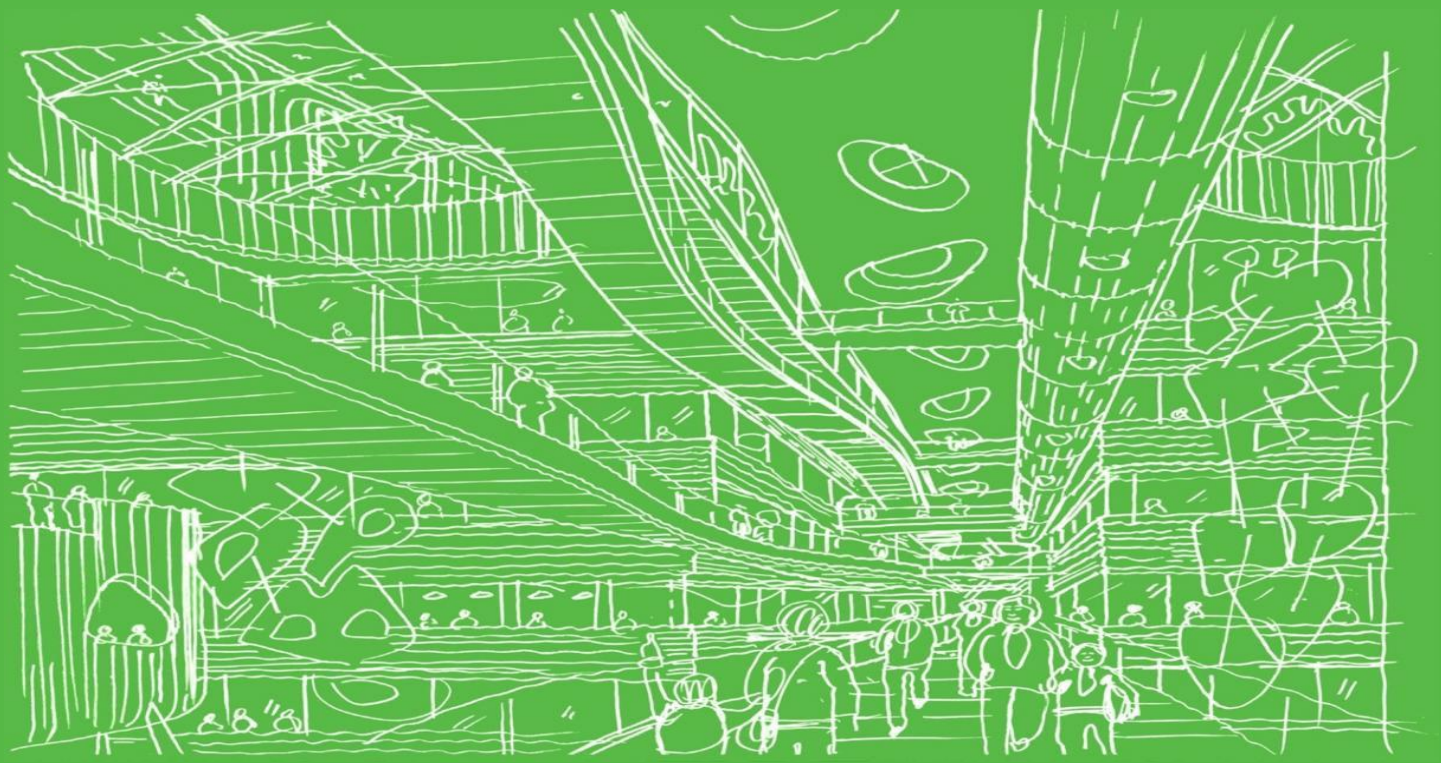
National Paediatric Hospital Project

Environmental Impact Statement
Non - Technical Summary



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Non – Technical Summary

1.0 Introduction

This document provides a summary of this Environmental Impact Statement (EIS) in non-technical language as is required by Directive 2011/92/EU, the Planning and Development Act, 2000 (as amended) and the Planning and Development Regulations, 2001 (as amended). The purpose of a Non-Technical Summary is to ensure that the public are made aware of the environmental implications of any decisions about whether to allow new developments to take place.

This Non-Technical Summary is laid out in a similar, but condensed, format to the main EIS, describing the project, existing environment, predicted and potential impacts and mitigation measures. The assessments that have informed this Non-Technical Summary have been conducted in a collaborative, integrated and analytical manner. This document should be read in conjunction with the main EIS.

1.1 Context of the EIS

This EIS has been prepared to accompany the planning application for the National Paediatric Hospital Project, see Section 4 below for a description of the development. Given the nature and scale of the proposed development it was considered prudent from the outset to prepare an EIS for lodgement with the application.

In a letter dated 10th July 2015 An Bord Pleanála advised that the proposal would if carried out fall within the scope of Paragraph (a) of Section 37A(2) of the Act (as amended) and therefore, constitutes strategic infrastructure development. The inclusion of an EIS is thus not only prudent but is also required in accordance with the provisions of Section 37E(1) as follows:

> *"An application for permission for development in respect of which a notice has been served under Section 37B(4)(a) shall be made to the Board and* ***shall be accompanied by an environmental impact statement*** *in respect of the proposed development."* (Emphasis added)

1.2 The Assessment Process

The EIS process seeks to identify the likely significant impacts on the environment associated with the proposed development, and to determine how to eliminate or minimise these impacts, where appropriate. This EIS summarises the environmental information collected as part of the assessment of the proposed development.

The interrelated steps which characterise the early stages of the assessment process are as follows:

- Screening
- Scoping
- Assessment of Alternatives
- Assessment and Evaluation

1.2.1 Screening

This initial stage involves the determination of whether or not an EIS will need to be prepared. The requirement for an EIS is outlined above.

1.2.2 Scoping

This stage identifies the extent of the proposed development which will be assessed as part of the Environmental Impact Assessment process and the issues and emphasis that are likely to be important during the assessment, eliminating those that are not. The scoping of this EIS also had regard to the following:

- Environmental Impact Assessment guidelines published by the Environmental Protection Agency.
- Guidance provided by An Bord Pleanála as part of pre-application consultations.
- The policy requirements of the relevant statutory plans for the three Local Authorities.
- The existing environment, including any vulnerable or sensitive features.
- The likely and significant impacts of the proposal on the environment.
- Available methods of reducing or eliminating undesirable impacts.

Following the detailed consideration of the scope and having regard to the Environmental Protection Agency guidance, this EIS considers the following topics:

- Human Beings
- Flora and Fauna
- Soil and Geology
- Hydrogeology and Hydrology
- Noise and Vibration
- Air Quality and Climate
- Micro Climate
- Landscape and Visual Impact Assessment
- Waste Management
- Traffic and Transport
- Archeological Heritage
- Architectural and Cultural Heritage
- Material Assets - Site Services
- Interactions and Potential Cumulative Impacts

The above covers the aspects of the environment which are most likely to be affected by the construction and operation of the National Pediatric Hospital Project and therefore, constitute the technical scope of this EIS.

Given the nature of the development, the geographical coverage of this EIS was considered at length and discussed with An Bord Pleanála as part of pre-application consultations. The following factors were taken into account: the physical extent of the proposed works, the areas over which any potential impacts are likely to be disseminated and the baseline environment at all locations. The potential impacts and the significance of the impacts will vary spatially.

1.2.3 Assessment of Alternatives

This stage outlines the possible alternative locations, designs and processes considered. The Environmental Protection Agency Guidelines state that the presentation and consideration of the various alternatives investigated by the applicant is an important requirement of the Environmental Impact Assessment process and require that an outline of the **main alternatives examined throughout the design and consultation processes** is described[1]. The alternatives considered are set out in Chapter 4 of this EIS.

1.2.4 Assessment and Evaluation

This stage involves the baseline assessment of the existing environment to determine its status, undertake evaluation of same, identify impacts and determine appropriate mitigation measure where necessary. Chapters 6 to 18 of this EIS contain this detail.

1.3 Approach to the EIS

Each of the elements of the National Paediatric Hospital Project operates in conjunction with each other, forming one integrated project and as such all elements are included and have been assessed as part of this EIS. For ease of reference this EIS is presented under the headings of St. James's Hospital, which includes the new children's hospital, the Family Accommodation Unit, the Children's Research and Innovation Centre and the construction compound at Davitt Road, Tallaght Hospital and Connolly Hospital being the three development locations covered by the Project and are situated in three separate Local Authority administrative areas. A full assessment of the development(s) proposed on these sites is provided under the relevant heading ensuring that the information relating to each site is readily identifiable.

This EIS examines each of the above environmental topics with the following items addressed within the Chapters as appropriate:

- An introduction to the chapter and the specific area of assessment
- The receiving environment – A description of the environment into which the proposal will fit.
- Characteristics of the proposed development - Outlines the specific aspects of a proposal paying attention to those that would be most relevant to the particular environmental feature in question.
- Potential impact of the proposed development – This includes a general description of the possible types of impacts which proposals of this kind would be likely to produce and provides a consideration of the 'Do-Nothing' impact
- Ameliorative, remedial or reductive measures - A description of any specified remedial or reductive measures considered necessary resulting from the assessment of the potential impacts
- Predicted impact of the proposed development - This section comprises an analysis of the impacts of the proposal on the environment, as identified by an expert analysis having regard to the receiving environment, the potential impacts and the characteristics of the proposal. A 'Worst Case' impact is considered and as such a range of environmental topics are taken into account

[1] EPA '*Guidelines on the Information to be contained in Environmental Impact Statements*', 2002, pg.17.

- Monitoring – This may be part of the ameliorative, remedial or reductive measures and would include a description of any post development monitoring of environmental effects which might be necessary
- Reinstatement – Where appropriate a description of reinstatement measures and the agencies responsible is provided

This EIS covers both the construction and operation periods of all facilities.

1.4 EIS Team

The following is a list of contributors and specialists to this EIS.

Table1 List of Contributors and Experts

Chapter	Aspect of EIS Provided	Specialist Consultant
1	Introduction	GVA
2	Description of the Proposed Development	GVA
3	Planning and Development Context	GVA
4	Examination of Alternatives	GVA
5	Human Beings	GVA
6	Traffic & Transportation	Arup
7	Soil and Geology	O'Connor Sutton Cronin and Roughan & O'Donovan
8	Hydrogeology and Hydrology	O'Connor Sutton Cronin and Roughan & O'Donovan
9	Flora and Fauna	Brady Shipman Martin
10	Waste Management	AWN Consulting
11	Noise and Vibration	AWN Consulting
12	Air Quality and Climate	AWN Consulting
13	Micro Climate	Brady Shipman Martin and RWDI Consulting Engineers
14	Landscape and Visual Impact Assessment	Brady Shipman Martin
15	Archaeological Heritage	Courtney Deery Heritage Consultancy
16	Architectural and Cultural Heritage	Courtney Deery Heritage Consultancy and Mr. Rob Goodbody
17	Material Assets – Site Services	O'Connor Sutton Cronin, Arup, Roughan & O'Donovan and Ethos Engineering
18	Interactions of the Foregoing	GVA

1.5 Consultation

Consultation was undertaken with key stakeholders and the community which identified the environmental and community issues that needed to be taken into consideration in designing the proposed development, specifically the new children's hospital, and in assessing the potential affects. This consultation was informed by the specific requirements for Strategic Infrastructure Developments. In relation to the process that informed this EIS, the consultation undertaken focused on the following:

- Early consultation to inform and help define the scope of the EIS in terms of what needed to be examined.
- Consultation during the process to identify any emerging issues, clarify any concerns and ensure that all such issues were considered as part of the EIS.

The level of consultation undertaken is discussed in Chapter 1 of this EIS.

2.0 Description of the Sites and Surroundings

The National Paediatric Hospital Project comprises ofsix interrelated elements on 6 no. sites, four sites within Dublin 8, a site at Tallaght and a site at Connolly, Blanchardstown. The Project, which is fully described in Chapter 2 of this EIS, includes the following developments:

- within – or associated with – the main project site on the campus of St. James's Hospital, Dublin 8 are:
    - a new children's hospital and associated Family Accommodation Unit, is sited in the west of the campus
    - a new Children's Research and Innovation Centre is sited along James's Street
    - associated works to boundaries, roads, entrances, parking areas, hard and soft landscaping *etc*. within the application site boundary
- a construction compound, which is directly associate with the developments at St. James's Hospital campus, is located remote from the hospital at Davitt Road, Drimnagh, Dublin 12
- a children's hospital satellite centre at Tallaght Hospital, Dublin 24
- a children's hospital satellite centre at Connolly Hospital, Blanchardstown, Dublin 15

2.1 St. James's Hospital Campus

St. James's Hospital campus extends to almost 19.4 hectares set within the mixed-use urban context of Rialto/Kilmainham, Dublin 8 (note: the application boundary measures some 8.7ha within this overall site). The campus is broadly 'U-shaped' bounded to the north by James's Street and Mount Brown – and internally within the 'U-shape' by the established residential area of Ceannt Fort and in particular by the residential streets of O'Reilly Avenue, Donnellan Avenue, and McDowell Avenue. The Campus is bounded to the south by the LUAS red line and associated public linear park, and immediately south thereof by primarily residential properties located along the south side of James's Walk.

The campus is bounded to the west by the South Circular Road and Brookfield Road including the residential area of Cameron Square; and to the east by the LUAS red line and the rear of various mixed-use and residential properties, including the Basin Street Flats and the Mater Dei National School.

Three specific developments will be located within St. James's Hospital Campus. There are outlined below.

2.1.1 New Children's Hospital Site

The subject lands at St. James's Hospital campus measure c.4.85ha and are located in the western part of the hospital complex. To the east and south east the site is bound by existing hospital buildings, by the main internal hospital road and by surface car parking associated with the hospital. To the north/north east the site is bound by the rear gardens of the dwellings on O'Reilly Avenue and a row of dwellings at St. John's Terrace that front Mount Brown. The remainder of the northern boundary has frontage onto Mount Brown. The site is bound to the south west/west, and has frontage onto, South Circular Road and Brookfield Road. The rear gardens of the residential dwellings on Cameron Square bound the site to the north west. The site is bound to the south by the linear park that is traversed by the LUAS red line, which runs parallel to St. James's Walk.

The site is currently in use as part of St. James's Hospital, with 23 no. buildings to be demolished as part of the subject application. The site is exceptionally well served by public modes of transportation including the LUAS and a number of Dublin Bus routes.

2.1.2 Family Accommodation Unit Site

The Family Accommodation Unit is to be located to the west of the new children's hospital within the 4.85ha site referred to above. The site is on the corner of, and has frontage onto, Brookfield Road to the west and the existing restricted hospital entrance from South Circular Road/Brookfield Road to the south. The site is bound to the west by Brookfield Clinic which is also associated with the hospital and to the north/north west by the rear gardens of residential dwellings on Cameron Square. The east of the site is currently defined by buildings associated with St. James's Hospital including information management services.

2.1.3 Children's Research and Innovation Centre Site

The site of the Children's Research and Innovation Centre measures approximately 0.14ha and is located in the north eastern part of St. James's Hospital campus, immediately west of the Trinity Centre for Health Sciences and currently consists of a surface car park and hard standing area associated with the Hospital and the retained façade of a 19th century building to the north. The site is bound by a limestone wall to the west which separates the lands from the rear gardens of the residential dwellings on Ceannt Fort. The Haughton Institute, a mid-19th century range, Protected Structure bounds the site to the south west, orientated in a north-south direction. Directly south of the site is an open space, courtyard in style. The site is bound to the north and has frontage onto James's Street, however, this boundary is currently defined by a high limestone wall.

2.2 Davitt Road Construction Compound Site

The site which is to act as a construction compound for the development on St. James's Hospital campus, is located c.1.6km to the south west of the Campus. It is a brownfield site, formerly occupied by Unilever. The compound site measures c.0.80ha on a total site area of 1.29ha and is located immediately south of Davitt Road but is separated from it by a wayleave which traverses the northern boundary of the site. The compound site is set within an overall Health Service Executive site and is bound to the west by the site of the recently permitted ambulance base (Reg. Ref. 2309/15) and to the east and south by undeveloped lands that are in the ownership of the Health Service Executive. The Framework Plan submitted with the ambulance base application (Reg. Ref. 2309/15) acknowledges the potential for a site compound on the existing site for other Health Service Executive related construction activities during Phase I.

2.3 Children's Hospital Satellite Centre Site Tallaght

The Tallaght Hospital Campus is located immediately north of Tallaght Town Centre. The Campus is accessible from Belgard Square North to the south, with Cookstown Way and the LUAS red line bounding the campus to the west. The internal hospital road runs proximate to the eastern boundary to the east of the existing hospital complex, connecting with and providing access from the industrial estate at Fourth Avenue to the east. The area to the north of the Campus is also industrial in nature. Exchange Hall, a mixed-use office and residential development fronts Belgard Square North to the south of the campus.

The children's hospital satellite centre will, in part, form a new build extension to the existing hospital and, in part, incorporate some of the existing ground floor of the main hospital building. The children's hospital satellite centre will be located on the eastern side of the hospital, south east of the main entrance on a site of 1.04ha. The new building will be located on a triangular shaped green space, bound to the north, south and east by internal hospital roads. The development will also incorporate a small portion of the internal road and car park to the south. The site is relatively flat and being located to the west of the main internal hospital road is removed from the surrounding uses to the east.

2.4 Children's Hospital Satellite Centre Site Connolly

Locally Connolly Hospital Campus is removed from the urban area of Blanchardstown, being located north of the Navan Road (N3) and separated from it by a band of dense woodland along the banks of the River Tolka, and bound to the south, east and west by high amenity areas and open space and recreational areas. The Campus is bound to the north by a residential development and is accessible from the Navan Road (N3), with limited accessibility by public transportation. The hospital road runs along the perimeter of the Campus, forming a natural boundary with the adjacent areas.

The proposed children's hospital satellite centre site measures 1.25ha and is located south of the hospital, immediately east of the main hospital entrance. The site is largely rectangular in shape, with its southern and western boundaries defined by hospital roads. To the east the site is bound by green space which separates it from the hospital road. Levels vary across the site with a low point centrally. There is a slight rise in level from the hospital road to the south up to the existing hospital. Given the site's location within the campus, adjacent to the existing hospital, it is removed from the surrounding high amenity areas.

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3.0 Strategic Need for the National Paediatric Hospital Project

Section 2.2 of Chapter 2 and Section 4.2 of Chapter 4 of this EIS explains the strategic need for the development, having regard to the strategic healthcare policy context and delivery of the proposed Model of Care[2]. The main points are as follows:

- The National Paediatric Hospital Project comprises six interrelated components that comprise one indivisible, integrated project and that this critical requirement has inevitably shaped the analysis of the alternative sites for the project
- The National Model of Care for Paediatric and Neonatology provides the foundation for the integrated nature of the project. Based on national and international best practice, this Model is the framework for how and where healthcare services will be delivered, managed and organised nationally and is the means by which the Irish healthcare service can respond to changing healthcare needs; address imminent needs and improve the existing model of service delivery
- The Model requires that the new children's hospital and children's hospital satellite centres will operate on a 'hub and spoke' basis and are part of a wider integrated programme of service delivery changes designed to improve the future health and well-being of children and young people in Ireland
- Section 2.2 of Chapter 2 references the existing children's hospital facilities contain old and outdated facilities and poor clinical adjacencies that do not meet contemporary service delivery requirements and do have a sufficient scale and critical mass of clinical activity to improve clinical outcomes for the sickest children and young people.
- The new children's hospital on the St. James's Hospital campus will be at the centre of a network of healthcare as an exemplary facility dealing with patients in need of specialist and complex care. The critical mass of clinical activity achieved by amalgamating the extant three children's hospitals, combined with the sub-specialisation achieved by tri-location with the adult St. James's Hospital and potential future maternity hospitals are universally accepted as the key means by which clinical results for the young patients will be secured.
- The children's hospital satellite centres at Tallaght and Connolly Hospital campuses will be at the heart of the 'hub and spoke' Model of Care and will have a critical role in dealing with the projected patient numbers contained in the model, in particular urgent care and out-patient activity.
- The new children's hospital will also be supported by the proposed Children's Research and Innovation Centre, which is integral to the National Paediatric Hospital Project and will be co-located with existing academic facilities as part of a focus on research, education and innovation.
- The final key part of the project will be the new Family Accommodation Unit that will enable parents and siblings of sick children with extended hospital stays to stay together and help reduce the emotional impact on all parties.

[2] Please see NPHDB Report – *'The Clinical Case for the New Children's Hospital'* - annexed at Appendix 2.2 of this EIS.

4.0 Description of the Proposed Development

This Strategic Infrastructure Development planning application is made by the National Paediatric Hospital Development Board (NPHDB). The integrated development as proposed is described as the National Paediatric Hospital Project and encompasses three sites at St. James's Hospital campus, a construction compound at Davitt Road, a site at Tallaght Hospital campus and a site at Connolly Hospital campus. A full description of the proposed development is provided in Chapter 2 of this EIS and is summarised in brief below.

The proposed new National Paediatric Hospital Project, which is an integrated health infrastructure development, comprising 6 no. principal elements and ancillary development as set out below:

i. A 473 no. bed new children's hospital (up to 118,113 sq.m. gross floor area) at the St. James's Hospital campus, James's Street, Dublin 8 (which contains Protected Structures);
ii. A 53 no. bed Family Accommodation Unit (up to 4,354 sq.m. gross floor area) at the St. James's Hospital campus, James's Street, Dublin 8 (which contains Protected Structures);
iii. A Children's Research and Innovation Centre (up to 2,971 sq.m. gross floor area) at the St. James's Hospital campus, James's Street, Dublin 8 (which contains Protected Structures);
iv. A construction compound at the former Unilever site at Davitt Road, Drimnagh, Dublin 12;
v. A children's hospital satellite centre at The Adelaide & Meath Hospital Dublin (Tallaght Hospital), Belgard Square North, Tallaght, Dublin 24 (up to 4,466. sq.m. gross floor area); and
vi. A children's hospital satellite centre at Connolly Hospital campus in Blanchardstown, Dublin 15 (up to 5,093 sq.m. gross floor area).

