

A7.3

St Stephens Green Report

Contents

MetroLink.....	1
St Stephens Green.....	1
Proposed Station and St Stephen's Green	1
St Stephen's Green East – Potential Station Location Assessment.....	2
St Stephen's Green East - Preferred Station Location – Preferred Location	3
1. Introduction	4
2. St Stephen's Green	5
2.1 Introduction	5
2.2 St Stephen's Green Park	5
2.2.1 St Stephen's Green – Historical and Cultural Heritage Context	5
2.2.2 Conservation Plan.....	12
2.3 Landscape & Visual Amenity	12
2.4 Amenity	12
3. Emerging Preferred Route and St Stephen's Green	14
3.1 Introduction	14
3.2 Methodology used in the Identification of the EPR	14
3.2.1 Assessment Outcomes	16
3.2.2 Consultation on the EPR.....	16
3.3 Description of the Proposed EPR at St Stephen's Green East	17
4. Preferred Route and St Stephen's Green Station.....	17
4.1 Introduction	17
4.2 Methodology for the determination of the Preferred Station Location at St Stephen's Green East	17
4.2.1 Stage 1: Review of the Receiving Environment	17
4.2.2 Stage 2: Identification and Description of Potential Station Locations.	18
4.2.3 Stage 3: Preliminary Analysis	18
4.2.4 Stage 4: Multi Criteria Analysis.....	18
4.3 Receiving Environment/Local Constraints	22
4.3.1 Transport/Traffic.....	22
4.3.2 Landscape/ Streetscape and Visual Amenity	23
4.3.3 Biodiversity.....	24
4.3.4 St Stephen's Green Park (East) - Cultural Heritage Items	24
4.3.5 Protected Structures and associated features on St Stephen's Green East.....	25
4.3.6 Amenity	26
4.4 Engineering Considerations.....	27
4.4.1 Intervention Shaft Requirement	27

4.4.2	Diversion of Utilities	28
5.	Potential Station Locations.....	31
5.1	Introduction	31
5.2	Location 1	31
5.3	Location 2	33
5.4	Location 3	35
5.5	Location 4	37
5.6	Location 5	39
5.7	Location 6	41
5.8	Location 7	43
6.	Preliminary Analysis and Conclusions	45
6.1	Introduction	45
6.2	Appraisal of Options.....	45
6.2.1	Location 1	45
6.2.2	Location 2	46
6.2.3	Location 3	47
6.2.4	Location 4	49
6.2.5	Location 5	50
6.2.6	Location 6	51
6.2.7	Location 7	52
6.2.8	Stage 3 Preliminary Analysis Outcome	52
7.	Multi-Criteria Analysis and Conclusions	54
7.1	Introduction	54
7.2	Assessment summaries.....	54
7.2.1	Location 5	54
7.2.2	Location 6	55
7.3	Stage 4: MCA outcomes	57
8.	St Stephen's Green Station Preferred Location	58
9.	References.....	59

Executive Summary

MetroLink

The MetroLink Project is a high capacity, high frequency, modern and efficient metro rail line running for 19km from Swords to Charlemont linking Dublin Airport, Irish Rail, Dart, Dublin Bus and Luas Services creating a fully integrated public transport in the Greater Dublin Area. MetroLink will be segregated from all other traffic and transport systems including pedestrians and cyclists. This will be achieved through Dublin City by having the system underground, meaning that MetroLink can operate a very frequent system to meet the transport needs of the areas served, without impacting or being impacted by other transport movements. Furthermore, the underground system will ensure that the construction phase impacts through a densely populated urban area will be minimised.

The current project programme envisages that construction of the project could commence in 2021, if a Railway Order Application to An Bord Pleanála was successful and would be operational by 2027, following a six year construction period.

St Stephens Green

St Stephen's Green is located in the heart of Dublin City Centre and its location and layout is central to providing the character and identity to this area of the city. St Stephens Green consists of a high-quality urban space, which is a significant attractor for over 8 million visitors every year. St Stephen's Green is also a designated National Monument, is listed on the Dublin City Council Record of Protected Structures (RPS) and contains many features of high architectural value. The current park layout still retains the original Victorian design of William Sheppard.

St Stephens Green also functions to provide space for the movement and circulation of people through and around the St Stephen's Green area. The road network around St Stephen's Green Park provides critical access points into to the City Centre for public transport systems and for other transport modes.

Proposed Station and St Stephen's Green

An underground station at St Stephen's Green East was identified as part of the Emerging Preferred Route (EPR) ARUP (2018). An in-depth multidisciplinary analysis was undertaken to determine the EPR. This analysis considered different options for a station location in the St Stephens Green area including station locations on the west side of St Stephen's Green, in a more central location in St Stephen's Green and at St Stephen's Green East. Other options with no stations at all in this location were also assessed. The assessment undertaken identified the EPR with a station at St Stephen's Green East for the following reasons:

- The EPR best serves passenger demand along the corridor;
- The EPR serves more key trip attractors than other options through the city including St Stephen's Green, the National Concert Hall, cultural institutions such as the National Gallery and the National Museum (Natural History & Archaeology). Furthermore, this route option serves key commercial, retail and office trip attractors such as Grafton Street;
- The EPR provides excellent interchange opportunities with other public transport modes as it links with the DART (at Tara St), Luas (at O'Connell St & Charlemont), multiple bus routes and heavy rail services at Glasnevin. The assessment found that route options that featured an interchange with the DART line at Tara Street to perform well against the Public Transport Interchange criteria. Locating a station at Tara Street constrains the possible tunnel alignments, when terminating the line at Charlemont due to tunnel boring machine turning constraints and operational considerations for the tunnel alignment. This means that the location of an interchange station at Tara Street was a key driver for the location of a station on St Stephen's Green East; and

- The EPR resulted in potential environmental impacts particularly for Archaeology, Architecture and Cultural Heritage and Landscape, but it was identified that the majority of impacts could be mitigated during design.

St Stephen's Green East – Potential Station Location Assessment

Following the identification of St Stephen's Green East as the best general location for a MetroLink station, a further multi-disciplinary analysis was undertaken in order to identify the optimum location for a station at St Stephens Green East having regard to Engineering, Environmental and Economy criteria. Seven potential station locations were identified on St Stephens Green East and Earlsfort Terrace (refer to Figures 5.1-5.7 for details of potential station locations). These locations were assessed having regard to the following:

- The importance of St Stephen's Green Park as an historical public park which maintains its Victorian layout and features extensive tree, shrub and flower planting that enhance the architectural features of the park. The park is one of the most important green spaces in the centre of Dublin and attracts significant numbers of visitors each year;
- The Architectural Heritage of the area having particular regard to St Stephen's Green Park which is designated as a National Monument (RMP DU018-020334) and is listed on the Dublin City Council Record of Protected Structures (RPS 7751-7761). Furthermore, there are a number of buildings on the east side of St Stephen's Green which may be impacted by potential station locations as they feature extensive cellars that protrude underneath the roadway;
- The importance of St Stephen's Green East as a transport corridor for public transport, private vehicles, cyclists and pedestrians. It should be noted that during the AM peak hour, 384 buses used the corridor to access the City Centre;
- The presence of multiple utilities underneath the roadway on St Stephen's Green East and the requirement for major diversions of those utilities. Particular attention was given to the requirement to divert a 1,800mm brick "ovoid" Victorian sewer under St Stephen's Green East and 1,710mm reinforced plastic mortar ovoid sewer situated underneath Hume Street as diversions of these utilities could extend the construction period by 12 months or more, causing significant additional impacts; and
- The requirement for an intervention shaft between the St Stephen's Green Station and Tara Street in the event that the distance between these stations is greater than 1,000m. An intervention shaft is a significant structure that would be required to allow for emergency services to access the MetroLink tunnel in the event of an emergency. The intervention shaft would need to be located between Tara Street and St Stephen's Green and would cause significant additional impacts if required.

St Stephen's Green East - Preferred Station Location – Preliminary Assessment

A number of potential station locations (Locations 1, 2, 3 and 7) were identified as being more than 1000m from Tara Station. This would mean that an intervention shaft would be required. The most appropriate location for an intervention shaft would be any available open spaces i.e Trinity College Dublin or Merrion Square. This requirement resulted in these locations performing poorly against several criteria in the preliminary assessment. In particular, the locations performed poorly against Economy and Environmental criteria due to the increased capital cost and environmental impacts associated with construction of an intervention shaft at identified sensitive locations. Given these unfavourable factors locations 1-3 and 7 were not progressed for further analysis. It should also be noted that station location 7 (Earlsfort Terrace) would also require the diversion of the Victorian sewer along Earlsfort Terrace which would mean that this option would perform poorly against Economy and Environmental criteria due to a prolonged construction period resulting in additional costs and environmental impacts. Finally, Location 7 performs poorly against the overall Project Objective criterion as a station located at

Earlsfort Terrace would not provide good public transport network legibility due a lack of key trip attractors. In this regard it is significantly inferior to options on St Stephen's Green East.

The proposed station (Location 4) is situated beneath the roadway on St Stephen's Green East will require the 1,800mm diameter Victorian sewer and the Hume Street sewer to be diverted to allow for the construction of this station. This is considered very technically challenging and would require an extended construction period of 12 months. This station location also performed poorly against the environmental criteria as a result of the requirement to close St Stephen's Green East and Hume Street to public transport and traffic during construction and due to the potential direct impacts on properties on the east side of St Stephen's Green which are listed on the RPS. In addition, despite being within the carriageway of St Stephen's Green East, there would be direct impacts on the St Stephen's Green Park. In terms of the economy criteria, the cost of utility diversions would be significant, and this caused this location to perform moderately in regard to this criterion. As a result of the poor performance against the engineering (constructability) and environmental criteria, Location 4 was not progressed for further analysis.

Locations 5 and 6 were brought forward for further analysis involving a further multicriteria analysis (MCA) using Environmental and Economy criteria. Both of these station locations would have a direct impact on St Stephen's Green Park, but due to the proposed station locations they avoid the following impacts;

- Diversion of the Victorian sewer and Hume Street sewer and associated impacts resulting from a more extensive construction area and duration;
- The closure of St Stephen's Green East to public transport and traffic during the Construction Phase; and
- Direct impacts on buildings listed on the RPS on Stephen's Green East.

St Stephen's Green East - Preferred Station Location – Preferred Location

The outcome of the further MCA analysis of Location 5 and 6 was that Location 5 was chosen as the preferred location for the proposed MetroLink station as it significantly reduces the impact on St Stephen's Green Park when compared to Location 6. Location 5 results in the requirement for less tree felling and vegetation removal when compared with Location 6. In addition, the long-term impacts on St Stephen's Green Park are significantly less for Location 5 as the main surface elements of the proposed station are largely located outside of the current extent of St Stephen's Green Park.

Furthermore, the choice of Location 5 allows for the long-term impacts of the station to be significantly mitigated by replanting trees and other vegetation, in addition to the reinstatement of existing elements of architectural heritage. In addition, high-quality design of station "pop-ups" would allow for the development of a high-quality urban environment in the north eastern corner of St Stephen's Green.

However, Location 6 performs better against the economic criteria than Location 5 as the station is located entirely under St Stephen's Green Park which would significantly lower the construction, reinstatement of roadway and utility diversion costs.

Overall, Location 5 has been chosen as the preferred station location for St Stephen's Green East. This is in order to mitigate the potential impacts on St Stephen's Green Park, reduce the overall construction phase impacts by avoiding the requirement for an intervention shaft, significant utility diversions and retain transport and traffic movements on St Stephen's Green East during the construction phase.

Station Location 5 will now be subject to further design development and potential impacts will be assessed, with mitigation measures recommended. The outputs of the assessment and recommended mitigation measures will be presented in the EIAR for the project.

1. Introduction

This report outlines the robust assessment process that has been undertaken in order to identify the optimum MetroLink station location serving the south City Centre area and St Stephen's Green. The identification of a preferred station location was achieved by employing a multiple stage assessment process as outlined below:

- Identification of the Emerging Preferred Route (EPR) for MetroLink;
- Identification of a preferred route for MetroLink and;
- A four-stage assessment to identify a preferred station location at St Stephen's Green.

Each stage of the assessment process was undertaken by multidisciplinary teams, including environmental specialists, led by Transport Infrastructure Ireland (TII).

2. St Stephen's Green

2.1 Introduction

St Stephen's Green is located in the heart of Dublin and its location and layout is central to providing the character and identity to this area of the city. St Stephen's Green consists of a high-quality urban space, which provides an attractive location for those living, working and visiting the city. St Stephen's Green also functions to provide space for the movement and circulation of people through and around the area. The road network around St Stephen's Green Park provide critical access points into to the City Centre for public transport systems and for other transport modes.

2.2 St Stephen's Green Park

St Stephen's Green Park is Irelands best known public park and consists of a 9 hectare park that maintains its late Victorian layout to this day, with shrub planting, extensive flower beds and perimeter tree planting and a substantial ornamental lake. The park is also home to many monuments and sculptures as well as other elements of archaeological, architectural and cultural heritage such as the decorative railings that surround the park.

The park functions as one of the principal amenity sites in Dublin City Centre, offering the public a peaceful refuge from the city, with attractors such as a Children's playground, a bandstand (regularly used for events) and the multitude of gardens within the boundaries of the Park.

St Stephen's Green Park is a National Monument the extent of which is defined by the kerb line of the perimeter footpath. A detailed cultural heritage background of the constraints present on both St Stephen's Green Park (East) and St Stephen's Green East has been prepared by TII and is attached as Appendix A to this report. A summary historical and cultural heritage background is provided in Section 2.2.1.

2.2.1 St Stephen's Green – Historical and Cultural Heritage Context

Historically the name St Stephen's Green originates from the 13th century St Stephen's Leper Hospital and Church, which was located c.300m to the east on the intersection of present day Stephens Street Lower and Mercer Street. During the medieval and post-medieval periods the lands of St Stephen's Green comprised marshy commonage, which extended as far as the River Dodder and was used by the citizens of the city for grazing livestock.

The park was originally established for the citizens of Dublin in 1653 as a 60 acre site. In 1664 the City Assembly decided that the plot of ground could be used to generate income for the city and a central area of twenty-seven acres (10.9 hectares) was marked out which would define the park boundary, with the remaining ground being let out into ninety building lots. The annual rent generated from the lease of these plots were to be used to not only to supplement the economy, but also to build walls and paving around the park and provide for its overall maintenance. The external boundary of the park was enclosed by a stonewall (c.1670-72) with wooden gates, gravel walks (1667-1687) and a watch house (c. 1683) constructed. Due to the fact that this was marshland a broad perimeter drainage ditch was also constructed to drain the park and facilitate the use of the promenade for recreational purposes. This took the form of a ha-ha with a stone revetment on the park side. As a condition of the lease, each tenant was required to plant six sycamore trees near the wall, in order to create the desired 'promenade'. This should have totalled 510 trees set out in rows of two, but tenants were notorious for not complying with this agreement, while many opted towards the preferred Lime and Ash trees thus resulting in a mix of planting, and historic references to the 'Lime Walk' promenade (McCabe 2011, 61-3; Figure 2.1 and Figure 2.2).

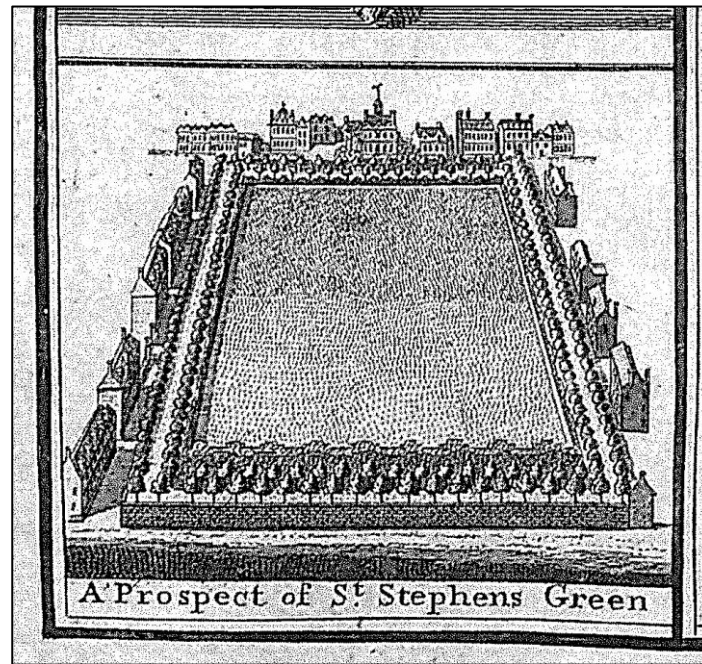


Figure 2.1: Extract from Charles Brooking's 1728 Map of the City of Dublin, illustrating the enclosing boundary wall and Lime Walk on St Stephen's Green (Copyright Irish Historic Towns Atlas).



Figure 2.2: St Stephen's Green, Dublin' Malton (1796). Note Lime Walk Promenade with internal perimeter ditch (revetment wall defined by low hedgerow) and animals grazing the park interior. (Copyright National Library of Ireland).

In 1670 the first paid gardeners were employed to tend to the park, the interior of which predominantly comprised meadow land which was let for pasture and annually harvested for hay until 1766-67. At this time it passed to the Lord Mayor who used it for dairy cows and horses, while the Assembly, in response to the overall improvement

activities of the Wide Street Committee throughout the city, instigated further repairs of the gravel walks, means of access and commissioned additional gardeners (McCabe 2011 181-2). However, due to an ongoing financial deficit the park fell into disrepair and did not receive a major investment in upkeep until it was privatised in 1814 under the auspices of which it was extensively landscaped. This entailed the infilling of the perimeter ditch, the removal of the original boundary wall and the sale of the trees on the promenade (Lime Walk; McCabe 2011, 257)). This early 19th century redesign entailed the enclosing of the park by a dwarf wall with an *'ornamental palisade of about six feet high, outside this is a gravel walk, bordered by octagonal granite pillars, connected by chains, and surmounted by lampposts'* (Heffernan 1861, 72; see Figure 2.3). This work effectively decreased the size of the park such that the location of the former perimeter ditch, Lime Walk and boundary wall now lie under the present day roadway.



Figure 2.3: View of St Stephen's Green North c. 1828-30 by H. Madden (after McCabe 2011). Note absence of Lime Walk, perimeter ditch, and limited interior planting.

The park again fell into disrepair and was redesigned from 1877-1880 under the patronage of Ardilaun Guinness, who as a promoter of the St Stephen's Green Act of 1877, ensured the park would permanently remain open to the public. The layout that was achieved during this period, which included the insertion of large corner gates and the replacement of the perimeter walls and railings, is largely what is in place today, with the notable exceptions of the northeast and southwest corners where respectively the Wolfe Tone Memorial and Fusiliers Arch now stand.



Figure 2.4: View of St Stephen's Green North. Note entrance gates illustrated were erected 1877-1880.

In terms of archaeological heritage, St Stephen's Green Park is a Recorded Monument and Place (RMP DU018-020334-). As the location of St Stephen's Green Park was commonage prior to 1635, and outside the medieval town, there is low potential for the presence of sub-surface archaeological stratigraphy other than that directly related to the park itself. Therefore the likely remains which survive, external to the park railings and beneath the surrounding footpath and carriageway relate to the parks perimeter 17th century perimeter ditch and boundary wall. Evidence for both these features was found on St Stephen's Green North during the construction of Luas Cross City. This work identified that the plinth wall and railings, which currently enclose the park, rest directly on the revetment wall of the 17th century perimeter ditch, using the latter as a foundation (Figure 2.5). The boundary wall, comprising rough limestone blocks, was identified towards the central carriageway of St Stephen's Green North.



Figure 2.5: Images of the revetment wall of the perimeter ditch as it relates to the present day railings and plinth of the park's perimeter boundary (RPS 7751). Identified on St Stephen's Green North (Rubicon Heritage Ltd.)

Additional remains external to the park are likely to be related to the various phases of dwelling houses that lined its sides including coal cellars, building/boundary wall foundations and drainage features (e.g. wells).

With reference to the interior of the park, it is not expected that significant sub-surface archaeological stratigraphy will be present as the area has historically either been used for grazing or as park space. Items likely to be found will be landscaping features (e.g. gravel walks and planting beds) and drainage ditches. During exploratory works on St Stephen's Green as a component of the old Metro North works, remains of the park's gate pier, removed from the north-west corner in 1907 to accommodate the erection of Fusiliers Arch, were identified. These remain in situ (see Figure 2.6). It is possible that similar remains may survive on the north-east corner, where the railings were removed to accommodate the insertion of the Wolfe Tone statue. As insurgents used the park during the 1916 Easter Rising there is a potential that the defensive ditches they dug internal to the park boundary may be identified during any ground disturbance works. This could also include spent bullets and other munitions, or other war related items.



Figure 2.6: The remains of gate piers erected in 1877-1880, and removed in 1907 to accommodate the erection of Fusiliers Arch.

In terms of architectural heritage various elements of St Stephen's Green Park have also been designated as Protected Structures. On its eastern boundary these include:

- Railings, gates and plinth walls of perimeter boundary on St Stephen's Green (RPS 7751);
- Surrounding bollards and traditional-style lampposts (RPSs 7752).

Additional protected structures include the bandstand, a pavilion, fountains, the superintendent's house and several statues representing notable individuals such as the statue of Countess Markievicz and Robert Emmet (Record of Protected Structures (RPSs) 7753–7761 DCC). St Stephen's Green Park is also an Historic Garden and Designed Landscape as listed in the National Inventory of Architectural Heritage (NIAH).

The west side of the park is dominated by Fusiliers Arch (1907) and a substantial (3 acre) ornamental lake with a central tree covered Pulham rockwork. The perimeter of the park, in particular its eastern side is vegetated by a combination of mature trees (including several significant specimens of Oak, London Plain and Elm) and shrubs.

The northeast entrance to St Stephen's Green, now functions as a broad plaza with fan detail paving which is dominated by the Wolfe Tone Monument (1967) comprising a three-meter bronze statue set against the architect Keating's curved line of granite monoliths ('Tone Henge'; Figure 2.7). The Hungry Heart 'Famine' Memorial is located to the rear of this. The insertion of these statues and monuments, necessitated the removal of the northeast gates which are now located in the grounds of Kilkenny Castle (Margaret Gormley OPW, pers comm.). Although the 19th century gates were removed to accommodate the insertion of these items in 1967, two of the original gate piers do survive, one either side of the entrance way (Figure 2.8)



Figure 2.7: Wolfe Tone statue and 'Tone Henge' on the north-east corner of St Stephen's Green



Figure 2.8: 19th century gate piers and fan detail railings on the north-east corner of St Stephen's Green

Within the parks south-east corner stands 'The Three Fates', by German artist Josef Wackerle, donated to Ireland by West German after World War II (Casey 2005, 533).

With reference to the above, as the boundary elements (railings RPSs 7751 and bollards -RPSs 7752) of the park are Protected Structures adopting the precautionary principle all items within its curtilage should be considered protected, with each item contributing to its distinct architectural and cultural heritage.

The park was original bounded to north, east and west by Dublin's historic tramlines of which sub-surface remains may survive. The historic ovoid sewer line, which surrounds the park, is also of industrial heritage merit.

2.2.2 Conservation Plan

The Office of Public Works (OPW) have developed a Draft St Stephen's Green Park Conversation Management Plan (OPW 2015) which aims to conserve the unique Victorian character of St Stephen's Green that has remained largely intact since the 1880s. The Conservation Management Plan's strategy for the future has a strong conversation and restoration objective for all aspects of the park including built and natural features. Relevant objectives include:

- To protect and conserve the historic landscape character of St Stephen's Green Park;
- To protect the historic setting of St Stephen's Green and conserve its archaeological and architectural heritage; and
- To preserve the peace and tranquillity of the Green.

The mature vegetation, specifically the trees make up an important element of the cultural heritage value of St Stephen's Green Park. This is reflected in the specific objectives of the Draft St Stephen's Green Park Conversation Management Plan (OPW 2015) relating to landscape which states:

'To ensure that trees and plantations continue to thrive in the Green, using species that are appropriate to the setting and soil conditions. Such features are fundamental in creating the landscape character by defining spaces and in directing views within the Green. Sustaining the current balance between open space and plantations is essential to the landscape character. The form, structure and species diversity and character of plantations will be conserved, and new plantations established by sensitive management including felling, remedial work and appropriate replanting.'

2.3 Landscape & Visual Amenity

The area next to the perimeter fence of the park vegetated by an unbroken line made up of a mixture of trees and shrubs. These provide a visually impermeable barrier between the urban environment and the green space inside St Stephen's Green Park. The upper canopy of the tree line along St Stephen's Green East is dominant by impressive specimens of Holm Oak (*Quercus Ilex*), Sycamore (*Acer Pseudoplatanus*), Horse Chestnut (*Aesculus Hippocastanum*), Wych Elm (*Ulmus Glabra*) and London Plane (*Plantanus x hispanica*). The majority of these trees have been classified as being in good condition.

