location of the site has been in an urban environment for centuries, and is currently in an area of high traffic volumes, it is possible that there is soil contamination at the site.

12.5.7 Hydrogeology Baseline Environment

12.5.8 Regional Hydrogeology

The Geological Survey of Ireland has devised a system for classifying the aquifers in Ireland based on the hydrogeological characteristics, size and productivity of the groundwater resource. The three main classifications are Regionally Important Aquifers, Locally Important Aquifers and Poor Aquifers.

The bedrock underlying the study area is classified by the GSI as a Locally Important Aquifer which is productive only in local zones (Ll) and belongs to the Dublin Groundwater Body (**Figure 12.7**). Locally Important aquifers are dominated by poor yielding boreholes with yields less than 40 m^3/d Kelly *et al*. (2015). Notwithstanding its designation the groundwater is recorded as being abstracted from the limestone bedrock at yields of up to 393 m^3/d located 900m from the site on the north side of the River Liffey (GSI 2016).

The aquifer is not considered to have any primary porosity and flow is likely to occur through fractures and fissures. The transmissivity of the aquifer is reported to be generally low (1-10 m^2/d) and decreases significantly with depth (GSI n.d.). Most groundwater flow will take place close to the surface or along fractures and fissures at greater depths (GSI n.d.).

The GSI described the general groundwater flow direction of the Dublin groundwater body to be from west to east towards the coast and also towards the River Liffey (GSI n.d.).

The locally important aquifer is considered to be of medium importance according to the IGI guidelines.

12.5.9 Groundwater vulnerability

Aquifer or groundwater vulnerability is a relative measure of the ease with which the groundwater could be contaminated by human activity and depends on the aquifer’s intrinsic geological and hydrogeological characteristics. The vulnerability is determined by the permeability of any overlying deposits. For example, bedrock with a thick, low permeability, clay-rich overburden is less vulnerable than bedrock with a thin, high permeability, gravelly overburden.

The GSI uses five groundwater vulnerability categories – Extreme rock at or near surface or karst (X), Extreme (E), High (H), Moderate (M) and Low (L) for mapping purposes and in the assessment of risk to ground waters. The classifications are based on the thickness and permeability of the sub-soils overlying the aquifer.

The GSI has classified the aquifer vulnerability underlying the site as Medium to High in the western side of the site and Extreme in the eastern part of the site (**Figure 12.8**). However, based on rock head level it is more likely to be Extreme and at risk from pollution.

12.5.10 Recharge

The effective rainfall is 302 mm/yr across the site and the recharge coefficient, which is the proportion of effective rainfall to recharge groundwater, is 20% (GSI 2016). Effective rainfall is the amount of rainfall available as either recharge to ground or run-off to surface water after evaporation or taken up by plants.

Recharge is the amount of rainfall that replenishes the aquifer. It is a function of the effective rainfall, the permeability and thickness of the subsoil and the aquifer characteristics. According to GSI the recharge to the bedrock is 60 mm/yr across the site (**Figure 12.9**). Due to the nature of the ground cover at the site this is likely to be an overestimation as practically all the rainfall will be captured by the surface water collection system.

12.5.11 Site Hydrogeology

Site investigation data which includes groundwater levels is not currently available for the study area.

The hydraulic conductivities of the units is unknown, however the clay is expected to be low, in the order of 10^{-11} to 10^{-9} m/s (Domenico and Schwartz 1998) while the hydraulic conductivity in the limestone is expected to be moderate, in the 10^{-9} to 10^{-5} m/s (GSI 2015).

Based on experience in the area water likely to be encountered at the base of the made ground, between 2-4mbgl, however this is unlikely to be groundwater and is more a reflection of rainfall which cannot drain quickly enough through the low permeability till.

12.5.12 Groundwater Quality

Under the requirements of the Water Framework Directive, the Dublin groundwater body was classified as having an overall good status for water quality and quantity 2010-2015. However, it is classified as 'at risk' of not achieving at least good ecological or good chemical status/potential by 2015.

No site specific water quality data is available.

12.5.13 Hydrology Baseline Environment

The study area is located within Hydrometric Area 09 (HA 09) which is the EPA classification for the catchments flowing into Dublin Bay. This hydrometric area falls within the Eastern River Basin District (ERBD). The principal catchments are the Liffey, Tolka and Dodder River catchments and their associated sub-catchments. Consultation of the EPA online Envision mapping showed that there are no rivers or streams at the site of the Proposed Project.

Hydrometric Area 09 is 1,616 km² in size with a maximum elevation of 338 m OD and a mean slope of 2.9% and is the most densely populated hydrometric area in Ireland.

The study area is in the catchment area for the River Liffey which contains the largest tract of continuous and discontinuous urban fabric in the country, which is approximately 21% of the hydrometric area while, agricultural land comprises more than 60% of the area. As the area is a rapidly expanding urban zone, the main driving forces are population growth, industrial production, agricultural production, transportation, and energy demand and consumption. Consequently, these driving forces cause a number of pressures to exert negative impacts on water bodies and the larger natural environment including sources of diffuse pollution and point source pollution.

Environmental pressures present in HA09 include:

- Diffuse sources;
- Point sources;
- Transport;
- Waste management; and
- Recreation and tourism.

Surface Water Bodies

Surface water bodies that are considered to be relevant to the Proposed Project include the River Liffey, Grand Canal and Dublin Bay (**Figure 12.1**).

River Liffey

The Liffey River rises between Kippure and Tonduff in the Wicklow mountains, and flows for approximately 125 km through counties Wicklow, Kildare and Dublin before entering the Irish Sea at its mouth at the mid-point of Dublin Bay, on a line extending from the Baily lighthouse to the Muglin Rocks. It is located approximately 0.2km north of the study area. The Liffey River is a controlled river that has a regulated flow. There are three ESB hydroelectric power stations along the river, at Poulaphouca, Golden Falls and Leixlip, as well as a number of minor private installations. Major reservoir facilities also exist at Poulaphouca where significant waterfalls there and at Golden Falls were flooded by reservoir construction. The annual average flow of the Liffey River at Leixlip is approximately 2.35 m^3/s. Low flow conditions are maintained at 2.00 m^3/s (Fingal, 2005).

Grand Canal

The Grand Canal is a manmade waterway that links the River Liffey with the Shannon at Shannon Harbour and the Barrow at Athy. It is located approximately 1.4km east of the site. The Grand Canal system is designated as a proposed Natural Heritage Area (pNHA) under national legislation which comprises the canal channel and the banks of either side of it. There are various habitats within the canal system including hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland. The ecological value of the canal lies within the diversity of species rather than the presence of rare species (NWPS, 2015).

Dublin Bay

South Dublin Bay, located less than ten metres to the south east of the site, is designated both as a Special Area of Conservation (SAC) and a Special Protection Area (SPA). The features of interest of the South Dublin Bay SAC include mudflats and sandflats not covered by seawater at low tide, annual vegetation of drift lines, salicornia and other annuals mud and sand and embryonic shifting dunes (NPWS, 2013). The SAC overlaps with South Dublin Bay and River Tolka Estuary SPA. The SPA is associated with site-specific conservation objectives aiming to preserve natural habitats for a number of species (NPWS, 2015).

12.5.14 Surface Water Quality

The Liffey is classified as a nutrient sensitive water body and is considered to be at high risk from diffuse pollution through groundwater and urban run-off and from point sources located within its catchment (ERBDA, 2005). Refer to Chapter 9 '*Biodiversity*' for further detail on the status of the River Liffey.

According to EPA mapping, the River Liffey has WFD status of 'Good' (2010 – 2012). It has also been classified as being "*at risk of not achieving good status in 2015*".

The EPA conducts regular water quality assessments for both physical-chemical and biological water quality at various locations along the River Liffey. The monitoring stations that are in closest vicinity to the Proposed Project are (1000) 2.5 km d/s Newbridge and (1050) Victoria Bridge. Water quality sampled at these sampling points is presented in **Table 12.2**.

Table 12.2 - River Liffey Biological Quality Ratings (EPA, 2013)

Biological Quality Rating (Q Value)							
Station	**Year**						
	1995	**1998**	**2002**	**2005**	**2007**	**2010**	**2013**
1000	4	4-5	4	4	4	4	4
1050	4	4	4	4	4	4	-

12.5.15 Flood Risk

The following planning policy documents are relevant to the assessment of the Proposed Project in terms of flood risk:

- The Planning System and Flood Risk Management Guidelines for Planning Authorities' published by the OPW and the Department of the Environment, Heritage and Local Government in November 2009; ';
- The Dublin City Council Development Plan 2016–2022.

Refer to **Appendix 12.3** (Flood Risk Assessment) for detailed discussion of these policy documents.

In broad terms, the potential sources of flooding at the site can be categorised as:

- Fluvial (River) Flooding;
- Tidal/Coastal Flooding;

- Pluvial Flooding;
- Groundwater Flooding;

Each of these potential sources of flooding are considered in this section.

It is noted that from an examination of historical records on OPW's National Flood Hazard Mapping Website (floodmaps.ie) there is no record of historic flooding in the study area.

12.5.16 Fluvial Flood Risk

The Eastern CFRAM fluvial flood extent map for the 10% 1% and 0.1% Annual Exceedance Probability (AEP) events for the site is presented in **Figure 12.10**. It can be seen that the study area is located outside of the predicted fluvial floodplain. The risk of fluvial flooding is therefore very low.

The River Stein runs to the front of Trinity College Dublin (**Figure 12.11)**. This watercourse, which has been incorporated into the public sewerage system since the early 1900's through a series of underground culverts, runs approximately 2.5km from Charlemont Bridge downstream to the River Liffey.

Based on an inspection of aerial imagery and from site visits, it can be concluded that the Stein is culverted throughout its reach. There are no open channel sections which offer a route for water to flood the surrounding area. The risk of fluvial flooding from the culvert is therefore limited to the potential for surcharging at the culvert entrance and pressurised flow within the culvert forcing water out through any connecting back pipes, manholes or connecting culverts.

The catchment area upstream of the River Stein culvert is likely to be very small

given the close proximity of the Dodder, Poddle and Gallows Stream catchments.

The risk of the culvert entrance being surcharged due to high flows is therefore likely to be low. It can therefore be concluded that surcharging of the culvert entrance is unlikely to present a significant risk of flooding to the project site.

In the absence of data on the culvert close to the subject site, the risk of flooding arising from pressurised flow within the culvert cannot be accurately determined. Given the absence of any record of historic flooding of the site, it is likely that this risk of flooding is low.

Coastal Flood Risk

Two separate studies have been undertaken in recent years which provide predicted coastal extents and design maximum water levels for Dublin:

- Eastern CFRAM Study;
- Irish Coastal Protection Strategy Study (ICPSS);

Both have been reviewed to determine the risk of flooding of the site.

Figure 12.12 presents an extract from the Eastern CFRAMS showing the coastal flood extents for the 10%, 0.5% and 0.1% AEP events. It can be seen that the site is located outside the 0.1% AEP flood extent.

Figure 12.13 presents the flood depth map for the 0.5% AEP coastal flood extent from the ICPSS. It can be seen that the College Green site is not located within the predicted flood extent.

Topographical data for the study area indicates that the ground levels at the site are circa 6m O.D. The 1 in 200 year (0.5% AEP flood event) tidal flood level as predicted by the Eastern CFRAM Study is 3.12m O.D which is significantly below the existing ground.

The risk of coastal flooding to the site is therefore very low.

Pluvial Flood Risk

Pluvial flooding occurs when extreme rainfall overwhelms drainage systems or soil infiltration capacity, causing excess rainwater to pond above ground at low points in the topography.

Two separate studies have been undertaken in recent years which considered the risk of pluvial flooding to Dublin:

- Flood Resilient City Project undertaken by Dublin City Council;
- PFRA maps;

Both have been reviewed to determine the risk of flooding of the site.

Figure 12.14 presents the pluvial flood extent from the Flood Resilient City. It can be seen from the figure that the College Green site is indicated as being at risk of pluvial flooding.

Figure 12.15 presents the flood extents for the 1% and 0.1% AEP pluvial events from the PFRA. It can be seen that a small area of the site is indicated as being at risk of pluvial flooding.

It is noted that the pluvial flood extents as estimated in both studies and presented in **Figure 12.14** and **Figure 12.15** are different with the Flood Resilient City Project predicting a greater pluvial flood extent than the PFRA extent.

Based on the finding of both of these studies it can be concluded that there is a minor risk of pluvial flooding to the site.

The existing drainage regime of the area of the site is being retained as part of the Proposed Project. Additional new SuDS features however will be incorporated into the Proposed Project. These will consist of new attenuation/infiltration areas beneath proposed trees filled with crushed stone or soil.

New gullies will also be arranged so that overflow from these attenuation/infiltration areas will discharge to the piped surface water drainage system. All existing surface water collection points will be raised to suit proposed new ground levels.

The low risk of pluvial flooding to the site will be mitigated by the design of the surface water drainage network.

12.5.17 Groundwater Flood Risk

Groundwater flooding can occur during lengthy periods of heavy rainfall, typically during later winter/early spring when the groundwater table is already high. If the groundwater level rises above surface level, it can pond at local points and cause periods of flooding.

As stated in **Section 12.5.12**, there is no site investigation groundwater information available for the study area. However, based on experience in the area, water beneath the site is likely to be present at approximately 2-4mbgl, at the top of the boulder clay.

The risk of groundwater flooding is therefore considered to be low.

Anecdotal evidence however suggests that some basements in the vicinity of the works may have experienced groundwater ingress during the recent Luas Cross City works.

12.5.18 Sensitive features of the Baseline Environment

12.5.19 Groundwater resources

Groundwater is not used extensively for residential or industrial purposes in the area. **Table 12.3** summarises the groundwater abstractions recorded in the GSI database and the Dublin City Council abstraction archives within 2km of the site boundary. These are presented in **Figure 12.18**. No groundwater abstractions are located within the area of the Proposed Project.

The nearest groundwater abstraction is 350 m from the site on the opposite side of the River Liffey. This is not be assessed further as the River Liffey will act as a hydraulic barrier.

Table 12.3 - Groundwater abstractions within 2km of the study area

Borehole Name (GSI)	Easting	Northing	Type	Depth (m)	Location accuracy	Use	Yield (m^3/day)
2923SEW013	315400	234300	Borehole	106.7	To 200m	Unknown	114.5
2923SEW015	314750	234750	Borehole	30.4	To 500m	Industrial	393
2923SEW012	315950	235050	Borehole	137	To 100m	Unknown	163.6
2923SEW029	317420	234700	Borehole	6.5	To 100m	Other	
2923SEW030	317500	234720	Borehole	7.8	To 200m	Other	
2923SEW014	317540	233680	Borehole	9.8	To 200m	Industrial	261.8

12.5.20 Groundwater dependent ecological sites

The study area is located approximately 1.5km west of the Grand Canal which is designated as a Proposed Natural Heritage Area (pNHA) and approximately 3km from Dublin Bay which is designated as a Special Area of Conservation (SAC) and a Special Protected Area (SPA) (**Figure 12.1**).

The Grand Canal is unlikely to be hydraulically connected to the underlying groundwater body and therefore is not assessed further in this Chapter. Refer to Chapter 9 '*Biodiversity*' for further detail.

As Dublin Bay is located over 2km from the site, it is not considered likely to be impacted by activities within the site and therefore is not assessed further.

12.5.21 Hydrological sites

The River Liffey is the closest river to the site located 150m to the north. The River Liffey is not protected under national or international status.

12.5.22 Geological Heritage Areas

The GSI database shows that there are no geological heritage areas on the site. The closest geological heritage area is the River Poddle which is an underground river located approximately 0.36km from the Proposed Project (**Figure 12.10**).

No quarries are located within 2km of the study area.

12.5.23 Conceptual model

A conceptual site model was compiled showing the depth and extents of overburden, bedrock profile, location of surface water features and groundwater levels were compiled. The model is presented in **Figure 12.19**.

12.5.24 Summary of features of importance

The main features of importance uncovered on the site and in the study area are summarised in **Table 12.4.**

Table 12.4 - Features of importance

Feature	Importance	Criteria / Justification
Soil	Low	The soil is poorly drained and therefore has a low significance or value on a local scale.
Bedrock aquifer classified by the GSI as a Locally Important Aquifer which is productive only in local zones (Ll)	Medium	A locally important aquifer is considered to be of medium value on a local scale.

The River Liffey is a hydrological feature of importance. The IGI do not designate importance ranking to hydrological features. There is no proposed construction adjacent to the river which may pose a risk from runoff of pollutants. Therefore, the River Liffey is not assessed further in this chapter. Refer to Chapter 9 '*Biodiversity*'.

12.5.25 Classification of environment

The generic type of geological/hydrogeological environment of the Proposed Project can be determined based on the IGI guidelines. The generic types of geological/hydrogeological environments include:

- Type A – Passive geological / hydrogeological environments e.g. areas of thick low permeability subsoil, areas underlain by poor aquifers, recharge areas, historically stable geological environments;
- Type B – Naturally dynamic hydrogeological environments e.g. groundwater discharge areas, areas underlain by regionally important aquifers, nearby spring rises, areas underlain by permeable subsoils;
- Type C – Man-Made dynamic hydrogeological environments e.g. nearby groundwater abstractions, nearby quarrying or mining activities below the water table, nearby waste water discharges to ground, nearby geothermal systems;
- Type D – Sensitive geological / hydrogeological environments e.g. potentially unstable geological environments, groundwater source protection zones, karst;
- Type E – Groundwater dependent eco systems e.g. wetlands, nearby rivers with a high groundwater component of base flow.

The study area is Type A as it is a passive geological/hydrogeological environment in which low permeability subsoil overlies a locally important aquifer and recharge is largely inhibited due to the presence of hard standing.

12.6 Characteristics of the proposal

The Proposed Project will involve the following activities during the construction phase which have the potential to impact the geological and hydrogeological features of importance:

- Excavations during the construction stage which will be up to 2.5 mbgl to link into existing utilities in the area. The excavations may encounter contaminated material.
- Storage of stockpiles during the construction phase
- Minor pumping may be required if groundwater is encountered during excavations, although this is expected to be very localised to the site. This groundwater may be contaminated.

During the operational phase the area will be an urban environment covered in hard standing. There are no perceived activities which pose a risk to the geological and hydrogeological features of importance.

The following assessments are required by the Activities/Environment Matrix in the Institute of Geologists of Ireland guidelines corresponding to the Proposed Project conditions (Type A):

- Earthworks; and
- Excavations of materials above the water table.

Table 12.5 outlines the investigations required by the IGI guidelines for a Type A Environment which should be undertaken on the Proposed Project, based on the environmental type and different activities which will be undertaken.

Table 12.5 - Details of works required under the IGI Guidelines for a Type A Environment and how they are to be undertaken on the Proposed Project

Work required under Activity and Environment Type Class A (based on IGI guidelines)	Details of Works completed on the Site
Earthworks	
Invasive site works to characterise the nature, thickness, permeability and stratification of soils.	Site Investigations completed as presented in **Section 12.5.5**
Excavation of materials above the water table	
Site works to characterise nature, thickness, permeability and stratification of soils and subsoils e.g. trial pits, augering.	Site Investigations completed as presented in **Section 12.5.5**
Site works to fully characterise the bedrock geology and in order to define the resource volume/weight according to the PERC Reporting Standard e.g. trenching, drilling, geophysics.	Not relevant. Bedrock will not be encountered
Works to determine groundwater level, quality, flow direction and gradient; e.g. monitoring in stand pipes, piezometers, or boreholes.	Site Investigations which include groundwater monitoring are not available within the site, however the expected groundwater levels have been described in **Section 12.5.11**

12.7 Potential impact of the Proposed Project

This section will describe the impacts associated with the Proposed Project before mitigation measures are applied.

Both direct and indirect impacts will be addressed for the construction and operation of the Proposed Project. The nature, extent and duration of the impacts will also be assessed.

12.7.1 Construction phase

During the construction phase the following activities may pose a potential impact:

- Excavation of inert soils,
- Excavation of made ground,
- Contamination of soils, and
- Contamination of groundwater.

12.7.2 Excavation of inert soils

Soil will be excavated as part of construction works resulting in a Permanent Negative impact on the soils. The anticipated maximum depth of excavation is a maximum of 2.5 metres below ground level in confined areas.

The magnitude of this impact is Negligible due to the impact on the attribute being insufficient in magnitude to affect either use or integrity of any of the important features (see **Appendix 12.1** for definitions).

12.7.3 Excavation of made ground

There is potential for excavation of made ground on site. The excavation of any hotspots of contamination will be a Permanent Positive impact on the soils environment. Therefore, the magnitude of this impact is Minor Beneficial due to a minor improvement to the attributes quality. As a result, the significance of this impact is not applicable for all important features.

12.7.4 Contamination of Soils

There is a potential risk of localised contamination from construction materials leeching into the underlying soils by exposure, dewatering or construction related spillages resulting in a Permanent Negative impact on the soils.

In the case of soils, the magnitude of this impact is Small Adverse as it may result in the requirement to excavate/remediate a small proportion of contamination or result in a low risk of pollution to the soils. As a result, its significance is Imperceptible for all important soils features (see **Appendix 12.1** for definitions).

12.7.5 Contamination of Groundwater

There is a potential risk of localised contamination of the groundwater due to construction activities i.e. construction spillages, leaks etc. resulting in a Permanent Negative impact on the groundwater.

The groundwater table is approximately 2-4 m bgl. The bedrock has been proven at 3.2 mbgl which is overlain by clay. This clay will limit the potential for contamination to infiltrate into the underlying aquifer. No excavations are anticipated to take place into the bedrock.

For these reasons, the impact is Negligible on the groundwater contained within the bedrock aquifer. As a result, its significance is imperceptible (see **Appendix 12.1** for definitions).

12.7.6 Flood risk

The Proposed Project will have no impact on floodplain storage and conveyance.

The Proposed Project will also not increase flood risk off site.

12.7.7 Application of the Flood Risk Management Guidelines

It is considered that the Proposed Project should be classed as a 'water compatible development' as per the vulnerability classification in **Figure 12.16**.

As indicated in **Section 2.1.2** of **Appendix 12.3**, the Proposed Project is not indicated as being within the 1,000 year fluvial or 1,000 year coastal/tidal floodplain. In accordance with the OPW's planning guidelines, the site therefore lies within Flood Zone C.

Figure 12.17 illustrates the sequential approach to be adopted under the 'Planning System and Flood Risk Management' Guidelines.

As the Proposed Project lies within Flood Zone C, a Justification Test is not required and it is necessary only to identify mitigation measures for any residual risks. This has been discussed in further detail in the Flood Risk Assessment in **Appendix 12.3**.

12.7.8 Flood Risk Assessment Conclusion

There is no historic record of flooding of the site.

The risk of both fluvial and tidal/coastal flooding to the site is remote. There is a minor risk of pluvial flooding to the site.

The risk of groundwater flooding is considered to be low. It is noted however that anecdotal evidence suggests that basements in the vicinity of the site may have experienced groundwater ingress during construction of the Luas Cross City works.

Access and egress routes to and from the site are highly unlikely to be compromised during flood events.

The Proposed Project will not have any adverse impact on floodplain conveyance and storage and will not increase the risk of flooding in the surrounding area.

The low risk of pluvial flooding to the site will be mitigated by the design of the surface water drainage network.

Based on the findings of this FRA and the application of the Flood Risk Management Guidelines, it is considered that the Proposed Project should be classed as a 'water less vulnerable development'. As the site lies within Flood Zone C, a Justification Test is not required.

12.7.9 Operational phase

The operational phase of the Proposed Project is predicted to have an overall neutral long-term impact on the soils, geology, hydrological and hydrology within the study area.

There will be a reduction in traffic within the area reducing the potential for associated hydrocarbons spills.

12.8 Mitigation Measures

12.8.1 Construction phase

A project-specific Construction Management Plan (CMP) will be prepared and submitted to the planning authority for approval. It will be maintained by the Contractor for the duration of the construction phase. The CMP will cover all potentially polluting activities and include an emergency response procedure. All personnel working on the site will be trained in the implementation of the procedures.

As a minimum, the CMP manual for the Proposed Project site will be formulated in consideration of the standard best practice. The CMP will include a range of site specific measures which will include:

- Earthworks operations shall be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe run-off and prevent ponding and flooding.
- Run-off will be controlled to minimise the water effects in outfall areas.
- Good housekeeping (site clean-ups, use of disposal bins, etc.) on the site project.

In order to prevent the accidental release of hazardous materials (fuels, cleaning agents, etc.) during construction site activity, all hazardous materials will be stored within secondary containment designed to retain at least 110% of the storage contents. Temporary bunds for oil/diesel storage tanks will be used on the site during the construction phase of the Proposed Project. Safe materials handling of all potentially hazardous materials will be emphasised to all construction personnel employed during this phase of the Proposed Project.

Mitigation during the construction phase will include implementing best practice during excavation works to avoid sediment running into the drainage system which discharges to the River Liffey.

12.8.2 Operational phase

No mitigation measures are required during the operational phase.

12.9 Residual impacts

Upon application of the mitigation measures outlined in **Section 12.8** the magnitude of any impacts both in the construction and operational phase are Negligible as detailed in **Table 12.6** (see **Appendix 12.1** for definitions). As a result, the significance of all the impacts is Imperceptible.

Table 12.6 - Summary of residual impacts on the identified features of importance

Feature	**Soil**	**Bedrock aquifer classified by the GSI as a Locally Important Aquifer which is productive only in local zones (Ll)**
Importance	Low	Medium
Justification	Poorly drained soil	Locally important aquifer.
Magnitude	Small adverse	Negligible
Justification	a low risk of pollution to the soils	Results in impact on attribute but of insufficient magnitude to affect either use or integrity
Significance	Imperceptible	Imperceptible
Mitigation measure	Refer to Section 12.8	Refer to Section 12.8
Residual impact	Negligible	Negligible
Justification	Imperceptible	Imperceptible

12.10 References

Domenico, P.A. and Schwartz, F.W., 1998 Physical and chemical hydrogeology, Volume 1, University of Michigan: Wiley.

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Kelly, C., Hunter Williams, T., Misstear, B.M., Motherway, K., 2015. Irish Aquifer Properties – A reference manual and guide. Prepared on behalf of the Geological Survey of Ireland and the Environmental Protection Agency.

IGI Guidelines, Environmental Impact Assessment (2013), available online, http://igi.ie/assets/files/Codes%20and%20Guidelines/IGI%20Enviro%20Impact%202013.

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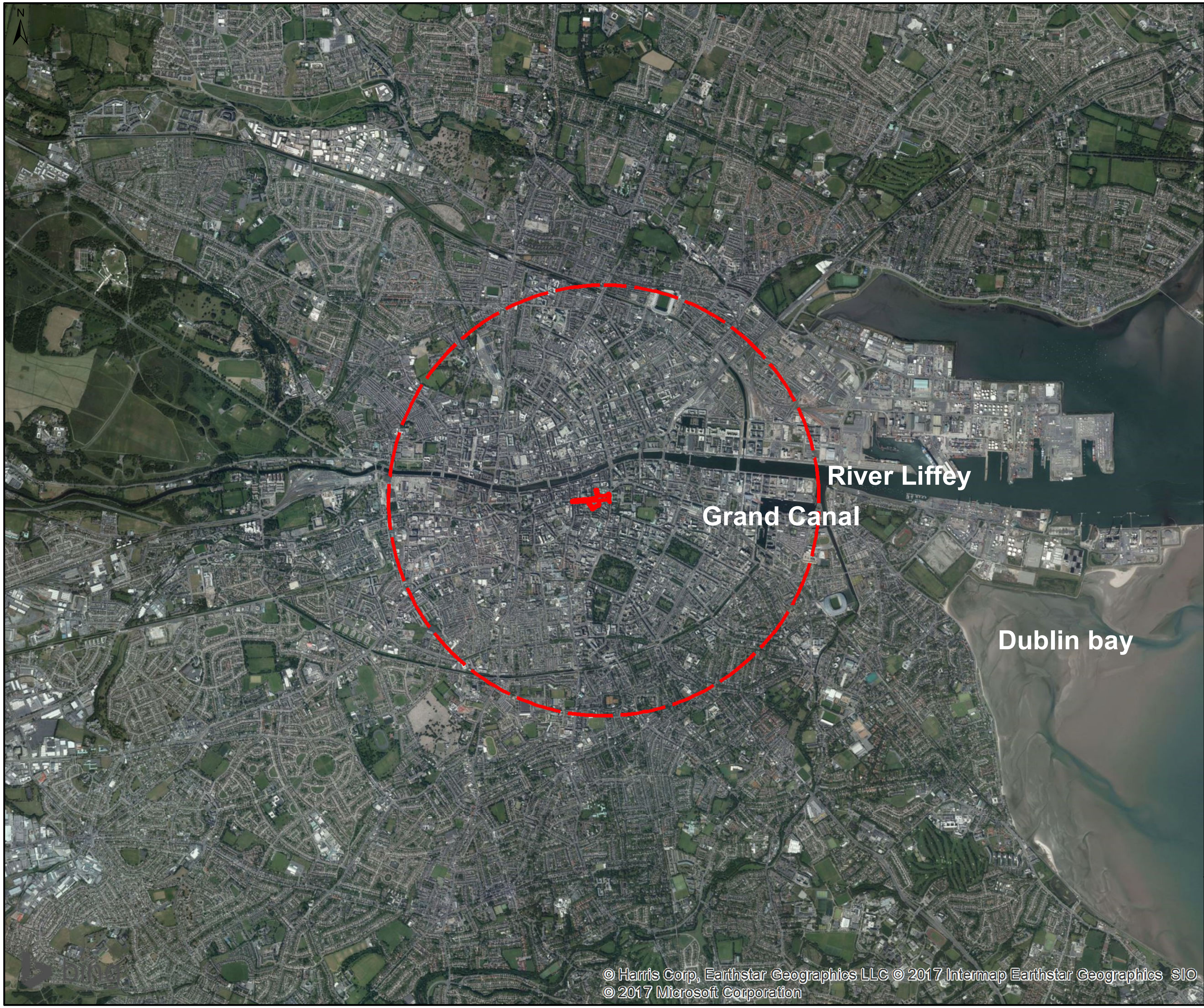

Legend

Extent of main works

2km radius

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Issue	Date	By	Chkd	Appd

Kilometers

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Location of the study area

Scale at A4
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Job No
252740-00

Drawing Status
For information

Drawing No
12.1

Issue
D1

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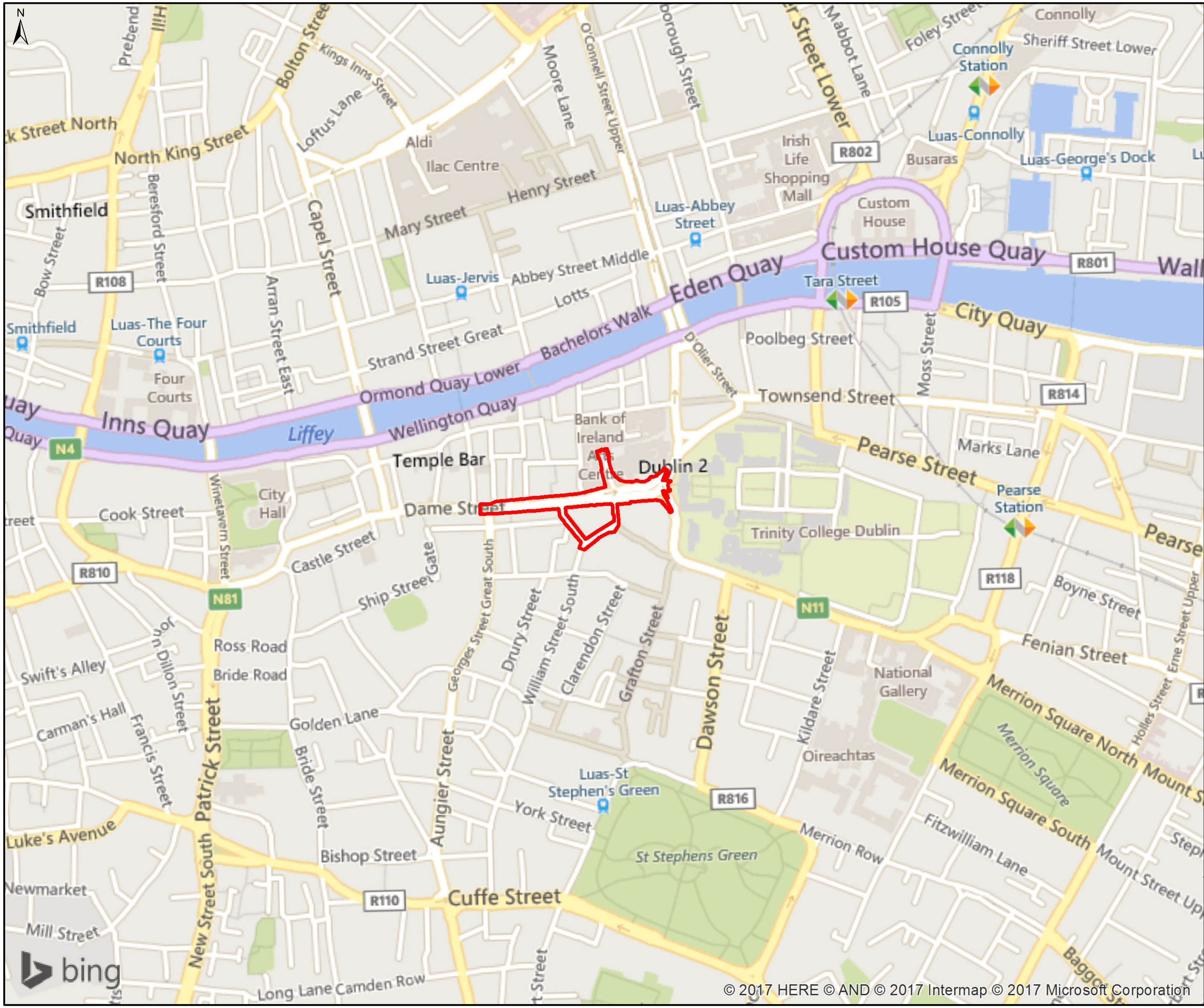

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Legend

Extent of main works

F1	2017-01-20	JF	AO	CN
Issue	Date	By	Chkd	Appd

Kilometers

0 0.075 0.15 0.3

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Site setting

Scale at A4
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Job No
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Drawing Status
For information

Drawing No
12.2

Issue
F1

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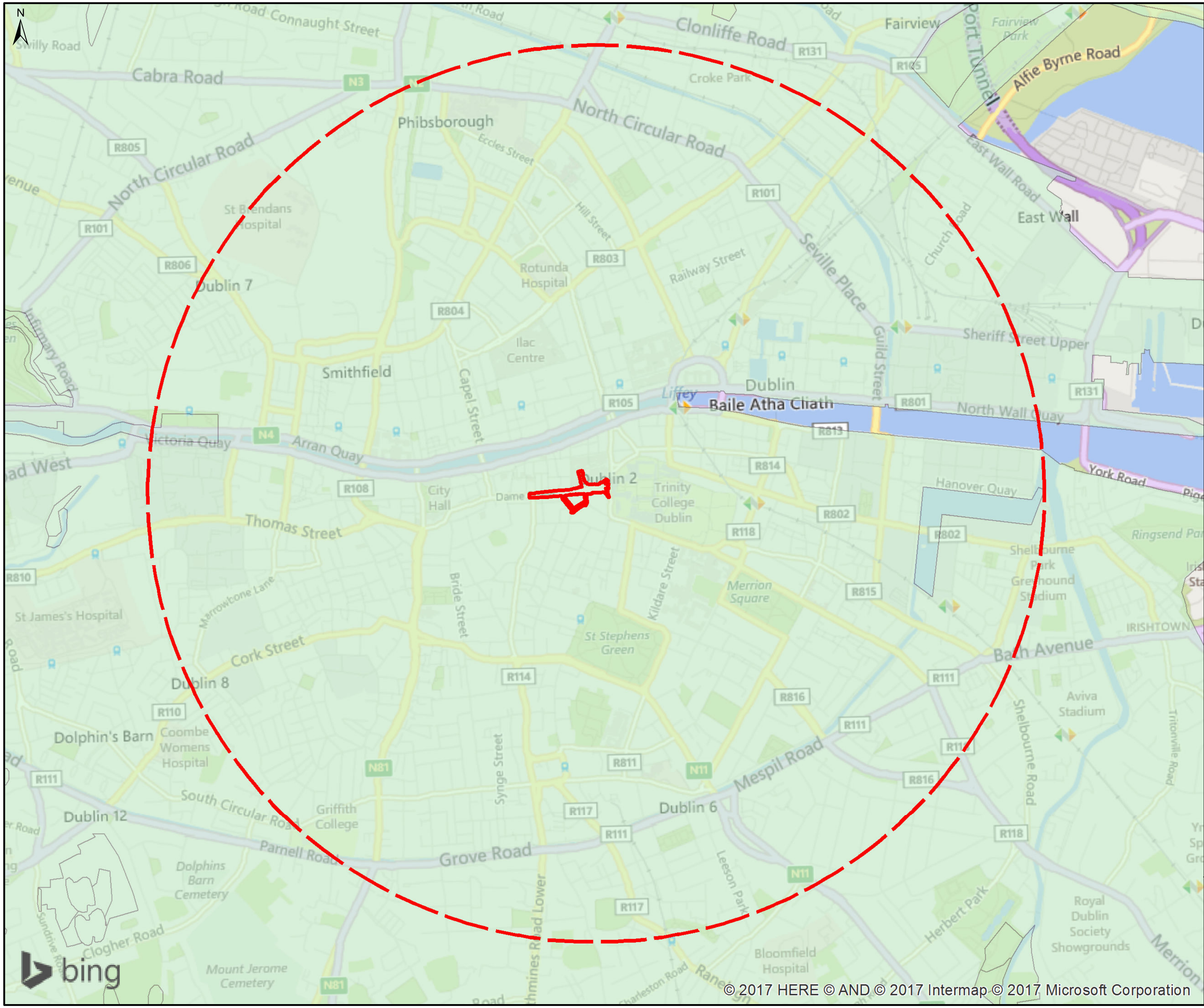

Legend

- Extent of main works
- 2km radius
- Made ground

D1	2017-01-20	JF	AO	CN
Issue	Date	By	Chkd	Appd

Kilometers

0 0.225 0.45 0.9

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Soils in the vicinity of the site

Scale at A4
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Job No **252740-00**

Drawing Status **For information**

Drawing No **12.3**

Issue **D1**

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Legend

- Extent of main works
- 2km radius
- Made ground

F2	2017-01-20	JF	AO	CN
Issue	Date	By	Chkd	Appd

Kilometers

0 0.225 0.45 0.9

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Subsoil in the vicinity of the site

Scale at A4
1:24,000

Job No
252740-00

Drawing Status
For information

Drawing No
12.4

Issue
F2

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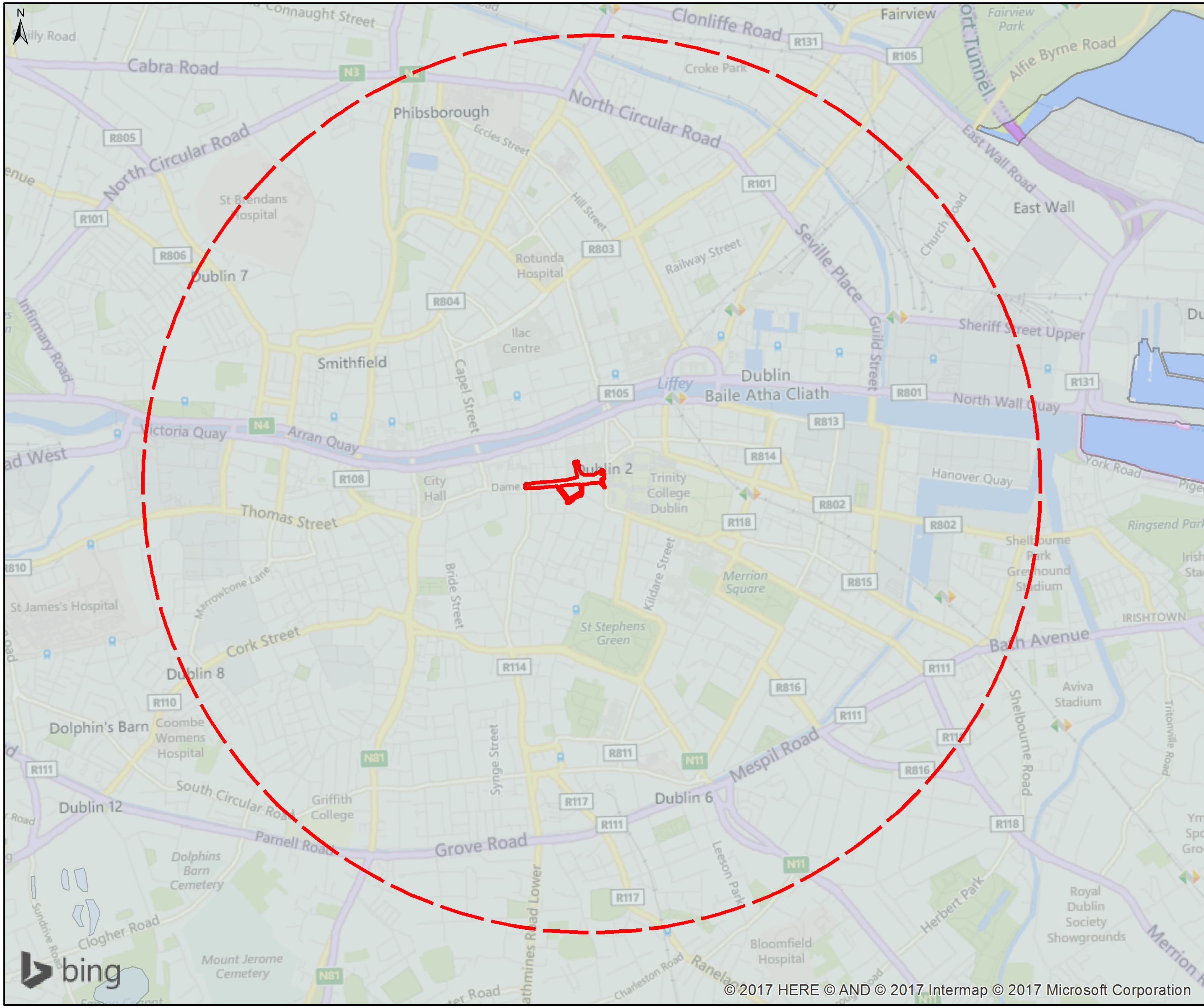

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Extent of main works

2km radius

Solid geology

Calp

D1	2017-01-20	JF	AO	CN
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Kilometers

0 0.225 0.45 0.9

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Solid geology in the vicinity of the study area

Scale at A4
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Job No **252740-00**

Drawing Status **For information**

Drawing No **12.5**

Issue **D1**

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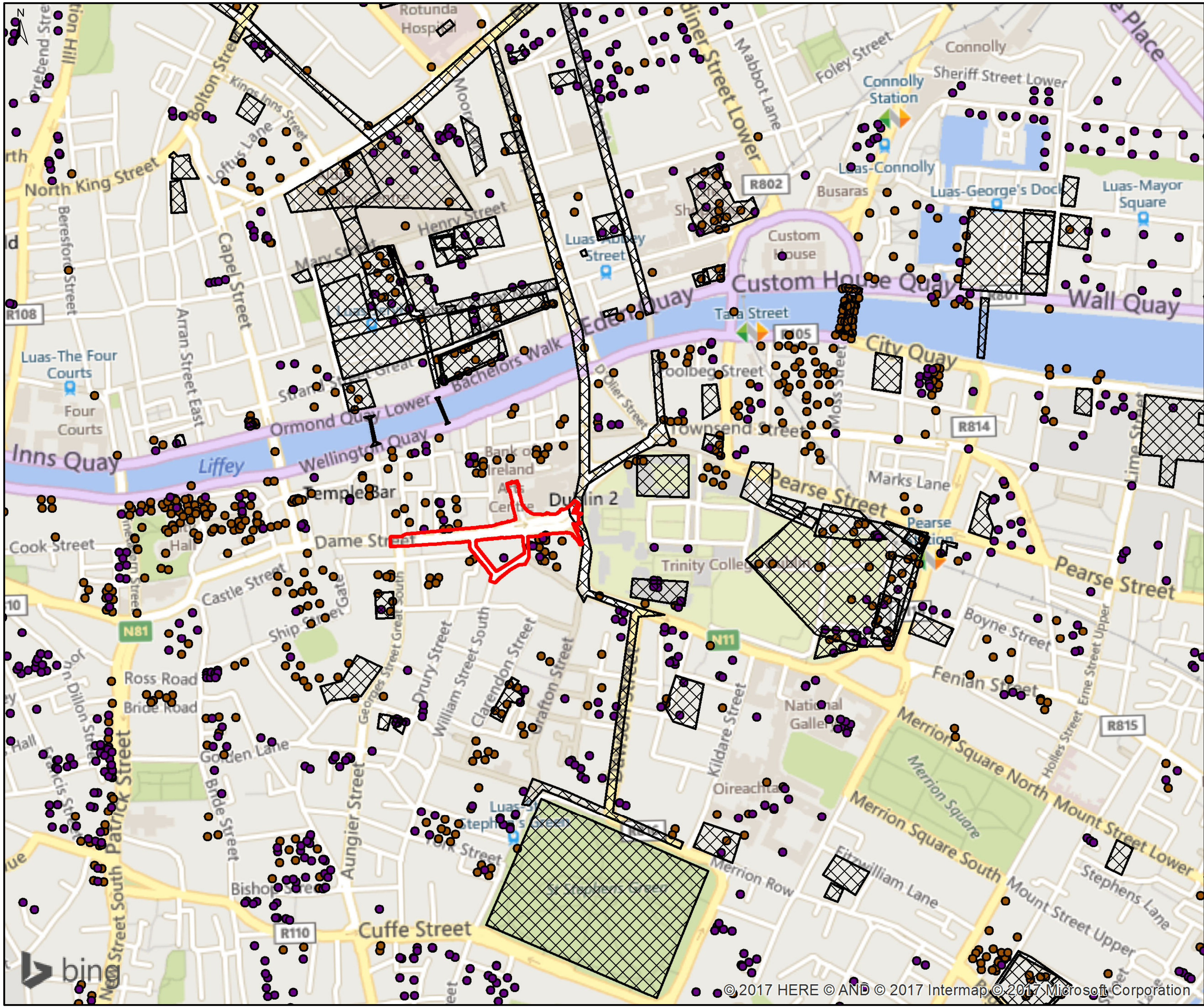

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- Site Investigations (internal database)
- GSI boreholes (Bedrock not met)
- GSI boreholes (bedrock met)

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Kilometers

0 0.075 0.15 0.3

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Previous site investigation locations

Scale at A4

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Job No

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Drawing Status

For information

Drawing No

12.6

Issue

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Legend

Extent of main works

2km radius

Bedrock aquifers

LI

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Kilometers

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Bedrock aquifers in the vicinity of the study area

Scale at A4
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Job No
252740-00

Drawing Status
For information

Drawing No
12.7

Issue
P0

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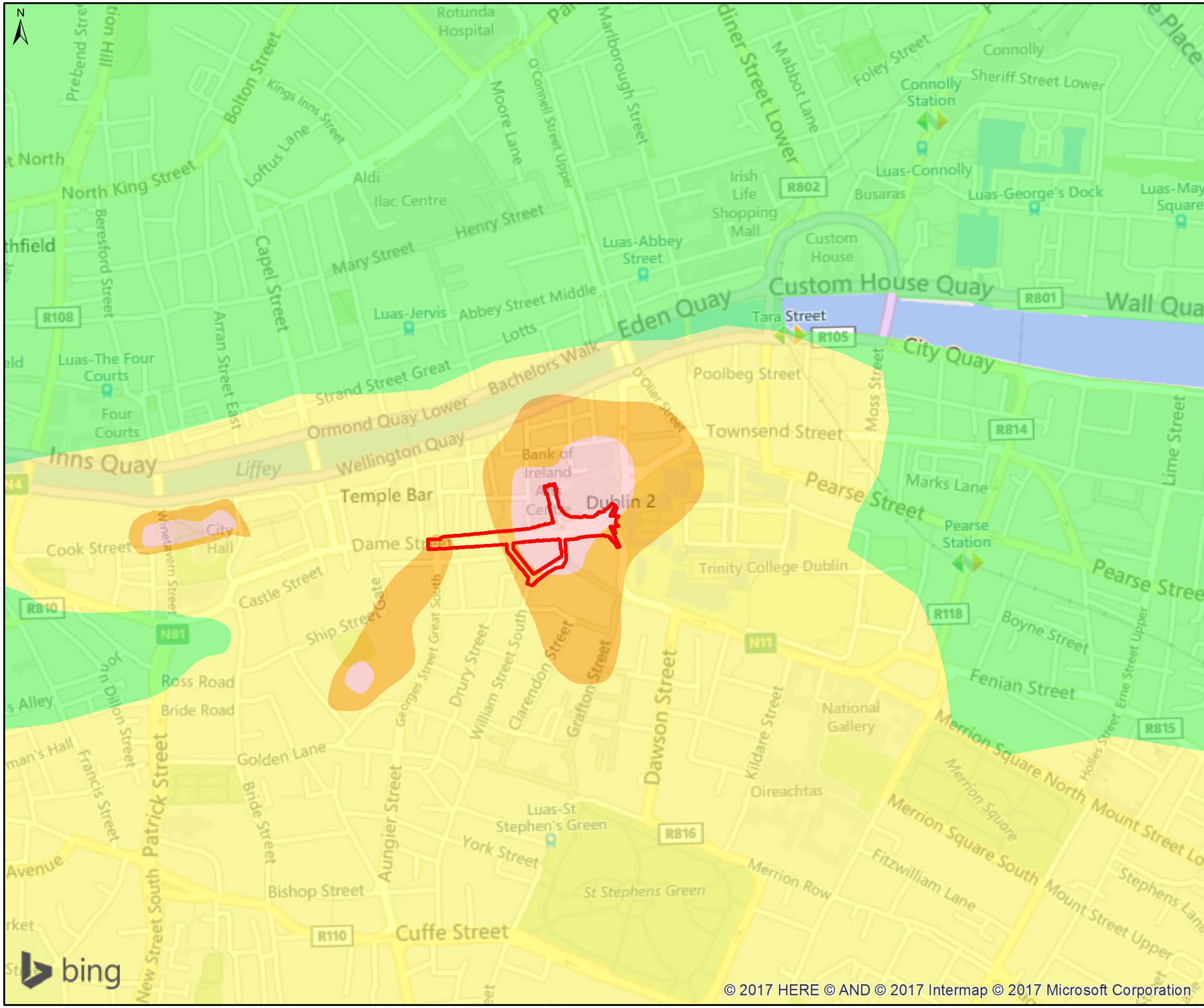

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- Extent of main works
- Extreme
- High
- Medium
- Low

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Kilometers

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Groundwater vulnerability

Scale at A4
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Job No	Drawing Status
252740-00	**For information**

Drawing No	Issue
12.8	**P0**

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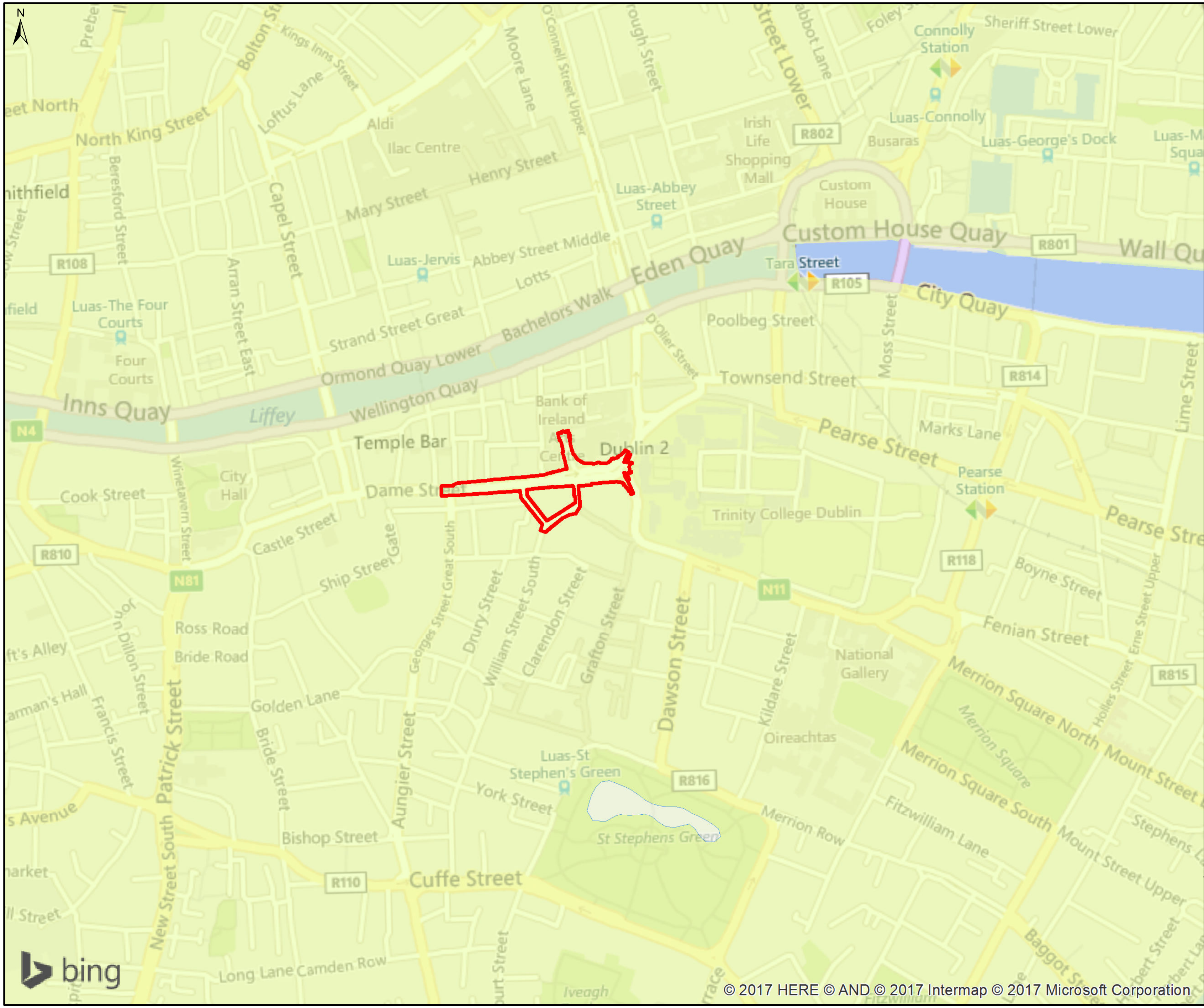

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Extent of main works

Recharge (mm/yr)

51-100

water

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Issue	Date	By	Chkd	Appd

Kilometers

0 0.075 0.15 0.3

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Groundwater recharge

Scale at A4
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Job No **252740-00**
Drawing Status **For information**

Drawing No **12.9**
Issue **P0**

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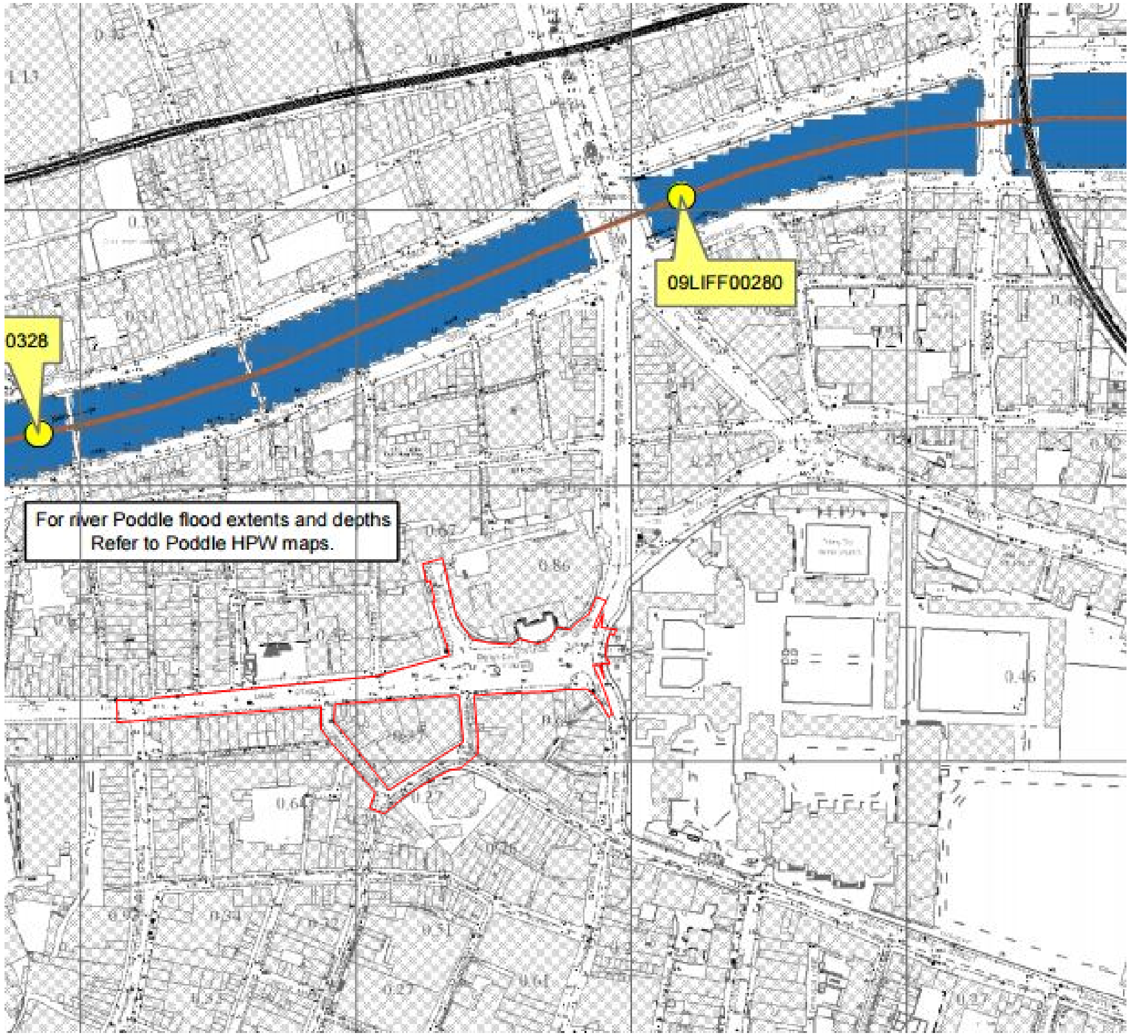

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- 10% Fluvial AEP Event
- 1% Fluvial AEP Event
- 0.1% Fluvial AEP Event
- Modelled River Centreline
- AFA Extents
- Wall
- Defended Area
- 1% AEP — Standard of Protection of Flood Defence (Walls)
- Node Point
- Node ID — Node Label
- Extent of main works