Each of these elements operates in conjunction with each other, forming one indivisible, integrated project. This fact has been recognised by An Bord Pleanála, which has advised that all the elements of the National Paediatric Hospital Project should be included in a single application and that as one single integrated development it constitutes Strategic Infrastructure Development.

5.0 Planning and Development Context

The statutory planning framework relating to the development is examined at the National, Regional and Local levels in Chapter 3 of this EIS. In addition, relevant non-statutory plans were considered. A brief overview of the relevant documents is provided below.

5.1 National Level

The documents assessed as part of the National Level Planning Framework are listed below with a brief summary of each provided.

5.1.1 Statutory Planning Policy Framework

- **National Development Plan, 2007 – 2013** - It provided for investment in social infrastructure which was to include just under €5 billion on health infrastructure, acute hospitals and primary community and continuing care facilities, with €2.4 billion proposed for acute Hospital Care[3].
- **National Spatial Strategy, 2002 – 2020** – It states that "*economic infrastructure, such as social infrastructure, relates to particular locations and is needed to support balanced regional development*[4]". This principle formed part of the development of the gateway and hub approach adopted by the Strategy.

5.1.2 Supplementary Policy Framework

- **National Model of Care for Paediatric Healthcare in Ireland, 2010** - It outlines the decision to develop the 'hub and spoke' model of a main National Tertiary Hospital with satellite centres. The Model of Care required a shift, where appropriate, from inpatient care to ambulatory or short stay care, and from hospital-centred care to home-based care.
- **The National Clinical Programme for Paediatrics and Neonatology, 2011-** The overall aim of the programme is to ensure high quality care is provided to children throughout Ireland, from the point of first contact.
- **Smarter Travel – A Sustainable Transport Future: A New Transport Policy for Ireland, 2009-2020** - A fundamental objective of this document is the provision of a high quality, integrated and sustainable travel and transport infrastructure that supports the movement of goods and people.
- **National Cycle Policy Framework, 2009** – This document outlines national policy for cycling, to create a stronger cycling society and a friendlier environment for cycling.
- **Our Sustainable Future, A Framework for Sustainable Development in Ireland, 2012** – This document puts in place a medium to long-term framework for advancing sustainable development and the green economy in Ireland.

5.2 Regional Level

The documents assessed as part of the Regional Level Planning Framework are listed below with a brief summary of the relevant provisions of each provided.

5.2.1 Statutory Planning Policy Framework

- **Regional Planning Guidelines for the Greater Dublin Area, 2010-2022 -** The Core Principles of the Strategy Vision for the Guidelines include *inter alia* that development within the existing urban footprint of the Metropolitan Area will be consolidated to achieve a more compact urban form.

5.2.2 Supplementary Policy Framework

- **Greater Dublin Area Draft Transport Strategy, 2011 – 2030 -** The purpose of the Strategy is to establish appropriate policies and transport measures that would support the Greater Dublin Area in meeting its potential as a competitive, sustainable city-region with a good quality of life for all. The Draft Strategy was, however, not formally adopted and the National Transport Authority has since progressed with the preparation of the Integrated Implementation Plan, 2013 – 2018.
- **Integrated Implementation Plan, 2013 – 2018 -** It is an objective of this Plan to invest in the existing public transport modes to achieve a substantially greater modal shift from private car use to public transport.
- ***Draft Greater Dublin Transport Strategy, 2015 – 2030*** - A draft strategy is currently being prepared, however, no date has been agreed for public consultation.

[3] National Development Plan, 2007-2013, pg. 216.

[4] National Spatial Strategy, 2002 – 2020, pg. 56.

5.3 Local Level

The National Paediatric Hospital Project covers three separate administrative areas with St. James's Hospital campus and the construction compound at Davitt Road, located in Dublin City Council, Tallaght Hospital located in South Dublin County Council and Connolly Hospital located in Fingal County Council. As a result there are three separate sets of local level planning frameworks to be assessed. Each area is addressed in turn below with a brief overview of the planning framework provided. Further information on each document is contained in Chapter 3 of this EIS.

5.3.1 St. James's Hospital

Dublin City Development Plan, 2011 - 2017

Both St. James's Hospital campus and the Davitt Road construction compound are located within the administrative area of Dublin City Council. Under the Dublin City Development Plan, St. James's Hospital campus is zoned Z15 - *"To protect and provide for institutional and community uses and to ensure that existing amenities are protected*." Under this zoning "*buildings for the health, safety and welfare of the public, Medical and related consultants, Residential Institution and Education*" are permitted in principle, with "*car park ancillary to main use*" open for consideration. There are 5 no. Protected Structures within St. James's Hospital campus, all located on the eastern part of the Campus.

There is an emphasis on the importance of Z15 lands as a resource for the City in providing *inter alia* health facilities and in the maintenance and creation of sustainable, vibrant neighbourhoods. The Family Accommodation Unit and the Children's Research and Innovation Centre are an integral component of the main institutional use of the lands and support the zoning objective. The Dublin City Development Plan also states that with any development proposal on Z15 lands, consideration should be given to their potential to contribute to the development of a strategic green network.

St. James's Hospital is recognised as being in one of the three new innovation corridors radiating from the City Centre, which form part of a proposed innovation network to lever growth across the city region[5]. In addition the Dublin City Development Plan also promotes innovative clusters. St. James's Hospital campus is also located within the Heuston/Kilmainham Character Area, the Heuston Gateway Cultural Quarter and is on an identified 'Existing Green or Previously Proposed Corridor'.

In addition to the core strategy and policy objectives, the Dublin City Development Plan also contains qualitative and quantitative development standards. An overview of the relevant development standards, including *inter alia* height, design, plot ratio, open space etc. is provided in Chapter 3 of this EIS.

Dublin City Sustainable Energy Action Plan, 2010 - 2020

The core aims of the Action Plan were to analyse the City's current energy and carbon dioxide emissions and to evaluate ways of reducing energy consumption across a number of areas, as well as increasing the usage of renewable energy.

5.3.2 Davitt Road

The subject site is zoned Z10 in the Dublin City Development. The objective for this zoning is *"to consolidate and facilitate the development of inner city and inner suburban sites for mixed-use development of which office, retail and residential would be the predominant uses."* Under this zoning there are a number of uses that are permitted in principle including *inter alia* medical and related consultants as well as buildings for the health, safety and welfare of the public[6].

The site is also located within the area of the Drimnagh Integrated Area Plan, 2009, forming part of an area known as Canal Village, a mixed use promenade enhancing the canal as an amenity.

Dublin City Development Plan, 2016 – 2022

The review of the Dublin City Development Plan has commenced with a Draft City Development Plan due to be published in October/November of 2015.

[5] Dublin City Development Plan, 2011 – 2017, pg. 24.
[6] Dublin City Development Plan 2011-2017, pg. 202-203.

5.3.3 Tallaght Hospital

South Dublin County Development Plan, 2010 – 2016

Tallaght Hospital campus is located in the administrative area of South Dublin County Council and therefore, the South Dublin County Development Plan, is the relevant statutory plan. Under the Plan the subject site is zoned CT "*To protect, improve and provide for the future development of the County Town of Tallaght*'". Hospital as a land use is Permitted in Principle under this zoning. The subject site also contains the Local Objective "*IN – to provide for a post primary school or other institution". The site is within the Baldonnel Casement Aerodrome identified on the SDCDP maps as "Approach Areas Variable Height Restrictions*".

The South Dublin County Development Plan recognises Tallaght Town Centre as providing a range of uses and states that the Regional Hospital is well established in the Town[7]. In this regard the Council seeks to work in conjunction with the County's third level and medical institutions in the creation and fostering of enterprise. The Tallaght Town Centre designation, within which the Tallaght Hospital campus is located, is also considered to be the most appropriate location for an Intellectual Development Zone capable of promoting innovation[8].

Draft South Dublin County Development Plan, 2016 - 2022

The Draft South Dublin County Development Plan is on public display from 13th July - 24th September 2015. It contains a number of draft policies and development standards pertaining to the Campus with the site proposed to be zoned TC *"to protect, improve and provide for the future development of Town Centres"* under which "*Hospital*" as a land use is Permitted in Principle.

Tallaght Town Centre Local Area Plan, 2006

The Tallaght Town Centre Local Area Plan recognises the importance of community/social infrastructure in serving the needs of the community in areas such as *inter alia* health and the requirement to ensure that such facilities are located so as to be used in an efficient and cost-effective manner. It is an objective of the Local Area Plan to "*facilitate the expansion and enhancement of existing community facilities and to facilitate the provision of a range of new community facilities to meet the needs of both the existing and future residents of Tallaght*[9]".

5.3.4 Connolly Hospital

Fingal County Development Plan, 2011 – 2017

Under the Fingal County Development Plan Connolly Hospital campus is zoned CI "*Community Infrastructure*", with the objective to "*provide for and protect civic, religious, community, education, health care and social infrastructure*". Hospital (for public operators only) is Permitted in Principle under the CI zoning. Local Objective 539 also applies to Connolly Hospital campus which seeks to "*facilitate and promote synergies between Connolly Hospital and related Industries (onsite)*".

The Campus is bound to the south, east and west by amenity lands with the open space lands to the south, east and west containing the specific objective to "*protect & preserve trees, woodlands and hedgerows*".

Fingal County Development Plan, 2017 - 2023

The review of the Fingal County Development Plan has commenced and it is understood that the Draft Plan will go on public display in early 2016.

Blanchardstown Urban Structure Plan, 2007

The Blanchardstown Urban Structure Plan – Development Strategy and Implementation, sets out development themes for the Blanchardstown area and identifies Connolly Hospital as a centre of excellence in health care specialisms with the uses of medical specialists/facilities/clinics and residential identified. The Plan describes the hospital as being a major resource asset to Blanchardstown and being well placed to advance as a model of excellence in health care and medical specialisms[10].

[7] South Dublin County Development Plan, 2010-2016, pg. 204.
[8] South Dublin County Development Plan, 2010-2016, pg. 184.
[9] Tallaght Town Centre Local Area Plan, 2006, pg. 36.
[10] Blanchardstown Urban Structure Plan, 2007, pg.25.

6.0 Outline of Main Alternatives Considered

The Examination of Alternatives provides an overview of alternative sites, designs and concepts that have been considered for the National Paediatric Hospital Project. The extent of the Alternatives Section has been discussed with An Bord Pleanála as part of the statutory pre-application consultations and these discussions have directly informed the format and content of Chapter 4 of this EIS.

The Chapter examines alternatives at three levels as provided in the Environmental Protection Agency's document, *Guidelines on Information to be contained in Environmental Impact Statements, 2002,* as follows:

1. Alternative Locations
2. Alternative Designs
3. Alternative Processes

6.1 Alternative Locations

The decision on where to locate the new children's hospital and the two children's hospital satellite centres, has been determined by the Government following extensive research, assessment and analysis. The Reports produced, including *inter alia* the **McKinsey and Co. Report, 2006**, the **RKW Ambulatory and Urgent Care Centres for Greater Dublin Report, 2007** and **the KPMG Report, 2008** have directly informed the location of the Hospital. Through this body of work a robust examination of alternative locations for the new children's hospital and the children's hospital satellite centres has been undertaken and a case formulated in relation to the strategic need for the project, see Section 4. The policy requirement to deliver the proposed Model of Care as well as the need to consider specific environmental and planning factors have influenced the decision on potential locations for the new children's hospital.

Following the refusal of planning permission for the children's hospital on the Mater Campus, a Review Group was appointed to consider the implications of the decision and the different options for progressing the new children's hospital. The **Dolphin Report, 2012** having considered a wide range of potential sites, concluding that the hospital should be located in Dublin and devised criteria/principles for assessing the suitability of sites. The Report stated that sites which benefit from good public transport should be prioritised over ones which are largely car-dependent.

As the Dolphin Report identified excellence in training as crucial to any new children's hospital, the assessment of potential sites was confined to those that offered/were supported by a teaching hospital i.e. the Mater, Beaumont, St. James's, Tallaght, the Coombe, and Connolly. The findings of the Dolphin Report assessment of these co-located sites can be summarised as follows:

- Mater - The proposal had been reworked following the refusal of planning permission in 2012, however, whether the site was sufficiently large to accommodate a maternity and a children's hospital remained a concern.
- St. James's Hospital - From a clinical and academic perspective, it was identified as the hospital that best meets the criteria to be the adult partner in co-location. However, it initially offered the smallest site, had some drawbacks in terms of site suitability and was not without planning risk, however, it was identified as having excellent public transport services.
- Coombe - The adjacent site was of a sufficient size and a corridor-linking the new children's hospital to the Coombe maternity hospital could establish the maternity co-location conditions. From a design and planning perspective, the sites adjoining the Coombe and Connolly offered the best potential for future expansion and a landscaped setting.
- Connolly - The site on the National Sports Campus lands offered a parkland setting, and practically limitless scope for future expansion, with excellent access by car. However, Connolly Hospital would have needed very substantial investment of human and capital resources to develop into an adult tertiary hospital with critical mass supported by leading-edge research facilities which could have taken several decades to achieve.
- Beaumont – The site was in a low-rise housing area, and may have faced difficulty in gaining approval for a large building up to ten storeys. Construction of the new children's hospital could not have started until the multi-storey public car park and other buildings were rebuilt elsewhere.
- Tallaght - The design and layout of the new children's hospital would have been significantly constrained by the proximity of an existing apartment complex.

Following the Dolphin Report a supplementary planning assessment of the proposed new children's hospital sites at Connolly, the Coombe, the Mater, St. James's and Tallaght Hospitals was undertaken in the Report ***'New Children's Hospital: Further assessment of planning issues in relation to proposed sites'***, i.e. the **Clear Martin Report**. For each site the Report identified a range of planning issues likely to be considered in a planning assessment and considered how each site performed in relation to each issue. In some instances, where the performance was less than satisfactory, the Report suggested possible mitigation measures. This analysis further expanded on the examination of alternative locations contained in the Dolphin Report.

An additional assessment of the options reviewed in the Dolphin and Clear Martin Reports was undertaken as part of this EIS. This assessment found that when the scope is expanded in relation to planning/environmental considerations not one of the five sites is free from environmental impacts However, in relation to St. James Hospital campus there was scope to address the issues identified and it is the best served by public transportation. In this regard, St. James Hospital campus site is the most sustainable of the sites examined from an environmental and planning perspective.

Following numerous assessments and analysis, St. James Hospital campus has also been established as the most appropriate site for the location of the new children's hospital in terms of the implementation of the Model of Care and its fulfilment of the identified clinical requirements of a new children's hospital. In relation to the examination of alternative locations on site, a number of studies were carried out by St. James's Hospital examining the characteristics of the site, it was evident that the western end of the campus was the optimal location for the new children's hospital building.

Following the announcement at the end of 2012 that the new children's hospital was to be located on St. James Hospital campus, an internal review of the existing plan for an Ambulatory and Urgent Care Centre at Tallaght was undertaken, see Section 3. The review recommended that there should be two children's hospital satellite centres, to be established in advance of the main hospital opening and that they should be located on the site of a Model 3 or 4 acute hospital, as defined in the RKW Report. Given the central location of the main hospital, it was determined that a children's hospital satellite centre should be located on the northside and on the southside of the city to provide ease of access for the population of the Greater Dublin Area.

In relation to the southside location the geographical analysis carried out demonstrated that locating the children's hospital satellite centre at Tallaght rather than St Vincent's would be significantly more successful in improving access for children. In relation to the northside location Connolly Hospital offered advantages over Beaumont Hospital in relation to the development of the children's hospital satellite centre including *inter alia* lower capital cost; lower risk; and less impact on future development potential. The Minister acted on these findings and it was decided to locate the satellite units at Tallaght and Connolly hospitals.

In terms of the provision of a construction compound at Davitt Road, three options were considered for its location i.e. utilise an on-site compound, allow the contractor to determine the compound or make use of Health Service Executive owned lands at Davitt Road for a storage and staging area. Following an assessment of the three options Davitt Road was chosen as it is not only currently vacant and ready, i.e. would require little works to make available, but it would also allow all perceived or expected impacts to be examined in full in this EIS and mitigation to be deployed where required.

6.2 Alternative Design

The examination of alternative design options entailed a robust process which amalgamated design, spatial planning and clinical requirements. This was further informed by on-going consultation with the three Planning Authorities and feedback from public consultation events. This multi-stage process fed into the design progression at every stage. The design development considered a wide range of issues throughout the process with the final design representing, in the view of the Design Team and applicant, the most appropriate balance of the requirements of all stakeholders and adjoining properties.

6.2.1 St. James's Hospital

Upon appointment, the Design Team was required to carry out an in depth review of the site having regard to all site constraints, brief requirements, environmental and planning issues and the operational requirements of St. James's Hospital. At all stages of the design process the alternative design and location options relating to the Children's Research and Innovation Centre and the Family Accommodation Unit were considered. The consideration of the use of the site at Davitt Road was also central to the consideration of alternatives and was considered as an option offered a way in which local amenity impacts could be mitigated and managed.

Long List Design Options

The very initial stage of the exploration of alternatives yielded 9 no. sketch design concepts for the new children's hospital. The initial designs were refined to 5 no. 'long list' design options which were progressed to concept development, see Chapter 4 of this EIS. These long list options were then assessed by the project team having regard to the principal planning considerations and each option was measured against a set of key planning policy and physical environment assessment criteria. This assessment fed into an overall planning evaluation matrix, informed the decision on the short list options i.e. 2, 4 and 5 of the long list options and highlighted a number of key planning themes.

Short List Design Options

Informed by the above assessment of the long list design options, a short list of design options was brought forward comprising Option 2, Option 4 and option 5. These options were then assessed and scored against a detailed list of planning and environmental criteria and a preliminary visual impact assessment was carried out. From this assessment of the 3 short list options the conclusion, when taken in totality, was to proceed with Option 5 and it was developed as the preferred option.

Preferred Option

The preferred option was again assessed in the context of not only the key issues but having regard to a range of planning matters, both site specific and wider site issues and the planning context of the site. This review identified items that required further consideration and as the assessment was based on the initial design concept the items identified and the associated risk were addressed and/or changed as the project progressed. This formed the basis for developing the design of the new children's hospital as set out in this application.

Further to the selection of the preferred option and through each subsequent design phase, environmental considerations, including local amenity impact such as overlooking, massing, overshadowing as well as operational requirements and the potential for expansion, were considered and incorporated into the final design.

Figure 1: Final Preferred Option – May 2015

The final preferred option incorporated a number of minor changes that result in a better design as detailed in Chapter 4. As part of the examination of alternatives, options were also examined for both the helipad location and the relocation of an existing public sewer on the site (Drimnagh Sewer).

6.2.2 Tallaght Hospital

The children's hospital satellite centre at Tallaght Hospital campus has undergone a full design progression, with each of the design options measured against a set of key planning policy and physical environment assessment criteria. This assessment fed into an evaluation matrix which gave a priority rating for each of the specific criteria.

The site location options for Tallaght Hospital campus were internally reviewed, see Chapter 4 of the EIS. The site identified for progression offered the best connectivity with the existing Hospital and the least impact on the operational activities of the hospital campus.

6.2.3 Connolly Hospital

The children's hospital satellite centre at Connolly Hospital campus also underwent a full design progression, with each of the design options measured against a set of key planning policy and physical environment assessment criteria. This assessment fed into an evaluation matrix which gave a priority rating for each of the specific criteria.

The internal review identified two potential sites at Connolly Hospital campus for the children's hospital satellite centre, see Chapter 4 of the EIS. In conjunction with advice from on-going consultation with Fingal County Council, clinical considerations and Design Team analysis, Option 2, the Front Site, was selected as the more appropriate location from a planning and environmental perspective, while also meeting the clinical requirements for the children's hospital satellite centre. Design considerations included impact the amenities of patients of the existing hospital.

6.3 Alternative Processes

In relation to alternative process, this primarily relates to the phasing of the development and building construction processes and/or alternative uses on the site. Details of the alternative processes are provided in Chapter 4 of this EIS.

7.0 Summary of the Predicted Environmental Impacts

The following sections describe the Project with respect to the environmental topic headings utilised in this EIS, as outlined in the Environmental Protection Agency Guidelines. Each item is described in its existing condition, with the effect, or impact of the project then described, together with any means that have been included to improve or protect the environment. Where relevant, ameliorative, remedial or reductive measures are provided. A full assessment of each predicted environmental impact is provided in the relevant chapters of this EIS.

7.1 Human Beings

The purpose of the Human Beings Chapter is to assess the potential impacts that the proposed new children's hospital, Family Accommodation Unit, Children's Research and Innovation Centre, Davitt Road construction compound and the two children's hospital satellite centres may have on social activity, economic activity and land usage in the receiving environment.

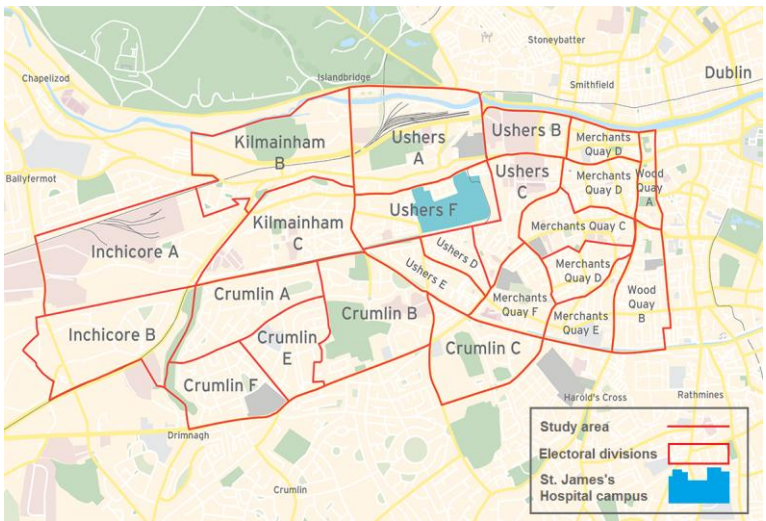
7.1.1 St. James's Hospital

In relation to the elements of the National Paediatric Hospital Project located on St. James's Hospital campus i.e. the new children's hospital, Family Accommodation Unit and Children's Research and Innovation Centre, this Section involves the analysis, examination and compilation of all relevant Central Statistics Office population and socio-economic data and has been informed by the Report by the NPHDB entitled '*Harnessing the potential – maximising the community benefit from the new children's hospital*' and the Report entitled '*National Paediatric Hospital – Local Regeneration Opportunities*' prepared by Urban Initiatives, see Appendix 5.1 and 5.2 respectively of Chapter 5 for a copy of these Reports.