The under canopy is dominated by Holy (*Ilex Aquafolium*) and Cherry trees (*Prunus Sp.*)

2.4 Amenity

St Stephen's Green is one of the most important green spaces in the centre of Dublin. Dublin City Council (DCC) have defined St Stephen's Green as a "Flagship Park" in the Dublin City Parks Strategy 2017-2022 (DCC, 2016).

St Stephen's Green Park has been defined as such in recognition of the significance of the park as a visitor and tourist attraction.

There are four main entrances to the park, with 14 entrances overall which allow safe access and egress to the park, seven days a week during opening hours. The Draft St Stephen's Green Park Conservation Management Plan (OPW, 2015) identifies that passive recreation is encouraged in the park and that the park offers a number of attractions such as the following:

- A clean, well maintained park in the middle of the city;
- A historic property open to all on a daily basis;
- A playground;
- Heritage features, statues, buildings and park furniture;
- Trees, shrubs and flower beds and borders;
- Water features;
- Wildlife; and
- Cultural events/lunchtime concerts.

In 2009, eight million visitors were recorded visiting the park and park users range from members of the public walking through the park, active walkers and joggers, lunchtime visitors, family groups and tourists.

3. Emerging Preferred Route and St Stephen's Green

3.1 Introduction

The Emerging Preferred Route (EPR) including a proposed underground station at St Stephen's Green East was identified based on an in-depth multidisciplinary analysis presented in ARUP (2018).

3.2 Methodology used in the Identification of the EPR

A study area was defined for the project as outlined in Figure 3.1. This study area was then split into three discrete study areas which included:

- Study Area A: City Centre (within which St Stephen's Green Station is located);
- Study Area B: Area B: Ballymun/Dublin Airport; and
- Study Area C: Swords.

Following this, all possible route options within each study area were identified and a preliminary analysis was undertaken to assess these options. All possible route options within each study area were identified and screened using a Pass/Fail Preliminary Assessment. Then the route options that passed this preliminary assessment were assessed using a two stage Multi Criteria Analysis (MCA) against a defined set of criteria. The criteria used are in line with the criteria outlined in the Common Appraisal Framework for Transport Projects and Programmes (DTTAS 2016) and included for a full environmental assessment of the route options.

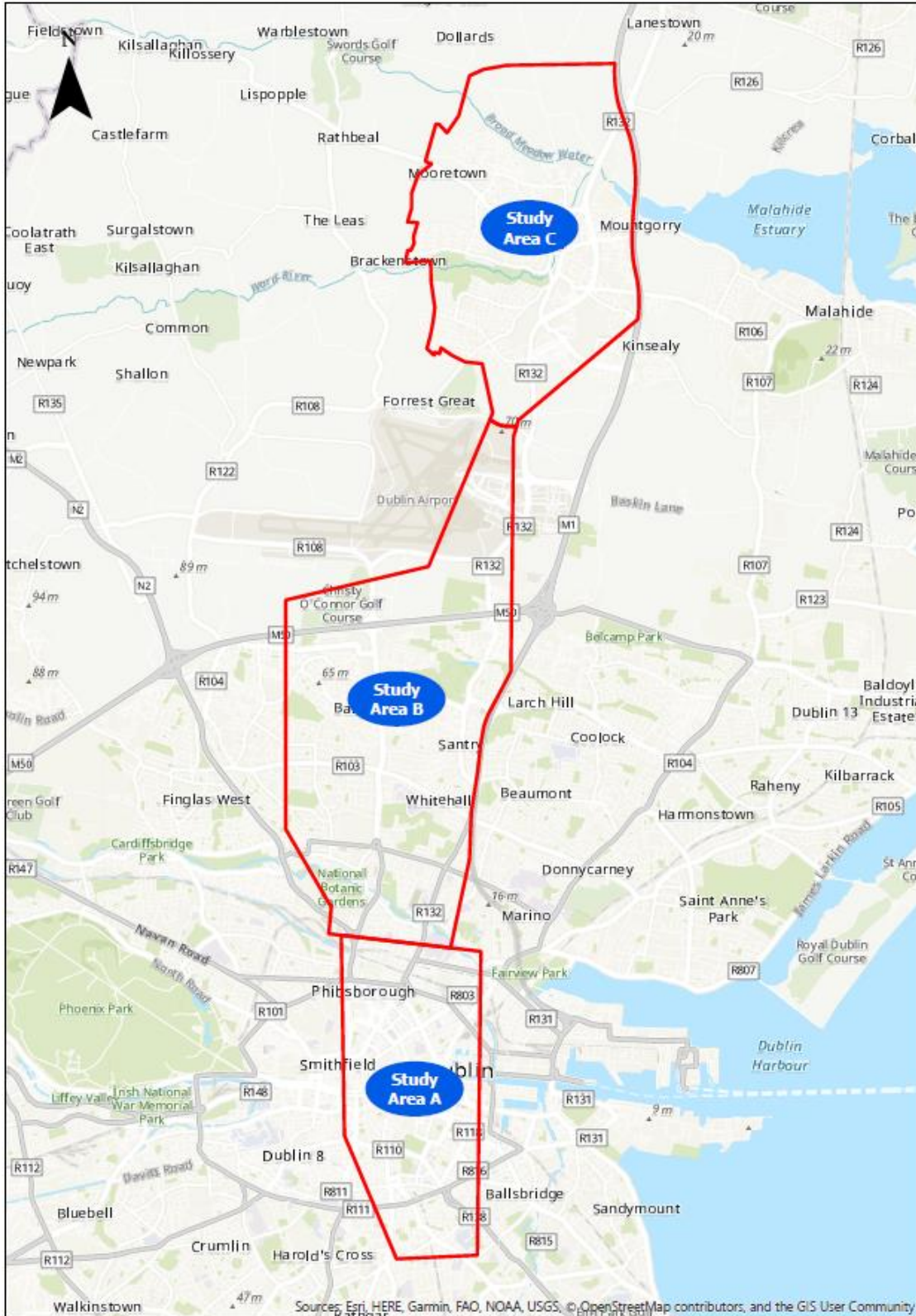


Figure 3.1: EPR Study Area

3.2.1 Assessment Outcomes

The preliminary assessment of possible options was carried out which identified 20 assessment options across the study areas which merited further consideration and analysis. In order to enhance the analysis, concept designs were developed for each of these options to allow for more a detailed assessment.

Six routes options in Study Area A (which includes the St Stephen's Green area) were developed and assessed for the first stage MCA. These route options took different paths through Study Area A and included station location options at St Stephen's Green West, St Stephen's Green East, St Stephen's Green Central and options with no station location at St Stephen's Green.

The first stage MCA identified St Stephen's Green East, St Stephen's Green West and with no station at St Stephen's Green as feasible options for Study Area A that would be subject to further analysis during the second stage MCA analysis. The route option with a station location in the centre of St Stephen's Green was ruled out on the basis of the Stage 1 MCA analysis as this option would have the potential to directly impact the core of St Stephen's Green, its ornamental ponds, bridge, ornamental fountains, mature trees and park structure.

Overall, following the first stage MCA a total of eight options within the overall study area were identified for further consideration; three in Study Area A, three in Study Area B and two in Study Area C.

The eight options were spread across the three study areas (See Fig 3.1) and were combined in various permutations to develop 10 end-to-end route options, each running from Estuary (Swords) to the tie-in location at Charlemont. The ten end-to-end route options were then subjected to a second stage MCA. This MCA included a full transport demand assessment, cost benefit analysis and environmental assessment for each of the 10 options.

The Stage 2 MCA identified the EPR for the project which included a proposed station at St Stephen's Green East. The EPR compared most favourably to other options overall as it:

- Best serves passenger demand along the corridor;
- Serves more key trip attractors than other options through the city including St Stephen's Green, the National Concert Hall, the Cultural Institutions such as the National Gallery and the National Museum (Natural History & Archaeology). Furthermore, this route option serves key commercial, retail and office trip attractors such as the IFSC and Grafton Street;
- Provides excellent interchange opportunities with other public transport modes as it links with the DART (at Tara Street), Luas (at O'Connell Street and Charlemont), multiple bus routes and heavy rail services at Glasnevin. The MCA analysis found route options in Study Area A that featured an interchange with the DART at Tara Street performed well against the Public Transport Interchange criteria. Locating a station at Tara Street constrains the possible tunnel alignment options to reach Charlemont station due to tunnel boring machine turning constraints and operational considerations for the tunnel alignment. This means that the location of an interchange station at Tara Street was a key driver for the location of a station on St Stephen's Green East; and
- Resulted in potential environmental impacts particularly for Archaeology, Architecture & Cultural Heritage and Landscape, however it was identified that the majority of impacts could be mitigated during design.

3.2.2 Consultation on the EPR

Public consultation on the EPR occurred between 22 March and 11 May 2018. Submissions were received during this consultation period and one specific response related to St Stephen's Green. This response related to the proximity of school children in the area to noise and construction phase impacts on St Stephen's Green and difficulties reinstating the park post construction.

3.3 Description of the Proposed EPR at St Stephen's Green East

The alignment at St Stephen's Green that was presented as part of the EPR is shown on Figure 3.2.

For the EPR, the station at St Stephen's Green was developed to the point of an indicative station box location with some station elements shown. The station was located within the roadway and footpath of St Stephen's Green East where the construction area would have directly impacted St Stephen's Green East and St Stephen's Green Park. The station was situated to make use of the footpath and open area adjacent to the Wolfe Tone Memorial on the eastern corner of St Stephen's Green for:

- Ingress and egress to and from the station (adjacent to the Wolfe Tone Memorial);
- Emergency lifts and stairs from the footpath; and
- Ventilation shafts located on the existing footpath.

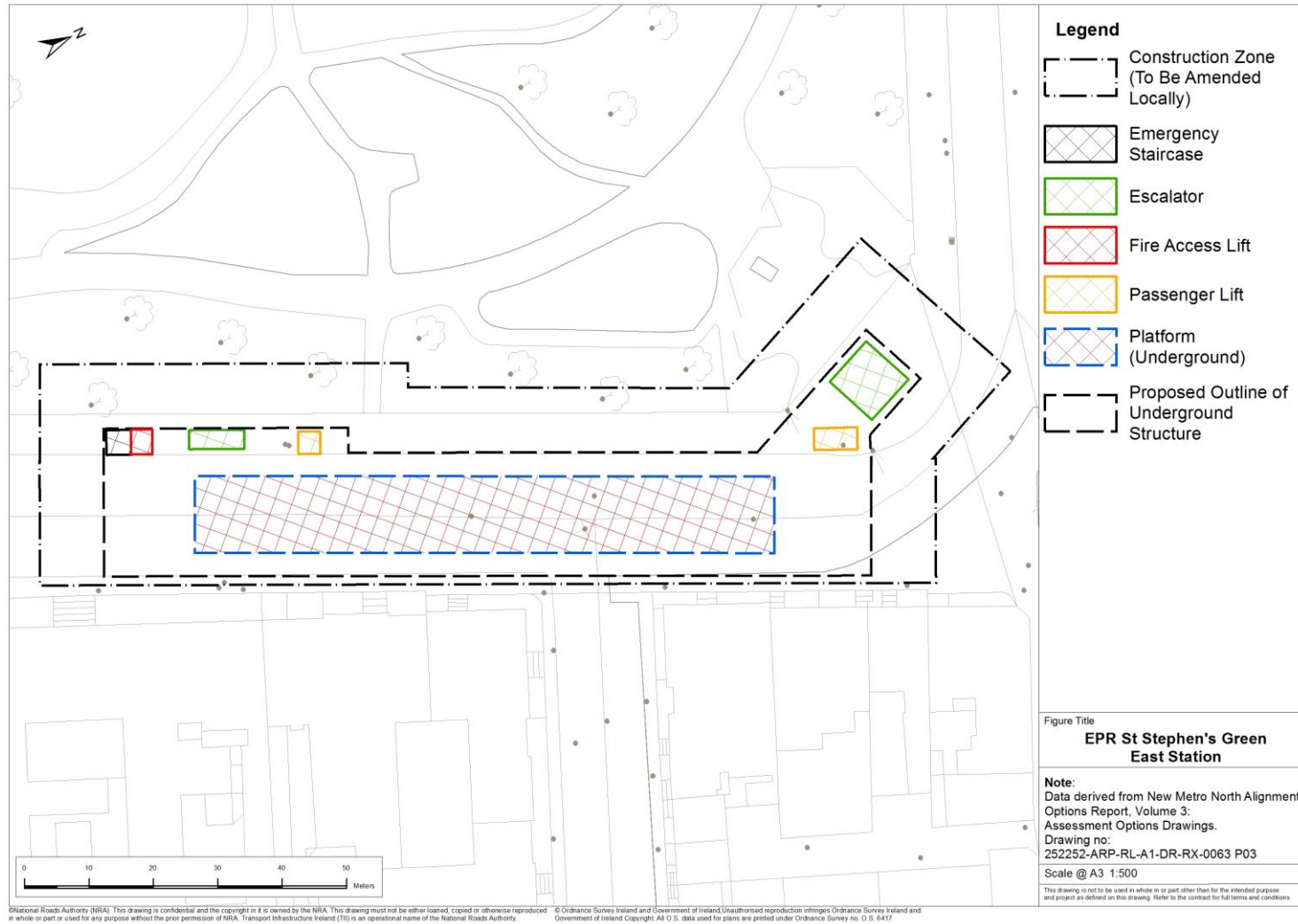


Figure 3.2: EPR Alignment and St Stephen's Green East Station

4. Preferred Route and St Stephen's Green Station

4.1 Introduction

As outlined in Section 3, the EPR for the project was identified and this route option included for a proposed station location on St Stephen's Green East.

Following the identification of the EPR, a programme of public consultation was undertaken on the EPR led by the National Transport Authority (NTA)/TII as described in Section 3.2.2 above. A review of submissions received has led to further analysis of the EPR resulting in a number of significant changes to the proposed project, including one that is particularly relevant here and this is the change from a proposed twin bore tunnel to a single bore tunnel.

This means that rather than having separate tunnels, one for each rail line, both north and south bound lines would run in parallel through a single tunnel. The single bore tunnel option has a number of distinct advantages, the most significant of which means that the project can be constructed in a shorter timeframe, thereby reducing the construction phase impacts of the proposed project. However, a single bore tunnel also requires for the provision of intervention shafts where the distance between stations is greater than 1,000m. Article 19(3) of Regulation (EU) 2016/796 of the European Parliament and of the Council of 11 May 2016 on the European Union Agency for Railways (EU216) establishes a maximum distance between lateral and/or vertical emergency exits of 1,000m for single bore tunnels.

Furthermore, a significant reduction in station box size was introduced and this means that the construction phase and operational phase impacts of the Preferred Route would be less significant than those for the EPR. (Refer to Figure 4.1 and Figure 4.2 for details of the preliminary design for the proposed station at St Stephen's Green East. These design changes have been factored into the determination of the optimum location for the preferred station location at St Stephen's Green East.

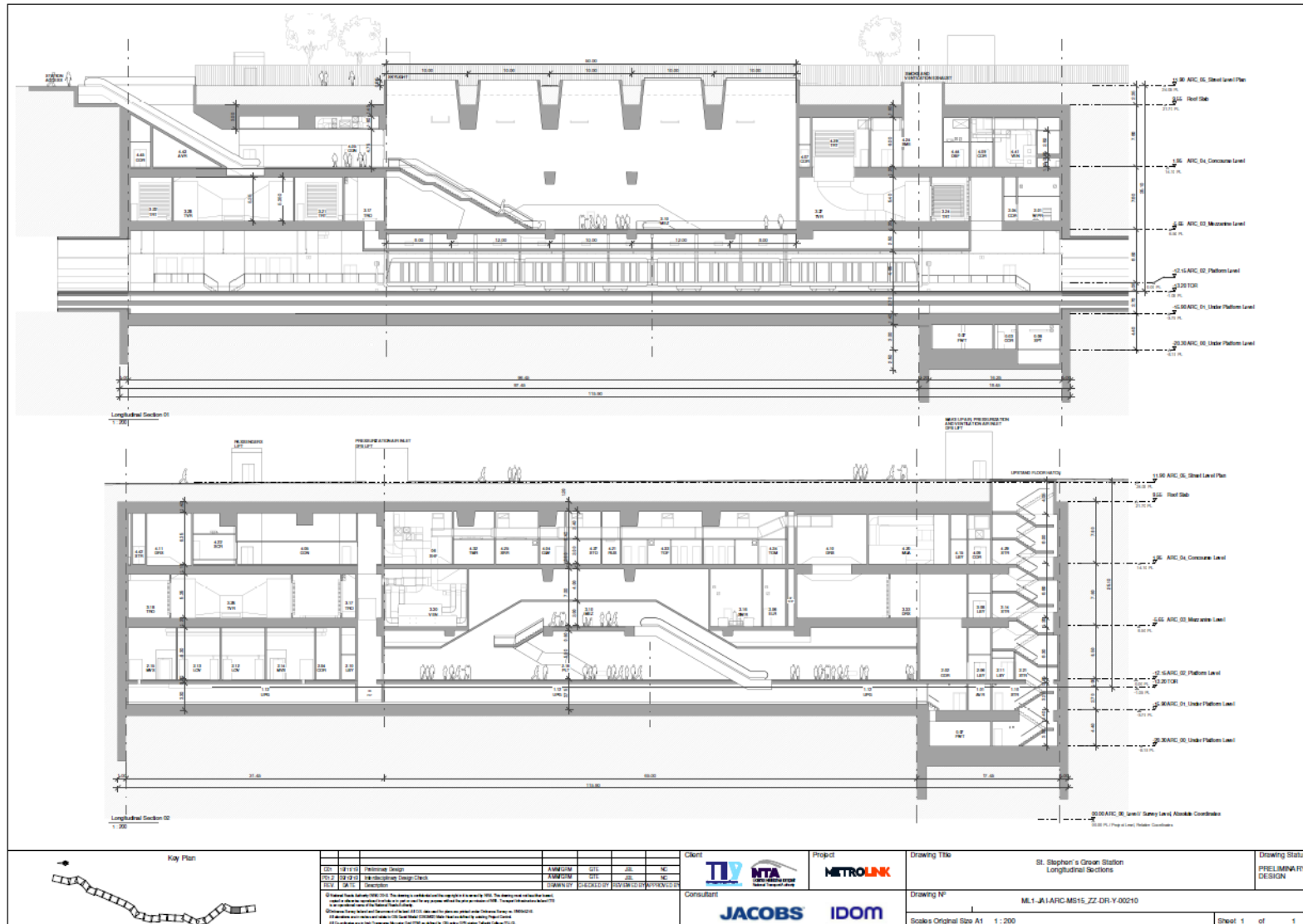


Figure 4.1: Preliminary Design of St Stephen's Green Station - Long Section

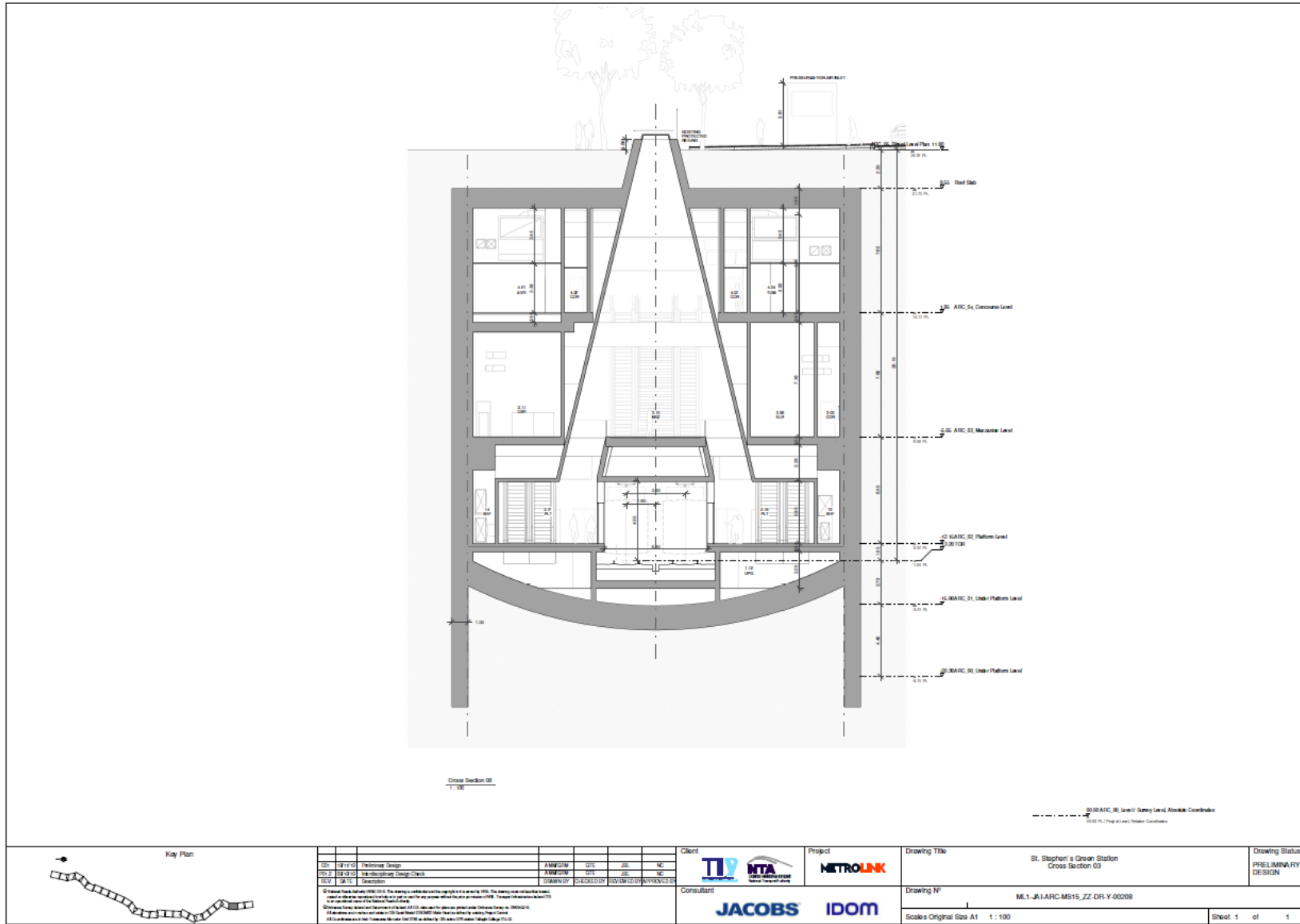


Figure 4.2: Preliminary Design of St Stephen's green - Cross Section

4.2 Methodology for the determination of the Preferred Station Location at St Stephen's Green East

A four-stage options assessment was undertaken to identify the preferred station location at St Stephen's Green East. The analysis was undertaken in line with the Project Appraisal Guidelines (TII 2016) and The Common Appraisal Framework (DTTS 2016) to provide a robust framework for comparing options. The assessment stages are outlined in Figure 4.3 below:

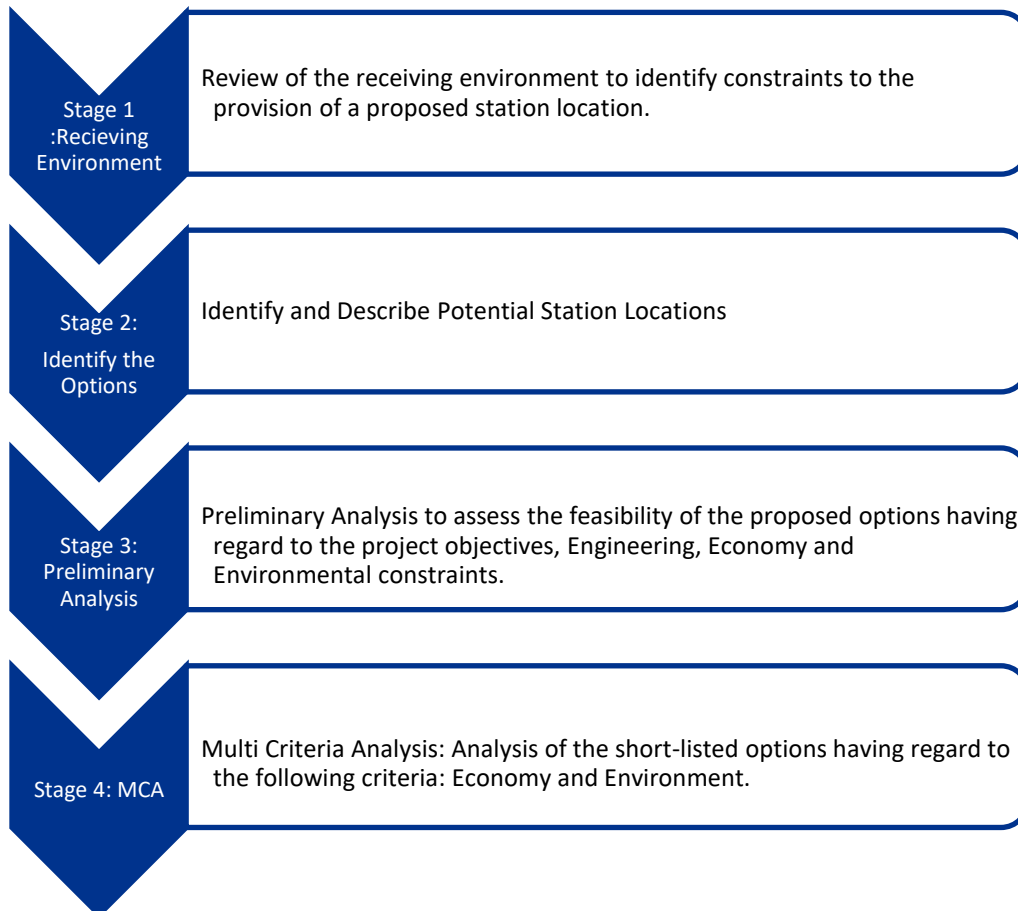


Figure 4.3: Outline Assessment Methodology

4.2.1 Stage 1: Review of the Receiving Environment

New Metro North - Alignment Options Report (TII 2018) identified an EPR alignment connecting Tara Street and Charlemont with a station location at St Stephen's Green East (Refer to Section 3 of this report for further information on the assessment undertaken). On the basis of providing a station location on St Stephen's Green East, a desk top study of the receiving environment was undertaken to identify the principal constraints that should be considered when identifying the preferred location for a station on St Stephen's Green East.