Issue	Date	By	Chkd	Appd
P0	2017-01-20	JF	AO	CN

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Job No	Drawing Status
252740	**Preliminary**

Drawing No	Issue
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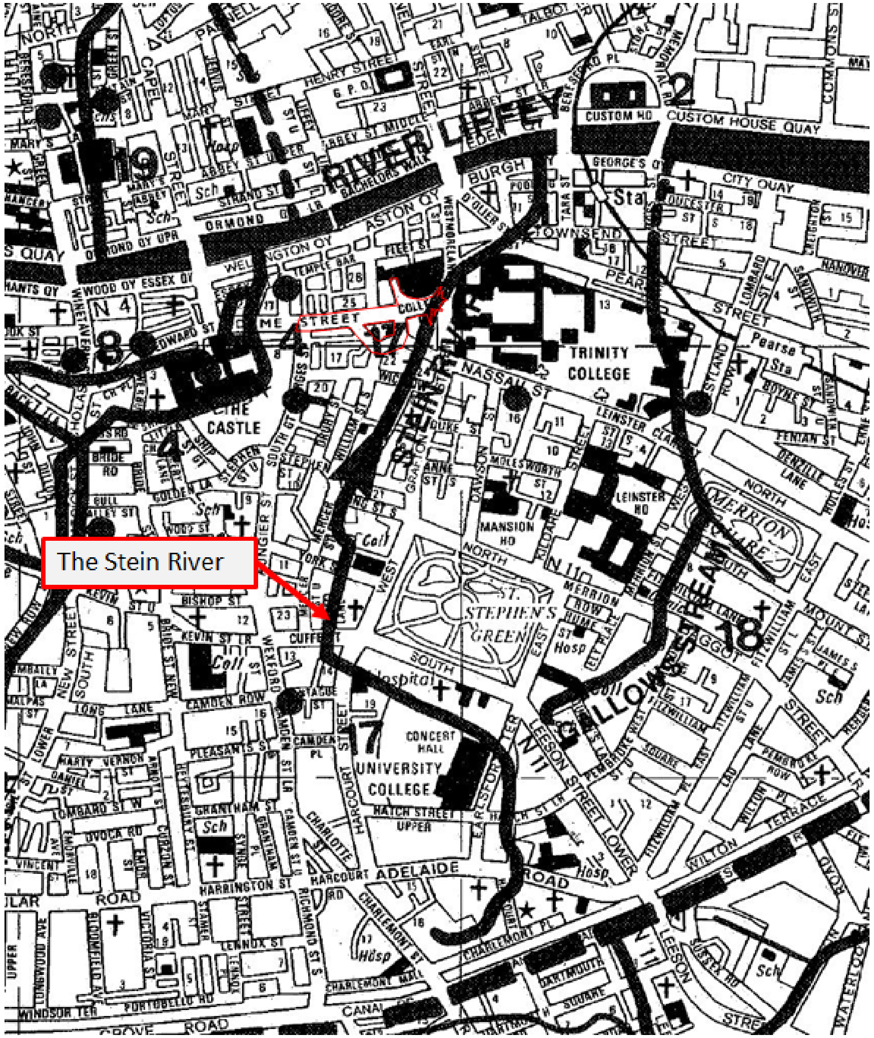

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Extent of main works

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River Stein

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252740	**Preliminary**

Drawing No	Issue
12.11	**P0**

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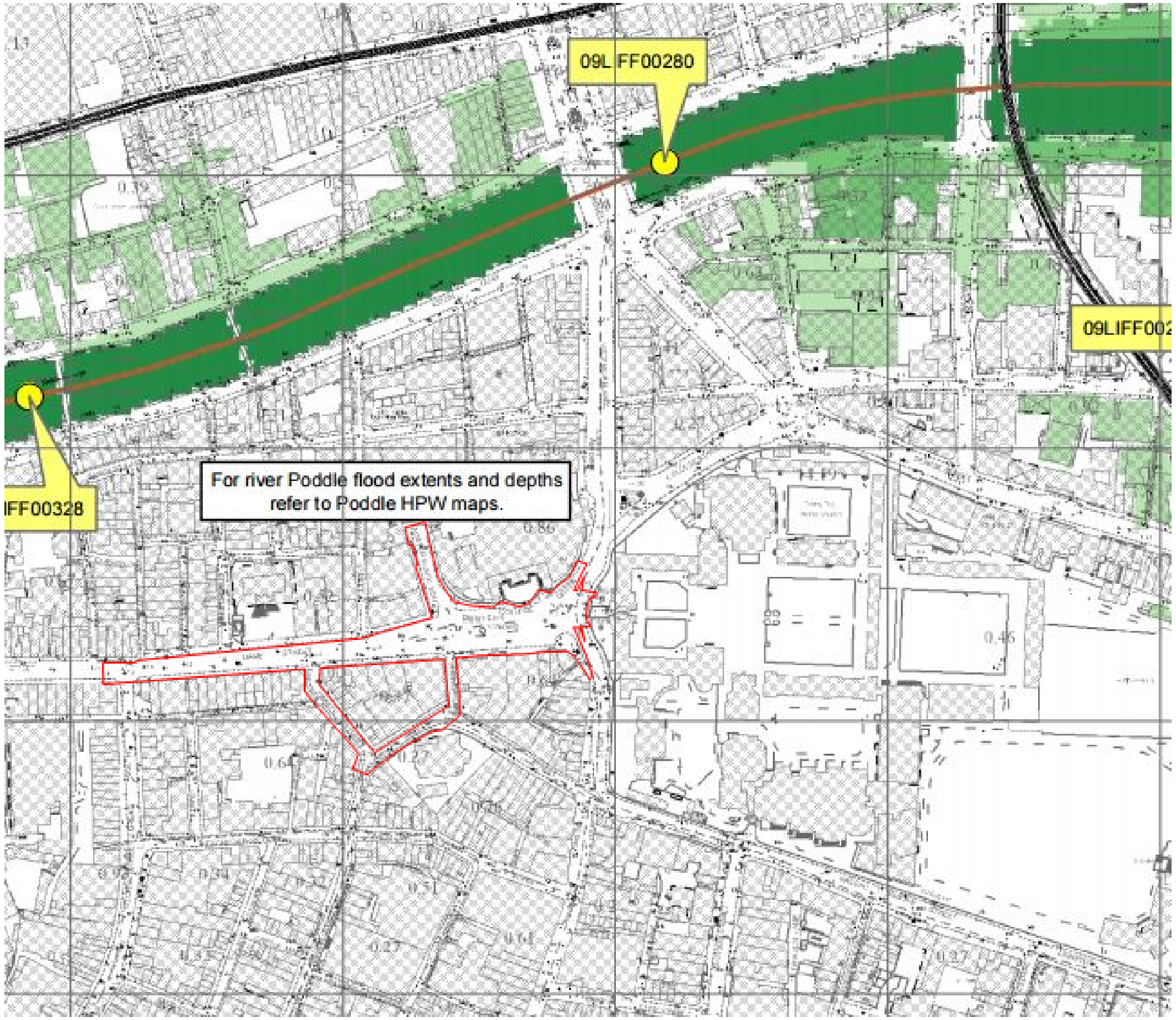

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Legend

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- 0.1% Tidal AEP Event
- Modelled River Centreline
- AFA Extents
- Embankment
- Wall
- Defended Area
- 1% AEP / 1% AEP — Standard of Protection of Flood Defence (Walls / Embankments)
- Node Point
- Node ID — Node Label
- Extent of main works

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Job No **252740**

Drawing Status **Preliminary**

Drawing No **12.12**

Issue **P0**

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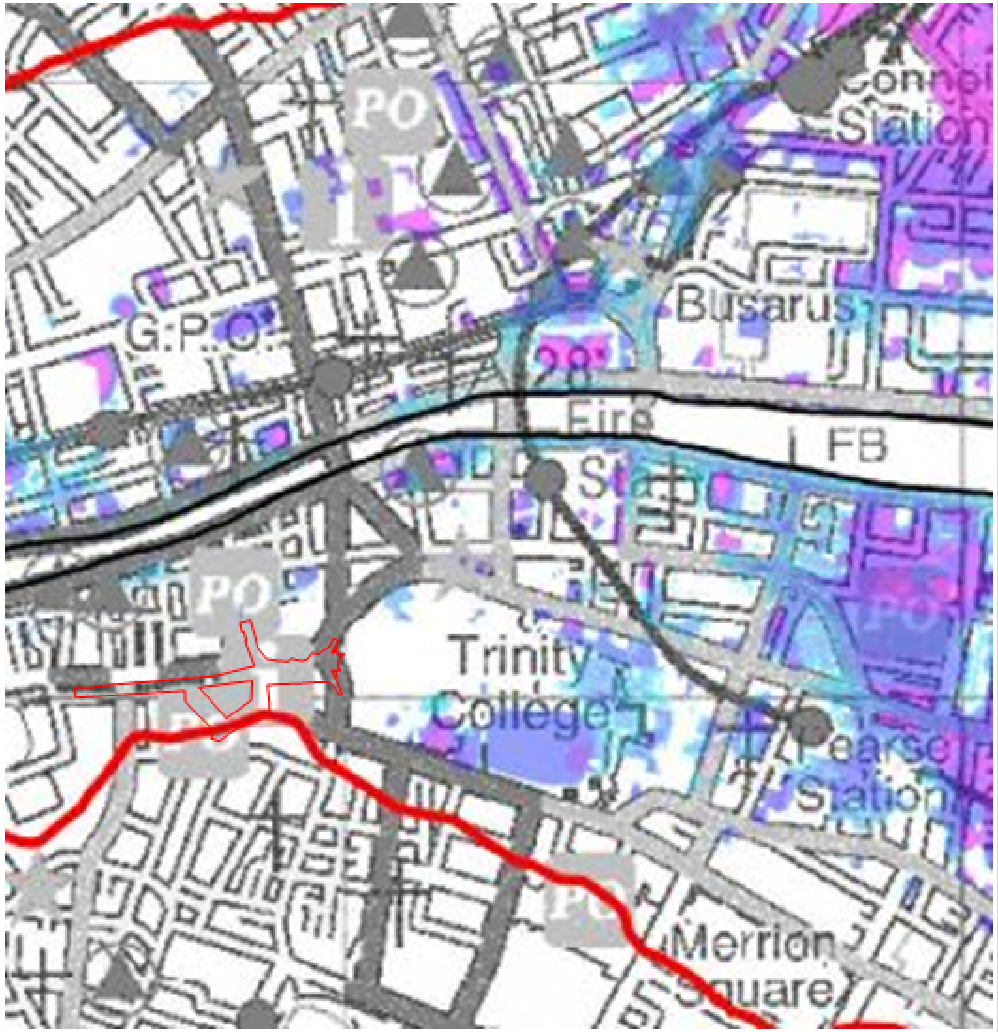

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Depth Grid

	0 -0.25 m		Extent of main works
	0.25 - 0.50 m		> 2.00 m
	0.50 - 1 m		Inland DTM Extent
	1.00 - 1.50 m		High Water Mark (HWM)
	1.50 - 2.00 m		Node Point
		Point 34	Node Label (refer to table)

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Drawing Status **Preliminary**
Drawing No **12.13**
Issue **P0**

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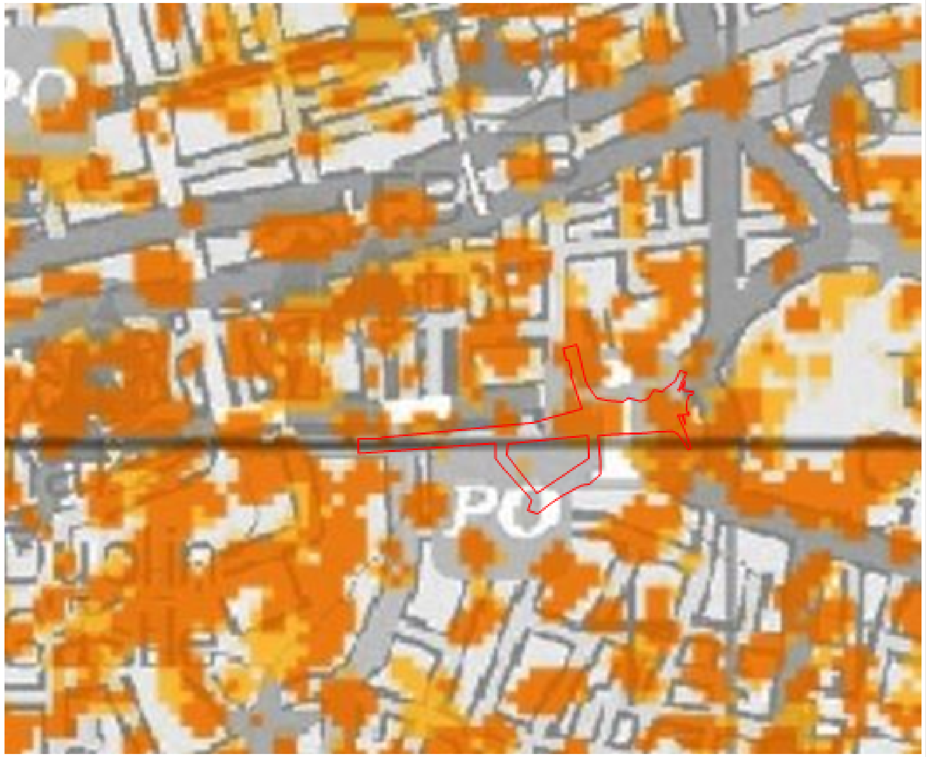

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LEGEND

10% AEP Pluvial

1% AEP Pluvial

0.5% AEP Pluvial

Extent of main works

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Pluvial Flood Extent

Job No **252740**

Drawing Status **Preliminary**

Drawing No **12.14**

Issue **P0**

A4

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20/01/2017 14:40:53

LEGEND

10% AEP Pluvial

1% AEP Pluvial

0.5% AEP Pluvial

Extent of main works

Issue	Date	By	Chkd	Appd
P0	2017-01-20	JF	AO	CN

ARUP

50 Ringsend Road
Dublin 4, D04 T6X0
Tel +353 (0)1 233 4455 Fax +353 (0)1 668 3169
www.arup.com

Client

Dublin City Council

Job Title

College Green Traffic Management Measures and Civic Plaza

PFRA Pluvial Flood Extent

Job No **252740**

Drawing Status **Preliminary**

Drawing No **12.15**

Issue **P0**

A4

N

Vulnerability class	Land uses and types of development which include*:
Highly vulnerable development (including essential infrastructure)	Garda, ambulance and fire stations and command centres required to be operational during flooding; Hospitals; Emergency access and egress points; Schools; Dwelling houses, student halls of residence and hostels; Residential institutions such as residential care homes, children's homes and social services homes; Caravans and mobile home parks; Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility; and Essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution (SEVESO sites, IPPC sites, etc.) in the event of flooding.
Less vulnerable development	Buildings used for: retail, leisure, warehousing, commercial, industrial and non-residential institutions; Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans; Land and buildings used for agriculture and forestry; Waste treatment (except landfill and hazardous waste); Mineral working and processing; and Local transport infrastructure.
Water-compatible development	Flood control infrastructure; Docks, marinas and wharves; Navigation facilities; Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location; Water-based recreation and tourism (excluding sleeping accommodation); Lifeguard and coastguard stations; Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan).

*Uses not listed here should be considered on their own merits

20/01/2017 14:40:53

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Client
Dublin City Council

Job Title
College Green Traffic Management Measures and Civic Plaza

Vulnerability Classification

Job No	Drawing Status
252740	**Preliminary**

Drawing No	Issue
12.16	**P0**

Issue	Date	By	Chkd	Appd
P0	2017-01-20	JF	AO	CN

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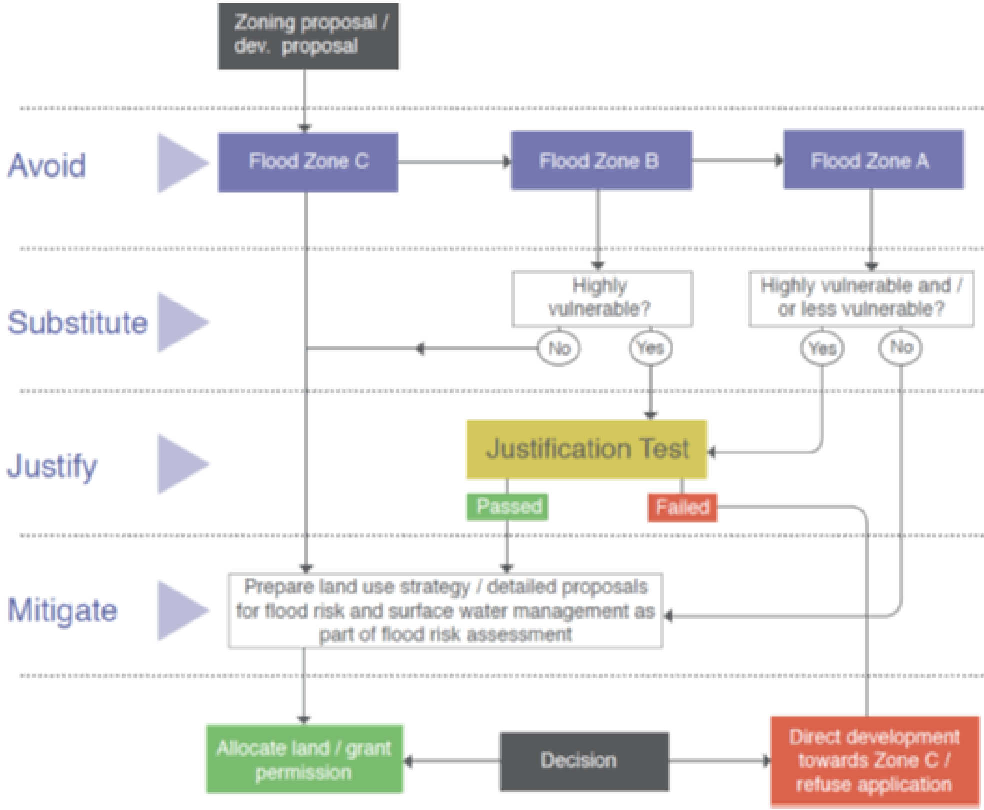
A4



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Sequential approach mechanism in the planning process

Client

Dublin City Council

Job Title

College Green Traffic Management Measures and Civic Plaza

P0	2017-01-20	JF	AO	CN
Issue	Date	By	Chkd	Appd

Job No	Drawing Status
252740	**Preliminary**

Drawing No	Issue
12.17	**P0**

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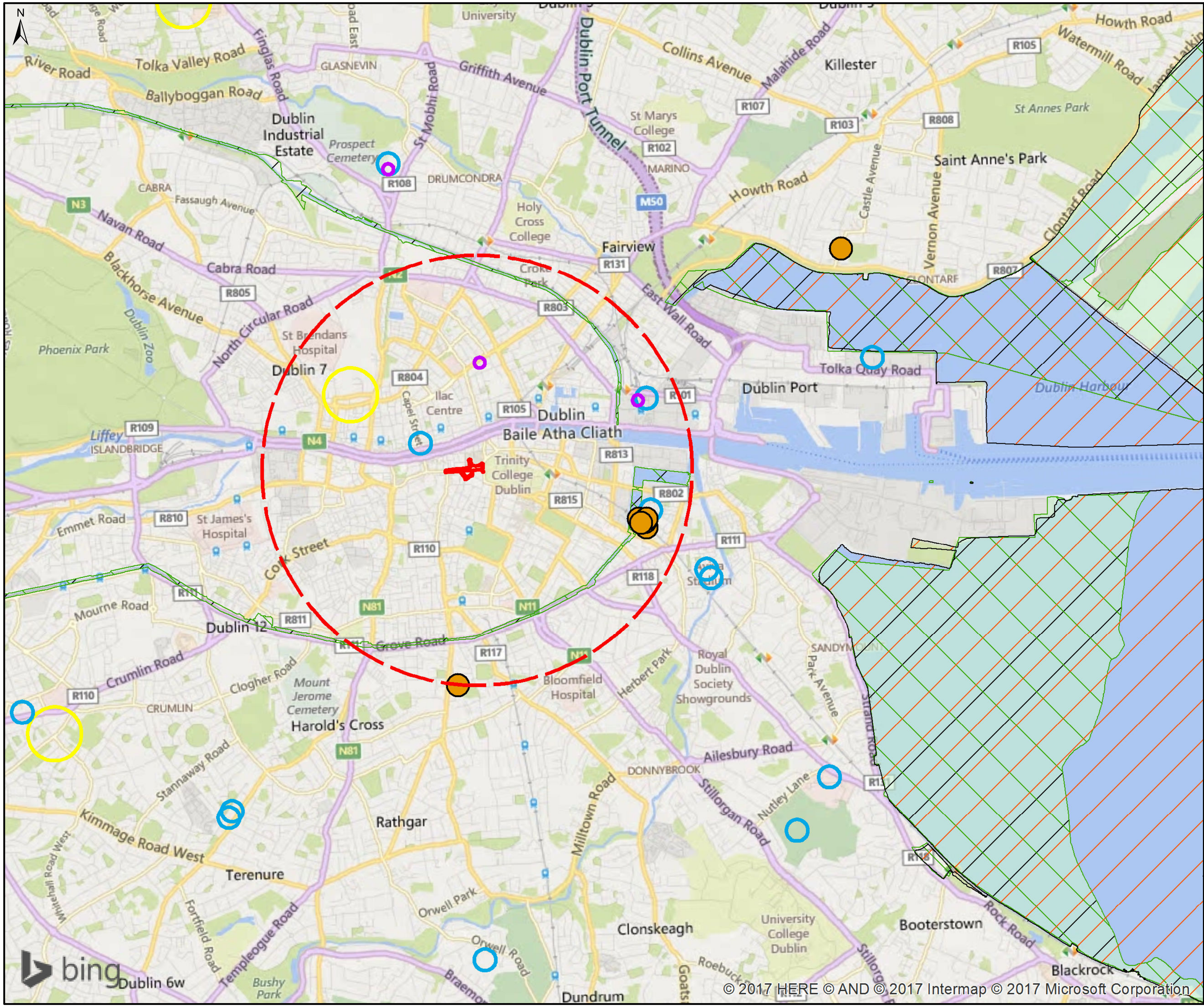
A4



Legend

- Extent of main works
- 2km radius
- Wells (10m location accuracy)
- Wells (100m location accuracy)
- Wells (1km location accuracy)
- Wells (200m location accuracy)
- Wells (500m location accuracy)
- Special Protected Area (SPA)
- Proposed National Heritage Area (pNHA)
- Special Area of Conservation (SAC)

P0	2017-01-23	JF	AO	CN
Issue	Date	By	Chkd	Appd

Kilometers

0 0.5 1 2

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Client
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Job Title
College Green Traffic Management Measures and Civic Plaza

Sensitive features in the vicinity of the study area

Scale at A4
1:50,000

Job No **252740-00**

Drawing Status **For information**

Drawing No **12.18**

Issue **P0**

03/05/2017 09:58:13

MXD Location \\dubnts03\Dublin_Jobs\252000\252740-00\4. Internal\4-03 Design\4-03-03 Infrastructure\GIS\Figures3.mxd

A4

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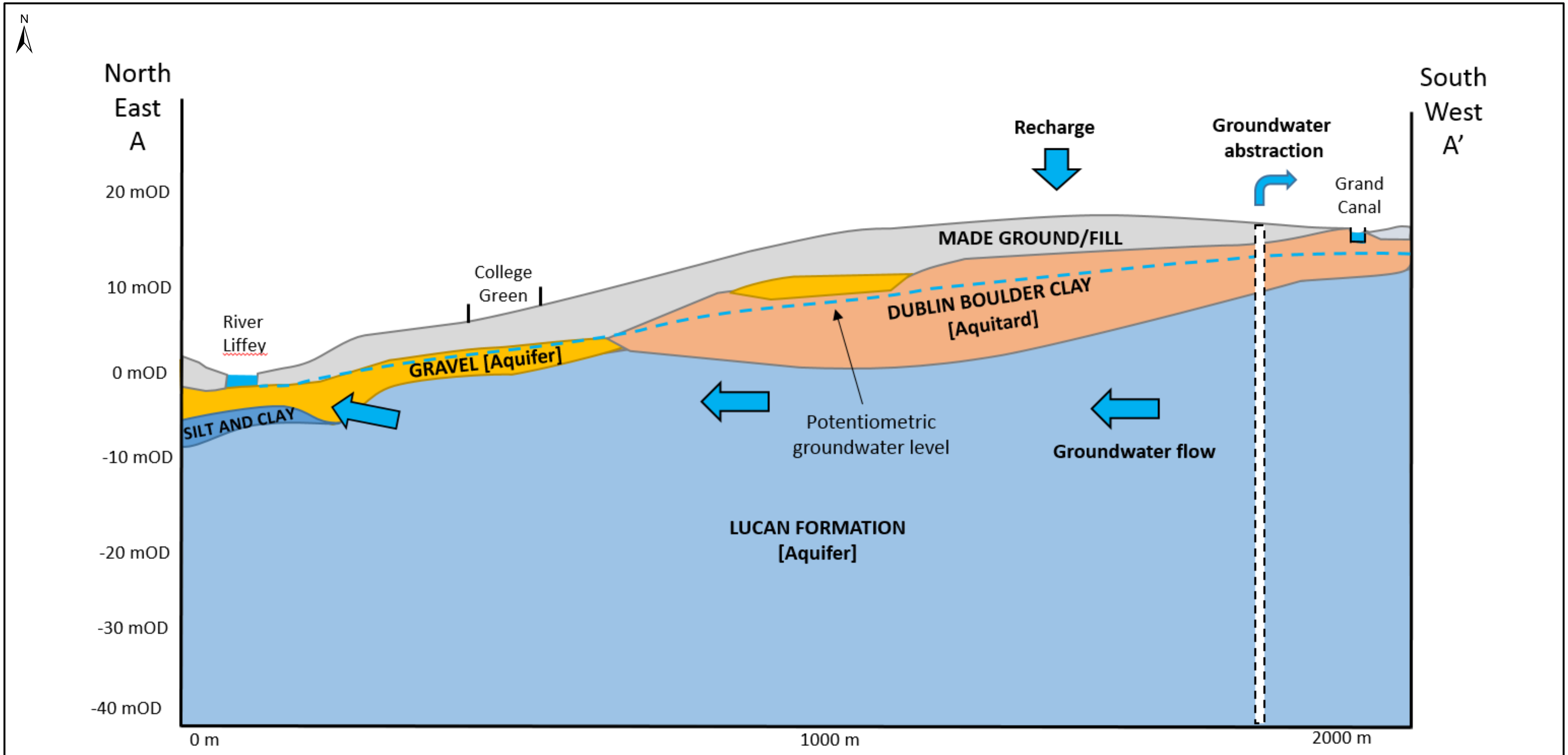

P0	2017-01-20	JF	AO	CN
Issue	Date	By	Chkd	Appd

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Job Title
College Green Traffic Management Measures and Civic Plaza

Job No
252740

Drawing Status
Preliminary

Drawing No
12.19

Issue
P0

MXD Location C:\Users\jenny.flink\Desktop\A4_Template_Landscape_Vertical_Dublin.mxd

13 Resource and Waste Management

13.1 Introduction

This chapter of the EIS describes the potential for waste to be generated during the excavation, construction and operation of the Proposed Project. Mitigation measures are proposed to reduce the impact of the waste generated by the Proposed Project in the excavation, construction and operational phases.

The principal objective of sustainable resource and waste management is to use material resources more efficiently, where the value of products, materials and resources are maintained in the economy for as long as possible and the generation of waste minimised. To achieve resource efficiency there is a need to move from a traditional linear economy to a circular economy (See **Figure 13.1**).

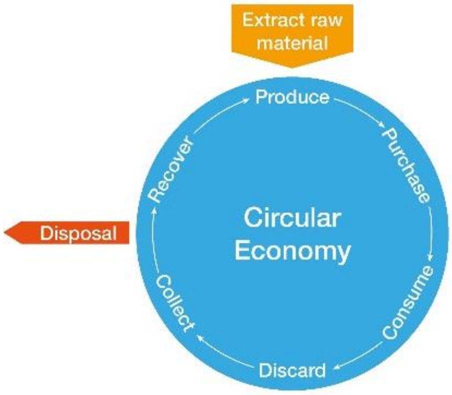

Figure 13.1 - Circular Economy

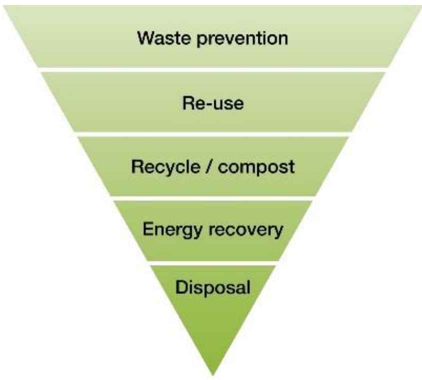

Figure 13.2 - Waste Hierarchy

However, where residual waste is generated, it should be dealt with in a way that follows the waste hierarchy (see **Figure 13.2**) and actively contributes to the economic, social and environmental goals of sustainable development.

This chapter of the environmental impact assessment examines the potential environmental effects of the generation and management of solid waste streams arising from the Proposed Project, in the context of the existing local and national resource and waste management environment. The Proposed Project is located within the Local Authority of Dublin City Council (DCC)-South East Area.

13.2 Assessment Methodology

13.2.1 General

This Chapter is based on the Proposed Project, as described in Chapter 4 '*Proposed Project Description*'. This section sets out the methodology followed in carrying out this resource and waste impact assessment. This resource and waste management assessment considers the following aspects:

- The legislative context;
- The construction phase, including excavation; and
- The operational phase.

A review was undertaken which included the following tasks:

- Review of relevant policy and legislation which creates the legal framework for resource and waste management in Ireland (refer to **Appendix 13.1**), including the Eastern - Midlands Regional Waste Management Plan 2015-2021;
- Description of waste generation during the construction and operational phases; and
- The Proposed Project was systematically reviewed to identify mitigation and move waste management up the waste hierarchy through implementation of best practice (refer to the aforementioned **Figure 13.1** and **Appendix 13.1**).

13.2.2 Guidance and Legislation

Resource and waste management takes place in a policy and legislative framework. A review of relevant legislation, policy and best practice guidance was undertaken to inform the impact assessment and recommended mitigation.

The key components of EU, national and local policy, legislation and guidance relevant to the Proposed Project (see **Appendix 13.1**) are summarised as follows:

- Prevention of waste is the preferred option such that the value of products, materials and resources are maintained in the economy for as long as possible and the generation of waste minimised;
- Where construction waste is generated it should be source separated to facilitate reuse, recycling and maximise diversion of waste from landfill;
- Where waste may not be prevented, reused or recycled it should be transported and disposed of in accordance with applicable legislation and without causing environmental pollution;
- Waste may only be transferred from the Proposed Project by a waste collection permit holder and delivered to an authorised waste facility (a facility which holds a certificate of registration, waste facility permit or waste licence); and
- Businesses must keep footpaths, pavements and gutters adjacent to premises litter free. Organisers of major events also have responsibilities in relation to collection and management of litter resulting from events.

13.2.3 Impact Assessment Methodology

Impacts significance and rating is as set out in the EIS guidance documents described in Chapter 1 '*Introduction'*.

13.3 Baseline Environment

The Proposed Project is located within the Local Authority of Dublin City Council (DCC)-South East Area.

In order to establish a baseline and review capacity in relation to construction wastes a review of published data and statistics was undertaken.

The most recent figures published by the Environmental Protection Agency relating to construction and demolition (C&D) waste are for the year 2011 with some limited hazardous construction and demolition waste data published relating to the year 2012. Approximately 3 million tonnes of this was soil and stones. In addition, just over 1 million tonnes of 'other' C&D waste was generated, and comprised metal, wood, glass etc.

From 2010 to 2011 there was a 10% decrease in the total quantity of construction waste collected in Ireland. C&D waste collection has decreased annually from a peak of almost 18 million tonnes in 2007. This decrease is reflective of the significant downturn which occurred in the construction industry at this time. In addition, the EPA reported that in 2012, excluding natural and stone waste, 97% by weight of C&D was prepared for reuse, recycling and other material recovery (including beneficial backfilling using waste as a substitute).

The quantity of C&D waste managed in Ireland is indicative of economic activity. At the peak of the economic and construction boom in 2007, approximately 17.8 million tonnes of C&D waste was collected for treatment. This fell to 3 million tonnes in 2011. Preliminary data for 2014 indicate increases in construction and demolition waste generation since 2011, most likely as a result of economic growth. 3.31 million tonnes of construction and demolition waste was generated in 2014 according to preliminary EPA data. The EPA notes in its Report "Ireland's Environment –An Assessment 2016" that *"With a government policy focus on the provision of social housing, major road infrastructural projects and the new children's hospital, C&D waste generated will increase again in the coming years."*

The national policy document, Changing Our Ways (Department of the Environment and Local Government, 1998), sets a target of 85% recycling of C&D waste by 2013.More recently the 2008 EU Waste Framework Directive sets a target of 70% by weight for C&D wastes. As such, with a recovery rate of 97% in 2012, Ireland exceeded the targets by a considerable margin.

An indicative breakdown of the composition of construction and demolition waste is set out in **Table 13.1** below. These figures should be considered as a guide only- as construction and demolition waste can vary depending on the nature of the development and waste can vary significantly from one project to another, depending on the nature of the development and the waste management practises employed on-site.

Table 13.1 - Composition of Construction and Demolition Waste (Non-Hazardous)

Category	Composition
Soil and Stone	45%
Concrete, brick, tiles and ceramics	31%
Asphalt / Tar	1%
Metals	6%
Wood	7%
Other	10%

The construction sector also generates hazardous waste such as lead-acid batteries, waste electrical and electronic equipment, asbestos solvent-based paints and varnishes, pesticides and waste oils.

13.3.1 Operational Wastes

Wastes generated during the operational phase typically comprise municipal waste from waste receptacles at the College Green area and adjoining streets.

13.4 Characteristics of the Proposed Project

13.4.1 Introduction

Dublin City Council are committed to sustainable waste management and the waste management hierarchy set out in the WU Waste Framework Directive (Directive 2008/98/EC). This waste management hierarchy is as follows:

- Prevention;
- Preparing for reuse;
- Recycling;
- Recovery; and
- Disposal.

Waste prevention and minimisation is the most environmentally sustainable means of managing excavated material and construction wastes. Prevention and minimisation of waste is inherent in the design of the Proposed Project and where feasible architectural features will be retained and reused within the Proposed Project.

A significant proportion of surplus excavation material from the Proposed Project will consist of inert construction waste and soil and stones which can be accepted for recovery and recycling at EPA licenced and permitted facilities. Off-site recycling/ recovery activities can include:

- Processing of stone to produce construction aggregate;
- Infilling of quarries; and
- Raising land for site improvement or development.

The option of delivery of inert uncontaminated material for disposal to landfill is the least desirable destination for surplus material generated by the Proposed Project and will only be considered where sufficient capacity cannot be secured at appropriately licensed/permitted facilities for recovery purposes. It is unavoidable that a small percentage of excavation material, due to the presence of contaminants will have to be disposed of off-site. All material presented for disposal will have to meet the receiving sites waste acceptance criteria.

Research was undertaken to determine if licensed capacity is likely to exist at authorised and regulated facilities for acceptance of surplus material generated from the Proposed Project. The case studies presented in **Appendix 13.2** identify a number of named facilities. The identified facilities merely represent a subset of the total number of facilities available in the Greater Dublin Area. The case studies are provided for demonstrative purposes and it will be responsibility of the Contractor to secure agreements for acceptance of the surplus spoil in similar authorised and regulated facilities, in accordance with Waste Management legislation and requirements.

There is considered to be adequate capacity in the region to receive the wastes likely to be generated by the construction and operation of the Proposed Project.

13.4.2 Demolition Phase

There will be no demolition required as part of the Proposed Project.

13.4.3 Reuse and Relocation of Architectural Heritage Features

A number of architectural heritage features will be temporarily removed from College Green, carefully and appropriately stored during the proposed works and reused within the Proposed Project. These include the following:

- Statues including the Henry Grattan statue and Thomas Davis memorial which occupy the central reservation which will be repositioned. Two decorative lamps including seahorse sculptures which are “part of the assemblage” of the Henry Grattan statue will be relocated along with the statue;
- The four angels fountain which occupies the central reservation; and
- The existing flags and cobbles in Foster Place which will be relaid within the Proposed Project.

13.5 Predicted Impacts

13.5.1.1 Do Nothing Scenario

The resource and waste management impact assessment assumes that under the “Do Nothing” scenario the Proposed Project will not be developed. Consequently, there will be a neutral impact on resource and waste management.

13.5.2 Excavation Phase

An estimated 15,172 m^3 material will be excavated in the course of the works. A summary of excavated material is included in **Table 13.2** below.

A significant proportion of the surplus excavation material from the project is likely to consist of soil and stones which may be accepted for recovery or recycling at waste licenced and permitted facilities. Case studies of authorised facilities which accept excavation soil and stones and construction waste in the region are described in **Appendix 13.2.** The Contractor may use these facilities or other similar authorised facilities for recovery or disposal of excavation soil and stones from the Proposed Project.

Table 13.2 - Estimated Quantity of Excavation, Material Reuse and Removal from Site resulting from the Proposed Project

Material	**Estimated volume for excavation resulting from the Proposed Project requiring removal from site (m^3)**
Road/pathway materials (made ground)	
Generated by open excavations	7,586
Topsoil	
Generated by open excavations	7,586
Total volume	**15,172**
Estimated total weight (tonnes)	**36, 512**

All excavated material which cannot be reused within the proposed development will be removed from site.

Where contaminated soil is encountered this will be delivered to appropriately licenced waste facilities for recovery/ disposal as appropriate.

The predicted impacts of excavation waste prior to implementation of mitigation measures is expected to be moderate, negative and short-term.

13.5.3 Construction Phase

Construction works, site offices and temporary works facilities are likely to generate construction waste. Construction waste is defined as waste which arises from construction and renovation activities. Also included within the definition are surplus and damaged products and materials arising in the course of construction work or used temporarily during the course of on-site activities.

Construction waste can vary significantly from site to site but typically would include the following non-hazardous fractions:

- Soil and stone.
- Concrete, brick, tiles and ceramics.
- Asphalt/tar.
- Metals.
- Wood.
- Other.

The hazardous waste streams which could arise from construction activities may include the following:

- Waste electrical and electronic components.
- Batteries.
- Asbestos.
- Wood preservatives.
- Liquid fuels.
- Contaminated soil.

In the case of the Proposed Project the most likely type of construction waste will be surplus concrete and unusable or damaged construction materials such as paving slabs.

Case studies of authorised facilities which accept excavation soil and stones and construction waste in the region are described in **Appendix 13.2**.

The predicted impact of construction waste prior to implementation of mitigation measures is expected to be slight, negative and short-term.

13.5.4 Operational Phase

Wastes generated during the operational phase will typically comprise municipal waste from litter bins and located on the civic plaza and street sweeping of the plaza by Dublin City Council. Management of litter is described below and overleaf.

Litter Bins

- Litter bins are placed throughout Dublin City Centre including College Green. Bins in the city centre are serviced/emptied a number of times per day due to high usage and prominent location. A specialised crew look after the maintenance and repair of bins across the City. **Figure 13.3** shows the model of bin which is currently in use in College Green.

- The Dublin City Council Litter Management Plan 2016-2018 notes that the use of *"smart litter bins using GPS and GIS technology will be assessed, piloted and adopted if feasible"*. Smart litter bin models can include solar powered compactors which reduce bin collection frequency. Models can also be purchased which include sensors and can communicate with waste collection teams over wireless mobile phone networks. Typically, notification is by e-mail or text message when bins are 85% full and require collection. The use of Smart bins as part of the Proposed Project will be considered by Dublin City Council. An example of a smart bin is shown in **Figure 13.4** below.

	
Figure 13.3 - Litter Bin type currently in use in College Green	**Figure 13.4 - Example Smart Compactor Litter Bin**

Street Sweeping

- Within the Dublin City Council area streets are organised into street sweeping categories. College Green is included in Category A which includes main city centre streets and high footfall areas. Category A streets are a priority of Dublin City Council and are swept daily. This level of sweeping is expected to be retained at the proposed plaza.
- An intensive street washing programme is implemented by Dublin City Council from April to October every year. This level of washing is expected to be retained at the proposed plaza.

The predicted impacts of operational waste prior to implementation of mitigation measures is expected to be imperceptible.

13.6 Mitigation Measures

13.6.1 Construction and Demolition Waste Management Plan

13.6.1.1 Introduction

A CDWMP plan will be required to be developed by the Main Contractor(s) following appointment and prior to commencing works on site. The CDWMP addresses waste generation and arrangements made for prevention, reuse, recycling disposal and collection of recyclables and wastes. The CDWMP will be prepared in line with the *DoEHLG Best Practise Guidelines on the Preparation of Waste Management Plans for Construction & Demolition Projects.*

13.6.1.2 Outline Construction and Demolition Waste Management Plan (CDWMP)

The following is an indicative list on the content of a CDWMP:

- Description of the Proposed Project;
- Wastes arising including proposals for minimisation/reuse/recycling;
- Procedures for prevention, reuse and recycling of wastes;
- Estimated cost of waste management;
- Roles including training and responsibilities for C&D Waste;
- Procedures for education of workforce and plan dissemination programme
- Record keeping procedures;
- Waste collectors, recycling and disposal sites including copies of relevant permits or licences; and
- Waste auditing protocols.

Using the information identified in this section and the outline Construction Environmental Management Plan in **Appendix 4.1** as a basis, the Contractor will be required to develop, implement and maintain a CDWMP for the construction phase of the Proposed Project.

13.6.2 Construction- General

In addition to the inherent design measures during the construction phase the following mitigation measures are proposed:

- The Contractor will minimise waste disposal so far as is reasonably practicable.
- Waste from the Proposed Project will be transported by authorised waste collectors in accordance with the Waste Management (Collection Permit) Regulations, 2007 as amended.
- Waste from the Proposed Project will be delivered to authorised waste facilities in accordance with the Waste Management Acts 1996 as amended.
- Source Segregation: Where possible metal, timber, glass and other recyclable material will be segregated during construction works and removed off site to a permitted/licensed facility for recycling. Waste stream colour coding, and photographs of wastes to be placed in each container as required, will be used to facilitate segregation. Where waste generation cannot be avoided this will maximise the quantity and quality of waste delivered for recycling and facilitate its movement up the waste hierarchy away from landfill disposal and reduce its environmental impact.
- Material Management: ‘Just-in-time’ delivery will be used so far as is reasonably practicable to minimise material wastage.
- Supply Chain Partners: The Contractor will engage with the supply chain to supply products and materials that use minimal packaging, and segregate packaging for reuse.
- Waste Auditing: The Main Contractor will record the quantity in tonnes and types of waste and materials leaving site during the construction phase.

13.6.3 Operation

As the impact of operational waste is predicted to be imperceptible, no mitigation is required.

13.7 Residual Impacts

Following the implementation of the mitigation described in **Section 13.5**, the residual impacts are expected to be as follows:

- The impact of excavation waste is expected to be slight, negative and short-term.
- The impact of construction waste is expected to be imperceptible.
- The impact of operational waste is expected to be imperceptible.

There is considered to be adequate capacity in the region to receive the wastes likely to be generated by the construction and operation of the Proposed Project.

13.8 Difficulties Encountered

No difficulties were encountered during the preparation of the resource and waste management impact assessment.

13.9 References

Conservation and Amenity Advice Service (CAAS) (2002). Guidelines on the Information to be contained in Environmental Impact Statements. Environmental Protection Agency (EPA), Johnstown Castle Estate, Wexford, Ireland.

CAAS (2003). Advice Notes on Current Practice in the Preparation of Environmental Impact Statements. EPA, Johnstown Castle Estate, Wexford, Ireland.

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EPA (2014). National Waste Report 2012, Johnstown Castle, Wexford, Ireland

EPA (2014). National Municipal Waste Recovery Capacity. An Assessment for the Department of the Environment, Community and Local Government. Johnstown Castle, Wexford, Ireland.

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EPA (2015a). Revised Guidelines on the information to be contained in Environmental Impact Statements Draft. EPA, Johnstown Castle Estate, Wexford, Ireland.

EPA (2015b). Advice Notes for Preparing Environmental Impact Statements Draft. EPA, Johnstown Castle Estate, Wexford, Ireland.

FAS & Construction Industry Federation. 2002. Construction & Demolition Waste Management – A handbook for Contractors & Site Managers. FAS Environmental Unit, Upper Baggot Street, Dublin 4.

Dublin City Council (2016) Litter Management Plan 2016-2018. Dublin City Council, Dublin, Ireland.

Smartdublin.ie

14 Material Assets: Utilities

14.1 Introduction

This chapter describes the material assets in the form of utilities that could potentially be impacted by the Proposed Project. Material assets are defined in the EPA *Guidelines on Information to be contained in Environmental Impacts Statements* (EPA, 2002) as:

"Resources that are valued and that are intrinsic to specific places are called 'material assets'. They may be of either human or natural origin and the value may arise for either economic or cultural reasons. Examples of natural resources of economic value include assimilative capacity of air and water, non-renewable resources (e.g. minerals, soils, quarries and mines), renewable resources (hydraulic head, wind exposure)."

The purpose of this chapter is to assess the impacts of the proposed utilities on the existing utility network which includes the following infrastructure:

- Electricity;
- Water;
- Drainage;
- Gas;
- Telecommunications (including broadband) and TV;

Other material assets of human origin are addressed in Chapter 15 *'Material Assets: Land Use and Property'*.

Material assets of natural origin are addressed in other chapters of this EIS, namely, Chapter 10, *'Archaeological, Architectural and Cultural Heritage'*, Chapter 12, *'Soils, Geology, Hydrogeology and Hydrology'*, and Chapter 13, *'Resource and Waste Management'*.

The Proposed Project is described in detail in Chapter 4, '*Proposed Project Description'*, and indicative construction methodology is also outlined in Chapter 4.

14.2 Assessment Methodology

14.2.1 Study Area

The study area with regard to utilities for the Proposed Project comprises the main areas of proposed construction works- i.e. Foster Place and College Green.

A description of the existing environment of the study area is given in Chapter 4 '*Proposed Project Description'*.

14.2.2 Identification of Utilities

TST Engineering were commissioned by Dublin City Council (DCC) to carry out a utilities investigation of the main proposed area of works.

The scope of the investigation consists of mapping underground infrastructures and detecting potential anomalies through non-invasive technology. The work included a preliminary on-site inspection, followed by data collection by GPR and inductive devices.

14.2.3 Significance Criteria

Significance criteria for impacts on utilities are set out in **Table 14.1** in accordance with the requirements of the following EPA guidance documents:

- *Guidelines on Information to be contained in Environmental Impact Statements*;
- *Advice Notes on Current Practice in the preparation of Environmental Impact Statements*,
- *Revised Guidelines on the information to be contained in Environmental Impact Statements* Draft. (EPA, 2015a); and
- *Advice* Notes *for Preparing Environmental Impact Statements Draft.* (EPA, 2015b).

Table 14.1 - Significance Criteria for Impacts on Material Assets- Utilities

Significance Level	Criteria
Profound	Profound impact occurs where there is permanent disruption to a utility service or where there is significant surcharging of an existing system.
Major	Major impact occurs where there is long-term disruption to a utility service or where there is minor surcharging of an existing system.
Moderate	Moderate impact occurs where there is medium-term disruption to a utility service or significant increase of flow within an existing system.
Slight	Slight impact occurs where there is short-term disruption to a utility service or minor increase of flow within an existing system.
Imperceptible	Imperceptible impact occurs where there is temporary disruption to a utility service or no quantifiable increase of flow within an existing system.

14.3 Baseline Environment

There is an extensive network of utilities in the ownership of DCC and a variety of companies, which provide services to domestic, commercial and industrial customers across the city centre area. The majority of utilities are buried beneath public roads and footpaths with numerous local connections branching from the main trunk services.

The following sections describe the layouts of mapped networks in the Foster Place and College Green areas.

14.3.1 Foster Place

Results of the no-dig survey confirmed the general information provided by the record drawings, adding details and specific referenced coordinates. Buried utilities and structures were identified as follows:

14.3.1.1 Electricity

There are a number of residential connections along the west side of Foster Place.

14.3.1.2 Water

There is one water line running in the roadway on Foster Place connecting from the mains running along College Green. There are multiple connections for fire hydrants as well as connections into buildings and residences.

14.3.1.3 Drainage/Sewerage

The drainage network in Foster Place consists of a Victorian drainage line with more modern pipes connecting to it. The Victorian drainage line (1400x800mm) runs along the centre of the road and exits the survey area in the north eastern side.

There are a number of gullies and connections along the western side of Foster Place which connect to a 300mm drainage line, this line has two drainage manholes and connects to the Victorian line in two locations.

14.3.1.4 Gas

In the northern side of Foster Place a gasmain is located with a number of connections. A number of these extend into cellars. Along the eastern wall at Foster Place a residential connection is found.

14.3.1.5 Telecommunications

A new Eir line runs along the road in Foster Place which originates at an Eir manhole at the south western edge of Foster Place. The line continues to the top of the road where it enters an Eir manhole. A residential connection runs out to the western side of the survey area.

14.3.2 College Green

Results of the no-dig survey confirmed the general information provided by the record drawings, adding details and specific referenced coordinates. Buried utilities were identified as follows:

14.3.2.1 Water

Two water lines run along both major roadways on College Green.

There are multiple connections into buildings and residences on southern and northern sides.

A number of changes to water lines has taken place on the eastern side of College Green as part of the Luas Cross City works.

14.3.2.2 Gas

A gas connection is located at the junction in front of Church Lane.

14.3.2.3 Electricity

A number of electricity lines run through College Green.

14.3.2.4 Drainage/Sewerage

A major Victorian drainage line enters the survey area at College Green through Church Lane. This line continues along the centre of the southern road and exits the survey area at the eastern boundary. A number of drainage gullies and residential connections to the Victorian line also exist.

14.3.2.5 Telecommunications

Three major Eir lines run through College Green: through the pavement along the northern side of College Green, along the north roadway and through the southern pavement and roadway.

A number of BT (British Telecommunications) manholes are located at College Green. The main BT lines run in both the north and south roadways in College Green, there are a number of residential connections.

There are two major areas in College Green which the traffic lines are isolated to, in the west side of College Green in front of Church Lane and to the east side of the survey boundary in beside the Luas Cross City works.

One Verizon line runs along the north roadway in College Green with one manhole and connection in the survey area.

Two Colt Telecoms lines enter the west boundary of the survey area, run along the south roadway of College Green and exit the survey area at the eastern boundary of College Green.

One NTL line runs along the north roadway at College Green with one manhole in the survey area.

14.4 Characteristics of the Proposed Project

During both the construction and operational phases of the Proposed Project, some realignment, upgrade or replacement of services and utilities may be required in conjunction with or to accommodate the proposed works. These are described below.

14.4.1 Electricity

Some local diversions may be required to power supplies to accommodate the works. In particular, supplies to existing traffic signal installations and public lighting installations may need to be adapted or removed.

A new public lighting regime is proposed for College Green, and new ducting and mini pillars will be provided to cater for same.

A power supply will be required for the proposed fountain installation in the centre of the plaza. Consultation will be required with the ESB at detailed design stage to establish the exact point of connection to the existing ESB network, however, it is anticipated that this will be within the extents of the red line area. The proposed installation will require ducts to be installed between the proposed underground fountain control chamber and the connection point to the existing network.

14.4.2 Water

The existing water supply utilities will be retained as part of the Proposed Project. Some online upgrade works to existing water services may be incorporated in the Works to avoid later maintenance requirements damaging the proposed plaza surface. In addition, a new water connection will be required to the proposed underground fountain installation control chamber. This would constitute a spur from the existing watermains within the red line area. The fountains will be supplied primarily from rainwater harvested from the proposed drainage channel around the fountains, supplemented by the public watermains during times of low rainfall.

14.4.3 Drainage

The existing drainage regime is being retained, and new low points will generally coincide with existing. However, it is intended to complement the existing drainage regime by the installation of Sustainable Urban Drainage Systems (SuDS) features, where possible. The SuDS features will consist of new attenuation / infiltration areas filled with crushed stone or soil. These will predominantly be located beneath the proposed trees. New gullies will be arranged such that overflow from these attenuation / infiltration areas will discharge to the piped surface water drainage system. Some new gully connections will be required, and these will connect to the existing surface water infrastructure, either directly, or via small collector pipes to a single discharge point.

A drainage channel will be installed around the proposed fountain installation to harvest rainwater and to return water from the fountains to the water pumps in the proposed underground control chamber. This channel will consist of precast drainage units covered by a continuous steel grating. Small connector pipes (c. 150mm) will connect the low points in the drainage channel to the control chamber.

14.4.4 Gas

The existing gas utilities will be retained as part of the Proposed Project.

14.4.5 Telecommunications

It is anticipated that localised diversion of services will be required. Trenches may have to be excavated along the proposed tree lines so that existing fibre optic ducting can be realigned away from the tree pits without disruption to services.

New traffic ducting, incorporating power and traffic communications ducting will be required to facilitate the proposed signalised crossing installations. It is proposed to provide a signalised crossing to Trinity College from the plaza, and to provide for the possible future signalisation of the cycle track crossing in the southeastern corner of the plaza.

14.5 Predicted Impacts

14.5.1 Construction Phase

14.5.1.1 Electricity

As described in **Section 14.4**, some local diversions may be required to power supplies to accommodate the construction works. This is anticipated to result in a slight, negative and short term impact.

Power will be required for the construction activities, for temporary lighting and temporary signals required during construction works.

The power demands during the construction phase on the existing electricity network are considered to be a slight, negative and short term impact.

14.5.1.2 Water

The Contractor will require a separate water supply connection for the construction activities.

The water demands during the construction phase on the existing water supply network are considered to be a slight, negative and short term impact.

14.5.1.3 Drainage

As described in **Section 14.4**, construction works will involve the installation of SUDs, new gullies, and some new gully connections. These works are expected to result in a slight, negative and short term impact.

The Contractor's operations has the potential to result in the generation of effluent and sanitary waste from facilities provided for the work force on site.

Surface water run-off will occur from hardstanding during the construction period. Surface water run-off from construction activities has the potential to be contaminated.

Ingress of groundwater and overland flows into excavations during construction have the potential to cause impacts and will require appropriate mitigation.

Excess surface and waste water during the construction phase is expected to result in a slight, negative and short term impact on the existing drainage system.

14.5.1.4 Gas

No new gas mains or additional gas supply is required during the construction phase of the Proposed Project. No impact is anticipated.

14.5.1.5 Telecommunications

New traffic ducting, incorporating power and traffic communications ducting will be required to facilitate the proposed signalised crossing installations. This is expected to result in a slight, negative and short-term impact.

14.5.2 Operational Phase

14.5.2.1 Drainage

The current site layout includes roads and paved areas. Surface water run-off from the proposed plaza area is less likely to contain contamination as vehicular traffic will be removed from this area. In addition, the Proposed Project includes a proposal for the installation of SuDs in the study area. It is expected that the Proposed Project will have a slight, positive impact on the surface water drainage network.

14.5.2.2 Gas

No additional gas supply is required to the site during the operational phase of the Proposed Project. There are no predicted impacts on the existing network.

14.5.2.3 Electricity

Power will be required to provide public lighting, fountains, information displays, traffic signals etc. for the Civic Plaza. This is similar to the existing situation. The power demands during the operational phase on the existing electricity network are considered to be imperceptible.

14.5.2.4 Telecommunications

The increased demand on existing telecommunications infrastructure is considered to be imperceptible.

14.5.2.5 Water

The only water supply required as part of the proposed works is the back-up supply to the fountains in the event of insufficient water being harvested from rainfall. Any water supplied to the fountains will return through the drainage channel. As such, the water demand will be very small. This will have no appreciable impacts on the existing network.

14.6 Mitigation Measures

14.6.1 Construction Phase

The Contractor will be obliged to put measures in place to ensure that there are no interruptions to existing services and all services and utilities are maintained unless this has been agreed in advance with the relevant service provider and local authority.

All works in the vicinity of utilities apparatus will be carried out in ongoing consultation with the relevant utility company and/or local authority and will be in compliance with any requirements or guidelines they may have.

Where new services are required, the Contractor will apply to the relevant utility company for a connection permit where appropriate, and will adhere to their requirements.

14.6.2 Operational Phase

Due to the measures already incorporated in the design as outlined above, i.e. SuDS, no mitigation measures will be necessary during the operational phase.

14.7 Residual Impacts

Following implementation of mitigation measures outlined in **Section 14.6**, the residual impact on utility services is considered to be imperceptible.

14.8 Difficulties Encountered

TST Engineering reports that the Luas Cross City works taking place outside of Trinity College made it difficult to survey the area.

14.9 References

CAAS (2002), Guidelines on Information to be contained in Environmental Impact Statements. Environmental Protection Agency, Johnstown Castle Estate, Wexford, Ireland.

CAAS (2003), Advice Notes on Current Practice in the preparation of Environmental Impact Statements. Environmental Protection Agency, Johnstown Castle Estate, Wexford, Ireland.

TST Engineering (2016) Technical Report, Ground-Penetrating Radar (GPR) Survey, College Green- Foster Place, Rathfarnham, Dublin 14, Ireland.

15 Material Assets: Land Use and Property

15.1 Introduction

This section describes the potential impacts of the Proposed Project on land use at, and adjacent to, College Green. This chapter describes the material assets of human origin that could be impacted by the Proposed Project at College Green. Material assets are defined in the EPA Guidelines on Information to be contained in Environmental Impact Statements' (EPA 2002) as:

"Resources that are valued and that are intrinsic to specific places are called 'material assets'. They may be of either human or natural origin and the value may arise for either economic or cultural reasons

The assessment objectives vary considerably according to the type of assets, those for economic assets being concerned primarily with ensuring equitable and sustainable use of resources."

Land-use considers if there will be severance, loss of rights of way or amenities, conflicts, or other changes likely to ultimately alter the character and use of the surroundings The EPA Guidelines state the following issues should be noted in particular in the consideration of land use:

- hotels and holiday accommodation;
- tourism and recreational facilities and amenities;
- economic activities such as visitor attractions based on cultural /historic or natural assets; and
- Other premises which although located elsewhere, may be the subject of secondary impacts such as alteration of traffic flows or increased urban development should also be considered.

This section has regard to the character and type of land use activities at College Green and the location of any sensitive neighbouring occupied premises likely to be directly affected by the Proposed Project. Other premises which although located elsewhere, may be the subject of secondary impacts such as alteration of traffic flows or increased urban development are also considered in this assessment.

Refer to Chapter 16 for socio-economic impacts (i.e. '*Socio-Economics*').

15.2 Assessment Methodology

The baseline environment is defined as the existing environment against which future changes can be measured. This section presents the methodology used in assessing the baseline land use environment. The scope for the assessment has been informed by consultation with statutory consultees, bodies with environmental responsibility and other interested parties at scoping stage and in consultation with business groups for the area.