Receiving Environment

The receiving environment was examined at the national, regional and local levels. In relation to the local level impact, the development proposal lies within the 'Ushers F' Electoral Division. A Study Area of 23 no. Electoral Divisions, covering an area of c.10km^2, was chosen, see Figure 2. The catchment was informed by consultations with the community and was established having regard not only to the potential direct impacts on adjacent Electoral Divisions but also the potential impacts which extend beyond the immediately adjacent areas.

Figure 2: St. James's Hospital Campus Local Catchment for EIS[11]



Population

It is considered that the construction phase will not have any significant impact on the national population and that any impact due to the relocation of workers at a regional level would be limited and transient. At a local level the proposal will not result in any change to the permanent population of the area during the construction phase. There will be an increase in the temporary population of the area as a result of workers that may need to reside in the local area. However, it is expected that those employed during the construction phase will for the most part travel from their existing residence, thus it is anticipated that the potential impacts for the population arising from the construction phase would be transient.

[11] NPHDB Report – '*Harnessing the potential - Maximising the community benefit from the new children's hospital*'

In relation to the operational phase, the nature of the proposed development would not result in population redistribution at a national level. At the regional level, as the majority of the workers at the existing facilities at Crumlin, Temple Street and Tallaght would already be resident in the Region it is expected that any redistribution of population would be limited. Therefore, the impact at a regional level is likely to be minor or even 'self-cancelling'. At the local level it is predicted that the development will impact the population profile due to the relocation of jobs and the creation of new jobs which will result in associated demands for residential properties. The development will also result in increased patient numbers to St. James's Hospital campus which will give rise to a demand for accommodation in the area and will have an impact on the level of population in the area, which on an individual level will be transient but overall continuous.

Overall it is predicted that the construction phase is unlikely to generate any significant adverse impact on the demography of the area but that the operational phase will have a significant, positive impact on the population of the Study Area. In addition, cumulatively the proposed development may act as an attractor to the area, thereby, supporting the redevelopment of surrounding areas for residential developments.

Employment

At a national level it is anticipated that the employment impacts will relate more broadly to the economic impacts that will arise from the investment which will support jobs in the national economy[12]. At a regional level, given the high rates of unemployment in the construction sector, there are likely to be labour resources available. The jobs created would thus bring new employment to the Region. At a local level there is potential for employment additionality arising from the development.This is further boosted by the key objective of the NPHDB to maximise community benefits from the proposed development, see Chapter 5. In addition, the development represents a major stimulus to the local area economy which can bring a range of positive impacts including regeneration of the local area. The proposed development has the potential to provide both short and long term direct and indirect local employment benefits to the economy during construction.

It is not envisaged that the operational phase will have a significant impact on employment nationally. The potential impact on employment regionally relates to the potential to create innovative clusters[13]. At the local level, the NPHDB Report '*Harnessing the Potential*' identifies the development as offering major potential for a range of cohorts within the community. The operation of the development has the potential for longer-term economic benefits for the local area through the employment offered directly by the hospital and the creation of a local sustainable, high value-adding enterprise base.

Overall it is predicted that the development will have measurable positive labour market outcomes above their primary objective of providing healthcare. In terms of cumulative impacts these relate to regeneration opportunities impacts on employment as a '*cluster anchor'*.

Community

The lands surrounding St. James's Hospital campus are urban in nature and comprise of a mixture of land uses typical of such a location. The receiving environment from a community perspective, therefore, comprises of three principal elements i.e. the resident community which includes the patients residing temporarily on Campus and the surrounding residential communities, the working community and the visiting community.

During the construction phase the **resident community** is likely to experience impacts arising from loss of amenity associated with construction activity. In addition to construction dust there is the potential for the spread of *Aspergillus* spores, that can potentially cause Legionnaires' disease, to occur. Prevention works in this regard are outlined in Chapter 12 and in the outline Construction Management Plan. The resident community may also experience some temporary disruption attributable to works to vehicular entrances and alterations to car parking within the Campus or works along the public road. An outline Construction Management Plan has been prepared to mitigate any disruption as far as possible, and impacts are expected to be temporary. During the construction phase the resident community is also likely to experience visual impact attributable to a change to landscape and visual amenities. Such impacts will potentially affect inpatients at St. James's Hospital as well as local residents.

People living near to the Davitt Road construction compound may also experience some loss of amenity as a result of noise from construction vehicles using the compound but these affects will not be significant and will cease once the site is no longer in use.

[12] NPHDB Report – '*Harnessing the potential - Maximising the community benefit from the new children's hospital*', 2015.
[13] NPHDB Report – '*Harnessing the potential - Maximising the community benefit from the new children's hospital*', 2015.

The impacts of the proposed development during the construction phase will also be experienced by the **working population** on St. James's Hospital campus. In this regard, loss of amenity and accessibility issues are likely to negatively impact staff, however, given the high level of accessibility to the Campus via public transportation, and subject to the application of appropriate mitigation measures, such impacts would not be significant and would be temporary in nature.

The NPHDB '*Harnessing the Potential*' Report examines in detail the issue of social clauses and community benefit, setting out actions which form a road map for maximising the potential impact of the development within the area. Such clauses would have a positive impact on the local working community. In addition, the development of the hospital represents a major stimulus to the local economy which can bring a range of positive impacts.

The impacts of the construction phase will be acutely experienced by out-patients and other **visitors** to the hospital. In this regard, loss of amenity and accessibility issues are likely to be significant but temporary in nature.

The commencement of operational phase is likely to be experienced as a significant positive impact by in-patients, as the quality of paediatric care and the care environment improves. Local **residents** are also likely to experience positive impacts such as permeability and accessibility. Chapter 11, Noise and Vibration, outlines that potential causes of disturbance are considered to be limited and that with appropriate mitigation none of these will increase the existing noise climate sufficiently so as to be likely to cause disturbance. The resident community is likely to experience visual impacts attributable to a change to landscape and visual amenities. These impacts are described in detail and comprehensively assessed in Chapter 14 - Landscape and Visual Impact Assessment.

On the other hand, as outlined in the Urban Initiatives Report, the significant investment on St. James's Hospital Campus could and should have tangible social and economic benefits for the wider community and act as a catalyst for a wider regeneration of the area[14]. The completion of the proposed development and commencement of the operation of the development is likely to be experienced as a significant positive impact by the staff **working** within the hospital. There may be positive economic spin off for local businesses during the construction and operational phases.

The completion of the development on St. James's Hospital campus and the commencement of the operational stage is likely to be experienced as a significant positive impact by **out-patients** and visitors to the Hospital.

Cumulatively major institutions can have a significant positive impact on the local area and its future success. The success of major institutions is intrinsically linked with the success of the neighbourhood within which they are located.

In relation to monitoring, the applicant is willing to accept a condition attached to the permission relating to the establishment of a Community Benefit Oversight Group and the appointment of a Community Engagement Manager for the period of construction as detailed in Chapter 5.

7.1.2 Tallaght Hospital

Population

It is not anticipated that the construction phase of the children's hospital satellite centre will have an impact on the population profile of the area as it is expected that those employed during the construction phase will for the most part travel from their existing residence. Where there is an impact on population arising this would be transient. This phase is unlikely to generate any significant adverse impact on the demography of the area.

At the operational stage, the relocation of the existing National Children's Hospital from Tallaght to St. James's Hospital campus may result in a redistribution of a small portion of the population. It is estimated that c. 90 staff will work at the children's hospital satellite centre at Tallaght Hospital campus, a portion of which would be expected to result in relocations to the area and the generation of a limited demand for residential properties. Therefore, the impact on population is likely to be minor or even 'self-cancelling'.

[14] Urban Initiatives Report – *'National Paediatric Hospital - Local Regeneration Opportunities',* 2015.

Employment

The construction phase of the proposed development is expected to generate c. 200 construction jobs, of which 100 will be on site. In addition to the direct financial and employment benefits of the construction programme itself, it is anticipated that other related services would benefit during the construction programme. Overall the proposed development has potential to provide short term direct and indirect local employment benefits.

The operational phase of the proposed development is not expected to give rise to any significant impact relating to an increase or decrease in direct or indirect employment on site or in the surrounding area. Overall the operational phase is unlikely to have any significant impact with respect to increasing or reducing direct employment opportunities on site or in the local area.

Community

The **resident community**, including in-patients, likely to experience impacts arising from loss of amenity associated with the construction phase in the first instance is limited. It is predicted that impacts emerging from the construction phase of the development will be limited and temporary in nature and will involve a general loss of amenity. However, through the implementation of the remedial and reductive measures proposed such impacts on the resident communities will not be significant and will only be temporary in nature.

The impacts of the proposed development during the construction phase will be most acutely experienced by the **working population** on Campus. In addition, at construction stage there may be positive economic spin off for local businesses.

The impact of the construction phase of the proposed development will be experienced by out-patients and other **visitors** to the hospital. However, the limited scale of the build means that the loss of amenity and accessibility issues are not likely to be significant and will be temporary in nature. Implementation of the remedial and reductive measures proposed during the construction period means the impact of the proposed development on communities in the area will not be significant and any impact will only be temporary.

The commencement of the operation of the children's hospital satellite centre is likely to be experienced as a positive impact by the **resident community** as the quality of paediatric care improves and the care environment is significantly enhanced. The resident community is likely to experience limited visual impacts, if any, attributable to a change to landscape and visual amenities.

The commencement of the operation of the children's hospital satellite centre is likely to be experienced as a positive impact by the staff **working** within the facility given the high quality working environment. In addition, it will represent a significant improvement in terms of the quality of the facilities offered. Loss of amenity and accessibility issues during the operational phase are expected to be limited. There may be positive economic spin off for local businesses during the operational phase.

The completion of the children's hospital satellite centre and the commencement of the operational stage is likely to be experienced as a positive impact by out-patients and **visitors** to the hospital. Limited loss of amenity is envisaged.

7.1.3 Connolly Hospital

Population

It is not anticipated that the construction phase will have an impact on the population profile of the area. Given the relatively small scale of the build it is expected that those employed during the construction phase will for the most part travel from their existing residence. Where there is an impact arising from the construction phase this would be transient.

Given the scale of the children's hospital satellite centre it is not expected to give rise to a significant impact on the population profile of the area during the operation phase. It is, however, predicted that there will be a positive impact on the population of the Study Area, specifically the working population, during the operational phase of the proposed development. It is not envisaged that any impact on the population of the Study Area will be significant.

Employment

The construction phase of the proposed development is expected to generate c. 200 construction jobs, of which 100 will be on site. In addition to the direct financial and employment benefits of the construction programme itself, it is anticipated that other related services would benefit during the construction programme due to an increase in trade demand. Overall the proposed development has potential to provide a short term direct and indirect local employment benefits, and thus benefit to the local economy during the construction phase. An adverse impact on local employment within the existing hospital is not predicted given the scale of the development proposed.

The operational phase will provide a new specialty for Connolly Hospital, with the children's hospital satellite centre creating c.90 no. jobs on site, which will result in an increase in staff, patient and visitor numbers to the hospital, however, it is not expected to give rise to any significant impact relating to an increase or decrease in direct or indirect employment on site or in the surrounding area. The proposed development is also predicted to continue to have likely positive knock on economic impacts for local businesses.

Community

The **resident community,** including in-patients, likely to experience impacts arising from loss of amenity associated with the construction phase in the first instance is limited. It is predicted that impacts emerging from the construction phase of the development will be limited and temporary in nature and will involve a general loss of amenity. However, through the implementation of the remedial and reductive measures proposed such impacts on the resident communities will not be significant and will only be temporary in nature.

The impacts of the proposed development during the construction phase will be acutely experienced by the **working population** on Campus. In this regard, loss of amenity and accessibility issues are likely to negatively impact staff albeit to a limited degree given the scale of the build. Subject to the application of appropriate mitigation measures any such impacts would not be significant and would be temporary in nature. In addition, at construction stage there may be positive economic spin off for local businesses.

The impacts of the construction phase of the proposed development will be experienced by out-patients and other **visitors** to the hospital. However, the limited scale of the build means that loss of amenity and accessibility issues are not likely to be significant and will be temporary in nature. Implementation of the remedial and reductive measures proposed during the construction period means the impact of the proposed development will not be significant and any impact will only be temporary.

The commencement of the operation of the children's hospital satellite centre is likely to be experienced as a positive impact by the **resident community** as the quality of paediatric care improves and the care environment is significantly enhanced. The resident community is likely to experience limited visual impacts, if any, attributable to a change to landscape and visual amenities.

The commencement of the operation of the children's hospital satellite centre is likely to be experienced as a positive impact by the staff **working** within the facility given the high quality working environment. In addition, it will represent a significant improvement in terms of the quality of the facilities offered. Loss of amenity and accessibility issues during the operational phase are expected to be limited.

The completion of the children's hospital satellite centre and the commencement of the operational stage is likely to be experienced as a positive impact by out-patients and **visitors** to the hospital. Limited loss of amenity is envisaged.

7.2 Traffic and Transportation

A comprehensive traffic and transport assessment has been undertaken for the proposed National Paediatric Hospital Project.

In order to inform the Transport Strategy for St James's Hospital campus as a whole, and the design principles underpinning the new children's hospital a baseline transport appraisal was initially undertaken. A sustainable Transport Strategy was then prepared in order to improve existing and to meet the future, transport needs. The strategy includes mitigation proposals to cater for the increased travel demand on the regional and local road, public transport, walking and cycle networks and takes cognisance of national, regional and local transport policy. The transport strategy and extent of the transportation appraisal undertaken has been established in consultation with the Roads and Traffic Departments of Dublin City Council, South Dublin County Council, Fingal County Council and the National Transport Authority.

7.2.1 Transport Policy

National and local transport policy, including the Department of Transport, Tourism and Sport's 'Smarter Travel', the current Local Authority Development Plans (Dublin City Council, South Dublin County Council and Fingal County Council) and the National Transport Authority's Transport and Implementation Strategies for the Greater Dublin Area all seek to encourage a modal shift from private car usage to more sustainable modes (public transport, walking and cycling).

The Dublin City Council Development Plan 2016-22 Issues Paper reinforces and continues the existing policy with respect to modal shift, while also placing greater emphasis on cooperation between various agencies responsible for public transport "*in order to accommodate as much movement as possible by high quality public transport, by walking and by cycling*[15]".

The on-going change to more sustainable modes of transport places significant emphasis on the importance of 'mobility management' implementation at large employment centres, targeted at reducing car use at workplaces, schools and in residential areas.

In line with national policy, both South Dublin County Council and Fingal County Council have sustainable transport objectives incorporated within their County Development Plans. South Dublin County Council sees Tallaght Hospital as an important element of the success of Tallaght Town Centre, for which a number of transport schemes focused particularly on improvements to sustainable modes of transport are proposed. Connolly Hospital will benefit from improved traffic management within Blanchardstown Town Centre and continued improvements to bus services, as well as the comprehensive proposals to enhance the cycle network in the area.

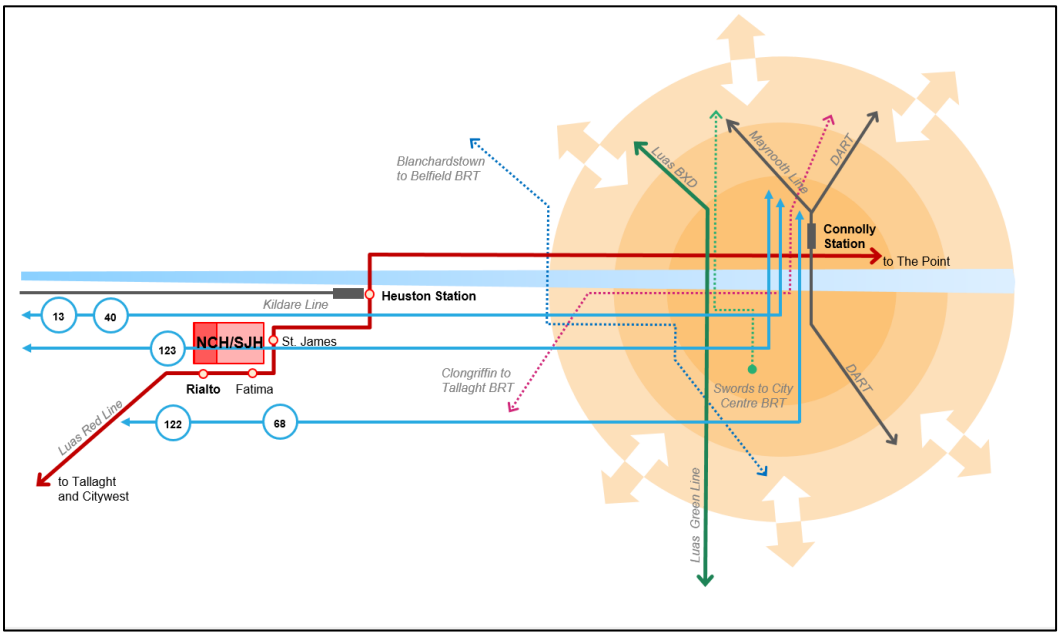
7.2.2 St James's Hospital

Receiving Environment

The baseline appraisal of existing travel demand and the transport networks serving the St James's Hospital campus confirms a high degree of public transport accessibility and availability of capacity to meet additional travel demand by bus and rail. The site of the new children's hospital at St James's Hospital campus has the distinct advantage of being directly served by the LUAS red line and onward connections to regional and inter-city rail networks at Heuston and Connolly Stations and with regional bus services at Busáras, as well as connectivity to the Dublin Bus network in the City. In overall terms, the regional population catchment which can access St James's Hospital campus within one hour by public transport is just over one million.

Ongoing and planned improvements to public transport in the Greater Dublin Area will improve accessibility to St James's Hospital campus even further prior to the completion of the new children's hospital. These improvements include the LUAS Cross City project currently under construction and continuing upgrading of the level of bus service, including three Swiftway 'Bus Rapid Transit' routes proposed to cross the city.

Figure 3: Public Transport Access to St James's Hospital Campus



[15] Dublin City Council Development Plan, 2016-22, pg. 13.

The National Transport Authority and Dublin City Council have invested, and are likely to continue to invest, in cycle and pedestrian network improvements within and connecting to the City Centre. Dublin City Council in conjunction with the National Transport Authority have delivered part of the Grand Canal cycle route between Ballsbridge and Portobello and are actively working on the section of this route between Portobello and Inchicore. The St James's Hospital campus will directly avail of some of these improvements over the next 5 year period.

In terms of the local road network and onward connections to the regional and national road network, the baseline appraisal identified that, as with most other city centre locations, the local road network can experience congestion during both the morning and evening peak commuter traffic periods. Outside of these periods, the local road network functions quite well, generally within the capacity of the various road links and junctions.

Within St James's Hospital campus, there is currently quite a large dependency on private car usage amongst staff, with 54% of staff currently driving to work. Staff car parking is currently provided free of charge, with plans for parking charges to be introduced for staff shortly. The campus also experiences considerable volumes of 'through traffic' between St James's Street and South Circular Road.

A Sustainable Transport Strategy

Based on prevailing transport policy and an understanding of the receiving environment, a number of core principles underpinning the Transport Strategy for St. James's Hospital campus have been established, reflecting the travel needs of patients, visitors and staff to the new children's hospital and the wider campus. The strategy therefore, has two key objectives as follows:

- To manage the potential traffic impact the development proposals have on the receiving environment to ensure that surrounding street network is not significantly adversely impacted on
- To provide staff, patients and visitors with a choice of travel modes to the Hospital ensuring their healthcare experience is as comfortable and convenient as possible

The core principles underpinning the Transport Strategy are as follows:

- **An accessible Hospital campus** - providing efficient access for all users, with particular focus on the accessibility experience of patients and their families, staff and ambulances
- **A balanced car parking strategy** - the provision and management of car parking is critical to the success of the Strategy and functionality of the Hospitals. It is important to provide adequate car parking to cater for the variety of needs that will be generated by the Hospital campus, in particular for patients and their families, while limiting the amount of employment or commuter car parking provided. This strategy provides commitment to both national and regional transport planning policies through the minimisation car parking provision on campus, particularly for commuters
- **Mobility management planning** - The St James's Hospital Campus Smarter Travel programme has been established and is currently being implemented. The Smarter Travel programme is underpinned by realistic and deliverable measures, supported by key stakeholders including the National Transport Authority, Dublin City Council and public transport service providers, and will be actively monitored to ensure success. It will also be externally focused in terms of continued engagement with the local community to ensure that any travel demand impacts, including parking issues are addressed as they arise
- **Wayfinding and journey planning** - ensuring that legibility and ease of movement is provided for, taking into account both the external transport networks and the existing St James's Hospital campus internal circulation
- **A functional Hospital campus environment** – providing an attractive and safe environment for pedestrians and cyclists, where vehicular access minimises the impact on the environment and landscape. Pedestrian improvements are currently planned to improve the footpaths along the internal road network within the Hospital campus

St. James's Hospital Campus Smarter Travel Programme

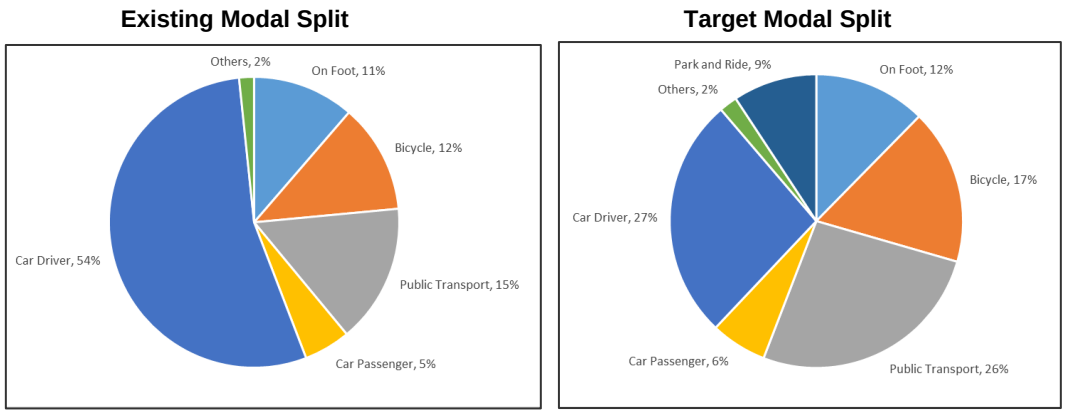
The St James's Adult Hospital, the NPHDB and the Children's Hospital Group have committed to the on-going mobility management implementation programme, working with the key transport authorities and service providers to provide staff and visitor's to the Hospital Campus with positive travel choices. A lot of work has already been done, including the appointment of a full time Mobility Management Coordinator, and support for staff Park and Ride along the LUAS red line to encourage sustainable travel.