4.2.2 Stage 2: Identification and Description of Potential Station Locations.

The project team held a series of internal workshops to review the outputs of the desk top assessment of the receiving environment and to develop a number of potential station location options, which are described in Section 5 of this Report.

4.2.3 Stage 3: Preliminary Analysis

The preliminary analysis undertaken consisted of a qualitative assessment of potential station locations based on the criteria identified in Project Appraisal Guidelines (TII 2016). (Refer to Table 4.1)

Table 4.1: Criteria used for Stage 3 Assessment

Criteria	Sub-Criteria	Criteria Description	Note
Environmental	Potential for adverse impacts	Minimise the potential for adverse impact on the natural and built environment and the community.	Environmental criteria were assessed given the potential for impacts for the station locations.
Engineering	Constructability	This criterion considers if the station option can be constructed having regard to the identified constraints and opportunities within the study area	The constructability criterion was assessed given the potential differentiation between station locations.
Economy	Cost	This criterion considers the cost of each of the proposed station options.	This criterion was assessed given the cost implications of differing station locations.

The proposed Project objectives were also assessed to ensure the station location options developed were consistent with relevant project objectives such as the following:

- Be designed to integrate appropriately into the existing public realm; and
- Be planned, constructed and operated in an environmentally sustainable manner.

All locations identified in Stage 2 were assessed against the relevant criteria identified above with the intention to identify the locations that are feasible and worth analysing further utilising the MCA analysis in Stage 4.

4.2.4 Stage 4: Multi Criteria Analysis

Stage 4 involved taking the locations which remained following the Stage 3 preliminary analysis and subjecting them to a more detailed MCA analysis to decide on a preferred station location.

The characteristics and potential impacts of each station location have been assessed against the following criteria in Table 4.2.

Table 4.2: Stage 4 MCA Sub-Criteria

Criteria	Description
Economy	The impacts of a transport investment on economic growth and competitiveness are assessed under the economic impact and economic efficiency criteria
Environment	Environment embraces a range of impacts such as emissions to air, noise and ecological and architectural impacts.

4.2.4.1 [Economy](#)

For this assessment, it is assumed that the operating and maintenance cost of each station option is equal. However, the construction costs may vary depending on the location of the station having regard to the following:

- Indicative station construction costs;
- Ground level reinstatement costs;
- Major utility diversion costs;
- The requirement for an intervention shaft; and
- Other project infrastructure required at each location.

Estimates of these costs for each station location are used to differentiate between each station option.

4.2.4.2 [Environment](#)

The MCA has regard to all the environmental sub-criteria identified in Table 4.3 below. As identified in Table 4.3 some criteria were not considered to differentiate between options as the environmental impacts were deemed similar.

Table 4.3: Environmental MCA Sub-Criteria

Environmental Aspect	Included as a sub-criterion	Rationale	Assessment
Air & Climate	Yes	It is considered that the project will have a largely positive impact on air and climate during the operational phase of the project due to modal shift from private vehicles to the MetroLink and the resultant reduction in emissions. However, there is potential for impacts on sensitive receptors during the construction phase due to emissions. Emissions of relevance during this phase include NOx and Particulate Matter (PM10).	Sensitive receptors within 100m of each station box location were identified and considered and assessed to identify potential impacts. St Stephen's Green is considered as a single sensitive receptor. However, the degree of impact on St Stephen's Green is considered in this analysis as a proxy for the impact on the immediate environment during the construction phase.

Environmental Aspect	Included as a sub-criterion	Rationale	Assessment
Noise & Vibration	Yes	<p>It is considered that the project will have a largely positive impact in terms of noise and vibration during the operational phase of the project due to modal shift from private vehicles to the MetroLink and the resultant reduction in noise. However, there is potential for impacts on sensitive receptors during the construction phase.</p>	<p>Sensitive receptors within 100m of each station box location were identified and considered and assessed to identify potential impacts.</p> <p>St Stephen's Green is considered as a single sensitive receptor. However, the degree of impact on St Stephen's Green is considered in this analysis as a proxy for the impact on the immediate environment during the construction phase.</p>
Resource & Waste Management	No	<p>For the purposes of this analysis the station box and excavation area required for each of the options assessed is assumed to be the same. As a result, the quantity of spoil material and/or waste generated will be similar for each option and is not considered to be a differentiator.</p> <p>For the operational phase, the resources required, and waste produced from each station box option would be similar and as a result not considered as a differentiator.</p>	Not applicable.
Biodiversity	Yes	<p>Each station box location will have potential to impact on local biodiversity within St Stephen's Green.</p> <p>Potential for impacts are associated with the construction phase and following construction and re-establishment of the park impacts are minimised.</p>	<p>The assessment undertaken for each of the station box locations is qualitative and entails the identification of the potential impacts on biodiversity within and surrounding St Stephen's Green Park.</p>
Agriculture	No	<p>The location of the station box is fully located within an urban setting with no potential impact on agricultural activity.</p>	Not Applicable
Non-Agricultural Properties	Yes	<p>Potential for direct impacts on a number of land holdings and properties.</p>	<p>The assessment consists of a count of the land holdings directly impacted by each station box location.</p>
Architectural Heritage	Yes	<p>Potential for direct impacts on several elements of architectural heritage during the construction and operational phases.</p>	<p>A qualitative assessment of potential direct impacts from on elements of architectural heritage from each station box and associated construction works.</p>

Environmental Aspect	Included as a sub-criterion	Rationale	Assessment
		Potential for impacts are primarily associated with the construction phase. Following construction, important architectural features such as the park such as railings and monuments will be reinstated.	
Archaeology	Yes	Potential for direct impacts on several elements of archaeology arising during the construction phase and the location of station elements.	The assessment consists of an analysis of directly impacted known archaeology and potential subsurface archaeology.
Landscape & Visual	Yes	<p>Potential for significant impacts on the landscape and visual amenity at St Stephen's Green East</p> <p>Potential for impacts are associated with the construction phase and following construction and re-establishment of the park impacts are minimised.</p>	Assessment involved the qualitative assessment of visual impacts and includes an identification of significant tree loss within each potential station location's construction area.
Soils & Geology	No	All station box locations potentially impact on the made ground to the same geographical extent. All station box locations impact on Dark limestone and shale bedrock of the Lucan Formation to the same geographical extent.	Not Applicable.
Hydrology	No	There are no surface water features potentially impacted by any of the station box locations. There is potentially a historical channel crossing the east of St Stephen's Green to the lakes within the green. However, OPW identified that this channel does not act as a water source for the lakes at St Stephen's Green.	Not Applicable
Hydrogeology	No	There are no known groundwater wells or springs impacted by any of the station box locations. All station box locations impact on a locally important aquifer to the same geographical extent.	Not Applicable
Traffic and transport	Yes	Potential for significant impact on traffic and transport during construction depending of station box location for each option. Long term	Assessment consists of the review of modelling of impacts on surrounding road network. It also assesses impacts on public transport and the

Environmental Aspect	Included as a sub-criterion	Rationale	Assessment
		operational impacts were not considered a differentiator as each of the station locations would have a similar positive impact in the long term.	Dublin City Council Heavy Goods Vehicles (HGV) strategy, cyclists and pedestrians.
Utilities	Yes	Potential for impacts on several utilities that require diversion to construct the station box.	The assessment involved identifying the utilities present that are potentially affected by each option.
Population and Human Health	Yes	<p>Potential Socio-Economic impacts for each station box locations during the construction phase of the project. Human Health impacts were not considered a differentiator due to the similarity between location for this discipline.</p> <p>During the operational phase, it is considered that there will be a similar positive impact arising from each of the proposed station box locations.</p>	The assessment involved a qualitative classification of negative impacts, during the construction phase. An assessment of the operational benefits was also undertaken.
Radiation and Stray Current	No	Not considered a differentiator as there is no potential for impacts on sensitive receptors arising from the proposed station box locations.	Not Applicable.

4.3 Receiving Environment/Local Constraints

As with all other City Centre locations, St Stephen's Green East is particularly constrained for the location of a proposed station and associated infrastructural works. The main constraints are discussed in this Section under the following headings:

- Transport/Traffic;
- Landscape/Streetscape and Visual Amenity;
- Biodiversity;
- St Stephen's Green - Railings, Monuments and other features; and
- Important adjacent Buildings and Cellars.

4.3.1 Transport/Traffic

St Stephen's Green East plays an important role in the city's transport network. It is designated as a secondary strategic pedestrian route, and as a primary cycle route in the Greater Dublin Area Cycle Network Plan (NTA 2013). It is also a busy route for vehicular traffic and is one of the designated Heavy Good Vehicle (HGV) routes within the City Centre, which forms the City Centre HGV Management Strategy (DCC 2007) for heavy goods

vehicles. As such, the maintenance of the south-north movements on the street is key to the maintenance of services attending the Grafton Street area.

St Stephen's Green East is also a busy artery for public transport services from the south-east of the city and further afield and is used by over 50 different Public Service Obligations (PSO) and commercial bus routes.

A baseline survey was undertaken for the MetroLink project in this area and on this basis, extensive transport modelling work was undertaken. The modelling output identified the following traffic and transport movements at St Stephen's Green East during the AM Peak:

- Bus routes: 384 buses including the following routes: 84x, 11, 145, 155, 32x, 41x, 46a, 757, 7b, 7d, 142, 37, 44 and 61;
- Private vehicles: 1,711 Private Car Units (PCU);
- 594 cyclists (travelling both north and south); and
- 3,319 pedestrians during AM Peak.

St Stephen's Green East is an important link in Dublin's bus network and is the main route in and out of the City Centre for buses coming from the south-east. Cross city routes such as 155 from Bray to Ballymun and the 11 from Sandyford Business District. to St Pappin's Road in Glasnevin rely on St Stephen's Green East for their services. Therefore, closure of this street would result in significant disruption to these services, providing no service to the Dawson Street area. Similarly, the 46a service from Dun Laoghaire to the Phoenix Park operates approximately every 7-8 minutes during the AM Peak, contributing greatly to the number of buses utilising St Stephen's Green East during this time. This service would face considerable disruption if St Stephen's Green East was closed, as it would be required to be redirected which would result in a significant delay to a number of services.

Partial or full restriction of pedestrian movements in this area during construction would also negatively impact access to and from the Grafton Street area. North-south and south-north pedestrian movements are prioritised under the Dublin City Development Plan (DCC 2016-2022) and Dublin City Centre Transport Study (DCC 2015). Therefore, these movements have local importance.

St Stephen's Green East also forms part of a proposal for a car-park access plan to remove vehicles from the core central area. Closure of this street would restrict this access and increase the number of vehicles within the City Centre.

All of the above mentioned transport and traffic movements are of strategic importance to the city and could have significant impacts if interrupted. Reasonable alternative routes could be provided for pedestrian, cyclists and access to multi-storey car parks, however there are no reasonable routes for goods and delivery traffic, or for the volume of north-south and south-north bus traffic.

4.3.2 Landscape/ Streetscape and Visual Amenity

The streetscape on St Stephen's Green East is dominated on the eastern side by a mixture of Georgian architecture and modern buildings. St Stephen's Green Park lines the western side of St Stephen's Green East. The footpath on the western side of St Stephen's Green East contains:

- 17 street trees (Caucasian Lime) to the east side of the park's perimeter fence. 13 of which are within the indicative construction areas for the proposed Project station locations.

- Protected structures which are situated on the footpath of St Stephen's Green within the curtilage of the National Monument:
 - Railings, gates and plinth walls of perimeter boundary on St Stephen's Green (RPSs 7751); and
 - Surrounding bollards and traditional-style lamp-posts (RPSs 7752).

The area next to the perimeter fence of the park is vegetated by an unbroken line made up of a mixture of trees and shrubs. These provide a visually impermeable barrier between the urban environment and the green space inside St Stephen's Green Park. A tree survey was undertaken for the eastern side of St Stephen's Green Park for the purpose of the MetroLink project. This survey covered all areas that would potentially be impacted by a station location. The tree survey was undertaken by a fully qualified arborist in line with *British Standard 5837: 2012 – Trees in relation to design, demolition and construction – Recommendations*.

The tree survey identified 136 No. of mature trees within the study area. The upper canopy of the tree line along St Stephen's Green East is dominated by impressive specimens of Holm Oak (*Quercus Ilex*), Sycamore (*Acer Pseudoplatanus*), Horse Chestnut (*Aesculus Hippocastanum*), Wych Elm (*Ulmus Glabra*) and London Plane (*Plantanus x hispanica*). The majority of these trees have been classified as being in good condition.

The under canopy is dominated by Holy (*Ilex Aquafolium*) and Cherry trees (*Prunus Sp.*).

A number of station location options would require the felling of a number of the trees identified in St Stephen's Green Park as described for each station location option in Section 6 and 7.

4.3.3 Biodiversity

Comprehensive biodiversity surveys were undertaken at St Stephen's Green. Surveys including a habitat survey, a Breeding Bird and a Bat detector survey has been undertaken at St Stephen's Green for the purposes of the MetroLink project.

On the basis of a desk-based assessment, the above mentioned surveys and in the context of the surrounding environment, St Stephen's Green is considered to be of local ecological value (higher value). St Stephen's Green Park is characterised by the following habitat types (Fossitt, 2000):

- Amenity Grassland (Improved) (GA2)
- Scattered Trees and Parkland (WD5); and
- Hedgerows (WL1) and Treelines (WL2)

Bats (Common pipistrelle & Leisler's bat) have also been recorded in the tree line and the mature trees here have potential to contain Bat Roosts. In addition, one red-listed and four amber listed bird species were recorded here during the Breeding bird survey.

A number of station location options would require the felling of a number of the trees and the removal of vegetation which would impact on the biodiversity at St Stephen's Green Park as is described for each station location option in Section 9.

4.3.4 St Stephen's Green Park (East) - Cultural Heritage Items

Within the National Monument on its Eastern boundary are several protected structures. These include:

- Perimeter railings, gates, plinth wall, bollards and lamp standards (St Stephen's Green East (RPSs 7751 - 7752));
- The bollards and traditional-style lamp posts which line the footpath (RPSs 7752); and
- Sculptures

A summary of each of these structural elements of St Stephen's Green are provided below. For the outputs of an in-depth analysis of these cultural heritage items please refer to Appendix A.

4.3.4.1 [Perimeter railings, gates, plinth wall, bollards and lamp standards \(St Stephen's Green East; RPS 7751-7752\)](#)

The railings are substantial, with closely spaced spear-topped railings rising off a cut-granite plinth. The railings terminate at the northern end of St Stephen's Green East at a neoclassical granite pier at the edge of the Wolfe Tone memorial plaza. The bollards are of granite, each topped with an iron boss that originally carried chains that ran from one bollard to the next. These are set at the kerb line of the pavement adjacent to the park. About a metre back from the kerb is a line of lamp standards in the style of traditional oil or gas lamps. Two types of lamp standards surround the green and these are

- A three lantern cast-iron version located on each corner illuminating the gates/access ways, and
- A single lantern cast-iron version aligned with the perimeter kerb

The footpath alongside the park was re-laid with granite flagstones, bordered by granite kerb stones. These are of high quality but are not heritage elements.

4.3.4.2 [Sculptures on St Stephen's Green Park \(East\)](#)

The Wolfe Tone Monument, and the Hungry Heart Famine Memorial are situated on the south western edge of the plaza area that makes up the north eastern corner of St Stephen's Green Park. These are not protected structures but form part of the architectural heritage of the park. The monument consists of a substantial paved area at the north-eastern corner of the park in which stands a bronze sculpture representing Wolfe Tone standing on a granite plinth. This is backed by a segmental array of tall granite columns (Tone Henge), behind which is a second, smaller array of columns. The plaza area is paved with granite blocks laid in a pattern of sweeping curves. To the rear of the granite columns, within the enclosed area of the park, is a bronze sculpture representing the Great Famine of the 1840s. Both the Wolfe Tone memorial and the Famine memorial were produced by Edward Delaney in the 1960s.

4.3.5 **Protected Structures and associated features on St Stephen's Green East**

There are ten protected buildings between Merrion Row, and Leeson St Lower on St Stephen's Green East These are listed in Table 4.4 below. The primary constraint relating to the protected buildings is the potential for coal cellars to be present under the eastern footpath and carriageway of the St Stephen's Green East. An indicator for the presence of cellars is often the presence of cast-iron coalhole covers in the footway to the front of a building. There are no coalhole covers in the footway on the eastern side of St Stephen's Green; however, the footway has been entirely re-laid with concrete flags and it is possible that any surviving coalhole covers were lost in that project. The kerbstones on the eastern side of the street are of heritage significance, as is the cast-iron pillar box outside number 50 St Stephen's Green and which dates from the 1870s.

The protected structures on the eastern side of St Stephen's Green are generally Georgian in style and vary in scale. At the northern end of the eastern side number 39-40 is an Edwardian bank building and its neighbour at number 41 is a Georgian-style house dating from the 1740s with later dormers added. Numbers 42 and 43 were

built as a pair in the 1740s and are Dutch-billy style houses, with the gabled fronts later rebuilt with parapets. Numbers 44 to 49 were built in the 1970s and have no heritage significance. Numbers 50 to 56 were built in the third quarter of the eighteenth century and are substantial houses. Number 51 is particularly large and was later further enlarged by the addition of wings.

Table 4.4: List of Buildings on the RPS on St Stephen's Green East

Building and Address	RPS reference number
39-40 St Stephen's Green East	7780
41 St Stephen's Green East	7781
42-43 St Stephen's Green East	7782
50 St Stephen's Green East	7783
51 St Stephen's Green East	7784
52 St Stephen's Green East	7785
53 St Stephen's Green East	7786
54 St Stephen's Green East	7787
55 St Stephen's Green East	7788
56 St Stephen's Green East	7789
Railings, gates and plinth walls of perimeter boundary on St Stephen's Green	7751
Surrounding bollards and traditional-style lamp-posts	7752

4.3.6 Amenity

The location of the potential station locations being considered for the MetroLink are at the eastern extent of St Stephen's Green Park. As such they are removed from some of the bigger visitor attractors within the park, such as the central area of Victorian floral displays, the Lime Walk, the Lakes, Playground, the Guinness Plot and the Band Stand.

However, the potential impact of Station Locations on the amenity value of St Stephen's Green Park is related to the extent of ingress of each option into the park and this is outlined in Section 9.

4.4 Engineering Considerations

The main engineering considerations that were considered during this analysis are discussed in this Section under the following headings:

- Intervention Shaft Requirement; and
- Diversion of Utilities.

4.4.1 Intervention Shaft Requirement

The railway tunnel design for the proposed Project must comply with appropriate fire safety standards. The single bore tunnel configuration requires emergency exit points to allow safe egress from the tunnel during an emergency.

In the case of an emergency, ground level is reached by evacuation shafts that are connected to the tunnel. Article 19(3) of Regulation (EU) 2016/796 of the European Parliament and of the Council of 11 May 2016 on the European Union Agency for Railways (EU216), establishes the requirement for a maximum distance between emergency exit points of 1,000m.

Due to this requirement, a number of potential station locations at St Stephens Green East assessed in this Report with a distance of more than 1,000m between Tara Street and the station would require an additional intervention shaft to allow for emergency evacuation.

4.4.1.1 [Function of an Intervention Shaft](#)

The tunnel intervention shaft should be a significant structure (Figure 4.4) and would have the following primary functions:

- It allows emergency services to access the underground system in an emergency situation;
- It provides a safe route for passengers to escape from the tunnel during an emergency;
- It assists in controlling/managing smoke extraction in emergency situations;
- It assists in providing ventilation for passenger comfort in normal day-to-day operations and
- It provides draught relief during the normal operation of the line, enabling the movement of air in or out when a train passes.

4.4.1.2 [Construction Phase](#)

The construction of the tunnel intervention shaft is a significant construction project that would last up to three years. It would require the mobilisation of a substantial quantity of machinery, materials and other auxiliary equipment. Most of the construction work would be below ground level and would require the excavation of a vertical shaft of approximately 15m diameter, which would extend 30m below ground level.

The shaft construction method would ultimately be selected by a works contractor. However an appropriate construction method would be to advance a secant pile wall into the weathered rockhead, followed by drill and blast methods below rockhead for further excavation. Furthermore, blasting would also be required for the subsurface passage connections to the main tunnel because they would likely be located below rockhead level. An example of a typical shaft under construction using secant piling is shown in Figure 4.4 below.

The temporary area required for the construction compound during the construction period would be greater than the area which would be ultimately required for the completed tunnel intervention shaft.

4.4.1.3 [Location of an Intervention Shaft](#)

The availability of suitable locations for an intervention shaft to be constructed and operated between St Stephen's Green and Tara Stations is limited given the built-up nature of the area. The tunnel alignment runs beneath public buildings including the National Museum of Ireland, Leinster House (House of the Oireachtas), and Trinity College. Locating a suitable place to construct an intervention shaft in this area would be challenging given the type of land use and potentially sensitive receptors in the vicinity. For the purposes of this report it is assumed that the most appropriate locations for an intervention shaft would be more open areas at the eastern end of Trinity College or on Merrion Square.



Figure 4.4: Intervention Shaft being Constructed by Secant Pilling Method

4.4.2 [Diversion of Utilities](#)

There are several utilities known to be situated within the road corridor and footpath of St Stephen's Green East. These include:

- An 1,800mm brick "ovoid" Victorian sewer situated in central position running north south 3m beneath the road surface. An example of which is shown in Figure 4.5;
- A 1,710mm reinforced plastic mortar "ovoid" sewer situated beneath the surface of Hume Street that joins the St Stephen's Green East sewer described above where the streets intersect;
- Water mains beneath the cycle lane on the western side of St Stephen's Green East;
- ESB high voltage cable beneath the cycle lane on the western side of St Stephen's Green East;

- Gas mains, Eir and ESAT/British Telecom cables beneath the traffic lanes of St Stephen's Green East; and
- Water mains, ESB High Voltage and Eir cables beneath the eastern footpath of St Stephen's Green East.



Figure 4.5: Typical Victorian Brick Sewer

There are no utilities under the western footpath of St Stephen's Green East which is within the National Monument boundary of St Stephen's Green Park.

4.4.2.1 [Construction Requirements for Utility Diversions](#)

Due to the depth of the Victorian sewer at St Stephen's Green East and in order to limit the extent of the surface works, the sewer diversions would be installed by trenchless techniques between two shafts/chambers approximately 6m diameter wide and 5m deep at suitable positions to the north and south of the potential station box location.

It would be necessary to install a temporary bypass system and subsequently divert the existing sewer services from above and around the sewer connection and diversion launch box areas. This would require the diversion of the footpath and two eastern traffic lanes on St Stephen's Green East. Furthermore, it may be necessary to close Hume Street to construct a temporary pump station to redirect the flow from the Hume Street sewer. However, once in place the use of trenchless techniques along St Stephen's Green East should allow Hume Street to be reopened.

As the existing sewer is beneath the centre of the road the launch chamber would need to be extended to the west to form the connections onto the north and south ends of the existing sewer, maintaining through flow at all

times. When ready the side connections would be connected into the new sewer and the temporary bypass system disconnected. The through system would then be connected at the upstream end.

While the diversion of the Victorian sewer on St Stephen's Green East is the main constraint here, the diversion of other utilities would also require sequenced closure of alternate lanes right across the roadway.