The methodology has been devised in consideration of the following guidelines:

- CAAS, 2002, Guidelines on the Information to be Contained in Environmental Impact Statements (Environmental Protection Agency (EPA));
- CAAS, 2003, Advice Notes on Current Practice (in the Preparation of Environmental Impact Statements) (EPA);
- CAAS, 2015, Draft Revised Guidelines on the Information to be contained in Environmental Impact Statement;
- CAAS, 2015, Draft Revised Advice Notes on Current Practise in the Preparation of Environmental Impact Statements.

15.2.1 Study area

The baseline environment is described in the context of two study areas which have been defined considering the potential for impact of the Proposed Project:

- The core study area aligns with the Red line boundary of the Proposed Project, as described in Chapter 4 and considers the potential for direct impact on adjoining land use and property.
- The wider study area considers the potential for broader indirect impact arising changes in movement and access associated with the proposals. This has been defined as a 10 minute walk time catchment area (or isochrones) which is considered a reasonable distance people are prepared to walk to a destination.

The baseline land use environment has been defined through a desktop study and supplemented with site visits and surveys.

15.2.2 Desktop research

The assessment involved desk top research and analysis of existing documentation to build up profiles of the communities which would be directly impacted upon by the Proposed Project. The principal data sources used in the study are described below:

- Census 2011, Central Statistics Office (CSO);
- Pobal Maps;
- GeoDirectory;
- Map viewer of the Valuation Office of Ireland;
- Dublin City Council online planning searches of recently submitted and granted planning applications for development in the area;
- Dublin County Council data retrieved from Dublinked - http://dublinked.com;
- Department of Education and Skills;
- Fáilte Ireland; and,
- Property Services Regulatory Authority (PSRA).

GeoDirectory is a service, jointly established by An Post and Ordnance Survey Ireland, which provides a complete database of all of the buildings in the Republic of Ireland and their geolocation details. It holds records for 1.8 million properties. The database is regularly updated and no legacy or previous versions are retained. In this case the GeoDirectory (used under licence), provides a snapshot for a particular point in time (Q2 2016). The GeoDirectory has been utilised in this Proposed Project to determine the level of commercial activity and the sectoral base/provision of services in the study areas.

Land use Impacts

The assessment of land use considers any significant existing trends evident in the overall growth or decline of various land uses, or any changes in the proportion of one type of activity relative to any other. Consideration is also given regarding any residential, commercial or sensitive land use activities which are likely to be directly affected, including any resultant environmental impacts.

The location of any sensitive neighbouring occupied premises likely to be directly affected, and other premises which although located elsewhere, may be the subject of secondary impacts such as alteration of traffic flows or increased urban development.

The assessment of economic effects is carried out in accordance with the criteria outlined in **Table 15.1**.

Table 15.1 - Classification of Impacts to land-use

Significance Level	Criteria
Significant Negative	An impact that would substantially affect land use and property (i.e. property acquisition and CPO)
Moderate Negative	An impact that causes a noticeable negative change to the character of land use in the area (including business and trading environment)
Slight Negative	An impact that causes noticeable negative changes in businesses or premises without affecting trade
Imperceptible	No appreciable impacts on land use (property use and operation)
Slight Positive	An impact that causes noticeable positive changes in land use or property
Moderate Positive	An impact that causes a noticeable positive change to land use (character, intensity etc.)
Significant Positive	An impact that would substantially positively affect land use (causing positive changes in property, intensity and nature of use and attractiveness of business or trading patterns)

15.3 Baseline Environment

This section addresses the land use context of the receiving environment only. The historical and cultural significance of the urban fabric is addressed under Chapter 10, *'Archaeological, Architectural and Cultural Heritage'*.

Figure 15.1 - Land use classification

Figure 15.1 illustrates data from the Geo Directory which presents a colour-coded overview of land use in the study area. As may be expected there is a notable concentration of retail (purple) long Grafton Street and up to the southern edge of College Green. North of College Green there is a notable concentration of accommodation and food services (green) in the Temple Bar area. The city centre location also reflects a significant concentration of professional services and technical activities (blue).

The following analysis presents an overview of baseline land use in the vicinity of the subject site at College Green, followed by a sectoral analysis based on Geo-Code data for the site and surrounding area within a 10 minute walk time catchment.

15.3.1 Core Study Area (Works Area)

All works for the Proposed Project are contained within the public road way and public footpaths at the subject site on College Green (primarily) and adjoining side streets (Grafton Street Lower, Church Lane, Trinity Street and Foster Place).

The land use of the site is that of roadway (including pedestrian footpaths and parking areas). The works extend to the boundary of adjoining private properties but there is no egress on boundaries (with the exception of Bank of Ireland building).

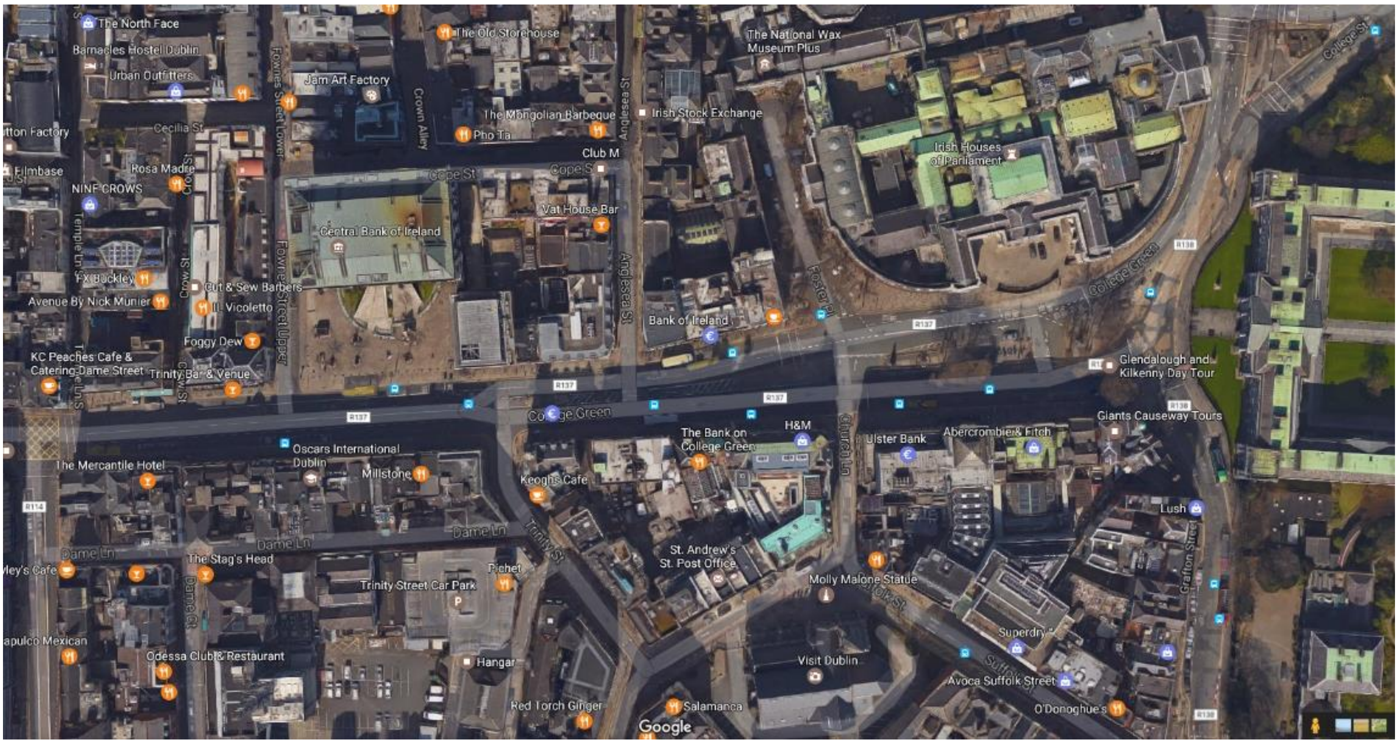


Figure 15.2 - Aerial photo of subject and adjoining land uses

15.3.2 Adjoining land uses

The subject site is located at the core of an historic city centre and as may be anticipated is surrounded by a broad range of uses. The predominant land uses in the surrounding streets and blocks are outlined below.

Luas Cross City is currently under construction with the permitted alignment running down Grafton Street Lower and onto Westmoreland Street and College Street/Hawkins Street. The Luas line sustains the existing road route along the eastern edge of College Green. New Luas stops are under construction at College Street and Westmoreland Street which will be the nearest point of light rail access/egress to the study area.

Eastern Boundary - Trinity College Dublin

The eastern edge of College Green is dominated by Trinity College Dublin (TCD); a university campus with some 17,000 students. The campus dominates the eastern boundary of College Green between Pearse Street and Nassau Street as far as Westland Row (an area of some 165,000m^2). This is a pedestrian campus with limited access for cars. There is a singular entrance to the campus from College Green which is a focal point of pedestrian movement and activity.

Trinity is also a significant tourist destination with c. 767,996 visitors to the Book of Kells in 2015. It is notable that the remainder of the boundary between College Green and TCD is impermeable and contains no further access points, curtailing activity beyond the main gate.

Northern boundary - Bank of Ireland/Foster Place

The northern boundary of College Green is bounded by the Bank of Ireland former Irish Houses of Parliament building. The buildings have been in banking use since 1803 and remains in active banking use (accessed via Westmoreland Street). Parts of the building are open to tourists. While the building presents a magnificent architectural presence on the edge of the proposed plaza area, it is not a public building and it provides little animation in terms of activity or use. It is currently undergoing restoration works.

There have been several planning applications for development at the Bank building itself, including educational uses. An exhibition centre is to be incorporated as part of the investment in the structure and improved public access. At adjoining structures around Foster Place (including former National Wax Museum) several planning permissions have been granted by the Council for modernisation of buildings and facilities and incorporating change of uses at ground floor (including restaurant uses) marking a trend to a more open and animated towards Foster Place. The Foster Place cul-de-sac is dominated by taxi parking. While the space has a pleasant south-facing aspect, surrounded by graceful historic buildings, it does not currently support any active public uses, aside from the coffee shop unit on the western corner with College Green.

Northern Boundary - Foster Place to (entrance to Temple Bar) - former Central Bank plaza

The northern edge of College Green is characterised by a range of commercial uses at ground floor level from the Starbucks, Costa Coffee and Londis convenience retail from the corner of Foster Place to Angelsea Street. The street section from Angelsea Street to the former Central Bank Plaza comprises office and institutional uses but does not include any active street uses. The Blooms Hotel and nightclub is located to the rear of this block. Moving westwards along Dame Street beyond the central bank plaza, the land use notably changes again with a predominance of bars, restaurants and cafes.

Southern edge of College Green (Grafton Street Lower to Church Lane)

This edge to College Green includes large comparison retailing units (Ambercrombie & Fitch) accommodated within typically former institutional/banking structures, along with smaller units including Spar, Dubarry and the Dublin Tourist office. The Ulster Bank building on the corner of Church Lane is a dominant presence.

Southern edge of College Green (Church Lane to Trinity Street)

This edge of College Green includes the recently opened H&M comparison clothes retailer, the Bank bar and a Tesco Express comparison retail unit.

A KBC bank outlet sits next to cafés (Jc Tornaio and Keoghs) and private Tourist Office. The Pen Corner (specialty retail) turns the corner with Trinity Street.

The character of the street changes slightly with the commencement of Dame Street, with a wide range of units including office, bars, language institutes, hotel (Mercantile) and services (Print Bureau).

Surrounding City Blocks:

It is noted that the Westin Hotel (bounded by Westmoreland Street and College Street) while not directly adjoining the site, does form a prominent landmark to the northeast of College Green and Trinity.

To the south, land use is dominated by the city's primary retail street; Grafton Street and surrounding district, with a full range of city centre mixed use activities. Grafton Street was repaved in 2015 by Dublin Council and allows for servicing vehicle access only at limited times of day. There are a number of distinctive character areas within this overall envelope. Grafton Street incorporates international brand retail, luxury goods, department stores and complimentary services. Suffolk Street/Church Lane provide a range of retail, restaurants, bars, cafés and services. Wicklow Street/Exchequer Street provide a strong retail offer, whereas William Street South, Drury Street and Fade Street are characterised by a greater emphasis on recreation, bars, cafés and restaurants. The 'Dame District' is orientated around Dame Court between Exchequer Street and Dame Lane. This quarter is dominated by pedestrian activity, with private car access focused on servicing businesses and providing access to car parks (i.e. Drury Street and Clarendon Street and St Andrew's Lane (Trinity Car Park)).

The Holiday Inn Express and Central Hotel are located on Exchequer Street to the south of Dame Street.

Temple Bar

Extending from College Green/Dame Street northwards to the Quays and from Westmoreland Street to Fishamble Street, Temple Bar is Dublin's primary cultural and recreational quarter. The area includes residential, office, institutional and education uses but is dominated by cafes, restaurants and bars.

While private and servicing vehicles can access the area's streets, the district is dominated by pedestrian movement. A car park is located at Parliament Row which is accessed via Fleet Street.

The Morgan Hotel on Fleet Street and Blooms Hotel on Anglesea Street are located to the north of College Green with Kinlay House, George Frederic Handel Hotel and The Clarence Hotel located at the western end of Temple Bar.

Planning Permissions

The city centre location and high number of protected structures in the study area entails that hundreds of planning permissions are attached to properties adjoining and in close proximity to the subject site. The list below summarises current applications and recently granted planning permissions by Dublin City Council of interest which reflect land use change trends in the vicinity including higher retail content, apartments at upper floors and refurbishment and improvement of properties onto public streets.

Current Planning Applications in Vicinity of Proposed Project

- Under Reg. Ref. 2753/17 Dame Plaza Lodged a planning application on 21st April 2017 at 6-8, College Green and 1-2 Anglesea Street, Site is bound by College Green to the south, Anglesea Street to the east, Blooms Hotel to the north, 9 College Green to the West. The Proposed Project consists of 1. change of use of existing ground and first floor commercial office, and part basement, to retail use 2. Elevational changes at ground and first floor level to include new retail facade to both College Green and Anglesea Street, and including new canopy over revised office and retail entrances.
- Under Reg. Ref. 2611/17 IBAT College Limited Lodged a planning application on 31st March 2017 at 16-19, Wellington Quay. The Proposed Project will consist of the temporary change of use (for a period of up to 5 years) of the existing basement from car park to staff and student facilities, maintenance and storage areas and associated works to subdivide the space.
- Under Reg. Ref. 2499/17 College Green Hotel Ltd Lodged a planning application on 16th March 2017 at The Westin Hotel, 1-5 and 5a College Street, 35-41 Westmoreland Street, 32-37 Fleet Street, Dublin 2. The Proposed Project will consist of Modifications to signage at ground level 2 no. soffit mounted folding telescopic arm fabric awnings within the window reveals of 35-36 Westmoreland Street.
- Under Reg. Ref. 2659/17 Iskasinc Limited Lodged a planning application on 7th April 2017 at 16-18 Parliament Street, and corner of East Essex Street for development works at 'The Porterhouse'. The Proposed Project involves the provision of 3 No. en-suite guest bedrooms and coldroom on 2nd floor, 4 No. en-suite guest bedrooms on 3rd floor: new fourth floor at roof level containing 3 No. en-suite guest bedrooms. Works are to include raising in height the existing cupola, and new gable on Essex Street East to provide 4th floor to 16 and 17 Parliament Street/corner of East Essex Street. The works as it relates to 18 Parliament Street, will provide 2 No. ensuite guest bedrooms on the 3rd floor.

Permitted Development in Vicinity of Proposed Project

- Under Reg. Ref. 2648/16 Aston Quay Property Ltd were Granted permission on 04th October 2016 for development at the Morgan Hotel, 10-12 Fleet Street, Temple Bar. The Proposed Project will consist of the: construction of a sixth storey (fifth floor level) on the northern (rear) (574 sq m) and southern (front) (534 sq m) blocks; construction of a private roof terrace and a plant room at roof level on the northern (rear) block; replacement of the existing mansard-type facade to the southern (front) block and the replacement of the existing glazed facade to the northern (rear) block at fourth floor level with a facade treatment to match that proposed at fifth floor level; build-out of the existing set-backs on the northern, southern and eastern facades of the northern (rear) block at fourth floor level; build-out of the existing set-back on the northern facade of the southern (front) block at fourth floor level; construction of a 'green roof' using a sedum blanket system on each block; provision of plant areas at third, fourth, and fifth floor level of the northern facade of the southern (front) block; and for all other associated site excavation, infrastructural and site development works above and below ground. The Proposed Project will result in an overall increase in hotel bedrooms from 132 No. to 168 No. and an increase in floor area from 7,135 sq m to 8,448 sq m.

- Under Reg. Ref. 3454/16 The Irish Stock Exchange Plc were granted permission on 4th November 2016 at 24-28, Anglesea Street and The Armoury Building, Foster Place. The Proposed Project includes (i) External refurbishment and repairs and internal modifications and refurbishment of both the Armoury building and the 24-28 Anglesea Street building; (ii) Demolition of the part single, part two and part three storey rear (north) extension at the Armoury Building and demolition of the two storey rear returns to 24-28 Anglesea Street, and the construction of a new four storey over single basement level extension located to the rear (north) of the building linked to ground, first and second floor levels of 24-28 Anglesea Street by a three storey over basement link building with rooftop amenity terrace; (iii) Change of use of the original element of the existing Armoury building from museum use to office use; The Proposed Project will provide for a total of circa 1,434.43m^2 gross new office floor space in the proposed rear extension to the Armoury Building and the new link building between the Armoury building and 24-28 Anglesea Street. The overall gross office floor space of the amalgamated buildings, including the proposed new floor space, will be circa 3,274.5m^2.
- Under Reg. Ref. 2422/11 Trinity College Dublin were Granted permission on 22nd November 2011 at 30 to 34, Anglesea Street and 3 and 4 Foster Place (a former Allied Irish Bank). The Proposed Project comprises: Change of use of the basement and ground floor level (including the original Banking Hall) from banking to restaurant (1341m^2); alterations to the basement of 3 Foster Place to accommodate new air handling plant, toilets, kitchen and storage; alterations at 3 Foster Place including a freestanding, enclosed servery element within the Banking Hall and 31- 33 Anglesea Street to accommodate dining areas and toilets. It is also including the change of use from banking to shop (108m^2) at ground floor, 4 Foster Place and change of use from Banking to Educational uses (2191m^2) at basement, ground, first, upper first, second and third floor levels at 30- 34 Anglesea Street and nos. 3 and 4 Foster Place.
- Under Reg. Ref. 2331/15 the Governor & Company of Bank of Ireland were granted permission on 11th June 2015 at Bank of Ireland, 2, College Green, Dublin 2. The Proposed Project consists of temporary change of use of existing administrative offices, located on the east side of the complex, to a cultural and heritage centre; demolition of a 1950's courtyard infill block on

the west side of the complex and construction of a new three storey office building in the same location, with a disabled access lift and bridge links to existing buildings. It also provides for an enclosed, glazed footbridge at 1st floor level, to link the main building to the existing three storey north range; re-surfacing of the courtyard facing College Green, including provision of a lightweight and architecturally reversible disabled access ramp, located to the east side of the courtyard, and the installation of a lightweight canopy over the rear yard to the north-east of the site.

- Under Reg. Ref. 1655/08 J.J. Fox Ltd was granted Planning Permission on 30th July 2008 at 119, Grafton Street, 37 College Green and Basement of 36 College Green. The Proposed Project comprises the change of use of the existing ground floor retail unit at no. 119 Grafton Street, including basement levels of no. 119 Grafton Street, 36 and 37 College Green, from retail, office, ancillary and storage, to retail, office, ancillary storage and sale of intoxicating liquor (for consumption off the premises) at ground floor level and new signage.
- Under Reg. Ref. 3068/13 Popple Investments Ltd was granted permission on 4th November 2013 for development at 23- 27 College Green, 6 and 7, Church Lane, 25-27, St Andrew’s Street. The Proposed Project includes permission to change the use of the basement, ground, mezzanine, first and second floor from banking use to retail use. The existing goods entrance on St Andrew’s Street is to be converted to an additional entrance to the retail area including a new shop front and canopy. A new service access door is proposed on the Church lane elevation. The Proposed Project also included change the use of the third, fourth and attic floor from banking offices to six two bedroom apartments and two one bedroom apartments. The apartments range in size from $100m^2$ to $136m^2$. The total gross area devoted to residential use is $1583m^2$ and devoted to retail use is $3370m^2$.
- Under Reg. Ref 2440/13 KC Peaches Ltd was granted permission on 8th July 2013 at 54, Dame Street, Dublin 2. The Permission is for the change of use of the basement, ground and first floors ($233m^2$) from financial institution to whole foods shop and cafe including the sale of food for consumption off the premises together with all associated reversible internal fit out works.
- Under Reg. Ref. 2339/09 Coppercove Ltd was granted permission on 23-Mar-2009 for development at 56 and 57, Dame Street. The Proposed Project provides for the replacement of two existing shop-fronts including external lighting, signage and one retractable canopy (at no. 57); Restoration of both facades to Dame Street; and renovation of the interior of both shops at ground level.
- Under Reg. Ref. 3559/15 Design Island Initiative Ltd was granted permission on 2nd December 2015 for development at the former St Andrew’s Church, St Andrew’s Street/Suffolk Street. The Proposed Project includes the change of use of the existing Tourism Centre to a Design and Exhibition Centre with ancillary office accommodation and ancillary cafe use.

Residential land use

As noted in Chapter 16 '*Socio-Economics'* there is a small residential population in this area. Using the GeoDirectory database it has been established that there are 357 residential units located within the study area (10 minute walk isochrone). The locations of these houses are displayed on **Figure 15.3**. This shows low concentrations of dwellings to the immediate north and south of College Green, and some accommodation on the Trinity campus to the east.

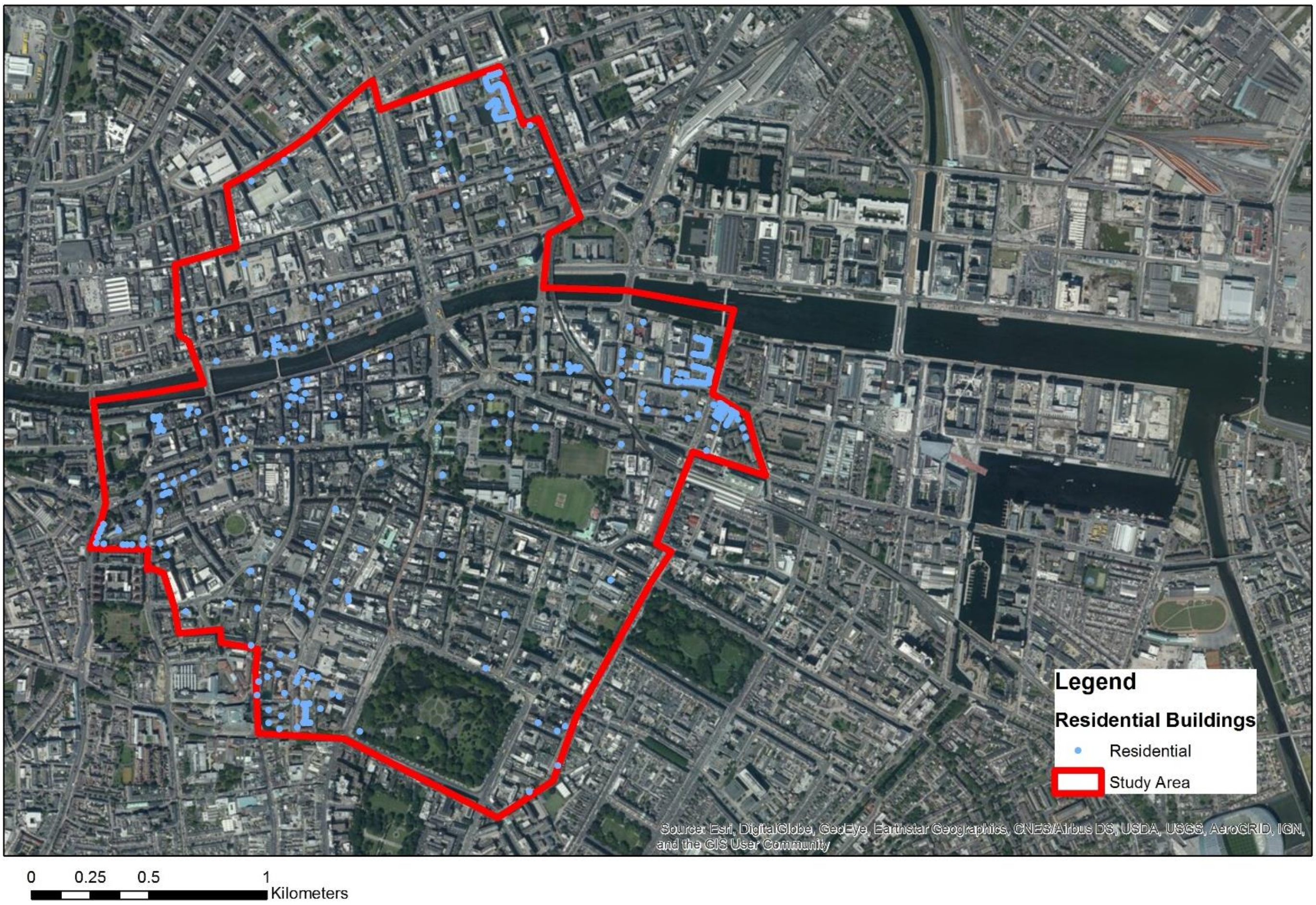


Figure 15.3 - Residential buildings within the study areas

A review of pending and recently granted planning applications revealed a number of development proposals at sites located within the study area (**Figure 15.4**). The medium (between 25 and 150 units) and larger (greater than 150 units) of these residential schemes are illustrated in **Figure 15.5**.

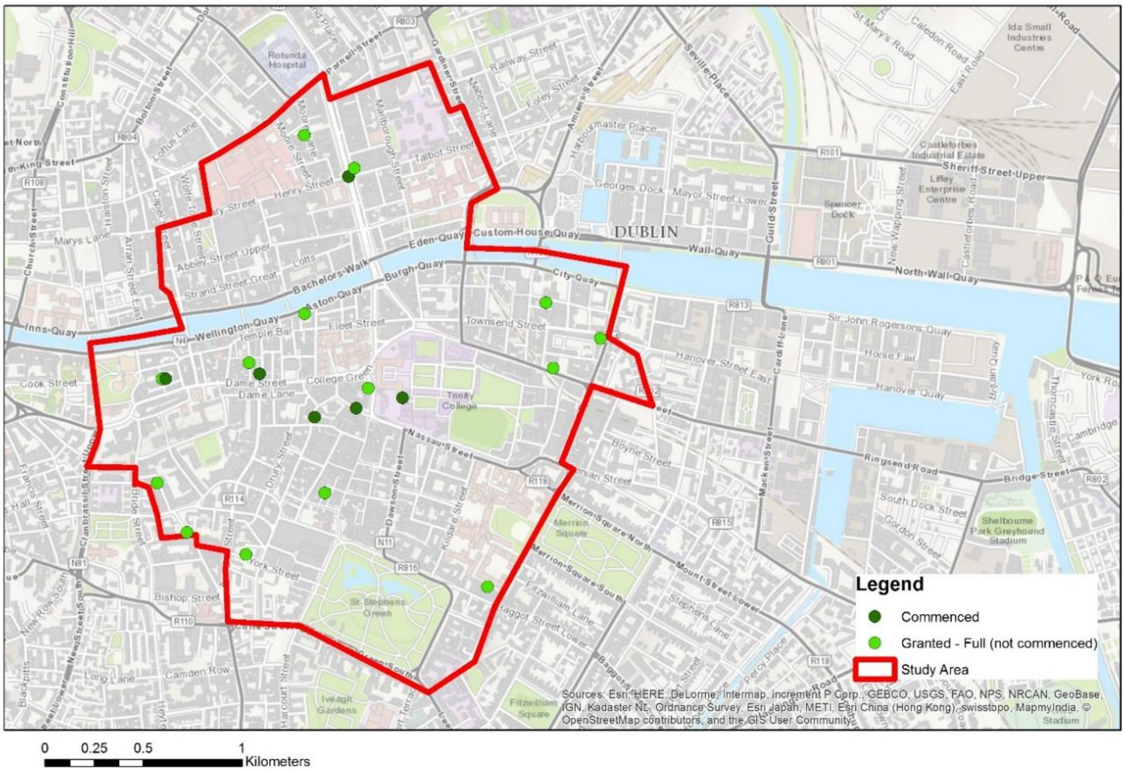


Figure 15.4 - All residential extant planning permissions within the study area

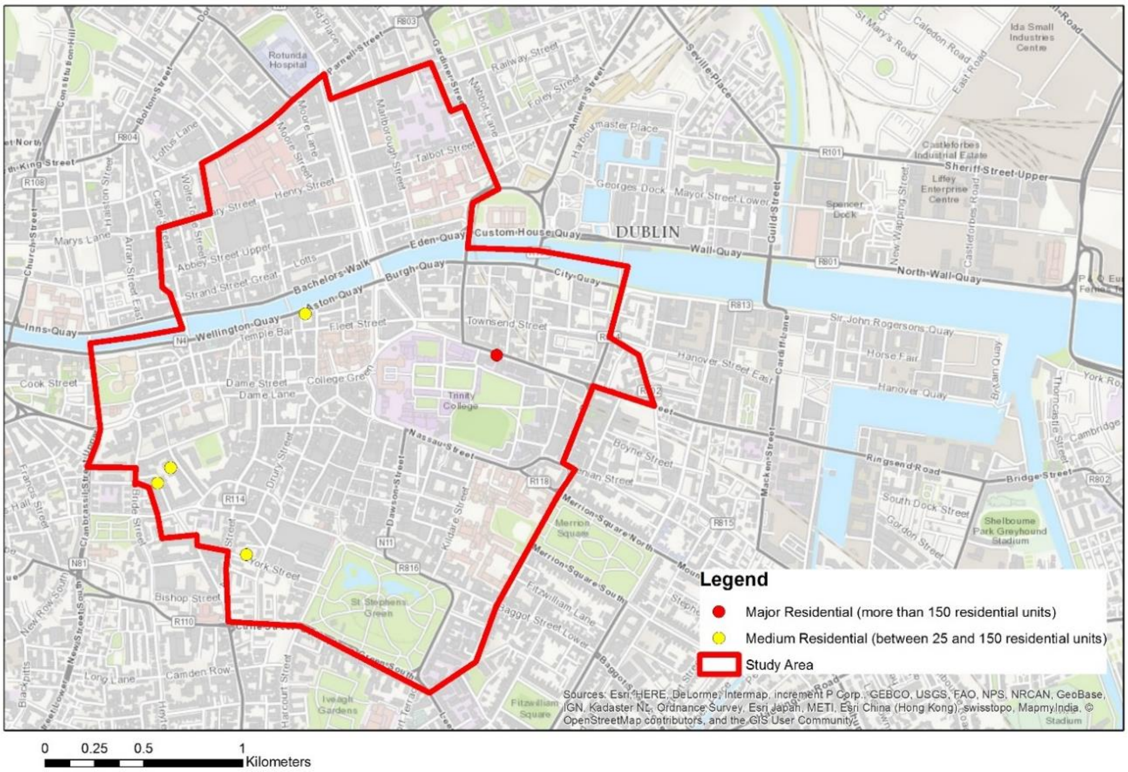


Figure 15.5 - Extant planning permissions within the study area (large residential development schemes)

15.3.3 Retail, hospitality and service industry

Analysis of commercial use within the wider study area presents a more general overview of the nature of businesses within the entire study area. This analysis was utilising the GeoDirectory database which lists commercial activity and sectoral base/provisions of services in any given location at a specific point in time (Q2 2016). This high-level overview of the study area allows an appreciation of landuse patterns and concentrations at a strategic scale. **Figure 15.2** below verifies the concentrations of retail activity along Grafton and Henry Streets (purple dots), while identifying concentrations of Food and Services premises on Dame Street and in Temple bar. This mapping exercise helps to indicate the intensification of use, and allows for quantification of same.

Commercial use in the wider study area is illustrated in **Figure 15.6**, and defined in **Table 15.2**.

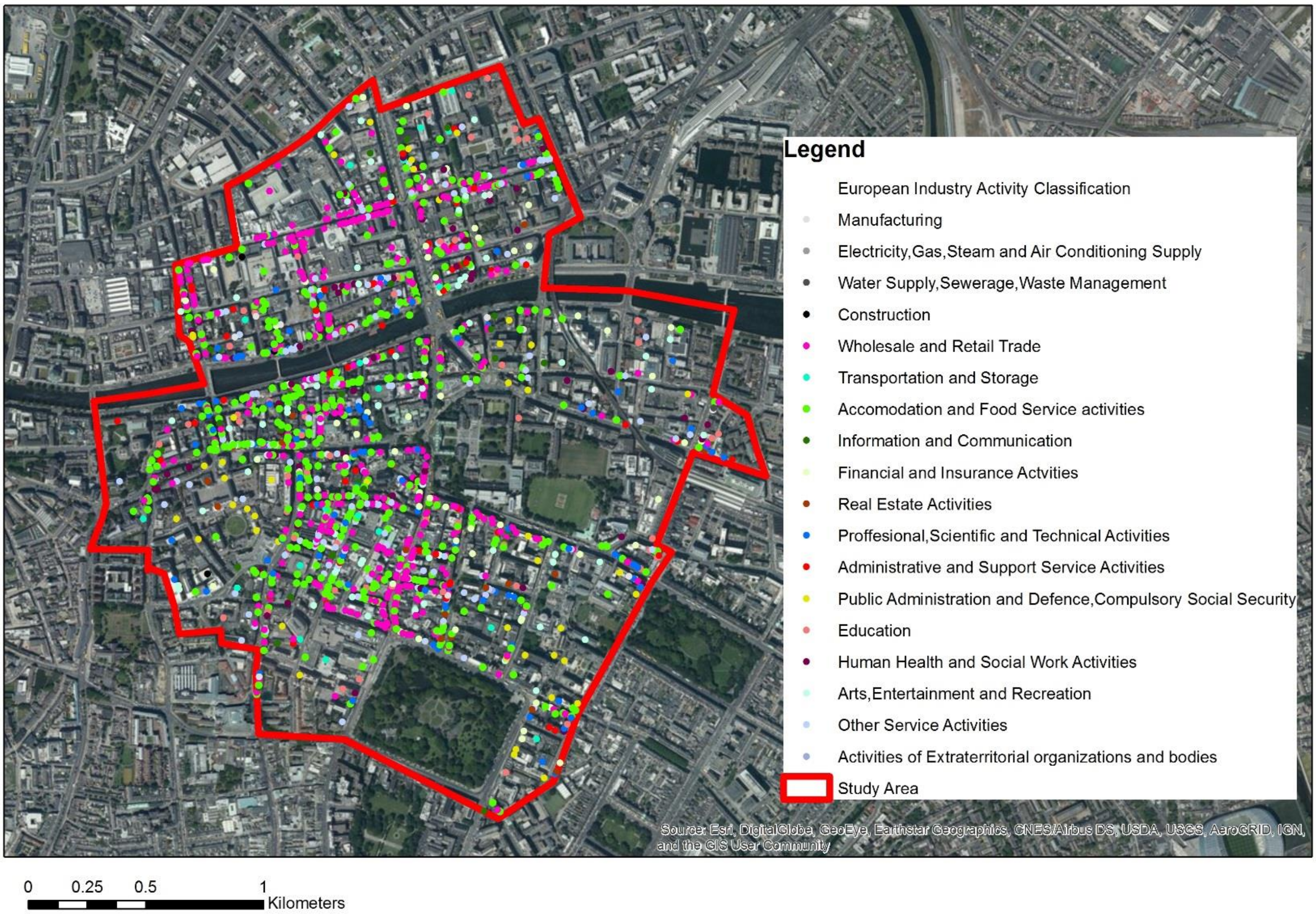


Figure 15.6 - Commercial land uses in the wider study area

Table 15.2 - Sectoral base of the study areas (Source: GeoDirectory Q2 2016)

European industry activity classification	Total	% Total
C. Manufacturing	17	1
D. Electricity, Gas, Steam and Air Conditioning Supply	1	0
E. Water Supply, Sewerage, Waste Management and Remediation Activities	1	0
F. Construction	4	0
G. Wholesale and Retail Trade, Repair of Motor Vehicles and Motorcycles	446	16
H. Transportation and Storage	19	1
I. Accommodation and Food Service activities	416	15
J. Information and Communication	37	1
K. Financial and Insurance Activities	57	2
L.Real Estate Activities	22	1
M. Professional, Scientific and Technical Activities	105	4
N. Administrative and Support Service Activities	53	2
O. Public Administration and Defence, Compulsory Social Security	45	2
P. Education	58	2
Q. Human Health and Social Work Activities	69	3
R. Arts, Entertainment and Recreation	73	3
S. Other Service Activities	146	5
U. Activities of Extraterritorial organizations and bodies	1	0
Commercial (not stated)	463	17
Both – Commercial and Residential (not stated)	157	7
Residential	357	13
Unknown	132	5
Total (Total)	2709	

15.3.4 Healthcare facilities

There are 18 General Practitioners practices located inside the wider study area. Dublin Dental University Hospital is the only hospital in the area, as indicated on **Figure 15.7**. No healthcare facilities immediately adjoin College Green.

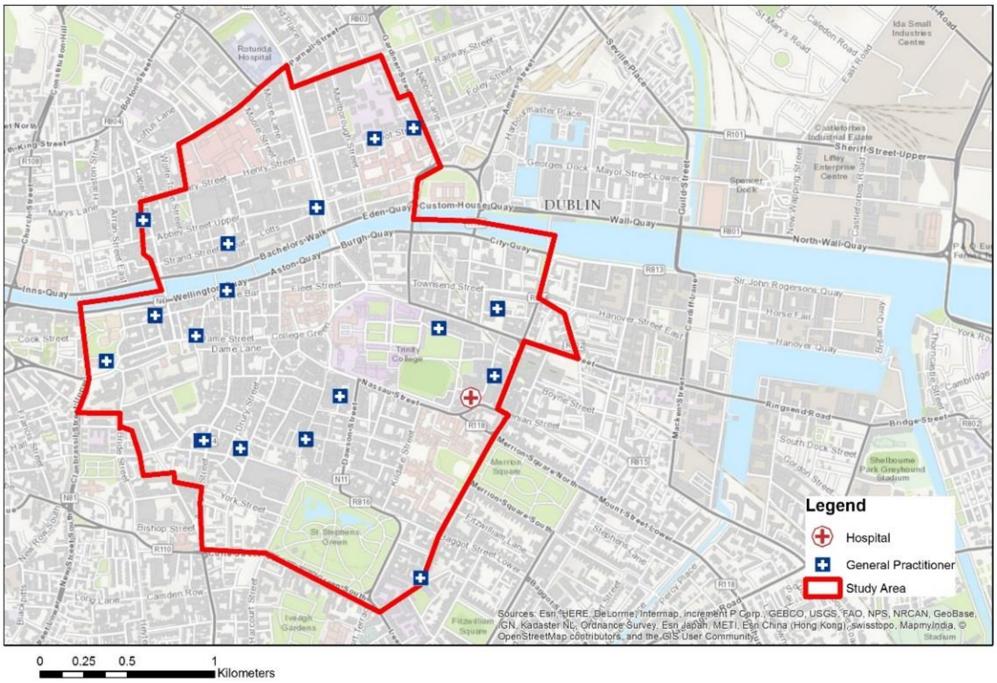


Figure 15.7 - General Practitioners and Hospital within Study Area

15.3.5 Educational Facilities

A list of schools situated within the wider study area (10 minute isochrone) is provided in **Table 15.3**, the locations of which are indicated on **Table 15.3**.

Table 15.3 - Schools within the study areas

Schools within the study areas	
Type	Name
Post-Primary	Larkin Community College
Post-Primary	Loreto College
Primary	Central Senior MXD NS
Primary	Central INFS School
Primary	City Quay Boys NS
Primary	St Enda Primary School
Private Higher Education Institutions	Dublin Business School
Private Higher Education Institutions	IBAT College Dublin
Private Higher Education Institutions	ICD Business School
Private Higher Education Institutions	Independent College Dublin
Private Higher Education Institutions	Dublin Business School
Private Higher Education Institutions	IBAT College Dublin
Private Higher Education Institutions	ICD Business School
Private Higher Education Institutions	Independent College Dublin
Private Higher Education Institutions	College of Computing Technology
Universities	Trinity College Dublin (TCD)

Universities	Royal College of Surgeons in Ireland
Universities	Trinity College Dublin (TCD)
Universities	Royal College of Surgeons in Ireland
Language Schools	IBAT College
Language Schools	Kaplan Dublin
Language Schools	International House Dublin
Language Schools	ATC Language Schools - Dublin
Language Schools	International Study Centre - Trinity College
Language Schools	Swan Training Institute
Language Schools	Malvern House Dublin
Language Schools	CES Dublin
Language Schools	ECM School of English

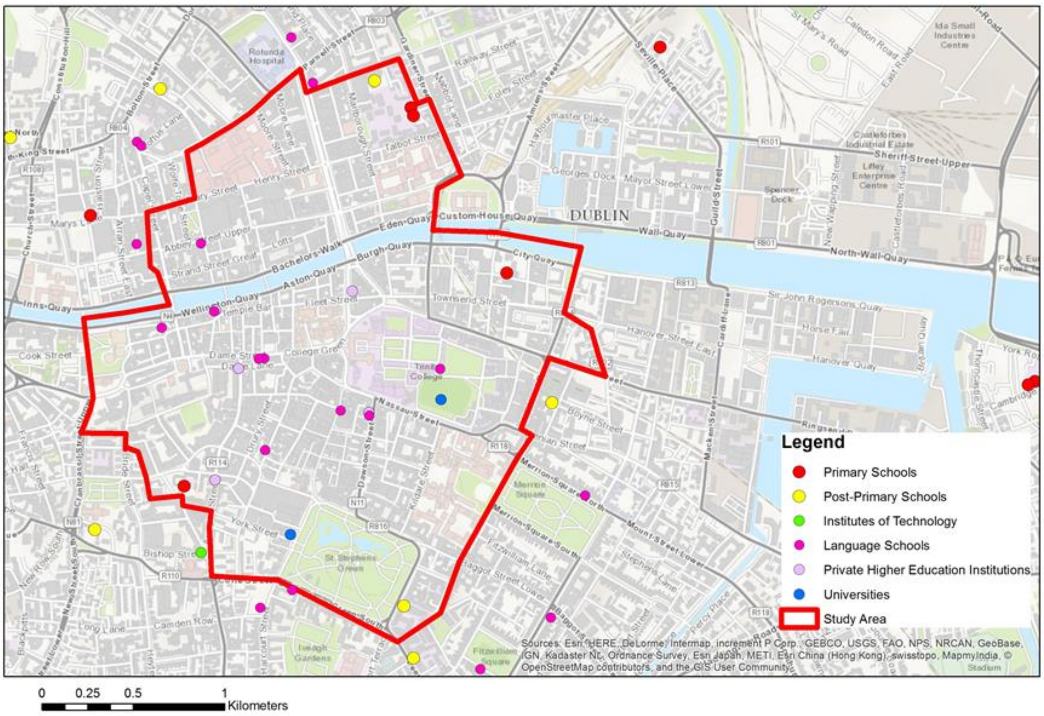


Figure 15.8 - Schools within the study area

15.4 Predicted Impacts

15.4.1 Construction Phase

The construction of the Proposed Project will require temporary use of lands, which shall transition to a permanent change. Lands will be permanently required for the construction and operation of the Proposed Project. These permanent impacts are discussed in **Section 15.4.2**.

There will be no direct impact on any property adjoining the subject site. However, there is the potential for indirect slight negative impacts arising due to the proximity of premises to the works. Premises bounding the site at College

Green may experience temporary disruption to pedestrian and vehicular access to their premises. In addition, there is the potential for dust and noise due to the construction works. These impacts are addressed in Chapter 7 '*Air Quality and Climate Factors'*, Chapter 8, '*Noise and Vibration'* and Chapter 15 *'Socio-economics'*.

The construction phase shall provide for the removal of through-traffic at College Green. This phase shall also see the removal of taxi parking at Foster Place and the taxi rank at College Green. The Proposed Project entails the removal of a number of bus stops at College Green and Dame Street as a result of route changes. Passengers waiting for buses or alighting from buses, do so on the public footpath. The socio-economic impact of these measures are discussed in Chapter 16, '*Socio-economics'*.

Construction phase impacts on land use and property are expected to be slight negative, temporary impacts.

15.4.2 Operational Phase

The impact of the Proposed Project on land use is considered to be direct positive significant and permanent. The use of College Green as a pedestrian plaza will significantly improve the functionality, attractiveness and integration of the location. The Proposed Project will also facilitate and host regular public events and activities which will be a significant positive long-term to the area in terms of activity. The removal of the taxi rank from Foster Place will have a direct significant positive impact on the space replacing stationary vehicles with amenity and recreation space. The secondary impacts arising from traffic re-routing has been considered as part of this assessment and no significant negative impact is expected with regards land use and property.

The indirect impact of the Proposed Project on adjoining property to the north and south of College Green is considered significant positive and long term in terms of land use. It is expected that the proximity to the public space will provide an opportunity at ground floor level to support active uses and activities. Moderate land use change would be expected on an incremental basis including uses such as new or extended cafés and restaurants. Subject to licencing arrangements it is likely that cafes may include outdoor seating areas spilling over onto the plaza.

The impact on land use at the Trinity edge of the plaza is likely to be imperceptible, as no change in the educational use is likely to arise. The impact on the Bank of Ireland use is considered moderate positive and long-term as the plaza will support tourist activities of diversity of uses. In addition, access to the bank will be maintained. It is considered that impacts on land use in districts to the north (Temple Bar) and south of College Green (Grafton Street, Dame District) will be indirect and moderately positive in the long-term, arising from improvements in the pedestrian facilities at the new plaza.

It is notable that the positive impacts on property and land use are also affected by cumulative impacts depend on other factors including national economic growth, availability of development investment and finance, public transport access to the city centre, and investment by the City Council in other public realm improvements. The cumulative impact of the Proposed Project taken with other measures is considered to significant positive and long-term.

15.5 Mitigation Measures

15.5.1 Construction Phase

During the construction phase, site management measures including the provision of high quality hoarding and proactive communication with business and public regarding phasing, extent and duration of works will be carried out. Access to all properties will be maintained during the construction phase. Signage will be provided as necessary.

15.5.2 Operational Phase

No mitigation measures are required as it is expected that the Proposed Project will have a positive impact on land use and property.

The management of land use is a function of the Dublin City Council's planning department in accordance with the policies of the Dublin City Development Plan 2016-22.

The careful management of proposals for change of use in a coherent manner is likely to complement the investment in the plaza is a very important role to mitigate negative impacts arising from value and use changes in property beside the plaza.

The taxi rank will to be removed at College Green (five spaces). The taxi parking facility at Foster Place is to be removed entirely. It is proposed to introduce a taxi rank on the outbound lane on Dame Street, East of South Great George's Street and West of Trinity Street. Adjoining this would be 35 metres of Loading Bay which would be a Night time taxi rank. A loading Bay will act as Night time taxi rank, is proposed for the East side of Trinity Street just prior to the junction of St Andrew's Street. A loading Bay which will act as Night time taxi rank, is proposed for the West side of Church Lane. The impact on property and land use from these measures is considered neutral.

15.6 Residual Impacts

15.6.1 Construction Phase

A moderate inconvenience to business deliveries and access will be experienced as a result of the establishment and ongoing use of the construction site. However, the mitigation measures outlined will maintain access arrangements and ensure no significant negative effects arise.

15.6.2 Operational Phase

In the long-term the College Green plaza is expected to become one of the core focal points of the city centre, sustaining a permanent positive legacy for the city.

15.7 Difficulties Encountered

In some cases, it was not possible to determine the exact land use from the desktop study and supplementing site visits. Examples of this include residential uses on upper floors or unoccupied upper floors of buildings in the city centre.

15.8 References

Dublin City Council (2017) *Find a Planning Application* Available at: http://www.dublincity.ie/main-menu-services-planning/find-planning-application

Dublin City Council (2016) *Dublin City Development Plan 2016-2022*, Dublin Ireland

Dublin County Council data retrieved from Dublinked - http://dublinked.com;

Department of Education and Skills map resource [tbc]

Conservation and Amenity Advice Service (CAAS) (2002). *Guidelines on the Information to be contained in Environmental Impact Statements*. Environmental Protection Agency (EPA), Johnstown Castle Estate, Wexford, Ireland.

CAAS (2003). *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements.* EPA, Johnstown Castle Estate, Wexford, Ireland.

Fáilte Ireland map resource [tbc]

Fáilte Ireland's (2015) *Visitor attitudes Survey for 2015* (http://www.failteireland.ie)

GeoDirectory (2017) *GeoDirectory* Available at: https://www.geodirectory.ie/

Pobal Maps

Property Services Regulatory Authority (PSRA).

Trinity College Dublin website (2017) Available at: https://www.tcd.ie/students/

Valuation Office of Ireland map viewer.

https://www.tcd.ie/students/

Fáilte Ireland's Visitor attitudes Survey for 2015 (http://www.failteireland.ie)

16 Socio-Economic

16.1 Introduction

This section of the EIS assesses the impact of the Proposed Project, both during construction and operation, on the human environment and quality of life in the general area of the subject site for the Proposed Project, and also within a 10 minute walk time from the site.

Human beings in this chapter refer to people who live, work or visit the area. Actual and perceived impacts of the Proposed Project on human beings may arise from many aspects of the proposal. These impacts are dealt with throughout the EIS, in particular, the following chapters:

- Air Quality and Climate Factors (Chapter 7)
- Noise and Vibration (Chapter 8)
- Townscape and Visual (Chapter 11)
- Material Assets: Utilities (Chapter 14)

This chapter initially sets out the methodology to be used for the assessment (**Section 16.2**), then describes the existing environment (**Section 16.3**), sets out the predicted impacts of the Proposed Project for the area during both the construction and operational stages of the Proposed Project (**Section 16.4**). Following this, the identification of impacts, avoidance and mitigation measures to be incorporated in the Proposed Project are set out (**Section 16.5**), following by details of any residual impacts (**Section 16.6**). Finally, the chapter outlines the difficulties encountered in compiling information (**Section 16.7**).

16.2 Assessment Methodology

16.2.1 General

16.2.1.1 Overview

The methodology is based on established best practice with cognisance given to all relevant guidelines and legislation. GIS mapping has been used to visually record information relevant to the assessment. The assessment will consider attributes and characteristics associated with the following aspects:

- Demographics;
- Land use;
- Community and residential settlement;
- Economic activities and employment;
- Public amenity and community infrastructure;
- Tourism; and
- Access and connectivity.

It should be noted that conformity with recognised national and international standards have been addressed within the EIS under relevant environmental topics such as noise, vibration, landscape and visual and air quality. Details from these assessments have been used to inform the assessment of impacts.

16.2.1.2 Use of Geodirectory

GeoDirectory is a service, jointly established by An Post and Ordnance Survey Ireland, which provides a complete database of all of the buildings in the Republic of Ireland and their geolocation details. It holds records for 1.8 million properties. The database is regularly updated and no legacy or previous versions are retained. In this case the GeoDirectory (used under licence), provides a snapshot for a particular point in time (Q2 2016). The GeoDirectory has been utilised in this Proposed Project to determine the level of commercial activity and the sectoral base/provision of services in the study areas.

16.2.1.3 Desktop research

The assessment involved desk top research and analysis of existing documentation to build up profiles of the communities which would be directly impacted upon by the Proposed Project. The principal data sources used in the study are described below:

- Census 2011, 2016, Central Statistics Office (CSO);
- Pobal Maps (Pobal.ie);
- GeoDirectory (An Post GeoDirectory- Dublin City Council area);
- Map viewer of the Valuation Office of Ireland;
- Dublin City Council online planning searches of recently submitted and granted planning applications for development in the area;
- Dublin County Council data retrieved from Dublinked - http://dublinked.com;
- Department of Education and Skills;
- Fáilte Ireland; and
- Property Services Regulatory Authority (PSRA).

16.2.2 Guidance and Legislation

As the Proposed Project is located in the centre of Dublin City it intersects with several roadways. It was therefore considered appropriate to assess the impact of the Proposed Project in terms of disturbance arising from the changes in the function and movement characteristics of this space and adjoining areas. The assessment was carried out in accordance with the guidelines contained in “Environmental Assessment”, Volume 11 of the UK HA/DMRB, published by the UK Department of Transport, but with some modifications having regard to the EPA’s Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (2003) and Guidelines on the Information to be Contained in Environmental Impact Statements (2002).

Impacts on Residential Settlements and Communities

The criteria used for assessing the significance of community (social) impacts are presented below. The impact of the works on resident, working and visiting communities is based on assessing the impact of the Proposed Project on connectivity and accessibility. Severance is a key community issue addressed in this report. The UK Highways Agency Design Manual for Roads and Bridges (UK HA/DMRB, 1995) defines community severance as the separation of residents from facilities and services they use within their community caused by new or improved roads or changes in traffic flows. Thus in its widest definition, it is the impact that a project (where roads are impacted on) may have on the accessibility and mobility of the resident, working and visiting communities including social interaction between neighbours. Impact ratings have been based on those recommended in Volume 11, Part 8, Section 3 of the UK HA/DMRB, refer to **Table 16.1**.

Table 16.1 - Assessment of Community Effects (Source: HA/DMRB, 1995, Volume 11, Section 3, Part 8)

Community	
Significant negative	Considerable hindrance will be caused to people trying to make their existing journeys. People are likely to be deterred from making trips.
Moderate negative	Trips will become longer or less attractive. Some people, particularly children and elderly people, will be dissuaded from making trips.
Slight negative	Some hindrance is caused to current journeys. However the current journey pattern is likely to be maintained.
Imperceptible	No appreciable change is caused to present journeys.
Slight positive	Present journeys will become safer and more attractive thereby offering some relief from existing severance.
Moderate positive	Existing roads will be much easier to cross. Existing severance will be considerably relieved.
Significant positive	Traffic flows will reduce to such an extent that they will no longer hinder trips and existing severance will be substantially eliminated.

Similarly, impacts on facilities and amenities are assessed on the basis of whether there is a direct impact on their property, and whether the facility or amenity is severed from its surrounding community. Furthermore, environmental impacts affecting the pleasantness of journeys, such as pollution, noise and visual impacts, also affect general amenity or the wellbeing of people living in the vicinity. So too can direct impacts on particular community facilities and recreational sites. Typically, these impacts are specifically addressed under separate chapters throughout this EIS, notably the chapters on noise and visual impacts. However, these impacts have a community dimension too in that well-being is affected through the effect on utility and, possibly tourism.

Economic Impacts

The assessment of economic effects is carried out in accordance with **Table 16.2**.

Table 16.2 - Assessment of Effects on Business (Source: HA/DMRB, 1995, Volume 11, Section 3, Part 8)

Economy/Business	
Significant negative	An impact that would substantially negatively affect business or trading patterns
Moderate negative	An impact that causes a noticeable negative change to the business and trading environment
Slight negative	An impact that causes noticeable negative changes in businesses or premises without affecting trade
Imperceptible	No appreciable impacts on business or economy
Slight positive	An impact that causes noticeable positive changes in businesses or premises without affecting trade
Moderate positive	An impact that causes a noticeable positive change to the business and trading environment
Significant positive	An impact that would substantially positively affect business or trading patterns

16.2.3 Study Area

For the purposes of this environmental assessment it is important to understand the project in terms of the core area in which the physical works will take place at College Green itself, as well a wider area which may be impacted by works during construction and operation phases. This is in order to consider direct and indirect impacts respectively.

For the purposes of the socio-economic assessment a study area of 10 minute walk catchment was considered as reasonable. This area which is illustrated in **Figure 16.1** includes Trinity, Grafton Street district, Temple Bar and the main core district north of the river including O'Connell Street and Henry Street. The map highlights the position of the College Green within the city centre as a central hub and highly connected area.

Within the 10 minute walk-time catchment (or 10 minute isochrone) a study area of 45 CSO Small Areas has been defined for the assessment of impacts on human beings. The area covers approximately 531.8 Ha from the proposed College Green Plaza.

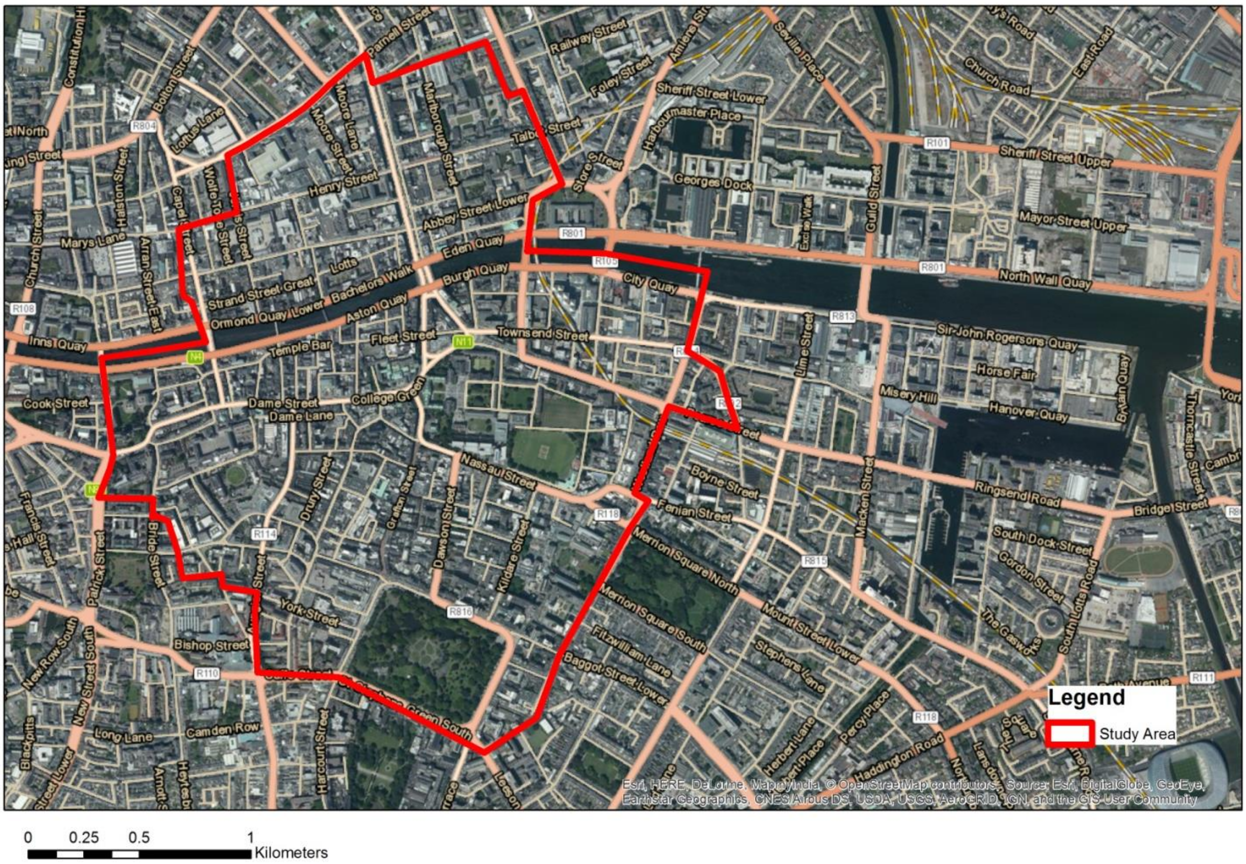


Figure 16.1 - Study Area and the road network

16.2.4 Site Visits

A number of site visits were undertaken by the study team throughout the course of the EIS preparation during working hours and at evening time.