St James's Adult Hospital is currently investing in a significant upgrade of cycle and pedestrian facilities for staff, including a 'central change facility' (incorporating, lockers, changing rooms and showers) and an increase in secure cycle parking. The design of the new children's hospital has also incorporated significant mobility management measures, including a 'central change facility' and provision for up to 400 cycle parking spaces, with the majority securely provided within the basement of the new children's hospital.

The mobility management programme will ensure that the travel demands of patients, visitors and staff are fully catered for during the construction stage of the new children's hospital. The Smarter Travel Programme will incorporate the existing three children's hospitals relocating from Temple Street, Crumlin and Tallaght, ensuring that the transition to the St James's Hospital for staff is supported in terms of meeting travel needs. The Smarter Travel Programme will consider and will be available to all users of the hospital campus, including the Irish Blood Transfusion Board, Trinity College and private clinics.

A comparison of current staff travel modes at St James's Adult Hospital and the targets set by the Smarter Travel Programme for when the new children's hospital becomes operational are presented in Figure 4.

Figure 4 Modal Split Targets



These targets are considered to be wholly achievable, given the level of accessibility by each mode that the staff of St James's Hospital campus can avail of, and are in line with the travel demand management objectives of Dublin City Council.

In order to provide oversight and governance to the Smarter Travel programme, a Working Group has been established, comprising representatives from St James's Hospital and the existing children's hospitals which are relocating. In addition to the Working Group, a Steering Group is also in place, including representation from the National Transport Authority Smarter Travel Workplaces Team and Dublin City Council. Both of these groups will ensure that planned mobility measures are being adequately implemented and will monitor progress taking any necessary corrective action to ensure that the travel mode split targets set are being achieved. The key Mobility Management Plan measures are as follows:

- The reduction in the number of staff parking spaces within the Campus
- The introduction of parking charges for staff on the Campus and the retention of parking charges for visitors
- The extension of the existing on-street pay parking system in agreement with the local residential community, where required
- The provision of quality cycle facilities, changing rooms and cycle parking facilities, at both the existing St. James's Hospital and the new children's hospital
- The expansion, proactive promotion and marketing of the Government's 'Taxsaver' and 'Cycle to work' programmes
- The provision of staff subsidies to use the existing Park and Ride facilities along the LUAS red line
- The establishment of a centralised commuter centre, providing all transport services in one location within the Campus

The Proposed Scheme

The new children's hospital will have 380 in-patient beds along with 93 day care beds. In addition, the new children's hospital (including its satellite centres) will cater for over 320,000 annual out-patient visits and non-consultant clinics along with approximately 120,000 urgent care cases per annum. The existing St James's Hospital (excluding Trinity College, Irish Blood Transfusion Service, and the Private Clinic) currently employs approximately 4,500 staff with approximately 3,000 staff working core weekday hours. The number of staff working on campus will increase to 7,500 staff, 5,000 of which are expected to work core weekday hours following the construction of the new children's hospital.

Traffic Management

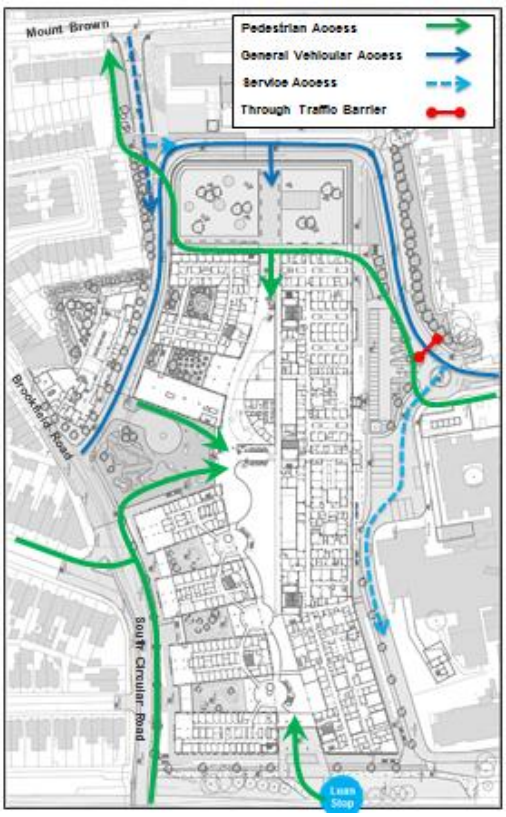
Designing for the new children's hospital has afforded the opportunity to look at the St James's Hospital campus as a whole in terms of catering for the travel needs of all users, including ensuring that the future expansion of the Adult Hospital and the emerging plans for the future maternity hospital are accommodated.

The design philosophy adopted has been to significantly increase the accessibility and permeability of the Hospital Campus for walking and cycling and providing connectivity to the public transport networks, either directly serving or stopping close to the Hospital Campus.

In addition to the existing St James's LUAS stop, a new direct pedestrian access from the Fatima LUAS stop into the campus, will shortly be opened which will also facilitate additional connectivity to bus routes to the south of the campus, along Cork Street. The new children's hospital proposals include a new direct access from the LUAS Rialto stop, while there will also be a new pedestrian route opened up from Mount Brown, which will also directly connect to bus services running along this corridor.

Further restrictions to vehicular movement through the campus will be applied, with a through route maintained for buses, emergency vehicles and selected permitted users only. The vehicle barrier will be controlled using an Automatic Number Plate Recognition (ANPR) system and will remove a significant volume of non-hospital related traffic who currently use the campus. The existing hospital campus entrances off St James's Street and at Rialto will be upgraded as part of the proposed development, while a new entrance off Mount Brown to the basement car park of the new children's hospital will provide additional flexibility for distribution of traffic movements across the local road network, thereby mitigating traffic impact. The primary access routes to the new children's hospital are presented in Figure 5.

Figure 5: Site Layout – New Children's Hospital at St James's Hospital Campus



Car Parking and Management Proposals

The provision of appropriate levels of car parking and its management will significantly contribute to the successful implementation of the Transport Strategy for the hospital campus, including the new children's hospital. Achieving the correct balance of provision is however important, particularly in order to meet the needs of patients and their families. This is also an important consideration in terms of ensuring that there isn't an impact on the surrounding neighbourhoods in terms of potential parking overspill.

Based on the Smarter Travel mode targets established, an understanding of hospital travel demand and mitigating impact locally, the following levels of car parking provision are proposed:

- Staff – there will be an overall reduction in staff car parking within the St James's Hospital campus from 1124 spaces currently to 880 spaces, equating to 244 less parking spaces. The reduction in staff parking is expected to commence towards the end of 2015 as part of the decant of uses from the site before construction of the new children's hospital begins.
- Patient / Public – there will be an increase from 467 spaces to 1131 spaces, equating to 664 additional visitor spaces (includes the provision of 675 new visitor spaces and the loss of 11 existing visitor spaces).

The new children's hospital parking proposals include a net gain in parking of 420 spaces.

Within the proposed children's hospital development, a total of 1,000 of these spaces will be accommodated, 675 of which will be patient/ public, with 325 allocated to staff. Staff will not be permitted to use public car parking spaces during the day.

The Hospitals are particularly aware of their responsibilities in terms of managing staff parking. All staff car parking within the hospital campus will be fully managed, including issuing parking permits based on need and the introduction of parking charges. The introduction of parking charges for staff will both encourage more staff to choose alternative travel modes and the revenue generated can be invested in alternative modes thereby further improving their attractiveness. The following parking controls will be introduced on the St James's Hospital campus as follows:

- Car Park Registration - All cars wishing to access any of the staff car parking spaces have to be registered with the Hospital. It is proposed to commence the registration of the new parking management measures later in 2015 with staff parking charges introduced at the beginning of 2016.
- Daytime Permit - Staff can apply for a permit that allows access to all staff parking spaces on campus on an annual basis. It is proposed that the cost of the Daytime Permit is deducted directly from salary on a monthly/ fortnightly basis. The purchase of a parking permit does not guarantee a parking space. In the event of over subscription as part of the parking registration process, eligibility for allocation would be based on the following set of criteria as follows:
    - Disability/Medical requirements
    - Car sharing
    - Clinical necessity
    - Distance from home to hospital
    - Access to public transport
    - Child care/family responsibilities
- The phased introduction of parking charges beginning in early 2016. Staff parking charges will be introduced on both an annual and on a daily basis. The introduction of a daily parking charge for staff does not commit staff to a single mode compared to the annual pass and allows staff flexibility throughout the year to choose their most appropriate mode for different times of the year.
- Night-time/ Weekend Permit - All staff will be permitted to enter any car park (including the visitor car park) for free at night time from 19:00 on weekdays and all day Saturday and Sunday.

External to the Campus, the hospitals will work closely with local communities and Dublin City Council to ensure that any additional on-street parking controls are implemented. These measures will be put in place, with the support of the local community, in advance of any construction works commencing

The provision of 675 additional car parking spaces for patients and visitors represents a significant improvement to that provided at the existing children's hospitals and will mitigate against parking impact on the local roads and streets surrounding the Hospital Campus.

Traffic Impact

A transport appraisal has been undertaken to evaluate the impact of the new children's hospital on the surrounding street network. The extent of the appraisal has been scoped with Dublin City Council and in consultation with the National Transport Authority.

The appraisal assumes the Smarter Travel Programme's set targets continue to be implemented and met, takes account of the planned changes in the level of staff and public car parking provided and the changes proposed to the access arrangements to the Hospital Campus, including the new car park access off Mount Brown.

The overall reduction in staff car parking provision means that the relative increases in traffic generation during the morning peak commuter period associated with patient activity are marginal. With the exception of the Mount Brown/James's Street/Thomas Street east-west route, additional traffic on the surrounding road and junction network is less than 5%. The transport appraisal indicates that the increase in traffic along the Mount Brown/James's Street/Thomas Street route does not create any significant additional impact on junction performance or traffic movement.

Throughout the day when existing traffic volumes are lower than the morning and evening peak periods, the appraisal indicates that the relative increase in traffic volumes on the local road network increase above 5%. The traffic analysis indicates however that the local road network has sufficient capacity to cater for the additional traffic demand, primarily related to outpatient appointments.

The level of additional traffic generated during the evening commuter peak period is also limited by the reduction in staff parking. Relative traffic increases on the local road network remain below 5%, with the exception of the Mount Brown/James's Street/Thomas Street route. As with the morning peak evaluation, this additional traffic does not create any significant additional impact on junction performance or traffic movement. While traffic leaving the hospital campus during the evening peak period will experience delay on the local road network, the level of additional external impact is limited. Proposed upgrades to the existing Hospital campus junctions off James's Street and Rialto, together with the removal of non-hospital through-traffic, will ensure that better traffic management in the evening peak, and will have added benefits in terms of reducing the delays currently experienced by bus services running through the Campus.

Future Maternity Hospital

The St. James's Hospital campus will also potentially support the emerging proposals for the Maternity Hospital to the east of the proposed new children's hospital, although it does not form part of this planning application. The Maternity Hospital proposals are at an early stage and there is no permission to build them. Given the absence of information it is not possible to assess the impact of this development, either singly or cumulatively, other than at a very high level. This matter is referenced in Section 6.14 below.

In terms of staff at the future Maternity Hospital, their travel demands will be provided for through the expansion of St. James's Hospital Campus Smarter Travel Programme. Any future staff of the emerging Maternity Hospital would have access to the wider staff parking provided on St. James's Hospital campus. It is envisaged that public transport accessibility within the Greater Dublin Area will continue and that wider improvements to public transport accessibility will help reduce the demand from staff to use cars

Construction Stage Transport Impacts

The National Paediatric Hospital Project has been particularly sensitive to ensuring that transport impacts during construction of the new children's hospital are minimised for both the existing operation of the St James's Adult Hospital and the local community. Key reasons for the early establishment of the St James's Hospital Campus Smarter Travel programme include:

- To assist manage the loss of existing staff parking spaces as a result of the decant programme, the removal of staff parking spaces on campus will start later in 2015; and
- To ensure that travel demand and the continued safe access for emergency vehicles is managed during the construction phase of the project.

As the new children's hospital will be constructed over a large part of the existing hospital campus, a total of 607 existing staff car parking spaces will be removed during the construction phase with a corresponding reduction in traffic entering and exiting the Hospital on a daily basis.

Construction traffic will be managed at all times. The Contractor will not have any construction staff car parking provision on site and, as is the case with all city centre construction sites, will be required to take responsibility for, and manage the travel requirements of his staff. The proposed additional parking management measures in the neighbouring roads and street will ensure that construction related parking impacts external to the site will be controlled. In addition, as part of the outline Construction Management Plan, the contractor will be required to liaise on an on-going basis with local community groups.

The greatest traffic impact during construction will be as a result of the export of material from site during basement excavations, over an approximate 18 month period, and the import of materials (including concrete deliveries) for the construction process. In terms of the former, at peak excavation, approximately 150 daily heavy goods vehicle (HGV) loads are likely to be generated. In terms of material import, approximately 100 HGV's per day are likely to be generated during the peak period.

All material exports and imports will be strictly controlled by the Contractor and enforced by NPHDB under the works contract. Access routes to and from the site are prescribed by Dublin City Council and will be adhered to. The increase in traffic associated with construction activities will be off-set by the projected reduction in traffic associated with the removal of the 607 parking spaces during the construction phase. Therefore, the construction impact on the operational performance of the surrounding road network will be minimal during peak periods, with some increases in construction vehicle activity expected during the off-peak periods.

In addition, to general controls on construction traffic movement being imposed, the project will avail of the former Unilever Site at Davitt Road to store construction materials. This will have the benefit of the Contractor being able to manage movements of material to the site so that they are undertaken at suitable times that minimise traffic impact on the local road network.

Residual Impacts

Following the construction of the new children's hospital, it is acknowledged that the surrounding street network will continue to experience traffic queuing and delays at some periods through a typical week day. The mitigation proposals included as part of the Transport Strategy for the St James's Hospital campus and the new children's hospital will ensure however that the increase in traffic levels and associated impact during these periods are kept to a minimum

7.2.3 The Children's Hospital Satellite Centre at Tallaght Hospital Campus

The children's hospital satellite centre at Tallaght Hospital campus will provide urgent care facilities along with secondary acute outpatient services, including rapid access general paediatrics clinics to a geographical catchment that includes a fast-expanding area of the Greater Dublin Area as well as of its immediate hinterland.

The National Children's Hospital Tallaght, which will close following the opening of the new children's hospital at the St James's Hospital campus and its associated children's hospital satellite centres, is currently located within Tallaght Hospital. The relocation of the children's hospital to St James's Hospital campus will result in an overall reduction in activity at Tallaght Hospital.

Receiving Environment

Tallaght Hospital is situated within Tallaght Town Centre, availing of good connectivity by all travel modes. Access to the regional road network, including Cookstown Way, Belgard Road, the N81, and further afield, the N7 and the M50, ensures good access for patients. Furthermore, the hospital is very well served by public transport, with frequent bus services and the LUAS red line within its immediate vicinity. The nearest LUAS stop, Hospital, is located adjacent to the Hospital campus itself.

The location of Tallaght Hospital campus within a consolidated urban area with a relatively dense street network, means that it is well accessed by sustainable modes such as walking and cycling. These networks are likely to be further improved in the future through a number of schemes that include, for example the upgrade of the roundabouts on Belgard Square North into pedestrian and cycle friendly signalised junctions.

Traffic counts at key locations on the surrounding road network were carried out on the 19th November 2014. These confirmed that the main Hospital access is off Belgard Square North, catering for the vast majority of traffic entering and exiting the Hospital. The traffic flows on Belgard Square North, east of the hospital access are tidal in nature, with higher eastbound trips than westbound trips in the morning and vice versa in the evening peak. It is observed that during the peak hours, junctions along Belgard Square North cater for high traffic levels and are likely to be operating close to capacity.

The Proposed Scheme

It is estimated that approximately 90 staff will work at the children's hospital satellite centre at Tallaght Hospital campus. The estimated number of outpatient and urgent care visits corresponds to 15,000 and 25,000 per year respectively.

The existing National Children's Hospital facilities within the Tallaght Hospital building will be vacated with the majority of staff relocating to the new children's hospital at St. James's Hospital campus. There will be no intensification of the Hospital activities as a result the proposed scheme, and there will be a net reduction of staff at Tallaght Hospital.

The existing vehicular access leading to the Geriatric Department and the car parking located between this building and the main hospital building are proposed to be realigned to provide a junction with the main hospital access further to the south.

The children's hospital satellite centre at Tallaght Hospital campus will avail of a dedicated ambulance area, a short-term lay-by and an extension of the existing lay-by leading to the main entrance of the Adult Hospital. The enhancement of the public realm opposite the proposed children's hospital satellite centre will result in the replacement of the existing taxi lay-by along the canopy by a landscaped area. Capacity for taxis will be provided at the south of the new building on a new drop-off/pick-up zone.

Due to the reduction in activity resulting from the relocation of most of the National Children's Hospital facilities, no additional car parking is proposed. Dedicated staff cycle parking and convenience public cycle stands will be provided in proximity to the children's hospital satellite centre main entrance.

Traffic Impact

On the basis of the net reduction in activity at Tallaght Hospital, there will be a resulting net reduction in traffic impact as a result of the children's hospital satellite centre at Tallaght Hospital campus. Also, since no changes to the quantum of car parking within campus are proposed, the reduced demand will result in increased car parking capacity as and when the children's hospital satellite centre and the main children's hospital are fully operational.

Construction Stage Transport Impacts

The children's hospital satellite centre at Tallaght Hospital campus is located in close proximity to the regional road network. During the peak construction period, it is estimated that a maximum 64 HGV movements (32 HGV in and 32 HGV out) per day will be generated by the construction activities. The regional and local road network has the capacity to accommodate the construction phase traffic.

Furthermore, it is expected that, during the period of highest construction intensity, there will be approximately 100 construction staff working on site. Robustly assuming a 70% car (driver) mode share, the number of additional daily vehicular trips associated with construction staff would be 70 vehicles, 140 two-way trips. It is assumed that the majority of these trips would take place outside the normal network peak periods as construction activity tends to start and end outside of the traditional peak periods. As part of this appraisal it has been assumed 25% of these (18 vehicles) enter during the morning peak period and leave during the evening peak period. The total peak traffic generation during the most intensive construction stage therefore equates to 22 trips in and 4 trips out during the morning peak period and the reverse in the evening peak period.

Residual Impacts

The transportation impacts of the children's hospital satellite centre at Tallaght Hospital campus are therefore considered to be insignificant. The proposed modifications to the internal access layout will generally improve the internal circulation and provide, where possible, additional drop-off/pick-up capacity in the vicinity of the children's hospital satellite centre.

A Mobility Management Plan will be implemented for the children's hospital satellite centre, to promote sustainable travel means to the Hospital Campus.

7.2.4 The Children's Hospital Satellite Centre at Connolly Hospital Campus

The children's hospital satellite centre at Connolly Hospital campus will also provide urgent care facilities along with secondary acute outpatient services, serving the geographical catchment to the north and northwest of Dublin.

Receiving Environment

The Connolly Hospital campus is situated in Blanchardstown and has good road access to the N3 and the M50 Motorway. The local area is served by a number of Dublin Bus services including the 17A, 220, 38/ 38A/ 38B, 39/ 39A. In the vicinity of the site, there are cycle facilities provided along the R843 and Waterville Road. The Connolly Hospital campus has good pedestrian access to the Waterville residential area.

Traffic counts on the surrounding road network were carried out on 19th November 2014. The Connolly Hospital campus has two entrances, with the entrance from the south via the N3 observed to be much busier than the northwest entrance, catering for 75-80% of the hospital trips.

The Proposed Scheme

It is estimated that approximately 90 staff will work at the children's hospital satellite centre at Connolly Hospital campus with an estimated 15,000 outpatient appointments and 25,000 urgent care visits to be catered for annually.

The proposed children's hospital satellite centre at Connolly Hospital campus is to be located to the front of the main hospital building. The children's hospital satellite centre at Connolly Hospital campus has a dedicated ambulance area and two set down areas to facilitate the arrival of patients.