It is estimated that two traffic lanes on St Stephen's Green East could be closed for 12 months or more in the event that significant utility diversions are required.

5. Potential Station Locations

5.1 Introduction

Seven potential station location options were developed for St Stephen's Green East. The Station Location options were developed using internal multidisciplinary workshops, where potential station locations were developed having regard to the constraints identified during the Stage 1 Review of the Receiving Environment analysis.

A description of each of the potential station locations are detailed in this section of the Report.

5.2 Location 1

Location 1 is situated primarily within the carriageway of St Stephen's Green East as shown in Figure 5.1. This station location has the following features:

- The station box western extent is situated directly in line with St Stephen's Green East Park's eastern fence; and
- The eastern extent is situated in line with the footpath on the eastern side of St Stephen's Green East.

The indicative construction area as shown in Figure 5.1 takes in the entire footpath of the eastern side of St Stephen's Green and encroaches approximately 12m into St Stephen's Green Park.

The Victorian sewer described under St Stephen's Green East would require diversion east (away from St Stephen's Green Park) under the footpath on the street's eastern side. Another sewer situated under Hume Street joins the sewer running north/south under St Stephen's Green East. The station box has been located far enough south to avoid the point where these two sewers join. However, locating the station box to avoid the sewer makes the distance between Stephen's Green and Tara Stations greater than 1,000m resulting in the need for an intervention shaft at either Trinity College Dublin or Merrion Square.

For this location, St Stephen's Green East would be closed to through traffic and pedestrians during the construction phase. The entire area within the indicative construction site would be closed to the public including areas of St Stephen's Green Park. Vegetation and trees would be cleared fully within the construction area and elements of the park including railings and bollards would be removed and stored for reinstatement following construction.

On completion of the construction phase there would be permanent elements of the station present at ground level. These include lifts for passengers and the fire brigade. Ventilation shafts and sky lights would be present in addition to the station entrance. Where possible the lifts and shafts would be located on the footpath outside of the park. The skylights would be situated within the perimeter of the park as would some ventilation shafts.



Figure 5.1: Main Constraints to potential location 1

5.3 Location 2

The potential station Location 2 station box is situated further west than Location 1. While it is situated partially within St Stephen's Green East and partially within St Stephen's Green Park the location allows for an additional lane of traffic to remain open during construction. This position is shown in Figure 5.2 and the station box location has the following features:

- The central axis of the station box sit slightly west of the eastern perimeter fence of St Stephen's Green Park;
- The western extent is situated approximately 17m west of the perimeter fence of St Stephen's Green Park; and
- The station box eastern extent is situated so it aligns with the closest traffic lane to St Stephen's Green Park.

The indicative construction area as shown in Figure 5.2 encroaches approximately 27m into St Stephen's Green Park.

Location 2 does not require the sewer under St Stephen's Green East to be diverted. The sewer situated under Hume Street which joins this sewer is also avoided.

Due to the more southerly location of the station location, there would be a requirement for an intervention shaft at either Trinity College or Merrion Square.

During construction St Stephen's Green East would be partially closed to through traffic with two northbound traffic and one southbound bus lane remaining open. Using the indicative construction area, pedestrian access along the eastern footpath would remain open. The entire area within the indicative construction area would be closed to the public including St Stephen's Green Park. Vegetation and trees would be cleared within the construction area and elements of the park including railings and bollards would be removed and stored for reinstatement.

On completion of construction there would be permanent elements of the station present at ground level. These include lifts for passengers and the fire brigade. Ventilation shafts and sky lights would be present within the park in addition to the entrance to the station which includes elevators and MetroLink signage. Where possible the lifts and shafts would be located on the footpath outside of the park. The skylights would be situated within the perimeter of the park as will some ventilation shafts.



Figure 5.2: Main Constraints to potential location 2

5.4 Location 3

Potential Station Location 3 would be situated entirely within St Stephen's Green Park as shown in Figure 5.3 and is, in turn, located further west than Location 2. This location is designed to avoid St Stephen's Green East carriageway and the footpath and protected structures that are situated there. This station location has the following features:

- The station box central axis sits approximately in line with the pathway that runs in a north-south direction within the north-eastern portion of St Stephen's Green Park; and
- The station box is located entirely within St Stephen's Green Park.

The indicative construction area as shown in Figure 5.3 is situated so its eastern boundary is just within park's perimeter fence and encroaches approximately 40m into St Stephen's Green Park.

As Location 3 is situated within St Stephen's Green Park it is situated far enough west not to require the diversion of utilities within the carriageway of St Stephen's Green East.

The station box and indicative construction area are situated far enough south avoid the north eastern plaza and the monuments situated there. However, this means the distance between St Stephen's Green and Tara St Stations is greater than 1,000m resulting in the need for an intervention shaft at either Trinity College Dublin or Merrion Square.

During the construction phase, the roadway on St Stephen's Green East will remain open. Using the indicative construction area pedestrian access along the eastern and potentially the western footpaths of St Stephen's Green East would remain open. The entire area of the park located within indicative construction area would be closed to the public for the construction phase. Vegetation and trees would be cleared from within the construction area and elements of the park including railings and bollards would be removed and stored for reinstatement on completion.

On completion of the construction phase there would be permanent elements of the station present within the park. These include lifts for passengers and the fire brigade. Ventilation shafts and sky lights would be present and the entrance to the station including elevators and MetroLink signage. The station box is situated too far west for lifts to be located on the footpath so these would need to be located within St Stephen's Green Park.

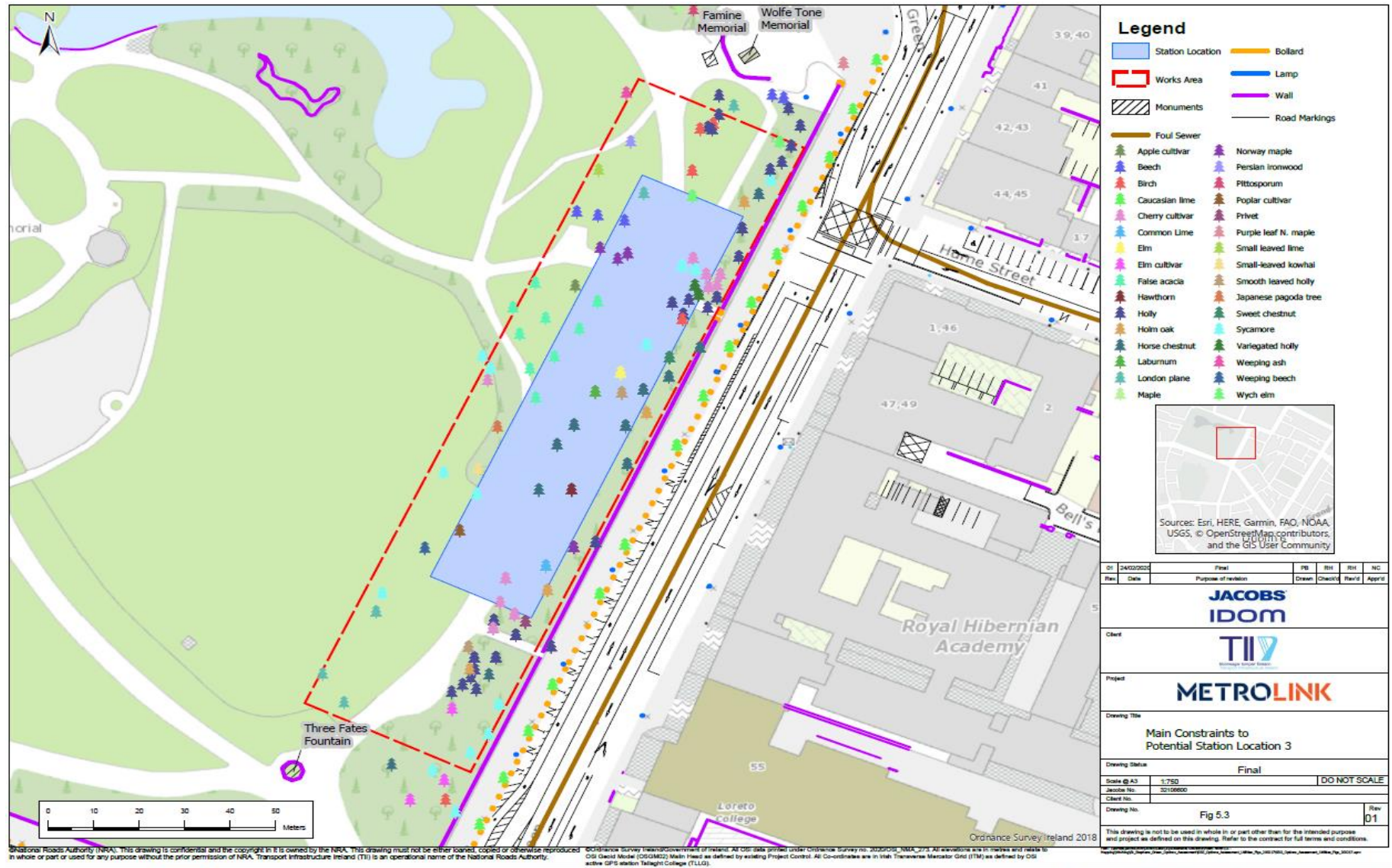


Figure 5.3: Main Constraints to potential location 3

5.5 Location 4

Potential station Location 4 is situated in a similar east/west axis to Location 1 but is located 31m further north. It is situated primarily within the carriageway of St Stephen's Green East as shown in Figure 4.4. The station box location has the following features:

- The station box western extent is situated directly in line with St Stephen's Green East Park's eastern fence;
- The eastern extent is situated in line with the footpath on the eastern side of St Stephen's Green East but also takes in the front steps of several properties on St Stephen's Green East; and
- The northern extent of the station box is located across the junction between Hume St and St Stephen's Green East.

The indicative construction area as shown in Figure 4.4 takes in the entire footpath of the eastern side of St Stephen's Green and encroaches approximately 12m into St Stephen's Green Park. The north eastern corner of the construction area takes in the steps and accessways for several buildings on St Stephen's Green East

The Victorian sewer under St Stephen's Green East would require diversion east to be situated under the footpath on the street's eastern side. The sewer situated under Hume Street joins the sewer running north/south under St Stephen's Green East. The station box is located at the point where these two sewers join meaning the Hume St sewer will also require diversion eastwards.

St Stephen's Green East would be closed to through traffic and pedestrians during construction. The right turn from Hume St to St Stephen's Green East would also be closed to through traffic. The entire area within the indicative construction area would be closed to the public including areas of St Stephen's Green Park. Vegetation and trees would be cleared within the construction area and elements of the park including railings and bollards would be removed and stored for replacement.

On completion there would be permanent elements of the station present at ground level. These include lifts for passengers and the fire brigade. Ventilation shafts and sky lights would be present and the entrance to the station including elevators and signage. Where possible the lifts and shafts would be located on the footpath outside of the park. The skylights would be situated within the perimeter of the park as will some ventilation shafts. No intervention shaft is required for this station location.

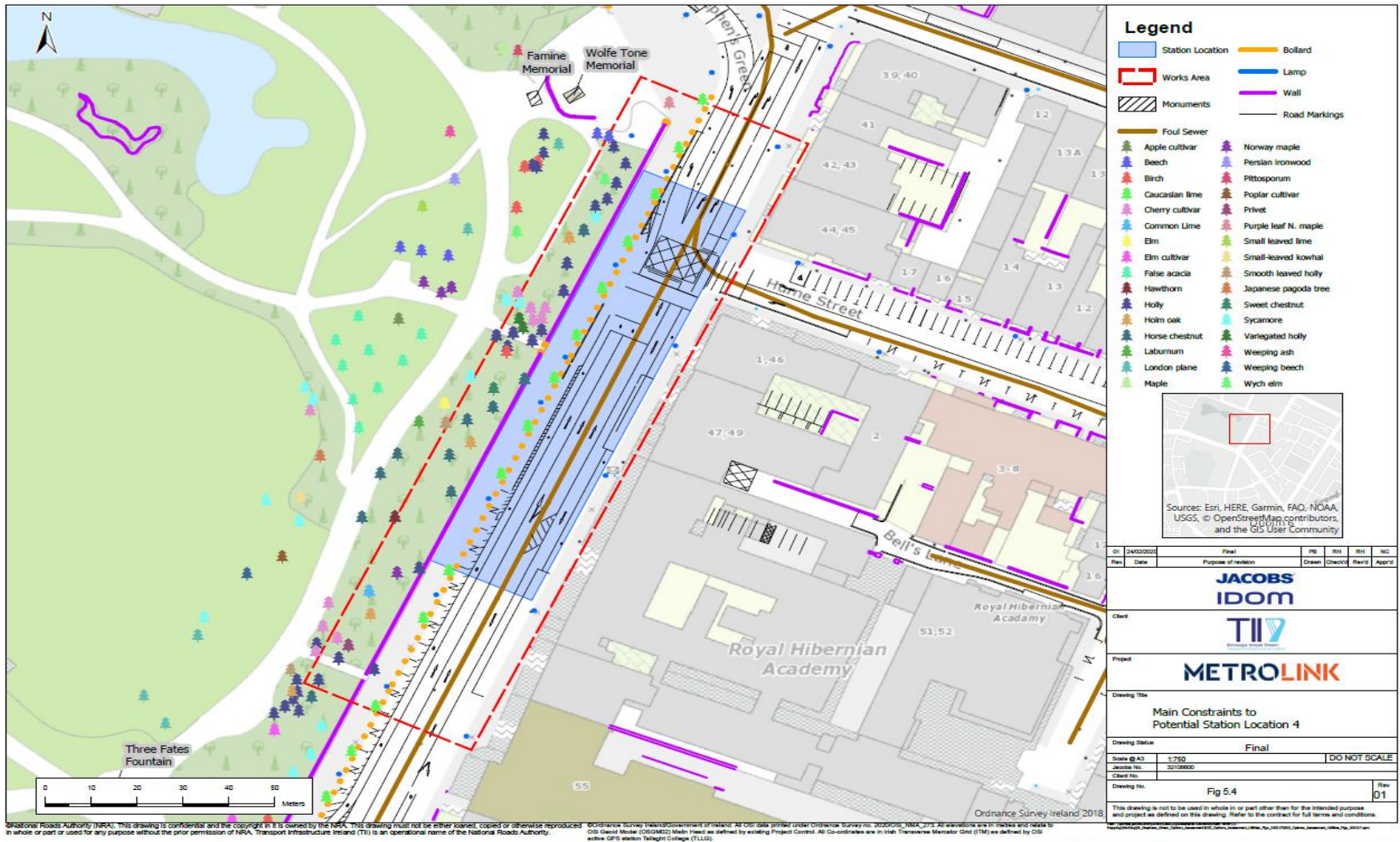


Figure 5.4: Main Constraints to potential location 4

5.6 Location 5

Location 5 is situated partially within St Stephen's Green East and partially within St Stephen's Green Park. However, the location allows for three lanes of traffic to remain open during construction. This position is shown in Figure 5.5 and the station box location has the following features:

- The central axis sits slightly west of the eastern perimeter fence of St Stephen's Green Park;
- The western extent is situated approximately 17m west of the perimeter fence of St Stephen's Green Park;
- The station box eastern extent is situated so it aligns with the closest traffic lane to St Stephen's Green Park.

The indicative construction area as shown in Figure 5.5 is located so its eastern boundary intrudes onto of St Stephen's Green East's carriageway and encroaches approximately 27m into St Stephen's Green Park. It takes in the Wolfe Tone Memorial and Hungry Heart Memorial locations.

Location 5 would not require the sewer under St Stephen's Green East to be diverted. The sewer situated under Hume Street which joins this sewer would also not be impacted.

During construction St Stephen's Green East would be partially closed to through traffic with two northbound traffic and one southbound bus lanes remaining open. Pedestrian access along the eastern footpath would remain open. The entire area within indicative construction area shown in Figure 5.5 would be closed to the public including areas of St Stephen's Green Park. Vegetation would be cleared within the construction area and elements of the park including railings and bollards would be removed and stored for reinstatement. The Wolfe Tone Memorial and Hungry Heart Memorial are located within the indicative construction area and as a result would be moved and stored for reinstatement.

On completion there would be permanent elements of the station present on the surface. These include lifts for passengers and the fire brigade. Ventilation shafts and sky lights would be present and the entrance to the station including elevators and MetroLink signage. The entrance would be situated on the southern edge of the plaza that makes up the north eastern corner of St Stephen's Green Park and incorporated into the park entrance on completion. The lifts shafts would be located on the footpath outside of the park. The skylights would be situated within the perimeter of the park as would some ventilation shafts. No intervention shaft would be required for this option.



Figure 5.5: Main Constraints to potential location 5

5.7 Location 6

This station location would be located entirely within St Stephen's Green Park as shown in Figure 5.6. This location is designed to avoid St Stephen's Green East road, the footpath and buildings that are situated there. The station box location therefore has the following features:

- The station box central axis and the tunnel sit approximately in line with the pathway that runs in a north-south direction within the north-eastern portion of St Stephen's Green Park; and
- This station location is located fully within St Stephen's Green Park.

The indicative construction area as shown in Figure 5.6 is situated so its eastern boundary is just within park's perimeter fence and encroaches approximately 40m into St Stephen's Green Park. The station box and indicative construction area envelop the north eastern plaza and the monuments situated there. These monuments would be moved prior to the construction phase and stored in a secure location for reinstatement.

As Location 6 is situated within the St Stephen's Green Park it does not require the diversion of any utilities.

During construction St Stephen's Green East would remain open. Using the indicative construction area pedestrian access along the eastern and potentially the western footpaths of St Stephen's Green East would remain open. The entire area of park within indicative construction area would be closed to the public. Vegetation and trees would be cleared within the construction area and elements of the park including railings and bollards would be removed and stored for replacement as necessary.

On completion there would be permanent elements of the station present within the park. These include lifts for passengers and the fire brigade. Ventilation shafts and sky lights and the entrance to the station including elevators and MetroLink signage would be present. This location would affect the interior concept design of the station as skylights would potentially not be feasible so far into the park.

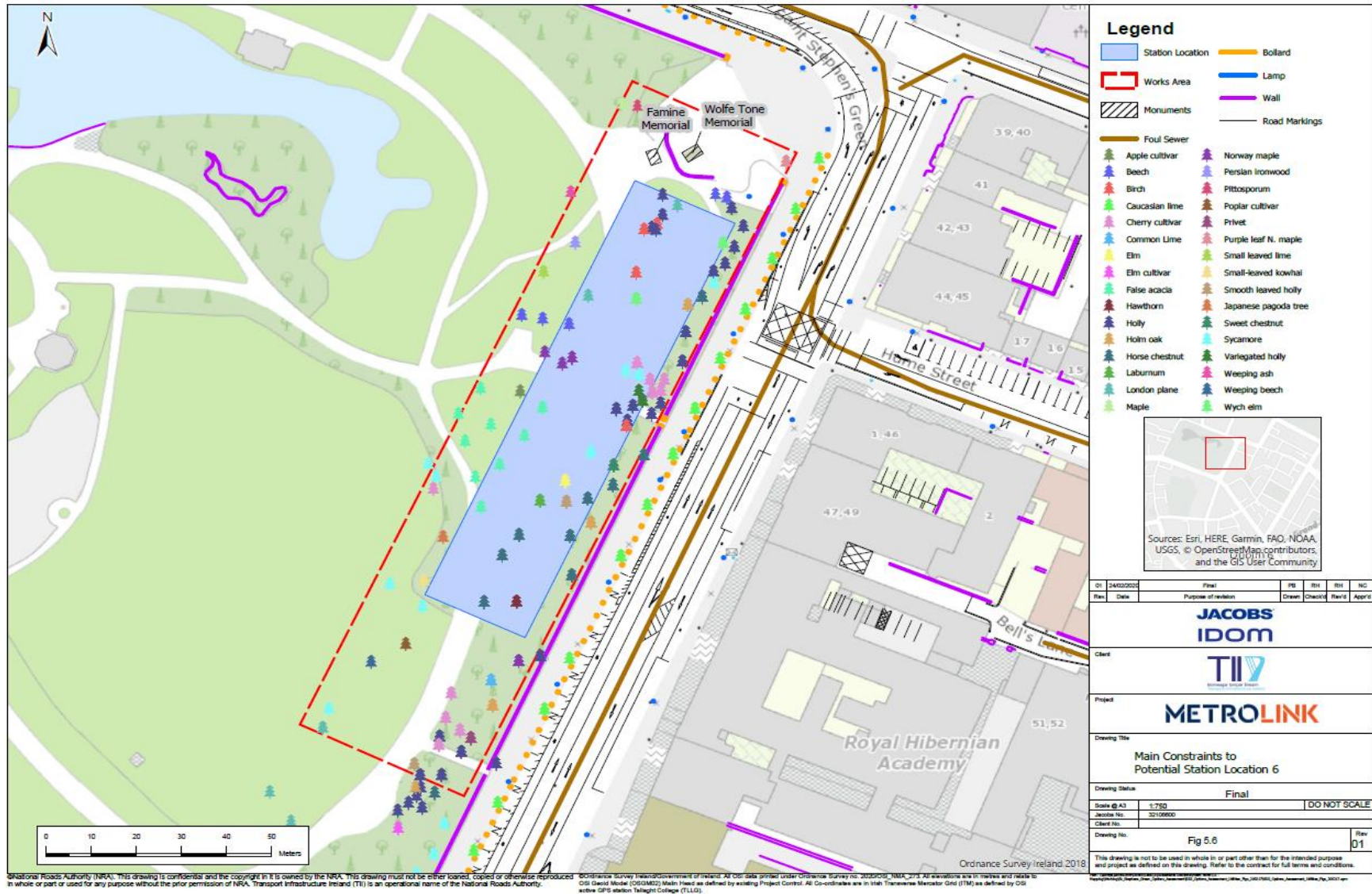


Figure 5.6: Main Constraints to potential location 6

5.8 Location 7

This potential station location would be located entirely within the Earlsfort Terrace roadway and also the footprint of buildings on either side of the street as shown in Figure 5.7. This location is designed to avoid St Stephen's Green Park by moving the station south onto Earlsfort Terrace.

The indicative construction area conflicts with the access to an office building and a hotel. The station box and indicative construction area occupies the width of Earlsfort Terrace and extends to the front steps to the National Concert Hall.

As Location 7 is situated within Earlsfort Terrace it would require the diversion of the 1,800mm Victorian Sewer and all other utilities present under the road. These would require diversion to the east directly impacting on the buildings situated there.

Earlsfort Terrace would be closed for the duration of construction phase including footpaths and the entrances to buildings adjacent to or within the indicative construction area. Street trees and trees in front of the National Concert Hall would be removed within the construction area. Architectural elements within the grounds of the National Concert Hall, including walls and gates would be removed and stored for reinstatement on completion as necessary.

On completion of the construction phase, there would be a requirement for permanent elements of the station to be located within footpaths along Earlsfort Terrace. These include lifts for passengers and the emergency access and egress. Ventilation shafts, sky lights and the entrance to the station including elevators and MetroLink signage would also be permanent features.

A station location on Earlsfort Terrace would impact the feasibility of the current station design as skylights would potentially not be feasible within the carriageway of Earlsfort Terrace.