16.2.5 Consultation

The preparation of the Human Beings sections of the EIS was informed by consultation events held by Dublin City Council.

A period of non-statutory public consultation of the Proposed Project was conducted from 12th April 2016 to 24th May 2016 with the intention of obtaining the views of the public and interested parties on two aspects of the scheme:

1. The proposal to remove East-West traffic from College Green allowing a Civic space to be created and
2. The bus diversion routes which were proposed following consultation with the NTA and Dublin Bus.

Some 2,756 submissions were received during the six week consultation period.

Dublin City Council undertook further consultation with the Imagine College Green Workshop in November 2016 (with Report in January 2017). Further on-street and on-line surveys were conducted in January 2017.

As part of the Environmental Impact Assessment process stakeholders were circulated with the EIS Scoping Report at the end of November 2016. In February and March 2017 business organisations were contacted. The design team facilitated a workshop and discussion on 28th March 2017 and 13th April with business groups, refer to Chapter 3, *'Consultation'*.

16.3 Baseline Environment

16.3.1 Demographics

16.3.1.1 Resident Population

Information on demographics is useful in providing an overview of key characteristics of the local population that resides in the study areas. A demographic profile of the study area was established based on 2011 Census data. The study area contains 45 CSO Small Areas as shown in **Figure 16.2**. Small Areas are areas of population comprising between 50 and 200 dwellings created by the National Institute of Regional and Spatial Analysis (NIRSA) on behalf of the Ordnance Survey Ireland (OSi) in consultation with CSO. Small Areas were designed as the lowest level of geography for the compilation of statistics in line with data protection and generally comprise either complete or part of townlands or neighbourhoods (within Electoral Division boundaries). Small areas were used as the basis for the enumeration in Census 2011.

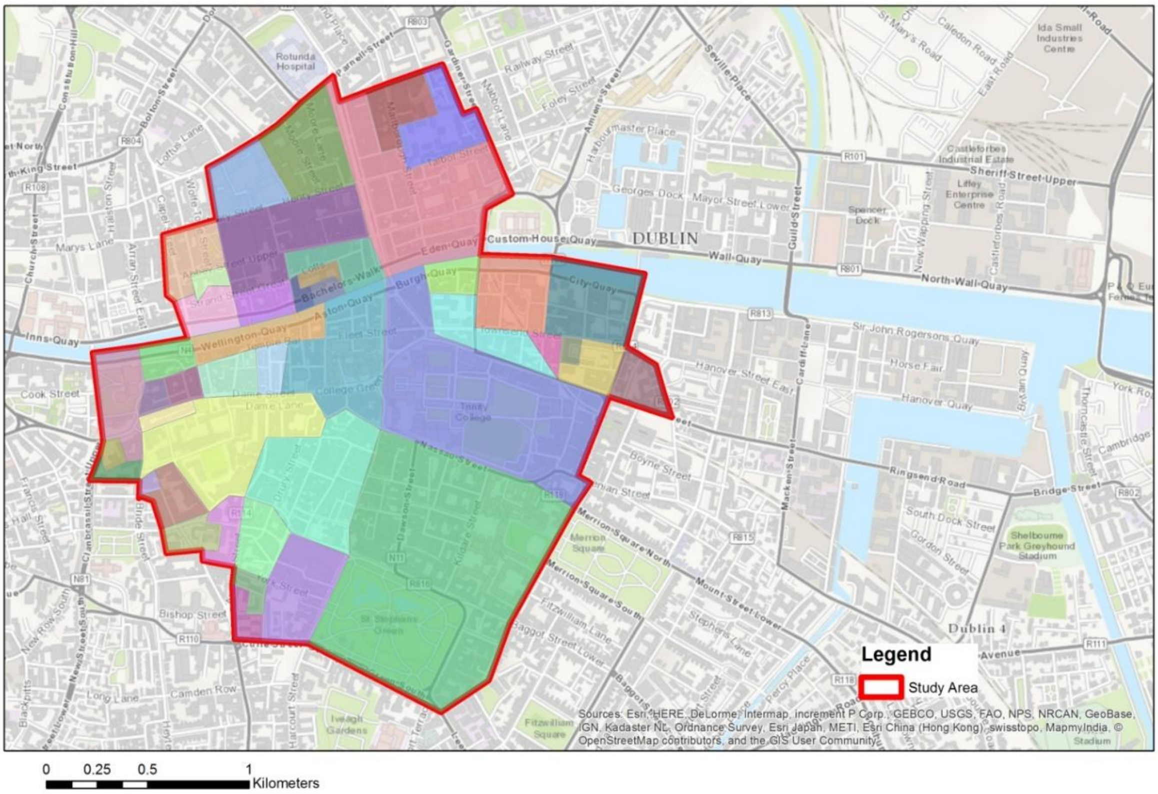


Figure 16.2 - Small areas located within the Study Area

The 2011 population recorded inside study area is 12,694. The 2016 population for this area is not yet available from the CSO. Therefore, in order to provide a sense of population dynamics in this city centre location, analysis of the Electoral Divisions (ED) covering the study areas was undertaken. **Figure 16.3** illustrates the outline of the EDs relative to the 10 minute catchment area. **Table 16.3** provides information on population and household change from 2006 to 2011. The areas highlighted in green most closely align with the 10 minute catchment area, refer to **Figure 16.4**.

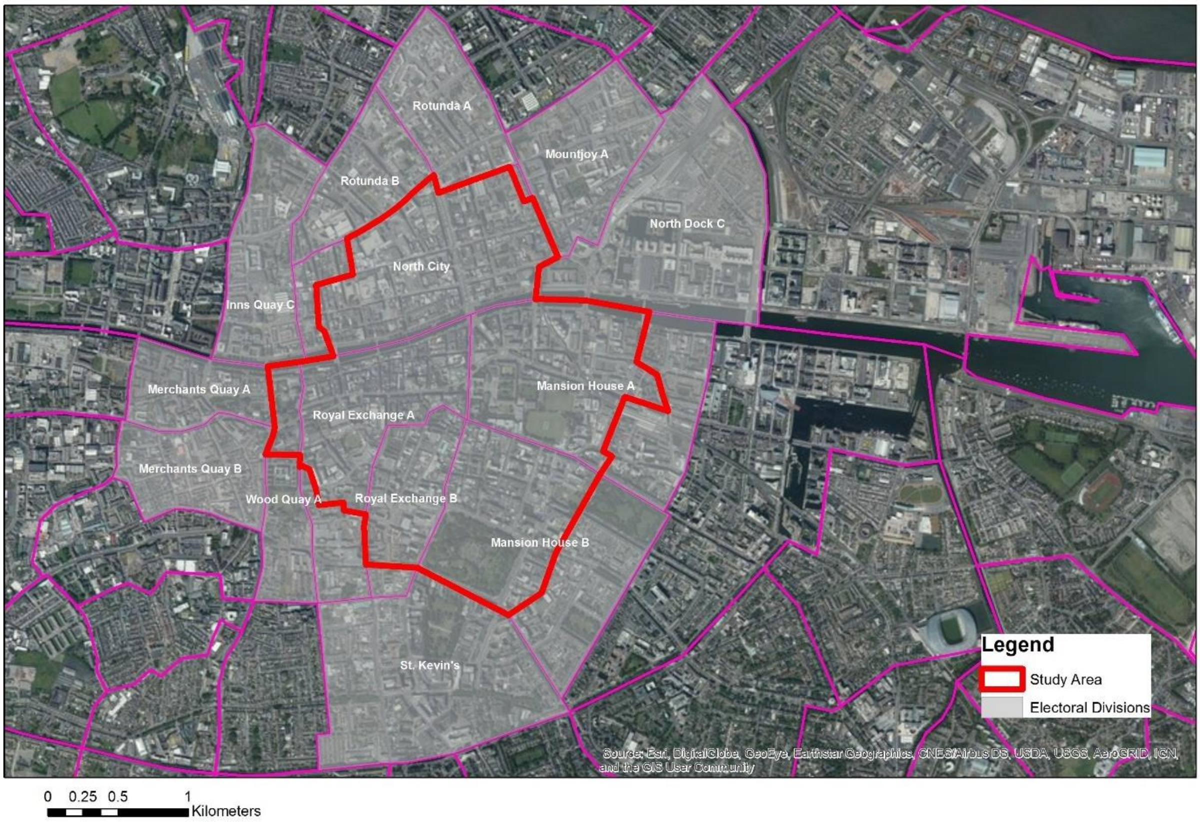


Figure 16.3 - Electoral Divisions located within Study Area

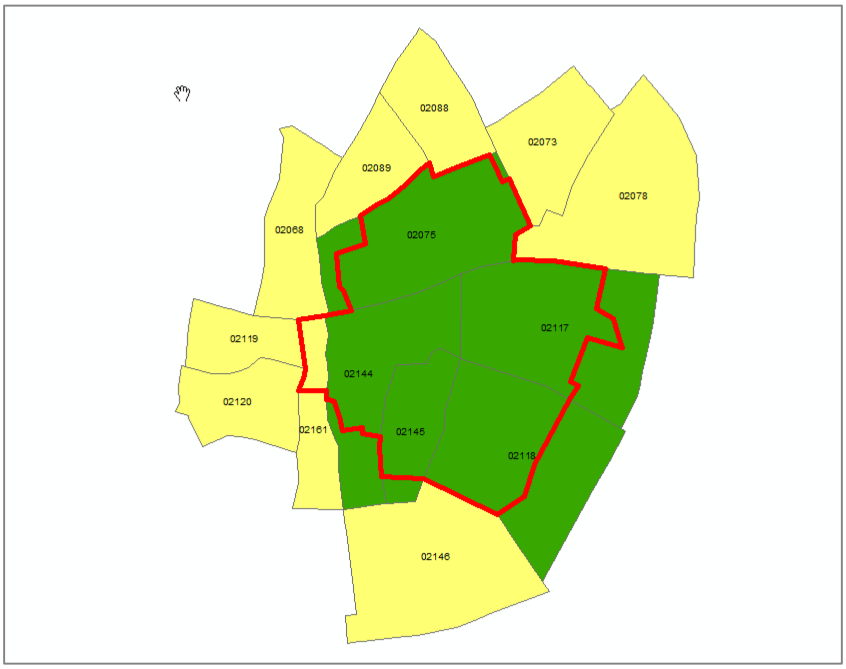


Figure 16.4 - City centre electoral divisions overlaid on 10 minute catchment area, with Mansion House A, Mansion House B, Royal Exchange A, Royal Exchange B and North City EDs highlighted in green closely align with 10 minute catchment.

Table 16.3 - Population and Household Change 2006, 2011 and 2016

CSOED	OSIED	EDNAME	Total Population 2006	2006 Occupied Dwellings	Average H'h size 2006	Total Pop 2011	2011 Occupied Dwellings	Average H'h size 2011	Total Pop 2016	2016 Occupied Dwellings	Average H'h size 2016
		State	4239848	1503291	2.8	4588252	1,705,394	2.7	4757976	1,763,333	2.7
		Dublin City	506211	197006	2.6	527612	217040	2.4	553165	220616	2.5
02068	268082	Inns Quay C	2672	1133	2.4	2709	1183	2.3	2715	1194	2.3
02073	268104	Mountjoy A	3760	1312	2.9	5326	1645	3.2	5313	1793	3.0
02075	268106	North City	3867	1148	3.4	5345	1794	3.0	5441	1720	3.2
02078	268109	North Dock C	4179	1552	2.7	4345	1628	2.7	4162	1673	2.5
02088	268138	Rotunda A	4672	1576	3.0	4698	1594	2.9	5629	1994	2.8
02089	268139	Rotunda B	2137	851	2.5	2439	921	2.6	2434	1029	2.4
02117	268096	Mansion House A	4462	1569	2.8	4347	1596	2.7	4544	1704	2.7
02118	268097	Mansion House B	869	208	4.2	1069	320	3.3	1278	324	3.9
02119	268098	Merchants Quay A	2062	855	2.4	2275	1000	2.3	2492	989	2.5
02120	268099	Merchants Quay B	3901	1725	2.3	3822	1801	2.1	3855	1791	2.2
02144	268140	Royal Exchange A	3602	1264	2.8	4481	1493	3.0	4550	1287	3.5
02145	268141	Royal Exchange B	2020	547	3.7	1914	635	3.0	2041	663	3.1
02146	268142	St. Kevin's	5206	1753	3.0	4910	1805	2.7	5085	1893	2.7
02161	268161	Wood Quay A	2743	1150	2.4	2669	1179	2.3	2598	1231	2.1
Totals			46152	16643	Av 2.9	50349	18594	Av 2.7	52137	19285	Av. 2.8

It is interesting to note that while the population in the city centre EDs has grown by 5,985 person or circa 13% between 2006 and 2016, within the core area (green) the population has grown 3,034 or circa 20.5% over the same period. The average household size for the core study area in 2016 stood at 3.01, down slightly from 3.39 in 2006. Overall, this demographic overview provides a picture of population growth in the core city centre area.

Figure 16.5 illustrates deprivation levels from the Pobal Index. It reflects that the study area is relatively affluent.

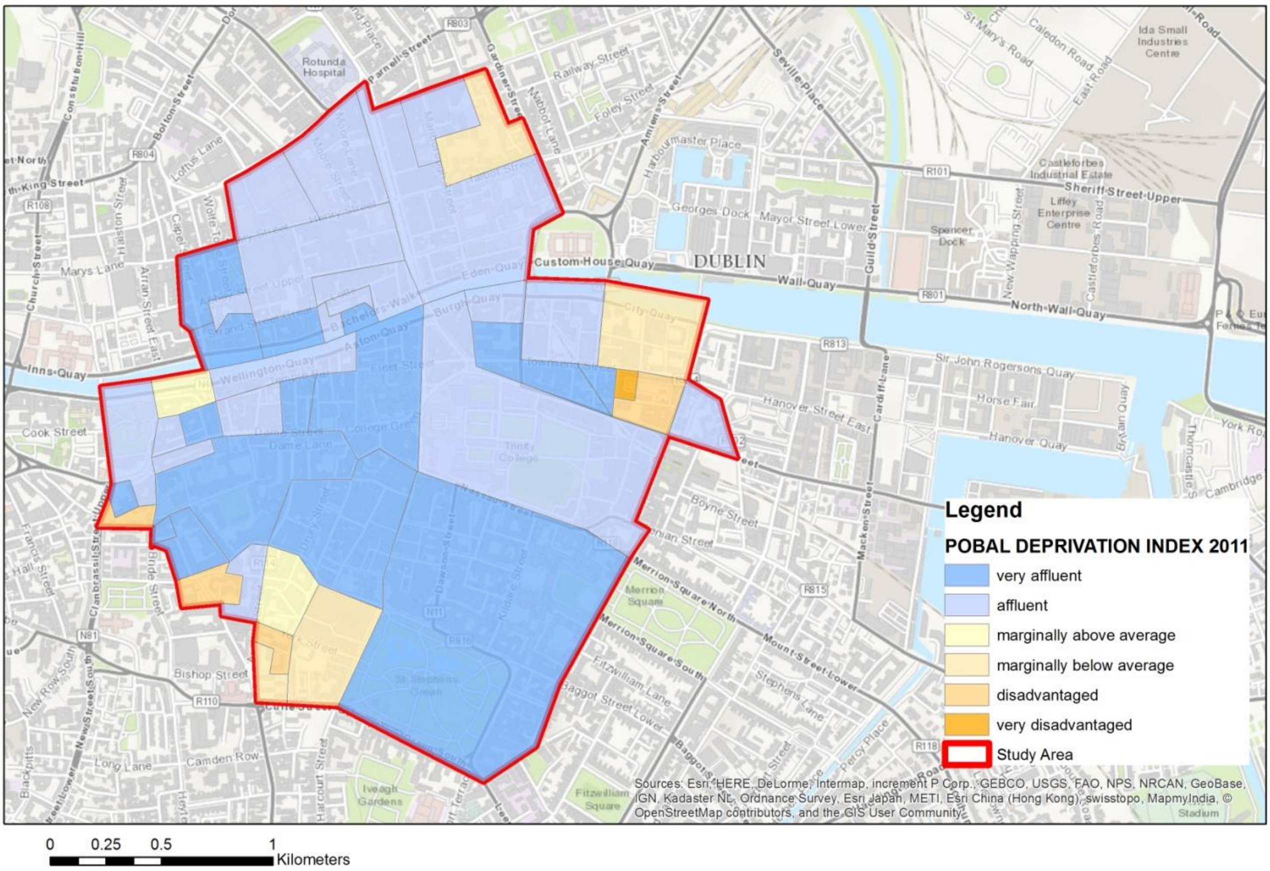
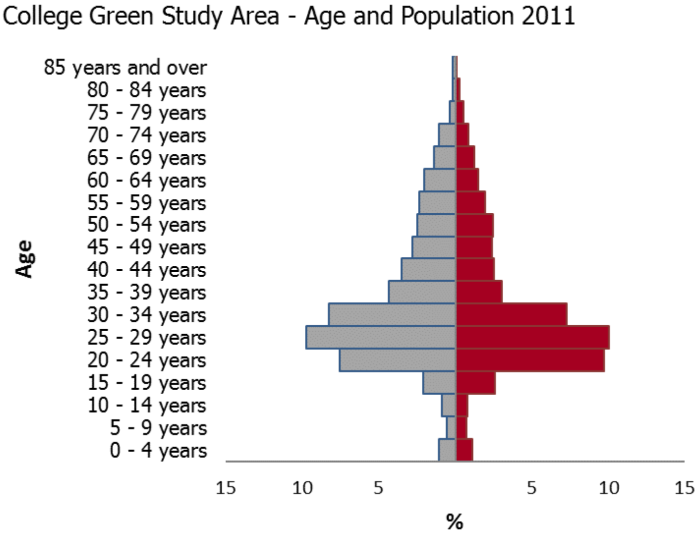


Figure 16.5 - Deprivation and affluence from POBAL Index

The age profile pyramid for the study area is presented in **Table 16.4**. This reveals a high proportion of the population inside study area are within the prime working age cohorts (here defined as the 20-34 age cohorts).

Table 16.4 - Population pyramid– Census 2011



Non-resident Population

As may be anticipated for a city centre location non-residential population is larger and more significant than the resident. As highlighted in the Chapter 15, '*Material Asset: Land Use and Property'*, the area in and around College Green is characteristic of a mixed use city core with strong educational (third level) and retail functions. As a highly accessible location within the city centre, there is also a high level of throughput in peak hours.

Using publicly available information from pedestrian count cameras around the city (maintained by Dublin Town BID) an average profile of activity along key nodes within the study area has been generated. Taking bi-directional totals for each camera within the study area and matching this with peak and low traffic periods the daily flows of the non-resident population has been established (refer to **Table 16.5**).

Table 16.5 - Pedestrian Footfall Index - (Week 4,15,22,34 Summarised) - 2016

Name	Pedestrians recorded in Week 4 - 2016 IN	Pedestrians recorded in Week 4 – 2016 OUT	Pedestrians recorded in Week 15 - 2016 IN	Pedestrians recorded in Week 15 – 2016 Out	Pedestrians recorded in Week 22 – 2016 In	Pedestrians recorded in Week 22- 2016 Out	Pedestrians recorded in Week 34 - 2016 In	Pedestrians recorded in Week 34 - 2016 Out	Pedestrians recorded in Average In	Pedestrians recorded in Average Out
O'Connell Street at Clerys	127,919	85,539	154,920	100,289	157,071	98,297	158,497	101,668	**149,602**	**96,448**
South King Street	67,190	69,232	89,670	94,684	97,545	102,233	88,918	95,217	**85,831**	**90,342**
South Great George Street	55,815	65,848	61,770	71,294	58,547	68,806	62,308	70,673	**59,610**	**69,155**
Talbot Street	61,520	70,511	50,416	67,197	47,813	64,453	51,180	65,420	**52,732**	**66,895**
Mary Street	94,289	83,566	119,532	105,531	126,097	109,112	123,545	108,879	**115,866**	**101,772**
Moore Street	95,304	99,184	94,460	96,279	93,409	97,285	87,148	86,256	**92,580**	**94,751**
Capel Street at Mullen	23,902	23,011	30,303	27,054	25,734	27,218	30,955	27,248	**27,724**	**26,133**
Dame Court	19,952	23,864	16,199	18,984	21,417	24,043	19,299	22,833	**19,217**	**22,431**
Grafton Street Card Gallery	253,642	244,882	271,919	231,225	207,327	233,226	282,289	283,617	**253,794**	**248,238**
Grafton Street MS	239,071	231,128	257,962	249,959	276,465	264,868	283,379	271,058	**264,219**	**254,253**
OConnell Street Easons	111,973	133,506	123,898	155,655	122,669	152,150	129,897	162,544	**122,109**	**150,964**
Henry Street at Butlers	141,398	156,849	156,628	176,427	155,983	174,370	163,276	181,068	**154,321**	**172,179**
William Street South	24,384	28,915	26,908	32,705	29,074	35,804	29,619	34,932	**27,496**	**33,089**

Table 16.5 illustrates that the main commuter flows are observed on north-south axis between O'Connell Street and Grafton Street, with a strong correlation between the planning policy definition of the Grand Civic Spine along the route (see Planning Policy Chapter) and the intensity of pedestrian movement. Weekly pedestrian numbers on average of 518,472 (both directions) were observed on Grafton Street. It is also notable that pedestrian flows drop off considerably as close by as South Great George's Street, with average flow down to an average of 128,765 (both directions). Peak flows of pedestrians commence at 7am on O'Connell Street and at 8am on Grafton Street (refer to **Figure 16.6** for camera locations in the study area).

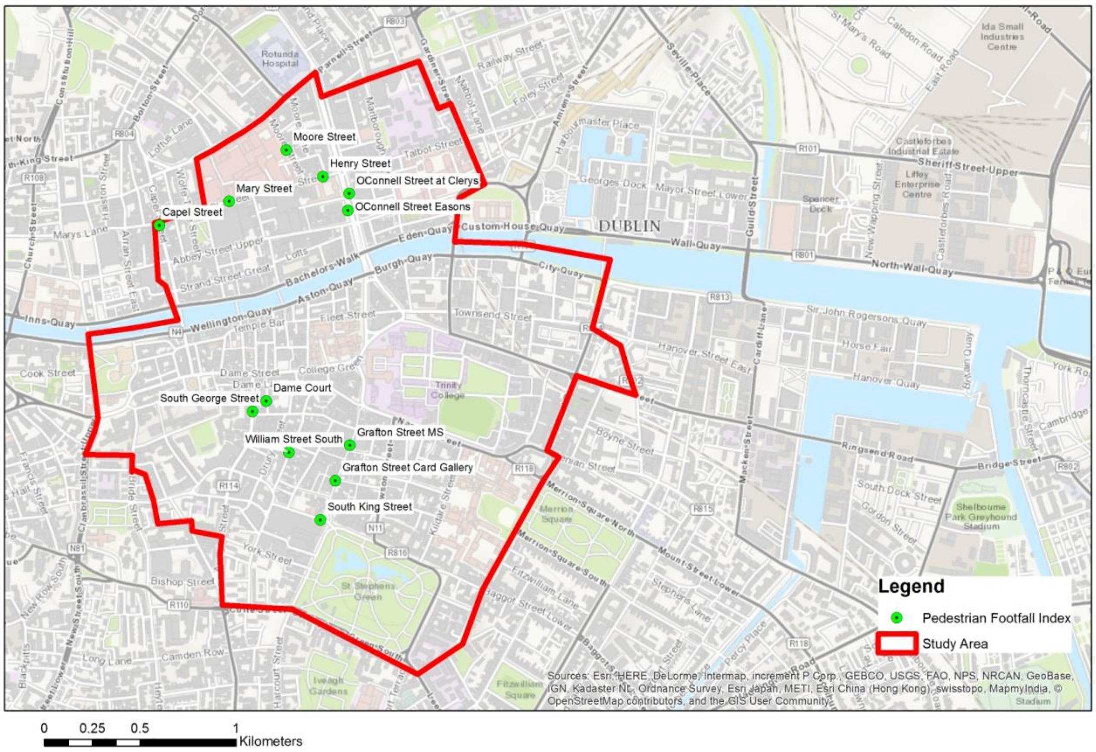


Figure 16.6 - Pedestrian Footfall Index – Approximate location of pedestrian cameras

Table 16.6 - Example of pedestrians flows in detail on Grafton Street (Marks & Spencer) – Week 15

Entrance Name: Grafton St at M&S														
	Mon		Tue		Wed		Thu		Fri		Sat		Sun	
Time	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
00:00	525	355	282	281	492	460	437	431	626	527	984	1013	1219	1253
01:00	393	185	247	214	234	194	240	157	410	283	996	624	1039	675
02:00	185	117	323	151	267	126	182	153	418	253	883	517	829	561
03:00	165	105	228	110	269	65	252	143	430	240	900	549	987	591
04:00	173	75	77	34	134	72	201	86	250	99	460	233	542	272
05:00	58	91	50	97	98	145	91	144	82	126	188	95	242	96
06:00	150	337	194	391	185	378	178	370	195	373	136	233	119	129
07:00	401	1021	506	1064	495	1150	500	1237	447	1074	200	358	163	163
08:00	1479	2252	1070	1806	1292	2245	1437	2222	1197	1969	385	633	247	300
09:00	1396	1715	1083	1694	1233	1771	1126	1510	911	1243	933	1032	440	560
10:00	1311	1572	1546	1842	1440	1690	1688	1848	1492	1680	1512	1668	888	1044
11:00	1944	2199	2036	2168	1920	2205	1827	2163	2060	2333	2423	2601	1619	1700

12:00	2564	2476	2575	2623	2779	2759	2837	2942	3146	2866	3179	3179	2535	2420
13:00	3162	3138	3494	3325	3572	3442	3867	3780	3937	3515	3534	3587	2592	2880
14:00	2604	2342	2615	2455	2844	2885	3168	2906	3574	3418	3671	3738	2787	3107
15:00	2476	2316	2497	2294	2871	2648	2924	2678	3051	2798	3424	3607	2873	3002
16:00	2758	2267	2858	2631	2897	2660	3131	2769	3896	3198	4157	3864	2664	2848
17:00	2694	2125	3571	2589	3411	2619	3867	3157	4561	3494	4223	3625	2981	2665
18:00	2671	1928	2910	2374	3232	2568	3680	3181	3580	3024	3264	2702	2371	2410
19:00	1672	1248	1989	1666	2124	1744	2791	2390	2586	2158	2384	2096	1548	1283
20:00	1036	868	1164	971	1283	1043	1729	1536	1704	1605	1602	1633	960	1000
21:00	776	747	1120	875	1093	932	1327	1102	1393	1263	1190	1277	737	855
22:00	552	544	899	830	909	863	1119	855	1282	1219	1258	1326	559	729
23:00	468	509	746	607	649	715	836	749	1224	1120	1107	1360	725	476

16.3.1.2 Community and Residential Settlement

The existing and proposed developments situated within the study area have been identified. This involved site visits, a review of aerial photography, and review of Dublin County Council zoning plans. Chapter 15 of this EIS reviews the land use in the vicinity of College Green and within the 10 minute catchment area in detail.

A land use zoning map showing all permitted land use zones within the study area is provided in **Figure 16.7**. As can be seen, the main land use zonings designated for the area are as follows:

- Z5 (blue) - To consolidate and facilitate the development of the central area, and to identify, reinforce, strengthen and protect its civic design character and dignity;
- Z8 (orange) - To protect the existing architectural and civic design character, and to allow only for limited expansion consistent with the conservation objective;
- Z1 (yellow) - To protect, provide and improve residential amenities; and
- Z9 - To preserve, provide and improve recreational amenity and open space and green networks.

As noted above, the zoning reflects the areas location and function generally as a mixed use city centre district, with a growing population. It is noted that within this framework there is a concentration of resident student population within the Trinity Campus.

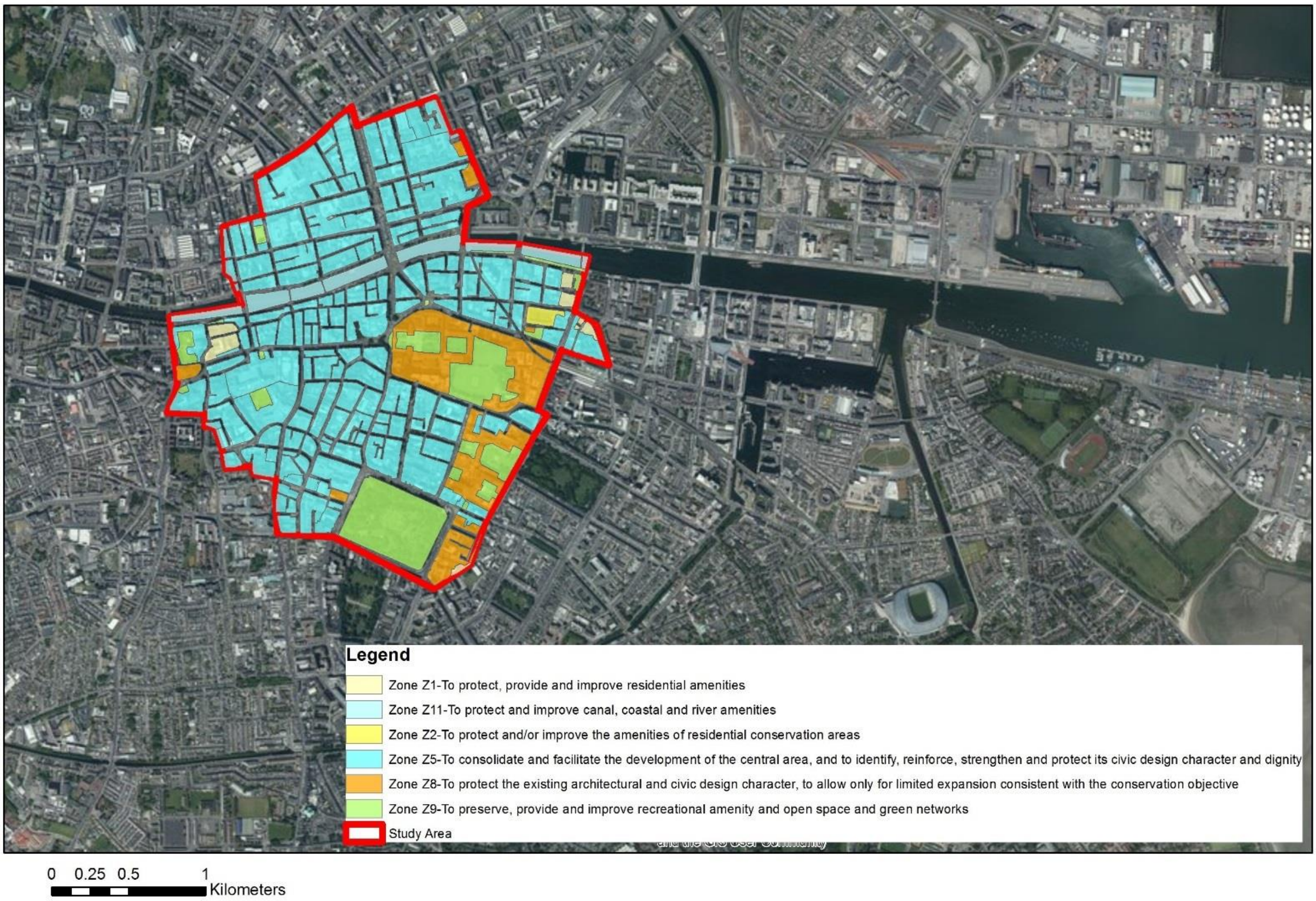


Figure 16.7 - Land Use Zonings –Dublin County Development Plan 2016-2022

16.3.2 Economic Activities and Employment

16.3.2.1 Employment

The total number of unemployed people within the study area based on CSO 2011 data is shown in **Table 16.7**:

Table 16.7 - Unemployment (Total number of persons) 2011 within the study area – Census 2011

College Green Study Area	2011
Total numbers	858

Live register figures from social welfare offices located inside the study areas were also reviewed for a more up to date overview of employment trends. As is evident for Dublin County as a whole, unemployment has been declining in Dublin city centre over the past number of years, refer to **Table 16.8**, **Table 16.9** and **Figure 16.8**.

Table 16.8 - Live register figures for the month of December from 2010 to 2016

YEAR	Dec-10	Dec-11	Dec-12	Dec-13	Dec-14	Dec-15	Dec-16
Thomas Street	4,435	4,496	4,555	4,366	3,960	Discontinued	Discontinued
Bishop Square	8,534	8,614	8,532	7,981	7,200	6,495	5,590
Apollo House (Tara Street)	2,804	2,766	2,616	2,520	2,260	Discontinued	Discontinued
Kings Inn Street	7,614	7,579	7,421	6,871	6,278	5,359	4,493
Cork Street	N/A	N/A	N/A	N/A	N/A	5,789	5,373

Table 16.9 - Live register figures for the month of December from 2011 to 2016 (percentage change year on year)

YEAR	Dec-11	Dec-12	Dec-13	Dec-14	Dec-15	Dec-16
Thomas Street	1%	1%	-4%	-9%	Discontinued	Discontinued
Bishop Square	1%	-1%	-6%	-10%	-10%	-14%
Apollo House (Tara Street)	-1%	-5%	-4%	-10%	Discontinued	Discontinued
Kings Inn Street	0%	-2%	-7%	-9%	-15%	-16%
Cork Street	N/A	N/A	N/A	N/A	N/A (no record from previous year)	-8%

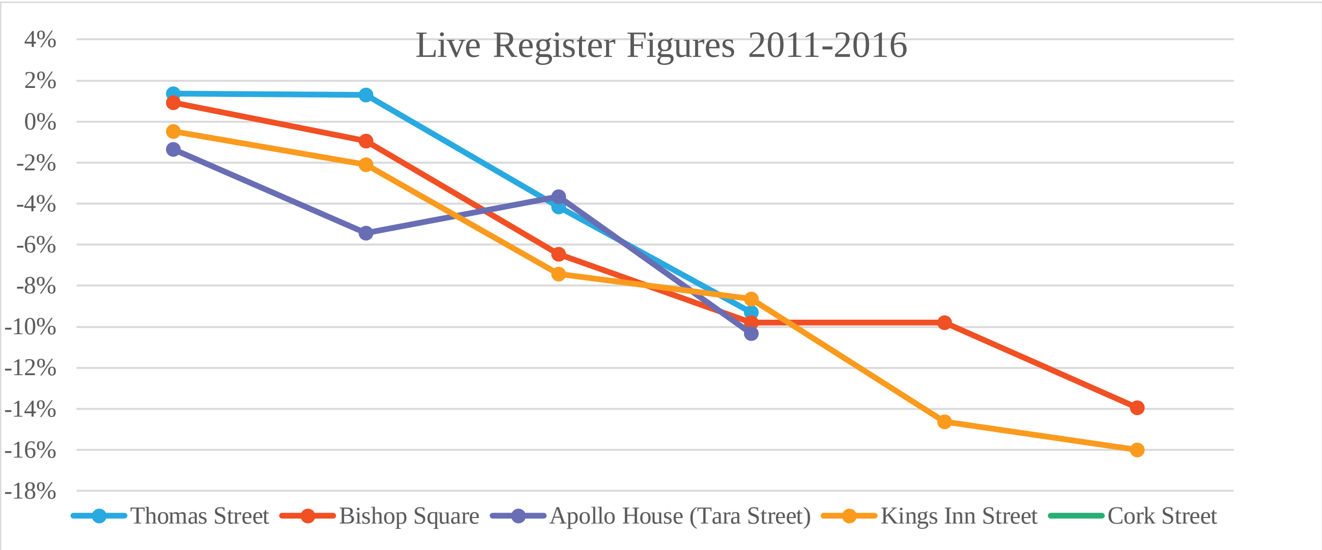


Figure 16.8 - Live Register Figures 2011-2016

16.3.2.2 Economic Status

A breakdown of socio-economic groups within the study area is provided in **Table 16.10**. As may be expected in a city centre location, the majority of the workforce is engaged in non-manual work (24%), lower professional (11%) and managerial (11%) groups. A significant proportion is also classified in 'Other' socio-economic groups. This is likely to reflect a high student population in the study area.

Table 16.10 - Persons aged 15 years and over by Socio-Economic Group, 2011 (CSO Census 2011)

	Employers & Managers	Higher Professional	Lower Professional	Non manual	Manual Skilled	Semi-skilled	Unskilled	Own Account Workers	Farmers	Agricultural Workers	Other	Total
College Green Study Area	837	616	884	1,857	254	452	303	96	5	0	2,442	7,746
	11%	8%	11%	24%	3%	6%	4%	1%	0%	0%	32%	100%

16.3.2.3 Economic activity

Existing and proposed economic activity taking place within the study area have been identified. This involved site visits, review of aerial photography, a review of Dublin County Council zoning plans, analysis of data from the Geodirectory database and the use of the Valuations Office map viewer.

There is a degree of overlap with Chapter 15 '*Material Assets: Land Use and Property*' which maps and assesses the distribution of various uses. This analysis highlights the mixed-use nature of the city centre location in which College Green is situated. The predominant land uses are the Grafton Street Retail district to the south, Trinity College education campus to the east and Temple Bar cultural and leisure/recreation district to the north of the site. At a fine grain level, there is a high degree of mix of uses including many office-based enterprise and SME businesses at ground and upper floors, residential, cultural and institutional uses. This is a dynamic land use context where College Green has already experienced change with comparison retailing and complementary service activities occupying former banking and institutional properties.

A review of the business activity in this area shows a sectoral base that ranges from retail, education, professional and other service related activity uses.

Particular attention has been drawn to the impact of diverted traffic at the EIS Screening stage, and statkeholder consultation to the potenial indirect socio-economic impact on Parliament Street arising from changes in bus movements. In terms of receiving environment it is notable that the street is an attractive tree-lined avenue currently serves as a heavily trafficked roadway, that marks a separation between eastern and western parts of Templebar. The streetfont units are characteristed by bars, cafes as well as several legal firms. The footpaths are quite restricted in area and none of the premises appear to have outdoor seating. There are no outdoor seating licenses in operation on the street.

It is notable that while there are a number of small offices with direct street access, the economy of the street is largely related to leisure and recreational uses associated with the Temple Bar area, which are predominantly off peak in operational character, associated with the evening and night time economies.

16.3.2.4 Transport and Infrastructure

College Green is situated at a highly accessible and integrated location within the city centre. It is accessible by national rail and bus stations, and metropolitan bus routes.

College Green is an important hub for the city's bus routes. There are 8 bus stops located at College Green, 5 out-bound and 3 in-bound. According to information provided by Dublin Bus there are 15,000 daily boardings at these stops.

It also relevant to refer to the Luas stops currently under construction at College Street and Westmoreland Street. The NTA have extracted information from the NTA ERM Do-Minimum Model, (2018 Do Min (LCC) for line flows between Dawson and Trinity / Westmoreland). It is estimated that during AM Peak Hours passenger flows will be 1,957 northbound and 2,550 southbound. This drops to approx. 640 and 842 respectively at off peak. The PM Peak is estimated to be 1,881 northbound and 2,142 southbound.

It is also notable that there is a taxi rank at the centre of College Green, and another rank at Foster Place (with a holding area).

According to the Dublin City Centre Transport Study, in 2014 there were 192,000 journeys into the city centre each weekday in the peak morning period alone (7am to 10am). By 2023, it is anticipated that Dublin City Centre will have to cater for an additional 42,000 journeys in the morning peak, an increase of over 20 per cent. It is also noted that with more than 57,000 annual subscribers and 12,003,733 trips taken since its launch in 2009, Coca Cola Zero dublinbikes have contributed significantly to increasing the use of sustainable transport in the City.

With reference to the 2016 City Centre Transport Proposals Assessment of Impact on Retail Market, (DKM and EY p.26) the most common reason for visiting the city centre is for shopping. This is based on market research undertaken by Millward Brown for the NTA in 2014. The majority of people who visit Henry Street do so for shopping (75% of people visited for the purposes of shopping). However, Grafton Street is equally a shopping and social/recreation location (49% visited for shopping compared to 48% visiting for social/recreation reasons).

The majority of visitors to the City Centre do so for shopping or social reasons, including for those who stated more than one reason for their visit, with 49% and 75% giving this reason for visiting Grafton Street and Henry Street respectively. The proportion of users who stated that work was a reason for their visit was lower, at 27% for Grafton Street and 15% for Henry Street.

16.3.2.5 Retail, hospitality and service industry

The importance of retail to the city centre is reflected in the Dublin City Development Plan 2016-22 Appendix 4 Retail Strategy.

It highlights Dublin city centre as *"unique in the range and mix of retail and associated linked services provided, the levels of connectivity it offers and the wide hinterland and tourist trade it serves"*. The city centre retail core area is the main shopping, tourist and employment destination for the Greater Dublin Area (GDA). In retail terms, the retail core area dominates 'fashion' and higher order comparison goods retailing with the GDA and acts as a significant attraction for persons outside the region. Therefore, the area is at the top of the hierarchy of retail centres within both the GDA and Dublin City Council area.

Currently, Dublin City Centre is estimated to have approximately 380,000m^2 of retail floor space, with an annual turnover of over €1.7 billion (Experian Property Consultancy). It also accounts for 33% of retail spending within the Greater Dublin Area catchment (Section 10.5.1, Luas Cross City Dawson Stop EIS, 2014).

16.3.2.6 Tourism

Fáilte Ireland, the National Tourism Development Authority has prepared Guidelines on the treatment of tourism in an Environmental Impact Statement. It highlights that under '*Human Beings*', the principal issues are to avoid damage to sites and structures of cultural, historical, archaeological or architectural significance – and to their contexts or settings. It is also highlighted that the character of the site in terms of tourist numbers and attractions should be highlighted. Fáilte Ireland's guidance considers a key question is whether will the development stimulate or suppress demand for additional tourism development in the area.

Tourism is one of Ireland's most important economic sectors and has significant potential to play a further role in Ireland's economic renewal. In 2015, tourism was responsible for overseas earnings of €4.208 billion (excluding carrier receipts – airfares and ferry costs). Combining the data from the domestic market and international visitors, total tourism revenue for the economy in 2015 was approximately €7.0609 billion. The tourism sector supports 143,500 jobs in the accommodation and food sector alone, and overall employment in tourism is estimated to be in the region of 205,000. Tourism also shapes Ireland's image and attractiveness as a place to live, work and invest (www.dttas.ie/tourism).

Data from the Central Statistics Office for 2015 shows that overall visits to Ireland in 2015 rose by 13.7% (8.645 million trips). Core tourism visits grew strongly with holiday trips up 20.4% and business trips up 12.3%. Visits to friends and relatives in Ireland rose by 4%. Spending by visitors to Ireland also increased in 2015, with total tourism and travel earnings from overseas visitors (including fares) growing by 17.3% to €5.530 billion.

The Dublin Economic Monitor (www.dublineconomy.ie) reflects that tourism is the lifeblood of every major city: it provides jobs and revenue, incentivises the preservation of cultural heritage, and allows the exchange of ideas and inspiration.

According to the Irish Tourist Industry Confederation (ITIC), in 2015 Dublin experienced a +14% year-on-year increase in visitors to 6.68 million with €1.95 billion spend. This included 4.7 million international visitors and 1.98 million domestic visitors to Dublin (Eoghan O'Mara Walsh Chief Executive Irish Tourist

Industry Confederation Economic Impact to Dublin of Tourism March 2016). The Book of Kells is one of the top three tourist attractions in the city.

The ITIC has highlighted a 2020 target of 6.2 million visitors for the city by 2020. The ITIC believes circa 8,000 additional net bedrooms are required to accommodate this demand.

College Green is located at pivotal location in the city at a central hub linking retail, leisure/recreation and visitor attractions (Dublin and Trinity College).

16.4 Predicted Impacts

16.4.1 Construction impacts

Business impacts

During the construction phase, the accessibility of certain businesses in the vicinity of the Proposed Project may be reduced due to the presence of temporary construction fencing and pedestrian diversions. Some disruption to the timing and locations of deliveries during construction hours is expected. The magnitude of the impact of the construction phase of the Proposed Project is considered to be significant, short-term and negative on these businesses.

Transport changes

The re-location of the taxi-ranks at College Green traffic island and Foster Place is considered to be a negative moderate short-term impact on that economic group, subject to the implementation of mitigation measures.

The Proposed Project entails the re-routing of all bus routes that currently run through College Green in an east-west direction. This will commence in the construction phase. Provision will be made for buses completing a u-turn on Dame Street. This is estimated to represent a drop of the order of 12,000 daily boardings at College Green/Dame Street. In terms of human beings and socio-economic context this is considered to be a significant short-term negative impact, on public transport customers as they adjust to new routes and bus stop configurations.

The introduction of the new Luas stops in 2018 will balance the loss of bus customers boarding on the street with light rail access to the city core.

It is notable that private car access to this area has already been greatly restricted with the bus gate and it is considered that there will be no significant impact in people's experience accessing College Green by private car. With the completion of the Luas Cross City works prior to commencement of the construction phase, north-south bus and taxi access from Westmoreland Street, College Street and Grafton Street shall be maintained.

Community severance

The construction of the College Green Plaza will entail the erection of construction hoardings to demarcate the site during this phase, so that pedestrians will experience local diversions and inconvenience. This is considered to be a moderate short-term negative impact.

In terms of indirect impact the traffic management measures associated with the Proposed Project will change, traffic movement patterns and buses will be diverted to alternative routes. This includes Parliament Street, Winetavern Street, and South Great George's Street.

Community severance considers the potential for the separation of residents from facilities and services they use within their community caused by changes in traffic flows. However, it is not likely that this will give rise to a signifcant chage in the character of any roadway, so as to increase separation. However, due to changes in the nature of traffic, with increased bus movement on Parliaments Street and Winetavern Street, residents and business are likely to perceive there to be a marked change in the environment of the streets.

Given that this change occurs on city streets that already heavily trafficked (and with no loss of footpath area or street trees) the impact is considered modertate negative and short-term.

Tourists

During the construction phase it is considered there will be a moderate short-term negative impact on tourists arising from disturbance, inconvenience and local diversions arising from the demarcation of the construction site.

16.4.2 Operational impacts

The potential impacts on business, retail and tourism and on improved accessibility of community and social facilities are all considered to be significant and positive.

The Proposed Project will enhance the economic wellbeing of the College Green area through improved amenity for workers, shoppers and visitors and is likely to further increase the attractiveness of the overall area as a place to do business.

The Proposed Project (taken cumulatively with Luas Cross City) will address severance between the Grafton Street area, Temple Bar, city quays and O'Connell Street caused by car and bus-dominated public realm. This will serve to enhance the city centre's retail environment and will support the retail policies and objectives promoted by Dublin City Council (DCC) in the Dublin City Development Plan (DCDP) 2016-2022. Accessibility and footfall are recognised as key factors in optimising retail and business performance as a destination.

The proposed plaza will complement retail and non-retail uses such as a café and restaurants that add to the vibrancy of the street and create a mixed-use environment to provide for a more integrated shopping and leisure experience, will be considered favourably but with regard also to the primary retail function of the street.

The City Development Plan recognises the importance of non-retail service uses as part of a "thriving and multi-dimensional city". It states that: "there is a need to facilitate the concept of the 24- hour city particularly in the city centre and other key district centres".

The plaza will link pedestrian streets and low-traffic environments on all sides of College Green improving linkage, the shopping and commercial environment, thereby strengthening and consolidating the retail core.

Impact on trade

International studies ranging from London to New York, Hong Kong and Copenhagen provide evidence that expansion and improvement of pedestrianised zones in cities has a positive impact on economic activity.

A 2014 Report by the Social Enterprise Research Group, The University of Northampton titled: Abington Street, Northampton *The evidence for and against pedestrianization,* comprised a comprehensive review of existing written material, published in reputable and ideally peer-reviewed journals, and identifying evidence that made the case both for and against pedestrianisation. It includes the following key finding:

"The evidence clearly shows that, provided a pedestrianisation scheme is part of a well-planned, integrated approach to urban development and renewal (the provision of adequate car parking being particularly important), the impact is overwhelmingly positive.

Effective pedestrianisation of urban areas benefits trade by increasing public throughput, public spending and commercial rent rates. Pedestrianisation also decreases the levels of vacancy in urban retail areas, thereby helping to increase employment levels in the area as well as trade figures."

Jan Gehl is a well-known urbanist who has studied the effects of pedestrianisation on Copenhagen since pedestrianisation commenced with Strøget in 1962 using surveys in 1968, 1986 and 1995/6 to examine the change in the city. This is documented in the 1996 book: *Public Spaces-Public Life, Copenhagen*. Interviewed for Siemens.com in July 2016 he noted the following conclusions:

"We were able to prove over many years that every expansion of the pedestrian system brought more people and more seats and more entertainment and more culture. For example, we found that for every extra 14 square meters of car-free space, you got another person participating in public life. So there's a direct correlation between the available space in square meters and the growth of public life."

Chung Yim Yiu (2009) of the Department of Real Estate and Construction, The University of Hong Kong, prepared detailed research on the *Impact of a pedestrianisation scheme on retail rent – an empirical study in Hong Kong (2009)***.** The literature review in the report cited the Research Institute of Trade's study, cited in Hass-Klau (1993), which found that in Germany that 83% of retailers within the pedestrianised areas reporting an increase in turnover, compared with the only 20% of retailing business outside the pedestrian areas. Hass-Klau (1993) also reported a survey of retailers in Germany, which found that turnover increased by 15% to 100% after the implementation of the pedestrianisation scheme.

While Hong Kong clearly presents a very different city environment to Dublin, Yim Yiu's empirical research is broadly referenced due to the rigorous nature of the research. He studied a pedestrian scheme which had been implemented in Hong Kong for about eight years (firstly introduced as a transport strategy to enhance the environment and safety for pedestrians) using a pedestrianised street and a control street for comparison.

The study found that pedestrianisation was generally welcomed by the public in terms of changes to the streetscape of the city. For example, one of the typical pedestrianised streets in Mong Kok, Sai Yeung Choi Street South, is now not only a shopping street, but also a public space enjoyed by the local residents and tourists. Street performances and non-economic activities can commonly be found in the street. The increase in pedestrian flows in the pedestrianised street benefits the retail shops on the street in general.

He estimated the value difference between the selected pedestrian street and a control street before and after the implementation of the pedestrianisation scheme showed significant increases in the retail rental value of the street by approximately 17% all other matters being equal.

The Association of Town & City Management (ATCM) the British Parking Association (BPA), Springboard Research Ltd and Parking Data & Research International (PDRI) produced joint research in 2013 titled Re-Think! Parking on the High Street: Guidance on Parking Provision in Town and City Centres. This research is referenced here as there is a strong emphasis on increasing footfall having a positive effect on city centre economies.

This research examined the relationship between town centre prosperity and car parking. The research states that *"towns with higher footfall levels generate a higher spend and have a better quality of retail offer. For example, in towns with an average footfall of over 300,000 per week, annual spend is over £500 million and the average Venuescore is 483. This compares to towns with footfall of between 150,000 and 200,000 per week in which annual spend is around £150 million and the average Venuescore is 201."*

The report found that simply increasing the quantity of car park spaces would not necessarily have a positive impact on footfall. It does suggest that the quantity of car parks is well considered and planned in accordance with the performance of the location. The study highlights parking is about value, rather than cost having regard to attractions (retail and otherwise), parking provision and fees. In effect this that car parks are important for customers to use in order to facilitate increased footfall on streets, so that it is the increased circulation of people on streets (not necessarily in cars).

The New York City (NYC) Department of Transportation (DOT) (2013) report, *The Economic Benefits of Sustainable Streets*, notes that *"one of the most visible elements of New York City's sustainable development agenda has been the transformation of the city's streets from unwelcoming, traffic-dominated corridors to safer, more attractive public spaces that better accommodate all users. Large arterials have been transformed into "complete streets""*.

With reference to the CABE (Commission for Architecture and the Built Environment), Paved with Gold (2007), NYC DOT note that those quantitative studies that do exist, suggest that when streets within urban shopping districts are pedestrianized or receive streetscape enhancements the results are often positive, with businesses seeing increases in both the number of shoppers and in revenues. Similarly, the value of real estate increases so property owners benefit along with the retail tenants.

The design quality of a street appears to contribute to these outcomes on its own, regardless of other factors, and simply improving street design can have a major impact on market values.

The conclusion of NYC's own research, using total retail sales (cumulatively or per business) as the critical indicator for overall economic performance on a number of street improvement schemes (compared to control streets or squares) is that *"It is clear that rolling out safer, more inviting and sustainable streets is rarely detrimental to local businesses and in the great majority of cases can be a boon to them."*

The research report notes:

"experience has shown that in many instances business owners are apprehensive of changes to streets that are perceived to benefit pedestrians and cyclists while reducing convenience for drivers based on a belief that providing easy access for motorists into their business district along with ample, nearby parking is critical to their store's success. As described above, results from surveys of shoppers in urban shopping districts suggest that this fear is in large part unfounded."

The 2014 report by Living Streets titled *The Pedestrian Pound* highlights four performance indicators for these investments were identified from their literature review. Namely; impact on existing business performance (footfall and retail); urban regeneration (new business, rental income, employment, social exclusion etc.); improved consumer and business perceptions, and business diversity.

While city centre pedestrian schemes always have their own particular contexts, circumstances and characteristics to differentiate details, it is nevertheless useful to have regard to general trends. This Living Street report highlights the following evidence:

- Case study evidence suggests that well-planned improvements to these public spaces can boost footfall and trading by up to 40%;
- Investing in better streets and spaces for walking can provide a competitive return compared to other transport projects; walking and cycling projects can increase retails sales by 30%;
- Evaluations of pedestrian improvements in Coventry and Bristol show a 25% increase in footfall on Saturdays and predict £1.4million benefits respectively;
- Improved walking routes to and from Wanstead High Street, in east London, increased footfall by 98%;
- In Dublin, the redevelopment of the Temple Bar District led to a 300% increase in employment before the economic boom.

Overall, the predicted impact on retail trade, services and employment in the vicinity of the plaza is considered to be positive, ranging from moderate to significant in the short to long-term.

Transport changes

The re-location of the taxi-ranks at College Green traffic island and Foster Place is considered to be a moderate negative short-term impact on that economic group, as customers adjust to changes in location of taxi-ranks.

The Proposed Project entails the re-routing of all bus routes that run through College Green in an east-west direction. In terms of human beings and socio-economic impact this is considered to be a moderate negative short-term negative impact, as customers adjust to new routes and bus stop configurations. Any changes in journey times also affect people's experience of using public transport in this area. In the longterm the impact is considered to be neutral.

With the completion of the Luas Cross City works prior to commencement of the construction phase, north-south bus and taxi access from Westmoreland Street, College Street and Grafton Street shall be maintained. During the operation phase, Luas Cross City will be operational with stops at College Street and Westmoreland Street.

Community severance

The construction of the College Green Project will form a pedestrian priority zone where a busy arterial road currently exists. It is therefore considered that the direct impact on College Green and Sussex Street (through a reduction in traffic) will be significant, positive and longterm.

In the secondary study area the indirect impact of the proposed plaza project is considered to be neutral. With regard to Parliament Street it is considered that the traffic plan associated with while introducing more bus traffic onto that street, does not alter the character of the street which is currently heavily trafficked. However, there is considered to be potential for long-term moderate negative impact on business from changes in traffic access to the street and day time servicing arrangements.

It is noted that the public nature of the plaza is designed to provide a new and unique space and experience for residents, workers and visitors alike. However, it is possible that this very openness may invoke anti-social behaviour randomnly or in assosication with events, if the space were to be unpolicied or unmanaged.

Tourists

The Proposed Project will provide a world class public space at the heart of the city, in a location that is readily accessible by tourists and visitors in the city. In terms of image, product and utility the plaza is envisaged to have a significant positive impact on tourism and associated businesses and services in the short to long-term.

16.5 Mitigation Measures

16.5.1 Construction impact

This assessment, has determined that the negative impact on businesses during the construction will be of slight to moderate negative significance. A broad range of mitigation measures will be implemented for the construction of College Green Plaza and the Proposed Project.

Mitigation measures for traffic/pedestrians relate primarily to maintaining access to businesses, which will minimise disruption during the construction phase. Changes to traffic, public transportation and access to the city core will be clearly communicated to the resident and visiting public.

The capacity for business to be serviced on street, and receive deliveries in limited periods in the day would mitigate the socio-economic impact of the proposal.

Alternative access arrangements for private cars and buses will mitigate the impact of direct access through College Green.

Mitigation measures will be introduced to minimise disruption during construction to businesses and visitors in terms of air and noise, refer to Chapters 7 and 8.

Luas Cross City works will be completed before construction commences on the site to ensure that north-south access by bus and taxis is available. Taxi ranks will be re-located on adjoining streets with no net loss in parking spaces. Changes to operation of services will be clearly communicated to customers and visitors, including on-street signage.

16.5.2 Operational Impacts

During the operational phase, the most important mitigation measures refer to the management and maintenance of the space. In order to sustain a positive impact on the economy of the city centre, a high level of street cleaning measures will be implemented and a policing presence maintained to ensure that there is a strong sense of a safe and secure space, where anti-social behaviour is controlled. As a public authority Dublin City Council engages with the Gardaí on a regular basis and has the capacity to work with Gardaí directly and in policing forums to manage the safety and security of the space.

Taxi ranks will be re-located on nearby adjoining streets (Dame Street, east of South Great George's Street and west of Trinity Street) with no net loss in parking spaces. Dublin City Council as the roads authority is empowered to provide these alternative spaces.

Luas Cross City works will be completed before construction commences on the site to ensure that north-south access by bus and taxis is available.

16.6 Residual Impacts

16.6.1 Construction residual impacts

The Proposed Project will entail changes in access and movement through the subject site. Alternative access arrangements for private cars and buses will mitigate the impact of direct access through College Green. Constraints on pedestrian and cycle will be short term.

The re-location of the taxi ranks will not have a negative impact on that socio-economic group. The review of bus route operations through College Green will seek to ensure that any potential negative impacts arising from change in routes and inconvenience for customers can be resolved.

While bus stops are being displaced, the careful management of this process will ensure that new the new routes and stops remain with the 10 minute catchment area and easy walking distance of services, businesses and facilities. The potential air quality and noise impacts are addressed in Chapters 7 and 8 respectively.

16.6.2 Operational residual impacts

The Proposed Project will have an operational residual significant positive impact on business, retail and tourism, by improving the public realm in a city centre site, increasing the space available to people and activity, improving the quality of the experience of visiting Dublin and improving convenient walking access to economic, commercial, tourism, educational and social facilities in the area. The residual impact of the Proposed Project is considered to be significant and positive in the long-term.