Traffic Impact

The children's hospital satellite centre at Connolly Hospital campus is expected to generate approximately 60 trips, two-way, during the morning peak period and 50 trips, two-way, during the evening peak period. The transport appraisal demonstrates that the projected increase in traffic on the surrounding road network is generally less than 1% with the exception of the Hospital's direct access routes. The additional traffic generated by the children's hospital satellite centre will therefore have little or no impact on prevailing traffic conditions in and around the Hospital.

Construction Stage Transport Impacts

The site for the children's hospital satellite centre at Connolly Hospital campus is located in close proximity to the national and regional road network. During the peak construction period, it is estimated that a maximum 64 HGV movements, 32 HGV in and 32 HGV out, per day will be generated by the construction activities. Furthermore, it is expected that, during the period of highest construction intensity, there will be approximately 100 construction staff working on site resulting in 80 vehicles, 160 two-way trips, per day. During the construction phase, the additional peak hour traffic flows will be in the region of 28 vehicles per hour, two-way, which is less than projected during the operational phase. This increase in traffic will not have any material impact on prevailing traffic conditions in the area.

Residual Impacts

The transportation impacts of the children's hospital satellite centre at Connolly Hospital campus are considered to be insignificant. A Mobility Management Plan will be implemented for the children's hospital satellite centre, to promote sustainable travel means to the Hospital Campus.

7.3 Soil and Geology

7.3.1 St. James's Hospital

An impact assessment of the proposed National Paediatric Hospital Project development sites at, and associated with, St. James's Hospital campus on the existing soils and geological environment was carried out using data collection from detailed desk study information and four phases of site specific site investigation and monitoring work. These investigations included the excavation of boreholes and trial pits, soil sampling and in-situ testing, surface and downhole geophysics, water sampling, and laboratory testing. These works provided information on the ground conditions within the subject sites and provided geotechnical input into the proposed design of the National Paediatric Hospital Project elements on St. James's Hospital campus.

The geology encountered at the new children's hospital, Family Accommodation Unit and Children's Research and Innovation Centre sites was consistent with the wider central Dublin region and the overburden included the following:

- Made Ground – tarmac, concrete overlying gravel fill/hardcore or sandy gravelly CLAY with low cobble content, occasional pieces of cinders, brick and/or concrete with an average thickness of c1.5m
- Glacial Deposits; Glacial Till, Dublin Boulder Clay with some gravel pockets with a total thickness of 10-15m

The made ground and upper native overburden was sampled and analysed for a range of compounds and contaminants to allow classification for disposal purposes. The National Paediatric Hospital Project sites at St. James's Hospital campus were found to be generally free from contamination with the exception of a small number of isolated hotspots which are associated with former site activities.

The underlying bedrock comprised Carboniferous Limestone (Calp) described as thinly to medium bedded dark grey to black limestone interbedded with mudstone. During the site investigations bedrock was encountered at depths of c.10-15m below ground level with the rock surface undulating over short distances.

The geological environment of the site can be described as a passive/benign geological environment in that it is an area of thick low permeability subsoil underlain by competent limestone in a historically stable geological environment. The Dublin region is the most extensively investigated, characterised and understood geological areas of the Country and there are numerous examples and case histories of large excavations, retaining walls and basements in the area which are similar to the proposed development. A large basement of up to 2-3 storeys is proposed for the new children's hospital and a small basement for the Family Accommodation Unit. A small single storey is proposed for the Children's Research and Innovation Centre. Both sites will also include secant pile retaining walls. The Davitt Road site is intended as a temporary construction compound and dry goods store which will be made available to the contractor during the construction works.

Potential impact of the National Paediatric Hospital Project on the soils and geological environment at St. James's Hospital campus include:

- The excavation of made ground, subsoil and a minimal amount of rock and reuse/recover/disposal off site
- Accidental spills or leaks of construction related material
- Excavation instability and settlement

The potential for impacts on the soils and geological environment at the Davitt Road site are limited as it is intended as a dry-goods storage area only with no excavation of soil required. There are no predicted impacts at this site.

Proposed mitigation measures include the following:

- Construction of retaining wall and ground anchors which are based on detailed site specific geotechnical information to ensure ground stability and prevent settlement
- Controlled excavation of made ground, soil and rock and management under the Waste Management Act
- Reuse of subsoil on site or for other projects where possible
- Good housekeeping on the project to mitigate against the risk of any spills and reduce impacts associated with dust and dirt
- An outline Construction Management Plan will be put in place and will outlined how spills or environmental incidents will be dealt with should they occur

The principle residual impact on the soils and geology environment from the proposed National Paediatric Hospital Project at St. James's Hospital campus is the excavation of soil and some rock which is a permanent impact that cannot be avoided due to the nature of the proposed development. Design and maintenance of fuel and waste storage facilities will ensure no ground contamination impacts arise during the operational phase of the National Paediatric Hospital Project. No issues will arise at Davitt Road as no invasive construction is proposed.

7.3.2 Tallaght Hospital

A site investigation was carried out for the children's hospital satellite centres at Tallaght Hospital campus to determine the component layers of the underlying soil.

The existing soil profile consists of topsoil overlying made ground on very stiff sandy clay, at an average depth of 1.2m. The geology in the wider area consists of limestone and shale bedrock. Bedrock was not encountered during the site investigation. It is envisaged that there will be a high level of soil stripping in order to achieve a suitable founding strata for ground slabs, roadways/pavements and foundations. In addition, there will be a number of deep excavations to allow for underground service diversions.

Potential impacts from these works are as follows:

- Excavation of material for foundations, disturbance of topsoil and subsoil to enable the levelling of the site, deliveries of imported engineering fill, crushed stone, concrete, reinforcement and other construction materials
- Risk of accidental pollution incidences from spillage or leakage of oils from construction machinery
- Accidental spillages may result in contamination of soils and groundwater underlying the site should contaminants migrate through the subsoils and impact underlying groundwater

As the proposed development is located at an urbanised site, next to the existing Tallaght Hospital, there is likely to be negligible impacts during the operational phase.

The following measures are proposed to mitigate the effects of impacts referenced above:

- Where feasible, any excavated material will be re-used for landscaping purposes
- All potentially contaminated soil should be tested for level of contamination and disposed of accordingly
- Potentially contaminated groundwater and polluted surface water generated during construction activities will not be discharged directly to ground or surface drainage
- Oils, solvents and paints used during construction will be stored within temporary storage areas
- Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles, will take place in a designated area
- An outline Construction Management Plan will be implemented on site
- Monitoring will be carried out on site during construction
- Any temporary construction compounds will be completely removed from the site following the end of the construction phase and these areas will be restored to their original condition, where practical

There are no predicted significant impacts arising from the proposed construction or operation of the children's hospital satellite centre at Tallaght Hospital campus. The remedial measures indicated should ensure that the soil and geology environment is not adversely impacted during construction or operational phase.

7.3.3 Connolly Hospital

A site investigation was carried out for the children's hospital satellite centres at Connolly Hospital campus to determine the component layers of the underlying soil.

The existing soil profile consists of topsoil overlying made ground to shallow depths on limestone bedrock, at an approximate depth of 2m. The geology in the wider area consists of limestone and shale bedrock. Ground levels slope gradually downwards from north to south across the site. It is proposed that excavated material from the north of the site will be reused at the southern section of the site to provide a level surface for the proposed construction.

Potential impacts from these works are as follows:

- Excavation of material for foundations, disturbance of topsoil and subsoil to enable the levelling of the site, deliveries of imported engineering fill, crushed stone, concrete, reinforcement and other construction materials
- Risk of accidental pollution incidences from spillage or leakage of oils from construction machinery
- Accidental spillages may result in contamination of soils and groundwater underlying the site should contaminants migrate through the subsoils and impact underlying groundwater

As the proposed development is located at an urbanised site, next to the existing Connolly Hospital, there is likely to be negligible impacts during the operational phase.

The following measures are proposed to mitigate the effects of impacts referenced above:

- Where feasible, any excavated material will be re-used for landscaping purposes.
- All potentially contaminated soil should be tested for level of contamination and disposed of accordingly.
- Potentially contaminated groundwater and polluted surface water generated during construction activities will not be discharged directly to ground or surface drainage.

- Oils, solvents and paints used during construction will be stored within temporary storage areas.
- Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles, will take place in a designated area.
- An outline Construction Management Plan will be implemented on site.
- Monitoring will be carried out on site during construction.
- Any temporary construction compounds will be completely removed from the site following the end of the construction phase and these areas will be restored to their original condition, where practical.

There are no predicted significant impacts arising from the proposed construction or operation of the children's hospital satellite centre at Connolly Hospital campus. The remedial measures indicated should ensure that the soil and geology environment is not adversely impacted during construction or operational phase.

7.4 Hydrogeology and Hydrology

7.4.1 St. James's Hospital

An impact assessment of the proposed National Paediatric Hospital Project development sites at, and associated with, St. James's Hospital campus on the existing hydrogeological and hydrological environments was carried out using data collection from detailed desk study information and four phases of site specific site investigation and monitoring work. These investigations included the excavation of boreholes, soil sampling and in-situ testing, surface and downhole geophysics, hydrogeological testing, water sampling and laboratory testing. These works provided information on the groundwater and surface water regimes within and associated with the proposed National Paediatric Hospital Project sites and provided input into the proposed design of the National Paediatric Hospital Project elements on St. James's Hospital campus.

The National Paediatric Hospital Project development sites at St. James's Hospital campus include the new children's hospital, Family Accommodation Unit, Children's Research and Innovation Centre and the Davitt Road construction compound. These sites are located within the Dublin Urban Groundwater Body component of the Eastern River Basin District. Groundwater flow is generally north-eastwards to the coast and also the River Liffey.

The Dublin region is the most extensively investigated, characterised and understood geological areas of the Country and there are numerous examples and case histories of large excavations, retaining walls and basements in the area which are similar to the proposed development.

The geology underlying the St. James's Hospital campus sites consists of limestone bedrock, the Lucan Formation, which is classified as a locally important aquifer which is moderately productive only in local zones. Flow in the aquifer is restricted to and controlled by fractures within the rock which is essentially impermeable in itself. The aquifer's productivity in a local zone will depend on the number, frequency and size of fractures present. No major bedrock fault structure is identified at the project sites. The bedrock is overlain by a thick blanket of low permeability clay which covers most of central Dublin and is known as Dublin Boulder Clay.

The hydrogeological environment of the site can be described as a passive/benign geological environment in that it is an area of thick low permeability subsoil underlain by competent limestone in a historically stable geological environment. The site is not located in an area of groundwater recharge or discharge. The groundwater quality in the Dublin Urban Groundwater Body and at the project site has been found to be of good quality. The Groundwater Body is considered 'At Risk' from contamination from activities associated with urban environments such as contaminated ground and leaking sewer networks.

The sites lie within the catchment of the River Liffey which is the principle surface water feature draining the Dublin Urban Groundwater Body. The sites are within the sub-catchment of the Camac River which passes just to the north of the main project site and flows eastwards where it joins the Upper Liffey Estuary at Heuston Station. The River Liffey flows through central Dublin before entering Dublin Bay which contains a number of important conservation sites designated under the Habitats Directive. The Grand Canal is also located in close proximity to the Davitt Road and the new children's hospital site although it is not linked to either via groundwater or surface water pathways. The River Camac is not considered to be in hydraulic connectivity with the groundwater beneath the St. James's Hospital campus due to the hydrogeological setting and presence of boulder clay which prevents groundwater flow from entering the River in the vicinity of the site. However, the Camac is connected to the site via the existing Drimnagh Sewer, which is to be realigned within the application site, which is a known source of contamination to the Camac River due to the discharge of sewage to the River during heavy rainfall events, knowns as combined sewer overflows. The proposed new children's hospital and Family Accommodation Unit sites will also be connected via a storm water run-off discharge to the Camac, however, the new system will be much improved as the potential for combined sewer overflows from the sites will be removed and storm water flows will be attenuated and will be put through a petrol interceptor before leaving the new children's hospital and Family Accommodation Unit sites.

A large basement of up to 2-3 storeys is proposed for the new children's hospital and a small basement for the Family Accommodation Unit. A small single storey basement/lower ground floor is also proposed for the Children's Research and Innovation Centre site. Both sites will also include secant pile retaining walls. The structures will entirely be based within the low permeability boulder clay with the exception of a very small area in the south of the new children's hospital site which will likely be founded in the top of the bedrock. As the proposed structures will be constructed within the boulder clay where flows are minimal or absent, there is little potential for the basement and retaining wall to impact on the local groundwater regime. Some shallow perched water is present in the upper 1-3m below ground surface and this will be controlled by the retaining walls which will included weep holes to maintain the groundwater level status quo.

During construction some water entry into the excavation is unavoidable due to rainfall and possible minor seepages through the retaining wall. This water may become muddy as it will be falling in a building site and could become contaminated with sediment, fuels or other construction related materials. As is common practice on construction sites, this water will be collected, treated and discharged to the local foul water drainage network under licence from the regulating authority.

When basement excavations are deep and within a few meters of bedrock the water level in the underlying bedrock aquifer will be locally lowered to allow safe working conditions and reduce the amount of potentially soiled water which needs to be managed and discharged to the foul sewer network. This water will be clean and can be discharged to the local storm sewer network under licence from the regulating authority. Discharges to both storm and sewer networks will be subject to continuous qualitative and quantitative monitoring.

There are no significant impacts predicted on the hydrogeological or hydrological environments predicted as a result of the proposed National Paediatric Hospital Project at St. James's Hospital campus or the Davitt Road construction compound.

7.4.2 Tallaght Hospital

The development is located within the River Dodder Catchment. The nearest identified stream is the Jobstown Stream located approximately 1.5km to the south of the site.

Surface water run-off from the development will be collected in a new drainage system prior to being discharged to the public system. No groundwater recharging is proposed as part of the development. Permeable paving is proposed for areas of new car parking for storage and filtration only prior to discharge to the surface water system. Water is proposed to be supplied from the existing mains system and no groundwater extraction is proposed for the development.

There are a number of potential impacts to ground water from the construction stage of the project, as follows:

- Ground excavation solids
- Waste from cementitious products and other construction debris
- Ground water from surface excavations
- Inappropriate handling and storage of materials and waste

Risks to groundwater that may occur during the construction and operational phase of the development are as follows:

- Accidental spillage of hydrocarbons from the construction plant
- Foul waste and surface water discharging to ground through leaking drainage pipes.

The magnitude of these potential contaminants is dependent on the site management practices during the works. The following measures are proposed to mitigate the effects of impacts referenced above:

- Remedial works to the existing foul and surface water drainage system may be required locally
- All new drainage on site will be pressure tested and have a CCTV survey carried out prior to being made operational
- All fuel storage will require to be contained in tanks with double bund walls with leak detection measures to prevent any accidental discharge
- The contractor will be required to submit and implement a n outline Management Plan detailing surface water management strategy and separation traps during the works.
- Monitoring will be carried out on site during construction

There are no predicted significant impacts arising from the proposed construction of the children's hospital satellite centre at Tallaght Hospital campus. A range of mitigation measures have been proposed for the operational phases of the project. These measures seek to ensure that all discharges from the development are controlled to prevent impacts to receiving systems. No significant residual impacts are anticipated with the measures proposed.

7.4.3 Connolly Hospital

The development is located within the River Tolka Catchment. The nearest identified river is the Tolka River located approximately 0.5km to the south of the site. This River flows in easterly direction prior to discharging to Dublin Bay. In addition, there is an unnamed stream flowing north to south to the east of the site discharging to the Tolka.

There are a number of potential impacts to ground water from the construction stage of the project, as follows:

- Ground excavation solids
- Waste from cementitious products and other construction debris
- Ground water from surface excavations
- Inappropriate handling and storage of materials and waste

Risks to groundwater that may occur during the construction and operational phase of the development are as follows:

- Accidental spillage of hydrocarbons from the construction plant
- Foul waste and surface water discharging to ground through leaking drainage pipes.

The magnitude of these potential contaminants is dependent on the site management practices during the works. The following measures are proposed to mitigate the effects of impacts referenced above:

- Remedial works to the existing foul and surface water drainage system may be required locally
- All new drainage on site will be pressure tested and have a CCTV survey carried out prior to being made operational
- All fuel storage will require to be contained in tanks with double bund walls with leak detection measures to prevent any accidental discharge
- The contractor will be required to submit and implement an outline Construction Management Plan detailing surface water management strategy and separation traps during the works.
- Monitoring will be carried out on site during construction

There are no predicted significant impacts arising from the proposed construction of the children's hospital satellite centre at Connolly Hospital campus. A range of mitigation measures have been proposed for the operational phases of the project. These measures seek to ensure that all discharges from the development are controlled to prevent impacts to receiving systems. No significant residual impacts are anticipated with the measures proposed.

7.5 Flora and Fauna

An assessment of the likely impacts on flora and fauna associated with each element of the proposed National Paediatric Hospital Project was undertaken.

The flora and fauna assessment was undertaken with regard to all relevant guidelines, legislation, policy and plans. Desk and field studies were undertaken, including dedicated site visits to assess habitats and protected species such as bats and birds.

The methodologies used to determine the value of ecological resources within the Zone of Influence of the proposed development, to characterise impacts and to assess the significance of impacts and any residual effects are in accordance with the NRA '*Guidelines for Assessment of Ecological Impacts of National Road Schemes*[16], This methodology is consistent with the '*Guidelines for Ecological Impact Assessment in the United Kingdom*[17].

None of the sites proposed for development, including St. James's Hospital campus, the proposed construction compound at Davitt Road and the children's hospital satellite centres at Tallaght Hospital and Connolly Hospital, contain features of ecological value. Habitats present include buildings, surface carparks and artificial surfaces, amenity grassland (mown areas), ornamental/non-native scrub, flower beds and borders, areas of recolonizing bare ground, some tree lines, hedgerows and groups of trees and scrub. A mound of soil is present at the Davitt Road site.

Despite the limited value of the development sites themselves, they are linked, via the water pathway (rivers) to a number of sites designated for protection associated with Dublin Bay, Special Areas of Conservation and Special Protection Areas, also known as European sites. These sites are designated in order to protect nationally and internationally important numbers of bird species, as well as for wetlands and other habitats. A separate Natura Impact Statement has been prepared.

7.5.1 Impacts

The construction of the new children's hospital, Family Accommodation Unit and Children's Research and Innovation Centre at St. James's Hospital campus, together with the children's hospital satellite centres at Tallaght and Connolly Hospitals, will result in the direct loss of and/or disturbance of the existing habitats within the footprint of the development during initial site preparation/clearance works and during construction activities. However, the habitats and species that will be lost are of negligible ecological or conservation value. Their loss is predicted to be insignificant.

Furthermore, the construction works will not result in any direct land take, reduction of habitat area, or habitat fragmentation within any area of ecological value.

Proposed construction works, including earthworks and alterations to the water table have an associated potential risk of pollution as a result of fuel spillages, oil leakages and other accidents that could, in the absence of mitigation, lead to an adverse impact on water quality. Consequently, given the scale of the proposed development, at St. James's Hospital campus in particular, the habitats and species present in any such affected water body, such as the rivers Camac and Liffey in the case of the St. James's Hospital campus, and the River Tolka in the case of Connolly Hospital campus, could be impacted in the absence of mitigation measures.

7.5.2 Mitigation

The removal of trees or other features suitable for use by nesting birds will where possible be undertaken outside the bird nesting season, avoiding the period 1st March to 31st August. Prior to demolition, all buildings will be checked for the presence of nests of birds such as herring gull and swift and for bat roosts. Should any such features be encountered, works in the vicinity of the nest will cease until advice is sought from a competent ecologist.

As part of the proposed construction at St. James's Hospital campus, and in order to replace potential lost nesting sites, a number of Schwegler Triple cavity swift boxes will be installed. These boxes will be appropriately placed in accordance with the advice of a competent ecologist.

Trees to be retained are to be protected in accordance with *BS5837:2012 'Trees in Relation to Design, Demolition and Construction' – Recommendations'*.

[16] NRA, 2009

[17] The IEEM Guidelines', CIEEM, 2006

A small area of the invasive species Japanese knotweed has been identified at the eastern end of the rear of Donnellan Avenue on St. James's Hospital campus. The affected area has been fenced-off and is excluded from construction works. A programme of management and treatment for the eradication of the invasive species has been put in place under the supervision of a qualified ecologist and in accordance with best practice. The outline Construction Management Plan also incorporates measures to ensure that no invasive species are introduced either deliberately or inadvertently to the site. No material containing invasive species will be imported onto the site.

Comprehensive construction management procedures have been detailed to plan, control and manage the construction phase of the development. These include measures for site clearance, excavation, basement construction, works to services, and general building construction. The procedures have taken account of requirements for protection of the ecological environment and will ensure an orderly and managed construction process.

Comprehensive surface water management measures will be implemented during the construction stage at all sites to prevent any pollution of local surface and ground waters. The excavation will be kept as dry as possible through dewatering. Any surface or groundwater to be discharged from any site will be treated to remove potentially polluting substances such as suspended solids and hydrocarbons. Settlement and interceptors will be used in advance of any water being discharged from site and the discharge will be monitored and regulated under a Discharge Licence.

Protection of groundwater from potentially polluting substances will be dealt with through a number of measures including correct handling and storage of potentially polluting substances. Good housekeeping on all project sites and proper handling, storage and disposal of any potentially polluting substances can prevent soil and/or water contamination. Designated and bunded storage areas will be maintained.

The implementation and effectiveness of these standard measures proposed will be inspected and recorded regularly during the entire construction period and where deficiencies or faults are identified the contractor will immediately remedy them.

7.5.3 Residual Impacts

There will be no impacts on any habitats or species of ecological value or on sites designated for nature conservation, such as the European sites of Dublin Bay, as a result of the development of the proposed developments, either at St. James's Hospital campus, Davitt Road, Tallaght Hospital campus or Connolly Hospital campus. The outline Construction Management Plan will ensure that there are no impacts on surface or ground water. Therefore, no residual impacts will arise. Furthermore, the proposed extensive landscape and planting strategy to be implemented at St. James's Hospital campus will likely result in an overall increase in biodiversity at the site.