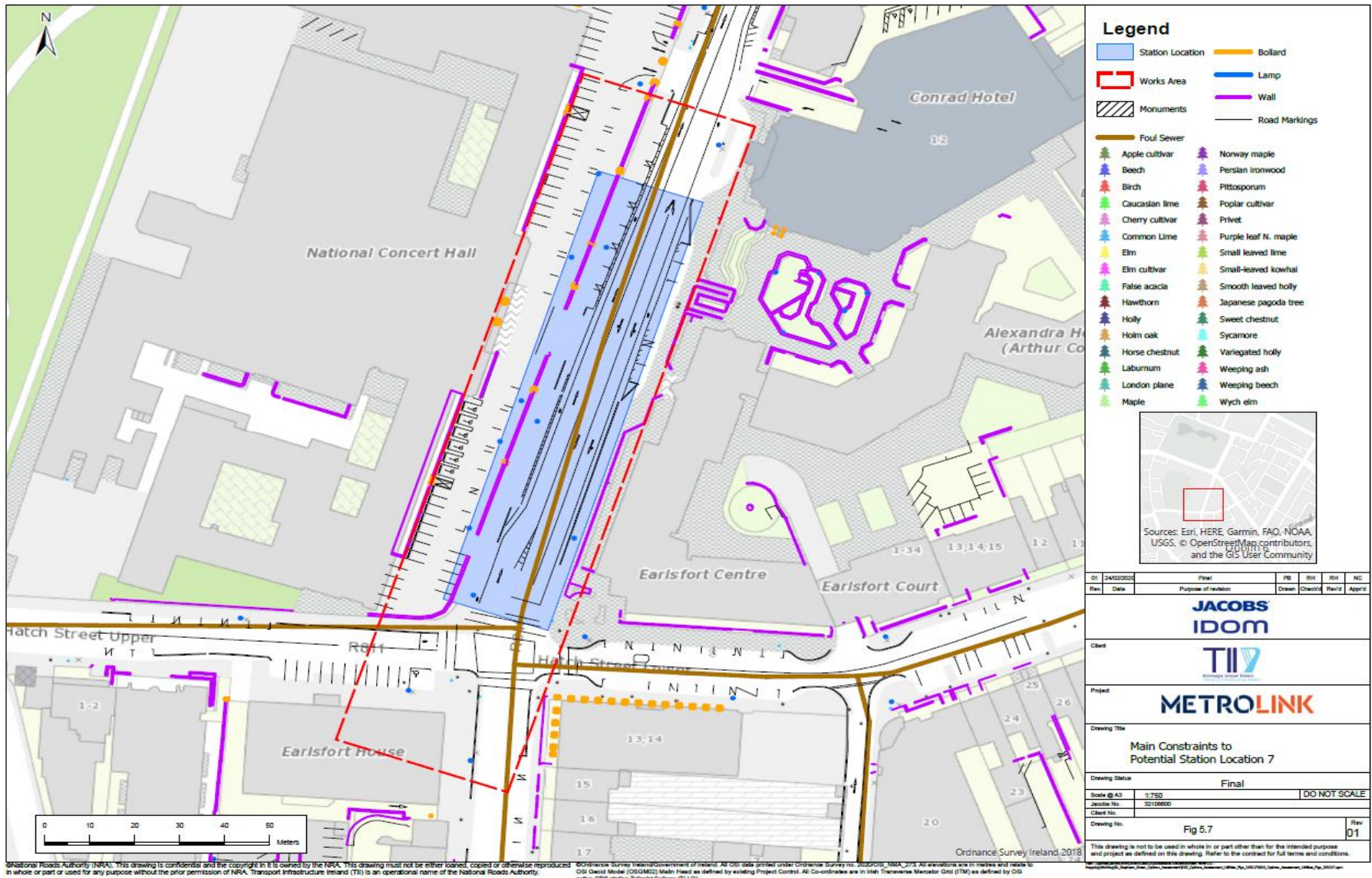


Figure 5.7: Main Constraints to potential location 7

6. Preliminary Analysis and Conclusions

6.1 Introduction

The seven options described in Section 5 have been subjected to Stage 3 preliminary analysis as described in Section 4.2.3 to ascertain if they are feasible and should be subjected to further Stage 4 assessment.

6.2 Appraisal of Options

6.2.1 Location 1

As shown in Figure 5.1, Location 1 is situated primarily within the road corridor of St Stephen's Green East. The principle constraints and opportunities identified during the full multidisciplinary analysis undertaken for this potential station location are detailed below. For full details of the analysis utilising the project objectives, the economic, environmental and engineering criteria, please refer to Appendix B.

6.2.1.1 [St Stephen's Green Park](#)

- There would be a direct impact on in St Stephen's Green Park which is a National Monument (DU018-020334-). The indicative construction area within the National Monument is approximately 717m²;
- Protected structures within the National Monument curtilage including the eastern perimeter fence railings and plinth wall (RPS 7751) and bollards and lampposts (RPS 7752) would be directly impacted;
- If present, subsurface archaeology would potentially be impacted; and
- There is potential for medium to long term impacts on the National Monument related to landscape and visual impacts due to the felling of trees and vegetation clearance within the park. Trees impacted include mature, dominant specimens of Holm Oak and Sycamore. However, in the long term the impacts on St Stephen's Green Park would be less significant once planting is re-established, architectural features are reinstated and following the enhancement of the area through the provision of a high-quality station design.

6.2.1.2 [Victorian Sewer](#)

- The provision of a station at Location 1 would require the diversion of an 1,800mm Victorian sewer situated below St Stephen's Green East. This sewer is of strategic importance and serves large parts of the city centre and as a result, the diversion of the same would be difficult to achieve without significant disruption during the construction phase;
- The sewer would need to be diverted underneath the footpath on the eastern side of the road during the construction phase. Diverting this sewer would be extremely technically challenging, expensive and difficult to achieve due to its age, shape, depth and size. This would create significant additional construction related impacts to those associated with constructing the station box resulting in a larger construction footprint and extended construction phase; and
- The sewer diversion would require the St Stephen's Green East road to be closed for the duration of the construction phase which would result in significant disruption to pedestrians, public transport and traffic on this critical transport corridor. There is potential for direct impacts on the cellars of a number of buildings listed on the RPS located on the eastern side of St Stephen's Green East. These buildings are Listed in Table 4.4 of this Report.

6.2.1.3 [Transport & Traffic](#)

- In addition to the sewer diversion, the location of the station box in the road corridor would also require the closure of all traffic lanes on St Stephen's Green East during construction;
- The closure of St Stephen's Green East would result in the diversion of 384 bus movements during the AM peak; and approximately 1,711 Passenger Car Units (PCU) that utilise St Stephen's Green East in the AM peak would also be displaced. These diversions would result in significant increased traffic congestion in the surrounding area of the city as a result for the duration of the construction phase, with the AM and PM peak hours seeing the worst impacts.

6.2.1.4 [Intervention Shaft](#)

- The position of Location 1 means that an additional intervention shaft would be required between Location 1 and Tara Station;
- The provision of an intervention shaft would result in a significantly increased construction phase with an additional construction site required at a sensitive location between Tara Street and St Stephen's Green East. This would result in significantly increased costs and environmental impacts associated with this construction; and
- There would be additional permanent environmental impacts associated with the permanent surface structures, access roads and other elements required for the intervention shaft.

6.2.1.5 [Overall](#)

Overall due to the above factors, Location 1 scores poorly against all criteria assessed. Due to the overall poor performance against all assessment criteria Location 1 was not considered to be a feasible station location and was not taken forward for further analysis.

6.2.2 [Location 2](#)

Potential station location is illustrated in Figure 5.2. The principle constraints and opportunities identified during the full multidisciplinary analysis undertaken for this potential station location are detailed below. For full details of the analysis utilising the project objectives, the economic, environmental and engineering criteria, please refer to Appendix B.

6.2.2.1 [St Stephen's Green Park](#)

- Location 2 would have a greater impact on St Stephen's Green Park (than Location 1) as it is situated further west, and more vegetation removal would occur during construction. The indicative construction area would occupy approximately 2,157m² of the park;
- The National Monument would experience potentially medium to long term direct landscape and visual impacts due to the felling of trees and vegetation clearance within the park;
- As with Location 1 the protected structures within the National Monument curtilage, including perimeter fence railings and plinth, bollards and lamp posts, would be directly impacted. They would be removed prior to construction and reinstated following construction;
- However, in the long term the impacts on St Stephen's Green Park would be less significant once planting is re-established, architectural features are reinstated and following the enhancement of the area through the provision of a high-quality station design.

6.2.2.2 [Victorian Sewer](#)

- The 1,800 Victorian sewer would be maintained and would not require diversion for this potential station location.

6.2.2.3 [Traffic and Transport](#)

- St Stephen's Green East would be partially closed to allow the construction of the station box for this potential station location. However, enough capacity for car, bus and HGV traffic would be maintained with some disruption anticipated.

6.2.2.4 [Intervention Shaft](#)

- As with Location 1, Location 2 is located such that an intervention shaft would be required. As a result, the same significant impacts as described for Location 1 would result here.

6.2.2.5 [Overall](#)

This location performs poorly against Project Objective, Economy and Environmental criteria. Performance against the Engineering criteria is moderate as the diversion of the Victorian sewer would be avoided. However, due to the overall poor performance against assessment criteria Location 2 was not considered to be a feasible option and as result was not taken forward for further analysis.

6.2.3 **Location 3**

Potential station location is illustrated in Figure 5.3. The principle constraints and opportunities identified during the full multidisciplinary analysis undertaken for this potential station location are detailed below. For full details of the analysis utilising the project objectives, the economic, environmental and engineering criteria, please refer to Appendix B.

6.2.3.1 [Victorian sewer](#)

- The 1,800 Victorian sewer on St Stephen's green East would be maintained for this potential station location.

6.2.3.2 [Traffic and Transport](#)

- Traffic and transport routes on St Stephen's Green East would not be directly impacted for this station location during the construction phase.

6.2.3.3 [Intervention shaft](#)

- The position of Location 3 means that an additional intervention shaft would be required between Location 3 and Tara Station. Potential impacts of this would be in line with those described for Location 1.

6.2.3.4 [St Stephen's Green Park](#)

- The provision of a station at Location 3 would have medium to long term impacts on the National Monument. The perimeter fence railings and plinth and other protected structures on the footpath (and within the curtilage of the National Monument) would be directly impacted; and
- As with Locations 1 and 2 there would be impacts on protected structures, undiscovered archaeology, trees and vegetation within St Stephen's Green Park. However, as the station box and indicative

construction area are located entirely within the park there would be more significant direct impacts than for other station locations due to more significant tree and vegetation clearance. The indicative construction area for this location would occupy approximately 2,704m² of the area of the National Monument. However, in the long term the impacts on St Stephen's Green Park would be less significant once planting is re-established, architectural features are reinstated and following the enhancement of the area through the provision of a high-quality station design.

6.2.3.5 [Overall](#)

This location performs moderately against the engineering assessment criteria as the Victorian sewer on St Stephen's Green East is maintained but this station location still requires an intervention shaft to be constructed. The potential station location performs poorly against Economy criteria due to the need for an intervention shaft. The location performs poorly against environmental criteria as the location is entirely within St Stephen's Green park and due to the requirement for an Intervention Shaft. Due to the overall poor performance against assessment criteria this location was not considered to be viable and was not progressed for further analysis.

6.2.4 Location 4

Potential station location is illustrated in Figure 5.4. The principle constraints and opportunities identified during the full multidisciplinary analysis undertaken for this potential station location are detailed below. For full details of the analysis utilising the project objectives, the economic, environmental and engineering criteria, please refer to Appendix B.

6.2.4.1 Victorian Sewer

- The provision of a station at Location 4 would require the diversion of an 1,800mm Victorian sewer situated below St Stephen's Green East as with Location 1. The strategic importance of the sewer would create significant construction phase impacts and add significant cost;
- The location of the station box would also require a sewer under Hume Street to be diverted. This sewer has a junction with the Victorian sewer. This would create additional traffic impacts on Hume Street and its junction with St Stephen's Green East; and
- Diverting the sewer underneath the footpath would result in potential direct impacts on the cellars of a number of buildings listed on the RPS on St Stephen's Green East. These buildings are listed in Section 4.3.5 of this report.

6.2.4.2 Traffic and Transport

- As described for Location 1, Location 4 would require the closure of St Stephen's Green East traffic lanes during construction due to the location of the station box;
- All bus, car and pedestrian traffic would need to be diverted away from this location resulting in significant impacts. These diversions would result in significant increased traffic congestion in the surrounding area of the city as a result for the duration of the construction phase, with the AM and PM peak hours seeing the worst impacts.

6.2.4.3 Intervention shaft

- No intervention shaft would be required for potential station location 4.

6.2.4.4 St Stephen's Green Park

- St Stephen's Green Park would be directly impacted in a similar way to Location 1 although situated 31m further north along St Stephen's Green East. The indicative construction area within the National Monument is 729m²;
- Protected structures within the National Monument would be directly impacted including the perimeter fence railings and plinth, bollards and lampposts;
- If present, subsurface archaeology would potentially be impacted;
- Landscape and visual impacts would occur due to the felling of trees and vegetation clearance within the park. However, in the long term the impacts on St Stephen's Green Park would be less significant once planting is re-established, architectural features are reinstated and following the enhancement of the area through the provision of a high-quality station design.

6.2.4.5 [Overall](#)

The full closure of St Stephen's Green East during the construction phase, including its junction with Hume Street would prevent all traffic movements from St Stephen's Green East to Kildare Street and Merrion Row. These factors all trigger a poor rating against the environment criteria;

Constructing the station under St Stephen's Green East increases the construction cost due to factors such as reinstating the road surface and diversion of utilities. This results in a poor performance against the engineering criteria. The additional cost associated with this results in a moderate performance against the economy criteria. Due to the overall poor performance against assessment criteria this location was not considered to be viable and was not progressed to Stage 4.

6.2.5 [Location 5](#)

Location 5 is situated partially within the road corridor of St Stephen's Green East as shown in Figure 5.5. It is similar to Location 2 but is moved further north along St Stephen's Green East to avoid the requirement for an intervention shaft.

The principle constraints and opportunities identified during the full multidisciplinary analysis undertaken for this potential station location are detailed below. For full details of the analysis utilising the project objectives, the economic, environmental and engineering criteria, please refer to Appendix B.

6.2.5.1 [St Stephen's Green Park](#)

- The construction phase would impact directly on St Stephen's Green Park having regard to architectural heritage, archaeology, biodiversity and landscape impacts. The indicative construction area would occupy approximately 2,181m² of the park. The plaza in the north eastern corner of St Stephen's Green Park including the Wolfe Tone Memorial and Hungry Heart memorial would be directly impacted in addition to protected structures (railings and plinth, bollards and lampposts) and undiscovered archaeology;
- However, in the long term the impacts on St Stephen's Green Park would be less significant once planting is re-established, architectural features are reinstated and following the enhancement of the area through the provision of a high-quality station design.

6.2.5.2 [Victorian sewer](#)

- The 1,800mm Victorian sewer would be maintained during construction with no requirement for a diversion.

6.2.5.3 [Traffic and Transport](#)

- St Stephen's Green would be partially closed during construction as described for Location 2. Bus, PCU and HGV traffic movements would be disrupted but satisfactorily maintained to minimise traffic impacts.

6.2.5.4 [Intervention shaft](#)

- No intervention shaft would be required if a station was built at this location.

6.2.5.5 [Overall](#)

Location 5 has a moderate performance against the project objective criteria requiring the project to be sustainably constructed and operated and to be integrated into the public realm. However, this station location delivers a poor performance against the environment criteria due to direct impacts on the National Monument, particularly during

the construction phase. Reduced construction risk within St Stephen's Green Park means Location 5 achieves moderate performance against the engineering sub-criteria for constructability. While there are potential impacts on the receiving environment, utilities and traffic, Location 5 was deemed to have performed sufficiently against the assessment criteria to warrant further assessment under the Stage 4 MCA process.

6.2.6 Location 6

Location 6 is situated entirely within the boundary St Stephen's Green Park. It is similar to Location 3 but is further north removing the need for an intervention shaft.

The principle constraints and opportunities identified during the full multidisciplinary analysis undertaken for this potential station location are detailed below. For full details of the analysis utilising the project objectives, the economic, environmental and engineering criteria, please refer to Appendix B.

6.2.6.1 [St Stephen's Green Park](#)

The station box and indicative construction area are entirely within St Stephen's Green Park. The indicative construction area would occupy 2,704m² of the National Monument resulting in significant direct impacts on existing trees and vegetation including:

- Felling of trees and clearance of other vegetation within the park would cause medium to long term impacts on the park;
- The eastern extent of the indicative construction area would directly impact protected structures including railings and plinth, bollards and lampposts. The plaza in the north eastern corner of St Stephen's Green Park including the Wolfe Tone Memorial and Hungry Heart memorial would also be impacted;
- However, in the long term the impacts on St Stephen's Green Park would be less significant once planting is re-established, architectural features are reinstated and following the enhancement of the area through the provision of a high-quality station design.

6.2.6.2 [Victorian Sewer](#)

- The Victorian Sewer on St Stephen's Green East would not require diversion during the construction phase.

6.2.6.3 [Traffic and Transport](#)

- Traffic and transport routes on St Stephen's Green East would not be directly impacted.

6.2.6.4 [Intervention shaft](#)

- No Intervention shaft would be required for this location

6.2.6.5 [Overall](#)

Location 6 performs poorly against the Project Objective criterion as integrating station elements entirely within the park environment would be difficult to achieve without significant landscape and visual impacts. However, constructing the station within St Stephen's Green Park reduces construction costs. This allows Location 6 to achieve a good performance against the economy criteria. The construction phase impacts would be significant on St Stephen's Green Park particularly potential impacts on architectural heritage, archaeology, biodiversity and the landscape and visual amenity. This results in a poor performance against environment criteria.

While there are potentially significant impacts on St Stephen's Green Park, this option has advantages in not impacting traffic and utilities on St Stephen's Green East and lower costs of reinstatement post construction. Therefore, Location 6 was deemed to warrant further analysis under the Stage 4 MCA process.

6.2.7 Location 7

Location 7 is situated entirely within Earlsfort Terrace and does not impact on St Stephen's Green directly. The principle constraints and opportunities identified during the full multidisciplinary analysis undertaken for this potential station location are detailed below. For full details of the analysis utilising the project objectives, the economic, environmental and engineering criteria, please refer to Appendix B.

6.2.7.1 [St Stephen's Green Park](#)

There would be no direct impact on St Stephen's Green Park arising from this potential station location.

6.2.7.2 [Victorian Sewer](#)

- Location 7 would require a significant diversion of the Victorian Sewer on Earlsfort Terrace. This sewer diversion would be very difficult to achieve given the very limited space either side of the station box on Earlsfort Terrace without impacting on properties such as the National Concert Hall.

6.2.7.3 [Transport & Traffic](#)

- Traffic and transport routes on Earlsfort Terrace would be directly impacted for the duration of the construction phase.

6.2.7.4 [Intervention shaft](#)

- The position of Location 7 means that an additional intervention shaft would be required between Location 7 and Tara Station. Potential impacts of this would be in line with those described for Location 1.

6.2.7.5 [Overall](#)

Location 7 performs poorly against the Project Objective criterion as a station located at Earlsfort Terrace would not provide good public transport network legibility due to a lack of key trip attractors in this area. Furthermore, the location would not perform as well in terms of public transport interchange or customer patronage levels as other options due to the location further from key city centre locations and within 450m of Charlemont Station. In this regard, it is significantly inferior to options on St Stephen's Green East.

This location performs poorly against the engineering assessment criteria as the Victorian sewer along Earlsfort Terrace requires diversion and there would be a requirement for an intervention shaft to be constructed. The location performs poorly against economy criteria due to the need for an intervention shaft. The location performs poorly against environmental criteria as the location would impact on nearby sensitive receptors such as the National Concert Hall and an adjacent hotel during the construction phase. Furthermore, the construction of this station entirely within Earlsfort Terrace would require significant traffic and public transport diversions during the construction phase. Due to the overall poor performance against all of the assessment criteria, this location was not considered to be viable and was not progressed to Stage 4.

6.2.8 Stage 3 Preliminary Analysis Outcome

An appraisal table has been prepared and is shown below in Table 6.1. The table collates and summarises the appraisal of each potential station location under each of the assessment criteria.

Table 6.1: Summary of Results of Stage 3 Analysis

Location	1	2	3	4	5	6	7
Project Objectives	Red	Red	Red	Red	Yellow	Red	Red
Economy	Red	Red	Red	Yellow	Yellow	Green	Red
Environment	Red	Red	Red	Red	Red	Red	Red
Engineering	Red	Yellow	Yellow	Red	Yellow	Yellow	Red
Overall	Red	Red	Red	Red	Yellow	Yellow	Red

The results show Locations 1 to 3 and 7 perform poorly against the economy appraisal criteria due to the need for an intervention shaft. Location 7 would also require the diversion of a significant length of the Victorian sewer. Locations 1-4 and 7 perform poorly against the environmental criteria due to environmental impacts associated with the required Intervention shaft. Location 4 also performs poorly against this criterion due to impacts on traffic and utilities.

Location 5 performs better overall when compared with other locations because:

- It does not require an intervention shaft or the diversion of the Victorian sewer. It is an “intermediate” option as it avoids the more significant construction phase impacts associated with Locations 1-3 and 7 and
- It avoids the more significant impacts on St Stephen’s Green Park associated with Locations 4 and 6.

On this basis it is recommended that Location 5 proceed to Stage 4 assessment.

Location 6 performs well against the economy criterion as it is located entirely within the St Stephen’s Green Park and therefore avoids the more expensive reinstatement costs associated with road surfaces and utility diversions. The location within the park and associated direct impacts however drives a poor performance against the environmental criteria. However, it performs moderately well against the engineering criterion as it does not require an intervention shaft, utility or traffic diversions. This coupled with good performance against the economy criteria means that Location 6 will proceed to Stage 4 assessment.

The nature of the constraints in the study area mean that options 5 and 6 perform poorly against certain criteria but are advanced for further assessment because they are considered more feasible from a cost, engineering and environmental perspective than Locations 1-4 and 7.

It is therefore recommended that Options 5 and 6 are progressed to the Stage 4 MCA process.

7. Multi-Criteria Analysis and Conclusions

7.1 Introduction

A MCA was undertaken for Stage 4 using economic and environmental criteria.

7.2 Assessment summaries

The proposed station locations are assessed having regard to their potential economic and environmental impacts. Engineering criteria are not considered further here as the station locations to be analysed are both feasible from an engineering perspective.

7.2.1 Location 5

Detail on the principle environmental and economic constraints and opportunities are provided below for potential station location 5. These were identified as part of a full multidisciplinary analysis undertaken for this potential station location. For full details of the analysis utilising the economic and environmental criteria, please refer to Appendix C.

7.2.1.1 [St Stephen's Green](#)

- The station box and indicative construction area could have direct impacts on mature trees and other vegetation on the eastern edge of St Stephen's Green Park. An estimated 75 trees are located within the proposed construction area including 55 that are mature. Of these 4 are A21 rated, 1 is A3 and 33 are B2 trees. Of these one is a London Plane, one is a "dominant" Wych Elm (which has a B2 rating). The above-mentioned trees would require felling to allow for the construction of the station box resulting in medium to long term impacts on the landscape & visual amenity of the area and the setting of the National Monument;
- The eastern edge of the station box and construction area directly impacts protected structures within the National Monument boundary. These structures include railings and plinth wall, bollards and lampposts. These impacts would occur for the length of the station box and indicative construction area during the construction phase. However, all of these elements of architectural heritage would be reinstated following the completion of the construction phase;
- There is potential for significant impacts on unrecorded sub-surface archaeology within the park including a 17th Century perimeter wall and ditch. The impacts on subsurface archaeology would be for the length of the construction area but particularly for the area where the station box would be excavated, and diaphragm walls constructed;
- In the long term, there would be a small number of station elements visible at the surface level including the main station access, lift shafts, ventilation shafts and the proposed station skylights. The most significant of these elements including the main station access and the lift shafts would be located largely outside of the St Stephen's Green Park area. While this would still be within the curtilage of the National Monument, these elements would be integrated into the area with good design;
- In the long term the impacts on St Stephen's Green Park would be less significant once planting is re-established, architectural features are reinstated and following the enhancement of the area through the provision of a high-quality station design.

¹ In accordance with tree quality assessment BS5837:2012

- This station location would not require the diversion of the Victorian sewer which means that the construction phase associated with this station location would be much less significant than if this diversion was required. Furthermore, there would be no direct impacts on properties contained on the Dublin City Council Record of Protected Structures (RPS) on the east side of St Stephen's Green East;

7.2.1.2 [St Stephen's Green East – Traffic & Transport](#)

- Location 5 would require some minor diversions of utilities including water, gas and communications lines that are situated under the northbound traffic lanes of St Stephen's Green East. However, this station location does not require the diversion of the Victorian sewer which would mean that the construction phase associated with this station location would be much less significant than if this diversion was required;
- Location 5 would require works within the road carriageway of St Stephen's Green East. This location would require the roadway of St Stephen's Green East to be partially closed to through traffic with two northbound traffic and one southbound bus lane remaining open. Pedestrian access along the eastern footpath would remain open. As a result, some transport and traffic disruption would occur during the construction phase, particularly during AM and PM peak hours. However, a transport and traffic assessment of this option identified that the impacts on public transport and traffic movements in the area would be manageable.

7.2.1.3 [Overall](#)

- This location achieved good performance against the economy criterion based on construction and surface reinstatement costs;
- A range of performance results against the environmental criteria occurred. The performance was found to be poor or very poor for impacts associated with mature tree loss within the park and impacts on the National Monument generally. However, the station location performed well against Traffic and Transport and Utilities (material assets) criteria due to being able to avoid significant constraints relevant to these disciplines.

7.2.2 [Location 6](#)

Detail on the principle environmental and economic constraints and opportunities are provided below for potential station location 6. These were identified as part of a full multidisciplinary analysis undertaken for this potential station location. For full details of the analysis utilising economic and environmental criteria, please refer to Appendix C.