The re-location of the taxi ranks will not have a negative residual impact on that socio-economic group. The implementation of the Proposed Project will improve the permeability of the city centre areas, and support the improved growth and integration of the city core. It is expected that footfall will grow significantly in College Green itself as well as Westmoreland Street, Dame Street and Temple Bar. This will have a significant positive impact on trade and business. The considered review of bus route operations will address any potential negative impacts arising from change in routes and inconvenience for customers. The introduction of Luas stops beside College Green are likely to focus the new Civic Plaza the activity and interaction hub for the city centre. While bus stops are being displaced, the careful management of this process will ensure that new the new routes and stops remain with the 10 minute catchment area (and generally 5 minute catchment). The potential air quality and noise impacts are addressed in Chapters 7 and 8 respectively.

16.7 Difficulties Encountered

Proposals for the Proposed Project are made within a dynamic city centre environment, with a broad range of developments and interventions to public space. This includes Luas Cross City construction (and operation) and access arrangements to the city centre generally. The College Green Project is therefore a part of continual city change rather than a cause of it. This presents difficulties in extracting precise socio-economic impacts from the Proposed Project on its own, extracted from cumulative city wide change and progress.

16.8 References

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Jan Gehl: A passion for the livable city, https://www.siemens.com/customer-magazine/en/home/specials/taking-the-measure-of-the-city/jan-gehl-a-passion-for-the-livable-city.html, Christopher Findlay, 3 July 2016

Venuescore, is calculated on the basis of the breadth and quality of a centre’s multiple retailing offer provided by Javelin’s who prepare National Ranking for the UK

17 Cumulative Impacts and Interaction of Effects

17.1 Introduction

This chapter addresses the cumulative impacts and main interactions between different aspects of the environment likely to be significantly affected by the Proposed Project.

Only topics that could be logically linked to the Proposed Project have been examined in detail. Accordingly, when a topic is not mentioned, it has been concluded that no potential for impacts exists.

17.2 Assessment Methodology

17.3 Statutory Requirements

The requirement to address interactions of effects and cumulative impacts is set out in Council Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment. This Directive has been amended by Council Directive 97/11/EC, Directive 2003/35/EC and Directive 2009/31/EC and is now codified in Directive 2011/92/EU.

Article 3 of the EIA Directive outlines the information to be contained in an EIS as follows:

> *"The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case and in accordance with Articles 4 to 12, the direct and indirect effects of a project on the following factors:*
>
> *(a) human beings, fauna and flora;*
>
> *(b) soil, water, air, climate and the landscape;*
>
> *(c) material assets and the cultural heritage;*
>
> *(d) the interaction between the factors referred to in points (a), (b) and (c)."*

In addition, Annex IV of the directive states that the following information should be included in an EIS:

> *"3. A description of the aspects of the environment likely to be significantly affected by the proposed project, including, in particular, population, fauna, flora, soil, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and the interrelationship between the above factors."*

A footnote to Annex IV states that a description of impacts should include:

> *"….. the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the project."*

The aforementioned Directives are transposed into Irish legislation through Schedule 6 of the Planning and Development Regulations 2001 , as amended and the Roads Act, 1993 , as amended by Section 14 of the European Communities (Environmental Impact Assessment) (Amendment) Regulations, 1999

17.3.1 Guidance

This chapter has been prepared in accordance with the following guidelines:

- EPA (2015) Revised *Guidelines on the Information to be contained in Environmental Impact Statements,* Draft, 2015;
- EPA (2015) *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements,* Draft, 2015; and
- EPA (2002) Guidelines on the Information to be contained in Environmental Impact Statements, 2002;
- EPA (2003) *Advice Notes on Current Practise in the Preparation of Environmental Impact Statements,* 2003.
- European Commission Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions.

17.3.2 Assessment Methodology

The potential for significant interactions, cumulative impact and indirect impacts was examined at the screening stage in the preparation of this EIS. Where the potential for significant interactions or impacts was identified, such interactions and impacts were included in the scope and addressed in the baseline and impact assessment chapter for each of the relevant environmental media namely Chapters 6 to 16 inclusive.

The matrix and expert opinion approaches, as described and outlined in the aforementioned EU Guidelines were used in the identification of the potential for significant interactions, cumulative impacts, direct and indirect impacts. To facilitate this a workshop attended by specialist sub-consultants, the EIS team and Dublin City Council as well as various communications between the specialist sub-groups and design team took place. Interactions and cumulative impacts are addressed in the following sections. Direct and indirect effects are described in the previous chapters of this EIS which address the different environmental media.

17.4 Interaction of Effects

17.4.1 Introduction

All environmental factors are inter-related to some extent, and the relationships can range from tenuous to highly complex.

The major interactions between the recorded environmental impacts are assessed within the individual chapters of the EIS.

Table 17.1 provides a matrix summarising the interactions between the various parameters outlined in this EIS from Chapters 6 to 16, inclusive.

Table 17.1 - Key Environmental Interaction Matrix

Key environmental Interaction Matrix	Traffic and Transportation	Air Quality and Climate Factors	Noise and Vibration	Biodiversity	Archaeological, Architectural and Cultural Heritage	Townscape and Visual	Soils, Geology, Hydrogeology and Hydrology	Resource and Waste Management	Material Assets: Utilities	Material Assets: Land Use and Property	Socio-Economics
Traffic and Transportation		CO	CO	-	CO	O	-	C	-	CO	CO
Air Quality and Climate Factors	CO		-	-	-	-	-	-	-	C	C
Noise and Vibration	CO	-		-	CO	-	C	-	-	C	C
Biodiversity	-	-	-		-	CO	C	-	-	-	-
Archaeological, Architectural and Cultural Heritage	CO	-	CO	-		CO	C	C	C	-	-
Townscape and Visual	O		-	CO	CO		-	-	-	-	CO
Soils, Geology, Hydrogeology and Hydrology	-	-	C	C	C	-		C	-	-	-
Resource and Waste Management	C	-	-	-	C	-	-C		-	-	-
Material Assets: Utilities	-	-	-	-	C	-	-	-		-	-
Material Assets: Land Use and Property	CO	C	C	-	-	-	-	-	-		CO
Socio-Economics	CO	C	C	--	-	CO	-	-	-	CO	

The effects matrix examines the potential for the topic or issue in the left hand column to have an effect on the environmental media listed in the top row of the matrix.

If there is the potential for an effect during the construction phase, this is indicated by a 'C'. An 'O' indicates the potential for an effect during the operational phase and 'CO' indicates the potential for an effect during both phases. If there is considered to be no potential for an effect, this is indicated by '-'.

The purpose of the effects matrix is to identify potential effects in different media. Actual effects and their significance are dealt with in the most relevant chapter.

This assessment was based on information contained within this EIS, the outcome of workshops and consultation with the relevant sub-consultants.

The main environmental interactions anticipated as they relate to the Proposed Project are also summarised in the following sections.

17.4.2 Traffic and Transportation and Air Quality and Climate

The generation of traffic during the construction phase and the re-organisation of city centre traffic during the operational phase of the Proposed Project has the potential to impact on air quality and climate.

17.4.3 Traffic and Transportation and Noise and Vibration

The generation of traffic during the construction phase and the re-organisation of city centre traffic during the operational phase of the Proposed Project has the potential to impact on noise and vibration.

17.4.4 Traffic and Transportation and Archaeology, Architectural and Cultural Heritage

The generation of traffic during the construction phase and re-organisation of traffic during the operational phase of the Proposed Project has the potential to impact architectural heritage.

Vibration from traffic has the potential to impact on buildings and features of architectural and cultural significance. In addition, the re-routing of buses away from College Green has the potential to visually impact buildings and features of architectural heritage.

17.4.5 Traffic and Transportation and Townscape and Visual

The re-organisation of city centre traffic including the re-routing of buses away from College Green has the potential to result in a visual impact to buildings and features of architectural and cultural heritage.

17.4.6 Traffic and Transportation and Resource and Waste Management

During the construction phase, there is the potential for interaction between traffic and transportation and resource and waste management. Excavated material that cannot be re-used on site will be removed from site, adding to construction traffic.

17.4.7 Traffic and Transportation and Socio-Economics

The generation of traffic during the construction phase and re-organisation of traffic during the operational phase of the Proposed Project has the potential to impact the socio-economics of the area by means of access to economic, commercial, tourism, educational and social facilities in the area.

17.4.8 Air Quality and Climate and Material Assets: Land Use and Property

A potential interaction between air quality and climate and material assets: land use and property during the construction phase of the Proposed Project is identified.

Dust generated during construction works has the potential to impact economic, commercial, tourism, educational and social facilities at College Green and the employees, visitors and customers who frequent the area.

17.4.9 Air Quality and Climate and Socio-Economics

A potential interaction between air quality and climate and socio-economics during the construction phase of the Proposed Project is identified.

Dust generated during construction works has the potential to impact economic, commercial, tourism, educational and social facilities at College Green and the employees, visitors and customers who frequent the area.

17.4.10 Noise and Vibration and Archaeology, Architectural and Cultural Heritage

A potential interaction between noise and vibration and archaeology, architectural and cultural heritage during both the construction and operational phase of the Propose Project is identified.

Vibration generated from construction activities has the potential to impact buildings and features of architectural and cultural significance at College Green. In addition, vibration from traffic has the potential to impact buildings and features of architectural and cultural significance.

17.4.11 Noise and Vibration and Soils, Geology, Hydrogeology and Hydrology

A potential interaction between noise and vibration and soils, geology, hydrogeology and hydrology during the construction phase of the Proposed Project is identified. There is the potential for noise and vibration to be generated during the excavation phase of the Proposed Project.

17.4.12 Noise and Vibration and Material Assets: Land Use and Property

A potential interaction between noise and vibration and material assets: land use and property during the construction phase of the Proposed Project is identified.

Noise and vibration generated during construction works has the potential to impact economic, commercial, tourism, educational and social facilities at College Green and the employees, visitors and customers who frequent the area.

17.4.13 Noise and Vibration and Socio-Economics

A potential interaction between noise and vibration and socio-economics during the construction phase of the Proposed Project is identified.

Noise and vibration generated during construction works has the potential to impact economic, commercial, tourism, educational and social facilities at College Green- and the employees, visitors and customers who frequent the area.

17.4.14 Biodiversity and Townscape and Visual

A potential interaction between biodiversity and landscape and visual during both the construction and operational phase of the Proposed Project is identified.

Trees will be removed from the College Green area during the construction phase, potentially impacting on the landscape. The replanting of trees has the potential to impact on architectural heritage.

17.4.15 Biodiversity and Soils, Geology, Hydrogeology and Hydrology

A potential interaction between biodiversity and soils, geology, hydrogeology and hydrology during the construction phase of the Proposed Project is identified.

There is potential for contamination of watercourses as a result of construction activities associated with the Proposed Project.

17.4.16 Soils, Geology, Hydrogeology and Hydrology and Resource and Waste Management

An interaction between soils, geology, hydrogeology and hydrology and resource and waste management during the construction phase of the Proposed Project is identified.

Small quantities of excavated material will be generated during construction and removed from site as a waste material.

17.4.17 Archaeology, Architectural and Cultural Heritage and Townscape and Visual

A potential interaction between archaeology, architectural and cultural heritage and landscape and visual during both the construction and operational phase of the Proposed Project is identified.

Hoarding present during the construction phase has the potential to result in the visual obstruction of some buildings and features of architectural and cultural significance.

During the operational phase, the replanting of trees along the southern boundary of the study area has the potential to result in a visual impact and impact on features of architectural and cultural significance.

17.4.18 Archaeology, Architectural and Cultural Heritage and Soils, Geology, Hydrogeology and Hydrology

An interaction between archaeology, architectural and cultural heritage and soils, geology, hydrogeology and hydrology during the construction phase of the Proposed Project is identified. Excavated material will be monitored for features of archaeological significance during the excavation process.

17.4.19 Archaeology, Architectural and Cultural Heritage and Resource and Waste Management

An interaction between archaeology, architectural and cultural heritage and resource and waste management during the construction phase of the Proposed Project is identified.

A number of architectural heritage features will be temporarily removed from College Green, carefully and appropriately stored during the proposed works and reused within the Proposed Project.

17.4.20 Archaeology, Architectural and Cultural Heritage and Material Assets: Utilities

Construction works associated with the provision of Material Assets (Utilities), in particular underground works have the potential to interact with Archaeology, Architectural and Cultural Heritage.

17.4.21 Townscape and Visual and Socio-Economics

An interaction between landscape and visual and socio-economics during both the construction and operational phase of the Proposed Project is identified.

During the construction phase, the accessibility of certain businesses in the vicinity of the Proposed Project may be reduced due to the presence of temporary construction hoarding and pedestrian diversions.

During the operational phase the provision of an aesthetically pleasing civic plaza at College Green has the potential to improve the quality of the experience of visiting Dublin and attract tourists to the area.

17.4.22 Material Assets: Land Use and Property and Socio Economics

An interaction between material assets: land use and property and socio-economics during both the construction and operational phase of the Proposed Project is identified.

During the construction phase, the accessibility of certain businesses in the vicinity of the Proposed Project may be reduced due to the presence of temporary construction hoarding and pedestrian diversions.

During the operational phase the provision of a new civic plaza at College Green has the potential to improve the quality of the experience of visiting Dublin and attract tourists to the area.

17.5 Cumulative Impacts

The EU Guidelines define cumulative impacts as:

> *"Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project. For example:*
>
> - *incremental noise from a number of separate developments;*
> - *combined effect of individual impacts, e.g. noise, dust and visual, from one development on a particular receptor; and*
> - *Several developments with insignificant impacts individually but which together have a cumulative effect."*

The EPA Guidelines on the Information to be contained in Environmental Impact Statements mirrors this approach and defines cumulative impacts as "The addition of many small impacts to create one larger, more significant, impact".

Therefore, the assessment of cumulative impacts considers the total impact associated with the Proposed Project when combined with other past, present, and reasonably foreseeable future developments.

An examination of the potential for other projects to contribute cumulatively to the impacts from this Proposed Project was undertaken during the preparation of this EIS. Due to the city centre location of the Proposed Project, development is continually occurring in the area. However, no major projects have been identified that would result in a significant cumulative impact with the Proposed Project.

It is assumed that the Luas Cross City will be operational once construction works commence on the Proposed Project. Therefore, no concurrent construction impacts will occur between the two projects.

The proposed traffic measures outlined in the NTA Transport Strategy for the Greater Dublin Area 2016 – 2035 have been considered cumulatively in this EIS. Particularly, Chapter 6 '*Traffic and Transportation'*, Chapter 7, '*Air Quality and Climate Factors'* and Chapter 8 '*Noise and Vibration'*.

17.6 References

European Commission (1999), Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions. European Commission, Luxembourg.

CAAS (2003), Advice Notes on Current Practice in the Preparation of Environmental Impact Statements. Environmental Protection Agency (EPA), Johnstown Castle Estate, Wexford, Ireland.

18 Summary of Mitigation and Residual Impacts

18.1 Introduction

Mitigation describes the measures proposed in order to avoid, reduce and where practicable remedy significant adverse effects. It is also a means by which decisions about a Proposed Project are modified to avoid, reduce or remedy the adverse environmental effects that are identified.

Mitigation measures have been incorporated into the design of the Proposed Project and will be applied during the construction and operation of the Proposed Project. A summary of these mitigation measures is included in the following section. The mitigation measures for both the construction and operational phases are detailed as appropriate. All mitigation measures are based on the Proposed Project as described in Chapter 4, '*Proposed Project Description*'. Individual chapters of the EIS should be referred to for context and detail.

The Contractor appointed to construct the Proposed Project will be required to compile and maintain a Construction Management Plan. This plan will also incorporate the following documents:

- Construction and Environmental Management Plan (CEMP). An outline CEMP is provided in **Appendix 4.1** of this EIS;
- Construction and Demolition Waste Management Plan, refer to Chapter 13, '*Resource and Waste Management*';
- Construction Traffic Management Plan, refer to Chapter 6, '*Traffic and Transportation*'.

18.2 Summary of Mitigation Measures

18.2.1 Traffic and Transportation

18.2.1.1 Construction Phase

General Construction Traffic Strategy

Construction traffic will be limited to certain routes and times of day, with the aim of keeping disruption to existing traffic and public transport to a minimum. To minimise disruption to the local areas, construction traffic volumes will be managed through the following measures which include:

- During peak hours, ancillary, maintenance and other site vehicles movements will be discouraged.
- Daily construction programmes will be planned to minimise the number of disruptions to surrounding streets by staggering HGV movements to avoid site queues.
- No car parking will be provided on site for staff.

- The Contractor will be required to promote travel by sustainable modes of transport. A framework mobility management plan is presented later in this section.

Hours of Working

Construction operations on site will generally be between the hours of 07:00 and 18:00, Monday to Friday, and 08:00 to 14:00 on Saturdays. Similarly, deliveries of materials to site will generally be between the hours of 07:00 and 18:00, Monday to Friday, and 08:00 to 14:00 on Saturdays. However, it is acknowledged that works outside of these hours will be required on occasion. Any works proposed outside the core site hours will be agreed in advance with Dublin City Council.

The construction shift times will ensure any staff travelling to the site by car will have limited impact on the peak periods of 08:00-09:00 in the morning and 17:00-18:00 in the evening as it is envisaged most construction staff will arrive to work before 08:00 in the morning and leave after 18:00 in the evening.

Construction Traffic Management Plan

As part of the construction works the appointed Contractor shall prepare a Construction Traffic Management Plan (CTMP) which will outline their approach to the Proposed Project and detail potential impacts for the public road system. This will include provision of transport facilities and encouragement of car sharing for staff. It will also include measures to mitigate any potential noise and air quality impacts resulting from construction activities, namely from traffic movements in and out of the site.

The CTMP will provide details of intended construction practice for the development, including:

- Location of the site and materials compound(s) including area(s) identified for the storage of construction refuse.
- Location of areas for construction site offices and staff facilities.
- Details of site security fencing and hoardings.
- Details of pedestrian routes through College Green.
- Details of the timing and routing of construction traffic to and from the construction site and associated directional signage, to include proposals to facilitate the delivery of abnormal loads to the site.
- Measures to obviate queuing of construction traffic on the adjoining road network.
- Measures to prevent the spillage or deposit of clay, rubble or other debris on the public road network.
- Alternative arrangements to be put in place for pedestrians and vehicles in the case of the closure of any public road or footpath during the course of site development works.
- Details of appropriate mitigation measures for noise, dust and vibration, and monitoring of such levels.

- Containment of all construction-related fuel and oil within specially constructed bunds to ensure that fuel spillages are fully contained. Such bunds shall be roofed to exclude rainwater.
- Off-site disposal of construction/demolition waste and details of how it is proposed to manage excavated soil.
- Means to ensure that surface water run-off is controlled such that no silt or other pollutants enter local surface water sewers or drains.

The CTMP will be agreed with both Dublin City Council and An Garda Síochana, prior to commencement of works.

Mobility Management

The Contractor will be required as part of the contract to introduce a Mobility Management Plan (MMP) for its workforce to encourage access to the site by means other than by private car. The following section identifies some of the measures the Contractor will provide as part of the MMP. The Mobility Management Plan will form part of the Construction Traffic Management Plan and will be agreed with DCC prior to works beginning on site.

Cycling: Cycle parking spaces will be provided on the site for construction staff, in addition lockers will be provided to allow cyclists store their cycling clothes.

Car Sharing: Car sharing among the construction staff should be encouraged, especially from areas where construction staff may be clustered. The Contractor will aim to organise shifts in accordance to staff origins, hence enabling higher levels of car sharing. Such a measure offers a significant opportunity to reduce the proportion of construction staff driving to the off-site car parking facility, and will minimise the potential traffic impact on the road network surrounding this facility

Public Transport: The Contractor will issue an information leaflet to all staff as part of their induction on site highlighting the location of the numerous bus routes that operate in the vicinity of the site. The Contractor will also offer the "Travel to Work Scheme" to employees.

18.2.1.2 Operation Phase

Other than the proposed measures included as part of the Proposed Project, no further mitigation measures are proposed.

18.2.2 Air Quality and Climate

18.2.2.1 Construction Phase

In order to ensure that no dust nuisance occurs during the construction phase, a series of measures will be implemented. In summary, the measures which will be implemented will include:

- Vehicles delivering material with dust potential (soil, aggregates) will be enclosed or covered with tarpaulin at all times to restrict the escape of dust.
- Public roads outside the site will be regularly inspected for cleanliness, and cleaned as necessary.

- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.
- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.
- Hoarding will be provided around the construction site.

At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

18.2.2.2 Operational phase

Climate

At a national / European level, improvements in air quality are likely over the next few years as a result of the on-going comprehensive vehicle inspection and maintenance program, fiscal measures to encourage the use of alternatively fuelled vehicles and the introduction of cleaner fuels.CO_2 emissions for the average new car fleet were reduced to 120 g/km by 2012 through EU legislation on improvements in vehicle motor technology and by an increased use of biofuels. Additional measures included in the National Climate Change Strategy include: (1) VRT and Motor Tax rebalancing to favour the purchase of more fuel-efficient vehicles with lower CO_2 emissions; (2) continuing the Mineral Oils Tax Relief II Scheme and introduction of a biofuels obligation scheme; (3) implementation of a national efficient driving awareness campaign, to promote smooth and safe driving at lower engine revolutions; and (4) enhancing the existing mandatory vehicle labelling system to provide more information on CO_2 emission levels and on fuel economy.

Air Quality

At European level, mitigation measures in relation to traffic-derived pollutants have focused generally on improvements in both engine technology and fuel quality. EU legislation, based on the EU sponsored Auto-Oil programmes, has imposed stringent emission standards for key pollutants (Regulation) (EC) No 715/2007) for passenger cars which was complied with in 2009 (Euro V) and 2014 (Euro VI).

A range of legislation in Europe since 1992 has significantly reduced the allowable steady cycle emissions of both NO_X and PM from road vehicles with NO_X emission reductions for HDV (Heavy Diesel Vehicles) a factor of 20 and PM a factor of 36 over this period (Euro I to Euro VI). In relation to LDV (Light Diesel Vehicles) the reduction of NO_X and PM from road vehicles has also been significant with NO_X emission reductions from HDV a factor of 12 and PM a factor of 40 over this period (Euro I to Euro VI). Although actual on-road emission reductions will be less dramatic, significant reductions in vehicle-related NO_X and PM emissions are to be expected over the next 5-10 years as the fleet turns over.

Improvements in air quality are also likely over the next few years as a result of the on-going comprehensive vehicle inspection and maintenance program, fiscal measures to encourage the use of alternatively fuelled vehicles and the introduction of cleaner fuels. In addition, Dublin Bus proposes to introduce cleaner, more efficient buses, including electric vehicles, in the future.

18.2.3 Noise and Vibration

18.2.3.1 Construction Phase

This section describes typical measures to minimise the potential for noise and vibration disturbance to the surrounding area which will be employed by the Contractor. This will ensure the noise and vibration criteria outlined in **Table 8.1** and **Table 8.2** are not exceeded in the vicinity of the works.

The Contractor will take specific noise abatement measures and comply with the recommendations of BS 5228 Code of practice for noise and vibration control on construction and open sites and the European Communities (Noise Emission by Equipment for Use Outdoors) Regulations, 2001.

BS 5228 includes guidance on several aspects of construction site practices, including, but not limited to:

- Selection of quiet plant and the control of noise sources – the use of proprietary acoustic enclosures and the quietest plant, where possible;
- Selection of the method of excavation to ensure there is no likelihood of structural or cosmetic damage to neighbouring buildings;
- Screening – the effectiveness of screening is based on the location, height and length of the barrier;
- Liaison with the public – a designated liaison officer will be appointed to deal with any complaints relating to noise.

18.2.3.2 Operational Phase

No mitigation measures are deemed appropriate in this instance. The locations where potential noise impacts may occur are located in a busy city centre environment, where noise levels are already elevated. The provision of noise mitigation measures in the form of noise barriers are not feasible in such a city centre environment.

18.2.4 Biodiversity

18.2.4.1 Tree Replacement

By way of compensation for tree loss at the Henry Grattan Statue and Four Angels Fountain, it is proposed to plant 22 new London Plane trees; ten in a single line along the southern side of the plaza, and a further twelve forming an avenue at the approach to the space from Dame Street. It is proposed to retain the distinguished Plane trees in Foster Place.

18.2.4.2 Management Measures for Surface Water

The surface water drainage network is designed in full cognisance of the recommendations of the Greater Dublin Strategic Drainage Study (GDSDS). Sustainable Urban Drainage Systems (SUDS) are to be incorporated into the design of all storm control areas, using best practice standards as detailed in the Chapter 12, '*Soils, Geology, Hydrogeology and Hydrology'*.

Chapter 12, '*Soils, Geology, Hydrogeology and Hydrology'* of this EIS highlights the construction management measures to be implemented to reduce potential impacts on surface water quality.

During construction, the Contractor will employ management measures outlined in the Construction and Environmental Management Plan (CEMP) attached to this EIS to contain any areas at risk of contaminated runoff. Construction management measures specifically related to the protection of surface water quality are listed below:

- Any stockpiles of construction material shall be stored on impermeable surfaces and covered using tarpaulin;
- Good housekeeping (daily site clean-ups, use of disposal bins, etc.) on the site during construction, and the proper use, storage and disposal of these substances and their containers will prevent groundwater contamination;
- For all activities involving the use of potential pollutants or hazardous materials, there will be a requirement to ensure that material such as concrete, fuels, lubricants and hydraulic fluids will be carefully handled and stored to avoid spillages. Potential pollutants shall also be adequately secured against vandalism and will be provided with proper containment according to codes of practice. Any spillages will be immediately contained and contaminated soil removed from the site and properly disposed of;
- The risk of water pollution will be minimised by the implementation of good construction practices. Such practices will include adequate bunding for silos, oil containers, wheel washers and dust suppression on site roads, and regular plant maintenance. The Construction Industry Research and Information Association (CIRIA) provides guidance on the control and management of water pollution from construction sites in their publication Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (Masters – Williams et al, 2001). A contingency plan for pollution emergencies will also be developed by the appointed Contractor prior to the commencement of the works and regularly updated, which will identify the actions to be taken in the event of a pollution incident;
- In accordance with recommendations in the CIRIA document, a contingency plan for pollution emergencies will be prepared which will address the following:
  - Containment measures;
  - Emergency discharge routes;
  - List of appropriate equipment and clean-up materials;
  - Maintenance schedule for equipment;
  - Details of trained staff, location and provision for 24-hour cover;
  - Details of staff responsibilities;
  - Notification procedures to inform the Environmental Protection Agency (EPA) or Environmental Department of the Dublin City Council;

- Audit and review schedule;
- Telephone numbers of statutory water consultees; and
- List of specialist pollution clean-up companies and their telephone numbers.

18.2.5 Archaeology, Architectural and Cultural Heritage

18.2.5.1 Archaeology

All ground disturbances associated with the Proposed Project shall be subject to continuous archaeological monitoring. Monitoring will be carried out under licence to the DoAHRRGA in consultation with the National Museum and the Dublin City Archaeologist. Full provision will be made available for the resolution of any archaeological remains that may be discovered (i.e. preservation by record), should this be deemed an appropriate manner in which to proceed.

Furthermore, a suitably qualified archaeologist will be appointed as part of the detailed design team in order to advice on specific potential impacts as and when they may arise. This will result in continuous impact assessment of the detailed works, allowing mitigation measures to be agreed in advance, in full consultation with the statutory bodies.

18.2.5.2 Architecture

Historic footway to front of Bank of Ireland

During the works to extend the paving across to Grafton Street the adjacent granite paving of the footway to the front of the Bank of Ireland will be protected from damage.

Lamp standards in College Green

The lamp standards will be removed with care, in accordance with a conservation method statement, and put into storage for potential use elsewhere.

Henry Grattan statue

The statue will be moved by a heritage Contractor with experience in moving monuments of this type and in accordance with a conservation method statement.

Thomas Davis plaque

The Thomas Davis plaque will be lifted and reset in accordance with a conservation method statement and the work will be carried out by a heritage Contractor with experience in lifting stones of this type.

Thomas Davis sculpture

The Thomas Davis sculpture assemblage will be lifted and moved in accordance with a conservation method statement and the work will be carried out by a heritage Contractor with experience in working with monuments of this type.

18.2.6 Townscape and Visual Impact

Given that the Proposed Project, once constructed, is considered to have a positive impact on the visual setting of College Green as well as its structure and function within the context of the surrounding urban fabric, it is not warranted to provide any long term forms of mitigation.

Only during the construction phase is mitigation considered necessary in respect of townscape and visual issues. These relate to ensuring that College Green does not become a place that will be avoided by locals and visitors during the 12-18 month construction period. Effects that could give rise to this situation relate to perceived danger, congestion, way-finding confusion, scattering of dust and debris and overall visual clutter and disharmony. Mitigation to reduce these adverse construction related effects is principally the concern of the Construction and Environmental Management Plan (an outline is provided in **Appendix 4.1**). This will include the form of site hoarding, which in this instance should be solid and well constructed to reduce visibility of the on-going works and will also reduce the noise and dust emissions from the site. It is proposed that the solid hoardings will also include images of the future plaza as this can remind those affected of the long-term benefit of the temporary works. Pedestrian and cycle movement areas will be generous in dimension and clearly presented in terms of directional movement to avoid confusion. Areas outside of the site hoarding will also be kept clear of dust and debris.

18.2.7 Soils, Geology, Hydrogeology and Hydrology

A project-specific Construction Management Plan (CMP) will be prepared and submitted to the planning authority for approval. It will be maintained by the Contractor for the duration of the construction phase. The CMP will cover all potentially polluting activities and include an emergency response procedure. All personnel working on the site will be trained in the implementation of the procedures.

As a minimum, the CMP manual for the Proposed Project site will be formulated in consideration of the standard best practice. The CMP will include a range of site specific measures which will include:

- Earthworks operations shall be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe run-off and prevent ponding and flooding.
- Run-off will be controlled to minimise the water effects in outfall areas.
- Good housekeeping (site clean-ups, use of disposal bins, etc.) on the site project.

In order to prevent the accidental release of hazardous materials (fuels, cleaning agents, etc.) during construction site activity, all hazardous materials will be stored within secondary containment designed to retain at least 110% of the storage contents. Temporary bunds for oil/diesel storage tanks will be used on the site during the construction phase of the Proposed Project. Safe materials handling of all potentially hazardous materials will be emphasised to all construction personnel employed during this phase of the Proposed Project.

Mitigation during the construction phase will include implementing best practice during excavation works to avoid sediment running into the drainage system which discharges to the River Liffey.

18.2.8 Resource and Waste Management

A Construction and Demolition Waste Management Plan **(**CDWMP) will be required to be developed by the Main Contractor(s) following appointment and prior to commencing works on site.

The CDWMP will address waste generation and arrangements made for prevention, reuse, recycling disposal and collection of recyclables and wastes. It will be prepared in line with the *DoEHLG Best Practise Guidelines on the Preparation of Waste Management Plans for Construction & Demolition Projects.*

The following is an indicative list on the content of a CDWMP:

- Description of the Proposed Project;
- Wastes arising including proposals for minimisation/reuse/recycling;
- Procedures for prevention, reuse and recycling of wastes;
- Estimated cost of waste management;
- Roles including training and responsibilities for C&D Waste;
- Procedures for education of workforce and plan dissemination programme
- Record keeping procedures;
- Waste collectors, recycling and disposal sites including copies of relevant permits or licences; and
- Waste auditing protocols.

Using the information identified in this section and the outline Construction Environmental Management Plan in **Appendix 4.1** as a basis the Contractor will be required to develop, implement and maintain a CDWMP for the construction phase of the Proposed Project.

In addition to the inherent design measures during the construction phase the following mitigation measures are proposed:

- The Contractor will minimise waste disposal so far as is reasonably practicable;
- Waste from the Proposed Project will be transported by authorised waste collectors in accordance with the Waste Management (Collection Permit) Regulations, 2007 as amended;
- Waste from the Proposed Project will be delivered to authorised waste facilities in accordance with the Waste Management Acts 1996 as amended;
- Source Segregation: Where possible metal, timber, glass and other recyclable material will be segregated during construction works and removed off site to a permitted/licensed facility for recycling. Waste stream colour coding, and photographs of wastes to be placed in each container as required, will be used to facilitate segregation. Where waste generation cannot be avoided this will maximise the quantity and quality of waste delivered for recycling and facilitate its movement up the waste hierarchy away from landfill disposal and reduce its environmental impact;

- Material Management: 'Just-in-time' delivery will be used so far as is reasonably practicable to minimise material wastage;
- Supply Chain Partners: The Contractor will engage with the supply chain to supply products and materials that use minimal packaging, and segregate packaging for reuse; and
- Waste Auditing: The Contractor will record the quantity in tonnes and types of waste and materials leaving site during the construction phase.

18.2.9 Material Assets: Utilities

The Contractor will be obliged to put measures in place to ensure that there are no interruptions to existing services and all services and utilities are maintained unless this has been agreed in advance with the relevant service provider and local authority.

All works in the vicinity of utilities apparatus will be carried out in ongoing consultation with the relevant utility company and/or local authority and will be in compliance with any requirements or guidelines they may have.

Where new services are required, the Contractor will apply to the relevant utility company for a connection permit where appropriate, and will adhere to their requirements.

18.2.10 Material Assets: Land Use and Property

18.2.10.1 Construction Phase

During the construction phase, site management measures including the provision of high quality hoarding and proactive communication with business and public regarding phasing, extent and duration of works will be carried out. Access to all properties will be maintained during the construction phase. Signage will be provided as necessary.

18.2.10.2 Operational Phase

No mitigation measures are required as it is expected that the Proposed Project will have a positive impact on land use and property.

The management of land use is a function of the Dublin City Council's planning department in accordance with the policies of the Dublin City Development Plan 2016-22.

The careful management of proposals for change of use in a coherent manner is likely to complement the investment in the plaza is a very important role to mitigate negative impacts arising from value and use changes in property beside the plaza.

The taxi rank will to be removed at College Green (five spaces). The taxi parking facility at Foster Place is to be removed entirely. It is proposed to introduce a taxi rank on the outbound lane on Dame Street, east of South Great George's Street and west of Trinity Street. Adjoining this would be 35 metres of loading bay which would be a night time taxi rank. A loading bay will act as night time taxi rank, is proposed for the East side of Trinity Street just prior to the junction of St Andrew's Street.

A loading bay which will act as night time taxi rank, is proposed for the west side of Church Lane. The impact on property and land use from these measures is considered neutral.

18.2.11 Socio-Economics

18.2.11.1 Construction Phase

This assessment, has determined that the negative impact on businesses during the construction will be of slight to moderate negative significance. A broad range of mitigation measures will be implemented for the construction of the Proposed Project.

Mitigation measures for traffic/pedestrians relate primarily to maintaining access to businesses, which will minimise disruption during the construction phase. Changes to traffic, public transportation and access to the city core will be clearly communicated to the resident and visiting public.

The capacity for business to be serviced on street, and receive deliveries in limited periods in the day would mitigate the socioeconomic impact of the proposal.

Alternative access arrangements for private cars and buses will mitigate the impact of direct access through College Green.

Mitigation measures will be introduced to minimise disruption during construction to businesses and visitors in terms of air and noise, refer to Chapters 7 and 8. The bus route reorganisation is obliged to meet air quality standards so that businesses and dwellings in the central area are not negatively affected by the re-organisation, refer to Chapter 7, '*Air Quality and Climate Factors'*.

Luas Cross City works will be completed before construction commences on the site to ensure that north-south access by bus and taxis is available. Taxi ranks will be re-located on adjoining streets with no net loss in parking spaces.

Changes to operation of services will be clearly communicated to customers and visitors, including on-street signage.

18.2.11.2 Operational Phase

During the operational phase, the most important mitigation measures refer to the management and maintenance of the space. In order to sustain a positive impact on the economy of the city centre, a high level of street cleaning measures will be implemented and a policing presence maintained to ensure that there is a strong sense of a safe and secure space, where anti-social behaviour is controlled. As a public authority Dublin City Council engages with the Gardaí on a regular basis and has the capacity to work with Gardaí directly and in policing forums to manage the safety and security of the space.

Taxi ranks will be re-located on nearby adjoining streets (Dame Street, east of South Great George's Street and west of Trinity Street) with no net loss in parking spaces. Dublin City Council as the roads authority is empowered to provide these alternative spaces.

Luas Cross City works will be completed before construction commences on the site to ensure that north-south access by bus and taxis is available.

18.3 Summary of Residual Impacts

18.3.1 Traffic and Transportation

During construction, the Proposed Project will result in a temporary increase in traffic volumes along Dame Street and approach routes to the construction site. However, these increases will be negligible and not result in any material impact on the operation of the local road network.

Once operational, the College Green Project will improve pedestrian, cyclist and public transport mobility through the centre of the city. The Proposed Project will result in changes to traffic flows on a number of road links within the city centre. The residual impacts in terms of traffic are considered further in the Chapter 7 '*Air Quality and Climate Factors*' and Chapter 8 '*Noise and Vibration*' which are the direct environmental impacts as a result of increased traffic.

18.3.2 Air Quality and Climate

18.3.2.1 Construction phase

When the dust minimisation measures detailed in the mitigation section of this chapter are implemented, fugitive emissions of dust from the site will be insignificant and pose no nuisance at nearby receptors.

Due to the size and nature of the construction activities, CO_2 and N_2O emissions during construction will have a negligible impact on climate.

18.3.2.2 Operational phase

The air dispersion modelling assessment has found that the Proposed Project will be beneficial overall in the study area. By 2035 all ground level and first-floor façades will have ambient air quality in compliance with the ambient air quality standards for the do something (and do minimum) scenario.

In relation to 2018, the Proposed Project will improve air quality at significantly more receptors relative to the number of receptors which deteriorate in air quality.

There will however be a period of time, between opening year and 2021, during which a number of first-floor facades are likely to remain above the annual mean NO_2 ambient air quality standard and between opening year and 2024, during which some ground level façades are likely to be in excess of the annual mean NO_2 ambient air quality standard.

However, in the absence of the Proposed Project, the impact on existing ground floor and first-floor façades will be greater with a higher number of receptors experiencing air quality in excess of the annual mean NO_2 limit value for a period of time.

18.3.3 Noise and Vibration

The modelling outputs for the day time 2018 do something (DS) scenario predict an increase of 5% in residential addresses points in the undesirable day time category and a decrease of 2% in residential locations in the desirable category.

The study concludes that when comparing the do minimum (DM) and DS 2018 scenarios for night time, a 5% increase in residential locations in the undesirable band and a slight decrease of approximately 1% in the desirable band is predicted.

At Parliament Street, it is predicted that there will be no difference to noise exposure levels at all address points, for either day or night time.

The modelling outputs for the day time 2035 DS scenario predict an increase of 9% in residential addresses points in the undesirable day time category and a decrease of 3% in residential locations in the desirable category.

The study concludes that when comparing the DM and DS 2035 scenarios for night time, a 1% increase in residential locations in the undesirable band and a slight decrease of approximately 2% in the desirable band is predicted.

At Parliament Street, it is predicted that there will be no difference to noise exposure levels at all address points, for either day or night time.

18.3.4 Biodiversity

There will be no significant impact on biodiversity following the proposed best practice construction management measures and tree replacement.

Construction management measures to prevent impacts on surface water quality which have been described in the EIS will be included in a Construction and Environmental Management Plan (refer to **Appendix 4.1**) to ensure these measures are fully implemented by the Contractor.

There will be no significant residual impacts on surface water quality once these measures have been employed.

18.3.5 Archaeology, Architectural and Cultural Heritage

With regards to the archaeological resource, following the implementation of the mitigations measures, there will be no residual impact on the archaeological resource.

The residual impact of the Proposed Project on architectural heritage will be positive, removing traffic from College Green and allowing it to be a high-quality urban space, with the surrounding buildings and the memorials, all of which are of architectural heritage significance, to become an integral part of the space.

18.3.6 Townscape and Visual

There is no need to mitigate the operational stage of the development as it is deemed to result in positive impacts that will enhance the townscape of College Green and its environs. However, it is considered that if the construction stage mitigation measures to achieve a tidy and orderly site are appropriately implemented, the predicted ‘Moderate’ significance of visual impact (**Section 11.4.2.2**) will reduce to **Moderate-slight**.

18.3.7 Soils, Geology, Hydrogeology and Hydrology

Upon application of the mitigation measures outlined the magnitude of any impacts both in the construction and operational phase are Negligible as detailed in **Table 18.1** (see **Appendix 12.1** for definitions). As a result, the significance of all the impacts is Imperceptible.

Table 18.1 - Summary of residual impacts on the identified features of importance

Feature	**Soil**	**Bedrock aquifer classified by the GSI as a Locally Important Aquifer which is productive only in local zones (Ll)**
Importance	Low	Medium
Justification	Poorly drained soil	Locally important aquifer.
Magnitude	Small adverse	Negligible
Justification	a low risk of pollution to the soils	Results in impact on attribute but of insufficient magnitude to affect either use or integrity
Significance	Imperceptible	Imperceptible
Mitigation measure	Refer to Section 12.8	Refer to Section 12.8
Residual impact	Negligible	Negligible
Justification	Imperceptible	Imperceptible

18.3.8 Resource and Waste Management

Following the implementation of the mitigation, the residual impacts are expected to be as follows:

- The impact of excavation waste is expected to be slight, negative and short-term.
- The impact of construction waste is expected to be imperceptible.
- The impact of operational waste is expected to be imperceptible.

There is considered to be adequate capacity in the region to receive the wastes likely to be generated by the construction and operation of the Proposed Project.

18.3.9 Material Assets: Utilities

Following implementation of mitigation measures outlined above, the residual impact on utility services is considered to be imperceptible.

18.3.10 Material Assets: Land Use and Property

18.3.10.1 Construction Phase

A moderate inconvenience to business deliveries and access will be experienced as a result of the establishment and ongoing use of the construction site. However, the mitigation measures outlined will maintain access arrangements and ensure no significant negative effects arise.

18.3.10.2 Operational Phase

In the long-term the Proposed Project is expected to become one of the core focal points of the city centre, sustaining a permanent positive legacy for the city.

18.3.11 Socio-Economics

The Proposed Project will have an operational residual significant positive impact on business, retail and tourism, by improving the public realm in a city centre site, increasing the space available to people and activity, improving the quality of the experience of visiting Dublin and improving convenient walking access to economic, commercial, tourism, educational and social facilities in the area. The residual impact of the Proposed Project is considered to be significant and positive in the long-term.

The re-location of the taxi ranks will not have a negative residual impact on that socio-economic group. The implementation of the Proposed Project will improve the permeability of the city centre areas, and support the improved growth and integration of the city core. It is expected that footfall will grow significantly in College Green itself as well as Westmoreland Street, Dame Street and Temple Bar. This will have a significant positive impact on trade and business. The considered review of bus route operations will address any potential negative impacts arising from change in routes and inconvenience for customers. The introduction of Luas stops beside College Green are likely to focus the new Civic Plaza the activity and interaction hub for the city centre. While bus stops are being displaced, the careful management of this process will ensure that new the new routes and stops remain with the 10 minute catchment area (and generally five minute catchment).

18.4 References

BS 5228-1 and 2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Noise and vibration

Masters – Williams et al (2001), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors
Department of Environment Community and Local Government (2006). Best Practice Guidelines on the Preparation of Waste management Plans for Construction and Demolition Projects. DoECLG, Dublin, Ireland.

Dublin City Council (2016) *Dublin City Development Plan 2016-2022,* Dublin Ireland

Appendices

Proposed College Green Project

Contents

Appendix 1.1

EIA Planning Authority Determination

A1.1-1. Determination by Planning Authority as to whether the proposals are likely to have significant effects on the environment.

The project is the College Green Traffic Management Measures – which will be carried out at College Green and surrounding streets. This is the Masterplan for proposals to free up the road space which will allow for the creation of a civic plaza area in College Green from Church Lane to Lower Grafton Street with all through traffic except pedestrians and cyclists being removed.

CAAS Environmental Consultants have been engaged by Dublin City Council to review the College Green proposals in accordance with the EIA Guidance for Consent Authorities regarding sub-threshold development, 2003, DEHG to reach a conclusion on whether the proposal should be subject to EIA or not.
The review includes an assessment of the details of the proposal with reference to the relevant EIA legislation including the Planning & Development Regulations, the EIA Directive and relevant EU Guidance including Interpretation of definitions of project categories of annex I and II of the EIA Directive, 2015, EU and Guidance on EIA Screening, 2001, EC.

The Planning Authority has considered the CAAS report including an analysis of the type and extent of development involved which falls within an area of 2.5 Ha approx. It is noted that Part 10 of the Planning & Development Regulations 2001-10 (Schedule 5) identifies infrastructure projects involving an area over 2.0 Ha in a business district as requiring an EIS. It is further noted that even if the area of works is less than 2.5 Ha and is considered as 'sub threshold' development, an EIS is still required having regard to the characteristics and location of the proposals at the heart of the City, and the likely significant alteration in the intensity of activities (increase in pedestrian and decrease of vehicular movement). The report also considers that the proposals will give rise to significant off-site, secondary and cumulative effects, which will require detailed environmental analysis.

Planning Authority Determination

Having regard to the fact that the proposal comprises urban development over an extensive area of the core of the Central Business District, the project is of a class that requires an Environmental Impact Assessment. It is also concluded that the environmental sensitivity of the receiving environment – on account of its social, tourism, cultural and business significance means that there is a likelihood that significant environmental resources could be affected – which would warrant an Environmental Impact Assessment.

Having regard to the potential for significant environmental effects to arise relating to

- Human Beings (socio-economic, amenity, tourism and trade)
- Cultural Heritage (Context and Setting of Protected Structures)
- Air (Air Quality and Noise)
- Material Assets (Traffic and Parking)
- Health and Safety
- Interaction, Secondary and off-site effects,

it is concluded that an Environmental Impact Assessment should be carried out of the proposed College Green Traffic Management Measures.

Appendix 4.1

Outline Construction and Environmental Management Plan

A4.1.1 Introduction

This section provides an outline of the general activities and issues associated with the construction of the Proposed Project. Ultimately, a Construction Management Plan for the works will be prepared by the Contractor on appointment, in advance of any works commencing. This will be updated at each stage of the project as it progresses and will deal with health and safety, security, access to and within the site, entrance and fencing treatment and parking.

The Construction Management Plan will be subject to the restrictions imposed by the Employer's Works Requirements. These restrictions will include:

1) The need to maintain access to premises through the Works area;
2) The need to maintain servicing to premises through the Works area;
3) The need to maintain adequate width pedestrian / cycle routes through the Works area;
4) The need to maintain utilities and services;
5) The need to maintain emergency access.

This section also includes an indicative outline of the construction programme, phasing and the typical construction activities required for the construction of the Proposed Project. Mitigation measures relating to minimising potential negative impacts arising from construction activities are described in relevant chapters, for example, Chapters 7 and Chapter 8, '*Air Quality and Climate Factors'* and '*Noise and Vibration'* respectively. Proposed construction management measures are also described.

The main construction works are associated with the development of the civic plaza area. The construction works associated with this phase of the development are described and assessed in this strategy. Other works that relate to road realignments and marking on Dame Street, Trinity Street, Andrew's Street, Church Lane and Grafton Street are considered minor and on that basis the measures outlined in this strategy do not apply. Standard Dublin City Council requirements, control procedures and permits will apply to those works.

A4.1.2 Indicative Construction Programme

An indicative construction sequence is described below. It should be noted that this construction sequence is just an overview, and the actual construction sequence will be confirmed when a Contractor is appointed.

The construction phase of the proposed project is likely to take 12 – 18 months, and is expected to commence in early 2018. The main stages of construction will proceed in a general sequence as follows:

- Enabling works- including the set-up of site construction facilities, hoarding, signage etc.

- Excavation and site clearance- including the excavation of roads and paved surfaces, and clearance of study area including careful removal of trees, street furniture, historic features etc.
- Provision of services- including the implementation of Sustainable Urban Drainage System (SuDS), localised diversion to local power supplies, and localised diversion of telecommunication services. A new public lighting regime is proposed for College Green, and new ducting and mini pillars will be provided to cater for same. In addition, an underground control chamber will be provided for the fountains, along with associated water supply, power supply and drainage connections.
- Construction of the civic plaza including relaying the setts at Foster Place, laying granite setts in the civic plaza area, paving works to trafficked plaza area at western end, construction of turning circle and works to existing footpaths.
- Replacement of statues and fountain, and planting of trees. This stage of construction will also involve the placement of street furniture, bicycle facilities, lighting, signage etc.

Main Stages of Construction

Enabling Works

Enabling works are generally undertaken in advance of the main works. Enabling works will be carried out to ensure that:

- Site construction facilities are established in advance of commencement of significant elements of work.
- Adequate work areas and access for the permanent works and or construction is provided.

The timing of enabling works depends on the programmed start of the phase of main works that they are designed to enable. Some may start significantly in advance of the main construction activities.

The initial phase of enabling works will include the provision of construction facilities located at the works area. The initial works area is expected to include the northern side of the site, with pedestrian and cyclist access being retained along the southern side of the site. Once this main section of works is complete, the works area will move to the southern side of the site, with pedestrians and cyclist access to be provided on the northern side of the site. A works area will provide secure and safe refuge space for Contractor facilities and equipment.

Construction site hoardings are used to provide a secure site boundary to what can be a dangerous environment for people who have not received the proper training and are unfamiliar with construction operations. Site hoarding also performs an important function in relation to minimising some of the potential environmental impacts associated with construction, namely noise, visual impact, and dust deposition.

Hoarding will be established around the site construction area before any significant construction activity takes place. Hoarding will be established such that maximum pedestrian access will be maintained around the works area. Hoardings works will be of the same nature as that carried out for similar operations at most urban construction and building sites.

Construction lighting will be powered by mains supplies or diesel generators where an electrical supply is not available and will be positioned and angled downwards to minimise spillage of light from the site. Weather and vandal resistant fluorescent fitting will be installed on hoardings around the construction area to illuminate public walkways.

Construction vehicles will gain access to the site using designated routes and access points such as Dame Street. Further detail on construction traffic and access is provided in Chapter 6 '*Traffic and Transportation.*'

A construction traffic management plan will be developed as required by the Contractor so as to ensure that routes around the works are maintained for pedestrians and vehicles for the duration of the construction works. Refer to Chapter 6 '*Traffic and Transportation'*.

Site Clearance and Excavation

Following erection of hoarding, street furniture, such as cycle features, traffic lights, bins and public lighting columns will be cleared where required from the excavation area and safely stored for reinstatement following the works. The statues of Thomas Davis and Henry Grattan, as well as the Four Angels Fountain will also be safely stored for reinstatement.

It is proposed to remove eight trees from the area of the traffic island at the Grattan and Davis Statues. It is proposed to retain the distinguished Plane trees in Foster Place South. Measures will be put in place to protect all retained trees.

Detailed surveys of existing underground utilities have been carried out by TST Engineering on behalf of DCC to determine if underground services are present in the area of the proposed works. In addition, areas to be excavated for utility trenches and the underground control chamber for the fountains will be scanned using a CAT scanner or similar utility scanning techniques to identify the location of any live cables prior to any excavation works commencing. All service diversions will be carried out in consultation with the relevant utility companies. The Contractor will as appropriate submit diversion proposals to the relevant utility company for their consideration prior to works being carried out.

Footpath and road surfacing will be broken by either manual or mechanical means and disposed of appropriately or stored for reuse. Trenches excavated for utility diversions will be supported to ensure that the sides of the excavation are secure. New utility ducts and pipes will be laid in an open cut trench with any existing utilities crossing the diversion trench protected and supported. Ducting, pipework, manholes, and chambers will be constructed to the utility owner specification and the trench then backfilled.

A significant proportion of the surplus excavation material from the project will consist of soil and stones which may be accepted for recovery or recycling at waste licenced and permitted facilities.

Excavation will be typically carried out using large tracked excavators where cut and re-profiling works are carried out on site. Material to be taken off site will be transferred to trucks for onward transportation to the disposal recovery site as soon as possible following excavation in order to minimise the amount of excavated material being stored on-site. In addition, materials required for the works will be delivered on a 'just in time basis' so as to minimise storage of materials on site.

Archaeological monitoring of earthmoving works for site preparation will be undertaken to ensure that any features of an archaeological nature that may be revealed are identified, recorded and fully resolved. Hoardings, additional support and temporary weathering will be provided, if required for protected structures on site.

Chapter 12, '*Soils, Geology, Hydrogeology and Hydrology'* provides detailed information on excavation material and mineralogy. Chapter 13, '*Resource and Waste Management'* contains more detailed information on Resource and Waste Management associated with the project.

Provision of Services

Following on from completion of site clearance and excavation, construction activities will focus on the installation/diversions of underground utilities to provide the infrastructure required for drainage, electricity and telecommunications.

Detailed surveys of existing underground utilities have been carried out on behalf of DCC. This survey information, together with information provided by the individual utility providers will be used to highlight the scope of early enabling works where service isolation or diversions may be required.

Installation of underground services within the civic plaza will be carried out including a new public lighting regime, as well as new traffic communications and electricity ducting, and the provision of the underground control chamber for fountains. Localised diversion of services will also be required.

A specific works installation plan and sequence will be developed by the Contractor in advance of commencement of these works. This plan will ensure that particular consideration is given to the sequence of excavations, consultation with utility providers and the phased completion of works in each area to ensure a sequenced handover of the completed installation.

While the existing drainage regime at College Green is being retained, it is intended to complement the existing system with the installation of a Sustainable Urban Drainage System (SuDS), where possible. These SuDS features will consist of new attenuation/infiltration areas filled with crushed stone or soil. These will predominately be located beneath the proposed trees. New gullies will be arranged such that overflow from these attenuation/ infiltration areas will discharge to the piped surface water drainage system. Some new gully connections will be required, and these will connect to the existing surface water infrastructure, either directly, or via small collector pipes to a single discharge point.

A drainage channel will be installed around the proposed fountain installation to harvest rainwater and to return water from the fountains to the water pumps in the proposed underground control chamber.

This channel will consist of precast drainage units covered by a continuous steel grating. Small connector pipes (c. 150mm) will connect the low points in the drainage channel to the control chamber.

Construction of Civic Plaza

Construction of the civic plaza will involve the construction of the hard landscape throughout the site. Light and dark granite setts will be laid in the central area. The original setts located at Foster Place will be removed, stored (on/off-site) and reinstated. A turning circle will be constructed opposite Foster Place which will act as a bus/car turning point.

The construction of the soft landscape will be integrated with completion works on elements of hard landscape.

Replacement of Street Furniture and Statues, and Replanting

The final phase of the construction works will involve the replacement /placement of street furniture including seating, litter bins, bollards, cycle stands, lighting planters and tree grilles.

The monuments of Henry Grattan and Thomas Davis will be repositioned to the locations.

The final phase of the construction works will also involve the planting of 22 new plane trees.

Water Management

Site drainage will be provided to collect surface runoff prior to discharge to the local drainage network – all in accordance with the necessary Dublin City Council approval.

Employment and Accommodation

The construction workforce numbers will vary depending on the construction stage of the project. However, it is anticipated that at the peak of construction there will be an average construction workforce of approximately 50 people employed on site.

Hours of Working

Normal working hours during the construction phase will be as follows:

Start	Finish	
0700	1800	Monday to Friday
0800	1400	Saturday

However, it may be necessary to work outside of these hours at night and at weekends during certain activities and stages of the development.

Community Liaison During Construction

During the construction phase, site management measures including proactive communication with business and public regarding phasing, extent and duration of works will be carried out by the Contractor. Access to all properties will be maintained during the construction phase. Signage and hoarding will be provided as necessary.

A4.1.3 Construction Health and Safety

Health and Safety

The Contractor will be required to ensure all Health & Safety requirements are agreed with Dublin City Council. This is to protect the public who will be accessing College Green during the construction phase of the works and will include all suitable temporary signage, barriers and hoarding as necessary.

All construction staff and operatives will be inducted into the security, health and safety and logistic requirements on site prior to commencing work.

All contractors will be required to progress their works with reasonable skill, care and diligence and to proactively manage the works in a manner most likely to ensure the safety, health and welfare of those carrying out construction works, all other persons accessing College Green and interacting stakeholders.

Contractors will also have to ensure that, as a minimum, all aspects of their works and project facilities comply with legislation, good industry practice and all necessary consents.

Particular cognisance will be taken by the contractor to managing the use of machinery in a public environment.

The requirements of the Safety, Health and Welfare at Work Act 2005, the Safety, Health and Welfare at Work (Construction) Regulations, 2006 and other relevant Irish and EU safety legislation will be complied with at all times.

As required by the Regulations, a Health and Safety Plan will be formulated which will address health and safety issues from the design stages through to completion of the construction and maintenance phases. This plan will be reviewed and updated as required, as the development progresses.

In accordance with the Regulations, a “Project Supervisor Construction Stage” will be appointed as appropriate. The Project Supervisor Construction Stage will assemble the Safety File as the project progresses.

Emergency Response Provision

The Contractor will maintain an emergency response action plan which will cover all foreseeable risks, i.e. fire, spill, flood, etc. Appropriate site personnel will be trained as first aiders and fire marshals. In addition, appropriate staff will be trained in environmental issues and spill response procedures.

Equipment and vehicles will be locked, have keys removed and be stored securely in the works area.

Site Management and Security

A Construction Management team will be established for the duration of the construction phase. The team will manage the construction of the Works including monitoring the Contractor's performance to ensure that the proposed construction phase mitigation measures are implemented and that construction impacts and nuisance are minimised.

A Construction Management Plan for the works will be prepared and submitted to the planning authority in advance of any works commencing. This will be updated at each stage of the development as it progresses and will deal with health and safety, security, access to and within the site, entrance and fencing treatment and parking.

The primary function of site security will be to ensure that no unauthorised entry to site occurs. There will be hoarding around the construction sites to minimise the risk of vandalism and unauthorised access.

Environmental Management

Environmental impacts during construction will be mitigated or reduced where possible (refer to the individual chapters in this EIS for specific mitigation measures).

In this regard, Contractors will be required to produce an environmental management plan for DCC approval prior to commencing any works on site. The Contractor's CEMP will be a development of this outline CEMP.

This plan will deal with issues such as noise and dust mitigation measures, hours of operation, traffic management, waste management, environmental management (including debris from construction traffic, noise, dust, air quality and the like), demolition, protection of trees, works to protected structures, etc.

Construction and Demolition Waste Management Plan

Resource and waste generation during construction will be mitigated and managed where possible. In this regard, Contractors will be required to produce a Construction and Demolition Waste Management Plan (CDWMP) for DCC approval prior to commencing any works on site. The CDWMP will address waste generation and arrangements made for prevention, reuse, recycling disposal and collection of recyclables and wastes.

The outline CDWMP was prepared in line with the DoEHLG Best Practice Guidelines on the Preparation of Waste Management Plans for Construction & Demolition Projects.

The following is an indicative list on the content of a CDWMP:

- Description of the Project;
- Wastes Arising Including Proposals for Minimisation/Reuse/Recycling;
- Procedures for prevention, reuse and recycling of wastes

- Estimated Cost of Waste Management;
- Roles including Training and Responsibilities for C&D Waste;
- Procedures for education of workforce and plan dissemination programme
- Record Keeping Procedures;
- Waste Collectors, Recycling and Disposal Sites Including Copies of Relevant Permits or Licences; and
- Waste auditing protocols.