7.6 Waste Management

An assessment of the potential impacts associated with waste management during the construction and operational phases of the proposed National Paediatric Hospital Project was undertaken.

The proposed developments fall within the local authority areas of Dublin City Council, for developments at St. James's Hospital campus and Davitt Road, South Dublin County Council, for the children's hospital satellite centre at Tallaght Hospital campus and Fingal County Council for the children's hospital satellite centre at Connolly Hospital campus. These three local authorities are responsible for setting and administering waste management activities in their respective areas which is largely governed by the recently published '*Eastern-Midlands Region (EMR) Waste Management Plan 2015 – 2021*'.

Demolition and refurbishment waste will be generated to allow for construction of the proposed developments. Estimated refurbishment waste quantities at the children's hospital satellite centres at Tallaght and Connolly Hospitals will be relatively small, approximately 110 tonne and 9 tonne, respectively and will primarily be generated from the reconfiguration of existing walls and partitions to create access links into the new buildings. There will be a significant volume of demolition material generated at St. James's Hospital campus from the removal of a number of buildings to allow for construction of the proposed developments. The estimated quantity of demolition material that will be generated from St. James's Hospital campus is approximately 12,323 tonne. The majority of demolition/refurbishment waste material will be made up of concrete, bricks, ceramics, tiles, wood and metals but will also contain smaller volumes of glass, plasterboard, asphalt, waste electronic and electrical equipment (WEEE). The estimated breakdown of material weights by waste type is detailed in Chapter 10 of this EIS. There will be no demolition waste generated at the Davitt Road construction compound.

During the construction phase of the project, waste materials will be generated at each site from surplus building materials such as off-cuts from timber, metals, plasterboard and from waste packaging. It is likely that waste concrete will also be generated on site. The estimated quantity of construction waste at the children's hospital satellite centres at Tallaght and Connolly Hospitals is approximately 25 tonne and 32 tonne, respectively. The estimated quantity of construction waste at the St. James's Hospital campus is approximately 792 tonnes. There will be no construction waste generated at the Davitt Road construction compound.

The proposed developments at St. James's Hospital campus, Tallaght Hospital campus and Connolly Hospital campus will give rise to a wide variety of waste streams during the operational phase. These waste materials will comprise healthcare non-risk non-hazardous wastes, i.e. organic (food/catering/garden) waste, dry mixed recyclables, mixed non-recyclables, confidential paper, glass, polystyrene, furniture, as well as non-clinical hazardous wastes, i.e. batteries, WEEE, printer cartridges, fluorescent tubes, waste cooking oil, waste sludge from grease traps, cleaning chemicals etc. In addition, there will be healthcare risk wastes generated which will include clinical and special wastes as well as chemical waste, i.e. spent and expired chemicals from laboratories and radioactive wastes. The Davitt Road construction compound will only be utilised during the construction phase and therefore, there will be no operational waste arising's or associated waste impacts or ameliorative, remedial or reductive measures required.

Site specific Outline Construction & Demolition and Operational Waste Management Plans have been prepared and included as appendices to Chapter 10 of this EIS, to outline the anticipated waste types, weights/volumes and procedures for managing the waste.

If waste generated during the construction & demolition and operational phase is not managed and stored correctly, it is likely to lead to litter or pollution issues at the sites and/or on adjacent developments. The knock-on effect of litter issues is the presence of vermin within the development and surrounding areas. If contaminated or potentially contaminated excavated materials are not correctly identified, segregated and appropriately classified, there may be incorrect handling of the material which could impact negatively on construction workers as well as water and soil environments, both onsite and offsite. The use of non-permitted waste hauliers and non-registered/permitted/licenced receiving facilities could give rise to inappropriate management of waste and result in negative environmental impacts and pollution causing harm to a range of environmental receptors. Where the procedures outlined in the site specific Waste Management Plans are not implemented, it is unlikely that targets for reuse, recovery and recycling as set out in the new Regional Waste Management Plan and Waste Framework Directive will be achieved.

As previously noted, Outline Construction & Demolition and Operational Waste Management Plans have been prepared for each of the three development sites to outline procedures for management of waste arising during the construction and operational phases in accordance with national and local legislation as well as the Regional Waste Management Plan for the Eastern-Midlands Region. Key mitigation measures outlined in Chapter 10, and further detailed in the Waste Management Plans, include:

- Adherence to the waste hierarchy for management of waste materials, i.e. reduce waste, where possible, or reuse/recover/recycle waste material that cannot be avoided. Disposal of waste to landfill shall be the last resort where no alternatives are available.
- Segregation of wastes at source into appropriate categories
- Identification of designated waste storage areas (WSAs) with appropriate signage
- Colour coding of waste receptacles to avoid cross contamination and location of receptacles in easy to access areas
- Using permitted and licensed waste hauliers and facilities
- Recording and keeping documentation related to waste on site/at the facility
- Engagement with the relevant Local Authority regarding the proposed end destinations for waste materials prior to the commencement of the construction phase and also regarding the waste collection arrangements during the operational phase.

These mitigation measures, and others as presented in Chapter 10 and specific Waste Management Plans, will ensure that waste arising from the development are dealt with in compliance with the provisions of the Waste Management Act, 1996 (as amended 2001), associated Regulations, the Litter Act,1997 and the '*EMR Waste Management Plan, 2015 - 2021'*. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

A carefully planned approach to waste management and adherence to the Construction & Demolition Waste Management Plans during the construction phase will ensure that the impact on the environment will be neutral, short-term and imperceptible from each of the development sites and the project as a whole. During the operational phase, a structured approach to waste management will promote resource efficiency and waste minimisation. Provided the Operational Waste Management Plans are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted impact of the operational phase on the environment will be neutral, long-term and imperceptible.

Monitoring of waste generation rates throughout both phases of the development will allow for comparison against targets set in the Waste Management Plans. This will allow contractors/facilities teams to identify areas where targets are not being met and action procedures to increase reuse/recovery/recycling rates, where possible, or look for opportunities to minimise waste generation. Cost saving opportunities will also be identified from tracking of waste movements. Regular monitoring should also include checking/auditing contractor and facility waste permits/licences as appropriate and checking for updates of local authority Waste Bye-Laws, waste legislation, policies and plans.

The Davitt Road construction compound will only be utilised during the construction phase and, therefore, there will be no operational waste arising's or associated operational phase impacts.

7.7 Noise and Vibration

An assessment into the likely noise and vibration impact associated with the proposed National Paediatric Hospital Project has been undertaken.

The existing noise climate has been surveyed during both daytime and night-time periods in the vicinity of each development. The existing noise environment has been found to be typical of a suburban area. Prevailing noise levels are primarily due to local and distant road traffic movements with some contributions from plant noise in other nearby developments.

When considering developments of this nature, the potential noise & vibration impact on the surroundings must be considered for each of two distinct stages: the short term impact of the construction phase and the longer term impact of the operational phase.

During the construction phase it is expected that there will be some temporary impact on the nearest noise sensitive locations, including existing hospital buildings, due to noise emissions from the sites. The construction noise & vibration impacts of construction activity on St. James's Hospital campus, the Davitt Road construction compound, the children's hospital satellite centre at Tallaght Hospital and the children's hospital satellite centre at Connelly Hospital have all been assessed. Given that the construction phase of the development is temporary in nature, it is expected that the various noise sources will not be excessively intrusive. Furthermore, the application of binding hours of construction operations, along with implementation of appropriate noise and vibration control measures, will ensure that the noise and vibration impact is controlled to be within acceptable standards at all off-site receptors and existing hospital buildings.

During the operational phase, potential causes of disturbance vary depending on the development. A summary of each of the main noise sources and their potential impact is listed below.

New children's hospital & Family Accommodation Unit

- Building services plant – noise emissions from building services plant will be controlled so as not to have any significant impact on both nearby residential dwellings or existing hospital buildings
- Additional vehicles on the existing road system – the predicted increase in traffic noise as a result of additional traffic serving the development is less than 1dB, such an increase is slight and the associated noise impact is not significant
- Car parking activity – the existing noise environment is not expected to change significantly as a result of car parking activity
- Helicopter movements – given the emergency nature of the helicopter movement and the limited number of trips that are expected, it is concluded that the helipad activity will not be a significant noise nuisance
- Traffic on internal road network – the predicted noise level from traffic on the internal road network is similar to the existing noise levels in the area and as a result is an insignificant noise source
- Waste and service yard area – taking into account the location of the waste and service yard areas in the basement of the building the noise impact is insignificant

Children's Research and Innovation Centre

- Building services plant – noise emissions from building services plant will be controlled so as not to have any significant impact on both nearby residential dwellings or existing hospital buildings
- Waste and service yard area – the noise impact of activity within the waste and service yard area is within acceptable standards at the nearest sensitive locations.

Children's Hospital Satellite Centres

- Building services plant – noise emissions from building services plant will be controlled so as not to have any significant impact on both nearby residential dwellings or existing hospital buildings
- Additional vehicles on the existing road system – no appreciable change in noise level is expected as a result of additional vehicles on the existing road network

The Davitt Road construction compound is associated with the construction phase of developments on St. James's Hospital campus only. Therefore, it has no impact during the operational phase as its use will have ceased.

It has been predicted that, subject to the implementation of appropriate noise and vibration control measures, none of these will increase the existing noise climate sufficiently or with such frequency so as to be likely to cause disturbance at all off-site receptors or existing hospital buildings.

7.8 Air Quality and Climate

An assessment into the likely air quality & climate impact associated with the proposed integrated National Paediatric Hospital Project as been undertake. The assessment has been conducted in the context of current relevant standards and guidance, and identifies any requirements or possibilities for mitigation.

In terms of the existing air quality environment, baseline data and data available from similar environments indicates that levels of nitrogen dioxide (NO_2), carbon monoxide (CO), particulate matter less than 10 microns (PM_{10}) and less than 2.5 microns ($PM_{2.5}$) and benzene are generally well below the National and European Union (EU) ambient air quality standards.

The operational impact of the developments was assessed for the pollutants NO_2, PM_{10}, $PM_{2.5}$, CO and benzene using the UK Design Manual for Roads and Bridges (DMRB) screening model which is a recommended screening model for assessing the impact of traffic on air quality. The inputs to the air dispersion model consisted of information on road layouts, receptor locations, annual average daily traffic movement's, annual average traffic speeds and background concentrations.

Modelling a scenario whereby the proposed development does not progress indicates that concentrations are within the EU ambient air quality standards under all scenarios and all five pollutants assessed. In addition, the impact of the traffic from the proposed developments at St. James Hospital campus, the construction compound on Davitt Road and the children's hospital satellite centres were compared to the respective EU limit values for the pollutants under consideration. Based on the modelling results, the impact of the proposed developments in terms of ambient levels of NO_2, PM_{10}, $PM_{2.5}$, CO and benzene is considered imperceptible. Mitigation measures in relation to traffic-derived pollutants have focused on improvements in both engine technology and fuel quality with vehicles over recent years significantly cleaner than those prior to this period.

Boilers, generators and combined, heat and power (CHP) engines are likely to emit Nitrogen Oxides (NO_x) when in operation. Arup Consulting Engineers conducted an air dispersion modelling study in relation to the design of new flues. This Study was conducted in accordance with the Environmental Protection Agency Guidance Document, '*Air Dispersion Modelling from Industrial Installations (AG4)*'. The Study predicted ground level concentration of NO_x at the most sensitive receptors outside and inside the boundary of the proposed developments on St. James's Hospital campus. It was concluded that the worst case predicted ground level concentrations arising from the existing and proposed sources are in compliance with the applicable air quality standards.

The impact of construction traffic from the proposed developments at St. James Hospital campus, the children's hospital satellite centres and the construction compound on Davitt Road were compared to the respective EU limit values for PM_{10} and $PM_{2.5}$. Based on the modelling results, the impact of the developments in terms of ambient levels of PM_{10} and $PM_{2.5}$ is considered imperceptible. In terms of the construction phase, a dust minimisation plan has been formulated in order to reduce potential dust emissions.

With regard to climate, Ireland ratified the Kyoto Protocol in May 2002 agreeing to limit the net growth of the six greenhouse gases to 13% above the 1990 level over the period 2008 to 2012. In relation to the current proposal, construction vehicles and road traffic during the operational phase would be expected to be the dominant source of greenhouse gas emissions. However, due to the scale and nature of the proposal, the impact on climate will be negligible in both the construction and operational phases, as a result, no mitigation is required. The EU, on the 23/24th of October 2014, agreed the '*2030 Climate and Energy Policy Framework*[18]'. The European Council endorsed a binding EU target of at least a 40% domestic reduction in greenhouse gas emissions by 2030 compared to 1990. The target will be delivered collectively by the EU in the most cost-effective manner possible, with the reductions in the Emissions Trading Scheme (ETS) and non-ETSsectors amounting to 43% and 30% by 2030 compared to 2005, respectively. Secondly, it was agreed that all Member States will participate in this effort, balancing considerations of fairness and solidarity. The policy also outlines, under '*Renewables and Energy Efficiency*', an EU binding target of at least 27% for the share of renewable energy consumed in the EU in 2030.

[18] EU, 2014.

The impact of NO_x (i.e. NO and NO_2) emissions resulting from development traffic at the Grand Canal proposed Natural Heritage Area (pNHA) was assessed. The National Roads Authority guidelines[19] state that as the potential impact of a scheme/development is limited to a local level, detailed consideration need only be given to roads where there is a significant change to traffic flows (>5%) and the designated site lies within 200m of the road centre line. The Herberton Road is predicted to have a 5% increase in traffic as a result of the development and is within 200m of the Grand Canal pNHA. Dispersion modelling and prediction was carried out at typical traffic speeds at this location. The predicted annual average NO_x levels at the Grand Canal pNHA near Herberton Road exceed the limit value of 30 µg/m^3,should the development progress in the opening year. The impact of the proposed development leads to an increase in NO_x concentrations of at most 0.6 µg/m^3 within the Grand Canal pNHA. The National Road Authority guidelines state in Appendix 9 that where the scheme is expected to cause an increase of more than 2 µg/m^3 and the predicted concentrations (including background) are close to, or exceed the standard, then the sensitivity of the habitat to NO_X should be assessed by the Project Ecologist. However, in this case, the operational phase of the new children's hospital does not cause an increase in concentrations greater than 2 µg/m^3. In fact, the limit value of 30 µg/m^3 for the protection of vegetation is exceeded mainly due to the background concentration of NO_x in the area.

7.9 Micro Climate

This Chapter assesses and evaluates the potential impacts associated with sunlight, daylight and overshadowing and wind during the construction and operational phases of the proposed National Paediatric Hospital Project.

The National Paediatric Hospital Project includes the new children's hospital, the Family Accommodation Unit the Children's Research and Innovation Centre at St. James's Hospital campus and a construction compound at Davitt Road, as well as children's hospital satellite centres at Tallaght Hospital campus and at Connolly Hospital campus. The children's hospital satellite centres are both modest extensions to existing hospital facilities that are not proximate to dwellings or public open spaces, and the construction compound at Davitt Road is located in the centre of an existing open brownfield site. It is considered that there are no daylight, sunlight, overshadowing or wind implications for the children's hospital satellite centres or the construction compound, and these are not considered further in the assessment. As such, the new children's hospital, the Family Accommodation Unit and the Children's Research and Innovation Centre are the focus of Chapter 13 of this EIS.

7.9.1 Sunlight and Daylight

The assessment was carried out using the guidance in the BRE Report BR 209 '*Site Layout Planning for Daylight and Sunlight, a guide to good practice*'. This Report is quoted in the Dublin City Development Plan, 2011-2017, and is widely used as guidance in Ireland and the UK for such assessment.

The assessment points out the general relationship between visual impacts, and impacts on daylight, sunlight and overshadowing, and refers to the early stage design development during which various design approaches were considered and tested in particular for their visual impact. This informed the selection of a preferred option, which was ultimately developed through to full design and is the basis of the application.

The assessment includes three specific aspects as follows:

- Impacts on access to daylight (skylight) from windows of residential properties
- Impacts on access to direct sunlight at windows of residential properties
- Impacts on sunlight on outdoor amenity space, and in particular, on private gardens

Given the urban context of the development site, and the residential nature of much of the immediately surrounding lands, the Chapter provides detailed assessment test reference points at O'Reilly Avenue, James's Walk, South Circular Road, Brookfield Road, Cameron Square, Faulkner's Terrace, St. John's Terrace, James's Street and McDowell Avenue. While each and every property is not tested, those that are tested are representative of similar adjoining properties.

Potential Construction Impacts

Initial construction activity will involve the demolition of existing structures and the removal of material off site. During this period, it is likely that access to daylight and sunlight may increase slightly at some locations than that experienced from current levels. However, it is likely that this will be offset by the erection of proposed site hoarding.

[19] NRA 2011

Subsequently, there will be a phase of excavations and groundworks, including removal of material off site and import of building materials. This phase, by virtue of activity being primarily at or below ground level, will generally not give rise to any impacts on daylight, sunlight or overshadowing, other than minor localised impacts that may be caused by the site hoarding. For a number of noise generating activities during this phase, the site hoarding will be increased locally in height up to 4.0m. This taller hoarding will give rise to temporary localised increased daylight, sunlight and overshadowing impacts on certain properties to the north, east and west of the site, but the hoarding will revert to 2.4m high once the particular noise generating activity has been completed.

Following groundworks, the above ground construction will commence. Construction of buildings and other structures will gradually result in the later operational phase impact levels.

Potential Operational Impacts

For daylight, the assessment finds that post construction, for the specific properties tested on O'Reilly Avenue, Glenmalure Court, South Circular Road, Cameron Square, Faulkner's Terrace, St. John's Terrace and McDowell Avenue, the loss of daylight would be within BRE guidelines. Loss of daylight for other dwellings in these areas is also expected to be within guidelines. The loss of light is considered to be slight/not significant.

The only area where the loss of daylight exceeds BRE guidelines is on Brookfield Road, where reference points Nos. 53 and 49 will experience a slight/moderate adverse impact. However, at the northern end of the terrace No. 39 will be within BRE guidelines and the loss of light will be not significant. The assessment indicates that for the terrace comprising Nos. 39 to 53A inclusive, the southernmost properties, will experience a slight/moderate impact, whilst no significant impact is experienced towards the northern end of the terrace. This pattern reflects the location of the proposed Family Accommodation Unit.

For sunlight, the assessment finds that post construction, for the specific properties tested on O'Reilly Avenue, Glenmalure Court, Brookfield Road, South Circular Road, Cameron Square, Faulkner's Terrace, St. John's Terrace and McDowell Avenue, the loss of sunlight would be within BRE guidelines or not applicable. Loss of sunlight for other dwellings in these areas is also expected to be within the guidelines. Loss of sunlight will generally be slight on an annual basis, rising in some instances to moderate for winter months.

For overshadowing of private gardens, the assessment finds that the gardens of the properties tested are likely to meet BRE guidelines, and that this is also likely to be the case for nearby properties.

Residual Impacts

The nature of daylight, sunlight and overshadowing impacts is such that residual impacts will be the same as for operational impacts.

Given the size of the proposed development, the impact on daylight is limited, with moderate losses of daylight to a small number of dwellings, and no significant losses of sunlight. These findings validate the benefit and effectiveness of the early stage design development referred to above.

7.9.2 Wind

A desk based assessment was conducted in order to assess the effects of the Proposed Development on the local wind microclimate. The wind microclimate is assessed according to the suitability of an area (in terms of pedestrian wind comfort) for its intended use, categorised according to RWDI's wind comfort criteria. Occasional strong gusts, where they occur, are also identified and require mitigation on the basis that they may impede walking and present a safety concern to vulnerable pedestrians.

Receiving Environment

From a review of the meteorological data, it is noted that Dublin has a relatively 'windy' climate overall (by comparison with the wind climate in London, for example). Strong winds and storms are prevalent, typically occurring from westerly or south-westerly directions (the 'prevailing' wind directions) which are expected to create an uncomfortable microclimate for pedestrians for part of the year even without the influence of building-induced accelerations.

Existing conditions at this location are expected to experience a wind microclimate suitable for strolling in winter and standing in summer at ground level. Conditions at higher terrace levels are expected to be uncomfortable in winter and suitable for strolling in summer.

Effects during Construction Phase

Professional judgment was used to assess the overall demolition and construction effects of the Proposed Development on the local wind microclimate. It would be expected that during this temporary phase, conditions across the Site would transition from the current baseline conditions to conditions measured for the Proposed Development with existing surroundings. As this transition occurs, uncomfortable conditions are expected in some areas. It can also be noted that during construction, there would be areas considered as a working site in which windier conditions would be tolerated.

Ameliorative, Remedial or Reductive Measures

Indicative mitigation measures have been described in this Chapter. It is recommended that specific proposals for mitigation measures should be tested during detailed design of the landscaping proposals by means of wind tunnel testing to confirm the effectiveness of the proposed measures.

During the construction phase, conditions will transition from the baseline conditions to conditions measured for the Proposed Development with existing surroundings. Adverse wind effects during this time will be temporary if remedial measures such as landscaping are incorporated during the construction process. Until such measures are implemented, it is recommended that public access to these areas is limited where possible by the use of construction hoardings.

Thoroughfares within and around the Site are mostly expected to be suitable for their intended use (in terms of wind microclimate), with a few isolated exceptions throughout the Site where 'uncomfortable' wind conditions were found to occur. At these locations wind conditions are too windy for thoroughfare use, and mitigation in the form of canopies to prevent the wind downdrafting combined with ground floor screens and landscaping is recommended to improve conditions.

Entrance locations at ground level present conditions suitable for entrance use, however a number of entrances at terrace level would be considered too windy for comfortable pedestrian use. These entrances would benefit from mitigation in the form of recessing or vertical screening to improve local conditions. Additional mitigation measures as described below to improve the amenity use of the terrace space will also improve conditions for these entrances.