7.2.2.1 [St Stephen's Green](#)

- Impacts on the National Monument would be similar to those described for Location 5 in the preceding section including direct impacts on protected structures and archaeology. However, the impacts would be more significant due to Location 6 being located completely within St Stephen's Green Park.
- 98 trees would be within the construction area including 70 that are mature. Of these 16 are A2, 1 is A3 and 35 are B2 trees. Of these four are London Plane, one is a "dominant" Wych Elm. The above-mentioned trees would require felling to allow for the construction of the station box resulting in medium to long term impacts, which would be more significant than for Location 5;
- All station elements including "pop-ups" would be located within the park including lift shafts, ventilation shafts and the proposed station skylights. These would be difficult to integrate into the park setting.

- This station location would not require the diversion of the Victorian sewer which means that the construction phase associated with this station location would be much less significant than if this diversion was required. Furthermore, there would be no direct impacts on properties contained on the Dublin City Council Record of Protected Structures (RPS) on the east side of St Stephen's Green East;

7.2.2.2 St Stephen's Green East – Traffic & Transport

- Location 6 avoids direct impacts on traffic and transport networks along St Stephen's Green East as the station location and the required construction area would be fully located within St Stephen's Green park;
- Location 6 would not require utility diversions at St Stephen's Green East. As a result, the construction phase associated with this station location would be much less significant than if utility diversions were required.

7.2.2.3 Overall

- Location 6 performs better against the economy criteria than Location 5. Surface reinstatement of park or green space is relatively economical when compared with road surface construction or utility diversions. These factors improve the Location 6 performance against the economic criteria when compared to Location 5;
- Location 6 performs very poorly against most environmental criteria especially those associated with the National Monument due to the fact that the station location is fully within St Stephen's Green park requiring a more significant footprint within the park during the construction and operational phase. Location 6 would require all above ground elements (pop ups) to occur within the park while Location 5 would have a less significant impact on the park, as some of the more significant surface elements would be located outside of the fence line of the park.

7.3 Stage 4: MCA outcomes

An appraisal summary table has been prepared which collates and summarises the MCA of Locations 5 and 6 in Table 7.1 below.

Table 7.1: Stage 4 MCA

CRITERIA	LOCATION 5	LOCATION 6
ECONOMY		
Cost	Light Green	Green
ENVIRONMENTAL		
Air and Climate	Yellow	Red
Noise and Vibration	Yellow	Red
Biodiversity	Yellow	Red
Non-Agricultural Properties	Yellow	Yellow
Cultural Heritage: Archaeology	Yellow	Red
Cultural Heritage: Architectural Heritage	Red	Red
Landscape and Visual	Yellow	Red
Traffic and Transport	Light Green	Green
Utilities	Light Green	Green
Population and Human Health	Yellow	Red

8. St Stephen's Green Station Preferred Location

The choice of a preferred location for a MetroLink Station at St Stephen's Green East was determined based on a robust assessment process of a number of potential station locations. This built on earlier completed work in ARUP (2017) which identified St Stephen's Green East as the best location for a MetroLink station.

The Stage 3 multicriteria analysis ruled out Locations 1 to 4 and 7 due to poor performance against Project Objectives, economy, environmental and engineering criteria. The poor performance of Locations 1-3 and 7 was due in part to the need to construct an Intervention Shaft between St Stephen's Green and Tara Street. In addition, station locations that required the Victorian and Hume Street sewers to be diverted and the full closure of St Stephen's Green East or Earlsfort Terrace to public transport and traffic during the construction phase were not taken to Stage 4 for further assessment.

Locations 5 and 6 were brought forward to Stage 4 where a further MCA was undertaken using Environmental and Economy criteria. Both of these station locations have a direct impact on St Stephen's Green Park, but due to the proposed station locations they avoid the following impacts;

- Diversion of the Victorian sewer and Hume Street sewer and associated impacts resulting from a more extensive construction area and duration;
- The closure of St Stephen's Green East to public transport and traffic during the construction phase; and
- Direct impacts on buildings listed on the RPS on St Stephen's Green East.

The outcome of the Stage 4 MCA was that Location 5 was chosen as the preferred location for the proposed MetroLink station as it significantly reduces the impact on St Stephen's Green Park when compared to Location 6. Location 5 results in the requirement for less vegetation removal and trees to be felled to allow for the construction of the station when compared with Location 6. In addition, the long term impacts on St Stephen's Green Park are significantly less for Location 5 as the main surface elements of the proposed station are largely located outside of the current extent of St Stephen's Green Park.

Furthermore, the choice of Location 5 allows for the long term impacts of the station location to be significantly mitigated by replanting of trees and other vegetation, in addition to the reinstatement of existing elements of architectural heritage. In addition, high-quality design of station "pop-ups" would allow for the development of a high quality urban environment in the north eastern corner of St Stephen's Green.

Station Location 5 will now be subject to further design development and potential impacts will be assessed, with mitigation measures recommended. The outputs of the assessment and recommended mitigation measures will be presented in the EIAR for the project.

9. References

- Archaeological monitoring of Metro North Utility Slit Trenching at St Stephens Green, Dublin. Headland Archaeology (Ireland) Ltd 2009.
- ARUP (on behalf of the NTA) (2018). New Metro North - Alignment Options Report.
- British Standard 5837 (2012); Trees in relation to design, demolition and construction – Recommendations.
- Department of Housing, Planning and Local Government (DHPLG) (2017); Project Ireland 2040: National Planning Framework.
- Department of Transport, Tourism and Sport (DTTAS) (2016); Common Appraisal Framework for Transport Projects and Programmes.
- Dublin City Council (2007); Dublin City Council HGV Management Strategy.
- Dublin City Council (2015); Dublin City Centre Transport Study.
- Dublin City Council (2016); Dublin City Parks Strategy 2017-2022.
- Dublin City Council (2016); Dublin City Development Plan (DCC 2016-2022).
- European Union (2014); Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (EIA Directive).
- European Union (2016); Regulation (EU) 2016/796 of the European Parliament and of the Council of 11 May 2016 on the European Union Agency for Railways and repealing Regulation (EC) No 881/2004.
- Fossitt, (2000); A Guide to Habitats in Ireland.
- Jacobs Idom (2019); Preferred Route Design Development Report.
- National Transport Authority (NTA) (2016); Transport Strategy for the Greater Dublin Area 2016-2035.
- Office of Public Works (OPW) (2015); Draft St Stephen's Green Park Conversation Management Plan.
- Office of Public Works (OPW) (2019); [Online] Available at ststephensgreenpark.ie/ [Accessed 18/12/2019].
- Transport Infrastructure Ireland (TII) (2016); Project Appraisal Guidelines for National Roads Unit 7.0 - Multi Criteria Analysis.

Appendix A. Cultural Heritage Background: St Stephen's Green Park and St Stephen's Green East

A.1 Introduction

This appendix has been prepared by TII to supplement the Jacobs/Idom St Stephen's Green Station Study Assessment Report. It provides an illustrated cultural heritage background of various heritage constraints identified for both St Stephen's Green Park and St Stephen's Green East. The information presented was utilised as background information for the purposes of developing an in-depth understanding of St Stephen's Green as an input into identifying the preferred station location.

A.2 St Stephen's Green Park (East) - Cultural heritage items

The items of cultural heritage on the east side of St Stephen's Green Park, can be broken down into the following categories, noting these do not address the design of the parks Victorian landscape itself which is addressed by the appropriate Landscape and Visual Specialist. In addition, this appendix addresses only those elements, which lie within the construction zone of the various MetroLink St Stephen's Green station options:

1. Perimeter railings, gates and plinth wall of the perimeter boundary (RPS 7751);
2. The surrounding bollards and traditional-style lamp-posts (RPS 7752) which help define the perimeter footpath of the park; and
3. Sculptures

A.2.1 Perimeter railings, gates, plinth wall, bollards and lamp standards (St Stephen's Green East; RPS 7751 - 7752)

From its origins, St Stephen's Green Park has traditionally been an enclosed park. In the 17th and 18th century this was achieved by means of an external masonry wall. In 1815 this was changed to a dwarf (6-8 inch high) granite plinth wall with a 6 foot high cast-iron railing, external to which lay a 25 foot gravel (and possible grass) walk delineated by a row of granite bollards linked by chains (Figure A1.1). The railings were manufactured in the foundry of Abraham Mason on 10 Dawson Street (McCabe 2011, 258-9) and had spearhead finials intervened with daggers. No trees were planted on the walk from 1815-1870, and it was illuminated by lampposts which were set onto the surrounding bollards.



Figure A1.1: View of St Stephen's Green North c. 1828-30 by H. Madden (after McCabe 2011). Note absence of Lime Walk, perimeter ditch, and limited interior planting.

From 1877-1880 under the auspices of Ardilaun Guinness, the park was enclosed with new railings, replicating the design of 1815. The latter were used where suitable to define internal elements of the park with low foot rails also installed defining internal gravel paths. Large cast-iron access gates were inserted onto each of the parks four corners, with wicket gates also installed three each on the south and north sides, two to east and west. The latter number has been increased to five to accommodate access to additional features such as the twentieth century Toilet Block. The granite bollards and chains were retained and continue (minus the chains) to define the perimeter of the park today (Figures A1.2 – A1.4). The perimeter path was a likely to initially have comprised a mix of gravel and paving, with drawings from 1901 showing a change to a mix of concrete and gravel (Figure A1.3). These drawings also illustrate the design and spacing of the historic street furniture (bollards [73 no.], lamp standards [12 no] and tree guards) on St Stephen's Green Park East (see Figure A1.4).

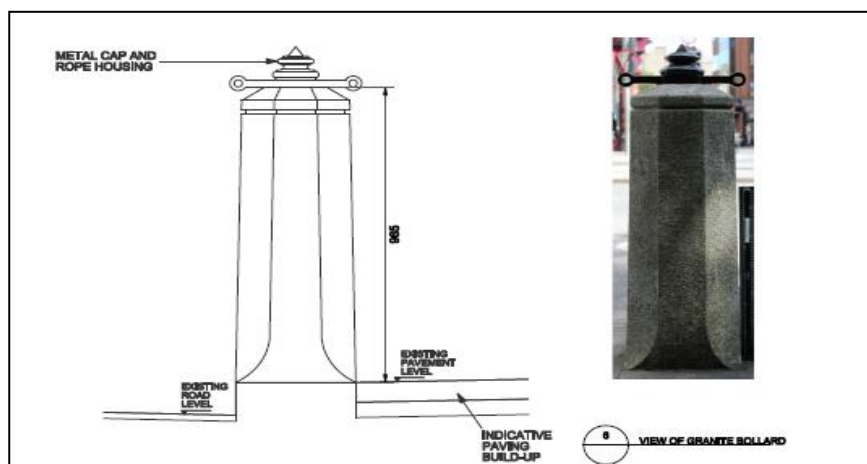


Figure A1.2: Detail of existing bollards on St Stephen's Green Park (TII)

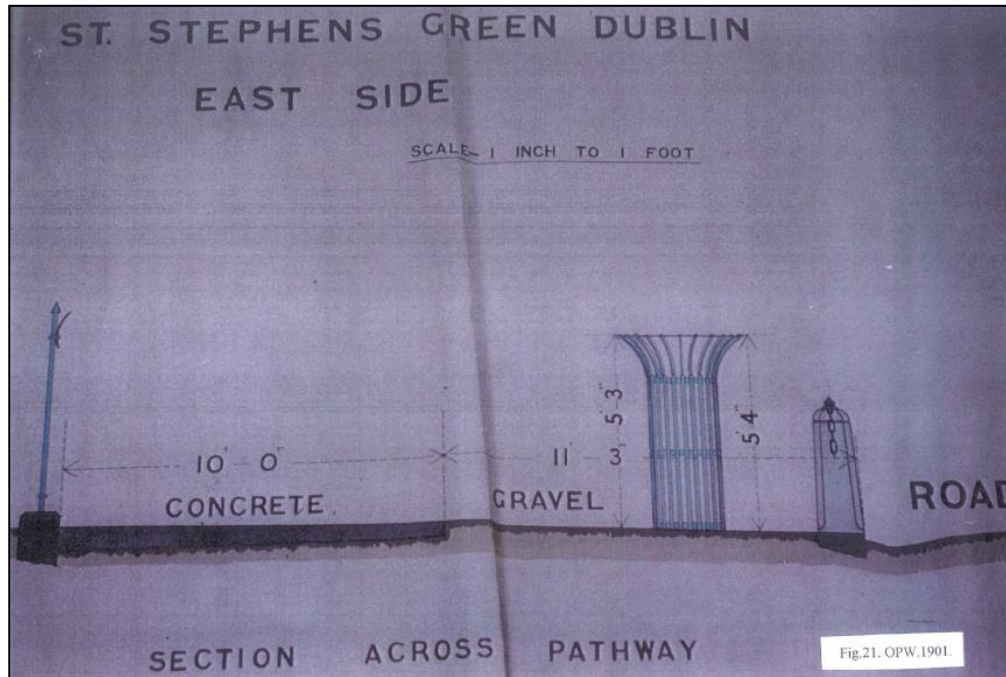


Figure A1.3: Section of the perimeter path of St Stephen's Green East, dated 1901 (Extracted from Duchas)

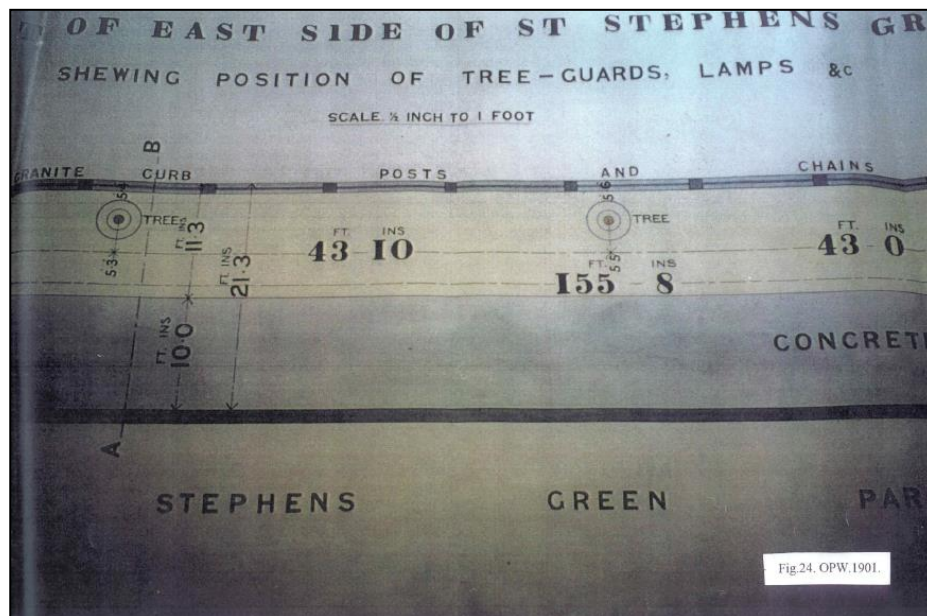


Figure A1.4: Layout of historic street furniture on St Stephen's Green East, dated 1901 (Extracted from Duchas)

In the 1990 the park's gates and railings underwent a substantial programme of repair and conservation by the Office of Public Works with some rails being replaced with cast-iron replicas (OPW 2015; Lotts 2009). It is likely that the square profile back stays may have been procured at this time, and that the Victorian backstays were of a more ornate cast iron style. A backstay is present on every 16th rail.

It was noted in a visual inspection of the railings and plinth wall undertaken in February 2020 that the railings continue to be maintained in overall good condition, though some deterioration of the paint was recorded. With

reference to the finials, occasional rust was noted, with a small number of finials also missing (Figure A1.6). The upper and lower wrought iron horizontal rails are also in good condition, though some rusting of scarf joints and exposed fixings was noted. The lead fixing of the feet of the railings was generally good, but some separation was noted, indicating failure of the lead adhesion to the socket over time.

The plinth walls granite blocks showed fracturing likely to do with weathering and reorganisation of the rails (with some empty sockets noted), only occasional large fractures were noted. The mortar was flushed and in need of repair (Figure A1.6).

The current traditional style lamp standards are protected structures, and are later additions to the park's Victorian design. Two types of lamp standards surround the green – a three lantern cast-iron version located on each corner illuminating the gates/access ways, and a single lantern cast-iron version (manufactured at the local Hammond Lane Foundry) aligned with the perimeter kerb (Figure A1.7).



A



B



C



D



Figure A1.6: Visual survey of railings on St Stephen's Green East (A: railings with deteriorated paint. B: rust on horizontal rail scarf joint. C: missing spear head finials. D: failure of lead fixing, note chipped and weathered plinth. E: evidence of previous rearrangement of railings (empty sockets), flushed mortar and chipped and weathered plinth.

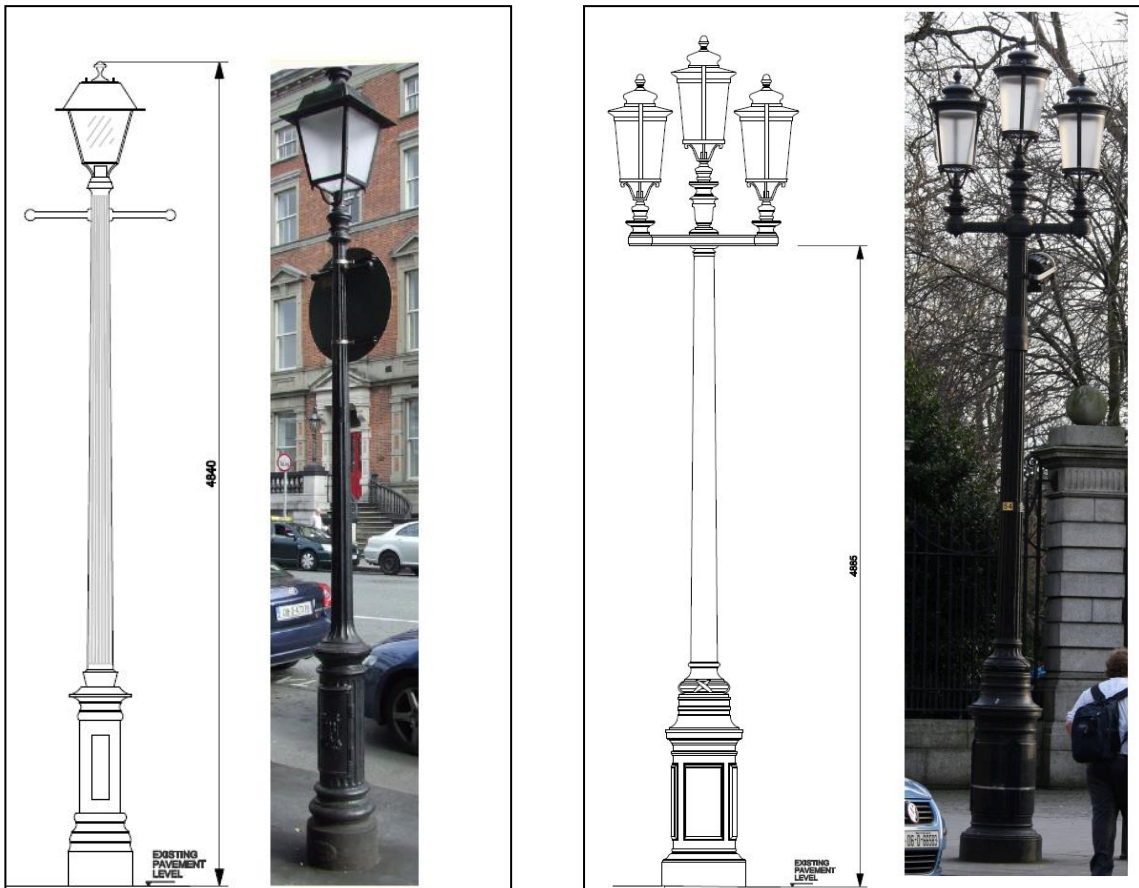


Figure A1.7: Details of traditional style lamp standards (single lantern to left and three lantern to right) on the perimeter of St Stephen's Green Park (TII)

A.2.2 Sculpture on St Stephen's Green Park (East)

The north-east corner of St Stephen's Green Park is defined by a plaza housing three sculptures and the vestigial remains of the late 19th century gate piers. The former comprise:

- The Wolfe Tone Memorial;
- Tone Henge (granite monoliths); and
- Hungry Heart Famine Memorial (most commonly referred to as the 'Famine Memorial').

A fourth sculpture 'The Three Fates' is located within the south-east entrance of the Park.

A.2.3 The Wolfe Tone Memorial and 'Tone Henge'

Theobald Wolfe Tone (1763-1798), a son of a protestant coach maker and qualified lawyer was the founder of the Society of United Irishmen who led a team of French revolutionaries on two occasions to Ireland in an attempt to overthrow the English rule. The first attempt in 1796 entailed 14,000 troops but these troops and their ships were dispersed by storm. The second attempt during the 1798 rebellion comprised 3000 troops, who arrived in Ireland in September of that year in small parties around the coast. He was sentenced to death on 10th November 1798, but on the day of his intended hanging he sought to thwart the English, and slit his own throat with a penknife, dying from his own injuries on the 19th November. In 1898 the Wolfe Tone Memorial Committee was established, but their plans of a commemorative statue for Wolfe Tone did not materialise until a government grant of £15,000 was provided, along with a site for the statue on the site for the statue, on the north-east corner of St Stephen's Green Park (<https://www.irishtimes.com/opinion/february-8th-1971-1.459563>).

On foot of a competition, the commission to develop the memorial was awarded to Mayo sculptor Eddie Delaney (1930-2009) and the architect Noel Keating (<https://www.irishtimes.com/culture/modern-ireland-in-100-artworks-1964-wolfe-tone-by-edward-delaney-1.2393337>). Delaney was responsible for the sculpture, with Keating responsible for the curved line of granite monoliths behind it (see Figure A1.8). It took three years for the sculpture and installation to be completed, with the opening ceremony presided by President de Valera taking place on the 18 November 1967, with the date chosen in mind of the upcoming 50th anniversary of the Easter Rising.

Unfortunately, due to its symbolism Wolfe Tone's statue became a target for Loyalist activity and the monument was blown up in the early hours of the morning of 8th February 1971. It is believed it was a glycerine bomb, placed low down on the statue shearing its trunk and head (Figure A1.9). Very little other damage was caused by the explosion, other than the shattering of windows on nearby properties (<https://www.irishtimes.com/opinion/february-8th-1971-1.459563>). The statue was repaired by Delaney within a number of months, as he was able to recast the damaged elements.

Both the Wolfe Tone Memorial statue and the Tone Henge monoliths survive in very good condition.



Figure A1.8 Wolfe Tone statue and 'Tone Henge' on the north-east corner of St Stephen's Green Park



Figure A1.9: The Wolfe Tone Memorial after the bombing of February 1971. (Copyright Irish Photo Archive).

A.2.4 The Hungry Heart Famine Memorial

The Hungry Heart Famine memorial, more commonly referred to as the Famine Memorial, was also sculpted by Delaney and forms an intrinsic component of the Wolfe Tone Memorial, sitting to its rear (Figure A1.10). The memorial comprises three abstract bronze figures (2 standing, 1 sitting) and a dog sitting on granite slabs, representing victims of the Great Famine of 1845-9. Delaney believed that the famine was directly linked to the failed 1798 rebellion, and with reference to the victims depicted stated '*I would like to have depicted him in French uniform, plumed hat and victorious sword. But history decided otherwise*' (<https://www.theguardian.com/artanddesign/2009/oct/19/edward-delaney-obituary>).

Overall the memorial is in a good state of preservation but some damage does exist. The standing figure to east is holding both a decorated cane and spoon, which it is using to feed the seated figure. The cane head is missing and in need of repair, exposing the interior of this element of the sculpture to further water damage (Figure A1.11). The dowels supporting the standing figure to the west are also exposed both at the front and to the rear, again exposing the statue to water damage. Pitting of the bronze is apparent on the rear of the dog sculpture.



Figure A1.10: Delaney's Hungry Heart 'Famine' Memorial, 1967.