Using the information identified in this section the Contractor will be required to develop, implement and maintain a CDWMP for the construction phase of the Proposed Project.

A4.1.4 Proposed Mitigation Measures

Traffic and Transportation

General Construction Traffic Strategy

Construction traffic will be limited to certain routes and times of day, with the aim of keeping disruption to existing traffic and public transport to a minimum. To minimise disruption to the local areas, construction traffic volumes will be managed through the following measures which include:

- During peak hours, ancillary, maintenance and other site vehicles movements will be discouraged.
- Daily construction programmes will be planned to minimise the number of disruptions to surrounding streets by staggering HGV movements to avoid site queues.
- No car parking will be provided on site for staff.
- The Contractor will be required to promote travel by sustainable modes of transport. A framework mobility management plan is presented later in this section.

Hours of Working

Construction operations on site will generally be between the hours of 07:00 and 19:00, Monday to Friday, and 08:00 to 14:00 on Saturdays. Similarly, deliveries of materials to site will generally be between the hours of 07:00 and 19:00, Monday to Friday, and 07:00 to 14:00 on Saturdays. However, it is acknowledged that works outside of these hours will be required on occasion. Any works proposed outside the core site hours

The construction shift times will ensure any staff travelling to the site by car will have limited impact on the peak periods of 08:00-09:00 in the morning and 17:00-18:00 in the evening as it is envisaged most construction staff will arrive to work before 08:00 in the morning and leave after 18:00 in the evening.

Construction Traffic Management Plan

As part of the construction works the appointed Contractor shall prepare a Construction Traffic Management Plan (CTMP) which will outline their approach to the Proposed Project and detail potential impacts for the public road system. This will include provision of transport facilities and encouragement of car sharing for staff. It will also include measures to mitigate any potential noise and air quality impacts resulting from construction activities, namely from traffic movements in and out of the site.

The CTMP will provide details of intended construction practice for the development, including:

- Location of the site and materials compound(s) including area(s) identified for the storage of construction refuse.
- Location of areas for construction site offices and staff facilities.
- Details of site security fencing and hoardings.
- Details of pedestrian routes through College Green.
- Details of the timing and routing of construction traffic to and from the construction site and associated directional signage, to include proposals to facilitate the delivery of abnormal loads to the site.
- Measures to obviate queuing of construction traffic on the adjoining road network.
- Measures to prevent the spillage or deposit of clay, rubble or other debris on the public road network.
- Alternative arrangements to be put in place for pedestrians and vehicles in the case of the closure of any public road or footpath during the course of site development works.
- Details of appropriate mitigation measures for noise, dust and vibration, and monitoring of such levels.
- Containment of all construction-related fuel and oil within specially constructed bunds to ensure that fuel spillages are fully contained. Such bunds shall be roofed to exclude rainwater.
- Off-site disposal of construction/demolition waste and details of how it is proposed to manage excavated soil.
- Means to ensure that surface water run-off is controlled such that no silt or other pollutants enter local surface water sewers or drains.
- The CTMP will be agreed with both Dublin City Council and An Garda Síochana, prior to commencement of works.

Mobility Management

The Contractor will be required as part of the contract to introduce a Mobility Management Plan (MMP) for its workforce to encourage access to the site by means other than by private car. The following section identifies some of the measures the Contractor will provide as part of the MMP. The Mobility Management Plan will form part of the Construction Traffic Management Plan and will be agreed with KCC prior to works beginning on site.

Cycling: Cycle parking spaces will be provided on the site for construction staff, in addition lockers will be provided to allow cyclists store their cycling clothes.

Car Sharing: Car sharing among the construction staff should be encouraged, especially from areas where construction staff may be clustered. The Contractor will aim to organise shifts in accordance to staff origins, hence enabling higher levels of car sharing. Such a measure offers a significant opportunity to reduce the proportion of construction staff driving to the off-site car parking facility, and will minimise the potential traffic impact on the road network surrounding this facility

Public Transport: The Contractor will issue an information leaflet to all staff as part of their induction on site highlighting the location of the numerous bus routes that operate in the vicinity of the site. The Contractor will also offer the "Travel to Work Scheme" to employees.

Air Quality and Climate

In order to ensure that no dust nuisance occurs, a series of measures will be implemented. In summary, the measures which will be implemented will include:

- Vehicles delivering material with dust potential (soil, aggregates) will be enclosed or covered with tarpaulin at all times to restrict the escape of dust.
- Public roads outside the site will be regularly inspected for cleanliness, and cleaned as necessary.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.
- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.
- Hoarding will be provided around the construction site.

At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

Construction vehicles, generators etc., may give rise to some CO_2 and N_2O emissions. However, due to short-term and temporary nature of these works the impact on climate will not be significant.

Noise and Vibration

The following section describes typical measures to minimise the potential for noise and vibration disturbance to the surrounding area which will be employed by the Contractor to ensure the construction noise and vibration criteria outlined in **Tables A.4.1** and **Table A.4.2** are not exceeded.

The Contractor will take specific noise abatement measures and comply with the recommendations of BS 5228 and the European Communities (*Noise Emission by Equipment for Use Outdoors*) Regulations, 2001.

BS 5228 includes guidance on several aspects of construction site practices, including, but not limited to:

- Selection of quiet plant and the control of noise sources – the use of proprietary acoustic enclosures and the quietest plant, where possible;
- Selection of the method of excavation to ensure there is no likelihood of structural or cosmetic damage to neighbouring buildings;
- Screening – the effectiveness of screening is based on the location, height and length of the barrier;
- Liaison with the public – a designated liaison officer will be appointed to deal with any complaints relating to noise.

Table A.4.1.1 - BS5228 (Part 1) ABC Assessment Categories and Thresholds (BSI, 2014)

Assessment Category and Threshold Value Period L_{Aeq}	**Threshold Value in Decibels (dB)**		
	A[A)]	**B[B)]**	**C[C)]**
Night (23:00-07:00hrs)	45	50	55
Evening [D)]	55	60	65
Day (07:00-19:00hrs)	65	70	75

[A)] Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values

[B)] Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values

[C)] Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A

[D)] 19:00 – 23:00hrs weekdays, 13:00-23:00hrs Saturdays and 07:00-23:00hrs Sundays

Table A.4.1.2 - Noise Limits to be applied based on BS5228 Criteria

Assessment Category and Threshold Value Period L_{Aeq}	**Threshold Value in Decibels (dB)**
Night (23:00-07:00hrs) (L_{Aeq}, dB)	55
Evening (19:00-23:00hrs) (L_{Aeq}, dB)	65
Day (07:00-19:00hrs) (L_{Aeq}, dB)	75

Biodiversity

Construction management measures specifically related to the protection of surface water quality are listed below:

- Any stockpiles of construction material shall be stored on impermeable surfaces and covered using tarpaulin;

- Good housekeeping (daily site clean-ups, use of disposal bins, etc.) on the site during construction, and the proper use, storage and disposal of these substances and their containers will prevent groundwater contamination;
- For all activities involving the use of potential pollutants or hazardous materials, there will be a requirement to ensure that material such as concrete, fuels, lubricants and hydraulic fluids will be carefully handled and stored to avoid spillages. Potential pollutants shall also be adequately secured against vandalism and will be provided with proper containment according to codes of practice. Any spillages will be immediately contained and contaminated soil removed from the site and properly disposed of;
- The risk of water pollution will be minimised by the implementation of good construction practices. Such practices will include adequate bunding for silos, oil containers, wheel washers and dust suppression on site roads, and regular plant maintenance. The Construction Industry Research and Information Association (CIRIA) provides guidance on the control and management of water pollution from construction sites in their publication Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (Masters – Williams et al, 2001). A contingency plan for pollution emergencies will also be developed by the appointed Contractor prior to the commencement of the works and regularly updated, which will identify the actions to be taken in the event of a pollution incident;
- In accordance with recommendations in the CIRIA document, a contingency plan for pollution emergencies will be prepared which will address the following:
  - Containment measures;
  - Emergency discharge routes;
  - List of appropriate equipment and clean-up materials;
  - Maintenance schedule for equipment;
  - Details of trained staff, location and provision for 24-hour cover;
  - Details of staff responsibilities;
  - Notification procedures to inform the Environmental Protection Agency (EPA) or Environmental Department of the Dublin City Council;
  - Audit and review schedule;
  - Telephone numbers of statutory water consultees; and
  - List of specialist pollution clean-up companies and their telephone numbers.

Archaeology, Cultural Heritage and Architectural Heritage

Archaeology

All ground disturbances associated with the Proposed Project shall be subject to continuous archaeological monitoring. Monitoring will be carried out under licence to the DoAHRRGA in consultation with the National Museum and the Dublin City Archaeologist. Full provision will be made available for the resolution of any archaeological remains that may be discovered (i.e. preservation by record), should this be deemed an appropriate manner in which to proceed.

Furthermore, a suitably qualified archaeologist will be appointed as part of the detailed design team in order to advice on specific potential impacts as and when they may arise. This will result in continuous impact assessment of the detailed works, allowing mitigation measures to be agreed in advance, in full consultation with the statutory bodies.

Architecture

Historic footway to front of Bank of Ireland

During the works to extend the paving across to Grafton Street the adjacent granite paving of the footway to the front of the Bank of Ireland will be protected from damage.

Lamp standards in College Green

The lamp standards will be removed with care, in accordance with a conservation method statement, and put into storage for potential use elsewhere.

Henry Grattan statue

The statue will be moved by a heritage Contractor with experience in moving monuments of this type and in accordance with a conservation method statement.

Thomas Davis plaque

The Thomas Davis plaque will be lifted and reset in accordance with a conservation method statement and the work will be carried out by a heritage Contractor with experience in lifting stones of this type.

Thomas Davis sculpture

The Thomas Davis sculpture assemblage will be lifted and moved in accordance with a conservation method statement and the work will be carried out by a heritage Contractor with experience in working with monuments of this type.

Townscape and Visual

Given that the Proposed Project, once constructed, is considered to have a positive impact on the visual setting of College Green as well as its structure and function within the context of the surrounding urban fabric, it is not warranted to provide any long term forms of mitigation.

Only during the construction phase is mitigation considered necessary in respect of townscape and visual issues. These relate to ensuring that College Green does not become a place that will be avoided by locals and visitors during the 12-18 month construction period. Effects that could give rise to this situation relate to perceived danger, congestion, way-finding confusion, scattering of dust and debris and overall visual clutter and disharmony. Mitigation to reduce these adverse construction related effects is principally the concern of the Construction and Environmental Management Plan. This will include the form of site hoarding, which in this instance should be solid and well constructed to reduce visibility of the on-going works and will also reduce the noise and dust emissions from the site. It is proposed that the solid hoardings will also include images of the future plaza as this can remind those affected of the long-term benefit of the temporary works. Pedestrian and cycle movement areas will be generous in dimension and clearly presented in terms of directional movement to avoid confusion. Areas outside of the site hoarding will also be kept clear of dust and debris.

Soils, Geology, Hydrogeology and Hydrology

A project-specific Construction Management Plan (CMP) will be prepared and submitted to the planning authority for approval. It will be maintained by the Contractor for the duration of the construction phase. The CMP will cover all potentially polluting activities and include an emergency response procedure. All personnel working on the site will be trained in the implementation of the procedures.

As a minimum, the CMP manual for the Proposed Project site will be formulated in consideration of the standard best practice. The CMP will include a range of site specific measures which will include:

- Earthworks operations shall be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe run-off and prevent ponding and flooding.
- Run-off will be controlled to minimise the water effects in outfall areas.
- Good housekeeping (site clean-ups, use of disposal bins, etc.) on the site project.

In order to prevent the accidental release of hazardous materials (fuels, cleaning agents, etc.) during construction site activity, all hazardous materials will be stored within secondary containment designed to retain at least 110% of the storage contents. Temporary bunds for oil/diesel storage tanks will be used on the site during the construction phase of the Proposed Project. Safe materials handling of all potentially hazardous materials will be emphasised to all construction personnel employed during this phase of the Proposed Project.

Mitigation during the construction phase will include implementing best practice during excavation works to avoid sediment running into the drainage system which discharges to the River Liffey.

Resource and Waste Management

Construction and Demolition Waste Management Plan

An outline Construction and Demolition Waste Management Plan (CDWMP) is described in section 13.6.1.2. This outline CDWMP plan will be required to be developed into a detailed CDWMP by the Main Contractor(s) following appointment and prior to commencing works on site. The CDWMP addresses waste generation and arrangements made for prevention, reuse, recycling disposal and collection of recyclables and wastes.

The outline CDWMP was prepared in line with the *DoEHLG Best Practise Guidelines on the Preparation of Waste Management Plans for Construction & Demolition Projects.*

The following is an indicative list on the content of a CDWMP:

- Description of the project;
- Wastes arising including proposals for minimisation/reuse/recycling;
- Procedures for prevention, reuse and recycling of wastes
- Estimated cost of waste management;
- Roles including training and responsibilities for C&D Waste;
- Procedures for education of workforce and plan dissemination programme
- Record keeping procedures;
- Waste collectors, recycling and disposal sites including copies of relevant permits or licences; and
- Waste auditing protocols.

Using the information identified in this section and the outline Construction Environmental Management Plan in Appendix 4.1 as a basis the Contractor will be required to develop, implement and maintain a CDWMP for the construction phase of the Proposed Project.

Construction- General

In addition to the inherent design measures during the construction phase the following mitigation measures are proposed:

- The Contractor will minimise waste disposal so far as is reasonably practicable.
- Waste from the Proposed Project will be transported by authorised waste collectors in accordance with the Waste Management (Collection Permit) Regulations, 2007 as amended.
- Waste from the Proposed Project will be delivered to authorised waste facilities in accordance with the Waste Management Acts 1996 as amended.
- Source Segregation: Where possible metal, timber, glass and other recyclable material will be segregated during construction works and removed off site to

a permitted/licensed facility for recycling. Waste stream colour coding, and photographs of wastes to be placed in each container as required, will be used to facilitate segregation. Where waste generation cannot be avoided this will maximise the quantity and quality of waste delivered for recycling and facilitate its movement up the waste hierarchy away from landfill disposal and reduce its environmental impact:

- Material Management: 'Just-in-time' delivery will be used so far as is reasonably practicable to minimise material wastage; and
- Supply Chain Partners: The Contractor will engage with the supply chain to supply products and materials that use minimal packaging, and segregate packaging for reuse.
- Waste Auditing: The Main Contractor will record the quantity in tonnes and types of waste and materials leaving site during the construction phase.
- Material assets – utilities.

The Contractor will be obliged to put measures in place to ensure that there are no interruptions to existing services and all services and utilities are maintained unless this has been agreed in advance with the relevant service provider and local authority.

All works in the vicinity of utilities apparatus will be carried out in ongoing consultation with the relevant utility company and/or local authority and will be in compliance with any requirements or guidelines they may have.

Where new services are required, the Contractor will apply to the relevant utility company for a connection permit where appropriate, and will adhere to their requirements.

Material assets – land use and property

During the construction phase, site management measures including the provision of high quality hoarding and proactive communication with business and public regarding phasing, extent and duration of works will be carried out. Access to all properties will be maintained during the construction phase. Signage will be provided as necessary.

Socio-economics

This assessment, has determined that the negative impact on businesses during the construction will be of slight to moderate negative significance. A broad range of mitigation measures will be implemented for the construction of College Green Plaza and the Proposed Project.

Mitigation measures for traffic/pedestrians relate primarily to maintaining access to businesses, which will minimise disruption during the construction phase. Changes to traffic, public transportation and access to the city core will be clearly communicated to the resident and visiting public.

The capacity for business to be serviced on street, and receive deliveries in limited periods in the day would mitigate the socioeconomic impact of the proposal.

Alternative access arrangements for private cars and buses will mitigate the impact of direct access through College Green.

Luas works will be completed before construction commences on the site to ensure that north-south access by bus and taxis is available. Taxi ranks will be re-located on adjoining streets with no net loss in parking spaces. Changes to operation of services will be clearly communicated to customers and visitors, including on-street signage.

References

Department of Environment Community and Local Government (2006). Best Practice Guidelines on the Preparation of Waste management Plans for Construction and Demolition Projects. DoECLG, Dublin, Ireland.

BS 5228 and the European Communities (*Noise Emission by Equipment for Use Outdoors*) Regulations, 2001.

Masters – Williams et al (2000) Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors

Appendix 6.1

Traffic Modelling Data

Links with > 2.5% change in flow, 2018

	2018 Do Minimum		2018 Do Something		% Difference	
	AM Flow	PM Flow	AM Flow	PM Flow	AM Flow	PM Flow
Link	Vehicles	Vehicles	Vehicles	Vehicles	Vehicles	Vehicles
Anglesea Street between College Green and Fleet Street (1-Way)	1	73	9	88	1150%	20%
Aston Quay between Westmoreland Street and Price's Lane (1-Way)	377	460	427	504	13%	10%
Aston Quay between Price's Place and Aston Place (1-Way)	395	630	432	666	9%	6%
Aston Quay between Aston Place and Bedford Row (1-Way)	398	635	432	666	8%	5%
Bachelors Walk between Liffey Street Lower and O'Connell Street (1-Way)	1290	1076	1323	1053	3%	-2%
Bedford Row between Aston Quay and Fleet Street (1-Way)	296	350	172	368	-42%	5%
Bride Street between Peter Street and Bishop Street (2-Way)	703	602	761	517	8%	-14%
Bride Street between Bishop Street and Kevin Street Upper (2-Way)	501	317	612	314	22%	-1%
Bridgefoot Street between Oliver Bond Street and Usher's Quay (1-Way)	817	463	836	577	2%	25%
Burgh Quay between Corn Exchange Place and Rosie Hackett Bridge (1-Way)	449	518	471	537	5%	4%
Burgh Quay between Rosie Hackett Bridge and O'Connell Bridge (1-Way)	415	481	448	509	8%	6%
Burgh Quay between Burgh Quay and Aston Quay (1-Way)	369	427	398	457	8%	7%
Christchurch Place between Fishamble Street and Werburgh Street (2-Way)	806	773	865	552	7%	-29%
Christchurch Place between Werburgh Street and Nicholas Street (2-Way)	1017	733	1256	887	24%	21%
Church Lane between Suffolk Street and College Green (2-Way)	100	110	102	84	2%	-24%
College Street between College Green and College Street (2-Way)	286	207	276	213	-4%	3%
Dame Street between South Great George's Street and Parliament Street (2-Way)	709	524	906	555	28%	6%
Dawson Street between St. Stephen's Green and Joshua Lane (1-Way)	319	215	217	226	-32%	5%

Dawson Street between Joshua Lane and Molesworth Street (1-Way)	298	205	198	217	-34%	6%
Dawson Street between Molesworth Street and Duke Street (2-Way)	115	150	121	148	5%	-1%
Eden Quay between Bachelors' Walk and Eden Quay (1-Way)	899	831	909	821	1%	-1%
Eden Quay between O'Connell Street and Harbour Court (1-Way)	68	103	153	119	126%	16%
Eden Quay between Harbour Court and Rosie Hackett Bridge (1-Way)	113	157	184	162	62%	4%
Eden Quay between Rosie Hackett Bridge and Butt Bridge (1-Way)	218	243	256	232	17%	-4%
Eden Quay between Eden Quay and Butt Bridge (1-Way)	231	255	268	244	16%	-4%
Fishamble Street between Essex Quay and Exchange Street Lower (1-Way)	213	27	283	120	33%	345%
Fishamble Street between Exchange Street Lower and Lord Edward Street (2-Way)	11	0	227	142	1955%	∞
Foster Place (2-Way)	223	150	271	199	21%	32%
Grafton Street between College Green and Suffolk Street (2-Way)	170	109	276	213	62%	96%
High Street between Nicholas Street and Back Lane (2-Way)	1882	1201	1975	1417	5%	18%
High Street between Back Lane and Lamb Alley (2-Way)	2581	1863	2666	2077	3%	12%
Lord Edward Street between Fishamble Street and Exchange Street Upper (2-Way)	817	773	1079	629	32%	-19%
Lord Edward Street between Exchange Street Upper and Parliament Street (2-Way)	762	775	908	580	19%	-25%
Nassau Street between Grafton Street and Dawson Street (2-Way)	270	219	276	213	2%	-3%
Nassau Street between Dawson Street and South Frederick Street (1-Way)	168	109	174	113	4%	4%
Ormond Quay Lower between Swifts Row and Liffey Street Lower (1-Way)	1157	925	1203	910	4%	-2%
Saint Andrew Street between Trinity Street and Church Lane (1-Way)	0	0	102	84	∞	∞
Watling Street between Usher's Island and Island Street (1-Way)	268	155	265	169	-1%	9%
Watling Street between Island Street and Thomas Street (1-Way)	167	77	170	94	2%	23%

Wellington Quay between Bedford Row and Eustace Street (1-Way)	693	988	602	1036	-13%	5%
Wellington Quay between Eustace Street and Parliament Street (1-Way)	745	1041	656	1090	-12%	5%

	2035 Do Minimum		**2035 Do Something**		**% Difference**	
	AM Flow	**PM Flow**	**AM Flow**	**PM Flow**	**AM Flow**	**PM Flow**
Link	Vehicles	Vehicles	Vehicles	Vehicles	Vehicles	Vehicles
Anglesea Street between Fleet Street and College Green (1-Way)	33	13	28	17	-16%	31%
Aston Quay between Westmoreland Street and Price's Lane (1-Way)	928	1046	886	1106	-5%	6%
Aston Quay between Price's Place and Bedford Row (1-Way)	967	1276	905	1375	-6%	8%
Bachelors Walk between Liffey Street Lower and O'Connell Street (1-Way)	594	374	604	421	2%	13%
Bedford Row between Aston Quay and Fleet Street (1-Way)	33	13	28	17	-16%	31%
Bride Street between Bride Road and Bull Alley Street (2-Way)	704	442	718	454	2%	3%
Bride Street between Bull Alley Street and Peter Street (2-Way)	856	536	967	598	13%	12%
Bride Street between Peter Street and Bishop Street (2-Way)	1307	574	1392	494	6%	-14%
Bride Street between Bishop Street and Kevin Street Upper (2-Way)	1347	589	1441	509	7%	-14%
Bridgefoot Street between Oliver Bond Street and Usher's Quay (2-Way)	788	599	790	665	0%	11%
Burgh Quay between Corn Exchange Place and Rosie Hackett Bridge (1-Way)	507	532	514	549	1%	3%
Burgh Quay between Rosie Hackett Bridge and O'Connell Bridge (1-Way)	508	533	516	551	2%	3%
Burgh Quay between Burgh Quay and Aston Quay (1-Way)	375	478	400	498	6%	4%
Christchurch Place between Nicholas Street and Werburgh Street (2-Way)	1342	723	1507	985	12%	36%
Church Lane between Suffolk Street and College Green (1-Way)	84	68	244	80	190%	17%
Church Street between Arran Quay and Hammond Lane (2-Way)	1145	1293	1051	1387	-8%	7%
Church Street between Hammond Lane and Mary's Lane (2-Way)	1095	1157	1018	1256	-7%	9%

College Green between Trinity Street and Anglesea Street (2-Way)	370	230	475	153	28%	-33%
College Green between Anglesea Street and Church Lane (2-Way)	337	217	447	137	33%	-37%
Dame Street between South Great George's Street and Parliament Street (2-Way)	1012	762	1083	677	7%	-11%
Dame Street between Trinity Street and South Great George's Street (2-Way)	370	230	475	153	28%	-33%
Dawson Street between St. Stephen's Green and Joshua Lane (1-Way)	193	200	191	207	-1%	3%
Dawson Street between Joshua Lane and Molesworth Street (1-Way)	201	207	206	214	2%	4%
Dawson Street between Molesworth Street and Duke Street (2-Way)	116	136	122	142	5%	5%
Dawson Street between Duke Street and Nassau Street (1-Way)	103	106	108	111	5%	5%
D'Olier Street between Burgh Quay and D'Olier Street (1-Way)	940	724	919	779	-2%	8%
D'Olier Street between Fleet Street and Burgh Quay (1-Way)	963	853	971	915	1%	7%
Duke Street between Fleet Street and College Street (1-Way)	808	741	694	767	-14%	4%
Eden Quay between Bachelors' Walk and Eden Quay (1-Way)	243	156	225	173	-7%	11%
Eden Quay between O'Connell Street and Harbour Court (1-Way)	125	100	135	117	8%	17%
Eden Quay between Harbour Court and Rosie Hackett Bridge (1-Way)	143	131	152	133	6%	2%
Essex Quay between Fishamble Street and Parliament Street (1-Way)	1092	1398	1313	1799	20%	29%
Fishamble Street between Essex Quay and Exchange Street Lower (2-Way)	310	106	400	378	29%	257%
Fishamble Street between Exchange Street Lower and Lord Edward Street (2-Way)	310	106	334	377	8%	257%
Fleet Street between Aston Place and Westmoreland Street (1-Way)	40	22	65	19	64%	-13%
Foster Place (2-Way)	276	180	287	195	4%	8%
Grafton Street between College Green and Suffolk Street (2-Way)	271	211	280	219	3%	4%
High Street between Nicholas Street and Back Lane (2-Way)	1116	992	1371	1502	23%	51%

High Street between Back Lane and Lamb Alley (2-Way)	1790	1658	2052	2027	15%	22%
Inns Quay between Chancery Place and Charles Street West (1-Way)	728	463	656	558	-10%	20%
Leinster Street South between Clare Street and Kildare Street (1-Way)	521	555	508	638	-3%	15%
Lord Edward Street between Fishamble Street and Exchange Street Upper (2-Way)	1114	752	1255	767	13%	2%
Lord Edward Street between Exchange Street Upper and Parliament Street (2-Way)	943	717	1106	698	17%	-3%
Nassau Street between Grafton Street and Dawson Street (2-Way)	271	211	280	219	3%	4%
Nassau Street between Dawson Street and South Frederick Street (1-Way)	166	105	169	107	2%	2%
Nassau Street between South Frederick Street and Kildare Street (1-Way)	664	639	656	727	-1%	14%
Ormond Quay Upper between Charles Street West and Capel Street (1-Way)	728	463	656	558	-10%	20%
Ormond Quay Lower between Capel Street and Swifts Row (1-Way)	877	526	777	639	-11%	21%
Ormond Quay Lower between Swifts Row and Liffey Street Lower (1-Way)	440	248	457	292	4%	18%
Saint Andrew Street between Trinity Street and Church Lane (1-Way)	84	68	244	80	190%	17%
Saint Michaels Hill between Cross Lane and Christchurch Place (1-Way)	790	512	755	576	-4%	12%
Watling Street between Usher's Island and Island Street (1-Way)	360	291	375	287	4%	-2%
Watling Street between Island Street and Thomas Street (1-Way)	217	199	237	197	10%	-1%
Wellington Quay between Bedford Row and Eustace Street (1-Way)	1001	1292	933	1395	-7%	8%
Wellington Quay between Eustace Street and Parliament Street (1-Way)	1048	1343	981	1445	-6%	8%
Winetavern Street between Cross Lane and Cook Street (1-Way)	626	677	585	754	-7%	11%
Winetavern Street between Cook Street and Wood Quay (1-Way)	590	577	582	636	-1%	10%

Wood Quay between Fishamble Street and Winetavern Street (1-Way)	782	1330	913	1773	17%	33%

Appendix 7.1

Detailed Meteorological Data

Dublin Airport 2011-2015 (numbers given as percentages)

Dublin Airport 2011

Dir \ Spd	<= 1.54	<= 3.09	<= 5.14	<= 8.23	<= 10.80	> 10.80	Total
0.0	0.65	0.61	0.46	0.08	0.00	0.00	1.79
22.5	0.35	0.35	0.57	0.19	0.00	0.00	1.47
45.0	0.16	0.57	0.87	0.42	0.02	0.00	2.04
67.5	0.09	0.33	1.42	0.29	0.06	0.00	2.18
90.0	0.29	0.59	2.36	0.66	0.25	0.01	4.17
112.5	0.57	1.11	2.16	0.70	0.09	0.03	4.66
135.0	0.42	0.75	3.34	2.64	0.61	0.18	7.95
157.5	0.37	0.64	2.15	2.05	0.48	0.11	5.80
180.0	0.29	0.56	1.61	1.31	0.61	0.03	4.41
202.5	0.25	0.57	2.02	3.09	1.07	0.35	7.36
225.0	0.27	0.68	3.54	4.99	2.34	1.35	13.17
247.5	0.22	0.61	3.97	5.26	3.44	1.56	15.06
270.0	0.59	1.46	5.57	7.49	3.22	1.82	20.15
292.5	0.63	1.06	1.69	1.37	0.35	0.00	5.10
315.0	0.40	0.50	0.89	0.56	0.09	0.03	2.48
337.5	0.41	0.54	0.78	0.25	0.02	0.00	2.00
Total	5.96	10.94	33.39	31.36	12.65	5.49	99.78
Calms							0.22
Missing							0.00
Total							100.00

Dublin Airport 2012

Dir \ Spd	<= 1.54	<= 3.09	<= 5.14	<= 8.23	<= 10.80	> 10.80	Total
0.0	0.60	0.58	0.75	0.40	0.23	0.07	2.63
22.5	0.28	0.32	0.79	0.64	0.26	0.40	2.69
45.0	0.28	0.32	1.37	1.34	0.20	0.06	3.57
67.5	0.10	0.34	1.16	1.20	0.42	0.10	3.32
90.0	0.35	0.77	2.37	0.81	0.15	0.00	4.45
112.5	0.60	1.31	2.45	0.81	0.18	0.03	5.38
135.0	0.44	0.99	2.99	2.94	0.54	0.14	8.04
157.5	0.43	1.00	1.82	1.58	0.19	0.02	5.05
180.0	0.38	0.56	1.12	0.55	0.17	0.06	2.82
202.5	0.23	0.44	1.94	1.75	0.57	0.15	5.08
225.0	0.20	0.52	3.47	4.26	1.62	0.25	10.33
247.5	0.25	0.74	3.35	5.61	2.85	0.77	13.57
270.0	0.36	0.98	6.80	7.41	2.66	1.28	19.49
292.5	0.42	0.72	2.85	1.76	0.26	0.05	6.06
315.0	0.46	0.38	2.15	1.25	0.22	0.00	4.45
337.5	0.28	0.34	1.00	1.00	0.27	0.00	2.90
Total	5.69	10.31	36.36	33.31	10.79	3.37	99.84
Calms							0.16
Missing							0.00
Total							100.00

Dublin Airport 2013

Dir \ Spd	<= 1.54	<= 3.09	<= 5.14	<= 8.23	<= 10.80	> 10.80	Total
0.0	0.48	0.70	0.95	0.48	0.03	0.00	2.64
22.5	0.25	0.39	0.56	0.50	0.02	0.00	1.72
45.0	0.26	0.55	1.18	0.73	0.13	0.01	2.85
67.5	0.15	0.41	1.75	0.63	0.19	0.14	3.26
90.0	0.34	0.82	3.62	2.41	0.81	0.23	8.23
112.5	0.57	1.22	2.42	1.48	0.43	0.25	6.38
135.0	0.32	0.73	3.14	3.17	0.80	0.21	8.37
157.5	0.41	0.50	1.40	1.23	0.21	0.06	3.81
180.0	0.38	0.35	1.10	1.06	0.62	0.16	3.66
202.5	0.18	0.57	1.71	2.05	0.55	0.47	5.54
225.0	0.23	0.58	3.52	4.03	1.75	0.92	11.03
247.5	0.17	0.68	3.52	4.91	2.28	1.11	12.67
270.0	0.48	1.11	5.96	5.42	2.71	0.94	16.61
292.5	0.50	0.78	2.98	1.67	0.31	0.14	6.37
315.0	0.34	0.49	1.60	1.47	0.35	0.06	4.32
337.5	0.25	0.50	0.84	0.35	0.27	0.01	2.24
Total	5.32	10.39	36.23	31.61	11.46	4.69	99.70
Calms							0.30
Missing							0.00
Total							100.00

Dublin Airport 2014

Dir \ Spd	<= 1.54	<= 3.09	<= 5.14	<= 8.23	<= 10.80	> 10.80	Total
0.0	0.71	0.50	1.26	0.50	0.02	0.00	2.99
22.5	0.37	0.37	0.80	0.46	0.13	0.00	2.11
45.0	0.34	0.39	1.63	0.66	0.02	0.00	3.05
67.5	0.18	0.34	1.59	0.55	0.00	0.00	2.66
90.0	0.27	0.83	2.91	1.26	0.21	0.00	5.48
112.5	0.48	1.38	2.58	1.15	0.33	0.23	6.15
135.0	0.24	0.78	3.32	2.03	0.45	0.40	7.21
157.5	0.19	0.59	1.99	1.38	0.51	0.37	5.03
180.0	0.31	0.79	1.44	1.19	0.55	0.09	4.36
202.5	0.16	0.67	2.01	2.25	1.24	0.58	6.92
225.0	0.17	0.61	3.53	3.98	2.47	0.75	11.51
247.5	0.25	0.74	4.04	5.45	2.83	1.55	14.86
270.0	0.82	1.50	5.58	4.89	2.17	0.79	15.74
292.5	0.51	0.74	2.81	1.14	0.22	0.10	5.53
315.0	0.45	0.43	1.84	1.05	0.09	0.00	3.86
337.5	0.30	0.37	0.95	0.62	0.05	0.00	2.27
Total	5.75	11.03	38.26	28.55	11.28	4.86	99.74
Calms							0.26
Missing							0.00
Total							100.00

Dublin Airport 2015

Dir \ Spd	<= 1.54	<= 3.09	<= 5.14	<= 8.23	<= 10.80	> 10.80	Total
0.0	0.58	0.80	0.88	0.33	0.01	0.00	2.60
22.5	0.22	0.35	0.71	0.08	0.00	0.00	1.36
45.0	0.17	0.33	1.50	0.23	0.00	0.00	2.23
67.5	0.05	0.32	1.02	0.32	0.00	0.00	1.70
90.0	0.38	0.83	2.35	1.06	0.15	0.00	4.77
112.5	0.55	0.89	1.97	1.00	0.16	0.01	4.59
135.0	0.51	0.91	3.25	2.83	0.57	0.06	8.14
157.5	0.49	0.64	1.36	0.95	0.65	0.09	4.18
180.0	0.53	0.55	1.15	1.24	0.62	0.25	4.34
202.5	0.38	0.50	2.24	3.25	1.50	0.81	8.68
225.0	0.23	0.41	2.96	5.80	2.95	1.53	13.87
247.5	0.35	0.47	2.71	5.19	3.29	1.87	13.88
270.0	0.55	1.19	5.11	6.47	2.83	1.23	17.39
292.5	0.58	0.78	2.51	1.82	0.39	0.09	6.16
315.0	0.33	0.46	1.56	0.89	0.23	0.05	3.52
337.5	0.48	0.62	0.99	0.19	0.06	0.00	2.34
Total	6.37	10.05	32.27	31.67	13.39	5.99	99.74
Calms							0.26
Missing							0.00
Total							100.00

Appendix 9.1

Report for the Purposes of
Appropriate Assessment Screening

Report for the purposes of Appropriate Assessment Screening

as required under Article 6(3) of the Habitats Directive

(Council Directive 92/43/EEC)

College Green Project

Prepared by: Moore Group – Environmental Services

May 2017

On behalf of Dublin City Council

& An Bord Pleanála

Client	Dublin City Council
Project	College Green Project
Title	Report for the purposes of Appropriate Assessment Screening College Green Project

Project Number	16230	**Document Reference**	16230 College Green Project AAS1 Rev2.docx
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Rev0	Issued for Client Review	G. O'Donohoe	20th January 2017
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Moore Archaeological and Environmental Services Limited			

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1. Introduction

1.1. General Introduction

This report contains information required for the competent authority to undertake an Appropriate Assessment (AA) process on the effects of a project consisting of the development of Traffic Management Measures and a Civic Plaza at College Green in Dublin City.

Screening is the process that addresses and records the reasoning and conclusions in relation to the first two tests of Article 6(3):

i) whether a plan or project is directly connected to or necessary for the management of the site, and

ii) whether a plan or project, alone or in combination with other plans and projects, is likely to have significant effects on a Natura 2000 site in view of its conservation objectives.

If the effects are deemed to be significant, potentially significant, or uncertain, or the screening process becomes overly complicated, then the process must proceed to Stage 2 (AA). Screening should be undertaken without the inclusion of mitigation, unless potential impacts clearly can be avoided through the modification or redesign of the plan or project, in which case the screening process is repeated on the altered plan or project.

When screening the project there are two possible outcomes:

- the project poses no risk of a significant effect and as such requires no further assessment; and
- the project has potential to have a significant effect (or this is uncertain) and AA of the project is necessary.

This report has been prepared by Moore Group - Environmental Services for An Bord Pleanála and assesses the potential for the proposed development to impact on sites of European-scale ecological importance in accordance with Articles 6(3) and 6(4) of the Habitats Directive. The report was compiled by Ger O'Donohoe (B.Sc. Applied Aquatic Sciences (GMIT, 1993) & M.Sc. Environmental Sciences (TCD, 1999)) who has over 20 years' experience in environmental impact assessment and has completed numerous Appropriate Assessment Screening Reports and Natura Impact Statements in terrestrial and aquatic habitats.

The report assesses the potential for the proposed development to impact on sites of European-scale ecological importance. It is necessary that the Project has regard to Article 6 of the Council Directive

92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (as amended) (referred to as the Habitats Directive). This is transposed into Irish Law by the European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. 477) (referred to as the Habitats Regulations).

1.2. Legislative Background - The Habitats and Birds Directives

The Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora) is the main legislative instrument for the protection and conservation of biodiversity in the EU. Under the Directive Member States are obliged to designate Special Areas of Conservation (SACs) which contain habitats or species considered important for protection and conservation in a European Union context.

The Birds Directive (Council Directive 79/409/EEC as codified by Directive 2009/147/EC), is concerned with the long-term protection and management of all wild bird species and their habitats in the EU. Among other things, the Directive requires that Special Protection Areas (SPAs) be established to protect migratory species and species which are rare, vulnerable, in danger of extinction, or otherwise require special attention.

Special Areas of Conservation (SACs) designated under the Habitats Directive and Special Protection Areas, designated under the Birds Directive, form a pan-European network of protected sites known as Natura 2000. The Habitats Directive sets out a unified system for the protection and management of SACs and SPAs.

Articles 6(3) and 6(4) of the Habitats Directive set out the requirement for an assessment of proposed plans and projects likely to affect Natura 2000 sites.

Article 6(3) establishes the requirement to screen all plans and projects and to carry out a further assessment if required (Appropriate Assessment (AA)):

> Article 6(3): *"Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subjected to an appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only*

after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public."

Article 6(4): *"If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, Member States shall take all compensatory measures necessary to ensure that the overall coherence of the Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted. Where the site concerned hosts a priority natural habitat type and/or a priority species the only considerations which may be raised are those relating to human health or public safety, to the beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest."*

This Report for Screening is a documentary record of the Appropriate Assessment process on the effects of a project consisting of the development of Traffic Management Measures and a Public Plaza at College Green in Dublin City, referred to in this case as the Project.

2. Methodology

The Commission's methodological guidance (EC, 2002) promotes a four-stage process to complete the AA, and outlines the issues and tests at each stage. An important aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required.

Stages 1-2 deal with the main requirements for assessment under Article 6(3). Stage 3 may be part of Article 6(3) or may be a necessary precursor to Stage 4. Stage 4 is the main derogation step of Article 6(4).

Stage 1 Screening: This stage examines the likely effects of a project either alone or in combination with other projects upon a Natura 2000 site and considers whether it can be objectively concluded that these effects will not be significant.

Stage 2 Appropriate Assessment: In this stage, there is a consideration of the impact of the project with a view to ascertain whether there will be any adverse effect on the integrity of the Natura 2000 site either alone or in combination with other projects or plans, with respect to the site's structure and function and its conservation objectives. Additionally, where there are predicted impacts, an assessment of the potential mitigation of those impacts.

Stage 3 Assessment of Alternative Solutions: This stage examines alternative ways of implementing the project that, where possible, avoid any adverse impacts on the integrity of the Natura 2000 site.

Stage 4 Assessment where no alternative solutions exist and where adverse impacts remain: Where imperative reasons of overriding public interest (IROPI) exist, an assessment to consider whether compensatory measures will or will not effectively offset the damage to the sites will be necessary.

To ensure that the Project complies fully with the requirements of Article 6 of the Habitats Directive and all relevant Irish transposing legislation, Moore Group compiled this report for screening of the Project to determine if Stage 2 AA is required.

2.1. Guidance

The AA has been compiled in accordance with guidance contained in the following documents:

- Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities. (Department of Environment, Heritage and Local Government, 2010 rev.).
- Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities. Circular NPWS 1/10 & PSSP 2/10.
- Assessment of Plans and Projects Significantly Affecting Natura 2000 sites: Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission Environment Directorate-General, 2001); hereafter referred to as the EC Article Guidance Document.
- Managing Natura 2000 Sites: The Provisions of Article 6 of the Habitat's Directive 92/43/EEC (EC Environment Directorate-General, 2000); hereafter referred to as MN2000.

2.2. Data Sources

Sources of information that were used to collect data on the Natura 2000 network of sites are listed below:

- Ordnance Survey of Ireland mapping and aerial photography available from www.osi.ie and Bing and Google Earth aerial photography (2017).

- Online data available on Natura 2000 sites as held by the National Parks and Wildlife Service (NPWS) from www.npws.ie including; the Natura 2000 network Data Form; Site Synopsis; Generic Conservation Objective data;
    - Online database of rare, threatened and protected species,
    - Publicly accessible biodiversity datasets.
- Status of EU Protected Habitats in Ireland. (National Parks & Wildlife Service, 2013),
- Relevant Development Plans and Local Area Plans in neighbouring areas.

3. Description of the Project

The project is the College Green Traffic Management Measures and Civic Plaza which will be carried out at College Green and surrounding streets. The proposal will allow for the creation of a civic plaza area in College Green from Church Lane to Lower Grafton Street with all through traffic except pedestrians and cyclists being removed., see Figure 1 for the site location in Dublin City.

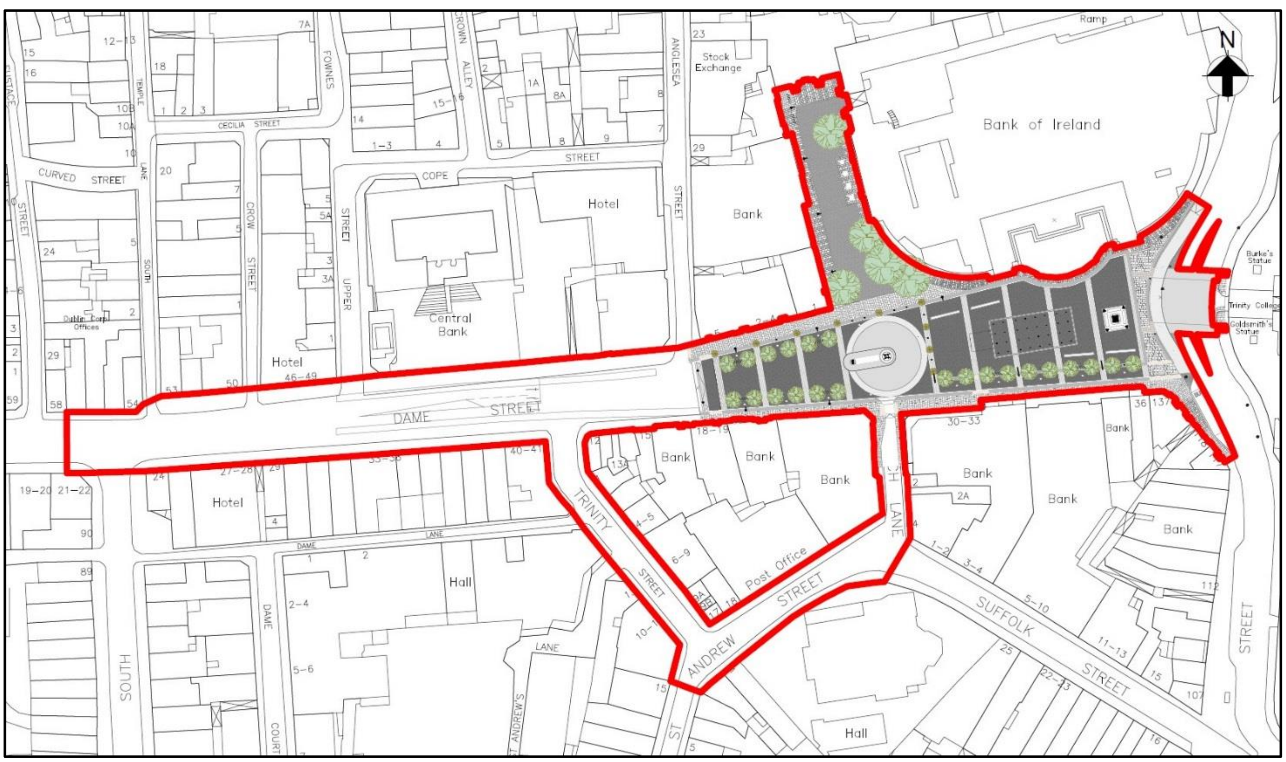

Figure 1. Scheme extents of the College Green Traffic Management Measures and Civic Plaza project in Dublin City.

The proposed development will consist of;

Traffic Management Proposals on College Green including:

- No through east-west traffic movements in the College Green area except for pedestrians and cyclists.
- Two-way segregated cycle track at the Bank of Ireland opposite Trinity College.
- Bus turn-around arrangement on Dame Street, west of the Plaza area.

The project involves the carrying out of works as well as the change of the character and intensity of use over an extensive area of the city centre business district. The proposed development, therefore, constitutes 'development' arising from;

- The carrying out of works over a large extent of a city centre [urban] location.
- The significant alteration of the nature and character of the use [alteration from vehicular to pedestrian use, alteration of appearance].
- The significant alteration of the intensity of the use [increase in pedestrian and reduction in vehicular movements].

The core area of works, involving the alteration of surface pavement, kerbs, street furniture, signage and utilities extends east-west from the Central Bank Plaza to the front of Trinity College. It extends north-south from the end of Grafton Street to Westmoreland Street. This core area falls within an area of approximately 1.3 hectares.

4. Identification of Natura 2000 Sites

4.1. Description of Natura Sites Potentially Affected

Departmental guidance suggests an assessment of Natura 2000 sites within a zone of influence of 15 km which can be revised down depending on the proposed development and location of Natura 2000 sites. There are 16 Natura 2000 sites located within a 15km radius of the project study area including the following:

- 000199 Baldoyle Bay SAC (10.5 km)
- 000202 Howth Head SAC (11.5 km)
- 000205 Malahide Estuary SAC (14 km)
- 000206 North Dublin Bay SAC (5.5 km)
- 000210 South Dublin Bay SAC (2.5 km)

- 001209 Glenasmole Valley SAC (13 km)
- 002193 Ireland's Eye SAC (14.5 km)
- 003000 Rockabill to Dalkey Island SAC (11.5 km)
- 004006 North Bull Island SPA (7 km)
- 004016 Baldoyle Bay SPA (10.5 km)
- 004024 South Dublin Bay and River Tolka Estuary SPA (3.5 km)
- 004025 Malahide Estuary SPA (14 km)
- 004040 Wicklow Mountains SPA (12 km)
- 004113 Howth Head Coast SPA (11.5 km)
- 004117 Ireland's Eye SPA (14.5 km)
- 004172 Dalkey Island SPA (13 km)

Of the 16 Natura 2000 sites identified, a number of these are not considered to have any direct ecological or hydrological connectivity to the proposed development site, by which a significant impact could arise. These sites include:

- 000199 Baldoyle Bay SAC
- 000202 Howth Head SAC
- 000205 Malahide Estuary SAC
- 001209 Glenasmole Valley SAC
- 002193 Ireland's Eye SAC
- 003000 Rockabill to Dalkey Island SAC
- 004016 Baldoyle Bay SPA
- 004025 Malahide Estuary SPA
- 004040 Wicklow Mountains SPA
- 004113 Howth Head Coast SPA
- 004117 Ireland's Eye SPA
- 004172 Dalkey Island SPA

It is determined that there is no potential for significant effect on these sites and they are screened out at this preliminary stage for the following reasons:

- Distance from the development site,
- There is no direct connection between the site of the proposed development and these three sites,
- The potential for indirect impacts is unlikely due to distance and lack of connectivity.

The development location at College Green is then considered in terms of source-pathway-receptor relationship and proximity to the River Liffey with regards direct ecological and hydrological connectivity to Dublin Bay. There are four Natura 2000 sites located within a potential zone of influence of the development:

- 000206 North Dublin Bay SAC
- 000210 South Dublin Bay SAC
- 004006 North Bull Island SPA
- 004024 South Dublin Bay and River Tolka Estuary SPA

The location of the development site is presented in Figure 2 below in relation to the Natura 2000 sites considered within the potential zone of influence. These are listed in Tables 1 and 2 below and Site Synopses are available on the NPWS metadata site. Spatial boundary data on the Natura 2000 network was extracted from the NPWS website on 20th January 2017.

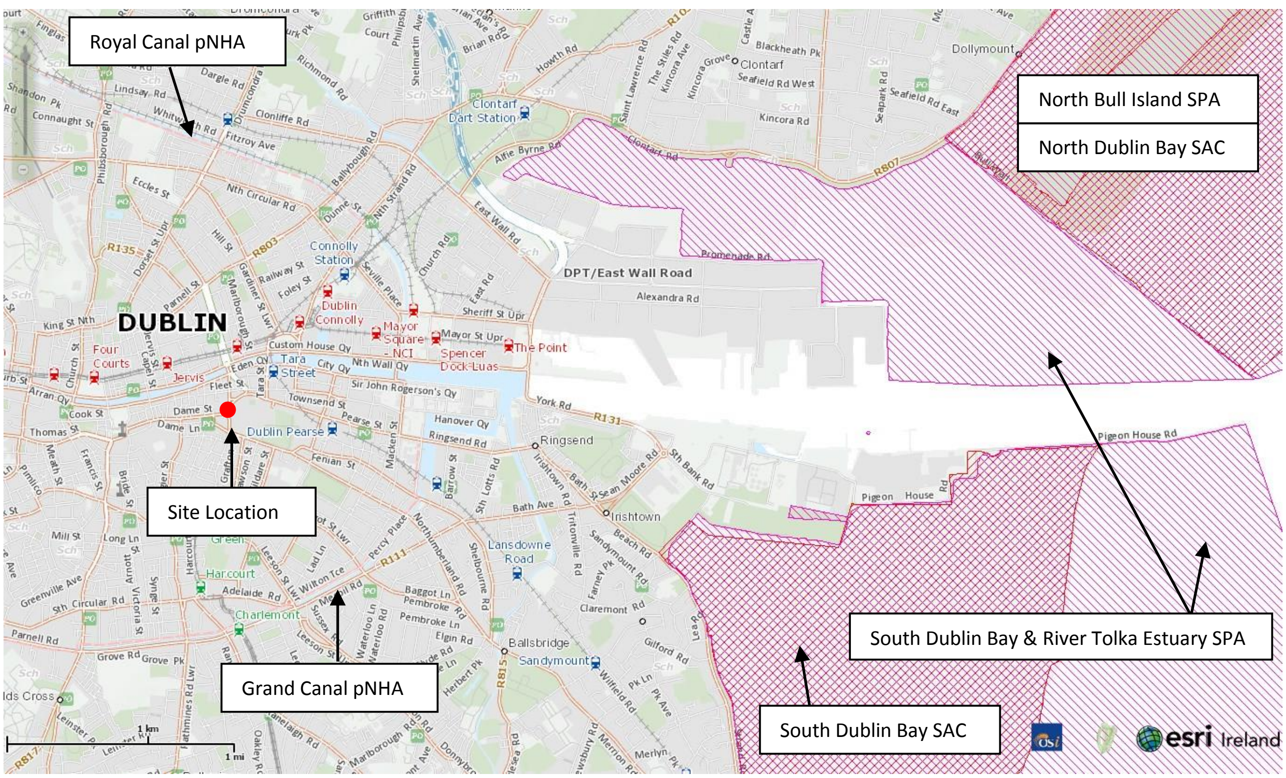

Figure 2. Site Location at College Green in relation to downstream Natura 2000 sites.

Table 1. SACs located within the zone of influence of the Project (*indicates priority habitat).

Site Code	Site Name	Qualifying Habitats	Qualifying Species
000206	North Dublin Bay SAC	[1140] Mudflats and sandflats not covered by seawater at low tide [1210] Annual vegetation of drift lines [1310] Salicornia and other annuals colonizing mud and sand [1330] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1410] Mediterranean salt meadows (*Juncetalia maritimi*) [2110] Embryonic shifting dunes [2120] Shifting dunes along the shoreline with Ammophila arenaria ("white dunes") [2130] * Fixed coastal dunes with herbaceous vegetation ("grey dunes") [2190] Humid dune slacks	[1395] *Petalophyllum ralfsii*
000210	South Dublin Bay SAC	[1140] Mudflats and sandflats not covered by seawater at low tide	

Table 2. SPAs located within the zone of influence of the Project.

Site Code	Site Name	Qualifying Habitats	Qualifying Species
004006	North Bull Island SPA	Wetlands [A999]	Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Teal (*Anas crecca*) [A052] Pintail (*Anas acuta*) [A054] Shoveler (*Anas clypeata*) [A056] Oystercatcher (*Haematopus ostralegus*) [A130] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Knot (*Calidris canutus*) [A143] Sanderling (*Calidris alba*) [A144] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162] Turnstone (*Arenaria interpres*) [A169] Black-headed Gull (*Larus ridibundus*) [A179]

004024	South Dublin Bay and River Tolka Estuary SPA	Wetlands [A999]	Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Oystercatcher (*Haematopus ostralegus*) [A130] Ringed Plover (*Charadrius hiaticula*) [A137] Grey Plover (*Pluvialis squatarola*) [A141] Knot (*Calidris canutus*) [A143] Sanderling (*Calidris alba*) [A144] Dunlin (*Calidris alpina*) [A149] Bar-tailed Godwit (*Limosa lapponica*) [A157] Redshank (*Tringa totanus*) [A162] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Roseate Tern (*Sterna dougallii*) [A192] Common Tern (*Sterna hirundo*) [A193] Arctic Tern (*Sterna paradisaea*) [A194]

4.2. Conservation Objectives of the Natura 2000 Sites

The following Conservation Objectives, available from the NPWS, are set out for the SAC. Specific attributes, measures and targets are presented in the Conservation Objectives document and will be addressed in more detail if required after potential impacts have been determined.

North Dublin Bay SAC [000206]. Version 1. 6th November 2013;

1140 Mudflats and sandflats not covered by seawater at low tide

To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Habitat area: Hectares- The permanent habitat area is stable or increasing, subject to natural processes.

Community extent: Hectares- Maintain the extent of the Mytilus edulis-dominated community, subject to natural processes.

Community structure: Mytilus edulis density: Individuals/m^2- Conserve the high quality of the *Mytilus edulis* dominated community, subject to natural processes.

Community distribution: Hectares- Conserve the following community types in a natural condition: Fine sand to sandy mud with *Pygospio elegans* and *Crangon crangon* community complex; Fine sand with *Spio martinensis* community complex.

1210 Annual vegetation of drift lines

To restore the favourable conservation condition of Annual vegetation of drift lines in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Habitat area: Hectares- Area increasing, subject to natural processes, including erosion and succession. Total area mapped: South Bull - 0.11ha.

Habitat distribution: Occurrence- No decline, or change in habitat distribution, subject to natural processes.

Physical structure: functionality and sediment supply: Presence/ absence of physical barriers- Maintain the natural circulation of sediment and organic matter, without any physical obstructions.

Vegetation structure: zonation: Occurrence- Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.

Vegetation composition: typical species and sub-communities: Percentage cover- at a representative number of monitoring stops Maintain the presence of species-poor communities with typical species: sea rocket (*Cakile maritima*), sea sandwort (*Honckenya peploides*), prickly saltwort (*Salsola kali*) and oraches (*Atriplex* spp.).

Vegetation composition: negative indicator species: Percentage cover- Negative indicator species (including non-natives) to represent less than 5% cover

1310 Salicornia and other annuals colonising mud and sand

To restore the favourable conservation condition of Salicornia and other annuals colonizing mud and sand in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Habitat area: Hectares Area- stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: North Bull Island - 29.10ha.

Habitat distribution: Occurrence- No decline, or change in habitat distribution, subject to natural processes.

Physical structure: sediment supply: Presence/ absence of physical barriers- Maintain, or where necessary restore, natural circulation of sediments and organic matter, without any physical obstructions.

Physical structure: creeks and pans: Occurrence- Maintain creek and pan structure, subject to natural processes, including erosion and succession.

Physical structure: flooding regime: Hectares- flooded; frequency Maintain natural tidal regime.

Vegetation structure: zonation: Occurrence- Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.

Vegetation structure: vegetation height: Centimetres- Maintain structural variation within sward.

Vegetation structure: vegetation cover: Percentage cover at a representative number of monitoring stops- Maintain more than 90% of area outside creeks vegetated.

Vegetation composition: typical species and sub-communities: Percentage cover- Maintain the presence of species-poor communities listed in SMP (McCorry and Ryle, 2009).

Vegetation structure: negative indicator species - *Spartina anglica*: Hectares- No significant expansion of common cordgrass (*Spartina anglica*), with an annual spread of less than 1%.

1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

To maintain the favourable conservation condition of Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Habitat area: Hectares- Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: North Bull Island - 81.84ha.

Habitat distribution: Occurrence- No decline or change in habitat distribution, subject to natural processes.

Physical structure: creeks and pans: Occurrence- Maintain creek and pan structure, subject to natural processes, including erosion and succession.

Physical structure: flooding regime: Hectares- flooded; frequency Maintain natural tidal regime.

Vegetation structure: zonation: Occurrence- Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.

Vegetation structure: vegetation height: Centimetres- Maintain structural variation within sward.

Vegetation structure: vegetation cover: Percentage cover at a representative number of monitoring stops- Maintain more than 90% area outside creeks vegetated.

Vegetation composition: typical species and sub-communities: Percentage cover at a representative sample of monitoring stops- Maintain range of sub-communities with typical species listed in SMP (McCorry and Ryle, 2009).

Vegetation structure: negative indicator species - Spartina anglica: Hectares- No significant expansion of common cordgrass (Spartina anglica), with an annual spread of less than 1%.

1410 Mediterranean salt meadows (Juncetalia maritimi)

To maintain the favourable conservation condition of Mediterranean salt meadows (*Juncetalia maritimi*) in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Habitat area: Hectares- Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: North Bull Island - 7.98ha.

Habitat distribution: Occurrence- No decline or change in habitat distribution, subject to natural processes.

Physical structure: sediment supply: Presence/absence of physical barriers- Maintain/restore natural circulation of sediments and organic matter, without any physical obstructions.

Physical structure: creeks and pans: Occurrence- Maintain creek and pan structure, subject to natural processes, including erosion and succession.

Physical structure: flooding regime: Hectares- flooded; frequency Maintain natural tidal regime.