The ground floor level amenity spaces are suitable for standing conditions during the summer season. If seating or events are planned within the amenity spaces, landscaping would provide shelter to achieve the desired sitting conditions. The courtyards along the western side of the proposed development are sheltered and therefore suitable for sitting conditions during the summer season; hence no mitigation would be required.

During the summer season the large terrace to the south and rooftop areas to the west are expected to experience conditions windier than desired for an amenity space. Occasional instances of strong winds are also expected in these areas during the windiest season Mitigation in addition to the proposed landscaping is recommended to improve conditions on the rooftop terraces. It is recommended that this mitigation is developed through the use of physical wind tunnel testing. Examples of mitigation are an increase in the perimeter balustrade height, physical screens within the terrace and evergreen planting.

Occasional strong winds are expected at the building corners and on the large 4th floor terrace spaces. Mitigation measures will be required to reduce wind speeds. It should be noted that mitigation measures will be needed at these location to improve pedestrian comfort, and the implementation of such measures is likely to reduce the severity of strong wind issues. The effectiveness of such measures should be verified by means of wind tunnel testing.

Predicted Effects of the Proposed Development

Overall if the mitigation measures suggested in the section above are implemented, the required comfort conditions will be achieved throughout the majority of the proposed development. The effectiveness of such measures should be verified by means of further wind tunnel testing.

With the use of the suggested canopies all of the thoroughfare areas within and around the site will suitable for their intended use.

Recessing the entrances on the fourth floor terrace or the inclusion of local vertical screening, will improve local conditions and present conditions suitable for or calmer than required for entrance use.

The suggested use of landscaping as mitigation for ground floor amenity spaces, can achieve suitable conditions for amenity spaces.

As suggested in the section above, mitigation in addition to the proposed landscaping is recommended to improve conditions on the rooftop terraces. It is recommended that this mitigation is developed through the use of physical wind tunnel testing. Examples of mitigation are an increase in the perimeter balustrade height, physical screens within the terrace and evergreen planting.

If the proposed mitigation measures recommended in the section above are implemented to improve comfort conditions, then this is also expected to reduce the severity of strong wind issues.

7.10 Landscape and Visual Impact Assessment

An assessment of the likely landscape/townscape and visual impacts associated the proposed National Paediatric Hospital Project has been undertaken.

The assessment was undertaken with regard to relevant guidelines, legislation, policy and plans. This involved desk and field studies, including dedicated site visits to assess the landscape/townscape and visual characteristics of each of the development sites and their surrounds. The main developments include a new children's hospital, a Family Accommodation Unit and a Children's Research and Innovation Centre to be sited on the existing St. James's Hospital campus, as well as a related construction compound to be located on a disused site at Davitt Road. The National Paediatric Hospital Project also includes children's hospital satellite centres at Tallaght Hospital campus and Connolly Hospital campus.

A series of photomontages have been prepared of the new children's hospital, the Family Accommodation Unit, the Children's Research and Innovation Centre and of the children's hospital satellite centres at Tallaght and Connolly Hospitals. These are included in Chapter 14 of this EIS.

7.10.1 Receiving Environment

The sites for the proposed new children's hospital and Family Accommodation Unit are located within the western section of St. James's Hospital campus. The site is characterised by a range of generally low rise buildings, open surface carparks, roads and small landscape areas. A small chapel is a feature of visual interest within the southern portion of the site. Trees, some of which are mature specimens, are located both along sections of the hospital boundary and internally within landscape islands.

The site is visually flat, but there is a steep slope down to Mount Brown at its northern end. In general it is visually enclosed, however, views are available into and out of the site, most notably along the relatively open boundary with O'Reilly Avenue, Ceannt Fort. Other views are available over the boundary walls to and from properties along St. James's Walk to the south, South Circular Road and Brookfield Road to the west, and to a lesser degree to and from Cameron Square and the Royal Hospital Kilmainham.

The site has particular landscape and visual significance and sensitivities, most especially in relation to the adjoining residential conservation area at O'Reilly / Donnellan Avenues, Ceannt Fort; to residential amenity at South Circular Road, Brookfield Road, Cameron Square and along Mount Brown; in relation to views from the historic property of Royal Hospital Kilmainham, and in relation to trees on site.

The site for the proposed Children's Research and Innovation Centre directly fronts James's Street, where it is enclosed by a high part retaining limestone wall. A high, part retaining limestone wall also forms the boundary between the site and rear of the lower residential properties along McDowell Avenue, Ceannt Fort. The site is partly enclosed by the Haughton Institute, a Protected Structure located to the southwest. The site, which is mainly used as a surface carpark is open to a tree-lined lawn to the south.

The site has particular landscape and visual significance and sensitivities, most especially in relation to the Protected Structure of the Haughton Institute, the adjoining residential conservation area at McDowell and Donnellan Avenues and the presence of mature trees on the adjoining lawn and on James's Street.

It is proposed to establish a construction compound on a disused site south of Grand Canal and LUAS red line at Davitt Road. The lands are overlooked from the rear of the residential properties along Kilworth, Carrow and Galtymore Roads. Other than for residential visual amenity, there is no particular landscape or visual significance or sensitivity pertaining to the site.

The sites for the children's hospital satellite centres at Tallaght and Connolly Hospitals are currently small generally open landscape areas, dominated by the existing hospital buildings. Neither site is openly viewed from outside of the Campus or from residential properties or other landscape or visual amenities. As such the sites are not of particular landscape or visual sensitivity.

7.10.2 Construction Phase

The construction of the proposed developments at St. James's Hospital campus will involve significant alterations to the site. A new entrance will be constructed off Mount Brown and the existing complex of buildings, including the old chapel, carparks, roads and the majority of trees will be removed. Thereafter, the site will undergo major enabling works, including diversion of services, piling works and deep excavations for the formation of basement levels. Construction of the new children's hospital and related Family Accommodation Unit will progress on a stage by stage basis with the gradual emergence of new structures and the use of cranes and scaffolding, etc. All of the works proposed are standard and commonplace in the urban environment, albeit the site does represent a large single construction project.

Landscape/townscape and particularly visual impacts associated with the construction phase will vary from significant and neutral, temporary or short-term, to significant and negative temporary or short-term at different times and at different locations across the duration of the construction works. The impacts will be most apparent for those properties adjoining the site boundary, i.e. O'Reilly Avenue, the northern end of McDowell Avenue, properties along Mount Brown, Cameroon Square and east of Brookfield Road, or close to the works, i.e. wider Ceannt Fort area, James's Street, the Brookfield Street/east end of South Circular Road and Mount Shannon Road areas and the western end of James's Walk. It is noted that construction is not a static process and it will not have a consistent character or impact. However, in visual terms, the character of the construction works is an expected and accepted part of a developing city and for the most part will be viewed as such.

The use of the Davitt Road site as a construction compound will be a feature for many years while the developments are being constructed at St. James's Hospital campus. However, the compound site is well-sited and setback significantly from residential properties and from the Grand Canal. It is considered that the construction compound will not give rise to significant landscape/townscape or visual impact.

7.10.3 Operational Phase

The proposed development of the new children's hospital and associated Family Accommodation Unit is well-screened and integrated within longer distance views. However, the proposed development will be openly visible along many linear corridors, roads, etc., or over intervening development, within close and medium distance views. In such views the oval setback of the upper floors, together with a curving roof line presents a more interesting and softer profile on the skyline. A feature of some of the close-distance views is that while some are exposed and open, others, even a short distance away can be largely or entirely screened. However, some close views are also fully open to the development, especially at the immediately surrounding residential areas and streets of Ceannt Fort, Mount Brown, Cameron Square; east end of South Circular Road, Mount Shannon and along James's Walk.

From close distance, the rhythm of 3 storey fingers and recesses fronting South Circular Road can be fully appreciated, as can the general 4 storey level of the core of the main building and the oval setback of the upper floors. From close and medium distance the curving roofline also appears to lower the actual height of the building and avoids creating a harsh skyline. Extensive planting on the Level 4 roof garden is also a prominent feature for nearby views.

While the overall landscape/townscape and the visual impact of the proposed development from close-distance locations can be described as significant and often positive, it is accepted that there is a very significant change in the existing visual environment for many residential properties in Cameron Square, Ceannt Fort, along Mount Brown, along Brookfield Road/Street and at the eastern end of South Circular and Mount Shannon Roads. As such, it is assessed that the initial temporary and short-term visual impact from such areas and properties will be viewed as being negative.

The proposed development will be openly viewed as a positive contribution from the elevated and panoramic vantage of the viewing platform of the Guinness Storehouse, from where the proposed development will sit well in the panoramic setting adding interest and orientation to the view. The development will also be prominent in views from the first and second floors of the southern wing of the Royal Hospital Kilmainham, incorporating the Irish Museum for Modern Art.

The proposed Children's Research and Innovation Centre will complete built development along the southern side of James's Street in a manner that is broadly consistent with that established by the existing Trinity Centre for Health Sciences. The existing roadside trees will be retained and these will help in blending the view along the streetscape. Properties along McDowell Avenue are set low behind a high stone wall and will have very limited views to the building.

The Children's Research and Innovation Centre will establish an internal courtyard and civic space for the users of the centre and adjoining facilities. The impact of the development from outside of the campus is neutral, while it is positive within the campus.

There are no operational stage landscape/townscape or visual impacts associated with the construction compound at Davitt Road.

There are no significant operational stage landscape/townscape or visual impacts associated with the children's hospital satellite centres at Tallaght Hospital campus and Connolly Hospital campus.

7.10.4 Mitigation

During the construction phase, mitigation measures are focused on avoiding or minimising impact on adjoining and surrounding properties, especially residential properties. The site will be enclosed with solid site hoarding, normally 2.4m high but up to 4m high in some places, for screening and protection of residential and other adjoining amenity. Trees to be retained, *e.g.* south of Cameron Square and east of Brookfield Road, will be fenced off and protected. Aspects such as site lighting and the use of cranes shall have particular regard to avoiding any impact on residential properties and all construction activities shall be strictly controlled and managed throughout the works phase.

The principal landscape/townscape and visual mitigation measures for the operational phase are inherent in the design and treatment of the proposed buildings and in the finishes to the public areas and in landscape measures. In addition the development includes for significant new areas of tree and shrub planting for screening and visual integration, especially along the rear of O'Reilly Avenue; on the east side of Cameron Square, around the new entrance off Mount Brown, and along the LUAS linear park. Measures are also incorporated to protect existing residential amenity, avoiding light spill and/or overlooking from adjacent areas.

7.10.5 Residual Impacts

The new children's hospital is a significant development, which will alter the existing townscape and visual characteristics of the western end of St. James's Hospital campus. The design has taken detailed consideration of the local environment, including surrounding residences and has proposed a high-quality modern hospital development comprising a 4 storey core with upper floors setback significantly in a curving oval form. As such, the development has the potential to have a positive residual contribution to the urban fabric of the area and to the townscape and visual environment.

No residual impacts are expected from the Family Accommodation Unit, Children's Research and Innovation Centre, the temporary Davitt Road construction compound or from either of the children's hospital satellite centres.

7.11 Archaeological Heritage

This Chapter assesses the archaeological heritage significance and potential with respect to the National Paediatric Hospital Project.

The new children's hospital, Family Accommodation Unit and the Children's Research and Innovation Centre are all located within the existing St. James's Hospital campus. The northern footprint of the Campus is aligned along James's Street which forms part of the Zone of Archaeological Potential for the 'Historic City of Dublin' (RPM DU018-020) as this route would have formed part of an early medieval roadway known as the Slighe Mhór which extended westward to Kilmainham and beyond from Dublin.

The St. James's Hospital campus is a significant archaeological complex, reflected in the various excavations that have been carried out to date. In summary, these excavations have revealed the complete footprint of the various institutions within the complex, including the basement level of the original Poorhouse along with ancillary buildings to the south, the late church to the north of the Poorhouse, part of the Male Infirmary and the mid-19th century school house. Thus, where the cartographic sources indicate the presence of buildings now demolished, it is probable that some stone foundations will survive, along with other features, such as drains, surfaces and clays.

7.11.1 The New Children's Hospital and Family Accommodation Unit

The new children's hospital and Family Accommodation Unit are proposed to be located in the western section of the existing Campus. There are no monuments, stray finds or artefacts recorded within the proposed development area. The cartographic sources suggest that development in the Early Modern Period did not occur in this area until after the mid-19th century, as the Ordnance Survey depicts open fields at this date. However, the late 19th century saw development with the construction of the Auxiliary Workhouse by the 1876 with the granite and brick chapel in place by the 1890s. While the main burial ground associated with the hospital complex is located on the other (eastern) side of the complex (outside the proposed development area) and marked on the OS map of 1836, there may have been an unmarked burial ground or cemetery associated with the chapel and Auxiliary Workhouse.

Test excavation and monitoring of geotechnical investigations took place in order to establish if the foundations of the former building could be revealed and also if previously unrecorded burials could be detected.

The findings from the investigations generally suggested post-medieval clay infill deposits or made-up ground to a depth of between 0.90m and 1.20m. These fills consisted of low-grade sticky yellow and grey clays with inclusions of brick, mortar, charcoal and bone, which were used to infill the ground.

Archaeological test trenches did produce evidence of a stone drain, surfaces and a general infilling in the vicinity of the late 19th century auxiliary workhouse complex. These findings suggest that there is likely to be stone wall foundations in this location, extending over a large area and representing the demolished complex, although these were not exposed in the examined test-trenches. The general phase of infilling was also identified in the form of low-grade archaeological soils that contained human fragments of bone in one location. While they may have originated in the official graveyard of the hospital, this is not certain and they may have come from a defunct graveyard although no burials in situ were identified.

Along the southern end (in the car-park) the results suggested an area under cultivation in the 19th century and probably open-plan after this, as there are several mature trees in this location. The investigations also indicate a certain amount of infilling with clay in this location along with some very truncated remains of brick build.

7.11.2 The Children's Research and Innovation Centre

The area proposed for the Children's Research and Innovation Centre was archaeologically investigated, as the site lies a short distance to the north-west of the site of the original Poorhouse built in the early 18th century. A section of the basement of this historic building was found during a previous archaeological assessment in 2000 and was subsequently excavated and incorporated into the new modern build (The Trinity Centre of Health Services) (Simpson 1999, *Excavations 2000,* 267; and Walsh, *Excavations* 2001, 402). This is now recorded in the Record of Monuments and Places as (DU018-020304 and DU018-043001, hospital and workhouse respectively).

The archaeological investigations established that a significant amount of demolition debris, from the Trinity Centre of Health Services to the east, was dumped in the north-east corner of the site and this included deep deposits of general building debris. This area was evidently very disturbed during the construction of the adjoining new build to a depth of at least 1.20m.

The results suggest that there is a post-medieval structural horizon surviving across the entire site. These take the form of stone foundations, pits and surfaces, which can be dated to the 19th century with a possible earlier cellar (possibly 18th century in date) in the north-west corner.

The buildings are cut into re-deposited clays used to infill the ground in the 19th century, which appear to be low-grade archaeological soils. These clays represent an attempt to infill and raise up the ground level and can be traced right across the hospital complex. Similar infilling programmes were carried out elsewhere in Dublin and have been revealed through archaeological investigation for example in Trinity College Dublin, Leinster House, the National Concert Hall and the National Gallery.

The northern frontage of the hospital complex lies within the Zone of Archaeological Potential for Dublin in what was originally a medieval streetscape. This is reflected in the fact that medieval archaeological horizons were found close to the street frontage where a roadway was previously identified (Walsh 2001). The testing at the Children's Research and Innovation Centre site does suggest that there may be truncated medieval clays beneath the clay infill measuring approximately 0.30m in depth. This heavy sticky clay contained charcoal and shell fleck but no brick suggesting it may date to the medieval period. However, these are likely to be low-grade archaeological soils. While this would correlate with the deposits found to the east during the previous excavations to the east by Walsh in 2001, the deposits are different in type, composed of sticky clay as opposed to friable green garden soil.

7.11.3 Mitigation Measures

Given that demolition and large scale building clearance will take place across the subject sites on St. James's Hospital campus as well as deep excavation work, there is the potential to remove in-situ archaeological layers. There is also the potential that building foundations associated with the auxiliary workhouse may be exposed and removed during this phase.

A programme of archaeological monitoring will have to be agreed with the authorities in order to mitigate any potential impacts.

In the event that significant archaeological features are discovered during this phase of work, the National Monuments Service of the Department of Arts, Heritage and the Gaeltacht and the National Museum of Ireland, as well as the City Archaeologist will be informed. All archaeological issues will be resolved to the satisfaction and in consultation with the authorities, who will advise on any remedial action they consider appropriate.

Further to the archaeological excavation work there is a potential that ground works such as the insertion of services or additional excavations during the construction period for temporary roads, landscaping, diversion of utilities etc. may have a direct and significant impact on any subsurface remains that survive within the proposed redevelopment areas. In order to mitigate against this, it is proposed that a programme of archaeological monitoring be put in place to record the extent and nature of all newly revealed material and deposits and report all findings to the authorities in a report format as required under the archaeological licencing agreement.

7.11.4 Davitt Road Construction Compound and the Children's Hospital Satellite Centres at Tallaght and Connolly Hospitals

Each of these proposed development and construction sites are brownfield and urban or suburban in context. The Davitt Road site was formerly occupied by industrial buildings and both the Tallaght and Connolly Hospital sites lie within the landscaped grounds of the existing hospital campuses, adjacent to the existing buildings.

There are no archaeological monuments recorded within or in close proximity to the proposed development sites. A site inspection and detailed documentary and cartographical review was undertaken and no features of archaeological heritage significance were found within the proposed development sites.

The proposed development will have no impact on recorded archaeological sites in the area. Although all of the proposed sites have suffered previous ground disturbance to some degree, there is the slight potential that subsurface archaeological features may survive within the sites. Therefore, a programme of archaeological monitoring of the site clearance/ground works will be undertaken in line with the recommendations of the National Monuments Service of the Department of Arts, Heritage and the Gaeltacht. All archaeological works will be carried out with reference to the relevant guidelines and codes of practice.

7.12 Architectural Heritage

This Chapter assesses the architectural and cultural heritage significance and potential with respect to the National Paediatric Hospital Project.

The new children's hospital, Family Accommodation Unit and the Children's Research and Innovation Centre are all located within the existing St. James's Hospital campus. As part of the methodology undertaken for this EIS a detailed site building survey, documentary research and an historic cartographic survey were carried out.

St. James's Hospital is typical of many inner city hospitals based on a Victorian foundation. The entire Campus comprises buildings dating from the 18th century to the 21st century in varying states of repair and clinical functionality. The following buildings fall under protected status, Protected Structures and are recorded collectively as RPS Ref No 4011 St. James's Hospital, James's Street. These buildings while located within St. James's Hospital campus are all located outside the areas proposed for development as part of the National Paediatric Hospital Project as follows:

- Three storey building annexe on western boundary to the rear of McDowell Avenue
- Chief Executive Office – stone and red brick institutional building, built as a convent c.1890
- Hospital 1 - 19th century stone and brick hospital building
- Hospital 2 - stone hospital building, built c.1840s
- Hospital 4 – stone hospital building and mid-20th century service blocks and central entrance feature.

The occupation of the South Dublin Union by the Irish Volunteers took place due to its proximity and strategic position in relation to a number of key military installations such as the Richmond Barracks in Inchicore and the British military headquarters at the Royal Hospital in Kilmainham. The site also overlooked Kingsbridge, now Heuston, Station and could be used as a position to control James's Street, a main artery in and out of Dublin City. The building, now known as the Haughton's Institute was established as the headquarters for the rebels and the battling consisted of sustained sniper fire and sporadic skirmishes around the network of hospital buildings until the volunteers were ordered to surrender on the 30th April, some seven days later.

The South Dublin Union along with several other prominent building such as the General Post Office, Dublin Castle, Boland's Mill all formed part of the weeklong guerrilla campaign that would see Dublin City become the site of an urban battleground during the Easter Rising of 1916. Evidence of this warfare that sowed the seeds for an independent Irish Republic is scant within the modern day hospital campus however, this historical event is an important part of St. James's Hospital recent past.

7.12.1 The New Children's Hospital and Family Accommodation Unit

The proposed sites of the new children's hospital and Family Accommodation Unit are at present in use as part of St. James's Hospital campus and are located in the western part of the Campus. The proposal would involve the clearance of the sites, requiring the demolition of a number of buildings. Some of these buildings date from the 19th century, such as Garden Hill, a villa built in about the 1830s and some hospital buildings from later in that century. Early 20th century buildings include the hospital chapel. The greater part of the buildings that would be demolished date from the 1950s and from a period from around 1990 to 2010, as well as several temporary buildings. It is not considered that any of the buildings on the site at present are of such merit that they should be retained.

There are no Protected Structures in the immediate vicinity of the sites other than those mentioned above. At a greater distance from the sites is the Irish Museum of Modern Art, which is located in the Royal Hospital, Kilmainham, which is a building of international significance. Analysis of the potential effects of the proposed hospital development on this building and its setting show that the museum would not be affected adversely.

Two residential conservation areas lie adjacent to or close to the site. It is not anticipated that the essential character of these conservation areas would be affected by the proposal.

7.12.2 The Children's Research and Innovation Centre

It is intended that a Children's Research and Innovation Centre would be provided on the southern side of James's Street, at its western end, adjacent to the Trinity College buildings associated with St. James's Hospital. This would involve the construction of a building that is partly adjacent to James's Street and would be partly below ground level. This building would be adjacent to a Protected Structure known as the Haughton Institute (RPS ref. 4011(a)) and the below ground element would be close to the Protected Structure. The above ground part of the proposed building would be at a sufficient distance that it would not affect the essential character of the Protected Structure. The construction of the below ground element would have the potential to damage the Protected Structure, though measures would be put in place to ensure that this does not occur.