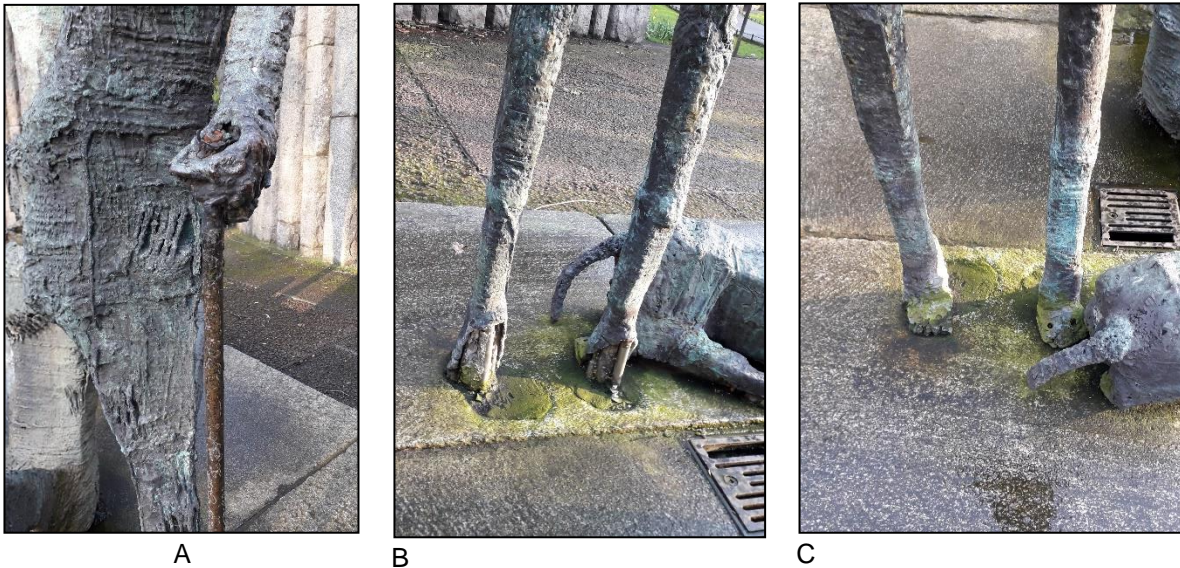


Figure A1.11: Detail of the Hungry Heart Famine Memorial elements. (A: missing cane head. B: Exposed dowels in feet. C. exposed dowel heads in feet, and pitting on dog).

A.2.5 The Three Fates

As previously mentioned a fourth sculpture the “Three Fates” Fountain, by German artist Josef Wackerle, donated to Ireland by the German Federal Republic in 1956, in thanks for the generosity shown to German people after World War II (Casey 2005, 533).

From 1946-9 ‘Save the German Children Society’ via the Irish Red Cross, brought nearly 500 German children to Ireland to help them recover from the trauma of the war. The sculpture comprises three bronze figures in a fountain and is based on Norse mythology representing Urd (past) Verdandi (present) and Skuld (future). The three fates are cast by the sculptor ‘spinning and measuring the thread of man’s destiny’. The attached plaque states ‘This fountain, designed by the sculptor Josef Wackerle, is the gift of the people of the German Federal Republic to mark their gratitude for Ireland’s help after the war of 1939-45. The bronze group portrays the three legendary fates spinning and measuring the thread of man’s destiny’ (<https://meetingwater.wordpress.com/erik-hollabaugh/fountain-of-the-three-fates/>)

A.3 Protected Structures and associated features on St Stephen's Green East

This street located on the east side of St Stephen's Green Park, was first laid out in 1664 as both a perimeter walk for the park and as lots for residential development (Lennon 2008, 19). The street is defined in the north by the junction of St Stephen's Green North/Merrion Row and in the south by the intersection of St Stephen's Green South/Leeson Street/Earlsfort Terrace. It was first illustrated as an unnamed street on De Gomme's map of 1673 with approximately three houses fronting onto its eastern side. Development of its street frontage appears to have been completed by the time of its recording by Thomas Dineley in 1681 (McCabe 2011, 64-65). On Brooking's Map of 1728 the street is unnamed, and a large plot on the southwest corner appears undeveloped or in use as a green. The street is first named as 'Monk's Walk' on Rocque's map of 1756 (Figure A1.12).

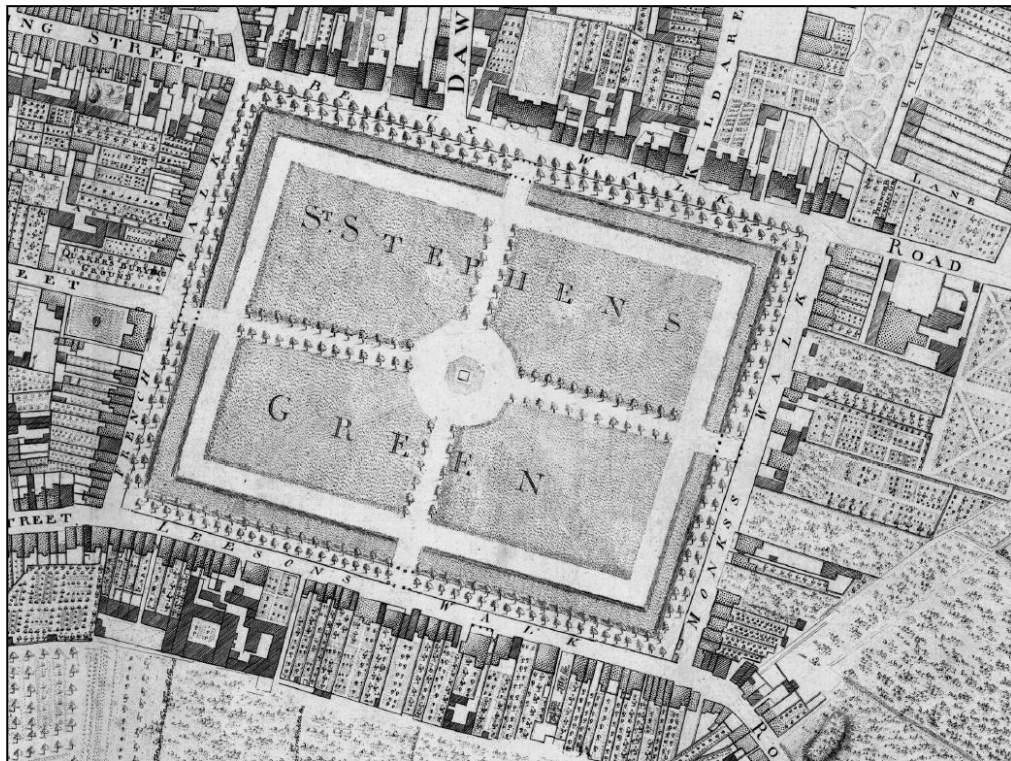


Figure A1.12: Extract from Rocque's 'Exact Survey of the City and Suburbs of Dublin', 1756. Note irregular development of property plots on Monk's Walk (St Stephen's Green East; copyright IHTA).

The street is first named as St Stephen's Green East on the 1st edition 6" Ordnance Survey (OS) map (1843). It is depicted in great detail on the 1st edition OS 5':1 mile map (1847; Figure A1.13). In 1775 the streets surrounding the park were described as being 'so extremely irregular, that there are scarcely two of the same height, breath, materials or architecture' (Casey 2005, 531) however, on this map the street frontage is shown as having undergone extensive redevelopment with a well aligned property frontage illustrated. All properties are shown with substantial light wells and access steps to front; many are depicted with elaborate gardens to rear.

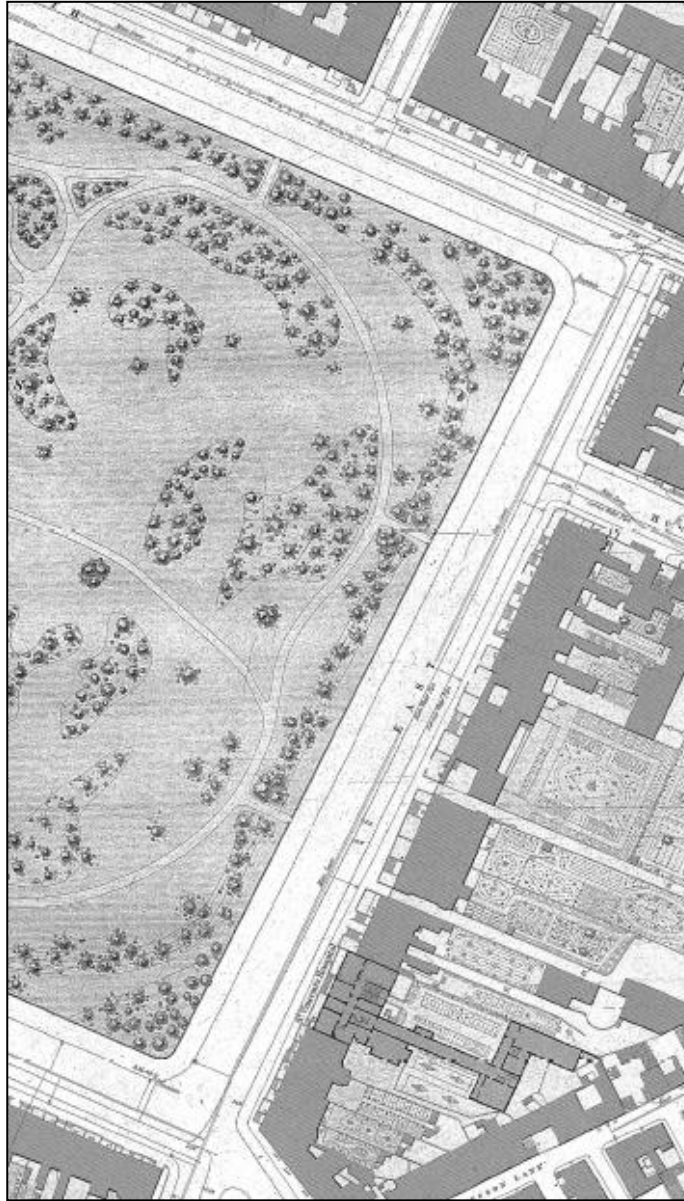


Figure A1.13: Extracts from Sheet 27 1st edition OS 5':1 mile map (1847), showing St Stephen's Green East

The street, which is part of a Conservation Area is currently defined by 22 properties (No's 39-60) of which twelve (Nos 39-43 and 50-56) are Protected Structures (RPSs 7780-7789). St Stephen's Green East is also a Conservation Area (refer to Table A1).

Table A1: Properties lining St Stephen's Green East

No	Street	Name	Date of Current Building	Date of 1st Building if different	RPS No.
39	St Stephen's Green East	Bank of Ireland	1913	NA	7780
40	St Stephen's Green East	Bank of Ireland	1913	NA	7780
41	St Stephen's Green East	Residence	1745-1746	NA	7781
42	St Stephen's Green East	Boston College	1745-1746	pre 1756	7782
43	St Stephen's Green East	Boston College	1745-1746	pre 1756	7782
44	St Stephen's Green East	Ivor FitzPatrick	1969	pre 1756	N/A
45	St Stephen's Green East	Ivor FitzPatrick	1969	pre 1756	N/A
46	St Stephen's Green East	Housing Finance Authority	1969	18th century	N/A
47	St Stephen's Green East	IPUT Headquarters	1969	pre 1756	N/A
48	St Stephen's Green East	IPUT Headquarters	1969	pre 1756	N/A
49	St Stephen's Green East	IPUT Headquarters	1969	N/A	N/A
50	St Stephen's Green East	Office of Public Works	1771-1772	pre-1756	7783
51	St Stephen's Green East	Office of Public Works	1760	pre-1673	7784
52	St Stephen's Green East	Office of Public Works	1771-1772	N/A	7785
53	St Stephen's Green East	Loreto College	1771-1772	N/A	7786
54	St Stephen's Green East	Loreto College	Modified 1970s	pre 1756	7787
55	St Stephen's Green East	Loreto College	Modified 1970s	pre 1756	7788
56	St Stephen's Green East	PTSB	1760 with 1975-8 modifications	pre 1756	7789
57	St Stephen's Green East	PTSB	1975-1978	1760/pre 1756	N/A
58	St Stephen's Green East	PTSB	1975-1978	1760/pre 1756	N/A
59	St Stephen's Green East	PTSB	1975-1978	1760/pre 1756	N/A
60	St Stephen's Green East	—	1980	1760/pre 1756	N/A

Eight mid-18th century houses survive on St Stephen's Green East (Nos 41, 42, 43, 50, 51, 52, 53 and 56) the remainder date to the late 18th/early 19th and 20th century (Casey 2005, 541-544). Those of the late 18th/early 19th century are typical Georgian style, comprising 3-5 storey over basement structures, with open basement area and coal cellars (beneath footpath) to fore (Figure A1.14). The front door of each building has a series of elevated granite steps providing access over the basement area, others also have steps to the basement area itself, providing a separate means of access for servants and delivery men to the basement and coal cellars (where present). A number of buildings have, or originally had, side laneways providing access to the rear of the buildings; for terraced buildings, rear access was typically provided by means of a stable lane.

Examination of the available cartographic sources indicates that some of the properties plots may have experienced two to three distinct phases of complete rebuilding, while others were often heavily altered during the 20th century.

Nos 39-40: on Rocque's map of 1756 a single building is depicted on these two plots with a centrally positioned door, though the rear garden appears to have comprised two distinct plots. The 1st edition OS map of 1847 indicates that this earlier building was replaced by two typically Georgian buildings, each with a separate entrance to south. These buildings were demolished and rebuilt from 1912-1913 as the Bank of Ireland. A decorative coal hole cover, is present on the uppermost entrance step into the building (Figure A1.15); the cellar beneath is concrete (ORS Survey 2019, 191_182-ORS-XX-XX-RP-B-13b-B10).

No 41: Constructed 1745 for Mrs Ruth Croker, it maintains original ceilings and staircase (Casey 2005, 540-1), the building was heavily renovated and extended throughout the 20th century (ORS Survey 2019, 191_182-ORS-XX-XX-RP-B-13b-B9).

No 42-43: Originally two separate buildings constructed 1754 by Benjamin Rudd, some original panelling survives but the buildings were heavily remodelled in the 20th century by David Crowley Architects (Casey 2005, 251). Now functioning as Boston College. There is a late 19th and mid-late 20th century extension to rear.

Nos 44-45: Two properties were illustrated on Rocque's map of 1756, the facades of which protruded out from the main building line. The subsequent buildings on the 1st edition OS map of 1847, maintain a constant building line, suggesting the properties were rebuilt in the late 18th century, with No 45 having a porch extension to south. It is probable that these were rebuilt c.1768 when the adjacent Hume Street was laid out. These buildings were demolished and rebuilt as modern offices in 1969 (Casey 2005, 541).

Nos 46-49: No 47 and 48 were illustrated on Rocque's map of 1756, with Nos 46 and 49 shown as vacant plots with irregular frontage. All four buildings, which Casey (2005, 541) states were of 1760 date, are shown as regular fronted properties on the 1st edition OS map of 1847. These, along with Nos 44-45 were demolished in 1969.

Nos 50-52: Nos 50 was illustrated on Rocque's map of 1756 and, was rebuilt in 1771 by Gustavus Hume, who also built No 52. No 51, was originally illustrated on de Gomme's map of 1673 and rebuilt by the owners grandson George Paul Monck c.1760. In 1848 it functioned as the Museum of Geology, with tiles of polished Irish stone from this date still on display in the entrance hallway. Original decorative wall and ceiling plasterwork survives in both Nos 50 and 51. No. 52 retains much of its extravagant decorative features including Rocco cornices while the *piano noble* was decorated by Flemish artist *Pieter de Gree* c.1785-1789. This property has substantially been extended to rear, and the original laneway to north has been built over to link with No 51. Of significance is that No 52 also houses three early medieval cross slabs (RMPs DU018-238---- — DU018-240----)

Nos 53 – 55: Now functioning as Loreto College, No 53 was constructed in 1771. Nos 54-55 were illustrated on Rocque's map of 1756, with a starkly similar building plan shown on the 1st edition OS map of 1847, suggesting the properties were maintained throughout the 18th and 19th centuries. The buildings contain Rocco plasterwork and joinery of c. 1770 date, but have been much altered and extended to accommodate their use as a school.

No 56-60: No 56 was constructed c.1760, replacing a smaller two-bay structure which, along with Nos 57-60 were illustrated on Rocque's map of 1756. The buildings were used as St Vincent's Hospital from the 1830's. The exterior of these buildings was substantially redeveloped from 1975-78, with the properties now functioning as a bank. However much of the internal decoration of No 56 survives, including Late Baroque and Rococo decorative plasterwork (Casey 2005, 543-4). In 1980 No 60 was completely rebuilt, but one of the original ceilings was retained and reinstated.

No 61: demolished in 1799 by the Wide Street Commission to accommodate the widening of Leeson Street.

Nos 62-64: demolished in 1839 to accommodate the construction of Earlsfort Terrace (Casey 2003, 544; Figure A1.14).

A.3.1 Coal Cellars

It is likely that all of the original buildings on this street had associated coal cellars, for storing fuel. In the majority of cases, these are likely to have been located to the fore of each building beneath the current street pavement and may extend out beneath the present carriageway. Georgian coal cellars were typically filled from the footpath via a coal chute which was sealed with a coal hole cover. Typically, each two to three bay property had two coal cellars, with larger properties having up to five. Each coal cellar had an access door allowing movement between the cellar and the basement area.

In light of the multiple building phases represented on St Stephen's Green East, it is possible that multiple phases of coal cellar construction also took place, with each phase surviving to various degrees of preservation below the current street surface. Multiple phases of coal cellar construction was recorded on Dominick Street during recent Luas Cross City works, with the mid-18th century cellar located outside of the late 18th century cellar.

It is likely that the alignment of the main sewer functions as an indicator of the westward extent of the majority of the cellars, as the property owners would not have permitted its construction to impact or impede on the functioning of their coal cellars. Where an historic property has been demolished and replaced (e.g. 44-49, 56-60), new works are generally confined to the basement and basement area, thus the original coal cellars often continue to survive beneath the footpath (see Figure A1.14).

Only one property on St Stephen's Green East has a surviving coal hole cover (Nos 39-40). Unusually a MetroLink survey of No 43 St Stephen's Green East identified that the coal cellar was located to the rear of the building, which along with its coal chute survives in fair condition. It is probable that a similar arrangement existed for No 42 as both properties were built by the same developer (ORS Survey 2019, 191_182-ORS-XX-XX-RP-B-13b-B8). No 51 has an unusually large and low basement area to front, mimicking its 17th century predecessor. As there appears to be insufficient head height between the pavement level and floor of the basement area, it is possible that any original coal cellars may also have been to rear with easy access provided by the carriageway to south.

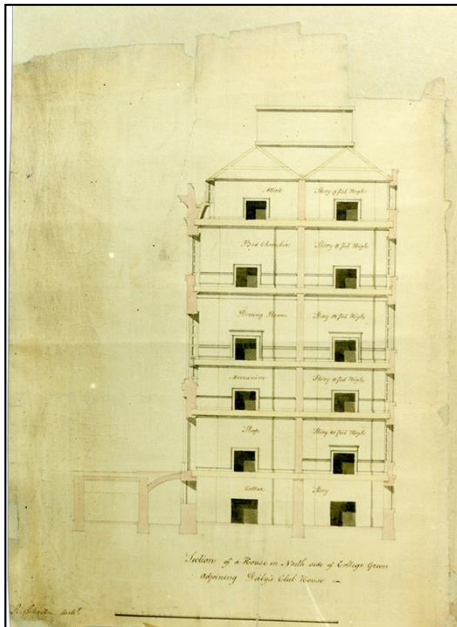


Figure A1.14: Left: Wide Street Commission map No 528, College Green, showing typical cross-section of a Georgian building with 'Basement' (beneath building proper), 'Basement area' and coal cellars to fore (Copyright Dublin City Archives). Right: the demolition of Nos 62-64 in 1839 – note coal cellar doors visible beneath street level to fore of image (Copyright National Library of Ireland).

Historic Street Furniture and Paving

The paving of St Stephen's Green East comprises concrete slabs predominantly retained by historic granite kerbstones. To the fore of Nos 39-45 the footpath has been widened, with the alignment of the original granite kerbing retained in the centre of the path (Figure A1.15 [C]). A probable mason's mark is located to the fore of No 55, with a single coalhole cover present on the steps to Nos 39-40 (Figure A1.15 [A]). An historic post box is present on the street to the fore of No 50. A sculpture – Trace by Grace Weir (1988) – stood on the pavement at the streets northern end but was removed to storage by DCC in 2015.



Figure A1.15: Historic Street Furniture on St Stephen's Green East: Coal Hole Cover (Nos 39-40), original Granite kerblines retained towards path centre (Nos 39-45) and probable Mason's Mark (No. 55)

References

Casey, C. (2005) Dublin, Yale University Press, London.

Dúchas, St Stephen's Green: a historical review. Dublin: Dúchas – The Heritage Service.

Heffernan, D. (1861) Handbook of Dublin: containing all the information required by tourists, with a new plan of the city and numerous engravings. Dublin: M'Glashan and Gill.

McCabe, D. (2011) St Stephen's Green Dublin 1660-1875. Dublin: Stationery Office.

Lennon, C. (2008) Dublin Part II, 1610 to 1756, Irish Historic Towns Atlas No. 19. Dublin: Royal Irish Academy.

Lotts (2009) Historic Landscape Assessment of St Stephen's Green Park. Dublin: Lotts for the Railway Procurement Agency.

Office of Public Works (2015) St Stephen's Green Park, Draft Conservation Management Plan 2015-2020. Dublin: Office of Public Works

Websites

<https://www.irishtimes.com/opinion/february-8th-1971-1.459563>

<https://www.irishtimes.com/culture/modern-ireland-in-100-artworks-1964-wolfe-tone-by-edward-delaney-1.2393337>

<https://www.theguardian.com/artanddesign/2009/oct/19/edward-delaney-obituary>

<https://meetingwater.wordpress.com/erik-hollabaugh/fountain-of-the-three-fates/>

<https://www.irishphotoarchive.ie/index/G0000mYA8dm73p44/thumbs>

Appendix B. Stage 3 Preliminary Analysis Summary Table

Assessment Criteria	Assessment Sub-Criteria	LOCATION 1	LOCATION 2	LOCATION 3	Notes
Project Objectives	Design to Integrate appropriately into the existing public realm.	<p>This station location requires the provision of surface elements of the project into the existing public realm which is within the curtilage of the National Monument.</p> <p>The construction of an intervention shaft structure between Location 1 and Tara St Station would result in an impact having regard to public realm integration.</p> <p>Overall the required station infrastructure and the intervention shaft would be difficult to integrate into the public realm impacting performance against this Project Objective.</p>	<p>This station location requires the provision of surface elements of the project into the existing public realm which is within the curtilage of the National Monument.</p> <p>The construction of an intervention shaft structure between Location 2 and Tara St Station would result in an impact having regard to public realm integration.</p> <p>Overall the required station infrastructure and the intervention shaft would be difficult to integrate into the public realm impacting performance against this Project Objective.</p>	<p>This station location requires the provision of surface elements of the project into the existing public realm which is within the curtilage of St Stephens Green Park.</p> <p>The construction of an intervention shaft structure between Location 3 and Tara St Station would result in an impact having regard to public realm integration.</p> <p>Overall the required station infrastructure and the intervention shaft would be difficult to integrate into the public realm impacting performance against this Project Objective.</p>	The Station location options are assessed against the Project Objectives here.
	<i>Rank</i>				
	Planned, constructed and operated in a sustainable manner.	<p>Construction phase impacts of Location 1 would result in poor performance against this Project Objective. These are detailed further in the Environmental criteria assessment below.</p> <p>The project provides a sustainable transport option to St Stephen's Green station which will have positive impacts and is aligned with this Project Objective.</p> <p>Overall Location 1 has Poor performance against this Project Objective.</p>	<p>Construction phase impacts of Location 2 would result in poor performance against this Project Objective. These are detailed further in the Environmental criteria assessment below.</p> <p>The project provides a sustainable transport option to St Stephen's Green station which will have positive impacts and is aligned with this Project Objective.</p> <p>Overall Location 2 has a Poor performance against this Project Objective.</p>	<p>Construction phase impacts of Location 3 would result in poor performance against this Project Objective. These are detailed further in the Environmental criteria assessment below. Impacts from station location being entirely within St Stephen's Green Park.</p> <p>The project provides a sustainable transport option to St Stephen's Green station which will have positive impacts and is aligned with this Project Objective.</p> <p>Overall Location 3 has a Poor performance against this Project Objective.</p>	
<i>Rank</i>					
Economy	Capital Cost	<p>Constructing the station at this location would increase the construction cost of a typical station box by approximately 10%.</p> <p>The additional costs arise from staged and constrained construction in the road carriageway, associated traffic management and significant utility diversions.</p> <p>The need to construct an additional Intervention Shaft, would increase the overall cost by approximately 25%.</p>	<p>The station is located at the edge of the road carriageway and as a result has a more limited impact on utility diversions with less traffic management and less potential mitigation requirements. Based on this, construction of the station at this location would increase the construction cost of a typical station box by approximately 7%.</p> <p>The need to construct an additional Intervention Shaft, would increase the overall cost by approximately 25%.</p>	<p>Constructing the station within the St Stephens Green is the most cost effective of options 1-3, as construction can be completed more quickly and there are no requirements for utility diversions or significant traffic management.</p> <p>The need to construct an additional Intervention Shaft, would increase the overall cost by approximately 25%.</p>	This criterion considers the cost of each of the proposed station options.
	<i>Rank</i>				
Environmental		<p>This option has an overall poor performance against the environmental objective.</p> <p>This location requires the closure of St Stephen's Green East road during the construction phase, including its junction with Hume Street. This would disrupt existing</p>	<p>This option has an overall poor performance against the environmental objective.</p> <p>This location requires the partial closure of St Stephen's Green East during construction. Three lanes can be kept open to traffic which are adequate to maintain flows</p>	<p>This option has an overall poor performance against the environmental objective.</p>	<p>Minimise the potential for adverse impact on the natural and built environment and the community. Selected key constraints identified.</p>