Vegetation structure: zonation: Occurrence- Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.

Vegetation structure: vegetation height: Centimetres- Maintain structural variation in the sward.

Vegetation structure: vegetation cover: Percentage cover at a representative sample of monitoring stops- Maintain more than 90% of area outside creeks vegetated.

Vegetation composition: typical species and sub-communities: Percentage cover at a representative number of monitoring stops- Maintain range of sub-communities with characteristic species listed in SMP (McCorry and Ryle, 2009).

Vegetation structure: negative indicator species - *Spartina anglica*: Hectares- No significant expansion of common cordgrass (*Spartina anglica*), with an annual spread of less than 1%.

2110 Embryonic shifting dunes

To restore the favourable conservation condition of Embryonic shifting dunes in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Habitat area: Hectares- Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: North Bull - 2.64ha; South Bull - 3.43ha.

Habitat distribution: Occurrence- No decline or change in habitat distribution, subject to natural processes.

Physical structure: functionality and sediment supply: Presence/absence of physical barriers- Maintain the natural circulation of sediment and organic matter, without any physical obstructions.

Vegetation structure: zonation: Occurrence- Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.

Vegetation composition: plant health of foredune grasses: Percentage cover- More than 95% of sand couch (*Elytrigia juncea*) and/or lyme-grass (*Leymus arenarius*) should be healthy (i.e. green plant parts above ground and flowering heads present).

Vegetation composition: typical species and sub-communities: Percentage cover at a representative number of monitoring stops- Maintain the presence of species-poor communities with typical species: sand couch (*Elytrigia juncea*) and/or lyme-grass (*Leymus arenarius*).

Vegetation composition: negative indicator species: Percentage cover- Negative indicator species (including non-native species) to represent less than 5% cover.

2120 Shifting dunes along the shoreline with Ammophila arenaria (white dunes)

To restore the favourable conservation condition of Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes') in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Habitat area: Hectares- Area stable or increasing, subject to natural processes including erosion and succession. North Bull - 2.20ha; South Bull - 0.97ha.

Habitat distribution: Occurrence- No decline, or change in habitat distribution, subject to natural processes.

Physical structure: functionality and sediment supply: Presence/ absence of physical barriers- Maintain the natural circulation of sediment and organic matter, without any physical obstructions.

Vegetation structure: zonation: Occurrence- Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.

Vegetation composition: plant health of dune grasses: Percentage cover- 95% of marram grass (*Ammophila arenaria*) and/or lyme-grass (*Leymus arenarius*) should be healthy (i.e. green plant parts above ground and flowering heads present).

Vegetation composition: typical species and sub-communities: Percentage cover at a representative number of monitoring stops- Maintain the presence of species-poor communities dominated by marram grass (*Ammophila arenaria*) and/or lyme grass (*Leymus arenarius*).

Vegetation composition: negative indicator species: Percentage cover- Negative indicator species (including non-natives) to represent less than 5% cover.

2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)

To restore the favourable conservation condition of Fixed coastal dunes with herbaceous vegetation ('grey dunes') in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Habitat area: Hectares- Area stable or increasing, subject to natural processes including erosion and succession. For subsites mapped: North Bull - 40.29ha; South Bull - 64.56ha.

Habitat distribution: Occurrence- No decline, or change in habitat distribution, subject to natural processes.

Physical structure: functionality and sediment supply: Presence/ absence of physical barriers- Maintain the natural circulation of sediment and organic matter, without any physical obstructions.

Vegetation structure: zonation: Occurrence- Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.

Vegetation structure: bare ground: Percentage cover- Bare ground should not exceed 10% of fixed dune habitat, subject to natural processes.

Vegetation structure: sward height: Centimetres- Maintain structural variation within sward.

Vegetation composition: typical species and sub-communities: Percentage cover at a representative number of monitoring stops- Maintain range of sub-communities with typical species listed in Delaney et al. (2013).

Vegetation composition: negative indicator species (including *Hippophae rhamnoides*): Percentage cover- Negative indicator species (including non-natives) to represent less than 5% cover.

Vegetation composition: scrub/trees: Percentage cover- No more than 5% cover or under control.

2190 Humid dune slacks

To restore the favourable conservation condition of Humid dune slacks in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Habitat area: Hectares- Area increasing, subject to natural processes including erosion and succession. For sub-sites mapped: North Bull - 2.96ha; South Bull - 9.15ha.

Habitat distribution: Occurrence- No decline or change in habitat distribution, subject to natural processes.

Physical structure: functionality and sediment supply: Presence/ absence of physical barriers- Maintain the natural circulation of sediment and organic matter, without any physical obstructions.

Physical structure: hydrological and flooding regime: Water table levels; groundwater fluctuations (metres)- Maintain natural hydrological regime.

Vegetation structure: zonation: Occurrence- Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.

Vegetation structure: bare ground: Percentage cover- Bare ground should not exceed 5% of dune slack habitat, with the exception of pioneer slacks which can have up to 20% bare ground.

Vegetation structure: vegetation height: Centimetres- Maintain structural variation within sward.

Vegetation composition: typical species and sub-communities: Percentage cover at a representative number of monitoring stops- Maintain range of sub-communities with typical species listed in Delaney et al. (2013).

Vegetation composition: cover of *Salix repens*: Percentage cover; centimetres- Maintain less than 40% cover of creeping willow (*Salix repens*).

Vegetation composition: negative indicator species: Percentage cover- Negative indicator species (including non-natives) to represent less than 5% cover.

Vegetation composition: scrub/trees: Percentage cover- No more than 5% cover or under control.

1395 Petalwort Petalophyllum ralfsii

To maintain the favourable conservation condition of Petalwort in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Distribution of populations: Number and geographical spread of populations- No decline.

Population size: Number of individuals- No decline. Population at Bull Island estimated at a maximum of 5,824 thalli. Actual population is more likely to be 5% of this, or c. 300 thalli.

Area of suitable habitat: Hectares- No decline. Area of suitable habitat at Bull Island is estimated at c. 0.04ha.

Hydrological conditions: soil moisture: Occurrence- Maintain hydrological conditions so that substrate is kept moist and damp throughout the year, but not subject to prolonged inundation by flooding in winter.

Vegetation structure: height and cover: Centimetres and percentage- Maintain open, low vegetation with a high percentage of bryophytes (small acrocarps and liverwort turf) and bare ground.

South Dublin Bay SAC [000210]. Version 1. 22nd August 2013;

1140 Mudflats and sandflats not covered by seawater at low tide

To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in South Dublin Bay SAC, which is defined by the following list of attributes and targets:

Habitat area: Hectares- The permanent habitat area is stable or increasing, subject to natural processes.
Community extent: Hectares- Maintain the extent of the Zostera-dominated community, subject to natural processes.

Community structure: Zostera density: Shoots/m²- Conserve the high quality of the Zostera-dominated community, subject to natural processes.

Community distribution: Hectares- Conserve the following community type in a natural condition: Fine sands with *Angulus tenuis* community complex.

North Bull Island SPA [004006]. Version 1. 9th March 2015;

To maintain the favourable conservation condition of [Bird Species]in North Bull Island SPA, which is defined by the following list of attributes and targets:
Population trend: Percentage change- Long term population trend stable or increasing
Distribution: Range, timing and intensity of use of areas- No significant decrease in the range, timing or intensity of use of areas by [Bird Species], other than that occurring from natural patterns of variation.

A999 Wetlands
To maintain the favourable conservation condition of the wetland habitat in North Bull Island SPA as a resource for the regularly occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:

Habitat area: Hectares- The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 1,713 hectares, other than that occurring from natural patterns of variation.

South Dublin Bay and River Tolka Estuary SPA [004024]. Version 1. 9th March 2015;

To maintain the favourable conservation condition of [Bird Species] in South Dublin Bay and River Tolka Estuary SPA, which is defined by the following list of attributes and targets:
Population trend: Percentage change- Long term population trend stable or increasing.
Distribution: Range, timing and intensity of use of areas- No significant decrease in the range, timing or intensity of use of areas by [Bird Species], other than that occurring from natural patterns of variation.

The following species have the same COs:

A192 Roseate Tern Sterna dougallii

A193 Common Tern Sterna hirundo

A194 Arctic Tern Sterna paradisaea

To maintain the favourable conservation condition of Roseate/ Common/Arctic Tern in South Dublin Bay and River Tolka Estuary SPA, which is defined by the following list of attributes and targets:
Passage population: Number of individuals- No significant decline.
Distribution: roosting areas: Number; location; area (hectares)- No significant decline.
Prey biomass available: Kilogrammes- No significant decline.
Barriers to connectivity: Number; location; shape; area (hectares)- No significant increase.
Disturbance at roosting site: Level of impact- Human activities should occur at levels that do not adversely affect the numbers of Arctic tern among the post-breeding aggregation of terns.

A999 Wetlands

To maintain the favourable conservation condition of the wetland habitat in South Dublin Bay and River Tolka Estuary SPA as a resource for the regularly occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:

Habitat area: Hectares- The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 2,192 hectares, other than that occurring from natural patterns of variation.

4.3. Assessment Criteria

4.3.1. Examples of Direct, Indirect or Secondary Impacts

To identify those sites that could be potentially affected, it is necessary to describe the Natura 2000 site in the context of why it has been designated i.e. in terms of its Qualifying Interests and the environmental and ecological conditions that maintain the condition of these features. The underpinning conditions that are required to maintain the 'health' of these features are listed in Table 3 below.

Table 3. Qualifying Interests and Key environmental conditions supporting site integrity.

Qualifying Interests	Key environmental conditions supporting site integrity	Current Threats to Qualifying Interests
Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	Marine and groundwater dependent. Medium sensitivity to hydrological change. Changes in salinity and tidal regime. Overgrazing, erosion and accretion.	Overgrazing; erosion; invasive species, particularly common cordgrass (Spartina anglica); infilling and reclamation.
Annual vegetation of drift lines	Marine and groundwater dependent. Sensitivity to hydrological change. Changes in salinity and tidal regime. Overgrazing, erosion and accretion.	Grazing, Sand and gravel extraction – removal of beach materials, Walking, horse riding and non-motorised vehicles, Outdoor sports and leisure activities – 21otorized vehicles, Other leisure and tourism impacts (beach cleaning), Trampling, overuse, Sea defence or coastal protection works
Embryonic shifting dunes	Marine and groundwater dependent. Substrate is highly unstable, availability of nutrients is low and there is an absence of organic soil and humus. The habitat is subject to salt spray and occasional tidal inundation. Exposure increases the risk of water loss.	Walking, horseriding and non-motorised vehicles, Motorised vehicles, Trampling, overuse, Sea defence or coastal protection works, Erosion, Other natural processes (depletion of sediment source)
* Fixed coastal dunes with herbaceous vegetation ("grey dunes")	Marine and groundwater dependent. Once a complete sward is established and sand mobility has effectively ceased, dunes are said to be stable or 'fixed' and are referred to as 'fixed dunes'. A combination of geomorphologic, edaphic, climatic and anthropogenic factors determine the composition of the fixed dune vegetation that develops at a particular site.	Mowing/cutting, Agricultural improvement, Fertilisation, Grazing, Abandonment of pastoral systems, Overgrazing by sheep, Overgrazing by cattle, Overgrazing by hares, rabbits, small mammals, Undergrazing, Restructuring agricultural holding, Stock feeding, Burning, Sand and gravel extraction, Urbanised areas, human habitation, urbanization, Dispersed habitation, Disposal of household waste, Other urbanisation, industrial or similar activities, Paths, tracks, cycling routes, Routes, autoroutes, course, Sports pitch, Camping and caravans, Walking, horseriding and non-motorised vehicles,

		Motorised vehicles, , Trampling, overuse, pollution or human activities, Sea defence or coastal protection works, Erosion, Invasion by a species, Competition
Humid dune slacks	Marine and groundwater dependent. Sensitivity to hydrological change. Changes in salinity and tidal regime.	Agricultural improvement, Fertilisation, Grazing, Overgrazing by sheep, Overgrazing by cattle, Overgrazing by hare, rabbits, small mammals, Undergrazing, Restructuring agricultural land holding, Forestry, Stock feeding, Golf course, Walking, horseriding and non-motorised vehicles, Motorised vehicles, Trampling, overuse, Drainage, human induced changes in hydraulic conditions, Drying out, Invasion by a species
Mediterranean salt meadows (*Juncetalia maritimi*)	Marine and groundwater dependent. Sensitivity to hydrological change. Changes in salinity and tidal regime. Overgrazing, erosion and accretion	Overgrazing; erosion; invasive species, particularly common cordgrass (Spartina anglica); infilling and reclamation.
Mudflats and sandflats not covered by seawater at low tide	Surface and marine water dependent. Low sensitivity to hydrological changes. Aquaculture, fishing and pollution.	Aquaculture, fishing, dumping of wastes and water pollution.
Petalophyllum ralfsii	Lime-rich sandy habitat. Overgrazing. Water supply for damp conditions.	Grazing Imbalance, Physical Disturbance, Pollution, Desiccation, trampling from stock and recreation, changes in land use.
Salicornia and other annuals colonizing mud and sand	Marine and groundwater dependent. Medium sensitivity to hydrological change. Changes in salinity and tidal regime. Infilling, reclamation, invasive species.	Invasive Species; erosion and accretion.
Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes")	Marine habitat subject to accretion (sand accumulation) and ablation (sand removal). Plants highly specialised and can cope with some degree of salinity (in the form of salt spray and occasional periods of inundation), an unstable substrate and limited levels of nutrients and moisture.	Grazing, Sand and gravel extraction, Removal of beach materials, Paths, tracks, cycling routes, Walking, horseriding and non-motorised vehicles, Motorised vehicles, Trampling, overuse, Sea defence or coastal protection works, Erosion, Other natural processes (depletion of sediment source)

Wetlands & Waterbirds	Highly sensitive to hydrological changes and loss of wetland habitat. Sensitive to disturbance.	A number of pressures have been identified by Crowe (2005). These pressures include: the modification of wetland sites, particularly for industry or housing and increased levels of disturbance, largely related to recreational activity. Eutrophication at a number of wetland sites as a result of nutrient inputs from a range of polluting activities were also identified as a potential pressure. However this latter pressure is now being alleviated through stricter control of activities associated with water discharge/runoff etc. Climate change was also noted as a significant factor underlying changes in trends of wintering waterbirds in Ireland.

4.3.2. Ecological Network Supporting Natura 2000 Sites

An analysis of the proposed Natural Heritage Areas and designated Natural Heritage Areas in terms of their role in supporting the species using Natura 2000 sites was undertaken. It was assumed that these supporting roles mainly related to mobile fauna such as mammals and birds which may use pNHAs and NHAs as “stepping stones” between Natura 2000 sites.

Article 10 of the Habitats Directive and the Habitats Regulations 2011 place a high degree of importance on such non-Natura 2000 areas as features that connect the Natura 2000 network. Features such as ponds, woodlands and important hedgerows were considered during the rest of the AA process.

The ESB Dolphins in Dublin Docks are a pNHA and are included in the South Dublin Bay and River Tolka Estuary SPA. The Royal and Grand Canals pNHAs have no relevant connectivity with the project and will not be affected.

5. Identification of Potential Impacts & Assessment of Significance

The project is not directly connected with or necessary to the management of the sites considered in the assessment and therefore potential impacts must be identified and considered.

5.1. Potential Impacts

This section uses the information collected on the sensitivity of each Natura 2000 site and describes any likely significant effects of implementation of the Project. This assumes the absence of any controls, conditions or assumption mitigation measures.

The likely significant effects of the Project are presented in Table 4 below, both in isolation and potentially in combination with other plans and projects.

A worst-case scenario would occur whereby the project would result in a significant detrimental change in water quality in Dublin Bay either alone or in combination with other projects or plans. The effect would have to be considered in terms of changes in water quality which would affect the habitats or food sources for which the SACs and SPA species are designated.

The proposed development includes works, involving the alteration of surface pavement, kerbs, street furniture, signage and utilities extends east-west from the Central Bank Plaza to the front of Trinity College extending north-south from the end of Grafton Street to Westmoreland Street.

However, given the lack of source-pathway-receptor links to the River Liffey, a deterioration of water quality in Dublin Bay downstream as a result of surface water contamination is highly unlikely.

The works will be carried out under a Construction & Environmental Management Plan which includes design measures to avoid unforeseen discharges to surface water.

Table 4. Outlining the potential impacts in the absence of mitigation of the Project.

Site	Distance from Project	Potential Direct Impacts e.g. Habitat Loss	Potential Indirect Impacts e.g. alteration to hydrological regime	Surface or Groundwater Contamination	Disturbance to Protected Species (Habitats Directive Annex II & IV)	Stage 2 AA Required
000206 North Dublin Bay SAC	5.5 km	No	None	No	No	No
000210 South Dublin Bay SAC	2.5 km	No	None	No	No	No
004006 North Bull Island SPA	7 km	No	None	No	No	No
004024 South Dublin Bay and River Tolka Estuary SPA	3.5 km	No	None	No	No	No

5.2. Assessment of Potential Cumulative Effects

Cumulative impacts or effects are changes in the environment that result from numerous human-induced, small-scale alterations. Cumulative impacts can be thought of as occurring through two main pathways: first, through persistent additions or losses of the same materials or resource, and second, through the compounding effects as a result of the coming together of two or more effects.

As part of the Screening for an Appropriate Assessment, in addition to the proposed works, other relevant projects and plans in the region must also be considered at this stage. This step aims to identify at this early stage any possible significant in-combination or cumulative effects / impacts of the proposed development with other such plans and projects on the Natura 2000 sites.

Other schemes that are not integral to the College Green Traffic Management Measures but which would be relevant for consideration of cumulative effects include but are not limited to:

- South Quays (Aston Quay and Wellington Quay) –Additional bus lane and bus stops (i.e. double bus lane), Reduction of general traffic lanes from two lanes to one lane;

- O'Connell Bridge – Revised arrangements including no right turn from Bachelors Walk; single straight ahead and single public transport only right turn northbound on O'Connell Bridge; single straight ahead and single public transport only right turn southbound on O'Connell Bridge;
- North Quays (Eden Quay) – Public Transport only between O'Connell Bridge and Rosie Hackett Bridge;
- North Quays (Ormond Quay and Bachelors Walk) – Additional bus lane and bus stops (i.e. double bus lane), Reduction of general traffic lanes from two lanes to one lane from Millennium bridge;
- Burgh Quay - Additional bus priority measures;
- Grafton Street Lower - 2-way traffic buses, taxis and Luas only.
- Liffey cycle route
- Carpark signage scheme
- City wide Directional signage scheme

Any development in central Dublin City with potential surface water connectivity to the River Liffey is required to comply with Best Practice Construction Methodology to avoid surface water contamination/runoff. In this way, these developments would be unlikely to have in-combination effects.

The Dublin City Development Plan in complying with the requirements of the Habitats Directive requires that all Projects and Plans that could affect the Natura 2000 sites in the same zone of influence of the project site would be initially screened for Appropriate Assessment and if requiring Stage 2 AA, that appropriate employable mitigation measures would be put in place to avoid, reduce or ameliorate negative impacts. In this way, any in-combination impacts with Plans or Projects for the area in which the development is located, would be avoided.

Any new applications for the project area will be assessed on a case by case basis by Dublin City Council which will determine the requirement for AA Screening as per the requirements of Article 6(3) of the Habitats Directive.

6. Screening Statement

The conclusion of this Screening Report is that given the lack of biological and hydrological connectivity and the employment of best practice construction methods, there would be no significant impacts on the Qualifying interests or Conservation Objectives of the European sites considered in this assessment.

It has been objectively concluded by Moore Group Environmental Services that:

1. The project is not directly connected with, or necessary to the conservation management of the European sites considered in this assessment.
2. The implementation of the project will not have a direct impact on the European sites considered in this assessment.
3. The project has been designed to include appropriate treatment of wastewater and therefore avoids indirect impacts on the European sites considered in this assessment.
4. The project, alone or in combination with other projects or plans, is not likely to have a significant effect on the European sites considered in this assessment in view of their conservation objectives.

It is the view of Moore Group Environmental Services that it is not necessary to undertake any further stage of the Appropriate Assessment process.

A finding of no significant effects report is presented in Appendix A in accordance with the EU Commission's methodological guidance (European Commission, 2001).

7. References

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NPWS (2015) Conservation Objectives: North Bull Island SPA 004006. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht

NPWS (2015) Site synopsis of the South Dublin Bay and River Tolka Estuary SPA. Version date: 30.05.2015. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2015) Conservation Objectives: South Dublin Bay and River Tolka Estuary SPA 004024. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Appendix A

FINDING **O**F **N**O **S**IGNIFICANT **E**FFECTS REPORT

Finding no significant effects report matrix

Name of project or plan

College Green Traffic Management Measures and Public Plaza.

Name and location of the Natura 2000 site(s)

Departmental guidance suggests an assessment of Natura 2000 sites within a zone of influence of 15 km which can be revised down depending on the proposed development and location of Natura 2000 sites. There are 16 Natura 2000 sites located within a 15km radius of the project study area including the following:

- 000199 Baldoyle Bay SAC (10.5 km)
- 000202 Howth Head SAC (11.5 km)
- 000205 Malahide Estuary SAC (14 km)
- 000206 North Dublin Bay SAC (5.5 km)
- 000210 South Dublin Bay SAC (2.5 km)
- 001209 Glenasmole Valley SAC (13 km)
- 002193 Ireland's Eye SAC (14.5 km)
- 003000 Rockabill to Dalkey Island SAC (11.5 km)
- 004006 North Bull Island SPA (7 km)
- 004016 Baldoyle Bay SPA (10.5 km)
- 004024 South Dublin Bay and River Tolka Estuary SPA (3.5 km)
- 004025 Malahide Estuary SPA (14 km)
- 004040 Wicklow Mountains SPA (12 km)
- 004113 Howth Head Coast SPA (11.5 km)
- 004117 Ireland's Eye SPA (14.5 km)
- 004172 Dalkey Island SPA (13 km)

Of the 16 Natura 2000 sites identified, a number of these are not considered to have any direct ecological or hydrological connectivity to the proposed development site, by which a significant impact could arise. These sites include:

- 000199 Baldoyle Bay SAC
- 000202 Howth Head SAC
- 000205 Malahide Estuary SAC
- 001209 Glenasmole Valley SAC
- 002193 Ireland's Eye SAC
- 003000 Rockabill to Dalkey Island SAC
- 004016 Baldoyle Bay SPA
- 004025 Malahide Estuary SPA
- 004040 Wicklow Mountains SPA
- 004113 Howth Head Coast SPA
- 004117 Ireland's Eye SPA
- 004172 Dalkey Island SPA

It is determined that there is no potential for significant e It is determined that there is no potential for significant effect on these sites and they are screened out at this preliminary stage for the following reasons effect on these sites and they are screened out at this preliminary stage for the following reasons:

- Distance from the development site,

- There is no direct connection between the site of the proposed development and these three sites,
- The potential for indirect impacts is unlikely due to distance and lack of connectivity.

The project location at College Green is then considered in terms of source-pathway-receptor relationship and the proximity of the only water course in the vicinity, the River Liffey and hydrological connectivity to Dublin Bay. Thus, there are four Natura 2000 sites located within a potential zone of influence of the Project:

- 000206 North Dublin Bay SAC
- 000210 South Dublin Bay SAC
- 004006 North Bull Island SPA
- 004024 South Dublin Bay and River Tolka Estuary SPA

Description of the project or plan

The proposed development will consist of;
Traffic Management Proposals on College Green including:

- No through east-west traffic movements in the College Green area except for pedestrians and cyclists.
- Two-way segregated cycle track at the Bank of Ireland opposite Trinity College.
- Bus turn-around arrangement on Dame Street, west of the Plaza area.

The project involves the carrying out of works as well as the change of the character and intensity of use over an extensive area of the city centre business district. The proposed development, therefore, constitutes ‘development’ arising from;

- The carrying out of works over a large extent of a city centre [urban] location.
- The significant alteration of the nature and character of the use [alteration from vehicular to pedestrian use, alteration of appearance].
- The significant alteration of the intensity of the use [increase in pedestrian and reduction in vehicular movements].

Is the project or plan directly connected with or necessary to the management of the site(s)

No

Are there other projects or plans that together with the projects or plan being assessed could affect the site

Other schemes that are not integral to the College Green Traffic Management Measures but which would be relevant for consideration of cumulative effects include but are not limited to:

- South Quays (Aston Quay and Wellington Quay) –Additional bus lane and bus stops (i.e. double bus lane), Reduction of general traffic lanes from two lanes to one lane;
- O’Connell Bridge – Revised arrangements including no right turn from Bachelors Walk; single straight ahead and single public transport only right turn northbound on O’Connell Bridge; single straight ahead and single public transport only right turn southbound on O’Connell Bridge;
- North Quays (Eden Quay) – Public Transport only between O’Connell Bridge and Rosie Hackett Bridge;
- North Quays (Ormond Quay and Bachelors Walk) – Additional bus lane and bus stops (i.e. double bus lane), Reduction of general traffic lanes from two lanes to one lane from Millennium bridge;
- Burgh Quay - Additional bus priority measures;

- Grafton Street Lower - 2-way traffic buses, taxis and Luas only.
- Liffey cycle route
- Carpark signage scheme
- City wide Directional signage scheme

Any development in central Dublin City with potential surface water connectivity to the River Liffey is required to comply with Best Practice Construction Methodology to avoid surface water contamination/runoff. In this way, these developments would be unlikely to have in-combination effects.

The Dublin City Development Plan in complying with the requirements of the Habitats Directive requires that all Projects and Plans that could affect the Natura 2000 sites in the same zone of influence of the project site would be initially screened for Appropriate Assessment and if requiring Stage 2 AA, that appropriate employable mitigation measures would be put in place to avoid, reduce or ameliorate negative impacts. In this way, any in-combination impacts with Plans or Projects for the area in which the development is located, would be avoided.

Any new applications for the project area will be assessed on a case by case basis by Dublin City Council which will determine the requirement for AA Screening as per the requirements of Article 6(3) of the Habitats Directive.

The assessment of significance of effects

Describe how the project or plan (alone or in combination) is likely to affect the Natura 2000 site.

A worst-case scenario would occur whereby the project would result in a significant detrimental change in water quality in Dublin Bay either alone or in combination with other projects or plans. The effect would have to be considered in terms of changes in water quality which would affect the habitats or food sources for which the SACs and SPA species are designated.

The proposed development includes works, involving the alteration of surface pavement, kerbs, street furniture, signage and utilities extends east-west from the Central Bank Plaza to the front of Trinity College extending north-south from the end of Grafton Street to Westmoreland Street.

Explain why these effects are not considered significant

Given the lack of source-pathway-receptor links to the River Liffey, a deterioration of water quality in Dublin Day downstream as a result of surface water contamination is highly unlikely.

The works will be carried out under a Construction & Environmental Management Plan which includes design measures to avoid unforeseen discharges to surface water.

List of agencies consulted: provide contact name and telephone or e-mail address

Dublin City Council.

Response to consultation

The need for Appropriate Assessment Screening was determined in pre-planning meetings with Dublin City Council.

Data collected to carry out the assessment

Who carried out the assessment

Moore Group Environmental Services.

Sources of data

NPWS database of designated sites at www.npws.ie
National Biodiversity Data Centre database http://maps.biodiversityireland.ie

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Level of assessment completed

Desktop Assessment.

Where can the full results of the assessment be accessed and viewed

Dublin City Council Planning.

Overall Conclusions

The conclusion of this Screening Report is that given the lack of biological and hydrological connectivity and the employment of best practice construction methods, there would be no significant impacts on the Qualifying interests or Conservation Objectives of the European sites considered in this assessment.

It has been objectively concluded by Moore Group Environmental Services that:

1. The project is not directly connected with, or necessary to the conservation management of the European sites considered in this assessment.
2. The implementation of the project will not have a direct impact on the European sites considered in this assessment.
3. The project has been designed to include appropriate treatment of wastewater and therefore avoids indirect impacts on the European sites considered in this assessment.
4. The project, alone or in combination with other projects or plans, is not likely to have a significant effect on the European sites considered in this assessment in view of their conservation objectives.

It is the view of Moore Group Environmental Services that it is not necessary to undertake any further stage of the Appropriate Assessment process.

Appendix 12.1

IGI Guidelines and Impact Significance

IGI rating criteria uses the same significance terminology as the EPA, however it has intermediate steps to justify using that terminology:

- Step 1: Quantify the Importance of a feature for geology (**Table A12.1.1**) and hydrogeology (**Table A12.1.2**);
- Step 2: Estimate the Magnitude of the impact on the feature from the proposed development (**Table A12.1.3**: Geology, **Table A12.1.4**: Hydrogeology);
- Step 3: Determine the Significance of the impact on the feature from the matrix (Table 5) based on the Importance of the feature and the Magnitude of the impact.

Table A12.1.1 - Criteria for Rating Site Importance of Geological Features

Importance	Criteria	Typical Example
Very high	Attribute has a high quality, significance or value on a regional or national scale Degree or extent of soil contamination is significant on a national or regional scale Volume of peat and/or soft organic soil underlying route is significant on a national or regional scale	Geological feature rare on a regional or national scale (NHA) Large existing quarry or pit Proven economically extractable mineral resource
High	Attribute has a high quality, significance or value on a local scale Degree or extent of soil contamination is significant on a local scale Volume of peat and/or soft organic soil underlying route is significant on a local scale	Contaminated soil on site with previous heavy industrial usage Large recent landfill site for mixed wastes Geological feature of high value on a local scale (County Geological Site) Well drained and/or high fertility soils Moderately sized existing quarry or pit Marginally economic extractable mineral resource
Medium	Attribute has a medium quality, significance or value on a local scale Degree or extent of soil contamination is moderate on a local scale Volume of peat and/or soft organic soil underlying route is moderate on a local scale	Contaminated soil on site with previous light industrial usage Small recent landfill site for mixed wastes Moderately drained and/or moderate fertility soils Small existing quarry or pit Sub-economic extractable mineral resource
Low	Attribute has a low quality, significance or value on a local scale Degree or extent of soil contamination is minor on a local scale	Large historical and/or recent site for construction and demolition wastes Small historical and/or recent landfill site for construction and demolition wastes Poorly drained and/or low fertility soils

Importance	Criteria	Typical Example
	Volume of peat and/or soft organic soil underlying route is small on a local scale	Uneconomically extractable mineral resource

Table A12.1.2 - Criteria for Rating Site Importance of Hydrogeological Features

Importance	Criteria	Typical Example
Extremely high	Attribute has a high quality or value on an international scale	Groundwater supports river, wetland or surface water body ecosystem protected by EU legislation e.g. SAC or SPA status
Very high	Attribute has a high quality or value on a regional or national scale	Regionally Important Aquifer with multiple wellfields. Groundwater supports river, wetland or surface water body ecosystem protected by national legislation – e.g. NHA status. Regionally important potable water source supplying >2500 homes Inner source protection area for regionally important water source.
High	Attribute has a high quality or value on a local scale	Regionally Important Aquifer. Groundwater provides large proportion of baseflow to local rivers. Locally important potable water source supplying >1000 homes. Outer source protection area for regionally important water source. Inner source protection area for locally important water source.
Medium	Attribute has a medium quality or value on a local scale	Locally Important Aquifer Potable water source supplying >50 homes. Outer source protection area for locally important water source.
Low	Attribute has a low quality or value on a local scale	Poor Bedrock Aquifer. Potable water source supplying <50 homes.

Table A12.1.3 - Criteria for Rating Impact Significance at EIS Stage – Estimation of Magnitude of Impact on Geology Attribute

Importance	Criteria	Typical Example
Large adverse	Results in loss of attribute	Loss of high proportion of future quarry or pit reserves Irreversible loss of high proportion of local high fertility soils Removal of entirety of geological heritage feature Requirement to excavate / remediate entire waste site Requirement to excavate and replace high proportion of peat, organic soils and/or soft mineral soils beneath alignment
Moderate adverse	Results in impact on integrity of attribute or loss of part of attribute	Loss of moderate proportion of future quarry or pit reserves Removal of part of geological heritage feature Irreversible loss of moderate proportion of local high fertility soils Requirement to excavate / remediate significant proportion of waste site Requirement to excavate and replace moderate proportion of peat, organic soils and/or soft mineral soils beneath alignment
Small adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Loss of small proportion of future quarry or pit reserves Removal of small part of geological heritage feature Irreversible loss of small proportion of local high fertility soils and/or high proportion of local low fertility soils Requirement to excavate / remediate small proportion of waste site Requirement to excavate and replace small proportion of peat, organic soils and/or soft mineral soils beneath alignment
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	No measurable changes in attributes
Minor beneficial	Results in minor improvement of attribute quality	Minor enhancement of geological heritage feature
Moderate beneficial	Results in moderate improvement of attribute quality	Moderate enhancement of geological heritage feature

Importance	Criteria	Typical Example
Major beneficial	Results in major improvement of attribute quality	Major enhancement of geological heritage feature

Table A12.1.4 - Criteria for Rating Impact Significance at EIS Stage – Estimation of Magnitude of Impact on Hydrogeology Attribute

Importance	Criteria	Typical Example
Large adverse	Results in loss of attribute and /or quality and integrity of attribute	Removal of large proportion of aquifer. Changes to aquifer or unsaturated zone resulting in extensive change to existing water supply springs and wells, river baseflow or ecosystems. Potential high risk of pollution to groundwater from routine run-off1. Calculated risk of serious pollution incident >2% annually.
Moderate adverse	Results in impact on integrity of attribute or loss of part of attribute	Removal of moderate proportion of aquifer. Changes to aquifer or unsaturated zone resulting in moderate change to existing water supply springs and wells, river baseflow or ecosystems. Potential medium risk of pollution to groundwater from routine run-off. Calculated risk of serious pollution incident >1% annually.
Small adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Removal of small proportion of aquifer. Changes to aquifer or unsaturated zone resulting in minor change to water supply springs and wells, river baseflow or ecosystems. Potential low risk of pollution to groundwater from routine run-off1. Calculated risk of serious pollution incident >0.5% annually.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	Calculated risk of serious pollution incident <0.5% annually

Table A12.1.5 - Rating of Significant Environmental Impacts at EIS Stage

Importance of attribute	Magnitude of impact			
	Negligible	**Small adverse**	**Moderate adverse**	**Large adverse**
Extremely high	Imperceptible	Significant	Profound	Profound
Very high	Imperceptible	Significant/ Moderate	Profound/ Significant	Profound
High	Imperceptible	Moderate/ Slight	Significant/ Moderate	Profound/ Significant
Medium	Imperceptible	Slight	Moderate	Significant
Low	Imperceptible	Imperceptible	Slight	Slight/ Moderate

Appendix 12.2

Historical Maps

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Legend

Proposed extent of main works

P0	2017-01-20	JF	AO	CN
Issue	Date	By	Chkd	Appd

ARUP

50 Ringsend Road
Dublin 4, D04 T6X0
Tel +353 (0)1 233 4455 Fax +353 (0)1 668 3169
www.arup.com

Client

Dublin City Council

Job Title

College Green Traffic Management Measures and Civic Plaza

Historical Maps

Map by Henry Pratt (1708)
Historic Dublin Maps,
The National Library of Ireland,
Historical Documents

A4

20/01/2017 14:40:53

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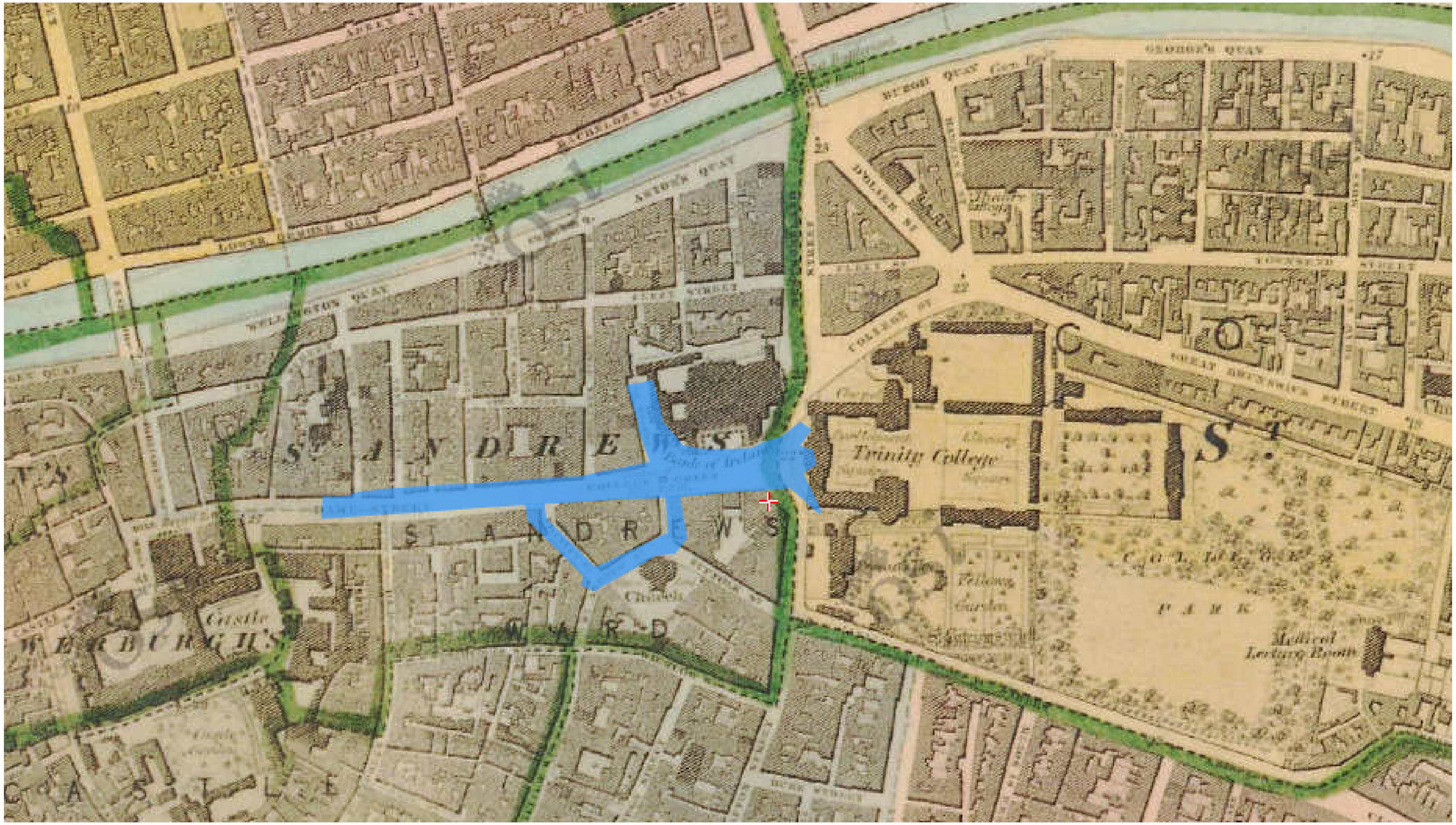

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Proposed extent of main works

Issue	Date	By	Chkd	Appd
P0	2017-01-20	JF	AO	CN

ARUP
50 Ringsend Road
Dublin 4, D04 T6X0
Tel +353 (0)1 233 4455 Fax +353 (0)1 668 3169
www.arup.com

Client

Dublin City Council

Job Title

College Green Traffic Management Measures and Civic Plaza

Historical Maps

Ordnance Survey Ireland 6" 1827-1841

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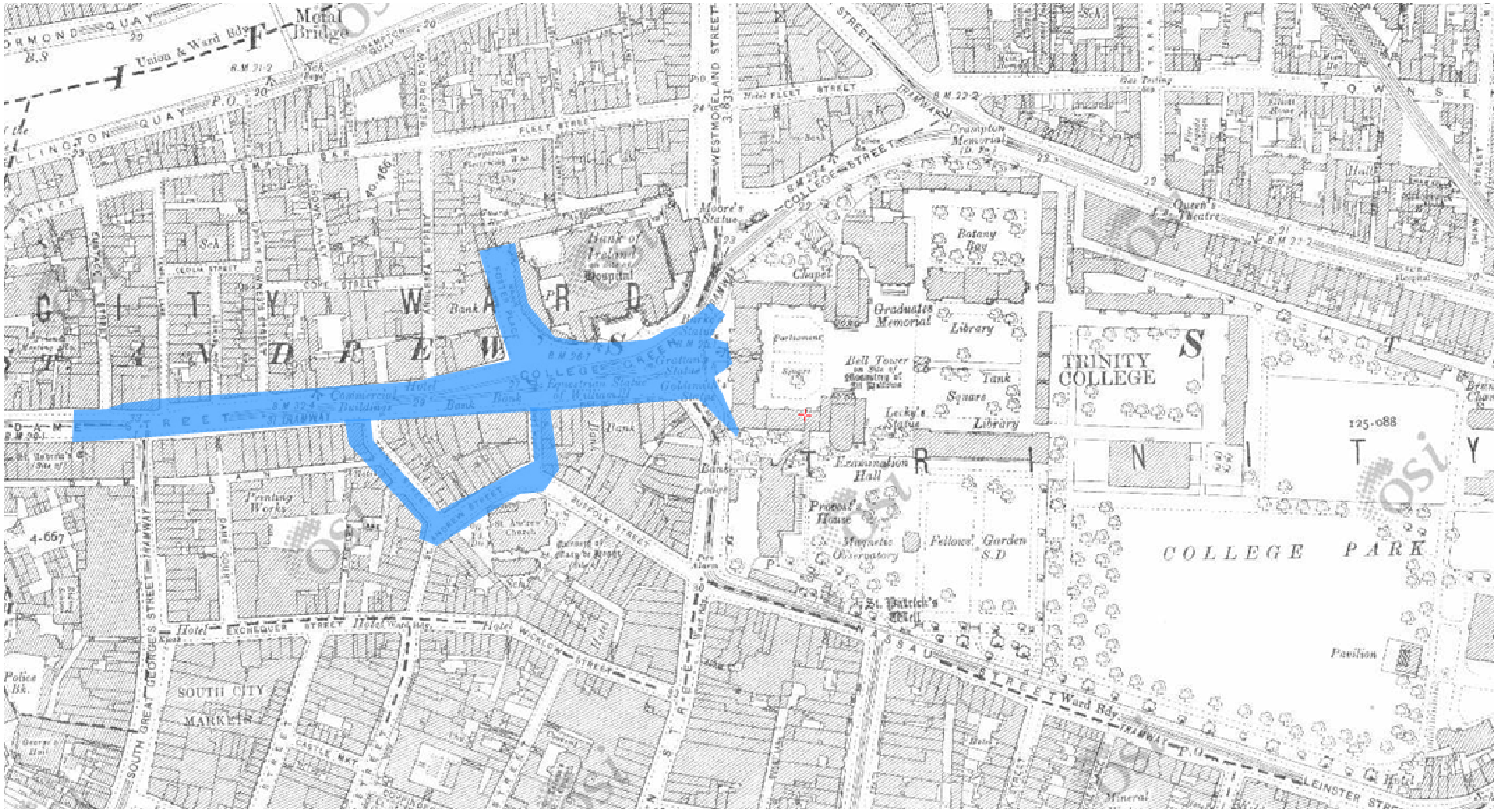

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Proposed extent of main works

ARUP

50 Ringsend Road
Dublin 4, D04 T6X0
Tel +353 (0)1 233 4455 Fax +353 (0)1 668 3169
www.arup.com

Client

Dublin City Council

Job Title

College Green Traffic Management Measures and Civic Plaza

Historical Maps

Ordnance Survey Ireland 25" 1897-1931

Issue	Date	By	Chkd	Appd
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A4

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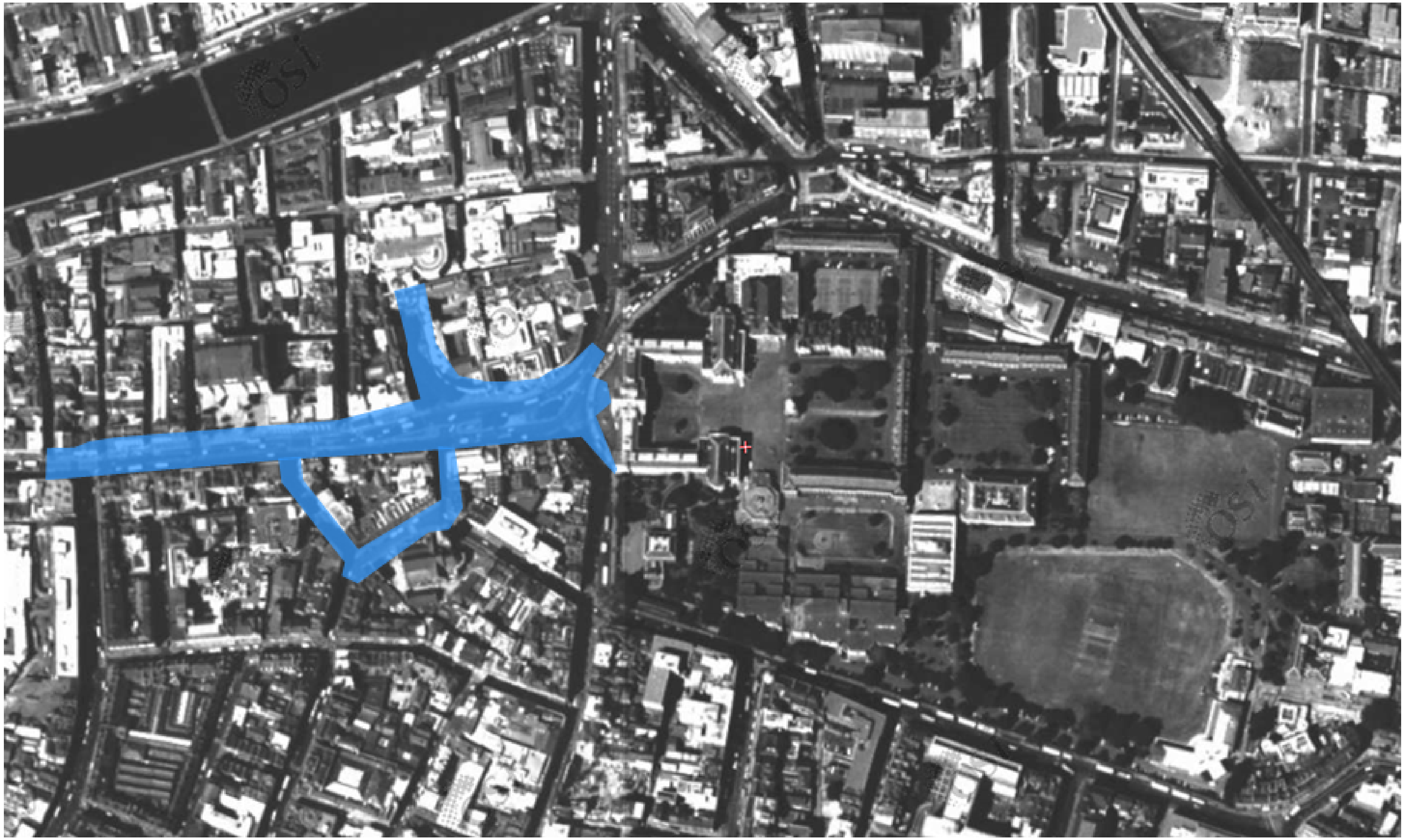

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Proposed extent of main works

P0	2017-01-20	JF	AO	CN
Issue	Date	By	Chkd	Appd

ARUP

50 Ringsend Road
Dublin 4, D04 T6X0
Tel +353 (0)1 233 4455 Fax +353 (0)1 668 3169
www.arup.com

Client

Dublin City Council

Job Title

College Green Traffic Management Measures and Civic Plaza

Historical Maps

Ordnance Survey Ireland
Ortho 1995

A4

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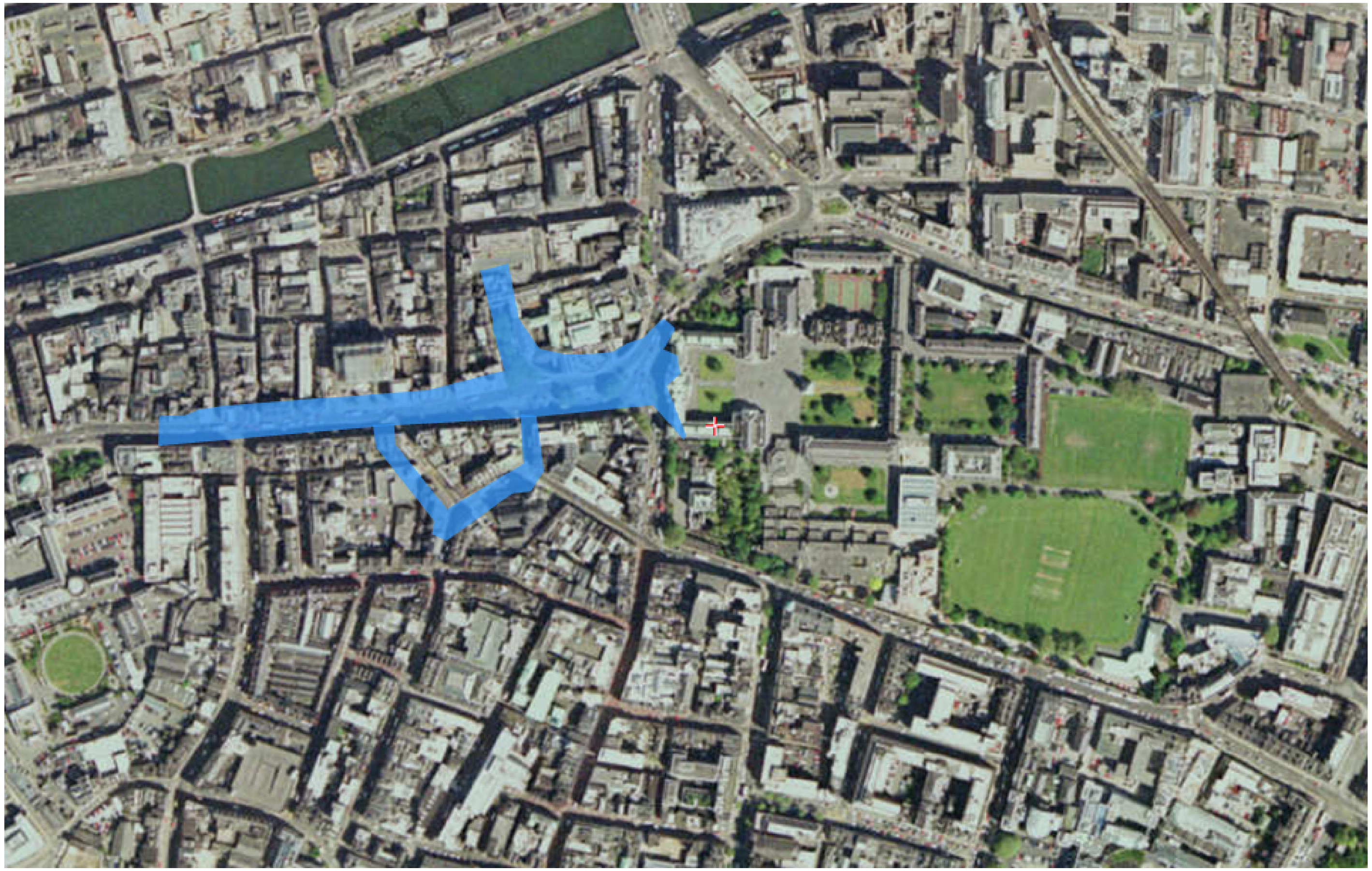

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Proposed extent of main works

P0	2017-01-20	JF	AO	CN
Issue	Date	By	Chkd	Appd

ARUP

50 Ringsend Road
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Tel +353 (0)1 233 4455 Fax +353 (0)1 668 3169
www.arup.com

Client

Dublin City Council

Job Title

College Green Traffic Management Measures and Civic Plaza

Historical Maps

Ordnance Survey Ireland
Ortho 2000

A summary of the relevant information presented on historical maps from 1708-2000.

Map date	Land use at the site	Land use in the vicinity of the site
1708	Open space	The study area is located in an urban area surrounded by buildings and Trinity college to the east. Farmland is located to the south east of the study area and the River Liffey estuary is located to the north east.
1827-1841	College Green plaza, road, tramway and bank buildings.	The study area is located in an urban area surrounded by buildings, mainly banks, and Trinity college to the east. No farmland seen on map.
1897-1931	No change	No change
1995	No change	No change
2000	No change	No change

Appendix 12.3

Flood Risk Assessment

Contents

A12.3-1 Introduction

This appendix details the Flood Risk Assessment carried out as part of the proposed development. It has been undertaken in accordance with the Guidelines for Planning Authorities on 'The Planning system and Flood Risk Management' published in November 2009, jointly by the Office of Public Works (OPW) and the then Department of Environment. Heritage and Local Government (DEHLG).

A12.3-1.1 Scope of Work

The scope of study includes the following:

Review of all relevant information and data from:

- The Office of Public Works (OPW) Preliminary Flood Risk Assessment Mapping (PFRA);
- Flood maps and reports from the Eastern Catchment Flood Risk Assessment (CFRAM) and Management Study;
- The Irish Coastal Protection Strategy Study (ICPSS);
- Historic flooding information for the area;

Review of the risk of coastal, fluvial, pluvial and groundwater flooding;

Preparation of a flood risk assessment report.

A12.3-1.2 Summary of Data Used

In preparing this report, the following data was collated and reviewed:

- Flood history of the site from the OPW National Flood Hazard Mapping website (www.floodmaps.ie);
- Catchment Flood Risk Assessment and Management (CFRAM) Mapping produced by the OPW (map.opw.ie/floodplans)
- Preliminary Flood Risk Assessment (PFRA) Mapping produced by the OPW (www.cfram.ie/pfra);
- Predicted extreme water levels and flood extent maps from the ICPSS;
- Pluvial flood maps of Dublin produced as part of the Flood Resilient City Project;
- Site Geological and hydrogeological data from the Geological Survey of Ireland website (www.gsi.ie);
- Guidelines for Planning Authorities on 'The Planning System and Flood Risk Management' published in November 2009, jointly by the Office of Public

Works (OPW) and the then Department of Environment, Heritage and Local Government (DEHLG);

- River of Dublin book;
- Aerial photography and mapping from Bing Maps and Google Maps.
- All Ordnance Datum (OD) levels referred to in this report are to Malin Head Ordnance Datum unless otherwise stated.

A12.3-1.3 Proposed Project

The proposal is to create a civic plaza area in College Green from Angelsea Street to Lower Grafton Street and to implement traffic management measures. This change of use of College Green presents an important opportunity for the city to redefine this area as a civic space of national importance in line with the City Council's long standing objective for College Green.

The proposal will remove all east-west vehicular through-traffic from College

Green, reassigning the road space to ensure that pedestrians, cyclists and public transport can operate in a safer and more efficient manner and without potentially dangerous conflicting movements. The development will also result in the diversion of traffic including buses along alternative routes.

The Proposed Project will not significantly change the existing ground levels of the area.

A12.3-2 Planning Context

The following planning policy documents are relevant to the assessment of the proposed development:

- The national planning Guidelines published by the OPW and the Department of the Environment, Heritage and Local Government in November 2009 entitled 'The Planning System and Flood Risk Management Guidelines for Planning Authorities'
- The Dublin City Council Development Plan 2017–2022.

A12.3-2.1 The Planning System and Flood Risk Management Guidelines

Introduction

In November 2009, the Department of Environment, Heritage and Local Government and the Office of Public Works jointly published a Guidance Document for Planning Authorities entitled "the Planning System and Flood Risk Management".

The Guidelines are issued under Section 28 of the Planning and Development Act 2000. Planning Authorities and An Bord Pleanála are therefore required to implement these Guidelines in carrying out their functions under the Planning Acts.

The aim of the Guidelines is to ensure that flood risk is neither created nor increased by inappropriate development.

The Guidelines require the Planning system to avoid development in areas at risk of flooding, unless the development can be justified on wider sustainability grounds and the risk can be reduced or managed to an acceptable level.

The Guidelines require the adoption of a Sequential Approach (to Flood Risk Management) of Avoidance, Reduction, Justification and Mitigation and they require the incorporation of Flood Risk Assessment into the process of making decisions on Planning Applications and Planning Appeals.

Fundamental to the Guidelines is the introduction of flood risk zoning and the classifications of different types of development having regard to their vulnerability.

The management of flood risk is now a key element of any development proposal in an area of potential flood risk and should therefore be addressed as early as possible in the site master planning stage.

Definition of Flood Zones

Flood Zones are geographical areas within which the likelihood of flooding is in a particular range. There are three types of flood zones defined in the Guidelines as follows:

Flood Zone	Probability
Flood Zone A	Probability of flooding from rivers and the sea is highest (greater than 1% or 1 in 100 for river flooding or 0.5% or 1 in 200 for coastal flooding).
Flood Zone B	Probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1000 year and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1000 year and 0.5% or 1 in 200 for coastal flooding); and
Flood Zone C	Probability of flooding from rivers and the sea is low (less than 0.1% or 1 in 1000 for both river and coastal flooding). Flood Zone C covers all areas of the plan which are not in zones A or B.

Definition of Vulnerability Classes

The following table summarises the Vulnerability Classes defined in the Guidelines and provides a sample of the most common type of development applicable to each.

Vulnerability	Type of Development
Highly Vulnerable Development	Includes Garda, ambulance and fire stations, hospitals, schools, residential dwellings, residential institutions, essential infrastructure, such as primary transport and utilities distribution and SEVESO and IPPC sites, etc.
Less Vulnerable Development	Includes retail, leisure, warehousing, commercial, industrial and non-residential institutions, etc.
Water Compatible Development	Includes Flood Control Infrastructure, docks, marinas, wharves, navigation facilities, water based recreation facilities, amenity open spaces and outdoor sport and recreation facilities

The proposed development is classed as a ‘Highly Vulnerably Development’ as per the above table.

Types of Vulnerability Classes Appropriate to Each Zone

The following table illustrates the different types of Vulnerability Class appropriate to each Zone and indicates where a Justification Test will be required.

	Flood Zone A	Flood Zone B	Flood Zone C
Highly Vulnerable	Justification Test	Justification Test	Appropriate
Less Vulnerable	Justification Test	Appropriate	Appropriate
Water Compatible	Appropriate	Appropriate	Appropriate

A12.3-2.2 The Dublin City Council Development Plan 2017-2022

The Dublin City Development Plan 2017-2022 sets out policies for the continuing sustainable development of the Count for the period 2017 – 2022. The following paragraphs summarise the relevant provisions contained within the plan which deal with Flood Risk Management.

Section 9.3 of the plan presents the challenges faced by Dublin City Council in relation to flooding:

- To reduce the flood risk in Dublin city to the National Flood Standards to above 1% annual exceedance probability or AEP (roughly 100-year flood event) for fluvial flooding and above 0.5% AEP (roughly 200-year flood event) for tidal flooding, as far as is reasonably possible.
- To comply fully with the DECLG 'The Planning System and Flood Risk Management' Guidelines for Planning Authorities in the Dublin city area.
- To comply with Dublin City Council climate change adaption policy 2015-2021 in all flood alleviation projects, planning applications and flood warning systems.
- To continue to work with the Office of Public Works on the development of Catchments Flood Risk and Management Plans (CFRAMP) for the City's major rivers and coastline, as well as general policies and objectives.
- To develop and where possible implement strategies to reduce the effects of nontidal and non-fluvial flooding in Dublin city.
- To liaise with Fingal, South Dublin, Dún Laoghaire-Rathdown, Meath, Kildare and Wicklow County Councils as well as the Electricity Supply Board and Irish Water in the management of flood alleviation on the rivers coming into the Dublin city area and the coastline adjacent to it.