7.12.3 Davitt Road Construction Compound and the Children's Hospital Satellite Centres at Tallaght and Connolly Hospitals

Each of the proposed development sites is a brownfield site in an urban or suburban context. The Davitt Road site was formerly occupied by industrial buildings and both the Tallaght and Connolly Hospital sites lie within the landscaped grounds of the existing hospital campuses, adjacent the existing buildings.

There are no Protected Structures or features of architectural and cultural heritage merit recorded within the proposed development sites. A site inspection and detailed documentary and cartographical review was undertaken and no features of architectural or cultural heritage significance were found within the proposed development sites.

Davitt Road Construction Compound

In the wider receiving environment Goldenbridge Cemetery and Chapel, located c.95m to the northeast of the proposed development site, are noted as Protected Structures (RPS Ref 7817 & 7818). The Grand Canal, which is of cultural, historical and built heritage interest, is located across the road and *c*.17m north of the proposed site. None of these structures or features will be negatively impacted by the proposed development. The proposed development will have no direct impact on the architectural heritage or cultural heritage in the area, therefore, no mitigation measures are required.

The Children's Hospital Satellite Centre at Tallaght Hospital

The proposed development will have no impact on the architectural heritage or cultural heritage in the area, therefore, no mitigation measures are required.

The Children's Hospital Satellite Centre at Connolly Hospital

The former Abbotstown House, located c.750m to the northeast of the proposed development site, is noted as a Protected Structure (RPS Ref. 683). The proposed development site is located within the southern half of the former demesne associated with the protected structure. No demesne landscape features survive in this part of the former estate. The proposed development will have no direct impact on the architectural heritage or cultural heritage in the area therefore, no mitigation measures are required.

7.13 Material Assets – Site Services

This Chapter describes material assets that are potentially impacted by the proposed National Paediatric Hospital Project. Material Assets can be defined as valued resources that are intrinsic to specific places. Material Assets may be of either human or natural origin and the value may arise for economic or cultural reasons. Economic assets of human origin are considered in Chapter 17 of this EIS. The potential impacts are assessed in terms of electricity services, water supply, foul drainage infrastructure, surface water drainage infrastructure, gas services, telecommunication services and utilities owned by other stakeholders.

7.13.1 St. James's Hospital

Watermains

Raw water is extracted from the River Liffey and treated at the water treatment works at Ballymore Eustace, Co. Kildare. From there, trunk mains transport the water via the Cookstown reservoir to Dublin City and the site. In the vicinity of the subject site, there is an extensive network of watermains in the ownership of Irish Water that is operated and maintained in conjunction with Dublin City Council. A number of trunk watermains are routed along the LUAS red line corridor to the south of the site. St. James's Hospital campus is currently supplied with water from an existing connection at South Circular Road.

The proposed new children's hospital, Family Accommodation Unit and Children's Research and Innovation Centre will lead to an increase in demand on the watermain infrastructure. It is proposed to supply water via the existing connection in South Circular Road and a new connection at Mount Brown to the new children's hospital, the Family Accommodation Unit and the St. James's Hospital campus. The Children's Research and Innovation Centre building will be supplied with water from a new connection in James's Street.

Cold water storage tanks provided as part of the proposed development will buffer demand on the public watermain infrastructure. Irish Water and Dublin City Council have indicated that there is sufficient capacity and pressure within the public watermain system to manage the additional demand and ensure that all existing customers are provided with acceptable service pressure in accordance with Irish Water/Dublin City Council operational guidelines.

Foul Drainage

In the vicinity of the subject site, there is an extensive network of combined sewers, collecting both foul sewage and surface water, in the ownership of Irish Water that is operated and maintained in conjunction with Dublin City Council. A trunk sewer, known as the Drimnagh Sewer, runs across the site of the new children's hospital from south to north. There are five manholes on the Drimnagh Sewer within the subject site, each of which acts as a Combined Sewer Overflow, which allow combined foul-surface water to overflow and discharge via surface water sewers to the River Camac.

From Mount Brown the combined/foul sewers follow the course of the River Camac and the River Liffey before reaching the Ringsend Waste Water Treatment Plant. There are multiple Combined Sewer Overflows on the downstream sewers that currently discharge to the River Camac and the River Liffey during heavy rainfall events.

Ringsend Waste Water Treatment Plant serves Dublin City and the City environs in the neighbouring counties. In November 2012, Dublin City Council received planning permission to expand the capacity of the plant to 2.1 million Population Equivalent firm capacity. The upgrade of the treatment works has already commenced and will be implemented in three phases, with an anticipated completion date at the end of 2020. It is therefore, expected that there will be expanded capacity at Ringsend Waste Water Treatment Plant prior to the opening of the new children's hospital.

The proposed development will result in the removal from the combined/foul sewerage infrastructure of surface water runoff from the subject site, which will reduce the hydraulic loading on the public sewerage infrastructure during the critical times of rainfall. The diversion of the Drimnagh Sewer within the site will involve the removal of five existing Combined Sewer Overflows.

The proposed development and diversion of the Drimnagh Sewer was subjected to a Development Impact Assessment conducted on behalf of Irish Water. The findings of the Development Impact Assessment show that, in the vicinity of the site, "*there is a reduction in overall flooding as a result of the [new children's] hospital drainage proposals*". The Report concludes that "*there are a number of benefits to the sewer network*" as a result of the National Paediatric Hospital Project development. In summary, the Development Impact Assessment Report for Irish Water concludes that "*the development of the National Paediatric Hospital Project results in a reduction of storm run-off to the combined sewer network, with attenuation provided on site to limit run-off to the River Camac. This results in negligible changes to environmental spills, some localised surcharging, but an overall reduction in flood volume in the vicinity of the National Paediatric Hospital Project*."

Surface Water Drainage

The subject site is located within the catchment of the River Camac, which flows eastwards approximately 60m north of Mount Brown. The River Camac outfalls to the Liffey Estuary at Heuston Station. The Liffey discharges to the Irish Sea at Dublin Bay.

The site of the new children's hospital currently comprises extensive areas of hardstanding, roads, roofs, car parks, etc. with associated high rainfall runoff characteristics. There is currently no attenuation of surface water runoff from the subject site. Historic development in the area has resulted in large areas of surface water runoff being discharged to combined/foul sewerage, which ultimately drain to the Ringsend Waste Water Treatment Plant. The current lack of attenuation facilities on the site leads to high peak runoff to the receiving sewers and watercourses during periods of heavy rainfall and is a contributory factor to flooding.

The buildings for the new children's hospital, the Family Accommodation Unit and the Children's Research and Innovation Centre will be provided with extensive green roofs and landscaped roof gardens with a range of soil depths. Green roofs intercept rainfall, reducing the rate and volume of rainfall runoff. Surface water runoff from the proposed development will be collected and attenuated to greenfield runoff rates, which will substantially reduce the peak flow from the site during periods of heavy rainfall.

As a result of the proposed development, there will be no discharge of surface water to the combined sewerage network; this will improve the hydraulic conditions in the sewer in Brookfield Road and the Drimnagh Sewer combined/foul pipeline.

The Development Impact Assessment Report prepared for Irish Water notes that "*there is a 100% reduction in storm run-off entering the combined network at Mount Brown and Brookfield Road*". In summary, the Development Impact Assessment Report for Irish Water concludes that "*the development of the National Paediatric Hospital Project results in a reduction of storm run-off to the combined sewer network, with attenuation provided on site to limit run-off to the River Camac. This results in negligible changes to environmental spills, some localised surcharging, but an overall reduction in flood volume in the vicinity of the National Paediatric Hospital Project*."

Electricity

A new electrical substation will be provided for the new children's hospital which will be located to the North West of the site adjacent to the new entrance ramp from Mount Brown. The ESB will bring dedicated cables to this substation from Heuston South Quarter and from Harold's Cross. A new sub-station will also be provided by the ESB for the Children's Research and Innovation Centre which will be located on James's Street. The ESB will arrange all required road opening licences, carry out the works and reinstating the roads once completed. The ESB is happy that their network has sufficient capacity to feed the new developments without any impacts to existing customer supply.

The ESB is also going to relocate a substation which currently feeds Rialto housing from the new children's hospital site to the Brookfield boundary. The ESB will complete these works and will be responsible for the customer liaison in this regard.

Gas

A new gas main will be provided for the National Paediatric Hospital Project at St. James's Hospital campus. This will be extended from James's Street to Mount Brown and will serve a new site gas meter to be located adjacent to the new entrance ramp from Mount Brown. Separate gas meters will be provided for the Parent Accommodation Unit and the Children's Research and Innovation Centre from the local network. Gas Networks Ireland (or their approved contractors) will carry out all of the works in the street including arranging for road opening licences and reinstatement on completion of the works. Gas Networks Ireland has sufficient capacity to feed the National Paediatric Hospital Project at St. James's Hospital campus without any impacts to existing customer supply.

Telecommunications

Work in relation to telecommunications will be local and will consist of the installation of new incoming ducts to provide voice and data including television services to the site from the boundaries at Mount Brown and Rialto.

Medical Gases

The existing liquid oxygen vessel which is located to the rear of O'Reilly Avenue will be relocated to a position to the rear of the existing St. James's Hospital energy centre which is further away from the housing than at present.

A small liquid nitrogen vessel will be placed on the site adjacent to one of the internal roads and should have no visual or other impact on surrounding areas.

7.13.2 Tallaght Hospital

A Ground Penetrating Radar (GPR) survey was conducted in 2014 to identify existing foul, storm, watermain and utility services to Tallaght Hospital campus that may be impacted on during the construction of the children's hospital satellite centre.

Water Supply

South Dublin County Council receives treated water from Dublin City Council's water treatment facility at Ballymore Eustace and from Fingal County Council's water treatment plant at Leixlip.

An existing 225mm watermain services Tallaght Hospital campus and serves all of the Campus potable water requirements. The existing infrastructure serving Tallaght Hospital campus has adequate water supply capacity to meet the projected demand and no new watermains or diversion of existing watermain services is proposed. New hydrant arrangements have been proposed for the project.

Potential impacts from these works are as follows:

- New fire hydrants will be positioned in accordance with the Building Regulations Technical Guidance Document part B and will be no closer than 6m to any building
- During the operational phase there will be an increased water supply demand based on the additional staff and patients accessing these services

The following measures were considered to mitigate the effects of impacts referenced above:

- 24 hours storage will be provided for the development and a potable cold water storage tank shall be provided
- No further mitigation measures are proposed at this time as there should be sufficient capacity in the public system to supply the development

- The architect and services engineers may consider the incorporation of water conservation measures such as low flush toilets or grey water reuse
- Rainwater harvesting was also considered and determined as a non-viable Sustainable Urban Drainage System (SuDs) measure, due to increased infection risks from consuming potentially untreated water, as well as increased maintenance costs

As a result, the proposed development will have negligible impact on the existing water supply services.

Foul Drainage

South Dublin County Council has verbally confirmed that there are no issues with the public foul drainage system immediately surrounding the Campus. It has been confirmed that there is sufficient wastewater treatment capacity to cater for the proposed development.

The existing foul drainage to the north and south of the existing building will be utilised if possible. However, it should be noted that the existing system is shallow and is reported as having flooded manholes. Generally, a separate foul water system will be provided for the development. There are a number of existing manholes in the internal hospital courtyards that will be in the new corridor upon completion of the works. As it is not feasible to divert these drains, manholes are to be rebuilt in reinforced concrete and double-sealed manholes cover installed to prevent infection risks.

Potential impacts from these works are as follows:

- Risk of damage to existing foul drainage system
- Risk of accidental pollution incidences from temporary drainage facilities from construction phase canteen and toilet facilities
- During the operational phase there will be an increased demand on foul drainage based on the additional staff and patients using these services

The following measures are proposed to mitigate the effects of impacts referenced above:

- The contractor will be required to ensure that existing foul drainage flows are maintained at all times by either the installation of temporary drainage runs or the use of pumping
- At no time during construction will foul sewerage be allowed to discharge to existing or proposed storm water drains
- In the event of pipes or manholes being damaged beyond repair, they will be replaced on site
- No significant impact on the existing public foul sewer system is envisaged based on the proposed flows
- Pressure testing of the new drainage systems will be required, by the contractor, and a CCTV survey carried out to discover any possible defects

Surface Water Drainage

South Dublin County Council has verbally confirmed that there are no current capacity issues in the immediate vicinity of the Hospital.

There are a number of local surface water drains on the site that will need to be diverted as part of the works. In addition there will be the number of deep excavations to allow for underground service diversions. It is proposed to connect the new development to the existing surface water system to the east of the site.

A new surface water system is proposed to serve the new development.

Potential impacts from these works are as follows:

- Excavation of material for drainage, disturbance of topsoil and subsoil to enable the levelling of the site, deliveries of imported engineering fill, crushed stone, concrete, reinforcement and other construction materials
- Risk of accidental pollution incidences from spillage or leakage of oils from construction machinery
- Accidental spillages may result in contamination of soils and groundwater underlying the site should contaminants migrate through the subsoils and impact underlying groundwater

The following measures were considered to mitigate the effects of impacts referenced above:

- Permeable paving has been proposed for the new car parking to act as both a storage zone and provide filtration for hydrocarbons
- Potentially contaminated groundwater and polluted surface water generated during construction activities will not be discharged directly to ground or surface drainage
- Oils, solvents and paints used during construction will be stored within temporary storage areas
- A detailed Construction and Environmental Management Plan will be implemented on site
- Monitoring will be carried out on site during construction
- All surface water from the proposed new developed will be collected and stored on site prior to discharge to the public surface water system at a controlled rate

Flooding

The OPW Flood Hazard Mapping shows no immediate risk of flooding within Tallaght Hospital campus. The guidelines state that the site would be classed as a highly vulnerable facility and would therefore, be suited to Flood Zone C. Outputs from the initial flood risk assessment indicate that full flood risk assessment is not required for this site.

Potential impacts from these works are as follows:

- During the construction phase of the works, there is an increased flow from the site as the full drainage system may not be in place
- The impact on the receiving environment with respect to surface water management and flooding will be minimal as the run-off will be routed through a flow control device (such as a hydrobrake) and released in a controlled manner

The following measures are proposed to mitigate the effects of impacts referenced above:

- The contractor will be required to regulate flows from the site during this period as per their Construction Waste Management Plan
- Regular maintenance is undertaken by the management of the satellite centre to ensure that all systems are free of debris and operating as designed.

Power

The children' hospital satellite centre will be powered from existing substation no. 4 on the Tallaght Hospital campus. Temporary down time to the substation will be required during these works however, there will be no residual impact to the Campus.

Natural Gas

A new natural gas main will be taken to the children' hospital satellite centre. This will consist of a new meter and mains pipe connection to the main Gas Networks Ireland grid. Groundworks will be required to lay the pipe, but there will be no residual impact from the installation.

Telecoms (ICT)

New ICT connections will be made to service the children's hospital satellite centre. There will be downtime during the connection works. This will also require groundworks to make the connections, but there will be no residual impacts resulting from the works.

Conclusion

There are no predicted significant impacts arising from the proposed construction or operation of the children's hospital satellite centre at Tallaght Hospital campus. No significant residual impacts are anticipated with the measures proposed.

7.13.3 Connolly Hospital

A Ground Penetrating Radar (GPR) survey was conducted in 2014 to identify existing foul, storm, watermain and utility services to the existing campus that may be impacted on during the construction of the children's hospital satellite centre at Connolly Hospital campus.

Water Supply

Fingal County Council is currently operating two water treatment plants at Leixlip and Bog of the Rings. The primary source of water for Fingal is the Leixlip plant on the River Liffey, while the Bog of the Rings provides water from wells and is mostly employed for supplementing the north county area.

An existing watermain services Connolly Hospital campus and serves all of the Campus potable water requirements. The existing infrastructure serving Connolly Hospital campus has adequate water supply capacity to meet the projected demand and no new watermains or diversion of existing watermain services is proposed. New hydrant arrangements have been proposed for the project.

Potential impacts from these works are as follows:

- New fire hydrants will be positioned in accordance with the Building Regulations Technical Guidance Document part B and will be no closer than 6m to any building
- During the operational phase there will be an increased water supply demand based on the additional staff and patients accessing these services

The following measures were considered to mitigate the effects of impacts referenced above:

- 24 hours storage will be provided for the development and a potable cold water storage tank shall be provided
- No further mitigation measures are proposed at this time as there should be sufficient capacity in the public system to supply the development
- The architect and services engineers may consider the incorporation of water conservation measures such as low flush toilets or grey water reuse
- Rainwater harvesting was also considered and determined as a non-viable Sustainable Urban Drainage System (SuDs) measure, due to increased infection risks from consuming potentially untreated water, as well as increased maintenance costs

As a result the proposed development will have negligible impact on the existing water supply services.

Foul Drainage

Fingal County Council have indicated that the sewers on site have adequate capacity for the proposed extension, but there are constraints downstream that are outside of the control of NPHDB or the Design Team including accidental infiltration to the system in Castleknock, the capacity of the Ringsend Waste Water Treatment Works and additional overall storage on the system. However, due to the very small proposed increased in foul waste, it is not felt that these are a particular issue.

There is an existing foul water sewer running east-west, currently constructed at a depth of approximately 4.5m, which will require diversion. Generally, a separate foul water system will be provided for the development.

Potential impacts from these works are as follows:

- Risk of damage to existing foul drainage system
- Risk of accidental pollution incidences from temporary drainage facilities from construction phase canteen and toilet facilities
- During the operational phase there will be an increased demand on foul drainage based on the additional staff and patients using these services

The following measures are proposed to mitigate the effects of impacts referenced above:

- The contractor will be required to ensure that existing foul drainage flows are maintained at all times by either the installation of temporary drainage runs or the use of pumping
- An outline Construction Management Plan will be implemented on site
- At no time during construction will foul sewerage be allowed to discharge to existing or proposed storm water drains
- In the event of pipes or manholes being damaged beyond repair, they will be replaced on site
- No significant impact on the existing public foul sewer system is envisaged based on the proposed flows
- Pressure testing of the new drainage systems will be required, by the contractor, and a CCTV survey carried out to discover any possible defects

Surface Water Drainage

There are a number of local surface water drains on the site that will need to be diverted as part of the works. In addition there will be the number of deep excavations to allow for underground service diversions. A new surface water system is proposed to serve the new development. All surface water from the proposed new development will be collected and attenuated on site prior to discharge to the public surface water system.

Potential impacts from these works are as follows:

- Excavation of material for drainage, disturbance of topsoil and subsoil to enable the levelling of the site, deliveries of imported engineering fill, crushed stone, concrete, reinforcement and other construction materials
- According to the utilities survey, there are a number of blocked and flooded drains on the proposed development site that may contribute to pluvial flooding onsite
- Risk of accidental pollution incidences from spillage or leakage of oils from construction machinery
- Accidental spillages may result in contamination of soils and groundwater underlying the site should contaminants migrate through the subsoils and impact underlying groundwater

The following measures were considered to mitigate the effects of impacts referenced above:

- Permeable paving has been proposed for the new car parking to act as both a storage zone and provide filtration for hydrocarbons
- Potentially contaminated groundwater and polluted surface water generated during construction activities will not be discharged directly to ground or surface drainage
- Oils, solvents and paints used during construction will be stored within temporary storage areas
- An outline Construction Management Plan will be implemented on site
- Monitoring will be carried out on site during construction
- All surface water from the proposed new developed will be collected and stored on site prior to discharge to the public storm water system at a controlled rate

Flooding

The OPW Flood Hazard Mapping shows no immediate risk of flooding within the Connolly Hospital campus. The guidelines state that the site would be classed as a highly vulnerable facility and would therefore, be suited to Flood Zone C.

Additional surveying is being undertaken and a catchment analysis for the stream is proposed to ensure that there are no residual issues. In the event that the additional catchment analysis indicates that the extension is subject to fluvial flooding, options may include bunding, flood gates integrated into the structure, re-grading of the existing roads amongst others, subject to agreement with the NPHDB and Connolly Hospital.

Potential impacts from these works are as follows:

- During the construction phase of the works, there is an increased flow from the site as the full drainage system may not be in place
- The impact on the receiving environment with respect to surface water management and flooding will be minimal as the run-off will be routed through a flow control device, such as a hydrobrake and released in a controlled manner

The following measures are proposed to mitigate the effects of impacts referenced above:

- The contractor will be required to regulate flows from the site during this period as per their Construction Waste Management Plan
- Regular maintenance is undertaken by the management of the children's' hospital satellite centre to ensure that all systems are free of debris and operating as designed

Power

The children' hospital satellite centre will be powered from the existing eastern substation on Connolly Hospital campus. A new generator will be installed to serve the children's hospital satellite centre. Temporary down time to the substation will be required during these works however, there will be no residual impact to the Campus

Natural Gas

A new natural gas main will be taken to the children's hospital satellite centre. This will consist of a new meter and mains pipe connection to the main Gas Networks Ireland grid. Groundworks will be required to lay the pipe, but there will be no residual impact from the installation.

Telecoms (ICT)

New ICT connections will be made to service the children's hospital satellite centre. There will be downtime during the connection works and this will also require groundworks to make the connections, but there will be no residual impacts resulting from the works.

Conclusion

There are no predicted significant impacts arising from the proposed construction or operation of the children's hospital satellite centre at Connolly Hospital campus. No significant residual impacts are anticipated with the measures proposed.

7.14 Interactions and Potential Cumulative Impacts

A range of interactions have been identified in Chapter 18 of the EIS. The interactions identified comprise interactions between the various development sites and with respect to the individual sites themselves and various environmental topics, as set out in this EIS. With respect to cumulative impacts these have also been set out and a range of potential cumulative impacts have been identified with respect to the future potential maternity hospital on St. James's Hospital campus.

7.15 Difficulties in Compiling Specified Information

No significant difficulties were experienced in compiling the necessary information for the proposed development. Where appropriate, surveys and references are provided as are the relevant sub-consultants, who acting on behalf of some of the above listed consultants, prepared the specialist reports.