Assessment Criteria	Assessment Criteria	Sub-	LOCATION 1	LOCATION 2	LOCATION 3	Notes
			<p>traffic movements from St Stephen's Green East to Kildare Street and Merrion Row. This includes bus routes, and HGV access.</p> <p>The 1800mm Victorian sewer situated below St Stephen's Green East would need to be diverted under the eastern footpath during construction. This would be technically difficult and may directly impact protected cellars situated below St Stephen's Green East and the footpath.</p> <p>While this option is primarily within the road corridor the station box and construction zone would have a direct significant impact on St Stephen's Green Park which is a National Monument and (RMP DU018-020334-). There would be a direct impact on eastern perimeter fence railings and plinth wall (RPS 7751) and bollards and lampposts (RPS 7752). Subsurface archaeology would potentially be impacted.</p> <p>Street trees on St Stephen's Green East would need to be removed.as would a number of mature trees within St Stephen's Green Park.</p> <p>This location requires an intervention shaft between St Stephen's Green and Tara Station resulting in very significant impacts on potential sites at Trinity College or Merrion Square.</p>	<p>resulting in moderate impacts on existing bus and the HGV routes with some delays but no diversions.</p> <p>The 1800mm Victorian sewer below St Stephen's Green East would not require diversion.</p> <p>While this option is primarily within the road corridor the station box and construction zone would have a direct very significant impact on St Stephen's Green Park which is a National Monument and (RMP DU018-020334-). There would be a direct impact on eastern perimeter fence railings and plinth wall (RPSs 7751) and bollards and lampposts (RPSs 7752). Subsurface archaeology would potentially be impacted.</p> <p>Street trees on St Stephen's Green East would need to be removed as would a number of mature trees within St Stephen's Green Park</p> <p>This location requires an intervention shaft between St Stephen's Green and Tara Station resulting in very significant impacts on potential at Trinity College or Merrion Square. The intervention shaft requirement is the primary reason for this location's poor environmental performance.</p>	<p>Traffic and transport impacts are not significant as the station box and construction areas do not directly impact St Stephen's Green East.</p> <p>This location would have a direct very significant impact on St Stephen's Green Park which is a National Monument and (RMP DU018-020334-). There would be a direct impact on eastern park railings and plinth wall (RPSs 7751). Subsurface archaeology would potentially be impacted. The position of the station box is entirely within the park and requires a large amount of tree removal. Street trees are outside the indicative construction area so may be able to be retained.</p> <p>This location requires an intervention shaft between St Stephen's Green and Tara Station resulting in very significant impacts on potential at Trinity College or Merrion Square.</p>	
		Rank				
Engineering	Constructability		<p>This option has an overall poor performance against the constructability objective.</p> <p>The characteristics of the sewer make a diversion to allow the construction of the station box technically challenging. It is a an old, relatively large (1800mm) egg-shaped sewer constructed of brick buried 3.5m below St Stephen's Green East.</p> <p>The construction of an intervention shaft would be challenging given the potential site locations which have limited space and significant environmental constraints. This is due to potentially feasible locations for an intervention shaft being sensitive.</p>	<p>This option has an overall moderate performance against the constructability objective. While the 1800mm sewer is maintained other utilities require diversion.</p> <p>The construction of an intervention shaft would be challenging given the potential locations which have limited space and significant environmental constraints. This is due to potentially feasible locations for an intervention shaft being sensitive.</p>	<p>This option has overall moderate performance against the constructability objective.</p> <p>The station box would be constructed within St Stephen's Green Park. Construction phase constraints include undertaking the construction work in close proximity to park users and the requirement to minimise construction impacts on the park including on trees and other park features and subsurface archaeology.</p> <p>The construction of an intervention shaft would also be challenging given the potential locations which have limited space and significant environmental constraints. This is due to potentially feasible locations for an intervention shaft being sensitive.</p>	<p>This criterion considers if the station option can be constructed having regard to the identified constraints and opportunities within the study area</p>
		Rank				
Conclusion			<p>Due to a poor performance against all sub-criteria this option will not proceed to MCA stage.</p>	<p>Due to a poor performance against economic and environmental criteria this option will not proceed to MCA stage.</p>	<p>Due to poor performance in economic and environmental criteria this option will not proceed to MCA stage</p>	

Assessment Criteria	Assessment Sub-Criteria	Location 4	Location 5	Location 6	Location 7	Notes
Project Objectives	Design to Integrate appropriately into the existing public realm.	<p>Initial design considers station integration into the existing public realm which is within the curtilage of the National Monument. Design features that assist in achieving this include sensitive design of station "pop ups" and to ensure appropriate replacement of protected structures impacted during construction e.g. perimeter fence railings. This station location allows entrance/egress to form part of the plaza area at the North Eastern corner of St Stephen's Green Park improving integration.</p> <p>Overall ongoing impacts from station infrastructure would be challenging to integrate into the public realm impacting performance against this Project Objective.</p>	<p>Initial design considers station integration into the existing public realm which is within the curtilage of the National Monument. Design features that assist in achieving this include sensitive design of station "pop ups" and to ensure appropriate replacement of protected structures impacted during construction e.g. perimeter fence railings.</p> <p>This station location allows entrance/egress to form part of the plaza area at the North Eastern corner of St Stephen's Green Park improving integration.</p> <p>Overall ongoing impacts from station infrastructure would be challenging to integrate into the public realm impacting performance against this Project Objective.</p>	<p>Initial design considers station integration into the existing public realm which is within the curtilage of the National Monument. Design features that assist in achieving this include sensitive design of station "pop ups" and to ensure appropriate replacement of protected structures impacted during construction e.g. perimeter fence railings.</p> <p>Location 8 is entirely within St Stephen's Green Park so pop ups must also be placed within the park creating operation impacts.</p> <p>Overall ongoing impacts from station infrastructure would be challenging to integrate into the public realm impacting performance against this Project Objective.</p>	<p>Appropriate reinstatement of commercial buildings directly impacted on the eastern side of the street would be required. Protected structures impacted during construction would require reinstatement e.g. perimeter fence and access to the National Concert Hall.</p> <p>Overall impacts during construction e.g. direct impact on commercial property would be significant and public realm integration during operation phase difficult to achieve as a result. This triggers a poor performance against this Project Objective.</p>	These Project Objectives are those relevant to the St Stephen's Green Station assessment.
	Rank					
	Planned, constructed and operated in a sustainable manner.	<p>Construction phase impacts of Location 4 would result in poor performance against this Project Objective. These are detailed further in the Environmental criteria assessment below. This primarily relates to utility diversions and traffic impacts.</p> <p>The project provides a sustainable transport option to St Stephen's Green station which would have positive impacts and is aligned with this Project Objective.</p> <p>Overall Location 4 performs poorly against this Project Objective</p>	<p>Construction phase impacts of Location 5 would result in moderate performance against this Project Objective. These are detailed further in the Environmental criteria assessment below.</p> <p>The project provides a sustainable transport option to St Stephen's Green station which would have positive impacts and is aligned with this Project Objective.</p> <p>Overall Location 5 has a Moderate performance against this Project Objective.</p>	<p>Construction phase impacts of Location 6 would result in poor performance against this Project Objective. These are detailed further in the Environmental criteria assessment below. Impacts from station location being entirely within St Stephen's Green Park.</p>	<p>Construction phase impacts of Location 7 would result in poor performance against this Project Objective. These are detailed further in the Environmental criteria assessment below. Impacts relate to station location requiring significant utility diversions that would directly impact existing commercial property present on eastern side of Earlsfort Terrace.</p> <p>The project does provide a sustainable transport option to the area but the location is sub-optimum due to less trip attractors, potential for lower patronage and a sub optimum location for interchange.</p> <p>Overall Location 6 performs poorly against this Project Objective. Overall Location 6 performs poorly against this Project Objective.</p>	
	Rank					
Economy	Cost	Constructing the station at this location increases the construction cost of a typical station box by approximately 10%. The additional costs arise from staged and constrained construction in the carriageway, associated traffic management,	Constructing the station at this location increases the construction cost of a typical station box by approximately 7%. The station is located at the edge of the carriageway and so has more limited impact on utility diversions, less traffic	Constructing the station within the St Stephens Green is the most economical of all the options, as none of the previously stated additional construction impacts occur.	Constructing the station at this location increases the construction cost of a typical station box by approximately 10%. The additional costs arise from constrained construction in the	This criterion considers the cost of each of the proposed station options.

Assessment Criteria	Assessment Criteria	Sub-	Location 4	Location 5	Location 6	Location 7	Notes
			significant utility diversions work as well as a higher degree of mitigation during the works, due to the proximity of existing buildings.	management and less potential mitigation requirements.		carriageway, associated traffic management, significant utility diversions work as well as a significant of mitigation during and after works, due to the proximity of existing buildings and direct impacts and compensation required.	
	<i>Rank</i>						
Environmental			<p>This option has an overall poor performance against the environmental objective.</p> <p>This location requires the closure of St Stephen's Green East during the construction phase, including its junction with Hume Street. This would disrupt existing traffic movements from St Stephen's Green East to Kildare Street and Merrion Row. This includes bus routes, HGV access.</p> <p>The 1800mm sewer situated below St Stephen's Green East would need to be diverted into the eastern footpath during construction. A 1710mm sewer beneath Hume St that joins the St Stephen's Green East sewer would also require diversion. This would be technically difficult and may directly impact protected cellars situated below St Stephen's Green East and the footpath.</p> <p>While this option is primarily within the road corridor the station box and construction zone would have a direct very significant impact on St Stephen's Green Park which is a National Monument and (RMP DU018-020334-). There would be a direct impact on eastern perimeter fence railings and plinth wall (RPSs 7751) and bollards and lampposts (RPSs 7752). Subsurface archaeology potentially impacted, and tree removal would be necessary.</p> <p>There would be a direct impact on the steps in front of several protected structures on St Stephen's Green East which are:</p> <ul style="list-style-type: none"> • 42-43 St Stephen's Green East (RPSs 7782) • 50 St Stephen's Green East (RPSs 7783) 	<p>This option has an overall poor performance against the environmental objective.</p> <p>This location requires the partial closure of St Stephen's Green East during construction. Three lanes can be kept open to traffic which are adequate to maintain flows resulting in moderate impacts on existing bus and the HGV routes with some delays but no diversions.</p> <p>The Victorian sewer below St Stephen's Green East would not require diversion.</p> <p>While this option is primarily within the road corridor the station box and construction zone would have a direct significant impact on St Stephen's Green Park which is a National Monument and (RMP DU018-020334-). There would be a direct impact on eastern perimeter fence railings and plinth wall (RPSs 7751) and bollards and lampposts (RPSs 7752). Subsurface archaeology potentially impacted.</p> <p>Street trees on St Stephen's Green East would need to be removed as would a number of mature trees within St Stephen's Green Park.</p>	<p>This option has an overall poor performance against the environmental objective primarily relating to the significance on impacts on the St Stephen's Green Park.</p> <p>Traffic and transport impacts are not significant as the station box and construction areas do not directly impact St Stephen's Green East.</p> <p>This location would have a direct very significant impact on St Stephen's Green Park which is a National Monument and (RMP DU018-020334-). There would be a direct impact on St Stephen's Green East park railings and plinth wall (RPSs 7751)..Subsurface archaeology would be potentially impacted. The position of the station box is entirely within the park and therefore requires a large amount of tree removal.</p>	<p>This option has an overall poor performance against the environmental objective primarily relating to the significance on impacts on the Earlsfort Terrace during construction and buildings on both sides of the street.</p> <p>Traffic and Transport impacts of closing Earlsfort Terrace are not as significant as with St Stephen's Green East. However, Earlsfort Terrace would be closed to public transport and traffic movements for the duration of construction.</p> <p>While this option is primarily within the road corridor the station box and construction zone would have a direct significant impact on The National Concert Hall (RPS 2425). There would be a direct impact on perimeter fence railings which form part of the protected structure and bollards and lampposts (RPSs 7752). Potentially for subsurface archaeology to be impacted.</p> <p>Street trees and trees within the National Convert Hall ground would require removal.</p>	Minimise the potential for adverse impact on the natural and built environment and the community. Selected key constraints identified.
	<i>Rank</i>						

Assessment Criteria	Assessment Criteria	Sub-Criteria	Location 4	Location 5	Location 6	Location 7	Notes
Engineering	Constructability		<p>This option has an overall poor performance against the constructability objective.</p> <p>The characteristics of the sewer make a diversion to allow the construction of the station box technically challenging. It is an old, relatively large egg-shaped sewer constructed of brick buried 3.5m below St Stephen's Green East.</p> <p>Risk exists in relation to traffic management, public safety and management of monuments and other architectural features within the National Monument.</p>	<p>This option has an overall moderate performance against the constructability objective. While the 1800mm sewer is maintained other utilities require diversion</p> <p>Risk exists in relation to traffic management, public safety and management of monuments and other architectural features located within the National Monument. Mitigation risks exist in terms of suitable reinstatement of St Stephen's Green Park.</p>	<p>This option has an overall moderate performance against the constructability objective.</p> <p>The scale of the construction required to build the station box is technically challenging within St Stephen's Green Park, which is designated as a National Monument.</p> <p>However, there is no requirement for the diversion of a significant sewer and traffic management requirements are minimised.</p>	<p>This option has an overall poor performance against the constructability objective.</p> <p>The characteristics of the Victorian sewer beneath Earlsfort Terrace make a diversion to allow the construction of the station box technically challenging. It is an old, relatively large ovoid sewer constructed of brick buried more than 3m below the road surface. There is limited space to divert the sewer east around the station box without a direct impact on commercial buildings.</p> <p>The width of Earlsfort Terrace means the National Concert Hall steps would also be directly impacted and require reconstruction. This would be technically challenging to undertake and maintain integrity of the National Concert Hall façade.</p>	This criterion considers if the station option can be constructed having regard to the identified constraints and opportunities within the study area.
		<i>Rank</i>					
Conclusion			Due poor performance against environmental and constructability sub-criteria this option will not proceed to MCA stage.	Due to a moderate performance against all sub-criteria with the exception of Environment, this option will be taken forward and subjected to an MCA.	Due to moderate performance against the engineering criteria and the good performance against the economy criteria this option will be taken forward and subjected to an MCA.	Due to a poor performance against all criteria this option will not proceed to MCA stage.	

Colour	Description
	Overall good performance against the criteria
	Overall moderate performance against the criteria
	Overall poor performance against the criteria

Appendix C. Stage 4 Appraisal Summary Table

Assessment Criteria	Assessment Sub-Criteria	LOCATION 5	LOCATION 6	Notes
Economy	Cost	Construction of the station at this location increases the construction cost of a typical station box by approximately 7%. The station is located at the edge of the carriageway and so has more limited impact on utility diversions, less traffic management and less potential mitigation requirements.	Constructing the station within the St Stephens Green is the most economical of all the options, as none of the previously stated additional construction impacts occur.	This criterion considers the cost of each of the proposed station options.
	Rank			
Environmental	Air Quality and climate	<p>Potential for impacts on sensitive receptors during the construction phase due to emissions. Emissions of relevance during this phase include NOx and Particulate Matter (PM10). Receptors within 100m of the indicative construction zone include commercial premises, a college and a secondary school on the eastern side of St Stephen's Green East. A hotel is situated on the northern side St Stephen's Green North. A medical clinic and art gallery are also within 100m of the indicative construction zone.</p> <p>During construction the park next to the indicative construction zone will continue to function as a public park and resulting in potential air quality impacts on park users.</p> <p>Climate related impacts are potentially GHG emissions from construction traffic and embodied energy from construction materials.</p> <p>Positive impact on air quality and climate during the operational phase of the project due to modal shift from private vehicles to the MetroLink and the resultant reduction in emissions.</p>	<p>Potential for impacts on sensitive receptors during the construction phase due to emissions. Emissions of relevance during this phase include NOx and Particulate Matter (PM10). Receptors within 100m of the indicative construction zone include commercial premises, a college and a secondary school on the eastern side of St Stephen's Green East. A hotel is situated on the northern side St Stephen's Green North. A medical clinic and art gallery are also within 100m of the indicative construction zone.</p> <p>During construction the park next to the indicative construction zone will continue to function as a public park and resulting in potential air quality impacts on park users. Location 6 is entirely within the park and has more potential impacts on park users but is also further away from receptors on St Stephen's Green East.</p> <p>Climate related impacts are potentially GHG emissions from construction traffic and embodied energy from construction materials.</p> <p>Positive impact on air quality and climate during the operational phase of the project due to modal shift from private vehicles to the MetroLink and the resultant reduction in emissions.</p>	Minimise the potential for adverse impact on the natural and built environment and the community. Selected key constraints identified.
	Rank			
	Noise and Vibration	<p>Potential for noise impacts during construction due to close proximity of sensitive receptors including schools, hotels, office space and recreational/greenspace (including a children's playground).</p> <p>Potential for vibration impacts during construction due to the advancement of the TBM and station box works near sensitive receptors.</p> <p>Potential for operational impacts from train movements on buildings north of station.</p>	<p>Potential for noise impacts during construction due to close proximity of commercial properties and users of St Stephens Green. This option is further away from receptors on St Stephens Green but closer to park users including children's playground.</p> <p>Potential for vibration impacts during construction due to the advancement of the TBM and station box works near sensitive receptors.</p> <p>Potential for operational impacts from train movements on buildings north of station location including a hotel for this option.</p>	
	Rank			
	Biodiversity	<p>In the context of the surrounding environment, the impacted area is of local ecological importance (higher value).</p> <p>Potential impacts on the Common pipistrelle and Leisler's bat recorded along this tree line.</p> <p>One red-listed (Herring Gull) and four amber-listed (i.e. robin, mistle thrush, starling and swift) bird species recorded during breeding bird surveys.</p> <p>In absence of mitigation, residual significant impact of a local importance (higher value) due to a direct loss of habitat; and, indirect impact on bats and birds (due to increases in light, noise and human disturbance).</p>	<p>In the context of the surrounding environment, the impacted area is of local ecological importance (higher value).</p> <p>Impacts on Common pipistrelle and Leisler's bat recorded along this treeline. As described in visual impacts above direct impact on mature trees in an area of scattered trees and parkland and ornamental/non-native shrub.</p> <p>One red-listed (Herring Gull) and four amber-listed (i.e. robin, mistle thrush, starling and swift) bird species recorded during breeding bird surveys.</p> <p>In absence of mitigation, residual impact of local importance (higher value) due to a direct loss of habitat; an indirect impact on habitats because of habitat degradation/reduction in air</p>	

Assessment Criteria	Assessment Sub-Criteria	LOCATION 5	LOCATION 6	Notes
			quality; and, indirect impact on bats and birds (due to increases in light, noise and human disturbance). The station position entirely within the park exacerbates significance of impacts on St Stephen's Green Park and biodiversity.	
	Rank			
	Non-Agricultural Buildings	100m buffer from construction area has identified potential impacts on sensitive receptors including an art gallery, a college, a secondary school, and a medical clinic. Potential construction impacts include noise, vibration and air quality.	100m buffer from construction area has identified potential impacts on sensitive receptors including an art gallery, a college, a secondary school, and a medical clinic. Potential construction impacts include noise, vibration and air quality. This location is further west than Locations 4 and 5 allowing better performance against this criterion.	
	Rank			
	Cultural Heritage: Architectural Heritage	Direct impact on St Stephens Green Park which is a National Monument, an RMP and an RPS (RMP DU018:020334: RPS 7751-7761). Direct impact on railings and plinth (RPSs 7751) and bollards and lampposts (RPSs 7752). Potential direct impact on the Wolfe Tone statue, and the Hungry Heart Famine memorial during construction as these structures fall within the indicative construction area. Potential for a direct long-term visual impact on St Stephens Green East due to the felling of trees and the removal of vegetation and a direct permanent moderate visual impact on the street at operation phase due to location of station infrastructure including lifts, skylights and ventilation.	Direct impact on St Stephens Green Park which is a National Monument, an RMP and an RPS (RMP DU018:020334: RPS 7751-7761). Direct impact on railings and plinth (RPSs 7751) and bollards and lampposts (RPSs 7752). Potential direct impact on the Wolfe Tone statue, and the Hungry Heart Famine memorial during construction as these structures fall within the indicative construction area. For this location the northern extent of the station box is in very close proximity to the Hungry Heart memorial increasing impacts. Potential for a direct long term visual impact on St Stephens Green East due to the felling of trees and removal of vegetation and a direct permanent moderate visual impact on the street at operation phase due to location of station infrastructure including lifts, skylights and ventilation.	
	Rank			
	Cultural Heritage: Archaeology	Potentially significant impacts on unrecorded sub-surface archaeology area within park including a 17th Century perimeter wall and ditch for the length of the station box and indicative construction area. Potential impacts on subsurface remains of historic tramline on St Stephen's Green East.	Potentially very significant impacts on unrecorded sub-surface archaeology area within park including a 17th Century perimeter wall and ditch for the length of the station box and indicative construction area.	
	Rank			
	Landscape and Visual	Very significant direct on/loss of vegetation of eastern side of St Stephen's Green Park. 75 trees are within the construction zone including 55 that are mature. Of these 4 are A2, 1 is A3 and 33 are B2 trees. Of these one is a London Plane, one is a "dominant" Wych Elm. 15 are Holly which are not notable individual specimens but when grouped together provide a screening function on the eastern park boundary. Operational phase impacts while trees planted grow and re-establish. Operational visual impacts from station related infrastructure (lifts, escalators and ventilation) within St Stephen's Green Park and footpath of St Stephen's Green East which is within the National Monument boundary.	Very significant direct impact on/loss of vegetation of eastern side of St Stephen's Green Park. 98 trees are within the construction zone including 70 that are mature. Of these 16 are A2, 1 is A3 and 35 are B2 trees. Of these four are London Plane, one is a "dominant" Wych Elm. 13 are Holly which are not notable individual specimens but when grouped together provide a screening function. The significance of impacts are exacerbated by the station position entirely within St Stephen's Green Park and the no. of mature tree removal necessary. Operational phase impacts while trees planted re-establish. Operational visual impacts from station related infrastructure (lifts, escalators and ventilation) within St Stephen's Green Park. As this option is located completely within the park boundary the pop ups in St Stephen's Green park.	
	Rank			

Assessment Criteria	Assessment Sub-Criteria	LOCATION 5	LOCATION 6	Notes
	Traffic and transportation	<p>The following potential impacts were identified during the construction period:</p> <ul style="list-style-type: none"> Closure of the footpath on the western side of St Stephen's Green East would interfere on north and southbound movements of 361 pedestrians in the AM Peak hour; Reduced east and westbound pedestrian permeability through the St Stephen's Green Park; 292 cyclists (AM Peak hour) would be affected by the capacity reduction on St Stephen's Green East; Existing dedicated cycle lanes are potentially compromised by width reduction. Alternative routes to northbound cyclist movements (279 cyclists in the AM Peak) would be necessary; Removal of existing Dublin Bike station at St Stephen's Green East; Slight impact on existing bus routes. No bus stops need to be re-located or removed; Removal of on street parking on St Stephen's Green East, between R110 St Stephen's Green and Merrion Row; Slight impact on wider traffic due to the reduction of one northbound lane, however, the remaining lanes have the capacity to absorb the traffic. 	<p>The following potential impacts were identified during the construction period:</p> <ul style="list-style-type: none"> Pedestrian movements to and from St Stephen Green Park would be affected by the closure of two existing pedestrian access points on St Stephen's Green East. 	
	Rank			
	Utilities	Water mains, Telecoms, Gas and HV ESB impacted by station box location. No sewer diversion required on St Stephen's Green East or Hume St due to more western location compared to option 6	Minimal impact on utilities as box located inside park.	
	Rank			
	Population and Human Health	<p>This option maintains a balance between impacts to commuter flows and traffic around the green and access for pedestrians through the North-Eastern entrance (though reduced) during the construction phase. However, its proximity to Merrion Row's restaurants, cafes, hotel, shops and bars would significantly impact on their operation during the construction phase but would greatly benefit them post-construction.</p>	<p>Decreased or eliminated access to the north east entrance during the construction phase which serves as a meeting point and events venue at present, will impact park amenity and tourism in the area.</p> <p>This option heavily impacts upon the amenity and accessibility of the park. However, in doing so it minimises disruption to commuting, traffic and access to businesses and institutions along St Stephen's Green East. It eliminates access via the North-Eastern park entrance, which is critical to the flow of people during the day (business viability). Furthermore, due to its placement requiring a route realignment, it is will have impacts both north and south of St Stephen's Green.</p>	
Rank				