Section 9.5.3 of the plan deals with Flood Management and outlines the key policies and objectives of Dublin City Council in relation to flood risk. The plan presents a number of Dublin City Council 'Strategic Infrastructure' (SI) policies that state that it is there policy to:

- SI9: To assist the Office of Public Works in developing catchment-based Flood Risk Management Plans for rivers, coastlines and estuaries in the Dublin city area and have regard to their provisions/recommendations.
- SI10: To have regard to the Guidelines for Planning Authorities on the Planning System and Flood Risk Management, and Technical Appendices, November 2009, published by the Department of the Environment, Community, and Local Government as may be revised/updated when assessing planning applications and in the preparation of plans both statutory and non-statutory.
- SI11: To put in place adequate measures to protect the integrity of the existing Flood Defence Infrastructure in Dublin City Councils ownership and identified in the Strategic Flood Risk Assessment and to ensure that the new developments do not have the effect of reducing the effectiveness or integrity of any existing or new flood defence infrastructure and that flood defence

infrastructure has regard also to nature conservation, open space and amenity issues.

- SI12: To implement and comply fully with the recommendations of the Strategic Flood Risk Assessment prepared as part of the Dublin City Development Plan.
- SI13: That development of basements or any above-ground buildings for residential use below the estimated flood levels for Zone A or Zone B will not be permitted.
- SI14: To protect the Dublin City coastline from flooding as far as reasonably practicable, by implementing the recommendations of the Dublin Coastal Flood Protection Project and the Dublin Safer Project.
- SI15: To minimise the risk of pluvial (intense rainfall) flooding in the city as far as is reasonably practicable and not to allow any development which would increase this risk.
- SI16: To minimise the flood risk in Dublin City from all other sources of flooding, including fluvial, reservoirs and dams and the piped water system.
- SI17: To require an environmental assessment of all proposed flood protection or flood alleviation works.

Section 9.5.3 of the development plan also outlines the following objectives in relation to Flood Risk Management. The plan presents a number of Dublin City Council 'Strategic Infrastructure Objectives' (SIO) objectives that state that it is there objectives for:

- SIO8: All development proposals shall carry out, to an appropriate level of detail, a Site-Specific Flood Risk Assessment (SSFRA) that shall demonstrate compliance with:
  - The Planning System and Flood Risk Management, Guidelines for Planning Authorities, Department of the Environment, Community and Local Government, November 2009, as may be revised/updated and the Strategic Flood Risk Assessment (SFRA) as prepared by this Development Plan.
  - The site-specific flood risk assessment (SSFRA) shall pay particular emphasis to residual flood risks, site-specific mitigation measures, flood-resilient design and construction, and any necessary management measures (the SFRA and Appendix B4 of the above mentioned national guidelines refer). Attention shall be given in the site-specific flood risk assessment to building design and creating a successful interface with the public realm through good design that addresses flood concerns but also maintains appealing functional streetscapes. All potential sources of flood risk must be addressed in the SSFRA.
- SIO9: Proposals which may be classed as 'minor development', for example small-scale infill, small extensions to houses or the rebuilding of houses or paving of front gardens to existing houses, most changes of use and small-scale extensions to existing commercial and industrial enterprises in Flood

Zone A or B, should be assessed in accordance with the Guidelines for Planning Authorities on the Planning System and Flood Risk Management & Technical Appendices, November 2009 as may be revised/updated, with specific reference to Section 5.28 and in relation to the specific requirements of the Strategic Flood Risk Assessment. The policy shall be not to increase the risk of flooding and to ensure risk to the development is managed.

- SIO10: That recommendations and flood maps arising from the Fingal-East Meath CFRAM Study, the Dodder CFRAM Study and the Eastern CFRAM Study are taken into account in relation to the preparation of statutory plans and development proposals. This will include undertaking a review of the Strategic Flood Risk Assessment for Dublin city following the publication of the Final Eastern CFRAM Study, currently being produced by the OPW.
- SIO11: To work with neighbouring Local Authorities when developing cross-boundary flood management work programmes and when considering cross-boundary development.
- SIO12: To ensure each flood risk management activity is examined to determine actions required to embed and provide for effective climate change adaptation as set out in the Dublin City Council climate change adaption policy and in the OPW Climate Change Sectorial Adaptation Plan Flood Risk Management applicable at the time.

A12.3-3 Overview of Flood Mechanisms and Historical Flooding at the Site

A12.3-3.1 Flood Mechanisms

In broad terms, the potential sources of flooding at the site can be categorised as:

- Fluvial (River) Flooding: The main risk of fluvial flooding is from the River Liffey, which is located circa 250m from the site of the development.
- Tidal/Coastal Flooding: The risk from coastal flooding is from surge events in the Irish Sea.
- Pluvial Flooding: Pluvial flooding occurs when the capacity of the local urban drainage network is exceeded during periods of intense rainfall. At these times, water can collect at low points in the topography and cause flooding.
- Groundwater Flooding: Groundwater Flooding can occur during lengthy periods of heavy rainfall, typically during late winter/early spring when the groundwater table is already high. If the groundwater level rises above ground level, it can pond at local low points and cause periods of flooding.

Each of these potential sources of flooding are considered in this FRA.

A12.3-3.2 Historic Flooding at the Site

Reports and maps from the OPW Flood Hazard Mapping website (www.floodmaps.ie) have been examined as part of this flood risk assessment. **Figure A12.3.1** presents a screenshot from floodmaps.ie which indicates that there are no recorded historic flood events in the vicinity of the site.

The absence of a historic record of flooding however does not mean that the site has not flooded in the past.

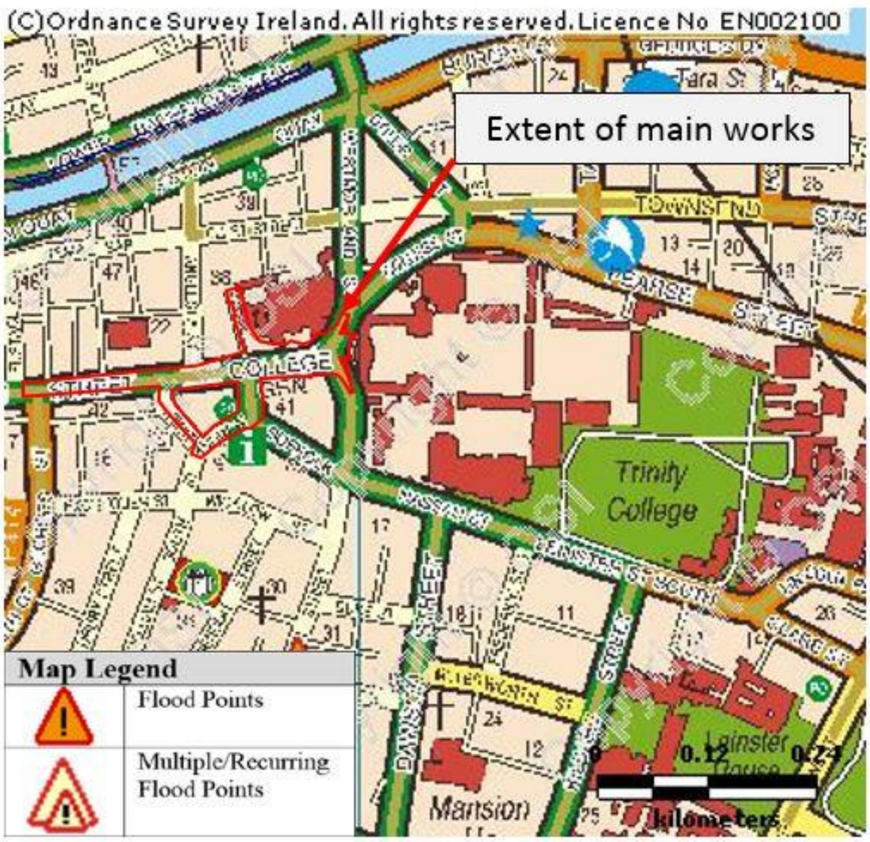

Figure A12.3.1 - Extract from floodmaps.ie showing flood history for site and surrounding area

A12.3-3.2 Fluvial Flood Risk

Figure A12.3.2 presents the fluvial flood extent as predicted by the Eastern CFRAM Study for the 10% 1% and 0.1% AEP events. It can be seen that the site is located outside the 0.1% fluvial extent**.**

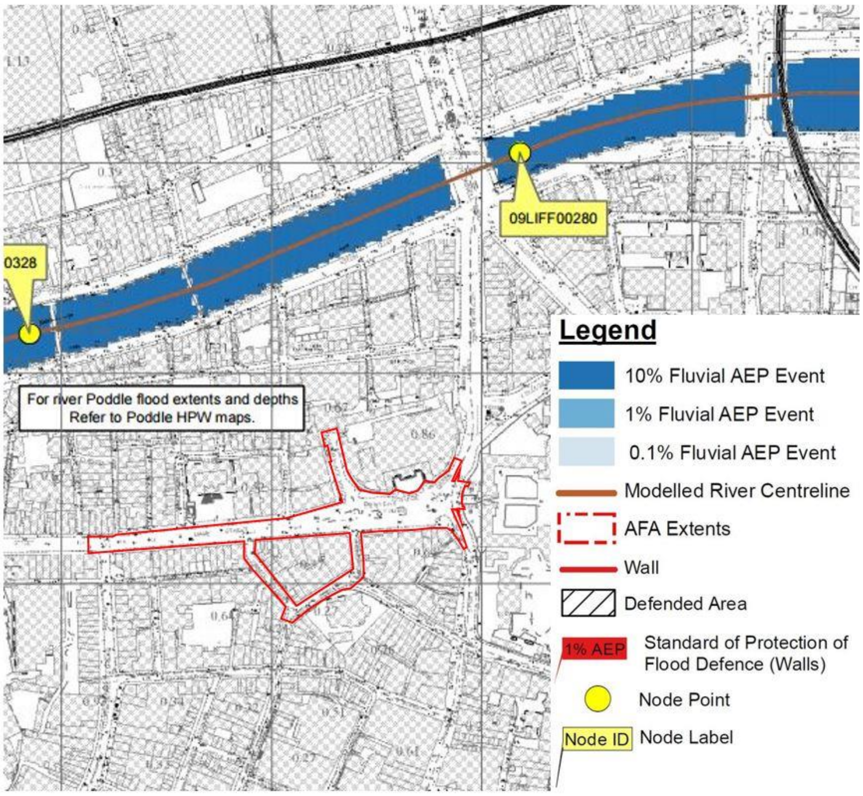

Figure A12.3.2 - Fluvial Flood Map – CFRAM

OPW's PRFA flood extent maps have also been assessed as part of this FRA. **Figure A12.3.3** presents an extract from the PRFA mapping highlighting the 1% and 0.1% AEP fluvial flood extents. It can be seen that the site is located outside of the 0.1% AEP extent.

The risk of fluvial flooding to the site from the River Liffey is therefore very low.

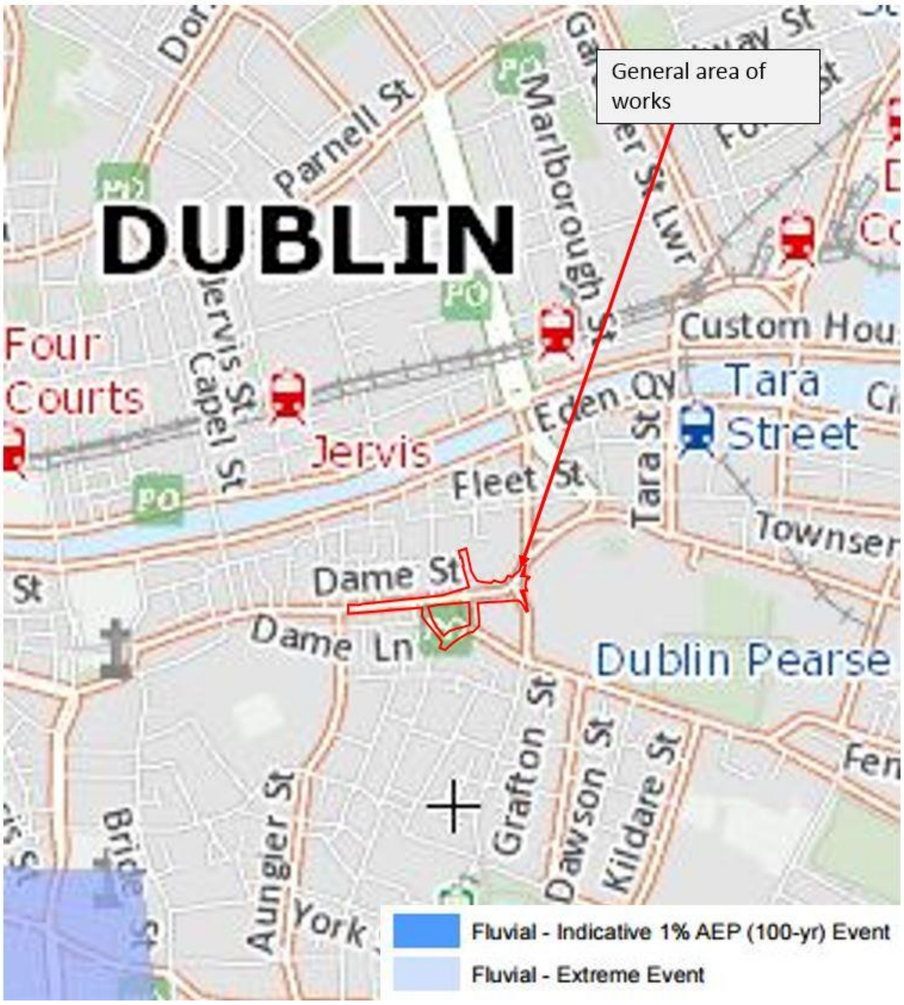

Figure A12.3.3 - Fluvial Flood Map – PFRA

The subject site is located in the vicinity of the River Stein which is a minor tributary of the River Liffey that is culverted throughout its reach. **Figure A12.3.4** presents an approximate route of the culvert which is taken from the "Rivers of Dublin" book.

It can be seen from the figure that the origin of the river is close to Charlemont Bridge. From here it flows north and passes very close to the boundary of our subject site. The culvert discharges into the River Liffey downstream of Rosie Hackett Bridge close to Tara Street.

The book notes that the dimensions of the culvert are approximately 1m wide and

1.6m high in the vicinity of Mercer Street Lower. The book also notes that the culvert was rerouted as part of the construction of St Stephen's Green Shopping Centre.

It is noted that the River Stein is not referred to in the Liffey-Dublin Bay

Inception Report of the Eastern CFRAM and it is our understanding that the watercourse has not been modelled as part of the same study.

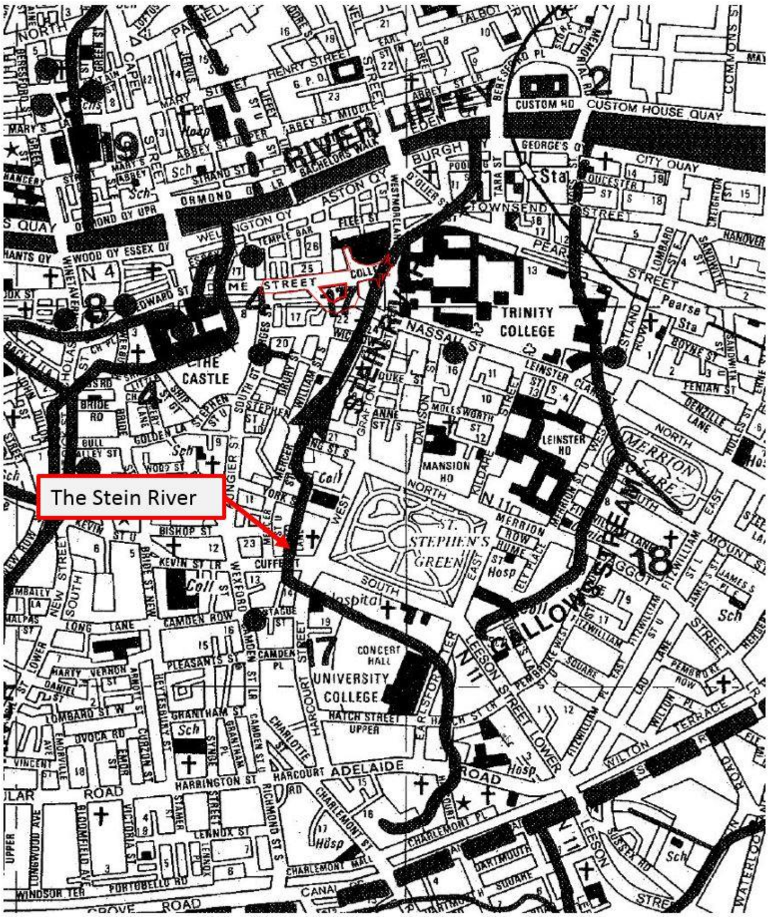

Figure A12.3.4 - Map of The River Stein - The Rivers of Dublin book

Based on an inspection of aerial imagery of the area, it can be concluded that the Stein is culverted throughout its reach. There are no open channel sections which offer a route for water to flood the surrounding area. The risk of fluvial flooding from the culvert is therefore limited to the potential for surcharging at the culvert entrance and pressurised flow within the culvert forcing water out through any connecting back pipes, manholes or connecting culverts.

It is not known however if the River Stein culvert is connected to other minor culverts. It is not within the scope of the study to undertake a detailed assessment of any such connections if they exist.

The catchment area upstream of the River Stein culvert is likely to be very small given the close proximity of the Dodder, Poddle and Gallows Stream catchments.

The risk of the culvert entrance being surcharged due to high flows is therefore likely to be very low. We can therefore conclude that surcharging of the culvert entrance is very unlikely to present any significant risk of flooding to our site.

In the absence of data on the culvert close to our subject site we are unable to accurately determine the risk of flooding arising from pressurised flow within the culvert. Given the absence of any record of historic flooding of the site, it is likely however that this risk flooding is very low.

A12.3-3.3 Coastal Flood Risk

Figure A12.3.5 presents the coastal flood extent map for the site from the Eastern CFRAM Study for the 10%, 0.5% and 0.1% AEP events. It can be seen that the site is outside of the predicted flood extents.

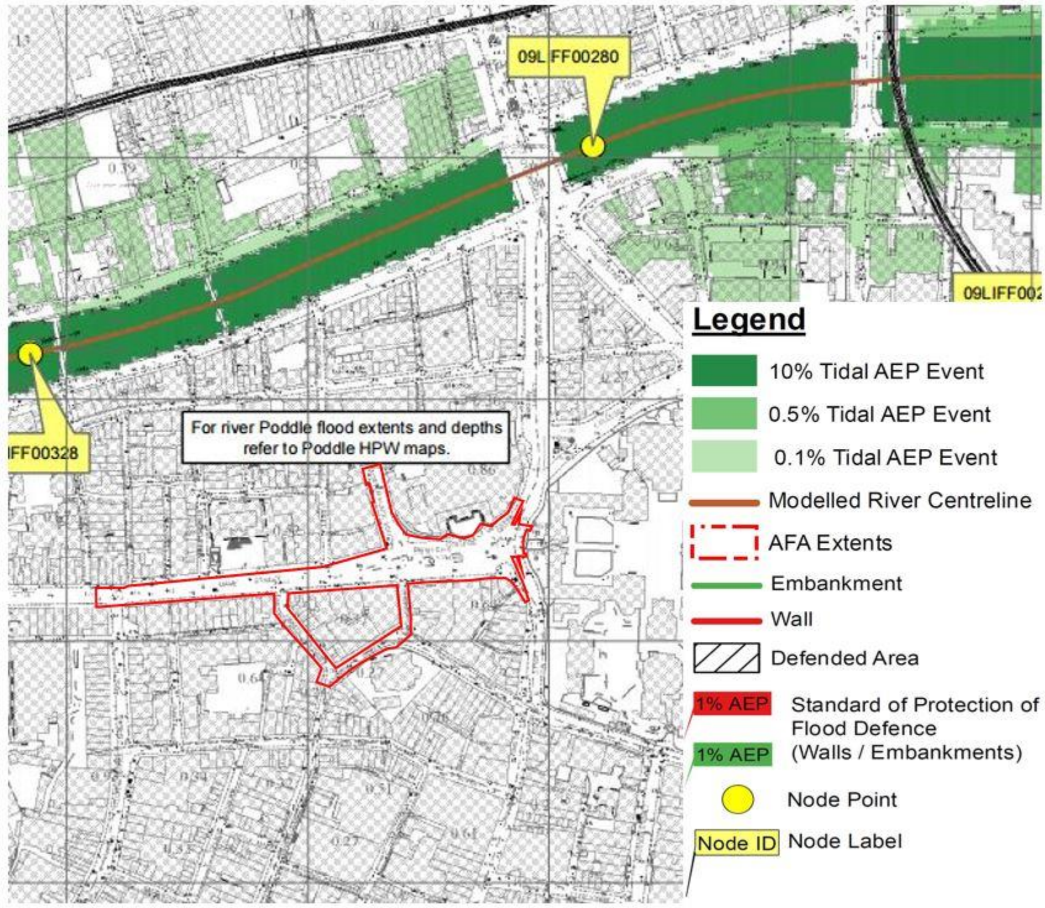

Figure A12.3.5 - Coastal Flood Map – CFRAM

As part of this FRA we have also assessed flood maps produced as part of the Irish Coastal Protection Strategy Study (ICPSS). **Figure A12.3.6** presents the 0.5% flood extent as predicted by the study. It can be seen that the site is located outside of the extent.

It can therefore be concluded that the risk of tidal/coastal flooding to the site is very low.

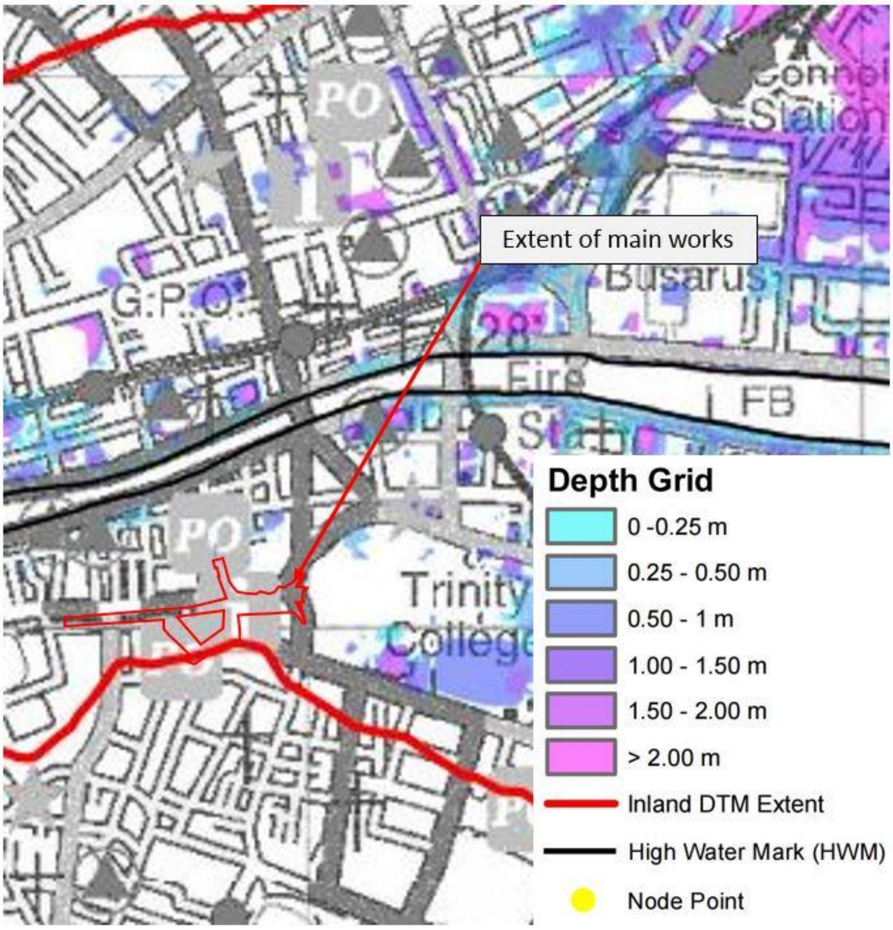

Figure A12.3.6 - Coastal Flood Map – ICPSS

A12.3-3.4 Pluvial Flood Risk

Pluvial flooding occurs when extreme rainfall overwhelms drainage systems or soil infiltration capacity, causing excess rainwater to pond above ground at low points in the topography.

Figure A12.3.7 presents the pluvial flood extent map for the site as predicted by the Flood Resilient City Project. It can be seen that the site is included within the predicted pluvial flood extent.

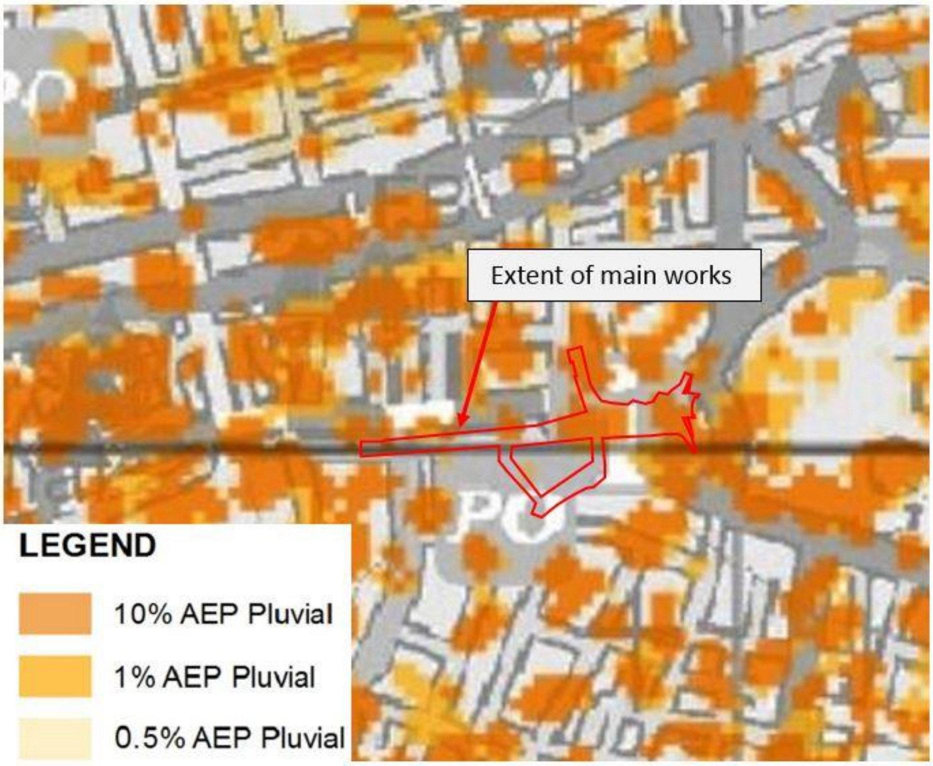

Figure A12.3.7 - Pluvial Flood Map of the area in the vicinity of the site as produced by the Flood Resilient City Project

Flood maps from OPW's PRFA programme have also been assessed as part of this FRA. **Figure A12.3.8** presents the 10%, 1% and 0.5% AEP pluvial flood extents. It can be seen from the figure that a small area of the site is indicated to be at risk from pluvial flooding.

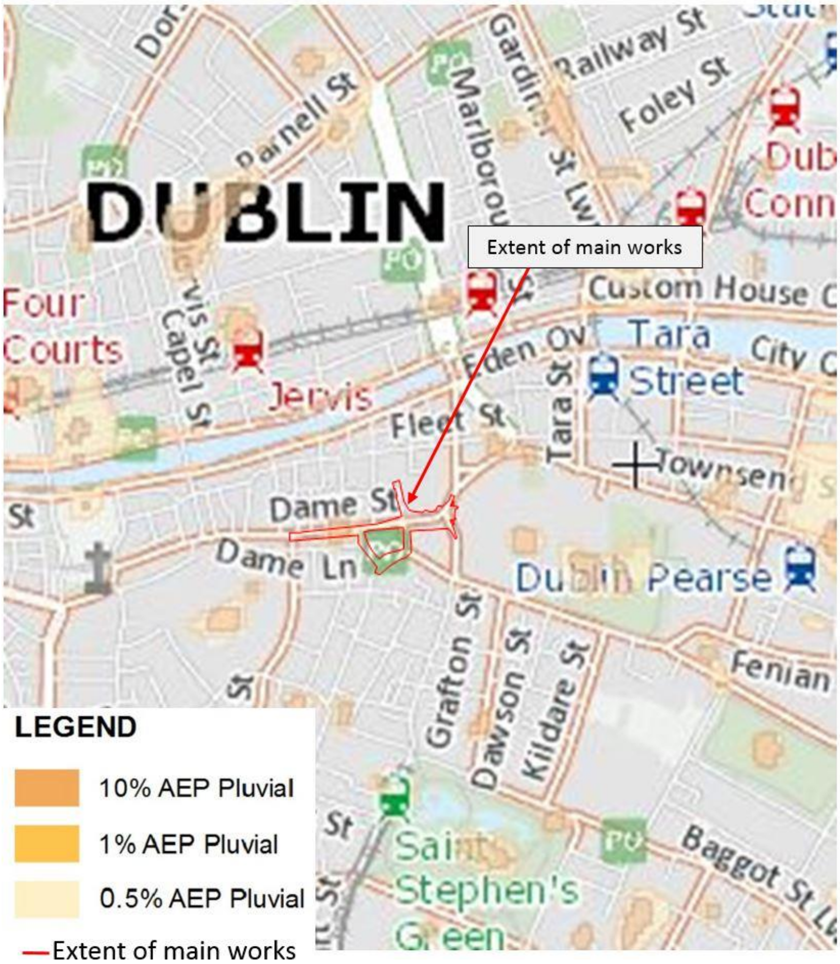

Figure A12.3.8 - Pluvial Flood Map of the area in the vicinity of the site as produced by the PFRA Study

It is noted that the pluvial flood extents produced by both studies are different with the Flood Resilient City Project predicting a greater pluvial flood extent than the PFRA extent.

Based on the finding of both of these studies it can be concluded that there is a minor risk of pluvial flooding to the site.

A12.3-3.5 Groundwater Flood Risk

Groundwater flooding can occur during lengthy periods of heavy rainfall, typically during later winter/early spring when the groundwater table is already high. If the groundwater level rises above surface level, it can pond at local points and cause periods of flooding.

Figure A12.3.9 presents mapping from the Geological Survey of Ireland (gsi.ie) and indicates the groundwater vulnerability of the site and the surrounding areas. The groundwater vulnerability is indicated as being moderate to high.

As stated in Section 14.3.3.4 there is no site investigation groundwater information available for the study area.

However, based on experience in the area the groundwater beneath the site is likely to be approximately 2-4mbgl, at the top of the boulder clay.

The risk of groundwater flooding is therefore considered to be low.

It is noted that anecdotal evidence suggests that during the recent Luas Cross City works a number of basements in the vicinity of the works may have experienced groundwater ingress.

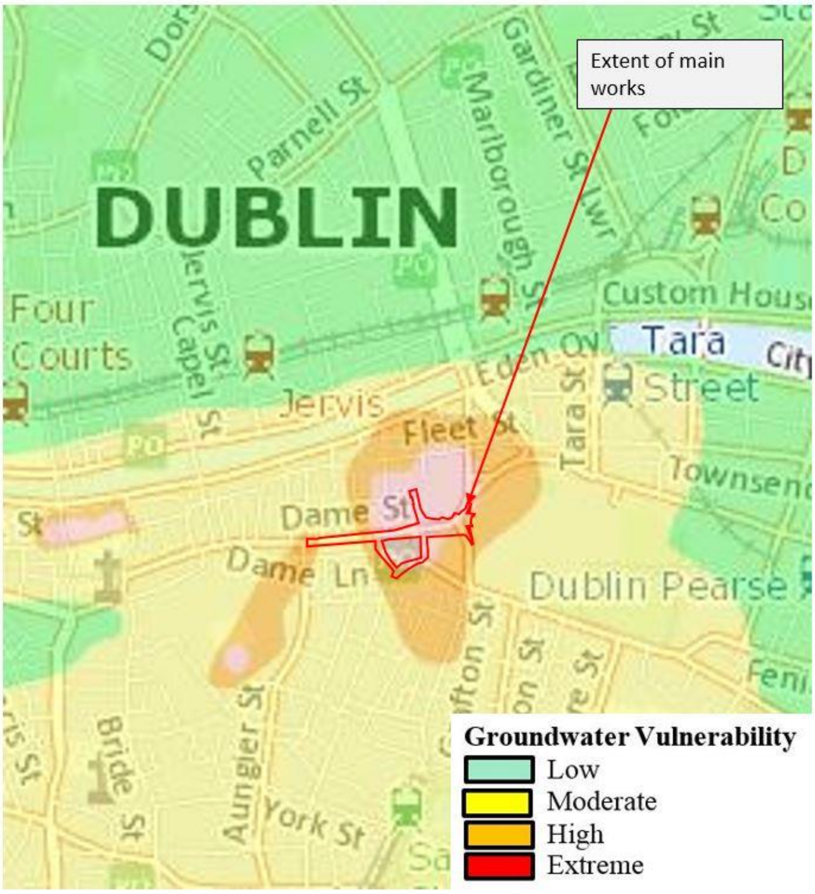

Figure A12.3.9 - Groundwater Flood Risk – GSI Groundwater Data Viewer

A12.3-4 Management of flood risk at the site

A12.3-4.1 Access and Egress Route

Given the very low risk of fluvial and coastal/tidal flooding to the site and its surrounding area, access and egress routes are highly unlikely to be compromised during flood events.

A12.3-4.2 Offsite impacts of the development

The proposed development will also not have any adverse impact on floodplain conveyance and will not increase the risk of flooding in the surrounding area.

A12.3-4.3 Surface Water Drainage Network

The existing drainage regime of the area of the site is being retained as part of the proposed development. Additional new SuDS features however will be incorporated into the development. These will consist of new attenuation/infiltration areas beneath proposed trees filled with crushed stone or soil.

New gullies will also be arranged so that overflow from these attenuation/infiltration areas will discharge to the piped surface water drainage system. All existing surface water collection points will be raised to suit proposed new ground levels.

It is proposed to construct a fountain as part of the development. A drainage channel will be installed around the proposed fountain to harvest rainwater and to return water from the fountains to the water pumps in the proposed underground control chamber of the fountain. This channel will consist of precast drainage units covered by a continuous steel grating. Small connector pipes (c. 150mm) will connect the low points in the drainage channel to the control chamber.

Any risk of pluvial flooding to the site will be mitigated by the design of the surface water drainage network and the incorporation of new SuDs features as mentioned above.

A12.3-5 Application of the ‘Flood Risk Management Guidelines’

A12.3-5.1 Vulnerability Classification

It is considered that the proposed development should be classed as a ‘water compatible development’ as per the vulnerability classification in **Figure A12.3.10**.

Vulnerability class	Land uses and types of development which include*:
Highly vulnerable development (including essential infrastructure)	Garda, ambulance and fire stations and command centres required to be operational during flooding; Hospitals; Emergency access and egress points; Schools; Dwelling houses, student halls of residence and hostels; Residential institutions such as residential care homes, children's homes and social services homes; Caravans and mobile home parks; Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility; and Essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution (SEVESO sites, IPPC sites, etc.) in the event of flooding.
Less vulnerable development	Buildings used for: retail, leisure, warehousing, commercial, industrial and non-residential institutions; Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans; Land and buildings used for agriculture and forestry; Waste treatment (except landfill and hazardous waste); Mineral working and processing; and Local transport infrastructure.
Water-compatible development	Flood control infrastructure; Docks, marinas and wharves; Navigation facilities; Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location; Water-based recreation and tourism (excluding sleeping accommodation); Lifeguard and coastguard stations; Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan).
*Uses not listed here should be considered on their own merits	

Figure A12.3.10 - Vulnerability Classification as per OPW Planning guidelines

A12.3-5.2 Flood Zones

As illustrated earlier in this report, the subject site lies outside the predicted 1 in 1000 year fluvial and 1 in 200 year tidal flood extent. The site is therefore classified as lying within Flood Zone C.

A12.3-5.3 Sequential Approach

Figure A12.3.11 illustrates the sequential approach to be adopted under the 'Planning System and Flood Risk Management' Guidelines. It can be seen from the flow chart that as the proposed development is located within Flood Zone C, a Justification Test is not required.

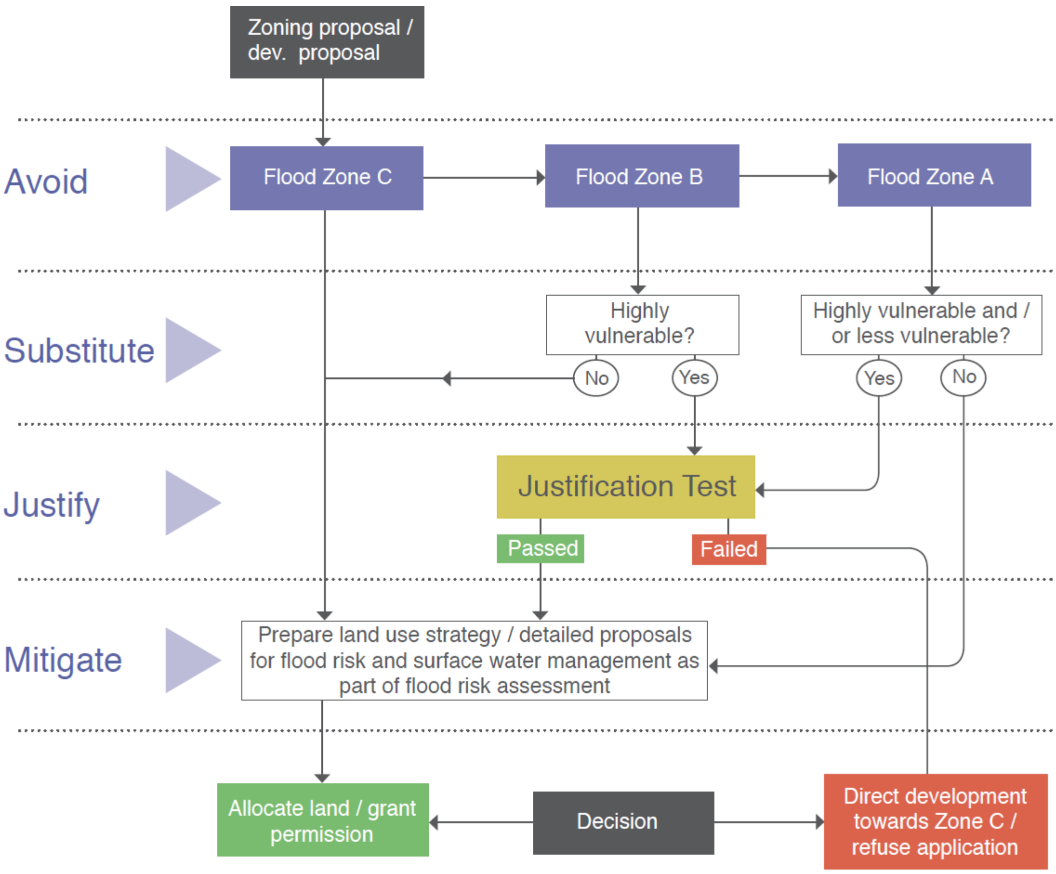

Figure A12.3.11 - Sequential approach mechanism in the planning process

A12.3-6 Conclusion

There is no historic record of flooding of the site.

The risk of both fluvial and tidal/coastal flooding to the site is remote. There is a minor risk of pluvial flooding to the site.

The risk of groundwater flooding is considered to be low. Anecdotal evidence however suggests that some basements in the vicinity of the works may have experienced groundwater ingress during the recent Luas Cross City works.

Access and egress routes to and from the site are highly unlikely to be compromised during flood events.

The proposed development will not have any adverse impact on floodplain conveyance and storage and will not increase the risk of flooding in the surrounding area.

The low risk of pluvial flooding to the site will be mitigated by the design of the surface water drainage network.

Based on the findings of this FRA and the application of the Flood Risk Management Guidelines, it is considered that the proposed development should be classed as a 'water less vulnerable development'. As the site lies within Flood Zone C, a Justification Test is not required.

Appendix 13.1

Resource and Waste Policy and Legislation Review

A12.3-1 Legislation

A12.3-1.1 European

Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (Text with EEA relevance)

Directive 2008/98/EC came into force on 12th December 2008, and Ireland has two years from this date to implement it into national law. The Directive lays down the five-step hierarchy of waste management options, with waste prevention as the preferred option, followed by re-use, recycling, recovery and safe disposal, in descending order.

In addition, the Directive also deals with the issue of 'end of waste' and clarifies the definitions of recovery, disposal and by-product. The directive states that, "The recovery of waste and the use of recovered material as raw materials should be encouraged in order to conserve natural resources."

A12.3-1.2 National

Waste Management Acts, 1996 to 2008 and Regulations Made under the Acts

The Waste Management Act, 1996 was enacted in May, 1996 and sets out the responsibilities and functions of various persons in relation to waste. This was subsequently amended by a number of subsequent acts including the Waste Management (Amendment) Act 2001 and the Protection of the Environment Act 2003. The Act:

- Prohibits any person from holding, transporting, recovering or disposing of waste in a manner which causes or is likely to cause environmental pollution.
- Requires any person who carries on activities of an agricultural, commercial or industrial nature to take all such reasonable steps as are necessary to prevent or minimise the production of waste.
- Prohibits the transfer of waste to any person other than an authorised person (i.e. a holder of a waste collection permit or a local authority).
- Requires the Environmental Protection Agency (EPA) to make a national plan in relation to hazardous waste.
- Requires local authorities to make waste management plans in relation to non-hazardous waste.
- Imposes certain obligations on local authorities to ensure that a service is provided for collection of household waste and to provide facilities for the recovery and disposal of such waste.
- Enables the Minister for the Environment and Local Government to make Regulations for various purposes to promote better waste management.

- Provides for substantial penalties for offences including fines, imprisonment and/or liability for clean-up measures.

Litter Pollution Acts 1997-2009

The Litter Pollution Acts 1997-2009 puts a number of legal responsibilities on Businesses to control litter. The following are offences under the Act:

- Failure to keep footpaths, pavements and gutters adjacent to premises litter free (cigarette butts, receipts, wrappers etc.).
- Putting up posters or signs without authorisation or placing advertising flyers on cars.
- Placing commercial waste in a public litter bin.
- Dumping material in an area other than a waste receptacle or authorised waste facility.
- Mobile operators and organisers of major events have additional responsibilities.

Waste Management (Collection Permit) Regulations, 2007 as Amended

Waste from the proposed development may only be collected by the holder of a waste collection permit or a local authority. Waste collection permits are granted in accordance with the Waste Management (Collection Permit) Regulations, 2007 as amended. Waste storage and collection areas on site should be designed to prevent environmental pollution.

Waste Management (Shipments of Waste) Regulations 2007, S.I. No. 419

Where waste from the proposed development is exported outside of Ireland for recovery or disposal the National Transfrontier Shipment (TFS) Office within Dublin City Council must be notified. Certain financial guarantees must be in place and a certificate issued by the National TFS Office prior to the waste movement taking place.

SI 126 of 2011 - European Communities (Waste Directive) Regulations 2011

These regulations which were adopted in 2011 significantly changed the provisions of the Waste Management Acts, 1996 to 2011. The Regulations define "waste disposal" and "waste recovery" as well as setting out tests which must be complied with in order for material to be described as a "by-product" or achieve "end of waste" status.

The Regulations formally set out the following waste hierarchy which shall apply as a priority order in waste prevention and management legislation and policy:

(a) prevention;
(b) preparation for re-use;
(c) recycling;
(d) other recovery (including energy recovery); and

(e) disposal

The Regulations require that all waste management plans and hazardous waste management plans in existence at the commencement of the Regulations shall be evaluated by 31 December 2012 and where appropriate be revised to be brought into line with Directive 2006/12/EC on Waste.

The Regulations also require the Environment Agency to establish a waste prevention programme by December 2013.

A12.3-1.3 Policy

European Policy

Europe 2020 Strategy, European Commission (2010)

Europe 2020 is the European Union's ten-year growth strategy published in 2010. A key focus of the strategy is to support the shift towards a resource-efficient, low-carbon economy by decoupling economic growth from resource use and reducing the resource intensity of what we use and consume.

Roadmap to a Resource Efficient Europe, European Commission (2011)

The Roadmap to a Resource Efficient Europe outlines a "roadmap" to transform Europe's economy into a sustainable one by 2050.
It proposes ways to increase resource productivity and decouple economic growth from resource use and its environmental impact. The roadmap aims to address resource inefficiency in the sectors that are responsible for the greatest share of environmental impacts – namely food, buildings and mobility, whose combined effects account for 70-80 % of all environmental impacts.
Measures are set out aimed at transforming production and consumption, with incentives for investors to promote green innovation, and a greater role for eco-design, eco-labelling, and greener spending by public bodies. Governments are invited to shift taxation away from labour towards pollution and resources, and to provide fresh incentives to push consumers towards resource-efficient products. The roadmap also recommends adapting prices to reflect the real costs of resource use, especially on environment and health.

7th Environmental Action Programme, European Commission (2014)
The 7th Environmental Action Programme came into force in January 2014 and will guide European environment policy until 2020. A key objective of the programme is to turn the Union into a resource-efficient, green and competitive low carbon economy. There is a special focus on turning waste into a resource, with more prevention, re-use and recycling, and phasing out wasteful and damaging practices like landfilling. By 2020 the European Union and member states are to ensure that:

- The environment and human health are protected by preventing or reducing the adverse impacts of the generation and management of waste.

- Per capita waste generation and waste generation in absolute terms are reducing.
- Landfilling is phased out for recyclables and recoverable wastes and limiting energy recovery to non- recyclable materials.

European Commission Circular Economy Strategy (2015)

In December 2015 the European Commission adopted an ambitious Circular Economy Package, which includes revised legislative proposals on waste to stimulate Europe's transition towards a circular economy.

The Circular Economy Package consists of an EU Action Plan for the Circular Economy that establishes a programme of action, with measures covering the whole cycle: from production and consumption to waste management and the market for secondary raw materials. The annex to the action plan sets out the timeline when the actions will be completed.
The proposed actions will contribute to "closing the loop" of product lifecycles through greater recycling and re-use, and bring benefits for both the environment and the economy.

The revised legislative proposals on waste set clear targets for reduction of waste and establish an ambitious and credible long-term path for waste management and recycling. Key elements of the revised waste proposal include:

- An EU target for recycling 65% of municipal waste by 2030;
- An EU target for recycling 75% of packaging waste by 2030;
- A target to reduce landfill to maximum of 10% of all waste by 2030;
- A ban on landfilling of separately collected waste;
- Promotion of economic instruments to discourage landfilling;
- Simplified, improved definitions and harmonised calculation methods for recycling rates throughout the EU;
- Concrete measures to promote re-use and stimulate industrial symbiosis - turning one industry's by-product into another industry's raw material;
- Economic incentives for producers to put greener products on the market and support recovery and recycling schemes (e.g. for packaging, batteries, electric and electronic equipment, vehicles).

Legislative proposals on waste adopted include a Proposed Directives on Waste, Packaging Waste, Landfill and Electrical and Electronic Waste, on End-of-Life Vehicles, and Batteries and Accumulators.

National Policy

The first national waste policy statement was published by the Department of Environment and Local Government in 1998. A number of statements have been published since, each of which builds on the objectives of the previous plans to improve how waste is managed in Ireland, move waste away from landfill and towards a more sustainable option. The statements published to date include:

- Department of the Environment and Local Government (1998). 'Waste Management - Changing Our Ways' – A Policy Statement.
- Department of the Environment and Local Government (2002). Preventing and Recycling Waste – Delivering Change – A Policy Statement.
- Department of the Environment, Heritage and Local Government (2004). Waste Management - Taking Stock and Moving Forward.
- Department of the Environment, Heritage and Local Government (2006). National Strategy on Biodegradable Waste Management.
- Department of the Environment, Heritage and Local Government (2012). A Resource Opportunity- Waste Management Policy in Ireland.

From 2012 a number of policy documents and reports have been published which are summarised in the sections below.

Department of the Environment, Heritage and Local Government (2012). A Resource Opportunity- Waste Management Policy in Ireland

This policy document sets out measures through which Ireland will increase recycling rates and reduce delivery of waste to landfill following coming into force of the Waste Framework Directive. Key measures set out in the report are as follows:

- Significant reduction of Planning Regions from ten to three. A review of regional waste management plans will be undertaken to comply with the requirements of the Waste Framework Directive.
- Timing and nature of the application of landfill bans will be considered taking into account the level of diversion being achieved and the development of viable beneficial uses for waste in support of the virtual elimination of our dependence on landfill.
- Ireland requires an adequate network of quality waste treatment facilities. The EPA will undertake a review of recovery infrastructure to advise on national requirements for managing municipal waste in accordance with the principles of proximity and self-sufficiency.
- All householders will be obliged to demonstrate that they are availing of an authorised waste collection service or are otherwise managing their waste in an environmentally acceptable manner

- Through waste collection permits waste collectors will be required to manage waste in accordance with the waste hierarchy and operate pricing structures to incentivise environmentally sustainable behaviours by households in terms of waste reduction
- Separate collection of organics will be a required waste permit condition for those collecting from households within population centres of a given size and will be introduced on a phased basis over a 4 year period, beginning with larger population centres.
- All current and future producer responsibility schemes will be required, as part of the conditions of their approval, to formulate, implement and demonstrate significant waste prevention and re-use initiatives for their particular waste streams.

EPA (2013 & 2014) National Waste Reports 2011 & 2012

The EPA produced an annual Waste Report. The reports provide information on key statistics and trends in waste as well as information on Ireland's progress in meeting EU waste collection, recovery and diversion targets. The information is broken down relating to: municipal waste generation and management; biodegradable municipal waste; waste infrastructure; packaging waste; waste electrical and electronic equipment; end of life vehicles; waste tires and hazardous waste.

EPA (2014) National Municipal Waste Recovery Capacity. An Assessment for the Department of the Environment, Community and Local Government

In 2012 the EPA were tasked by the Department of the Environment, Community and Local Government (DoECLG) to undertake an assessment of municipal waste recovery infrastructural capacities in the State. This report documents the outcome of that assessment. This task was articulated in the DoECLG publication 'A Resource Opportunity – Waste Management Policy in Ireland' (2012) (see above).

The EPA assessment, undertaken during 2013, has yielded an electronic register holding estimated municipal waste recovery capacity figures for authorised waste activities. The Capacity Register compromises different worksheets containing capacity data on:

- EPA waste licences
- EPA IPC/IE licences
- Sites authorised under an EPA Certificate of Registration
- Local Authority issued Waste Facility Permits, and
- Local Authority issued Certificates of Registration

There is an estimated 5,800 to 6,000 'live' waste facility authorisations in the state. This assessment report presents a synthesis of the Capacity Resister information. The data in this study reflects a snapshot in time – May 2013.

Environmental Protection Agency (2014). National Hazardous Waste Management Plan, 2014-2020

The Third National Hazardous Waste Management Plan was published by the Environmental Protection Agency in 2014.
This Plan sets out priority actions to be taken over the six year life of the plan in relation to:

- Prevention of hazardous waste.
- Improved collection rates for certain categories of hazardous waste.
- Steps required to improve Ireland's self-sufficiency in hazardous waste management.
- Identification and management of certain legacy hazardous wastes such as historic unregulated waste disposal sites and contaminated soil.

The plan includes eight key environmental objectives which will be adopted for the plan including "*To minimise the export of hazardous waste for treatment and/or disposal and reduce emissions due to transportation*".
The plan also includes a range of targets and indicators which provide a means of measuring progress towards the plan objectives. These include "*minimise distance travelled by hazardous waste"* and "*Minimise export of hazardous waste and move towards self sufficiency*".

EPA (2015) Waste Classification – List of Waste and Determining if Waste is hazardous or Non Hazardous.

This document was published by the Environmental Protection Agency in 2015. From 1 June 2015, waste classification is based on:

- Commission Decision of 18 December 2014, amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European parliament and of the Council (2014/955/EEC.
- Commission Regulation (EU) No 1357/2014 of 18 December 2014, replacing Annex III to Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives.

This waste classification system applies across the EU and is the basis for all national and international waste reporting obligations. This document consolidates the Decision and Regulation and provides guidance on how to follow them.

This document replaces:

- The 2002 European Waste Catalogue and the Hazardous Waste List
- Hazardous Waste Classification Tool
- Hazardous Waste Classification Worksheet.

There are two main elements,

- List of Waste (LoW) (Appendix 1)
- Determining if waste is hazardous or non-hazardous (Appendix 2)

Regional and Local Policy

The Eastern Midlands Region Waste Management Plan 2015-2021

For the purposes of waste management planning, Ireland is now divided into three regions: Southern, Eastern-Midlands, Connacht-Ulster. The Eastern-Midlands Region includes the Dublin City Council area.

The Eastern Midlands Region Waste Management Plan 2015-2021 was launched in 2015. The strategic approach of the plan places a stronger emphasis on preventing wastes and material reuse activities. Three strategic targets have been set in the plan which include:

- Achieve a recycling rate of 50% of managed municipal waste by 2020
- Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill in favour of higher value pre-treatment processes and indigenous recovery practices

The plan looks to 2030 and includes a goal of reaching a recycling rate of 60%.

Dublin City Council Litter Management Plan 2016-2018

The overarching objectives of the Dublin City Council Litter Management Plan 2016-2018 are as follows:

1. Reduce litter by working with our citizens to make Dublin a welcoming environment for all who work, live in and visit the City.
2. Communicate the litter prevention message throughout Dublin City.
3. Ensure that there is an effective and efficient street cleaning operation in place throughout the city.
4. Use all available enforcement options under the Litter Pollution Acts 1997 - 2009 and the Bye Laws to prosecute litter offenders whenever possible.

The plan also includes the following objectives:

- Dublin City Council will avail of the latest technology in order to address the litter problems in the Central Business District during the lifetime of 2016-2018 Litter Management Plan. New innovations such as smart litter bins using GPS and GIS technology will be assessed, piloted and adopted if feasible. It is recognised that technology can result in cost savings in staff time, fleet and fuel.
- There has been an increasing trend of successful deployment of smart bin technologies in cities that incorporate features such as sensors that communicate back to the street cleaners when they are full. The use of accompanying software that allows for optimization of routes for cleaning schedules and provision of real time data information. Dublin City Council

will investigate how this type of technology might be utilised successfully in the City.

- Dublin City Council will review and consider the introduction of small mounted litter receptacles at traffic lights and bus stops for the disposal of chewing gum and cigarette butts.
- Dublin City Council will assess the latest designs of segregated type bins that facilitate recycling and put in place a trial of this type of bin to promote on street recycling.

Guidance

Construction and Demolition Waste Management – A Handbook for Contractors & Site Managers, FÁS and CIF (2002)

This handbook was produced in conjunction with Fás and the CIF in 2002. It provides advice for contractors and site managers on how to manage construction and demolition waste to make financial savings in purchasing material and disposal costs in a sustainable manner.

Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects

These guidelines were published by the DoEHLG in July 2006. They were developed in conjunction with the National Construction & Demolition Waste Council (NCDWC) as part of the Voluntary Construction Industry Initiative and give advice on planning for C&D waste management. They also give guidance on source separation of waste, the diversion of waste from landfill and encourage construction companies to work towards achieving the national recycling target of 85% as outlined in the Government Policy Document Changing Our Ways (DOEHLG).

Appendix 13.2

Case Studies

Waste Licence W0272-01 Roadstone Limited

Roadstone Ltd holds a Waste Licence (Number 272-01) from the EPA for a site at Milverton. Skerries, County Dublin for the recovery of up to 400,000 tonnes per annum of soil and stones. The following waste processes are authorised at the facility:

- Importation, stockpiling and use of soil and stones for quarry backfill; and
- Use of inert soil and stones for land improvement.

A total of 2.47Mt of material can be backfilled at the facility over its authorised life.

The facility is therefore a viable destination for surplus excavation soil and stones arising from construction of the proposed development providing the overall limit of 2.47Mt over the facilities lifetime is not reached prior to the start of construction.

Waste Licence W0277-02 Roadstone Wood Limited

Roadstone Wood Ltd holds a Waste Licence (Number W0277-02) from the EPA for a site at Huntstown Inert Waste Recovery Facility, Huntstown Quarry, Finglas, Dublin 11 for recovery of up to 750,000 tonnes per annum of soil and stones. The following waste processes are authorised at the facility:

- Importation, stockpiling and use of soil and stones for quarry backfill; and
- Use of inert soil and stones for land improvement.

A total of 7.295Mt of material can be backfilled at the facility over its authorised life.

The facility is therefore a viable destination for surplus excavation soil and stones arising from construction of the proposed development providing the overall limit of 7.295 Mt over the facilities lifetime is not reached prior to the start of construction.

Waste Licence W0261-01 Nurendale Ltd T/A Panda Waste Services

Nurendale Ltd T/A Panda Waste Services holds a waste licence from the EPA (Number W0261-01) in respect of a facility located at Cappagh Road, Finglas, Dublin 11 to undertake the following activities:

- Reception bulking storage and transfer of wastes; and
- Recovery of wastes by sorting, separation, shredding, crushing, tromelling, screening, baling and repackaging processes.

The facility is licenced to accept a total of 200,000 tonnes per annum including 75,000 tonnes non-hazardous construction and demolition wastes.

The facility is therefore a viable destination for surplus non- hazardous construction and demolition waste from the construction of the proposed development.

Industrial Emissions Licence P1002-01 Hammond Lane Metal Company Limited

The Hammond Lane Metal Company Limited holds an industrial emissions licence from the EPA (Number P1002-01) for operation of a waste metal recycling and shredding installation for the processing of ferrous and non- ferrous metals at Pigeon House Road, Ringsend, Dublin 4. The waste types accepted include ferrous and non-ferrous metals. The maximum quantity of waste licenced to be accepted is 136,000 tonnes per annum.

The facility is therefore a viable destination for surplus metal construction and demolition waste from the construction of the proposed development.

Industrial Emissions Licence W0036-02 Indaver Ireland Limited

Indaver Ireland Ltd holds an EPA licence (Number W0036-02) for a hazardous waste transfer station at Tolka Quay Road, Dublin Port, Dublin 1. While wastes accepted at the facility are predominantly hazardous solvents (up to 20,000 tonnes) 18,000 tonnes per annum of other hazardous wastes including pharmaceutical wastes and contaminated rubble and soil are licenced for acceptance at the facility.

The facility is therefore a viable destination for hazardous construction and demolition wastes from the construction of the proposed development.